INTRODUCTION

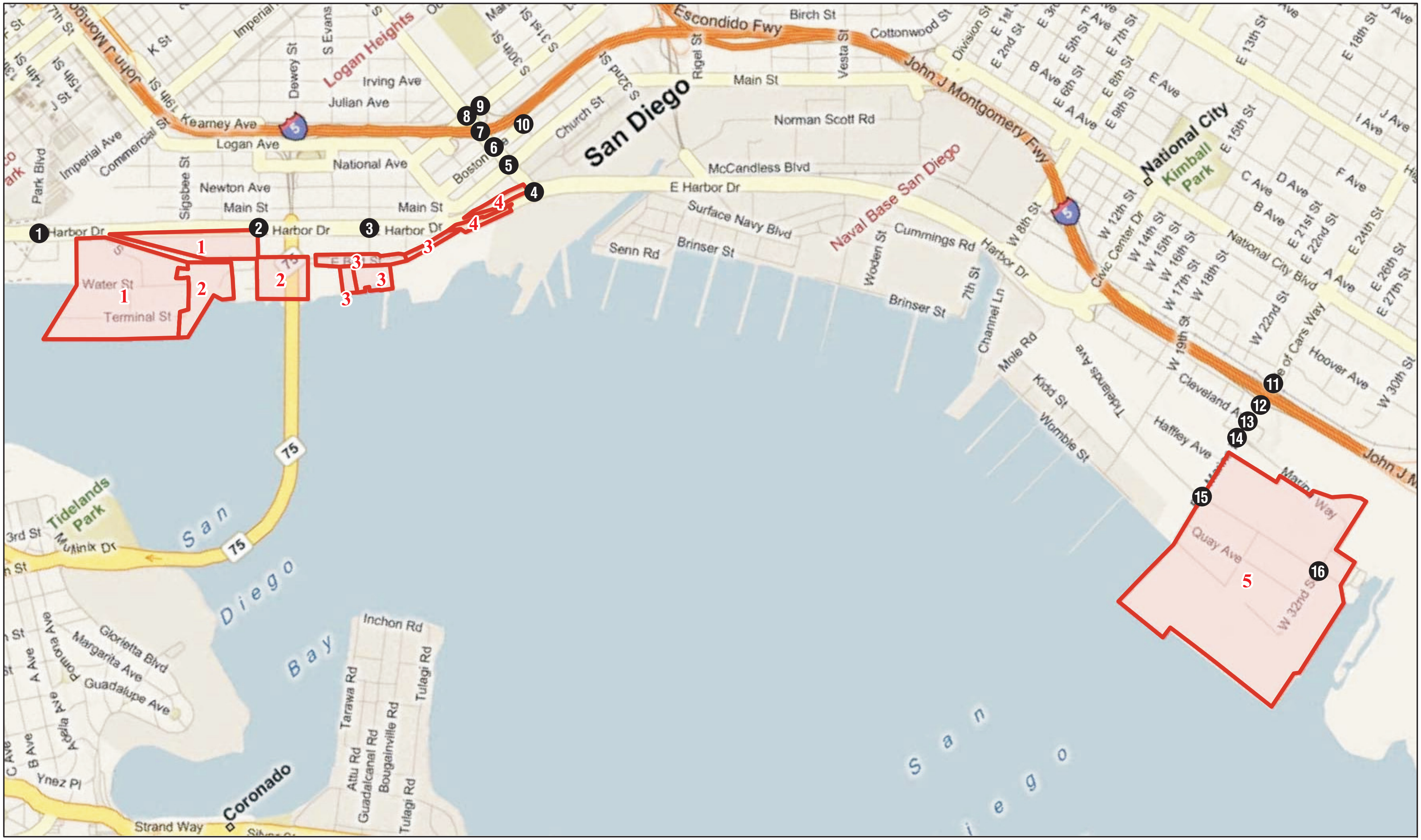
LSA Associates, Inc. (LSA) is pleased to provide this traffic analysis for the proposed Shipyard Sediment Remediation Project. The purpose of the following analysis is to identify the short-term and long-term traffic impacts associated with project build-out. This traffic study has been prepared in accordance with the methodologies and procedures outlined in the City of San Diego *Traffic Impact Study Guidelines*, San Diego Traffic Engineers' Council (SANTEC) *Traffic Impact Study Guidelines*, the Highway Capacity Manual 2000 (HCM) published by the Transportation Research Board, and applicable provisions from the California Environmental Quality Act (CEQA). It should be noted that the City of National City follows the SANTEC *Traffic Impact Study Guidelines.*

PROJECT DESCRIPTION

The proposed project is the dredging of sediment adjacent to shipyards in the San Diego Bay, the dewatering, solidification and possible solidification of the dredged material on-shore, potential treatment of decanted water, and the transport of the removed material to an appropriate landfill for disposal. The proposed project includes the dredging and removal of approximately 143,400 cubic yards of contaminated sediment from the Shipyard Sediment Site. The project consists of marine sediments in the bottom bay waters that contain elevated levels of pollutants above San Diego Bay background conditions. The purpose of the project is to implement a Tentative Cleanup and Abatement Order issued by the California Regional Water Quality Control Board, San Diego Region (hereinafter the San Diego Water Board). The San Diego Water Board is the Lead Agency under California Environmental Quality Act (CEQA) for the proposed project.

The removal of the marine sediments will require upland areas for dewatering, solidification and stockpiling of the materials, and potential treatment of decant waters prior to off-site disposal. Therefore, in addition to the open waters of the Shipyard Sediment Site, five upland areas have been identified by the San Diego Water Board as potential sediment staging areas. Each of the potential staging areas has more defined usable areas, further described below. Figure 1 shows the potential sediment staging locations.

- **Staging Area 1:** 10th Avenue Marine Terminal and Adjacent Parking (approximately 49.66 potentially usable acres).
- **Staging Area 2:** Commercial Berthing Pier and Parking Lots Adjacent to Coronado Bridge (approximately 11.66 potentially usable acres).
- **Staging Area 3:** SDG&E/BAE/BAE and NASSCO Parking Lot (approximately 7.27 potentially usable acres).
- **Staging Area 4:** NASSCO/NASSCO Parking and Parking Lot North of Harbor Drive (approximately 3.85 potentially usable acres).



L S A

FIGURE 1

LEGEND

Potential Sediment Staging Areas

4 Study Area Intersection

0 1250 2500

FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Locations Index
and Study Area Intersections

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- **Staging Area 5:** 24th Street Marine Terminal and Adjacent Parking Lots (approximately 145.31 potentially usable acres).

The five potential Staging Areas consist primarily of leasehold lands and associated parking areas in the immediate vicinity of the Shipyard Sediment Site. The potential usable areas within each potential Staging Area are comprised of open, paved portions that could be used for the dewatering, solidifying and drying of the dredged marine sediments. Staging Areas 1 through 4 are located within the City of San Diego and are designated in the City's General Plan as Industrial Employment. Staging Area 5 is located within the City of National City and is designated in the City's existing General Plan as Industrial–Tidelands Manufacturing and is under the jurisdiction of the San Diego Unified Port District. National City is currently updating its General Plan; the proposed Land Use designation for Staging Area 5 in the updated General Plan is San Diego Unified Port District (land uses governed by the Sand Diego Port Master Plan).

Once the dredge materials have been dried and tested, they will be loaded onto trucks for disposal at an approved landfill. For purposes of this project, it is assumed that 85 percent of the material will be transported from the staging area to Otay Landfill, approximately 15 miles southeast of the Shipyard Sediment Site. Although the sediment is not known to be classified as California hazardous material, it will be tested upon removal and prior to disposal. It is assumed for the purposes of this PEIR that up to 15 percent of the material will require transport to a hazardous waste facility (a Class III facility), most likely the Kettleman Hills Landfill in Kings County, California, near Bakersfield.

The number of truck trips necessary to remove the treated dredge material is based on several factors. The average truck weight during a recent dredging project at BAE Systems was 21 tons per truck. The industry standard metric is 1.6 tons per cubic yard of sediment. Geosyntec Inc. estimates that 50 truck trips per day is the feasible maximum number of trucks that can operate at the treatment site. The entreated dredge quantity is 143,400 cubic yards. As a result of the increase in bulk that would occur after treatment with binding agents, the total treated dredge quantity to be transported off site is approximately 164,910 cubic yards. With 21 tons (or 13.1 cubic yards) of material per truck, and 50 truck trips per day, the total duration of the dredge-and-haul activity is approximately 50 weeks. The duration of the dredge-and-haul activity is assumed to include several weeks of equipment set up and staging area preparation; therefore, a 54-week or 12.5-month schedule is anticipated.

Trucks departing from potential Staging Areas 1 through 4 would access the Interstate 5 (I-5) south via East Harbor Drive and 28th Street; trucks departing from Staging Area 5 would access the I-5 south either directly from Bay Marina Drive or from West 32nd Street to Marina Way to Bay Marina Drive. The preferred most direct route to Otay Landfill is via I-5 south to Highway State Route 54 (SR-54) east, to Interstate 805 (I-805) south. Although the sediment is not known to be classified as California hazardous material, it will be tested upon removal and prior to disposal. It is assumed for the purposes of this study that up to 15 percent of the material will require transport to a Class III facility, most likely the Kettleman Hills Landfill in Kings County, California, near Bakersfield. Based on the excavation quantity of 143,400 cubic yards, and accounting for an additional 15 percent of bulk material due to the dewatering and treatment process, it is estimated that up to 250 truck trips per week could be required over an approximately 12.5-month period to remove the material. These estimates are a worst-case scenario and will be finalized during the design phase.

REGULATORY SETTING

Regional Transportation Plan

The Regional Transportation Plan (RTP), prepared and adopted by the San Diego Association of Governments (SANDAG) is the region's long-range mobility plan. The RTP plans for and identifies projects for multiple modes of transportation in order to achieve a balanced regional system. It establishes the basis for state funding of local and regional transportation projects, and is a prerequisite for federal funding. SANDAG prioritizes and allocates the expenditure of regional, state, and federal transportation funds to implement RTP projects.

Congestion Management Plan. The region’s Congestion Management Program (CMP), also prepared by SANDAG, serves as a short-term element of the RTP. It focuses on actions that can be implemented in advance of the longer-range transportation solutions contained within the RTP. The CMP establishes programs for mitigating the traffic impacts of new development and monitoring the performance of system roads relative to Level of Service (LOS) standards. It links land use, transportation, and air quality concerns.

Bayshore Bikeway Plan

The Bayshore Bikeway is a designated 24-mile bikeway route around San Diego Bay. Planning for the Bikeway began in 1975 with a feasibility study prepared by Caltrans and funded by National City. The stated objective of the study was “to determine an acceptable route for bicyclists to traverse the southern regions of San Diego Bay.” The final study, released in 1976, recommended 11 miles of bicycle paths and 14 miles of bike lanes and bike routes providing convenient and scenic bicycle transportation and recreation around the bay. Currently, the Bayshore Bikeway route consists of approximately 12 miles of offstreet bicycle paths, and about 12 miles of on-street sections designated as either bicycle lanes or bicycle routes. SANDAG is developing additional improvements to the bikeway based on the Bayshore Bikeway Plan, which was adopted by SANDAG in 2006, to identify opportunities to improve the bikeway along the east side of the Bay. More specifically, SANDAG is undertaking engineering and environmental studies for the next project, which would extend the bike path north along the east side of the San Diego Bay through Chula Vista and National City to 32nd Street in the City of San Diego. A new section of bike path from

Palomar Street to H Street in Chula Vista is scheduled for construction in the summer of 2011. SANDAG also is pursuing funding for improvements beginning at Marina Way in National City north to 32nd Street in San Diego. Construction is anticipated to begin in summer 2012.

City General Plans

City of San Diego Mobility Element. The Mobility Element, the RTP and the CMP all highlight the importance of integrating transportation and land use planning decisions, and using multi-modal strategies to reduce congestion and increase travel choices. However, the Mobility Element more specifically plans for the City of San Diego's transportation goals and needs. An overall goal of the Mobility Element is to further the attainment of a balanced, multi-modal transportation network that also minimizes environmental and neighborhood impacts. A balanced network is one in which each mode, or type of transportation, is able to contribute to an efficient network of services meeting varied user needs.

Barrio Logan Community Plan. Community Plans in the City of San Diego establish individual communities' land use designations and policies guiding development. The Barrio Logan Community Plan ensures consistency with overall guiding principles, land use policies, and other goals found in the City's General Plan. The Barrio Logan/Harbor 101 Community Plan was adopted in 1978. Because of the community's geographical location on the San Diego waterfront, proximity to downtown San Diego, and its older urban and mixed-use characteristics that have been described at length, transportation plays a major role in the community's development. Practically all known forms of transportation have an important role in the community and its future development. Transportation modes for the Barrio Logan/Harbor 101 community fall into the following categories: Automobile Transportation (freeways, major streets, collector streets, and local streets), Public Transportation in the form of rail (MTDB) and Bus Transportation, Industry-related Transportation (rail, trucking, and shipping), and Pedestrian/Bicycle Open Space-Related Transportation (recreational transit, bicycle, and pedestrian). According to the Community Plan, because of the many existing transportation modes in the community, major circulation conflicts exist. The City is currently updating the Barrio Logan Community Plan. The preferred land use map and plan are anticipated to be ready for review in late fall 2011.

National City General Plan. The National City General Plan was approved in 1996. The General Plan contains land use and development policies that serve as the foundation for all planning decisions in the City. The combined General Plan/Zoning Map recognizes the rights-of-way of I-5, I-805, and the San Diego Trolley. National City is currently in the process of updating its General Plan. The update considers the interconnectedness of planning issues, responds to diverse community needs, identifies realistic implementing actions, and establishes a monitoring and evaluation process to track progress toward reaching goals and objectives. Once approved, the updated Circulation Element will be a transportation plan for the movement of people and goods and it will identify the general location and extent of existing and proposed major roadways, transportation routes, terminals, air and water ports, and pedestrian and bikeway facilities.

METHODOLOGY

The following traffic analysis was conducted according to the methodologies and procedures outlined in the City of San Diego *Traffic Impact Study Guidelines*, SANTEC *Traffic Impact Study Guidelines*, the HCM 2000 published by the Transportation Research Board, and applicable provisions from CEQA.

Project Study Area

The study area analyzed in this report includes the following intersections and roadway segments. In addition to the potential sediment staging locations, previously referenced Figure 1 also shows the locations of the study area intersections and the roadway segments analyzed in this report.

Intersections

1. Park Boulevard/Harbor Drive;
2. Cesar Chavez Parkway/Harbor Drive;
3. Sampson Street/Harbor Drive;
4. 28th Street/Harbor Drive;
5. 28th Street/Main Street;
6. 28th Street/Boston Avenue;
7. I-5 Southbound Off-Ramp/28th Street;
8. 28th Street/National Avenue;
9. I-5 Northbound Ramps/National Avenue;
10. I-5 Southbound Ramps/Boston Avenue;
11. I-5 Northbound Ramps/Mile of Cars Way;
12. I-5 Southbound Ramps/Mile of Cars Way;
13. Cleveland Street/Bay Marina Drive;
14. 32nd Street/Bay Marina Drive;
15. Tidelands Avenue/Bay Marina Drive; and

16. Tidelands Avenue/W. 32nd Street.

Roadway Segments

1. Harbor Drive between Park Boulevard and Cesar Chavez Parkway;
2. Harbor Drive between Cesar Chavez Parkway and Sampson Street;
3. Harbor Drive between Sampson Street and 28th Street;
4. Harbor Drive between 28th Street and 32nd Street;
5. 28th Street between Harbor Drive and Main Street;
6. 28th Street between Main Street and Boston Avenue;
7. 28th Street between Boston Avenue and National Avenue;
8. National Avenue between 28th Street and I-5 Northbound Ramps;
9. Boston Avenue between 28th Street and I-5 Southbound Ramp;
10. 24th Street between I-5 Northbound Ramps and I-5 Southbound Ramps;
11. 24th Street between I-5 Southbound Ramps and Cleveland Street;
12. 24th Street between Cleveland Street and W. 32nd Street;
13. 24th Street between W. 32nd Street and Tidelands Avenue;
14. W. 32nd Street between 24th Street and Tideland Avenue; and
15. Tidelands Avenue between 24th Street and W. 32nd Street.

Daily, a.m., and p.m. peak-hour (7 a.m.–9 a.m. and 4 p.m.–6 p.m.) turn volumes for the study area intersections and roadway segments were collected by National Data and Surveying Services (NDS) in March 2011. The existing traffic counts are provided as Attachment A.

Intersection Level of Service Methodology. The HCM 2000 methodology has been used to determine the intersection level of service (LOS) at signalized intersections within the study area. The resulting delay is expressed in terms of LOS, where LOS A represents free-flow activity and LOS F represents overcapacity operation. LOS is a qualitative assessment of the quantitative effects of such factors as traffic volume, roadway geometrics, speed, delay, and maneuverability on roadway and intersection operations.

The relationship between delay and LOS at signalized intersections is summarized below. Intersections with LOS D are considered the upper limit of satisfactory conditions.

LOS	Unsignalized Intersection Delay per Vehicle (sec)	Signalized Intersection Delay per Vehicle (sec)
A	≤10.0	≤10.0
B	>10.0 and ≤15.0	>10.0 and ≤20.0
C	>15.0 and ≤25.0	>20.0 and ≤35.0
D	>25.0 and ≤35.0	>35.0 and ≤55.0
E	>35.0 and ≤50.0	>55.0 and ≤80.0
F	>50.0	>80.0

Source: Highway Capacity Manual 2000

Roadway Segment LOS Methodology. Roadway segments were analyzed on a daily basis by comparing the Average Daily Traffic (ADT) volume to the City of San Diego Proposed Level of Service Standards – Street Segment Average Daily Trip Thresholds for Staging Areas 1 through 4. The City of National City has amended the SANTEC roadway capacities; these are analyzed separately for Staging Area Five. These tables are provided in Attachment B and provide LOS estimates based on traffic volumes and roadway characteristics. This analysis focuses on the performance of specific Major and Collector roadways; therefore, the daily volumes for Major and Collector roadways are summarized below.

Street Classification	Lanes	Capacity (LOS A)	Capacity (LOS B)	Capacity (LOS C)	Capacity (LOS D)	Capacity (LOS E)
City of San Diego						
Major Arterial	4	15,000	21,000	30,000	35,000	40,000
Collector (w/ TWLT)	4	10,000	14,000	20,000	25,000	30,000
Collector (w/ TWLT)	3	7,500	10,500	15,000	18,750	22,500
Collector (no TWLT)	3	3,750	5,250	7,500	9,750	11,250
Collector (no TWLT)	2	2,500	3,500	5,000	6,500	8,000
City of National City						
Major Arterial	4	0–15,000	15,001–21,000	21,001–30,000	30,001–35,000	35,001–40,000
Collector	4	0–7,000	7,001–10,000	10,001–14,000	14,001–17,000	17,001–20,000
Collector	2	0–4,000	4,001–5,500	5,501–7,500	7,501–9,000	9,000–10,000

Notes: TWLT = Two-way left-turn lane.
Sources: City of San Diego *Traffic Impact Study Guidelines*, San Diego Traffic Engineers' Council (SANTEC) *Traffic Impact Study Guidelines.*

The table below identifies threshold changes in delay or volume-to-capacity (v/c) ratios that define an impact for intersections and roadway segments. Changes in delay or v/c ratios are only considered significant if the existing LOS is E or F.

LOS With Project	Intersection Delay (seconds)	Roadway Segments v/c Increase
City of San Diego		
E	>2.0	>0.02
F	>1.0	>0.01
City of National City		
E or F	>2.0	>0.02

Sources: City of San Diego *Traffic Impact Study Guidelines*, San Diego Traffic Engineers' Council (SANTEC) *Traffic Impact Study Guidelines*

EXISTING CONDITIONS

Existing Circulation System

Key roadways in the vicinity of the proposed project area as follows:

- **Interstate 5.** I-5 is located to the east of the project site and is classified and functions as an 8-lane freeway with four main lanes of traffic in each direction. Direct access to the project site from I-5 is provided via northbound and southbound on-/off-ramps at 24th Street, northbound on-/off-ramps at National Avenue, and a southbound on-ramp at Boston Avenue.
- **Harbor Drive.** Harbor Drive functions as an east-west, 4-lane major arterial between Sigsbee Street and Vesta Street. The road has a raised or landscaped median along the entire length of the segment. Harbor Drive is a designated truck route and has a class II bikeway with bike lanes along both sides of the road. The street has intermittent curbs, sidewalks, and parallel parking along the northern side of the road. The southern side of Harbor Dive has limited curbs and sidewalks. Parallel parking is intermittently permitted between Schley Street and 32nd Street. The posted speed limit is 40 and 45 mph.
- **28th Street.** 28th Street is located southeast of the project site and functions as a north-south, 4-lane collector between Boston Avenue and Main Street and a 4-lane with raised median major arterial between Main Street and Harbor Drive. Between National Avenue and Boston Avenue, 28th Street functions as a three-lane collector with two northbound lanes and a southbound lane. This street is a designated truck route. Sidewalks and curbs line both sides of the street for the entire length of the segment. Parallel parking is available on both sides of the street between Main Street and Harbor Drive. The NASSCO shipyard is located at the southern end of 28th Street. South of Main Street, Naval Base San Diego fronts on the east side of 28th Street, including an access gate to the base. I-5 on- and off-ramps connect 28th Street to I-5 near the northern end of the

segment. The Traffic Study for the proposed Barrio Logan Community Plan update recommends that 28th Street between Harbor Drive and the I-5 ramps be classified as a 4-lane major arterial.

- **Boston Avenue.** Boston Avenue functions as an east-west, 2-lane collector between 28th Street and 32nd Street. This road has sidewalks, curbs, and parallel parking spaces on both sides of the street. A southbound I-5 on-ramp is located at the intersection with 29th Street.
- **National Avenue.** National Avenue functions as an east-west, 2-lane collector between 16th Street and 27th Street and a 4-lane collector between Commercial Street and 16th Street. Trucks above five tons are prohibited by signage to travel along National Avenue. An eastbound State Route 75 (SR-75) off-ramp is located along National Avenue between Cesar Chavez Parkway and Evans Street. This segment of National Avenue has sidewalks, curbs, and parallel parking on both sides of the road. Diagonal parking is provided on National Avenue on the south side of the street for portions of the segment between Beardsley Street and Evans Street.
- **Cesar Chavez Parkway.** Cesar Chavez Parkway functions as a north-south, 4-lane collector between Logan Avenue and National Avenue and between Main Street and Harbor Drive. This road functions as a 3-lane collector between Logan Avenue and Kearny Avenue and between National Avenue and Main Street. Cesar Chavez Parkway is lined with sidewalks and curbs on both sides of the road, for the entire length of the street. Parallel parking is available on the west side of the street between National Avenue and Main Street. Signs prohibit trucks above five tons from traveling along Cesar Chavez Parkway. A northbound I-5 on-ramp is located at the intersection of Cesar Chavez Parkway and Kearny Avenue. A westbound SR-75 on-ramp is located at the intersection of Cesar Chavez Parkway and Logan Avenue.
- **Sampson Street.** Sampson Street functions as a north-south, 2-lane collector between I-5 and Harbor Drive. Sidewalks, curbs, and parallel parking spaces are located on both sides of the road. Trucks above five tons are prohibited by signage to travel along Sampson Street.
- **Main Street.** Main Street functions as an east-west, 2-lane collector between Beardsley Street and 26th Street and between Rigel Street and Yama Street. Main Street functions as a 3-lane collector between 26th Street and 27th Street and between 29th Street and 32nd Street, and a 4-lane collector between 27th Street and 29th Street and between 32nd Street and Rigel Street. Curbs and sidewalks are located on both sides of the road, along the entire length of the segment. Signs prohibit trucks over five tons from traveling on Main Street, west of 26th Street. A northbound Interstate 15 (I-15) on-ramp and a southbound I-15 off-ramp are located between 32nd Street and Rigel Street. Southbound I-5 on and off-ramps are also located near the intersection with Yama Street. Main Street is a designated class III bikeway. Parallel parking is intermittently permitted along both sides of the road.
- **24th Street.** 24th Street (also known as Bay Marina Drive) is a 4-lane east-west collector between Tidelands Avenue and Harrison Avenue and a 4-lane east-west arterial between

Harrison Avenue and Highland Avenue. At the intersection with Tidelands Avenue, 24th Street has sidewalks and curbs.

- **Tidelands Avenue.** Tidelands Avenue is a 2-lane north-south collector. At the intersection with 24th Street, Tidelands Avenue has sidewalks and curbs.

Existing Intersection LOS Analysis

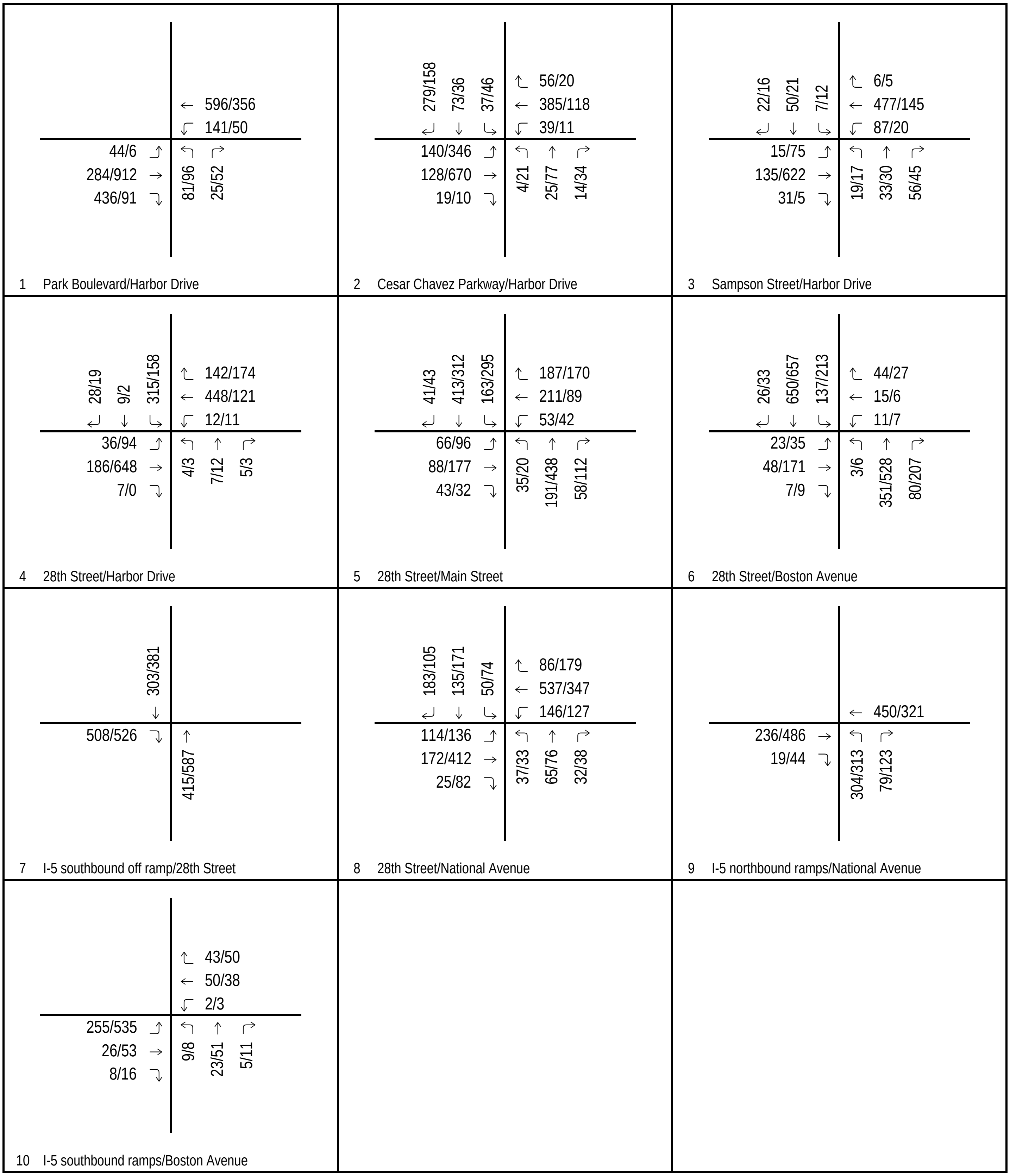
Figure 2 presents the existing a.m. and p.m. peak-hour trips from Attachment A. These peak-hour trips are used to calculate (or determine) the existing LOS. The existing LOS calculation worksheets are provided as Attachment C. Table A summarizes the results of the existing a.m. and p.m. peak-hour LOS analysis for the study area intersections. As Table A indicates, all study area intersections operate at an acceptable LOS (D or better) in the a.m. and p.m. peak hour, with the exception of I-5 Southbound Ramp/Boston Avenue (LOS E during p.m. peak hour).

Figure 3 presents the existing average daily trips at the study area roadway segments. Table B summarizes the daily traffic volumes and v/c ratios for the area roadway segments in the existing condition from Attachment A. As Table B illustrates, all study area roadway segments operate at an acceptable LOS (LOS D or better), with the exception of National Avenue between 28th Street and I-5 Northbound Ramps (LOS F), and Boston Avenue between 28th Street and I-5 Southbound Ramp (LOS F).

HAUL TRUCK, DELIVERY TRUCK, AND EMPLOYEE TRAFFIC

Project Trip Generation

To determine the project traffic destined to the Staging Area and landfills, the project applicant provided traffic data that included the number of delivery vehicles, haul vehicles, and employees. Based on these data, a total of approximately 50 haul trucks, 8 delivery trucks, and 29 employees will be destined to the project site on the busiest day. For a conservative approach, a 10-hour shift was used to capture both a.m. and p.m. peak hours. The 10-hour shift is scheduled to start at 7:00 a.m. and end at 5:30 p.m. To convert the daily truck traffic to peak hour truck traffic, LSA divided the daily trips by 10 hours and split the ingress and egress evenly since it is anticipated that haul trucks will travel back and forth throughout the day. Of the 50 haul trucks, 5 will access the site during the a.m. peak hour, and 5 will access the site during the p.m. peak hour. Of the 8 delivery trucks, 1 will access the site during the a.m. peak hour, and 1 will access the site during the p.m. peak hour. The remaining 40 haul trucks and 6 delivery trucks will access the site during the off-peak hours of 9:00 a.m. to 4:00 p.m. Employees are expected to arrive to the project site in the morning and leave at the end of the day. For purposes of this analysis, the haul and delivery truck trips were converted to passenger car equivalent (PCE) trips at a ratio of 2.5 passenger cars



LSA

FIGURE 2A

123/456 AM/PM Volumes

San Diego Sediment Project

Existing Peak Hour Traffic Volumes (City of San Diego Locations)

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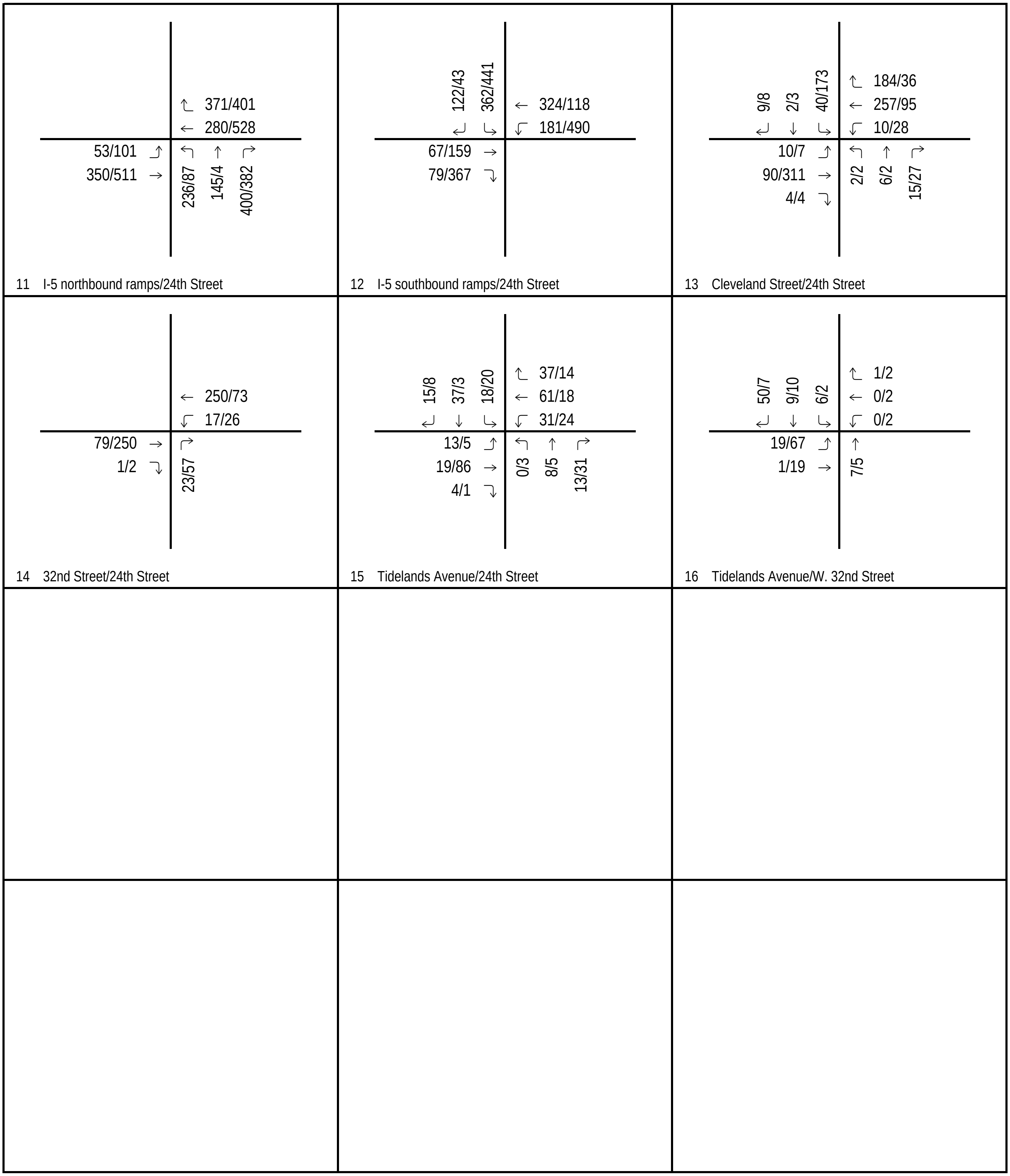


LSA

FIGURE 2B

123/456 AM/PM Volumes

San Diego Sediment Project

Existing Peak Hour Traffic Volumes (City of National City Locations)

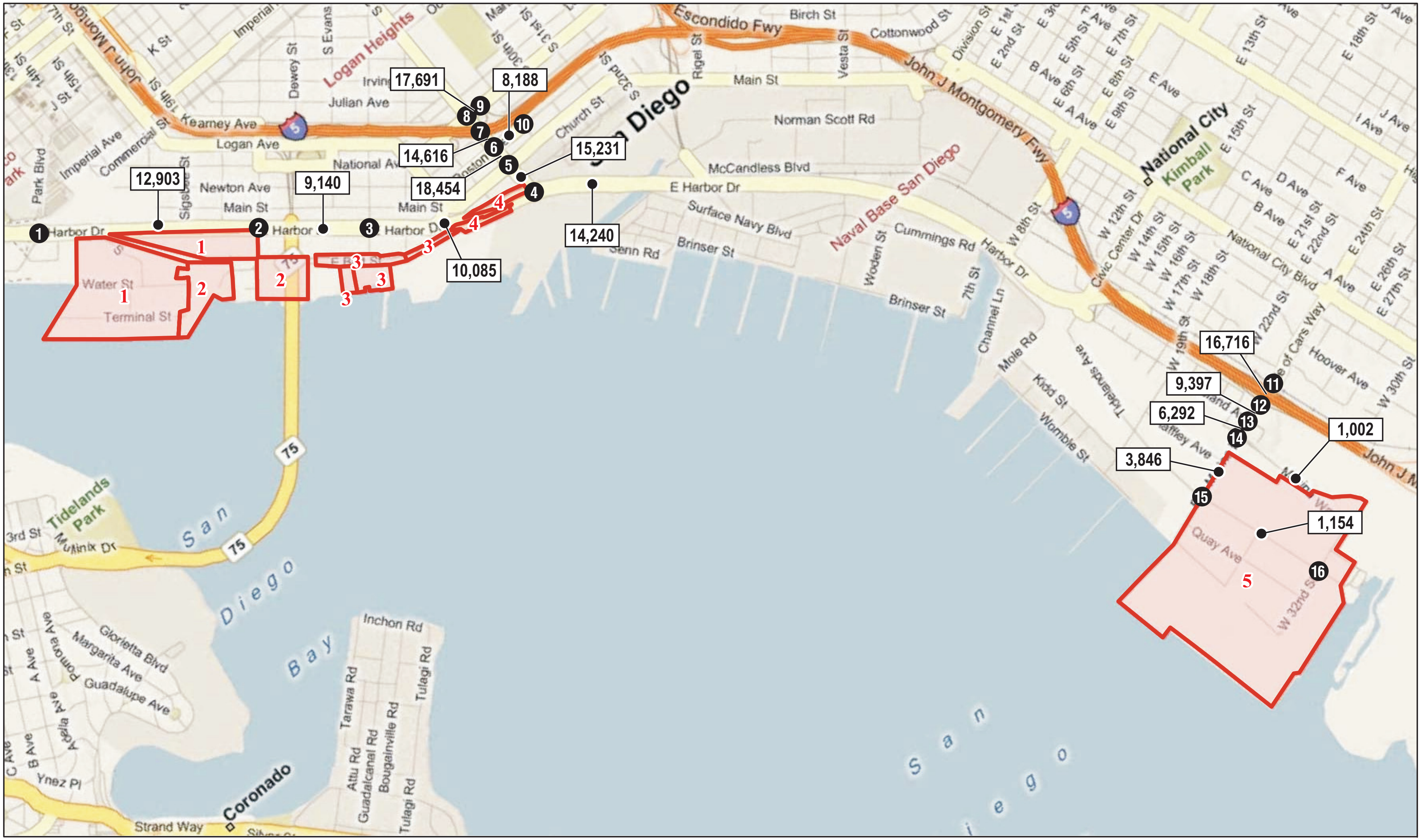
Table A - Existing Peak Hour Intersection Level of Service Summary

			Existing Condition			
			AM Peak Hour		PM Peak Hour	
Intersection		Control Type	Delay (sec)	LOS	Delay (sec)	LOS
1	Park Boulevard/Harbor Drive	Signalized	15.0	B	13.9	B
2	Cesar Chavez Parkway/Harbor Drive	Signalized	31.4	C	25.8	C
3	Sampson Street/Harbor Drive	Signalized	20.4	C	17.3	B
4	28th Street/Harbor Drive	Signalized	27.9	C	22.2	C
5	28th Street/Main Street	Signalized	30.0	C	33.3	C
6	28th Street/Boston Avenue	Signalized	18.4	B	26.0	C
7	28th Street/I-5 Southbound Off-Ramp	No Control	-	-	-	-
8	28th Street/National Avenue	Signalized	33.7	C	31.3	C
9	I-5 Northbound Ramps/National Avenue	Signalized	18.6	B	18.8	B
10	I-5 Southbound On-Ramp/Boston Avenue	Unsignalized	15.2	C	49.2	E
11	I-5 Northbound Ramps/24th Street	Signalized	25.3	C	22.3	C
12	I-5 Southbound Ramps/24th Street	Signalized	23.5	C	27.7	C
13	Cleveland Street/24th Street	Unsignalized	8.9	A	10.0	B
14	W. 32nd Street/24th Street	Signalized	11.3	B	19.2	B
15	Tidelands Avenue/24th Street	Signalized	26.4	C	29.9	B
16	Tidelands Avenue/W. 32nd Street	Unsignalized	7.3	A	8.0	A

Source: LSA Associates, March 2011

Notes:

☐ Exceeds level of service criteria



LSA

FIGURE 3

LEGEND

Potential Sediment Staging Areas

Study Area Intersection

X,XXX Average Daily Traffic Volume

0 1250 2500
FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Existing Daily Traffic Volumes

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Table B - Existing Roadway Segment Level of Service Summary

Roadway	Segment	Roadway Classification	Capacity	Existing		
				Volume	LOS	V/C
Harbor Boulevard	Park Boulevard and Cesar Chavez Parkway	4 Lane Major Arterial	40,000	12,903	A	0.32
	Cesar Chavez Parkway and Sampson Street	4 Lane Major Arterial	40,000	9,140	A	0.23
	Sampson Street and 28th Street	4 Lane Major Arterial	40,000	10,085	A	0.25
	28th Street and 32nd Street	4 Lane Major Arterial	40,000	14,240	B	0.36
28th Street	Harbor Boulevard and Main Street	4 Lane Major Arterial	40,000	15,231	B	0.38
	Main Street and Boston Avenue	4 Lane Collector (with TWLT)	30,000	18,454	C	0.62
	Boston Avenue and National Avenue	3 Lane Collector (with TWLT)	22,500	14,616	C	0.65
National Avenue	28th Street and I-5 Northbound Ramps	3 Lane Collector (no TWLT)	11,250	**17,691**	**F**	**1.57**
Boston Avenue	28th Street and I-5 Southbound Ramps	2 Lane Collector (no TWLT)	8,000	**8,188**	**F**	**1.02**
24th Street	I-5 Northbound Ramps and I-5 Southbound I	4 Lane Major Arterial	40,000	16,716	B	0.42
	I-5 Southbound Ramps and Cleveland Street	4 Lane Major Arterial	40,000	9,397	A	0.23
	Cleveland Street and W. 32nd Street	4 Lane Major Arterial	40,000	6,292	A	0.16
	W. 32nd Street and Tidelands Avenue	4 Lane Collector (no TWLT)	15,000	3,846	A	0.26
W. 32nd Street	24th Street and Tidelands Avenue	2 Lane Collector	8,000	1,002	A	0.13
Tidelands Avenue	24th Street and W. 32nd Street	2 Lane Collector	8,000	1,154	A	0.14

Source: LSA Associates, March 2011

☐ Exceeds level of service criteria

☐ Significant Impact

per truck, consistent with the guidance in the HCM. Table C provides the project trip generation to and from the project site.

Project Trip Distribution

Once the dredge materials have been dried and tested at the Staging Area, they will be loaded onto trucks for disposal at an approved landfill. For purposes of this project, it is assumed that 85 percent of the material will be transported from the staging area to Otay Landfill, approximately 15 miles southeast of the Shipyard Sediment Site. Trucks departing from potential Staging Areas 1 through 4 would access the I-5 south via E. Harbor Drive and 28th Street; trucks departing from Staging Area 5 would access the I-5 south either directly from 24th Street-Bay Marina Drive or from W. 32nd Street to 24th Street-Marina Way to Bay Marina Drive. The preferred route to Otay Landfill is via I-5 south to Highway 54 east, to I-805 south. Although the sediment is not known to be classified as California hazardous material, it will be tested upon removal and prior to disposal.

It is assumed for the purposes of this study that up to 15 percent of the material will require transport to a Class III facility, most likely the Kettleman Hills Landfill in Kings County, California, near Bakersfield. Based on the excavation quantity of 143,400 cubic yards, and accounting for an additional 15 percent of bulk material due to the dewatering and treatment process, it is estimated that up to 250 truck trips per week could be required over an approximately 12.5-month period to remove the material. These estimates are a worst-case scenario and will be finalized during the design phase.

The trip distribution for employees was determined based on existing counts at the northbound and southbound I-5 Ramps. For Staging Areas 1 through 4, approximately 60 percent are destined toward the north and 40 percent are destined toward the south along I-5. For Staging Area 5, approximately 35 percent are destined toward the north and 65 percent are destined toward the south along I-5. Table D provides the trip distribution of the project traffic within the circulation system for each staging area.

EXISTING CONDITIONS WITH PROJECT TRAFFIC

Traffic generated during the haul period was added to the existing traffic volumes at the study area intersections and roadway segments for each staging area.

Staging Areas 1 and 2

It is anticipated that Staging Areas 1 and 2 will utilize the same driveway to access the project site (i.e., Cesar Chavez Parkway/Harbor Boulevard). Therefore, the level of service would be identical for both staging areas. Trucks departing from potential Staging Areas 1 and 2 would access I-5 north and south via Harbor Drive and 28th Street. Figure 4 presents

Table C - Project Trip Generation Summary

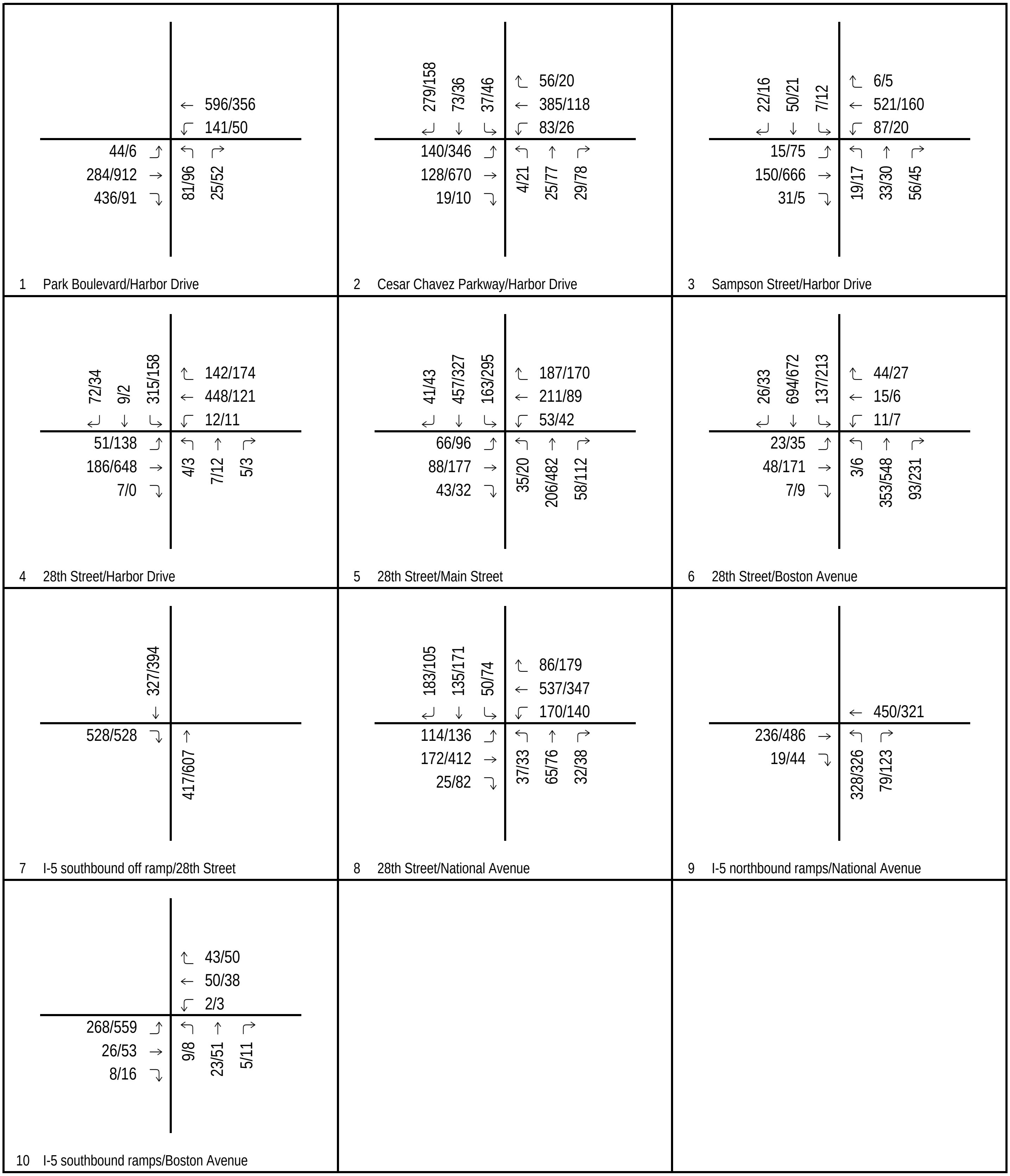
TRIP GENERATION (PCE)	AM PEAK HOUR		PM PEAK HOUR		ADT
	IN	OUT	IN	OUT	
Staging Areas 1, 2, 3, & 5	44	15	15	44	348
Staging Area 4A (75%)	33	11	11	33	261
Staging Area 4B (25%)	11	4	4	11	87

Source: LSA Associates, March 2011

Table D - Project Trip Distribution Summary

Vehicle Type/Direction	Percentage
Deliver/Haul Trucks	
Northbound on the I-5	15%
Southbound on the I-5	85%
TOTAL	*100%*
Employee Trips (Staging Areas 1-4)	
Northbound on the I-5	60%
Southbound on the I-5	40%
TOTAL	*100%*
Employee Trips (Staging Area 5)	
Eastbound on the SR-78	35%
Westbound from W. Valley Parkway	65%
TOTAL	*100%*

Source: LSA Associates, March 2011



LSA

FIGURE 4

123/456 AM/PM Volumes

San Diego Sediment Project

Existing + Project Peak Hour Traffic Volumes (Staging Areas 1 & 2)

U:\SWB1001\Traffic\Figures\Figure 4.xls\Figure

the existing plus project a.m. and p.m. peak hour trips. Table E summarizes the results of the existing plus project a.m. and p.m. peak-hour LOS analysis for all study area intersections. The LOS worksheets are provided as Attachment D. As Table E indicates, all study area intersections will continue to operate at an acceptable LOS (D or better) in the a.m. and p.m. peak hour with implementation of the proposed project, with the exception of I-5 Southbound Ramp/Boston Avenue (LOS F during p.m. peak hour). The addition of project traffic will increase the vehicle delay greater than one second at this intersection. As such, the project traffic will create a significant impact at this intersection in the existing plus project condition, based on the City’s significance criteria.

Figure 5 presents the existing plus project average daily trips. Table F summarizes the daily traffic volumes and v/c ratios for the study area roadway segments in the existing condition with the addition of project traffic. Based on this analysis, the roadway segments are forecast to operate at an acceptable LOS (LOS D or better) with the addition of project traffic, with the exception of National Avenue between 28th Street and I-5 Northbound Ramps (LOS F), and Boston Avenue between 28th Street and I-5 Southbound Ramp (LOS F). The addition of project traffic will not increase the v/c ratio greater than 0.01 along National Avenue between 28th Street and I-5 Northbound Ramps. However, implementation of the project would cause a significant impact along Boston Avenue between 28th Street and I-5 Southbound Ramp.

Staging Area 3

It is anticipated that Staging Area 3 will utilize the intersection of Sampson Avenue to access the project site. Trucks departing from potential Staging Area 3 would access I-5 north and south via Harbor Drive and 28th Street. Figure 6 presents the existing plus project a.m. and p.m. peak hour trips. Table G summarizes the results of the existing plus project a.m. and p.m. peak-hour LOS analysis for all study area intersections. The LOS worksheets are provided as Attachment E. As Table G indicates, all study area intersections will continue to operate at an acceptable LOS (D or better) in the a.m. and p.m. peak hour with implementation of the proposed project, with the exception of I-5 Southbound Ramp/Boston Avenue (LOS F during p.m. peak hour). The addition of project traffic will increase the vehicle delay greater than one second at this intersection. As such, the project traffic will create a significant impact at this intersection in the existing plus project condition, based on the City’s significance criteria.

Figure 7 presents the existing plus project average daily trips. Table H summarizes the daily traffic volumes and v/c ratios for the study area roadway segments in the existing condition with the addition of project traffic. Based on this analysis, the roadway segments are forecast to operate at an acceptable LOS (LOS D or better) with the addition of project traffic, with the exception of National Avenue between 28th Street and I-5 Northbound Ramps (LOS F), and Boston Avenue between 28th Street and I-5 Southbound Ramp (LOS F). The addition of project traffic will not increase the v/c ratio greater than 0.01 along National Avenue between

Table E - Staging Areas 1 and 2 Existing Plus Project Peak Hour Intersection Level of Service Summary

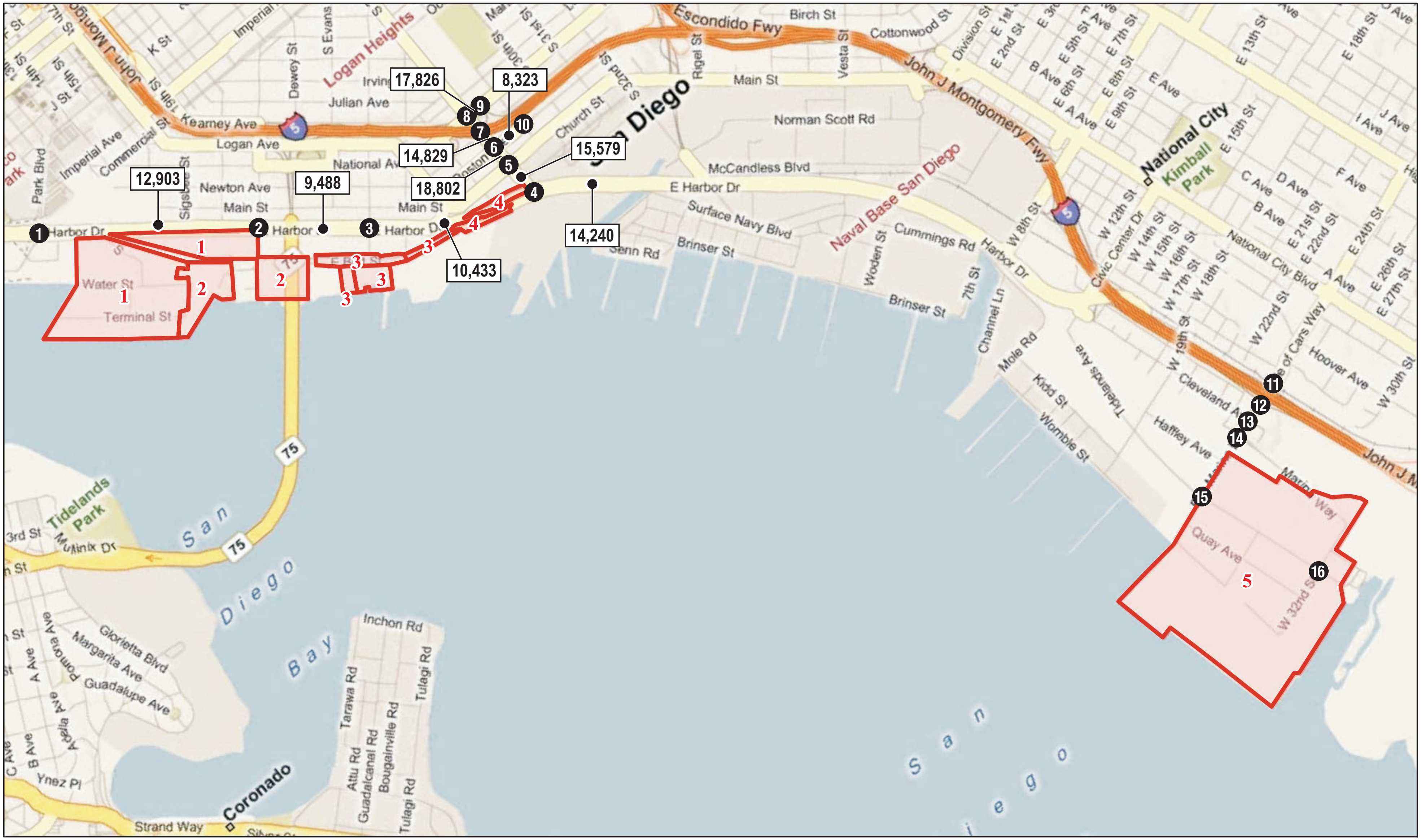
	Intersection	Control Type	Existing Condition				Existing Plus Project Condition					
			AM Peak Hour		PM Peak Hour		AM Peak Hour		△	PM Peak Hour		△
			Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS		Delay (sec)	LOS	
1	Park Boulevard/Harbor Drive	Signalized	15.0	B	13.9	B	15.0	B	0.0	13.9	B	0.0
2	Cesar Chavez Parkway/Harbor Drive	Signalized	31.4	C	25.8	C	31.5	C	0.1	26.4	C	0.6
3	Sampson Street/Harbor Drive	Signalized	20.4	C	17.3	B	19.9	B	-0.5	17.0	B	-0.3
4	28th Street/Harbor Drive	Signalized	27.9	C	22.2	C	28.6	C	0.7	23.3	C	1.1
5	28th Street/Main Street	Signalized	30.0	C	33.3	C	29.8	C	-0.2	33.3	C	0.0
6	28th Street/Boston Avenue	Signalized	18.4	B	26.0	C	18.0	B	-0.4	25.9	C	-0.1
7	28th Street/I-5 Southbound Off-Ramp	No Control	-	-	-	-	-	-	-	-	-	-
8	28th Street/National Avenue	Signalized	33.7	C	31.3	C	33.7	C	0.0	31.6	C	0.3
9	I-5 Northbound Ramps/National Avenue	Signalized	18.6	B	18.8	B	19.1	B	0.5	19.1	B	0.3
10	I-5 Southbound On-Ramp/Boston Avenue	Unsignalized	15.2	C	49.2	E	15.6	C	0.4	56.3	F	7.1

Source: LSA Associates, March 2011

Notes:

☐ Exceeds level of service criteria

■ Significant Impact



LSA

FIGURE 5

LEGEND

Potential Sediment Staging Areas

Study Area Intersection

X,XXX Average Daily Traffic Volume

0 1250 2500

FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Existing Plus Project Daily Traffic Volumes

Staging Areas 1 and 2

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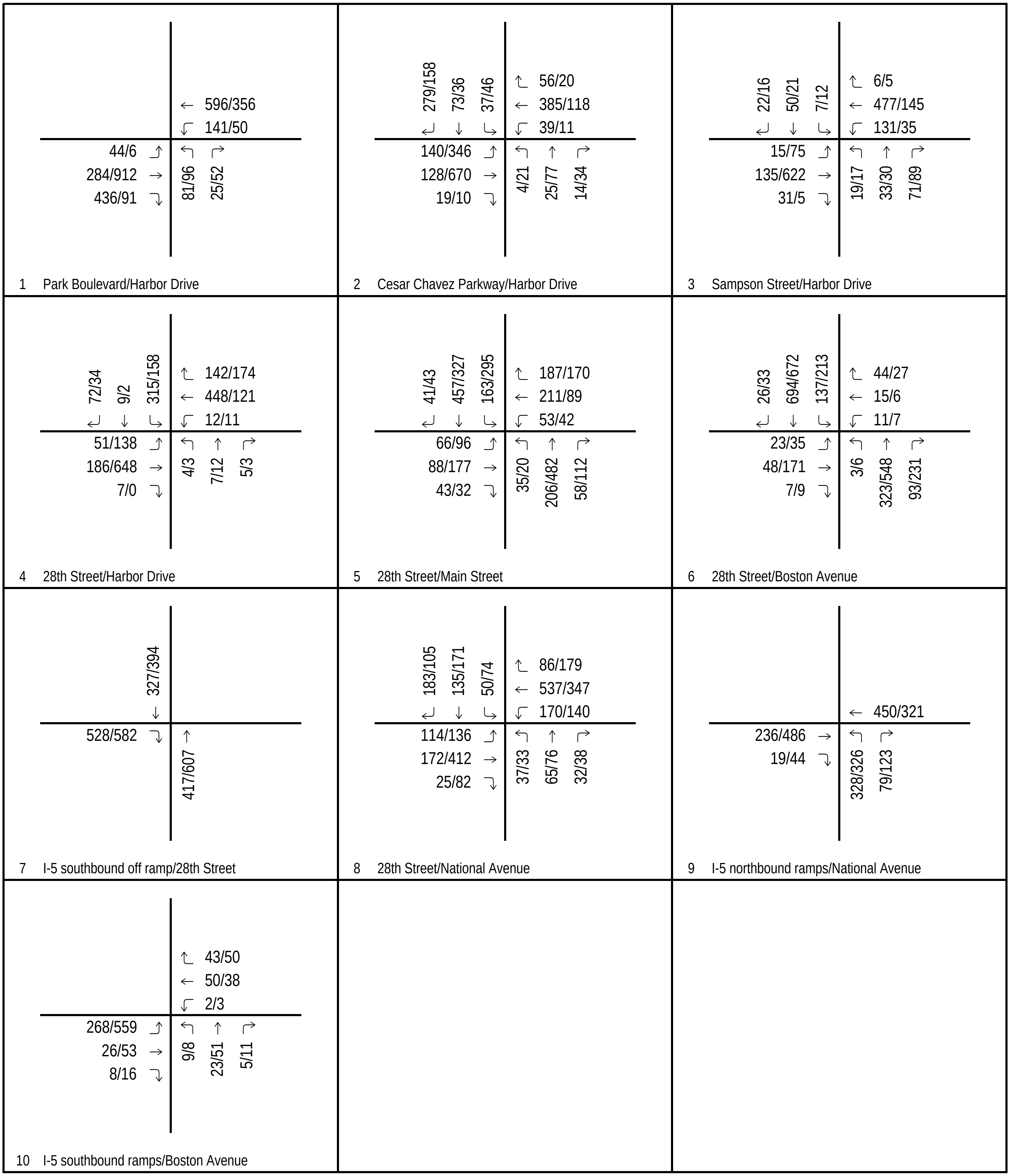
Table F - Staging Areas 1 and 2 Existing Plus Project Roadway Segment Level of Service Summary

Roadway	Segment	Roadway Classification	Capacity	Existing			Project ADT	Existing + Project			△
				Volume	LOS	V/C		Volume	LOS	V/C	
Harbor Boulevard	Park Boulevard and Cesar Chavez Parkway	4 Lane Major Arterial	40,000	12,903	A	0.32	0	12,903	A	0.32	0.00
	Cesar Chavez Parkway and Sampson Street	4 Lane Major Arterial	40,000	9,140	A	0.23	348	9,488	A	0.24	0.01
	Sampson Street and 28th Street	4 Lane Major Arterial	40,000	10,085	A	0.25	348	10,433	A	0.26	0.01
	28th Street and 32nd Street	4 Lane Major Arterial	40,000	14,240	B	0.36	0	14,240	B	0.36	0.00
28th Street	Harbor Boulevard and Main Street	4 Lane Major Arterial	40,000	15,231	B	0.38	348	15,579	B	0.39	0.01
	Main Street and Boston Avenue	4 Lane Collector (with TWLT)	30,000	18,454	C	0.62	348	18,802	C	0.63	0.01
	Boston Avenue and National Avenue	3 Lane Collector (with TWLT)	22,500	14,616	C	0.65	213	14,829	C	0.66	0.01
National Avenue	28th Street and I-5 Northbound Ramps	3 Lane Collector (no TWLT)	11,250	**17,691**	**F**	**1.57**	135	**17,826**	**F**	**1.58**	0.01
Boston Avenue	28th Street and I-5 Southbound On-Ramp	2 Lane Collector (no TWLT)	8,000	**8,188**	**F**	**1.02**	135	**8,323**	**F**	**1.04**	0.02

Source: LSA Associates, March 2011

☐ Exceeds level of service criteria

■ Significant Impact



LSA

FIGURE 6

123/456 AM/PM Volumes

San Diego Sediment Project

Existing + Project Peak Hour Traffic Volumes (Staging Area 3)

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Table G - Staging Area 3 Existing Plus Project Peak Hour Intersection Level of Service Summary

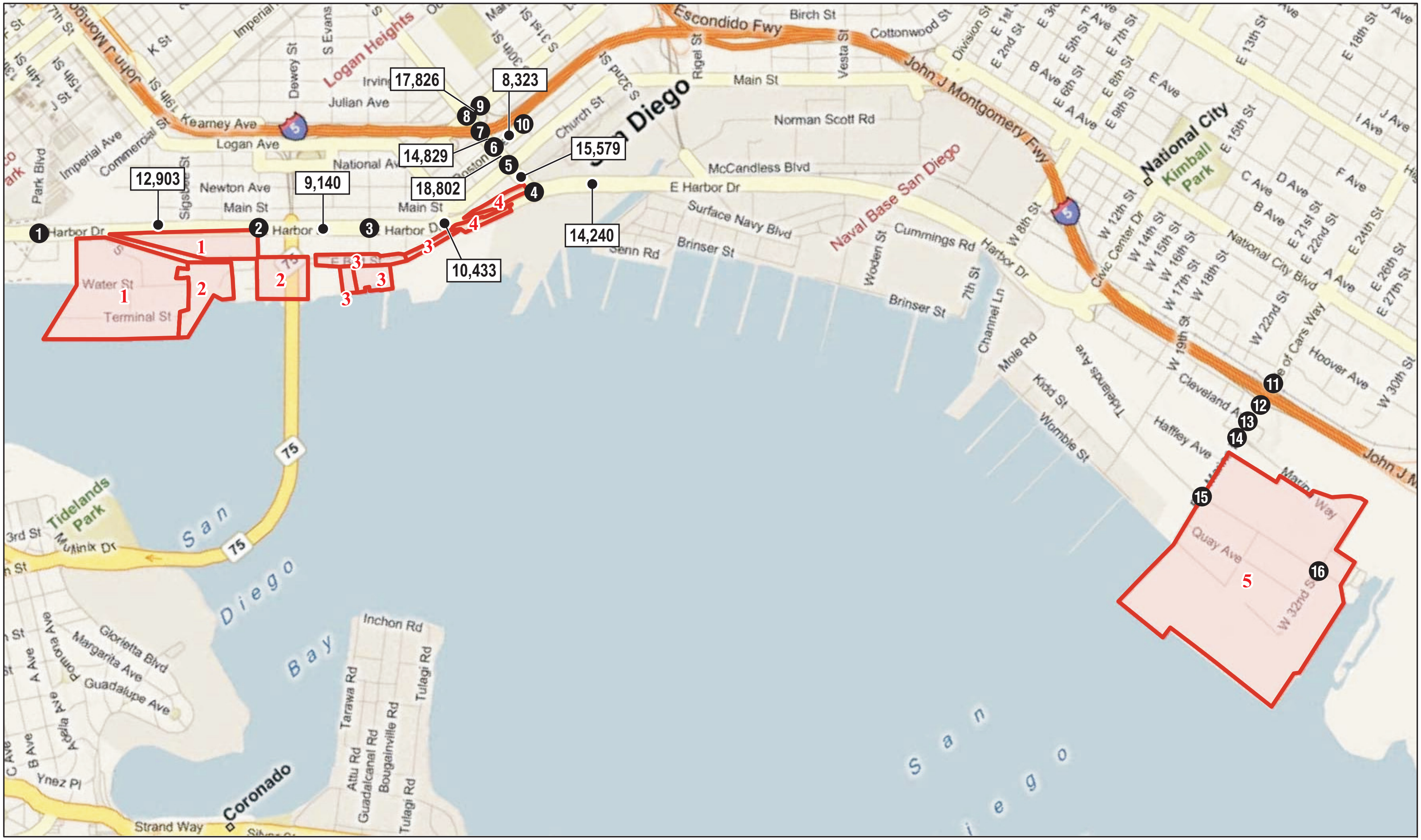
Intersection		Control Type	Existing Condition				Existing Plus Project Condition					
			AM Peak Hour		PM Peak Hour		AM Peak Hour		△	PM Peak Hour		△
			Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS		Delay (sec)	LOS	
1	Park Boulevard/Harbor Drive	Signalized	15.0	B	13.9	B	15.0	B	0.0	13.9	B	0.0
2	Cesar Chavez Parkway/Harbor Drive	Signalized	31.4	C	25.8	C	31.4	C	0.0	25.8	C	0.0
3	Sampson Street/Harbor Drive	Signalized	20.4	C	17.3	B	21.7	B	1.3	20.4	B	3.1
4	28th Street/Harbor Drive	Signalized	27.9	C	22.2	C	28.6	C	0.7	23.3	C	1.1
5	28th Street/Main Street	Signalized	30.0	C	33.3	C	29.8	C	-0.2	33.3	C	0.0
6	28th Street/Boston Avenue	Signalized	18.4	B	26.0	C	18.0	B	-0.4	25.9	C	-0.1
7	28th Street/I-5 Southbound Off-Ramp	No Control	-	-	-	-	-	-	-	-	-	-
8	28th Street/National Avenue	Signalized	33.7	C	31.3	C	33.7	C	0.0	31.6	C	0.3
9	I-5 Northbound Ramps/National Avenue	Signalized	18.6	B	18.8	B	19.1	B	0.5	19.1	B	0.3
10	I-5 Southbound On-Ramp/Boston Avenue	Unsignalized	15.2	C	49.2	E	15.6	C	0.4	56.3	F	7.1

Source: LSA Associates, March 2011

Notes:

☐ Exceeds level of service criteria

■ Significant Impact



LSA

FIGURE 7

LEGEND

Potential Sediment Staging Areas

Study Area Intersection

X,XXX Average Daily Traffic Volume

0 1250 2500 FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Existing Plus Project Daily Traffic Volumes
Staging Area 3

I:\SWB1001\G\Existing+Proj ADT-Area 3.cdr (3/31/2011)

Table H - Staging Area 3 Existing Plus Project Roadway Segment Level of Service Summary

Roadway	Segment	Roadway Classification	Capacity	Existing			Project ADT	Existing + Project			
				Volume	LOS	V/C		Volume	LOS	V/C	△
Harbor Boulevard	Park Boulevard and Cesar Chavez Parkway	4 Lane Major Arterial	40,000	12,903	A	0.32	0	12,903	A	0.32	0.00
	Cesar Chavez Parkway and Sampson Street	4 Lane Major Arterial	40,000	9,140	A	0.23	0	9,140	A	0.23	0.00
	Sampson Street and 28th Street	4 Lane Major Arterial	40,000	10,085	A	0.25	348	10,433	A	0.26	0.01
	28th Street and 32nd Street	4 Lane Major Arterial	40,000	14,240	B	0.36	0	14,240	B	0.36	0.00
28th Street	Harbor Boulevard and Main Street	4 Lane Major Arterial	40,000	15,231	B	0.38	348	15,579	B	0.39	0.01
	Main Street and Boston Avenue	4 Lane Collector (with TWLT)	30,000	18,454	C	0.62	348	18,802	C	0.63	0.01
	Boston Avenue and National Avenue	3 Lane Collector (with TWLT)	22,500	14,616	C	0.65	213	14,829	C	0.66	0.01
National Avenue	28th Street and I-5 Northbound Ramps	3 Lane Collector (no TWLT)	11,250	**17,691**	**F**	**1.57**	135	**17,826**	**F**	**1.58**	0.01
Boston Avenue	28th Street and I-5 Southbound On-Ramp	2 Lane Collector (no TWLT)	8,000	**8,188**	**F**	**1.02**	135	**8,323**	**F**	**1.04**	0.02

Source: LSA Associates, March 2011

☐ Exceeds level of service criteria

▩ Significant Impact

28th Street and I-5 Northbound Ramps. However, implementation of the project would cause a significant impact along Boston Avenue between 28th Street and I-5 Southbound Ramp.

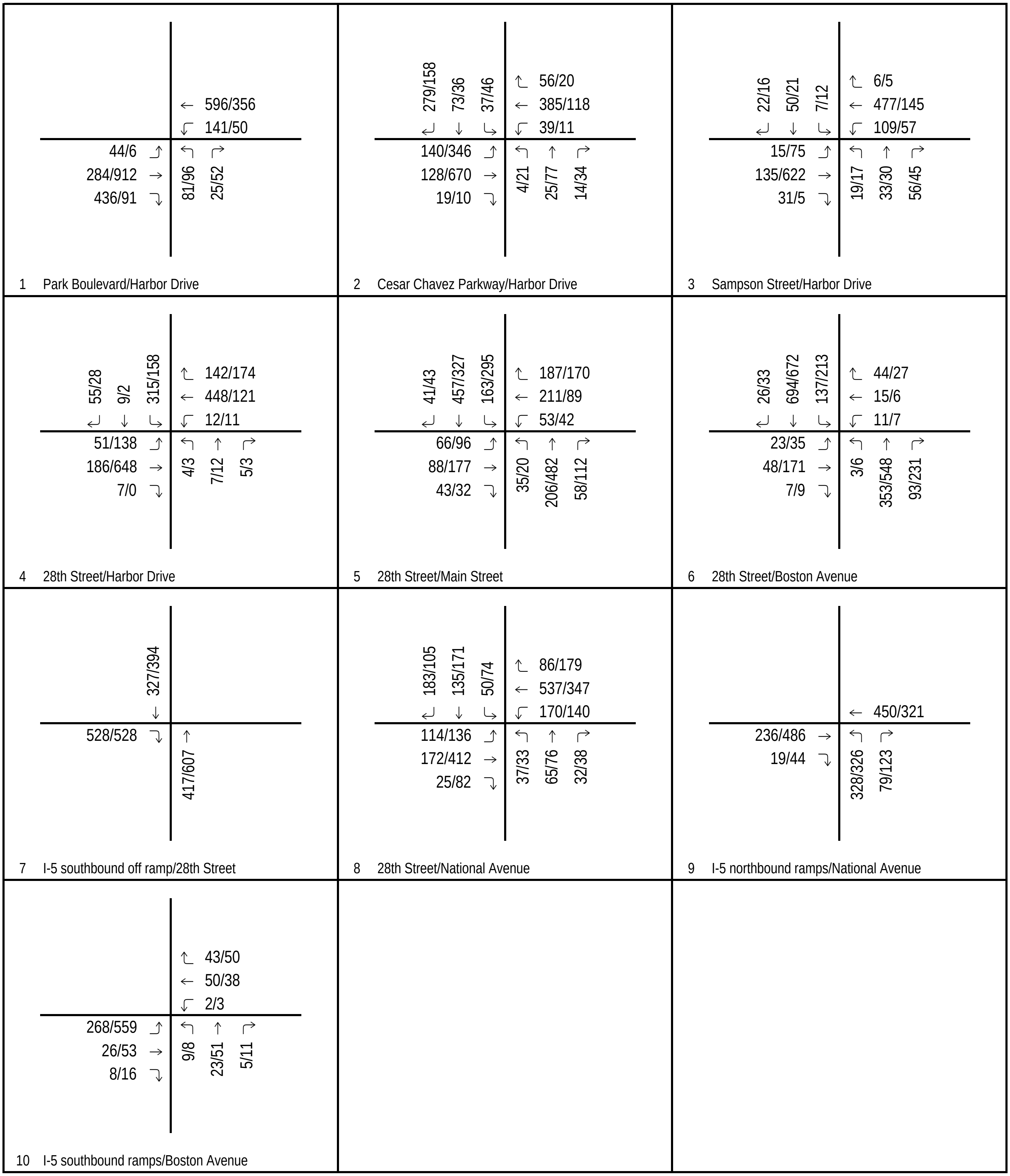
Staging Area 4

Staging Area 4 consists of two existing NASSCO parking lots. The north parking lot is larger than the south lot. To determine the amount of traffic destined to the north and south lots, the project trips were split based on the size of each parking lot as 75 percent and 25 percent, respectively. The trips associated with the south lot would access I-5 north and south via Harbor Drive and 28th Street. Before the trips can reach the I-5 ramps, the trips associated with the north lot would have to travel west along Harbor Drive, make a U-turn at the intersection of Sampson Street, then continue east along Harbor Drive and north along 28th Street. Figure 8 presents the existing plus project a.m. and p.m. peak hour trips. Table I summarizes the results of the existing plus project a.m. and p.m. peak-hour LOS analysis for all study area intersections. The LOS worksheets are provided as Attachment F. As Table I indicates, all study area intersections will continue to operate at an acceptable LOS (D or better) in the a.m. and p.m. peak hour with implementation of the proposed project, with the exception of I-5 Southbound Ramp/Boston Avenue (LOS F during p.m. peak hour). The addition of project traffic will increase the vehicle delay greater than one second at this intersection. As such, the project traffic will create a significant impact at this intersection in the existing plus project condition, based on the City's significance criteria.

Figure 9 presents the existing plus project average daily trips. Table J summarizes the daily traffic volumes and v/c ratios for the study area roadway segments in the existing condition with the addition of project traffic. Based on this analysis, the roadway segments are forecast to operate at an acceptable LOS (LOS D or better) with the addition of project traffic, with the exception of National Avenue between 28th Street and I-5 Northbound Ramps (LOS F), and Boston Avenue between 28th Street and I-5 Southbound Ramp (LOS F). The addition of project traffic will not increase the v/c ratio greater than 0.01 along National Avenue between 28th Street and I-5 Northbound Ramps. However, implementation of the project would cause a significant impact along Boston Avenue between 28th Street and I-5 Southbound Ramp.

Staging Area 5

It is anticipated that Staging Area 5 will utilize the intersections of Tidelands Avenue/ 24th Street and Tidelands Avenue/W.32nd Street to access the project site. Trucks departing from potential Staging Area 5 would access I-5 north and south either directly from 24th Street-Bay Marina Drive or from W. 32nd Street to 24th Street-Marina Way to Bay Marina Drive. Figure 10 presents the existing plus project a.m. and p.m. peak hour trips. Table K summarizes the results of the existing plus project a.m. and p.m. peak-hour LOS analysis for all study area intersections. The LOS worksheets are provided as Attachment G.



LSA

FIGURE 8

123/456 AM/PM Volumes

San Diego Sediment Project

Existing + Project Peak Hour Traffic Volumes (Staging Area 4)

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Table I - Staging Area 4 Existing Plus Project Peak Hour Intersection Level of Service Summary

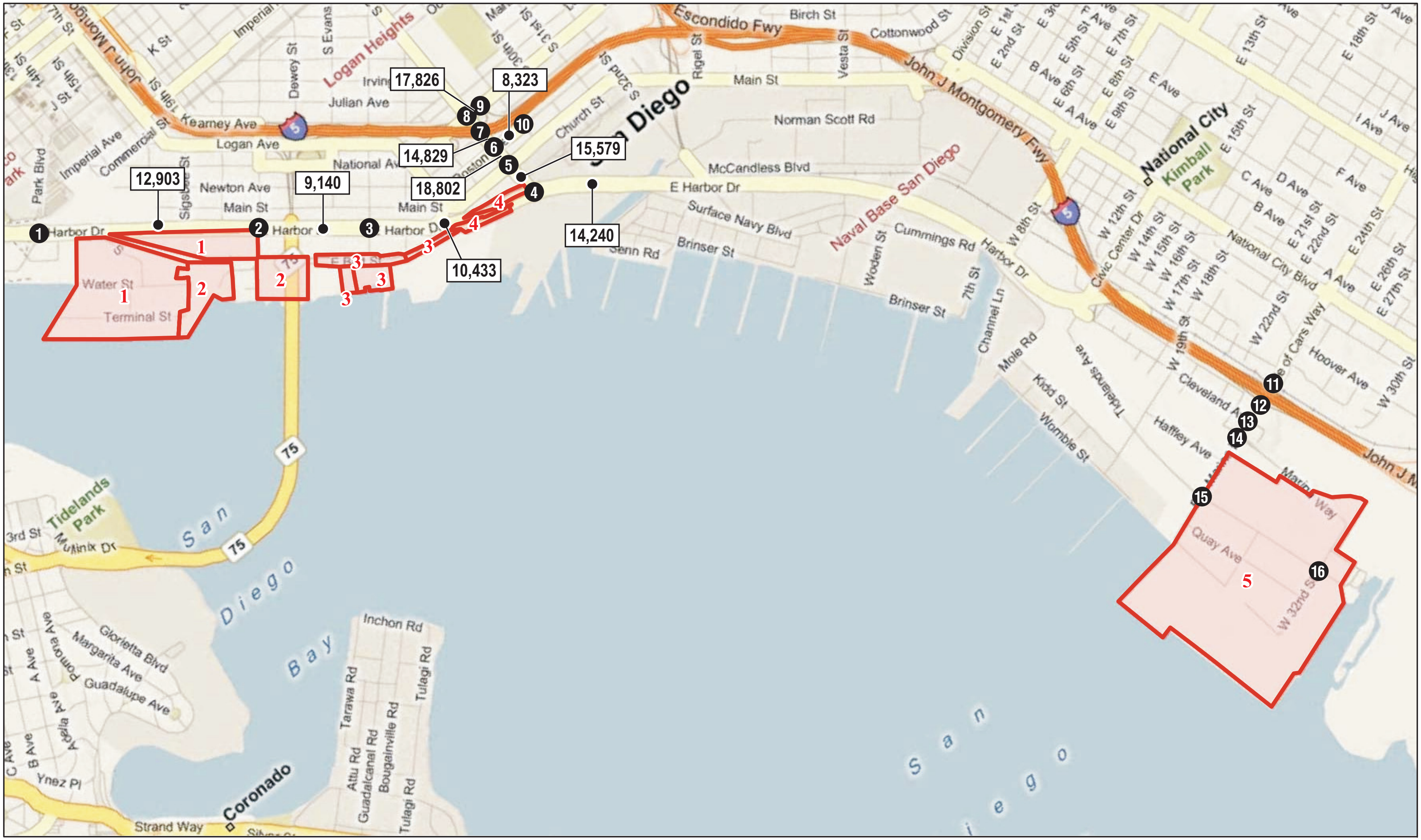
			Existing Condition				Existing Plus Project Condition					
			AM Peak Hour		PM Peak Hour		AM Peak Hour		△	PM Peak Hour		△
Intersection		Control Type	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS		Delay (sec)	LOS	
1	Park Boulevard/Harbor Drive	Signalized	15.0	B	13.9	B	15.0	B	0.0	13.9	B	0.0
2	Cesar Chavez Parkway/Harbor Drive	Signalized	31.4	C	25.8	C	31.4	C	0.0	25.8	C	0.0
3	Sampson Street/Harbor Drive	Signalized	20.4	C	17.3	B	20.8	B	0.4	19.5	B	2.2
4	28th Street/Harbor Drive	Signalized	27.9	C	22.2	C	28.6	C	0.7	23.2	C	1.0
5	28th Street/Main Street	Signalized	30.0	C	33.3	C	29.8	C	-0.2	33.3	C	0.0
6	28th Street/Boston Avenue	Signalized	18.4	B	26.0	C	18.0	B	-0.4	25.9	C	-0.1
7	28th Street/I-5 Southbound Off-Ramp	No Control	-	-	-	-	-	-	-	-	-	-
8	28th Street/National Avenue	Signalized	33.7	C	31.3	C	33.7	C	0.0	31.6	C	0.3
9	I-5 Northbound Ramps/National Avenue	Signalized	18.6	B	18.8	B	19.1	B	0.5	19.1	B	0.3
10	I-5 Southbound On-Ramp/Boston Avenue	Unsignalized	15.2	C	49.2	E	15.6	C	0.4	56.3	F	7.1

Source: LSA Associates, March 2011

Notes:

☐ Exceeds level of service criteria

▩ Significant Impact



LSA

FIGURE 9

LEGEND

Potential Sediment Staging Areas

Study Area Intersection

X,XXX Average Daily Traffic Volume

0 1250 2500

FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Existing Plus Project Daily Traffic Volumes

Staging Area 4

I:\SWB1001\G\Existing+Proj ADT-Area 4.cdr (3/31/2011)

Table J - Staging Area 4 Existing Plus Project Roadway Segment Level of Service Summary

Roadway	Segment	Roadway Classification	Capacity	Existing			Project ADT	Existing + Project			
				Volume	LOS	V/C		Volume	LOS	V/C	△
Harbor Boulevard	Park Boulevard and Cesar Chavez Parkway	4 Lane Major Arterial	40,000	12,903	A	0.32	0	12,903	A	0.32	0.00
	Cesar Chavez Parkway and Sampson Street	4 Lane Major Arterial	40,000	9,140	A	0.23	0	9,140	A	0.23	0.00
	Sampson Street and 28th Street	4 Lane Major Arterial	40,000	10,085	A	0.25	348	10,433	A	0.26	0.01
	28th Street and 32nd Street	4 Lane Major Arterial	40,000	14,240	B	0.36	0	14,240	B	0.36	0.00
28th Street	Harbor Boulevard and Main Street	4 Lane Major Arterial	40,000	15,231	B	0.38	348	15,579	B	0.39	0.01
	Main Street and Boston Avenue	4 Lane Collector (with TWLT)	30,000	18,454	C	0.62	348	18,802	C	0.63	0.01
	Boston Avenue and National Avenue	3 Lane Collector (with TWLT)	22,500	14,616	C	0.65	213	14,829	C	0.66	0.01
National Avenue	28th Street and I-5 Northbound Ramps	3 Lane Collector (no TWLT)	11,250	**17,691**	**F**	**1.57**	135	**17,826**	**F**	**1.58**	0.01
Boston Avenue	28th Street and I-5 Southbound On-Ramp	2 Lane Collector (no TWLT)	8,000	**8,188**	**F**	**1.02**	135	**8,323**	**F**	**1.04**	0.02

Source: LSA Associates, March 2011

☐ Exceeds level of service criteria

■ Significant Impact

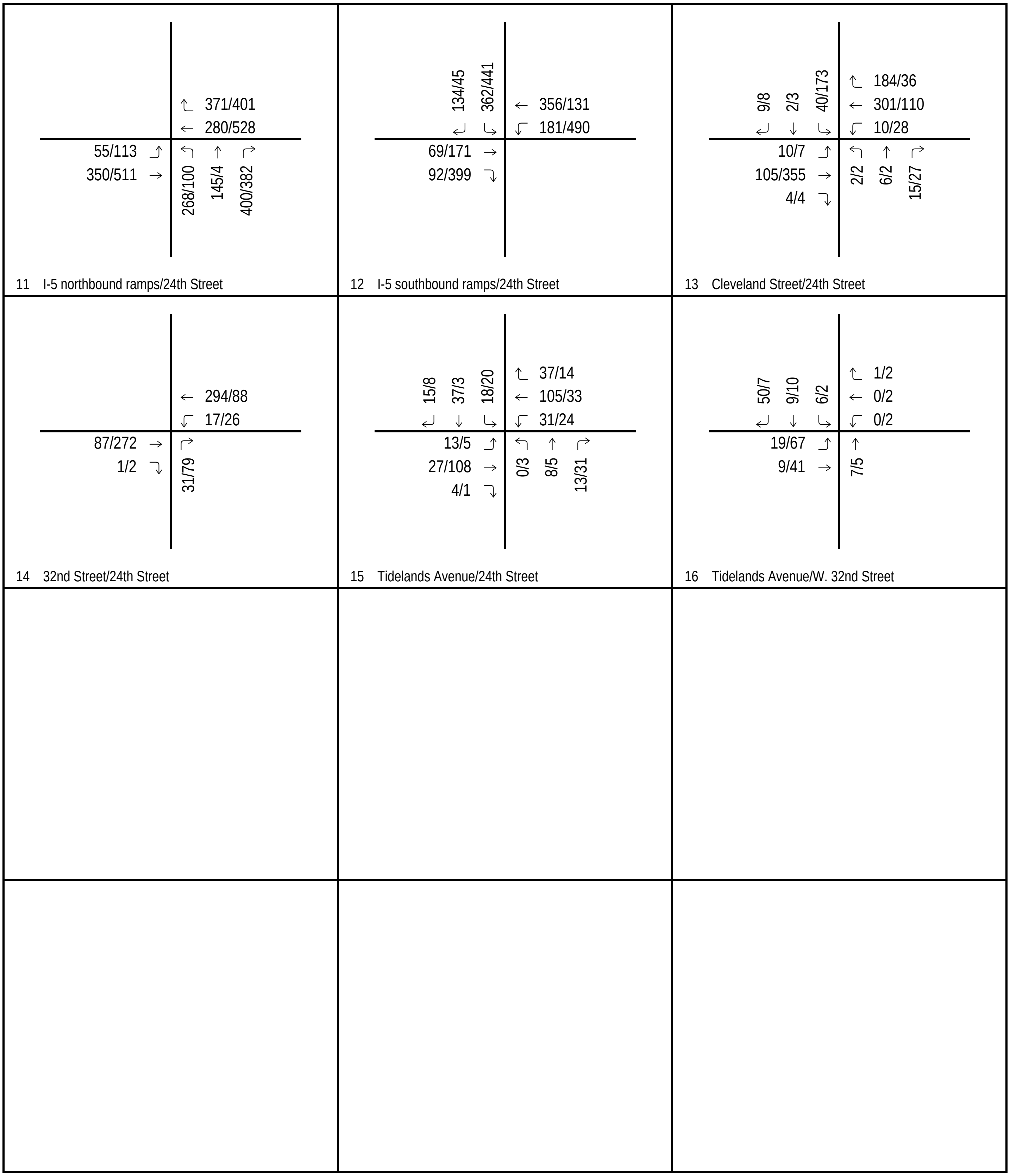


FIGURE 10

LSA

123/456 AM/PM Volumes

San Diego Sediment Project

Existing + Project Peak Hour Traffic Volumes (Staging Area 5)

Table K - Staging Area 5 Existing Plus Project Peak Hour Intersection Level of Service Summary

Intersection		Control Type	Existing Condition				Existing Plus Project Condition					
			AM Peak Hour		PM Peak Hour		AM Peak Hour		△	PM Peak Hour		△
			Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS		Delay (sec)	LOS	
11	I-5 Northbound Ramps/24th Street	Signalized	25.3	C	22.3	C	25.5	C	0.2	22.9	C	0.6
12	I-5 Southbound Ramps/24th Street	Signalized	23.5	C	27.7	C	23.4	C	-0.1	28.0	C	0.3
13	Cleveland Street/24th Street	Unsignalized	8.9	A	10.0	B	9.2	A	0.3	10.3	B	0.3
14	W. 32nd Street/24th Street	Signalized	11.3	B	19.2	B	11.9	B	0.6	20.7	C	1.5
15	Tidelands Avenue/24th Street	Signalized	26.4	C	29.9	B	24.5	C	-1.9	28.7	C	-1.2
16	Tidelands Avenue/W. 32nd Street	Unsignalized	7.3	A	8.0	A	7.3	A	0.0	7.9	A	-0.1

Source: LSA Associates, March 2011

Notes:

☐ Exceeds level of service criteria

■ Significant Impact

As this table indicates, all study area intersections will continue to operate at an acceptable LOS (D or better) in the a.m. and p.m. peak hour with implementation of the proposed project.

Figure 11 presents the existing plus project average daily trips. Table L summarizes the daily traffic volumes and v/c ratios for the study area roadway segments in the existing condition with the addition of project traffic. Based on this analysis, the roadway segments are forecast to operate at an acceptable LOS (LOS D or better) with the addition of project traffic.

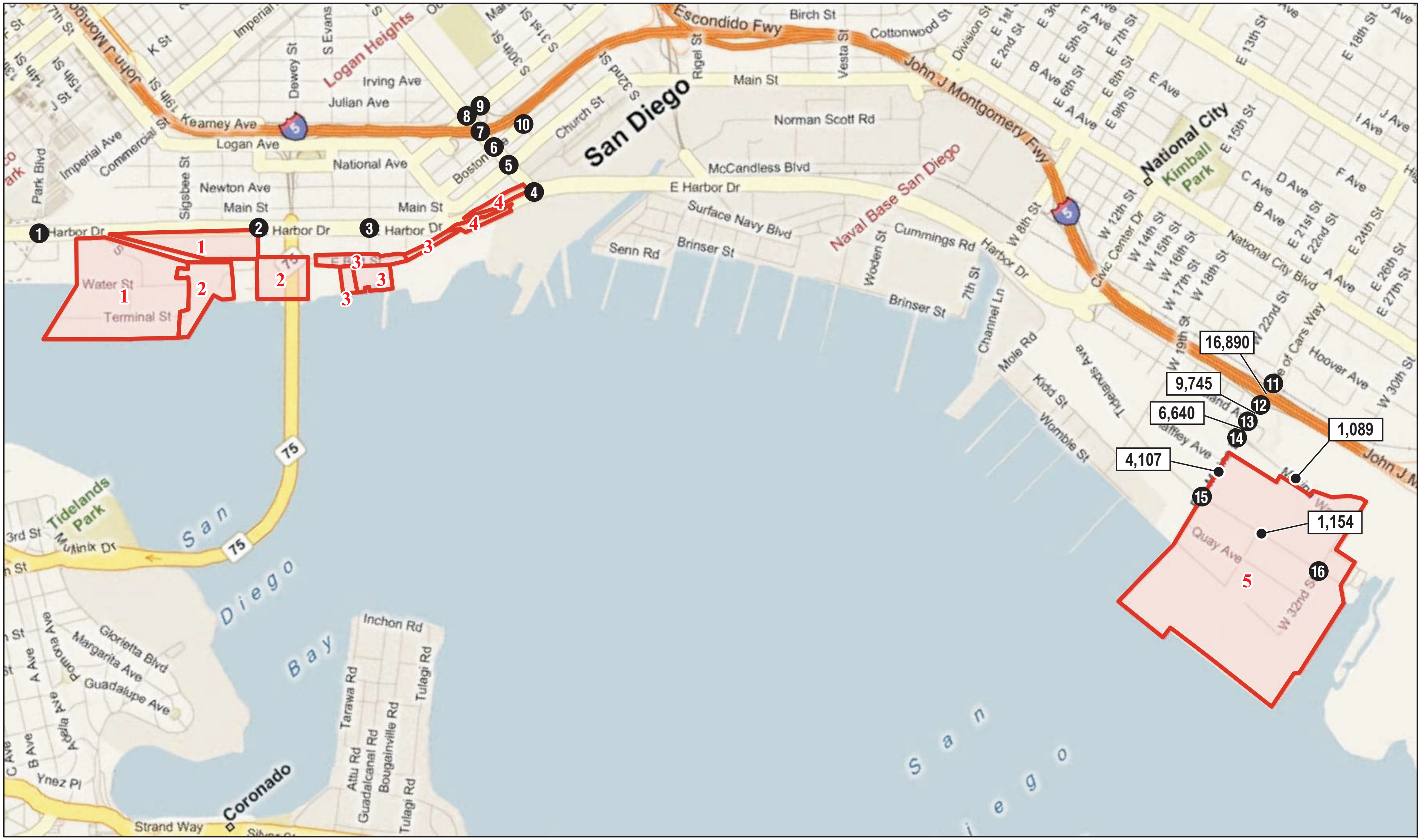
Bayshore Bikeway

The Bayshore Bikeway consists of bike routes along Harbor Drive and Tidelands Avenue. Based on the results of the roadway segment analysis, Harbor Drive and Tidelands Avenue are forecast to operate at acceptable LOS (LOS A or B) with the implementation of the proposed project. Therefore, bike safety and bike routes would not be significantly affected with the addition of project traffic. No bike route detours are warranted with the project.

MITIGATION APPROACH

With the implementation of project traffic, significant impacts are forecast at the intersection of I-5 Southbound Ramp/Boston Avenue and the roadway segment of Boston Avenue between 28th Street and I-5 Southbound Ramp for Staging Areas 1 through 4. The draft Barrio Logan Community Plan Update (CPU), March 2011, acknowledges that the intersection of I-5 Southbound Ramp/Boston Avenue currently operates at unacceptable LOS (LOS F during p.m. peak hour). The draft CPU recommends the signalization of this intersection. The draft CPU also acknowledges that the roadway segment of Boston Avenue between 28th Street and I-5 Southbound Ramp currently operates at LOS F. Boston Avenue is desired by the community of Barrio Logan to be a more pedestrian and bicycle-friendly corridor. The widening of this roadway to improve vehicular circulation was not desired by the community. The vehicular operations along this facility could be congested during peak periods and vehicular speeds would be low. The draft CPU states that additional widening is not recommended.

Instead of contributing to capital improvements to mitigate the affected locations (such as signalization of the intersection or temporary roadway widening), an alternative option would be to reroute project traffic away from Boston Avenue. The project traffic can be rerouted south of Staging Areas 1 through 4 along Harbor Drive to the I-5 Northbound and Southbound Ramps at Civic Center Drive.



LSA

FIGURE 11

LEGEND

Potential Sediment Staging Areas

Study Area Intersection

X,XXX Average Daily Traffic Volume

0 1250 2500

FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Existing Plus Project Daily Traffic Volumes
Staging Area 5

I:\SWB1001\G\Existing+Proj ADT-Area 5.cdr (3/31/2011)

Table L - Staging Area 5 Existing Plus Project Roadway Segment Level of Service Summary

Roadway	Segment	Roadway Classification	Capacity	Existing			Project ADT	Existing + Project			
				Volume	LOS	V/C		Volume	LOS	V/C	△
24th Street	I-5 Northbound Ramps and I-5 Southbound Rar	4 Lane Major Arterial	40,000	16,716	B	0.42	174	16,890	B	0.42	0.00
	I-5 Southbound Ramps and Cleveland Street	4 Lane Major Arterial	40,000	9,397	A	0.23	348	9,745	A	0.24	0.01
	Cleveland Street and W. 32nd Street	4 Lane Major Arterial	40,000	6,292	A	0.16	348	6,640	A	0.17	0.01
	W. 32nd Street and Tidelands Avenue	4 Lane Collector (no TWLT)	20,000	3,846	A	0.19	261	4,107	A	0.21	0.01
W. 32nd Street	24th Street and Tidelands Avenue	2 Lane Collector	10,000	1,002	A	0.10	87	1,089	A	0.11	0.01
Tidelands Avenue	24th Street and W. 32nd Street	2 Lane Collector	10,000	1,154	A	0.12	0	1,154	A	0.12	0.00

Source: LSA Associates, March 2011

☐ Exceeds level of service criteria

■ Significant Impact

CONCLUSION

Based on the results of this traffic analysis, significant impacts are forecast at the intersection of I-5 Southbound Ramp/Boston Avenue and the roadway segment of Boston Avenue between 28th Street and I-5 Southbound Ramp for Staging Areas 1 through 4. The draft CPU acknowledges that the intersection of I-5 Southbound Ramp/Boston Avenue currently operates at unacceptable LOS (LOS F during p.m. peak hour). The draft CPU recommends the signalization of this intersection. The draft CPU also acknowledges that the roadway segment of Boston Avenue between 28th Street and I-5 Southbound Ramp currently operates at unacceptable LOS (LOS F). Boston Avenue is desired by the community of Barrio Logan to be a more pedestrian and bicycle-friendly corridor. The widening of this roadway to improve vehicular circulation was not desired by the community. The vehicular operations along this facility could be congested during peak periods and vehicular speeds would be low. The draft CPU states that additional widening is not recommended.

The anticipated haul, delivery, and employee traffic to and from the project site can be accommodated without causing a significant impact for Staging Area 5, based on the existing traffic conditions in the study area. Evaluation of the intersection and roadway LOS shows that the addition of the project's traffic to the existing traffic volumes will not cause a significant increase in delay at the study area intersections or an increase in v/c ratio on the roadway segments, according to the City's performance criteria. As a result, no improvements would be warranted during the haul period for Staging Area 5.

ATTACHMENT A

EXISTING TRAFFIC COUNTS

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Park Blvd and Harbor Dr , City of San Diego

Date:	3/3/2011
Day:	Thursday
Project #:	CA11_4063_001

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

CONTROL: Signalized

N

Park Blvd

Harbor Dr

Southbound Approach

	Col 1	Col 2	Col 3	
Lanes	0	0	0	
AM	0	0	0	0
NOON	0	0	0	0
PM	0	0	0	0

Eastbound Approach

	AM	NOON	PM
(out)	677	0	452

Lanes	AM	NOON	PM
0	0	0	0
2	284	0	912
1	436	0	91

Westbound Approach

	AM	NOON	PM	Lanes
	0	0	0	0
	596	0	356	2
	133	0	42	1
(out)	309	0	964	

Northbound Approach

	(out)	Col 1	Col 2	Col 3
AM	569	81	0	25
NOON	0	0	0	0
PM	133	96	0	52
Lanes		0	2	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

AM	0	0
NOON	0	0
PM	0	0

West Leg

AM	NOON	PM
677	0	452
720	0	1003

East Leg

AM	NOON	PM
729	0	398
309	0	964

South Leg

AM	569	106
NOON	0	0
PM	133	148

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	0	0	0
West Leg	1397	0	1455
East Leg	1038	0	1362
South Leg	675	0	281

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Park Blvd and Harbor Dr , City of San Diego

Date: 3/3/2011

Day: Thursday

Project #: CA11_4063_001

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Peak Hour Summary

Park Blvd / Harbor Dr

Southbound Approach

	Right (⤶)	Through (↓)	Left (⤷)	Departing (⇧)
Lanes	0	0	0	
AM	0	0	0	44
NOON	0	0	0	0
PM	0	0	0	6

Eastbound Approach

	Lanes	AM	NOON	PM
Departing (⇦)		0	0	0
Left (⮥)	0	44	0	6
Through (→)	2	0	0	0
Right (⮧)	1	0	0	0

Westbound Approach

	AM	NOON	PM	Lanes
Right (⮤)	0	0	0	0
Through (←)	0	0	0	2
Left (⮦)	8	0	8	1
Departing (⇨)	0	0	0	

CONTROL

Signalized

Northbound Approach

	Departing (⇩)	Left (↰)	Through (↑)	Right (↱)
AM	8	0	0	0
NOON	0	0	0	0
PM	8	0	0	0
Lanes		0	2	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

AM	0	44
NOON	0	0
PM	0	6

East Leg

AM	NOON	PM
8	0	8
0	0	0

West Leg

AM	NOON	PM
0	0	0
44	0	6

South Leg

AM	8	0
NOON	0	0
PM	8	0

Total Volume Per Leg

North Leg

AM	44
NOON	0
PM	6

East Leg

AM	NOON	PM
8	0	8

West Leg

AM	NOON	PM
44	0	6

South Leg

AM	8
NOON	0
PM	8

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Cesar Chavez Pkwy and Harbor Dr , City of San Diego

Date: 3/3/2011

Day: Thursday

Project #: CA11_4063_002

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

CONTROL: Signalized

Cesar Chavez Pkwy (north–south) / Harbor Dr (east–west)

Southbound Approach

Lanes	1	0.5	0.5	
AM	279	73	37	221
NOON	0	0	0	0
PM	158	36	46	443

Eastbound Approach

Lanes	AM	NOON	PM
	668	0	297
1	140	0	346
2	128	0	670
0	19	0	10

Westbound Approach

	AM	NOON	PM	Lanes
	56	0	20	0
	385	0	118	2
	39	0	11	1
	179	0	750	

Northbound Approach

AM	131	4	25	14
NOON	0	0	0	0
PM	57	21	77	34
Lanes		1	0.5	0.5

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg			
AM	389	221
NOON	0	0
PM	240	443

West Leg	AM	NOON	PM
	668	0	297
	287	0	1026

East Leg	AM	NOON	PM
	480	0	149
	179	0	750

South Leg		
AM	131	43
NOON	0	0
PM	57	132

Total Volume Per Leg

	North Leg	West Leg	East Leg	South Leg
AM	610	955	659	174
NOON	0	0	0	0
PM	683	1323	899	189

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Sampson St and Harbor Dr , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_003

N

Sampson St

Harbor Dr

Peak Hour Summary

	AM Peak Hour	730 AM
	NOON Peak Hour	
	PM Peak Hour	430 PM

CONTROL: Signalized

Southbound Approach

	Right	Through	Left	Exiting (northbound)
Lanes	0	2	0	
AM	22	50	7	52
NOON	0	0	0	0
PM	16	21	12	99

Eastbound Approach

Lanes	Movement	AM	NOON	PM
	Exiting (westbound)	518	0	178
1	Left	13	0	64
2	Through	135	0	622
0	Right	31	0	5

Westbound Approach

Movement	AM	NOON	PM	Lanes
Right	6	0	5	0
Through	477	0	145	2
Left	86	0	18	1
Exiting (eastbound)	198	0	679	

Northbound Approach

	Exiting (southbound)	Left	Through	Right
AM	167	19	33	56
NOON	0	0	0	0
PM	44	17	30	45
Lanes		0	1	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg	Out	In
AM	79	52
NOON	0	0
PM	49	99

West Leg	AM	NOON	PM
Out	518	0	178
In	179	0	691

East Leg	AM	NOON	PM
In	569	0	168
Out	198	0	679

South Leg	In	Out
AM	167	108
NOON	0	0
PM	44	92

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	131	0	148
West Leg	697	0	869
East Leg	767	0	847
South Leg	275	0	136

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Sampson St and Harbor Dr , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_003

AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	415 PM

Peak Hour Summary

Sampson St

Harbor Dr

N

Southbound Approach

	Right	Thru	Left	Out
Lanes	0	2	0	
AM	0	0	0	2
NOON	0	0	0	0
PM	0	0	0	11

Eastbound Approach

	Lanes	AM	NOON	PM
Out		0	0	0
Left	1	2	0	11
Thru	2	0	0	0
Right	0	0	0	0

Westbound Approach

	AM	NOON	PM	Lanes
Right	0	0	0	0
Thru	0	0	0	2
Left	1	0	2	1
Out	0	0	0	

CONTROL

Signalized

Northbound Approach

	Out	Left	Thru	Right
AM	1	0	0	0
NOON	0	0	0	0
PM	2	0	0	0
Lanes		0	1	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

	In	Out
AM	0	2
NOON	0	0
PM	0	11

West Leg

	AM	NOON	PM
Out	0	0	0
In	2	0	11

East Leg

	AM	NOON	PM
In	1	0	2
Out	0	0	0

South Leg

	Out	In
AM	1	0
NOON	0	0
PM	2	0

Total Volume Per Leg

	North Leg	East Leg	South Leg	West Leg
AM	2	1	1	2
NOON	0	0	0	0
PM	11	2	2	11

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

28th St and Harbor Dr , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_004

N

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

28th St

Harbor Dr

Southbound Approach

	Right	Through	Left	Out (northbound)
Lanes	0	2	1	
AM	28	9	315	181
NOON	0	0	0	0
PM	19	2	158	278

Eastbound Approach

	AM	NOON	PM
Out (westbound)	480	0	143

Lanes	Movement	AM	NOON	PM
1	Left	32	0	92
2	Through	186	0	648
0	Right	7	0	0

Westbound Approach

Movement	AM	NOON	PM	Lanes
Right	142	0	174	0
Through	448	0	121	2
Left	3	0	2	1
Out (eastbound)	506	0	809	

CONTROL

Signalized

Northbound Approach

	Out (southbound)	Left	Through	Right
AM	19	4	7	5
NOON	0	0	0	0
PM	4	3	12	3
Lanes		0	1	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

	In	Out
AM	352	181
NOON	0	0
PM	179	278

West Leg

	AM	NOON	PM
Out	480	0	143
In	225	0	740

East Leg

	AM	NOON	PM
In	593	0	297
Out	506	0	809

South Leg

	Out	In
AM	19	16
NOON	0	0
PM	4	18

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	533	0	457
West Leg	705	0	883
East Leg	1099	0	1106
South Leg	35	0	22

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

28th St and Harbor Dr , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_004

AM Peak Hour	800 AM
NOON Peak Hour	
PM Peak Hour	400 PM

North–south street: 28th St. East–west street: Harbor Dr.

Peak Hour Summary

Southbound Approach

	Right (Lanes 0)	Through (Lanes 2)	Left (Lanes 1)	Outbound (northbound exit)
AM	0	0	0	4
NOON	0	0	0	0
PM	0	0	0	2

Eastbound Approach

	Lanes	AM	NOON	PM
Outbound (westbound exit)		0	0	0
Left	1	4	0	2
Through	2	0	0	0
Right	0	0	0	0

Westbound Approach

	AM	NOON	PM	Lanes
Right	0	0	0	0
Through	0	0	0	2
Left	9	0	9	1
Outbound (eastbound exit)	0	0	0	

CONTROL

Signalized

Northbound Approach

	Outbound (southbound exit)	Left (Lanes 0)	Through (Lanes 1)	Right (Lanes 0)
AM	9	0	0	0
NOON	0	0	0	0
PM	9	0	0	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg			
AM	0	4	
NOON	0	0	
PM	0	2	

West Leg	AM	NOON	PM
	0	0	0
	4	0	2

East Leg	AM	NOON	PM
	9	0	9
	0	0	0

South Leg		
AM	9	0
NOON	0	0
PM	9	0

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	4	0	2
West Leg	4	0	2
East Leg	9	0	9
South Leg	9	0	9

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

28th St and Main St , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_005

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Peak Hour Summary

28th St

Main St

N

Southbound Approach

Lanes	0	2	1		
AM	41	413	155	444	AM
NOON	0	0	0	0	NOON
PM	43	312	284	704	PM

Eastbound Approach

Lanes	AM	NOON	PM	
	286	0	145	
1	66	0	96	
2	88	0	177	
0	43	0	32	

Westbound Approach

	AM	NOON	PM	Lanes
	187	0	170	0
	211	0	89	2
	53	0	42	1
	301	0	573	

CONTROL

Signalized

Northbound Approach

AM	509	34	191	58	AM
NOON	0	0	0	0	NOON
PM	386	13	438	112	PM
		1	2	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

AM	609	444	
NOON	0	0	
PM	639	704	

East Leg

	AM	NOON	PM
	451	0	301
	301	0	573

West Leg

	AM	NOON	PM
	286	0	145
	197	0	305

South Leg

AM	509	283
NOON	0	0
PM	386	563

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	1053	0	1343
East Leg	752	0	874
West Leg	483	0	450
South Leg	792	0	949

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

28th St and Main St , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_005

AM Peak Hour	800 AM
NOON Peak Hour	
PM Peak Hour	415 PM

Peak Hour Summary

CONTROL: Signalized

Southbound Approach (28th St)

	Lanes 0	Lanes 2	Lanes 1	Departing
AM	0	0	8	0
NOON	0	0	0	0
PM	0	0	11	0

Eastbound Approach (Main St)

Lanes	AM	NOON	PM
Departing	1	0	7
1	0	0	0
2	0	0	0
0	0	0	0

Westbound Approach

	AM	NOON	PM	Lanes
	0	0	0	0
	0	0	0	2
	0	0	0	1
Departing	8	0	11	

Northbound Approach

	Departing			
AM	0	1	0	0
NOON	0	0	0	0
PM	0	7	0	0
Lanes		1	2	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

Leg	AM		NOON		PM	
North Leg	8	0	0	0	11	0
East Leg	0	8	0	0	0	11
West Leg	1	0	0	0	7	0
South Leg	0	1	0	0	0	7

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	8	0	11
East Leg	8	0	11
West Leg	1	0	7
South Leg	1	0	7

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

28th St and Boston Ave , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_006

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

N

28th St

Boston Ave

Peak Hour Summary

Southbound Approach

				Out
Lanes	1	1	1	
AM	26	650	137	418
NOON	0	0	0	0
PM	33	657	213	590

Eastbound Approach

	AM	NOON	PM
Out	44	0	45

Lanes	AM	NOON	PM
1	23	0	35
1	48	0	171
0	7	0	9

CONTROL

Signalized

Westbound Approach

AM	NOON	PM	Lanes
44	0	27	0
15	0	6	1
11	0	7	1

	AM	NOON	PM
In	265	0	591

Northbound Approach

	Out				
AM	668	3	351	80	AM
NOON	0	0	0	0	NOON
PM	673	6	528	207	PM
		1	2	1	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

813	418	AM
0	0	NOON
903	590	PM

West Leg

AM	NOON	PM
44	0	45
78	0	215

East Leg

AM	NOON	PM
70	0	40
265	0	591

South Leg

AM	668	434
NOON	0	0
PM	673	741

Total Volume Per Leg

North Leg

1231	AM
0	NOON
1493	PM

West Leg

AM	NOON	PM
122	0	260

East Leg

AM	NOON	PM
335	0	631

South Leg

AM	1102
NOON	0
PM	1414

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

28th St and I-5 SB Off-Ramp , City of San Diego

Date: 3/2/2011
Day: Wednesday

Project #: CA11_4063_007

N

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Peak Hour Summary

Southbound Approach (28th St)

	Right	Thru	Left	Out
Lanes	0	1	0	
AM	0	303	0	415
NOON	0	0	0	0
PM	0	381	0	587

Eastbound Approach (I-5 SB Off-Ramp)

	Lanes	AM	NOON	PM
Out		0	0	0
Left	0	0	0	0
Thru	0	0	0	0
Right	1	508	0	526

Westbound Approach

	AM	NOON	PM	Lanes
Right	0	0	0	0
Thru	0	0	0	0
Left	0	0	0	0
Out	0	0	0	

CONTROL
No Control

Northbound Approach

	Out	Left	Thru	Right
AM	811	0	415	0
NOON	0	0	0	0
PM	907	0	587	0
Lanes		0	2	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

	In	Out
AM	303	415
NOON	0	0
PM	381	587

West Leg

	AM	NOON	PM
Out	0	0	0
In	508	0	526

East Leg

	AM	NOON	PM
In	0	0	0
Out	0	0	0

South Leg

	Out	In
AM	811	415
NOON	0	0
PM	907	587

Total Volume Per Leg

	North Leg	South Leg
AM	718	1226
NOON	0	0
PM	968	1494

	AM	NOON	PM
West Leg	508	0	526
East Leg	0	0	0

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

28th St and National Ave , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_008

N

28th St

National Ave

Peak Hour Summary

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Southbound Approach

	Left	Through	Right	Outbound
Lanes	0	1	0	
AM	183	135	50	265
NOON	0	0	0	0
PM	105	171	74	391

Eastbound Approach

	Lanes	AM	NOON	PM
Outbound		757	0	485
Left	1	114	0	136
Through	1	172	0	412
Right	1	25	0	82

Westbound Approach

	AM	NOON	PM	Lanes
Right	86	0	179	0
Through	537	0	347	1
Left	146	0	127	1
Outbound	254	0	524	

Northbound Approach

	Outbound	Left	Through	Right
AM	306	37	65	32
NOON	0	0	0	0
PM	380	33	76	38
Lanes		0	1	0

CONTROL

Signalized

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

	In	Out
AM	368	265
NOON	0	0
PM	350	391

East Leg

	AM	NOON	PM
In	769	0	653
Out	254	0	524

West Leg

	AM	NOON	PM
Out	757	0	485
In	311	0	630

South Leg

	Out	In
AM	306	134
NOON	0	0
PM	380	147

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	633	0	741
East Leg	1023	0	1177
West Leg	1068	0	1115
South Leg	440	0	527

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

28th St and I-5 NB On-Ramp , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_108

Peak Hour Summary

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Southbound Approach (28th St)

	Right	Through	Left	Out (North Leg)
AM	0	0	0	0
NOON	0	0	0	0
PM	0	0	0	0

Lanes

Eastbound Approach (I-5 NB On-Ramp)

	AM	NOON	PM
Out (West Leg)	0	0	0
Left	0	0	0
Through	0	0	0
Right	0	0	0

Lanes

Westbound Approach

	AM	NOON	PM
Right	0	0	0
Through	0	0	0
Left	0	0	0
Out (East Leg)	300	0	443

Lanes

CONTROL

0

Northbound Approach

	Out (South Leg)	Left	Through	Right
AM	0	0	0	300
NOON	0	0	0	0
PM	0	0	0	443

Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg		
AM	0	0
NOON	0	0
PM	0	0

West Leg	AM	NOON	PM
	0	0	0
	0	0	0

East Leg	AM	NOON	PM
	0	0	0
	300	0	443

South Leg		
AM	0	300
NOON	0	0
PM	0	443

Total Volume Per Leg

North Leg	
AM	0
NOON	0
PM	0

	AM	NOON	PM
West Leg	0	0	0
East Leg	300	0	443

South Leg	
AM	300
NOON	0
PM	443

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

I-5 NB Ramps and National Ave , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_009

N

I-5 NB Ramps

National Ave

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Peak Hour Summary

Southbound Approach

	Right	Thru	Left	Departing
Lanes	0	0	0	
AM	0	0	0	0
NOON	0	0	0	0
PM	0	0	0	0

Westbound Approach

	AM	NOON	PM	Lanes
Right	0	0	0	0
Thru	450	0	321	1
Left	0	0	0	0
Departing	315	0	609	

Eastbound Approach

Lanes		AM	NOON	PM
	Departing	754	0	634
0	Left	0	0	0
1	Thru	236	0	486
1	Right	19	0	44

CONTROL

Signalized

Northbound Approach

	Departing	Left	Thru	Right
AM	19	304	0	79
NOON	0	0	0	0
PM	44	313	0	123
Lanes		1	0	1

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

Leg	Period	In	Out
North Leg	AM	0	0
North Leg	NOON	0	0
North Leg	PM	0	0
South Leg	AM	19	383
South Leg	NOON	0	0
South Leg	PM	44	436

Leg		AM	NOON	PM
West Leg		754	0	634
West Leg		255	0	530
East Leg		450	0	321
East Leg		315	0	609

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	0	0	0
West Leg	1009	0	1164
East Leg	765	0	930
South Leg	402	0	480

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

I-5 SB Ramps and Boston Ave , City of San Diego

Date: 3/2/2011

Day: Wednesday

Project #: CA11_4063_010

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Peak Hour Summary

Southbound Approach (I-5 SB Ramps)

	Right	Through	Left	Out
Lanes	0	0	0	
AM	0	0	0	321
NOON	0	0	0	0
PM	0	0	0	636

Eastbound Approach (Boston Ave)

	Lanes	AM	NOON	PM
Out		59	0	46
Left	0	255	0	535
Through	1	26	0	53
Right	0	8	0	16

Westbound Approach

	AM	NOON	PM	Lanes
Right	43	0	50	0
Through	50	0	38	1
Left	2	0	3	0
Out	31	0	64	

CONTROL

1-Way Stop (NB)

Northbound Approach

	Out	Left	Through	Right
AM	10	9	23	5
NOON	0	0	0	0
PM	19	8	51	11
Lanes		0	1	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg	In	Out
AM	0	321
NOON	0	0
PM	0	636

West Leg	AM	NOON	PM
Out	59	0	46
In	289	0	604

East Leg	AM	NOON	PM
In	95	0	91
Out	31	0	64

South Leg	Out	In
AM	10	37
NOON	0	0
PM	19	70

Total Volume Per Leg

	AM	NOON	PM
North Leg	321	0	636
West Leg	348	0	650
East Leg	126	0	155
South Leg	47	0	89

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

I-5 NB Ramps and 24th St , City of San Diego

Date: 3/3/2011

Day: Thursday

Project #: CA11_4063_011

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	430 PM

N

I-5 NB Ramps

24th St

Peak Hour Summary

Southbound Approach

	Right	Thru	Left	Out (Departing)
Lanes	0	0	0	
AM	0	0	0	569
NOON	0	0	0	0
PM	0	0	0	506

Eastbound Approach

	Lanes	AM	NOON	PM
Out (Departing)		516	0	615
Left	1	53	0	101
Thru	2	350	0	511
Right	0	0	0	0

CONTROL

Signalized

Westbound Approach

	AM	NOON	PM	Lanes
Right	371	0	401	0
Thru	280	0	528	2
Left	0	0	0	1
Out (Departing)	750	0	893	

Northbound Approach

	Out (Departing)	Left	Thru	Right
AM	0	236	145	400
NOON	0	0	0	0
PM	0	87	4	382
Lanes		1	1	1

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

	In	Out
AM	0	569
NOON	0	0
PM	0	506

West Leg

	AM	NOON	PM
Out	516	0	615
In	403	0	612

East Leg

	AM	NOON	PM
In	651	0	929
Out	750	0	893

South Leg

	Out	In
AM	0	781
NOON	0	0
PM	0	473

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	569	0	506
West Leg	919	0	1227
East Leg	1401	0	1822
South Leg	781	0	473

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

I-5 SB Ramps and 24th St , City of San Diego

Date: 3/3/2011

Day: Thursday

Project #: CA11_4063_012

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

N

I-5 SB Ramps

24th St

Peak Hour Summary

CONTROL: Signalized

Southbound Approach

	Right	Through	Left	Departing (North Leg)
Lanes	1	0.5	1.5	
AM	122	0	362	0
NOON	0	0	0	0
PM	43	0	441	0

Eastbound Approach

	Lanes	AM	NOON	PM
Departing (West Leg)		446	0	161
Left	0	0	0	0
Through	1	67	0	159
Right	1	79	0	367

Westbound Approach

	AM	NOON	PM	Lanes
Right	0	0	0	0
Through	324	0	118	2
Left	181	0	490	1
Departing (East Leg)	429	0	600	

Northbound Approach

	Departing (South Leg)	Left	Through	Right
AM	260	0	0	0
NOON	0	0	0	0
PM	857	0	0	0
Lanes		0	0	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

Leg	Period	In	Out
North Leg	AM	484	0
North Leg	NOON	0	0
North Leg	PM	484	0
East Leg	AM	505	429
East Leg	NOON	0	0
East Leg	PM	608	600
South Leg	AM	0	260
South Leg	NOON	0	0
South Leg	PM	0	857
West Leg	AM	146	446
West Leg	NOON	0	0
West Leg	PM	526	161

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	484	0	484
East Leg	934	0	1208
South Leg	260	0	857
West Leg	592	0	687

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Cleveland St and 24th St , City of San Diego

Date: 3/3/2011

Day: Thursday

Project #: CA11_4063_013

N

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

CONTROL: 4-Way Stop

Southbound Approach (Cleveland St)

	Right (SB)	Thru (SB)	Left (SB)	Northbound exit
Lanes	0	1	1	
AM	9	2	40	200
NOON	0	0	0	0
PM	8	3	173	45

Eastbound Approach (24th St)

	AM	NOON	PM
Westbound exit	268	0	105

Lanes	Movement	AM	NOON	PM
0	Left	10	0	7
2	Thru	90	0	311
0	Right	4	0	4

Westbound Approach

Movement	AM	NOON	PM	Lanes
Right	184	0	36	0
Thru	257	0	95	2
Left	10	0	28	0

	AM	NOON	PM
Eastbound exit	145	0	511

Northbound Approach

	Southbound exit	Left (NB)	Thru (NB)	Right (NB)
AM	16	2	6	15
NOON	0	0	0	0
PM	35	2	2	27
Lanes		1	0.5	0.5

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg			
AM	51	200	
NOON	0	0	
PM	184	45	

East Leg	AM	NOON	PM
	451	0	159
	145	0	511

West Leg	AM	NOON	PM
	268	0	105
	104	0	322

South Leg		
AM	16	23
NOON	0	0
PM	35	31

Total Volume Per Leg

	North Leg	South Leg
AM	251	39
NOON	0	0
PM	229	66

	AM	NOON	PM
West Leg	372	0	427
East Leg	596	0	670

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

W 32nd St and 24th St , City of San Diego

Date: 3/3/2011

Day: Thursday

Project #: CA11_4063_014

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

N

W 32nd St

24th St

Peak Hour Summary

Southbound Approach

	Right	Thru	Left	Out
Lanes	0	0	0	
AM	0	0	0	0
NOON	0	0	0	0
PM	0	0	0	0

Westbound Approach

	AM	NOON	PM	Lanes
Right	0	0	0	0
Thru	250	0	73	2
Left	17	0	26	1
Out	102	0	307	

Eastbound Approach

	Lanes	AM	NOON	PM
Out		250	0	73
Left	0	0	0	0
Thru	2	79	0	250
Right	0	1	0	2

Northbound Approach

	Out	Left	Thru	Right
AM	18	0	0	23
NOON	0	0	0	0
PM	28	0	0	57
Lanes		1	0	1

CONTROL

Signalized

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

AM	0	0
NOON	0	0
PM	0	0

West Leg

	AM	NOON	PM
Out	250	0	73
In	80	0	252

East Leg

	AM	NOON	PM
In	267	0	99
Out	102	0	307

South Leg

AM	18	23
NOON	0	0
PM	28	57

Total Volume Per Leg

North Leg

AM	0
NOON	0
PM	0

West Leg

AM	NOON	PM
330	0	325

East Leg

AM	NOON	PM
369	0	406

South Leg

AM	41
NOON	0
PM	85

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Tidelands Ave and 24th St-Bay Marina Dr , City of San Diego

Date: 3/3/2011

Day: Thursday

Project #: CA11_4063_015

Tidelands Ave

24th St-Bay Marina Dr

Peak Hour Summary

Southbound Approach

	Left	Through	Right	Exiting
Lanes	0	1	1	
AM	15	37	18	58
NOON	0	0	0	0
PM	8	3	20	24

Westbound Approach

	AM	NOON	PM	Lanes
Right	37	0	14	0
Through	61	0	18	2
Left	31	0	24	1
Exiting	50	0	137	

Eastbound Approach

Lanes		AM	NOON	PM
	Exiting	76	0	29
1	Left	13	0	5
2	Through	19	0	86
0	Right	4	0	1

Northbound Approach

	Exiting	Left	Through	Right
AM	72	0	8	13
NOON	0	0	0	0
PM	28	3	5	31
Lanes		1	1	0

CONTROL

Signalized

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

	In	Out
AM	70	58
NOON	0	0
PM	31	24

East Leg

	AM	NOON	PM
In	129	0	56
Out	50	0	137

West Leg

	AM	NOON	PM
Out	76	0	29
In	36	0	92

South Leg

	Out	In
AM	72	21
NOON	0	0
PM	28	39

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	128	0	55
East Leg	179	0	193
West Leg	112	0	121
South Leg	93	0	67

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Tidelands Ave and W 32nd St , City of San Diego

Date: 3/3/2011

Day: Thursday

Project #: CA11_4063_016

N

Tidelands Ave

W 32nd St

AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Peak Hour Summary

Southbound Approach

	Lanes 0	Lanes 2	Lanes 0		Departing
AM	50	9	6	AM	27
NOON	0	0	0	NOON	0
PM	7	10	2	PM	74

Eastbound Approach

	AM	NOON	PM
Departing	50	0	9

Lanes	AM	NOON	PM
1	19	0	67
1	1	0	19
1	0	0	0

Westbound Approach

AM	NOON	PM	Lanes
1	0	2	0
0	0	2	2
0	0	2	1

	AM	NOON	PM
Departing	7	0	21

CONTROL
4-Way Stop

Northbound Approach

	Departing				
AM	9	0	7	0	AM
NOON	0	0	0	0	NOON
PM	12	0	5	0	PM
		0	1	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg	In	Out
AM	65	27
NOON	0	0
PM	19	74

West Leg	AM	NOON	PM
Out	50	0	9
In	20	0	86

East Leg	AM	NOON	PM
In	1	0	6
Out	7	0	21

South Leg	Out	In
AM	9	7
NOON	0	0
PM	12	5

Total Volume Per Leg

	North Leg	West Leg	East Leg	South Leg
AM	92	70	8	16
NOON	0	0	0	0
PM	93	95	27	17

Prepared by NDS/ATD

VOLUME

Harbor Dr between Park Blvd & Cesar Chavez Pkwy

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	7,099	5,804	12,903

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			36		9		45		12:00			99		67		166	
00:15			24		12		36		12:15			140		86		226	
00:30			14		7		21		12:30			98		82		180	
00:45			14	88	4	32	18	120	12:45			109	446	70	305	179	751
01:00			13		6		19		13:00			78		70		148	
01:15			11		6		17		13:15			99		76		175	
01:30			5		5		10		13:30			115		76		191	
01:45			8	37	7	24	15	61	13:45			120	412	69	291	189	703
02:00			7		4		11		14:00			115		73		188	
02:15			7		4		11		14:15			102		91		193	
02:30			1		3		4		14:30			152		94		246	
02:45			2	17	6	17	8	34	14:45			133	502	117	375	250	877
03:00			1		6		7		15:00			107		95		202	
03:15			5		9		14		15:15			124		89		213	
03:30			2		6		8		15:30			156		94		250	
03:45			1	9	17	38	18	47	15:45			147	534	113	391	260	925
04:00			9		15		24		16:00			184		93		277	
04:15			9		19		28		16:15			181		91		272	
04:30			12		40		52		16:30			278		108		386	
04:45			18	48	43	117	61	165	16:45			258	901	74	366	332	1267
05:00			14		35		49		17:00			240		96		336	
05:15			32		50		82		17:15			252		89		341	
05:30			39		62		101		17:30			208		78		286	
05:45			55	140	74	221	129	361	17:45			153	853	81	344	234	1197
06:00			65		56		121		18:00			116		70		186	
06:15			64		97		161		18:15			83		66		149	
06:30			63		130		193		18:30			72		51		123	
06:45			50	242	134	417	184	659	18:45			64	335	52	239	116	574
07:00			76		134		210		19:00			71		37		108	
07:15			55		183		238		19:15			54		36		90	
07:30			92		206		298		19:30			57		35		92	
07:45			74	297	199	722	273	1019	19:45			47	229	31	139	78	368
08:00			51		160		211		20:00			49		30		79	
08:15			65		121		186		20:15			32		36		68	
08:30			61		92		153		20:30			38		28		66	
08:45			67	244	102	475	169	719	20:45			45	164	23	117	68	281
09:00			85		79		164		21:00			42		31		73	
09:15			66		74		140		21:15			60		27		87	
09:30			76		75		151		21:30			36		23		59	
09:45			77	304	92	320	169	624	21:45			40	178	29	110	69	288
10:00			84		68		152		22:00			52		20		72	
10:15			89		54		143		22:15			44		23		67	
10:30			74		73		147		22:30			46		31		77	
10:45			95	342	66	261	161	603	22:45			39	181	26	100	65	281
11:00			76		79		155		23:00			53		16		69	
11:15			80		84		164		23:15			36		13		49	
11:30			130		81		211		23:30			75		17		92	
11:45			105	391	81	325	186	716	23:45			41	205	12	58	53	263
TOTALS				2159		2969		**5128**	**TOTALS**				4940		2835		**7775**
SPLIT %				42.1%		57.9%		**39.7%**	**SPLIT %**				63.5%		36.5%		**60.3%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	7,099	5,804	12,903

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour			11:30	07:15	**07:15**	**PM Peak Hour**			16:30	15:45	**16:30**
AM Pk Volume			474	748	**1020**	**PM Pk Volume**			1028	405	**1395**
Pk Hr Factor			0.846	0.908	**0.856**	**Pk Hr Factor**			0.924	0.896	**0.903**
7 - 9 Volume	0	0	541	1197	**1738**	**4 - 6 Volume**	0	0	1754	710	**2464**
7 - 9 Peak Hour			07:00	07:15	**07:15**	**4 - 6 Peak Hour**			16:30	16:15	**16:30**
7 - 9 Pk Volume	0	0	297	748	**1020**	**4 - 6 Pk Volume**	0	0	1028	369	**1395**
Pk Hr Factor	0.000	0.000	0.807	0.908	**0.856**	**Pk Hr Factor**	0.000	0.000	0.924	0.854	**0.903**

Prepared by NDS/ATD

VOLUME

Harbor Dr between Cesar Chavez Pkwy & Sampson St

Day: Tuesday
Date: 3/8/2011

City: San Diego
Project #: CA11_4064_002

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,401	3,739	9,140

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			19		14		33		12:00			88		50		138	
00:15			22		12		34		12:15			63		53		116	
00:30			20		12		32		12:30			77		53		130	
00:45			17	78	9	47	26	125	12:45			67	295	38	194	105	489
01:00			21		10		31		13:00			60		47		107	
01:15			19		12		31		13:15			67		54		121	
01:30			18		12		30		13:30			57		62		119	
01:45			12	70	10	44	22	114	13:45			65	249	46	209	111	458
02:00			14		9		23		14:00			73		40		113	
02:15			12		6		18		14:15			95		53		148	
02:30			11		7		18		14:30			75		66		141	
02:45			7	44	2	24	9	68	14:45			104	347	77	236	181	583
03:00			2		10		12		15:00			104		77		181	
03:15			3		1		4		15:15			77		68		145	
03:30			2		2		4		15:30			95		79		174	
03:45			9	16	3	16	12	32	15:45			89	365	66	290	155	655
04:00			13		16		29		16:00			133		50		183	
04:15			17		6		23		16:15			145		50		195	
04:30			19		15		34		16:30			171		57		228	
04:45			25	74	10	47	35	121	16:45			172	621	46	203	218	824
05:00			29		17		46		17:00			191		46		237	
05:15			49		19		68		17:15			208		49		257	
05:30			91		27		118		17:30			185		47		232	
05:45			95	264	25	88	120	352	17:45			111	695	30	172	141	867
06:00			90		43		133		18:00			122		32		154	
06:15			80		41		121		18:15			68		20		88	
06:30			82		67		149		18:30			47		28		75	
06:45			58	310	63	214	121	524	18:45			41	278	23	103	64	381
07:00			44		71		115		19:00			32		33		65	
07:15			73		130		203		19:15			37		19		56	
07:30			47		136		183		19:30			21		23		44	
07:45			62	226	121	458	183	684	19:45			32	122	26	101	58	223
08:00			42		131		173		20:00			41		15		56	
08:15			45		142		187		20:15			18		14		32	
08:30			57		92		149		20:30			28		18		46	
08:45			65	209	74	439	139	648	20:45			15	102	9	56	24	158
09:00			58		46		104		21:00			20		22		42	
09:15			45		49		94		21:15			29		24		53	
09:30			76		43		119		21:30			20		9		29	
09:45			58	237	55	193	113	430	21:45			15	84	16	71	31	155
10:00			76		41		117		22:00			22		21		43	
10:15			68		63		131		22:15			25		6		31	
10:30			72		53		125		22:30			16		15		31	
10:45			72	288	60	217	132	505	22:45			26	89	12	54	38	143
11:00			62		71		133		23:00			24		10		34	
11:15			59		45		104		23:15			14		5		19	
11:30			64		59		123		23:30			23		6		29	
11:45			68	253	57	232	125	485	23:45			24	85	10	31	34	116
TOTALS				2069		2019		**4088**	**TOTALS**				3332		1720		**5052**
SPLIT %				50.6%		49.4%		**44.7%**	**SPLIT %**				66.0%		34.0%		**55.3%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,401	3,739	9,140

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour			05:30	07:30	**07:15**	**PM Peak Hour**			16:45	14:45	**16:45**
AM Pk Volume			356	530	**742**	**PM Pk Volume**			756	301	**944**
Pk Hr Factor			0.937	0.933	**0.914**	**Pk Hr Factor**			0.909	0.953	**0.918**
7 - 9 Volume	0	0	435	897	**1332**	**4 - 6 Volume**	0	0	1316	375	**1691**
7 - 9 Peak Hour			07:00	07:30	**07:15**	**4 - 6 Peak Hour**			16:45	16:00	**16:45**
7 - 9 Pk Volume	0	0	226	530	**742**	**4 - 6 Pk Volume**	0	0	756	203	**944**
Pk Hr Factor	0.000	0.000	0.774	0.933	**0.914**	**Pk Hr Factor**	0.000	0.000	0.909	0.890	**0.918**

Prepared by NDS/ATD

VOLUME

Harbor Dr between Sampson St & 28th St

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_003

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,888	4,197	10,085

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			32		11		43		12:00			69		72		141	
00:15			11		8		19		12:15			79		71		150	
00:30			24		17		41		12:30			65		74		139	
00:45			11	78	12	48	23	126	12:45			70	283	48	265	118	548
01:00			8		8		16		13:00			80		41		121	
01:15			5		3		8		13:15			73		66		139	
01:30			32		5		37		13:30			108		51		159	
01:45			10	55	6	22	16	77	13:45			82	343	59	217	141	560
02:00			9		3		12		14:00			93		76		169	
02:15			11		0		11		14:15			91		85		176	
02:30			6		4		10		14:30			175		95		270	
02:45			9	35	1	8	10	43	14:45			237	596	73	329	310	925
03:00			1		4		5		15:00			165		98		263	
03:15			3		5		8		15:15			142		84		226	
03:30			3		2		5		15:30			153		76		229	
03:45			1	8	14	25	15	33	15:45			149	609	63	321	212	930
04:00			7		12		19		16:00			146		42		188	
04:15			6		24		30		16:15			132		32		164	
04:30			10		53		63		16:30			189		46		235	
04:45			14	37	41	130	55	167	16:45			174	641	39	159	213	800
05:00			20		54		74		17:00			209		38		247	
05:15			47		60		107		17:15			187		34		221	
05:30			66		72		138		17:30			156		40		196	
05:45			91	224	46	232	137	456	17:45			99	651	34	146	133	797
06:00			104		41		145		18:00			78		34		112	
06:15			97		70		167		18:15			40		22		62	
06:30			80		81		161		18:30			34		25		59	
06:45			53	334	75	267	128	601	18:45			32	184	29	110	61	294
07:00			50		89		139		19:00			33		19		52	
07:15			53		127		180		19:15			37		19		56	
07:30			46		148		194		19:30			48		18		66	
07:45			62	211	177	541	239	752	19:45			23	141	22	78	45	219
08:00			43		125		168		20:00			33		22		55	
08:15			51		89		140		20:15			25		13		38	
08:30			65		76		141		20:30			19		12		31	
08:45			53	212	57	347	110	559	20:45			22	99	15	62	37	161
09:00			66		58		124		21:00			31		15		46	
09:15			70		67		137		21:15			17		11		28	
09:30			78		61		139		21:30			18		12		30	
09:45			52	266	58	244	110	510	21:45			18	84	17	55	35	139
10:00			72		68		140		22:00			28		12		40	
10:15			67		57		124		22:15			22		14		36	
10:30			76		53		129		22:30			40		7		47	
10:45			76	291	57	235	133	526	22:45			14	104	11	44	25	148
11:00			81		75		156		23:00			19		6		25	
11:15			80		61		141		23:15			17		10		27	
11:30			62		79		141		23:30			50		10		60	
11:45			67	290	60	275	127	565	23:45			26	112	11	37	37	149
TOTALS				2041		2374		**4415**	**TOTALS**				3847		1823		**5670**
SPLIT %				46.2%		53.8%		**43.8%**	**SPLIT %**				67.8%		32.2%		**56.2%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,888	4,197	10,085

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour			05:45	07:15	**07:15**	**PM Peak Hour**			16:30	14:15	**14:30**
AM Pk Volume			372	577	**781**	**PM Pk Volume**			759	351	**1069**
Pk Hr Factor			0.894	0.815	**0.817**	**Pk Hr Factor**			0.908	0.895	**0.862**
7 - 9 Volume	0	0	423	888	**1311**	**4 - 6 Volume**	0	0	1292	305	**1597**
7 - 9 Peak Hour			07:45	07:15	**07:15**	**4 - 6 Peak Hour**			16:30	16:00	**16:30**
7 - 9 Pk Volume	0	0	221	577	**781**	**4 - 6 Pk Volume**	0	0	759	159	**916**
Pk Hr Factor	0.000	0.000	0.850	0.815	**0.817**	**Pk Hr Factor**	0.000	0.000	0.908	0.864	**0.927**

Prepared by NDS/ATD

VOLUME

Harbor Dr between 28th St & 32nd St

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_004

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	8,109	6,131	14,240

AM Period	NB	SB	EB		WB		TOTAL	
00:00			30		6		36	
00:15			17		12		29	
00:30			43		7		50	
00:45			17	107	4	29	21	136
01:00			14		0		14	
01:15			3		4		7	
01:30			11		3		14	
01:45			7	35	4	11	11	46
02:00			7		4		11	
02:15			12		4		16	
02:30			5		6		11	
02:45			2	26	9	23	11	49
03:00			6		9		15	
03:15			3		10		13	
03:30			4		12		16	
03:45			6	19	33	64	39	83
04:00			24		41		65	
04:15			16		53		69	
04:30			28		79		107	
04:45			46	114	104	277	150	391
05:00			51		159		210	
05:15			76		187		263	
05:30			81		184		265	
05:45			132	340	134	664	266	1004
06:00			148		88		236	
06:15			155		77		232	
06:30			126		96		222	
06:45			89	518	100	361	189	879
07:00			80		117		197	
07:15			66		149		215	
07:30			67		173		240	
07:45			64	277	183	622	247	899
08:00			73		132		205	
08:15			47		111		158	
08:30			57		95		152	
08:45			91	268	69	407	160	675
09:00			85		76		161	
09:15			79		76		155	
09:30			88		80		168	
09:45			78	330	79	311	157	641
10:00			81		95		176	
10:15			94		88		182	
10:30			85		74		159	
10:45			102	362	102	359	204	721
11:00			96		104		200	
11:15			117		104		221	
11:30			85		92		177	
11:45			99	397	88	388	187	785
TOTALS				2793		3516		**6309**
SPLIT %				44.3%		55.7%		**44.3%**

PM Period	NB	SB	EB		WB		TOTAL	
12:00			87		99		186	
12:15			105		89		194	
12:30			84		112		196	
12:45			125	401	73	373	198	774
13:00			77		90		167	
13:15			97		100		197	
13:30			123		86		209	
13:45			94	391	92	368	186	759
14:00			98		112		210	
14:15			111		113		224	
14:30			234		116		350	
14:45			324	767	83	424	407	1191
15:00			327		85		412	
15:15			300		107		407	
15:30			230		106		336	
15:45			226	1083	72	370	298	1453
16:00			221		66		287	
16:15			230		68		298	
16:30			225		68		293	
16:45			267	943	65	267	332	1210
17:00			248		88		336	
17:15			268		61		329	
17:30			218		56		274	
17:45			152	886	58	263	210	1149
18:00			108		69		177	
18:15			70		48		118	
18:30			43		35		78	
18:45			33	254	34	186	67	440
19:00			35		25		60	
19:15			47		36		83	
19:30			45		21		66	
19:45			40	167	23	105	63	272
20:00			38		25		63	
20:15			28		20		48	
20:30			22		17		39	
20:45			24	112	23	85	47	197
21:00			33		23		56	
21:15			16		15		31	
21:30			20		16		36	
21:45			15	84	18	72	33	156
22:00			34		19		53	
22:15			21		20		41	
22:30			33		8		41	
22:45			15	103	13	60	28	163
23:00			25		13		38	
23:15			19		14		33	
23:30			54		8		62	
23:45			27	125	7	42	34	167
TOTALS				5316		2615		**7931**
SPLIT %				67.0%		33.0%		**55.7%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	8,109	6,131	14,240

	NB	SB	EB	WB	Total
AM Peak Hour			05:45	05:00	**05:15**
AM Pk Volume			561	664	**1030**
Pk Hr Factor			0.905	0.888	**0.968**
7 - 9 Volume	0	0	545	1029	**1574**
7 - 9 Peak Hour			07:00	07:15	**07:15**
7 - 9 Pk Volume	0	0	277	637	**907**
Pk Hr Factor	0.000	0.000	0.866	0.870	**0.918**

	NB	SB	EB	WB	Total
PM Peak Hour			14:30	13:45	**14:30**
PM Pk Volume			1185	433	**1576**
Pk Hr Factor			0.906	0.933	**0.956**
4 - 6 Volume	0	0	1829	530	**2359**
4 - 6 Peak Hour			16:30	16:15	**16:30**
4 - 6 Pk Volume	0	0	1008	289	**1290**
Pk Hr Factor	0.000	0.000	0.940	0.821	**0.960**

Prepared by NDS/ATD

VOLUME

28th St between Harbor Dr & Main St

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_005

DAILY TOTALS	NB	SB	EB	WB	Total
	7,611	7,620	0	0	15,231

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	20		11				31		12:00	171		130				301	
00:15	8		12				20		12:15	152		164				316	
00:30	53		5				58		12:30	136		152				288	
00:45	22	103	10	38			32	141	12:45	183	642	150	596			333	1238
01:00	2		11				13		13:00	160		115				275	
01:15	11		3				14		13:15	163		139				302	
01:30	29		6				35		13:30	165		126				291	
01:45	9	51	12	32			21	83	13:45	160	648	114	494			274	1142
02:00	16		1				17		14:00	141		106				247	
02:15	6		4				10		14:15	131		97				228	
02:30	11		7				18		14:30	163		99				262	
02:45	15	48	7	19			22	67	14:45	174	609	108	410			282	1019
03:00	5		6				11		15:00	175		89				264	
03:15	8		14				22		15:15	179		110				289	
03:30	11		22				33		15:30	157		120				277	
03:45	5	29	32	74			37	103	15:45	143	654	103	422			246	1076
04:00	12		31				43		16:00	181		80				261	
04:15	16		49				65		16:15	132		95				227	
04:30	9		79				88		16:30	160		89				249	
04:45	11	48	96	255			107	303	16:45	121	594	78	342			199	936
05:00	19		83				102		17:00	134		59				193	
05:15	26		150				176		17:15	130		92				222	
05:30	52		242				294		17:30	73		79				152	
05:45	61	158	278	753			339	911	17:45	87	424	82	312			169	736
06:00	58		194				252		18:00	87		77				164	
06:15	58		209				267		18:15	91		52				143	
06:30	53		172				225		18:30	71		38				109	
06:45	55	224	149	724			204	948	18:45	84	333	51	218			135	551
07:00	92		169				261		19:00	67		38				105	
07:15	64		142				206		19:15	52		35				87	
07:30	81		136				217		19:30	69		43				112	
07:45	56	293	86	533			142	826	19:45	42	230	45	161			87	391
08:00	50		97				147		20:00	58		25				83	
08:15	65		107				172		20:15	35		24				59	
08:30	79		102				181		20:30	41		33				74	
08:45	76	270	97	403			173	673	20:45	32	166	22	104			54	270
09:00	98		95				193		21:00	44		27				71	
09:15	122		100				222		21:15	19		18				37	
09:30	116		94				210		21:30	40		21				61	
09:45	109	445	124	413			233	858	21:45	27	130	30	96			57	226
10:00	108		116				224		22:00	22		23				45	
10:15	137		114				251		22:15	22		18				40	
10:30	143		132				275		22:30	38		13				51	
10:45	158	546	126	488			284	1034	22:45	25	107	13	67			38	174
11:00	209		139				348		23:00	22		10				32	
11:15	159		144				303		23:15	14		12				26	
11:30	206		167				373		23:30	56		16				72	
11:45	175	749	168	618			343	1367	23:45	18	110	10	48			28	158
TOTALS		2964		4350				**7314**	**TOTALS**		4647		3270				**7917**
SPLIT %		40.5%		59.5%				**48.0%**	**SPLIT %**		58.7%		41.3%				**52.0%**

DAILY TOTALS	NB	SB	EB	WB	Total
	7,611	7,620	0	0	15,231

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour	11:00	05:30			**11:00**	**PM Peak Hour**	14:30	12:00			**12:00**
AM Pk Volume	749	923			**1367**	**PM Pk Volume**	691	596			**1238**
Pk Hr Factor	0.896	0.830			**0.916**	**Pk Hr Factor**	0.965	0.909			**0.929**
7 - 9 Volume	563	936	0	0	**1499**	**4 - 6 Volume**	1018	654	0	0	**1672**
7 - 9 Peak Hour	07:00	07:00			**07:00**	**4 - 6 Peak Hour**	16:00	16:00			**16:00**
7 - 9 Pk Volume	293	533	0	0	**826**	**4 - 6 Pk Volume**	594	342	0	0	**936**
Pk Hr Factor	0.796	0.788	0.000	0.000	**0.791**	**Pk Hr Factor**	0.820	0.900	0.000	0.000	**0.897**

Prepared by NDS/ATD

VOLUME

28th St between Main St & Boston Ave

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_006

DAILY TOTALS	NB	SB	EB	WB	Total
	9,671	8,783	0	0	18,454

AM Period	NB		SB		EB	WB	TOTAL	
00:00	16		21				37	
00:15	22		20				42	
00:30	49		15				64	
00:45	35	122	13	69			48	191
01:00	20		11				31	
01:15	13		17				30	
01:30	39		11				50	
01:45	17	89	17	56			34	145
02:00	17		12				29	
02:15	17		12				29	
02:30	9		7				16	
02:45	18	61	7	38			25	99
03:00	5		9				14	
03:15	6		22				28	
03:30	12		33				45	
03:45	13	36	29	93			42	129
04:00	23		40				63	
04:15	18		53				71	
04:30	25		74				99	
04:45	31	97	92	259			123	356
05:00	29		101				130	
05:15	31		146				177	
05:30	67		185				252	
05:45	72	199	188	620			260	819
06:00	72		159				231	
06:15	80		149				229	
06:30	98		155				253	
06:45	83	333	150	613			233	946
07:00	120		155				275	
07:15	79		144				223	
07:30	126		130				256	
07:45	90	415	121	550			211	965
08:00	70		111				181	
08:15	91		136				227	
08:30	115		127				242	
08:45	99	375	131	505			230	880
09:00	112		114				226	
09:15	123		137				260	
09:30	129		112				241	
09:45	146	510	146	509			292	1019
10:00	146		116				262	
10:15	150		124				274	
10:30	156		130				286	
10:45	158	610	144	514			302	1124
11:00	191		138				329	
11:15	215		144				359	
11:30	197		177				374	
11:45	221	824	167	626			388	1450
TOTALS		3671		4452				**8123**
SPLIT %		45.2%		54.8%				**44.0%**

PM Period	NB		SB		EB	WB	TOTAL	
12:00	189		129				318	
12:15	175		155				330	
12:30	172		136				308	
12:45	175	711	141	561			316	1272
13:00	174		138				312	
13:15	196		153				349	
13:30	165		117				282	
13:45	177	712	129	537			306	1249
14:00	193		120				313	
14:15	162		126				288	
14:30	233		122				355	
14:45	231	819	108	476			339	1295
15:00	251		137				388	
15:15	224		132				356	
15:30	239		142				381	
15:45	178	892	139	550			317	1442
16:00	196		135				331	
16:15	170		159				329	
16:30	206		150				356	
16:45	184	756	138	582			322	1338
17:00	188		135				323	
17:15	182		148				330	
17:30	109		140				249	
17:45	133	612	133	556			266	1168
18:00	135		118				253	
18:15	116		84				200	
18:30	99		63				162	
18:45	116	466	76	341			192	807
19:00	94		47				141	
19:15	79		61				140	
19:30	74		52				126	
19:45	64	311	56	216			120	527
20:00	62		56				118	
20:15	70		39				109	
20:30	59		43				102	
20:45	54	245	31	169			85	414
21:00	50		26				76	
21:15	45		37				82	
21:30	45		38				83	
21:45	42	182	30	131			72	313
22:00	40		38				78	
22:15	21		32				53	
22:30	60		27				87	
22:45	33	154	28	125			61	279
23:00	32		19				51	
23:15	30		26				56	
23:30	51		21				72	
23:45	27	140	21	87			48	227
TOTALS		6000		4331				**10331**
SPLIT %		58.1%		41.9%				**56.0%**

DAILY TOTALS	NB	SB	EB	WB	Total
	9,671	8,783	0	0	18,454

	NB	SB	EB	WB	Total
AM Peak Hour	11:00	05:30			**11:00**
AM Pk Volume	824	681			**1450**
Pk Hr Factor	0.932	0.906			**0.934**
7 - 9 Volume	790	1055	0	0	**1845**
7 - 9 Peak Hour	07:00	07:00			**07:00**
7 - 9 Pk Volume	415	550	0	0	**965**
Pk Hr Factor	0.823	0.887	0.000	0.000	**0.877**

	NB	SB	EB	WB	Total
PM Peak Hour	14:45	15:45			**14:45**
PM Pk Volume	945	583			**1464**
Pk Hr Factor	0.941	0.917			**0.943**
4 - 6 Volume	1368	1138	0	0	**2506**
4 - 6 Peak Hour	16:30	16:00			**16:00**
4 - 6 Pk Volume	760	582	0	0	**1338**
Pk Hr Factor	0.922	0.915	0.000	0.000	**0.940**

Prepared by NDS/ATD

VOLUME

28th St between Boston Ave & National Ave

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_007

DAILY TOTALS	NB	SB	EB	WB	Total
	7,943	6,673	0	0	14,616

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	12		13				25		12:00	157		117				274	
00:15	9		22				31		12:15	147		126				273	
00:30	8		9				17		12:30	135		116				251	
00:45	11	40	14	58			25	98	12:45	150	589	109	468			259	1057
01:00	9		5				14		13:00	146		117				263	
01:15	10		15				25		13:15	155		106				261	
01:30	13		10				23		13:30	137		123				260	
01:45	7	39	7	37			14	76	13:45	134	572	114	460			248	1032
02:00	8		3				11		14:00	151		100				251	
02:15	12		13				25		14:15	130		94				224	
02:30	6		7				13		14:30	164		121				285	
02:45	4	30	9	32			13	62	14:45	184	629	108	423			292	1052
03:00	6		6				12		15:00	206		120				326	
03:15	5		27				32		15:15	222		117				339	
03:30	11		26				37		15:30	169		135				304	
03:45	5	27	21	80			26	107	15:45	171	768	122	494			293	1262
04:00	6		25				31		16:00	161		115				276	
04:15	8		33				41		16:15	150		112				262	
04:30	20		54				74		16:30	161		98				259	
04:45	24	58	55	167			79	225	16:45	148	620	94	419			242	1039
05:00	20		69				89		17:00	147		101				248	
05:15	28		75				103		17:15	143		90				233	
05:30	55		113				168		17:30	114		110				224	
05:45	45	148	117	374			162	522	17:45	121	525	110	411			231	936
06:00	70		89				159		18:00	125		102				227	
06:15	66		80				146		18:15	100		89				189	
06:30	93		73				166		18:30	88		81				169	
06:45	84	313	93	335			177	648	18:45	93	406	73	345			166	751
07:00	105		70				175		19:00	81		72				153	
07:15	91		58				149		19:15	59		63				122	
07:30	114		81				195		19:30	52		53				105	
07:45	90	400	90	299			180	699	19:45	57	249	66	254			123	503
08:00	77		70				147		20:00	47		55				102	
08:15	81		101				182		20:15	56		47				103	
08:30	107		87				194		20:30	78		40				118	
08:45	103	368	87	345			190	713	20:45	48	229	38	180			86	409
09:00	89		89				178		21:00	35		32				67	
09:15	107		96				203		21:15	41		64				105	
09:30	99		87				186		21:30	32		50				82	
09:45	119	414	85	357			204	771	21:45	31	139	30	176			61	315
10:00	130		99				229		22:00	19		30				49	
10:15	126		86				212		22:15	14		26				40	
10:30	145		78				223		22:30	22		24				46	
10:45	147	548	90	353			237	901	22:45	23	78	42	122			65	200
11:00	163		93				256		23:00	20		21				41	
11:15	162		115				277		23:15	8		10				18	
11:30	164		105				269		23:30	26		11				37	
11:45	191	680	114	427			305	1107	23:45	20	74	15	57			35	131
TOTALS		3065		2864				5929	TOTALS		4878		3809				8687
SPLIT %		51.7%		48.3%				40.6%	SPLIT %		56.2%		43.8%				59.4%

DAILY TOTALS	NB	SB	EB	WB	Total
	7,943	6,673	0	0	14,616

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour	11:00	11:45			11:15	PM Peak Hour	14:45	15:00			15:00
AM Pk Volume	680	473			1125	PM Pk Volume	781	494			1262
Pk Hr Factor	0.890	0.938			0.922	Pk Hr Factor	0.880	0.915			0.931
7 - 9 Volume	768	644	0	0	1412	4 - 6 Volume	1145	830	0	0	1975
7 - 9 Peak Hour	07:00	07:45			08:00	4 - 6 Peak Hour	16:00	16:00			16:00
7 - 9 Pk Volume	400	348	0	0	713	4 - 6 Pk Volume	620	419	0	0	1039
Pk Hr Factor	0.877	0.861	0.000	0.000	0.919	Pk Hr Factor	0.963	0.911	0.000	0.000	0.941

Prepared by NDS/ATD

VOLUME

National Ave between 28th St & I-5 NB Ramps

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_008

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,206	12,485	17,691

AM Period	NB	SB	EB		WB		TOTAL	
00:00			9		25		34	
00:15			6		23		29	
00:30			13		17		30	
00:45			11	39	14	79	25	118
01:00			6		15		21	
01:15			6		18		24	
01:30			3		14		17	
01:45			7	22	12	59	19	81
02:00			8		6		14	
02:15			3		14		17	
02:30			1		16		17	
02:45			2	14	15	51	17	65
03:00			4		19		23	
03:15			0		32		32	
03:30			3		35		38	
03:45			1	8	41	127	42	135
04:00			2		59		61	
04:15			4		98		102	
04:30			1		134		135	
04:45			4	11	171	462	175	473
05:00			4		187		191	
05:15			9		239		248	
05:30			14		252		266	
05:45			26	53	205	883	231	936
06:00			35		169		204	
06:15			34		178		212	
06:30			20		168		188	
06:45			34	123	212	727	246	850
07:00			35		193		228	
07:15			54		212		266	
07:30			55		204		259	
07:45			61	205	189	798	250	1003
08:00			63		185		248	
08:15			52		211		263	
08:30			59		180		239	
08:45			70	244	175	751	245	995
09:00			73		159		232	
09:15			70		166		236	
09:30			75		140		215	
09:45			88	306	173	638	261	944
10:00			62		170		232	
10:15			67		147		214	
10:30			65		170		235	
10:45			70	264	157	644	227	908
11:00			75		176		251	
11:15			84		168		252	
11:30			89		229		318	
11:45			109	357	175	748	284	1105
TOTALS				1646		5967		**7613**
SPLIT %				21.6%		78.4%		**43.0%**

PM Period	NB	SB	EB		WB		TOTAL	
12:00			92		162		254	
12:15			93		203		296	
12:30			93		193		286	
12:45			93	371	230	788	323	1159
13:00			94		242		336	
13:15			78		213		291	
13:30			72		252		324	
13:45			75	319	225	932	300	1251
14:00			105		202		307	
14:15			68		243		311	
14:30			136		228		364	
14:45			139	448	228	901	367	1349
15:00			141		212		353	
15:15			148		204		352	
15:30			107		216		323	
15:45			137	533	188	820	325	1353
16:00			134		184		318	
16:15			104		182		286	
16:30			141		174		315	
16:45			125	504	130	670	255	1174
17:00			155		145		300	
17:15			95		161		256	
17:30			107		142		249	
17:45			109	466	150	598	259	1064
18:00			98		155		253	
18:15			90		136		226	
18:30			64		138		202	
18:45			67	319	112	541	179	860
19:00			50		110		160	
19:15			35		89		124	
19:30			37		99		136	
19:45			42	164	90	388	132	552
20:00			47		77		124	
20:15			37		70		107	
20:30			42		76		118	
20:45			36	162	68	291	104	453
21:00			32		72		104	
21:15			29		68		97	
21:30			27		88		115	
21:45			38	126	76	304	114	430
22:00			31		40		71	
22:15			24		52		76	
22:30			22		44		66	
22:45			17	94	47	183	64	277
23:00			12		24		36	
23:15			16		23		39	
23:30			15		28		43	
23:45			11	54	27	102	38	156
TOTALS				3560		6518		**10078**
SPLIT %				35.3%		64.7%		**57.0%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	5,206	12,485	17,691

	NB	SB	EB	WB	Total
AM Peak Hour			11:45	05:00	**11:30**
AM Pk Volume			387	883	**1152**
Pk Hr Factor			0.888	0.876	**0.906**
7 - 9 Volume	0	0	449	1549	**1998**
7 - 9 Peak Hour			08:00	07:00	**07:15**
7 - 9 Pk Volume	0	0	244	798	**1023**
Pk Hr Factor	0.000	0.000	0.871	0.941	**0.961**

	NB	SB	EB	WB	Total
PM Peak Hour			14:30	12:45	**14:30**
PM Pk Volume			564	937	**1436**
Pk Hr Factor			0.953	0.930	**0.978**
4 - 6 Volume	0	0	970	1268	**2238**
4 - 6 Peak Hour			16:15	16:00	**16:00**
4 - 6 Pk Volume	0	0	525	670	**1174**
Pk Hr Factor	0.000	0.000	0.847	0.910	**0.923**

Prepared by NDS/ATD

VOLUME

Boston Ave between 28th St & I-5 SB Ramps

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_009

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	7,392	796	8,188

AM Period	NB		SB		EB		WB		TOTAL	
00:00					23		0		23	
00:15					14		2		16	
00:30					56		3		59	
00:45					29	122	1	6	30	128
01:00					13		1		14	
01:15					7		0		7	
01:30					36		5		41	
01:45					10	66	2	8	12	74
02:00					9		0		9	
02:15					8		0		8	
02:30					7		0		7	
02:45					12	36	3	3	15	39
03:00					5		0		5	
03:15					4		0		4	
03:30					7		2		9	
03:45					9	25	6	8	15	33
04:00					18		2		20	
04:15					14		2		16	
04:30					10		8		18	
04:45					27	69	4	16	31	85
05:00					16		4		20	
05:15					24		6		30	
05:30					49		11		60	
05:45					71	160	13	34	84	194
06:00					73		19		92	
06:15					48		9		57	
06:30					49		9		58	
06:45					53	223	9	46	62	269
07:00					75		14		89	
07:15					51		17		68	
07:30					84		25		109	
07:45					87	297	14	70	101	367
08:00					70		13		83	
08:15					74		11		85	
08:30					80		11		91	
08:45					55	279	11	46	66	325
09:00					82		13		95	
09:15					90		13		103	
09:30					74		9		83	
09:45					99	345	8	43	107	388
10:00					102		11		113	
10:15					95		14		109	
10:30					88		9		97	
10:45					80	365	14	48	94	413
11:00					95		9		104	
11:15					126		14		140	
11:30					100		11		111	
11:45					118	439	13	47	131	486
TOTALS						2426		375		**2801**
SPLIT %						86.6%		13.4%		**34.2%**

PM Period	NB		SB		EB		WB		TOTAL	
12:00					128		9		137	
12:15					115		13		128	
12:30					102		14		116	
12:45					98	443	10	46	108	489
13:00					105		13		118	
13:15					118		14		132	
13:30					130		11		141	
13:45					126	479	12	50	138	529
14:00					125		9		134	
14:15					111		6		117	
14:30					255		13		268	
14:45					282	773	20	48	302	821
15:00					310		17		327	
15:15					265		29		294	
15:30					190		11		201	
15:45					161	926	9	66	170	992
16:00					147		14		161	
16:15					132		7		139	
16:30					137		9		146	
16:45					143	559	14	44	157	603
17:00					143		11		154	
17:15					139		11		150	
17:30					106		12		118	
17:45					114	502	9	43	123	545
18:00					95		9		104	
18:15					89		9		98	
18:30					84		9		93	
18:45					73	341	9	36	82	377
19:00					82		11		93	
19:15					79		10		89	
19:30					61		5		66	
19:45					64	286	7	33	71	319
20:00					51		0		51	
20:15					57		6		63	
20:30					63		4		67	
20:45					52	223	6	16	58	239
21:00					40		5		45	
21:15					43		3		46	
21:30					59		8		67	
21:45					24	166	3	19	27	185
22:00					33		3		36	
22:15					27		3		30	
22:30					58		3		61	
22:45					40	158	3	12	43	170
23:00					32		5		37	
23:15					20		2		22	
23:30					36		0		36	
23:45					22	110	1	8	23	118
TOTALS						4966		421		**5387**
SPLIT %						92.2%		7.8%		**65.8%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	7,392	796	8,188

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour			11:15	07:00	**11:15**	**PM Peak Hour**			14:30	14:30	**14:30**
AM Pk Volume			472	70	**519**	**PM Pk Volume**			1112	79	**1191**
Pk Hr Factor			0.922	0.700	**0.927**	**Pk Hr Factor**			0.897	0.681	**0.911**
7 - 9 Volume	0	0	576	116	**692**	**4 - 6 Volume**	0	0	1061	87	**1148**
7 - 9 Peak Hour			07:30	07:00	**07:30**	**4 - 6 Peak Hour**			16:30	16:45	**16:30**
7 - 9 Pk Volume	0	0	315	70	**378**	**4 - 6 Pk Volume**	0	0	562	48	**607**
Pk Hr Factor	0.000	0.000	0.905	0.700	**0.867**	**Pk Hr Factor**	0.000	0.000	0.983	0.857	**0.967**

Prepared by NDS/ATD

VOLUME

24th St between I-5 NB Ramps & I-5 SB Ramps

Day: Tuesday
Date: 3/8/2011

City: San Diego
Project #: CA11_4064_010

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	8,109	8,607	16,716

AM Period	NB	SB	EB		WB		TOTAL	
00:00			19		17		36	
00:15			25		19		44	
00:30			23		16		39	
00:45			12	79	13	65	25	144
01:00			6		14		20	
01:15			7		13		20	
01:30			14		11		25	
01:45			22	49	9	47	31	96
02:00			8		15		23	
02:15			6		21		27	
02:30			7		22		29	
02:45			5	26	42	100	47	126
03:00			3		6		9	
03:15			11		8		19	
03:30			8		15		23	
03:45			9	31	28	57	37	88
04:00			8		32		40	
04:15			17		41		58	
04:30			4		39		43	
04:45			9	38	85	197	94	235
05:00			23		34		57	
05:15			27		58		85	
05:30			39		120		159	
05:45			36	125	157	369	193	494
06:00			38		113		151	
06:15			65		124		189	
06:30			54		131		185	
06:45			59	216	164	532	223	748
07:00			73		108		181	
07:15			90		125		215	
07:30			106		139		245	
07:45			133	402	181	553	314	955
08:00			114		146		260	
08:15			118		117		235	
08:30			118		133		251	
08:45			125	475	78	474	203	949
09:00			109		105		214	
09:15			110		94		204	
09:30			133		112		245	
09:45			107	459	124	435	231	894
10:00			118		93		211	
10:15			116		127		243	
10:30			124		109		233	
10:45			122	480	139	468	261	948
11:00			139		134		273	
11:15			159		149		308	
11:30			184		123		307	
11:45			130	612	129	535	259	1147
TOTALS				2992		3832		**6824**
SPLIT %				43.8%		56.2%		**40.8%**

PM Period	NB	SB	EB		WB		TOTAL	
12:00			144		167		311	
12:15			139		186		325	
12:30			145		179		324	
12:45			149	577	174	706	323	1283
13:00			134		152		286	
13:15			133		161		294	
13:30			133		122		255	
13:45			155	555	133	568	288	1123
14:00			147		123		270	
14:15			164		128		292	
14:30			177		133		310	
14:45			226	714	120	504	346	1218
15:00			189		124		313	
15:15			177		147		324	
15:30			230		156		386	
15:45			152	748	146	573	298	1321
16:00			187		132		319	
16:15			167		162		329	
16:30			195		175		370	
16:45			148	697	117	586	265	1283
17:00			161		155		316	
17:15			158		152		310	
17:30			131		111		242	
17:45			123	573	94	512	217	1085
18:00			114		134		248	
18:15			88		103		191	
18:30			95		105		200	
18:45			91	388	70	412	161	800
19:00			76		90		166	
19:15			75		68		143	
19:30			43		58		101	
19:45			60	254	66	282	126	536
20:00			50		64		114	
20:15			70		54		124	
20:30			58		66		124	
20:45			42	220	71	255	113	475
21:00			59		75		134	
21:15			39		41		80	
21:30			40		44		84	
21:45			32	170	34	194	66	364
22:00			33		31		64	
22:15			39		34		73	
22:30			32		21		53	
22:45			27	131	24	110	51	241
23:00			29		19		48	
23:15			23		16		39	
23:30			19		15		34	
23:45			19	90	23	73	42	163
TOTALS				5117		4775		**9892**
SPLIT %				51.7%		48.3%		**59.2%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	8,109	8,607	16,716

	NB	SB	EB	WB	Total
AM Peak Hour			11:15	11:45	**11:45**
AM Pk Volume			617	661	**1219**
Pk Hr Factor			0.838	0.888	**0.938**
7 - 9 Volume	0	0	877	1027	**1904**
7 - 9 Peak Hour			07:45	07:15	**07:45**
7 - 9 Pk Volume	0	0	483	591	**1060**
Pk Hr Factor	0.000	0.000	0.908	0.816	**0.844**

	NB	SB	EB	WB	Total
PM Peak Hour			14:45	12:00	**14:45**
PM Pk Volume			822	706	**1369**
Pk Hr Factor			0.893	0.949	**0.887**
4 - 6 Volume	0	0	1270	1098	**2368**
4 - 6 Peak Hour			16:00	16:15	**16:00**
4 - 6 Pk Volume	0	0	697	609	**1283**
Pk Hr Factor	0.000	0.000	0.894	0.870	**0.867**

Prepared by NDS/ATD

VOLUME

24th St between I-5 SB Ramps & Cleveland St

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_011

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	4,570	4,827	9,397

AM Period	NB	SB	EB		WB		TOTAL	
00:00			10		11		21	
00:15			2		6		8	
00:30			3		3		6	
00:45			6	21	2	22	8	43
01:00			7		3		10	
01:15			9		4		13	
01:30			1		6		7	
01:45			2	19	4	17	6	36
02:00			2		4		6	
02:15			4		6		10	
02:30			7		10		17	
02:45			6	19	44	64	50	83
03:00			14		9		23	
03:15			10		3		13	
03:30			9		6		15	
03:45			10	43	29	47	39	90
04:00			9		21		30	
04:15			14		37		51	
04:30			14		23		37	
04:45			6	43	41	122	47	165
05:00			8		36		44	
05:15			8		61		69	
05:30			10		94		104	
05:45			22	48	146	337	168	385
06:00			19		96		115	
06:15			29		113		142	
06:30			46		120		166	
06:45			38	132	156	485	194	617
07:00			39		119		158	
07:15			30		100		130	
07:30			36		120		156	
07:45			47	152	143	482	190	634
08:00			42		109		151	
08:15			38		90		128	
08:30			31		83		114	
08:45			48	159	81	363	129	522
09:00			60		88		148	
09:15			56		71		127	
09:30			54		77		131	
09:45			61	231	76	312	137	543
10:00			78		69		147	
10:15			58		68		126	
10:30			72		56		128	
10:45			73	281	61	254	134	535
11:00			65		89		154	
11:15			80		103		183	
11:30			112		76		188	
11:45			99	356	94	362	193	718
TOTALS				1504		2867		**4371**
SPLIT %				34.4%		65.6%		**46.5%**

PM Period	NB	SB	EB		WB		TOTAL	
12:00			92		76		168	
12:15			84		112		196	
12:30			81		87		168	
12:45			87	344	109	384	196	728
13:00			118		104		222	
13:15			85		86		171	
13:30			107		69		176	
13:45			65	375	75	334	140	709
14:00			68		63		131	
14:15			78		81		159	
14:30			126		62		188	
14:45			92	364	64	270	156	634
15:00			99		69		168	
15:15			121		59		180	
15:30			158		58		216	
15:45			108	486	47	233	155	719
16:00			130		49		179	
16:15			87		53		140	
16:30			155		44		199	
16:45			93	465	36	182	129	647
17:00			151		48		199	
17:15			108		52		160	
17:30			94		20		114	
17:45			78	431	29	149	107	580
18:00			91		40		131	
18:15			54		20		74	
18:30			32		32		64	
18:45			21	198	30	122	51	320
19:00			41		17		58	
19:15			22		21		43	
19:30			21		26		47	
19:45			22	106	22	86	44	192
20:00			21		17		38	
20:15			20		19		39	
20:30			20		24		44	
20:45			24	85	14	74	38	159
21:00			25		13		38	
21:15			9		11		20	
21:30			28		14		42	
21:45			14	76	12	50	26	126
22:00			58		19		77	
22:15			15		6		21	
22:30			11		8		19	
22:45			21	105	8	41	29	146
23:00			11		8		19	
23:15			10		11		21	
23:30			4		10		14	
23:45			6	31	6	35	12	66
TOTALS				3066		1960		**5026**
SPLIT %				61.0%		39.0%		**53.5%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	4,570	4,827	9,397

	NB	SB	EB	WB	TOTAL
AM Peak Hour			11:30	06:15	**11:30**
AM Pk Volume			387	508	**745**
Pk Hr Factor			0.864	0.814	**0.950**
7 - 9 Volume	0	0	311	845	**1156**
7 - 9 Peak Hour			07:30	07:00	**07:00**
7 - 9 Pk Volume	0	0	163	482	**634**
Pk Hr Factor	0.000	0.000	0.867	0.843	**0.834**

	NB	SB	EB	WB	TOTAL
PM Peak Hour			15:15	12:15	**12:15**
PM Pk Volume			517	412	**782**
Pk Hr Factor			0.818	0.920	**0.881**
4 - 6 Volume	0	0	896	331	**1227**
4 - 6 Peak Hour			16:30	16:00	**16:30**
4 - 6 Pk Volume	0	0	507	182	**687**
Pk Hr Factor	0.000	0.000	0.818	0.858	**0.863**

Prepared by NDS/ATD

VOLUME

24th St between Cleveland St & W 32nd St

Day: Tuesday
Date: 3/8/2011

City: San Diego
Project #: CA11_4064_012

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	2,941	3,351	6,292

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			5		4		9		12:00			57		68		125	
00:15			6		1		7		12:15			47		67		114	
00:30			1		8		9		12:30			55		82		137	
00:45			0	12	2	15	2	27	12:45			49	208	91	308	140	516
01:00			1		2		3		13:00			76		62		138	
01:15			0		9		9		13:15			56		60		116	
01:30			3		4		7		13:30			70		54		124	
01:45			7	11	1	16	8	27	13:45			68	270	55	231	123	501
02:00			2		7		9		14:00			41		37		78	
02:15			4		18		22		14:15			62		58		120	
02:30			1		22		23		14:30			122		53		175	
02:45			0	7	30	77	30	84	14:45			76	301	56	204	132	505
03:00			2		8		10		15:00			68		43		111	
03:15			7		5		12		15:15			70		35		105	
03:30			6		6		12		15:30			122		60		182	
03:45			5	20	10	29	15	49	15:45			58	318	31	169	89	487
04:00			3		7		10		16:00			62		29		91	
04:15			11		12		23		16:15			80		27		107	
04:30			10		16		26		16:30			116		19		135	
04:45			4	28	41	76	45	104	16:45			44	302	19	94	63	396
05:00			16		23		39		17:00			74		28		102	
05:15			8		34		42		17:15			50		25		75	
05:30			20		70		90		17:30			64		21		85	
05:45			27	71	93	220	120	291	17:45			36	224	23	97	59	321
06:00			16		73		89		18:00			35		19		54	
06:15			22		58		80		18:15			12		11		23	
06:30			26		84		110		18:30			21		12		33	
06:45			23	87	109	324	132	411	18:45			16	84	13	55	29	139
07:00			20		72		92		19:00			19		13		32	
07:15			32		74		106		19:15			16		6		22	
07:30			30		78		108		19:30			11		11		22	
07:45			26	108	103	327	129	435	19:45			10	56	16	46	26	102
08:00			24		77		101		20:00			13		8		21	
08:15			38		63		101		20:15			9		14		23	
08:30			32		55		87		20:30			15		3		18	
08:45			23	117	45	240	68	357	20:45			24	61	8	33	32	94
09:00			17		51		68		21:00			7		7		14	
09:15			27		42		69		21:15			14		6		20	
09:30			34		63		97		21:30			15		10		25	
09:45			27	105	71	227	98	332	21:45			4	40	7	30	11	70
10:00			27		43		70		22:00			29		8		37	
10:15			33		81		114		22:15			12		1		13	
10:30			45		60		105		22:30			1		1		2	
10:45			43	148	50	234	93	382	22:45			2	44	9	19	11	63
11:00			46		54		100		23:00			9		2		11	
11:15			67		59		126		23:15			3		6		9	
11:30			113		72		185		23:30			7		1		8	
11:45			71	297	84	269	155	566	23:45			3	22	2	11	5	33
TOTALS				1011		2054		**3065**	**TOTALS**				1930		1297		**3227**
SPLIT %				33.0%		67.0%		**48.7%**	**SPLIT %**				59.8%		40.2%		**51.3%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	2,941	3,351	6,292

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour			11:15	06:30	**11:15**	**PM Peak Hour**			14:30	12:00	**14:15**
AM Pk Volume			308	339	**591**	**PM Pk Volume**			336	308	**538**
Pk Hr Factor			0.681	0.778	**0.799**	**Pk Hr Factor**			0.689	0.846	**0.769**
7 - 9 Volume	0	0	225	567	**792**	**4 - 6 Volume**	0	0	526	191	**717**
7 - 9 Peak Hour			07:45	07:15	**07:15**	**4 - 6 Peak Hour**			16:15	17:00	**16:15**
7 - 9 Pk Volume	0	0	120	332	**444**	**4 - 6 Pk Volume**	0	0	314	97	**407**
Pk Hr Factor	0.000	0.000	0.789	0.806	**0.860**	**Pk Hr Factor**	0.000	0.000	0.677	0.866	**0.754**

Prepared by NDS/ATD

VOLUME

24th St between W 32nd St & Tidelands Ave

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_013

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,880	1,966	3,846

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			2		0		2		12:00			42		35		77	
00:15			0		0		0		12:15			32		35		67	
00:30			0		1		1		12:30			38		30		68	
00:45			4	6	0	1	4	7	12:45			42	154	40	140	82	294
01:00			0		1		1		13:00			46		49		95	
01:15			1		3		4		13:15			44		37		81	
01:30			0		0		0		13:30			36		23		59	
01:45			2	3	2	6	4	9	13:45			42	168	26	135	68	303
02:00			1		0		1		14:00			22		24		46	
02:15			2		3		5		14:15			34		38		72	
02:30			0		0		0		14:30			67		23		90	
02:45			0	3	4	7	4	10	14:45			55	178	29	114	84	292
03:00			5		3		8		15:00			49		44		93	
03:15			8		0		8		15:15			41		18		59	
03:30			0		1		1		15:30			57		21		78	
03:45			2	15	5	9	7	24	15:45			48	195	9	92	57	287
04:00			4		2		6		16:00			46		15		61	
04:15			4		4		8		16:15			20		8		28	
04:30			6		3		9		16:30			69		17		86	
04:45			5	19	10	19	15	38	16:45			41	176	14	54	55	230
05:00			3		10		13		17:00			43		13		56	
05:15			5		26		31		17:15			15		22		37	
05:30			8		53		61		17:30			24		7		31	
05:45			11	27	78	167	89	194	17:45			24	106	11	53	35	159
06:00			1		51		52		18:00			32		18		50	
06:15			14		58		72		18:15			12		6		18	
06:30			21		68		89		18:30			8		4		12	
06:45			16	52	73	250	89	302	18:45			3	55	3	31	6	86
07:00			13		57		70		19:00			9		11		20	
07:15			15		31		46		19:15			4		7		11	
07:30			21		58		79		19:30			5		3		8	
07:45			23	72	51	197	74	269	19:45			8	26	7	28	15	54
08:00			28		41		69		20:00			7		6		13	
08:15			30		28		58		20:15			3		4		7	
08:30			18		31		49		20:30			13		8		21	
08:45			30	106	50	150	80	256	20:45			4	27	9	27	13	54
09:00			36		44		80		21:00			6		4		10	
09:15			43		35		78		21:15			1		5		6	
09:30			30		23		53		21:30			3		6		9	
09:45			44	153	20	122	64	275	21:45			2	12	0	15	2	27
10:00			33		30		63		22:00			9		7		16	
10:15			39		34		73		22:15			1		0		1	
10:30			28		30		58		22:30			3		4		7	
10:45			28	128	33	127	61	255	22:45			17	30	1	12	18	42
11:00			29		36		65		23:00			2		6		8	
11:15			49		59		108		23:15			1		11		12	
11:30			42		56		98		23:30			0		4		4	
11:45			46	166	38	189	84	355	23:45			0	3	0	21	0	24
TOTALS				750		1244		**1994**	**TOTALS**				1130		722		**1852**
SPLIT %				37.6%		62.4%		**51.8%**	**SPLIT %**				61.0%		39.0%		**48.2%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,880	1,966	3,846

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour			11:15	06:15	**11:15**	**PM Peak Hour**			14:30	12:30	**14:15**
AM Pk Volume			179	256	**367**	**PM Pk Volume**			212	156	**339**
Pk Hr Factor			0.913	0.877	**0.850**	**Pk Hr Factor**			0.791	0.796	**0.911**
7 - 9 Volume	0	0	178	347	**525**	**4 - 6 Volume**	0	0	282	107	**389**
7 - 9 Peak Hour			08:00	07:00	**07:30**	**4 - 6 Peak Hour**			16:00	16:30	**16:30**
7 - 9 Pk Volume	0	0	106	197	**280**	**4 - 6 Pk Volume**	0	0	176	66	**234**
Pk Hr Factor	0.000	0.000	0.883	0.849	**0.886**	**Pk Hr Factor**	0.000	0.000	0.638	0.750	**0.680**

Prepared by NDS/ATD

VOLUME

W 32nd St between 24th St & Tidelands Ave

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_014

DAILY TOTALS	NB	SB	EB	WB	Total
	551	451	0	0	1,002

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	0		2				2		12:00	13		9				22	
00:15	2		1				3		12:15	18		14				32	
00:30	0		0				0		12:30	13		8				21	
00:45	1	3	0	3			1	6	12:45	14	58	12	43			26	101
01:00	0		0				0		13:00	1		3				4	
01:15	0		0				0		13:15	11		8				19	
01:30	0		0				0		13:30	10		7				17	
01:45	0		0				0		13:45	12	34	7	25			19	59
02:00	0		0				0		14:00	14		5				19	
02:15	0		0				0		14:15	8		5				13	
02:30	0		0				0		14:30	15		11				26	
02:45	0		0				0		14:45	9	46	13	34			22	80
03:00	0		0				0		15:00	15		5				20	
03:15	0		0				0		15:15	12		6				18	
03:30	1		1				2		15:30	14		11				25	
03:45	0	1	0	1			0	2	15:45	9	50	8	30			17	80
04:00	0		0				0		16:00	8		8				16	
04:15	0		0				0		16:15	8		13				21	
04:30	0		0				0		16:30	28		5				33	
04:45	0		0				0		16:45	8	52	10	36			18	88
05:00	0		1				1		17:00	9		15				24	
05:15	1		2				3		17:15	15		6				21	
05:30	0		3				3		17:30	19		4				23	
05:45	4	5	5	11			9	16	17:45	11	54	6	31			17	85
06:00	5		2				7		18:00	5		9				14	
06:15	5		5				10		18:15	9		5				14	
06:30	6		1				7		18:30	7		6				13	
06:45	2	18	3	11			5	29	18:45	4	25	4	24			8	49
07:00	2		5				7		19:00	4		6				10	
07:15	9		7				16		19:15	3		3				6	
07:30	7		1				8		19:30	5		3				8	
07:45	5	23	4	17			9	40	19:45	3	15	4	16			7	31
08:00	9		5				14		20:00	1		3				4	
08:15	6		9				15		20:15	0		4				4	
08:30	6		6				12		20:30	1		4				5	
08:45	9	30	7	27			16	57	20:45	4	6	2	13			6	19
09:00	11		7				18		21:00	7		2				9	
09:15	13		14				27		21:15	1		2				3	
09:30	1		11				12		21:30	4		0				4	
09:45	6	31	20	52			26	83	21:45	4	16	0	4			4	20
10:00	4		8				12		22:00	6		1				7	
10:15	10		6				16		22:15	2		0				2	
10:30	11		6				17		22:30	1		1				2	
10:45	11	36	9	29			20	65	22:45	3	12	0	2			3	14
11:00	9		9				18		23:00	0		0				0	
11:15	7		13				20		23:15	0		0				0	
11:30	9		11				20		23:30	0		2				2	
11:45	11	36	7	40			18	76	23:45	0		0	2			0	2
TOTALS		183		191				**374**	**TOTALS**		368		260				**628**
SPLIT %		48.9%		51.1%				**37.3%**	**SPLIT %**		58.6%		41.4%				**62.7%**

DAILY TOTALS	NB	SB	EB	WB	Total
	551	451	0	0	1,002

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour	11:45	09:15			**11:45**	**PM Peak Hour**	16:30	12:00			**12:00**
AM Pk Volume	55	53			**93**	**PM Pk Volume**	60	43			**101**
Pk Hr Factor	0.764	0.663			**0.727**	**Pk Hr Factor**	0.536	0.768			**0.789**
7 - 9 Volume	53	44	0	0	**97**	**4 - 6 Volume**	106	67	0	0	**173**
7 - 9 Peak Hour	07:15	08:00			**08:00**	**4 - 6 Peak Hour**	16:30	16:15			**16:15**
7 - 9 Pk Volume	30	27	0	0	**57**	**4 - 6 Pk Volume**	60	43	0	0	**96**
Pk Hr Factor	0.833	0.750	0.000	0.000	**0.891**	**Pk Hr Factor**	0.536	0.717	0.000	0.000	**0.727**

Prepared by NDS/ATD

VOLUME

Tidelands Ave between 24th St & W 32nd St

Day: Thursday
Date: 3/3/2011

City: San Diego
Project #: CA11_4064_015

DAILY TOTALS	NB	SB	EB	WB	Total
	638	516	0	0	1,154

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	0		2				2		12:00	12		6				18	
00:15	0		0				0		12:15	9		12				21	
00:30	0		0				0		12:30	19		5				24	
00:45	0		0	2			0	2	12:45	12	52	7	30			19	82
01:00	0		0				0		13:00	12		7				19	
01:15	1		0				1		13:15	11		11				22	
01:30	0		0				0		13:30	5		13				18	
01:45	0	1	0				0	1	13:45	8	36	6	37			14	73
02:00	1		0				1		14:00	3		9				12	
02:15	0		1				1		14:15	4		2				6	
02:30	0		0				0		14:30	12		6				18	
02:45	0	1	0	1			0	2	14:45	11	30	9	26			20	56
03:00	0		0				0		15:00	2		14				16	
03:15	1		0				1		15:15	37		6				43	
03:30	0		0				0		15:30	23		8				31	
03:45	0	1	0				0	1	15:45	33	95	4	32			37	127
04:00	0		0				0		16:00	43		3				46	
04:15	3		0				3		16:15	23		4				27	
04:30	0		1				1		16:30	17		7				24	
04:45	1	4	1	2			2	6	16:45	5	88	8	22			13	110
05:00	0		1				1		17:00	2		4				6	
05:15	0		7				7		17:15	1		7				8	
05:30	3		14				17		17:30	4		7				11	
05:45	1	4	9	31			10	35	17:45	8	15	8	26			16	41
06:00	2		1				3		18:00	12		5				17	
06:15	0		2				2		18:15	9		2				11	
06:30	1		4				5		18:30	0		2				2	
06:45	2	5	3	10			5	15	18:45	12	33	4	13			16	46
07:00	7		3				10		19:00	3		6				9	
07:15	6		4				10		19:15	5		1				6	
07:30	17		11				28		19:30	5		2				7	
07:45	11	41	16	34			27	75	19:45	1	14	5	14			6	28
08:00	5		14				19		20:00	6		4				10	
08:15	8		19				27		20:15	5		3				8	
08:30	10		23				33		20:30	1		2				3	
08:45	6	29	20	76			26	105	20:45	4	16	3	12			7	28
09:00	7		4				11		21:00	3		1				4	
09:15	9		11				20		21:15	1		0				1	
09:30	22		6				28		21:30	0		0				0	
09:45	21	59	15	36			36	95	21:45	2	6	0	1			2	7
10:00	9		9				18		22:00	5		2				7	
10:15	4		6				10		22:15	5		0				5	
10:30	12		12				24		22:30	4		3				7	
10:45	4	29	11	38			15	67	22:45	19	33	3	8			22	41
11:00	9		8				17		23:00	0		11				11	
11:15	12		20				32		23:15	4		1				5	
11:30	9		9				18		23:30	1		1				2	
11:45	11	41	15	52			26	93	23:45	0	5	0	13			0	18
TOTALS		215		282				**497**	**TOTALS**		423		234				**657**
SPLIT %		43.3%		56.7%				**43.1%**	**SPLIT %**		64.4%		35.6%				**56.9%**

DAILY TOTALS	NB	SB	EB	WB	Total
	638	516	0	0	1,154

	NB	SB	EB	WB	TOTAL		NB	SB	EB	WB	TOTAL
AM Peak Hour	09:15	08:00			**07:45**	**PM Peak Hour**	15:15	13:15			**15:15**
AM Pk Volume	61	76			**106**	**PM Pk Volume**	136	39			**157**
Pk Hr Factor	0.693	0.826			**0.803**	**Pk Hr Factor**	0.791	0.750			**0.853**
7 - 9 Volume	70	110	0	0	**180**	**4 - 6 Volume**	103	48	0	0	**151**
7 - 9 Peak Hour	07:00	08:00			**07:45**	**4 - 6 Peak Hour**	16:00	16:30			**16:00**
7 - 9 Pk Volume	41	76	0	0	**106**	**4 - 6 Pk Volume**	88	26	0	0	**110**
Pk Hr Factor	0.603	0.826	0.000	0.000	**0.803**	**Pk Hr Factor**	0.512	0.813	0.000	0.000	**0.598**

ATTACHMENT B

CITY OF SAN DIEGO AND CITY OF NATIONAL CITY PROPOSED LOS STANDARDS

TABLE 2
Roadway Classifications, Levels of Service (LOS)
and Average Daily Traffic (ADT)

			LEVEL OF SERVICE				
STREET CLASSIFICATION	LANES	CROSS SECTIONS	A	B	C	D	E
Freeway	8 lanes		60,000	84,000	120,000	140,000	150,000
Freeway	6 lanes		45,000	63,000	90,000	110,000	120,000
Freeway	4 lanes		30,000	42,000	60,000	70,000	80,000
Expressway	6 lanes	102/122	30,000	42,000	60,000	70,000	80,000
Primary Arterial	6 lanes	102/122	25,000	35,000	50,000	55,000	60,000
Major Arterial	6 lanes	102/122	20,000	28,000	40,000	45,000	50,000
Major Arterial	4 lanes	78/98	15,000	21,000	30,000	35,000	40,000
Collector	4 lanes	72/92	10,000	14,000	20,000	25,000	30,000
Collector (no center lane) continuous left-turn lane)	4 lanes 2 lanes	64/84 50/70	5,000	7,000	 10,000	13,000	15,000
Collector (no fronting property)	2 lanes	40/60	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2 lanes	50/70	2,500	3,500	5,000	6,500	8,000
Collector (multifamily)	2 lanes	40/60	2,500	3,500	5,000	6,500	8,000
Sub-Collector (single-family)	2 lanes	36/56	—	—	2,200	—	—

LEGEND:

XXX/XXX = Curb to curb width (feet)/right-of-way width (feet): based on the City of San Diego Street Design. Manual

XX/XXX= Approximate recommended ADT based on the City of San Diego Street Design Manual.

NOTES:

1. The volumes and the average daily level of service listed above are only intended as a general planning guideline.

2. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

TABLE 3.2:
CIRCULATION ELEMENT ROADWAY CLASSIFICATIONS
CAPACITY AND LEVEL OF SERVICE STANDARDS

Street Classification	Lanes	Level of Service*					
		A	B	C	D	E	F
Major Arterial	6	0-20,000	20,001-28,000	28,001-40,000	40,001-45,000	45,001-40,000	50,001+
Major Arterial	4	0-15,000	15,001-21,000	21,001-30,000	30,001-35,000	35,001-40,000	40,001+
Secondary Arterial	4	0-10,000	10,001-14,000	14,001-20,000	20,001-25,000	25,001-30,000	30,001+
Collector	4	0-7,000	7,001-10,000	10,001-14,000	14,001-17,000	17,001-20,000	20,001+
Collector	2+1	0-5,000	5,001-7,000	7,001-10,000	10,001-13,000	13,001-15,000	15,000+
Collector	2	0-4,000	4,001-5,500	5,501-7,500	7,501-9,000	9,001-10,000	10,001+

* Approximate recommended Average Daily Traffic based upon the City of San Diego Street Design Manual, and adopted by the City of National City.

ATTACHMENT C

EXISTING LOS WORKSHEETS

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--------------------------------------------------------------------------------
                          San Diego Sediment Project
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                      Level Of Service Computation Report
             2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #1 Park Boulevard/Harbor Drive
********************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):        0.509
Loss Time (sec):       12              Average Delay (sec/veh):       15.0
Optimal Cycle:         60              Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  1! 0  0    0  0  0  0  0    1  0  2  0  1    1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      81    0    25     0    0     0    44  284   436   141  596     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   81    0    25     0    0     0    44  284   436   141  596     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.88 0.88  0.88  0.88 0.88  0.88  0.88 0.88  0.88  0.88 0.88  0.88
PHF Volume:    92    0    28     0    0     0    50  323   497   161  679     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   92    0    28     0    0     0    50  323   497   161  679     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   92    0    28     0    0     0    50  323   497   161  679     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.91 1.00  0.91  1.00 1.00  1.00  0.93 0.93  0.83  0.93 0.93  1.00
Lanes:       1.62 0.00  0.38  0.00 0.00  0.00  1.00 2.00  1.00  1.00 2.00  0.00
Final Sat.:  2800    0   660     0    0     0  1769 3538  1583  1769 3538     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.03 0.00  0.04  0.00 0.00  0.00  0.03 0.09  0.31  0.09 0.19  0.00
Crit Moves:             ****                              ****  ****
Green/Cycle: 0.07 0.00  0.08  0.00 0.00  0.00  0.16 0.62  0.62  0.18 0.63  0.00
Volume/Cap:  0.49 0.00  0.51  0.00 0.00  0.00  0.17 0.15  0.51  0.51 0.30  0.00
Delay/Veh:   46.5  0.0  45.6   0.0  0.0   0.0  36.2  8.1  11.1  38.5  8.5   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  46.5  0.0  45.6   0.0  0.0   0.0  36.2  8.1  11.1  38.5  8.5   0.0
LOS by Move:    D    A     D     A    A     A     D    A     B     D    A     A
HCM2kAvgQ:      2    0     3     0    0     0     1    2     9     4    5     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec): 100
Loss Time (sec): 16
Optimal Cycle: 60

Critical Vol./Cap.(X): 0.512
Average Delay (sec/veh): 31.4
Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 0 1 0			0 1 0 0 1			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	4	25	14	37	73	279	140	128	19	39	385	56
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	25	14	37	73	279	140	128	19	39	385	56
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	4	28	16	41	82	312	156	143	21	44	430	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	28	16	41	82	312	156	143	21	44	430	63
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	28	16	41	82	312	156	143	21	44	430	63
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.96	0.96	0.83	0.93	0.91	0.91	0.93	0.91	0.91
Lanes:	1.00	0.64	0.36	0.34	0.66	1.00	1.00	1.74	0.26	1.00	1.75	0.25
Final Sat.:	1769	1129	632	616	1215	1583	1769	3022	449	1769	3030	441
Capacity Analysis Module:												
Vol/Sat:	0.00	0.02	0.02	0.07	0.07	0.20	0.09	0.05	0.05	0.02	0.14	0.14
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.18	0.18	0.24	0.36	0.36	0.16	0.21	0.21	0.21	0.26	0.26
Volume/Cap:	0.05	0.14	0.14	0.28	0.18	0.54	0.54	0.22	0.22	0.12	0.54	0.54
Delay/Veh:	45.5	35.0	35.0	31.5	21.8	26.2	40.5	32.7	32.7	31.9	32.4	32.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.5	35.0	35.0	31.5	21.8	26.2	40.5	32.7	32.7	31.9	32.4	32.4
LOS by Move:	D	C	C	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	0	1	1	3	3	8	4	2	2	1	7	7

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.265
Loss Time (sec):	16	Average Delay (sec/veh):	20.4
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	19	33	56	7	50	22	15	135	31	87	477	6
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	19	33	56	7	50	22	15	135	31	87	477	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	20	35	59	7	53	23	16	142	33	92	502	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	35	59	7	53	23	16	142	33	92	502	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	20	35	59	7	53	23	16	142	33	92	502	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.92	0.92	0.92	0.93	0.90	0.90	0.93	0.93	0.93
Lanes:	0.18	0.30	0.52	0.09	0.63	0.28	1.00	1.63	0.37	1.00	1.98	0.02
Final Sat.:	288	501	850	155	1110	488	1769	2797	642	1769	3487	44
Capacity Analysis Module:												
Vol/Sat:	0.07	0.07	0.07	0.05	0.05	0.05	0.01	0.05	0.05	0.05	0.14	0.14
Crit Moves:		****					****				****	
Green/Cycle:	0.26	0.26	0.26	0.26	0.26	0.26	0.05	0.29	0.29	0.29	0.53	0.53
Volume/Cap:	0.27	0.27	0.27	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.27	0.27
Delay/Veh:	30.0	30.0	30.0	29.2	29.2	29.2	46.5	26.7	26.7	26.4	12.8	12.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	30.0	30.0	30.0	29.2	29.2	29.2	46.5	26.7	26.7	26.4	12.8	12.8
LOS by Move:	C	C	C	C	C	C	D	C	C	C	B	B
HCM2kAvgQ:	3	3	3	2	2	2	0	2	2	2	4	4

Note: Queue reported is the number of cars per lane.

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--------------------------------------------------------------------------------
                          San Diego Sediment Project
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                       Level Of Service Computation Report
             2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #4 28th Street/Harbor Drive
********************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):         0.423
Loss Time (sec):       16                Average Delay (sec/veh):        27.9
Optimal Cycle:         60                Level Of Service:                  C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1! 0  0   1  0  1  1  0   1  0  1  1  0   1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       4    7     5  315    9    28   36  186     7   12  448   142
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    4    7     5  315    9    28   36  186     7   12  448   142
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.94 0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94
PHF Volume:     4    7     5  335   10    30   38  198     7   13  476   151
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    4    7     5  335   10    30   38  198     7   13  476   151
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    4    7     5  335   10    30   38  198     7   13  476   151
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.93 0.93  0.93 0.93 0.82  0.82 0.93 0.93  0.93 0.93 0.93  0.83
Lanes:       0.25 0.44  0.31 1.00 1.00  1.00 1.00 1.93  0.07 1.00 2.00  1.00
Final Sat.:   441  771   551 1769 1567  1567 1769 3392   128 1769 3538  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.01  0.01 0.19 0.01  0.02 0.02 0.06  0.06 0.01 0.13  0.10
Crit Moves:       ****       ****            ****                 ****
Green/Cycle: 0.24 0.05  0.05 0.43 0.24  0.24 0.05 0.19  0.19 0.17 0.31  0.31
Volume/Cap:  0.04 0.19  0.19 0.44 0.03  0.08 0.43 0.30  0.30 0.04 0.44  0.31
Delay/Veh:   29.1 46.6  46.6 20.3 29.0  29.4 49.5 34.9  34.9 35.2 28.0  26.9
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  29.1 46.6  46.6 20.3 29.0  29.4 49.5 34.9  34.9 35.2 28.0  26.9
LOS by Move:    C    D     D    C    C     C    D    C     C    D    C     C
HCM2kAvgQ:      0    1     1    7    0     1    1    3     3    0    6     4
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 28th Street/Main Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.388
Loss Time (sec):	16	Average Delay (sec/veh):	30.0
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 1 1 0			1 0 1 1 0			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	35	191	58	163	413	41	66	88	43	53	211	187
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	35	191	58	163	413	41	66	88	43	53	211	187
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	37	202	61	172	437	43	70	93	45	56	223	198
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	202	61	172	437	43	70	93	45	56	223	198
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	37	202	61	172	437	43	70	93	45	56	223	198
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.93	0.92	0.92	0.93	0.89	0.89	0.93	0.87	0.87
Lanes:	1.00	1.53	0.47	1.00	1.82	0.18	1.00	1.34	0.66	1.00	1.06	0.94
Final Sat.:	1769	2619	795	1769	3176	315	1769	2260	1104	1769	1744	1546
Capacity Analysis Module:												
Vol/Sat:	0.02	0.08	0.08	0.10	0.14	0.14	0.04	0.04	0.04	0.03	0.13	0.13
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.18	0.18	0.23	0.35	0.35	0.10	0.22	0.22	0.22	0.33	0.33
Volume/Cap:	0.39	0.43	0.43	0.43	0.39	0.39	0.39	0.19	0.19	0.15	0.39	0.39
Delay/Veh:	48.3	36.9	36.9	33.7	24.4	24.4	43.4	32.2	32.2	31.9	26.0	26.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	48.3	36.9	36.9	33.7	24.4	24.4	43.4	32.2	32.2	31.9	26.0	26.0
LOS by Move:	D	D	D	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	2	4	4	4	6	6	2	2	2	1	5	5

Note: Queue reported is the number of cars per lane.

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                        Level Of Service Computation Report
                2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #6 28th Street/Boston Avenue
********************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):        0.306
Loss Time (sec):      16                Average Delay (sec/veh):       18.4
Optimal Cycle:        60                Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  1   1  0  1  1  0   1  0  0  1  0   1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       3  351    80  137  650    26   23   48     7   11   15    44
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    3  351    80  137  650    26   23   48     7   11   15    44
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.94 0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94
PHF Volume:     3  372    85  145  689    28   24   51     7   12   16    47
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    3  372    85  145  689    28   24   51     7   12   16    47
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    3  372    85  145  689    28   24   51     7   12   16    47
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.93 0.93  0.83 0.93 0.93  0.93 0.93 0.96  0.96 0.93 0.87  0.87
Lanes:       1.00 2.00  1.00 1.00 1.92  0.08 1.00 0.87  0.13 1.00 0.25  0.75
Final Sat.:  1769 3538  1583 1769 3381   135 1769 1594   232 1769  420  1233
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.11  0.05 0.08 0.20  0.20 0.01 0.03  0.03 0.01 0.04  0.04
Crit Moves:  ****                ****        ****                  ****
Green/Cycle: 0.05 0.38  0.38 0.30 0.62  0.62 0.05 0.08  0.08 0.08 0.12  0.12
Volume/Cap:  0.04 0.28  0.14 0.28 0.33  0.33 0.28 0.39  0.39 0.08 0.33  0.33
Delay/Veh:   45.4 21.7  20.5 27.3  9.0   9.0 47.5 45.1  45.1 42.6 41.6  41.6
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  45.4 21.7  20.5 27.3  9.0   9.0 47.5 45.1  45.1 42.6 41.6  41.6
LOS by Move:    D    C     C    C    A     A    D    D     D    D    D     D
HCM2kAvgQ:      0    4     2    3    5     5    1    2     2    0    2     2
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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                          San Diego Sediment Project
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                      Level Of Service Computation Report
                    Unknown Method (Base Volume Alternative)
********************************************************************************
Intersection #7 28th Street/I-5 southbound ramp
********************************************************************************

********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled     Uncontrolled     Uncontrolled
Rights:          Include          Include          Ignore           Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        0  0  2  0  0    0  0  1  1  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0  415     0    0  303     0    0    0   508    0    0     0
Growth Adj:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
Initial Bse:   0    0     0    0    0     0    0    0     0    0    0     0
User Adj:    0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Volume:    0    0     0    0    0     0    0    0     0    0    0     0
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   0    0     0    0    0     0    0    0     0    0    0     0
PCE Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
MLF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
FinalVolume:   0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   0    0     0    0    0     0    0    0     0    0    0     0
Potent Cap.:   0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:   0    0     0    0    0     0    0    0     0    0    0     0
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #8 28th Street/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.781
Loss Time (sec):	16	Average Delay (sec/veh):	33.7
Optimal Cycle:	82	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Permitted			Permitted			Protected			Protected	
Rights:		Include			Include			Include			Include	
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1 0 1 0			0 0 1! 0 0			1 0 1 1 0			1 0 0 1 0		
Volume Module:												
Base Vol:	37	65	32	50	135	183	114	172	25	146	537	86
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	37	65	32	50	135	183	114	172	25	146	537	86
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
PHF Volume:	38	67	33	52	140	190	118	178	26	151	556	89
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	38	67	33	52	140	190	118	178	26	151	556	89
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	38	67	33	52	140	190	118	178	26	151	556	89
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.68	0.68	0.68	0.85	0.85	0.85	0.93	0.91	0.91	0.93	0.96	0.96
Lanes:	0.55	0.97	0.48	0.13	0.37	0.50	1.00	1.75	0.25	1.00	0.86	0.14
Final Sat.:	712	1251	616	221	596	808	1769	3030	440	1769	1571	252
Capacity Analysis Module:												
Vol/Sat:	0.05	0.05	0.05	0.23	0.23	0.23	0.07	0.06	0.06	0.09	0.35	0.35
Crit Moves:					****		****				****	
Green/Cycle:	0.30	0.30	0.30	0.30	0.30	0.30	0.09	0.22	0.22	0.32	0.45	0.45
Volume/Cap:	0.18	0.18	0.18	0.78	0.78	0.78	0.78	0.27	0.27	0.27	0.78	0.78
Delay/Veh:	26.0	26.0	26.0	39.9	39.9	39.9	67.3	32.5	32.5	25.6	27.9	27.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.0	26.0	26.0	39.9	39.9	39.9	67.3	32.5	32.5	25.6	27.9	27.9
LOS by Move:	C	C	C	D	D	D	E	C	C	C	C	C
HCM2kAvgQ:	2	2	2	13	13	13	6	3	3	3	18	18

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #9 I-5 northbound ramps/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.493
Loss Time (sec):	12	Average Delay (sec/veh):	18.6
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0	0 1	0 0	0	0 0	0 0	1	0 1	0 0	1	0 0
Volume Module:												
Base Vol:	304	0	79	0	0	0	0	236	19	0	450	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	304	0	79	0	0	0	0	236	19	0	450	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95
PHF Volume:	319	0	83	0	0	0	0	247	0	0	472	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	319	0	83	0	0	0	0	247	0	0	472	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	319	0	83	0	0	0	0	247	0	0	472	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
Final Sat.:	1769	0	1583	0	0	0	0	1862	1900	0	1862	0
Capacity Analysis Module:												
Vol/Sat:	0.18	0.00	0.05	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.25	0.00
Crit Moves:	****										****	
Green/Cycle:	0.37	0.00	0.37	0.00	0.00	0.00	0.00	0.51	0.00	0.00	0.51	0.00
Volume/Cap:	0.49	0.00	0.14	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.49	0.00
Delay/Veh:	25.1	0.0	21.3	0.0	0.0	0.0	0.0	13.7	0.0	0.0	16.2	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	25.1	0.0	21.3	0.0	0.0	0.0	0.0	13.7	0.0	0.0	16.2	0.0
LOS by Move:	C	A	C	A	A	A	A	B	A	A	B	A
HCM2kAvgQ:	8	0	2	0	0	0	0	4	0	0	9	0

Note: Queue reported is the number of cars per lane.

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #10 I-5 southbound ramp/Boston Avenue
********************************************************************************
Average Delay (sec/veh):      6.1      Worst Case Level Of Service: C[ 15.2]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  1  0    0  0  0  0  0    1  0  0  1  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       9   23     5     0    0     0   255   26     8     2   50    43
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    9   23     5     0    0     0   255   26     8     2   50    43
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     9   23     5     0    0     0   255   26     8     2   50    43
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    9   23     5     0    0     0   255   26     8     2   50    43
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  616  637    30  xxxx xxxx xxxxx    93 xxxx xxxxx    34 xxxx xxxxx
Potent Cap.:  454  395  1044  xxxx xxxx xxxxx  1501 xxxx xxxxx  1578 xxxx xxxxx
Move Cap.:    395  327  1044  xxxx xxxx xxxxx  1501 xxxx xxxxx  1578 xxxx xxxxx
Volume/Cap:  0.02 0.07  0.00  xxxx xxxx  xxxx  0.17 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx   0.6 xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 14.3 xxxx xxxxx xxxxx xxxx xxxxx   7.9 xxxx xxxxx   7.3 xxxx xxxxx
LOS by Move:    B    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx   373  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx   0.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx  15.4 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.3 xxxx xxxxx
Shared LOS:     *    *     C     *    *     *     *    *     *     A    *     *
ApproachDel:       15.2           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         C               *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #11 I-5 northbound ramps/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.718
Loss Time (sec):	12	Average Delay (sec/veh):	25.3
Optimal Cycle:	62	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1! 0	1	0 0	0 0	0	1 0	2 0	0	0 0	1 1	0
Volume Module:												
Base Vol:	236	145	400	0	0	0	53	350	0	0	280	371
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	236	145	400	0	0	0	53	350	0	0	280	371
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
PHF Volume:	275	169	467	0	0	0	62	408	0	0	327	433
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	275	169	467	0	0	0	62	408	0	0	327	433
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	275	169	467	0	0	0	62	408	0	0	327	433
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	1.00	1.00	1.00	0.93	0.93	1.00	1.00	0.85	0.85
Lanes:	1.25	0.31	1.44	0.00	0.00	0.00	1.00	2.00	0.00	0.00	1.00	1.00
Final Sat.:	2060	514	2350	0	0	0	1769	3538	0	0	1619	1619
Capacity Analysis Module:												
Vol/Sat:	0.13	0.33	0.20	0.00	0.00	0.00	0.03	0.12	0.00	0.00	0.20	0.27
Crit Moves:		****					****					****
Green/Cycle:	0.46	0.46	0.46	0.00	0.00	0.00	0.05	0.29	0.00	0.00	0.37	0.37
Volume/Cap:	0.29	0.72	0.43	0.00	0.00	0.00	0.70	0.39	0.00	0.00	0.54	0.72
Delay/Veh:	17.0	23.9	18.5	0.0	0.0	0.0	68.7	28.4	0.0	0.0	25.1	29.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	17.0	23.9	18.5	0.0	0.0	0.0	68.7	28.4	0.0	0.0	25.1	29.3
LOS by Move:	B	C	B	A	A	A	E	C	A	A	C	C
HCM2kAvgQ:	4	14	7	0	0	0	2	5	0	0	9	13

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report

2000 HCM Operations Method (Base Volume Alternative)

Intersection #12 I-5 southbound ramps/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.288
Loss Time (sec):	12	Average Delay (sec/veh):	23.5
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	0 0	1 1	0	0 1	0 0	2	0 1	1 0	2	0 0
Volume Module:												
Base Vol:	0	0	0	362	0	122	0	67	79	181	324	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	362	0	122	0	67	79	181	324	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.00	0.88	0.88	0.88
PHF Volume:	0	0	0	411	0	138	0	76	0	205	368	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	411	0	138	0	76	0	205	368	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	0	0	0	411	0	138	0	76	0	205	368	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	0.93	1.00	0.83	1.00	0.93	1.00	0.93	0.93	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	0	0	0	3545	0	1583	0	3538	1900	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.12	0.00	0.09	0.00	0.02	0.00	0.12	0.10	0.00
Crit Moves:				****				****		****		
Green/Cycle:	0.00	0.00	0.00	0.40	0.00	0.40	0.00	0.07	0.00	0.40	0.32	0.00
Volume/Cap:	0.00	0.00	0.00	0.29	0.00	0.22	0.00	0.29	0.00	0.29	0.32	0.00
Delay/Veh:	0.0	0.0	0.0	20.3	0.0	19.7	0.0	44.4	0.0	20.4	25.8	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	20.3	0.0	19.7	0.0	44.4	0.0	20.4	25.8	0.0
LOS by Move:	A	A	A	C	A	B	A	D	A	C	C	A
HCM2kAvgQ:	0	0	0	4	0	3	0	1	0	4	4	0

Note: Queue reported is the number of cars per lane.

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #13 Cleveland Street/24th Street
********************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):        0.308
Loss Time (sec):        0              Average Delay (sec/veh):        8.9
Optimal Cycle:          0              Level Of Service:                 A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        1  0  0  1  0   1  0  1  0  1   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       2    6    15   40    2     9   10   90     4   10  257   184
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    2    6    15   40    2     9   10   90     4   10  257   184
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     2    6    15   40    2     9   10   90     4   10  257   184
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    2    6    15   40    2     9   10   90     4   10  257   184
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    2    6    15   40    2     9   10   90     4   10  257   184
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       1.00 0.29  0.71 1.00 1.00  1.00 0.19 1.73  0.08 0.04 1.14  0.82
Final Sat.:   536  180   450  526  567   637  130 1186    53   32  853   679
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.03  0.03 0.08 0.00  0.01 0.08 0.08  0.07 0.31 0.30  0.27
Crit Moves:       ****       ****            ****            ****
Delay/Veh:    9.0  8.2   8.2  9.6  8.6   8.0  8.3  8.2   8.2  9.7  9.5   8.5
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   9.0  8.2   8.2  9.6  8.6   8.0  8.3  8.2   8.2  9.7  9.5   8.5
LOS by Move:    A    A     A    A    A     A    A    A     A    A    A     A
ApproachDel:       8.2              9.3              8.3              9.1
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        8.2              9.3              8.3              9.1
LOS by Appr:        A                A                A                A
AllWayAvgQ:   0.0  0.0   0.0  0.1  0.0   0.0  0.1  0.1   0.1  0.4  0.4   0.4
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #14 W. 32nd Street/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.113
Loss Time (sec):	12	Average Delay (sec/veh):	11.3
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound	South Bound	East Bound	West Bound
Control:	Protected	Protected	Protected	Protected
Rights:	Include	Include	Include	Include
Lanes:	1 0 0 0 1	0 0 0 0 0	0 0 1 1 0	1 0 2 0 0

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Volume Module:												
Base Vol:	0	0	23	0	0	0	0	79	1	17	250	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	23	0	0	0	0	79	1	17	250	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
PHF Volume:	0	0	27	0	0	0	0	92	1	20	292	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	27	0	0	0	0	92	1	20	292	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	27	0	0	0	0	92	1	20	292	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	0.83	1.00	1.00	1.00	1.00	0.93	0.93	0.93	0.93	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.98	0.02	1.00	2.00	0.00
Final Sat.:	1900	0	1583	0	0	0	0	3487	44	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.03	0.03	0.01	0.08	0.00
Crit Moves:			****				****				****	
Green/Cycle:	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.37	0.37	0.37	0.69	0.00
Volume/Cap:	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.07	0.07	0.03	0.12	0.00
Delay/Veh:	0.0	0.0	37.7	0.0	0.0	0.0	0.0	20.5	20.5	20.1	5.3	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	37.7	0.0	0.0	0.0	0.0	20.5	20.5	20.1	5.3	0.0
LOS by Move:	A	A	D	A	A	A	A	C	C	C	A	A
HCM2kAvgQ:	0	0	1	0	0	0	0	1	1	0	2	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #15 Tidelands Avenue/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.087
Loss Time (sec):	16	Average Delay (sec/veh):	26.4
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 0 1 0			1 0 0 1 0			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	0	8	13	18	37	15	13	19	4	31	61	37
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	8	13	18	37	15	13	19	4	31	61	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	0	9	14	20	41	17	14	21	4	34	68	41
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	9	14	20	41	17	14	21	4	34	68	41
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	9	14	20	41	17	14	21	4	34	68	41
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.89	0.89	0.93	0.94	0.94	0.93	0.91	0.91	0.93	0.88	0.88
Lanes:	1.00	0.38	0.62	1.00	0.71	0.29	1.00	1.65	0.35	1.00	1.24	0.76
Final Sat.:	1900	643	1045	1769	1268	514	1769	2847	599	1769	2077	1260
Capacity Analysis Module:												
Vol/Sat:	0.00	0.01	0.01	0.01	0.03	0.03	0.01	0.01	0.01	0.02	0.03	0.03
Crit Moves:	****				****		****				****	
Green/Cycle:	0.00	0.20	0.20	0.20	0.35	0.35	0.09	0.22	0.22	0.22	0.35	0.35
Volume/Cap:	0.00	0.07	0.07	0.06	0.09	0.09	0.09	0.03	0.03	0.09	0.09	0.09
Delay/Veh:	0.0	32.5	32.5	32.4	21.9	21.9	42.2	30.7	30.7	31.1	21.7	21.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	32.5	32.5	32.4	21.9	21.9	42.2	30.7	30.7	31.1	21.7	21.7
LOS by Move:	A	C	C	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	0	1	1	1	1	1	0	0	0	1	1	1

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                           San Diego Sediment Project
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                       Level Of Service Computation Report
             2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #16 Tidelands Avenue/W. 32nd Street
*******************************************************************************
Cycle (sec):         100                 Critical Vol./Cap.(X):        0.066
Loss Time (sec):       0                 Average Delay (sec/veh):        7.3
Optimal Cycle:         0                 Level Of Service:                 A
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        0  0  1  0  0   1  0  0  1  0   1  0  1  0  1   1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    7     0    6    9    50   19    1     0    0    0     1
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    7     0    6    9    50   19    1     0    0    0     1
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     0    7     0    6    9    50   19    1     0    0    0     1
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    7     0    6    9    50   19    1     0    0    0     1
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0    7     0    6    9    50   19    1     0    0    0     1
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.00 1.00  0.00 1.00 0.15  0.85 1.00 1.00  1.00 1.00 1.00  1.00
Final Sat.:     0  770     0  704  137   759  682  753   883  676  745   871
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.01  xxxx 0.01 0.07  0.07 0.03 0.00  0.00 0.00 0.00  0.00
Crit Moves:       ****                  **** ****                         ****
Delay/Veh:    0.0  7.7   0.0  7.8  7.0   7.0  8.1  7.4   0.0  0.0  0.0   6.8
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  7.7   0.0  7.8  7.0   7.0  8.1  7.4   0.0  0.0  0.0   6.8
LOS by Move:    *    A     *    A    A     A    A    A     *    *    *     A
ApproachDel:       7.7              7.1              8.0              6.8
Delay Adj:         1.00             1.00             1.00             1.00
ApprAdjDel:        7.7              7.1              8.0              6.8
LOS by Appr:         A                A                A                A
AllWayAvgQ:   0.0  0.0   0.0  0.0  0.1   0.1  0.0  0.0   0.0  0.0  0.0   0.0
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Park Boulevard/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.425
Loss Time (sec):	12	Average Delay (sec/veh):	13.9
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1!	0 0	0 0	0	0 0	1 0	2	0 1	1 0	2	0 0
Volume Module:												
Base Vol:	96	0	52	0	0	0	6	912	91	50	356	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	96	0	52	0	0	0	6	912	91	50	356	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	104	0	56	0	0	0	7	989	99	54	386	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	104	0	56	0	0	0	7	989	99	54	386	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	104	0	56	0	0	0	7	989	99	54	386	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	1.00	0.90	1.00	1.00	1.00	0.93	0.93	0.83	0.93	0.93	1.00
Lanes:	1.48	0.00	0.52	0.00	0.00	0.00	1.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	2529	0	888	0	0	0	1769	3538	1583	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.06	0.00	0.00	0.00	0.00	0.28	0.06	0.03	0.11	0.00
Crit Moves:			****					****		****		
Green/Cycle:	0.10	0.00	0.15	0.00	0.00	0.00	0.23	0.66	0.66	0.07	0.50	0.00
Volume/Cap:	0.41	0.00	0.42	0.00	0.00	0.00	0.02	0.42	0.09	0.42	0.22	0.00
Delay/Veh:	43.0	0.0	39.4	0.0	0.0	0.0	29.8	8.2	6.3	46.7	14.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	43.0	0.0	39.4	0.0	0.0	0.0	29.8	8.2	6.3	46.7	14.0	0.0
LOS by Move:	D	A	D	A	A	A	C	A	A	D	B	A
HCM2kAvgQ:	3	0	3	0	0	0	0	8	1	2	3	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.457
Loss Time (sec):	16	Average Delay (sec/veh):	25.8
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	0 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	21	77	34	46	36	158	346	670	10	11	118	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	77	34	46	36	158	346	670	10	11	118	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	23	85	38	51	40	175	383	741	11	12	131	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	23	85	38	51	40	175	383	741	11	12	131	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	23	85	38	51	40	175	383	741	11	12	131	22
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.95	0.95	0.83	0.93	0.93	0.93	0.93	0.91	0.91
Lanes:	1.00	0.69	0.31	0.56	0.44	1.00	1.00	1.97	0.03	1.00	1.71	0.29
Final Sat.:	1769	1232	544	1016	795	1583	1769	3479	52	1769	2959	501
Capacity Analysis Module:												
Vol/Sat:	0.01	0.07	0.07	0.05	0.05	0.11	0.22	0.21	0.21	0.01	0.04	0.04
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.17	0.17	0.12	0.24	0.24	0.46	0.45	0.45	0.11	0.09	0.09
Volume/Cap:	0.26	0.42	0.42	0.42	0.21	0.47	0.47	0.47	0.47	0.07	0.47	0.47
Delay/Veh:	47.3	38.4	38.4	42.1	31.0	33.8	19.0	19.5	19.5	40.4	44.0	44.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	47.3	38.4	38.4	42.1	31.0	33.8	19.0	19.5	19.5	40.4	44.0	44.0
LOS by Move:	D	D	D	D	C	C	B	B	B	D	D	D
HCM2kAvgQ:	1	4	4	3	2	5	8	8	8	0	2	2

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report

2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.323
Loss Time (sec):	16	Average Delay (sec/veh):	17.3
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0 1! 0 0			0 0 1! 0 0			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	17	30	45	12	21	16	75	622	5	20	145	5
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	17	30	45	12	21	16	75	622	5	20	145	5
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	19	33	50	13	23	18	83	689	6	22	161	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	19	33	50	13	23	18	83	689	6	22	161	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	19	33	50	13	23	18	83	689	6	22	161	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.87	0.87	0.87	0.93	0.93	0.93	0.93	0.93	0.93
Lanes:	0.18	0.33	0.49	0.24	0.43	0.33	1.00	1.98	0.02	1.00	1.93	0.07
Final Sat.:	304	536	804	405	708	539	1769	3506	28	1769	3403	117
Capacity Analysis Module:												
Vol/Sat:	0.06	0.06	0.06	0.03	0.03	0.03	0.05	0.20	0.20	0.01	0.05	0.05
Crit Moves:		****						****		****		
Green/Cycle:	0.19	0.19	0.19	0.19	0.19	0.19	0.33	0.60	0.60	0.05	0.33	0.33
Volume/Cap:	0.33	0.33	0.33	0.17	0.17	0.17	0.14	0.33	0.33	0.25	0.15	0.15
Delay/Veh:	35.6	35.6	35.6	34.2	34.2	34.2	24.0	10.0	10.0	47.2	24.0	24.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	35.6	35.6	35.6	34.2	34.2	34.2	24.0	10.0	10.0	47.2	24.0	24.0
LOS by Move:	D	D	D	C	C	C	C	B	B	D	C	C
HCM2kAvgQ:	3	3	3	1	1	1	2	5	5	1	2	2

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 28th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.384
Loss Time (sec):	16	Average Delay (sec/veh):	22.2
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0 1! 0 0			1 0 1 1 0			1 0 1 1 0			1 0 2 0 1		
Volume Module:												
Base Vol:	3	12	3	158	2	19	94	648	0	11	121	174
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	12	3	158	2	19	94	648	0	11	121	174
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
PHF Volume:	3	13	3	177	2	21	105	725	0	12	135	195
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	13	3	177	2	21	105	725	0	12	135	195
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	13	3	177	2	21	105	725	0	12	135	195
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.95	0.93	0.80	0.80	0.93	0.93	0.95	0.93	0.93	0.83
Lanes:	0.16	0.67	0.17	1.00	1.00	1.00	1.00	2.00	0.00	1.00	2.00	1.00
Final Sat.:	301	1203	301	1769	1528	1528	1769	3538	0	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.01	0.01	0.01	0.10	0.00	0.01	0.06	0.20	0.00	0.01	0.04	0.12
Crit Moves:		****		****				****		****		
Green/Cycle:	0.15	0.05	0.05	0.24	0.15	0.15	0.18	0.50	0.00	0.05	0.37	0.37
Volume/Cap:	0.08	0.22	0.22	0.41	0.01	0.10	0.33	0.41	0.00	0.14	0.10	0.33
Delay/Veh:	37.0	46.9	46.9	32.5	36.5	37.1	36.5	16.0	0.0	46.2	20.7	23.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	37.0	46.9	46.9	32.5	36.5	37.1	36.5	16.0	0.0	46.2	20.7	23.0
LOS by Move:	D	D	D	C	D	D	D	B	A	D	C	C
HCM2kAvgQ:	1	1	1	5	0	1	3	7	0	0	1	4

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 28th Street/Main Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.622
Loss Time (sec):	16	Average Delay (sec/veh):	33.3
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 1	0	1 0	1 1	0	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	20	438	112	295	312	43	96	177	32	42	89	170
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	438	112	295	312	43	96	177	32	42	89	170
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	21	469	120	316	334	46	103	190	34	45	95	182
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	21	469	120	316	334	46	103	190	34	45	95	182
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	21	469	120	316	334	46	103	190	34	45	95	182
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.93	0.91	0.91	0.93	0.91	0.91	0.93	0.84	0.84
Lanes:	1.00	1.59	0.41	1.00	1.76	0.24	1.00	1.69	0.31	1.00	1.00	1.00
Final Sat.:	1769	2730	698	1769	3053	421	1769	2927	529	1769	1596	1596
Capacity Analysis Module:												
Vol/Sat:	0.01	0.17	0.17	0.18	0.11	0.11	0.06	0.06	0.06	0.03	0.06	0.11
Crit Moves:		****		****			****					****
Green/Cycle:	0.18	0.28	0.28	0.29	0.39	0.39	0.09	0.16	0.16	0.12	0.18	0.18
Volume/Cap:	0.07	0.62	0.62	0.62	0.28	0.28	0.62	0.41	0.41	0.21	0.33	0.62
Delay/Veh:	34.4	32.9	32.9	33.3	21.2	21.2	50.8	38.6	38.6	40.2	35.7	40.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.4	32.9	32.9	33.3	21.2	21.2	50.8	38.6	38.6	40.2	35.7	40.4
LOS by Move:	C	C	C	C	C	C	D	D	D	D	D	D
HCM2kAvgQ:	1	9	9	8	4	4	4	4	4	1	3	6

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #6 28th Street/Boston Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.477
Loss Time (sec):	16	Average Delay (sec/veh):	26.0
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	6	528	207	213	657	33	35	171	9	7	6	27
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	528	207	213	657	33	35	171	9	7	6	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	6	571	224	230	710	36	38	185	10	8	6	29
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	571	224	230	710	36	38	185	10	8	6	29
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	571	224	230	710	36	38	185	10	8	6	29
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.83	0.93	0.92	0.92	0.93	0.97	0.97	0.93	0.86	0.86
Lanes:	1.00	2.00	1.00	1.00	1.90	0.10	1.00	0.95	0.05	1.00	0.18	0.82
Final Sat.:	1769	3538	1583	1769	3345	168	1769	1757	92	1769	297	1336
Capacity Analysis Module:												
Vol/Sat:	0.00	0.16	0.14	0.13	0.21	0.21	0.02	0.11	0.11	0.00	0.02	0.02
Crit Moves:		****		****				****		****		
Green/Cycle:	0.11	0.32	0.32	0.26	0.47	0.47	0.13	0.21	0.21	0.05	0.13	0.13
Volume/Cap:	0.03	0.50	0.44	0.50	0.45	0.45	0.16	0.50	0.50	0.09	0.17	0.17
Delay/Veh:	39.8	27.8	27.4	32.4	18.0	18.0	39.0	36.0	36.0	45.7	39.1	39.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	39.8	27.8	27.4	32.4	18.0	18.0	39.0	36.0	36.0	45.7	39.1	39.1
LOS by Move:	D	C	C	C	B	B	D	D	D	D	D	D
HCM2kAvgQ:	0	7	5	6	8	8	1	6	6	0	1	1

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
Unknown Method (Base Volume Alternative)

Intersection #7 28th Street/I-5 southbound ramp

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Lanes:	0 0	2	0 0	0 0	1	1 0	0 0	0	0 1	0 0	0	0 0
Volume Module:												
Base Vol:	0	587	0	0	381	0	0	0	526	0	0	0
Growth Adj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0
User Adj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHF Adj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHF Volume:	0	0	0	0	0	0	0	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PCE Adj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MLF Adj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FinalVolume:	0	0	0	0	0	0	0	0	0	0	0	0
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<												
Critical Gp:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capacity Module:												
Cnflict Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Potent Cap.:	0	0	0	0	0	0	0	0	0	0	0	0
Level Of Service Module:												
LOS by Move:												
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	0	0	0	0	0	0	0	0	0	0	0

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #8 28th Street/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.731
Loss Time (sec):	16	Average Delay (sec/veh):	31.3
Optimal Cycle:	74	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 1	0	0 0	1! 0	0	1 0	1 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	33	76	38	74	171	105	136	412	82	127	347	179
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	33	76	38	74	171	105	136	412	82	127	347	179
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
PHF Volume:	34	79	39	77	177	109	141	426	85	131	359	185
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	34	79	39	77	177	109	141	426	85	131	359	185
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	34	79	39	77	177	109	141	426	85	131	359	185
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.73	0.73	0.73	0.84	0.84	0.84	0.93	0.91	0.91	0.93	0.93	0.93
Lanes:	0.45	1.03	0.52	0.21	0.49	0.30	1.00	1.67	0.33	1.00	0.66	0.34
Final Sat.:	619	1426	713	338	781	479	1769	2877	573	1769	1166	601
Capacity Analysis Module:												
Vol/Sat:	0.06	0.06	0.06	0.23	0.23	0.23	0.08	0.15	0.15	0.07	0.31	0.31
Crit Moves:					****		****				****	
Green/Cycle:	0.31	0.31	0.31	0.31	0.31	0.31	0.11	0.35	0.35	0.18	0.42	0.42
Volume/Cap:	0.18	0.18	0.18	0.73	0.73	0.73	0.73	0.42	0.42	0.42	0.73	0.73
Delay/Veh:	25.3	25.3	25.3	36.3	36.3	36.3	56.5	24.8	24.8	37.5	27.9	27.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	25.3	25.3	25.3	36.3	36.3	36.3	56.5	24.8	24.8	37.5	27.9	27.9
LOS by Move:	C	C	C	D	D	D	E	C	C	D	C	C
HCM2kAvgQ:	2	2	2	11	11	11	6	6	6	4	15	15

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #9 I-5 northbound ramps/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.526
Loss Time (sec):	12	Average Delay (sec/veh):	18.8
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Split Phase			Split Phase			Permitted			Permitted	
Rights:		Include			Include			Ignore			Include	
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:		1 0 0 0 1			0 0 0 0 0			0 0 1 0 1			0 0 1 0 0	
Volume Module:												
Base Vol:	313	0	123	0	0	0	0	486	44	0	321	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	313	0	123	0	0	0	0	486	44	0	321	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95
PHF Volume:	331	0	130	0	0	0	0	514	0	0	339	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	331	0	130	0	0	0	0	514	0	0	339	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	331	0	130	0	0	0	0	514	0	0	339	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
Final Sat.:	1769	0	1583	0	0	0	0	1862	1900	0	1862	0
Capacity Analysis Module:												
Vol/Sat:	0.19	0.00	0.08	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.18	0.00
Crit Moves:	****							****				
Green/Cycle:	0.36	0.00	0.36	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.52	0.00
Volume/Cap:	0.53	0.00	0.23	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.35	0.00
Delay/Veh:	26.4	0.0	22.8	0.0	0.0	0.0	0.0	16.1	0.0	0.0	14.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.4	0.0	22.8	0.0	0.0	0.0	0.0	16.1	0.0	0.0	14.0	0.0
LOS by Move:	C	A	C	A	A	A	A	B	A	A	B	A
HCM2kAvgQ:	8	0	3	0	0	0	0	10	0	0	6	0

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                          San Diego Sediment Project
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #10 I-5 southbound ramp/Boston Avenue
*******************************************************************************
Average Delay (sec/veh):     10.6      Worst Case Level Of Service: E[ 49.2]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  1  0   0  0  0  0  0   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        8   51    11     0    0     0   535   53    16     3   38    50
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     8   51    11     0    0     0   535   53    16     3   38    50
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      8   51    11     0    0     0   535   53    16     3   38    50
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     8   51    11     0    0     0   535   53    16     3   38    50
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1200 1225    61  xxxx xxxx xxxxx    88 xxxx xxxxx    69 xxxx xxxxx
Potent Cap.:  204  179  1004  xxxx xxxx xxxxx  1508 xxxx xxxxx  1532 xxxx xxxxx
Move Cap.:    148  115  1004  xxxx xxxx xxxxx  1508 xxxx xxxxx  1532 xxxx xxxxx
Volume/Cap:  0.05 0.44  0.01  xxxx xxxx  xxxx  0.35 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.2 xxxx xxxxx  xxxx xxxx xxxxx   1.6 xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 30.7 xxxx xxxxx xxxxx xxxx xxxxx   8.7 xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    D    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx   137  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx   2.0 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx  51.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx
Shared LOS:     *    *     F     *    *     *     *    *     *     A    *     *
ApproachDel:      49.2            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        E                *                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #11 I-5 northbound ramps/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.589
Loss Time (sec):	12	Average Delay (sec/veh):	22.3
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 1! 0 1			0 0 0 0 0			1 0 2 0 0			0 0 1 1 0		
Volume Module:												
Base Vol:	87	4	382	0	0	0	101	511	0	0	528	401
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	87	4	382	0	0	0	101	511	0	0	528	401
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
PHF Volume:	92	4	406	0	0	0	107	543	0	0	561	426
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	92	4	406	0	0	0	107	543	0	0	561	426
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	92	4	406	0	0	0	107	543	0	0	561	426
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.84	0.84	0.84	1.00	1.00	1.00	0.93	0.93	1.00	1.00	0.87	0.87
Lanes:	1.18	0.02	1.80	0.00	0.00	0.00	1.00	2.00	0.00	0.00	1.14	0.86
Final Sat.:	1881	27	2865	0	0	0	1769	3538	0	0	1880	1428
Capacity Analysis Module:												
Vol/Sat:	0.05	0.16	0.14	0.00	0.00	0.00	0.06	0.15	0.00	0.00	0.30	0.30
Crit Moves:		****					****				****	
Green/Cycle:	0.27	0.27	0.27	0.00	0.00	0.00	0.10	0.46	0.00	0.00	0.51	0.51
Volume/Cap:	0.18	0.59	0.52	0.00	0.00	0.00	0.59	0.33	0.00	0.00	0.59	0.59
Delay/Veh:	28.0	32.7	31.5	0.0	0.0	0.0	47.8	17.4	0.0	0.0	17.9	17.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	28.0	32.7	31.5	0.0	0.0	0.0	47.8	17.4	0.0	0.0	17.9	17.9
LOS by Move:	C	C	C	A	A	A	D	B	A	A	B	B
HCM2kAvgQ:	2	7	6	0	0	0	3	5	0	0	12	12

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #12 I-5 southbound ramps/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.588
Loss Time (sec):	12	Average Delay (sec/veh):	27.7
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	0 0	1 1	0	0 1	0 0	2	0 1	1 0	2	0 0
Volume Module:												
Base Vol:	0	0	0	441	0	43	0	159	367	490	118	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	441	0	43	0	159	367	490	118	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.00	0.86	0.86	0.86
PHF Volume:	0	0	0	512	0	50	0	184	0	568	137	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	512	0	50	0	184	0	568	137	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	0	0	0	512	0	50	0	184	0	568	137	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	0.93	1.00	0.83	1.00	0.93	1.00	0.93	0.93	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	0	0	0	3545	0	1583	0	3538	1900	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.14	0.00	0.03	0.00	0.05	0.00	0.32	0.04	0.00
Crit Moves:				****				****		****		
Green/Cycle:	0.00	0.00	0.00	0.25	0.00	0.25	0.00	0.09	0.00	0.55	0.32	0.00
Volume/Cap:	0.00	0.00	0.00	0.59	0.00	0.13	0.00	0.59	0.00	0.59	0.12	0.00
Delay/Veh:	0.0	0.0	0.0	34.3	0.0	29.6	0.0	46.7	0.0	16.1	24.3	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	34.3	0.0	29.6	0.0	46.7	0.0	16.1	24.3	0.0
LOS by Move:	A	A	A	C	A	C	A	D	A	B	C	A
HCM2kAvgQ:	0	0	0	8	0	1	0	4	0	11	1	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #13 Cleveland Street/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.323
Loss Time (sec):	0	Average Delay (sec/veh):	10.0
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Lanes:	1 0	0 1	0	1 0	1 0	1	0 1	0 1	0	0 1	0 1	0
Volume Module:												
Base Vol:	2	2	27	173	3	8	7	311	4	28	95	36
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	2	2	27	173	3	8	7	311	4	28	95	36
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	2	2	27	173	3	8	7	311	4	28	95	36
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	2	27	173	3	8	7	311	4	28	95	36
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	2	2	27	173	3	8	7	311	4	28	95	36
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.07	0.93	1.00	1.00	1.00	0.04	1.94	0.02	0.35	1.20	0.45
Final Sat.:	517	43	578	535	574	646	28	1255	16	213	752	298
Capacity Analysis Module:												
Vol/Sat:	0.00	0.05	0.05	0.32	0.01	0.01	0.25	0.25	0.25	0.13	0.13	0.12
Crit Moves:			****	****			****			****		
Delay/Veh:	9.2	8.3	8.3	12.0	8.6	8.0	9.8	9.8	9.7	9.3	9.0	8.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.2	8.3	8.3	12.0	8.6	8.0	9.8	9.8	9.7	9.3	9.0	8.6
LOS by Move:	A	A	A	B	A	A	A	A	A	A	A	A
ApproachDel:		8.3			11.7			9.8			8.9	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		8.3			11.7			9.8			8.9	
LOS by Appr:		A			B			A			A	
AllWayAvgQ:	0.0	0.0	0.0	0.4	0.0	0.0	0.3	0.3	0.3	0.1	0.1	0.1

Note: Queue reported is the number of cars per lane.

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--------------------------------------------------------------------------------
                          San Diego Sediment Project
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                      Level Of Service Computation Report
             2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #14 W. 32nd Street/24th Street
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):        0.190
Loss Time (sec):      12              Average Delay (sec/veh):       19.2
Optimal Cycle:        60              Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  1  0   1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0    57    0    0     0    0  250     2   26   73     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    0    57    0    0     0    0  250     2   26   73     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.73 0.73  0.73 0.73 0.73  0.73 0.73 0.73  0.73 0.73 0.73  0.73
PHF Volume:     0    0    78    0    0     0    0  343     3   36  100     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    0    78    0    0     0    0  343     3   36  100     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0    0    78    0    0     0    0  343     3   36  100     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 1.00  0.83 1.00 1.00  1.00 1.00 0.93  0.93 0.93 0.93  1.00
Lanes:       1.00 0.00  1.00 0.00 0.00  0.00 0.00 1.98  0.02 1.00 2.00  0.00
Final Sat.:  1900    0  1583    0    0     0    0 3506    28 1769 3538     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00  0.05 0.00 0.00  0.00 0.00 0.10  0.10 0.02 0.03  0.00
Crit Moves:             ****                      ****        ****
Green/Cycle: 0.00 0.00  0.26 0.00 0.00  0.00 0.00 0.51  0.51 0.11 0.31  0.00
Volume/Cap:  0.00 0.00  0.19 0.00 0.00  0.00 0.00 0.19  0.19 0.19 0.09  0.00
Delay/Veh:    0.0  0.0  29.0  0.0  0.0   0.0  0.0 13.1  13.1 41.3 24.5   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0  29.0  0.0  0.0   0.0  0.0 13.1  13.1 41.3 24.5   0.0
LOS by Move:    A    A     C    A    A     A    A    B     B    D    C     A
HCM2kAvgQ:      0    0     2    0    0     0    0    3     3    1    1     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #15 Tidelands Avenue/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.117
Loss Time (sec):	16	Average Delay (sec/veh):	29.9
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	3	5	31	20	3	8	5	86	1	24	18	14
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	5	31	20	3	8	5	86	1	24	18	14
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
PHF Volume:	4	7	43	28	4	11	7	118	1	33	25	19
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	7	43	28	4	11	7	118	1	33	25	19
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	7	43	28	4	11	7	118	1	33	25	19
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.85	0.85	0.93	0.87	0.87	0.93	0.93	0.93	0.93	0.87	0.87
Lanes:	1.00	0.14	0.86	1.00	0.27	0.73	1.00	1.98	0.02	1.00	1.12	0.88
Final Sat.:	1769	225	1397	1769	452	1207	1769	3490	41	1769	1859	1446
Capacity Analysis Module:												
Vol/Sat:	0.00	0.03	0.03	0.02	0.01	0.01	0.00	0.03	0.03	0.02	0.01	0.01
Crit Moves:		****		****				****		****		
Green/Cycle:	0.20	0.26	0.26	0.13	0.20	0.20	0.22	0.29	0.29	0.16	0.22	0.22
Volume/Cap:	0.01	0.12	0.12	0.12	0.05	0.05	0.02	0.12	0.12	0.12	0.06	0.06
Delay/Veh:	32.4	28.4	28.4	38.5	32.7	32.7	30.3	26.2	26.2	36.2	30.6	30.6
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	32.4	28.4	28.4	38.5	32.7	32.7	30.3	26.2	26.2	36.2	30.6	30.6
LOS by Move:	C	C	C	D	C	C	C	C	C	D	C	C
HCM2kAvgQ:	0	1	1	1	0	0	0	1	1	1	1	1

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                         San Diego Sediment Project
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #16 Tidelands Avenue/W. 32nd Street
********************************************************************************
Cycle (sec):          100               Critical Vol./Cap.(X):        0.096
Loss Time (sec):        0               Average Delay (sec/veh):        8.0
Optimal Cycle:          0               Level Of Service:                 A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5     5    5     5     5    5     5     5    5     5
Lanes:        0  0  1  0  0    1  0  0  1  0    1  0  1  0  1    1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    5     0     2   10     7    67   19     0     2    2     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    5     0     2   10     7    67   19     0     2    2     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    5     0     2   10     7    67   19     0     2    2     2
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    5     0     2   10     7    67   19     0     2    2     2
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    5     0     2   10     7    67   19     0     2    2     2
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 1.00  0.00  1.00 0.59  0.41  1.00 1.00  1.00  1.00 1.00  1.00
Final Sat.:     0  738     0   671  463   324   701  777   914   674  743   869
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.01  xxxx  0.00 0.02  0.02  0.10 0.02  0.00  0.00 0.00  0.00
Crit Moves:       ****                   ****  ****              ****
Delay/Veh:    0.0  7.8   0.0   8.0  7.3   7.3   8.3  7.4   0.0   8.0  7.5   6.8
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  7.8   0.0   8.0  7.3   7.3   8.3  7.4   0.0   8.0  7.5   6.8
LOS by Move:    *    A     *     A    A     A     A    A     *     A    A     A
ApproachDel:       7.8              7.4              8.1              7.4
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        7.8              7.4              8.1              7.4
LOS by Appr:         A                A                A                A
AllWayAvgQ:   0.0  0.0   0.0   0.0  0.0   0.0   0.1  0.0   0.0   0.0  0.0   0.0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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ATTACHMENT D

EXISTING WITH PROJECT TRAFFIC LOS WORKSHEETS (STAGING AREAS 1 & 2)

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--------------------------------------------------------------------------------
                          San Diego Sediment Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #1 Park Boulevard/Harbor Drive
********************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):        0.509
Loss Time (sec):      12                Average Delay (sec/veh):       15.0
Optimal Cycle:        60                Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  1! 0  0    0  0  0  0  0    1  0  2  0  1    1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      81    0    25    0    0     0   44  284   436  141  596     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:   81    0    25    0    0     0   44  284   436  141  596     0
Added Vol:      0    0     0    0    0     0    0    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   81    0    25    0    0     0   44  284   436  141  596     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.88 0.88  0.88 0.88 0.88  0.88 0.88 0.88  0.88 0.88 0.88  0.88
PHF Volume:    92    0    28    0    0     0   50  323   497  161  679     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   92    0    28    0    0     0   50  323   497  161  679     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:   92    0    28    0    0     0   50  323   497  161  679     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.91 1.00  0.91 1.00 1.00  1.00 0.93 0.93  0.83 0.93 0.93  1.00
Lanes:       1.62 0.00  0.38 0.00 0.00  0.00 1.00 2.00  1.00 1.00 2.00  0.00
Final Sat.:  2800    0   660    0    0     0 1769 3538  1583 1769 3538     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.03 0.00  0.04 0.00 0.00  0.00 0.03 0.09  0.31 0.09 0.19  0.00
Crit Moves:             ****                              ****  ****
Green/Cycle: 0.07 0.00  0.08 0.00 0.00  0.00 0.16 0.62  0.62 0.18 0.63  0.00
Volume/Cap:  0.49 0.00  0.51 0.00 0.00  0.00 0.17 0.15  0.51 0.51 0.30  0.00
Delay/Veh:   46.5  0.0  45.6  0.0  0.0   0.0 36.2  8.1  11.1 38.5  8.5   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  46.5  0.0  45.6  0.0  0.0   0.0 36.2  8.1  11.1 38.5  8.5   0.0
LOS by Move:    D    A     D    A    A     A    D    A     B    D    A     A
HCM2kAvgQ:      2    0     3    0    0     0    1    2     9    4    5     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.512
Loss Time (sec):	16	Average Delay (sec/veh):	31.5
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 0 1 0			0 1 0 0 1			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	4	25	14	37	73	279	140	128	19	39	385	56
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	25	14	37	73	279	140	128	19	39	385	56
Added Vol:	0	0	15	0	0	0	0	0	0	44	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	4	25	29	37	73	279	140	128	19	83	385	56
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	4	28	32	41	82	312	156	143	21	93	430	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	28	32	41	82	312	156	143	21	93	430	63
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	28	32	41	82	312	156	143	21	93	430	63
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.96	0.96	0.83	0.93	0.91	0.91	0.93	0.91	0.91
Lanes:	1.00	0.46	0.54	0.34	0.66	1.00	1.00	1.74	0.26	1.00	1.75	0.25
Final Sat.:	1769	792	919	616	1215	1583	1769	3022	449	1769	3030	441
Capacity Analysis Module:												
Vol/Sat:	0.00	0.04	0.04	0.07	0.07	0.20	0.09	0.05	0.05	0.05	0.14	0.14
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.18	0.18	0.24	0.36	0.36	0.16	0.21	0.21	0.22	0.26	0.26
Volume/Cap:	0.05	0.20	0.20	0.28	0.18	0.54	0.54	0.23	0.23	0.24	0.54	0.54
Delay/Veh:	45.5	35.5	35.5	31.5	21.8	26.2	40.5	33.1	33.1	32.6	32.4	32.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.5	35.5	35.5	31.5	21.8	26.2	40.5	33.1	33.1	32.6	32.4	32.4
LOS by Move:	D	D	D	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	0	2	2	3	3	8	4	2	2	2	7	7

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.280
Loss Time (sec):	16	Average Delay (sec/veh):	19.9
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0 1! 0 0			0 0 1! 0 0			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	19	33	56	7	50	22	15	135	31	87	477	6
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	19	33	56	7	50	22	15	135	31	87	477	6
Added Vol:	0	0	0	0	0	0	0	15	0	0	44	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	19	33	56	7	50	22	15	150	31	87	521	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	20	35	59	7	53	23	16	158	33	92	548	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	35	59	7	53	23	16	158	33	92	548	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	20	35	59	7	53	23	16	158	33	92	548	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.92	0.92	0.92	0.93	0.91	0.91	0.93	0.93	0.93
Lanes:	0.18	0.30	0.52	0.09	0.63	0.28	1.00	1.66	0.34	1.00	1.98	0.02
Final Sat.:	288	501	849	155	1109	488	1769	2856	590	1769	3491	40
Capacity Analysis Module:												
Vol/Sat:	0.07	0.07	0.07	0.05	0.05	0.05	0.01	0.06	0.06	0.05	0.16	0.16
Crit Moves:		****					****				****	
Green/Cycle:	0.24	0.24	0.24	0.24	0.24	0.24	0.05	0.31	0.31	0.29	0.55	0.55
Volume/Cap:	0.29	0.29	0.29	0.20	0.20	0.20	0.18	0.18	0.18	0.18	0.29	0.29
Delay/Veh:	31.3	31.3	31.3	30.4	30.4	30.4	46.5	25.4	25.4	26.8	12.2	12.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	31.3	31.3	31.3	30.4	30.4	30.4	46.5	25.4	25.4	26.8	12.2	12.2
LOS by Move:	C	C	C	C	C	C	D	C	C	C	B	B
HCM2kAvgQ:	3	3	3	2	2	2	0	2	2	2	5	5

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 28th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.433
Loss Time (sec):	16	Average Delay (sec/veh):	28.6
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0	1 0	2	0 1
Volume Module:												
Base Vol:	4	7	5	315	9	28	36	186	7	12	448	142
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	7	5	315	9	28	36	186	7	12	448	142
Added Vol:	0	0	0	0	0	44	15	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	4	7	5	315	9	72	51	186	7	12	448	142
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
PHF Volume:	4	7	5	335	10	77	54	198	7	13	476	151
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	7	5	335	10	77	54	198	7	13	476	151
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	7	5	335	10	77	54	198	7	13	476	151
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.93	0.81	0.81	0.93	0.93	0.93	0.93	0.93	0.83
Lanes:	0.25	0.44	0.31	1.00	1.00	1.00	1.00	1.93	0.07	1.00	2.00	1.00
Final Sat.:	441	771	551	1769	1534	1534	1769	3392	128	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.01	0.01	0.01	0.19	0.01	0.05	0.03	0.06	0.06	0.01	0.13	0.10
Crit Moves:		****		****			****				****	
Green/Cycle:	0.24	0.05	0.05	0.42	0.24	0.24	0.07	0.20	0.20	0.17	0.30	0.30
Volume/Cap:	0.04	0.19	0.19	0.45	0.03	0.21	0.45	0.29	0.29	0.04	0.45	0.32
Delay/Veh:	29.5	46.6	46.6	21.1	29.4	31.0	47.4	34.4	34.4	34.7	28.6	27.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	29.5	46.6	46.6	21.1	29.4	31.0	47.4	34.4	34.4	34.7	28.6	27.5
LOS by Move:	C	D	D	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	0	1	1	7	0	2	2	3	3	0	6	4

Note: Queue reported is the number of cars per lane.

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
           2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #5 28th Street/Main Street
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):        0.403
Loss Time (sec):      16               Average Delay (sec/veh):       29.8
Optimal Cycle:        60               Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  1  1  0   1  0  1  1  0   1  0  1  1  0   1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      35  191    58   163  413    41    66   88    43    53  211   187
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   35  191    58   163  413    41    66   88    43    53  211   187
Added Vol:      0   15     0     0   44     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   35  206    58   163  457    41    66   88    43    53  211   187
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.95
PHF Volume:    37  218    61   172  483    43    70   93    45    56  223   198
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   37  218    61   172  483    43    70   93    45    56  223   198
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   37  218    61   172  483    43    70   93    45    56  223   198
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.93 0.90  0.90  0.93 0.92  0.92  0.93 0.89  0.89  0.93 0.87  0.87
Lanes:       1.00 1.56  0.44  1.00 1.84  0.16  1.00 1.34  0.66  1.00 1.06  0.94
Final Sat.:  1769 2669   752  1769 3208   288  1769 2260  1104  1769 1744  1546
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.02 0.08  0.08  0.10 0.15  0.15  0.04 0.04  0.04  0.03 0.13  0.13
Crit Moves:  ****                   ****         ****                   ****
Green/Cycle: 0.05 0.19  0.19  0.23 0.37  0.37  0.10 0.21  0.21  0.21 0.32  0.32
Volume/Cap:  0.40 0.42  0.42  0.42 0.40  0.40  0.40 0.20  0.20  0.15 0.40  0.40
Delay/Veh:   48.8 35.8  35.8  33.4 23.3  23.3  43.9 32.9  32.9  32.6 27.0  27.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  48.8 35.8  35.8  33.4 23.3  23.3  43.9 32.9  32.9  32.6 27.0  27.0
LOS by Move:    D    D     D     C    C     C     D    C     C     C    C     C
HCM2kAvgQ:      2    4     4     4    6     6     2    2     2     1    5     5
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #6 28th Street/Boston Avenue
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):        0.322
Loss Time (sec):      16               Average Delay (sec/veh):       18.0
Optimal Cycle:        60               Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  1   1  0  1  1  0   1  0  0  1  0   1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       3  351    80  137  650    26   23   48     7   11   15    44
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    3  351    80  137  650    26   23   48     7   11   15    44
Added Vol:      0    2    13    0   44     0    0    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    3  353    93  137  694    26   23   48     7   11   15    44
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.94 0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94
PHF Volume:     3  374    99  145  736    28   24   51     7   12   16    47
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    3  374    99  145  736    28   24   51     7   12   16    47
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    3  374    99  145  736    28   24   51     7   12   16    47
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.93 0.93  0.83 0.93 0.93  0.93 0.93 0.96  0.96 0.93 0.87  0.87
Lanes:       1.00 2.00  1.00 1.00 1.93  0.07 1.00 0.87  0.13 1.00 0.25  0.75
Final Sat.:  1769 3538  1583 1769 3393   127 1769 1594   232 1769  420  1233
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.11  0.06 0.08 0.22  0.22 0.01 0.03  0.03 0.01 0.04  0.04
Crit Moves:  ****                 ****       ****                   ****
Green/Cycle: 0.05 0.38  0.38 0.30 0.63  0.63 0.05 0.08  0.08 0.08 0.11  0.11
Volume/Cap:  0.04 0.28  0.16 0.28 0.34  0.34 0.28 0.40  0.40 0.08 0.34  0.34
Delay/Veh:   45.4 21.4  20.4 27.2  8.8   8.8 47.5 45.5  45.5 42.9 42.3  42.3
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  45.4 21.4  20.4 27.2  8.8   8.8 47.5 45.5  45.5 42.9 42.3  42.3
LOS by Move:    D    C     C    C    A     A    D    D     D    D    D     D
HCM2kAvgQ:      0    4     2    3    6     6    1    2     2    0    2     2
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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                          San Diego Sediment Project
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                      Level Of Service Computation Report
                  Unknown Method (Future Volume Alternative)
********************************************************************************
Intersection #7 28th Street/I-5 southbound ramp
********************************************************************************

********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Uncontrolled     Uncontrolled
Rights:           Include          Include          Ignore           Include
Min. Green:     5    5     5     5    5     5     5    5     5     5    5     5
Lanes:        0  0  2  0  0    0  0  1  1  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  415     0     0  303     0     0    0   508     0    0     0
Growth Adj:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
Initial Bse:    0    0     0     0    0     0     0    0     0     0    0     0
Added Vol:      0    2     0     0   24     0     0    0    20     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0     0     0    0     0     0    0     0
User Adj:    0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Volume:     0    0     0     0    0     0     0    0     0     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0     0    0     0     0    0     0     0    0     0
PCE Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
MLF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
FinalVolume:    0    0     0     0    0     0     0    0     0     0    0     0
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Potent Cap.:    0    0     0     0    0     0     0    0     0     0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:    0    0     0     0    0     0     0    0     0     0    0     0
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #8 28th Street/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.781
Loss Time (sec):	16	Average Delay (sec/veh):	33.7
Optimal Cycle:	82	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 1	0	0 0	1!	0 0	1 0	1 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	37	65	32	50	135	183	114	172	25	146	537	86
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	37	65	32	50	135	183	114	172	25	146	537	86
Added Vol:	0	0	0	0	0	0	0	0	0	24	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	37	65	32	50	135	183	114	172	25	170	537	86
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
PHF Volume:	38	67	33	52	140	190	118	178	26	176	556	89
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	38	67	33	52	140	190	118	178	26	176	556	89
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	38	67	33	52	140	190	118	178	26	176	556	89
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.68	0.68	0.68	0.85	0.85	0.85	0.93	0.91	0.91	0.93	0.96	0.96
Lanes:	0.55	0.97	0.48	0.13	0.37	0.50	1.00	1.75	0.25	1.00	0.86	0.14
Final Sat.:	712	1251	616	221	596	808	1769	3030	440	1769	1571	252
Capacity Analysis Module:												
Vol/Sat:	0.05	0.05	0.05	0.23	0.23	0.23	0.07	0.06	0.06	0.10	0.35	0.35
Crit Moves:					****		****				****	
Green/Cycle:	0.30	0.30	0.30	0.30	0.30	0.30	0.09	0.20	0.20	0.34	0.45	0.45
Volume/Cap:	0.18	0.18	0.18	0.78	0.78	0.78	0.78	0.29	0.29	0.29	0.78	0.78
Delay/Veh:	26.0	26.0	26.0	39.9	39.9	39.9	67.3	34.2	34.2	24.5	27.9	27.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.0	26.0	26.0	39.9	39.9	39.9	67.3	34.2	34.2	24.5	27.9	27.9
LOS by Move:	C	C	C	D	D	D	E	C	C	C	C	C
HCM2kAvgQ:	2	2	2	13	13	13	6	3	3	4	18	18

Note: Queue reported is the number of cars per lane.

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #9 I-5 northbound ramps/National Avenue
********************************************************************************
Cycle (sec):          100               Critical Vol./Cap.(X):        0.509
Loss Time (sec):       12               Average Delay (sec/veh):       19.1
Optimal Cycle:         60               Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase        Permitted        Permitted
Rights:           Include          Include           Ignore           Include
Min. Green:     5    5     5     5    5     5     5    5     5     5    5     5
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
Lanes:        1  0  0  0  1    0  0  0  0  0    0  0  1  0  1    0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     304    0    79     0    0     0     0  236    19     0  450     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  304    0    79     0    0     0     0  236    19     0  450     0
Added Vol:     24    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  328    0    79     0    0     0     0  236    19     0  450     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95  0.95 0.95  0.95  0.95 0.95  0.00  0.95 0.95  0.95
PHF Volume:   344    0    83     0    0     0     0  247     0     0  472     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  344    0    83     0    0     0     0  247     0     0  472     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  0.00  1.00 1.00  1.00
FinalVolume:  344    0    83     0    0     0     0  247     0     0  472     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.93 1.00  0.83  1.00 1.00  1.00  1.00 0.98  1.00  1.00 0.98  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 1.00  1.00  0.00 1.00  0.00
Final Sat.:  1769    0  1583     0    0     0     0 1862  1900     0 1862     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.19 0.00  0.05  0.00 0.00  0.00  0.00 0.13  0.00  0.00 0.25  0.00
Crit Moves:  ****                                                    ****
Green/Cycle: 0.38 0.00  0.38  0.00 0.00  0.00  0.00 0.50  0.00  0.00 0.50  0.00
Volume/Cap:  0.51 0.00  0.14  0.00 0.00  0.00  0.00 0.27  0.00  0.00 0.51  0.00
Delay/Veh:   24.3  0.0  20.3   0.0  0.0   0.0   0.0 14.7   0.0   0.0 17.3   0.0
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  24.3  0.0  20.3   0.0  0.0   0.0   0.0 14.7   0.0   0.0 17.3   0.0
LOS by Move:    C    A     C     A    A     A     A    B     A     A    B     A
HCM2kAvgQ:      8    0     2     0    0     0     0    4     0     0   10     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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                         San Diego Sediment Project
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                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #10 I-5 southbound ramp/Boston Avenue
********************************************************************************
Average Delay (sec/veh):      6.3      Worst Case Level Of Service: C[ 15.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        1  0  0  1  0   0  0  0  0  0   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        9   23     5     0    0     0   255   26     8     2   50    43
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     9   23     5     0    0     0   255   26     8     2   50    43
Added Vol:       0    0     0     0    0     0    13    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     9   23     5     0    0     0   268   26     8     2   50    43
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      9   23     5     0    0     0   268   26     8     2   50    43
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     9   23     5     0    0     0   268   26     8     2   50    43
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  642  663    30  xxxx xxxx xxxxx    93 xxxx xxxxx    34 xxxx xxxxx
Potent Cap.:  439  382  1044  xxxx xxxx xxxxx  1501 xxxx xxxxx  1578 xxxx xxxxx
Move Cap.:    378  313  1044  xxxx xxxx xxxxx  1501 xxxx xxxxx  1578 xxxx xxxxx
Volume/Cap:  0.02 0.07  0.00  xxxx xxxx  xxxx  0.18 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx   0.6 xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 14.8 xxxx xxxxx xxxxx xxxx xxxxx   7.9 xxxx xxxxx   7.3 xxxx xxxxx
LOS by Move:    B    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx   358  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx   0.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx  15.9 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.3 xxxx xxxxx
Shared LOS:     *    *     C     *    *     *     *    *     *     A    *     *
ApproachDel:       15.6           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:          C                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Park Boulevard/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.425
Loss Time (sec):	12	Average Delay (sec/veh):	13.9
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 1! 0 0			0 0 0 0 0			1 0 2 0 1			1 0 2 0 0		
Volume Module:												
Base Vol:	96	0	52	0	0	0	6	912	91	50	356	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	96	0	52	0	0	0	6	912	91	50	356	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	96	0	52	0	0	0	6	912	91	50	356	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	104	0	56	0	0	0	7	989	99	54	386	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	104	0	56	0	0	0	7	989	99	54	386	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	104	0	56	0	0	0	7	989	99	54	386	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	1.00	0.90	1.00	1.00	1.00	0.93	0.93	0.83	0.93	0.93	1.00
Lanes:	1.48	0.00	0.52	0.00	0.00	0.00	1.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	2529	0	888	0	0	0	1769	3538	1583	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.06	0.00	0.00	0.00	0.00	0.28	0.06	0.03	0.11	0.00
Crit Moves:			****					****		****		
Green/Cycle:	0.10	0.00	0.15	0.00	0.00	0.00	0.23	0.66	0.66	0.07	0.50	0.00
Volume/Cap:	0.41	0.00	0.42	0.00	0.00	0.00	0.02	0.42	0.09	0.42	0.22	0.00
Delay/Veh:	43.0	0.0	39.4	0.0	0.0	0.0	29.8	8.2	6.3	46.7	14.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	43.0	0.0	39.4	0.0	0.0	0.0	29.8	8.2	6.3	46.7	14.0	0.0
LOS by Move:	D	A	D	A	A	A	C	A	A	D	B	A
HCM2kAvgQ:	3	0	3	0	0	0	0	8	1	2	3	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.457
Loss Time (sec):	16	Average Delay (sec/veh):	26.4
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	0 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	21	77	34	46	36	158	346	670	10	11	118	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	77	34	46	36	158	346	670	10	11	118	20
Added Vol:	0	0	44	0	0	0	0	0	0	15	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	77	78	46	36	158	346	670	10	26	118	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	23	85	86	51	40	175	383	741	11	29	131	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	23	85	86	51	40	175	383	741	11	29	131	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	23	85	86	51	40	175	383	741	11	29	131	22
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.91	0.91	0.95	0.95	0.83	0.93	0.93	0.93	0.93	0.91	0.91
Lanes:	1.00	0.50	0.50	0.56	0.44	1.00	1.00	1.97	0.03	1.00	1.71	0.29
Final Sat.:	1769	856	867	1016	795	1583	1769	3479	52	1769	2959	501
Capacity Analysis Module:												
Vol/Sat:	0.01	0.10	0.10	0.05	0.05	0.11	0.22	0.21	0.21	0.02	0.04	0.04
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.19	0.19	0.10	0.24	0.24	0.46	0.45	0.45	0.11	0.09	0.09
Volume/Cap:	0.26	0.52	0.52	0.52	0.21	0.47	0.47	0.47	0.47	0.15	0.47	0.47
Delay/Veh:	47.3	38.0	38.0	46.0	31.0	33.8	19.0	19.5	19.5	41.1	44.0	44.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	47.3	38.0	38.0	46.0	31.0	33.8	19.0	19.5	19.5	41.1	44.0	44.0
LOS by Move:	D	D	D	D	C	C	B	B	B	D	D	D
HCM2kAvgQ:	1	5	5	3	2	5	8	8	8	1	2	2

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.339
Loss Time (sec):	16	Average Delay (sec/veh):	17.0
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	17	30	45	12	21	16	75	622	5	20	145	5
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	17	30	45	12	21	16	75	622	5	20	145	5
Added Vol:	0	0	0	0	0	0	0	44	0	0	15	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	17	30	45	12	21	16	75	666	5	20	160	5
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	19	33	50	13	23	18	83	738	6	22	177	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	19	33	50	13	23	18	83	738	6	22	177	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	19	33	50	13	23	18	83	738	6	22	177	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.87	0.87	0.87	0.93	0.93	0.93	0.93	0.93	0.93
Lanes:	0.18	0.33	0.49	0.24	0.43	0.33	1.00	1.99	0.01	1.00	1.94	0.06
Final Sat.:	303	535	803	404	706	538	1769	3508	26	1769	3417	107
Capacity Analysis Module:												
Vol/Sat:	0.06	0.06	0.06	0.03	0.03	0.03	0.05	0.21	0.21	0.01	0.05	0.05
Crit Moves:		****						****		****		
Green/Cycle:	0.18	0.18	0.18	0.18	0.18	0.18	0.32	0.61	0.61	0.05	0.34	0.34
Volume/Cap:	0.34	0.34	0.34	0.18	0.18	0.18	0.14	0.34	0.34	0.25	0.15	0.15
Delay/Veh:	36.5	36.5	36.5	35.1	35.1	35.1	24.1	9.7	9.7	47.2	23.3	23.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	36.5	36.5	36.5	35.1	35.1	35.1	24.1	9.7	9.7	47.2	23.3	23.3
LOS by Move:	D	D	D	D	D	D	C	A	A	D	C	C
HCM2kAvgQ:	3	3	3	2	2	2	2	6	6	1	2	2

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 28th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.384
Loss Time (sec):	16	Average Delay (sec/veh):	23.3
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0 1! 0 0			1 0 1 1 0			1 0 1 1 0			1 0 2 0 1		
Volume Module:												
Base Vol:	3	12	3	158	2	19	94	648	0	11	121	174
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	12	3	158	2	19	94	648	0	11	121	174
Added Vol:	0	0	0	0	0	15	44	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	3	12	3	158	2	34	138	648	0	11	121	174
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
PHF Volume:	3	13	3	177	2	38	154	725	0	12	135	195
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	13	3	177	2	38	154	725	0	12	135	195
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	13	3	177	2	38	154	725	0	12	135	195
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.95	0.93	0.80	0.80	0.93	0.93	0.95	0.93	0.93	0.83
Lanes:	0.16	0.67	0.17	1.00	1.00	1.00	1.00	2.00	0.00	1.00	2.00	1.00
Final Sat.:	301	1203	301	1769	1518	1518	1769	3538	0	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.01	0.01	0.01	0.10	0.00	0.03	0.09	0.20	0.00	0.01	0.04	0.12
Crit Moves:		****		****				****		****		
Green/Cycle:	0.15	0.05	0.05	0.24	0.15	0.15	0.23	0.50	0.00	0.05	0.32	0.32
Volume/Cap:	0.08	0.22	0.22	0.41	0.01	0.17	0.38	0.41	0.00	0.14	0.12	0.38
Delay/Veh:	37.0	46.9	46.9	32.5	36.5	37.7	33.3	16.0	0.0	46.2	24.1	26.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	37.0	46.9	46.9	32.5	36.5	37.7	33.3	16.0	0.0	46.2	24.1	26.8
LOS by Move:	D	D	D	C	D	D	C	B	A	D	C	C
HCM2kAvgQ:	1	1	1	5	0	1	4	7	0	0	2	5

Note: Queue reported is the number of cars per lane.

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #5 28th Street/Main Street
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):        0.638
Loss Time (sec):      16              Average Delay (sec/veh):       33.3
Optimal Cycle:        61              Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5     5    5     5     5    5     5     5    5     5
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
Lanes:        1  0  1  1  0    1  0  1  1  0    1  0  1  1  0    1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      20  438   112   295  312    43    96  177    32    42   89   170
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   20  438   112   295  312    43    96  177    32    42   89   170
Added Vol:      0   44     0     0   15     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   20  482   112   295  327    43    96  177    32    42   89   170
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93
PHF Volume:    21  516   120   316  350    46   103  190    34    45   95   182
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   21  516   120   316  350    46   103  190    34    45   95   182
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   21  516   120   316  350    46   103  190    34    45   95   182
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.93 0.90  0.90  0.93 0.92  0.92  0.93 0.91  0.91  0.93 0.84  0.84
Lanes:       1.00 1.62  0.38  1.00 1.77  0.23  1.00 1.69  0.31  1.00 1.00  1.00
Final Sat.:  1769 2790   648  1769 3073   404  1769 2927   529  1769 1596  1596
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.18  0.18  0.18 0.11  0.11  0.06 0.06  0.06  0.03 0.06  0.11
Crit Moves:       ****        ****             ****                         ****
Green/Cycle: 0.17 0.29  0.29  0.28 0.40  0.40  0.09 0.15  0.15  0.12 0.18  0.18
Volume/Cap:  0.07 0.64  0.64  0.64 0.29  0.29  0.64 0.42  0.42  0.22 0.33  0.64
Delay/Veh:   34.6 32.3  32.3  34.3 20.7  20.7  52.1 39.0  39.0  40.5 36.1  41.2
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  34.6 32.3  32.3  34.3 20.7  20.7  52.1 39.0  39.0  40.5 36.1  41.2
LOS by Move:    C    C     C     C    C     C     D    D     D     D    D     D
HCM2kAvgQ:      1   10    10     8    4     4     4    4     4     1    3     7
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 28th Street/Boston Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.485
Loss Time (sec):	16	Average Delay (sec/veh):	25.9
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	6	528	207	213	657	33	35	171	9	7	6	27
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	528	207	213	657	33	35	171	9	7	6	27
Added Vol:	0	20	24	0	15	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	6	548	231	213	672	33	35	171	9	7	6	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	6	592	250	230	726	36	38	185	10	8	6	29
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	592	250	230	726	36	38	185	10	8	6	29
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	592	250	230	726	36	38	185	10	8	6	29
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.83	0.93	0.92	0.92	0.93	0.97	0.97	0.93	0.86	0.86
Lanes:	1.00	2.00	1.00	1.00	1.91	0.09	1.00	0.95	0.05	1.00	0.18	0.82
Final Sat.:	1769	3538	1583	1769	3349	164	1769	1757	92	1769	297	1336
Capacity Analysis Module:												
Vol/Sat:	0.00	0.17	0.16	0.13	0.22	0.22	0.02	0.11	0.11	0.00	0.02	0.02
Crit Moves:		****		****				****		****		
Green/Cycle:	0.11	0.33	0.33	0.26	0.47	0.47	0.13	0.21	0.21	0.05	0.13	0.13
Volume/Cap:	0.03	0.51	0.48	0.51	0.46	0.46	0.17	0.51	0.51	0.09	0.17	0.17
Delay/Veh:	39.9	27.5	27.5	32.9	17.8	17.8	39.2	36.3	36.3	45.7	39.2	39.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	39.9	27.5	27.5	32.9	17.8	17.8	39.2	36.3	36.3	45.7	39.2	39.2
LOS by Move:	D	C	C	C	B	B	D	D	D	D	D	D
HCM2kAvgQ:	0	7	6	6	8	8	1	6	6	0	1	1

Note: Queue reported is the number of cars per lane.

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                         San Diego Sediment Project
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                      Level Of Service Computation Report
                   Unknown Method (Future Volume Alternative)
********************************************************************************
Intersection #7 28th Street/I-5 southbound ramp
********************************************************************************

********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled     Uncontrolled     Uncontrolled
Rights:          Include          Include          Ignore           Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        0  0  2  0  0    0  0  1  1  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0  587     0    0  381     0    0    0   526    0    0     0
Growth Adj:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
Initial Bse:   0    0     0    0    0     0    0    0     0    0    0     0
Added Vol:     0   20     0    0   13     0    0    0     2    0    0     0
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   0    0     0    0    0     0    0    0     0    0    0     0
User Adj:    0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Volume:    0    0     0    0    0     0    0    0     0    0    0     0
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   0    0     0    0    0     0    0    0     0    0    0     0
PCE Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
MLF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
FinalVolume:   0    0     0    0    0     0    0    0     0    0    0     0
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   0    0     0    0    0     0    0    0     0    0    0     0
Potent Cap.:   0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:   0    0     0    0    0     0    0    0     0    0    0     0
********************************************************************************
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--------------------------------------------------------------------------------
                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #8 28th Street/National Avenue
********************************************************************************
Cycle (sec):          100                 Critical Vol./Cap.(X):        0.731
Loss Time (sec):       16                 Average Delay (sec/veh):       31.6
Optimal Cycle:         74                 Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  1  0  1  0   0  0  1! 0  0   1  0  1  1  0   1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      33   76    38    74  171   105   136  412    82   127  347   179
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   33   76    38    74  171   105   136  412    82   127  347   179
Added Vol:      0    0     0     0    0     0     0    0     0    13    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   33   76    38    74  171   105   136  412    82   140  347   179
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.97 0.97  0.97  0.97 0.97  0.97  0.97 0.97  0.97  0.97 0.97  0.97
PHF Volume:    34   79    39    77  177   109   141  426    85   145  359   185
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   34   79    39    77  177   109   141  426    85   145  359   185
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   34   79    39    77  177   109   141  426    85   145  359   185
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.73 0.73  0.73  0.84 0.84  0.84  0.93 0.91  0.91  0.93 0.93  0.93
Lanes:       0.45 1.03  0.52  0.21 0.49  0.30  1.00 1.67  0.33  1.00 0.66  0.34
Final Sat.:   619 1426   713   338  781   479  1769 2877   573  1769 1166   601
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.06  0.06  0.23 0.23  0.23  0.08 0.15  0.15  0.08 0.31  0.31
Crit Moves:                        ****        ****                    ****
Green/Cycle: 0.31 0.31  0.31  0.31 0.31  0.31  0.11 0.34  0.34  0.19 0.42  0.42
Volume/Cap:  0.18 0.18  0.18  0.73 0.73  0.73  0.73 0.43  0.43  0.43 0.73  0.73
Delay/Veh:   25.3 25.3  25.3  36.3 36.3  36.3  56.5 25.7  25.7  36.8 27.9  27.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  25.3 25.3  25.3  36.3 36.3  36.3  56.5 25.7  25.7  36.8 27.9  27.9
LOS by Move:    C    C     C     D    D     D     E    C     C     D    C     C
HCM2kAvgQ:      2    2     2    11   11    11     6    7     7     4   15    15
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #9 I-5 northbound ramps/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.535
Loss Time (sec):	12	Average Delay (sec/veh):	19.1
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 1 0 1			0 0 1 0 0		
Volume Module:												
Base Vol:	313	0	123	0	0	0	0	486	44	0	321	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	313	0	123	0	0	0	0	486	44	0	321	0
Added Vol:	13	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	326	0	123	0	0	0	0	486	44	0	321	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95
PHF Volume:	345	0	130	0	0	0	0	514	0	0	339	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	345	0	130	0	0	0	0	514	0	0	339	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	345	0	130	0	0	0	0	514	0	0	339	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
Final Sat.:	1769	0	1583	0	0	0	0	1862	1900	0	1862	0
Capacity Analysis Module:												
Vol/Sat:	0.19	0.00	0.08	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.18	0.00
Crit Moves:	****							****				
Green/Cycle:	0.36	0.00	0.36	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.52	0.00
Volume/Cap:	0.53	0.00	0.23	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.35	0.00
Delay/Veh:	26.0	0.0	22.2	0.0	0.0	0.0	0.0	16.8	0.0	0.0	14.6	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.0	0.0	22.2	0.0	0.0	0.0	0.0	16.8	0.0	0.0	14.6	0.0
LOS by Move:	C	A	C	A	A	A	A	B	A	A	B	A
HCM2kAvgQ:	9	0	3	0	0	0	0	11	0	0	6	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #10 I-5 southbound ramp/Boston Avenue

Average Delay (sec/veh): 11.3 Worst Case Level Of Service: F[56.3]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	1 0	0	1 0	0 0	0	0 0	1 0	0	1 0	0 1	0	0 1
Volume Module:												
Base Vol:	8	51	11	0	0	0	535	53	16	3	38	50
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	8	51	11	0	0	0	535	53	16	3	38	50
Added Vol:	0	0	0	0	0	0	24	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	8	51	11	0	0	0	559	53	16	3	38	50
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	8	51	11	0	0	0	559	53	16	3	38	50
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	8	51	11	0	0	0	559	53	16	3	38	50
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1248	1273	61	xxxx	xxxx	xxxxx	88	xxxx	xxxxx	69	xxxx	xxxxx
Potent Cap.:	191	167	1004	xxxx	xxxx	xxxxx	1508	xxxx	xxxxx	1532	xxxx	xxxxx
Move Cap.:	136	105	1004	xxxx	xxxx	xxxxx	1508	xxxx	xxxxx	1532	xxxx	xxxxx
Volume/Cap:	0.06	0.49	0.01	xxxx	xxxx	xxxx	0.37	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.2	xxxx	xxxxx	xxxx	xxxx	xxxxx	1.7	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	33.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.8	xxxx	xxxxx	7.4	xxxx	xxxxx
LOS by Move:	D	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	125	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	2.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	59.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.4	xxxx	xxxxx
Shared LOS:	*	*	F	*	*	*	*	*	*	A	*	*
ApproachDel:		56.3			xxxxxx			xxxxxx			xxxxxx	
ApproachLOS:		F			*			*			*	

Note: Queue reported is the number of cars per lane.

ATTACHMENT E

EXISTING WITH PROJECT TRAFFIC LOS WORKSHEETS (STAGING AREA 3)

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Park Boulevard/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.509
Loss Time (sec):	12	Average Delay (sec/veh):	15.0
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 1! 0 0			0 0 0 0 0			1 0 2 0 1			1 0 2 0 0		
Volume Module:												
Base Vol:	81	0	25	0	0	0	44	284	436	141	596	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	81	0	25	0	0	0	44	284	436	141	596	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	81	0	25	0	0	0	44	284	436	141	596	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
PHF Volume:	92	0	28	0	0	0	50	323	497	161	679	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	92	0	28	0	0	0	50	323	497	161	679	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	92	0	28	0	0	0	50	323	497	161	679	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.91	1.00	0.91	1.00	1.00	1.00	0.93	0.93	0.83	0.93	0.93	1.00
Lanes:	1.62	0.00	0.38	0.00	0.00	0.00	1.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	2800	0	660	0	0	0	1769	3538	1583	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.04	0.00	0.00	0.00	0.03	0.09	0.31	0.09	0.19	0.00
Crit Moves:			****						****	****		
Green/Cycle:	0.07	0.00	0.08	0.00	0.00	0.00	0.16	0.62	0.62	0.18	0.63	0.00
Volume/Cap:	0.49	0.00	0.51	0.00	0.00	0.00	0.17	0.15	0.51	0.51	0.30	0.00
Delay/Veh:	46.5	0.0	45.6	0.0	0.0	0.0	36.2	8.1	11.1	38.5	8.5	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	46.5	0.0	45.6	0.0	0.0	0.0	36.2	8.1	11.1	38.5	8.5	0.0
LOS by Move:	D	A	D	A	A	A	D	A	B	D	A	A
HCM2kAvgQ:	2	0	3	0	0	0	1	2	9	4	5	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.512
Loss Time (sec):	16	Average Delay (sec/veh):	31.4
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	0 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	4	25	14	37	73	279	140	128	19	39	385	56
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	25	14	37	73	279	140	128	19	39	385	56
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	4	25	14	37	73	279	140	128	19	39	385	56
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	4	28	16	41	82	312	156	143	21	44	430	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	28	16	41	82	312	156	143	21	44	430	63
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	28	16	41	82	312	156	143	21	44	430	63
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.96	0.96	0.83	0.93	0.91	0.91	0.93	0.91	0.91
Lanes:	1.00	0.64	0.36	0.34	0.66	1.00	1.00	1.74	0.26	1.00	1.75	0.25
Final Sat.:	1769	1129	632	616	1215	1583	1769	3022	449	1769	3030	441
Capacity Analysis Module:												
Vol/Sat:	0.00	0.02	0.02	0.07	0.07	0.20	0.09	0.05	0.05	0.02	0.14	0.14
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.18	0.18	0.24	0.36	0.36	0.16	0.21	0.21	0.21	0.26	0.26
Volume/Cap:	0.05	0.14	0.14	0.28	0.18	0.54	0.54	0.22	0.22	0.12	0.54	0.54
Delay/Veh:	45.5	35.0	35.0	31.5	21.8	26.2	40.5	32.7	32.7	31.9	32.4	32.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.5	35.0	35.0	31.5	21.8	26.2	40.5	32.7	32.7	31.9	32.4	32.4
LOS by Move:	D	C	C	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	0	1	1	3	3	8	4	2	2	1	7	7

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.276
Loss Time (sec):	16	Average Delay (sec/veh):	21.7
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	19	33	56	7	50	22	15	135	31	87	477	6
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	19	33	56	7	50	22	15	135	31	87	477	6
Added Vol:	0	0	15	0	0	0	0	0	0	44	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	19	33	71	7	50	22	15	135	31	131	477	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	20	35	75	7	53	23	16	142	33	138	502	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	35	75	7	53	23	16	142	33	138	502	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	20	35	75	7	53	23	16	142	33	138	502	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.92	0.92	0.92	0.93	0.90	0.90	0.93	0.93	0.93
Lanes:	0.15	0.27	0.58	0.09	0.63	0.28	1.00	1.63	0.37	1.00	1.98	0.02
Final Sat.:	253	439	945	155	1110	488	1769	2797	642	1769	3487	44
Capacity Analysis Module:												
Vol/Sat:	0.08	0.08	0.08	0.05	0.05	0.05	0.01	0.05	0.05	0.08	0.14	0.14
Crit Moves:		****					****				****	
Green/Cycle:	0.28	0.28	0.28	0.28	0.28	0.28	0.05	0.22	0.22	0.34	0.51	0.51
Volume/Cap:	0.28	0.28	0.28	0.17	0.17	0.17	0.18	0.23	0.23	0.23	0.28	0.28
Delay/Veh:	28.5	28.5	28.5	27.4	27.4	27.4	46.5	32.1	32.1	23.9	14.1	14.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	28.5	28.5	28.5	27.4	27.4	27.4	46.5	32.1	32.1	23.9	14.1	14.1
LOS by Move:	C	C	C	C	C	C	D	C	C	C	B	B
HCM2kAvgQ:	3	3	3	2	2	2	0	2	2	3	5	5

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 28th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.433
Loss Time (sec):	16	Average Delay (sec/veh):	28.6
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0 1! 0 0			1 0 1 1 0			1 0 1 1 0			1 0 2 0 1		
Volume Module:												
Base Vol:	4	7	5	315	9	28	36	186	7	12	448	142
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	7	5	315	9	28	36	186	7	12	448	142
Added Vol:	0	0	0	0	0	44	15	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	4	7	5	315	9	72	51	186	7	12	448	142
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
PHF Volume:	4	7	5	335	10	77	54	198	7	13	476	151
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	7	5	335	10	77	54	198	7	13	476	151
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	7	5	335	10	77	54	198	7	13	476	151
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.93	0.81	0.81	0.93	0.93	0.93	0.93	0.93	0.83
Lanes:	0.25	0.44	0.31	1.00	1.00	1.00	1.00	1.93	0.07	1.00	2.00	1.00
Final Sat.:	441	771	551	1769	1534	1534	1769	3392	128	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.01	0.01	0.01	0.19	0.01	0.05	0.03	0.06	0.06	0.01	0.13	0.10
Crit Moves:		****		****			****				****	
Green/Cycle:	0.24	0.05	0.05	0.42	0.24	0.24	0.07	0.20	0.20	0.17	0.30	0.30
Volume/Cap:	0.04	0.19	0.19	0.45	0.03	0.21	0.45	0.29	0.29	0.04	0.45	0.32
Delay/Veh:	29.5	46.6	46.6	21.1	29.4	31.0	47.4	34.4	34.4	34.7	28.6	27.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	29.5	46.6	46.6	21.1	29.4	31.0	47.4	34.4	34.4	34.7	28.6	27.5
LOS by Move:	C	D	D	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	0	1	1	7	0	2	2	3	3	0	6	4

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 28th Street/Main Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.403
Loss Time (sec):	16	Average Delay (sec/veh):	29.8
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Protected			Protected			Protected			Protected	
Rights:		Include			Include			Include			Include	
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:		1 0 1 1 0			1 0 1 1 0			1 0 1 1 0			1 0 1 1 0	
Volume Module:												
Base Vol:	35	191	58	163	413	41	66	88	43	53	211	187
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	35	191	58	163	413	41	66	88	43	53	211	187
Added Vol:	0	15	0	0	44	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	35	206	58	163	457	41	66	88	43	53	211	187
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	37	218	61	172	483	43	70	93	45	56	223	198
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	218	61	172	483	43	70	93	45	56	223	198
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	37	218	61	172	483	43	70	93	45	56	223	198
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.93	0.92	0.92	0.93	0.89	0.89	0.93	0.87	0.87
Lanes:	1.00	1.56	0.44	1.00	1.84	0.16	1.00	1.34	0.66	1.00	1.06	0.94
Final Sat.:	1769	2669	752	1769	3208	288	1769	2260	1104	1769	1744	1546
Capacity Analysis Module:												
Vol/Sat:	0.02	0.08	0.08	0.10	0.15	0.15	0.04	0.04	0.04	0.03	0.13	0.13
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.19	0.19	0.23	0.37	0.37	0.10	0.21	0.21	0.21	0.32	0.32
Volume/Cap:	0.40	0.42	0.42	0.42	0.40	0.40	0.40	0.20	0.20	0.15	0.40	0.40
Delay/Veh:	48.8	35.8	35.8	33.4	23.3	23.3	43.9	32.9	32.9	32.6	27.0	27.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	48.8	35.8	35.8	33.4	23.3	23.3	43.9	32.9	32.9	32.6	27.0	27.0
LOS by Move:	D	D	D	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	2	4	4	4	6	6	2	2	2	1	5	5

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 28th Street/Boston Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.322
Loss Time (sec):	16	Average Delay (sec/veh):	18.0
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	3	351	80	137	650	26	23	48	7	11	15	44
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	351	80	137	650	26	23	48	7	11	15	44
Added Vol:	0	2	13	0	44	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	3	353	93	137	694	26	23	48	7	11	15	44
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
PHF Volume:	3	374	99	145	736	28	24	51	7	12	16	47
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	374	99	145	736	28	24	51	7	12	16	47
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	374	99	145	736	28	24	51	7	12	16	47
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.83	0.93	0.93	0.93	0.93	0.96	0.96	0.93	0.87	0.87
Lanes:	1.00	2.00	1.00	1.00	1.93	0.07	1.00	0.87	0.13	1.00	0.25	0.75
Final Sat.:	1769	3538	1583	1769	3393	127	1769	1594	232	1769	420	1233
Capacity Analysis Module:												
Vol/Sat:	0.00	0.11	0.06	0.08	0.22	0.22	0.01	0.03	0.03	0.01	0.04	0.04
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.38	0.38	0.30	0.63	0.63	0.05	0.08	0.08	0.08	0.11	0.11
Volume/Cap:	0.04	0.28	0.16	0.28	0.34	0.34	0.28	0.40	0.40	0.08	0.34	0.34
Delay/Veh:	45.4	21.4	20.4	27.2	8.8	8.8	47.5	45.5	45.5	42.9	42.3	42.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.4	21.4	20.4	27.2	8.8	8.8	47.5	45.5	45.5	42.9	42.3	42.3
LOS by Move:	D	C	C	C	A	A	D	D	D	D	D	D
HCM2kAvgQ:	0	4	2	3	6	6	1	2	2	0	2	2

Note: Queue reported is the number of cars per lane.

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
                 Unknown Method (Future Volume Alternative)
********************************************************************************
Intersection #7 28th Street/I-5 southbound ramp
********************************************************************************

********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Uncontrolled     Uncontrolled
Rights:           Include          Include           Ignore          Include
Min. Green:     5    5     5     5    5     5     5    5     5     5    5     5
Lanes:        0  0  2  0  0    0  0  1  1  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  415     0     0  303     0     0    0   508     0    0     0
Growth Adj:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
Initial Bse:    0    0     0     0    0     0     0    0     0     0    0     0
Added Vol:      0    2     0     0   24     0     0    0    20     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0     0     0    0     0     0    0     0
User Adj:    0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Volume:     0    0     0     0    0     0     0    0     0     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0     0    0     0     0    0     0     0    0     0
PCE Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
MLF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
FinalVolume:    0    0     0     0    0     0     0    0     0     0    0     0
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Potent Cap.:    0    0     0     0    0     0     0    0     0     0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:    0    0     0     0    0     0     0    0     0     0    0     0
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #8 28th Street/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.781
Loss Time (sec):	16	Average Delay (sec/veh):	33.7
Optimal Cycle:	82	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1 0 1 0			0 0 1! 0 0			1 0 1 1 0			1 0 0 1 0		
Volume Module:												
Base Vol:	37	65	32	50	135	183	114	172	25	146	537	86
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	37	65	32	50	135	183	114	172	25	146	537	86
Added Vol:	0	0	0	0	0	0	0	0	0	24	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	37	65	32	50	135	183	114	172	25	170	537	86
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
PHF Volume:	38	67	33	52	140	190	118	178	26	176	556	89
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	38	67	33	52	140	190	118	178	26	176	556	89
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	38	67	33	52	140	190	118	178	26	176	556	89
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.68	0.68	0.68	0.85	0.85	0.85	0.93	0.91	0.91	0.93	0.96	0.96
Lanes:	0.55	0.97	0.48	0.13	0.37	0.50	1.00	1.75	0.25	1.00	0.86	0.14
Final Sat.:	712	1251	616	221	596	808	1769	3030	440	1769	1571	252
Capacity Analysis Module:												
Vol/Sat:	0.05	0.05	0.05	0.23	0.23	0.23	0.07	0.06	0.06	0.10	0.35	0.35
Crit Moves:					****		****				****	
Green/Cycle:	0.30	0.30	0.30	0.30	0.30	0.30	0.09	0.20	0.20	0.34	0.45	0.45
Volume/Cap:	0.18	0.18	0.18	0.78	0.78	0.78	0.78	0.29	0.29	0.29	0.78	0.78
Delay/Veh:	26.0	26.0	26.0	39.9	39.9	39.9	67.3	34.2	34.2	24.5	27.9	27.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.0	26.0	26.0	39.9	39.9	39.9	67.3	34.2	34.2	24.5	27.9	27.9
LOS by Move:	C	C	C	D	D	D	E	C	C	C	C	C
HCM2kAvgQ:	2	2	2	13	13	13	6	3	3	4	18	18

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #9 I-5 northbound ramps/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.509
Loss Time (sec):	12	Average Delay (sec/veh):	19.1
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 1 0 1			0 0 1 0 0		
Volume Module:												
Base Vol:	304	0	79	0	0	0	0	236	19	0	450	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	304	0	79	0	0	0	0	236	19	0	450	0
Added Vol:	24	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	328	0	79	0	0	0	0	236	19	0	450	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95
PHF Volume:	344	0	83	0	0	0	0	247	0	0	472	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	344	0	83	0	0	0	0	247	0	0	472	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	344	0	83	0	0	0	0	247	0	0	472	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
Final Sat.:	1769	0	1583	0	0	0	0	1862	1900	0	1862	0
Capacity Analysis Module:												
Vol/Sat:	0.19	0.00	0.05	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.25	0.00
Crit Moves:	****										****	
Green/Cycle:	0.38	0.00	0.38	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.50	0.00
Volume/Cap:	0.51	0.00	0.14	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.51	0.00
Delay/Veh:	24.3	0.0	20.3	0.0	0.0	0.0	0.0	14.7	0.0	0.0	17.3	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	24.3	0.0	20.3	0.0	0.0	0.0	0.0	14.7	0.0	0.0	17.3	0.0
LOS by Move:	C	A	C	A	A	A	A	B	A	A	B	A
HCM2kAvgQ:	8	0	2	0	0	0	0	4	0	0	10	0

Note: Queue reported is the number of cars per lane.

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #10 I-5 southbound ramp/Boston Avenue
********************************************************************************
Average Delay (sec/veh):      6.3       Worst Case Level Of Service: C[ 15.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  1  0   0  0  0  0  0   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       9   23     5     0    0     0   255   26     8     2   50    43
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    9   23     5     0    0     0   255   26     8     2   50    43
Added Vol:      0    0     0     0    0     0    13    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    9   23     5     0    0     0   268   26     8     2   50    43
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     9   23     5     0    0     0   268   26     8     2   50    43
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    9   23     5     0    0     0   268   26     8     2   50    43
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  642  663    30  xxxx xxxx xxxxx    93 xxxx xxxxx    34 xxxx xxxxx
Potent Cap.:  439  382  1044  xxxx xxxx xxxxx  1501 xxxx xxxxx  1578 xxxx xxxxx
Move Cap.:    378  313  1044  xxxx xxxx xxxxx  1501 xxxx xxxxx  1578 xxxx xxxxx
Volume/Cap:  0.02 0.07  0.00  xxxx xxxx  xxxx  0.18 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx   0.6 xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 14.8 xxxx xxxxx xxxxx xxxx xxxxx   7.9 xxxx xxxxx   7.3 xxxx xxxxx
LOS by Move:    B    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx   358  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx   0.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx  15.9 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.3 xxxx xxxxx
Shared LOS:     *    *     C     *    *     *     *    *     *     A    *     *
ApproachDel:      15.6            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        C                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Park Boulevard/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.425
Loss Time (sec):	12	Average Delay (sec/veh):	13.9
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 1! 0 0			0 0 0 0 0			1 0 2 0 1			1 0 2 0 0		
Volume Module:												
Base Vol:	96	0	52	0	0	0	6	912	91	50	356	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	96	0	52	0	0	0	6	912	91	50	356	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	96	0	52	0	0	0	6	912	91	50	356	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	104	0	56	0	0	0	7	989	99	54	386	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	104	0	56	0	0	0	7	989	99	54	386	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	104	0	56	0	0	0	7	989	99	54	386	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	1.00	0.90	1.00	1.00	1.00	0.93	0.93	0.83	0.93	0.93	1.00
Lanes:	1.48	0.00	0.52	0.00	0.00	0.00	1.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	2529	0	888	0	0	0	1769	3538	1583	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.06	0.00	0.00	0.00	0.00	0.28	0.06	0.03	0.11	0.00
Crit Moves:			****					****		****		
Green/Cycle:	0.10	0.00	0.15	0.00	0.00	0.00	0.23	0.66	0.66	0.07	0.50	0.00
Volume/Cap:	0.41	0.00	0.42	0.00	0.00	0.00	0.02	0.42	0.09	0.42	0.22	0.00
Delay/Veh:	43.0	0.0	39.4	0.0	0.0	0.0	29.8	8.2	6.3	46.7	14.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	43.0	0.0	39.4	0.0	0.0	0.0	29.8	8.2	6.3	46.7	14.0	0.0
LOS by Move:	D	A	D	A	A	A	C	A	A	D	B	A
HCM2kAvgQ:	3	0	3	0	0	0	0	8	1	2	3	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.457
Loss Time (sec):	16	Average Delay (sec/veh):	25.8
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	0 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	21	77	34	46	36	158	346	670	10	11	118	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	77	34	46	36	158	346	670	10	11	118	20
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	77	34	46	36	158	346	670	10	11	118	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	23	85	38	51	40	175	383	741	11	12	131	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	23	85	38	51	40	175	383	741	11	12	131	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	23	85	38	51	40	175	383	741	11	12	131	22
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.95	0.95	0.83	0.93	0.93	0.93	0.93	0.91	0.91
Lanes:	1.00	0.69	0.31	0.56	0.44	1.00	1.00	1.97	0.03	1.00	1.71	0.29
Final Sat.:	1769	1232	544	1016	795	1583	1769	3479	52	1769	2959	501
Capacity Analysis Module:												
Vol/Sat:	0.01	0.07	0.07	0.05	0.05	0.11	0.22	0.21	0.21	0.01	0.04	0.04
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.17	0.17	0.12	0.24	0.24	0.46	0.45	0.45	0.11	0.09	0.09
Volume/Cap:	0.26	0.42	0.42	0.42	0.21	0.47	0.47	0.47	0.47	0.07	0.47	0.47
Delay/Veh:	47.3	38.4	38.4	42.1	31.0	33.8	19.0	19.5	19.5	40.4	44.0	44.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	47.3	38.4	38.4	42.1	31.0	33.8	19.0	19.5	19.5	40.4	44.0	44.0
LOS by Move:	D	D	D	D	C	C	B	B	B	D	D	D
HCM2kAvgQ:	1	4	4	3	2	5	8	8	8	0	2	2

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.369
Loss Time (sec):	16	Average Delay (sec/veh):	20.4
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	17	30	45	12	21	16	75	622	5	20	145	5
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	17	30	45	12	21	16	75	622	5	20	145	5
Added Vol:	0	0	44	0	0	0	0	0	0	15	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	17	30	89	12	21	16	75	622	5	35	145	5
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	19	33	99	13	23	18	83	689	6	39	161	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	19	33	99	13	23	18	83	689	6	39	161	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	19	33	99	13	23	18	83	689	6	39	161	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.87	0.87	0.87	0.93	0.93	0.93	0.93	0.93	0.93
Lanes:	0.13	0.22	0.65	0.24	0.43	0.33	1.00	1.98	0.02	1.00	1.93	0.07
Final Sat.:	205	361	1072	404	707	539	1769	3506	28	1769	3403	117
Capacity Analysis Module:												
Vol/Sat:	0.09	0.09	0.09	0.03	0.03	0.03	0.05	0.20	0.20	0.02	0.05	0.05
Crit Moves:		****						****		****		
Green/Cycle:	0.25	0.25	0.25	0.25	0.25	0.25	0.30	0.53	0.53	0.06	0.30	0.30
Volume/Cap:	0.37	0.37	0.37	0.13	0.13	0.13	0.16	0.37	0.37	0.37	0.16	0.16
Delay/Veh:	31.6	31.6	31.6	29.3	29.3	29.3	26.2	13.8	13.8	47.4	26.1	26.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	31.6	31.6	31.6	29.3	29.3	29.3	26.2	13.8	13.8	47.4	26.1	26.1
LOS by Move:	C	C	C	C	C	C	C	B	B	D	C	C
HCM2kAvgQ:	4	4	4	1	1	1	2	6	6	1	2	2

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 28th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.384
Loss Time (sec):	16	Average Delay (sec/veh):	23.3
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0 1! 0 0			1 0 1 1 0			1 0 1 1 0			1 0 2 0 1		
Volume Module:												
Base Vol:	3	12	3	158	2	19	94	648	0	11	121	174
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	12	3	158	2	19	94	648	0	11	121	174
Added Vol:	0	0	0	0	0	15	44	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	3	12	3	158	2	34	138	648	0	11	121	174
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
PHF Volume:	3	13	3	177	2	38	154	725	0	12	135	195
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	13	3	177	2	38	154	725	0	12	135	195
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	13	3	177	2	38	154	725	0	12	135	195
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.95	0.93	0.80	0.80	0.93	0.93	0.95	0.93	0.93	0.83
Lanes:	0.16	0.67	0.17	1.00	1.00	1.00	1.00	2.00	0.00	1.00	2.00	1.00
Final Sat.:	301	1203	301	1769	1518	1518	1769	3538	0	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.01	0.01	0.01	0.10	0.00	0.03	0.09	0.20	0.00	0.01	0.04	0.12
Crit Moves:		****		****				****		****		
Green/Cycle:	0.15	0.05	0.05	0.24	0.15	0.15	0.23	0.50	0.00	0.05	0.32	0.32
Volume/Cap:	0.08	0.22	0.22	0.41	0.01	0.17	0.38	0.41	0.00	0.14	0.12	0.38
Delay/Veh:	37.0	46.9	46.9	32.5	36.5	37.7	33.3	16.0	0.0	46.2	24.1	26.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	37.0	46.9	46.9	32.5	36.5	37.7	33.3	16.0	0.0	46.2	24.1	26.8
LOS by Move:	D	D	D	C	D	D	C	B	A	D	C	C
HCM2kAvgQ:	1	1	1	5	0	1	4	7	0	0	2	5

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 28th Street/Main Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.638
Loss Time (sec):	16	Average Delay (sec/veh):	33.3
Optimal Cycle:	61	Level Of Service:	C

Approach:	North Bound	South Bound	East Bound	West Bound
Control:	Protected	Protected	Protected	Protected
Rights:	Include	Include	Include	Include
Lanes:	1 0 1 1 0	1 0 1 1 0	1 0 1 1 0	1 0 1 1 0

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Volume Module:												
Base Vol:	20	438	112	295	312	43	96	177	32	42	89	170
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	438	112	295	312	43	96	177	32	42	89	170
Added Vol:	0	44	0	0	15	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	20	482	112	295	327	43	96	177	32	42	89	170
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	21	516	120	316	350	46	103	190	34	45	95	182
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	21	516	120	316	350	46	103	190	34	45	95	182
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	21	516	120	316	350	46	103	190	34	45	95	182
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.93	0.92	0.92	0.93	0.91	0.91	0.93	0.84	0.84
Lanes:	1.00	1.62	0.38	1.00	1.77	0.23	1.00	1.69	0.31	1.00	1.00	1.00
Final Sat.:	1769	2790	648	1769	3073	404	1769	2927	529	1769	1596	1596
Capacity Analysis Module:												
Vol/Sat:	0.01	0.18	0.18	0.18	0.11	0.11	0.06	0.06	0.06	0.03	0.06	0.11
Crit Moves:		****		****			****					****
Green/Cycle:	0.17	0.29	0.29	0.28	0.40	0.40	0.09	0.15	0.15	0.12	0.18	0.18
Volume/Cap:	0.07	0.64	0.64	0.64	0.29	0.29	0.64	0.42	0.42	0.22	0.33	0.64
Delay/Veh:	34.6	32.3	32.3	34.3	20.7	20.7	52.1	39.0	39.0	40.5	36.1	41.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.6	32.3	32.3	34.3	20.7	20.7	52.1	39.0	39.0	40.5	36.1	41.2
LOS by Move:	C	C	C	C	C	C	D	D	D	D	D	D
HCM2kAvgQ:	1	10	10	8	4	4	4	4	4	1	3	7

Note: Queue reported is the number of cars per lane.

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                          San Diego Sediment Project
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                      Level Of Service Computation Report
             2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #6 28th Street/Boston Avenue
********************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):        0.485
Loss Time (sec):      16                Average Delay (sec/veh):       25.9
Optimal Cycle:        60                Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  1    1  0  1  1  0    1  0  0  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       6  528   207  213  657    33   35  171     9    7    6    27
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    6  528   207  213  657    33   35  171     9    7    6    27
Added Vol:      0   20    24    0   15     0    0    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    6  548   231  213  672    33   35  171     9    7    6    27
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93 0.93 0.93  0.93
PHF Volume:     6  592   250  230  726    36   38  185    10    8    6    29
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    6  592   250  230  726    36   38  185    10    8    6    29
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    6  592   250  230  726    36   38  185    10    8    6    29
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.93 0.93  0.83 0.93 0.92  0.92 0.93 0.97  0.97 0.93 0.86  0.86
Lanes:       1.00 2.00  1.00 1.00 1.91  0.09 1.00 0.95  0.05 1.00 0.18  0.82
Final Sat.:  1769 3538  1583 1769 3349   164 1769 1757    92 1769  297  1336
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.17  0.16 0.13 0.22  0.22 0.02 0.11  0.11 0.00 0.02  0.02
Crit Moves:       ****       ****                   ****       ****
Green/Cycle: 0.11 0.33  0.33 0.26 0.47  0.47 0.13 0.21  0.21 0.05 0.13  0.13
Volume/Cap:  0.03 0.51  0.48 0.51 0.46  0.46 0.17 0.51  0.51 0.09 0.17  0.17
Delay/Veh:   39.9 27.5  27.5 32.9 17.8  17.8 39.2 36.3  36.3 45.7 39.2  39.2
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  39.9 27.5  27.5 32.9 17.8  17.8 39.2 36.3  36.3 45.7 39.2  39.2
LOS by Move:    D    C     C    C    B     B    D    D     D    D    D     D
HCM2kAvgQ:      0    7     6    6    8     8    1    6     6    0    1     1
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

```
--------------------------------------------------------------------------------
                          San Diego Sediment Project
--------------------------------------------------------------------------------
                       Level Of Service Computation Report
                   Unknown Method (Future Volume Alternative)
********************************************************************************
Intersection #7 28th Street/I-5 southbound ramp
********************************************************************************

********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Uncontrolled     Uncontrolled
Rights:           Include          Include          Ignore           Include
Min. Green:     5    5     5     5    5     5     5    5     5     5    5     5
Lanes:        0  0  2  0  0    0  0  1  1  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  587     0     0  381     0     0    0   526     0    0     0
Growth Adj:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
Initial Bse:    0    0     0     0    0     0     0    0     0     0    0     0
Added Vol:      0   20     0     0   13     0     0    0     2     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0     0     0    0     0     0    0     0
User Adj:    0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Volume:     0    0     0     0    0     0     0    0     0     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0     0    0     0     0    0     0     0    0     0
PCE Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
MLF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
FinalVolume:    0    0     0     0    0     0     0    0     0     0    0     0
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Potent Cap.:    0    0     0     0    0     0     0    0     0     0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:    0    0     0     0    0     0     0    0     0     0    0     0
********************************************************************************
```

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #8 28th Street/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.731
Loss Time (sec):	16	Average Delay (sec/veh):	31.6
Optimal Cycle:	74	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1 0 1 0			0 0 1! 0 0			1 0 1 1 0			1 0 0 1 0		
Volume Module:												
Base Vol:	33	76	38	74	171	105	136	412	82	127	347	179
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	33	76	38	74	171	105	136	412	82	127	347	179
Added Vol:	0	0	0	0	0	0	0	0	0	13	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	33	76	38	74	171	105	136	412	82	140	347	179
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
PHF Volume:	34	79	39	77	177	109	141	426	85	145	359	185
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	34	79	39	77	177	109	141	426	85	145	359	185
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	34	79	39	77	177	109	141	426	85	145	359	185
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.73	0.73	0.73	0.84	0.84	0.84	0.93	0.91	0.91	0.93	0.93	0.93
Lanes:	0.45	1.03	0.52	0.21	0.49	0.30	1.00	1.67	0.33	1.00	0.66	0.34
Final Sat.:	619	1426	713	338	781	479	1769	2877	573	1769	1166	601
Capacity Analysis Module:												
Vol/Sat:	0.06	0.06	0.06	0.23	0.23	0.23	0.08	0.15	0.15	0.08	0.31	0.31
Crit Moves:					****		****				****	
Green/Cycle:	0.31	0.31	0.31	0.31	0.31	0.31	0.11	0.34	0.34	0.19	0.42	0.42
Volume/Cap:	0.18	0.18	0.18	0.73	0.73	0.73	0.73	0.43	0.43	0.43	0.73	0.73
Delay/Veh:	25.3	25.3	25.3	36.3	36.3	36.3	56.5	25.7	25.7	36.8	27.9	27.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	25.3	25.3	25.3	36.3	36.3	36.3	56.5	25.7	25.7	36.8	27.9	27.9
LOS by Move:	C	C	C	D	D	D	E	C	C	D	C	C
HCM2kAvgQ:	2	2	2	11	11	11	6	7	7	4	15	15

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #9 I-5 northbound ramps/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.535
Loss Time (sec):	12	Average Delay (sec/veh):	19.1
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 1 0 1			0 0 1 0 0		
Volume Module:												
Base Vol:	313	0	123	0	0	0	0	486	44	0	321	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	313	0	123	0	0	0	0	486	44	0	321	0
Added Vol:	13	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	326	0	123	0	0	0	0	486	44	0	321	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95
PHF Volume:	345	0	130	0	0	0	0	514	0	0	339	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	345	0	130	0	0	0	0	514	0	0	339	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	345	0	130	0	0	0	0	514	0	0	339	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
Final Sat.:	1769	0	1583	0	0	0	0	1862	1900	0	1862	0
Capacity Analysis Module:												
Vol/Sat:	0.19	0.00	0.08	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.18	0.00
Crit Moves:	****							****				
Green/Cycle:	0.36	0.00	0.36	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.52	0.00
Volume/Cap:	0.53	0.00	0.23	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.35	0.00
Delay/Veh:	26.0	0.0	22.2	0.0	0.0	0.0	0.0	16.8	0.0	0.0	14.6	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.0	0.0	22.2	0.0	0.0	0.0	0.0	16.8	0.0	0.0	14.6	0.0
LOS by Move:	C	A	C	A	A	A	A	B	A	A	B	A
HCM2kAvgQ:	9	0	3	0	0	0	0	11	0	0	6	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #10 I-5 southbound ramp/Boston Avenue

Average Delay (sec/veh): 11.3 Worst Case Level Of Service: F[56.3]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	1 0 0 1 0			0 0 0 0 0			1 0 0 1 0			0 1 0 0 1		
Volume Module:												
Base Vol:	8	51	11	0	0	0	535	53	16	3	38	50
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	8	51	11	0	0	0	535	53	16	3	38	50
Added Vol:	0	0	0	0	0	0	24	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	8	51	11	0	0	0	559	53	16	3	38	50
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	8	51	11	0	0	0	559	53	16	3	38	50
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	8	51	11	0	0	0	559	53	16	3	38	50
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1248	1273	61	xxxx	xxxx	xxxxx	88	xxxx	xxxxx	69	xxxx	xxxxx
Potent Cap.:	191	167	1004	xxxx	xxxx	xxxxx	1508	xxxx	xxxxx	1532	xxxx	xxxxx
Move Cap.:	136	105	1004	xxxx	xxxx	xxxxx	1508	xxxx	xxxxx	1532	xxxx	xxxxx
Volume/Cap:	0.06	0.49	0.01	xxxx	xxxx	xxxx	0.37	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.2	xxxx	xxxxx	xxxx	xxxx	xxxxx	1.7	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	33.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.8	xxxx	xxxxx	7.4	xxxx	xxxxx
LOS by Move:	D	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	125	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	2.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	59.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.4	xxxx	xxxxx
Shared LOS:	*	*	F	*	*	*	*	*	*	A	*	*
ApproachDel:	56.3			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Note: Queue reported is the number of cars per lane.

ATTACHMENT F

EXISTING WITH PROJECT TRAFFIC
LOS WORKSHEETS (STAGING AREA 4)

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--------------------------------------------------------------------------------
                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #1 Park Boulevard/Harbor Drive
********************************************************************************
Cycle (sec):          100                 Critical Vol./Cap.(X):        0.509
Loss Time (sec):       12                 Average Delay (sec/veh):       15.0
Optimal Cycle:         60                 Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  1! 0  0   0  0  0  0  0   1  0  2  0  1   1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      81    0    25    0    0     0   44  284   436  141  596     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:   81    0    25    0    0     0   44  284   436  141  596     0
Added Vol:      0    0     0    0    0     0    0    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   81    0    25    0    0     0   44  284   436  141  596     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.88 0.88  0.88 0.88 0.88  0.88 0.88 0.88  0.88 0.88 0.88  0.88
PHF Volume:    92    0    28    0    0     0   50  323   497  161  679     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   92    0    28    0    0     0   50  323   497  161  679     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:   92    0    28    0    0     0   50  323   497  161  679     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.91 1.00  0.91 1.00 1.00  1.00 0.93 0.93  0.83 0.93 0.93  1.00
Lanes:       1.62 0.00  0.38 0.00 0.00  0.00 1.00 2.00  1.00 1.00 2.00  0.00
Final Sat.:  2800    0   660    0    0     0 1769 3538  1583 1769 3538     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.03 0.00  0.04 0.00 0.00  0.00 0.03 0.09  0.31 0.09 0.19  0.00
Crit Moves:             ****                            ****  ****
Green/Cycle: 0.07 0.00  0.08 0.00 0.00  0.00 0.16 0.62  0.62 0.18 0.63  0.00
Volume/Cap:  0.49 0.00  0.51 0.00 0.00  0.00 0.17 0.15  0.51 0.51 0.30  0.00
Delay/Veh:   46.5  0.0  45.6  0.0  0.0   0.0 36.2  8.1  11.1 38.5  8.5   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  46.5  0.0  45.6  0.0  0.0   0.0 36.2  8.1  11.1 38.5  8.5   0.0
LOS by Move:    D    A     D    A    A     A    D    A     B    D    A     A
HCM2kAvgQ:      2    0     3    0    0     0    1    2     9    4    5     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.512
Loss Time (sec):	16	Average Delay (sec/veh):	31.4
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	0 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	4	25	14	37	73	279	140	128	19	39	385	56
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	25	14	37	73	279	140	128	19	39	385	56
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	4	25	14	37	73	279	140	128	19	39	385	56
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	4	28	16	41	82	312	156	143	21	44	430	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	28	16	41	82	312	156	143	21	44	430	63
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	28	16	41	82	312	156	143	21	44	430	63
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.96	0.96	0.83	0.93	0.91	0.91	0.93	0.91	0.91
Lanes:	1.00	0.64	0.36	0.34	0.66	1.00	1.00	1.74	0.26	1.00	1.75	0.25
Final Sat.:	1769	1129	632	616	1215	1583	1769	3022	449	1769	3030	441
Capacity Analysis Module:												
Vol/Sat:	0.00	0.02	0.02	0.07	0.07	0.20	0.09	0.05	0.05	0.02	0.14	0.14
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.18	0.18	0.24	0.36	0.36	0.16	0.21	0.21	0.21	0.26	0.26
Volume/Cap:	0.05	0.14	0.14	0.28	0.18	0.54	0.54	0.22	0.22	0.12	0.54	0.54
Delay/Veh:	45.5	35.0	35.0	31.5	21.8	26.2	40.5	32.7	32.7	31.9	32.4	32.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.5	35.0	35.0	31.5	21.8	26.2	40.5	32.7	32.7	31.9	32.4	32.4
LOS by Move:	D	C	C	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	0	1	1	3	3	8	4	2	2	1	7	7

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.265
Loss Time (sec):	16	Average Delay (sec/veh):	20.8
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Permitted			Permitted			Protected			Protected	
Rights:		Include			Include			Include			Include	
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	19	33	56	7	50	22	15	135	31	87	477	6
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	19	33	56	7	50	22	15	135	31	87	477	6
Added Vol:	0	0	0	0	0	0	0	0	0	22	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	19	33	56	7	50	22	15	135	31	109	477	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	20	35	59	7	53	23	16	142	33	115	502	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	35	59	7	53	23	16	142	33	115	502	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	20	35	59	7	53	23	16	142	33	115	502	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.92	0.92	0.92	0.93	0.90	0.90	0.93	0.93	0.93
Lanes:	0.18	0.30	0.52	0.09	0.63	0.28	1.00	1.63	0.37	1.00	1.98	0.02
Final Sat.:	288	501	850	155	1110	488	1769	2797	642	1769	3487	44
Capacity Analysis Module:												
Vol/Sat:	0.07	0.07	0.07	0.05	0.05	0.05	0.01	0.05	0.05	0.06	0.14	0.14
Crit Moves:		****					****				****	
Green/Cycle:	0.26	0.26	0.26	0.26	0.26	0.26	0.05	0.26	0.26	0.33	0.53	0.53
Volume/Cap:	0.27	0.27	0.27	0.18	0.18	0.18	0.18	0.20	0.20	0.20	0.27	0.27
Delay/Veh:	30.0	30.0	30.0	29.2	29.2	29.2	46.5	29.3	29.3	24.4	12.8	12.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	30.0	30.0	30.0	29.2	29.2	29.2	46.5	29.3	29.3	24.4	12.8	12.8
LOS by Move:	C	C	C	C	C	C	D	C	C	C	B	B
HCM2kAvgQ:	3	3	3	2	2	2	0	2	2	2	4	4

Note: Queue reported is the number of cars per lane.

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                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #4 28th Street/Harbor Drive
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):        0.433
Loss Time (sec):      16               Average Delay (sec/veh):       28.6
Optimal Cycle:        60               Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1! 0  0    1  0  1  1  0    1  0  1  1  0    1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       4    7     5  315    9    28   36  186     7   12  448   142
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    4    7     5  315    9    28   36  186     7   12  448   142
Added Vol:      0    0     0    0    0    27   15    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    4    7     5  315    9    55   51  186     7   12  448   142
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.94 0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94
PHF Volume:     4    7     5  335   10    58   54  198     7   13  476   151
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    4    7     5  335   10    58   54  198     7   13  476   151
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    4    7     5  335   10    58   54  198     7   13  476   151
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.93 0.93  0.93 0.93 0.81  0.81 0.93 0.93  0.93 0.93 0.93  0.83
Lanes:       0.25 0.44  0.31 1.00 1.00  1.00 1.00 1.93  0.07 1.00 2.00  1.00
Final Sat.:   441  771   551 1769 1541  1541 1769 3392   128 1769 3538  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.01  0.01 0.19 0.01  0.04 0.03 0.06  0.06 0.01 0.13  0.10
Crit Moves:       ****       ****            ****                  ****
Green/Cycle: 0.24 0.05  0.05 0.42 0.24  0.24 0.07 0.20  0.20 0.17 0.30  0.30
Volume/Cap:  0.04 0.19  0.19 0.45 0.03  0.16 0.45 0.29  0.29 0.04 0.45  0.32
Delay/Veh:   29.5 46.6  46.6 21.1 29.4  30.5 47.4 34.4  34.4 34.7 28.6  27.5
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  29.5 46.6  46.6 21.1 29.4  30.5 47.4 34.4  34.4 34.7 28.6  27.5
LOS by Move:    C    D     D    C    C     C    D    C     C    C    C     C
HCM2kAvgQ:      0    1     1    7    0     2    2    3     3    0    6     4
********************************************************************************
Note: Queue reported is the number of cars per lane.
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 28th Street/Main Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.403
Loss Time (sec):	16	Average Delay (sec/veh):	29.8
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 1	0	1 0	1 1	0	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	35	191	58	163	413	41	66	88	43	53	211	187
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	35	191	58	163	413	41	66	88	43	53	211	187
Added Vol:	0	15	0	0	44	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	35	206	58	163	457	41	66	88	43	53	211	187
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	37	218	61	172	483	43	70	93	45	56	223	198
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	218	61	172	483	43	70	93	45	56	223	198
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	37	218	61	172	483	43	70	93	45	56	223	198
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.93	0.92	0.92	0.93	0.89	0.89	0.93	0.87	0.87
Lanes:	1.00	1.56	0.44	1.00	1.84	0.16	1.00	1.34	0.66	1.00	1.06	0.94
Final Sat.:	1769	2669	752	1769	3208	288	1769	2260	1104	1769	1744	1546
Capacity Analysis Module:												
Vol/Sat:	0.02	0.08	0.08	0.10	0.15	0.15	0.04	0.04	0.04	0.03	0.13	0.13
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.19	0.19	0.23	0.37	0.37	0.10	0.21	0.21	0.21	0.32	0.32
Volume/Cap:	0.40	0.42	0.42	0.42	0.40	0.40	0.40	0.20	0.20	0.15	0.40	0.40
Delay/Veh:	48.8	35.8	35.8	33.4	23.3	23.3	43.9	32.9	32.9	32.6	27.0	27.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	48.8	35.8	35.8	33.4	23.3	23.3	43.9	32.9	32.9	32.6	27.0	27.0
LOS by Move:	D	D	D	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	2	4	4	4	6	6	2	2	2	1	5	5

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 28th Street/Boston Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.322
Loss Time (sec):	16	Average Delay (sec/veh):	18.0
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 2 0 1			1 0 1 1 0			1 0 0 1 0			1 0 0 1 0		
Volume Module:												
Base Vol:	3	351	80	137	650	26	23	48	7	11	15	44
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	351	80	137	650	26	23	48	7	11	15	44
Added Vol:	0	2	13	0	44	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	3	353	93	137	694	26	23	48	7	11	15	44
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
PHF Volume:	3	374	99	145	736	28	24	51	7	12	16	47
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	374	99	145	736	28	24	51	7	12	16	47
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	374	99	145	736	28	24	51	7	12	16	47
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.83	0.93	0.93	0.93	0.93	0.96	0.96	0.93	0.87	0.87
Lanes:	1.00	2.00	1.00	1.00	1.93	0.07	1.00	0.87	0.13	1.00	0.25	0.75
Final Sat.:	1769	3538	1583	1769	3393	127	1769	1594	232	1769	420	1233
Capacity Analysis Module:												
Vol/Sat:	0.00	0.11	0.06	0.08	0.22	0.22	0.01	0.03	0.03	0.01	0.04	0.04
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.38	0.38	0.30	0.63	0.63	0.05	0.08	0.08	0.08	0.11	0.11
Volume/Cap:	0.04	0.28	0.16	0.28	0.34	0.34	0.28	0.40	0.40	0.08	0.34	0.34
Delay/Veh:	45.4	21.4	20.4	27.2	8.8	8.8	47.5	45.5	45.5	42.9	42.3	42.3
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.4	21.4	20.4	27.2	8.8	8.8	47.5	45.5	45.5	42.9	42.3	42.3
LOS by Move:	D	C	C	C	A	A	D	D	D	D	D	D
HCM2kAvgQ:	0	4	2	3	6	6	1	2	2	0	2	2

Note: Queue reported is the number of cars per lane.

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
                 Unknown Method (Future Volume Alternative)
********************************************************************************
Intersection #7 28th Street/I-5 southbound ramp
********************************************************************************

********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled     Uncontrolled     Uncontrolled
Rights:          Include          Include           Ignore          Include
Min. Green:     5    5     5     5    5     5     5    5     5     5    5     5
Lanes:        0  0  2  0  0    0  0  1  1  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  415     0     0  303     0     0    0   508     0    0     0
Growth Adj:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
Initial Bse:    0    0     0     0    0     0     0    0     0     0    0     0
Added Vol:      0    2     0     0   24     0     0    0    20     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0     0     0    0     0     0    0     0
User Adj:    0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Volume:     0    0     0     0    0     0     0    0     0     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0     0    0     0     0    0     0     0    0     0
PCE Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
MLF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
FinalVolume:    0    0     0     0    0     0     0    0     0     0    0     0
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Potent Cap.:    0    0     0     0    0     0     0    0     0     0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:    0    0     0     0    0     0     0    0     0     0    0     0
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #8 28th Street/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.781
Loss Time (sec):	16	Average Delay (sec/veh):	33.7
Optimal Cycle:	82	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1 0 1 0			0 0 1! 0 0			1 0 1 1 0			1 0 0 1 0		
Volume Module:												
Base Vol:	37	65	32	50	135	183	114	172	25	146	537	86
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	37	65	32	50	135	183	114	172	25	146	537	86
Added Vol:	0	0	0	0	0	0	0	0	0	24	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	37	65	32	50	135	183	114	172	25	170	537	86
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
PHF Volume:	38	67	33	52	140	190	118	178	26	176	556	89
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	38	67	33	52	140	190	118	178	26	176	556	89
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	38	67	33	52	140	190	118	178	26	176	556	89
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.68	0.68	0.68	0.85	0.85	0.85	0.93	0.91	0.91	0.93	0.96	0.96
Lanes:	0.55	0.97	0.48	0.13	0.37	0.50	1.00	1.75	0.25	1.00	0.86	0.14
Final Sat.:	712	1251	616	221	596	808	1769	3030	440	1769	1571	252
Capacity Analysis Module:												
Vol/Sat:	0.05	0.05	0.05	0.23	0.23	0.23	0.07	0.06	0.06	0.10	0.35	0.35
Crit Moves:					****		****				****	
Green/Cycle:	0.30	0.30	0.30	0.30	0.30	0.30	0.09	0.20	0.20	0.34	0.45	0.45
Volume/Cap:	0.18	0.18	0.18	0.78	0.78	0.78	0.78	0.29	0.29	0.29	0.78	0.78
Delay/Veh:	26.0	26.0	26.0	39.9	39.9	39.9	67.3	34.2	34.2	24.5	27.9	27.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.0	26.0	26.0	39.9	39.9	39.9	67.3	34.2	34.2	24.5	27.9	27.9
LOS by Move:	C	C	C	D	D	D	E	C	C	C	C	C
HCM2kAvgQ:	2	2	2	13	13	13	6	3	3	4	18	18

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #9 I-5 northbound ramps/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.509
Loss Time (sec):	12	Average Delay (sec/veh):	19.1
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0	0 1	0 0	0	0 0	0 0	1	0 1	0 0	1	0 0
Volume Module:												
Base Vol:	304	0	79	0	0	0	0	236	19	0	450	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	304	0	79	0	0	0	0	236	19	0	450	0
Added Vol:	24	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	328	0	79	0	0	0	0	236	19	0	450	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95
PHF Volume:	344	0	83	0	0	0	0	247	0	0	472	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	344	0	83	0	0	0	0	247	0	0	472	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	344	0	83	0	0	0	0	247	0	0	472	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
Final Sat.:	1769	0	1583	0	0	0	0	1862	1900	0	1862	0
Capacity Analysis Module:												
Vol/Sat:	0.19	0.00	0.05	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.25	0.00
Crit Moves:	****										****	
Green/Cycle:	0.38	0.00	0.38	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.50	0.00
Volume/Cap:	0.51	0.00	0.14	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.51	0.00
Delay/Veh:	24.3	0.0	20.3	0.0	0.0	0.0	0.0	14.7	0.0	0.0	17.3	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	24.3	0.0	20.3	0.0	0.0	0.0	0.0	14.7	0.0	0.0	17.3	0.0
LOS by Move:	C	A	C	A	A	A	A	B	A	A	B	A
HCM2kAvgQ:	8	0	2	0	0	0	0	4	0	0	10	0

Note: Queue reported is the number of cars per lane.

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                          San Diego Sediment Project
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                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #10 I-5 southbound ramp/Boston Avenue
********************************************************************************
Average Delay (sec/veh):      6.3       Worst Case Level Of Service: C[ 15.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  1  0    0  0  0  0  0    1  0  0  1  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       9   23     5     0    0     0   255   26     8     2   50    43
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    9   23     5     0    0     0   255   26     8     2   50    43
Added Vol:      0    0     0     0    0     0    13    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    9   23     5     0    0     0   268   26     8     2   50    43
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     9   23     5     0    0     0   268   26     8     2   50    43
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    9   23     5     0    0     0   268   26     8     2   50    43
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  642  663    30  xxxx xxxx xxxxx    93 xxxx xxxxx    34 xxxx xxxxx
Potent Cap.:  439  382  1044  xxxx xxxx xxxxx  1501 xxxx xxxxx  1578 xxxx xxxxx
Move Cap.:    378  313  1044  xxxx xxxx xxxxx  1501 xxxx xxxxx  1578 xxxx xxxxx
Volume/Cap:  0.02 0.07  0.00  xxxx xxxx  xxxx  0.18 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx   0.6 xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 14.8 xxxx xxxxx xxxxx xxxx xxxxx   7.9 xxxx xxxxx   7.3 xxxx xxxxx
LOS by Move:    B    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx   358  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx   0.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx  15.9 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.3 xxxx xxxxx
Shared LOS:     *    *     C     *    *     *     *    *     *     A    *     *
ApproachDel:        15.6           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:          C               *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
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                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #1 Park Boulevard/Harbor Drive
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):        0.425
Loss Time (sec):      12               Average Delay (sec/veh):       13.9
Optimal Cycle:        60               Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  1! 0  0   0  0  0  0  0   1  0  2  0  1   1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      96    0    52    0    0     0    6  912    91   50  356     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:   96    0    52    0    0     0    6  912    91   50  356     0
Added Vol:      0    0     0    0    0     0    0    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   96    0    52    0    0     0    6  912    91   50  356     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92 0.92 0.92  0.92
PHF Volume:   104    0    56    0    0     0    7  989    99   54  386     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  104    0    56    0    0     0    7  989    99   54  386     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  104    0    56    0    0     0    7  989    99   54  386     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.90 1.00  0.90 1.00 1.00  1.00 0.93 0.93  0.83 0.93 0.93  1.00
Lanes:       1.48 0.00  0.52 0.00 0.00  0.00 1.00 2.00  1.00 1.00 2.00  0.00
Final Sat.:  2529    0   888    0    0     0 1769 3538  1583 1769 3538     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.00  0.06 0.00 0.00  0.00 0.00 0.28  0.06 0.03 0.11  0.00
Crit Moves:             ****                       ****       ****
Green/Cycle: 0.10 0.00  0.15 0.00 0.00  0.00 0.23 0.66  0.66 0.07 0.50  0.00
Volume/Cap:  0.41 0.00  0.42 0.00 0.00  0.00 0.02 0.42  0.09 0.42 0.22  0.00
Delay/Veh:   43.0  0.0  39.4  0.0  0.0   0.0 29.8  8.2   6.3 46.7 14.0   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  43.0  0.0  39.4  0.0  0.0   0.0 29.8  8.2   6.3 46.7 14.0   0.0
LOS by Move:    D    A     D    A    A     A    C    A     A    D    B     A
HCM2kAvgQ:      3    0     3    0    0     0    0    8     1    2    3     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.457
Loss Time (sec):	16	Average Delay (sec/veh):	25.8
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 0 1 0			0 1 0 0 1			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	21	77	34	46	36	158	346	670	10	11	118	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	77	34	46	36	158	346	670	10	11	118	20
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	21	77	34	46	36	158	346	670	10	11	118	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	23	85	38	51	40	175	383	741	11	12	131	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	23	85	38	51	40	175	383	741	11	12	131	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	23	85	38	51	40	175	383	741	11	12	131	22
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.95	0.95	0.83	0.93	0.93	0.93	0.93	0.91	0.91
Lanes:	1.00	0.69	0.31	0.56	0.44	1.00	1.00	1.97	0.03	1.00	1.71	0.29
Final Sat.:	1769	1232	544	1016	795	1583	1769	3479	52	1769	2959	501
Capacity Analysis Module:												
Vol/Sat:	0.01	0.07	0.07	0.05	0.05	0.11	0.22	0.21	0.21	0.01	0.04	0.04
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.17	0.17	0.12	0.24	0.24	0.46	0.45	0.45	0.11	0.09	0.09
Volume/Cap:	0.26	0.42	0.42	0.42	0.21	0.47	0.47	0.47	0.47	0.07	0.47	0.47
Delay/Veh:	47.3	38.4	38.4	42.1	31.0	33.8	19.0	19.5	19.5	40.4	44.0	44.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	47.3	38.4	38.4	42.1	31.0	33.8	19.0	19.5	19.5	40.4	44.0	44.0
LOS by Move:	D	D	D	D	C	C	B	B	B	D	D	D
HCM2kAvgQ:	1	4	4	3	2	5	8	8	8	0	2	2

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.350
Loss Time (sec):	16	Average Delay (sec/veh):	19.5
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	17	30	45	12	21	16	75	622	5	20	145	5
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	17	30	45	12	21	16	75	622	5	20	145	5
Added Vol:	0	0	0	0	0	0	0	0	0	37	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	17	30	45	12	21	16	75	622	5	57	145	5
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	19	33	50	13	23	18	83	689	6	63	161	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	19	33	50	13	23	18	83	689	6	63	161	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	19	33	50	13	23	18	83	689	6	63	161	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.87	0.87	0.87	0.93	0.93	0.93	0.93	0.93	0.93
Lanes:	0.18	0.33	0.49	0.24	0.43	0.33	1.00	1.98	0.02	1.00	1.93	0.07
Final Sat.:	303	535	802	404	706	538	1769	3506	28	1769	3403	117
Capacity Analysis Module:												
Vol/Sat:	0.06	0.06	0.06	0.03	0.03	0.03	0.05	0.20	0.20	0.04	0.05	0.05
Crit Moves:		****						****		****		
Green/Cycle:	0.18	0.18	0.18	0.18	0.18	0.18	0.33	0.56	0.56	0.10	0.33	0.33
Volume/Cap:	0.35	0.35	0.35	0.19	0.19	0.19	0.14	0.35	0.35	0.35	0.14	0.14
Delay/Veh:	36.8	36.8	36.8	35.3	35.3	35.3	23.6	12.1	12.1	43.0	23.5	23.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	36.8	36.8	36.8	35.3	35.3	35.3	23.6	12.1	12.1	43.0	23.5	23.5
LOS by Move:	D	D	D	D	D	D	C	B	B	D	C	C
HCM2kAvgQ:	3	3	3	2	2	2	2	6	6	2	2	2

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #4 28th Street/Harbor Drive
********************************************************************************
Cycle (sec):          100               Critical Vol./Cap.(X):         0.384
Loss Time (sec):       16               Average Delay (sec/veh):        23.2
Optimal Cycle:         60               Level Of Service:                  C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  1! 0  0    1  0  1  1  0    1  0  1  1  0    1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       3   12     3  158    2    19   94  648     0   11  121   174
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    3   12     3  158    2    19   94  648     0   11  121   174
Added Vol:      0    0     0    0    0     9   44    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    3   12     3  158    2    28  138  648     0   11  121   174
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.89 0.89  0.89 0.89 0.89  0.89 0.89 0.89  0.89 0.89 0.89  0.89
PHF Volume:     3   13     3  177    2    31  154  725     0   12  135   195
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    3   13     3  177    2    31  154  725     0   12  135   195
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    3   13     3  177    2    31  154  725     0   12  135   195
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.95 0.95  0.95 0.93 0.80  0.80 0.93 0.93  0.95 0.93 0.93  0.83
Lanes:       0.16 0.67  0.17 1.00 1.00  1.00 1.00 2.00  0.00 1.00 2.00  1.00
Final Sat.:   301 1203   301 1769 1521  1521 1769 3538     0 1769 3538  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.01  0.01 0.10 0.00  0.02 0.09 0.20  0.00 0.01 0.04  0.12
Crit Moves:       ****       ****                  ****        ****
Green/Cycle: 0.15 0.05  0.05 0.24 0.15  0.15 0.23 0.50  0.00 0.05 0.32  0.32
Volume/Cap:  0.08 0.22  0.22 0.41 0.01  0.14 0.38 0.41  0.00 0.14 0.12  0.38
Delay/Veh:   37.0 46.9  46.9 32.5 36.5  37.5 33.3 16.0   0.0 46.2 24.1  26.8
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  37.0 46.9  46.9 32.5 36.5  37.5 33.3 16.0   0.0 46.2 24.1  26.8
LOS by Move:    D    D     D    C    D     D    C    B     A    D    C     C
HCM2kAvgQ:      1    1     1    5    0     1    4    7     0    0    2     5
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report

2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 28th Street/Main Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.638
Loss Time (sec):	16	Average Delay (sec/veh):	33.3
Optimal Cycle:	61	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	20	438	112	295	312	43	96	177	32	42	89	170
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	438	112	295	312	43	96	177	32	42	89	170
Added Vol:	0	44	0	0	15	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	20	482	112	295	327	43	96	177	32	42	89	170
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	21	516	120	316	350	46	103	190	34	45	95	182
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	21	516	120	316	350	46	103	190	34	45	95	182
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	21	516	120	316	350	46	103	190	34	45	95	182
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.93	0.92	0.92	0.93	0.91	0.91	0.93	0.84	0.84
Lanes:	1.00	1.62	0.38	1.00	1.77	0.23	1.00	1.69	0.31	1.00	1.00	1.00
Final Sat.:	1769	2790	648	1769	3073	404	1769	2927	529	1769	1596	1596
Capacity Analysis Module:												
Vol/Sat:	0.01	0.18	0.18	0.18	0.11	0.11	0.06	0.06	0.06	0.03	0.06	0.11
Crit Moves:		****		****			****					****
Green/Cycle:	0.17	0.29	0.29	0.28	0.40	0.40	0.09	0.15	0.15	0.12	0.18	0.18
Volume/Cap:	0.07	0.64	0.64	0.64	0.29	0.29	0.64	0.42	0.42	0.22	0.33	0.64
Delay/Veh:	34.6	32.3	32.3	34.3	20.7	20.7	52.1	39.0	39.0	40.5	36.1	41.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.6	32.3	32.3	34.3	20.7	20.7	52.1	39.0	39.0	40.5	36.1	41.2
LOS by Move:	C	C	C	C	C	C	D	D	D	D	D	D
HCM2kAvgQ:	1	10	10	8	4	4	4	4	4	1	3	7

Note: Queue reported is the number of cars per lane.

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                        San Diego Sediment Project
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                     Level Of Service Computation Report
           2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #6 28th Street/Boston Avenue
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):        0.485
Loss Time (sec):      16               Average Delay (sec/veh):       25.9
Optimal Cycle:        60               Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  1   1  0  1  1  0   1  0  0  1  0   1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       6  528   207   213  657    33    35  171     9     7    6    27
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    6  528   207   213  657    33    35  171     9     7    6    27
Added Vol:      0   20    24     0   15     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    6  548   231   213  672    33    35  171     9     7    6    27
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93
PHF Volume:     6  592   250   230  726    36    38  185    10     8    6    29
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    6  592   250   230  726    36    38  185    10     8    6    29
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    6  592   250   230  726    36    38  185    10     8    6    29
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.93 0.93  0.83  0.93 0.92  0.92  0.93 0.97  0.97  0.93 0.86  0.86
Lanes:       1.00 2.00  1.00  1.00 1.91  0.09  1.00 0.95  0.05  1.00 0.18  0.82
Final Sat.:  1769 3538  1583  1769 3349   164  1769 1757    92  1769  297  1336
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.17  0.16  0.13 0.22  0.22  0.02 0.11  0.11  0.00 0.02  0.02
Crit Moves:       ****        ****                   ****        ****
Green/Cycle: 0.11 0.33  0.33  0.26 0.47  0.47  0.13 0.21  0.21  0.05 0.13  0.13
Volume/Cap:  0.03 0.51  0.48  0.51 0.46  0.46  0.17 0.51  0.51  0.09 0.17  0.17
Delay/Veh:   39.9 27.5  27.5  32.9 17.8  17.8  39.2 36.3  36.3  45.7 39.2  39.2
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  39.9 27.5  27.5  32.9 17.8  17.8  39.2 36.3  36.3  45.7 39.2  39.2
LOS by Move:    D    C     C     C    B     B     D    D     D     D    D     D
HCM2kAvgQ:      0    7     6     6    8     8     1    6     6     0    1     1
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
Unknown Method (Future Volume Alternative)

Intersection #7 28th Street/I-5 southbound ramp

```
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled     Uncontrolled     Uncontrolled
Rights:           Include          Include          Ignore           Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        0  0  2  0  0   0  0  1  1  0   0  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  587     0    0  381     0    0    0   526    0    0     0
Growth Adj:  0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
Initial Bse:    0    0     0    0    0     0    0    0     0    0    0     0
Added Vol:      0   20     0    0   13     0    0    0     2    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0    0     0    0    0     0    0    0     0    0    0     0
User Adj:    0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
PHF Volume:     0    0     0    0    0     0    0    0     0    0    0     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    0     0    0    0     0    0    0     0    0    0     0
PCE Adj:     0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
MLF Adj:     0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
FinalVolume:    0    0     0    0    0     0    0    0     0    0    0     0
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Potent Cap.:    0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.:    0    0     0    0    0     0    0    0     0    0    0     0
********************************************************************************
```

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--------------------------------------------------------------------------------
                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #8 28th Street/National Avenue
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):        0.731
Loss Time (sec):      16               Average Delay (sec/veh):       31.6
Optimal Cycle:        74               Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  1  0  1  0   0  0  1! 0  0   1  0  1  1  0   1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      33   76    38    74  171   105   136  412    82   127  347   179
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   33   76    38    74  171   105   136  412    82   127  347   179
Added Vol:      0    0     0     0    0     0     0    0     0    13    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   33   76    38    74  171   105   136  412    82   140  347   179
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.97 0.97  0.97  0.97 0.97  0.97  0.97 0.97  0.97  0.97 0.97  0.97
PHF Volume:    34   79    39    77  177   109   141  426    85   145  359   185
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   34   79    39    77  177   109   141  426    85   145  359   185
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   34   79    39    77  177   109   141  426    85   145  359   185
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.73 0.73  0.73  0.84 0.84  0.84  0.93 0.91  0.91  0.93 0.93  0.93
Lanes:       0.45 1.03  0.52  0.21 0.49  0.30  1.00 1.67  0.33  1.00 0.66  0.34
Final Sat.:   619 1426   713   338  781   479  1769 2877   573  1769 1166   601
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.06  0.06  0.23 0.23  0.23  0.08 0.15  0.15  0.08 0.31  0.31
Crit Moves:                        ****        ****                   ****
Green/Cycle: 0.31 0.31  0.31  0.31 0.31  0.31  0.11 0.34  0.34  0.19 0.42  0.42
Volume/Cap:  0.18 0.18  0.18  0.73 0.73  0.73  0.73 0.43  0.43  0.43 0.73  0.73
Delay/Veh:   25.3 25.3  25.3  36.3 36.3  36.3  56.5 25.7  25.7  36.8 27.9  27.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  25.3 25.3  25.3  36.3 36.3  36.3  56.5 25.7  25.7  36.8 27.9  27.9
LOS by Move:    C    C     C     D    D     D     E    C     C     D    C     C
HCM2kAvgQ:      2    2     2    11   11    11     6    7     7     4   15    15
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #9 I-5 northbound ramps/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.535
Loss Time (sec):	12	Average Delay (sec/veh):	19.1
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0	0 1	0 0	0	0 0	0 0	1	0 1	0 0	1	0 0
Volume Module:												
Base Vol:	313	0	123	0	0	0	0	486	44	0	321	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	313	0	123	0	0	0	0	486	44	0	321	0
Added Vol:	13	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	326	0	123	0	0	0	0	486	44	0	321	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95
PHF Volume:	345	0	130	0	0	0	0	514	0	0	339	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	345	0	130	0	0	0	0	514	0	0	339	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	345	0	130	0	0	0	0	514	0	0	339	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
Final Sat.:	1769	0	1583	0	0	0	0	1862	1900	0	1862	0
Capacity Analysis Module:												
Vol/Sat:	0.19	0.00	0.08	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.18	0.00
Crit Moves:	****							****				
Green/Cycle:	0.36	0.00	0.36	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.52	0.00
Volume/Cap:	0.53	0.00	0.23	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.35	0.00
Delay/Veh:	26.0	0.0	22.2	0.0	0.0	0.0	0.0	16.8	0.0	0.0	14.6	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.0	0.0	22.2	0.0	0.0	0.0	0.0	16.8	0.0	0.0	14.6	0.0
LOS by Move:	C	A	C	A	A	A	A	B	A	A	B	A
HCM2kAvgQ:	9	0	3	0	0	0	0	11	0	0	6	0

Note: Queue reported is the number of cars per lane.

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--------------------------------------------------------------------------------
                         San Diego Sediment Project
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                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #10 I-5 southbound ramp/Boston Avenue
********************************************************************************
Average Delay (sec/veh):     11.3      Worst Case Level Of Service: F[ 56.3]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  1  0    0  0  0  0  0    1  0  0  1  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        8   51    11     0    0     0   535   53    16     3   38    50
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     8   51    11     0    0     0   535   53    16     3   38    50
Added Vol:       0    0     0     0    0     0    24    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     8   51    11     0    0     0   559   53    16     3   38    50
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      8   51    11     0    0     0   559   53    16     3   38    50
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     8   51    11     0    0     0   559   53    16     3   38    50
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1248 1273    61  xxxx xxxx xxxxx    88 xxxx xxxxx    69 xxxx xxxxx
Potent Cap.:  191  167  1004  xxxx xxxx xxxxx  1508 xxxx xxxxx  1532 xxxx xxxxx
Move Cap.:    136  105  1004  xxxx xxxx xxxxx  1508 xxxx xxxxx  1532 xxxx xxxxx
Volume/Cap:  0.06 0.49  0.01  xxxx xxxx  xxxx  0.37 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.2 xxxx xxxxx  xxxx xxxx xxxxx   1.7 xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 33.1 xxxx xxxxx xxxxx xxxx xxxxx   8.8 xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    D    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx   125  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx   2.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx  59.3 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx
Shared LOS:     *    *     F     *    *     *     *    *     *     A    *     *
ApproachDel:        56.3            xxxxxx           xxxxxx           xxxxxx
ApproachLOS:           F                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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ATTACHMENT G

EXISTING WITH PROJECT TRAFFIC LOS WORKSHEETS (STAGING AREA 5)

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #11 I-5 northbound ramps/24th Street
********************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):        0.733
Loss Time (sec):      12                Average Delay (sec/veh):       25.5
Optimal Cycle:        64                Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase       Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  1! 0  1   0  0  0  0  0   1  0  2  0  0   0  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     236  145   400    0    0     0   53  350     0    0  280   371
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  236  145   400    0    0     0   53  350     0    0  280   371
Added Vol:     32    0     0    0    0     0    2    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  268  145   400    0    0     0   55  350     0    0  280   371
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.86 0.86  0.86 0.86 0.86  0.86 0.86 0.86  0.86 0.86 0.86  0.86
PHF Volume:   313  169   467    0    0     0   64  408     0    0  327   433
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  313  169   467    0    0     0   64  408     0    0  327   433
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  313  169   467    0    0     0   64  408     0    0  327   433
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.86 0.86  0.86 1.00 1.00  1.00 0.93 0.93  1.00 1.00 0.85  0.85
Lanes:       1.28 0.30  1.42 0.00 0.00  0.00 1.00 2.00  0.00 0.00 1.00  1.00
Final Sat.:  2098  496  2324    0    0     0 1769 3538     0    0 1619  1619
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.15 0.34  0.20 0.00 0.00  0.00 0.04 0.12  0.00 0.00 0.20  0.27
Crit Moves:       ****                      ****                          ****
Green/Cycle: 0.47 0.47  0.47 0.00 0.00  0.00 0.05 0.29  0.00 0.00 0.36  0.36
Volume/Cap:  0.32 0.73  0.43 0.00 0.00  0.00 0.73 0.40  0.00 0.00 0.55  0.73
Delay/Veh:   16.9 23.9  18.0  0.0  0.0   0.0 72.5 28.8   0.0  0.0 25.8  30.3
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  16.9 23.9  18.0  0.0  0.0   0.0 72.5 28.8   0.0  0.0 25.8  30.3
LOS by Move:    B    C     B    A    A     A    E    C     A    A    C     C
HCM2kAvgQ:      5   15     7    0    0     0    2    5     0    0    9    13
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #12 I-5 southbound ramps/24th Street
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):        0.289
Loss Time (sec):      12              Average Delay (sec/veh):       23.4
Optimal Cycle:        60              Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase       Protected        Protected
Rights:           Include          Include          Ignore           Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  0  0  0  0   1  1  0  0  1   0  0  2  0  1   1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0  362    0   122    0   67    79  181  324     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    0     0  362    0   122    0   67    79  181  324     0
Added Vol:      0    0     0    0    0    12    0    2    13    0   32     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0    0     0  362    0   134    0   69    92  181  356     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
PHF Adj:     0.88 0.88  0.88 0.88 0.88  0.88 0.88 0.88  0.00 0.88 0.88  0.88
PHF Volume:     0    0     0  411    0   152    0   78     0  205  404     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    0     0  411    0   152    0   78     0  205  404     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
FinalVolume:    0    0     0  411    0   152    0   78     0  205  404     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 1.00  1.00 0.93 1.00  0.83 1.00 0.93  1.00 0.93 0.93  1.00
Lanes:       0.00 0.00  0.00 2.00 0.00  1.00 0.00 2.00  1.00 1.00 2.00  0.00
Final Sat.:     0    0     0 3545    0  1583    0 3538  1900 1769 3538     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00  0.00 0.12 0.00  0.10 0.00 0.02  0.00 0.12 0.11  0.00
Crit Moves:                  ****                  ****        ****
Green/Cycle: 0.00 0.00  0.00 0.40 0.00  0.40 0.00 0.08  0.00 0.40 0.33  0.00
Volume/Cap:  0.00 0.00  0.00 0.29 0.00  0.24 0.00 0.29  0.00 0.29 0.34  0.00
Delay/Veh:    0.0  0.0   0.0 20.4  0.0  20.0  0.0 44.2   0.0 20.4 25.3   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0 20.4  0.0  20.0  0.0 44.2   0.0 20.4 25.3   0.0
LOS by Move:    A    A     A    C    A     C    A    D     A    C    C     A
HCM2kAvgQ:      0    0     0    4    0     3    0    1     0    4    5     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #13 Cleveland Street/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.339
Loss Time (sec):	0	Average Delay (sec/veh):	9.2
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Lanes:	1 0 0 1 0			1 0 1 0 1			0 1 0 1 0			0 1 0 1 0		
Volume Module:												
Base Vol:	2	6	15	40	2	9	10	90	4	10	257	184
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	2	6	15	40	2	9	10	90	4	10	257	184
Added Vol:	0	0	0	0	0	0	0	15	0	0	44	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	2	6	15	40	2	9	10	105	4	10	301	184
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	2	6	15	40	2	9	10	105	4	10	301	184
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	2	6	15	40	2	9	10	105	4	10	301	184
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	2	6	15	40	2	9	10	105	4	10	301	184
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.29	0.71	1.00	1.00	1.00	0.17	1.76	0.07	0.04	1.22	0.74
Final Sat.:	524	175	438	514	552	619	113	1198	46	30	911	609
Capacity Analysis Module:												
Vol/Sat:	0.00	0.03	0.03	0.08	0.00	0.01	0.09	0.09	0.09	0.34	0.33	0.30
Crit Moves:		****		****			****			****		
Delay/Veh:	9.1	8.3	8.3	9.7	8.7	8.1	8.5	8.4	8.3	10.0	9.8	8.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	9.1	8.3	8.3	9.7	8.7	8.1	8.5	8.4	8.3	10.0	9.8	8.9
LOS by Move:	A	A	A	A	A	A	A	A	A	B	A	A
ApproachDel:		8.4			9.4			8.4			9.4	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		8.4			9.4			8.4			9.4	
LOS by Appr:		A			A			A			A	
AllWayAvgQ:	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.5	0.4	0.4

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #14 W. 32nd Street/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.136
Loss Time (sec):	12	Average Delay (sec/veh):	11.9
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Protected			Protected			Protected			Protected	
Rights:		Include			Include			Include			Include	
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:		1 0 0 0 1			0 0 0 0 0			0 0 1 1 0			1 0 2 0 0	
Volume Module:												
Base Vol:	0	0	23	0	0	0	0	79	1	17	250	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	23	0	0	0	0	79	1	17	250	0
Added Vol:	0	0	8	0	0	0	0	8	0	0	44	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	31	0	0	0	0	87	1	17	294	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
PHF Volume:	0	0	36	0	0	0	0	102	1	20	343	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	36	0	0	0	0	102	1	20	343	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	36	0	0	0	0	102	1	20	343	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	0.83	1.00	1.00	1.00	1.00	0.93	0.93	0.93	0.93	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.98	0.02	1.00	2.00	0.00
Final Sat.:	1900	0	1583	0	0	0	0	3491	40	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.03	0.03	0.01	0.10	0.00
Crit Moves:			****				****				****	
Green/Cycle:	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.36	0.36	0.36	0.67	0.00
Volume/Cap:	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.08	0.08	0.03	0.14	0.00
Delay/Veh:	0.0	0.0	36.5	0.0	0.0	0.0	0.0	21.1	21.1	20.7	6.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	36.5	0.0	0.0	0.0	0.0	21.1	21.1	20.7	6.0	0.0
LOS by Move:	A	A	D	A	A	A	A	C	C	C	A	A
HCM2kAvgQ:	0	0	1	0	0	0	0	1	1	0	2	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #15 Tidelands Avenue/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.103
Loss Time (sec):	16	Average Delay (sec/veh):	24.5
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 0 1 0			1 0 0 1 0			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	0	8	13	18	37	15	13	19	4	31	61	37
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	8	13	18	37	15	13	19	4	31	61	37
Added Vol:	0	0	0	0	0	0	0	8	0	0	44	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	8	13	18	37	15	13	27	4	31	105	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	0	9	14	20	41	17	14	30	4	34	117	41
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	9	14	20	41	17	14	30	4	34	117	41
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	9	14	20	41	17	14	30	4	34	117	41
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	0.89	0.89	0.93	0.94	0.94	0.93	0.91	0.91	0.93	0.89	0.89
Lanes:	1.00	0.38	0.62	1.00	0.71	0.29	1.00	1.74	0.26	1.00	1.48	0.52
Final Sat.:	1900	643	1045	1769	1268	514	1769	3023	448	1769	2514	886
Capacity Analysis Module:												
Vol/Sat:	0.00	0.01	0.01	0.01	0.03	0.03	0.01	0.01	0.01	0.02	0.05	0.05
Crit Moves:	****				****		****				****	
Green/Cycle:	0.00	0.17	0.17	0.17	0.29	0.29	0.07	0.25	0.25	0.25	0.42	0.42
Volume/Cap:	0.00	0.08	0.08	0.07	0.11	0.11	0.11	0.04	0.04	0.08	0.11	0.11
Delay/Veh:	0.0	34.9	34.9	34.7	25.8	25.8	43.6	28.6	28.6	28.9	17.6	17.6
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	34.9	34.9	34.7	25.8	25.8	43.6	28.6	28.6	28.9	17.6	17.6
LOS by Move:	A	C	C	C	C	C	D	C	C	C	B	B
HCM2kAvgQ:	0	1	1	1	1	1	0	0	0	1	1	1

Note: Queue reported is the number of cars per lane.

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                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #16 Tidelands Avenue/W. 32nd Street
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):        0.066
Loss Time (sec):       0               Average Delay (sec/veh):        7.3
Optimal Cycle:         0               Level Of Service:                 A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        0  0  1  0  0   1  0  0  1  0   1  0  1  0  1   1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    7     0    6    9    50   19    1     0    0    0     1
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    7     0    6    9    50   19    1     0    0    0     1
Added Vol:      0    0     0    0    0     0    0    8     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0    7     0    6    9    50   19    9     0    0    0     1
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     0    7     0    6    9    50   19    9     0    0    0     1
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    7     0    6    9    50   19    9     0    0    0     1
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0    7     0    6    9    50   19    9     0    0    0     1
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.00 1.00  0.00 1.00 0.15  0.85 1.00 1.00  1.00 1.00 1.00  1.00
Final Sat.:     0  765     0  700  136   754  682  753   883  672  741   867
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.01  xxxx 0.01 0.07  0.07 0.03 0.01  0.00 0.00 0.00  0.00
Crit Moves:       ****                  **** ****                         ****
Delay/Veh:    0.0  7.7   0.0  7.9  7.0   7.0  8.1  7.5   0.0  0.0  0.0   6.8
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  7.7   0.0  7.9  7.0   7.0  8.1  7.5   0.0  0.0  0.0   6.8
LOS by Move:    *    A     *    A    A     A    A    A     *    *    *     A
ApproachDel:       7.7              7.1              7.9              6.8
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        7.7              7.1              7.9              6.8
LOS by Appr:         A                A                A                A
AllWayAvgQ:   0.0  0.0   0.0  0.0  0.1   0.1  0.0  0.0   0.0  0.0  0.0   0.0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #11 I-5 northbound ramps/24th Street
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):        0.602
Loss Time (sec):      12               Average Delay (sec/veh):       22.9
Optimal Cycle:        60               Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  1! 0  1    0  0  0  0  0    1  0  2  0  0    0  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      87    4   382    0    0     0  101  511     0    0  528   401
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:   87    4   382    0    0     0  101  511     0    0  528   401
Added Vol:     13    0     0    0    0     0   12    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  100    4   382    0    0     0  113  511     0    0  528   401
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.94 0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94
PHF Volume:   106    4   406    0    0     0  120  543     0    0  561   426
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  106    4   406    0    0     0  120  543     0    0  561   426
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  106    4   406    0    0     0  120  543     0    0  561   426
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.84 0.84  0.84 1.00 1.00  1.00 0.93 0.93  1.00 1.00 0.87  0.87
Lanes:       1.20 0.02  1.78 0.00 0.00  0.00 1.00 2.00  0.00 0.00 1.14  0.86
Final Sat.:  1916   26  2832    0    0     0 1769 3538     0    0 1880  1428
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.16  0.14 0.00 0.00  0.00 0.07 0.15  0.00 0.00 0.30  0.30
Crit Moves:       ****                      ****                   ****
Green/Cycle: 0.27 0.27  0.27 0.00 0.00  0.00 0.11 0.46  0.00 0.00 0.50  0.50
Volume/Cap:  0.20 0.60  0.53 0.00 0.00  0.00 0.60 0.33  0.00 0.00 0.60  0.60
Delay/Veh:   28.1 32.9  31.5  0.0  0.0   0.0 47.3 17.4   0.0  0.0 18.8  18.8
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  28.1 32.9  31.5  0.0  0.0   0.0 47.3 17.4   0.0  0.0 18.8  18.8
LOS by Move:    C    C     C    A    A     A    D    B     A    A    B     B
HCM2kAvgQ:      2    8     6    0    0     0    3    5     0    0   12    12
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #12 I-5 southbound ramps/24th Street

Cycle (sec): 100
Loss Time (sec): 12
Optimal Cycle: 60

Critical Vol./Cap.(X): 0.593
Average Delay (sec/veh): 28.0
Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	- T -	R	L	- T -	R	L	- T -	R	L	- T -	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	0	0 0	1 1	0	0 1	0 0	2	0 1	1 0	2	0 0
Volume Module:												
Base Vol:	0	0	0	441	0	43	0	159	367	490	118	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	441	0	43	0	159	367	490	118	0
Added Vol:	0	0	0	0	0	2	0	12	32	0	13	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	441	0	45	0	171	399	490	131	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.00	0.86	0.86	0.86
PHF Volume:	0	0	0	512	0	52	0	198	0	568	152	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	512	0	52	0	198	0	568	152	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	0	0	0	512	0	52	0	198	0	568	152	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	0.93	1.00	0.83	1.00	0.93	1.00	0.93	0.93	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	0	0	0	3545	0	1583	0	3538	1900	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.14	0.00	0.03	0.00	0.06	0.00	0.32	0.04	0.00
Crit Moves:				****				****		****		
Green/Cycle:	0.00	0.00	0.00	0.24	0.00	0.24	0.00	0.09	0.00	0.54	0.32	0.00
Volume/Cap:	0.00	0.00	0.00	0.59	0.00	0.14	0.00	0.59	0.00	0.59	0.13	0.00
Delay/Veh:	0.0	0.0	0.0	34.6	0.0	29.8	0.0	46.3	0.0	16.5	24.3	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	34.6	0.0	29.8	0.0	46.3	0.0	16.5	24.3	0.0
LOS by Move:	A	A	A	C	A	C	A	D	A	B	C	A
HCM2kAvgQ:	0	0	0	8	0	1	0	4	0	11	2	0

Note: Queue reported is the number of cars per lane.

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                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #13 Cleveland Street/24th Street
********************************************************************************
Cycle (sec):         100                 Critical Vol./Cap.(X):        0.332
Loss Time (sec):       0                 Average Delay (sec/veh):       10.3
Optimal Cycle:         0                 Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        1  0  0  1  0   1  0  1  0  1   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       2    2    27   173    3     8     7  311     4    28   95    36
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    2    2    27   173    3     8     7  311     4    28   95    36
Added Vol:      0    0     0     0    0     0     0   44     0     0   15     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    2    2    27   173    3     8     7  355     4    28  110    36
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     2    2    27   173    3     8     7  355     4    28  110    36
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    2    2    27   173    3     8     7  355     4    28  110    36
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    2    2    27   173    3     8     7  355     4    28  110    36
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.07  0.93  1.00 1.00  1.00  0.04 1.94  0.02  0.32 1.27  0.41
Final Sat.:   504   41   560   522  559   626    25 1254    14   193  785   268
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.05  0.05  0.33 0.01  0.01  0.28 0.28  0.28  0.15 0.14  0.13
Crit Moves:             ****  ****             ****              ****
Delay/Veh:    9.4  8.4   8.4  12.3  8.8   8.1  10.2 10.2  10.1   9.4  9.1   8.8
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   9.4  8.4   8.4  12.3  8.8   8.1  10.2 10.2  10.1   9.4  9.1   8.8
LOS by Move:    A    A     A     B    A     A     B    B     B     A    A     A
ApproachDel:       8.5              12.0              10.2               9.1
Delay Adj:        1.00              1.00              1.00              1.00
ApprAdjDel:        8.5              12.0              10.2               9.1
LOS by Appr:         A                 B                 B                 A
AllWayAvgQ:   0.0  0.0   0.0   0.4  0.0   0.0   0.4  0.4   0.4   0.2  0.1   0.1
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #14 W. 32nd Street/24th Street
********************************************************************************
Cycle (sec):          100                 Critical Vol./Cap.(X):        0.222
Loss Time (sec):       12                 Average Delay (sec/veh):       20.7
Optimal Cycle:         60                 Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  0  0  1    0  0  0  0  0    0  0  1  1  0    1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0    57    0    0     0    0  250     2   26   73     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    0    57    0    0     0    0  250     2   26   73     0
Added Vol:      0    0    22    0    0     0    0   22     0    0   15     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0    0    79    0    0     0    0  272     2   26   88     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     0.73 0.73  0.73 0.73 0.73  0.73 0.73 0.73  0.73 0.73 0.73  0.73
PHF Volume:     0    0   108    0    0     0    0  373     3   36  121     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    0   108    0    0     0    0  373     3   36  121     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0    0   108    0    0     0    0  373     3   36  121     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  1.00 1.00  0.83 1.00 1.00  1.00 1.00 0.93  0.93 0.93 0.93  1.00
Lanes:       1.00 0.00  1.00 0.00 0.00  0.00 0.00 1.99  0.01 1.00 2.00  0.00
Final Sat.:  1900    0  1583    0    0     0    0 3508    26 1769 3538     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00  0.07 0.00 0.00  0.00 0.00 0.11  0.11 0.02 0.03  0.00
Crit Moves:             ****                      ****        ****
Green/Cycle: 0.00 0.00  0.31 0.00 0.00  0.00 0.00 0.48  0.48 0.09 0.29  0.00
Volume/Cap:  0.00 0.00  0.22 0.00 0.00  0.00 0.00 0.22  0.22 0.22 0.12  0.00
Delay/Veh:    0.0  0.0  25.9  0.0  0.0   0.0  0.0 15.2  15.2 42.9 26.5   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0  25.9  0.0  0.0   0.0  0.0 15.2  15.2 42.9 26.5   0.0
LOS by Move:    A    A     C    A    A     A    A    B     B    D    C     A
HCM2kAvgQ:      0    0     3    0    0     0    0    3     3    1    1     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #15 Tidelands Avenue/24th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.128
Loss Time (sec):	16	Average Delay (sec/veh):	28.7
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0	1 0	1 0	0	1 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	3	5	31	20	3	8	5	86	1	24	18	14
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	5	31	20	3	8	5	86	1	24	18	14
Added Vol:	0	0	0	0	0	0	0	22	0	0	15	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	3	5	31	20	3	8	5	108	1	24	33	14
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
PHF Volume:	4	7	43	28	4	11	7	149	1	33	45	19
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	7	43	28	4	11	7	149	1	33	45	19
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	7	43	28	4	11	7	149	1	33	45	19
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.85	0.85	0.93	0.87	0.87	0.93	0.93	0.93	0.93	0.89	0.89
Lanes:	1.00	0.14	0.86	1.00	0.27	0.73	1.00	1.98	0.02	1.00	1.40	0.60
Final Sat.:	1769	225	1397	1769	452	1207	1769	3502	32	1769	2372	1006
Capacity Analysis Module:												
Vol/Sat:	0.00	0.03	0.03	0.02	0.01	0.01	0.00	0.04	0.04	0.02	0.02	0.02
Crit Moves:		****		****				****		****		
Green/Cycle:	0.18	0.24	0.24	0.12	0.18	0.18	0.24	0.33	0.33	0.15	0.24	0.24
Volume/Cap:	0.01	0.13	0.13	0.13	0.05	0.05	0.02	0.13	0.13	0.13	0.08	0.08
Delay/Veh:	33.7	30.0	30.0	39.4	33.9	33.9	29.1	23.3	23.3	37.4	29.5	29.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	33.7	30.0	30.0	39.4	33.9	33.9	29.1	23.3	23.3	37.4	29.5	29.5
LOS by Move:	C	C	C	D	C	C	C	C	C	D	C	C
HCM2kAvgQ:	0	1	1	1	0	0	0	2	2	1	1	1

Note: Queue reported is the number of cars per lane.

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--------------------------------------------------------------------------------
                          San Diego Sediment Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #16 Tidelands Avenue/W. 32nd Street
********************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):        0.096
Loss Time (sec):       0                Average Delay (sec/veh):        7.9
Optimal Cycle:         0                Level Of Service:                 A
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        0  0  1  0  0   1  0  0  1  0   1  0  1  0  1   1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    5     0    2   10     7   67   19     0    2    2     2
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    5     0    2   10     7   67   19     0    2    2     2
Added Vol:      0    0     0    0    0     0    0   22     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0    5     0    2   10     7   67   41     0    2    2     2
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     0    5     0    2   10     7   67   41     0    2    2     2
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    0    5     0    2   10     7   67   41     0    2    2     2
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    0    5     0    2   10     7   67   41     0    2    2     2
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.00 1.00  0.00 1.00 0.59  0.41 1.00 1.00  1.00 1.00 1.00  1.00
Final Sat.:     0  728     0  663  456   319  701  777   915  667  735   857
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.01  xxxx 0.00 0.02  0.02 0.10 0.05  0.00 0.00 0.00  0.00
Crit Moves:       ****                  **** ****             ****
Delay/Veh:    0.0  7.9   0.0  8.0  7.3   7.3  8.3  7.6   0.0  8.0  7.5   6.8
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   0.0  7.9   0.0  8.0  7.3   7.3  8.3  7.6   0.0  8.0  7.5   6.8
LOS by Move:    *    A     *    A    A     A    A    A     *    A    A     A
ApproachDel:       7.9              7.4              8.0              7.5
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        7.9              7.4              8.0              7.5
LOS by Appr:         A                A                A                A
AllWayAvgQ:   0.0  0.0   0.0  0.0  0.0   0.0  0.1  0.1   0.0  0.0  0.0   0.0
********************************************************************************
Note: Queue reported is the number of cars per lane.
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ATTACHMENT H

MITIGATION APPROACH MEASURES

TRAFFIC MEMO

SHIPYARD SEDIMENT REMEDIATION PROJECT – MITIGATION APPROACH ALTERNATIVE

LSA

LSA ASSOCIATES, INC.
703 PALOMAR AIRPORT ROAD, SUITE 260
CARLSBAD, CALIFORNIA 92011

760.931.5471 TEL
760.918.2458 FAX

BERKELEY
FORT COLLINS
FRESNO

IRVINE
PALM SPRINGS
POINT RICHMOND

RIVERSIDE
ROCKLIN
SAN LUIS OBISPO
SOUTH SAN FRANCISCO

MEMORANDUM

DATE: May 25, 2011

TO: Mona DeLeon, LSA Associates, Inc.

FROM: Joseph Jimenez, LSA Associates, Inc.

SUBJECT: Shipyard Sediment Remediation Project – Mitigation Approach Alternative

LSA Associates, Inc. (LSA) prepared a draft traffic impact analysis of the proposed Shipyard Sediment Remediation Project in May 2011. The draft traffic impact analysis showed significant impacts at the intersection of Interstate 5 (I-5) southbound ramp/Boston Avenue and at the roadway segment of Boston Avenue between 28th Street and the I-5 southbound ramp with implementation of the project for Staging Areas 1 through 4. Instead of having the project applicant contribute to capital improvements to mitigate the affected locations (such as signalization of the intersection or temporary roadway widening), an alternative option for Staging Areas 1 through 4 would be to reroute project traffic away from Boston Avenue. The project traffic can be rerouted south of Staging Areas 1 through 4 along Harbor Drive to the I-5 northbound and southbound ramps at Civic Center Drive.

LSA has prepared this technical memorandum to evaluate the mitigation approach to reroute project traffic away from Boston Avenue and onto Harbor Drive toward the northbound and southbound ramps at Civic Center Drive. The results are summarized below.

METHODOLOGY

The following traffic analysis was conducted according to the methodologies and procedures outlined in the City of San Diego *Traffic Impact Study Guidelines*, San Diego Traffic Engineers' Council (SANTEC) *Traffic Impact Study Guidelines*, the Highway Capacity Manual (HCM) 2000 published by the Transportation Research Board, and applicable provisions from the California Environmental Quality Act (CEQA).

Project Study Area

The study area analyzed in this report includes the following intersections and roadway segments.

Intersections:

1. Park Boulevard/Harbor Drive
2. Cesar Chavez Parkway/Harbor Drive
3. Sampson Street/Harbor Drive
4. 28th Street/Harbor Drive
5. 28th Street/Main Street

6. 28th Street/Boston Avenue
7. I-5 Southbound Off-Ramp/28th Street
8. 28th Street/National Avenue
9. I-5 Northbound Ramps/National Avenue
10. I-5 Southbound Ramps/Boston Avenue
17. 32nd Street/Harbor Drive (new location)
18. 8th Street/Harbor Drive (new location)
19. Civic Center Drive/Harbor Drive (new location)

Roadway Segments:

1. Harbor Drive between Park Boulevard and Cesar Chavez Parkway
2. Harbor Drive between Cesar Chavez Parkway and Sampson Street
3. Harbor Drive between Sampson Street and 28th Street
4. Harbor Drive between 28th Street and 32nd Street
5. 28th Street between Harbor Drive and Main Street
6. 28th Street between Main Street and Boston Avenue
7. 28th Street between Boston Avenue and National Avenue
8. National Avenue between 28th Street and I-5 Northbound Ramps
9. Boston Avenue between 28th Street and I-5 Southbound Ramp
16. Harbor Drive between 32nd Street and 8th Street (new location)
17. Harbor Drive between 8th Street and Civic Center Drive (new location)

Daily, a.m., and p.m. peak-hour (7:00 a.m.–9:00 a.m. and 4:00 p.m.–6:00 p.m.) turn volumes for the new study area intersections and roadway segments were collected by National Data and Surveying Services (NDS) in May 2011. New traffic count data is provided in Attachment A.

HAUL TRUCK, DELIVERY TRUCK, AND EMPLOYEE TRAFFIC

Project Trip Generation

The project trip generation was not changed for the purpose of this analysis.

Project Trip Distribution

For the purpose of this project, it is assumed that 85 percent of the material will be transported from the staging area to Otay Landfill, which is located approximately 15 miles southeast of the Shipyard Sediment Site. Trucks departing from Staging Areas 1 through 4 would access I-5 south via East Harbor Drive and Civic Center Drive. The most direct freeway route to Otay Landfill is via I-5 south to Highway 54 east, to I-805 south. Although the sediment is not known to be classified as California hazardous material, it will be tested upon removal and prior to disposal.

It is assumed for the purpose of this study that up to 15 percent of the material will require transport to a Class III facility, which will most likely be the Kettleman Hills Landfill in Kings County, California, near Bakersfield. Trucks departing from Staging Areas 1 through 4 would access I-5 north via East Harbor Drive and 28th Street.

The trip distribution for employees was determined based on existing counts at the northbound and southbound I-5 ramps. For Staging Areas 1 through 4, approximately 60 percent are destined toward the north and 40 percent are destined toward the south along I-5. Table A provides the trip distribution of the project traffic within the circulation system for each staging area.

Table A: Project Trip Distribution Summary

Vehicle Type/Direction	Percentage
Delivery/Haul Trucks	
Northbound on the I-5	15%
Southbound on the I-5	85%
TOTAL	100%
Employee Trips (Staging Areas 1–4)	
Northbound on the I-5	60%
Southbound on the I-5	40%
TOTAL	100%

I-5 = Interstate 5

EXISTING CONDITIONS WITH PROJECT TRAFFIC

Traffic generated during the haul period was added to the existing traffic volumes at the study area intersections and roadway segments for the outlying staging area (i.e., Staging Areas 1 and 2). This would represent a worst-case scenario.

Staging Areas 1 And 2

It is anticipated that Staging Areas 1 and 2 will utilize the same driveway to access the project site (i.e., Cesar Chavez Parkway/Harbor Boulevard). Therefore, the level of service (LOS) would be identical for both staging areas. Trucks departing from Staging Areas 1 and 2 would access I-5 north via Harbor Drive and 28th Street. Trucks would access I-5 south via Harbor Drive and Civic Center Drive. Table B summarizes the results of the existing plus project a.m. and p.m. peak-hour LOS analysis for all study area intersections. The LOS worksheets are provided as Attachment B. As Table B indicates, all study area intersections will continue to operate at an acceptable LOS (D or better) in the a.m. and p.m. peak hour, with the exception of I-5 southbound ramp/Boston Avenue (LOS E during p.m. peak hour). However, the addition of project traffic will not increase the vehicle delay greater than 1 second at this intersection. As such, the project traffic will not create a significant impact at this intersection in the existing plus project condition, based on the City's significance criteria.

Table C summarizes the daily traffic volumes and volume-to-capacity (v/c) ratios for the study area roadway segments in the existing condition with the addition of project traffic. Based on this analysis, the roadway segments are forecast to operate at an acceptable LOS (LOS D or better) with the exception of National Avenue between 28th Street and the I-5 northbound ramps (LOS F), and Boston Avenue between 28th Street and the I-5 southbound ramp (LOS F). However, the addition of project traffic will not increase the v/c ratio greater than 0.01 along both segments. As such, the project traffic will not create a significant impact at both locations, based on the City's significance criteria.

CONCLUSION

Based on the results of this alternative traffic analysis, no significant impacts are forecast. The anticipated haul, delivery, and employee traffic to and from the project site can be accommodated without causing a significant impact for the Mitigation Alternative, based on the existing traffic conditions in the study area. Evaluation of the intersection and roadway LOS shows that the addition of the project's traffic to the existing traffic volumes will not cause a significant increase in delay at the study area intersections or an increase in v/c ratio on the roadway segments, according to the City's performance criteria. As a result, no improvements would be warranted during the haul period for this alternative analysis.

Attachments: A: New Traffic Count Data
B: Level of Service Worksheets

Table B - Staging Areas 1 and 2 Existing Plus Project Peak Hour Intersection Level of Service Summary

	Intersection	Control Type	Existing Condition				Existing Plus Project Condition					
			AM Peak Hour		PM Peak Hour		AM Peak Hour		△	PM Peak Hour		△
			Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS		Delay (sec)	LOS	
1	Park Boulevard/Harbor Drive	Signalized	15.0	B	13.9	B	15.0	B	0.0	13.9	B	0.0
2	Cesar Chavez Parkway/Harbor Drive	Signalized	31.4	C	25.8	C	31.5	C	0.1	26.4	C	0.6
3	Sampson Street/Harbor Drive	Signalized	20.4	C	17.3	B	19.9	B	-0.5	17.0	B	-0.3
4	28th Street/Harbor Drive	Signalized	27.9	C	22.2	C	27.8	C	-0.1	22.4	C	0.2
5	28th Street/Main Street	Signalized	30.0	C	33.3	C	29.9	C	-0.1	33.3	C	0.0
6	28th Street/Boston Avenue	Signalized	18.4	B	26.0	C	18.2	B	-0.2	25.9	C	-0.1
7	28th Street/I-5 Southbound Off-Ramp	No Control	-	-	-	-	-	-	-	-	-	-
8	28th Street/National Avenue	Signalized	33.7	C	31.3	C	33.7	C	0.0	31.3	C	0.0
9	I-5 Northbound Ramps/National Avenue	Signalized	18.6	B	18.8	B	18.6	B	0.0	18.8	B	0.0
10	I-5 Southbound On-Ramp/Boston Avenue	Unsignalized	15.2	C	49.2	E	15.2	C	0.0	49.2	E	0.0
17	32nd Street/Harbor Drive	Signalized	28.1	C	34.6	C	28.3	C	0.2	34.4	C	-0.2
18	8th Street/Harbor Drive	Signalized	24.4	C	27.2	C	24.3	C	-0.1	27.3	C	0.1
19	Civic Center Drive/Harbor Drive	Signalized	33.2	C	33.7	C	34.5	C	1.3	37.4	D	3.7

Source: LSA Associates, March 2011

Notes:

☐ Exceeds level of service criteria

■ Significant Impact

Table C - Staging Areas 1 and 2 Existing Plus Project Roadway Segment Level of Service Summary

Roadway	Segment	Roadway Classification	Capacity at LOS E	Existing			Project ADT	Existing + Project			△
				Volume	LOS	V/C		Volume	LOS	V/C	
Harbor Boulevard	Park Boulevard and Cesar Chavez Parkway	4 Lane Major Arterial	40,000	12,903	A	0.32	0	12,903	A	0.32	0.00
	Cesar Chavez Parkway and Sampson Street	4 Lane Major Arterial	40,000	9,140	A	0.23	348	9,488	A	0.24	0.01
	Sampson Street and 28th Street	4 Lane Major Arterial	40,000	10,085	A	0.25	348	10,433	A	0.26	0.01
	28th Street and 32nd Street	4 Lane Major Arterial	40,000	14,240	B	0.36	270	14,510	B	0.36	0.01
	32nd Street and 8th Street	4 Lane Major Arterial	40,000	16,055	B	0.40	270	16,325	B	0.41	0.01
	8th Street and Civic Center Drive	4 Lane Major Arterial	40,000	12,921	A	0.32	270	13,191	A	0.33	0.01
28th Street	Harbor Boulevard and Main Street	4 Lane Major Arterial	40,000	15,231	B	0.38	78	15,309	B	0.38	0.00
	Main Street and Boston Avenue	4 Lane Collector (with TWLT	30,000	18,454	C	0.62	78	18,532	C	0.62	0.00
	Boston Avenue and National Avenue	3 Lane Collector (with TWLT	22,500	14,616	C	0.65	78	14,694	C	0.65	0.00
National Avenue	28th Street and I-5 Northbound Ramps	3 Lane Collector (no TWLT)	11,250	**17,691**	**F**	**1.57**	0	**17,691**	**F**	**1.57**	0.00
Boston Avenue	28th Street and I-5 Southbound On-Ramp	2 Lane Collector (no TWLT)	8,000	**8,188**	**F**	**1.02**	0	**8,188**	**F**	**1.02**	0.00

Source: LSA Associates, March 2011

☐ Exceeds level of service criteria

■ Significant Impact

ATTACHMENT A

NEW TRAFFIC COUNT DATA

Prepared by NDS/ATD

VOLUME

Harbor Dr between 32nd St & 8th St

Day: Thursday
Date: 5/5/2011

City: San Diego
Project #: CA11_4131_001

DAILY TOTALS	NB	SB	EB	WB	Total
	7,730	8,325	0	0	16,055

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	5		19				24		12:00	125		111				236	
00:15	4		16				20		12:15	115		90				205	
00:30	4		45				49		12:30	120		131				251	
00:45	11	24	18	98			29	122	12:45	119	479	115	447			234	926
01:00	3		8				11		13:00	101		118				219	
01:15	8		8				16		13:15	100		105				205	
01:30	8		12				20		13:30	93		122				215	
01:45	5	24	6	34			11	58	13:45	109	403	128	473			237	876
02:00	6		6				12		14:00	86		161				247	
02:15	5		1				6		14:15	100		193				293	
02:30	5		3				8		14:30	90		235				325	
02:45	7	23	5	15			12	38	14:45	112	388	309	898			421	1286
03:00	17		5				22		15:00	106		379				485	
03:15	6		1				7		15:15	108		413				521	
03:30	18		3				21		15:30	85		312				397	
03:45	29	70	4	13			33	83	15:45	84	383	235	1339			319	1722
04:00	29		7				36		16:00	73		287				360	
04:15	46		11				57		16:15	69		269				338	
04:30	84		9				93		16:30	62		251				313	
04:45	98	257	18	45			116	302	16:45	62	266	268	1075			330	1341
05:00	128		14				142		17:00	52		227				279	
05:15	169		35				204		17:15	50		264				314	
05:30	220		41				261		17:30	42		213				255	
05:45	250	767	66	156			316	923	17:45	48	192	171	875			219	1067
06:00	286		65				351		18:00	64		109				173	
06:15	249		71				320		18:15	50		72				122	
06:30	252		73				325		18:30	27		82				109	
06:45	263	1050	40	249			303	1299	18:45	43	184	61	324			104	508
07:00	278		51				329		19:00	21		52				73	
07:15	256		57				313		19:15	21		55				76	
07:30	254		68				322		19:30	29		41				70	
07:45	217	1005	46	222			263	1227	19:45	48	119	55	203			103	322
08:00	144		55				199		20:00	29		45				74	
08:15	121		66				187		20:15	24		55				79	
08:30	101		55				156		20:30	18		33				51	
08:45	116	482	65	241			181	723	20:45	16	87	31	164			47	251
09:00	115		73				188		21:00	10		24				34	
09:15	126		75				201		21:15	16		20				36	
09:30	106		69				175		21:30	10		24				34	
09:45	113	460	69	286			182	746	21:45	12	48	40	108			52	156
10:00	102		76				178		22:00	17		29				46	
10:15	100		79				179		22:15	10		15				25	
10:30	119		93				212		22:30	15		24				39	
10:45	117	438	111	359			228	797	22:45	14	56	14	82			28	138
11:00	136		137				273		23:00	8		20				28	
11:15	114		142				256		23:15	6		22				28	
11:30	127		132				259		23:30	11		41				52	
11:45	117	494	113	524			230	1018	23:45	6	31	12	95			18	126
TOTALS		5094		2242				7336	TOTALS		2636		6083				8719
SPLIT %		69.4%		30.6%				45.7%	SPLIT %		30.2%		69.8%				54.3%

DAILY TOTALS	NB	SB	EB	WB	Total
	7,730	8,325	0	0	16,055

	NB	SB	EB	WB	TOTAL		NB	SB	EB	WB	TOTAL
AM Peak Hour	06:45	11:00			05:45	PM Peak Hour	12:00	14:45			14:45
AM Pk Volume	1051	524			1312	PM Pk Volume	479	1413			1824
Pk Hr Factor	0.945	0.923			0.934	Pk Hr Factor	0.958	0.855			0.875
7 - 9 Volume	1487	463			1950	4 - 6 Volume	458	1950			2408
7 - 9 Peak Hour	07:00	08:00			07:00	4 - 6 Peak Hour	16:00	16:00			16:00
7 - 9 Pk Volume	1005	241			1227	4 - 6 Pk Volume	266	1075			1341
Pk Hr Factor	0.904	0.913			0.932	Pk Hr Factor	0.911	0.936			0.931

Prepared by NDS/ATD

VOLUME

Harbor Dr between 8th St & Civic Center Dr

Day: Thursday
Date: 5/5/2011

City: San Diego
Project #: CA11_4131_002

DAILY TOTALS	NB	SB	EB	WB	Total
	6,093	6,828	0	0	12,921

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	5		15				20		12:00	93		86				179	
00:15	1		8				9		12:15	99		83				182	
00:30	4		34				38		12:30	98		107				205	
00:45	5	15	15	72			20	87	12:45	80	370	86	362			166	732
01:00	3		6				9		13:00	65		91				156	
01:15	5		6				11		13:15	64		78				142	
01:30	2		8				10		13:30	76		128				204	
01:45	2	12	2	22			4	34	13:45	73	278	94	391			167	669
02:00	3		6				9		14:00	60		151				211	
02:15	3		2				5		14:15	64		174				238	
02:30	4		2				6		14:30	63		229				292	
02:45	6	16	5	15			11	31	14:45	82	269	279	833			361	1102
03:00	12		4				16		15:00	71		329				400	
03:15	5		2				7		15:15	78		369				447	
03:30	15		3				18		15:30	51		273				324	
03:45	20	52	7	16			27	68	15:45	56	256	250	1221			306	1477
04:00	29		5				34		16:00	48		238				286	
04:15	32		12				44		16:15	41		241				282	
04:30	69		10				79		16:30	42		237				279	
04:45	81	211	18	45			99	256	16:45	39	170	216	932			255	1102
05:00	106		11				117		17:00	35		199				234	
05:15	179		27				206		17:15	40		244				284	
05:30	228		33				261		17:30	29		171				200	
05:45	271	784	31	102			302	886	17:45	31	135	154	768			185	903
06:00	272		32				304		18:00	40		95				135	
06:15	257		25				282		18:15	27		66				93	
06:30	239		43				282		18:30	20		79				99	
06:45	243	1011	37	137			280	1148	18:45	28	115	55	295			83	410
07:00	256		28				284		19:00	11		42				53	
07:15	221		31				252		19:15	19		49				68	
07:30	212		44				256		19:30	25		34				59	
07:45	200	889	27	130			227	1019	19:45	33	88	39	164			72	252
08:00	136		44				180		20:00	12		36				48	
08:15	77		45				122		20:15	16		47				63	
08:30	85		39				124		20:30	10		24				34	
08:45	75	373	42	170			117	543	20:45	13	51	29	136			42	187
09:00	74		33				107		21:00	9		14				23	
09:15	73		40				113		21:15	13		15				28	
09:30	70		52				122		21:30	7		18				25	
09:45	66	283	47	172			113	455	21:45	6	35	33	80			39	115
10:00	65		61				126		22:00	10		23				33	
10:15	68		59				127		22:15	8		14				22	
10:30	83		74				157		22:30	12		9				21	
10:45	74	290	88	282			162	572	22:45	9	39	11	57			20	96
11:00	81		117				198		23:00	6		10				16	
11:15	84		95				179		23:15	8		14				22	
11:30	87		74				161		23:30	9		28				37	
11:45	71	323	79	365			150	688	23:45	5	28	9	61			14	89
TOTALS		4259		1528				5787	TOTALS		1834		5300				7134
SPLIT %		73.6%		26.4%				44.8%	SPLIT %		25.7%		74.3%				55.2%

DAILY TOTALS	NB	SB	EB	WB	Total
	6,093	6,828	0	0	12,921

	NB	SB	Total		NB	SB	Total
AM Peak Hour	05:45	10:30	05:45	PM Peak Hour	12:00	14:45	14:45
AM Pk Volume	1039	374	1170	PM Pk Volume	370	1250	1532
Pk Hr Factor	0.955	0.799	0.962	Pk Hr Factor	0.934	0.847	0.857
7 - 9 Volume	1262	300	1562	4 - 6 Volume	305	1700	2005
7 - 9 Peak Hour	07:00	08:00	07:00	4 - 6 Peak Hour	16:00	16:00	16:00
7 - 9 Pk Volume	889	170	1019	4 - 6 Pk Volume	170	932	1102
Pk Hr Factor	0.868	0.944	0.897	Pk Hr Factor	0.885	0.967	0.963

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Harbor Dr and Civic Center Dr , City of San Diego

Date: 5/5/2011

Day: Thursday

Project #: CA11_4130_003

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Peak Hour Summary

CONTROL: Signalized

Southbound Approach (Harbor Dr)

	Right	Through	Left	Out
Lanes	1	2	1	
AM	28	65	28	900
NOON	0	0	0	0
PM	93	765	52	161

Eastbound Approach (Civic Center Dr)

	Lanes	AM	NOON	PM
Out		49	0	109
Left	1	104	0	34
Through	2	109	0	187
Right	0	8	0	26

Westbound Approach

	AM	NOON	PM	Lanes
Right	58	0	6	0
Through	15	0	10	1
Left	40	0	115	1
Out	178	0	316	

Northbound Approach

	Out	Left	Through	Right
AM	113	6	738	41
NOON	0	0	0	0
PM	906	6	121	77
Lanes		1	1.5	.5

Total Ins & Outs

Leg	AM	NOON	PM
North Leg (in)	121	0	910
North Leg (out)	900	0	161
East Leg	113	0	131
East Leg	178	0	316
West Leg	49	0	109
West Leg	221	0	247
South Leg	113	0	906
South Leg	785	0	204

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	1021	0	1071
East Leg	291	0	447
West Leg	270	0	356
South Leg	898	0	1110

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

McKinley Ave and Civic Center Dr , City of San Diego

Date: 5/5/2011

Day: Thursday

Project #: CA11_4130_103

N

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach (McKinley Ave)

Lanes	1	0	1		
AM	0	2	15	18	AM
NOON	0	0	0	0	NOON
PM	1	6	6	7	PM

Eastbound Approach (Civic Center Dr)

	AM	NOON	PM
(out)	0	0	1

Lanes	AM	NOON	PM
1	13	0	3
2	0	0	0
0	0	0	0

Westbound Approach

AM	NOON	PM	Lanes
2	0	3	0
0	0	0	1
0	0	0	1
15	0	7	(out)

CONTROL

Signalized

Northbound Approach

AM	2	0	3	0	AM
NOON	0	0	0	0	NOON
PM	6	0	1	1	PM
		1	1.5	.5	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg		
17	18	AM
0	0	NOON
13	7	PM

West Leg	AM	NOON	PM
	0	0	1
	13	0	3

East Leg	AM	NOON	PM
	2	0	3
	15	0	7

South Leg		
AM	2	3
NOON	0	0
PM	6	2

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	35	0	20
West Leg	13	0	4
East Leg	17	0	10
South Leg	5	0	8

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

32nd St and Harbor Dr , City of San Diego

Date: 5/5/2011

Day: Thursday

Project #: CA11_4130_001

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

Peak Hour Summary

CONTROL: Signalized

Southbound Approach (32nd St)

	Left	Through	Right	Out
Lanes	1	2	1	
AM	122	676	82	351
NOON	0	0	0	0
PM	76	154	210	914

Eastbound Approach (Harbor Dr)

	Lanes	AM	NOON	PM
Out		598	0	282
Left	1	60	0	155
Through	2	148	0	540
Right	1	96	0	44

Westbound Approach

	AM	NOON	PM	Lanes
Right	172	0	300	1
Through	442	0	113	2
Left	182	0	25	1
Out	249	0	896	

Northbound Approach

	Out	Left	Through	Right
AM	954	34	119	19
NOON	0	0	0	0
PM	223	93	459	146
Lanes		1	2	1

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

Leg	Period	In	Out
North Leg	AM	880	351
North Leg	NOON	0	0
North Leg	PM	440	914
East Leg	AM	796	249
East Leg	NOON	0	0
East Leg	PM	438	896
South Leg	AM	172	954
South Leg	NOON	0	0
South Leg	PM	698	223
West Leg	AM	304	598
West Leg	NOON	0	0
West Leg	PM	739	282

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	1231	0	1354
East Leg	1045	0	1334
South Leg	1126	0	921
West Leg	902	0	1021

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Harbor Dr and 8th St , City of San Diego

Date: 5/5/2011

Day: Thursday

Project #: CA11_4130_002

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	400 PM

N

Harbor Dr

8th St

Peak Hour Summary

Southbound Approach

	Lanes 1	Lanes 2	Lanes 2	
AM	26	98	74	939
NOON	0	0	0	0
PM	17	748	337	236

Westbound Approach

	AM	NOON	PM	Lanes
Right	228	0	65	1
Through	260	0	42	2
Left	16	0	32	1
Out	226	0	682	

Eastbound Approach

	Lanes	AM	NOON	PM
Out		420	0	81
Left	.5	24	0	53
Through	1.5	75	0	313
Right	1	11	0	127

Northbound Approach

	Out	Lanes 1	Lanes 2	Lanes 1
AM	125	134	687	77
NOON	0	0	0	0
PM	907	22	118	32

CONTROL
Signalized

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

Leg	Period	In	Out
North Leg	AM	198	939
North Leg	NOON	0	0
North Leg	PM	1102	236
East Leg	AM	504	226
East Leg	NOON	0	0
East Leg	PM	139	682
West Leg	AM	110	420
West Leg	NOON	0	0
West Leg	PM	493	81
South Leg	AM	898	125
South Leg	NOON	0	0
South Leg	PM	172	907

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	1137	0	1338
East Leg	730	0	821
West Leg	530	0	574
South Leg	1023	0	1079

ATTACHMENT B

LEVEL OF SERVICE WORKSHEETS

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #1 Park Boulevard/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.509
Loss Time (sec):	12	Average Delay (sec/veh):	15.0
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1! 0	0	0 0	0 0	0	1 0	2 0	1	1 0	2 0	0
Volume Module:												
Base Vol:	81	0	25	0	0	0	44	284	436	141	596	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	81	0	25	0	0	0	44	284	436	141	596	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
PHF Volume:	92	0	28	0	0	0	50	323	497	161	679	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	92	0	28	0	0	0	50	323	497	161	679	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	92	0	28	0	0	0	50	323	497	161	679	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.91	1.00	0.91	1.00	1.00	1.00	0.93	0.93	0.83	0.93	0.93	1.00
Lanes:	1.62	0.00	0.38	0.00	0.00	0.00	1.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	2800	0	660	0	0	0	1769	3538	1583	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.04	0.00	0.00	0.00	0.03	0.09	0.31	0.09	0.19	0.00
Crit Moves:			****						****	****		
Green/Cycle:	0.07	0.00	0.08	0.00	0.00	0.00	0.16	0.62	0.62	0.18	0.63	0.00
Volume/Cap:	0.49	0.00	0.51	0.00	0.00	0.00	0.17	0.15	0.51	0.51	0.30	0.00
Delay/Veh:	46.5	0.0	45.6	0.0	0.0	0.0	36.2	8.1	11.1	38.5	8.5	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	46.5	0.0	45.6	0.0	0.0	0.0	36.2	8.1	11.1	38.5	8.5	0.0
LOS by Move:	D	A	D	A	A	A	D	A	B	D	A	A
HCM2kAvgQ:	2	0	3	0	0	0	1	2	9	4	5	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.512
Loss Time (sec):	16	Average Delay (sec/veh):	31.4
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0	1 0	0 1	0	0 1	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	4	25	14	37	73	279	140	128	19	39	385	56
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	25	14	37	73	279	140	128	19	39	385	56
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	4	28	16	41	82	312	156	143	21	44	430	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	28	16	41	82	312	156	143	21	44	430	63
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	28	16	41	82	312	156	143	21	44	430	63
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.96	0.96	0.83	0.93	0.91	0.91	0.93	0.91	0.91
Lanes:	1.00	0.64	0.36	0.34	0.66	1.00	1.00	1.74	0.26	1.00	1.75	0.25
Final Sat.:	1769	1129	632	616	1215	1583	1769	3022	449	1769	3030	441
Capacity Analysis Module:												
Vol/Sat:	0.00	0.02	0.02	0.07	0.07	0.20	0.09	0.05	0.05	0.02	0.14	0.14
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.18	0.18	0.24	0.36	0.36	0.16	0.21	0.21	0.21	0.26	0.26
Volume/Cap:	0.05	0.14	0.14	0.28	0.18	0.54	0.54	0.22	0.22	0.12	0.54	0.54
Delay/Veh:	45.5	35.0	35.0	31.5	21.8	26.2	40.5	32.7	32.7	31.9	32.4	32.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.5	35.0	35.0	31.5	21.8	26.2	40.5	32.7	32.7	31.9	32.4	32.4
LOS by Move:	D	C	C	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	0	1	1	3	3	8	4	2	2	1	7	7

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100		Critical Vol./Cap.(X):	0.265
Loss Time (sec):	16		Average Delay (sec/veh):	20.4
Optimal Cycle:	60		Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	19	33	56	7	50	22	15	135	31	87	477	6
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	19	33	56	7	50	22	15	135	31	87	477	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	20	35	59	7	53	23	16	142	33	92	502	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	35	59	7	53	23	16	142	33	92	502	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	20	35	59	7	53	23	16	142	33	92	502	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.92	0.92	0.92	0.93	0.90	0.90	0.93	0.93	0.93
Lanes:	0.18	0.30	0.52	0.09	0.63	0.28	1.00	1.63	0.37	1.00	1.98	0.02
Final Sat.:	288	501	850	155	1110	488	1769	2797	642	1769	3487	44
Capacity Analysis Module:												
Vol/Sat:	0.07	0.07	0.07	0.05	0.05	0.05	0.01	0.05	0.05	0.05	0.14	0.14
Crit Moves:		****					****				****	
Green/Cycle:	0.26	0.26	0.26	0.26	0.26	0.26	0.05	0.29	0.29	0.29	0.53	0.53
Volume/Cap:	0.27	0.27	0.27	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.27	0.27
Delay/Veh:	30.0	30.0	30.0	29.2	29.2	29.2	46.5	26.7	26.7	26.4	12.8	12.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	30.0	30.0	30.0	29.2	29.2	29.2	46.5	26.7	26.7	26.4	12.8	12.8
LOS by Move:	C	C	C	C	C	C	D	C	C	C	B	B
HCM2kAvgQ:	3	3	3	2	2	2	0	2	2	2	4	4

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 28th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.423
Loss Time (sec):	16	Average Delay (sec/veh):	27.9
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0	1 0	2	0 1
Volume Module:												
Base Vol:	4	7	5	315	9	28	36	186	7	12	448	142
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	7	5	315	9	28	36	186	7	12	448	142
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
PHF Volume:	4	7	5	335	10	30	38	198	7	13	476	151
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	7	5	335	10	30	38	198	7	13	476	151
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	7	5	335	10	30	38	198	7	13	476	151
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.93	0.82	0.82	0.93	0.93	0.93	0.93	0.93	0.83
Lanes:	0.25	0.44	0.31	1.00	1.00	1.00	1.00	1.93	0.07	1.00	2.00	1.00
Final Sat.:	441	771	551	1769	1567	1567	1769	3392	128	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.01	0.01	0.01	0.19	0.01	0.02	0.02	0.06	0.06	0.01	0.13	0.10
Crit Moves:		****		****			****				****	
Green/Cycle:	0.24	0.05	0.05	0.43	0.24	0.24	0.05	0.19	0.19	0.17	0.31	0.31
Volume/Cap:	0.04	0.19	0.19	0.44	0.03	0.08	0.43	0.30	0.30	0.04	0.44	0.31
Delay/Veh:	29.1	46.6	46.6	20.3	29.0	29.4	49.5	34.9	34.9	35.2	28.0	26.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	29.1	46.6	46.6	20.3	29.0	29.4	49.5	34.9	34.9	35.2	28.0	26.9
LOS by Move:	C	D	D	C	C	C	D	C	C	D	C	C
HCM2kAvgQ:	0	1	1	7	0	1	1	3	3	0	6	3

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 28th Street/Main Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.388
Loss Time (sec):	16	Average Delay (sec/veh):	30.0
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 1 1 0			1 0 1 1 0			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	35	191	58	163	413	41	66	88	43	53	211	187
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	35	191	58	163	413	41	66	88	43	53	211	187
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	37	202	61	172	437	43	70	93	45	56	223	198
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	202	61	172	437	43	70	93	45	56	223	198
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	37	202	61	172	437	43	70	93	45	56	223	198
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.93	0.92	0.92	0.93	0.89	0.89	0.93	0.87	0.87
Lanes:	1.00	1.53	0.47	1.00	1.82	0.18	1.00	1.34	0.66	1.00	1.06	0.94
Final Sat.:	1769	2619	795	1769	3176	315	1769	2260	1104	1769	1744	1546
Capacity Analysis Module:												
Vol/Sat:	0.02	0.08	0.08	0.10	0.14	0.14	0.04	0.04	0.04	0.03	0.13	0.13
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.18	0.18	0.23	0.35	0.35	0.10	0.22	0.22	0.22	0.33	0.33
Volume/Cap:	0.39	0.43	0.43	0.43	0.39	0.39	0.39	0.19	0.19	0.15	0.39	0.39
Delay/Veh:	48.3	36.9	36.9	33.7	24.4	24.4	43.4	32.2	32.2	31.9	26.0	26.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	48.3	36.9	36.9	33.7	24.4	24.4	43.4	32.2	32.2	31.9	26.0	26.0
LOS by Move:	D	D	D	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	2	4	4	4	6	6	2	2	2	1	5	5

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #6 28th Street/Boston Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.306
Loss Time (sec):	16	Average Delay (sec/veh):	18.4
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	3	351	80	137	650	26	23	48	7	11	15	44
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	351	80	137	650	26	23	48	7	11	15	44
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
PHF Volume:	3	372	85	145	689	28	24	51	7	12	16	47
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	372	85	145	689	28	24	51	7	12	16	47
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	372	85	145	689	28	24	51	7	12	16	47
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.83	0.93	0.93	0.93	0.93	0.96	0.96	0.93	0.87	0.87
Lanes:	1.00	2.00	1.00	1.00	1.92	0.08	1.00	0.87	0.13	1.00	0.25	0.75
Final Sat.:	1769	3538	1583	1769	3381	135	1769	1594	232	1769	420	1233
Capacity Analysis Module:												
Vol/Sat:	0.00	0.11	0.05	0.08	0.20	0.20	0.01	0.03	0.03	0.01	0.04	0.04
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.38	0.38	0.30	0.62	0.62	0.05	0.08	0.08	0.08	0.12	0.12
Volume/Cap:	0.04	0.28	0.14	0.28	0.33	0.33	0.28	0.39	0.39	0.08	0.33	0.33
Delay/Veh:	45.4	21.7	20.5	27.3	9.0	9.0	47.5	45.1	45.1	42.6	41.6	41.6
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.4	21.7	20.5	27.3	9.0	9.0	47.5	45.1	45.1	42.6	41.6	41.6
LOS by Move:	D	C	C	C	A	A	D	D	D	D	D	D
HCM2kAvgQ:	0	4	2	3	5	5	1	2	2	0	2	2

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                        San Diego Sediment Project
-------------------------------------------------------------------------------
                    Level Of Service Computation Report
                 Unknown Method (Base Volume Alternative)
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Intersection #7 28th Street/I-5 southbound ramp
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Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled     Uncontrolled     Uncontrolled
Rights:          Include          Include           Ignore          Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        0  0  2  0  0   0  0  1  1  0   0  0  0  0  1   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0  415     0    0  303     0    0    0   508    0    0     0
Growth Adj:  0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
Initial Bse:   0    0     0    0    0     0    0    0     0    0    0     0
User Adj:    0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
PHF Volume:    0    0     0    0    0     0    0    0     0    0    0     0
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   0    0     0    0    0     0    0    0     0    0    0     0
PCE Adj:     0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
MLF Adj:     0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
FinalVolume:   0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   0    0     0    0    0     0    0    0     0    0    0     0
Potent Cap.:   0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:   0    0     0    0    0     0    0    0     0    0    0     0
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #8 28th Street/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.781
Loss Time (sec):	16	Average Delay (sec/veh):	33.7
Optimal Cycle:	82	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 1	0 1	0	0 0	1! 0	0	1 0	1 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	37	65	32	50	135	183	114	172	25	146	537	86
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	37	65	32	50	135	183	114	172	25	146	537	86
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
PHF Volume:	38	67	33	52	140	190	118	178	26	151	556	89
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	38	67	33	52	140	190	118	178	26	151	556	89
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	38	67	33	52	140	190	118	178	26	151	556	89
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.68	0.68	0.68	0.85	0.85	0.85	0.93	0.91	0.91	0.93	0.96	0.96
Lanes:	0.55	0.97	0.48	0.13	0.37	0.50	1.00	1.75	0.25	1.00	0.86	0.14
Final Sat.:	712	1251	616	221	596	808	1769	3030	440	1769	1571	252
Capacity Analysis Module:												
Vol/Sat:	0.05	0.05	0.05	0.23	0.23	0.23	0.07	0.06	0.06	0.09	0.35	0.35
Crit Moves:					****		****				****	
Green/Cycle:	0.30	0.30	0.30	0.30	0.30	0.30	0.09	0.22	0.22	0.32	0.45	0.45
Volume/Cap:	0.18	0.18	0.18	0.78	0.78	0.78	0.78	0.27	0.27	0.27	0.78	0.78
Delay/Veh:	26.0	26.0	26.0	39.9	39.9	39.9	67.3	32.5	32.5	25.6	27.9	27.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.0	26.0	26.0	39.9	39.9	39.9	67.3	32.5	32.5	25.6	27.9	27.9
LOS by Move:	C	C	C	D	D	D	E	C	C	C	C	C
HCM2kAvgQ:	2	2	2	13	13	13	6	3	3	3	18	18

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #9 I-5 northbound ramps/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.493
Loss Time (sec):	12	Average Delay (sec/veh):	18.6
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0	0 1	0 0	0	0 0	0 0	1	0 1	0 0	1	0 0
Volume Module:												
Base Vol:	304	0	79	0	0	0	0	236	19	0	450	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	304	0	79	0	0	0	0	236	19	0	450	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95
PHF Volume:	319	0	83	0	0	0	0	247	0	0	472	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	319	0	83	0	0	0	0	247	0	0	472	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	319	0	83	0	0	0	0	247	0	0	472	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
Final Sat.:	1769	0	1583	0	0	0	0	1862	1900	0	1862	0
Capacity Analysis Module:												
Vol/Sat:	0.18	0.00	0.05	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.25	0.00
Crit Moves:	****										****	
Green/Cycle:	0.37	0.00	0.37	0.00	0.00	0.00	0.00	0.51	0.00	0.00	0.51	0.00
Volume/Cap:	0.49	0.00	0.14	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.49	0.00
Delay/Veh:	25.1	0.0	21.3	0.0	0.0	0.0	0.0	13.7	0.0	0.0	16.2	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	25.1	0.0	21.3	0.0	0.0	0.0	0.0	13.7	0.0	0.0	16.2	0.0
LOS by Move:	C	A	C	A	A	A	A	B	A	A	B	A
HCM2kAvgQ:	8	0	2	0	0	0	0	4	0	0	9	0

Note: Queue reported is the number of cars per lane.

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------------------------------------------------------------------------------
                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #10 I-5 southbound ramp/Boston Avenue
******************************************************************************
Average Delay (sec/veh):      6.1       Worst Case Level Of Service: C[ 15.2]
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  1  0    0  0  0  0  0    1  0  0  1  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       9   23     5     0    0     0   255   26     8     2   50    43
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    9   23     5     0    0     0   255   26     8     2   50    43
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     9   23     5     0    0     0   255   26     8     2   50    43
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    9   23     5     0    0     0   255   26     8     2   50    43
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  616  637    30  xxxx xxxx xxxxx    93 xxxx xxxxx    34 xxxx xxxxx
Potent Cap.:  454  395  1044  xxxx xxxx xxxxx  1501 xxxx xxxxx  1578 xxxx xxxxx
Move Cap.:    395  327  1044  xxxx xxxx xxxxx  1501 xxxx xxxxx  1578 xxxx xxxxx
Volume/Cap:  0.02 0.07  0.00  xxxx xxxx  xxxx  0.17 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx   0.6 xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 14.3 xxxx xxxxx xxxxx xxxx xxxxx   7.9 xxxx xxxxx   7.3 xxxx xxxxx
LOS by Move:    B    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx   373  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx   0.2 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx  15.4 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.3 xxxx xxxxx
Shared LOS:     *    *     C     *    *     *     *    *     *     A    *     *
ApproachDel:        15.2           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:          C               *                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

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--------------------------------------------------------------------------------
                        San Diego Sediment Project
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                    Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #13 Cleveland Street/24th Street
********************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):         0.308
Loss Time (sec):        0              Average Delay (sec/veh):         8.9
Optimal Cycle:          0              Level Of Service:                  A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        1  0  0  1  0   1  0  1  0  1   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       2    6    15   40    2     9   10   90     4   10  257   184
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    2    6    15   40    2     9   10   90     4   10  257   184
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     2    6    15   40    2     9   10   90     4   10  257   184
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    2    6    15   40    2     9   10   90     4   10  257   184
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    2    6    15   40    2     9   10   90     4   10  257   184
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       1.00 0.29  0.71 1.00 1.00  1.00 0.19 1.73  0.08 0.04 1.14  0.82
Final Sat.:   536  180   450  526  567   637  130 1186    53   32  853   679
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.03  0.03 0.08 0.00  0.01 0.08 0.08  0.07 0.31 0.30  0.27
Crit Moves:       ****       ****            ****            ****
Delay/Veh:    9.0  8.2   8.2  9.6  8.6   8.0  8.3  8.2   8.2  9.7  9.5   8.5
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   9.0  8.2   8.2  9.6  8.6   8.0  8.3  8.2   8.2  9.7  9.5   8.5
LOS by Move:    A    A     A    A    A     A    A    A     A    A    A     A
ApproachDel:       8.2              9.3              8.3              9.1
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        8.2              9.3              8.3              9.1
LOS by Appr:        A                A                A                A
AllWayAvgQ:   0.0  0.0   0.0  0.1  0.0   0.0  0.1  0.1   0.1  0.4  0.4   0.4
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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-------------------------------------------------------------------------------
                          San Diego Sediment Project
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                      Level Of Service Computation Report
              2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #16 Tidelands Avenue/W. 32nd Street
*******************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):          0.066
Loss Time (sec):        0                Average Delay (sec/veh):          7.3
Optimal Cycle:          0                Level Of Service:                   A
*******************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    5     5     5    5     5     5    5     5     5    5     5     5
Lanes:        0  0  1  0  0    1  0  0  1  0    1  0  1  0  1    1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0     7     0    6     9    50   19     1     0    0     0     1
Growth Adj:  1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Initial Bse:   0     7     0    6     9    50   19     1     0    0     0     1
User Adj:    1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
PHF Adj:     1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
PHF Volume:    0     7     0    6     9    50   19     1     0    0     0     1
Reduct Vol:    0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:   0     7     0    6     9    50   19     1     0    0     0     1
PCE Adj:     1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
FinalVolume:   0     7     0    6     9    50   19     1     0    0     0     1
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
Lanes:       0.00  1.00  0.00 1.00  0.15  0.85 1.00  1.00  1.00 1.00  1.00  1.00
Final Sat.:    0   770     0  704   137   759  682   753   883  676   745   871
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx  0.01  xxxx 0.01  0.07  0.07 0.03  0.00  0.00 0.00  0.00  0.00
Crit Moves:        ****                   **** ****                         ****
Delay/Veh:    0.0   7.7   0.0  7.8   7.0   7.0  8.1   7.4   0.0  0.0   0.0   6.8
Delay Adj:   1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00
AdjDel/Veh:   0.0   7.7   0.0  7.8   7.0   7.0  8.1   7.4   0.0  0.0   0.0   6.8
LOS by Move:    *     A     *    A     A     A    A     A     *    *     *     A
ApproachDel:        7.7              7.1              8.0              6.8
Delay Adj:         1.00             1.00             1.00             1.00
ApprAdjDel:         7.7              7.1              8.0              6.8
LOS by Appr:          A                A                A                A
AllWayAvgQ:   0.0   0.0   0.0  0.0   0.1   0.1  0.0   0.0   0.0  0.0   0.0   0.0
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

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--------------------------------------------------------------------------------
                          San Diego Sediment Project
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                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #29
********************************************************************************
Average Delay (sec/veh):      0.0       Worst Case Level Of Service:  [  0.0]
********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:         0  0  0  0  0   0  0  0  0  0   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0     0     0     0     0     0     0     0     0     0     0     0
Growth Adj:   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
Initial Bse:     0     0     0     0     0     0     0     0     0     0     0     0
User Adj:     0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
PHF Adj:      0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
PHF Volume:      0     0     0     0     0     0     0     0     0     0     0     0
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
FinalVolume:     0     0     0     0     0     0     0     0     0     0     0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
FollowUpTim:   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Potent Cap.:     0     0     0     0     0     0     0     0     0     0     0     0
Move Cap.:       1     1     1     1     1     1     1     1     1     1     1     1
Volume/Cap:   0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:     0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
Control Del:   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
LOS by Move:
Movement:      LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.:     0     0     0     0     0     0     0     0     0     0     0     0
SharedQueue:   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
Shrd ConDel:   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0
Shared LOS:
ApproachDel:         0.0               0.0               0.0               0.0
ApproachLOS:
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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--------------------------------------------------------------------------------
                        San Diego Sediment Project
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #30
********************************************************************************
Average Delay (sec/veh):       0.0       Worst Case Level Of Service:  [  0.0]
********************************************************************************
Approach:       North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R     L  -  T  -  R     L  -  T  -  R     L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign         Stop Sign        Uncontrolled      Uncontrolled
Rights:           Include           Include           Include           Include
Lanes:        0  0  0  0  0     0  0  0  0  0     0  0  0  0  0     0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0     0     0     0     0     0     0     0     0     0     0     0
Growth Adj:  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
Initial Bse:    0     0     0     0     0     0     0     0     0     0     0     0
User Adj:    0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
PHF Adj:     0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
PHF Volume:     0     0     0     0     0     0     0     0     0     0     0     0
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
FinalVolume:    0     0     0     0     0     0     0     0     0     0     0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
FollowUpTim:  0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    0     0     0     0     0     0     0     0     0     0     0     0
Potent Cap.:    0     0     0     0     0     0     0     0     0     0     0     0
Move Cap.:      1     1     1     1     1     1     1     1     1     1     1     1
Volume/Cap:  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
Control Del:  0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
LOS by Move:
Movement:     LT - LTR - RT     LT - LTR - RT     LT - LTR - RT     LT - LTR - RT
Shared Cap.:    0     0     0     0     0     0     0     0     0     0     0     0
SharedQueue:  0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
Shrd ConDel:  1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0   1.0
Shared LOS:
ApproachDel:        0.0               0.0               0.0               0.0
ApproachLOS:
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #48 32nd Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.454
Loss Time (sec):	16	Average Delay (sec/veh):	28.1
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	34	459	146	82	676	122	60	148	96	185	442	172
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	34	459	146	82	676	122	60	148	96	185	442	172
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.97	0.97	0.00	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
PHF Volume:	35	474	0	85	698	126	62	153	99	191	457	178
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	35	474	0	85	698	126	62	153	99	191	457	178
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	35	474	0	85	698	126	62	153	99	191	457	178
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	1.00	0.93	0.93	0.83	0.93	0.93	0.83	0.93	0.93	0.83
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1769	3538	1900	1769	3538	1583	1769	3538	1583	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.02	0.13	0.00	0.05	0.20	0.08	0.04	0.04	0.06	0.11	0.13	0.11
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.35	0.00	0.13	0.43	0.43	0.08	0.13	0.13	0.23	0.28	0.28
Volume/Cap:	0.40	0.38	0.00	0.37	0.46	0.18	0.46	0.33	0.48	0.48	0.46	0.40
Delay/Veh:	49.0	24.5	0.0	40.7	20.4	17.7	46.6	39.8	41.9	34.4	29.9	29.6
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	49.0	24.5	0.0	40.7	20.4	17.7	46.6	39.8	41.9	34.4	29.9	29.6
LOS by Move:	D	C	A	D	C	B	D	D	D	C	C	C
HCM2kAvgQ:	2	6	0	3	8	2	2	2	3	5	6	4

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #49 8th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.399
Loss Time (sec):	16	Average Delay (sec/veh):	24.4
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Ignore			Ignore			Ignore		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 0	1	1 0	2 0	1	2 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	24	75	11	16	260	228	74	98	26	134	687	77
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	24	75	11	16	260	228	74	98	26	134	687	77
User Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.00	0.90	0.90	0.00	0.90	0.90	0.00
PHF Volume:	27	83	12	18	288	0	82	108	0	148	760	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	27	83	12	18	288	0	82	108	0	148	760	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	27	83	12	18	288	0	82	108	0	148	760	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.98	0.83	0.93	0.93	1.00	0.90	0.93	1.00	0.93	0.93	1.00
Lanes:	1.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1769	1862	1583	1769	3538	1900	3432	3538	1900	1769	3538	1900
Capacity Analysis Module:												
Vol/Sat:	0.02	0.04	0.01	0.01	0.08	0.00	0.02	0.03	0.00	0.08	0.21	0.00
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.13	0.13	0.13	0.20	0.00	0.06	0.22	0.00	0.37	0.53	0.00
Volume/Cap:	0.30	0.36	0.06	0.08	0.41	0.00	0.41	0.14	0.00	0.23	0.41	0.00
Delay/Veh:	47.7	41.0	38.7	38.8	35.1	0.0	46.7	31.4	0.0	21.9	14.2	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	47.7	41.0	38.7	38.8	35.1	0.0	46.7	31.4	0.0	21.9	14.2	0.0
LOS by Move:	D	D	D	D	D	A	D	C	A	C	B	A
HCM2kAvgQ:	1	3	0	1	4	0	1	1	0	3	7	0

Note: Queue reported is the number of cars per lane.

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations	↰		↑↱		↰	↱			↰	↱		↱
Volume (vph)	104	13	109	8	40	15	58	2	6	738	3	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0			4.0	4.0		4.0
Lane Util. Factor	1.00		0.95		1.00	1.00			1.00	0.95		0.95
Frt	1.00		0.99		1.00	0.88			1.00	1.00		0.85
Flt Protected	0.95		1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (prot)	1770		3488		1770	1639			1770	1767		1504
Flt Permitted	0.51		0.92		0.66	1.00			0.95	1.00		1.00
Satd. Flow (perm)	957		3240		1235	1639			1770	1767		1504
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	112	14	117	9	43	16	62	2	6	794	3	44
RTOR Reduction (vph)	0	0	4	0	0	1	0	0	0	0	0	10
Lane Group Flow (vph)	112	0	136	0	43	79	0	0	6	801	0	30
Turn Type	pm+pt	Perm			pm+pt				Split			Perm
Protected Phases	7		4		3	8			2	2		
Permitted Phases	4	4			8							2
Actuated Green, G (s)	17.0		12.1		11.6	9.4			60.0	60.0		60.0
Effective Green, g (s)	17.0		12.1		11.6	9.4			60.0	60.0		60.0
Actuated g/C Ratio	0.16		0.11		0.11	0.09			0.56	0.56		0.56
Clearance Time (s)	4.0		4.0		4.0	4.0			4.0	4.0		4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0			3.0	3.0		3.0
Lane Grp Cap (vph)	188		363		144	143			984	983		836
v/s Ratio Prot	c0.03				0.01	0.05			0.00	c0.45		
v/s Ratio Perm	c0.07		0.04		0.03							0.02
v/c Ratio	0.60		0.38		0.30	0.55			0.01	0.81		0.04
Uniform Delay, d1	41.6		44.4		44.0	47.2			10.7	19.4		10.9
Progression Factor	1.00		1.00		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2	5.0		0.7		1.2	4.6			0.0	5.3		0.0
Delay (s)	46.6		45.1		45.2	51.8			10.7	24.7		10.9
Level of Service	D		D		D	D			B	C		B
Approach Delay (s)			45.7			49.5				24.0		
Approach LOS			D			D				C		

Intersection Summary			
HCM Average Control Delay	33.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	107.9	Sum of lost time (s)	24.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR	SWL2	SWR
Lane Configurations					
Volume (vph)	28	65	28	15	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	1583	1770	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	30	70	30	16	2
RTOR Reduction (vph)	0	0	28	0	0
Lane Group Flow (vph)	30	70	2	16	2
Turn Type	Split		Perm	Prot	custom
Protected Phases	6	6		1	
Permitted Phases			6		5
Actuated Green, G (s)	6.0	6.0	6.0	2.6	1.0
Effective Green, g (s)	6.0	6.0	6.0	2.6	1.0
Actuated g/C Ratio	0.06	0.06	0.06	0.02	0.01
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	98	197	88	43	15
v/s Ratio Prot	0.02	c0.02		c0.01	
v/s Ratio Perm			0.00		c0.00
v/c Ratio	0.31	0.36	0.02	0.37	0.13
Uniform Delay, d1	49.0	49.1	48.2	51.8	53.0
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	1.1	0.1	5.4	4.0
Delay (s)	50.7	50.2	48.3	57.2	57.0
Level of Service	D	D	D	E	E
Approach Delay (s)		49.9			
Approach LOS		D			

Intersection Summary

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

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Intersection #1 Park Boulevard/Harbor Drive

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Cycle (sec):	100	Critical Vol./Cap.(X):	0.425
Loss Time (sec):	12	Average Delay (sec/veh):	13.9
Optimal Cycle:	60	Level Of Service:	B

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1! 0	0	0 0	0 0	0	1 0	2 0	1	1 0	2 0	0
Volume Module:												
Base Vol:	96	0	52	0	0	0	6	912	91	50	356	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	96	0	52	0	0	0	6	912	91	50	356	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	104	0	56	0	0	0	7	989	99	54	386	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	104	0	56	0	0	0	7	989	99	54	386	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	104	0	56	0	0	0	7	989	99	54	386	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	1.00	0.90	1.00	1.00	1.00	0.93	0.93	0.83	0.93	0.93	1.00
Lanes:	1.48	0.00	0.52	0.00	0.00	0.00	1.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	2529	0	888	0	0	0	1769	3538	1583	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.06	0.00	0.00	0.00	0.00	0.28	0.06	0.03	0.11	0.00
Crit Moves:			****					****		****		
Green/Cycle:	0.10	0.00	0.15	0.00	0.00	0.00	0.23	0.66	0.66	0.07	0.50	0.00
Volume/Cap:	0.41	0.00	0.42	0.00	0.00	0.00	0.02	0.42	0.09	0.42	0.22	0.00
Delay/Veh:	43.0	0.0	39.4	0.0	0.0	0.0	29.8	8.2	6.3	46.7	14.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	43.0	0.0	39.4	0.0	0.0	0.0	29.8	8.2	6.3	46.7	14.0	0.0
LOS by Move:	D	A	D	A	A	A	C	A	A	D	B	A
HCM2kAvgQ:	3	0	3	0	0	0	0	8	1	2	3	0

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Note: Queue reported is the number of cars per lane.

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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.457
Loss Time (sec):	16	Average Delay (sec/veh):	25.8
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 0 1 0			0 1 0 0 1			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	21	77	34	46	36	158	346	670	10	11	118	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	21	77	34	46	36	158	346	670	10	11	118	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	23	85	38	51	40	175	383	741	11	12	131	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	23	85	38	51	40	175	383	741	11	12	131	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	23	85	38	51	40	175	383	741	11	12	131	22
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.95	0.95	0.83	0.93	0.93	0.93	0.93	0.91	0.91
Lanes:	1.00	0.69	0.31	0.56	0.44	1.00	1.00	1.97	0.03	1.00	1.71	0.29
Final Sat.:	1769	1232	544	1016	795	1583	1769	3479	52	1769	2959	501
Capacity Analysis Module:												
Vol/Sat:	0.01	0.07	0.07	0.05	0.05	0.11	0.22	0.21	0.21	0.01	0.04	0.04
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.17	0.17	0.12	0.24	0.24	0.46	0.45	0.45	0.11	0.09	0.09
Volume/Cap:	0.26	0.42	0.42	0.42	0.21	0.47	0.47	0.47	0.47	0.07	0.47	0.47
Delay/Veh:	47.3	38.4	38.4	42.1	31.0	33.8	19.0	19.5	19.5	40.4	44.0	44.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	47.3	38.4	38.4	42.1	31.0	33.8	19.0	19.5	19.5	40.4	44.0	44.0
LOS by Move:	D	D	D	D	C	C	B	B	B	D	D	D
HCM2kAvgQ:	1	4	4	3	2	5	8	8	8	0	2	2

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.323
Loss Time (sec):	16	Average Delay (sec/veh):	17.3
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	17	30	45	12	21	16	75	622	5	20	145	5
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	17	30	45	12	21	16	75	622	5	20	145	5
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	19	33	50	13	23	18	83	689	6	22	161	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	19	33	50	13	23	18	83	689	6	22	161	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	19	33	50	13	23	18	83	689	6	22	161	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.87	0.87	0.87	0.93	0.93	0.93	0.93	0.93	0.93
Lanes:	0.18	0.33	0.49	0.24	0.43	0.33	1.00	1.98	0.02	1.00	1.93	0.07
Final Sat.:	304	536	804	405	708	539	1769	3506	28	1769	3403	117
Capacity Analysis Module:												
Vol/Sat:	0.06	0.06	0.06	0.03	0.03	0.03	0.05	0.20	0.20	0.01	0.05	0.05
Crit Moves:		****						****		****		
Green/Cycle:	0.19	0.19	0.19	0.19	0.19	0.19	0.33	0.60	0.60	0.05	0.33	0.33
Volume/Cap:	0.33	0.33	0.33	0.17	0.17	0.17	0.14	0.33	0.33	0.25	0.15	0.15
Delay/Veh:	35.6	35.6	35.6	34.2	34.2	34.2	24.0	10.0	10.0	47.2	24.0	24.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	35.6	35.6	35.6	34.2	34.2	34.2	24.0	10.0	10.0	47.2	24.0	24.0
LOS by Move:	D	D	D	C	C	C	C	B	B	D	C	C
HCM2kAvgQ:	3	3	3	1	1	1	2	5	5	1	2	2

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #4 28th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.384
Loss Time (sec):	16	Average Delay (sec/veh):	22.2
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0	1 0	2	0 1
Volume Module:												
Base Vol:	3	12	3	158	2	19	94	648	0	11	121	174
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	12	3	158	2	19	94	648	0	11	121	174
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
PHF Volume:	3	13	3	177	2	21	105	725	0	12	135	195
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	13	3	177	2	21	105	725	0	12	135	195
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	13	3	177	2	21	105	725	0	12	135	195
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.95	0.93	0.80	0.80	0.93	0.93	0.95	0.93	0.93	0.83
Lanes:	0.16	0.67	0.17	1.00	1.00	1.00	1.00	2.00	0.00	1.00	2.00	1.00
Final Sat.:	301	1203	301	1769	1528	1528	1769	3538	0	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.01	0.01	0.01	0.10	0.00	0.01	0.06	0.20	0.00	0.01	0.04	0.12
Crit Moves:		****		****				****		****		
Green/Cycle:	0.15	0.05	0.05	0.24	0.15	0.15	0.18	0.50	0.00	0.05	0.37	0.37
Volume/Cap:	0.08	0.22	0.22	0.41	0.01	0.10	0.33	0.41	0.00	0.14	0.10	0.33
Delay/Veh:	37.0	46.9	46.9	32.5	36.5	37.1	36.5	16.0	0.0	46.2	20.7	23.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	37.0	46.9	46.9	32.5	36.5	37.1	36.5	16.0	0.0	46.2	20.7	23.0
LOS by Move:	D	D	D	C	D	D	D	B	A	D	C	C
HCM2kAvgQ:	1	1	1	5	0	1	3	7	0	0	1	4

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #5 28th Street/Main Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.622
Loss Time (sec):	16	Average Delay (sec/veh):	33.3
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 1 1 0			1 0 1 1 0			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	20	438	112	295	312	43	96	177	32	42	89	170
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	438	112	295	312	43	96	177	32	42	89	170
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	21	469	120	316	334	46	103	190	34	45	95	182
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	21	469	120	316	334	46	103	190	34	45	95	182
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	21	469	120	316	334	46	103	190	34	45	95	182
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.93	0.91	0.91	0.93	0.91	0.91	0.93	0.84	0.84
Lanes:	1.00	1.59	0.41	1.00	1.76	0.24	1.00	1.69	0.31	1.00	1.00	1.00
Final Sat.:	1769	2730	698	1769	3053	421	1769	2927	529	1769	1596	1596
Capacity Analysis Module:												
Vol/Sat:	0.01	0.17	0.17	0.18	0.11	0.11	0.06	0.06	0.06	0.03	0.06	0.11
Crit Moves:		****		****			****					****
Green/Cycle:	0.18	0.28	0.28	0.29	0.39	0.39	0.09	0.16	0.16	0.12	0.18	0.18
Volume/Cap:	0.07	0.62	0.62	0.62	0.28	0.28	0.62	0.41	0.41	0.21	0.33	0.62
Delay/Veh:	34.4	32.9	32.9	33.3	21.2	21.2	50.8	38.6	38.6	40.2	35.7	40.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.4	32.9	32.9	33.3	21.2	21.2	50.8	38.6	38.6	40.2	35.7	40.4
LOS by Move:	C	C	C	C	C	C	D	D	D	D	D	D
HCM2kAvgQ:	1	9	9	8	4	4	4	4	4	1	3	6

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #6 28th Street/Boston Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.477
Loss Time (sec):	16	Average Delay (sec/veh):	26.0
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	6	528	207	213	657	33	35	171	9	7	6	27
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	528	207	213	657	33	35	171	9	7	6	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	6	571	224	230	710	36	38	185	10	8	6	29
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	571	224	230	710	36	38	185	10	8	6	29
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	571	224	230	710	36	38	185	10	8	6	29
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.83	0.93	0.92	0.92	0.93	0.97	0.97	0.93	0.86	0.86
Lanes:	1.00	2.00	1.00	1.00	1.90	0.10	1.00	0.95	0.05	1.00	0.18	0.82
Final Sat.:	1769	3538	1583	1769	3345	168	1769	1757	92	1769	297	1336
Capacity Analysis Module:												
Vol/Sat:	0.00	0.16	0.14	0.13	0.21	0.21	0.02	0.11	0.11	0.00	0.02	0.02
Crit Moves:		****		****				****		****		
Green/Cycle:	0.11	0.32	0.32	0.26	0.47	0.47	0.13	0.21	0.21	0.05	0.13	0.13
Volume/Cap:	0.03	0.50	0.44	0.50	0.45	0.45	0.16	0.50	0.50	0.09	0.17	0.17
Delay/Veh:	39.8	27.8	27.4	32.4	18.0	18.0	39.0	36.0	36.0	45.7	39.1	39.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	39.8	27.8	27.4	32.4	18.0	18.0	39.0	36.0	36.0	45.7	39.1	39.1
LOS by Move:	D	C	C	C	B	B	D	D	D	D	D	D
HCM2kAvgQ:	0	7	5	6	8	8	1	6	6	0	1	1

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                          San Diego Sediment Project
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
                    Unknown Method (Base Volume Alternative)
*******************************************************************************
Intersection #7 28th Street/I-5 southbound ramp
*******************************************************************************

*******************************************************************************
Approach:        North Bound       South Bound        East Bound        West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled      Uncontrolled      Uncontrolled      Uncontrolled
Rights:           Include           Include           Ignore           Include
Min. Green:      5    5     5     5    5     5     5    5     5     5    5     5
Lanes:         0  0  2  0  0    0  0  1  1  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0  587     0     0  381     0     0    0   526     0    0     0
Growth Adj:   0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
Initial Bse:     0    0     0     0    0     0     0    0     0     0    0     0
User Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Adj:      0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Volume:      0    0     0     0    0     0     0    0     0     0    0     0
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:     0    0     0     0    0     0     0    0     0     0    0     0
PCE Adj:      0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
MLF Adj:      0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
FinalVolume:     0    0     0     0    0     0     0    0     0     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Potent Cap.:     0    0     0     0    0     0     0    0     0     0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:     0    0     0     0    0     0     0    0     0     0    0     0
*******************************************************************************
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--------------------------------------------------------------------------------
                          San Diego Sediment Project
--------------------------------------------------------------------------------
                       Level Of Service Computation Report
             2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #8 28th Street/National Avenue
********************************************************************************
Cycle (sec):          100              Critical Vol./Cap.(X):         0.731
Loss Time (sec):       16              Average Delay (sec/veh):        31.3
Optimal Cycle:         74              Level Of Service:                  C
********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:     5    5     5     5    5     5     5    5     5     5    5     5
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
Lanes:         0  1  0  1  0    0  0  1! 0  0    1  0  1  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      33   76    38    74  171   105   136  412    82   127  347   179
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   33   76    38    74  171   105   136  412    82   127  347   179
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.97 0.97  0.97  0.97 0.97  0.97  0.97 0.97  0.97  0.97 0.97  0.97
PHF Volume:    34   79    39    77  177   109   141  426    85   131  359   185
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   34   79    39    77  177   109   141  426    85   131  359   185
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   34   79    39    77  177   109   141  426    85   131  359   185
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.73 0.73  0.73  0.84 0.84  0.84  0.93 0.91  0.91  0.93 0.93  0.93
Lanes:       0.45 1.03  0.52  0.21 0.49  0.30  1.00 1.67  0.33  1.00 0.66  0.34
Final Sat.:   619 1426   713   338  781   479  1769 2877   573  1769 1166   601
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.06  0.06  0.23 0.23  0.23  0.08 0.15  0.15  0.07 0.31  0.31
Crit Moves:                        ****        ****                    ****
Green/Cycle: 0.31 0.31  0.31  0.31 0.31  0.31  0.11 0.35  0.35  0.18 0.42  0.42
Volume/Cap:  0.18 0.18  0.18  0.73 0.73  0.73  0.73 0.42  0.42  0.42 0.73  0.73
Delay/Veh:   25.3 25.3  25.3  36.3 36.3  36.3  56.5 24.8  24.8  37.5 27.9  27.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  25.3 25.3  25.3  36.3 36.3  36.3  56.5 24.8  24.8  37.5 27.9  27.9
LOS by Move:    C    C     C     D    D     D     E    C     C     D    C     C
HCM2kAvgQ:      2    2     2    11   11    11     6    6     6     4   15    15
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #9 I-5 northbound ramps/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.526
Loss Time (sec):	12	Average Delay (sec/veh):	18.8
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0	0 1	0 0	0	0 0	0 0	1	0 1	0 0	1	0 0
Volume Module:												
Base Vol:	313	0	123	0	0	0	0	486	44	0	321	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	313	0	123	0	0	0	0	486	44	0	321	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95
PHF Volume:	331	0	130	0	0	0	0	514	0	0	339	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	331	0	130	0	0	0	0	514	0	0	339	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	331	0	130	0	0	0	0	514	0	0	339	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
Final Sat.:	1769	0	1583	0	0	0	0	1862	1900	0	1862	0
Capacity Analysis Module:												
Vol/Sat:	0.19	0.00	0.08	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.18	0.00
Crit Moves:	****							****				
Green/Cycle:	0.36	0.00	0.36	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.52	0.00
Volume/Cap:	0.53	0.00	0.23	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.35	0.00
Delay/Veh:	26.4	0.0	22.8	0.0	0.0	0.0	0.0	16.1	0.0	0.0	14.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.4	0.0	22.8	0.0	0.0	0.0	0.0	16.1	0.0	0.0	14.0	0.0
LOS by Move:	C	A	C	A	A	A	A	B	A	A	B	A
HCM2kAvgQ:	8	0	3	0	0	0	0	10	0	0	6	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

```
********************************************************************************
Intersection #10 I-5 southbound ramp/Boston Avenue
********************************************************************************
Average Delay (sec/veh):     10.6       Worst Case Level Of Service: E[ 49.2]
********************************************************************************
Approach:       North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign         Stop Sign        Uncontrolled      Uncontrolled
Rights:          Include           Include           Include           Include
Lanes:        1  0  0  1  0    0  0  0  0  0    1  0  0  1  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       8   51    11     0    0     0   535   53    16     3   38    50
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    8   51    11     0    0     0   535   53    16     3   38    50
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     8   51    11     0    0     0   535   53    16     3   38    50
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    8   51    11     0    0     0   535   53    16     3   38    50
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5   6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0   3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1200 1225    61  xxxx xxxx xxxxx    88 xxxx xxxxx    69 xxxx xxxxx
Potent Cap.:  204  179  1004  xxxx xxxx xxxxx  1508 xxxx xxxxx  1532 xxxx xxxxx
Move Cap.:    148  115  1004  xxxx xxxx xxxxx  1508 xxxx xxxxx  1532 xxxx xxxxx
Volume/Cap:  0.05 0.44  0.01  xxxx xxxx  xxxx  0.35 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.2 xxxx xxxxx  xxxx xxxx xxxxx   1.6 xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 30.7 xxxx xxxxx xxxxx xxxx xxxxx   8.7 xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    D    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx   137  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx   2.0 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx  51.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx
Shared LOS:     *    *     F     *    *     *     *    *     *     A    *     *
ApproachDel:       49.2           xxxxxx            xxxxxx            xxxxxx
ApproachLOS:         E               *                 *                 *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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------------------------------------------------------------------------------
                          San Diego Sediment Project
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #13 Cleveland Street/24th Street
******************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):        0.323
Loss Time (sec):       0                Average Delay (sec/veh):       10.0
Optimal Cycle:         0                Level Of Service:                 B
******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     5    5    5    5    5    5    5    5    5    5    5    5
Lanes:        1  0  0  1  0   1  0  1  0  1   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       2    2   27   173    3    8     7  311    4    28   95   36
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    2    2   27   173    3    8     7  311    4    28   95   36
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:     2    2   27   173    3    8     7  311    4    28   95   36
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Reduced Vol:    2    2   27   173    3    8     7  311    4    28   95   36
PCE Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
MLF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
FinalVolume:    2    2   27   173    3    8     7  311    4    28   95   36
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Lanes:       1.00 0.07 0.93  1.00 1.00 1.00  0.04 1.94 0.02  0.35 1.20 0.45
Final Sat.:   517   43  578   535  574  646    28 1255   16   213  752  298
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.05 0.05  0.32 0.01 0.01  0.25 0.25 0.25  0.13 0.13 0.12
Crit Moves:            ****  ****            ****            ****
Delay/Veh:    9.2  8.3  8.3  12.0  8.6  8.0   9.8  9.8  9.7   9.3  9.0  8.6
Delay Adj:   1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
AdjDel/Veh:   9.2  8.3  8.3  12.0  8.6  8.0   9.8  9.8  9.7   9.3  9.0  8.6
LOS by Move:    A    A    A     B    A    A     A    A    A     A    A    A
ApproachDel:       8.3              11.7              9.8              8.9
Delay Adj:        1.00              1.00             1.00             1.00
ApprAdjDel:        8.3              11.7              9.8              8.9
LOS by Appr:         A                 B                A                A
AllWayAvgQ:   0.0  0.0  0.0   0.4  0.0  0.0   0.3  0.3  0.3   0.1  0.1  0.1
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

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--------------------------------------------------------------------------------
                          San Diego Sediment Project
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                      Level Of Service Computation Report
             2000 HCM 4-Way Stop Method (Base Volume Alternative)
********************************************************************************
Intersection #16 Tidelands Avenue/W. 32nd Street
********************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):         0.096
Loss Time (sec):        0                Average Delay (sec/veh):         8.0
Optimal Cycle:          0                Level Of Service:                  A
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:          Include          Include          Include          Include
Min. Green:    5     5     5    5     5     5    5     5     5    5     5     5
Lanes:        0  0  1  0  0    1  0  0  1  0    1  0  1  0  1    1  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0     5     0    2    10     7   67    19     0    2     2     2
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   0     5     0    2    10     7   67    19     0    2     2     2
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    0     5     0    2    10     7   67    19     0    2     2     2
Reduct Vol:    0     0     0    0     0     0    0     0     0    0     0     0
Reduced Vol:   0     5     0    2    10     7   67    19     0    2     2     2
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   0     5     0    2    10     7   67    19     0    2     2     2
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 1.00  0.00  1.00 0.59  0.41  1.00 1.00  1.00  1.00 1.00  1.00
Final Sat.:     0  738     0   671  463   324   701  777   914   674  743   869
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.01  xxxx  0.00 0.02  0.02  0.10 0.02  0.00  0.00 0.00  0.00
Crit Moves:       ****                   ****  ****              ****
Delay/Veh:    0.0  7.8   0.0   8.0  7.3   7.3   8.3  7.4   0.0   8.0  7.5   6.8
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  7.8   0.0   8.0  7.3   7.3   8.3  7.4   0.0   8.0  7.5   6.8
LOS by Move:   *     A     *     A    A     A     A    A     *     A    A     A
ApproachDel:       7.8              7.4              8.1              7.4
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        7.8              7.4              8.1              7.4
LOS by Appr:         A                A                A                A
AllWayAvgQ:   0.0  0.0   0.0   0.0  0.0   0.0   0.1  0.0   0.0   0.0  0.0   0.0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #29
********************************************************************************
Average Delay (sec/veh):      0.0      Worst Case Level Of Service:  [  0.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  0  0  0   0  0  0  0  0   0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    0    0     0    0    0     0    0    0     0
Growth Adj:  0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
Initial Bse:    0    0     0    0    0     0    0    0     0    0    0     0
User Adj:    0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
PHF Volume:     0    0     0    0    0     0    0    0     0    0    0     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:    0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0
FollowUpTim:  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Potent Cap.:    0    0     0    0    0     0    0    0     0    0    0     0
Move Cap.:      1    1     1    1    1     1    1    1     1    1    1     1
Volume/Cap:  0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00 0.00 0.00  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0
Control Del:  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0
LOS by Move:
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.:    0    0     0    0    0     0    0    0     0    0    0     0
SharedQueue:  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0  0.0  0.0   0.0
Shrd ConDel:  1.0  1.0   1.0  1.0  1.0   1.0  1.0  1.0   1.0  1.0  1.0   1.0
Shared LOS:
ApproachDel:       0.0              0.0              0.0              0.0
ApproachLOS:
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #30

Average Delay (sec/veh): 0.0   Worst Case Level Of Service: [0.0]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0 0	0	0 0	0 0	0	0 0	0 0	0	0 0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Adj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0
User Adj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHF Adj:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHF Volume:	0	0	0	0	0	0	0	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	0	0	0	0	0	0	0	0	0	0	0	0
Critical Gap Module:												
Critical Gp:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FollowUpTim:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capacity Module:												
Cnflict Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Potent Cap.:	0	0	0	0	0	0	0	0	0	0	0	0
Move Cap.:	1	1	1	1	1	1	1	1	1	1	1	1
Volume/Cap:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Level Of Service Module:												
2Way95thQ:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Del:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOS by Move:												
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	0	0	0	0	0	0	0	0	0	0	0	0
SharedQueue:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shrd ConDel:	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Shared LOS:												
ApproachDel:		0.0			0.0			0.0			0.0	
ApproachLOS:												

Note: Queue reported is the number of cars per lane.

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                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM Operations Method (Base Volume Alternative)
********************************************************************************
Intersection #48 32nd Street/Harbor Drive
********************************************************************************
Cycle (sec):          100               Critical Vol./Cap.(X):          0.676
Loss Time (sec):       16               Average Delay (sec/veh):         34.6
Optimal Cycle:         66               Level Of Service:                   C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:          Ignore           Include          Include          Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  2  0  1    1  0  2  0  1    1  0  2  0  1    1  0  2  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      93  459   146   210  154    76   155  540    44    25  113   300
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   93  459   146   210  154    76   155  540    44    25  113   300
User Adj:    1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.00  0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93
PHF Volume:   100  496     0   227  166    82   167  583    48    27  122   324
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  100  496     0   227  166    82   167  583    48    27  122   324
PCE Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  0.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  100  496     0   227  166    82   167  583    48    27  122   324
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.93 0.93  1.00  0.93 0.93  0.83  0.93 0.93  0.83  0.93 0.93  0.83
Lanes:       1.00 2.00  1.00  1.00 2.00  1.00  1.00 2.00  1.00  1.00 2.00  1.00
Final Sat.:  1769 3538  1900  1769 3538  1583  1769 3538  1583  1769 3538  1583
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.14  0.00  0.13 0.05  0.05  0.09 0.16  0.03  0.02 0.03  0.20
Crit Moves:       ****        ****             ****                         ****
Green/Cycle: 0.21 0.21  0.00  0.19 0.19  0.19  0.14 0.34  0.34  0.10 0.30  0.30
Volume/Cap:  0.27 0.68  0.00  0.68 0.25  0.27  0.68 0.49  0.09  0.15 0.11  0.68
Delay/Veh:   33.7 39.1   0.0  43.1 34.7  35.1  48.1 26.4  22.5  41.2 25.2  34.4
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  33.7 39.1   0.0  43.1 34.7  35.1  48.1 26.4  22.5  41.2 25.2  34.4
LOS by Move:    C    D     A     D    C     D     D    C     C     D    C     C
HCM2kAvgQ:      3    9     0     8    2     2     5    7     1     1    1     9
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #49 8th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.542
Loss Time (sec):	16	Average Delay (sec/veh):	27.2
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Ignore			Ignore			Ignore		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 0	1	1 0	2 0	1	2 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	53	313	127	32	42	65	337	748	17	22	118	32
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	53	313	127	32	42	65	337	748	17	22	118	32
User Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.00	0.90	0.90	0.00	0.90	0.90	0.00
PHF Volume:	59	347	141	36	47	0	374	830	0	24	131	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	59	347	141	36	47	0	374	830	0	24	131	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	59	347	141	36	47	0	374	830	0	24	131	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.98	0.83	0.93	0.93	1.00	0.90	0.93	1.00	0.93	0.93	1.00
Lanes:	1.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1769	1862	1583	1769	3538	1900	3432	3538	1900	1769	3538	1900
Capacity Analysis Module:												
Vol/Sat:	0.03	0.19	0.09	0.02	0.01	0.00	0.11	0.23	0.00	0.01	0.04	0.00
Crit Moves:		****		****				****		****		
Green/Cycle:	0.19	0.33	0.33	0.05	0.19	0.00	0.32	0.41	0.00	0.05	0.15	0.00
Volume/Cap:	0.18	0.57	0.27	0.40	0.07	0.00	0.34	0.57	0.00	0.28	0.25	0.00
Delay/Veh:	34.3	29.1	25.1	49.0	33.4	0.0	26.4	23.1	0.0	47.5	38.2	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.3	29.1	25.1	49.0	33.4	0.0	26.4	23.1	0.0	47.5	38.2	0.0
LOS by Move:	C	C	C	D	C	A	C	C	A	D	D	A
HCM2kAvgQ:	2	9	3	2	1	0	4	10	0	1	2	0

Note: Queue reported is the number of cars per lane.

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations	↰		↑↱		↰	↱			↰	↱		↱
Volume (vph)	34	3	187	26	115	10	6	3	6	121	2	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0			4.0	4.0		4.0
Lane Util. Factor	1.00		0.95		1.00	1.00			1.00	0.95		0.95
Frt	1.00		0.98		1.00	0.93			1.00	0.99		0.85
Flt Protected	0.95		1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (prot)	1770		3472		1770	1730			1770	1749		1504
Flt Permitted	0.73		0.95		0.59	1.00			0.95	1.00		1.00
Satd. Flow (perm)	1365		3311		1106	1730			1770	1749		1504
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	37	3	205	29	126	11	7	3	7	133	2	85
RTOR Reduction (vph)	0	0	10	0	0	2	0	0	0	3	0	65
Lane Group Flow (vph)	37	0	227	0	126	19	0	0	7	141	0	11
Turn Type	pm+pt	Perm			pm+pt				Split			Perm
Protected Phases	7		4		3	8			2	2		
Permitted Phases	4	4			8							2
Actuated Green, G (s)	17.8		13.4		17.4	13.2			10.6	10.6		10.6
Effective Green, g (s)	17.8		13.4		17.4	13.2			10.6	10.6		10.6
Actuated g/C Ratio	0.24		0.18		0.24	0.18			0.15	0.15		0.15
Clearance Time (s)	4.0		4.0		4.0	4.0			4.0	4.0		4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0			3.0	3.0		3.0
Lane Grp Cap (vph)	358		609		302	313			257	254		219
v/s Ratio Prot	0.01				c0.02	0.01			0.00	c0.08		
v/s Ratio Perm	0.02		0.07		c0.08							0.01
v/c Ratio	0.10		0.37		0.42	0.06			0.03	0.56		0.05
Uniform Delay, d1	21.3		26.1		22.7	24.7			26.7	29.0		26.8
Progression Factor	1.00		1.00		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2	0.1		0.4		0.9	0.1			0.0	2.6		0.1
Delay (s)	21.4		26.5		23.7	24.8			26.8	31.6		26.9
Level of Service	C		C		C	C			C	C		C
Approach Delay (s)			25.8			23.8				29.9		
Approach LOS			C			C				C		

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	72.9	Sum of lost time (s)	24.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR	SWL2	SWR	SWR2
Lane Configurations	↰	↑↑	↱	↰	↱	
Volume (vph)	52	765	93	6	6	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	1583	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	57	841	102	7	7	1
RTOR Reduction (vph)	0	0	74	0	1	0
Lane Group Flow (vph)	57	841	28	7	7	0
Turn Type	Split		Perm	Prot	custom	
Protected Phases	6	6		1		
Permitted Phases			6		5	
Actuated Green, G (s)	18.7	18.7	18.7	1.0	1.0	
Effective Green, g (s)	18.7	18.7	18.7	1.0	1.0	
Actuated g/C Ratio	0.26	0.26	0.26	0.01	0.01	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	454	908	406	24	22	
v/s Ratio Prot	0.03	c0.24		c0.00		
v/s Ratio Perm			0.02		c0.00	
v/c Ratio	0.13	0.93	0.07	0.29	0.32	
Uniform Delay, d1	20.8	26.4	20.5	35.6	35.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	15.0	0.1	6.7	8.2	
Delay (s)	20.9	41.4	20.6	42.3	43.8	
Level of Service	C	D	C	D	D	
Approach Delay (s)		38.1				
Approach LOS		D				

Intersection Summary

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Park Boulevard/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.509
Loss Time (sec):	12	Average Delay (sec/veh):	15.0
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1!	0 0	0 0	0	0 0	1 0	2	0 1	1 0	2	0 0
Volume Module:												
Base Vol:	81	0	25	0	0	0	44	284	436	141	596	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	81	0	25	0	0	0	44	284	436	141	596	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	81	0	25	0	0	0	44	284	436	141	596	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
PHF Volume:	92	0	28	0	0	0	50	323	497	161	679	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	92	0	28	0	0	0	50	323	497	161	679	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	92	0	28	0	0	0	50	323	497	161	679	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.91	1.00	0.91	1.00	1.00	1.00	0.93	0.93	0.83	0.93	0.93	1.00
Lanes:	1.62	0.00	0.38	0.00	0.00	0.00	1.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	2800	0	660	0	0	0	1769	3538	1583	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.04	0.00	0.00	0.00	0.03	0.09	0.31	0.09	0.19	0.00
Crit Moves:			****						****	****		
Green/Cycle:	0.07	0.00	0.08	0.00	0.00	0.00	0.16	0.62	0.62	0.18	0.63	0.00
Volume/Cap:	0.49	0.00	0.51	0.00	0.00	0.00	0.17	0.15	0.51	0.51	0.30	0.00
Delay/Veh:	46.5	0.0	45.6	0.0	0.0	0.0	36.2	8.1	11.1	38.5	8.5	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	46.5	0.0	45.6	0.0	0.0	0.0	36.2	8.1	11.1	38.5	8.5	0.0
LOS by Move:	D	A	D	A	A	A	D	A	B	D	A	A
HCM2kAvgQ:	2	0	3	0	0	0	1	2	9	4	5	0

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #2 Cesar Chavez Parkway/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.512
Loss Time (sec):	16	Average Delay (sec/veh):	31.5
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	0 1	0	0 1	0 0	1	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	4	25	14	37	73	279	140	128	19	39	385	56
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	25	14	37	73	279	140	128	19	39	385	56
Added Vol:	0	0	15	0	0	0	0	0	0	44	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	4	25	29	37	73	279	140	128	19	83	385	56
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	4	28	32	41	82	312	156	143	21	93	430	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	28	32	41	82	312	156	143	21	93	430	63
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	28	32	41	82	312	156	143	21	93	430	63
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.96	0.96	0.83	0.93	0.91	0.91	0.93	0.91	0.91
Lanes:	1.00	0.46	0.54	0.34	0.66	1.00	1.00	1.74	0.26	1.00	1.75	0.25
Final Sat.:	1769	792	919	616	1215	1583	1769	3022	449	1769	3030	441
Capacity Analysis Module:												
Vol/Sat:	0.00	0.04	0.04	0.07	0.07	0.20	0.09	0.05	0.05	0.05	0.14	0.14
Crit Moves:	****					****	****				****	
Green/Cycle:	0.05	0.18	0.18	0.24	0.36	0.36	0.16	0.21	0.21	0.22	0.26	0.26
Volume/Cap:	0.05	0.20	0.20	0.28	0.18	0.54	0.54	0.23	0.23	0.24	0.54	0.54
Delay/Veh:	45.5	35.5	35.5	31.5	21.8	26.2	40.5	33.1	33.1	32.6	32.4	32.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.5	35.5	35.5	31.5	21.8	26.2	40.5	33.1	33.1	32.6	32.4	32.4
LOS by Move:	D	D	D	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	0	2	2	3	3	8	4	2	2	2	7	7

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #3 Sampson Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.280
Loss Time (sec):	16	Average Delay (sec/veh):	19.9
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0
Volume Module:												
Base Vol:	19	33	56	7	50	22	15	135	31	87	477	6
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	19	33	56	7	50	22	15	135	31	87	477	6
Added Vol:	0	0	0	0	0	0	0	15	0	0	44	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	19	33	56	7	50	22	15	150	31	87	521	6
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	20	35	59	7	53	23	16	158	33	92	548	6
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	35	59	7	53	23	16	158	33	92	548	6
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	20	35	59	7	53	23	16	158	33	92	548	6
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.86	0.86	0.86	0.92	0.92	0.92	0.93	0.91	0.91	0.93	0.93	0.93
Lanes:	0.18	0.30	0.52	0.09	0.63	0.28	1.00	1.66	0.34	1.00	1.98	0.02
Final Sat.:	288	501	849	155	1109	488	1769	2856	590	1769	3491	40
Capacity Analysis Module:												
Vol/Sat:	0.07	0.07	0.07	0.05	0.05	0.05	0.01	0.06	0.06	0.05	0.16	0.16
Crit Moves:		****					****				****	
Green/Cycle:	0.24	0.24	0.24	0.24	0.24	0.24	0.05	0.31	0.31	0.29	0.55	0.55
Volume/Cap:	0.29	0.29	0.29	0.20	0.20	0.20	0.18	0.18	0.18	0.18	0.29	0.29
Delay/Veh:	31.3	31.3	31.3	30.4	30.4	30.4	46.5	25.4	25.4	26.8	12.2	12.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	31.3	31.3	31.3	30.4	30.4	30.4	46.5	25.4	25.4	26.8	12.2	12.2
LOS by Move:	C	C	C	C	C	C	D	C	C	C	B	B
HCM2kAvgQ:	3	3	3	2	2	2	0	2	2	2	5	5

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 28th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.433
Loss Time (sec):	16	Average Delay (sec/veh):	27.8
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0 1! 0 0			1 0 1 1 0			1 0 1 1 0			1 0 2 0 1		
Volume Module:												
Base Vol:	4	7	5	315	9	28	36	186	7	12	448	142
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	7	5	315	9	28	36	186	7	12	448	142
Added Vol:	0	0	0	0	0	20	2	13	0	0	24	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	4	7	5	315	9	48	38	199	7	12	472	142
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
PHF Volume:	4	7	5	335	10	51	40	211	7	13	502	151
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	4	7	5	335	10	51	40	211	7	13	502	151
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	4	7	5	335	10	51	40	211	7	13	502	151
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.93	0.93	0.81	0.81	0.93	0.93	0.93	0.93	0.93	0.83
Lanes:	0.25	0.44	0.31	1.00	1.00	1.00	1.00	1.93	0.07	1.00	2.00	1.00
Final Sat.:	441	771	551	1769	1546	1546	1769	3400	120	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.01	0.01	0.01	0.19	0.01	0.03	0.02	0.06	0.06	0.01	0.14	0.10
Crit Moves:		****		****			****				****	
Green/Cycle:	0.24	0.05	0.05	0.42	0.24	0.24	0.05	0.20	0.20	0.16	0.32	0.32
Volume/Cap:	0.04	0.19	0.19	0.45	0.03	0.14	0.45	0.31	0.31	0.04	0.45	0.30
Delay/Veh:	29.5	46.6	46.6	21.0	29.4	30.3	49.6	34.0	34.0	35.3	27.5	26.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	29.5	46.6	46.6	21.0	29.4	30.3	49.6	34.0	34.0	35.3	27.5	26.2
LOS by Move:	C	D	D	C	C	C	D	C	C	D	C	C
HCM2kAvgQ:	0	1	1	7	0	1	1	3	3	0	6	3

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 28th Street/Main Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.395
Loss Time (sec):	16	Average Delay (sec/veh):	29.9
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 1	0	1 0	1 1	0	1 0	1 1	0	1 0	1 1	0
Volume Module:												
Base Vol:	35	191	58	163	413	41	66	88	43	53	211	187
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	35	191	58	163	413	41	66	88	43	53	211	187
Added Vol:	0	2	0	0	20	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	35	193	58	163	433	41	66	88	43	53	211	187
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
PHF Volume:	37	204	61	172	458	43	70	93	45	56	223	198
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	204	61	172	458	43	70	93	45	56	223	198
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	37	204	61	172	458	43	70	93	45	56	223	198
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.93	0.92	0.92	0.93	0.89	0.89	0.93	0.87	0.87
Lanes:	1.00	1.54	0.46	1.00	1.83	0.17	1.00	1.34	0.66	1.00	1.06	0.94
Final Sat.:	1769	2625	789	1769	3190	302	1769	2260	1104	1769	1744	1546
Capacity Analysis Module:												
Vol/Sat:	0.02	0.08	0.08	0.10	0.14	0.14	0.04	0.04	0.04	0.03	0.13	0.13
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.18	0.18	0.23	0.36	0.36	0.10	0.21	0.21	0.21	0.32	0.32
Volume/Cap:	0.39	0.42	0.42	0.42	0.39	0.39	0.39	0.19	0.19	0.15	0.39	0.39
Delay/Veh:	48.5	36.5	36.5	33.4	23.9	23.9	43.6	32.5	32.5	32.3	26.5	26.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	48.5	36.5	36.5	33.4	23.9	23.9	43.6	32.5	32.5	32.3	26.5	26.5
LOS by Move:	D	D	D	C	C	C	D	C	C	C	C	C
HCM2kAvgQ:	2	4	4	4	6	6	2	2	2	1	5	5

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 28th Street/Boston Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.313
Loss Time (sec):	16	Average Delay (sec/veh):	18.2
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	3	351	80	137	650	26	23	48	7	11	15	44
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	351	80	137	650	26	23	48	7	11	15	44
Added Vol:	0	2	0	0	20	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	3	353	80	137	670	26	23	48	7	11	15	44
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
PHF Volume:	3	374	85	145	710	28	24	51	7	12	16	47
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	374	85	145	710	28	24	51	7	12	16	47
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	374	85	145	710	28	24	51	7	12	16	47
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.83	0.93	0.93	0.93	0.93	0.96	0.96	0.93	0.87	0.87
Lanes:	1.00	2.00	1.00	1.00	1.93	0.07	1.00	0.87	0.13	1.00	0.25	0.75
Final Sat.:	1769	3538	1583	1769	3385	131	1769	1594	232	1769	420	1233
Capacity Analysis Module:												
Vol/Sat:	0.00	0.11	0.05	0.08	0.21	0.21	0.01	0.03	0.03	0.01	0.04	0.04
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.38	0.38	0.30	0.63	0.63	0.05	0.08	0.08	0.08	0.11	0.11
Volume/Cap:	0.04	0.28	0.14	0.28	0.33	0.33	0.28	0.39	0.39	0.08	0.33	0.33
Delay/Veh:	45.4	21.5	20.3	27.3	8.9	8.9	47.5	45.3	45.3	42.7	41.9	41.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.4	21.5	20.3	27.3	8.9	8.9	47.5	45.3	45.3	42.7	41.9	41.9
LOS by Move:	D	C	C	C	A	A	D	D	D	D	D	D
HCM2kAvgQ:	0	4	2	3	6	6	1	2	2	0	2	2

Note: Queue reported is the number of cars per lane.

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                          San Diego Sediment Project
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                      Level Of Service Computation Report
                  Unknown Method (Future Volume Alternative)
********************************************************************************
Intersection #7 28th Street/I-5 southbound ramp
********************************************************************************

********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled     Uncontrolled     Uncontrolled
Rights:          Include          Include          Ignore           Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        0  0  2  0  0    0  0  1  1  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0  415     0    0  303     0    0    0   508    0    0     0
Growth Adj:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
Initial Bse:   0    0     0    0    0     0    0    0     0    0    0     0
Added Vol:     0    2     0    0    0     0    0    0    20    0    0     0
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   0    0     0    0    0     0    0    0     0    0    0     0
User Adj:    0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Volume:    0    0     0    0    0     0    0    0     0    0    0     0
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   0    0     0    0    0     0    0    0     0    0    0     0
PCE Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
MLF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
FinalVolume:   0    0     0    0    0     0    0    0     0    0    0     0
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   0    0     0    0    0     0    0    0     0    0    0     0
Potent Cap.:   0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:   0    0     0    0    0     0    0    0     0    0    0     0
********************************************************************************
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                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #8 28th Street/National Avenue
********************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):         0.781
Loss Time (sec):      16                Average Delay (sec/veh):        33.7
Optimal Cycle:        82                Level Of Service:                  C
********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  1  0  1  0    0  0  1! 0  0    1  0  1  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     37   65    32    50  135   183   114  172    25   146  537    86
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  37   65    32    50  135   183   114  172    25   146  537    86
Added Vol:     0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:   0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:  37   65    32    50  135   183   114  172    25   146  537    86
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.97 0.97  0.97  0.97 0.97  0.97  0.97 0.97  0.97  0.97 0.97  0.97
PHF Volume:   38   67    33    52  140   190   118  178    26   151  556    89
Reduct Vol:    0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  38   67    33    52  140   190   118  178    26   151  556    89
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  38   67    33    52  140   190   118  178    26   151  556    89
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.68 0.68  0.68  0.85 0.85  0.85  0.93 0.91  0.91  0.93 0.96  0.96
Lanes:       0.55 0.97  0.48  0.13 0.37  0.50  1.00 1.75  0.25  1.00 0.86  0.14
Final Sat.:   712 1251   616   221  596   808  1769 3030   440  1769 1571   252
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.05 0.05  0.05  0.23 0.23  0.23  0.07 0.06  0.06  0.09 0.35  0.35
Crit Moves:                        ****        ****                   ****
Green/Cycle: 0.30 0.30  0.30  0.30 0.30  0.30  0.09 0.22  0.22  0.32 0.45  0.45
Volume/Cap:  0.18 0.18  0.18  0.78 0.78  0.78  0.78 0.27  0.27  0.27 0.78  0.78
Delay/Veh:   26.0 26.0  26.0  39.9 39.9  39.9  67.3 32.5  32.5  25.6 27.9  27.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  26.0 26.0  26.0  39.9 39.9  39.9  67.3 32.5  32.5  25.6 27.9  27.9
LOS by Move:    C    C     C     D    D     D     E    C     C     C    C     C
HCM2kAvgQ:      2    2     2    13   13    13     6    3     3     3   18    18
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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                         San Diego Sediment Project
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                     Level Of Service Computation Report
            2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #9 I-5 northbound ramps/National Avenue
********************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):          0.493
Loss Time (sec):       12                Average Delay (sec/veh):         18.6
Optimal Cycle:         60                Level Of Service:                   B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase        Permitted        Permitted
Rights:           Include          Include          Ignore           Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  1  0  1   0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     304    0    79    0    0     0    0  236    19    0  450     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  304    0    79    0    0     0    0  236    19    0  450     0
Added Vol:      0    0     0    0    0     0    0    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  304    0    79    0    0     0    0  236    19    0  450     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
PHF Adj:     0.95 0.95  0.95 0.95 0.95  0.95 0.95 0.95  0.00 0.95 0.95  0.95
PHF Volume:   319    0    83    0    0     0    0  247     0    0  472     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  319    0    83    0    0     0    0  247     0    0  472     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  0.00 1.00 1.00  1.00
FinalVolume:  319    0    83    0    0     0    0  247     0    0  472     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment:  0.93 1.00  0.83 1.00 1.00  1.00 1.00 0.98  1.00 1.00 0.98  1.00
Lanes:       1.00 0.00  1.00 0.00 0.00  0.00 0.00 1.00  1.00 0.00 1.00  0.00
Final Sat.:  1769    0  1583    0    0     0    0 1862  1900    0 1862     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.18 0.00  0.05 0.00 0.00  0.00 0.00 0.13  0.00 0.00 0.25  0.00
Crit Moves:  ****                                                ****
Green/Cycle: 0.37 0.00  0.37 0.00 0.00  0.00 0.00 0.51  0.00 0.00 0.51  0.00
Volume/Cap:  0.49 0.00  0.14 0.00 0.00  0.00 0.00 0.26  0.00 0.00 0.49  0.00
Delay/Veh:   25.1  0.0  21.3  0.0  0.0   0.0  0.0 13.7   0.0  0.0 16.2   0.0
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:  25.1  0.0  21.3  0.0  0.0   0.0  0.0 13.7   0.0  0.0 16.2   0.0
LOS by Move:    C    A     C    A    A     A    A    B     A    A    B     A
HCM2kAvgQ:      8    0     2    0    0     0    0    4     0    0    9     0
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #10 I-5 southbound ramp/Boston Avenue

Average Delay (sec/veh): 6.1   Worst Case Level Of Service: C[15.2]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	1 0 0 1 0			0 0 0 0 0			1 0 0 1 0			0 1 0 0 1		
Volume Module:												
Base Vol:	9	23	5	0	0	0	255	26	8	2	50	43
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	9	23	5	0	0	0	255	26	8	2	50	43
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	9	23	5	0	0	0	255	26	8	2	50	43
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	9	23	5	0	0	0	255	26	8	2	50	43
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	9	23	5	0	0	0	255	26	8	2	50	43
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	616	637	30	xxxx	xxxx	xxxxx	93	xxxx	xxxxx	34	xxxx	xxxxx
Potent Cap.:	454	395	1044	xxxx	xxxx	xxxxx	1501	xxxx	xxxxx	1578	xxxx	xxxxx
Move Cap.:	395	327	1044	xxxx	xxxx	xxxxx	1501	xxxx	xxxxx	1578	xxxx	xxxxx
Volume/Cap:	0.02	0.07	0.00	xxxx	xxxx	xxxx	0.17	xxxx	xxxx	0.00	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.6	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	14.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.9	xxxx	xxxxx	7.3	xxxx	xxxxx
LOS by Move:	B	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	373	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	0.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.0	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	15.4	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.3	xxxx	xxxxx
Shared LOS:	*	*	C	*	*	*	*	*	*	A	*	*
ApproachDel:		15.2			xxxxxx			xxxxxx			xxxxxx	
ApproachLOS:		C			*			*			*	

Note: Queue reported is the number of cars per lane.

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-----------------------------------------------------------------------------
                         San Diego Sediment Project
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                     Level Of Service Computation Report
           2000 HCM 4-Way Stop Method (Future Volume Alternative)
*****************************************************************************
Intersection #13 Cleveland Street/24th Street
*****************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.308
Loss Time (sec):       0              Average Delay (sec/veh):         8.9
Optimal Cycle:         0              Level Of Service:                  A
*****************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        1  0  0  1  0   1  0  1  0  1   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       2    6    15   40    2     9   10   90     4   10  257   184
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    2    6    15   40    2     9   10   90     4   10  257   184
Added Vol:      0    0     0    0    0     0    0    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    2    6    15   40    2     9   10   90     4   10  257   184
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     2    6    15   40    2     9   10   90     4   10  257   184
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    2    6    15   40    2     9   10   90     4   10  257   184
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    2    6    15   40    2     9   10   90     4   10  257   184
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       1.00 0.29  0.71 1.00 1.00  1.00 0.19 1.73  0.08 0.04 1.14  0.82
Final Sat.:   536  180   450  526  567   637  130 1186    53   32  853   679
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.03  0.03 0.08 0.00  0.01 0.08 0.08  0.07 0.31 0.30  0.27
Crit Moves:       ****       ****            ****            ****
Delay/Veh:    9.0  8.2   8.2  9.6  8.6   8.0  8.3  8.2   8.2  9.7  9.5   8.5
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   9.0  8.2   8.2  9.6  8.6   8.0  8.3  8.2   8.2  9.7  9.5   8.5
LOS by Move:    A    A     A    A    A     A    A    A     A    A    A     A
ApproachDel:       8.2              9.3              8.3              9.1
Delay Adj:        1.00             1.00             1.00             1.00
ApprAdjDel:        8.2              9.3              8.3              9.1
LOS by Appr:         A                A                A                A
AllWayAvgQ:   0.0  0.0   0.0  0.1  0.0   0.0  0.1  0.1   0.1  0.4  0.4   0.4
*****************************************************************************
Note: Queue reported is the number of cars per lane.
*****************************************************************************
```

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #16 Tidelands Avenue/W. 32nd Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.066
Loss Time (sec):	0	Average Delay (sec/veh):	7.3
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Stop Sign			Stop Sign			Stop Sign			Stop Sign	
Rights:		Include			Include			Include			Include	
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Lanes:		0 0 1 0 0			1 0 0 1 0			1 0 1 0 1			1 0 1 0 1	
Volume Module:												
Base Vol:	0	7	0	6	9	50	19	1	0	0	0	1
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	7	0	6	9	50	19	1	0	0	0	1
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	7	0	6	9	50	19	1	0	0	0	1
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	7	0	6	9	50	19	1	0	0	0	1
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	7	0	6	9	50	19	1	0	0	0	1
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	7	0	6	9	50	19	1	0	0	0	1
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.00	0.15	0.85	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	0	770	0	704	137	759	682	753	883	676	745	871
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.01	xxxx	0.01	0.07	0.07	0.03	0.00	0.00	0.00	0.00	0.00
Crit Moves:		****				****	****					****
Delay/Veh:	0.0	7.7	0.0	7.8	7.0	7.0	8.1	7.4	0.0	0.0	0.0	6.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	7.7	0.0	7.8	7.0	7.0	8.1	7.4	0.0	0.0	0.0	6.8
LOS by Move:	*	A	*	A	A	A	A	A	*	*	*	A
ApproachDel:		7.7			7.1			8.0			6.8	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		7.7			7.1			8.0			6.8	
LOS by Appr:		A			A			A			A	
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

```
--------------------------------------------------------------------------------
                          San Diego Sediment Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #29
********************************************************************************
Average Delay (sec/veh):       0.0       Worst Case Level Of Service: A[  0.0]
********************************************************************************
Approach:       North Bound      South Bound       East Bound        West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Stop Sign        Stop Sign       Uncontrolled      Uncontrolled
Rights:            Include          Include          Include           Include
Lanes:         0  0  0  0  0    0  0  0  0  0    0  0  1  0  0    0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:         0    0     0     0    0     0     0    0     0     0    0     0
Growth Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:      0    0     0     0    0     0     0    0     0     0    0     0
Added Vol:        0    0     0     0    0     0     0   15     0     0   44     0
PasserByVol:      0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:      0    0     0     0    0     0     0   15     0     0   44     0
User Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:       1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:       0    0     0     0    0     0     0   15     0     0   44     0
Reduct Vol:       0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:      0    0     0     0    0     0     0   15     0     0   44     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     *
Movement:      LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:        *                *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

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-------------------------------------------------------------------------------
                       San Diego Sediment Project
-------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #30
*******************************************************************************
Average Delay (sec/veh):      0.0       Worst Case Level Of Service: A[  0.0]
*******************************************************************************
Approach:      North Bound       South Bound        East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R     L  -  T  -  R     L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Uncontrolled      Uncontrolled
Rights:           Include          Include           Include           Include
Lanes:        0  0  0  0  0    0  0  0  0  0    0  0  1  0  0    0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0     0     0     0     0     0     0     0     0     0     0     0
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     0     0     0     0     0     0     0     0     0     0     0     0
Added Vol:       0     0     0     0     0     0     0    15     0     0    44     0
PasserByVol:     0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:     0     0     0     0     0     0     0    15     0     0    44     0
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      0     0     0     0     0     0     0    15     0     0    44     0
Reduct Vol:      0     0     0     0     0     0     0     0     0     0     0     0
FinalVolume:     0     0     0     0     0     0     0    15     0     0    44     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:     *     *     *     *     *     *     *     *     *     *     *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:      *     *     *     *     *     *     *     *     *     *     *     *
ApproachDel:      xxxxxx            xxxxxx            xxxxxx            xxxxxx
ApproachLOS:           *                 *                 *                 *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #48 32nd Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.462
Loss Time (sec):	16	Average Delay (sec/veh):	28.3
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Protected			Protected			Protected			Protected	
Rights:		Ignore			Include			Include			Include	
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2	0 1	1 0	2	0 1	1 0	2	0 1	1 0	2	0 1
Volume Module:												
Base Vol:	34	459	146	82	676	122	60	148	96	185	442	172
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	34	459	146	82	676	122	60	148	96	185	442	172
Added Vol:	0	0	0	0	0	0	0	13	0	0	24	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	34	459	146	82	676	122	60	161	96	185	466	172
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.97	0.97	0.00	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
PHF Volume:	35	474	0	85	698	126	62	166	99	191	481	178
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	35	474	0	85	698	126	62	166	99	191	481	178
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	35	474	0	85	698	126	62	166	99	191	481	178
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	1.00	0.93	0.93	0.83	0.93	0.93	0.83	0.93	0.93	0.83
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1769	3538	1900	1769	3538	1583	1769	3538	1583	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.02	0.13	0.00	0.05	0.20	0.08	0.04	0.05	0.06	0.11	0.14	0.11
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.34	0.00	0.13	0.42	0.42	0.08	0.13	0.13	0.23	0.29	0.29
Volume/Cap:	0.40	0.39	0.00	0.37	0.47	0.19	0.47	0.35	0.47	0.47	0.47	0.38
Delay/Veh:	49.0	25.0	0.0	40.9	21.0	18.2	46.9	39.7	41.6	33.9	29.4	28.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	49.0	25.0	0.0	40.9	21.0	18.2	46.9	39.7	41.6	33.9	29.4	28.8
LOS by Move:	D	C	A	D	C	B	D	D	D	C	C	C
HCM2kAvgQ:	2	6	0	3	8	2	2	2	3	5	6	4

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #49 8th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.408
Loss Time (sec):	16	Average Delay (sec/veh):	24.3
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Protected			Protected			Protected			Protected	
Rights:		Include			Ignore			Ignore			Ignore	
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 1 0 1			1 0 2 0 1			2 0 2 0 1			1 0 2 0 1		
Volume Module:												
Base Vol:	24	75	11	16	260	228	74	98	26	134	687	77
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	24	75	11	16	260	228	74	98	26	134	687	77
Added Vol:	0	0	0	0	0	0	0	13	0	0	24	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	24	75	11	16	260	228	74	111	26	134	711	77
User Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.00	0.90	0.90	0.00	0.90	0.90	0.00
PHF Volume:	27	83	12	18	288	0	82	123	0	148	787	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	27	83	12	18	288	0	82	123	0	148	787	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	27	83	12	18	288	0	82	123	0	148	787	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.98	0.83	0.93	0.93	1.00	0.90	0.93	1.00	0.93	0.93	1.00
Lanes:	1.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1769	1862	1583	1769	3538	1900	3432	3538	1900	1769	3538	1900
Capacity Analysis Module:												
Vol/Sat:	0.02	0.04	0.01	0.01	0.08	0.00	0.02	0.03	0.00	0.08	0.22	0.00
Crit Moves:	****				****		****				****	
Green/Cycle:	0.05	0.12	0.12	0.12	0.20	0.00	0.06	0.22	0.00	0.37	0.54	0.00
Volume/Cap:	0.30	0.36	0.06	0.08	0.41	0.00	0.41	0.16	0.00	0.23	0.41	0.00
Delay/Veh:	47.7	41.2	38.9	39.0	35.6	0.0	46.9	31.5	0.0	21.7	14.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	47.7	41.2	38.9	39.0	35.6	0.0	46.9	31.5	0.0	21.7	14.0	0.0
LOS by Move:	D	D	D	D	D	A	D	C	A	C	B	A
HCM2kAvgQ:	1	3	0	1	4	0	1	2	0	3	7	0

Note: Queue reported is the number of cars per lane.

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations	↰		↑↱		↰	↱			↰	↱		↱
Volume (vph)	104	13	109	8	40	15	58	2	6	762	3	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0			4.0	4.0		4.0
Lane Util. Factor	1.00		0.95		1.00	1.00			1.00	0.95		0.95
Frt	1.00		0.99		1.00	0.88			1.00	1.00		0.85
Flt Protected	0.95		1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (prot)	1770		3488		1770	1639			1770	1767		1504
Flt Permitted	0.51		0.92		0.66	1.00			0.95	1.00		1.00
Satd. Flow (perm)	947		3241		1235	1639			1770	1767		1504
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	112	14	117	9	43	16	62	2	6	819	3	44
RTOR Reduction (vph)	0	0	4	0	0	1	0	0	0	0	0	9
Lane Group Flow (vph)	112	0	136	0	43	79	0	0	6	826	0	31
Turn Type	pm+pt	Perm			pm+pt				Split			Perm
Protected Phases	7		4		3	8			2	2		
Permitted Phases	4	4			8							2
Actuated Green, G (s)	17.2		12.2		11.6	9.4			60.0	60.0		60.0
Effective Green, g (s)	17.2		12.2		11.6	9.4			60.0	60.0		60.0
Actuated g/C Ratio	0.16		0.11		0.11	0.09			0.55	0.55		0.55
Clearance Time (s)	4.0		4.0		4.0	4.0			4.0	4.0		4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0			3.0	3.0		3.0
Lane Grp Cap (vph)	188		365		143	142			981	979		833
v/s Ratio Prot	c0.03				0.01	0.05			0.00	c0.47		
v/s Ratio Perm	c0.07		0.04		0.03							0.02
v/c Ratio	0.60		0.37		0.30	0.56			0.01	0.84		0.04
Uniform Delay, d1	41.6		44.5		44.2	47.5			10.8	20.2		11.0
Progression Factor	1.00		1.00		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2	5.0		0.6		1.2	4.7			0.0	6.7		0.0
Delay (s)	46.6		45.2		45.4	52.1			10.8	27.0		11.0
Level of Service	D		D		D	D			B	C		B
Approach Delay (s)			45.8			49.8				26.1		
Approach LOS			D			D				C		

Intersection Summary			
HCM Average Control Delay	34.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	108.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR	SWL2	SWR
Lane Configurations					
Volume (vph)	28	78	28	15	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	1583	1770	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	30	84	30	16	2
RTOR Reduction (vph)	0	0	28	0	0
Lane Group Flow (vph)	30	84	2	16	2
Turn Type	Split		Perm	Prot	custom
Protected Phases	6	6		1	
Permitted Phases			6		5
Actuated Green, G (s)	6.3	6.3	6.3	2.6	1.0
Effective Green, g (s)	6.3	6.3	6.3	2.6	1.0
Actuated g/C Ratio	0.06	0.06	0.06	0.02	0.01
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	103	206	92	42	15
v/s Ratio Prot	0.02	c0.02		c0.01	
v/s Ratio Perm			0.00		c0.00
v/c Ratio	0.29	0.41	0.02	0.38	0.13
Uniform Delay, d1	48.9	49.2	48.1	52.1	53.2
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.3	0.1	5.7	4.0
Delay (s)	50.4	50.5	48.2	57.7	57.2
Level of Service	D	D	D	E	E
Approach Delay (s)		50.0			
Approach LOS		D			

Intersection Summary

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #1 Park Boulevard/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.425
Loss Time (sec):	12	Average Delay (sec/veh):	13.9
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Protected			Protected			Protected			Protected	
Rights:		Include			Include			Include			Include	
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:		1 0 1! 0 0			0 0 0 0 0			1 0 2 0 1			1 0 2 0 0	
Volume Module:												
Base Vol:	96	0	52	0	0	0	6	912	91	50	356	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	96	0	52	0	0	0	6	912	91	50	356	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	96	0	52	0	0	0	6	912	91	50	356	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	104	0	56	0	0	0	7	989	99	54	386	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	104	0	56	0	0	0	7	989	99	54	386	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	104	0	56	0	0	0	7	989	99	54	386	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.90	1.00	0.90	1.00	1.00	1.00	0.93	0.93	0.83	0.93	0.93	1.00
Lanes:	1.48	0.00	0.52	0.00	0.00	0.00	1.00	2.00	1.00	1.00	2.00	0.00
Final Sat.:	2529	0	888	0	0	0	1769	3538	1583	1769	3538	0
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.06	0.00	0.00	0.00	0.00	0.28	0.06	0.03	0.11	0.00
Crit Moves:			****					****		****		
Green/Cycle:	0.10	0.00	0.15	0.00	0.00	0.00	0.23	0.66	0.66	0.07	0.50	0.00
Volume/Cap:	0.41	0.00	0.42	0.00	0.00	0.00	0.02	0.42	0.09	0.42	0.22	0.00
Delay/Veh:	43.0	0.0	39.4	0.0	0.0	0.0	29.8	8.2	6.3	46.7	14.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	43.0	0.0	39.4	0.0	0.0	0.0	29.8	8.2	6.3	46.7	14.0	0.0
LOS by Move:	D	A	D	A	A	A	C	A	A	D	B	A
HCM2kAvgQ:	3	0	3	0	0	0	0	8	1	2	3	0

Note: Queue reported is the number of cars per lane.

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                        San Diego Sediment Project
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                    Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
*********************************************************************************
Intersection #2 Cesar Chavez Parkway/Harbor Drive
*********************************************************************************
Cycle (sec):          100               Critical Vol./Cap.(X):          0.457
Loss Time (sec):       16               Average Delay (sec/veh):         26.4
Optimal Cycle:         60               Level Of Service:                   C
*********************************************************************************
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:      L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:         Protected        Protected         Protected         Protected
Rights:            Include          Include           Include           Include
Min. Green:     5     5     5    5     5     5    5     5     5    5     5     5
Y+R:          4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0
Lanes:         1  0  0  1  0    0  1  0  0  1    1  0  1  1  0    1  0  1  1  0
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:      21    77    34    46    36   158   346   670    10    11   118    20
Growth Adj:  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
Initial Bse:   21    77    34    46    36   158   346   670    10    11   118    20
Added Vol:      0     0    44     0     0     0     0     0     0    15     0     0
PasserByVol:    0     0     0     0     0     0     0     0     0     0     0     0
Initial Fut:   21    77    78    46    36   158   346   670    10    26   118    20
User Adj:    1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
PHF Adj:     0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90  0.90
PHF Volume:    23    85    86    51    40   175   383   741    11    29   131    22
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:   23    85    86    51    40   175   383   741    11    29   131    22
PCE Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
MLF Adj:     1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
FinalVolume:   23    85    86    51    40   175   383   741    11    29   131    22
------------|----------------||----------------||----------------||----------------|
Saturation Flow Module:
Sat/Lane:    1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900  1900
Adjustment:  0.93  0.91  0.91  0.95  0.95  0.83  0.93  0.93  0.93  0.93  0.91  0.91
Lanes:       1.00  0.50  0.50  0.56  0.44  1.00  1.00  1.97  0.03  1.00  1.71  0.29
Final Sat.:  1769   856   867  1016   795  1583  1769  3479    52  1769  2959   501
------------|----------------||----------------||----------------||----------------|
Capacity Analysis Module:
Vol/Sat:     0.01  0.10  0.10  0.05  0.05  0.11  0.22  0.21  0.21  0.02  0.04  0.04
Crit Moves:  ****                          ****  ****                    ****
Green/Cycle: 0.05  0.19  0.19  0.10  0.24  0.24  0.46  0.45  0.45  0.11  0.09  0.09
Volume/Cap:  0.26  0.52  0.52  0.52  0.21  0.47  0.47  0.47  0.47  0.15  0.47  0.47
Delay/Veh:   47.3  38.0  38.0  46.0  31.0  33.8  19.0  19.5  19.5  41.1  44.0  44.0
User DelAdj: 1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00
AdjDel/Veh:  47.3  38.0  38.0  46.0  31.0  33.8  19.0  19.5  19.5  41.1  44.0  44.0
LOS by Move:    D     D     D     D     C     C     B     B     B     D     D     D
HCM2kAvgQ:      1     5     5     3     2     5     8     8     8     1     2     2
*********************************************************************************
Note: Queue reported is the number of cars per lane.
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                      San Diego Sediment Project
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                   Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #3 Sampson Street/Harbor Drive
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.339
Loss Time (sec):      16              Average Delay (sec/veh):        17.0
Optimal Cycle:        60              Level Of Service:                  B
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Y+R:         4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:       0  0  1! 0  0   0  0  1! 0  0   1  0  1  1  0   1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     17   30    45   12   21    16   75  622     5   20  145     5
Growth Adj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:  17   30    45   12   21    16   75  622     5   20  145     5
Added Vol:     0    0     0    0    0     0    0   44     0    0   15     0
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:  17   30    45   12   21    16   75  666     5   20  160     5
User Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:    0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90 0.90 0.90  0.90
PHF Volume:   19   33    50   13   23    18   83  738     6   22  177     6
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:  19   33    50   13   23    18   83  738     6   22  177     6
PCE Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:  19   33    50   13   23    18   83  738     6   22  177     6
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:   1900 1900  1900 1900 1900  1900 1900 1900  1900 1900 1900  1900
Adjustment: 0.86 0.86  0.86 0.87 0.87  0.87 0.93 0.93  0.93 0.93 0.93  0.93
Lanes:      0.18 0.33  0.49 0.24 0.43  0.33 1.00 1.99  0.01 1.00 1.94  0.06
Final Sat.:  303  535   803  404  706   538 1769 3508    26 1769 3417   107
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:    0.06 0.06  0.06 0.03 0.03  0.03 0.05 0.21  0.21 0.01 0.05  0.05
Crit Moves:      ****                            ****       ****
Green/Cycle: 0.18 0.18  0.18 0.18 0.18  0.18 0.32 0.61  0.61 0.05 0.34  0.34
Volume/Cap: 0.34 0.34  0.34 0.18 0.18  0.18 0.14 0.34  0.34 0.25 0.15  0.15
Delay/Veh:  36.5 36.5  36.5 35.1 35.1  35.1 24.1  9.7   9.7 47.2 23.3  23.3
User DelAdj: 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh: 36.5 36.5  36.5 35.1 35.1  35.1 24.1  9.7   9.7 47.2 23.3  23.3
LOS by Move:   D    D     D    D    D     D    C    A     A    D    C     C
HCM2kAvgQ:     3    3     3    2    2     2    2    6     6    1    2     2
********************************************************************************
Note: Queue reported is the number of cars per lane.
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #4 28th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.393
Loss Time (sec):	16	Average Delay (sec/veh):	22.4
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0 0	1!	0 0	1 0	1	1 0	1 0	1	1 0	1 0	2	0 1
Volume Module:												
Base Vol:	3	12	3	158	2	19	94	648	0	11	121	174
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	12	3	158	2	19	94	648	0	11	121	174
Added Vol:	0	0	0	0	0	2	20	24	0	0	13	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	3	12	3	158	2	21	114	672	0	11	134	174
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
PHF Volume:	3	13	3	177	2	23	128	752	0	12	150	195
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	13	3	177	2	23	128	752	0	12	150	195
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	3	13	3	177	2	23	128	752	0	12	150	195
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.95	0.93	0.80	0.80	0.93	0.93	0.95	0.93	0.93	0.83
Lanes:	0.16	0.67	0.17	1.00	1.00	1.00	1.00	2.00	0.00	1.00	2.00	1.00
Final Sat.:	301	1203	301	1769	1527	1527	1769	3538	0	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.01	0.01	0.01	0.10	0.00	0.02	0.07	0.21	0.00	0.01	0.04	0.12
Crit Moves:		****		****				****		****		
Green/Cycle:	0.14	0.05	0.05	0.24	0.14	0.14	0.20	0.50	0.00	0.05	0.35	0.35
Volume/Cap:	0.08	0.22	0.22	0.42	0.01	0.11	0.35	0.42	0.00	0.14	0.12	0.35
Delay/Veh:	37.2	46.9	46.9	33.1	36.7	37.5	34.7	15.8	0.0	46.2	22.2	24.6
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	37.2	46.9	46.9	33.1	36.7	37.5	34.7	15.8	0.0	46.2	22.2	24.6
LOS by Move:	D	D	D	C	D	D	C	B	A	D	C	C
HCM2kAvgQ:	1	1	1	5	0	1	3	7	0	0	2	4

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #5 28th Street/Main Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.629
Loss Time (sec):	16	Average Delay (sec/veh):	33.3
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 1 1 0			1 0 1 1 0			1 0 1 1 0			1 0 1 1 0		
Volume Module:												
Base Vol:	20	438	112	295	312	43	96	177	32	42	89	170
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	438	112	295	312	43	96	177	32	42	89	170
Added Vol:	0	20	0	0	2	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	20	458	112	295	314	43	96	177	32	42	89	170
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	21	490	120	316	336	46	103	190	34	45	95	182
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	21	490	120	316	336	46	103	190	34	45	95	182
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	21	490	120	316	336	46	103	190	34	45	95	182
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.90	0.90	0.93	0.91	0.91	0.93	0.91	0.91	0.93	0.84	0.84
Lanes:	1.00	1.61	0.39	1.00	1.76	0.24	1.00	1.69	0.31	1.00	1.00	1.00
Final Sat.:	1769	2760	675	1769	3056	418	1769	2927	529	1769	1596	1596
Capacity Analysis Module:												
Vol/Sat:	0.01	0.18	0.18	0.18	0.11	0.11	0.06	0.06	0.06	0.03	0.06	0.11
Crit Moves:		****		****			****					****
Green/Cycle:	0.18	0.28	0.28	0.28	0.39	0.39	0.09	0.15	0.15	0.12	0.18	0.18
Volume/Cap:	0.07	0.63	0.63	0.63	0.28	0.28	0.63	0.42	0.42	0.21	0.33	0.63
Delay/Veh:	34.4	32.6	32.6	33.8	21.1	21.1	51.3	38.8	38.8	40.3	35.9	40.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.4	32.6	32.6	33.8	21.1	21.1	51.3	38.8	38.8	40.3	35.9	40.7
LOS by Move:	C	C	C	C	C	C	D	D	D	D	D	D
HCM2kAvgQ:	1	9	9	8	4	4	4	4	4	1	3	6

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #6 28th Street/Boston Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.485
Loss Time (sec):	16	Average Delay (sec/veh):	25.9
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	6	528	207	213	657	33	35	171	9	7	6	27
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	528	207	213	657	33	35	171	9	7	6	27
Added Vol:	0	20	0	0	2	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	6	548	207	213	659	33	35	171	9	7	6	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	6	592	224	230	712	36	38	185	10	8	6	29
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	592	224	230	712	36	38	185	10	8	6	29
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	592	224	230	712	36	38	185	10	8	6	29
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	0.83	0.93	0.92	0.92	0.93	0.97	0.97	0.93	0.86	0.86
Lanes:	1.00	2.00	1.00	1.00	1.90	0.10	1.00	0.95	0.05	1.00	0.18	0.82
Final Sat.:	1769	3538	1583	1769	3346	168	1769	1757	92	1769	297	1336
Capacity Analysis Module:												
Vol/Sat:	0.00	0.17	0.14	0.13	0.21	0.21	0.02	0.11	0.11	0.00	0.02	0.02
Crit Moves:		****		****				****		****		
Green/Cycle:	0.11	0.33	0.33	0.26	0.47	0.47	0.13	0.21	0.21	0.05	0.13	0.13
Volume/Cap:	0.03	0.51	0.43	0.51	0.45	0.45	0.17	0.51	0.51	0.09	0.17	0.17
Delay/Veh:	39.7	27.5	26.8	32.9	17.9	17.9	39.2	36.3	36.3	45.7	39.2	39.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	39.7	27.5	26.8	32.9	17.9	17.9	39.2	36.3	36.3	45.7	39.2	39.2
LOS by Move:	D	C	C	C	B	B	D	D	D	D	D	D
HCM2kAvgQ:	0	7	5	6	8	8	1	6	6	0	1	1

Note: Queue reported is the number of cars per lane.

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-------------------------------------------------------------------------------
                        San Diego Sediment Project
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
                 Unknown Method (Future Volume Alternative)
*******************************************************************************
Intersection #7 28th Street/I-5 southbound ramp
*******************************************************************************

*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:      Uncontrolled     Uncontrolled     Uncontrolled     Uncontrolled
Rights:          Include          Include          Ignore           Include
Min. Green:    5    5     5    5    5     5    5    5     5    5    5     5
Lanes:       0  0  2  0  0    0  0  1  1  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      0  587     0    0  381     0    0    0   526    0    0     0
Growth Adj:  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
Initial Bse:   0    0     0    0    0     0    0    0     0    0    0     0
Added Vol:     0   20     0    0    0     0    0    0     2    0    0     0
PasserByVol:   0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:   0    0     0    0    0     0    0    0     0    0    0     0
User Adj:    0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
PHF Volume:    0    0     0    0    0     0    0    0     0    0    0     0
Reduct Vol:    0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   0    0     0    0    0     0    0    0     0    0    0     0
PCE Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
MLF Adj:     0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00  0.00 0.00  0.00
FinalVolume:   0    0     0    0    0     0    0    0     0    0    0     0
Critical Gap Module: >> Population:0 << >> Run Speed(N/S): 30 MPH <<
Critical Gp:  0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0   0.0  0.0   0.0
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   0    0     0    0    0     0    0    0     0    0    0     0
Potent Cap.:   0    0     0    0    0     0    0    0     0    0    0     0
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
LOS by Move:
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.:   0    0     0    0    0     0    0    0     0    0    0     0
*******************************************************************************
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--------------------------------------------------------------------------------
                        San Diego Sediment Project
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                    Level Of Service Computation Report
          2000 HCM Operations Method (Future Volume Alternative)
********************************************************************************
Intersection #8 28th Street/National Avenue
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):         0.731
Loss Time (sec):      16               Average Delay (sec/veh):        31.3
Optimal Cycle:        74               Level Of Service:                  C
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Y+R:          4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0  4.0  4.0   4.0
Lanes:        0  1  0  1  0    0  0  1! 0  0    1  0  1  1  0    1  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      33   76    38    74  171   105   136  412    82   127  347   179
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   33   76    38    74  171   105   136  412    82   127  347   179
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   33   76    38    74  171   105   136  412    82   127  347   179
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.97 0.97  0.97  0.97 0.97  0.97  0.97 0.97  0.97  0.97 0.97  0.97
PHF Volume:    34   79    39    77  177   109   141  426    85   131  359   185
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   34   79    39    77  177   109   141  426    85   131  359   185
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   34   79    39    77  177   109   141  426    85   131  359   185
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  0.73 0.73  0.73  0.84 0.84  0.84  0.93 0.91  0.91  0.93 0.93  0.93
Lanes:       0.45 1.03  0.52  0.21 0.49  0.30  1.00 1.67  0.33  1.00 0.66  0.34
Final Sat.:   619 1426   713   338  781   479  1769 2877   573  1769 1166   601
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.06  0.06  0.23 0.23  0.23  0.08 0.15  0.15  0.07 0.31  0.31
Crit Moves:                        ****        ****                   ****
Green/Cycle: 0.31 0.31  0.31  0.31 0.31  0.31  0.11 0.35  0.35  0.18 0.42  0.42
Volume/Cap:  0.18 0.18  0.18  0.73 0.73  0.73  0.73 0.42  0.42  0.42 0.73  0.73
Delay/Veh:   25.3 25.3  25.3  36.3 36.3  36.3  56.5 24.8  24.8  37.5 27.9  27.9
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:  25.3 25.3  25.3  36.3 36.3  36.3  56.5 24.8  24.8  37.5 27.9  27.9
LOS by Move:    C    C     C     D    D     D     E    C     C     D    C     C
HCM2kAvgQ:      2    2     2    11   11    11     6    6     6     4   15    15
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #9 I-5 northbound ramps/National Avenue

Cycle (sec):	100	Critical Vol./Cap.(X):	0.526
Loss Time (sec):	12	Average Delay (sec/veh):	18.8
Optimal Cycle:	60	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Ignore			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 1 0 1			0 0 1 0 0		
Volume Module:												
Base Vol:	313	0	123	0	0	0	0	486	44	0	321	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	313	0	123	0	0	0	0	486	44	0	321	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	313	0	123	0	0	0	0	486	44	0	321	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.00	0.95	0.95	0.95
PHF Volume:	331	0	130	0	0	0	0	514	0	0	339	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	331	0	130	0	0	0	0	514	0	0	339	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
FinalVolume:	331	0	130	0	0	0	0	514	0	0	339	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	1.00	0.83	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
Final Sat.:	1769	0	1583	0	0	0	0	1862	1900	0	1862	0
Capacity Analysis Module:												
Vol/Sat:	0.19	0.00	0.08	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.18	0.00
Crit Moves:	****							****				
Green/Cycle:	0.36	0.00	0.36	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.52	0.00
Volume/Cap:	0.53	0.00	0.23	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.35	0.00
Delay/Veh:	26.4	0.0	22.8	0.0	0.0	0.0	0.0	16.1	0.0	0.0	14.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.4	0.0	22.8	0.0	0.0	0.0	0.0	16.1	0.0	0.0	14.0	0.0
LOS by Move:	C	A	C	A	A	A	A	B	A	A	B	A
HCM2kAvgQ:	8	0	3	0	0	0	0	10	0	0	6	0

Note: Queue reported is the number of cars per lane.

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--------------------------------------------------------------------------------
                          San Diego Sediment Project
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                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #10 I-5 southbound ramp/Boston Avenue
********************************************************************************
Average Delay (sec/veh):     10.6       Worst Case Level Of Service: E[ 49.2]
********************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign      Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        1  0  0  1  0   0  0  0  0  0   1  0  0  1  0   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        8   51    11     0    0     0   535   53    16     3   38    50
Growth Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:     8   51    11     0    0     0   535   53    16     3   38    50
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     8   51    11     0    0     0   535   53    16     3   38    50
User Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:      1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:      8   51    11     0    0     0   535   53    16     3   38    50
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:     8   51    11     0    0     0   535   53    16     3   38    50
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  6.4  6.5    6.2 xxxxx xxxx xxxxx   4.1 xxxx xxxxx   4.1 xxxx xxxxx
FollowUpTim:  3.5  4.0    3.3 xxxxx xxxx xxxxx   2.2 xxxx xxxxx   2.2 xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: 1200 1225     61  xxxx xxxx xxxxx    88 xxxx xxxxx    69 xxxx xxxxx
Potent Cap.:  204  179   1004  xxxx xxxx xxxxx  1508 xxxx xxxxx  1532 xxxx xxxxx
Move Cap.:    148  115   1004  xxxx xxxx xxxxx  1508 xxxx xxxxx  1532 xxxx xxxxx
Volume/Cap:  0.05 0.44   0.01  xxxx xxxx  xxxx  0.35 xxxx  xxxx  0.00 xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.2 xxxx xxxxx  xxxx xxxx xxxxx   1.6 xxxx xxxxx   0.0 xxxx xxxxx
Control Del: 30.7 xxxx xxxxx xxxxx xxxx xxxxx   8.7 xxxx xxxxx   7.4 xxxx xxxxx
LOS by Move:    D    *     *     *    *     *     A    *     *     A    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx    137  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx    2.0 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx
Shrd ConDel:xxxxx xxxx   51.6 xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx
Shared LOS:     *    *      F     *    *     *     *    *     *     A    *     *
ApproachDel:       49.2           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         E               *                *                *
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
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--------------------------------------------------------------------------------
                        San Diego Sediment Project
--------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM 4-Way Stop Method (Future Volume Alternative)
********************************************************************************
Intersection #13 Cleveland Street/24th Street
********************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):        0.323
Loss Time (sec):        0                Average Delay (sec/veh):       10.0
Optimal Cycle:          0                Level Of Service:                 B
********************************************************************************
Approach:       North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     5    5     5    5    5     5    5    5     5    5    5     5
Lanes:        1  0  0  1  0   1  0  1  0  1   0  1  0  1  0   0  1  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       2    2    27  173    3     8    7  311     4   28   95    36
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    2    2    27  173    3     8    7  311     4   28   95    36
Added Vol:      0    0     0    0    0     0    0    0     0    0    0     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    2    2    27  173    3     8    7  311     4   28   95    36
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     2    2    27  173    3     8    7  311     4   28   95    36
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:    2    2    27  173    3     8    7  311     4   28   95    36
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:    2    2    27  173    3     8    7  311     4   28   95    36
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       1.00 0.07  0.93 1.00 1.00  1.00 0.04 1.94  0.02 0.35 1.20  0.45
Final Sat.:   517   43   578  535  574   646   28 1255    16  213  752   298
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.05  0.05 0.32 0.01  0.01 0.25 0.25  0.25 0.13 0.13  0.12
Crit Moves:             ****  ****              ****             ****
Delay/Veh:    9.2  8.3   8.3 12.0  8.6   8.0  9.8  9.8   9.7  9.3  9.0   8.6
Delay Adj:   1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
AdjDel/Veh:   9.2  8.3   8.3 12.0  8.6   8.0  9.8  9.8   9.7  9.3  9.0   8.6
LOS by Move:    A    A     A    B    A     A    A    A     A    A    A     A
ApproachDel:         8.3             11.7              9.8              8.9
Delay Adj:          1.00             1.00             1.00             1.00
ApprAdjDel:          8.3             11.7              9.8              8.9
LOS by Appr:           A                B                A                A
AllWayAvgQ:   0.0  0.0   0.0  0.4  0.0   0.0  0.3  0.3   0.3  0.1  0.1   0.1
********************************************************************************
Note: Queue reported is the number of cars per lane.
********************************************************************************
```

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Future Volume Alternative)

Intersection #16 Tidelands Avenue/W. 32nd Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.096
Loss Time (sec):	0	Average Delay (sec/veh):	8.0
Optimal Cycle:	0	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Lanes:	0 0 1 0 0			1 0 0 1 0			1 0 1 0 1			1 0 1 0 1		
Volume Module:												
Base Vol:	0	5	0	2	10	7	67	19	0	2	2	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	5	0	2	10	7	67	19	0	2	2	2
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	5	0	2	10	7	67	19	0	2	2	2
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	5	0	2	10	7	67	19	0	2	2	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	5	0	2	10	7	67	19	0	2	2	2
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	5	0	2	10	7	67	19	0	2	2	2
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	0.00	1.00	0.59	0.41	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	0	738	0	671	463	324	701	777	914	674	743	869
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.01	xxxx	0.00	0.02	0.02	0.10	0.02	0.00	0.00	0.00	0.00
Crit Moves:		****				****	****			****		
Delay/Veh:	0.0	7.8	0.0	8.0	7.3	7.3	8.3	7.4	0.0	8.0	7.5	6.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	7.8	0.0	8.0	7.3	7.3	8.3	7.4	0.0	8.0	7.5	6.8
LOS by Move:	*	A	*	A	A	A	A	A	*	A	A	A
ApproachDel:		7.8			7.4			8.1			7.4	
Delay Adj:		1.00			1.00			1.00			1.00	
ApprAdjDel:		7.8			7.4			8.1			7.4	
LOS by Appr:		A			A			A			A	
AllWayAvgQ:	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0

Note: Queue reported is the number of cars per lane.

```
-------------------------------------------------------------------------------
                       San Diego Sediment Project
-------------------------------------------------------------------------------
                   Level Of Service Computation Report
         2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #29
*******************************************************************************
Average Delay (sec/veh):       0.0       Worst Case Level Of Service: A[  0.0]
*******************************************************************************
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  0  0  0   0  0  1  0  0   0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    0    0     0    0    0     0    0    0     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:    0    0     0    0    0     0    0    0     0    0    0     0
Added Vol:      0    0     0    0    0     0    0   44     0    0   15     0
PasserByVol:    0    0     0    0    0     0    0    0     0    0    0     0
Initial Fut:    0    0     0    0    0     0    0   44     0    0   15     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:     0    0     0    0    0     0    0   44     0    0   15     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
FinalVolume:    0    0     0    0    0     0    0   44     0    0   15     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *    *    *     *    *    *     *    *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *    *    *     *    *    *     *    *    *     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         *                *                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

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-------------------------------------------------------------------------------
                        San Diego Sediment Project
-------------------------------------------------------------------------------
                    Level Of Service Computation Report
          2000 HCM Unsignalized Method (Future Volume Alternative)
*******************************************************************************
Intersection #30
*******************************************************************************
Average Delay (sec/veh):      0.0       Worst Case Level Of Service: A[  0.0]
*******************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:          Include          Include          Include          Include
Lanes:        0  0  0  0  0   0  0  0  0  0   0  0  1  0  0   0  0  1  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     0    0     0     0    0     0     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     0    0     0     0    0     0     0    0     0
Added Vol:      0    0     0     0    0     0     0   44     0     0   15     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0    0     0     0    0     0     0   44     0     0   15     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0     0    0     0     0   44     0     0   15     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     0    0     0     0   44     0     0   15     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT   LT - LTR - RT   LT - LTR - RT   LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx           xxxxxx
ApproachLOS:         *                *                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
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San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #48 32nd Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.676
Loss Time (sec):	16	Average Delay (sec/veh):	34.4
Optimal Cycle:	66	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	93	459	146	210	154	76	155	540	44	25	113	300
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	93	459	146	210	154	76	155	540	44	25	113	300
Added Vol:	0	0	0	0	0	0	0	24	0	0	13	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	93	459	146	210	154	76	155	564	44	25	126	300
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.93	0.93	0.00	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
PHF Volume:	100	496	0	227	166	82	167	609	48	27	136	324
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	100	496	0	227	166	82	167	609	48	27	136	324
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	100	496	0	227	166	82	167	609	48	27	136	324
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.93	1.00	0.93	0.93	0.83	0.93	0.93	0.83	0.93	0.93	0.83
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1769	3538	1900	1769	3538	1583	1769	3538	1583	1769	3538	1583
Capacity Analysis Module:												
Vol/Sat:	0.06	0.14	0.00	0.13	0.05	0.05	0.09	0.17	0.03	0.02	0.04	0.20
Crit Moves:		****		****			****					****
Green/Cycle:	0.21	0.21	0.00	0.19	0.19	0.19	0.14	0.34	0.34	0.10	0.30	0.30
Volume/Cap:	0.27	0.68	0.00	0.68	0.25	0.27	0.68	0.50	0.09	0.15	0.13	0.68
Delay/Veh:	33.7	39.1	0.0	43.1	34.7	35.1	48.1	26.4	22.3	41.6	25.3	34.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	33.7	39.1	0.0	43.1	34.7	35.1	48.1	26.4	22.3	41.6	25.3	34.4
LOS by Move:	C	D	A	D	C	D	D	C	C	D	C	C
HCM2kAvgQ:	3	9	0	8	2	2	5	8	1	1	2	9

Note: Queue reported is the number of cars per lane.

San Diego Sediment Project

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #49 8th Street/Harbor Drive

Cycle (sec):	100	Critical Vol./Cap.(X):	0.551
Loss Time (sec):	16	Average Delay (sec/veh):	27.3
Optimal Cycle:	60	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Ignore			Ignore			Ignore		
Min. Green:	5	5	5	5	5	5	5	5	5	5	5	5
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	1 0	1	1 0	2 0	1	2 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	53	313	127	32	42	65	337	748	17	22	118	32
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	53	313	127	32	42	65	337	748	17	22	118	32
Added Vol:	0	0	0	0	0	0	0	24	0	0	13	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	53	313	127	32	42	65	337	772	17	22	131	32
User Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.00	0.90	0.90	0.00	0.90	0.90	0.00
PHF Volume:	59	347	141	36	47	0	374	857	0	24	145	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	59	347	141	36	47	0	374	857	0	24	145	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	59	347	141	36	47	0	374	857	0	24	145	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.98	0.83	0.93	0.93	1.00	0.90	0.93	1.00	0.93	0.93	1.00
Lanes:	1.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1769	1862	1583	1769	3538	1900	3432	3538	1900	1769	3538	1900
Capacity Analysis Module:												
Vol/Sat:	0.03	0.19	0.09	0.02	0.01	0.00	0.11	0.24	0.00	0.01	0.04	0.00
Crit Moves:		****		****				****		****		
Green/Cycle:	0.19	0.32	0.32	0.05	0.19	0.00	0.32	0.42	0.00	0.05	0.15	0.00
Volume/Cap:	0.18	0.58	0.28	0.40	0.07	0.00	0.34	0.58	0.00	0.28	0.28	0.00
Delay/Veh:	34.5	29.7	25.5	49.0	33.6	0.0	26.1	22.9	0.0	47.5	38.2	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.5	29.7	25.5	49.0	33.6	0.0	26.1	22.9	0.0	47.5	38.2	0.0
LOS by Move:	C	C	C	D	C	A	C	C	A	D	D	A
HCM2kAvgQ:	2	9	3	2	1	0	4	10	0	1	2	0

Note: Queue reported is the number of cars per lane.

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations	↰		↑↱		↰	↱			↰	↱		↱
Volume (vph)	34	3	187	26	115	10	6	3	6	134	2	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0			4.0	4.0		4.0
Lane Util. Factor	1.00		0.95		1.00	1.00			1.00	0.95		0.95
Frt	1.00		0.98		1.00	0.93			1.00	0.99		0.85
Flt Protected	0.95		1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (prot)	1770		3472		1770	1730			1770	1751		1504
Flt Permitted	0.73		0.95		0.59	1.00			0.95	1.00		1.00
Satd. Flow (perm)	1365		3311		1104	1730			1770	1751		1504
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	37	3	205	29	126	11	7	3	7	147	2	85
RTOR Reduction (vph)	0	0	10	0	0	2	0	0	0	2	0	65
Lane Group Flow (vph)	37	0	227	0	126	19	0	0	7	156	0	11
Turn Type	pm+pt	Perm			pm+pt				Split			Perm
Protected Phases	7		4		3	8			2	2		
Permitted Phases	4	4			8							2
Actuated Green, G (s)	17.9		13.5		17.5	13.3			11.0	11.0		11.0
Effective Green, g (s)	17.9		13.5		17.5	13.3			11.0	11.0		11.0
Actuated g/C Ratio	0.24		0.18		0.24	0.18			0.15	0.15		0.15
Clearance Time (s)	4.0		4.0		4.0	4.0			4.0	4.0		4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0			3.0	3.0		3.0
Lane Grp Cap (vph)	357		609		301	313			265	262		225
v/s Ratio Prot	0.01				c0.02	0.01			0.00	c0.09		
v/s Ratio Perm	0.02		0.07		c0.08							0.01
v/c Ratio	0.10		0.37		0.42	0.06			0.03	0.60		0.05
Uniform Delay, d1	21.4		26.2		22.9	24.9			26.6	29.1		26.7
Progression Factor	1.00		1.00		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2	0.1		0.4		0.9	0.1			0.0	3.6		0.1
Delay (s)	21.6		26.6		23.9	25.0			26.7	32.8		26.8
Level of Service	C		C		C	C			C	C		C
Approach Delay (s)			25.9			24.0				30.7		
Approach LOS			C			C				C		

Intersection Summary			
HCM Average Control Delay	37.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	24.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR	SWL2	SWR	SWR2
Lane Configurations						
Volume (vph)	52	789	93	6	6	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	1583	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	57	867	102	7	7	1
RTOR Reduction (vph)	0	0	72	0	1	0
Lane Group Flow (vph)	57	867	30	7	7	0
Turn Type	Split		Perm	Prot	custom	
Protected Phases	6	6		1		
Permitted Phases			6		5	
Actuated Green, G (s)	18.7	18.7	18.7	1.0	1.0	
Effective Green, g (s)	18.7	18.7	18.7	1.0	1.0	
Actuated g/C Ratio	0.25	0.25	0.25	0.01	0.01	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	451	902	403	24	22	
v/s Ratio Prot	0.03	c0.24		c0.00		
v/s Ratio Perm			0.02		c0.00	
v/c Ratio	0.13	0.96	0.08	0.29	0.32	
Uniform Delay, d1	21.1	27.0	20.8	35.8	35.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	21.0	0.1	6.7	8.2	
Delay (s)	21.2	48.0	20.9	42.5	44.1	
Level of Service	C	D	C	D	D	
Approach Delay (s)		43.8				
Approach LOS		D				
Intersection Summary						

Prepared for

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Water Quality

Technical Report

Shipyard Sediment Remediation Site
San Diego Bay, San Diego, CA

Prepared by

Keith Kroeger

Howard Cumberland

Geosyntec consultants

engineers | scientists | innovators

10875 Rancho Bernardo Road, Suite 200
San Diego, California 92127

4 May 2011

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1. INTRODUCTION

The proposed project is the dredging of sediment adjacent to shipyards in the San Diego Bay, the dewatering and possible solidification of the dredged material on-shore, potential treatment of decanted water and subsequent disposal to the San Diego Publically Owned Treatment Works (POTW), and the transport of the removed material to an appropriate landfill for disposal. The purpose of the project is to implement a Tentative Cleanup and Abatement Order (CAO) issued by the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board). The San Diego Water Board is the Lead Agency under the California Environmental Quality Act (CEQA) for the proposed project. The dredging will occur in an area of the Bay defined in the Tentative CAO. The San Diego Water Board is considering the use of one or more staging sites for the dewatering and treatment of the dredged material, as further described in this project description. The sediment remediation footprint and the optional staging sites comprise the project site for the purpose of this study.

This report evaluates the potential water quality impacts from dredging and dewatering activities that may include turbidity, potential for contaminant release, discharge of elutriate water from the barge, and discharge of water from the upland dewatering staging area(s). Mitigation measures are proposed to reduce impacts to water quality from the proposed actions to less than significant. The baseline characteristics of the site are based primarily on previous investigations which have been performed in the project area to define the extents of environmental impacts. These investigations are available for review at the San Diego Water Board offices.

There are two scheduling options for completion of the remedial action. The first scheduling option is expected to take 2 to 2.5 years to complete. Under this option, the dredging operations would occur for 7 months of the year and would cease from April through August during the endangered California least tern breeding season.

The second option is to implement the remedial plan with continuous dredging operations, which would be expected to take approximately 12.5 months to complete. Also assumed under this compressed schedule option is that dredging operations could proceed year-round, including during the breeding season of the endangered California least tern, which ranges from April through August of each year.

Both scheduling options would be followed by a period of post-remedial monitoring. The preferred schedule will be determined during the final design phase. However, both schedule options are included in the analysis for this technical study.

1.1 Project Location

The sediment removal site is located along the eastern shore of central San Diego Bay, extending approximately from the Sampson Street Extension on the northwest to Chollas Creek on the southeast, and from the shoreline out to the San Diego Bay main shipping channel to the west (Figure 1). The project consists of marine sediments in the bottom bay waters that contain elevated levels of pollutants above San Diego Bay background conditions. This area is hereinafter collectively referred to as the "Shipyard Sediment Site".

The Shipyard Sediment Site is more specifically bounded by the waters of R.E. Staite facility on the north, the 28th Street Pier on the south, the open waters and shipways of San Diego Bay on the west, and the shoreline of three leaseholds on the east (San Diego Gas & Electric Co., and two shipyard facilities on the east; the BAE Systems San Diego Ship Repair Facility [BAE Systems] and the National Steel and Shipbuilding Company Shipyard Facility [NASSCO]). The Shipyard Sediment Site (also referred to as the Proposed Remedial Footprint in the Draft Technical Report for Tentative CAO) is comprised of approximately 15.2 acres subject to dredging and 2.3 acres subject to clean sand cover, primarily under piers. The project consists of marine sediments in the bottom bay waters that contain elevated levels of pollutants above San Diego Bay background conditions.

The removal of the marine sediments will require upland areas for dewatering, solidification and stockpiling of the materials and potential treatment of decant waters prior to offsite disposal. Therefore, in addition to the open waters of the Shipyard Sediment Site, five upland areas have been identified by the San Diego Water Board as Potential Sediment Staging Areas. Each of the potential staging areas has more defined usable areas, which are presented in Figure 2 and further described below.

- Staging Area 1 – 10th Avenue Marine Terminal and Adjacent Parking (approximately 49.66 potentially usable acres)

- Staging Area 2 – Commercial Berthing Pier and Parking Lots Adjacent to Coronado Bridge (approximately 11.66 potentially usable acres)

- Staging Area 3 – SDG&E/BAE Systems /BAE Systems and NASSCO Parking Lot (approximately 7.27 potentially usable acres)

- Staging Area 4 – NASSCO/NASSCO Parking and Parking Lot North of Harbor Drive (approximately 3.85 potentially usable acres)

- Staging Area 5 – 24th Street Marine Terminal and Adjacent Parking Lots (approximately 145.31 potentially usable acres)

1.2 Report Organization

The remainder of this report is organized as follows:

- Section 2, Existing Environmental Setting, presents the water quality-related regulatory setting, and background information on the current site conditions, including contaminated sediments in the remediation area and potential sediment staging areas identified for dewatering;

- Section 3, Project Impacts and Mitigation Measures, presents a summary of potential impacts and recommended mitigation measures for each impact; and

- Section 4, Cumulative Impacts, presents an evaluation of potential incremental impacts related to water quality that may be anticipated when the proposed project is conducted to other closely related past, present and reasonably foreseeable projects in the vicinity of the project site.

2. EXISTING ENVIRONMENTAL SETTING

This section describes the water quality-related regulatory requirements and environmental setting of the project, which includes the current existing contamination at the Shipyard Sediment Site.

2.1 Regulatory Setting

Clean Water Act. The Clean Water Act (CWA) is a comprehensive piece of legislation that generally includes reference to the Federal Water Pollution Control Act. Overall, the CWA seeks to protect the nation's water from pollution by setting water quality standards for surface water and by limiting the discharge of effluents into waters of the United States. These water quality standards are enforced by the U.S. Environmental Protection Agency (EPA). The CWA also provides for development of municipal and industrial wastewater treatment standards and a permitting system to control wastewater discharges to surface waters. The CWA is the primary federal statute governing the discharge of dredged and/or fill material into waters of United States. Relevant sections include the following:

- **Section 404.** The United States Army Corps of Engineers (ACOE) regulates discharge of dredged or fill material into waters of the United States under Section 404 of the CWA. Activities requiring Section 404 permits are limited to discharges of dredged or fill materials into the waters of the United States. The proposed project will require a 404 Permit from the ACOE for the discharge of dredged and fill materials from and into San Diego Bay.

- **Section 401.** Section 401 of the CWA specifies that any applicant for a federal license or permit to conduct any activity, including but not limited to the construction or operation of facilities that may result in any discharge into navigable waters, shall provide the federal licensing or permitting agency a certification from the State in which the discharge originates or will originate from the State agency with jurisdiction over those waters (San Diego Water Board) that the project will comply with water quality standards, including beneficial uses, water quality objectives, and the State Antidegradation Policy (State Water Resources Control Board Resolution No. 68-16). The proposed project will require a 401 Permit in order to obtain the 404 Permit from the ACOE for the disposal of dredged materials from San Diego Bay and for the discharge of clean sand cover fill to San Diego Bay.

- **Section 303(d).** Section 303(d) of the CWA requires identifying and listing those water bodies that are water quality impaired. Once a water body has been deemed impaired, a total maximum daily load (TMDL) must be developed for each impairing water quality constituent. A TMDL is an estimate of the total load of pollutants from point, nonpoint, and natural sources that a water body may receive without exceeding applicable water quality standards (often with a “factor of safety” included, which limits the total load of pollutants to a level well below that which could cause the standard to be exceeded). Once established, the TMDL is allocated among current and future dischargers into the water body. The receiving water for the project site, as described in greater detail below, is 303(d) listed and is considered impaired for specific constituents.

Rivers and Harbors Act. Section 10 of the Rivers and Harbors Act requires authorization from the ACOE for the construction of any structure in or over any navigable water of the United States, the excavation/or deposition of material in these waters, or any obstruction or alteration in “navigable water.” The proposed project will require a Section 10 Permit from the ACOE for the disposal of dredged material.

Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972. Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 requires authorization from the ACOE for the transportation of dredged material for the purpose of disposal in the ocean, where it is determined that the disposal will not unreasonably degrade or endanger human health, welfare, or amenities; the marine environment or ecological systems; or economic potentialities. A Section 103 permit will not be required because the material is planned to be disposed at an upland landfill. However, if material was tested and found to be suitable for open water ocean disposal, and an ocean plan was approved by the San Diego Water Board, a Section 103 permit would be required.

Porter-Cologne Water Quality Control Act. The federal CWA places the primary responsibility for the control of water pollution and for planning the development and use of water resources within the states, although it does establish certain guidelines for states to follow in developing their programs.

California’s primary statute governing water quality and water pollution is the Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The Porter-Cologne Act grants the State Water Resources Control Board (State Water Board) and the Regional Water Quality Control Boards (Regional Water Boards) broad powers to protect water quality and is the primary vehicle for implementation of California's responsibility under the federal CWA. The Porter-Cologne Act grants the State Water Board and Regional Water Boards the authority and responsibility to adopt plans and policies, to regulate discharges to surface and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substance, sewage, oil, or petroleum product.

California Ocean Plan. The State Water Board has adopted a Water Quality Control Plan (WQCP) for ocean waters of California called the California Ocean Plan. With the exception of wildlife habitat, the Ocean Plan identifies the same beneficial uses as the WQCB for the San Diego Basin (Basin Plan). The Ocean Plan has similarly established water quality objectives for bacteriological, physical, chemical, radioactive, and biological characteristics. The Ocean Plan also incorporates general requirements for the management of wastes discharged directly into the ocean, effluent quality requirements for waste discharges directly into the ocean, discharge prohibitions, and general provisions. The Ocean Plan is incorporated by reference into the Basin Plan.

Water Quality Control Plan for the San Diego Basin. The Basin Plan is designated to preserve and enhance water quality and protect the beneficial uses of all regional waters (San Diego Water Board, 1994). The Basin Plan is the State implementation of the Federal the Clean Water Act provisions for water quality planning and management contained in 40 CFR 130 and 40 CFR 131. Division 7 of the California Water Code (the Porter-Cologne Act) establishes a regulatory program to protect water quality and to protect beneficial uses of state waters (San Diego Water Board, 1994).

Clean Water Act, Section 303, List of Water Quality Limited Segments. Section 303(d) specifically requires the State to develop a list of impaired water bodies and subsequent numeric TMDLs for whichever constituents impair a particular water body. These constituents include inorganic and organic chemical compounds, metals, sediments, and biological agents. The TMDL is the total amount of a constituent that can be discharged while meeting water quality objectives and protecting beneficial uses. It is the sum of the individual load allocations for point-source inputs (e.g., an industrial plant), load allocations for nonpoint-source inputs (e.g., runoff from urban areas), and natural background, with a margin of safety (San Diego Water Board 2002).

NPDES General Construction Permit. Pursuant to the CWA Section 402(p), which requires regulations for permitting of certain stormwater discharges, the shipyards will require a statewide general NPDES Permit for stormwater discharges from the sediment dewatering staging areas. Under this Construction General Permit, stormwater discharges from construction sites with a disturbed area of one or more acres are required to either obtain individual NPDES permits for storm water discharges or be covered by the Construction General Permit. Coverage under the Construction General Permit is accomplished by completing and filing a Notice of Intent (NOI) with the San Diego water Board. Each Applicant under the Construction General Permit must ensure that a Stormwater Pollution Prevention Plan (SWPPP) is prepared prior to preparing the staging area(s), and is implemented during construction. The primary objective of the SWPPP is to identify, construct, implement, and maintain Best Management Practices (BMPs) to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site.

General Waste Discharge Requirements for Construction Non-Storm Water Discharges. General Waste Discharge Requirements (WDRs) (Dewatering General Permit) will be issued by the San Diego Water Board, which governs non-storm water, construction-related discharges from activities associated with the upland dewatering staging areas. This permit addresses discharges from activities such as dewatering, water line testing, and sprinkler system testing. The discharge requirements include provisions mandating notification, testing, and reporting of dewatering and testing-related discharges. The General WDRs authorize such construction-related discharges so long as all conditions of the permit are fulfilled.

2.2 Regional Site Conditions

San Diego Bay is a naturally formed, crescent-shaped embayment. It is separated from the Pacific Ocean by Silver Strand Peninsula, a long, narrow sand spit that extends from the City of Imperial Beach to North Island. The mouth of San Diego Bay is about 0.6 mile wide, and is aligned north-to-south between Point Loma and Zuniga Point. From the mouth of the Otay River to the tip of Point Loma, San Diego Bay is about 15 miles long, and varies from 0.2 to 3.6 miles in width. It is 17 square miles in area at Mean Lower Low Water (Wang et al. 1998). The outer half of San Diego Bay is narrow, averaging about 0.6 to 1.2 miles, while the inner half is much wider, averaging about 2.0 to 2.4 miles.

Prior to major filling activities, which began in 1888 and intensified just before and during World War II, San Diego Bay had an area of 21 to 22 square miles, as defined by the mean high tide line of 1918. About six square miles of San Diego Bay, or about 27 percent, have been filled, based on this high tide line (Smith 1976). Only 17 to 18 percent of the original San Diego Bay floor remains undisturbed by dredge or fill (Smith 1976).

Several major freshwater basins drain into San Diego Bay. These basins include the Sweetwater River, which drains to the south-central portion of San Diego Bay; Chollas Valley, which drains to the central portion of the Bay; and Otay River and Telegraph Canyon, which drain to southern San Diego Bay. In the winter, when San Diego County receives most of its precipitation, fresh water enters San Diego Bay via storm drains, urban runoff, streams, and flood control channels. In the summer, freshwater flows into San Diego Bay are minimal, and evaporation of water from the surface of the Bay increases. San Diego Bay is an “inverse” embayment, where evaporation exceeds freshwater inputs, creating a net inflow of ocean water.

Tides in San Diego Bay are classified as mixed diurnal/semi-diurnal, with the semidiurnal component dominant (Largier 1995). Generally, the tides in San Diego Bay consist of two low and two high tides per day on an approximately two-week, spring-neap tidal cycle that is associated with the phase of the moon. Tides do not follow a 24-hour cycle, so some days experience only three of the four tides within the calendar day.

Tidal exchange in San Diego Bay exerts control over the flushing of contaminants, salt and heat balance, and residence time of water (Chadwick 1997). The ebb and flood of tides mix ocean and San Diego Bay waters. Tides produce currents, induce changes in salinity, and alternately expose and wet portions of the shoreline. Tidal flushing and mixing are important for dispersing pollutants, maintaining water quality, and moderating water temperature that has been affected by exchange with the atmosphere or heating.

Primarily, water quality in north-central San Diego Bay is affected by tidal flushing and currents. Water quality also is influenced locally by freshwater inflows. Portions of San Diego Bay are listed as impaired water bodies under CWA Section 303[d] by the San Diego Water Board due to excessive concentrations of one or more contaminants (San Diego Water Board 2007). A total of 172 acres of San Diego Bay are designated as contamination hot spots, which are a management priority in the TMDL process. Hot spots are identified as having toxic sediments and degraded benthic communities, due to both point and non-point sources.

The 1997 National Sediment Quality Survey determined that San Diego Bay and offshore areas around San Diego appear to have the most significant sediment contamination within the EPA Region 9 (USEPA 1997). Major contaminants found in San Diego Bay include chlorinated hydrocarbons, polychlorinated biphenyls (PCBs), toxic components of petroleum hydrocarbons, polynuclear aromatic hydrocarbons (PAHs), heavy metals, and organotins such as tributyltin (DoN 1998). The Shipyard Sediment Site is listed on the CWA Section 303[d] list as San Diego Bay Shoreline, between Sampson and 28th Streets.

Beneficial uses of surface waters are designated under the CWA Section 303[d] in accordance with regulations contained in 40 CFR 131. San Diego Bay, as listed in the Basin Plan, has multiple designated beneficial uses. These designations address water quality, not the apportioning or consumption of the available resources. These long-term beneficial uses include: industrial service supply (IND), shellfish harvesting (SHELL), commercial and sport fishing (COMM), contact water recreation (REC-1), non-contact water recreations (REC-2), estuarine habitat (EST), marine habitat (MAR), wildlife habitat (WILD), preservation of biological habitats of special significance (BIOL), Rare/Threatened/Endangered Species (RARE), navigation (NAV), spawning, reproduction, and/or early development (SPWN), and migration of aquatic organisms (MIGR). An adverse effect or impact on a beneficial use occurs where there is an actual or threatened loss or impairment of that beneficial use. The Basin Plan is designed to preserve and enhance water quality and protect the beneficial uses of all regional waters. The Pacific Ocean is the sole receiving water for the proposed project site. The long-term beneficial uses for the Pacific Ocean include: aquaculture (AQUA), IND, SHELL, COMM, REC-1, REC-2, MAR, WILD, BIOL, RARE, NAV, SPWN, and MIGR.

Water quality characteristics (e.g., salinity, temperature, and dissolved oxygen [DO]) form a gradient within San Diego Bay: waters in northern San Diego Bay being similar to ocean conditions; waters in southern San Diego Bay being strongly affected by shallow depths, fresh water inflows, and insulation; and waters in central San Diego Bay being intermediate in character. The turbidity (i.e., the amount of particulate matter in suspension in the water column) of San Diego Bay waters is affected by phytoplankton blooms; inputs of fine sediments from surface runoff during and after storms; and sediment resuspension by winds, waves, and human activities. Consequently, an increase in turbidity can limit light penetration and the level of primary production. Turbidity in San Diego Bay varies both temporally and spatially.

Data collected for the Bay Protection Toxic Cleanup Program (Fairey et al., 1996) were used to place portions of San Diego Bay on the CWA Section 303[d] list. The mouth of

Chollas Creek, which discharges just south of the NASSCO leasehold, is listed for sediment toxicity and benthic community degradation. Chollas Creek consists of freshwater flow with elevated suspended solids containing significant chemical pollutants. Chollas Creek was placed on the CWA Section 303[d] List of Water Quality Limited Segments in 1996 for the metals cadmium, copper, lead and zinc. On 29 June 2005 the San Diego Water Board adopted a TMDL for metals in Chollas Creek. Urban runoff discharges from the City of San Diego's Municipal Separate Storm Sewer System (MS4) are considered to be one of the leading causes of receiving water quality impairments in the Chollas Creek Watershed. The designated beneficial uses for Chollas Creek are defined as REC-1, REC-2, WILD, and Warm Freshwater Habitat (WARM).

The CWA 303[d] listing of San Diego Bay Shoreline at the mouth of Chollas Creek extends from the weir downstream of the Belt Street Bridge, bounded on the north by the NASSCO pier and to the south by the Naval Base San Diego (NBSD) Pier 1, and extends to the end of the piers. The estimated total area is 15 acres.

2.3 Project Site Conditions

The NASSCO and BAE Systems leaseholds, portions of which lie in the Shipyard Sediment Site, are adjacent to each other, have a similar range of water depths, and lie within the same hydrologic and biogeographic area. The total combined San Diego Bay water acres included in the NASSCO and BAE Systems leaseholds is approximately 56 acres.

There are multiple potential sources of contaminants to San Diego Bay in the region of the Shipyard Sediment Site including: past activities at the shipyards, storm water drains that discharge into the shipyard leaseholds, nonpoint surface water discharge through Chollas Creek, surface water runoff from the roadway between the properties, fill material added to the shoreline, and accidental releases from ships.

As mentioned above in the regional settings section, there are three major freshwater basins that drain into San Diego Bay. The Chollas Valley basin drains to the central portion of the Bay, through Chollas Creek, which is located just south of the Shipyard Sediment Site. Chollas Creek, placed on the CWA Section 303[d] List of Water Quality Limited Segments in 1996 for metals, is known to discharge a plume that blankets the Shipyard Sediment Site (Exponent 2003). The plume carries suspended particles, and because of the high affinity of contaminants for particles, most of the toxic chemicals in the plume are likely to be attached to these suspended particles.

All of these sources can contribute toxic chemicals to the shipyard leaseholds and adjoining bay areas, thereby degrading overall water quality.

3. PROJECT IMPACTS AND MITIGATION MEASURES

This section outlines potential impacts and mitigation measures to be implemented based on information presented in the Tentative CAO and a general understanding of the marine environment in San Diego Bay. The potential water quality impacts to be evaluated for the project are from dredging, unloading of dredged material to onshore dewatering area, onshore dewatering, and under pier clean sand cover.

The San Diego Water Board identified constituents of primary concern (primary COCs), which are associated with the greatest exceedance of background and highest magnitude of potential risk at the Shipyard Sediment Site (San Diego Water Board 2010). A greater concentration relative to background suggests a stronger association with the Shipyard Sediment Site, and a higher potential for exposure reduction via remediation. Secondary contaminants of concern (secondary COCs) are contaminants with lower concentrations relative to background, and are highly correlated with primary COCs and would be addressed in a common remedial footprint. Based on these criteria, the primary COCs for the Shipyard Sediment Site are copper, mercury, HPAHs, PCBs, and Tributyltin (TBT), and the secondary COCs are arsenic, cadmium, lead, and zinc.

The potential water quality impacts to be evaluated for the project are from dredging, unloading of dredged material to onshore dewatering area(s), onshore dewatering, and under pier clean sand cover. These activities could lead to increased turbidity due to resuspension of sediment and release of primary and secondary COCs into the water column. In order to preserve and enhance water quality and protect the beneficial uses in the Bay, the potential impacts to water quality will be mitigated to meet the sediment and water quality objectives as defined in the Tentative CAO and the Basin Plan.

3.1 <u>Project Characteristics</u>

The shipyard site sediments are known to contain both primary and secondary COCs; therefore, water quality could be degraded during dredging and barge loading, resulting in potentially significant impacts to beneficial uses in San Diego Bay. The release of COCs from resuspended particulate material will be re-deposited and some resuspended contaminants may also dissolve into the water column and be available for uptake by biota.

Sediments are resuspended not only from the dredge bucket, but also by other mechanisms associated with dredging such as spillage, prop wash, and anchor systems.

Chemical release can occur when bed sediments are suspended in the water column and increased turbidity can itself degrade acceptable levels of habitat quality for organisms in the water column. Re-deposition may occur near the dredge area or, depending on the environmental conditions and controls, resuspended sediment may be transported to other locations in the water body. Further, sediment dredging activities are planned such that a sufficient volume of contaminated sediment is removed; however, removing all particles of contaminated sediment is neither practical nor feasible.

The impacts to water quality during the project as a result of resuspension of contaminated sediments and release of COCs from resuspended contaminated sediments are the following:

- Decrease in DO;
- Changes in pH;
- Turbidity (i.e., decrease in water clarity); and
- Toxicity to aquatic receptors.

In the event that one of more of these impacts described above occurs during the project, impairment and/or degradation to beneficial uses in San Diego Bay are possible. Potential impacts to water quality and measures to mitigate these impacts are discussed in the sections below.

3.2 Dredging Operations

There are two scheduling options for completion of the remedial action. The first scheduling option would occur for 7 months of the year and is expected to take 2 to 2.5 years to complete. The second scheduling option is continuous dredging operations expected to take approximately 12.5 months. Regardless of the selected scheduling option, sediment removal efforts will be followed by a period of post-remedial monitoring activities. The post-remediation monitoring requirements are part of the proposed project and are not mitigation for the remediation efforts.

Sediment will be dredged by mechanical means using an environmental clamshell bucket, such as the Cable Arm Environmental Clamshell®, and placed into sealed barges. Once filled, barges will be moved to an onsite pier or offsite staging area(s) within San Diego Bay identified by the San Diego Water Board. Prior to sediment unloading, a concrete-based reagent may be added to the sediment load in the barge to facilitate its dewatering and drying. The material will then be unloaded using a large track excavator equipped with a standard bucket and transferred to an onshore dewatering area to dry in preparation for hauling offsite. Once sufficiently dewatered, the material will be loaded onto trucks and be hauled to either a solid waste or hazardous waste landfill, depending on its characteristics. Under pier clean sand cover operations will likely be performed after sediment removal operations are fully completed. Clean sand cover activities include hydraulic placement of sand from a barge or from shore.

Water quality may be temporarily degraded during dredging by excess turbid water leaking/spilling over barge barriers back into the Bay. Exposing deeper subsurface sediments with potentially higher concentrations of COCs to the water column could result in long-term degradation of water quality if these sediments were to be left in place. Water quality impacts associated with contaminated suspended solids would be associated with the remobilization of sediment-bound contaminants. COCs released into the water column can potentially be transported out of the area by wave action or tidal currents.

Dredging operations should be configured to limit the turbidity caused by the actual sediment removal. By reducing the amount of turbidity (i.e., increased suspended solids) in the water column caused by dredging, the water quality impacts related to the release of contaminants bound to the dredged sediments will also be reduced. Therefore, the following discussion assumes that the potential impacts to water quality due to the effects of dredging operations (turbidity and release of COCs) are mitigated by implementing operational controls and physical water quality control elements.

During sediment removal operations, dredging and barge loading will include the following conditions that may potentially lead to impacts to water quality:

- Oil and/or fuel discharges from mechanical equipment;
- Operator overfilling bucket;
- Debris preventing the dredge bucket from fully closing;
- Vessel propeller wash during barge repositioning;
- Damage (e.g., ripping) of silt curtain during dredging;

- Overloading of the dredged material barge(s); and
- Spillage during loading.

3.2.1 Operational Controls

Dredging operations, as related to the project, will involve the use of a barge-mounted crane equipped with an environmental bucket such as the Cable Arm Environmental Clamshell®. The Cable Arm Environmental Clamshell® is equipped with vertical side plates that reduce sediment loss during bucket closing, flatter sediment cut reducing the potential for sediment resuspension caused by potholes, and indicator switches at the four corners (i.e., left, right, top, bottom) of the clamshell seal. The switches are positioned in these locations to inform the operator if and where the bucket is failing to close. By using a Cable Arm Environmental Clamshell®, the loss of sediments during dredging activities is reduced; however, there will be minimal releases of suspended solids and resuspension of sediment to the water column during dredging operations.

The dredge operators should use automatic rather than manual monitoring of the dredging operations, which will allow continuous data logging with automatic interpretation and adjustments to the dredging operations for real-time feedback for the dredge operator. Automatic systems should also be used to monitor turbidity and other water quality conditions in the vicinity of the dredging operations to facilitate real-time adjustments by the dredging operators to control temporary water quality effects. The automatic systems should include threshold level alarms so that the operator or other appropriate project personnel recognize that a particular system within the operation has failed. This alarm notification will reduce impacts as it will immediately be identified resulting in a shut down or modification of the operations.

Considering that drying the sediment so that it can be hauled away is the most critical activity in the process of moving the sediments from the barge to the dewatering area and ultimately to the landfill, the effective removal without spillage of the water is of key importance to the project. The dredge contractor shall ensure that free waters from the dredging process (loading the dredge material barge and offloading dredged material to onshore) does not re-enter the Bay, as this will be strictly prohibited.

The dredge contractor shall implement standard BMPs for minimizing resuspension, spillage, and misplaced sediment during dredging operations, as the deposition of such material would increase turbidity and compromise cleanup efforts. Such BMPs should include:

- The contractor shall not stockpile material on the bottom of the bay floor and shall not sweep or level the bottom surface with the bucket. This operational control will minimize impacts of turbidity as well as migration of impacted sediment into the surrounding areas.

- The contractor shall use and maintain silt curtains that enclose the area of dredging and shall minimize the times in which these curtains are temporarily opened, to contain suspended sediments.

- The contractor shall ensure the bucket is entirely closed when withdrawn from the water and moved to the barge. This action requires extra attention when debris is present to make sure debris does not prevent the bucket from completely closing. Two closure switches shall be on each side of the bucket near the top and bottom to provide an electrical signal to the operator that the bucket is closed. Use of the switches will minimize the potential of sediment leaking from the bucket into the water column during travel to the surface.

- The contractor shall not overfill the digging bucket because overfill results in material overflowing back into the water. Use of instrumentation such as Clamvision® will allow the operator to visualize in real time the depth of cut which should be designed to prevent overfilling and minimize impact to the water column.

- The contractor shall utilize wide pocket material barges having watertight containments to prevent return water from re-entering the Bay. The contractor shall not overfill the material barge to a point where overflow or spillage could occur. Each material barge shall be marked in such a way to allow the operator to visually identify the maximum load point. The marking should allow sufficient interior free board to prevent spillage in rough water such as ship wakes during transit. Initiating the material barge marking will minimize impact of load spillage during transit to the unloading area.

- The contractor shall not use weirs as a means to dewater the scow and shall allow additional room for sediment placement. Preventing this action will minimize the introduction of turbidity to the water column.

- The contractor shall place material in the material barge such that splashing or sloshing does not occur, which could send sediment back into the water. Splashing can be controlled by restricting the drop height from the bucket. This operational control will minimize the introduction of sediment, in the form of turbidity, into the water column as well as the creation of a decontamination hazard on the surface of the material barges.

- The contractor shall not wash the bucket or material barge over areas that were previously dredged, as this action could re-contaminate those areas. This operational control will minimize re-contamination of previously dredged areas.

- If the use of a grate to collect debris is required, the contractor shall not allow material to pile up on the grid and flow or slip from the grid back into the water. The debris scalper shall be positioned in such a way as to be totally contained on the shore side of the unloading operations. The dredge operator will visually monitor for debris build-up and alert the support personnel on the barge to assist in clearing the debris, as necessary. Debris that is derived from dredging activities will be removed from the grate by the clamshell bucket and placed in a contained area on the dredge barge or in a second material barge for subsequent removal to the onshore dewatering facility.

- The contractor shall restrict barge movement and work boat speeds (i.e., reducing propeller wash) in the dredge area. The remedial design should identify the various areas where this operational control should be used. The use of this operational control will minimize the impact of resuspension into the water column by propeller wash.

Accidental oil or fuel spills that could potentially occur during the proposed dredging operations could impair and/or degrade water quality in the bay, depending on the severity of the spill. Such events are likely to be localized spills of lighter, refined diesel fuels, gasoline, and lubricating oils that are highly toxic to marine life. The potential for the occurrence of petroleum-product leaks or spills is low, but the potential for significant, long-term effect on marine resources is moderate to high.

As an operational control element, all oil and fuel shall be housed in a secondary containment structure to ensure if spilled or leaked it will be prevented from entering the water column. The inclusion and implementation of a Dredging Management Plan (DMP) containing Standard Operating Procedures (SOPs) for the project will assist the dredge contractor in preventing accidental spills and providing the necessary guidelines to follow in case of an oil or fuel spill. Together, these will reduce the potential for a significant long-term impact to less than significant. The DMP will include the following measures to prevent accidental oil/fuel spills during construction activities:

- Personnel involved with dredging and handling the dredged material will be given training on the potential hazards resulting from accidental oil and/or fuel spills. This operational control will provide the personnel with an awareness of the materials they are handling as well as the potential impact to the environment. This increased awareness will assist in minimizing impacts to the water column as a result of spills.

- All equipment will be inspected by dredge contractor personnel before starting the shift. These inspections are intended to identify typical wear or faulty parts that may contain oil or fuel. This operational control will minimize the potential of impacts during the operations by identifying potential impacts due to wear of important sub-systems.

- Personnel will be required to visually monitor for oil or fuel spills during construction activities. This operational control will minimize impacts associated with leaks or spills and will provide additional mitigation over the automatic systems identified above.

- In the event that a sheen or spill is observed, the equipment will be immediately shut down and the source of the spill identified and contained. Additionally, the spill will be reported to the applicable agencies presented in the DMP. This operational control will minimize impacts to the water quality both in volume and duration as the operations will be immediately shut down and the source of the impact will be identified and remedied.

- The shipyards currently have oil/fuel spill kits located at various locations onsite for routine ship repair operations. All personnel associated with dredging activities will be trained on where these spill kits are located, how to deploy the oil sorbent pads, and proper disposal guidelines. As an additional mitigation step, the dredging barge shall have a full complement of oil/fuel spill kits on board to allow for quick and timely implementation of spill containment.

- The use of oil booms will be deployed surrounding the dredging activities. In the event that a spill occurs, the oil and/or fuel will be contained within the oil boom boundary. This operational control will be the last line of defense against accidental oil/fuel spill occurrences. The oil boom shall be deployed along the entire length of the outer silt curtain.

In addition to providing SOPs to prevent accidental oil/fuel spills during construction activities, the DMP addresses several potential issues related to dredging and presents potential solutions. This includes the identification of dredging needs; a methodology and process for determining dredging priorities and scheduling; the feasibility and requirements for expedited permitting; Quality Assurance Protection Plan (QAPP) to comply with regulatory requirements; alternatives for control and operation of dredging equipment, and BMPs to implement in the event of equipment failure and/or repair.

Typical BMPs for equipment failure or repair include: communication to project personnel, proper signage and/or barriers alerting others of potentially unsafe conditions, all repair work shall be conducted on land and not over water, repair work involving use of liquids shall be performed with proper spill containment equipment (e.g., spill kit), and a contingency plan identifying availability of other equipment or subcontracting options. The use of operational controls will serve to mitigate this potential impact to water quality to less than significant. A regulatory oversight contractor may be used by the San Diego Water Board. The regulatory oversight contractor should be responsible for adherence to this operational control and such adherence should be verified by the San Diego Water Board.

3.2.2 Physical Water Quality Control Elements

3.2.1

3.2.2

3.2.2.1 Silt Curtains

As a supplemental protective measure, the contractor will also be required to institute physical water quality protection elements throughout the dredging process. The main physical measure used to contain the loss of suspended sediments from the dredging area will be the use of inner and outer boundary floating silt curtains deployed entirely around the dredging area at all times. Double silt curtains will be utilized for containment of the dredge area; configurations, technologies, and actual locations of silt curtains in relation to the dredge barge will be finalized during the design phase of the project. Figures 3 and 4 illustrate the two common configurations of dredge operations and silt curtains to minimize turbidity. Configurations shown in the figures are for illustrative purposes only.

The floating silt curtain will be comprised of connected lengths of Type III geotextile fabric. It is intended to supplement the operational controls described in the section above by helping to control and contain migration of (contaminated) suspended sediments at the water surface and at depth. This in turn will help protect surrounding submerged areas from accumulation of resuspended solids originating from the dredging work.

A continuous length of floating silt curtain will be arranged to fully enclose the dredging equipment and the scow barge being loaded with sediment. The silt curtain will be supported by a floating boom in open water areas (such as along the bayward side of the dredging areas). Along pier edges, the contractor will have the option of connecting the silt curtain directly to the structure. In either case, the contractor would be required to continuously monitor the silt curtain for damage, dislocation, or gaps and immediately fix any locations where it is no longer continuous or where it has loosened from its supports.

The bottom of the silt curtain shall be weighted with ballast weights or rods affixed to the base of the fabric. These weights are intended to resist the natural buoyancy of the geotextile fabric and lessen its tendency to move in response to currents. Extending the silt curtain further or all the way to the bay floor would be problematic and potentially counter-productive. This is because at lower tides the geotextile fabric would be in contact with sediments at the mudline, potentially folding up on the seabed; and when subsequently moved by current flow or lifted by rising tide it would cause increased sediment disturbance, generating an additional source of sediment resuspension and turbidity. Therefore, the floating silt curtain around the dredging unit will be deployed in a manner that includes a gap above the seafloor to allow for the tidal ranges and fluctuations, and to sufficiently allow for dredge operation. The outer silt curtain surrounding the remediation site shall be deployed in a manner dependent on site-specific conditions including, but not limited to, depth, current velocities, existing infrastructure for curtain deployment, and proximity of sensitive habitat (i.e., essential fish habitat).[1]

Where feasible and applicable, curtains will be anchored and deployed from the surface of the water to just above the substrate. If necessary, silt curtains with tidal flaps will be installed to facilitate curtain deployment in areas of higher flow. Additional curtains

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[1] United States Army Corps of Engineers: Engineer Research and Development Center. 2008. Technical Guidelines for Environmental Dredging of Contaminated Sediments. ERDC/EL TR-08-29.

may be required by resource agencies to isolate environmentally sensitive areas like essential fish habitat and eelgrass.

Air curtains may be used in conjunction with silt curtains to contain resuspended sediment, to enhance worker safety, and allow barges to transit into and out of the work area without the need to open and close silt curtain gates. Air curtains are formed by laying a perforated pipe along the mudline and pumping air continuously through the piping. The upwelling of the tiny bubbles to the surface of the water has the effect of preventing fine-grained sediments from passing across the line of the pipe.

. The use of silt curtains will effectively contain the resuspension of suspended sediments and prevent the dispersal of COCs outside the dredging area to a less than significant impact. Monitoring of water quality outside the silt curtains is discussed below in Section 3.2.2.2.

3.2.2.2 Water Quality Monitoring

In addition to the deployment of silt curtains, another supplemental protective measure to reduce impacts to water quality is physical monitoring. The Tentative CAO indicates that monitoring during remedial activities is required. Post-remediation monitoring is also required to verify that remaining pollutant concentrations in the sediments will not unreasonably affect beneficial uses in San Diego Bay (See Section 3.6). The post-remediation monitoring requirements are part of the proposed project and are not mitigation for the remediation efforts. The Tentative CAO requires that, prior to beginning remediation efforts, a Remedial Monitoring Plan (RMP) will be required to describe the remediation and monitoring activities. The RMP, as it pertains to potential impacts to water quality during construction activities, will describe the following, consistent with the Tentative CAO:

- Water quality monitoring to demonstrate that implementation of the selected remedial activities does not result in violations of water quality standards outside of the construction area.

- Sediment monitoring to confirm that the selected remedial activities have achieved target cleanup levels within the remedial footprint.

Water quality compliance will be predicated upon the Water Quality Control Plan for the San Diego Basin (i.e., the Basin Plan) turbidity objectives (Chapter 3, page 30) and DO objectives (Chapter 3, page 22), and will have specific compliance criteria based on comparisons with ambient conditions within San Diego Bay. Dissolved oxygen levels shall not be less than 5.0 mg/l during dredging activities.

Table 1 identifies the ambient turbidity levels within San Diego Bay and the corresponding turbidity criteria expressed as either a finite amount or percentage above ambient conditions.

Table 1 – Turbidity Compliance Criteria as per the Basin Plan

Ambient Turbidity	Compliance Criteria
0-50 NTU	20% over ambient turbidity levels
50-100 NTU	10 NTU
>100 NTU	10% over ambient turbidity levels

Water quality monitoring will be conducted using two methodologies: daily visual monitoring and enhanced water quality monitoring.

Visual Water Quality Monitoring

Daily visual monitoring will be conducted during construction activities (dredging and clean sand cover). A detailed worksheet describing both the visual turbidity plume as well as documenting all conditions and any additional debris encountered during the observational period will be reported on a daily basis. Photographs of operational elements of the dredging will also be taken to visually document conditions. All observer reports will be included in the Final Cleanup and Abatement Report.

During active dredging activities, the trained observer will conduct daily qualitative (visual) turbidity monitoring from a high vantage point to ensure water quality objectives for turbidity are not observed outside the silt curtains. If turbidity limits are exceeded, the observer has the authority to halt dredging activities to allow for additional BMPs to be implemented for turbidity containment. Following implementation of additional BMPs, visual turbidity monitoring will resume to ensure the effectiveness of the additional BMPs.

Enhanced Water Quality Monitoring

The Tentative CAO presents two methodologies to assess compliance of water quality monitoring goals during in-water construction activities. The two methodologies presented assume that silt curtains would not be deployed during in-water construction activities; therefore, the frequency of water quality measurements would be on a daily basis and the sample measurement locations would be on an arc around the dredge. Water quality monitoring requirements are discussed in further detail in the Draft Technical Report for the Tentative CAO No. R9-2011-0001 (San Diego Water Board 2010), and are summarized below.

In the event that silt curtains are not deployed during any phase of the in-water construction activities, enhanced water quality monitoring will be performed daily to obtain real-time data so that changes in water quality can be detected as they occur and resolution achieved. The enhanced water quality monitoring will evaluate turbidity levels (measured in Nephelometric Turbidity Units [NTUs]) and DO levels to demonstrate that remedy implementation does not result in violations of water quality standards outside the construction area specifically at a distance of 500 ft from the dredging activity as the point of compliance. As per the Tentative CAO, the frequency of water quality monitoring may be reduced if three days of daily monitoring (performed at the start of dredging activities) shows that no samples exceed water quality targets. In this event, water quality monitoring will be reduced from daily to weekly. Monitoring frequency will return to daily if a significant change in operations occurs.

As per the Tentative CAO, one of two methods may be employed for enhanced water quality monitoring if silt curtains are not deployed:

- A model of turbidity and synoptic measures developed for ambient conditions. The model will aid in determining if monitored turbidity would likely result in unacceptable water quality. Four samples will be collected from each of two arcs (250 ft and 500 ft from the dredge zone) for a total of eight samples from a depth of 10 ft below the water surface and compared to synoptic “ambient” measurements outside the construction area, including Bay conditions and effects of non-shipyard activities; or

- Synoptic real-time monitoring at two arcs (250 ft and 500 ft from the dredge zone) from a depth of 10 ft below the water surface and at ambient locations in the Bay. The 250 ft and 500 ft measurements will be compared to real-time ambient measurements to determine if an exceedance is observed (defined as more than the error rate of the monitors' measurement ability); appropriate corrective actions will be taken in the dredge area.

The samples collected, for either method selected, from the 250 ft arc are intended to warn of potential problems with the point of compliance at the 500 ft arc. If silt curtains are not deployed, the selection of the water quality monitoring method described above will be presented in the RMP. With respect to water quality, if turbidity or DO are not compliant at 250 ft, the construction activities will be adjusted to reduce turbidity and raise DO to achieve compliance. If turbidity or DO problems are found at 500 ft from the construction area, then remediation activities will be halted while BMPs and alternate remedial methods (i.e., equipment) are evaluated (San Diego Water Board 2010).

If silt curtains are deployed during in-water construction activities it is assumed that less frequent water quality measurements (once per week) would be required coupled with daily visual monitoring described above. The enhanced water quality monitoring program will include water quality observations taken at selected stations around the perimeter of the deployed silt curtains. Proposed sample stations based on predicted silt curtain configurations throughout the remedial project should be presented in the RMP. Monitoring of turbidity inside the outer silt curtain (of the double silt curtain) and outside (bayward) of the outer silt curtain shall be implemented. This operational control will allow all appropriate project personnel to effectively monitor the water quality as well as the overall removal operations. Weekly monitoring will be conducted during light hours at least one hour following the beginning of active dredging. The monitoring will evaluate inshore, offshore, and reference (ambient) turbidity levels (measured in NTUs) and DO.

Monitoring data will be partitioned into depth profiles for comparative purposes. The top depth profile will include those waters from the surface down to -2 meters, the middle depth profile will include all reading from -2 meters down to +2 meters from the bottom, and the bottom depth profile will include the bottom 2 meters. Accurate data collection and processing will be ensured by implementing real time data collection and extensive infield QA/QC. Depth profile averaged data will be compared to a reference station to determine compliance criteria.

If the quantitative monitoring indicates that a turbidity exceedance is detected (as per the compliance criteria presented in Table 1), water samples will be collected from the station that is out of compliance. Water samples will be collected at the depth at which the exceedance occurs (depth of maximum turbidity) and will be chemically analyzed for the primary and secondary COCs identified in the Tentative CAO. The primary COCs for the Shipyard Sediment Site are copper, mercury, HPAHs, PCBs, and TBT, and the secondary COCs are arsenic, cadmium, lead, and zinc. Analytical results will be included in the Final Cleanup and Abatement Report. Sediment monitoring during dredging activities is intended to confirm that remediation has achieved target cleanup levels within the remedial footprint. This confirmation sampling is necessary because sediment resuspension and chemical release are unavoidable during dredging (USACE 2008). Resuspended particulate material will be re-deposited and some resuspended contaminants may also dissolve into the water column and be available for uptake by biota.

As per the Tentative CAO, sediment monitoring will occur in footprint polygons (Figure 5) and will be implemented immediately after the dredging contractor has confirmed that dredge depths within the footprint area have been achieved. Confirmation sediment sampling will consist of surface (0 to 2 cm depth interval) sediment sample collection in each footprint polygon (San Diego Water Board 2010). Sediment concentrations in a horizon that represents the first undisturbed depth beneath the dredge depth will be measured. COCs that will be monitored and compared to background sediment chemistry levels include copper, mercury, HPAHs, TBT, and PCBs. The background sediment chemistry levels are presented in Table 2 and discussed in further detail in the Draft Technical Report for the Tentative CAO (San Diego Water Board 2010).

Table 2 – Background Sediment Chemistry Levels

Chemical of Concern	Background Sediment Chemistry Level[1]
Copper in mg/kg	121
Mercury in mg/kg	0.57
HPAHs[2] in µg/kg	663

PCBs[3] in µg/kg	84
Tributyltin in µg/kg	22

[1] Equal to the 2005 Reference Pool's 95% upper predictive limits shown in Section 18 of the Technical Report. The background levels for metals are based on the %fines:metals regression using 50% fines, which is conservative because the mean fine grain sediment at the Shipyard Investigation Site is 70% fines.

[2] HPAHs = sum of Fluoranthene, Perylene, Benzo(a)anthracene, Chrysene, Benzo(a)pyrene, and Dibenzo(a,h)anthracene.

[3] PCBs = sum of 41 congeners: 18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206.

The implementation of physical water quality monitoring coupled with control elements such as silt curtains and sediment and water quality monitoring will serve to mitigate potential impacts to water quality to less than significant levels.

3.3 Unloading Operations

The following conditions that may potentially lead to impacts to water quality during sediment unloading operations include:

- Overfilling of the unloading bucket; and
- Swinging the bucket from barge to truck.

At the sediment unloading area, the material barge is moored and the unloading operations begin. This sediment unloading operation is normally accomplished using one or more track mounted excavators (track mounted lattice boom cranes with buckets have also been employed). The types of buckets used for the sediment unloading operations range from standard open excavator buckets to hydraulically closed buckets, and in the case of a boom crane, a environmental clamshell bucket. During unloading operations, the excavator or crane will grab a volume of dredged material and swing from the barge to the trucks.

Overfilling of the unloading bucket is a common issue during the sediment unloading process. Depending on the specific unloading area, the space between the material barge and the dock/unloading surface where the excavator or crane is located can be rather wide, more than 4 ft. While the overfilled excavator bucket is swinging from the barge to the truck, passing over the space between the barge and dock, sediment could potentially spill out of the bucket into the water column. Sediment material that enters the water column can cause short-term increase in TSS locally, decrease DO, decrease water clarity, and potentially remobilize COCs in the water column, thereby degrading water quality. These impacts can impair and degrade beneficial uses in San Diego Bay.

Mitigation measures to compensate for overfilling the bucket should include the determination of the swing radius of the unloading equipment. Prior to mobilization, a steel plate should be placed between the material barge and the hardscape to prevent spillage from falling directly into the water. This “spill” plate shall be sufficiently large enough to cover the swing radius of the unloading equipment. The spill plate is designed to prevent any “drippings” from falling between the material barge and dock where the unloading equipment is stationed. The spill plate will be positioned so that any “dripped” material/water either runs back into the material barge or onto the unloading dock, which will be lined with an impermeable material and bermed to contain excess sediment/water. No water or sediment should re-enter the Bay, as this is strictly prohibited. As a secondary containment measure, filter fabric material can be placed over the spill plate and between edges of the barge and unloading dock to prevent any drippings from falling into the Bay. Upon completion of unloading a material barge, the spill plate will be thoroughly rinsed so that excess sediment is drained into the material barge or onto the unloading dock (depending on spill plate positioning) and then placed on the lined dock until the next unloading sequence.

A conceptual illustration of the spill plate configuration is shown in Figure 6. Additionally, implementing the following operational controls will mitigate the potential for spillage of sediment into the water column:

- The contractor shall ensure the bucket is entirely closed when withdrawn from the barge and moved to the truck. This action requires extra attention when debris is present to make sure debris does not prevent the bucket from completely closing.

- The contractor shall ensure the bucket is completely empty of sediment prior to being moved back to the barge to minimize sediment being spilled over the dock.

The use of operational controls and a spill plate will serve to mitigate this potential impact to water quality to less than significant. A regulatory oversight contractor may be used by the San Diego Water Board. The regulatory oversight contractor should be responsible for adherence to this operational control and such adherence should be verified by the San Diego Water Board.

3.4 Dewatering Operations

The conditions that may potentially lead to impacts to water quality during sediment onshore dewatering operations include:

- Breach in containment pad; and
- Improper disposal of decant water from containment cell.

Potential impacts to water quality associated with a breach in the pad containment is decant water flowing into the Bay causing turbid conditions, which can lower levels of DO, decrease water clarity, and increase existing concentrations of suspended solids. Additionally, if the decant water flowing back into the water column contains COCs, degradation of water quality can occur and increased toxicity to aquatic organisms is accentuated. These impacts can impair and degrade beneficial uses in the Bay. A breach in the dewatering pad could potentially occur if an excavator penetrates through the bottom of the pad while attempting to load sediment for transport.

Potential impacts to water quality associated with improper disposal of decant water from the containment cell is decant water exceeding City of San Diego requirements for discharge of waste water to the sanitary sewer system.

3.4.1 Mitigating a Breach in Dewatering Pad Containment from Excavator

The proper mitigation to this potential impact is the design and construction of an adequate decant water/stormwater containment area. The containment area shall consist of berms (k-rails and/or dry dock blocks) surrounding the area to mitigate for a potential breach in the pad that may lead to potential decant water/stormwater to the land adjacent to the dewatering containment area and potentially flowing into the Bay or into the water table. The area(s) adjacent to the dewatering containment cell may be unpaved; therefore, in the event of a breach in the cell, decant water may infiltrate through the ground surface and into the ground water. The containment cell should be designed so that stormwater run off/run on from adjacent areas to the cell cannot enter into the dewatering area.

To prevent a breach in the dewatering pad, the use of a savaging layer of sand to provide a visual indicator to the excavator operator that he/she is getting close to the containment liner, or the use of closely spaced k-rails and dry dock blocks at key points (i.e., corners) to prevent the operator from getting to the containment liner, should be designed and implemented. These methods would serve to mitigate this potential impact to water quality to less than significant because the equipment will be prevented from riding on the pad. A regulatory oversight contractor may be used by the San Diego Water Board. The regulatory oversight contractor should be responsible for adherence to this operational control and such adherence should be verified by the San Diego Water Board.

3.4.2 Mitigating Improper Disposal of Decant Water from the Sediment Drying/Dewatering Areas

The proper mitigation to this potential impact is routine testing of decant water prior to discharge to the sanitary sewer system. The containment area will consist of a small, depressed area (sump) within the dewatering cell. The containment cell will be designed to meet a performance standard of “no discharge” so that stormwater run off cannot enter the Bay or adjacent areas. The cell will also be designed to ensure that run on from adjacent areas to the cell cannot enter the dewatering area. The decant water will be collected in the sump in the depressed area and will be pumped to large capacity holding tanks. Prior to any discharge to the sanitary sewer system, the decant water will be analytically tested following the discharge requirements for the San Diego POTW.

If water samples were to exceed the City of San Diego requirements for discharge of waste water to the sanitary sewer system the water will be taken off site for treatment and subsequent disposal. The City of San Diego local limits are re-evaluated annually and are subject to change. The City of San Diego also has the authority to regulate other pollutants not listed under the standard local limit pollutants list based on historical site use and site-specific pollutants (i.e., PCBs). At the time of this report, the following pollutants are currently limited by the City of San Diego:

- pH (5-12.5)
- Oil and Grease (500 mg/L)
- Dissolved Sulfides (1.0 mg/L)
- Flash Point (>140˚F)
- Temperature (<150 ˚F)

- Cyanide (Total) (1.9 mg/L)
- Cadmium (1.0 mg/L)
- Chromium (5.0 mg/L)
- Copper (11.0 mg/L)
- Lead (5.0 mg/L)
- Nickel (13.0 mg/L)
- Silver (n/a)
- Zinc (24.0 mg/L)

Discharge times and flow rates at each staging area will be regulated by the City of San Diego under an industrial discharge permit so the sanitary sewer system does not become overloaded and that downgradient transfer stations and process facilities have the required capacity to accept the volume of water discharged.

An industrial and/or general construction stormwater permit may be required at each of the proposed staging areas. A SWPPP containing BMPs that defines how stormwater will be controlled in the containment area prior to discharge to the sewer system will be required. The SWPPP BMPs would include soil and erosion control (e.g., sloping, draining, and barriers) and good housekeeping (e.g., hazardous materials storage and handling and traffic control).

These methods would serve to mitigate this potential impact to water quality to less than significant.

3.5 <u>Water Quality Impacts Related to Under Pier Clean Sand Cover</u>

The conditions that may potentially lead to impacts to water quality during under pier clean sand cover operations include improper design of the sand cover thickness.

As presented in the Tentative CAO, portions of the remedial areas (2.4 ac) are located under piers and cannot be feasibly dredged without potential significant impacts to infrastructure. Therefore, it is assumed that a clean sand cover will be spread evenly in these under pier areas identified as containing contaminated sediments. It is assumed that the final engineering plan will be designed to illustrate where the sand cover will be placed in relationship to the anticipated dredge "cut" depths adjacent to the piers where covering will occur. It is assumed that the sand cover will not only be placed on top of the sediment under the piers, but also along the sides at an engineered slope designed to prevent lateral migration of contaminated sediment due to propeller wash, flow and tidal induced erosion. The source and type of sand required for the subaqueous cover will be presented in the final engineering plans.

Potential impacts to water quality could result from the improper design of the sand cover thickness and/or improper placement methods. An improperly designed sand cover thickness and placement methodology can cause turbid conditions and release contaminants into the water column by the following mechanisms:

- Failure to isolate contaminated sediments below the benthic environment;
- Failure to stabilize contaminated sediments to keep them from being re-suspended and transported to other areas; and
- Failure to reduce the transport (flux) of dissolved contaminants into the overlying water column.

Although a final engineering plan has not been developed, the clean sand cover thickness must be designed to prevent substantial bioturbation (mixing and overturning) of underlying contaminated sediments, erosion (e.g., propeller wash), and the upward chemical migration into the sand cover. The sand cover design will consider the uptake of bioaccumulative contaminants (i.e., PCBs) by aquatic organisms either directly from the sediments or by foraging on benthos. In order to eliminate this pathway for contaminant uptake, the in-situ cover should physically isolate the sediments from benthic or epibenthic organisms. To design a sand cover component for this function, the bioturbation potential of indigenous benthic infauna will be evaluated. The physical isolation component of the sand cover may include separate sub-components for isolation, bioturbation and consolidation. The sand cover should also be designed to stabilize the contaminated sediments being covered, and prevent them from being resuspended and transported offsite. The other function of this design component should be to make the sand cover itself resistant to erosion. Factors to consider during the design phase are propeller wash, flow and tidal induced erosion. To address chemicals, the sand cover design should consider advection and diffusion transport. Modeling migration should be used to obtain an estimate of the required thickness of granular sand cover material for chemical isolation.

During clean sand cover, the contractor should place the initial layers of the cover in thin lifts by hydraulically placing the material from a barge. This placement method reduces the vertical impact and lateral spreading of the cover material, thus reducing the potential for resuspending the contaminated surface sediments. Controlled placement also minimizes the mixing of cover and underlying sediment by allowing the sediment to slowly gain strength before subsequent layers are deposited. Operational controls such as silt curtains should be employed during the sand cover placement.

Turbidity resulting from sand cover placement is not expected to be substantial, since the material will be predominantly sandy material with fairly rapid settling rates, and is also typically confined to the immediate vicinity of the sand covering and is of short duration (minutes to several hours). However, the turbidity that typically results from dredging operations does pose a potential significant impact.

Water quality monitoring should be conducted during sand cover operations to measure DO and turbidity so that water quality impacts are mitigated to less than significant. Monitoring activities during sand covering should be described in the RMP as described in Section 3.2.2.2. Additionally, as part of the project and to comply with the Tentative CAO, post-remediation sampling activities should include testing of the sand cover integrity and sediment sampling adjacent to the under pier sand covered areas to confirm that the selected remedial activities have achieved target cleanup levels within the remedial footprint. Post-remediation sampling is described below in Section 3.6.

The design of a proper sand cover thickness, implementing controlled placement methods coupled with operational controls and physical monitoring activities, will serve to mitigate the potential impact to water quality to less than significant.

3.6 Post-Remediation Monitoring

The discussion of post-remediation monitoring is not intended to address potential significant impacts to water quality during dredging and clean sand cover activities. The discussion of post-remediation monitoring is intended to provide context to the overall remediation project and briefly describe how long-term water quality will be assessed at the Shipyard Sediment Site. The post-remediation monitoring requirements are part of the proposed project and are not mitigation for the remediation efforts.

As per the Tentative CAO, post-remediation monitoring will be required to be initiated at years two and five and potentially continue for a period of up to 10 years after remediation activities are completed. Therefore, a Post-Remedial Monitoring Plan

(PRMP) will be required to be submitted prior to initiation of the remedial cleanup activities. The PRMP will be designed to verify that remaining pollutant concentrations in the sediments will not unreasonably affect San Diego Bay beneficial uses.

For human health and aquatic dependent wildlife beneficial uses, post-remediation monitoring will include:

- Sediment chemistry monitoring to ensure that post-remediation surface-area weighted average concentrations (SWACs) are maintained at the site following cleanup. Analyses of surface sediment samples will include sediment bulk chemistry of the parameters PCBs, copper, mercury, HPAHs, and TBT, and sediment conventional parameters (e.g., grain size and Total Organic Carbon [TOC]).

- Sediment samples will undergo bioaccumulation testing using the 28-day *Macoma sp.* test.

As per the Tentative CAO, the frequency of sediment sampling and analyses (chemical, physical, and bioaccumulation) will occur at two and five years post-remediation and, depending on the results at year five post-remediation, may also occur at ten years post-remediation. The goals of the sediment chemistry monitoring are to demonstrate that the post-remedial site-wide SWACs are at or below threshold target levels for specific COCs. SWACs will be calculated as presented in the Draft Technical Report for the Tentative CAO (San Diego Water Board 2010).

The goals of bioaccumulation testing are to show decreasing bioaccumulation over time such that at two years' post-remediation, the average of stations sampled shows bioaccumulation levels below what was measured in the Shipyard SI Report (Exponent, 2003) and that this decreasing trend continues at year five post-remediation and, if determined necessary, at year ten post-remediation.

For aquatic life beneficial uses, post-remediation monitoring will include sediment chemistry, and toxicity bioassays to verify that post-remedial conditions have the potential to support a healthy benthic community (San Diego Water Board 2010). In addition, post-remediation monitoring will include benthic community condition assessments to evaluate the overall impact of remediation on the benthic community recolonization activities. The purpose of assessing benthic community conditions as part of post-remedy monitoring is to demonstrate the remediation will successfully create conditions that would be expected to promote re-colonization of a healthy benthic community.

4. CUMULATIVE IMPACTS

The evaluation of potential cumulative impacts of this project with other projects in and around San Diego Bay is the incremental impact of the project when added to other closely related past, present and reasonably foreseeable probable future projects. Although there are no other contaminated sediment dredging projects currently scheduled for implementation in the Bay, the San Diego Water Board anticipates that regularly scheduled maintenance dredging projects may occur in the Bay over the next several years.

To estimate the likely volume of these potential dredging actions, the San Diego Water Board has provided maintenance and environmental dredging records for the 11-year period from 1994 to 2005. These records show an average of approximately 245,000 cy of material was dredged from the Bay each year, with yearly totals ranging from 0 to 763,000 cy. While the dredge volume proposed for this project (approximately 143,400 cy) represents a significant dredge volume, the overall volume of impacts related to dredging projects in San Diego Bay is expected to be within these historical ranges and will not lead to significant cumulative impacts to water quality if appropriate mitigation measures are adopted as recommended above.

Because of the potential for a project involving contaminated sediment removal to occur concurrently with the Shipyard Sediment Site remedial effort in the next 10 years, discussions with the San Diego Water Board regarding a coordinated water quality monitoring effort and/or the sharing of water quality monitoring data should be initiated and continued throughout the duration of the project. Discussions should include distance(s) between sites and proposed timing of in-water activities that will involve potential impacts to water quality, selection of appropriate water quality reference sampling locations in the Bay, configuration of silt curtains, and coordination of expected commercial and recreational vessel traffic.

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Prepared for

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Hazards and Hazardous Materials

Technical Report

Shipyard Sediment Remediation Site
San Diego Bay, San Diego, CA

Prepared by

____
Brian Hitchens, P.G., C.Hg.

____
Howard L Cumberland

Geosyntec consultants

engineers | scientists | innovators

10875 Rancho Bernardo Road, Suite 200
San Diego, California 92127

4 May 2011

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Appendix

1. INTRODUCTION

The proposed project is the dredging of sediment adjacent to shipyards in San Diego Bay, the dewatering and possible solidification of the dredged material on-shore, potential treatment of decanted water, and the transport of the removed material to an appropriate landfill for disposal. The purpose of the project is to implement a Tentative Cleanup and Abatement Order (CAO) issued by the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board). The San Diego Water Board is the Lead Agency under the California Environmental Quality Act (CEQA) for the proposed project. The dredging will occur in an area of the Bay defined in the Tentative CAO. The San Diego Water Board is considering the use of one or more staging sites for the dewatering and treatment (dewatering) of the dredge material, as further described in Section 1.1. The sediment remediation footprint and the optional staging sites comprise the project site for the purpose of this study.

This Technical Report describes the hazards and hazardous materials identified at the site and hazardous conditions or releases that could potentially occur based on the project description. The full project description used as a basis to evaluate this project is attached to this Technical Report as Appendix A. A summary is provided below. Mitigation measures are proposed to reduce impacts associated with the potential release of hazardous materials into the environment to less than significant impacts. The baseline characteristics of the site are based primarily on previous investigations which have been performed in the project area to define the extents of environmental impacts. These investigations are available for review at the San Diego Water Board's office.

1.1 Project Description

The sediment removal site is located along the eastern shore of central San Diego Bay, extending approximately from the Sampson Street Extension on the northwest to Chollas Creek on the southeast, and from the shoreline out to the San Diego Bay main shipping channel to the west (Figure 1). The project consists of marine sediments in the bottom bay waters that contain elevated levels of pollutants above San Diego Bay background conditions. This area is hereinafter collectively referred to as the "Shipyard Sediment Site".

The Shipyard Sediment Site is more specifically bounded by the waters of R.E. Staite facility on the north, the 28th Street Pier on the south, the open waters and shipways of San Diego Bay on the west, and the shoreline of three leaseholds on the east (San Diego

Gas & Electric Co., and two shipyard facilities on the east; the BAE Systems San Diego Ship Repair Facility [BAE Systems] and the National Steel and Shipbuilding Company Shipyard Facility [NASSCO]). The Shipyard Sediment Site (also referred to as the Proposed Remedial Footprint in the Draft Technical Report for Tentative CAO) is comprised of approximately 15.2 acres subject to dredging and 2.3 acres subject to clean sand cover, primarily under piers. The project consists of marine sediments in the bottom bay waters that contain elevated levels of pollutants above San Diego Bay background conditions. The removal of the marine sediments will require upland areas for dewatering, solidification and stockpiling of the materials and potential treatment of decant waters prior to offsite disposal. Therefore, in addition to the open waters of the Shipyard Sediment Site, five upland areas and potentially usable acres at each site have been identified by the San Diego Water Board. Each of the potential staging areas has more defined usable areas, which are illustrated in Figures 2 through 7 and further described below.

- Staging Area 1 – 10th Avenue Marine Terminal and Adjacent Parking (approximately 50 potentially usable acres)
- Staging Area 2 – Commercial Berthing Pier and Parking Lots Adjacent to Coronado Bridge (approximately 12 potentially usable acres)
- Staging Area 3 – SDG&E/BAE Systems/BAE Systems and NASSCO Parking Lot (approximately 7 potentially usable acres)
- Staging Area 4 – NASSCO Parking and Parking Lot North of Harbor Drive (approximately 4 potentially usable acres)
- Staging Area 5 – 24th Street Marine Terminal and Adjacent Parking Lots (approximately 145 potentially usable acres)

1.1.1 Project Setting

The project site is located under the planning jurisdiction of the San Diego Unified Port District (Port District) and is identified as District 4 in the certified Port Master Plan. The Port District is a special government entity created in 1962 by the San Diego Unified Port District Act, California Harbors and Navigation Code, in order to manage San Diego Harbor and administer certain public lands along San Diego Bay. The Port District holds and manages as trust property on behalf of the People of the State of California, including the land occupied by NASSCO and BAE Systems. The Port Master Plan water use designation within the limits of the proposed project is Industrial – Specialized Berthing or Marine –Related Industrial.

San Diego Bay is designated as a State Estuary under section 1, Division 18 (commencing with section 28000) of the Public Resources Code. The San Diego Bay shoreline between Sampson and 28th Streets is listed on the Clean Water Act section 303(d) List of Water Quality Limited Segments for elevated levels of copper, mercury, zinc, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) in the marine sediment. These pollutants are impairing the aquatic life, aquatic-dependent wildlife, and human health beneficial uses designated for San Diego Bay. The northeast boundary of the Shipyard Sediment Site occupies this shoreline.

The principal structural components within the Shipyard Sediment Site include the concrete bulkheads, piers and dry dock facilities associated with the two shipyard facilities. Bathymetry at the Shipyard Sediment Site varies substantially due to the presence of shipways, dry docks, and berths and ranges from -2 feet Mean Lower Low Water (MLLW) along the bulkheads to -70 feet MLLW at the BAE Systems dry dock sump area.

The marine habitat within the Shipyard Sediment Site consists of open water containing both vegetated and unvegetated subtidal soft bottom habitats, pier pilings and bulkhead walls. The vegetated habitat species include sparse beds of eelgrass (*Zostera marina*). The entire extent of the Shipyard Sediment Site shoreline is artificially stabilized, generally consisting of a vertical sheet pile bulkhead and a seawall. The marine habitat types include vertical bulkhead walls and dock structures, vegetated and non-vegetated soft bottom subtidal habitats, and open water. These habitats support marine plants, invertebrates, and fishes.

The five potential staging areas consist primarily of leasehold lands and associated parking areas in the immediate vicinity of the Shipyard Sediment Site. The actual usable areas within each potential staging area are comprised of open, paved portions that could be used for the dewatering, solidifying and drying of the dredged marine sediments. Staging Areas 1 through 4 are located within the City of San Diego and are designated in the City’s General Plan as Industrial Employment. Staging Area 5 is located within the City of National City and is under the jurisdiction of the Port District. National City is currently updating their General Plan; the proposed Land Use designation for Staging Area 5 is governed by the San Diego Port Master Plan.

There are two scheduling options for completion of the remedial action. The first scheduling option is expected to take 2 to 2.5 years to complete. Under this option, the dredging operations would occur for 7 months of the year and would cease from April through August during the endangered California least tern breeding season.

The second option is to implement the remedial plan with continuous dredging operations, which would be expected to take approximately 12.5 months to complete. This scenario assumes that the dewatering, solidification and stockpiling of the materials would occur simultaneously and continuously with the dredging. Also assumed under this compressed schedule option is that dredging operations could proceed year-round, including during the breeding season of the endangered California least tern.

Both scheduling options would be followed by a period of post-remedial monitoring. The post-remediation monitoring requirements are part of the proposed project and are not mitigation for the remediation efforts. The preferred schedule will be determined during the final design phase. However, both schedule options are included in the analysis for the technical studies and the Program EIR.

1.2 Report Organization

The remainder of this Technical Report is organized as follows:

- Section 2, "Regulatory Framework and Regional Environmental Setting" presents background information on the current Shipyard Sediment Site conditions and regulatory framework for performing the proposed remedial actions and a summary of environmental conditions in the vicinity of the project site;

- Section 3, "Existing and Proposed Project Site Conditions" Describes the current physical and environmental setting of the project site.

- Section 4, "Project Impacts and Mitigation Measures" presents a summary of potential impacts and potential mitigation measures for each impact;

- Section 5, "Cumulative Impacts" presents an evaluation of potential cumulative impacts related to hazards and hazardous materials that may be anticipated if the proposed project is performed concurrently with other projects at and in the vicinity of the proposed Shipyard Sediment Site; and

- Section 6, "References" presents a list of references cited in this Technical Report.

2. REGULATORY FRAMEWORK AND REGIONAL ENVIRONMENTAL SETTING

The management of hazardous materials, worker safety, and safety of the public are regulated by both state and federal laws and regulations. These regulations are intended to mitigate risk related to handling, transport, and disposal of hazardous materials in addition to providing a framework for the Shipyard Sediment Site remediation process, and will regulate management of potentially hazardous material during the implementation of this project.

An environmental records review was compiled by Environmental Data Resources, Inc. (EDR) to identify locations with environmental impacts within 0.25 mile of the potential staging areas and the project site. Sites with potential hazardous conditions on or adjacent to the project site and the proposed potential dewatering locations were evaluated for compliance with the Cortese List requirements under CEQA as described below.

2.1 Cortese Lists

The "Cortese List" is a planning document used by the state, local agencies, and developers to comply with CEQA requirements to provide information about the location of hazardous materials release sites. The Cortese Lists are compiled annually by the State Water Board, the Department of Resources, Recovery, and Recycling, and the DTSC pursuant to Government Code section 65962.5. These lists are:

- The list of Hazardous Waste and Substances sites from DTSC's Envirostor Database;
- The List of Leaking Underground Storage Tank Sites from the Water Board's Geotracker Database;
- The list of solid waste disposal sites identified by the Department of Resources, Recovery, and Recycling with constituents above hazardous waste levels outside the waste management unit;
- A list of active Cease and Desist Orders and Cleanup and Abatement Orders from the Water Board; and
- A list of hazardous waste facilities subject to corrective action as identified by DTSC.

2.1.1 Review of Adjacent Hazardous Materials Sites

A comprehensive review of available environmental databases was performed by EDR including federal, state, and local hazardous waste records at or adjacent to the project site and the five potential dewatering areas (Appendix B). The Shipyard Sediment Site and potential staging areas are not on or adjacent to a listed site on the active Cortese list, which is compiled annually by the State Water Board, the Integrated Waste Board, and the DTSC pursuant to Government Code section 65962.5. However, there are 13 sites with historical Cortese listings within 0.25 mile of the project site:

- Continental Maritime
- BAE Systems San Diego Ship Repair
- ISP Alginates Inc.
- Silvergate Power Plant
- Chevron Service Station – 2351 Harbor Drive
- Arco San Diego Terminal – 2295 Harbor Drive
- Pro-Line Paints Company
- IMS Recycling Services, Inc.
- Markel Johnson – 2697 Main Street
- Eddie S. Specialists
- Giolzetti and Lulue
- Nex Gas 28th St.
- NASSCO Building 70

These sites are not included on the active Cortese list. This historical list documents sites with historical releases which have been evaluated or remediated such that they are no longer believed to be a source of potential impacts. As such, these sites are not considered to have the potential to impact the proposed sediment dredging project. The Shipyard Sediment Site is not located within an airport land use plan or in the vicinity of a private airstrip. Because the project site is located in an industrial area and is not adjacent to wildland areas, no potentially significant increase in risk due to wildland fires is identified resulting from the implementation of this project.

The combined EDR report was compiled for the project site and potential staging areas 1, 2, and 3, due to the close proximity of these areas (Appendix B). The following listings identified potential groundwater or soil impacts within 0.25 mile of these proposed staging areas:

- No sites on the current Cortese lists;
- 36 Sites on the Historical Cortese lists;
- 1 site on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list;
- 2 sites on the Federal Resource Conservation and Recovery Act Corrective Action Report (RCRA CORRACTS) list;
- 15 sites on the DTSC ENVIROSTOR database;
- 59 cases in the State Water Board leaking underground storage tank (LUST) system;
- 1 Solid Waste Landfill;
- 44 Spills, Leaks, Investigations, and Cleanups (SLIC) program sites;
- 64 sites currently under review by the San Diego County Site Assessment and Mitigation Program (SAM); and
- 68 California Hazardous Material Incident Report System (CHMIRS) Reports.

An EDR report was compiled for Staging Area 4 (Appendix B). The following listings identified potential groundwater and soil impacts within 0.25 mile of the proposed staging areas:

- No sites on the current Cortese list;
- 15 Sites on the Historical Cortese list;
- 2 sites on the DTSC ENVIROSTOR database;
- 20 cases in the State Water Board LUST system;
- 14 SLIC sites; and
- 38 CHMIRS Reports.

The staging, handling, and treatment (dewatering) of sediments in these areas will be in aboveground secondary containment units. These units will be constructed in asphalt paved areas with an underliner, if necessary to prevent infiltration. A savaging layer of sand is placed beneath the sediment to provide a visual indicator to the excavator operator that he/she is getting close to the containment liner, or closely-spaced railroad rails/k-rails are placed to shield the containment liner. It is anticipated that this sediment will be managed so as to not disturb or impact soils or groundwater. Therefore, the implementation of this proposed project is not anticipated to affect or be affected by local soil or groundwater impacts.

Staging Area 5 had an individual EDR report compiled (Appendix B). The following listings identified potential groundwater and soil impacts within 0.25 mile of the proposed staging areas:

- No sites on the current Cortese list;
- 8 sites on the Historical Cortese list;
- 18 cases in the State Water Board LUST system;
- 15 SLIC sites;
- 5 sites on the DTSC ENVIROSTOR database
- 1 Solid Waste Landfill;
- 21 sites currently under review by the SAM Program; and
- 7 CHMIRS sites.

The staging, handling, and treatment of sediments in these areas will be in aboveground secondary containment units and will be managed as to not disturb or impact soils or groundwater. Therefore, these local impacts to soil and groundwater are not anticipated to affect the implementation of the proposed project.

2.2 State and Regional Water Quality Control Boards

The State Water Resources Control Board sets statewide policy for the protection of surface and groundwater quality. The State Water Board oversees and coordinates the efforts of the nine San Diego Water Board agencies which implement and enforce water board policies on a regional level. Each regional board makes critical decisions for its region, including setting standards, issuing waste discharge requirements, determining compliance with those requirements, and taking appropriate enforcement actions.

The Porter-Cologne Act provides the State Water Resources Control Board and Regional Water Quality Control Boards with the authority to develop and enforce water quality standards within the state of California. California Water Code section 13304 authorizes the Regional Water Quality Control Boards to issue “Cleanup and Abatement” orders requiring a discharger to cleanup and abate waste, “Where the discharger has caused or permitted or threatened to cause or permit waste to be discharged or deposited where it is or probably will be discharged into waters of the state and creates or threatens to create a condition of pollution or nuisance.”

2.2.1 Water Quality Control Plan for the San Diego Basin

The water quality control plan for the San Diego Basin (Basin Plan) is designated to preserve and enhance water quality and protect the beneficial uses of all regional waters (San Diego Water Board, 1994). The Basin Plan is the state implementation of the Federal Clean Water Act provisions for water quality planning and management contained in 40 CFR 130 and 40 CFR 131. Division 7 of the California Water Code (the Porter-Cologne Act) establishes a regulatory program to protect water quality and to protect beneficial uses of state waters (San Diego Water Board, 1994). Certain statutory provisions contained in the Health and Safety Code, Fish and Game Code, Harbors and Navigation Code, and the Food and Agriculture Code supplement the water quality provisions of the California Water Code. The California Health and Safety Code (HSC) contains provisions for the regulation of hazardous waste and hazardous materials. The Harbors and Navigation Code has statutory provisions to prevent the unauthorized discharges of waste from vessels to surface waters. The Fish and Game Code has statutory provisions to prevent waste discharges deleterious to fish, plant, animal, or bird life (San Diego Water Board, 1994).

2.2.2 CEQA

The objective of CEQA is to provide full public disclosure of a project and to ensure that environmental factors are considered in the decision-making process. CEQA requires that all projects that may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, to prepare an Environmental Impact Report (EIR). The EIR records the scope of the applicant's proposal and analyzes its known potential environmental effects. The EIR must discuss any significant environmental effects which cannot be avoided if the project is implemented, and propose mitigation measures to minimize the impact of the project and project alternatives (San Diego Water Board, 1994).

2.3 DTSC

The Department of Toxic Substances Control (DTSC) protects California and its residents from exposure to hazardous wastes. DTSC operates programs regulating hazardous material management by: overseeing cleanups; preventing releases of hazardous waste by overseeing those who generate, handle, transport, store, and dispose of waste; taking enforcement actions against those who fail to manage hazardous waste properly; exploring and promoting means of preventing pollution, and encouraging reuse and recycling; evaluating soil, water and air sampling conducted at investigation and cleanup sites and developing new analytical methods; and practicing other environmental sciences, including toxicology, risk assessment, and technology development.

2.4 DEH

The San Diego County Department of Environmental Health (DEH) regulates, among other things, aboveground and underground storage tanks, monitoring wells, and medical and hazardous material and waste. In addition, the DEH also serves as the Solid Waste Local Enforcement Agency (LEA), and is responsible for regulating active and closed solid waste facilities.

2.5 Department of Resources Recycling and Recovery

The Department of Resources Recycling and Recovery (CalRecycle), formerly known as the Integrated Waste Management Board, is responsible for waste reduction and the management of materials to their highest and best use throughout the state. CalRecycle acts as the enforcement agency (EA) for the LEAs and has the authority to write and enforce compliance orders, corrective action orders, and cease and desist orders to ensure compliance at solid waste facilities.

2.6 US DOT

The U.S. Department of Transportation (US DOT) has the regulatory responsibility for the safe transport of hazardous materials by air, rail, highway, and water. The US DOT promulgated a national safety program to minimize the risks to life and property inherent in commercial transportation of hazardous waste. The US DOT also evaluates safety risks, develops and enforces standards for transporting hazardous material, educates shippers and carriers on proper handling and documentation procedures, investigates hazardous materials incidents and failures, and provides assistance to improve emergency response to incidents.

2.7 San Diego Unified Port District

The San Diego Harbor Police have jurisdiction for enforcing statutes within the Harbors and Navigation Code throughout the five member cities of the Port District, including San Diego Bay. These regulations include operation of vessels, boat safety, and navigation rules.

3. EXISTING AND PROPOSED PROJECT SITE CONDITIONS

The shipyard sediment remediation area is located along the eastern shore of central San Diego Bay and encompasses an area extending approximately from the Sampson Street Extension to the northwest and Chollas Creek to the southeast, and from the shoreline out to the San Diego Bay main shipping channel on the southwest (Figure 1). This area is referred to by the term "Shipyard Sediment Site" in this study.

The Shipyard Sediment Site is located on the eastern shore of central San Diego Bay, approximately one-half mile south of the Coronado Bridge and half the total distance into the Bay. The Shipyard Sediment Site encompasses a total combined 56 water acres of the NASCCO and BAE Systems leaseholds. These leaseholds are adjacent to each other, have a similar range of water depths, and lie within the same hydrologic and biogeographic area (Appendix A).

3.1 NASSCO Leasehold

NASSCO, a subsidiary of General Dynamics Company, owns and operates a full-service ship construction, modification, repair, and maintenance facility on 126 acres of tidelands property leased from the Port District on the eastern waterfront of central San Diego Bay, at 2798 Harbor Drive in San Diego, California. Shipyard operations have been conducted at this site over San Diego Bay waters or very close to the waterfront since at least 1960. Shipyard facilities operated over the years at the Shipyard Sediment Site have included concrete platens used for steel fabrication, a graving dock, shipbuilding ways, and berths on piers or land to accommodate the berthing of ships. An assortment of waste is generated at the facility, including spent abrasive, paint, rust, petroleum products, marine growth, sanitary waste, and general refuse.

Current Shipyard Sediment Site improvements include offices, shops, warehouses, concrete platens for steel fabrication, a floating dry dock, a graving dock, two shipbuilding ways, and five piers providing 12 berthing spaces (San Diego Water Board, 2010).

3.2 BAE Systems Leasehold

From 1979 to the present, Southwest Marine, Inc. and its successor BAE Systems have owned and operated a ship repair, alteration, and overhaul facility on approximately 39.6 acres of tidelands property on the eastern waterfront of central San Diego Bay. The facility, currently referred to as BAE Systems San Diego Ship Repair, is located on land leased from the Port District at 2205 East Belt Street, at the foot of Sampson Street in San Diego, California. Shipyard facilities operated over the years have included concrete platens used for steel fabrication, two floating dry docks, five piers, and two marine railways which, together with cranes, enable ships to be launched or repaired. An assortment of waste has been generated at the facility including spent abrasive, paint, rust, petroleum products, marine growth, sanitary waste, and general refuse. The business at the Shipyard Sediment Site has historically been ship repair and maintenance for the U.S. Navy and commercial customers (San Diego Water Board, 2010).

3.3 Sediment Quality in the Remediation Area

The San Diego Water Board compared sediment chemistry levels found at the Shipyard Sediment Site to various sediment quality guidelines (SQGs) as well as background reference sediment chemistry levels found in other parts of present-day San Diego Bay. The purpose of this comparison was to evaluate: 1) if sediment chemistry levels at the Shipyard Sediment Site exceeded background conditions in San Diego Bay; and 2) the potential threat to aquatic life from chemical pollutants detected in the marine sediment (San Diego Water Board, 2011).

In the human health risk assessment presented in the Appendix for Section 28 of the Draft Technical Report for Tentative CAO No. R9-2011-0001 (San Diego Water Board, 2010), the chemicals posing theoretical increased cancer risks include inorganic arsenic and PCBs. The chemicals posing theoretical increased non-cancer risks include cadmium, copper, mercury, and PCBs. Potential risk is also recognized to aquatic dependent wildlife from benzo(a)pyrene (a PAH), PCBs, copper, lead, mercury, and zinc.

3.3.1 Identification of Constituents of Concern

Primary Constituents of Concern (COCs) were defined by the San Diego Water Board in the Draft Technical Report Tentative CAO No. R9-2011-0001 (San Diego Water Board, 2010) as COCs meeting the following criteria:

- Greatest exceedance of background suggesting a strong association with the Shipyard Sediment Site;
- Highest magnitude of potential risk at the Shipyard Sediment Site; and

- Higher potential for exposure reduction via remediation.

Secondary COCs were defined as COCs meeting the following criteria:

- Lower concentrations relative to background suggesting a lower degree of association with the Shipyard Sediment Site; and

- Highly correlated with primary COCs and would be addressed in a common remedial footprint.

The results of the multiple-lines-of-evidence evaluation performed for the Shipyard Sediment Site resulted in the selection of the following primary COCs: copper, mercury, heavy-weight PAHs (HPAHs), PCBs and tributyltin (TBT). Secondary COCs are arsenic, cadmium, lead, and zinc.

3.3.2 Potential Health Effects Related to COCs

The Draft Technical Report for Tentative CAO No. R9-2011-0001 (San Diego Water Board, 2010) identified potential health effects related to the COCs identified in the dredge area as follows:

3.3.2.1 PCBs

The U.S. EPA (2000) has classified PCBs as "probable human carcinogens." Studies have suggested that PCBs may play a role in inducing breast cancer. Studies have also linked PCBs to increased risk for several other cancers including liver, biliary tract, gall bladder, gastrointestinal tract, pancreas, melanoma, and non-Hodgkin's lymphoma. PCBs may also cause non-carcinogenic effects, including reproductive effects and developmental effects (primarily to the nervous system). According to U.S. EPA (2000), "some human studies have also suggested that PCB exposure may cause adverse effects in children and developing fetuses while other studies have not shown effects. Reported effects include lower IQ scores, low birth weight, and lower behavior assessment scores."

3.3.2.2 Inorganic Arsenic

Arsenic is strongly associated with lung and skin cancer in humans, and may cause other internal cancers as well. Skin lesions, peripheral neuropathy, and liver and kidney disorders are commonly associated with chronic arsenic ingestion (U.S. EPA, 2000).

3.3.2.3 Cadmium

Kidney toxicity is the primary concern with cadmium exposure (U.S. EPA, 2000). Chronic exposure to cadmium may also include anemia and bone disorders, including osteomalacia, osteoporosis, and spontaneous bone fractures. Some studies have suggested an association between neurotoxicity and cadmium exposure at levels below those that cause kidney toxicity. According to U.S. EPA (2000b), reproductive and developmental toxicity have been associated with cadmium ingestion.

3.3.2.4 Copper

Although copper is an essential human nutrient, large intakes of copper can cause liver or kidney damage, or even death in cases of extreme exposure. Short periods of exposure to levels above the U.S. EPA's Action Level of 1.3 parts per million can cause gastrointestinal disturbance, including nausea and vomiting (U.S. EPA, 1995).

3.3.2.5 Mercury

Methyl mercury (CH3Hg) is the form of mercury that builds up in the tissues of fish and is the most toxic. It affects the immune system, alters genetic and enzyme systems, and damages the nervous system, including coordination and the senses of touch, taste, and sight (U.S. Geological Survey, 2000). Methyl mercury is particularly damaging to developing embryos, which are five to ten times more sensitive than adults (U.S. Geological Survey, 2000). Studies found that offspring born of women exposed to methyl mercury during pregnancy have exhibited a variety of developmental neurological abnormalities, including the following: delayed onset of walking, delayed onset of talking, cerebral palsy, altered muscle tone and deep tendon reflexes, and reduced neurological test scores (U.S. EPA, 1997).

3.4 Potential Staging Areas

Although no final dewatering site has been selected, 5 options have been proposed by the San Diego Water Board (Figures 2 through 7):

- Area 1 - 10th Avenue Marine Terminal and Parking Areas;
- Area 2 - Commercial Berthing Area and Parking Areas;
- Area 3 - SDG&E and BAE Systems Leaseholds and Parking Areas;
- Area 4 - NASSCO and North Harbor Drive Parking Areas; and
- Area 5 - 24th Street Marine Terminal.

Each site has unique attributes which will affect overall feasibility of use as a dewatering site, including potentially available acreage for dewatering as delineated by the San Diego Water Board, access for dredge barge unloading, proximity to schools or other potentially sensitive receptors, on-site haul and sediment staging logistics, and freeway access. Staging Area 4 is not located adjacent to the waterfront; therefore, sediment transport from the barge to the staging area would be required**.**

Summary of Dewatering Site Characteristics

Potential Dewatering Area	Acres	Number of Areas in Site	Sensitive Receptor Within 0.25 mile?	Proximity to Interstate 5 (miles)
1: 10th Ave. Terminal	36	6	Yes	0.4
2: Com. Berthing Area	11	6	Yes	0.5
3: SDG&E/BAE Systems	6.5	10	Yes	0.5
4: NASSCO/N. Harbor	3.9	4	Yes	0.3
5: 24th Street Terminal	145	6	No	0.5

3.4.1 10th Avenue Marine Terminal and Adjacent Parking

The 10th Avenue Marine Terminal Area is estimated to provide a total of approximately 48 acres of potentially usable area (not covered by structures) for dewatering activities: one 36-acre area directly adjacent to docks where barges could be unloaded, and 5 parking areas approximately 1 mile away from the barge unloading areas ranging in size from roughly 12 acres to 0.2 acres (Figure 3). However, the actual usable space is likely to be reduced to provide access to existing structures, create haul routes, and to optimize the final design of the dewatering containment areas. The dewatering areas are located approximately 0.4 miles from the nearest southbound access to Interstate 5 (I-5). Perkins Elementary School and the Barrio Logan College Institute are located approximately 0.1 and 0.05 miles from the 10th Avenue dewatering site, respectively. The Logan Heights Family Health Center is located approximately 0.2 miles from the dewatering site. Extended haul routes from barge offloading to dewatering areas and handling of potentially hazardous materials within 0.25 miles of a school or other sensitive receptors may increase risk related to hazards and hazardous conditions; mitigation measures for these issues are discussed in Section 4.

3.4.2 Commercial Berthing Area and Adjacent Parking

The Commercial Berthing Pier Areas would provide approximately 11 acres of potentially usable area for dewatering activities. These 11 acres are divided between 6 areas ranging from 0.6 acres to 2.7 acres. Four areas totaling approximately 6.75 acres are located adjacent to the Commercial Berthing Pier Areas, while the remaining 5 acres of potentially usable dewatering area are located adjacent to the Coronado Bridge, located approximately 0.3 to 0.5 miles from the Commercial Berthing Area (Figure 4). The dewatering areas are located approximately 0.5 miles from the nearest southbound access to I-5. Perkins Elementary School and Barrio Logan College Institute are located approximately 0.2 miles and 0.16 miles from the Commercial Berthing Area dewatering site, respectively. Extended haul routes from barge offloading to dewatering areas and handling of potentially hazardous materials within 0.25 miles of a school may increase risk related to hazards and hazardous conditions; mitigation measures for these issues are discussed in Section 4.

3.4.3 SDG&E and BAE Systems Leaseholds and Adjacent Parking

The SDG&E/BAE Systems parking areas would provide approximately 6.5 acres of potentially usable area for dewatering activities. These 6.5 acres are divided between 10 areas ranging from 0.4 acres to 1 acre in size. Five areas totaling approximately 3.5 acres are located adjacent to the BAE Systems Leasehold, while the remaining 3 acres of potentially usable dewatering area are located at five parking areas located along East Belt Street, up to 0.4 miles from the BAE Systems pier (Figure 5). The dewatering areas are located approximately 0.5 miles from the nearest southbound access to I-5. K-12 schools are located within 0.25 miles of the SDG&E and BAE Systems Leaseholds and Adjacent Parking site. However, Mercado Head Start and several family child care businesses are located within 0.25 miles from this potential dewatering site. Extended haul routes from barge offloading to dewatering and handling of potentially hazardous materials within 0.25 miles of sensitive receptors may increase risk related to hazards and hazardous conditions. Mitigation measures for these issues are discussed in Section 4.

3.4.4 NASSCO Parking and Parking Area North of Harbor Drive

The NASSCO Parking and Parking Area North of Harbor Drive would provide approximately 3.9 acres of potentially usable area for dewatering activities. These 3.9 acres are divided between four areas ranging from 0.4 acres to 1.4 acres in size. The areas are not located adjacent to a barge off-loading area and would require trucking to the dewatering sites (Figure 6). The dewatering areas are located approximately 0.3 miles from the nearest southbound access to I-5. No K-12 schools are located within 0.25 miles of the NASSCO Parking or Parking Areas North of Harbor Drive. However, several family child care businesses are located within 0.25 miles from this potential dewatering site. Extended haul routes from barge offloading to dewatering areas may increase risk related to hazards and hazardous conditions; mitigation measures for these issues are discussed in Section 4.

3.4.5 24th Street Marine Terminal

Although the 24th Street Marine Terminal is located approximately 3 miles south of the project site, barges could be offloaded directly at the terminal. The 24th Street terminal would provide approximately 145 acres of potentially usable area for dewatering activities. These 145 acres are divided between 6 areas ranging from 3.7 to 74 acres in size. Approximately 74 acres are located directly adjacent to barge unloading areas; the remaining dewatering areas are within approximately 0.5 miles of the barge unloading zone (Figure 7). The dewatering areas are located approximately 0.4 miles from the nearest southbound access to I-5. No K-12 schools or other sensitive receptors have been identified within 0.25 miles of the 24th Street Marine Terminal site.

3.5 Project Site Constraints

The most significant project constraint will be the coordination of contaminated sediment removal and dewatering activities with the normal ship movement within the project area.

Close coordination between project personnel and contractors with the shipyards, as well as continuance of normal marine traffic, is crucial not only to the overall efficiency of the project, but from a safety standpoint as well. Standard Operating Procedures (SOPs) are presented in Section 4 as mitigation measures which will be required to limit or reduce potential impacts and risks from implementation of the proposed project to less than significant levels. The SOPs are also necessary to conform with federal, state, and Port maritime regulations for safe project execution.

4. PROJECT IMPACTS AND MITIGATION MEASURES

This section outlines potential impacts related to the implementation of this project as understood based on information provided by the San Diego Water Board. Although there is not yet a final project design, the project characteristics as presented in the project description (Appendix A) provide a sufficient basis to evaluate the potential for typical impacts of the proposed dredging and dewatering activities.

There are two scheduling options for completion of the remedial action. The first scheduling option would occur for 7 months of the year and is expected to take 2 to 2.5 years to complete. The second scheduling option is continuous dredging operations expected to take approximately 12.5 months. Regardless of the selected scheduling option, sediment removal efforts will be followed by a period of post-remedial monitoring activities, as required in the Tentative CAO. All environmental dredging operations have the potential to result in impacts related to the handling of potentially hazardous materials. These potential impacts are evaluated in the following sections with associated mitigation measures.

4.1 Dredging Operations

While there is not a final dredging design for the project, the proposed sediment removal operations will most likely involve the use of a barge-mounted crane equipped with an environmental bucket such as the Cable Arm Environmental Clamshell®. Typically, the barge and the tip of the crane boom are equipped with Differential Geo-Positioning equipment that will allow the location and recording of each “clam bite” into the sediment. The actual equipment to be used (i.e., size of the crane and buckets) will depend on the final design.

Dredging operations will be configured to limit the turbidity caused by the actual sediment removal. Several configurations have been utilized throughout the U.S. that allow for the dredge to remove the sediment within a containment cell while the sediment is deposited into the material barge without significant water quality impacts. Double silt curtains will be utilized for containment of the dredge area; configurations and technologies will be finalized during the design phase of the project. Figures 8 and 9 illustrate the two common configurations of dredge operations and silt curtains to minimize turbidity. Configurations shown in the figures are for illustrative purposes only.

Once the clamshell bites into the sediment, it is lifted to the surface and the sediment is deposited into a material barge. This operation continues until the barge is full, and at that time it is transported to an unloading area. Following removal in an unloading area, the barges (dredge and material) are re-positioned via a work tug to the next area to be dredged. This process is repeated until the entire project area is dredged.

A silt curtain containment within a floating “dredge cell” that is lined with a silt curtain on the inside of the cell is shown in Figure 8. A modification of this type of configuration would be to install the silt curtain around the outside of the dredge cell. This type of containment was implemented during the BAE Systems Dry Dock Sump Maintenance Dredging Project executed in late 2010/early 2011 (BAE Systems, 2010). The main advantage of this containment configuration is that the dredge and the material barges are free to move around the project site without the restrictions associated with moving into and out of a total containment system. As dredging progresses, the dredge cell and the barges move about the area, as necessary.

A containment configuration that covers a large area within a double silt curtain is shown in Figure 9. This combination of silt curtain containment systems includes an outer curtain defining the dredging area and an inner curtain around the dredge to be used, to further minimize turbidity. This deployment was also used by BAE Systems during the Dry Dock Sump Maintenance Dredging Project executed in late 2010/early 2011. This configuration requires the material barge to egress and ingress the area via one or more silt curtain gates, if the unloading area is not within the containment area. The configuration also allows for the dredge barge to move throughout the area via tug positioning. The disadvantage to this configuration is that the silt curtain gate must be opened and closed by project personnel, which poses safety concerns, and also increases the potential for suspended contaminant dispersal outside the silt curtain.

The floating silt curtain will be comprised of connected lengths of geotextile fabric. It is intended to supplement the operational controls described above by helping to control and contain migration of (contaminated) suspended sediments at the water surface and at depth. This in turn will help protect surrounding submerged areas from accumulation of resuspended solids originating from the dredging work.

A continuous length of floating silt curtain will be arranged to fully enclose the dredging equipment and the scow barge being loaded with sediment. The silt curtain will be supported by a floating boom in open water areas (such as along the bayward side of the dredging areas). Along pier edges, the contractor will have the option of connecting the silt curtain directly to the structure. In either case, the contractor would be required to continuously monitor the silt curtain for damage, dislocation, or gaps and immediately fix any locations where it is no longer continuous or where it has loosened from its supports.

The bottom of the silt curtain shall be weighted with ballast weights or rods affixed to the base of the fabric. These weights are intended to resist the natural buoyancy of the geotextile fabric and lessen its tendency to move in response to currents. Extending the silt curtain further or all the way to the bay floor would be problematic and potentially counter-productive. This is because at lower tides the geotextile fabric would be in contact with sediments at the mudline, potentially folding up on the seabed; and when subsequently moved by current flow or lifted by rising tide it would cause increased sediment disturbance, generating an additional source of sediment resuspension and turbidity. Therefore, the floating silt curtain around the dredging unit will be deployed in a manner that includes a gap above the seafloor to allow for the tidal ranges and fluctuations, and to sufficiently allow for dredge operation. The outer silt curtain surrounding the remediation site shall be deployed in a manner dependent on site-specific conditions including, but not limited to, depth, current velocities, existing infrastructure for curtain deployment, and proximity of sensitive habitat (i.e., essential fish habitat).[1]

Where feasible and applicable, curtains will be anchored and deployed from the surface of the water to just above the substrate. If necessary, silt curtains with tidal flaps will be installed to facilitate curtain deployment in areas of higher flow. Additional curtains may be required by resource agencies to isolate environmentally sensitive areas like essential fish habitat and eelgrass.

Air curtains may be used in conjunction with silt curtains to contain resuspended sediment, to enhance worker safety, and allow barges to transit into and out of the work area without the need to open and close silt curtain gates. Air curtains are formed by laying a perforated pipe along the mudline and pumping air continuously through the piping. The upwelling of the tiny bubbles to the surface of the water has the effect of preventing fine-grained sediments from passing across the line of the pipe.

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[1] United States Army Corps of Engineers: Engineer Research and Development Center. 2008. Technical Guidelines for Environmental Dredging of Contaminated Sediments. ERDC/EL TR-08-29.

Potential operational impacts that may occur during sediment dredging, barge loading, and transiting to the unloading facility are discussed in the following sections. Common mitigation measures are also suggested.

4.1.1 Accidental Oil or Fuel Spills

Accidental oil or fuel spills that could potentially occur during the proposed dredging operations could impair and/or degrade water quality in the bay, depending on the severity of the spill. The potential for the occurrence of petroleum-product leaks or spills is low, but the potential for, long-term impacts moderate to high if a leak or spill occurs.

Mitigation: As an operational control element, all oil and fuel shall be housed in a secondary containment structure to ensure if spilled or leaked it will be prevented from entering the water column. The inclusion and implementation of a Dredging Management Plan (DMP) containing Standard Operating Procedures (SOPs) for the project will assist the dredge contractor in preventing accidental spills and providing the necessary guidelines to follow in case of an oil or fuel spill. Together, these will reduce the potential for a significant long-term impact to less than significant. The DMP will include the following measures to prevent accidental oil/fuel spills during construction activities:

- Personnel involved with dredging and handling the dredged material will be given training on the potential hazards resulting from accidental oil and/or fuel spills. This operational control will provide the personnel with an awareness of the materials they are handling as well as the potential impact to the environment. This increased awareness will assist in minimizing impacts to the water column as a result of spills.

- All equipment will be inspected by dredge contractor personnel before starting the shift. These inspections are intended to identify typical wear or faulty parts that may contain oil or fuel. This operational control will minimize the potential of impacts during the operations by identifying potential impacts due to wear of important sub-systems.

- Personnel will be required to visually monitor for oil or fuel spills during construction activities. This operational control will minimize impacts associated with leaks or spills and will provide additional mitigation over the automatic systems identified above.

- In the event that a sheen or spill is observed, the equipment will be immediately shut down and the source of the spill identified and contained. Additionally, the spill will be reported to the applicable agencies presented in the DMP. This operational control will minimize impacts to the water quality both in volume and duration as the operations will be immediately shut down and the source of the impact will be identified and remedied.

- The shipyards currently have oil/fuel spill kits located at various locations onsite for routine ship repair operations. All personnel associated with dredging activities will be trained on where these spill kits are located, how to deploy the oil sorbent pads, and proper disposal guidelines. As an additional mitigation step, the dredging barge shall have a full complement of oil/fuel spill kits on board to allow for quick and timely implementation of spill containment.

- The use of oil booms will be deployed surrounding the dredging activities. In the event that a spill occurs, the oil and/or fuel will be contained within the oil boom boundary. This operational control will be the last line of defense against accidental oil/fuel spill occurrences. The oil boom shall be deployed along the entire length of the outer silt curtain.

In addition to providing SOPs to prevent accidental oil/fuel spills during construction activities, the DMP addresses several potential issues related to dredging and presents potential solutions. This includes the identification of dredging needs; a methodology and process for determining dredging priorities and scheduling; the feasibility and requirements for expedited permitting; Quality Assurance Protection Plan (QAPP) to comply with regulatory requirements; alternatives for control and operation of dredging equipment, and BMPs to implement in the event of equipment failure and/or repair.

Typical BMPs for equipment failure or repair include: communication to project personnel, proper signage and/or barriers alerting others of potentially unsafe conditions, all repair work shall be conducted on land and not over water, repair work involving use of liquids shall be performed with proper spill containment equipment (e.g., spill kit), and a contingency plan identifying availability of other equipment or subcontracting options. The use of operational controls will serve to mitigate this potential impact to water quality to less than significant. A regulatory oversight contractor may be used by the San Diego Water Board. The regulatory oversight contractor should be responsible for adherence to this operational control and such adherence should be verified by the San Diego Water Board.

4.1.2 Resuspension due to Operator Over Filling Bucket

Over filling of the dredge bucket during the sediment removal operations is an impact which results in increased turbidity due to resuspension. Increased turbidity (suspended and settleable solids) is deleterious to benthic organisms and may cause the formation of anaerobic conditions, which can clog fish gills and interfere with respiration in aquatic fauna. It also can screen out light, hindering photosynthesis and normal aquatic plant growth and development (San Diego Water Board, 1994). Resuspended sediment from environmental dredging operations can settle onto areas already dredged and reduce the ability of the dredging program to reach target cleanup goals due to increased residual COC concentrations in the dredge area.

Mitigation: Equipment specifications will require that the dredging equipment contain instrumentation that includes bucket transducers, design cut information, and in-cab displays to provide the operator with real time "dredge cut" data. Pre-shift inspection of this instrumentation by the operator to document that it is functioning correctly will also reduce the potential for sediment suspension due to equipment failure. Using this combination of technologies, the operator shall be trained to know how deep the bucket is set in the sediment column prior to initiating its closure.

The development of a detailed sequence of actions that the operator will follow during the dredging cycle will also mitigate potential overfilling of the dredge bucket. The dredging performance will be monitored daily by the oversight team to provide additional control over best dredging practices and techniques. These mitigation measures will significantly reduce the potential for impacts related to bucket overfilling.

4.1.3 Debris Preventing the Dredge Bucket from Fully Closing

If large debris is present in the dredge area, it may lodge in the dredge bucket, preventing full closure and allowing sediment to escape from the bucket, causing resuspension of sediment, with the potential impacts described above.

Mitigation: A debris sweep of the project area prior to dredging can significantly reduce dredge bucket seal problems due to debris obstructions. During dredging, the dredge buckets can be equipped with 4 indicator switches at the four corners (i.e., left, right, top, bottom) of the clamshell seal. The switches are positioned in these locations to inform the operator if and where the bucket is failing to close. The indicator switch data will be relayed to instruments inside the cab to allow the operators to know how to reposition the bucket to avoid the obstruction which is preventing closure. These instrumental additions to dredge buckets and in-cab monitors were first used on the

St. Lawrence River Remediation Project in 2001 and have been subsequently used on several other dredging projects. The use of bucket indicator switches significantly reduces the potential for impacts from bucket non-closure. Pre-shift inspection of this instrumentation by the operator to document that it is functioning correctly will also reduce the potential for sediment suspension due to equipment failure.

4.1.4 Resuspension of Sediment During Barge Positioning due to Vessel Propeller Wash

Resuspension of sediment particles within the water column is due to vessel propeller wash, which is a common issue during operations in shallow waters. Resuspension of sediment particles within the dredge area will lead to increased turbidity and reduced effectiveness of dredging operations due to increased residual COC concentrations in the dredge area as described above. Resuspension of sediment due to propeller wash outside of the dredge area (related to barge traffic to and from the dewatering area) will also potentially result in increased turbidity in the Bay with resulting impacts to aquatic organisms and vegetation.

Mitigation: This potential impact is mitigated through identification of potential problem areas by comparing approximate filled barge draft versus bathymetry along the haul route. These areas will be mapped and provided to the dredge operators and oversight team. Furthermore, mandating load controlled barge movement, line attachment and horsepower requirements of tugs and support boats in the dredge area will reduce resuspension of sediment due to propeller wash.

4.1.5 Resuspension of Sediment During Silt Curtain Placement

Resuspended sediment may be introduced into the water column as a result of either silt curtain placement or re-deployment due to improper design or improper operator care during movement. Extending the silt curtain to the Bay floor can be problematic because at lower tides the geotextile fabric would be in contact with sediments at the mudline, potentially folding up on the seabed. When subsequently moved by current flow or lifted by the rising tide, it would cause increased sediment disturbance, becoming an additional source of sediment resuspension and turbidity. Therefore, the floating silt curtain should be deployed in a manner that includes a gap above the seafloor to allow for the tidal ranges and fluctuations. Resuspension of sediment during silt curtain placement would also result in increased turbidity with the potential effects described above.

Mitigation: Mitigation measures to minimize resuspension during silt curtain placement include using silt curtains designed such that the curtain is reefable and can be extended during high tide and retracted during low tide based on the expected tidal variation during the project implementation. Regular reefing events will be scheduled to ensure that the silt curtain is the appropriate length for the tidal conditions to prevent excess curtain from scouring the bottom due to wind or wave energy.

Personnel responsible for deployment of the silt curtains will be trained in proper deployment techniques. Supervisors will monitor turbidity during silt curtain maintenance operations and adjust best practices as required to reduce the potential for sediment suspension. Through implementation of these design, training, and best practices, sediment resuspension related to silt curtain placement can be significantly mitigated.

4.1.6 Resuspension of Sediment due to Damage of Silt Curtain During Dredging

Damage to the silt curtain during the dredging operations typically occurs when the dredge bucket comes in contact with the curtain, the curtain becomes entangled with the propellers of the tug moving either the dredge or material barges, or passing ships are too close to the operations, drawing the curtain into their propellers. Not only does this cause an instantaneous release of suspended sediments from the dredging containment area, but also causes project delays until the silt curtain can be repaired or replaced. The failure or damage of a silt curtain during dredge operations may lead to impacted sediment settling outside of the treatment area, resulting in a larger area impacted by site-related COCs.

Mitigation: Mitigation of this type of impact requires that the silt curtain be appropriately located during deployment, conforming to the final design locations. Proper lighting will be required in accordance with local, state and federal regulations including a notice to mariners. Daily pre-planning of barge movement and coordination with project, Shipyard Sediment Site and Port District personnel regarding the pre-movement and movement notifications will add an additional layer of impact mitigation.

A contingency plan will be developed prior to project initiation which identifies the notifications and actions to be taken in the event of an accidental breach of containment for immediate turbidity control. At a minimum, this plan will include provisions for emergency silt-curtain deployment, suspension of dredging in the vicinity of the damaged silt curtain until the area can be re-secured, and an incident reporting and review procedure to evaluate the causes of the accidental breach and propose steps to avoid further breaches. These practices will significantly reduce the potential for sediment impacts related to accidental silt-curtain breach.

4.1.7 Spillage of Sediment into the Water Column due to Overloading of the Dredged Material Barge(s)

This type of impact usually occurs when operators attempt to maximize the load within the material barges. Overloaded barges can result in the sloughing of dredged sediment from the barge during transport to the offloading area. Sediment sloughing off a loaded barge may lead to either resuspension of sediment within the treatment area, as described above, or dispersal of contaminated sediment outside the treatment footprint, if the incident occurs outside of the dredge area during transport to the dewatering area.

Mitigation: The impact is mitigated through the development of load limits for each material barge with respect to the bathymetry along the transit route. Additionally, marking the material barges by painting the appropriate draft level helps the operator visualize when the barge is reaching the target load. A contingency plan will also be developed which outlines the actions and notifications necessary if barge overfilling occurs. At a minimum, this plan will include a review of defined load limits and loading procedures and practices to mitigate further overfilling incidents. These practices will significantly reduce the potential for sediment impacts related to barge overfilling.

4.1.8 Contact with Sediment on or Around the Barge During Loading

Contact with sediment by workers during loading will occur regardless of the standard of care taken during the loading process. Contact with impacted sediment by personnel may lead to acute and/or chronic health effects depending on the contaminant type, concentration, and exposure route.

Mitigation: Mitigation of this type of impact is achieved through appropriate operator controls to minimize spillage of dredged material onto the sides, stern or bow of the material barges during the loading operations. Personnel working on or around barges (dredging and material) will be equipped with appropriate Personal Protective Equipment (PPE), will follow standard health and safety plan guidelines as developed for the project site, and will be certified under OSHA 1910.120 and trained in decontamination and waste containment procedures. These measures will significantly reduce potential impacts to barge workers from contact with impacted sediments.

4.1.9 Cable Snap Allowing Loaded Bucket to Enter Water Column

Poor dredging equipment maintenance could potentially lead to a snapped cable on the clamshell bucket, allowing a loaded bucket to enter the water column. This may lead to impacts related to both resuspension of sediment from the loaded bucket, as well as acute physical hazards for workers in the vicinity of the bucket.

Mitigation: Although this type of impact is rare, the crane operator and/or the oiler should check the condition of every aspect of the crane including the integrity of the cable during a “pre-shift” inspection. This inspection should cover the bucket(s) as well as the crane to insure proper operations. Such inspections significantly reduce the potential for unforeseen impacts related to sudden equipment failure.

4.1.10 Shear Pin Breakage Allowing Bucket to Open Prematurely

Poor dredging equipment maintenance could potentially lead to the breakage of a shear pin on the clamshell bucket, allowing a loaded bucket to open before proper positioning over the barge, allowing dredged material to enter the water column. This will lead to both impacts related to resuspension of sediment from the loaded bucket, as well as acute physical hazards for workers in the vicinity of the bucket.

Mitigation: This type of impact is also rare. However, as mentioned above, the “pre-shift” inspection should also include the dredge bucket to ensure proper operations. Such inspections significantly reduce the potential for unforeseen impacts related to sudden equipment failure.

4.1.11 Barge or Tug Collision with Merchant or Military Vessel

The movement of barges and tugs to and from the project site contains inherent risks associated with maritime operations. In addition to the acute physical hazards related to a vessel collision, there is the potential for a release of sediments stored on the barge.

Mitigation: The project will identify and establish lines of communication with the San Diego Port or Harbor Master. Project personnel requiring notification of barge movement will be identified prior to project execution. Most dredging companies operating in this environment are very aware of the lines of communication for barge or vessel movement; however, specific project requirements such as speed, wake/no wake, and notification to project personnel using air horns will be incorporated into the standard procedures for this activity to mitigate the potential for accidental vessel collision.

4.2 Sediment Unloading and Transport Operations

At the sediment unloading area, the material barge is moored and the unloading operations begin. This sediment unloading operation is normally accomplished using one or more track-mounted excavators (track-mounted lattice boom cranes have also been employed). The types of buckets used for the sediment unloading operations range from standard open excavator buckets to hydraulically closed buckets, and in the case of a boom crane, a clamshell bucket.

During unloading operations, the excavator or crane will grab a volume of dredged material and swing from the barge to the trucks. Once the trucks are loaded, they move the dredged material to either a staging area to be stockpiled or a treatment area to be mixed with pozzolonic agents, which facilitate drying.

Depending on Shipyard Sediment Site conditions, off-road or on-road hauling vehicles are used to transport the material from the unloading area to the treatment or stockpile area. The transportation routes, speeds and rights-of-way are developed prior to project implementation to minimize potential safety or hazard impacts.

Potential operational impacts and common mitigation measures which may be employed during sediment unloading and transport operations are discussed in the following sections

4.2.1 Sediment Unloading

Overfilling of the unloading bucket is a common issue during the sediment unloading process, and potential impacts can occur in the water column and on the hardscape adjacent to the barge. It is important to note that the space between the material barge and the dock/unloading surface where the excavator or crane is located can be rather wide, more than 4 feet. There is the potential for sediment to fall into this gap during offloading, re-entering the water column leading to sediment suspension and potential contamination of the Bay floor adjacent to the offloading area. Sediment can also fall onto hardscape of the unloading area or onto the sides of the vehicle being loaded. This material, if not contained, could be a source of landside impacts, or could eventually be washed back into the Bay.

Mitigation: Mitigation of water column impacts can be accomplished by controlling the swing radius of the unloading equipment. A spillage plate can be used to prevent the offloaded sediments from falling into the water beneath the swing radius of the unloading equipment at the offload location, to limit spillage from directly falling into the water (Figure 10).

Mitigation of hardscape spillage will be accomplished by sloping the hardscape near the spill plate into a collection sump to allow water and fluidized mud that may fall to be collected. The sump will require periodic pumping as it is filled during operations (Figure 11). The material removed from the sump will be placed into the dewatering piles and disposed off-site with the dredged sediment.

The addition of a power wash unit is recommended for mitigation of impacts related to spillage from the excavator arm onto transport vehicles. In the event that sediment is splashed onto the transport vehicle, it can be quickly washed into the collection sump. These measures are capable of significantly reducing potential impacts during the sediment unloading process.

4.2.2 Overfilling Transport Vehicle

Overfilling of a transport vehicle can cause sediment to overflow from the vehicle during transport to the sediment staging and dewatering areas. This has the potential to spread sediment related impacts along the designated sediment haul route.

Mitigation: Mitigation of this type of impact is accomplished through restricting the number of buckets allowed to be placed in each vehicle. The amount of material which can safely be placed in each vehicle will be a function of the sediment's physical consistency, as high water content sediments will have more of a tendency to spill during transport, and the transport vehicle's size and dimensions. By placing a set volume of sediment into each vehicle, the potential for accidental spillage of sediment is greatly reduced.

4.2.3 Sediment Spilling out of Transport Vehicle During Transport to the Treatment Area due to Operator Error

Excess vehicle speed, rapid deceleration or acceleration, or tight cornering during transport to the treatment area may result in spillage of sediment during transport, particularly with high water content sediments or with an overfull vehicle as described in Section 4.2.2. This also has the potential to spread impacted sediment along the haul route.

Mitigation: Mitigation of impacts related to sediment spillage from transport vehicles will be managed by restricting speed limits of loaded vehicles to 15 miles per hour (mph) for on-site operations and 25 mph on surface streets. Drivers will be trained to allow for proper stopping distances and cornering speed. These measures will significantly reduce potential impacts related to transportation.

4.3 Sediment Drying/Dewatering Operations

Drying/dewatering of sediments (e.g., with drying agents) may occur to meet transport and disposal requirements. The dewatering areas are typically set up to allow vehicles to enter, drop their load, and exit. The dewatering and sediment mixing areas normally consist of asphalt pads with or without under-liners, which are sloped to a collection area for stormwater and vehicular decant water. Typically, these areas are divided into discrete locations that can accommodate a full day of dredge production.

Given the limited usable areas within the San Diego Bay, selection of the solidification/dewatering area(s) will be a critical project component. As identified in Volume III of the Draft Technical Report for Tentative CAO No. R9-2011-0001 (San Diego Water Board, 2010), "Most uplands landfills require leaching tests for specific chemicals prior to final disposal and these can be performed on the stockpiled sediments after de-watering has occurred." Therefore, the solidified sediment requires time to cure and to be staged pending analytical results in order to make appropriate disposal decisions/certifications. A single day's production may require a 5-day holding time prior to load out, transport and disposal. Table 1 presents this concept over a period of 5 days using a 3-day turn-around for analytical results, after which the cycle begins anew. This example does not consider unanticipated delays related to transport or in landfill operations.

Sediment drying usually involves the introduction of pozzolonic agents such as Portland cement, the amount of which is determined during the final engineering design treatability testing. This approach was used during BAE Systems Dry Dock Sump Maintenance Dredging Project executed in late 2010/early 2011 (BAE Systems, 2010). Regardless of volume required, the pozzolonic agents can be introduced into the sediment stockpile in three general ways:

- Simultaneous addition of sediment and pozzolonics into a pug mill which mixes the two together;
- Surface casting of the pozzolonics onto the sediment stockpile and mixing with a track-mounted excavator; or
- Injection during mixing of the stockpile via a track-mounted excavator.

The stockpile is sampled for landfill profiling, based on the disposal facility's requirements, and usually allowed to cure for several days while daily work on the stockpile continues. Once the stockpile has met the analytical and strength requirements, the material is certified for disposal, manifested, loaded into on-road trucks (typically using a large-wheeled front-end loader), weighed to document compliance with DOT regulations, transported, and deposited at the selected disposal facility.

In San Diego, treatment and discharge of water to the sanitary sewer system is commonly restricted for the 24 hours immediately following a storm event due to sanitary sewer capacity issues. This limits the potential for immediate treatment and discharge of accumulated storm water. A Dredging Management Plan (DMP) will be prepared for the project prior to any dredging operations and will specify that water discharges (decant water from sediment and stormwater) to San Diego Bay are prohibited. Therefore, the containment cell will be designed to meet a performance standard of "no discharge" so that stormwater run off cannot enter the Bay or adjacent areas. The cell will also be designed to ensure that run on from adjacent areas to the cell cannot enter the dewatering area. The water will be tested to evaluate whether it meets discharge criteria for the San Diego Publically Owned Treatment Works (POTW) or if treatment is required. The approach listed above is the method used during BAE

Systems' Dry Dock Sump Maintenance Dredging Project executed in late 2010/early 2011.

Alternatively, where a smaller sump area is required due to specific dewatering area size constraints, additional stormwater containment capacity may be added by capturing stormwater in tanks staged at the dewatering area, filled using automated pumping systems.

Table 1 – Typical Holding Times

Dredge Day	Day Stockpile was Created	Activity on Stockpile
Day 1	1	Dewatering & Sampling
Day 2	1	Curing. Analytical results pending
	2	Dewatering & Sampling
Day 3	1	Curing. Analytical results pending
	2	Curing. Analytical results pending
	3	Dewatering & Sampling
Day 4	1	Sample Results Received & Load Out Scheduled
	2	Curing. Analytical results pending
	3	Curing. Analytical results pending
	4	Dewatering & Sampling
Day 5	1	Loading Out
	2	Sample Results Received & Load Out Scheduled
	3	Curing. Analytical results pending
	4	Curing. Analytical results pending
	5	Dewatering & Sampling

Potential operational impacts and common mitigation measures which may be employed during sediment unloading operations are discussed in the following sections.

4.3.1 Airborne Release of Drying Agent

If pozzolonic agents are used, there is the potential for airborne dispersal of the agent if it is applied as a dry powder. The fine dust can be a respiratory irritant to workers and nearby receptors.

Mitigation: The potential for airborne releases of drying agents will be mitigated through the application of wet pozzolonic agents using a standard track-mounted excavator which will be outfitted with a blending head. A hose from the concrete pump located adjacent to the excavator will be run along the excavator arms and connected to the blending head. Reagent will be delivered to the Shipyard Sediment Site by concrete transport trucks. The trucks will empty the reagent into the concrete pump and the reagent will be pumped to the blending head. The excavator operator will suspend the blending head in the sediment and rotate the blending head blades to mix the reagent into the sediment. This method of blending is similar to that used during BAE Systems' Dry Dock Sump Maintenance Dredging Project executed in late 2010/early 2011 (BAE Systems, 2010). By using a wet slurry, airborne release of pozzolonic agents can be prevented.

4.3.2 Airborne Release of Sediment Contaminants Through Volatilization or Particulate Transport

Sediment-related contaminants could be transported through volatilization to the atmosphere or wind-blown particulate transport of dry sediment. The airborne distribution of sediment-related contaminants could result in COC-related health impacts to receptors in the vicinity of the dewatering areas.

Mitigation: A sediment management plan including dust control as well as fenceline and work-area monitoring will be employed to mitigate potential airborne migration of potentially impacted sediment as particulates. These monitoring stations could be used to evaluate whether mitigation measures are adequately protective of sensitive receptors, such as schools, in the vicinity of several of the proposed dewatering sites. The COCs addressed through this project (metals, heavy-range polynuclear aromatic hydrocarbons (HPAHs), and tributyltin) are not particularly volatile. Consequently, the use of foam is not likely to be necessary to control volatilization.

4.3.3 Breach in Dewatering Pad Containment by Excavator

A breach in the dewatering pad could potentially occur if an excavator penetrates through the bottom of the pad while attempting to load sediment for transport. A breach in the dewatering pad could result in impacts from the impacted sediment to the soil or groundwater in the vicinity of the breach.

Mitigation: Accidental breach of the dewatering pad will be mitigated by either placing a savaging layer of sand beneath the sediment to provide a visual indicator to the excavator operator that he/she is getting close to the containment liner, or the use of closely-spaced railroad rails/k-rails to shield the containment liner. The latter method was implemented during BAE Systems' Dry Dock Sump Maintenance Dredging Project executed in late 2010/early 2011 and successfully prevented accidental breaches of the dewatering pad containment.

4.3.4 Decant and Stormwater Containment Failure

During dewatering operations, the decanted water from the sediment stockpiles will be collected in a containment area. In the event of a storm event, stormwater collected within the drying area will also be contained. There is the potential for the decant/stormwater containment area to fail, resulting in release of untreated water from the treatment area. A release of stormwater or decant water from the containment area could result in impacts to soil or groundwater in the vicinity of the release and potentially flow back into the Bay causing turbid conditions. Additionally, if the decant water flowing back into the water column contains COCs, degradation of water quality can occur and increased toxicity to aquatic organisms is accentuated.

Mitigation: The typical mitigation for this potential impact is to design and construct a decant/stormwater containment area. The containment area typically consists of a small, depressed area within the drying/dewatering area, with containment berms around the area to mitigate potential stormwater runoff/run-on to the project site. A Dredging Management Plan (DMP) will be prepared for the project prior to any dredging operations and will specify that water discharges to San Diego Bay are prohibited. Therefore, the containment cell will be designed to meet a performance standard of "no discharge" so that stormwater run off cannot enter the Bay or adjacent areas. The cell will also be designed to ensure that run on from adjacent areas to the cell cannot enter the dewatering area. The decant and/or stormwater is collected in the sump in the operation area and pumped to the tanks, sampled, and disposed of into the sanitary sewer, following the discharge requirements for the POTW.

An alternative mitigation measure could be the use of aboveground tanks that have sufficient design capacity. The decant and/or stormwater would be collected in a sump in the operation area and pumped to the tanks, sampled, and disposed of either within the sanitary sewer or off site.

4.4 Load out, Transport & Disposal Operations

Prior to load out and transport, other activities that will be performed in the sediment drying/dewatering containment area are sampling and chemical analysis of the dewatered sediment, evaluation of the appropriate disposal options, and weigh-out in accordance with Cal DOT regulations. These activities are not considered to pose an impact to the environment and will not be discussed further in this Technical Report.

Load out operations will take place within the sediment drying/dewatering containment area, which will be contained in a structure to be determined during the final engineering design. Load out operations are typically performed using wheeled front-end loaders which load sediment into trucks located inside of the contained area. Following loading, the trucks are typically power-washed to prevent cross-contamination onto the public roadways.

Potential impacts associated with the sediment unloading operations are discussed in the following sections.

4.4.1 Worker Contact with Treated Sediment

Similar to contact with sediment in and around the barge during loading, worker contact with treated (solidified) sediment is unavoidable. Contact with impacted sediment by personnel may lead to acute and/or chronic health effects depending on the contaminant type, concentration, and exposure route.

Mitigation: Personnel working with the treated sediment will be equipped with appropriate PPE, and will be certified under OSHA 1910.120 and trained in decontamination, use of PPE and respirators, and waste containment procedures. The site-specific health and safety plan will also identify specific task hazard analyses to mitigate potential impacts to workers from contact with impacted sediment.

4.4.2 Overfilling Transport Vehicles, Increasing Potential to Spill onto the Roadway

Although the sediment at load-out will be solidified, overfill of transport vehicles can still lead to potential incidental spills of sediment onto the roadway. This has the potential to spread sediment-related impacts along the transport route.

Mitigation: Truck volumes will be limited to the rated load of the vehicle, and trucks will be covered and secured per Cal-DOT regulations during transport to the disposal facility. These regulations mitigate significant spillage from trucks during transport of sediment.

4.4.3 Operator Error Spilling Sediment During Loading

During loading of vehicles for off-site disposal, some sediment may fall from the loading bucket into the exterior of the vehicle or onto the hardscape of the loading area. This has the potential to impact soil, groundwater, or stormwater in the vicinity of the loading area, if not contained.

Mitigation: Trucks could be loaded within a constructed loading zone to confine sediment spilled during the loading process. In the process of exiting the dewatering/sediment drying area, the vehicles may be power washed to prevent cross-contamination onto the roadways. These processes will mitigate potential sediment migration from the loading area from spillage during loading.

4.4.4 Transport and Disposal of Hazardous Materials

The current project description anticipates that up to 15 percent (21,500 cubic yards) of the excavated sediment may be classified as California hazardous material and would be required to be transported to Kettleman Hills Landfill, located approximately 300 miles north of the site. There is the potential for spills or accident conditions to occur during transportation, resulting in the release of sediment-related impacts to soil or groundwater in the vicinity of the accident. Depending on the concentration of COCs within the sediment, there may also be the potential for health effects to receptors in the vicinity of the accident.

Small quantities of hazardous materials such as fuels and oils will be routinely transported to the Shipyard Sediment Site for ongoing operations and maintenance of equipment for the duration of the project.

Mitigation: The potentially hazardous dewatered dredged soils from San Diego Bay may be transported by truck to approved disposal facilities in California. A Hazardous Material Transportation Plan will be prepared in accordance with local, state, and federal transportation laws, and will include procedures such as hazardous waste profiling, packaging, manifesting, EPA ID numbers (generator, transporter, and disposal facility), and proper placarding and labeling. A Traffic Control Plan will be in effect for the transport and disposal of the dredged sediment. This Plan will provide for emergency vehicle access and right-of-way during project execution and mitigate potential impacts due to accidental spillage or traffic congestion.

4.5 Summary of Impacts

Potential impacts were identified related to the following aspects of the project:

a) Creation of a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

b) Creation of a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

c) Hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 miles of an existing or proposed school.

While the final mitigation measures employed in the execution of the project may be modified based on the final project design details, the potential mitigation measures described in this Technical Report are capable of mitigating these potential impacts to less than significant levels. These measures or modified mitigation measures capable of providing equivalent or greater protection will be in place during implementation of the project.

5. CUMULATIVE IMPACTS

The evaluation of potential cumulative impacts of the implementation of this project with other projects in and around San Diego Bay requires the evaluation of the project with respect to other projects which are anticipated to be implemented simultaneously. Although there are no other contaminated sediment dredging projects currently scheduled for implementation in the Bay, the San Diego Water Board anticipates that regularly scheduled maintenance dredging projects may occur in the Bay over the next several years.

To estimate the likely volume of these potential dredging actions, the San Diego Water Board has provided maintenance and environmental dredging records for the 11-year period from 1994 to 2005. These records show an average of approximately 245,000 cubic yards of material dredged from the Bay each year with yearly totals ranging from zero to 763,000 cubic yards. While the dredge volume proposed for this project (143,000 cubic yards) represents a significant dredge volume, the overall impacts related to dredging projects in San Diego Bay is expected to be within these historical ranges.

Although no specific environmental dredging projects have been identified, the San Diego Water Board expects several dredging projects may be initiated within the next ten years. Based on the conservative assumption that two similar-sized dredging projects occur during the dredging operations at the project site, the potential cumulative impacts related to hazards and hazardous materials may be significant without the implementation of mitigation measures.

Mitigation: If dredging and dewatering areas are located adjacent to each other, the dredge schedule should be staggered to control the amount of material being handled, dewatered, and transported to reduce the potential for accidents or incidents related to high traffic or working in close proximity. If dredging and dewatering activities are ongoing in separate parts of the Bay with distinct haul routes, there is little potential for cumulative adverse impacts related to hazards and hazardous materials.

6. REFERENCES

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FIGURES

APPENDIX A

PROJECT DESCRIPTION

APPENDIX B

EDR REPORTS

APPENDIX E

NOISE IMPACT ANALYSIS

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NOISE IMPACT ANALYSIS

SHIPYARD SEDIMENT REMEDIATION PROJECT

SAN DIEGO BAY, CALIFORNIA

LSA

May 2011

NOISE IMPACT ANALYSIS

SHIPYARD SEDIMENT REMEDIATION PROJECT

SAN DIEGO BAY, CALIFORNIA

Prepared by:

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614-4731
(949) 553-0666

LSA Project No. SWB1001A

May 2011

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1.0 EXECUTIVE SUMMARY

LSA Associates, Inc. (LSA) was retained to prepare a noise impact analysis for the proposed dredging of sediment adjacent to shipyards in the San Diego Bay, located in the City of San Diego and National City, California.

This noise impact analysis provides a discussion of the proposed project, the physical setting of the project area, and the regulatory framework for noise. The report evaluates potential noise impacts associated with the proposed project, and identifies mitigation measures recommended for potentially significant impacts.

Construction equipment used within the proposed staging areas would generate a maximum noise level, or L_{max}, of up to 87 dBA within Cesar Chavez Park and up to 75 dBA at the closest residences to the project site. Due to the size of the staging areas and the mobile nature of construction equipment, the construction activities would not exceed the City of San Diego's 75 dBA L_{eq} or the City of National City's 75 dBA L_{max} thresholds. Adherence to the Cities' construction hours would reduce the short-term noise impacts to below a level of significance.

The increase in traffic flow on the surrounding roads due to construction traffic is expected to be small. The project would add up to 100 daily truck trips to either 28th Street or Bay Marina Drive, less than 2 percent of the existing traffic volumes. Therefore, the associated increase in long-term traffic noise will not be perceptible.

The proposed project would not result in any increase in long-term on-site stationary or off-site mobile sources. Therefore, the proposed project would not result in a substantial permanent increase in ambient noise levels in the project vicinity, and impacts related to long-term operational noise sources are less than significant.

2.0 INTRODUCTION

2.1 INTRODUCTION

The proposed Shipyard Sediment Remediation Project (proposed project) is the dredging of sediment adjacent to shipyards in the San Diego Bay, the dewatering, solidification and possible solidification of the dredged material on-shore, potential treatment of decanted water and the transport of the removed material to an appropriate landfill for disposal. The purpose of the project is to implement a Tentative Cleanup and Abatement Order issued by the California Regional Water Quality Control Board, San Diego Region (hereinafter the San Diego Water Board). The San Diego Water Board is the Lead Agency under California Environmental Quality Act (CEQA) for the proposed project. The dredging will occur in an area of the Bay defined in the CAO. The San Diego Water Board is considering the use of one or more staging sites for the dewatering and treatment of the dredge, as further described in this project description. The sediment removal footprint and the optional staging sites comprise the project site for the purpose of this study.

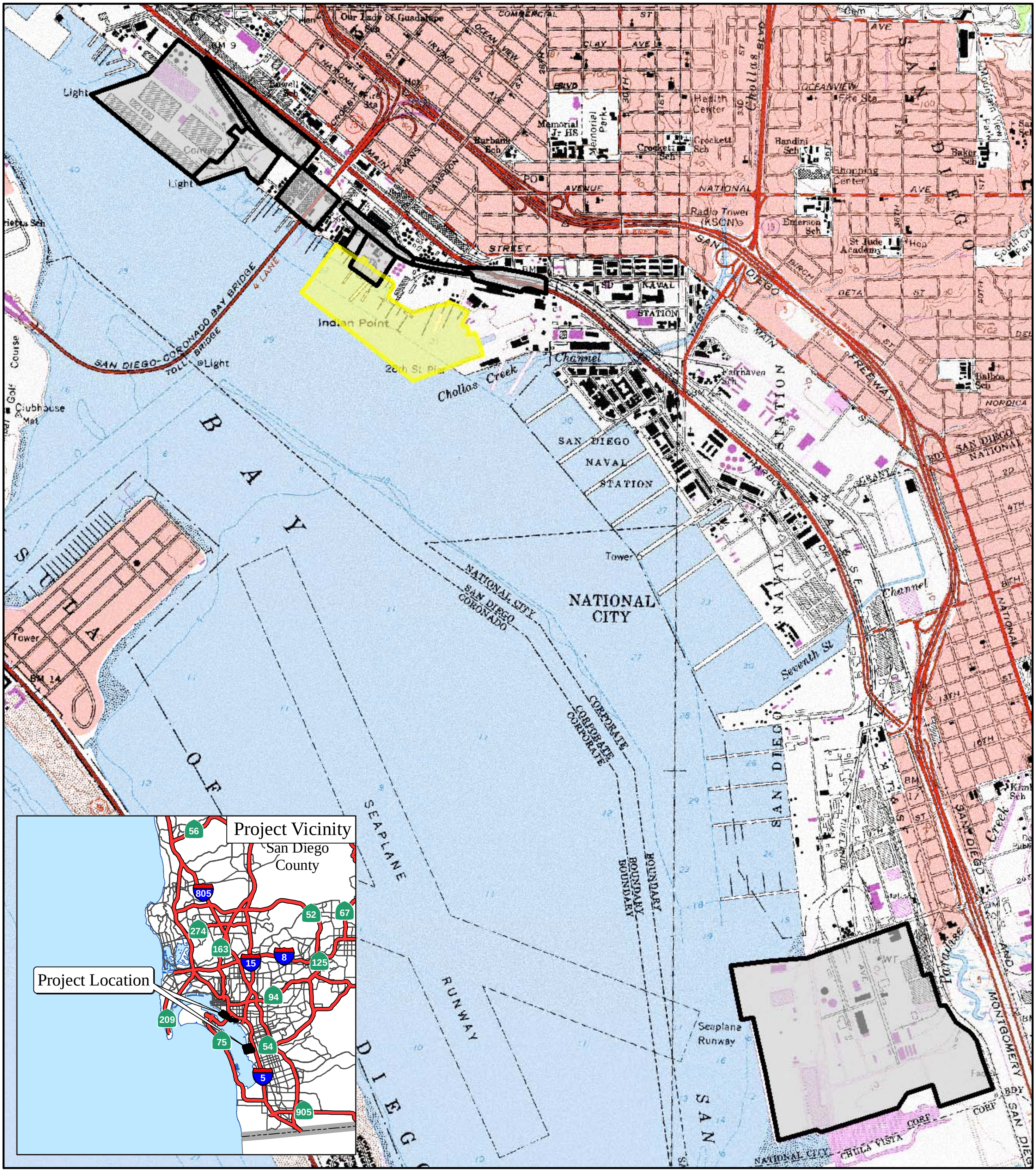
2.2 PROJECT LOCATION

The sediment removal site (Shipyard Sediment Site) is located along the eastern shore of central San Diego Bay, extending approximately from the Sampson Street Extension on the northwest to Chollas Creek on the southeast, and from the shoreline out to the San Diego Bay main shipping channel to the west (Figure 1, Project Location). The project consists of marine sediments in the bottom bay waters that contain elevated levels of pollutants above San Diego Bay background conditions. This area is hereinafter collectively referred to as the "Shipyard Sediment Site."

The Shipyard Sediment Site is more specifically bounded by the waters of R.E. Staite facility on the north, the 28th Street Pier on the south, the open waters and shipways of San Diego Bay on the west, and the shoreline of two shipyard facilities on the east (the BAE Systems San Diego Ship Repair Facility [BAE Systems] and the National Steel and Shipbuilding Company Shipyard Facility [NASSCO]). The Shipyard Sediment Site encompasses 63 water acres (46 within the NASSCO leasehold and 17 within the BAE leasehold[1]) of the NASSCO and BAE Systems leaseholds.

The removal of the marine sediments will require upland areas for dewatering, solidification and stockpiling of the materials and potential treatment of decant waters prior to offsite disposal. Therefore, in addition to the open waters of the Shipyard Sediment Site, five upland

1 Per the Exponent 2003 SI Report and the 2010 Tentative Cleanup and Abatement Order (CAO)



LSA

LEGEND

Shipyard Sediment Project Site

Potential Sediment Staging Areas

FIGURE 1

0 1250 2500 FEET

San Diego Sediment Project

Project Location

SOURCE: USGS 7.5' Quad - National City (1975), Point Loma (1994). CA

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areas have been identified by the San Diego Water Board as Potential Sediment Staging Areas. Each of the potential staging areas has more defined usable areas, which are illustrated in Figures 2 through 7 and further described below.

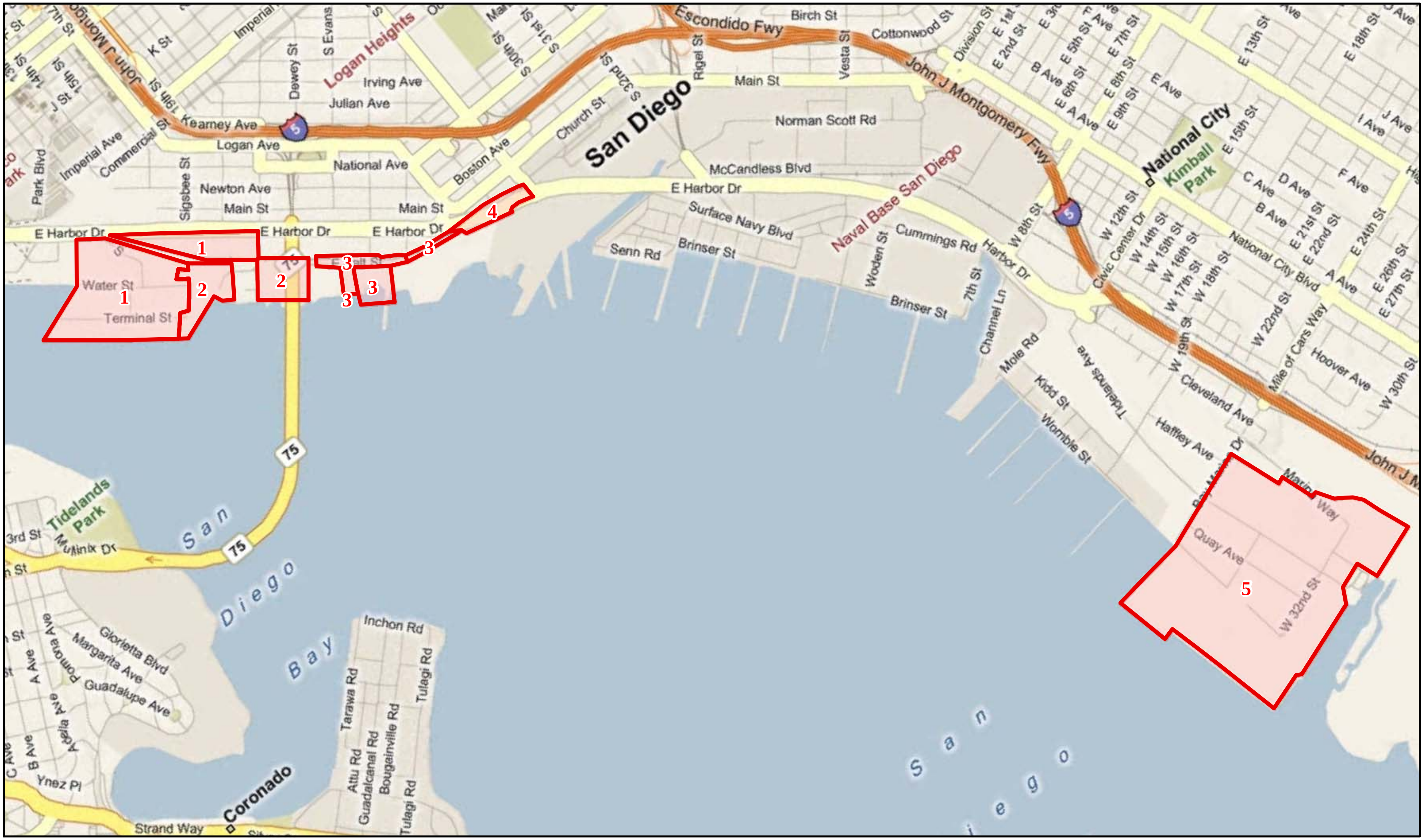
- Staging Area 1: 10th Avenue Marine Terminal and Adjacent Parking (approximately 49.66 potentially usable acres).
- Staging Area 2: Commercial Berthing Pier and Parking Lots Adjacent to Coronado Bridge (approximately 11.66 potentially usable acres).
- Staging Area 3: SDG&E/BAE/BAE and NASSCO Parking Lot (approximately 7.27 potentially usable acres).
- Staging Area 4: NASSCO/NASSCO Parking and Parking Lot North of Harbor Drive (approximately 3.85 potentially usable acres).
- Staging Area 5: 24th Street Marine Terminal and Adjacent Parking Lots (approximately 145.31 potentially usable acres).

2.3 PROJECT SETTING AND SITE DESCRIPTION

The project site is located under the planning jurisdiction of the San Diego Port District and is identified as District 4 in the certified Port Master Plan. The San Diego Port District is a special government entity, created in 1962 by the San Diego Unified Port District Act, California Harbors and Navigation Code, in order to manage San Diego Harbor and administer certain public lands along San Diego Bay. The Port District holds and manages as trust property on behalf of the People of the State of California, including the land occupied by NASSCO and BAE. The Port Master Plan water use designation within the limits of the proposed project is Industrial – Specialized Berthing.

San Diego Bay is designated as a State Estuary under Section 1, Division 18 (commencing with section 28000) of the Public Resources Code. The San Diego Bay shoreline between Sampson and 28th Streets is listed on the Clean Water Act section 303(d) List of Water Quality Limited Segments for elevated levels of copper, mercury, zinc, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) in the marine sediment. These pollutants are impairing the aquatic life, aquatic-dependent wildlife, and human health beneficial uses designated for San Diego Bay. The northeast boundary of the Shipyard Sediment Site occupies this shoreline.

The principal structural components within the Shipyard Sediment Site include the concrete bulkheads, piers and dry dock facilities associated with the two shipyard facilities. Bathymetry at the site varies substantially due to the presence of shipways, dry docks, and berths and ranges from -2 Mean Lower Low Water (MLLW) along the bulkheads to -70 feet MLLW at the BAE dry dock sump area. -2 MMLW as per Merkel & Associates Sept 16, 2010 BAE dry dock sump maintenance dredging project pre-construction eelgrass survey report.



LSA

LEGEND

Potential Sediment Staging Areas

FIGURE 2

0 1250 2500
FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Locations Index

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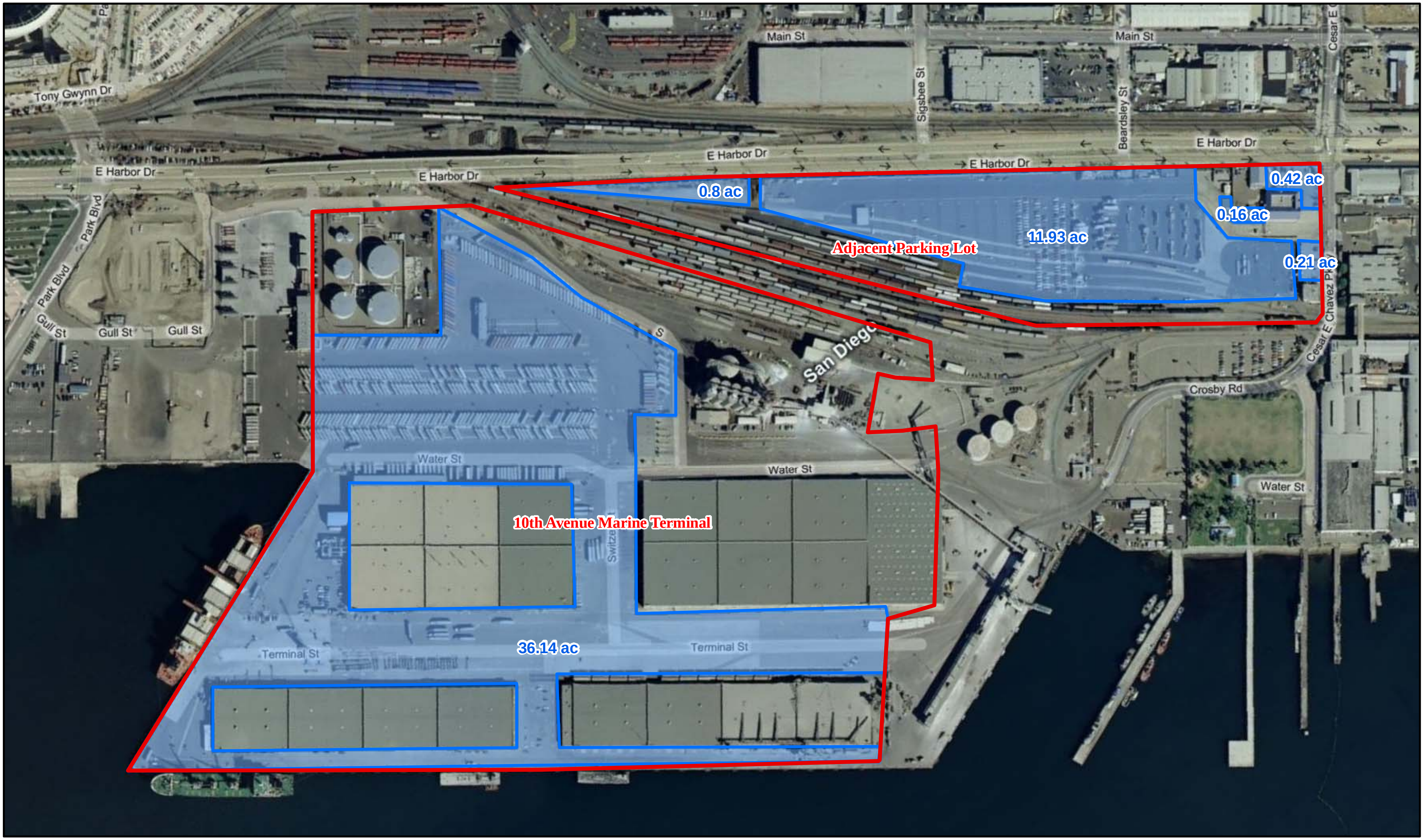

LSA

FIGURE 3

LEGEND

Potential Sediment Staging Area 1

Usable Areas (with Acreage)

0 225 450

FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Area 1
10th Avenue Marine Terminal and Adjacent Parking Lot

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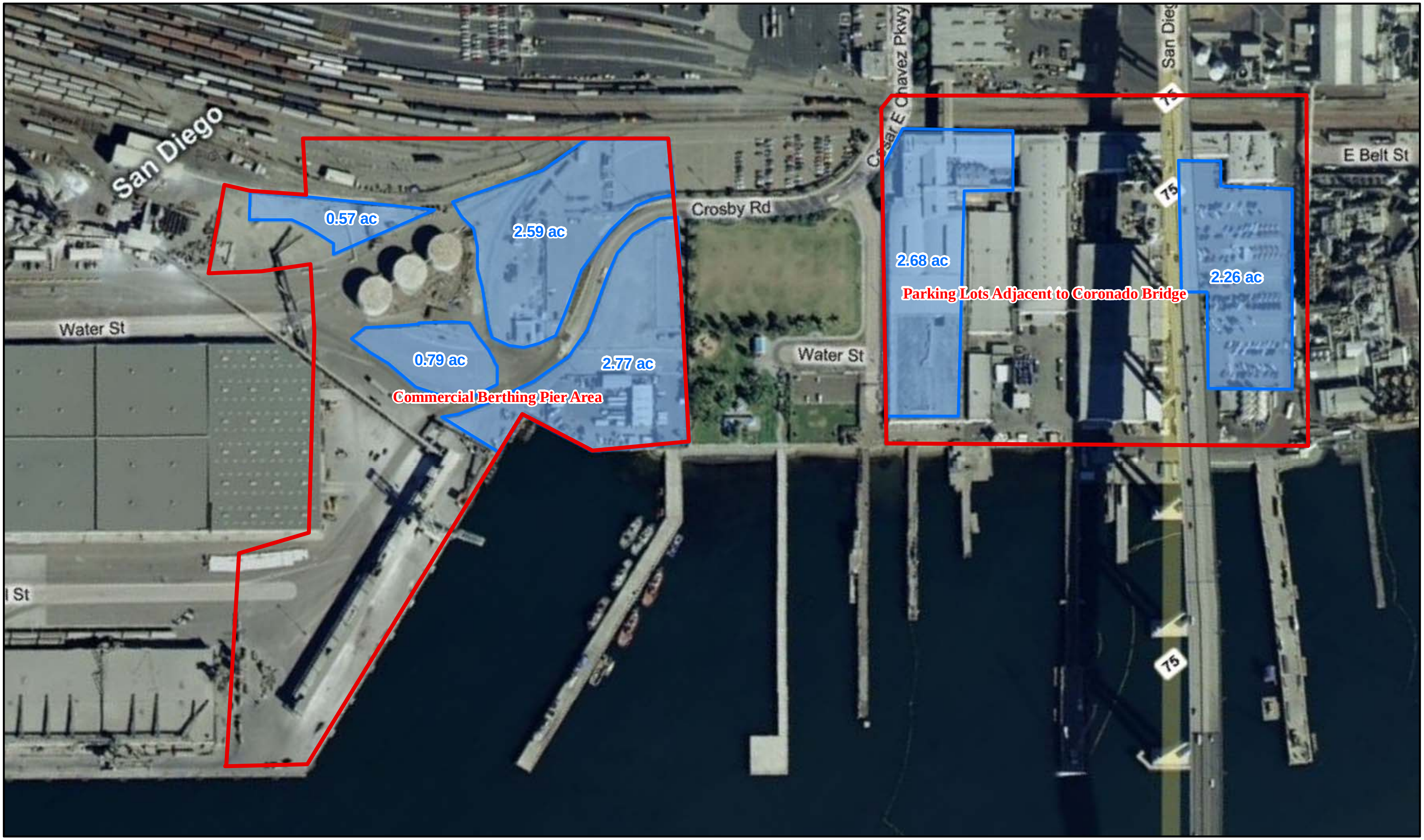

LSA

FIGURE 4

LEGEND

Potential Sediment Staging Area 2

Usable Areas (with Acreage)

0 150 300
FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Area 2
Commercial Berthing Pier Area and Parking Lots Adjacent to Coronado Bridge

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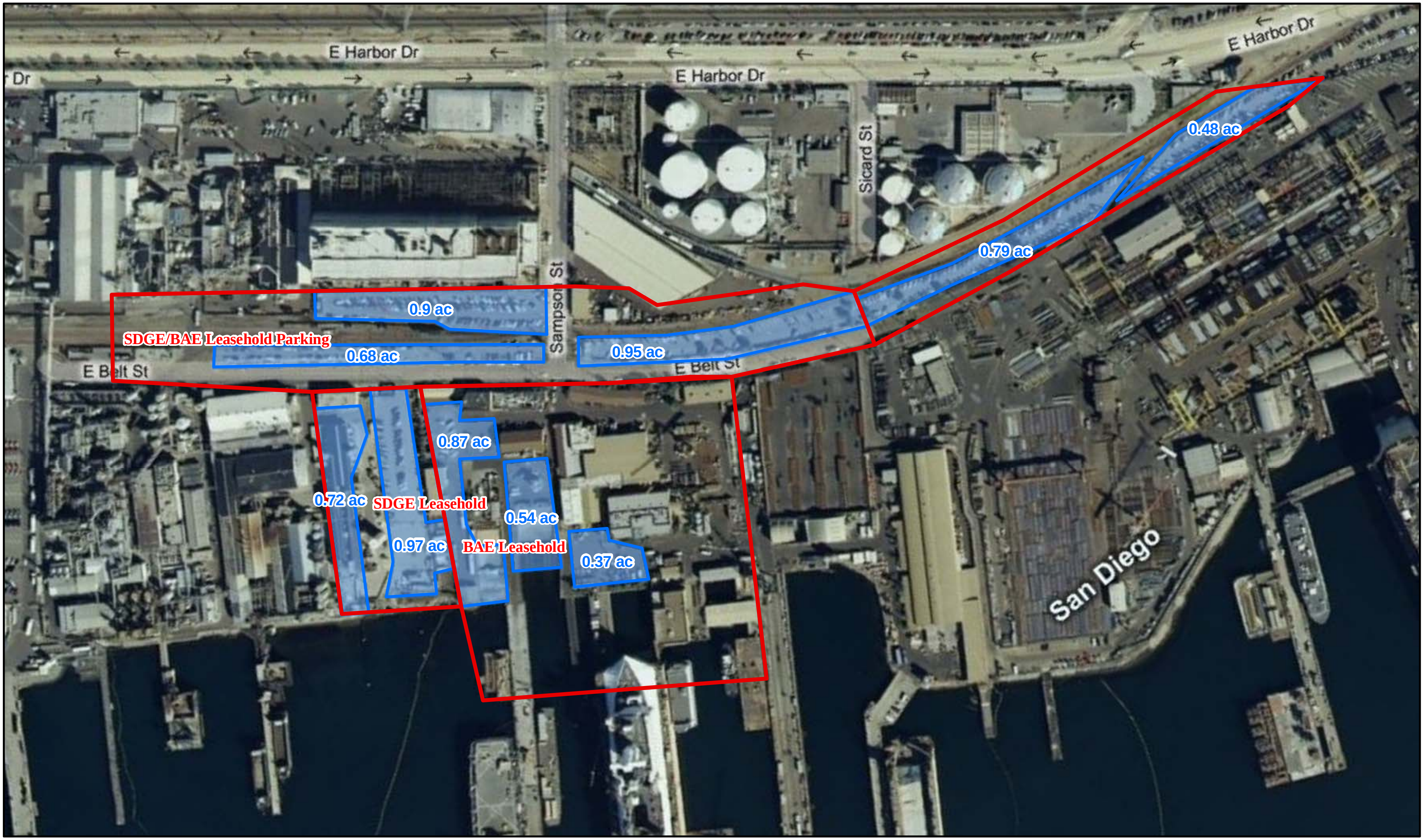

L S A

LEGEND

Potential Sediment Staging Area 3

Usable Areas (with Acreage)

0 150 300

FEET

SOURCE: Bing Maps (2008)

FIGURE 5

San Diego Sediment Project

Potential Sediment Staging Area 3
SDG&E Leasehold/BAE Leasehold/BAE and NASSCO Parking

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LSA

FIGURE 6

LEGEND

Potential Sediment Staging Area 4

Usable Areas (with Acreage)

N

0 100 200

FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Area 4
NASSCO Parking and Parking Area North of Harbor Drive

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LEGEND

Potential Sediment Staging Area 5

Usable Areas (with Acreage)

FIGURE 7

0 400 800
FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Area 5
24th Street Marine Terminal and Adjacent Parking Areas

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The marine habitat within the Shipyard Sediment Site consists of 63 open water acres (46 within the NASSCO leasehold and 17 within the BAE leasehold) containing both vegetated and unvegetated subtidal soft bottom habitats, pier pilings and bulkhead walls. The vegetated habitat species include sparse beds of eelgrass (*Zostera marina*). The entire extent of the Shipyard Sediment Site shoreline is artificially stabilized, generally consisting of a vertical sheet pile bulkhead and a seawall. The marine habitat types include vertical bulkhead walls and dock structures, vegetated and non-vegetated soft bottom subtidal habitats, and open water. These habitats support marine plants, invertebrates, and fishes.

The five potential Staging Areas consist primarily of leasehold lands and associated parking areas in the immediate vicinity of the Shipyard Sediment Site. The actual usable areas within each potential Staging Area are comprised of open, paved portions that could be used for the dewatering, solidifying and drying of the dredged marine sediments. Staging Areas 1 through 4 are located within the City of San Diego and are designated in the City's General Plan as Industrial Employment. Staging Area 5 is located within the City of National City and is designated in the City's existing General Plan as Industrial – Tidelands Manufacturing and is under the jurisdiction of the San Diego Unified Port District. National City is currently updating their General Plan; the proposed Land Use designation for Staging Area 5 in the updated General Plan is San Diego Unified Port District (land uses governed by the Sand Diego Port Master Plan).

2.4 PROJECT BACKGROUND

The California Regional Water Quality Control Board (RWQCB), San Diego Region, hereinafter referred to as the San Diego Water Board, alleges that several agencies and/or parties caused or permitted the discharge of waste to the Shipyard Sediment Site resulting in the accumulation of waste in the marine sediment. The contaminated marine sediment has caused conditions of contamination or nuisance in San Diego Bay that adversely affect aquatic life, aquatic-dependent wildlife, human health, and San Diego Bay beneficial uses. The San Diego Water Board determined that issuance of a Cleanup and Abatement Order (CAO) was the appropriate regulatory tool to use for correcting the impairment at the Shipyard Sediment Site.

CAOs are issued under the authority of the California Water Code (Section 13304). As defined in the State Water Board's Water Quality Enforcement Policy (adopted November 17, 2009), "CAOs may be issued to any person who has discharged or discharges waste into State waters in violation of any waste discharge requirement or other order or prohibition issued by a Regional Water Board or the State Water Board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the State and creates, or threatens to create, a condition of pollution or nuisance (discharger). The CAO requires the discharger to clean up the waste or abate the effects of the waste, or both, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including, but not limited to, overseeing cleanup and abatement efforts."

A CAO requires dischargers to clean up the pollution to background levels or the best water quality that is reasonable. At a minimum, cleanup levels must fully support beneficial uses, unless the Regional Water Board allows a containment zone. The CAO determined that cleaning up to a background sediment quality level at the Shipyard Sediment Site is economically infeasible. Therefore, the CAO established alternative cleanup levels for the project that are the lowest technologically and economically achievable levels, as required under the California Code of Regulations Title 23 section 2550.4(e). These alternative levels are described below in the Project Characteristics section.

This Program EIR addresses the cleanup project as identified in the Tentative Cleanup and Abatement Order No. R9-2011-0001, dated September 15, 2010.

2.5 PROJECT GOALS AND OBJECTIVES

The primary goal of the project is to improve water quality in San Diego Bay, consistent with:

- Protect the quality of the waters of San Diego Bay for use and enjoyment by the people of the state by executing a shipyard sediment clean-up project consistent with the provisions of Tentative Cleanup and Abatement Order (CAO) No. R9-2011-0001.
- Attain cleanup levels as included in the Tentative CAO No. R9-2011-0001 (judged to be technologically and economically feasible as defined in Section 2550.4 of Title 23 of the CCR, pursuant to Resolution No. 92-49).
- Remediate areas identified in Attachment 2 of Tentative CAO No. R9-2011-0001.
- Minimize adverse effects to aquatic life beneficial uses, including Estuarine Habitat (EST), Marine Habitat (MAR), and Migration of Aquatic Organisms (MIGR).
- Minimize adverse effects to aquatic-dependent wildlife beneficial uses, including Wildlife Habitat (WILD), Preservation of Biological Habitats of Special Significance (BIOL), and Rare, Threatened, or Endangered Species (RARE).
- Minimize adverse effects to human health beneficial uses, including Contact Water Recreation (REC-1), Non-contact Water Recreation (REC-2), Shellfish Harvesting (SHELL), and Commercial and Sport Fishing (COMM).
- Implement a clean up plan that will have long-term effectiveness.
- Minimize adverse effects to the natural and built environment.
- Avoid or minimize adverse impacts to residential areas.

- Result in no long term loss of use of shipyard and other San Diego Bay-dependent facilities.
- Minimize short term loss of use of shipyard and other San Diego Bay-dependent facilities.

2.6 PROJECT CHARACTERISTICS

The project addressed in this Program EIR is the implementation of Tentative CAO No. R9-2011-000, which requires that remedial actions be implemented within the Shipyard Sediment Site. Remedial actions may include dredging, capping, and/or natural recovery depending upon a number of factors, including levels of contamination in the sediment and site accessibility. The CAO determined that dredging and disposal of sediments is the proposed remedy for approximately 15.2 acres of the site and is expected to generate approximately 143,400 cubic yards of contaminated marine sediment. The CAO also indicate that if cleanup criteria for chemical constituents of concern in the sediments cannot be attained by dredging (for example, contaminants extend more deeply than anticipated or there is an obstacle due to a hard substrate) some dredge areas may be capped in-place with sand. In addition to the 15.2 acres targeted for dredging, approximately 2.3 acres of the project site are inaccessible or under-pier areas that will be remediated by one or more methods other than dredging, most likely by sand capping.

There are two scheduling options for completion of the remedial action. The first scheduling option is expected to take 2 to 2.5 years to complete. Under this option, the dredging operations would occur for 7 months of the year and would cease from April through August during the endangered California least tern breeding season.

The second option is to implement the remedial plan with continuous dredging operations, which would be expected to take approximately 12.5 months to complete. This scenario assumes that the dewatering, solidification and stockpiling of the materials would occur simultaneously and continuously with the dredging. Also assumed under this compressed schedule option is that dredging operations could proceed year-round, including during the breeding season of the endangered California least tern, which ranges from April through August of each year.

Both scheduling options would be followed by a period of post-remedial monitoring. The preferred schedule will be determined during the final design phase. However, both schedule options are included in the analysis for the technical studies and Program EIR.

The project includes the dredging and/or capping of the contaminated soils; vessel transport to shore; dewatering, stockpiling and testing of dredged materials at a landside staging location; and truck transport of dredge materials to the appropriate landfill disposal facility. Each of these components is further described below.

Dredging and Capping Operations

The project involves environmental dredging which, unlike navigational or construction dredging, is performed specifically for the removal of contaminated sediment while minimizing the spread of contaminants to the surrounding environment during dredging operations. The proposed project includes the dredging and removal of approximately 143,400 cubic yards of contaminated sediment from the Shipyards Sediment Site. The cubic yard amount was identified in the CAO and includes a one foot over-dredge assumption.

Silt curtains and/or air curtains will be placed around the dredge area, including the dredge barges. The silt curtain will consist of a geotextiles fabric curtain with a floatation boom at the upper hem and ballast weights at the lower hem. The silt curtain will act as a physical barrier that will limit access to the portions of the site where the dredging operations are occurring. The silt curtain will also contain any resuspended particles from migrating outside of the active dredging area. Air curtains may be used in conjunction with silt curtains to contain resuspended sediment, to enhance worker safety, and allow barges to transit into and out of the work area without the need to open and close silt curtain gates. Air curtains are formed by laying a perforated pipe along the mudline and pumping air continuously through the piping. The upwelling of the tiny bubbles to the surface of the water prevents fine-grained sediments from passing across the line of the pipe.

It is anticipated that the dredging would utilize a derrick barge equipped with a closed environmental bucket such as the Cable Arm® Environmental Clamshell in order to maintain water quality. The dredge material will be placed on material barges and transported with the help of tug boats to a landside staging area. All barges will be outfitted with a water recovery system to collect the water deposited on the barges during dredging operations; the objective is to ensure that no water collected during the operations re-enters the Bay.

Due to the presence of infrastructure, such as piers and pilings, dredging is constrained in several locations within the project site. Therefore, contaminated areas under piers and pilings will be remedied through subaqueous, or in-situ, capping. In-situ capping is the placement of clean material on top of the contaminated sediment. The capping material is typically clean sand, silty to gravelly sand, and/or armoring material. Effective capping requires sufficient cap thickness, careful cap placement to avoid disturbance, and maintenance to ensure cap integrity from future disturbances. Sand capping would involve the transport of capping material to the site (possibly via truck or barge) and placement of the materials over contaminated sediment. The capping operations will require a materials barge outfitted with a stone slinger truck, hoppers, and conveyors to move and place the capping materials over the contaminated marine sediments.

Onshore Dewatering and Treatment

The proposed project requires a landside sediment management site with sufficient space and access to stockpile, dewater, and transport the removed dredge material. Although the exact area required for sediment management will be determined during the final design phase, it is estimated that 2 to 2.5 acres would be required. Five potential staging areas have been identified.

The staging area will require site preparation and construction of a pad. The site will be graded and compacted (if necessary) and a sealing liner will be put in place. An asphalt pad will then be constructed. The drying area will be surrounded by k-rails and sealed with foam and impervious fabric to form a confined area.

The dredged sediment, depending upon physical characteristics, will either be off-loaded from the materials barge by an excavator and put into dump trucks for placement in the staging area or treated with pozzilonics in the barge, then off-loaded into trucks for placement in the staging area for curing and sampling. In either event, the sediment will then be mixed with a cement-based reagent (pozzilonics) to accelerate the drying. The sediment will be spread out and rotated frequently to further accelerate the drying process. The drains located in the drying area will be isolated from the rest of the stormwater system at the site. If the excess water from the drying area does not meet industrial wastewater permit requirements, and cannot be discharged into the City sewage system, the water will be dealt with as contaminated waste and removed from the site by a licensed waste hauler. All collected water will be tested and disposed of in accordance with local, state, and federal requirements. After drying, soil sampling will be conducted and all dredged material will be loaded directly onto trucks for disposal at an approved upland landfill.

Transportation and Disposal

Once the dredge materials have been dried and tested, they will be loaded onto trucks for disposal at an approved landfill. Based on input from the Shipyards, it has been assumed that 85 percent of the material will be transported from the staging area to Otay Landfill, approximately 15 miles southeast of the Shipyard Sediment Site. Trucks departing from potential Staging Areas 1 through 4 would access the I-5 south via E. Harbor Drive and 28th Street; trucks departing from Staging Area 5 would access the I-5 south either directly from Bay Marina Drive or from W. 32nd Street to Marina Way to Bay Marina Drive. The preferred route to Otay Landfill is via I-5 south to Highway 54 east, to I-805 south (Figure 8). Although the sediment is not known to be classified as California hazardous material, it will be tested upon removal and prior to disposal. It is assumed for the purposes of this study that up to 15% of the material will require transport to a Class III facility, most likely the Kettleman Hills Landfill in Kings County, California, near Bakersfield. Based on the excavation quantity of 143,400 cubic yards, and accounting for an additional 15 percent of bulk material due to the dewatering and treatment process, it is estimated that up to 250 truck

L S A

LEGEND

Census Tracts

Census Block Groups

Potential Sediment Staging Areas

Shipyard Sediment Project Site

Potential Haul Routes

0 1000 2000

FEET

SOURCE: Bing Maps (2008), U.S. Census Bureau (2000)

R:\SWB1001\GIS\Census_HaulRoutes_FIG8.mxd (3/31/2011)

FIGURE 8

San Diego Sediment Project

Study Area Census Tracts and Haul Routes trips per week could be required over an approximately 12.5 month period to remove the material. The total quantity of treated sediment to be hauled is approximately 164,910 cy. The total number of trips is estimated to be 13,500 trips, with approximately 12–13 cy/trip. These estimates will be finalized during the design phase.

2.7 METHODOLOGY RELATED TO NOISE IMPACT ASSESSMENT

Evaluation of noise impacts associated with a proposed project typically includes the following:

- Determine the short-term construction noise impacts on on-site and off-site noise-sensitive uses with industry-recognized noise emission levels for construction equipment
- Determine the long-term operational noise impacts, including vehicular traffic and aircraft activities, on on-site and off-site noise-sensitive uses
- Determine the required mitigation measures to reduce short-term and long-term noise impacts from all sources

2.8 CHARACTERISTICS OF SOUND

Sound is increasing to such disagreeable levels in our environment that it can threaten our quality of life. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep. To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect our ability to hear. Pitch is the number of complete vibrations or cycles per second of a wave that result in the tone's range from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment and is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

Measurement of Sound

Sound intensity is measured through the A-weighted scale (i.e., dBA) to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. For example, 10 decibels (dB) are 10 times more intense than 1 dB, 20 dB are 100 times more intense, and 30 dB are

1,000 times more intense. Thirty decibels (30 dB) represent 1,000 times as much acoustic energy as 1 dB. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the loudness of the sound. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source such as highway traffic or railroad operations, the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases 4.5 dB for each doubling of distance.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. However, the predominant rating scales for human communities in the State of California are the Equivalent-Continuous sound level (L_{eq}) and Community Noise Equivalent (CNEL) based on A-weighted decibels (dBA). L_{eq} is the total sound energy of time-varying noise over a sample period. CNEL is the time-varying noise over a 24-hour period, with a weighting factor of 5 dBA applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and with a weighting factor of 10 dBA from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). The noise adjustments are added to the noise events occurring during the more sensitive hours. Day-night average noise (L_{dn}) is similar to the CNEL but without the adjustment for nighttime noise events. CNEL and L_{dn} are normally exchangeable and within 1 dB of each other. Other noise-rating scales of importance when assessing annoyance factor include the maximum noise level, or L_{max}, and percentile noise exceedance levels, or L_N. L_{max} is the highest exponential time-averaged sound level that occurs during a stated time period. It reflects peak operating conditions and addresses the annoying aspects of intermittent noise. L_N is the noise level that is exceeded "N" percent of the time during a specified time period. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the lowest noise level experienced during a monitoring period. It is normally referred to as the background noise level.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions and thereby affecting blood pressure, functions of the heart, and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. Dizziness and loss of equilibrium may occur between 160 and 165 dBA. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying less developed areas.

Table A lists “Definitions of Acoustical Terms.” Table B shows “Common Sound Levels and Their Sources.” Table C shows “Land Use Compatibility for Exterior Community Noise” recommended by the California Department of Health, Office of Noise Control.

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dBA to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all encompassing noise associated with a given environment at a specified time, usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, 1991.

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environment	Subjective Evaluation
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a Few Feet Away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	
Near Freeway Auto Traffic	70	Moderately Loud	Baseline
Average Office	60	Quiet	One-half as loud
Suburban Street	55	Quiet	
Light Traffic; Soft Radio Music in Apartment	50	Quiet	One-quarter as loud
Large Transformer	45	Quiet	
Average Residence without Stereo Playing	40	Faint	One-eighth as loud
Soft Whisper	30	Faint	
Rustling Leaves	20	Very Faint	
Human Breathing	10	Very Faint	Threshold of Hearing
	0	Very Faint	

Source: Compiled by LSA Associates, Inc., 1998.

Table C: Land Use Compatibility for Exterior Community Noise

Land Use Category	Noise Range (L_{dn} or CNEL), dB			
	I	II	III	IV
Passively-used open spaces	50	50–55	55–70	70+
Auditoriums, concert halls, amphitheaters	45–50	50–65	65–70	70+
Residential: low-density single-family, duplex, mobile homes	50–55	55–70	70–75	75+
Residential: multifamily	50–60	60–70	70–75	75+
Transient lodging: motels, hotels	50–60	60–70	70–80	80+
Schools, libraries, churches, hospitals, nursing homes	50–60	60–70	70–80	80+
Actively used open spaces: playgrounds, neighborhood parks	50–67	—	67–73	73+
Golf courses, riding stables, water recreation, cemeteries	50–70	—	70–80	80+
Office buildings, business commercial and professional	50–67	67–75	75+	—
Industrial, manufacturing, utilities, agriculture	50–70	70–75	75+	—

Source: Office of Noise Control, California Department of Health, 1976.

Noise Range I—Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Noise Range II—Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Noise Range III—Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Noise Range IV—Clearly Unacceptable: New construction or development should generally not be undertaken.

CNEL = community noise equivalent level
dB = decibels
L_{dn} = day-night average noise level

3.0 SETTING

3.1 SENSITIVE LAND USES IN THE PROJECT VICINITY

Certain land uses are considered more sensitive to noise than others. Examples of these include residential areas, educational facilities, hospitals, childcare facilities, and senior housing. The sensitive land uses within the vicinity of the proposed project include Cesar Chavez Park located adjacent to Staging Areas 1 and 2, the single family residences along Main Street approximately 300 feet from Staging Area 4, and the multifamily residences adjacent the haul route along 28^{th} Street.

3.2 OVERVIEW OF THE EXISTING NOISE ENVIRONMENT

The primary existing noise sources in the project area are transportation facilities. Traffic on Interstate 5 (I-5), Harbor Drive, and other local arterials, along with operations within the shipyard and train yard are the dominant sources contributing to area ambient noise levels.

3.3 THRESHOLDS OF SIGNIFICANCE

A project will normally have a significant noise-related effect if it will substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the project site are the criteria in the City of San Diego's Progress Guide and General Plan (which are summarized in Significance Determination Thresholds, CEQA, City of San Diego Development Services Department, Land Development Review Division, Environmental Analysis Section, 2007) and Section 12.10 of the City of National City's Municipal Code.

3.3.1 City of San Diego

City of San Diego Progress Guide and General Plan, CEQA Significance Determination Thresholds. The City has adopted the following applicable significance threshold:

- Temporary construction noise that exceeds 75 dBA L_{eq}(1) at a sensitive receptor would be considered significant. Construction noise levels measured at or beyond the property lines of any property zoned residential shall not exceed an average sound level greater than 75 dB during the 12-hour period from 7:00 a.m. to 7:00 p.m. In addition, construction activity is prohibited between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with the exception of Columbus Day and Washington's Birthday, or on Sundays, that would create disturbing, excessive, or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator in conformance with San Diego Municipal Code Section 59.5.0404.

3.3.1 City of National City

City of National City Noise Control Ordinance. Section 12.10.160 states that it is unlawful to operate or to allow or cause the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on weekends or holidays. In addition, noise from construction or demolition activities shall not exceed the maximum noise levels listed in Table D.

Table D: Construction Noise Thresholds (dBA, L_{max})

	Type I Areas - Residential	Type II Areas – Semi-Residential/Commercial
Mobile Equipment	75	85
Stationary Equipment	60	70

Source: City of National City, Municipal Code, 2011.

4.0 IMPACTS AND MITIGATION MEASURES

4.1 SHORT-TERM CONSTRUCTION-RELATED IMPACTS

4.1.1 Short-Term Construction-Related Noise Impacts

Two types of short-term noise impacts would occur during project construction. The first is the increase in traffic flow on local streets, associated with the transport of workers, equipment, and materials to and from the project site. The pieces of heavy equipment to be utilized during construction will be moved to the site and remain for the duration of each construction phase. The increase in traffic flow on the surrounding roads due to construction traffic is expected to be small. The project would add up to 100 daily truck trips to either 28th Street or Bay Marina Drive, less than 2 percent of the existing traffic volumes. The associated increase in long-term traffic noise will not be perceptible. However, there will be short-term intermittent high noise levels associated with trucks passing by from the project site.

The second type of short-term noise impact is related to the noise generated by heavy equipment operating within the project area. The proposed project will be divided into multiple phases throughout project area. The activities that will occur during these phases will include:

- Debris and Pile Removal
- Dredging of the Project Site
- Landside Staging Area – Pad Construction
- Landside Staging Area – Operations
- Covering of Sediment Near Structures

The following construction equipment will be required to complete the above tasks:

- Bulldozers
- Loaders
- Tug Boats
- Excavators
- Trucks
- Cranes
- Paving Equipment

- Rollers
- Rock Slingers
- Barges

Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table E lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor.

Table E: Typical Construction Equipment Noise Levels

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 feet)	Suggested Maximum Sound Levels for Analysis (dBA at 50 feet)
Pile Drivers, 12,000 to 18,000 ft-lb/blow	81–96	93
Rock Drills	83–99	96
Jackhammers	75–85	82
Pneumatic Tools	78–88	85
Pumps	74–84	80
Scrapers	83–91	87
Haul Trucks	83–94	88
Cranes	79–86	82
Portable Generators	71–87	80
Rollers	75–82	80
Dozers	77–90	85
Tractors	77–82	80
Front-End Loaders	77–90	86
Hydraulic Backhoe	81–90	86
Hydraulic Excavators	81–90	86
Graders	79–89	86
Air Compressors	76–89	86
Trucks	81–87	86

Source: Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman, 1987.
dBA = A-weighted decibels
ft-lb/blow = foot-pounds per below

The following sensitive land uses are located within the vicinity of the proposed construction activities.

Cesar Chavez Park. Cesar Chavez Park is located approximately 75 feet from the edge of Staging Area 2 and 250 feet from the edge of Staging Area 1. Mobile equipment within Staging Area 2 would operate from 75 to 800 feet from Cesar Chavez Park. Standard construction equipment that would generate up to 86 dBA L_{max} at a distance of 50 ft would be required within the staging areas. Multiple construction equipment operating at the same time typically generates noise levels of up to 91 dBA L_{max} at 50 feet. The noise level from activities within Staging Area 2 would range from 67 to 87 dBA L_{max}. Mobile equipment within Staging Area 1 would operate from 250 to 2000 feet from Cesar Chavez Park. The noise level from activities within Staging Area 1 would range from 59 to 77 dBA L_{max}. Due to the size of the staging areas and the intermittent nature of the on-site activities, the 12 hour average noise level is not expected to exceed the City's 75 dBA L_{eq} threshold.

Residential Developments. The closest residences within the City of San Diego to the staging areas are the single-family residences along Main Street. These residences are located at a distance of approximately 300 feet from Staging Area 4. Mobile equipment within Staging Area 4 would operate within 300 to 800 feet of these residences. Noise levels from construction activities within Staging Area 4 would range from 67 to 75 dBA L_{max}. As the maximum noise level is projected to be 75 dBA or lower, the 12 hour average noise level would not exceed the City's 75 dBA L_{eq} threshold.

The closest residences within the City of National City to the staging areas are the single-family residences along Cleveland Avenue. These residences are located at a distance of approximately 750 feet from Staging Area 5. Mobile equipment within Staging Area 5 would operate within 750 to 3,500 feet of these residences. Noise levels from construction activities within Staging Area 5 would range from 54 to 67 dBA L_{max}. These noise levels would not exceed the City of National City's 75 dBA L_{max} threshold.

4.2 LONG-TERM NOISE IMPACTS

Long-term noise impacts are associated with any change in permanent use of the project site by on-site stationary and off-site mobile sources. The proposed project would not result in any increase in long-term on-site stationary or off-site mobile sources. Therefore, the proposed project would not result in a substantial permanent increase in ambient noise levels in the project vicinity, and impacts related to long-term operational noise sources are less than significant.

4.3 MITIGATION MEASURES

4.3.1 Construction Impacts

A. The City of San Diego Noise Control Officer shall ensure that construction activity is prohibited between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with the exception of Columbus Day and Washington's Birthday, or on Sundays, that would create disturbing, excessive, or offensive noise unless a permit has been applied for and granted beforehand by the Noise Abatement and Control Administrator in conformance with San Diego Municipal Code Section 59.5.0404.

B. The City of National City Noise Control Officer shall ensure that construction activity is prohibited between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on weekends or holidays as specified in Section 12.10.160 of the City of National City Municipal Code.

C. The following measures can be implemented to reduce potential construction noise impacts on nearby sensitive receptors:

   1. During all site excavation and grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.

   2. The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.

   3. The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.

4.3.2 Level of Significance after Mitigation

The mitigation measures identified above would reduce temporary construction-related noise impacts to below a level of significance.

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APPENDIX F

MARINE BIOLOGICAL RESOURCES ASSESSMENT TECHNICAL REPORT

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Prepared for

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Marine Biological Resources Assessment

Technical Report

Shipyard Sediment Remediation Site
National Steel and Shipbuilding Company (NASSCO)
BAE Systems San Diego Ship Repair, Inc.

Prepared by

Keith Kroeger

Howard Cumberland

Geosyntec consultants

engineers | scientists | innovators

10875 Rancho Bernardo Road, Suite 200
San Diego, California 92127

4 May 2011

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1. INTRODUCTION

The proposed project is the dredging of sediment adjacent to shipyards in the San Diego Bay, the dewatering and possible solidification of the dredged material on-shore, potential treatment of decanted water, and the transport of the removed material to an appropriate landfill for disposal. The purpose of the project is to implement a Tentative Cleanup and Abatement Order (CAO) issued by the California Regional Water Quality Control Board, San Diego Region (hereinafter the San Diego Water Board). The San Diego Water Board is the Lead Agency under California Environmental Quality Act (CEQA) for the proposed project. The dredging will occur in an area of the Bay defined in the Tentative CAO. The San Diego Water Board is considering the use of one or more staging sites for the dewatering and treatment of the dredge material, as further described in this project description. The sediment remediation footprint and the optional staging sites comprise the project site for the purpose of this study.

There are two scheduling options for completion of the remedial action. The first scheduling option is expected to take 2 to 2.5 years to complete. Under this option, the dredging operations would occur for 7 months of the year and would cease from April through August during the endangered California least tern breeding season.

The second option is to implement the remedial plan with continuous dredging operations, which would be expected to take approximately 12.5 months to complete. Also assumed under this compressed schedule option is that dredging operations could proceed year-round, including during the breeding season of the endangered California least tern, which ranges from April through August of each year.

Both scheduling options would be followed by a period of post-remedial monitoring. The preferred schedule will be determined during the final design phase. However, both schedule options are included in the analysis for this technical study.

1.1 Project Location

The sediment removal site is located along the eastern shore of central San Diego Bay, extending approximately from the Sampson Street Extension on the northwest to Chollas Creek on the southeast, and from the shoreline out to the San Diego Bay main shipping channel to the west (Figure 1). The project consists of the removal of marine sediments in the bottom bay waters that contain elevated levels of pollutants above San Diego Bay background conditions. This area is hereinafter collectively referred to as the “Shipyard Sediment Site”.

The Shipyard Sediment Site is more specifically bounded by the waters of R.E. Staite facility on the north, the 28th Street Pier on the south, the open waters and shipways of San Diego Bay on the west, and the shoreline of three leaseholds on the east (San Diego Gas & Electric Co., and two shipyard facilities on the east; the BAE Systems San Diego Ship Repair Facility [BAE Systems] and the National Steel and Shipbuilding Company Shipyard Facility [NASSCO]). The Shipyard Sediment Site (also referred to as the Proposed Remedial Footprint in the Draft Technical Report for Tentative CAO) is comprised of approximately 15.2 acres subject to dredging and 2.3 acres subject to clean sand cover, primarily under piers. The project consists of marine sediments in the bottom bay waters that contain elevated levels of pollutants above San Diego Bay background conditions. The removal of the marine sediments will require upland areas for dewatering, solidification and stockpiling of the materials and potential treatment of decant waters prior to offsite disposal. Therefore, in addition to the open waters of the Shipyard Sediment Site, five upland areas have been identified by the San Diego Water Board as Potential Sediment Staging Areas. Each of the potential staging areas has more defined usable areas, which are presented in Figure 2 and further described below.

- Staging Area 1 – 10th Avenue Marine Terminal and Adjacent Parking (approximately 49.66 potentially usable acres)
- Staging Area 2 – Commercial Berthing Pier and Parking Lots Adjacent to Coronado Bridge (approximately 11.66 potentially usable acres)
- Staging Area 3 – SDG&E/BAE Systems BAE Systems and NASSCO Parking Lot (approximately 7.27 potentially usable acres)
- Staging Area 4 – NASSCO/NASSCO Parking and Parking Lot North of Harbor Drive (approximately 3.85 potentially usable acres)
- Staging Area 5 – 24th Street Marine Terminal and Adjacent Parking Lots (approximately 145.31 potentially usable acres)

1.2 Regulatory Setting

Regulations pertaining to species and habitat protection and management are described below.

1.2.1 United States Army Corps of Engineers

Section 404 of the Clean Water Act. The United States Army Corps of Engineers (ACOE) regulates discharges of dredged or fill material into waters of the United States (U.S.). The term "waters of the U.S." is defined at 33 Code of Federal Regulations (CFR) Part 328 and includes (*1*) *All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce…*, (*2*) *all interstate waters and wetlands*, (*3*) *all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce*, (*4*) *all impoundments of waters mentioned above*, (*5*) *all tributaries to waters mentioned above*, (*6*) *the territorial seas, and* (*7*) *all wetlands adjacent to waters mentioned above*. Wetlands are defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Waters found to be isolated and not subject to Clean Water Act (CWA) regulation are often still regulated by the San Diego Water Board under the State Porter-Cologne Water Quality Control Act (Porter-Cologne Act), as discussed below.

Section 10 of the Rivers and Harbors Act. Section 10 of the Rivers and Harbors Act requires authorization from the ACOE for the creation of any obstruction to the navigable capacity of any of the waters of the U.S. ACOE approval is necessary to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any port, roadstead, haven, harbor, canal, navigable river, or other water of the U.S. In addition, ACOE approval is necessary to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of any port, roadstead, haven, harbor, canal, lake, harbor of refuge, or enclosure within the limits of any breakwater, or of the channel of any navigable water of the U.S.

1.2.2 San Diego Unified Port District Master Plan

The San Diego Unified Port District (SDUPD) Master Plan is intended to provide the official planning policies for the physical development of the tide and submerged lands granted to the SDUPD (SDUPD, 1996). The Shipyard Sediment Site is located under the planning jurisdiction of the SDUPD and is identified as District 4 in the certified Port Master Plan. The SDUPD is a special government entity, created in 1962 by the

San Diego Unified Port District Act, California Harbors and Navigation Code, in order to manage San Diego Harbor and administer certain public lands along San Diego Bay. The SDUPD may use the powers and authority granted to protect, preserve, and enhance the physical access to the Bay, the natural resources of the Bay (including plant and animal life), and the quality of waters in the Bay (Section 4[b]; SDUPD, 1996). The SDUPD holds and manages as trust property on behalf of the People of the State of California, including the land occupied by NASSCO and BAE Systems and all five potential staging areas with exception to a portion of the proposed acreage at Potential Staging Area 4 (Figure 2). Approximately 2.49 usable acres north of East Harbor Drive are in the jurisdiction of the City of San Diego. The Port Master Plan water use designation within the limits of the proposed project is Industrial – Specialized Berthing or Marine –Related Industrial.

1.2.3 Porter-Cologne Water Quality Control Act.

The federal CWA places the primary responsibility for the control of water pollution and for planning the development and use of water resources within the states, although it does establish certain guidelines for states to follow in developing their programs.

California's primary statute governing water quality and water pollution is the Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The Porter-Cologne Act grants the State Water Resources Control Board (State Water Board) and the Regional Water Quality Control Board (Regional Water Board) broad powers to protect water quality and is the primary vehicle for implementation of California's responsibility under the federal CWA. The Porter-Cologne Act grants the State Water Board and Regional Water Boards the authority and responsibility to adopt plans and policies, to regulate discharges to surface and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substance, sewage, oil, or petroleum product.

Each Regional Water Board must formulate and adopt a water quality plan for its region. The regional plans are to conform to the policies set forth in the Porter-Cologne Act and established by the State Water Board in its State water policy. The Porter-Cologne Act also provides that a Regional Water Board may include in its region a regional plan with water discharge prohibitions applicable to particular conditions, areas, or types of waste. The Regional Water Boards are also authorized to enforce discharge limitations, take actions to prevent violations of these limitations from occurring, and conduct investigations to determine the water quality status of any of the waters of the State within their region. Civil and criminal penalties are also applicable to persons who violate the requirement of the Porter-Cologne Act or State Water Board/orders.

1.2.4 Regional Water Quality Control Board (San Diego Water Board)

Waters subject to the provisions of Section 404 of the CWA also require Water Quality Certification from the San Diego Water Board pursuant to Section 401 of the CWA. Waters that do not fall under the jurisdiction of the San Diego Water Board pursuant to Section 401 of the CWA may require authorization through application for waste discharge requirements (WDRs) or through waiver of WDRs, pursuant to the Porter-Cologne Act (California Water Code, Division 7).

1.2.5 United States Fish and Wildlife Service

The Federal Endangered Species Act (FESA) of 1973 sets forth a two-tiered classification scheme based on the biological health of a species. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range. Threatened species are those likely to become endangered in the foreseeable future; Special Rules under Section 4(d) can be made to address threatened species. Ultimately, the FESA attempts to bring populations of listed species to healthy levels so that they no longer need special protection.

If a federal action exists and the project may impact listed species or designated critical habitat, consultation with the United States Fish and Wildlife Service (USFWS) is required through Section 7 of the FESA. By law, Section 7 consultation is a cooperative effort involving affected parties engaged in analyzing the effects posed by proposed actions on listed species or critical habitats. The FESA prohibits the "take" of listed species by anyone unless authorized by the USFWS. Take is defined as "conduct which attempts or results in the killing, harming, or harassing of a listed species." Harm is defined as "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering." Harassment is defined as an "intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns, including breeding, feeding, or sheltering." Therefore, in order to comply with the FESA, any proposed project should be assessed prior to construction to determine whether the project will impact listed species or, in the case of a federal action on the project, designated critical habitats.

Section 7 of the FESA directs all federal agencies to use their existing authorities to conserve threatened and endangered species and, in consultation with the USFWS, to ensure that their actions do not jeopardize listed species or destroy or adversely modify critical habitat. Section 7 applies to management of federal lands as well as other federal actions that may affect listed species, such as federal approval of private activities through the issuance of federal permits, licenses, or other actions.

Section 7(a)(2) of the FESA requires all federal agencies, in consultation with and with the assistance of the Secretary of the Interior, to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat. This includes any federal action including funding, licensing, permitting, authorizing, or carrying out activities under their jurisdictions. By law, Section 7 consultation is a cooperative effort involving affected parties engaged in analyzing effects posed by proposed actions on listed species or critical habitat(s).

1.2.6 California Department of Fish and Game

The California Department of Fish and Game (CDFG), through Sections 1600–1603 of the California Fish and Game Code, is empowered to issue agreements for any alteration of a river, stream, or lake where fish or wildlife resources may be adversely affected. CDFG defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation."

The CDFG regulates wetland areas only to the extent that those wetlands are a part of a river, stream, or lake as defined by CDFG. While seasonal ponds are within the CDFG definition of wetlands, if they are not associated with a river, stream, or lake, they are not subject to jurisdiction of CDFG under Section 1602 of the California Fish and Game Code. No Streambed Alteration Agreement (SAA) is required for the proposed project.

The California Endangered Species Act (CESA; California Fish and Game Code Sections 2050–2098) was signed into law in 1984. It was intended to parallel the federal law. The CESA prohibits the unauthorized "take" of species listed as threatened or endangered under its provisions. However, a significant difference exists in the CESA definition of "take," which is limited to actually or attempting to "hunt, pursue, capture, or kill." CESA provisions for authorization of incidental take include consultation with a State agency, board, or commission that is also a State Lead Agency pursuant to

CEQA; authorization of other entities through a 2081 permit; or adoption of a federal incidental take authorization pursuant to Section 2081.1. Similar to the FESA, actions in compliance with the measures specified as a result of the consultation process or 2081 permit are not prohibited.

1.2.7 California Coastal Commission

The California Coastal Commission (CCC), through provisions of the California Coastal Act, is empowered to issue a Coastal Development Permit (CDP) for many projects located within the Coastal Zone. In areas where a local entity has a certified Local Coastal Program (LCP), the local agency can issue a CDP only if it is consistent with the LCP. The CCC, however, has appeal authority for portions of LCPs and retains jurisdiction over certain public trust lands and in areas without an LCP.

The CCC regulates the diking, filling, and dredging of wetlands within the Coastal Zone. The Coastal Act Section 30121 defines wetlands as lands "within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens." The waterside portions of the Shipyard Sediment Site bayward of the pier head line are regulated and reviewed by the CCC. The Shipyard Sediment Site is artificially stabilized and the shoreline is predominantly made up of sheet pile bulkheads and seawalls. Therefore, no areas within the Shipyard Sediment Site contain wetlands as per the CCC definition. Additionally, the Potential Staging Areas located in the Coastal Zone do not contain wetlands as per the CCC definition.

1.2.8 National Marine Fisheries Service

The National Oceanic and Atmospheric Administration Marine Fisheries Services (NOAA Fisheries [NMFS]) receives its ocean stewardship responsibilities under many federal laws, including the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Most important are the FESA, which protects species determined to be threatened or endangered; the Marine Mammal Protection Act (MMPA), which regulates interactions with marine mammals; the Lacey Act, which prohibits fish or wildlife transactions and activities that violate State, federal, Native American tribal, or foreign laws; the Fish and Wildlife Coordination Act, which authorizes NOAA Fisheries to collect fisheries data on environmental decisions that affect living marine resources; and the federal Power Act, which allows NOAA Fisheries to minimize effects of dam operations on anadromous fish, such as prescribing fish passageways that bypass dams. Many other statutes, international conventions, and treaties also guide NOAA Fisheries activities.

Magnuson-Stevens Fishery Conservation and Management Act. The MSA was amended in 1996 and requires the NMFS to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a federal FMP. The 1996 amendments to the MSA set forth a number of new mandates for the NFMS, eight regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat. The councils, with assistance from NMFS, are required to delineate EFH for all managed species. EFH is defined as the waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Specifically, the MSA requires: (1) federal agencies to consult with NMFS on all actions or proposed actions authorized, funded, or undertaken by the agency that could adversely affect EFH; (2) NMFS to provide conservation recommendations for any federal or state action that could adversely affect EFH; and (3) federal agencies to provide a detailed response in writing to NMFS within 30 days of receiving EFH conservation recommendations.

Essential Fish Habitat. The proposed project is located within a general area designated as EFH by two Fishery Management Plans (FMPs), the Coastal Pelagic and the Pacific Coast Groundfish FMPs. Species managed under the Highly Migratory Species FMP may have EFH within the project area, but EFH has not been designated for these species under the MSA. In addition, because these are highly mobile species, these species are likely to be transient rather than stationary at the Shipyard Sediment Site. Salmonids have designated EFH within another FMP; however, there currently is no critical habitat designated in San Diego Bay. Therefore, it is highly unlikely they would occur in the project area and as such, they are not addressed further in this report.

EFH species are discussed in further detail in Section 3.0 Fisheries Management Plan Species.

1.2.9 Species Protection under Regulatory and Local Policies

Nesting Birds. The federal Migratory Bird Treaty Act (MBTA) regulations and portions of the California Fish and Game Code prohibit the “take” of nearly all native bird species and their nests. While these laws and regulations were originally intended to control the intentional take of birds and/or their eggs and nests by collectors, falconers, etc., they can nevertheless be applied to unintentional take (e.g., destroying an active nest by cutting down a tree). It is sometimes possible to obtain a permit for relocating or removing a nest.

Marine Mammals. All marine mammals are protected by the MMPA. In addition, some marine mammal species are listed as endangered or threatened by the FESA. NMFS is the federal agency charged with the responsibility of enforcing the provisions of the MMPA. The MMPA forbids the taking (including harassment, disturbance, capture, and death) of any marine mammals except as set forth in the Act. Therefore, none of the construction activities are legally permitted to disturb marine mammals or disrupt their activities or behavior in known migration routes, feeding areas, or breeding areas.

Sea Turtles. All sea turtle species listed under FESA are listed as either endangered or threatened. The USFWS and the NMFS are the federal agencies charged with the responsibility of enforcing the provisions of the FESA. FESA forbids the taking (including harassment, disturbance, capture, and death) of any sea turtles except as set forth in the Act. Therefore, none of the operational activities are legally permitted to disturb sea turtles or disrupt their activities or behavior in known migration routes, feeding areas, or breeding areas.

1.2.10 Marine Protected Areas

The Marine Life Management Act (MLMA) (Assembly Bill 1241; Statutes of 1998, Chapter 1052) directs the state to redesign California's system of marine protected areas (MPAs) to function as a network in order to: increase coherence and effectiveness in protecting the state's marine life and habitats, marine ecosystems, and marine natural heritage, as well as to improve recreational, educational and study opportunities provided by marine ecosystems subject to minimal human disturbance. Three types of MPA designation types are used in the MLMA process: state marine reserves, state marine parks and state marine conservation areas.

MPAs are primarily intended to protect or conserve marine life and habitat, and are therefore a subset of marine managed areas (MMAs), which are broader groups of named, discrete geographic areas along the coast that protect, conserve, or otherwise manage a variety of resources and uses, including living marine resources, cultural and historical resources, and recreational opportunities.

The MLMA was enacted to promote sustainable marine fisheries, primarily through FMPs based on the best readily available scientific and other relevant information. Rather than assuming that exploitation should continue until damage has become clear, the MLMA shifts the burden of proof toward demonstrating that fisheries and other activities are sustainable. Also, rather than focusing on single fisheries management, the

MLMA requires an ecosystem perspective including the whole environment. FMPs are prepared by the CDFG and submitted with implementing regulations for review and approval by the California Fish and Game Commission. FMPs have been prepared for abalone (*Haliotis* spp.), herring, squid, white seabass (*Atractoscion nobilis*), and nearshore fisheries.

The MLMA has identified five study regions: the north coast region, the north central coast region, the San Francisco Bay region, the central coast region, and the south coast region. The central coast region was selected as the initial study region from which to launch the MLMA. The south coast study region MPA, where the Shipyard Sediment Site resides, was developed in December 2010 and becomes effective in summer 2011 (http://www.dfg.ca.gov/mlpa - website visited March 2011). At this time, the MLMA does not identify a MPA in San Diego Bay in its south coast study region (CDFG, 2008).

1.2.11 San Diego National Wildlife Refuge

Located in the southern portion of the Bay, the San Diego Bay National Wildlife Refuge, consisting of the Sweetwater Marsh and South San Diego Bay Units, was dedicated in 1999 and includes 3,940 acres. Under a Comprehensive Conservation Plan, it includes intertidal salt marsh and submerged areas with eelgrass beds. It is the largest remaining contiguous mudflat in Southern California and is an important stop for migrating birds on the Pacific Flyway. It includes some former salt evaporation ponds which the USFWS is attempting to convert back into natural wetland.

The Refuge provides habitat for seven federally listed endangered and threatened species: the endangered California least tern (*Sterna antillarum browni*), light-footed clapper rail (*Ralluslongirostris levipes*), California brown pelican (*Pelecanus occidentalis californicus*), and salt marsh bird's beak (*Cordylanthus maritimus maritimus*); and the threatened western snowy plover (*Charadrius alexandrinus nivosus*), Pacific green sea turtle (*Chelonia mydas*), and California gnatcatcher (*Polioptila californica californica*). Of these species, the least tern, clapper rail, and snowy plover all nest on the Refuge.

Four of the federally listed endangered species supported by the Refuge, including salt marsh bird's beak, California least tern, light-footed clapper rail, and California brown pelican, are also listed as endangered by the State of California. The salt marsh habitat within this Refuge also supports the Belding's savannah sparrow, another species listed by the State as endangered.

The Refuge also supports 26 species identified by the USFWS as Birds of Conservation Concern. Of these species, the gull-billed tern, elegant tern, and black skimmer nest at the South Bay Salt Works site.

1.3 Marine Setting and Site Conditions

San Diego Bay is designated as a State Estuary under Section 1, Division 18 (commencing with section 28000) of the Public Resources Code. The San Diego Bay shoreline between Sampson and 28th Streets is listed on the Clean Water Act section 303(d) List of Water Quality Limited Segments for elevated levels of copper, mercury, zinc, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) in the marine sediment. These pollutants are impairing the aquatic life, aquatic-dependent wildlife, and human health beneficial uses designated for San Diego Bay. The northeast boundary of the Shipyard Sediment Site occupies this shoreline.

The principal structural components within the Shipyard Sediment Site include the concrete bulkheads, piers and dry dock facilities associated with the two shipyard facilities. Bathymetry at the site varies substantially due to the presence of shipways, dry docks, and berths and ranges from -2 feet Mean Lower Low Water (MLLW) along the bulkheads to -70 feet MLLW at the BAE Systems dry dock sump area (Figures 3 and 4).

The five potential staging areas consist primarily of leasehold lands and associated parking areas in the immediate vicinity of the Shipyard Sediment Site. The actual usable areas within each potential staging area are comprised of open, paved portions that could be used for the dewatering, solidifying and drying of the dredged marine sediments. Staging Areas 1 through 4 are located within the City of San Diego and are designated in the City's General Plan as Industrial Employment. Staging Area 5 is located within the City of National City and is designated in the City's existing General Plan as Industrial – Tidelands Manufacturing and is under the jurisdiction of the Port District. National City is currently updating their General Plan; the proposed Land Use designation for Staging Area 5 in the updated General Plan is Marine-Related Industrial.

Tides within the bay are classified as mixed diurnal/semidiurnal, which result in a higher high tide preceding the lower low tide (Largier, 1995). Tidal action results in strong tidal flushing in the north end of the Bay, but relatively low flushing in the central and southern portions (MacDonald et al., 1990) where the Shipyard Sediment Site is located. Due to its narrow entrance and geographical setting, San Diego Bay is protected from large ocean waves. Wave production within the Bay is generally driven by local winds (MacDonald et al., 1990). Due to their protected location within the Bay, conditions at the Shipyard Sediment Site are relatively quiescent, and are not subject to routine or significant wind, wave or current-driven sediment disturbance events.

San Diego Bay is the largest marine bay and estuary in Southern California and provides important spawning and nursery habitat for marine fish and invertebrates. The marine habitat within the Shipyard Sediment Site consists of 63 open water acres (46 within the NASSCO leasehold and 17 within the BAE Systems leasehold) containing both vegetated and unvegetated subtidal soft bottom habitats, pier pilings and bulkhead walls. The vegetated habitat species include sparse beds of eelgrass (*Zostera marina*). The entire extent of the Shipyard Sediment Site shoreline is artificially stabilized, generally consisting of a vertical sheet pile bulkhead and a seawall. The marine habitat types include vertical bulkhead walls and dock structures, vegetated and non-vegetated soft bottom subtidal habitats, and open water. These habitats support marine plants, invertebrates, and fishes.

The following subsections present a more detailed discussion of the habitats, flora and fauna found in the Bay, and more specifically at the Shipyard Sediment Site. These subsections were developed primarily using information available in the following documents:

- Detailed Sediment Investigation (SI) Report prepared for NASSCO/BAE Systems shipyards (Exponent, 2003);
- Marine Biological Resources and Essential Fish Habitat (EFH) Assessment for the BAE Systems Leasehold Projects (Merkel & Associates, 2010);
- BAE Systems 2010/2011 Dry Dock Sump Maintenance Dredging Project – Project Execution Plan. (BAE Systems, 2010); and
- Silver Strand Training Complex Final Environmental Impact Statement (EIS). Department of Navy. (U.S. Department of the Navy, 2011).

1.3.1 Subtidal Soft Bottom Habitat

Within the Shipyard Sediment Site, the most comprehensive fish and benthic macroinvertebrate sampling was conducted in August 2001 as part of the Phase 1 Sediment Investigation (SI) of the NASSCO and BAE Systems shipyards (Exponent, 2003). Fish were collected inside and outside the shipyard leaseholds using a variety of trawls and hooks. Surface sediment samples were collected at multiple subtidal locations at both shipyards to evaluate the benthic community living at the Shipyard Sediment Site.

Within this habitat, the 10 most abundant benthic taxa at the shipyards and reference areas were *Lumbrineris* sp., *Exogene lourei*, *Leitoscoloplos pugettensis*, *Mediomastus* sp., *Pista alata,* and *Scyphoproctus oculatus*, the polychaete *Pseudopolydora paucibranchiata*, the molluscs *Musculista senhousia* and *Theora lubrica*, and the crustacean *Synaptotanais notabilis* (Exponent, 2003). Three of these taxa (i.e., *M. senhousia*, *T. lubrica*, and *P. paucibranchiata*) are not native to Southern California and have been introduced to the region.

Benthic macroinvertebrate communities were evaluated using two methods: sediment profile images and collection and enumeration of benthic macroinvertebrates. Benthic macroinvertebrates were collected and enumerated at the 30 triad stations during Phase 1 of the SI (Exponent, 2003). Total numbers of benthic organisms per square meter ranged from 2,800 to 8,600 at NASSCO (excluding a station at the mouth of Chollas Creek), and 3,160 to 31,800 at BAE Systems. Species characteristic of mature benthic communities were found at almost all locations in both shipyards, often in combination with pioneering species.

In September 2010, an assessment of marine biological resources and preparation of an EFH was conducted within the BAE Systems leasehold to support three proposed projects. The projects included: 1) maintenance dredging of the dry dock sump; 2) fender pile replacement for the dry dock mooring dolphin; and 3) Pier 3 fender pile installation. During the September 2010 assessment of marine biological resources and EFH, the subtidal habitat reported the presence of barnacles (*Chthamalus* spp., *Balanus* sp.), which were the most common invertebrates on the bulkhead walls. Invertebrates included colonial tunicates (e.g., *Botryllus* sp.), oysters (*Ostrea lurida*), sponges (*Leucilla nuttingi*), mussels (*Mytilus* sp.), feather duster worms (*Sabillidae*), colonial ascidians (*Botrylloides* sp.), solitary tunicates (e.g., *Ciona* sp., *Styela plicata*), bryozoans (e.g., *Eurystomella* sp.), and the nonnative bryozoan *Zoobotryon verticillatum* (Merkel & Associates, 2010).

Bare mud occurs throughout most of the Shipyard Sediment Site, with depths to -70 ft in the BAE Systems dry dock sump (Exponent, 2003). During the 2010 assessment of marine biological resources and EFH conducted for BAE Systems, few invertebrates were observed on the mud although evidence of burrowing invertebrates, possibly tube dwelling anemones, arthropods (e.g., ghost shrimp, *Callianassa*), or bivalves, were observed. Although only round stingray (*Urobattus halleri*) were observed, other fish species including barred and spotted sand bass (*Paralabrax nebulifer* and *P. maculatofasciatus*), California halibut (*Paralichthys californicus),* and midshipman (*Porichthys myriaster*) are likely to use this habitat (Merkel & Associates, 2010).

Phase 2 of the SI was carried out in August, September, and November 2002 (Exponent, 2003). The eelgrass distribution at the shipyards was surveyed by divers. Eelgrass was present in the shallowest water (-10 MLLW) near the shore at the east and west ends of both shipyards (Figures 3 and 4).

A total of 10 eelgrass beds were reported within the BAE Systems leasehold (Exponent, 2003: Figure 3):

- Beds 1 through 4 are located along the eastern portion of Pier 4.
- Beds 5 through 7 are located adjacent to the bulkhead wall east of Pier 2.
- Bed 8 is located adjacent to the bulkhead wall between Piers 1 and 2.
- Beds 9 through 12 are located adjacent to the bulkhead wall east of Pier 4.

A total of 13 eelgrass beds were reported within the NASSCO leasehold (Exponent, 2003: Figure 4):

- Beds 1 and 2 are located adjacent to the bulkhead wall along the 24th street dock west of Berth III.
- Bed 3 is located adjacent to the bulkhead wall along the 24th Street Dock between Berths III and IV.
- Beds 4 and 5 are located adjacent to the bulkhead wall just east of Berth IX.
- Beds 6 through 11 are located adjacent to the bulkhead wall between Berths X and XI.
- Beds 12 and 13 are located adjacent to the bulkhead wall west of Berth XII.

Eelgrass was not present in the center of the NASSCO shipyard (between the floating dry dock area and the Graving Dock), where most ship construction and repair activities take place (Figure 4).

During the September 2010 assessment of marine biological resources and EFH conducted for BAE Systems, eelgrass was observed in the shallow water (less than -12 ft MLLW) adjacent to the bulkhead walls (Figure 5) (Merkel & Associates, 2010). The project area was approximately 12.3 acres and was surveyed with sidescan sonar, remotely operated vehicle (ROV), and biologist divers. A pre-construction eelgrass survey conducted on 6 September 2010 at BAE Systems documented approximately 0.14 acre of eelgrass within the proposed dry dock maintenance dredging area. A reference eelgrass bed located north of BAE Systems Pier 1 documented approximately 0.68 acre of eelgrass. The red alga (*Gracilaria verrucosa*) and the green alga (*Ulva* sp.) were commonly interspersed within the eelgrass beds.

Limited algal growth was reported to occur on the piles (e.g., *Ulva* spp., foliose red algae.). Invertebrates occurring on bulkhead walls, piles, and/or dock structures included: colonial tunicates (e.g., *Botryllus* sp.), oysters (*Ostrea lurida*), sponges (*Leucilla nuttingi*), mussels (*Mytilus* sp.), feather duster worms (*Sabillidae*), colonial ascidians (*Botrylloides* sp.), solitary tunicates (e.g., *Ciona* sp., *Styela plicata*), bryozoans (e.g., *Eurystomella* sp.), and the nonnative bryozoan *Zoobotryon verticillatum*.

1.3.2 Open Water

The pelagic zone is generally composed of a continuous water column. For the purpose of this discussion, the definition of the pelagic zone is the water column and resident organisms that have little interaction with the benthos. Pelagic organisms, such as schooling fish, and drifting plankton, generally remain in the water column.

Marine plankton consists of a diverse collection of plants and animals, all drifting with the current in the water column. Phytoplankton, using carbon dioxide and light energy to construct cell material, represent the beginning of the pelagic food chain. Zooplankton graze on phytoplankton and represent another significant component of the pelagic food chain. In addition to the phytoplankton and zooplankton, which spend their entire life as plankton, the larvae or juvenile forms of numerous other organisms spend time as plankton.

A great number of fish inhabit the pelagic zone, with the northern anchovy (*Engraulis mordax*) one of the most abundant fish in the California Current (Dailey et al., 1993; Emmett et al., 1991) as well as in San Diego Bay (Tierra Data, Inc., 2002). Some pelagic fish, such as northern anchovy and slough anchovy that are usually considered open water schooling fish are frequently found in San Diego Bay associated with the benthic zone (Allen, 1999). The northern anchovy species is considered epipelagic, a designation for fish that are active, grow fast, and reproduce early and often. In the case of northern anchovies, some fish are mature at less than 1 year of age and may spawn up to 20 times. It is abundant in California bays and estuaries during the spring, summer, and fall, moving offshore and southeast as spawning begins in late winter (Dailey et al., 1993).

1.3.3 Fishes

The types of fishes which commonly occur in protected bays of Southern California such as San Diego Bay are a combination of species that are associated with soft bottom habitat, hardscape of pilings, docks, cement bulkheads and jetties, as well as open water (water column) species. In April and July 2008 and again in June 2009, the Port of San Diego surveyed the estuarine fishes of San Diego Bay in four ecoregions of the Bay; North, North-Central , South-Central, and South (Pondella et al., 2009a and 2009b). The Shipyard Sediment Site and all five Potential Staging Areas are adjacent to the North-Central ecoregion sampled. At each of the four ecoregions surveyed, the following five subhabitats were sampled: deep channel, nearshore non-vegetated, nearshore vegetated, intertidal non-vegetated, and intertidal vegetated.

The goals of the 2008 study were to identify, determine and quantify the utilization of the fishery populations, identify habitats that support juvenile fish species, describe nursery utilization, and determine geographic and/or habitat areas of San Diego Bay that support significant populations of fish species utilized as forage by endangered avian species. The goal of the 2009 study was to determine the abundance and size class structure of avian forage species in San Diego Bay during the critical timing of the least tern breeding season.

During the 2008 and 2009 surveys, 15,692 (48 species) and 5,208 (27 species) fishes were collected, respectively. No ESA fish species were collected during the 2008 and 2009 surveys. Comparing both surveys, 23 of the same species were collected in 2008 and 2009. Twenty-five of the 48 species collected in 2008 were not observed in 2009, and only four of the 27 species collected in 2009 were not observed in 2008. Therefore, a total of 52 different species were collected during these two surveys (Pondella et al., 2009a and 2009b).

The most numerous species caught during both surveys was the slough anchovy (*Anchoa delicatissima*), topsmelt (*Atherinops affinis*), and shiner perch (*Cymatogaster aggregate*). In 2009, the total catch was greatest at the North-Central ecoregion (Pondella et al., 2009b). In terms of biomass, round stingrays (*Urobatis halleri*), spotted sand bass (*Paralabrax maculatofasciatus*), topsmelt, slough anchovy, California butterfly ray (*Gymnura marmorata*), and yellowfin croaker (*Umbrina roncador*) represented the greatest biomass for fishes (Pondella et al., 2009a and 2009b). In 2009, the total biomass was greatest at the North-Central ecoregion (Pondella et al., 2009b).

Fish in San Diego Bay taken by commercial or recreational fishing and that could be expected to appear at the Shipyard Sediment Site or Potential Staging Areas waterfront locations are listed in Table 1. Those species that support a commercial fishery are indicated with an asterisk. Commercial fishing no longer occurs in San Diego Bay: the last commercial fishery, for striped mullet (*Mugil cephalus*) in south San Diego Bay, ended in 1998. However, seven species inhabiting San Diego Bay support commercial fisheries elsewhere in southern California waters. The most important of these is the California halibut (*P. californicus*). The northern anchovy is taken commercially for use as live bait. In addition, the Pacific sardine is taken as part of this catch. Fish caught for live bait are brought and held in bait receivers located in north San Diego Bay, where they are sold to commercial and recreational fisherman. A much larger group of species are caught within the San Diego Bay by recreational fisherman and by those who fish for subsistence. At least 58 species are involved in the recreational catch.

Table 1: Fish Species of San Diego Bay Taken by Recreational and Commercial Fishermen

Scientific Name	Common Name	Scientific Name	Common Name
Osteichthyes	bony fish	*Pleuronichthys ritteri*	spotted turbot
Atherinops affinis	Topsmelt	*Pleuronichthys verticalis*	hornyhead turbot
Atherinopsis californiensis	Jacksmelt	*Cheilotrema saturnum*	black croaker
Leuresthes tenuis	California grunion	*Atractoscion nobilis**	white seabass
Hippoglossina stomata	bigmouth sole	*Genyonemus lineatus*	white croaker
Xysteurys liolepis	fantail sole	*Menticurrhus undulates*	California corbina
Caranx caballus	green jack	*Roncador stearnsii*	spotfin croaker
Caranx hippos	crevalle jack	*Seriphus politus*	queenfish
Trachurus symmetricus	jack mackerel	*Umbrina roncador*	yellowfin croaker
Chanos chanos	milkfish	*Sarda chiliensis*	Pacific bonito
Clupea harengus pallasii	Pacific herring	*Scomber japonicas*	Pacific mackerel
*Sardinops sagax caeruleus**	Pacific sardine	*Scomberomorus sierra*	sierra

Scorpaena guttata	sculpin	*Medialuna californiensis*	halfmoon
Scorpaenichthys marmoratus	cabezon	*Morone saxatilis*	striped bass
Amphistichus argenteus	barred surfperch	*Paralabrax clathratus**	kelp bass
Cymatogaster aggregata	shiner surfperch	*Paralabrax maculatofasciatus*	spotted sand bass
Damalichthys vacca	pile surfperch	*Paralabrax nebulifer*	barred sand bass
Embiotoca jacksoni	black surfperch	*Sphyraena argentea*	California barracuda
Hyperprosopon argenteum	walleye surfperch	*Albula vulpes*	bonefish
Micrometrus minimus	dwarf surfperch	*Cynoscion parvipinnis*	shortfin corvine
Phanerodon furcatus	white surfperch	Chondrichthyes	sharks and rays
Rhacochilus toxotes	rubberlip surfperch	*Carcharhinus remotus*	narrowtooth shark
*Engraulis mordax**	northern anchovy	*Galeorhinus zyopterus*	soupfin shark
Girella nigricans	opaleye	*Mustelus californicus*	gray smoothhound
*Mugil cephalus**	striped mullet	*Mustelus henlei*	brown smoothhound
Hypsopsetta guttulata	diamond turbot	*Mustelus lunulatus*	sicklefin smoothhound
*Paralichthys californicus**	California halibut	*Prionace glauca*	blue shark
Platichthys stellatus	starry flounder	*Triakis semifasciata*	leopard shark
*Parophrys vetulus**	English sole	*Sphyma zygaena*	smooth hammerhead shark
Pleuronichthys coenosus	CO turbot	*Squalus acanthias*	spiny dogfish

Note: Asterisks indicate species of commercial importance in southern California waters

As mentioned previously, fish sampling was conducted as part of the Shipyard Sediment Site SI; however, fish sampling was not performed to assess abundance or types of fish species present at the shipyards. Rather, fish histopathology was performed on the spotted sand bass (*P. maculatofasciatus*) to evaluate potential exposure of fishes to chemical contaminants found in the shipyard sediments. A total of 253 spotted sand bass were sampled in 2002, in five locations within San Diego Bay:

- Inside the NASSCO shipyard site (50 fish)
- Immediately outside of the NASSCO shipyard site (50 fish)

- Inside the Southwest Marine shipyard site (51 fish)
- Immediately outside of the Southwest Marine shipyard site (50 fish)
- Within a reference area (52 fish).

Fishes were collected using nets and by hook and line. Spotted sand bass were evaluated for lesions and other histopathological conditions. Both indices of fish health indicated that fish at shipyard locations and the reference location were similar. Neither growth nor health of fish at the shipyards was reported to be adversely affected relative to reference conditions. Bile was collected from spotted sand bass to evaluate fish exposure to PAH. No statistically significant differences in PAH breakdown products in fish bile were found at the shipyards relative to the reference location.

2. HABITAT AREAS OF PARTICULAR CONCERN

Impacts to Habitat Areas of Particular Concern (HAPC) are described in the regulations as subsets of EFH which are rare, particularly susceptible to human induced degradation, especially ecologically important habitats, or located in an environmentally stressed area, including estuaries and eelgrass.

The sole applicable designated HAPC for the Shipyard Sediment Site is seagrass habitat (NMFS, 2008). The primary marine seagrass occurring in San Diego Bay is eelgrass (*Zostera marina*). Eelgrass (*Z. marina*) is a marine plant historically found in shallow (+1 to -8 ft MLLW), soft bottom bays and estuaries ranging from Baja to Alaska. It plays an important ecological role via biological/physical benefits including: nursery habitat for commercial/recreational fish (predation refuge and food source), trapping sediment and clarifying water, fed on directly by birds, fish, and invertebrates, and supports epiphytic organisms fed on by others. Eelgrass found in the Bay supports nearly 20 percent of all eelgrass habitats in California (50 percent in Southern California) (NMFS, 2009). The majority of the eelgrass beds in the Bay are found in the southern ecoregions as this area has retained much of its historic shallow bathymetry. Longterm comparisons in the Bay from 1993 (first comprehensive survey in the Bay conducted by the Navy) to 2008 show an increase from 1,061 acres of eelgrass in 1993 to 2,078 acres in 2004. From 2004 to 2008 there was a reported decline from 2,078 to 1,319 acres. However, it appears that eelgrass is expanding in recent decades due to improved water quality and restoration efforts (NMFS, 2009).

Eelgrass (*Z. marina*) is identified as a HAPC for EFH groundfish species. Eelgrass beds are an important component of the San Diego Bay food web. Much of its productivity enters the food web as detritus or decayed material consumed by invertebrates. Fishes and invertebrates, such as juvenile lobster, use eelgrass beds to escape from predators, as a food source, and as a nursery. Fish documented to use eelgrass beds include topsmelt, guitarfish, diamond turbot, bat ray, dwarf perch, arrow goby, jack mackerel, pipefish, Pacific sardine, striped mullet, and walleye surfperch (U.S. Department of the Navy, 2000). The plants provide surfaces for egg attachment and sheltered locations for juveniles to hide and feed. Fish produced from these beds are consumed by fish-eating birds, including the endangered California least tern. Waterfowl, especially surf scoter, scaup, and brant are present in high numbers in late fall and winter in eelgrass beds.

Eelgrass beds are the most productive areas on the soft bottom habitat. Roots and rhizomes help stabilize the unconsolidated substrate by forming an interlocking matrix that inhibits erosion. The plants themselves keep water clearer by trapping fine sediments and preventing their resuspension (Takahashi, 1992). Leaves cut down wave action and currents; the resulting decrease in turbulence causes more fine sediment to be deposited. Abundant algae and invertebrates that grow on the leaf blades provide primary and secondary productivity for consumption by larval and juvenile fish. Sediments within eelgrass beds are loaded with detrital leaves, rhizomes, and nutrients that fuel infaunal invertebrates. When epibenthic invertebrate abundances are low, this indicates impaired food chain support functions (Rutherford, 1989).

The distribution and density of eelgrass beds are greatly influenced by many factors including available light, water clarity, and nutrient concentration. Temperature, salinity, currents, and the nature of the substrate may serve as other controlling factors for the distribution and abundance of eelgrass. For eelgrass in San Diego Bay, the primary limiting factors are likely available light (including turbid water and shading from permanent structures) and vessel traffic (Tierra Data, Inc., 2002).

In preparation for the 2010 BAE Systems maintenance dredging of the dry dock, fender pile replacement for the dry dock mooring dolphin, and Pier 3 fender pile installation projects, a pre-construction eelgrass survey was performed (Merkel & Associates, 2010). The 6 September 2010 survey found 0.84 acre of eelgrass within the survey limits at the BAE Systems facility (Figure 4). Of the mapped eelgrass, a total of 0.14 acre of eelgrass was mapped in the project survey area in multiple small patches interspersed between piers, bulkheads, and dredged basins, and 0.70 acre of eelgrass was mapped within the reference survey area. Eelgrass did not occur within the proposed dry dock dredging area or within close proximity of the dredging (Figure 5). The nearest eelgrass to the limits of dredging was located 52 meters to the north of the work area within the shallower waters adjacent to the shoreline bulkheads. To protect existing eelgrass beds, BAE Systems employed silt curtains to limit potential drift of incidental turbidity from the dredging operation. In addition, the existing eelgrass beds are located within highly confined regions of the shipyard that are generally inaccessible to large vessels.

3. FISHERY MANAGEMENT PLAN SPECIES

Essential fish species that have been identified by the NMFS and have been documented within San Diego Bay include a variety of fin fish, flat fish, rock fish, and squid. While some of these species are associated with hard bottom substrates, the Shipyard Sediment Site and Potential Staging Areas may include areas that could be considered EFH by either the Coastal Pelagics Fisheries Management Plan (FMP) or the Pacific Groundfish FMP.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) was amended in 1996 to include provisions for the identity and protection of important marine habitat and anadromous fish. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH, and respond in writing to the NMFS recommendations. The eelgrass habitat known to exist within the Shipyard Sediment Site leasehold qualifies as EFH, and may provide essential habitat for juvenile fish species to grow to maturity, or offer protection for managed species.

A database search through the California Natural Diversity Database (CNDDB) was conducted to identify species that may occur or are likely to occur at the Shipyard Sediment Site and Potential Staging Areas (CDFG, 2011). No fish species listed as Threatened or Endangered occur in San Diego Bay (Appendix A).

Some potential species of concern have been identified in San Diego Bay through other studies (Pondella et al., 2009a and 2009b; Merkel & Associates, 2000; Allen, 1999; Hoffman, 1994). The following analysis makes extensive use of Allen's (1999) data set because it is the most comprehensive survey in the Bay to date (surveys were completed quarterly for five and a half years, at four stations throughout San Diego Bay, utilizing six sampling gear types) with a total of 78 species identified. The other studies reviewed for this analysis are utilized primarily to confirm the presence of fish species and to identify additional species not captured by Allen.

Of these 78 species identified by Allen (1999), six are managed by the NMFS under the Coastal Pelagics Species FMP (Table 2) (NMFS, 2008). Four of the six fish managed under the Coastal Pelagics Species FMP are represented in San Diego Bay. The northern anchovy (*Engraulis mordax*) and pacific sardine (*Sardinops saga*) are the most abundant pelagics identified by Allen, ranking 1st and 4th in abundance, and 3rd and 10th in biomass, respectively (Table 2). Together, these two species accounted for 46.3 percent of the total abundance and 11.6 percent of the total biomass of fish enumerated by Allen (1999). The pacific mackerel (*Scomber japonicas*) and jack mackerel (*Trachurus symmetricus*) are the other two coastal pelagics of potential concern in the project area. These two species were much less abundant than the northern anchovy and pacific sardine, and were ranked by Allen as 32nd and 52nd in total abundance and 24th and 73rd in total biomass, respectively. Together the two species accounted for less than 1 percent of total abundance and biomass of fish captured (Allen, 1999).

Of the 83 species managed under the Pacific Groundfish FMP (NMFS, 2008), two have been identified in San Diego Bay during the studies analyzed for this assessment: California scorpionfish (*Scorpaena gutatta*) and English Sole (*Parophrys vetulus*). These species were observed only rarely in San Diego Bay during the five-and-a-half years of Allen's study, ranking 41st and 76th by abundance and 24th and 73rd by biomass, respectively (Table 2). These two species were not observed in the 2008 or 2009 surveys conducted by the Vantuna Research Group (Pondella et al., 2009a and 2009b). Together these two species accounted for less than 0.5 percent of the total abundance and biomass of fish captured (Allen, 1999).

Table 2 - Table of NMFS Managed Fish Species Previously Found in San Diego Bay.

Common Name	Scientific Name	Rank	
		Abundance	**Biomass**
Coastal Pelagics FMP			
Northern Anchovy	*Engraulis mordax*	1st	3rd
Pacific Sardine	*Sardinops sagax*	4th	10th
Pacific Mackerel	*Scomber japonicus*	32nd	17th
Jack Mackerel	*Trachurus symmetricus*	52nd	29th
Pacific Groundfish FMP			
California Scorpionfish	*Scorpaena gutatta*	41st	24th
English Sole	*Parophrys vetulus*	76th	73rd

Note: Rank refers to the relative rankings among 78 fish species observed by Allen (1999).

4. SENSITIVE SPECIES

Some species within the Bay have been designated with a special status under either state or federal laws or regulations. Both the California state and federal endangered species acts provide special protections for a variety of fish, invertebrates, marine mammals, birds, and plants. Marine mammals are also afforded protection under the Federal Marine Mammal Protection Act of 1972 (MMPA), and migratory seabirds and shorebirds found in the Bay are protected under the Migratory Bird Treaty Act. Direct take of some species has been prohibited by laws separate from the above acts, and these laws are found in various sections of the California Fish and Game Code. In addition, the CDFG maintains a list of taxa they are interested in tracking, regardless of the legal or protection status of that taxa. This list of "species at risk" or "special-status species" is comprised of those taxa considered to be of greatest conservation need. The CDFG has also designated certain vertebrate species as "Species of Special Concern" because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction. Not all "Species of Special Concern" have declined equally; some species may be just starting to decline, while others may have already reached the point where they meet the criteria for listing as a "threatened" or "endangered" species under the state and/or federal endangered species acts. The section below includes brief descriptions of special-status species that exist within the Bay.

A database search through the CNDDB was conducted to identify special-status species that may occur or are likely to occur at the Shipyard Sediment Site and Potential Staging Areas (CDFG, 2011). The CNDDB search was performed for rare plants and animals that are known to occur in San Diego County and the complete list is presented in Appendix A. Special-status species including birds, fish, marine mammals, and marine reptiles that may occur or are likely to occur at the Shipyard Sediment Site and Potential Staging Areas are discussed below. Special-status species of plants are not discussed in this report because the landside portions of the project site are in a highly industrial area and mostly paved. Therefore, no rare plants are known to occur at the Shipyard Sediment Site or Potential Staging Areas.

4.1 Birds

California Brown Pelican (*Pelecanus occidentalis californicus*). The California brown pelican was formerly listed as endangered under the ESA and CESA, but was delisted in 2009. The California brown pelican was also protected as endangered under the California ESA, but officially delisted in November 2009. This species is a fully protected species under §3511 of the Fish and Game Code and the Migratory Bird Treaty Act.

The distribution and foraging of the California brown pelican is strongly associated with the water temperatures and availability of fish stocks within particular temperature zones. Brown pelicans are plunge divers and rely on visual detection to capture prey within one meter of the water surface (Fish and Wildlife Information Exchange, 1996). They can be opportunistic or rely on a largely single-species diet. In the Southern California Bight, brown pelicans preferentially (more than 90 percent) feed on northern anchovy, and their population numbers have been so closely correlated with anchovy abundance that they can be considered indicators of the anchovy stocks (Anderson et al., 1980). California brown pelican are colonial nesters utilizing relatively small, inaccessible coastal islands for colony sites.

North American populations underwent dramatic declines during the 1960s and early 1970s due to eggshell thinning induced by dichloro-diphenyl-dichloroethylene (DDE), the primary metabolic breakdown product of the pesticide dichloro-diphenyl-trichloroethane (DDT). Although populations have recovered substantially from these declines, there is considerable interannual variation in productivity as related to prey availability, disturbance at colonies, and disease outbreaks. Breeding effort, productivity, and survival are lower during El Niño events.

While the California brown pelican may occur at the Shipyard Sediment Site or potential staging areas during construction activities, it is expected to avoid these areas due to its high mobility and capability to access other areas of the Bay for feeding and foraging. The Shipyard Sediment Site and potential staging areas is not conducive for nesting or breeding due to its paved industrial setting.

California least tern (*Sterna antillarum browni*). The California least tern is listed by both the USFWS (35 FR 16047 October 13, 1970) and under the California Endangered Species Act as endangered. Historically, the least tern's range extends from San Francisco Bay south to San Jose del Cabo, Baja California Sur, Mexico (Cogswell, 1977; Massey, 1974). Wintering areas are in Mexico and Central America. Human disturbance at former coastal nesting areas has reduced the breeding population in California (Garrett and Dunn, 1981). Disturbance along California beaches for recreational, residential, and industrial development severely diminished the availability of suitable least tern nesting habitat. Loss of nesting habitat in conjunction with increased loss of foraging areas, human disturbance, and predation at remaining breeding colonies resulted in a federal designation of endangered status in 1970 (35 FR

1604). In San Diego County, it is a fairly common summer resident from mid-April to September (Unitt, 2004 and 1984).

During the breeding season which ranges from April through August, the majority of the least tern population is concentrated in Southern California within the counties of Los Angeles, Orange, and San Diego. Over half (60.4 percent in 2008, 4240 pairs) of the U.S. least tern breeding population is located within San Diego County, a large portion of which nests at Camp Pendleton (Marschalek, 2009).

Upon its designation as endangered, California statewide efforts to implement protection for least tern nesting and foraging areas contributed to a breeding population increase from 623 pairs in 1969 to an estimated 7,006 pairs in 2006. Generally, growth has been positive except for 2002 with a one-year loss of over 1,100 breeding pairs, and 2004, with a one-year loss of over 500 pairs (USFWS, 2006a). The statewide population size has grown substantially since 1973 (Marschalek, 2009). Fledgling production has fluctuated more widely with unknown consequences for overall population numbers (Marschalek, 2009).

The number of least terns in the San Diego Bay area has increased in conjunction with the statewide increase (Patton, 2008). After a period of apparent instability during the 1980s, the population has been increasing since 1992. The San Diego Bay-wide breeding numbers experienced a substantial increase from 141 pairs in 1991 to 1,813-2,038 pairs in 2008. San Diego Bay least terns also increased in relative range-wide importance. In 1996, the breeding number of least terns in San Diego Bay was estimated at 436 pairs, or 13 percent of the range-wide population. In 2001, the breeding number of least terns in San Diego Bay was estimated at 871-873 pairs, or approximately 18-19 percent of the statewide population, and in 2006 it was estimated at 1,611-1,638 pairs, or approximately 22-23 percent of the statewide population. Recently, least terns have nested at seven to nine locations around San Diego Bay. These are North Delta Beach, South Delta Beach, Naval Amphibious Base (NAB) ocean beaches, Naval Air Station North Island (NASNI), as well as Lindbergh Field, the South Bay National Wildlife Refuge (formerly Western Saltworks), Chula Vista Wildlife Reserve, D Street Fill/Sweetwater Marsh, and Silver Strand State Beach (a single record of a pair in 2004). Figure 6 presents these least tern nesting areas in relationship to the Shipyard Sediment Site and Potential Staging Areas.

In 2008, the SDUPD monitored and managed the least tern colony at the "D Street Fill" adjacent to San Diego Bay and the mouth of the Sweetwater River on the eastern shoreline. The "D Street Fill" is located approximately three nautical miles south of the

Shipyard Sediment Site. At least 41 nests were established at D Street in 1997, but there were significant losses to predation, and only seven nests were established in 1998 (Patton, 1998a and 1998b). Nest numbers increased to 36 in 1999, but remained relatively low through 2002 when 24 nests were initiated (Patton, 1999; 2000; 2001; 2002). Numbers then increased with 91 nests in 2003, 111 in 2004, 101 in 2005, 100 in 2006, and 130 in 2007 (Patton, 2003; 2004; 2005; 2006; 2007).

As part of the monitoring program, least terns were observed from April 9 through August 29, 2008 at and adjacent to properties and facilities of the SDUPD. At the three Port District and San Diego County Regional Airport Authority sites, 320 nests were established from May 10 to July 18, 2008. At least 134 to 154 young are estimated to have fledged from San Diego International Airport - Lindbergh Field, D Street Fill, and Chula Vista Wildlife Reserve. The 2008 season's numbers of breeding pairs, nests, and fledglings at these three sites were the highest recorded since 2003 (Patton, 2008). The combined estimated number of fledglings produced per pair at the three sites was among the highest recorded that season in San Diego County (Patton, 2008).

The Recovery Plan (USFWS, Revised 27 Sept 1985) identified the population size, distribution, secure nesting site numbers, and reproductive rates necessary for recovery of the California least tern. The Recovery Plan states that for delisting, the terns must have an annual rangewide breeding population of at least 1,200 pairs. This goal has been far surpassed; breeding pairs throughout the range are currently estimated at over 7,000. In 2008, the following were statewide statistics: 2,254- 2,573 fledglings; 0.29-0.37 fledgling/pair; 8223-8226 nests, 6998-7698 pairs; 31 data sites at 56 locations. In 2006, the USFWS initiated a five-year review which has resulted in a recommendation to delist the species to Threatened under the ESA. Without continued intensive management of least tern sites, the USFWS anticipates that the threats of habitat loss and predation would reverse the population recovery that has been seen since the species was listed. Current recommendations for future actions include revisiting and revising management goals and recovery criteria. The USFWS recognizes that the management goals and recovery criteria identified in the 1985 Recovery Plan are outdated and that the plan needs to be revised (USFWS, 2006b).

While the California least tern may occur at the Shipyard Sediment Site or Potential Staging Areas 1 through 4 during construction activities during its breeding season, it is expected to avoid these areas due to its high mobility and capability to access other areas of the Bay for feeding and foraging. The Potential Staging Area 5 located at the 24th Street Marine Terminal and adjacent parking lots is located just north of the D

Street Fill nesting location (Figure 6). While this location is close in proximity to the D Street Fill nesting location, this area is predominantly paved, highly industrial, and offers no habitat for nesting/breeding. In the event that offloading of sediment and dewatering activities occur at this staging area, it is recommended that these activities take place outside of the breeding season to mitigate for potential significant impacts to the least tern. However, if offloading of sediment and dewatering activities were to occur at this staging area during the breeding season, a biological monitor is recommended to mitigate for potential significant impacts

The Shipyard Sediment Site and Potential Staging Areas are not conducive for nesting or breeding due their lack of intertidal beach habitat and existing bulkheads and seawalls that extends the entire length of each site.

Double-crested Cormorant (*Phalacrocorax auritus*). Double-crested cormorants live in both fresh and saltwater environments. Double-crested cormorants are pursuit feeders and actively dive and pursue prey. Double-crested cormorants forage nearshore in the littoral-benthic zone and in the water column over rocky bottoms. These cormorants are almost exclusively fish-eating (upwards to 99 percent) (Fish and Wildlife Information Exchange, 1996a). Cormorants are opportunistic feeders, and alter their diets in response to fish stocks available at the time. In a given location, they will feed on fish species that are most abundant and more easily captured (USFWS, 1998; Rail and Chapdelaine, 1998). Breeding occurs in coastal areas as well as near inland rivers and lakes. They build stick nests in trees, on cliff edges, or on the ground on suitable islands. Populations declined due to eggshell thinning from DDE contamination and, to some extent, human disturbance at nest sites, but the population is currently considered stable-to-increasing in California. This species is listed on the CDFG Watch List (Appendix A).

While the double-crested cormorant may occur at the Shipyard Sediment Site and Potential Staging Areas during construction activities, it is expected to avoid these sites due to its high mobility and capability to access other areas of the Bay for feeding and foraging. The Shipyard Sediment Site and Potential Staging Areas are not conducive for nesting or breeding due their paved industrial setting.

4.2 Fish

California Grunion (*Leuresthes tenuis*). This fish species is not a formally listed species but is considered sensitive because of its beach spawning activity and potential impacts from beach disturbances such as beach cleaning and beach nourishment. This species is also an important forage fish for several species that are protected or regulated. It uses the high intertidal sandy beach habitat of many Southern California beaches as spawning habitat. Grunion lay their eggs in the wet beach sands during the highest spring tides between late February or early March to as late as early September (Walker, 1952). Due to the lack of intertidal beach habitat and existing bulkhead and seawall that extends the entire length of the Shipyard Sediment Site, Grunion is not expected to spawn in this area.

Steelhead Trout (*Onchorynchus mykiss*). Steelhead trout is a Federal endangered and California State species of special concern. It is also one of the species listed in the Pacific Salmonid Management Plan. The steelhead trout is an anadromous sea-going rainbow trout that lives approximately two to four years of its life (but this period varies greatly) in the open ocean prior to returning to the stream where it was spawned. It is dependent on small, clear-flowing but not rapid, streams with gravel beds to complete its spawning cycle. The area must also have protective cover and an adequate food source. Steelhead populations are declining because of impacts on habitat such as dams, turbidity, stream temperature, and other habitat incursions. With exception to a small population in San Mateo Creek in northern San Diego County, steelhead appear to have been completely extirpated from nearly all systems in the southern portion of the range of the Distinct Population Segment (DPS) from Malibu Creek to the Mexican border.

As an ESA listed species, critical habitat for the California steelhead trout have been designated in the State of California (http://www.nwr.noaa.gov/Publications/FR-Notices/2005/Index.cfm). Final critical habitat designations have been developed for the following five evolutionarily significant units (ESUs) of steelhead in California: (1) southern California steelhead; (2) south-central California coast steelhead; (3) central California Coast steelhead; (4) Central Valley California steelhead; and (5) northern California steelhead. All five of these ESUs occur well north of San Diego Bay beginning in Malibu Creek (west of Los Angeles). Therefore, steelhead trout are not expected to occur in the Bay.

Tidewater Goby (*Eucyclogobius newberryi*). The tidewater goby is a Federally-listed endangered species that has been extirpated from many Southern California creek mouths. It is currently found in shallow marine areas and lower reaches of streams between San Diego northward to Humboldt County waters where salinity is less than 10 ppt (USFWS, 1998). These fish also prefer sandy bottoms with depths of 20–100 cm, near emergent vegetation beds, since they breed in the open areas and winter over in the vegetation. The tidewater goby may be found in small groups of less than a dozen or occasionally in large aggregations of hundreds. Young tidewater gobies consume small crustaceans, molluscs, and insect larvae.

The population of Tidewater Goby is depleted due to reduced or eliminated flows in the lower reaches of coastal streams, pollution, and the filling in, channelization, and other physical alterations of their habitats. The population disappeared from about 74 percent of the coastal lagoons from Morro Bay southward to San Diego (USFWS, 1994). Habitat conducive to tidewater gobies, such as shallow and brackish water, is absent from the Shipyard Sediment Site and Potential Staging Areas. Therefore, the tidewater goby is not expected to occur at these sites during construction activities.

California Halibut (*Paralichthys californicus*). Although it does not have a formal special status, the California halibut is considered a sensitive species by resource agencies because of its commercial value and a continued region-wide reduction of its nursery habitat in bays and wetlands. California halibut spawn at sea and its larval stages are planktonic. After several months, larval fish settle to the bottom and migrate into shallow coastal waters. Young-of-the-Year fish (YOTY) prefer shallow waters between about -1.5 feet and -3.5 feet MLLW, whereas juveniles prefer deeper channel bottoms to a maximum depth of approximately -15 feet MLLW. After spending nearly nine months in coastal embayments, juveniles move out into the open coastal environment (Allen, 1996). The species uses inshore waters of bays, harbors, and estuaries as a nursery and foraging habitat. Juvenile to sub-adult halibut are known to occur in San Diego Bay (Pondella et al., 2009a).

Adult California halibut and juveniles are expected to occur at the Shipyard Sediment Site and waterfront Potential Staging Areas due to the deep water habitat. Additionally, YOTY California halibut are expected to occur in shallow, unvegetated nearshore areas at the Shipyard Sediment Site and waterfront Potential Staging Areas.

4.3 Marine Mammals

All marine mammals are protected by the Federal Marine Mammal Protection Act of 1972 (MMPA). The MMPA prohibits the intentional taking, import, or export of marine mammals without a permit. Several of the species that occur within the Southern California Basin are also protected under the Federal ESA of 1973. A species that is listed as threatened or endangered under the ESA is categorized as depleted under the MMPA. Unintentional take of a depleted species is allowed by permit only if the activity is determined to have a negligible impact. Intentional take of a depleted species is only allowed under a scientific research permit.

While several species of cetaceans (whale, dolphin, and porpoise), seals, and sea lion (*Zalophus californianus*) occur in Southern California waters, only the bottlenose dolphin (*Tursiops truncatus*), harbor seal (*Phoca vitulina*), and California sea lion (*Zalophus californianus*) use San Diego Bay on a regular basis (Tierra Data, Inc., 2002).

Bottlenose dolphins are often found in shallow inland and coastal waters and live on a diet of approximately 6-7 kilograms (12-15 pounds) of shrimp, squid, eels, and small fish a day. Bottlenose dolphins are known to breed throughout the year.

There are approximately 40,000 harbor seals in California waters. They can usually be observed inhabiting shallow areas where sandbars, rocks and beaches are uncovered during low tides or are otherwise easily accessible. Since harbor seals do not migrate, in many areas they are present year-round and while site fidelity is displayed, harbor seals are also capable of long-distance movements. Some short movements may be associated with seasonal availability of prey and with breeding. Harbor seals are opportunistic feeders, primarily consuming bottom dwelling and schooling prey. Common prey species include herring, flounder, and perch. They will also consume octopus, squid, and shrimp. Breeding generally occurs between February and June.

California sea lions stay no more than 10 miles out to sea. On warm days, they stay close to the water's edge. At night or on cool days, the sea lions will move inland or up coastal slopes. California sea lions prefer to breed on sandy beaches and breed from May to June. Outside of the breeding season, they will often gather at marinas and wharves. California sea lions feed on a wide variety of seafood, mainly squid and fish, and sometimes even clams. Commonly eaten fish and squid species include salmon, hake, Pacific whiting, anchovies, herring, schooling fish, rock fish, lampreys, dog fish, and market squid. They feed mostly around the edge of the continental shelf sea mounts, the open ocean and the ocean bottom.

On the basis of their prey preference, the harbor seal and California sea lion are more likely to feed in the vicinity of Shipyard Sediment Site than the bottlenose dolphin. However, it is assumed that all three species could occur at the Shipyard Sediment Site during construction activities.

4.4 Marine Reptiles

Of the four sea turtles in the family Cheloniidae (green, loggerhead, Pacific ridley, and hawksbill), only the green sea turtle (*Chelonia mydas*), is known to reside in San Diego Bay (Stebbins, 1985). The number of green sea turtles using the bay is dynamic but has been estimated to range between 30 and 60 mature and immature animals (Stinson, 1984; Dutton and McDonald, 1990a, 1990b, 1992; McDonald et al., 1995; Tierra Data, Inc., 2002; Eguchi et al., 2010). Based on the preliminary findings of a sea turtle tagging and hydrophone tracking Joint Research Program being conducted by the Navy, the SDUPD and NOAA, the current number of sea turtles using San Diego Bay is estimated to be greater than 60. Eguchi et al. (2010) documented an annual abundance of green sea turtles in the Bay over a 19 year period ranging from 16 to 61. This is considered the only area on the western coast of the United States where this species congregates (Stinson, 1984; Dutton and McDonald, 1990a and b; San Diego Bay Interagency Water Quality Panel, 1998), and it has been hypothesized that these turtles continue to recruit from breeding sites in Mexico and Ecuador (McDonald and Dutton, 1993; Dutton et al., 1994). According to the Endangered Species Act, this species is listed as threatened wherever found, except breeding colony populations that are listed as endangered in Florida and along the Pacific coast of Mexico. As the San Diego Bay population is considered a part of the Mexican breeding population, it is considered endangered. The NMFS is the lead agency for the turtle recovery in the San Diego Bay region (Tierra Data, Inc., 2002). The NMFS and USFWS have issued a recovery plan for the green sea turtle (NMFS and USFWS, 1998).

Although few data exist regarding the spatial and temporal population distribution, movements and preferred habitat of sea turtles in San Diego Bay, it has been documented that the green sea turtle resided primarily in the southern portion of the Bay in an area where warm water effluent was discharged from the former San Diego Gas and Electric power plant (operations ceased in late 2010), and spends most of its time resting on the bottoms of the main channels (Stinson, 1984; McDonald and Dutton, 1992). Although the turtles' preferred location is likely the effluent channel of the former San Diego Gas and Electric power plant, they have historically been observed as far north as the San Diego - Coronado Bridge (Coronado Bridge) near NAB Coronado (McDonald and Dutton, 1995). The Shipyard Sediment Site and Potential Staging Areas 1 through 4 are located southeast of the Coronado Bridge. Potential Staging Area 5 is located approximately 2.5 nautical miles south of the Shipyard Sediment Site and Potential Staging Areas 1 through 4 in the central portion of the Bay.

Potential habitat for Pacific green sea turtles within San Diego Bay may be utilized during foraging, but are not considered suitable for nesting. Foraging by Pacific green sea turtles is concentrated to eelgrass beds and to lesser extent invertebrate communities in South and South Central bay, considering the concentration of the majority of habitat within those areas. Movement patterns of green turtles in the Bay tagged with temperature sensors indicated a strong diel pattern during winter months (Lyons, 2006). These turtles in the Bay were found to forage outside of the warm effluent plume at night and return to the effluent channel in the morning. Because little is known about foraging patterns of resident Pacific green sea turtles within San Diego Bay, and the majority of sightings have been concentrated in the former San Diego Gas and Electric power plant channel, inferences about movement patterns remain conjecture. Based on the recent closure of the power plant, effectively removing the warm water effluent, it is unknown as to how the green sea turtles will react to this change in habitat conditions.

To address information gaps and uncertainties regarding the spatial and temporal population distribution, movements and preferred habitat of sea turtles in San Diego Bay, the Joint Research Program is in the process of tagging and tracking turtles using an array of deployed hydrophones, including an array of 16 hydrophones in the vicinity of NAB Coronado. It is hoped that through these efforts, detailed information about the movement and feeding of East Pacific green sea turtles in the Bay will be determined in order to better manage their population. It is the parties' desire to develop an appropriate management strategy that will allow for continued use of the Bay as an important commercial and national defense asset, as well as allow for the continued healthy existence of the Pacific green sea turtle in San Diego Bay waters.

5. INVASIVE SPECIES

Aquatic invasive species disrupt the balance of natural ecosystems by consuming or competing with native plants and animals, altering biogeochemical cycles, and reducing native biodiversity. Invasive marine species have arrived in the Bay from all over the world through direct and indirect means, and for intentional and unintentional purposes. In Southern California, one main invasive species is a tropical seaweed (*Caulerpa taxifolia*). Native to the Indian ocean and believed to be an accidental introduction of the aquarium trade into southern California coastal waters, the alga produces a large amount of a single chemical that is toxic to fish and other would-be predators.

While outbreaks have been contained for *Caulerpa taxifolia*, the Water Resources Board, through the NMFS and the CDFG, require that projects that have potential to spread this species through dredging and bottom-disturbing activities conduct pre-construction surveys to determine if this species is present using standard agency-approved protocols conducted by NMFS/CDFG Certified Field Surveyors (NMFS, 2008).

In September 2010, *Caulerpa* surveys were performed to support the BAE Systems Dry Dock Sump Maintenance Dredging Project, Mooring Dolphin Fender Pile Replacement Project, and Pier No. 3 Fender Pile Installation Project. No *Caulerpa* algae were observed during the remote video surveys within the project area (Merkel & Associates, 2010).

Caulerpa surveys have been performed within the NASSCO leasehold in 2002-2004 and 2006 (Coastal Resources Management, 2002; 2003; 2004; 2006). These surveys were performed to support replacement of H-Piles on Berth VI, fender piles on Berths III and IV, jetting and pile driving at Berth VI, and the expansion of Building Ways 3 and 4 submerged groundways. No *Caulerpa* algae were observed during any of the diver transect surveys within the project areas.

It is assumed that no *Caulerpa* algae are currently present at the site based on previous surveys within the Shipyard Sediment Site. However, *Caulerpa* algae surveys will be conducted prior to construction activities to comply with permit applications for Corps Section 404 CWA and Section 10 of the Rivers and Harbors Act, and with the requirements of Section 305(b)(2) of the MSA.

6. IMPACT ASSESSMENT AND MITIGATION MEASURES

The proposed project is the dredging of sediment at the Shipyard Sediment Site, the dewatering and possible solidification of the dredged material on-shore, potential treatment of decanted water, and the transport of the removed material to an appropriate disposal facility. Additionally, portions of the remedial areas (2.4 acres) are located under piers and cannot be feasibly dredged without potential significant impacts to infrastructure. The removal of sediments could compromise the structural stability of the piers, wharves, or bulkheads by damaging and/or weakening pilings and/or fenders. Additionally, it is difficult to remove contaminated sediments under piers with a clamshell bucket due to access constraints. Therefore, it is assumed that a sand layer cover will be spread evenly in these under pier areas identified as containing contaminated sediments.

The Shipyard Sediment Site project area is similar to other industrialized areas within San Diego Bay with regard to distribution of habitats, biological features, and sediment characteristics. This section focuses on stressors associated with the proposed project and the potential impact to EFH (i.e., water column, subtidal [vegetated and non-vegetated] habitat) within the project area. Pursuant to 50 CFR 600.910(a), an adverse effect on EFH is defined as "any impact that reduces the quality and/or quantity of EFH." Factors that were considered in the analysis included the duration, frequency, intensity, and spatial extent of the impact; the sensitivity/vulnerability of the habitat; the habitat functions that might be altered by the impact; and the timing of the impact relative to when the species or life stages may use or need the habitat. Mitigation measures are also presented to reduce potential adverse impacts to marine resources, sensitive species, and rare and endangered species.

In late 2010/early 2011 BAE Systems performed the Dry Dock Sump Maintenance Dredging Project (BAE Systems, 2010). The purpose of the maintenance dredging project was to remove sediments that have deposited in the sump and are preventing the dry dock from achieving full submergence. This maintenance dredging project returned the dry dock sump to its original design depth of -70 ft MLLW by removing approximately 7,000 cubic yards of sediments from the sump floor and the lower part of the slopes. Mitigation efforts implemented to reduce impacts to marine biological resources during this project are discussed and referenced in the following sections.

6.1 Discretionary Permits, Approvals, or Actions

In accordance with Sections 15050 and 15367 of the State CEQA Guidelines, the San Diego Water Board is the designated Lead Agency for the project and has principal authority and jurisdiction for CEQA actions. Responsible Agencies are those agencies that have jurisdiction or authority over one or more aspects associated with the development of a proposed project. Trustee Agencies are State agencies that have jurisdiction by law over natural resources affected by a proposed project that are held in trust for the people of the State.

Project implementation, as it pertains to the marine biological resources, will require approval of a Coastal Development Permit by the Port District, pursuant to the California Coastal Act, and administrative (ministerial) approvals from Responsible and Trustee Agencies, including but not limited to the San Diego Water Board, pursuant to CWA and the California Water Code Porter-Cologne Act; the ACOE, pursuant to Section 404 of the CWA and Section 10 of the Federal Rivers and Harbors Appropriation Act of 1899 (CDFG will review and comment on ACOE permits pursuant to the Federal Fish and Wildlife Coordination Act); NMFS, pursuant to the MSA; the USFWS, pursuant to the ESA; and the California State Lands Commission.

6.2 Sediment and Water Quality

The purpose of the project is to implement a Tentative CAO issued by the San Diego Water Board for the cleanup of contaminated marine sediments. Cleanup efforts will include removal of contaminated sediments by dredging. The dredging will occur in an area of the Bay defined in the Tentative CAO. Sediment and water quality effects on marine biological resources from dredging would include temporary and localized increases in turbidity. Turbidity may also increase if vessel propellers impact the Bay floor or prop wash stirs up bottom sediments.

Dredging activities will also have a potential to release detectable levels of sediment-bound contaminants into the water column that could be redistributed through the tidally-induced movement of the turbidity plume. Organically enriched sediments resuspended into the water column during dredging will also cause a slight decrease in dissolved oxygen (DO) levels. Tidal currents will slowly dissipate the oxygen-poor water mass and replenish ambient oxygen levels within one-to-several tidal exchanges. To prevent the spread of any turbidity plume or release of sediment-bound contaminants out of the area, Best Management Practices (BMPs) should be implemented to reduce potential adverse impacts to marine resources, sensitive species, and rare and endangered species. BMPs include use of an environmental dredge bucket, installation of silt curtains, operational controls, and water quality monitoring. These BMPs are discussed below and in the Hazards and Hazardous Waste and Water Quality Technical Reports for this project.

Accidental oil or fuel spills that could potentially occur during the proposed dredging operations could result in significant effects on water quality, and subsequently the fish and wildlife of the Bay, depending on the severity of the spill. Such events are likely to be localized spills of lighter, refined diesel fuels, gasoline, and lubricating oils that are highly toxic to marine life. The potential for the occurrence of petroleum-product leaks or spills would be low, but the potential for significant, long-term effect on marine resources would be moderate to high. The inclusion and implementation of a Dredging Management Plan (DMP) for the project will assist in preventing accidental spills and providing the necessary guidelines to follow in case of an oil or fuel spill, and reduce the potential for a significant long-term impact to biological marine resources to less than significant.

Mitigation Measures. Turbidity caused by dredging will be minimized by using an environmental bucket such as the Cable Arm Environmental Clamshell®. The Cable Arm Environmental Clamshell® is equipped with vertical side plates that reduce sediment loss during bucket closing, flatter sediment cut reducing the potential for sediment resuspension caused by potholes, and indicator switches at the four corners (i.e., left, right, top, bottom) of the clamshell seal. The switches are positioned in these locations to inform the operator if and where the bucket is failing to close. The dredge operators will use automatic rather than manual monitoring of the dredging operations, which will allow continuous data logging with automatic interpretation and adjustments to the dredging operations for real-time feedback for the dredge operator. Automatic systems will also be used to monitor turbidity and other water quality conditions in the vicinity of the dredging operations to facilitate real-time adjustments by the dredging operators to control temporary water quality effects.

Dredging operations will be configured to limit the turbidity caused by the actual sediment removal. Double silt curtains, deployed by the dredge contractor, will be utilized for containment of the dredge area; configurations and technologies will be finalized during the design phase of the project. A silt curtain containment within a floating “dredge cell” that is lined with a silt curtain on the inside of the cell is shown in Figure 7. A modification of this type of configuration would be to install the silt curtain around the outside of the dredge cell. This type of containment was implemented during the BAE Systems Dry Dock Sump Maintenance Dredging Project executed in late 2010/early 2011 (BAE Systems, 2010).

The preferred containment configuration that covers a large area within a double silt curtain is shown in Figure 8. This combination of silt curtain containment systems includes an outer curtain defining the dredging area and an inner curtain around the dredge to be used, to further minimize turbidity. This deployment was also used by BAE Systems during the Dry Dock Sump Maintenance Dredging Project executed in late 2010/early 2011 (BAE Systems, 2010). The disadvantage to this configuration is that the silt curtain gate must be opened and closed by project personnel, which poses safety concerns, and also increases the potential for turbidity and/or suspended contaminant dispersal outside the silt curtain. To mitigate for this potential impact, the curtain gate should only be opened when the clamshell bucket is not in operation.

The floating silt curtain will be Type III comprised of connected lengths of geotextile fabric. It is intended to supplement the operational controls described above by helping to control and contain migration of (contaminated) suspended sediments at the water surface and at depth. This in turn will help protect surrounding submerged areas from accumulation of resuspended solids originating from the dredging work.

A continuous length of floating silt curtain will be arranged to fully enclose the dredging equipment and the scow barge being loaded with sediment. The silt curtain will be supported by a floating boom in open water areas (such as along the bayward side of the dredging areas). Along pier edges, the dredge contractor will have the option of connecting the silt curtain directly to the structure. In either case, the contractor would be required to continuously monitor the silt curtain for damage, dislocation, or gaps, and immediately fix any locations where it is no longer continuous or where it has loosened from its supports.

The bottom of the silt curtain shall be weighted with ballast weights or rods affixed to the base of the fabric. These weights are intended to resist the natural buoyancy of the geotextile fabric and lessen its tendency to move in response to currents. Extending the silt curtain further or all the way to the bay floor would be problematic and potentially counter-productive. This is because at lower tides the geotextile fabric would be in contact with sediments at the mudline, potentially folding up on the seabed; and when subsequently moved by current flow or lifted by rising tide it would cause increased sediment disturbance, generating an additional source of sediment resuspension and turbidity. Therefore, the floating silt curtain around the dredging unit will be deployed in a manner that includes a gap above the seafloor to allow for the tidal ranges and fluctuations, and to sufficiently allow for dredge operation. The outer silt curtain surrounding the remediation site shall be deployed in a manner dependent on site-specific conditions including, but not limited to, depth, current velocities, existing infrastructure for curtain deployment, and proximity of sensitive habitat (i.e., essential fish habitat).[1]

Where feasible and applicable, curtains will be anchored and deployed from the surface of the water to just above the substrate. If necessary, silt curtains with tidal flaps will be installed to facilitate curtain deployment in areas of higher flow. Additional curtains may be required by resource agencies to isolate environmentally sensitive areas like essential fish habitat and eelgrass.

Air curtains may be used in conjunction with silt curtains to contain resuspended sediment, to enhance worker safety, and allow barges to transit into and out of the work area without the need to open and close silt curtain gates. Air curtains are formed by laying a perforated pipe along the mudline and pumping air continuously through the piping. The upwelling of the tiny bubbles to the surface of the water has the effect of preventing fine-grained sediments from passing across the line of the pipe.

In addition to the deployment of silt curtains, another supplemental protective measure to reduce impacts to water quality is physical monitoring. The Tentative CAO requires monitoring during remedial activities. Post-remediation monitoring is also required to verify that remaining pollutant concentrations in the sediments will not unreasonably affect beneficial uses in San Diego Bay. The post-remediation monitoring requirements are part of the proposed project and are not mitigation for the remediation efforts. The Tentative CAO requires that, prior to beginning remediation efforts, a Monitoring and Reporting Plan (MRP) will be required to describe the remediation and monitoring activities. The MRP will describe the following, consistent with the Tentative CAO:

- Water quality monitoring to demonstrate that implementation of the selected remedial activities does not result in violations of water quality standards outside of the remedial area.
- Sediment monitoring to confirm that the selected remedial activities have achieved target cleanup levels within the remedial footprint.

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[1] United States Army Corps of Engineers: Engineer Research and Development Center. 2008. Technical Guidelines for Environmental Dredging of Contaminated Sediments. ERDC/EL TR-08-29.

Water quality compliance will be predicated upon the Water Quality Control Plan for the San Diego Basin (i.e., the Basin Plan) turbidity objectives (Chapter 3, page 30) and DO objectives (Chapter 3, page 22), and will have specific compliance criteria based on comparisons with ambient conditions within San Diego Bay. This is consistent with the water quality objectives implemented during the 2010/2011 BAE Systems Dry Dock Sump Maintenance Dredging Project.

The water quality monitoring will evaluate turbidity levels (measured in Nephelometric Turbidity Units [NTUs]) and DO levels to demonstrate that remedy implementation does not result in violations of water quality standards outside the construction area.

Daily visual monitoring will be conducted during construction activities (dredging and sand covering). A detailed worksheet describing both the visual turbidity plume as well as documenting all conditions and any additional debris encountered during the observational period will be reported on a daily basis. Photographs of operational elements of the dredging will also be taken to visually document conditions. All observer reports will be included in the Final Cleanup and Abatement Report.

During active dredging activities, the trained observer will conduct daily qualitative (visual) turbidity monitoring from a high vantage point to ensure water quality objectives for turbidity are not observed outside the silt curtains. If turbidity limits are exceeded, the observer has the authority to halt dredging activities to allow for additional BMPs to be implemented for turbidity containment. Following implementation of additional BMPs, visual turbidity monitoring will resume to ensure the effectiveness of the additional BMPs.

Project mitigation measures, such as operational controls, to reduce potential adverse impacts to marine resources, sensitive species, recreational and commercially important species, and rare and endangered species are provided below.

- No construction materials, equipment, debris, or waste that could increase turbidity and/or release potential contaminants shall be placed or stored where it may be subject to tidal erosion and dispersion to the Bay.
- All trash shall be disposed of in the proper trash receptacles on an ongoing basis throughout the project by contracted and shipyard personnel.
- Silt curtains, configured in similar fashion as deployed during the 2010/2011 BAE Systems Dry Dock Sump Maintenance Dredging Project (BAE Systems,

2010), shall be utilized to control turbidity and release of sediment-bound contaminants.

- The shipyards shall limit, to the greatest extent possible, the suspension of sediments into the water column outside the project area/silt curtains. This is accomplished by implementing the BMPs discussed above.
- Silt curtains will not be removed from the completed dredge area until turbidity has been reduced to ambient conditions. Water quality monitoring will be performed to measure for ambient conditions. Ambient conditions will be defined in the MRP discussed above.
- Construction methods shall be used that are the least damaging to sediments and benthic organisms. This is accomplished by implementing the BMPs discussed above.

The inclusion and implementation of a DMP containing Standard Operating Procedures (SOPs) for the project will assist in preventing accidental spills and provide the necessary guidelines to follow in case of an oil or fuel spill, such that the potential for a significant long-term impact is reduced to less than significant. The DMP will include the following measures to prevent accident oil/fuel spills during construction activities:

- Personnel involved with dredging and handling the dredged material will be given training on the potential hazards resulting from accidental oil and/or fuel spills. This operational control will provide the personnel with an awareness of the materials they are handling as well as the potential impact to the environment. This increased awareness will assist in minimizing impacts to the water column as a result of spills.

- All equipment will be inspected by dredge contractor personnel before starting the shift. These inspections are intended to identify typical wear or faulty parts that may contain oil or fuel. This operational control will minimize the potential of impacts during the operations by identifying potential impacts due to wear of important sub-systems.

- Personnel will be required to visually monitor for oil or fuel spills during construction activities. This operational control will minimize impacts associated with leaks or spills and will provide additional mitigation over the automatic systems identified above.

- In the event that a sheen or spill is observed, the equipment will be immediately shut down and the source of the spill identified and contained. Additionally, the spill will be reported to the applicable agencies presented in the DMP. This operational control will minimize impacts to the water quality both in volume and duration as the operations will be immediately shut down and the source of the impact will be identified and remedied.

- The shipyards currently have oil/fuel spill kits located at various locations onsite for routine ship repair operations. All personnel associated with dredging activities will be trained on where these spill kits are located, how to deploy the oil sorbent pads, and proper disposal guidelines. As an additional mitigation step, the dredging barge shall have a full complement of oil/fuel spill kits on board to allow for quick and timely implementation of spill containment.

- The use of oil booms will be deployed surrounding the dredging activities. In the event that a spill occurs, the oil and/or fuel will be contained within the oil boom boundary. This operational control will be the last line of defense against accidental oil/fuel spill occurrences. The oil boom shall be deployed along the entire length of the outer silt curtain.

6.3 Water Column Biota

As discussed above in Section 6.2, an increase in turbidity is anticipated during dredging and sand covering activities, which will result in a temporary reduction in submarine light levels, resulting in a short-term reduction of plankton productivity within the project area. Because plankton drift with the currents and turbidity is expected to be localized, there will be only short-term, less-than-significant impacts to the plankton community.

There is no mortality anticipated of open water schooling fishes (atheriniids or anchovies) or fishes associated with piling habitats (i.e., black surfperch, pile perch, kelpfish, and pipefish). Water column and bottom dwelling fishes (such as halibut and gobies) are expected to swim away from the immediate work area during active deployment of the silt curtain. It is uncertain if any water column biota will become entrapped within the silt curtain after deployment. Silt curtains will act as a mitigation measure to contain turbidity within the project area created during dredging activities. Regardless of which of the two scheduling options proposed for dredging is implemented, phasing of the dredging activities during 2 to 2.5 years or a continuous dredging cycle over a 12.5 month period, fish will be able to find sources of food on nearby hard substrata outside of the project area.

Mitigation Measures. The Shipyard Sediment Site water column habitat supports a plankton and fish community of species that are common to bays and harbors of Southern California. Living in bays and harbors, with constant sources of turbidity from stormwater runoff, recreational boat and large vessel operations, this community of marine organisms has acclimated, to some degree, to turbid conditions that might arise from site-specific ship repair operations. It is anticipated that most demersal and pelagic species would avoid the dredging area and that potential impacts would be minor resulting in the displacement of, followed by post-construction re-colonization by, these species.

The use of BMPs such as operational controls, silt curtains and water quality monitoring, as described above in Section 6.2, will minimize the extent of the turbidity plume and resuspension of sediments outside of the project area.

6.4 Soft-Bottom Benthic and Hardscape Associated Communities

Dredging and sand covering will result in the temporary loss (mortality) of the majority of benthic infauna within the dredge/sand covering footprints (approximately 759,790 sq ft). It is assumed that a portion of the mobile benthic invertebrate community found in the Shipyard Sediment Site may relocate during dredging/sand covering activities and avoid mortality. This will have a significant, but short-term localized impact on the benthic community. No loss of benthic infauna is expected at the Potential Staging Areas as no sediment removal will occur and in-work activities in these staging areas are limited to the offloading of dredged material from a floating material barge to land.

There will be no long-term reductions in the amount of benthic soft bottom habitat or populations of benthic invertebrates within the Shipyard Sediment Site as a consequence of dredging/sand covering. The area is typical of other bay environments in Southern California and is dominated by species adapted to constant environmental stresses. Following the completion of dredging/sand covering, benthic invertebrates will begin the recolonization process.

Post-Remediation Monitoring. As per the Tentative CAO, post-remediation monitoring will be initiated two years after remedy implementation has been completed and potentially continue for a period of up to 10 years after remediation. The post-remediation monitoring requirements are part of the proposed project and are not mitigation for the remediation efforts. As per the Tentative CAO, the frequency of sediment sampling and analyses (chemical, physical, and bioaccumulation) will occur at two and five years post-remediation and, depending on the results at year five post-remediation, may also occur at ten years post-remediation. Therefore, in compliance with the Tentative CAO, a Post-Remedial Monitoring Plan (PRMP) will be required as part of the proposed project to verify that remaining pollutant concentrations in the sediments will not unreasonably affect San Diego Bay beneficial uses.

For aquatic life beneficial uses in the Bay, post-remediation monitoring will include sediment chemistry and toxicity bioassays to verify that post-remedial conditions have the potential to support a healthy benthic community (San Diego Water Board, 2010). In addition, post-remediation monitoring will include benthic community condition assessments to evaluate the overall impact of remediation on the benthic community recolonization activities. The purpose of assessing benthic community conditions as part of post-remedy monitoring is to demonstrate the remediation will successfully create conditions that would be expected to promote re-colonization of a healthy benthic community.

6.5 Sensitive Species

California Least Tern. Construction activities may disturb the California least tern, if present during dredging activities. If construction activities are performed during the scheduling option that includes approximately seven month dredging episodes extending over 2 to 2.5 years, potential impacts to the California least tern are likely to be less than significant due to work being performed outside the breeding season. If construction activities are performed during the scheduling option of continuous dredging cycle over a 12.5-month period, potential significant impacts are recognized. However, only small areas of the Shipyard Sediment Site are to be affected at any one time regardless of the dredge schedule, leaving available other open water areas for this species to forage. There is no shallow water foraging habitat at the Shipyard Sediment Site, limiting current feeding opportunities. The least tern may choose to avoid the immediate construction work area based on the lack of foraging habitat and the fact that no known nests have been recorded at the site.

To ensure that any potential impacts remain less than significant, mitigation is proposed requiring a qualified biologist to monitor least terns and other special-status waterbirds at the Shipyard Sediment Site and selected Staging Area(s) immediately prior to and during the initial start-up phase of construction activities. The biologist will not be required to be onsite throughout the entire dredging process; however, monitoring should be performed once per week to adequately assess potential waterbirds occurring during construction.

In accordance with the ESA Consultation Handbook (USFWS, 1998), informal Section 7 consultation with USFWS and NMFS will be implemented to determine what effect the proposed project will have on the California least tern, explore means to modify the proposed project to reduce or remove adverse effects to the California least tern, determine the need to enter into formal Section 7 consultation, and explore the design or modification of the proposed project plans to benefit the California least tern. Based on the results of the informal consultation with USFWS/NMFS, either concurrence that the project will not adversely affect the California least tern will be received or formal consultation will be required if concurrence is not received.

If formal consultation is requested by USFWS/NMFS, a biological assessment will be required to be submitted documenting the presence of the California least tern near the proposed project area and a description of the effects of the proposed project. USFWS and NMFS will formulate a biological opinion and incidental take statement ending the formal consultation.

Mitigation Measures. The following mitigation measure would specifically reduce impacts to California least terns and other potentially present waterbirds to a less than significant level:

- A qualified biologist will be retained and be on site to assess the roosting (and foraging) behavior of waterbirds at the Shipyard Sediment Site and selected Staging Area(s) immediately prior to and during the initial start-up phase of construction activities. The biologist will not be required to be onsite throughout the entire dredging process; however, monitoring should be performed once per week to adequately assess potential waterbirds occurring during construction. The biologist will be present during either of the selected dredge scheduling options. In the event of an imminent threat to a California least tern and/or special-status species, the monitor shall immediately contact the Dredging Contractor’s Construction Manager. In the event the Construction Manager is not available, the monitor shall have the authority to redirect or halt construction activities if determined to be necessary.

Implementation of this Mitigation Measure would reduce impacts to this species to less than significant.

California Brown Pelican. Construction activities may disturb the California brown pelican, if present during such activities. However, construction will disturb small areas of the Shipyard Sediment Site at any one time, leaving available other open water areas for this species. Therefore, because construction is confined to a small area within the Bay, potential impacts to California brown pelicans are considered less than significant. However, to ensure that any potential impacts remain less than significant, mitigation has been proposed (see above for California least tern) requiring a qualified biologist to monitor special-status waterbirds prior to any significant construction activities.

Double-Crested Cormorant. Construction activities may disturb the double-crested cormorant, if present during such activities. However, construction will disturb small areas of the Shipyard Sediment Site at any one time, leaving available other open water areas for this species. Because cormorants are opportunistic feeders and alter their diets in response to fish stocks available at the time, this species is not expected to feed at the dredging site due to the absence of fish from the BMPs implemented. Therefore, because construction is confined to a small area within the Bay and fish stocks will not be available at the site, potential impacts to double-crested cormorants are considered less than significant. However, to ensure that any potential impacts remain less than significant, mitigation has been proposed (see above California least tern) requiring a qualified biologist to monitor special-status waterbirds prior to any significant construction activities.

California Grunion (*Leuresthes tenuis*). Due to the lack of intertidal beach habitat and existing bulkhead and seawall that extends the entire length of the Shipyard Sediment Site, Grunion is not expected to spawn in this area. Therefore, no construction-related impacts will occur on this species or its habitat.

Steelhead Trout. There are no known populations of this species in San Diego Bay; therefore, there will be no construction-related impacts on Steelhead Trout EFH for salmonids.

Tidewater Goby. Tidewater gobies are not known to occur within San Diego Bay; no construction-related impacts will occur to this species or its habitat.

California Halibut. Adult and juvenile halibut are found in many areas of San Diego Bay, and they will potentially be present within the Shipyard Sediment Site and

Potential Staging Areas. During dredging activities, adults/juveniles in the immediate area will swim to areas outside the immediate impacted zone. During offloading activities, adults/juveniles will be able to swim freely under the material barge as this mimics normal vessel docking conditions in the Bay. No mortality is anticipated as a result of construction activities. Therefore, the level of impact on halibut is expected to be less than significant.

6.6 Essential Fish Habitat

Eelgrass. Barges, scows, and support vessels have a potential to impact eelgrass through: (1) deployment of anchors and anchor chain within eelgrass habitat; (2) grounding of the vessels over eelgrass habitat; and (3) propeller scarring and propeller wash. These activities would create furrows and scars within the eelgrass vegetation, and perhaps temporarily increase turbidity that could potentially cause additional adverse losses of eelgrass habitat along the transit corridor in-and-out of the Shipyard Sediment Site and during offloading activities at any of the Potential Staging Area(s).

A long-term reduction of eelgrass within the BAE Systems leasehold and a portion of the NASSCO leasehold is predicted, related to dredging to depths beyond eelgrass depth limits. It is estimated that between 0.5 to 0.8 acres of eelgrass will be impacted during the sediment remediation project. Pre-construction surveys of each Potential Staging Area are not required with the exception of the staging area that lies within the Shipyard Sediment Site (Potential Staging Area 3 - BAE Systems leasehold). Potential Staging Areas 1, 2, and 5 offer dockside offloading of material barges (Potential Staging Area 4 is an upland parking lot and not adjacent to the water). These waterfront areas are deep water port docks and are not conducive habitat for eelgrass growth.

A pre-construction (dredging/sand covering) survey of eelgrass beds along the Shipyard Sediment Site will be conducted to evaluate the amount of eelgrass vegetation that will be impacted. The anticipated loss is a long-term, but mitigable, impact on EFH. Mitigation for these losses will be required per requirements of the Southern California Eelgrass Mitigation Policy (SCEMP) (NMFS, 1991 as amended). Upon successful mitigation for these losses, the level of impact will be reduced to a less than significant impact.

Mitigation Measures. Prior to sediment removal activities, BAE Systems and NASSCO will be required to conduct a robust eelgrass survey in accordance with the SCEMP (NMFS, 1991, revision 11). Each shipyard may choose to conduct their eelgrass surveys independent of each other. The pre-construction eelgrass surveys of each shipyards remedial area should cover the entire proposed dredging areas as well as a large reference area in the Bay near the Shipyard Sediment Site.

The survey will mark the beginning of formal consultation with NMFS. The goal of the survey will be to provide a quantitative assessment of the eelgrass communities in the vicinity of the project site in conformance with the SCEMP. Based on the Tentative CAO dredge footprint, it is assumed that 100 percent of the eelgrass identified during the pre-dredge survey will be removed and mitigated as per the SCEMP. Impacts to eelgrass from dredging will be mitigated at 1.2 to 1 per NMFS policy.

Eelgrass Mitigation Requirements. As a submerged aquatic habitat, eelgrass is given special status under the Clean Water Act, 1972 Section 404(b)(1), "Guidelines for Specification of Disposal Sites for Dredged or Fill Material", Subpart E, "Potential Impacts on Special Aquatic Sites." Mitigation will be required for the loss of existing vegetated areas, loss of potential eelgrass habitat, and/or degradation of existing/potential eelgrass habitat.

A pre-construction eelgrass habitat mapping survey for the Shipyard Sediment Site will be required to be completed within 120 days of the proposed start dates of each project phase in accordance with the SCEMP (NMFS, 1991 as amended) to amend, if required, the amount of eelgrass that will likely be affected by dredging activity. The results of these surveys will be integrated into a Final Eelgrass Mitigation Plan and used to calculate the amount of eelgrass to be mitigated. The Final Eelgrass Mitigation Plan will include the following elements:

- A detailed map of the area including distribution, density and relationship to depth contours of any eelgrass beds likely to be impacted by project construction.
- Identification of a Mitigation Site(s) - factors such as distance from project, depth, sediment type, distance from ocean connection, water quality, and currents are among those that should be considered in evaluating potential sites.
- Techniques for the construction and planting of the eelgrass mitigation site consistent with the best available technology at the time of the project.
- Proposed mitigation timing schedule.
- Proposed mitigation monitoring activities.

The location of eelgrass transplant mitigation shall be in areas similar to those where the initial impact occurs. Factors such as distance from project, depth, sediment type, distance from ocean connection, water quality, and currents are among those that should be considered in evaluating potential sites. In the case of transplant mitigation activities that occur concurrent to the project that result in damage to the existing eelgrass resource, a ratio of 1.2 to 1 shall apply. That is, for each square meter adversely impacted, 1.2 square meters of new suitable habitat, vegetated with eelgrass, must be created. The rationale for this ratio is based on: 1) the time (i.e., generally three years) necessary for a mitigation site to reach full fishery utilization; and 2) the need to offset any productivity losses during this recovery period within five years.

NMFS, USFWS, and the CDFG require that mitigation be conducted “in kind” (i.e., mitigation of eelgrass), and “on site” (i.e., within the same system - San Diego Bay). If this cannot be achieved, offsite mitigation areas can be evaluated. However, off-site mitigation is extremely difficult to achieve because agencies prefer that mitigation is conducted in the system that was affected by the project impacts.

A post-dredging project eelgrass survey will be completed and submitted within 30 days of the completion of each dredging episode in accordance with the SCEMP (NMFS, 1991 as amended) to the NMFS, USFWS, CDFG and the Executive Director of the CCC. It is likely that all identified eelgrass occurring at the Shipyard Sediment Site is within the Tentative CAO dredge footprint. Therefore, it is assumed that 100 percent of the eelgrass identified during the pre-dredge survey will be removed. Post-dredging eelgrass surveys will be compared to the pre-dredge surveys to assess overall eelgrass impacts. Mitigation will be required at a 1.2:1 ratio for the difference between impacted eelgrass beds based on the pre- and post-dredge survey results. .

Mitigation Success Criteria. Criteria for determination of transplant success shall be based upon a comparison of vegetation coverage (area) and density (turions per square meter) between the project adjusted impact area (i.e., original impact area multiplied by 1.2, or the amount of eelgrass habitat to be successfully mitigated at the end of five years) and mitigation site(s). Extent of vegetated cover is defined as that area where eelgrass is present and where gaps in coverage are less than one meter between individual turion clusters. Density of shoots is defined by the number of turions per area present in representative samples within the original impact area, control or transplant bed.

Specific criteria are as follows:

- The mitigation site shall achieve a minimum of 70 percent area of eelgrass and 30 percent density as compared to the adjusted project impact area after the first year.
- The mitigation site shall achieve a minimum of 85 percent area of eelgrass and 70 percent density as compared to the adjusted project impact area after the second year.
- The mitigation site shall achieve a sustained 100 percent area of eelgrass bed and at least 85 percent density as compared to the adjusted project impact area for the third, fourth and fifth years.

Should the required eelgrass transplant fail to meet any of the established criteria, then a Supplementary Transplant Area (STA) shall be constructed, if necessary, and planted.

The size of this STA shall be determined by the following formula:

$STA = MTA \times ([A_t + D_t] - [A_c + D_c])$

MTA = mitigation transplant area.

A_t = transplant deficiency or excess in area of coverage criterion (%).

D_t = transplant deficiency in density criterion (%).

A_c = natural decline in area of control (%).

D_c = natural decline in density of control (%).

The STA formula shall be applied to actions that result in the degradation of habitat (i.e., either loss of areal extent or reduction in density).

Five conditions apply:

1) For years 2-5, an excess of only up to 30 percent in area of coverage over the stated criterion with a density of at least 60 percent as compared to the project area may be used to offset any deficiencies in the density criterion.
2) Only excesses in area criterion equal to or less than the deficiencies in density shall be entered into the STA formula.
3) Densities which exceed any of the stated criteria shall not be used to offset any deficiencies in area of coverage.

4) Any required STA must be initiated within 120 days following the monitoring event that identifies a deficiency in meeting the success criteria. Any delays beyond 120 days in the implementation of the STA shall be subject to the penalties as described in Section 8 of the SCEMP.
5) Annual monitoring will be required of the STA for five years following the implementation and all performance standards apply to the STA.

Remedial and Contingency Plans for Unsuccessful Eelgrass Mitigation. If the initial transplant is unsuccessful, then one additional replanting at the primary on-site mitigation area will occur. The amount to be transplanted will be based upon the guidelines in the SCEMP (NMFS, 1991 as amended). If remedial transplants at the project site are unsuccessful, then eelgrass mitigation should be pursued at the secondary eelgrass transplant location.

The Mitigation Measure requirements described above in accordance with the SCEMP are proposed to reduce potential impacts to eelgrass marine resources at the Shipyard Sediment Site to a less than significant level. If the implementation of the Mitigation Measures described above are successful, this will reduce impacts related to eelgrass to a less than significant level.

6.7 Marine Reptiles

Sea Turtles. Although green sea turtles are known to be in San Diego Bay, the potential for adverse impacts to an individual during dredging activities is low. Dredging, sand covering, and vessel movements within the project area would potentially result in a behavioral modification to sea turtles that would include a change in swimming behavior to avoid excessive noise, turbidity, or the vessel movements. Additionally, the deployment of silt curtains surrounding the dredging/sand covering activities will act as a preventive barrier for green sea turtles entering the construction area.

Material barges transporting dredged material to potential sediment staging sites within San Diego Bay would be transiting a short distance in which green sea turtle may potentially be encountered. Therefore, there is a potential that green sea turtles may be in the general project barge transit lanes when barge transport activities are occurring. Similar to typical ongoing vessel traffic occurring in San Diego Bay, it is assumed that green sea turtles would change their swimming behavior to avoid vessel movements.

Mitigation Measures. The following mitigation measures would specifically reduce impacts to sea turtles to a less than significant level:

- Because sea turtles could potentially forage within and among eelgrass beds identified at the Shipyard Sediment Site, a project marine biologist shall mark the positions of eelgrass beds with buoys prior to the initiation of any construction to minimize damage to eelgrass beds outside the construction zone.
- The project marine biologist shall meet with the construction crews prior to dredging and periodically throughout the project to review pre-dredge survey areas of eelgrass beds to avoid located adjacent to the Shipyard Sediment Site and to review proper construction techniques.
- Barges and work vessels operated outside the project area in areas where eelgrass beds exist shall be operated in a manner throughout the entire project to ensure that they are not impacted through grounding, propeller damage, or other activities that may disturb the sea floor. Such measures shall include speed restrictions, establishment of off-limit areas, and use of shallow draft vessels.
- Barges and work vessels shall be operated in a manner throughout the entire project to ensure that sea turtles are not impacted through excessive vessel speed or propeller damage. Such measures shall include speed restrictions, establishment of off-limit areas, and use of shallow draft vessels.
- Construction crews and work vessel crews shall be briefed daily on the potential for this species to be present and provided with identification characteristics of sea turtles, since they may occasionally be mistaken for seals or sea lions.
- All construction activity shall be temporarily stopped if a sea turtle is sighted within 100 meters of the construction zone until the sea turtle is safely outside the outer perimeter of construction. The on-site biological monitor, who will be onsite periodically during dredging activities, shall have the authority to halt construction operation and shall determine when construction operations can proceed.
- The biological monitor shall prepare an incident report of any green sea turtle activity in the project area and shall inform the Construction Manager to have his/her crews be aware of the potential for additional sightings. The report shall be provided within 24 hours to the CDFG and NMFS.
- Use of silt curtains throughout the entire project will act as a preventive barrier to reduce sea turtle exposure to dredging activities.

6.8 Fisheries Management Plan

Project activities that would affect identified Coastal Pelagic FMP species (northern anchovy) include increased water turbidity caused by dredging and sand covering activities proposed for the project. These impacts could result in northern anchovy temporarily avoiding the project areas, and a minimal potential for mortality of larval anchovy. An increase in the suspended sediment load would temporarily increase the exposure of these species to potentially toxic levels of contaminants and clog their gills, resulting in a reduced ability to feed.

Mitigation Measures. Of the 83 species managed under the Pacific Groundfish FMP (NMFS, 2008), two have been found in San Diego Bay, each with very low occurrences. In the event that Pacific Groundfish species are present in San Diego Bay during dredging activities, the deployment of the silt curtains will act as a preventive barrier for any groundfish entering the construction area. The impact of turbidity created during dredging activities will be short-term and localized. Therefore, the potential impact of the project on FMP groundfish species is expected to be less than significant.

To address impacts to FMP species and water quality, the use of an environmental clamshell bucket for the dredging activities will be implemented to reduce turbidity within the dredge footprint. Additionally, the deployment of silt curtains surrounding the dredging/sand covering activities will act as a preventive barrier for any Coastal Pelagic FMP species entering the construction area.

As mentioned above, the use of silt curtains will act as a preventive barrier for any FMP pelagic schooling species entering the construction area. Therefore, potential impacts on Coastal Pelagic FMP species or their EFH are expected to be less than significant.

6.9 Marine Mammals

Construction activities may disturb marine mammals, if present during such activities. Dredging operations could disturb sediments containing sediment-bound contaminants that are potentially harmful to marine mammals. Exposure to these contaminants that could cause acute toxicity or bioaccumulation to marine mammals and sea birds would be avoided by implementation of standard conditions of the Corps permits requiring Section 401 water quality certification by the San Diego Water Board. The appropriate dredging permits require that dredging BMPs are incorporated into the project to ensure that impacts related to the effects of turbidity and dissolved concentrations of some contaminants are temporary and less than significant. Implementation of these measures will ensure that any impacts to marine mammals related to contamination effects from dredging would be less than significant. No additional mitigation is required.

Barges transiting dredge material to and from the Shipyard Sediment Site have a low potential to collide with marine mammals. Marine mammals are generally capable of avoiding boat traffic (Richardson et al., 1983), particularly at the speeds at which the vessels will likely be transiting. Marine mammals in the Bay have also likely habituated to vessel traffic since vessels commonly transit within and in-and-out of the Bay.

Mitigation Measures. As discussed above in Section 6.5, to ensure that any potential impacts remain less than significant, mitigation has been proposed requiring a qualified biologist to monitor special-status waterbirds prior to and periodically during construction activities. The biologist will also monitor for marine mammals potentially present at the site.

The following mitigation measures would specifically reduce impacts to marine mammals to a less than significant level:

- Barges and work vessels shall be operated throughout the entire project in a manner to ensure that marine mammals are not impacted through excessive vessel speed or propeller damage. Such measures shall include speed restrictions, establishment of off-limit areas, and use of shallow draft vessels.
- Vessel operators will be required to be trained prior to the start of the project to recognize the presence of marine mammals.
- Construction crews and work vessel crews shall be briefed daily at safety meetings on the potential for marine mammals to be present.
- All construction activity shall be temporarily stopped if a marine mammal is sighted within 100 meters of the construction zone until the marine mammal is safely outside the outer perimeter of construction. The on-site biological monitor shall have the authority to halt construction operation and shall determine when construction operations can proceed.
- Use of silt curtains will act as a preventive barrier to reduce marine mammal exposure to dredging activities.
- In the event a pinniped or cetacean is injured or killed as consequence of a collision, the impact would be a locally significant impact, but it would not result in a population-level impact. Should this occur, the vessel operator and the

appointed shipyard safety personnel will be required to immediately notify the NMFS (Southwest Division) and will submit a written, follow-up report within 24 hours of the incident.

6.10 Noise Production from Dredging

Sound travels through the air as pressure waves caused by some type of vibration. In general, sound waves travel away from a noise source at ground level in a hemispherical pattern. The energy contained in a sound wave is spread over an increasing area as it travels away from the source, so loudness decreases at greater distances from the noise source. Noise is defined as unwanted, intrusive, or unpleasant sound.

Sound level meters measure the air pressure fluctuations caused by sound waves, with separate measurements made for different sound frequency ranges. The decibel (dB) scale for describing sound uses a logarithmic scale to account for the large range of audible sound intensities. Most sounds consist of a broad range of sound frequencies, and several frequency-weighting schemes have been used to develop composite dB scales that approximate the way the human ear responds to noise levels. The A-weighted dB scale (dBA) is the most widely used for environmental noise assessments.

When distance is the only factor considered, sound levels from isolated point sources of noise typically decrease by about 6 dB for every doubling of distance from the noise source. When the noise source is a continuous line, such as vehicle traffic on a highway, sound levels decrease by about 3 dB for every doubling of distance. Noise levels can also be affected by several factors other than the distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can affect the reduction of noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) and the presence of dense vegetation can also affect the degree of sound attenuation.

Noises created during dredging would be attributed to the clamshell operating in the submerged aquatic environment. The measured sound exposure levels of a clamshell dredge may range between 75-88 dBA at 50 ft from the source. Animals have been observed flushing from haul out sites at a sound exposure level of less than 100 dBA, and it is possible that marine mammals may modify their behavior as a result of the noise produced by dredging operations (NMFS, 2009).

Based on Port of Los Angeles responses to comments on the Port of Los Angeles Channel Deepening Project EIR/EIS (2009), NMFS Comment NMFS 08, page 14-08, underwater noise from the clamshell dredging would be 150-162 dB (re1 μPa) in LA Harbor, which is below the designated level A harassment threshold of 190 dBrms (re 1 μPa) for pinnipeds. This would imply that clamshell (85 dBA = noise level at 50 feet from the source) and dredging effects for pinnipeds or other marine mammals near the Shipyard Sediment Site would be less than significant. No mitigation measure is proposed for noise production from dredging operations.

Noises created during offloading at each of the Potential Staging Areas would be attributed to the excavator operating on the dock and a bulldozer spreading dredged sediment at the dewatering pad. A standard size excavator and bulldozer produce approximately 80-90 dBA sound levels during operation. The noise produced from either piece of machinery will decrease as it travels away from the source. The duration of the excavator noise will be limited to material barge unloading episodes and bulldozer activity will be limited to episodes of dredged material being dumped at the dewatering pad requiring spreading. The rate at which the excavator/bulldozer will be operating will be provided in the final engineering plan; however, it is assumed that each piece of machinery would be operating approximately 7 hrs per work day. Noise attributed to offloading a material barge or spreading dredged sediment will not significantly affect aquatic marine life. It is assumed that noise produced from the offloading and dewatering activities will not significantly affect waterbirds (e.g., least tern) as these species will not be foraging in these upland areas.

The southern parcel of Potential Staging Area 5 is approximately 1,100 ft from the D Street Fill least tern nesting location (Figure 6). The typical noise level from an excavator/bulldozer 50 ft from the source is 82 and 85 dBA, respectively (Federal Transit Administration, 1995). If Staging Area 5 is selected as an offloading/dewatering site for the project, the noise produced from site machinery will not significantly affect the D Street least tern nesting location as the dBA sound levels from each source will be reduced below what is considered to be intrusive sound levels (< 70 dBA) due to the approximate distance (1,100 feet) from each location.

6.11 Invasive Species

Caulerpa taxifolia. This alga poses a substantial threat to marine ecosystems in Southern California, particularly to the extensive eelgrass meadows and other benthic environments that make coastal waters a rich and productive environment for fish and birds. The eelgrass beds and other coastal resources that could be directly impacted by an invasion of *Caulerpa* are part of a food web that is critical to the survival of numerous native marine species, including the commercially and recreationally important species. This invasive alga essentially displaces the natural vegetation in areas where it becomes established and becomes the dominant plant life.

Mitigation Measure. Based on previous surveys at the shipyards, no *Caulerpa* has been observed within the Shipyard Sediment Site, which precludes the potential spread of this species during construction and/or the operation of the facilities. However, a *Caulerpa* algae survey will be conducted prior to construction activities to comply with permit applications for Corps Section 404 CWA and Section 10 of the Rivers and Harbors Act, and with the requirements of Section 305(b)(2) of the MSA. If this species is found, then protocols for the eradication of *Caulerpa* will be implemented to remove this species from the project area. The shipyards will conform to the 2008 Caulerpa Control Protocol, which requires survey results to be submitted to NOAA and CDFG within 15 days of completion. This protocol also requires that NOAA and CDFG be notified within 24 hours if *Caulerpa* is identified at a permitted project site.

7. CONCLUSIONS

Water Column Communities (Plankton and Fish). With the implementation of water quality BMPs (i.e., silt curtains and physical water quality monitoring), there will be no long-term effect on water column organisms.

Benthic Communities. The loss of hard and soft bottom benthic organisms as a consequence of dredging and sand covering operations is considered a short-term, less than significant loss of marine life. Upon the cessation of dredging and sand covering, benthic organisms are expected to recolonize the sediments, with full recolonization expected to be successful over a period of one to three years. Therefore, impacts to benthic communities are considered a short term, but less than significant impact.

California Brown Pelican. Construction activities may disturb the California brown pelican, if present during such activities. However, construction will disturb small areas of the Shipyard Sediment Site at any one time, leaving available other open water areas for this species to forage and feed.

California Least Tern. Construction activities may result in a temporary increase in turbidity and decrease in available fish for foraging. Therefore, the impacts to the California least tern due to dredging will be temporary and less than significant due to the small area that will be dredged, the temporary nature of the project and the availability of adjacent foraging habitat. Implementation of mitigation measures, such as a biologist monitoring for the presence of least tern, will reduce potential impacts to less than significant.

The California least tern has a moderate potential to occur at the Shipyard Sediment Site due to its foraging behavior from their nests (<5 miles). However, no known nesting areas are present at the project site. The California least tern is not expected to be significantly adversely affected as a result of the remedial dredging effort, since the Shipyard Sediment Site is a poor quality foraging site and higher quality foraging sites (i.e., eelgrass beds and shallow water habitat) are available short distances away from the site.

Double-Crested Cormorant. Construction activities may disturb the double-crested cormorant, if present during such activities. However, construction will disturb small areas of the Shipyard Sediment Site at any one time, leaving available other open water areas for this species to forage and feed.

California Grunion. Due to the lack of intertidal beach habitat and existing bulkhead and seawall that extends the entire length of the Shipyard Sediment Site, Grunion is not expected to spawn in this area. Therefore, no construction-related impacts will occur on this species or its habitat.

Steelhead Trout. There are no known populations of this species in San Diego Bay; therefore, there will be no construction-related impacts on Steelhead Trout EFH for salmonids.

Tidewater Goby. Tidewater gobies are not known to occur within San Diego Bay; no construction-related impacts will occur to this species or its habitat.

California Halibut. Adult and juvenile halibut are found in many areas of San Diego Bay, and they will potentially be present within the Shipyard Sediment Site. During dredging activities, juveniles in the immediate area will swim to areas outside the immediate impacted zone. No mortality is anticipated as a result of construction activities. Therefore, the level of impact on halibut is expected to be less than significant.

Eelgrass and Essential Fish Habitat. Dredging is expected to result in the loss of 100 percent of the eelgrass vegetation at both shipyards, which is considered EFH. This is an adverse, long-term but mitigatable impact. A mitigation program as described in Section 6.6 will be required to reduce the level of impact to less than significant with the successful restoration of eelgrass vegetation.

Fisheries Management Plan Species. Based upon the known distribution of one Coastal Pelagics FMP species and two Pacific Groundfish FMP species present in San Diego Bay, the Sediment Shipyard Site dredging and sand covering project will not have a significant impact on FMP species during the dredging and sand covering operations or long-term use of the shipyards.

Marine Mammals. Impacts related to potential vessel collisions and noise production from dredging operations are expected to be less than significant with the implementation of identified mitigation measures.

Sea Turtles. The potential for the dredging project to have adverse impacts on the green sea turtle is relatively low with the implementation of identified mitigation measures (e.g., silt curtains acting as a barrier for sea turtles to enter the project area). Since green sea turtles are known to inhabit the Bay, the likely impact that the project might have on a sea turtle in the near vicinity of dredging operations would be a behavioral modification to avoid the construction area or transiting work vessel. No mortality is anticipated.

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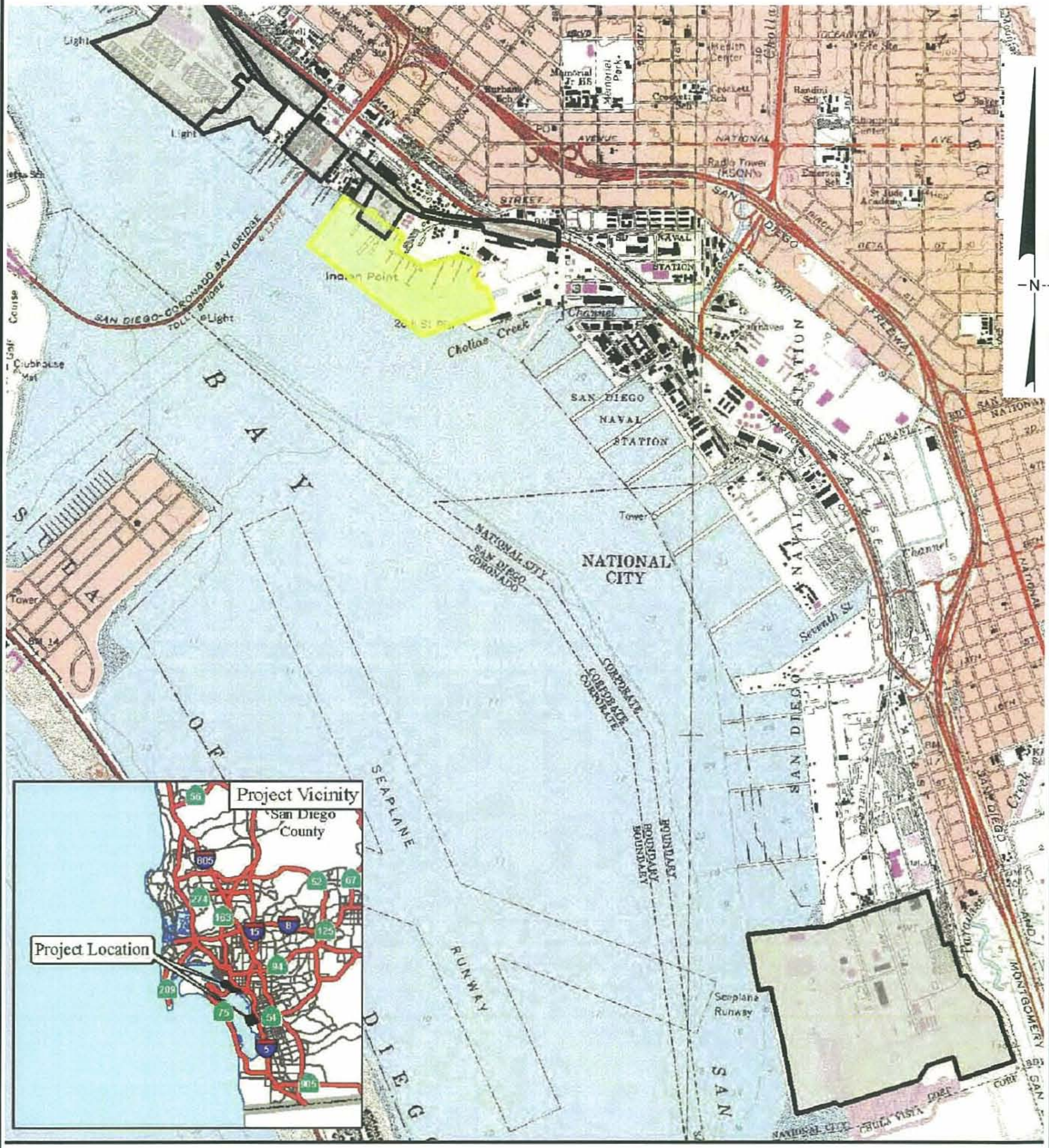

LEGEND

Shipyard Sediment Project Site

Potential Sediment Staging Areas

REFERENCE:
MERKEL & ASSOCIATES 2010
ESSENTIAL FISH HABITAT
ASSESSMENT FOR THE BAE SYSTEMS
LEASEHOLD PROJECTS, SAN DIEGO
BAY, CALIFORNIA.

PROJECT LOCATION MARINE BIOLOGICAL RESOURCES ASSESSMENT SHIPYARD SEDIMENT SITE PROJECT SAN DIEGO, CALIFORNIA			
Geosyntec consultants	DATE:	APRIL 2011	FIGURE
	PROJECT NO.	SC0552	1

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LSA

LEGEND

Potential Sediment Staging Areas

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FIGURE 2

POTENTIAL SEDIMENT STAGING AREAS
MARINE BIOLOGICAL RESOURCES ASSESSMENT
SHIPYARD SITE PROJECT
SAN DIEGO, CALIFORNIA

Geosyntec consultants

DATE:	APRIL 2011	FIGURE 2
PROJECT NO.	SC0552	

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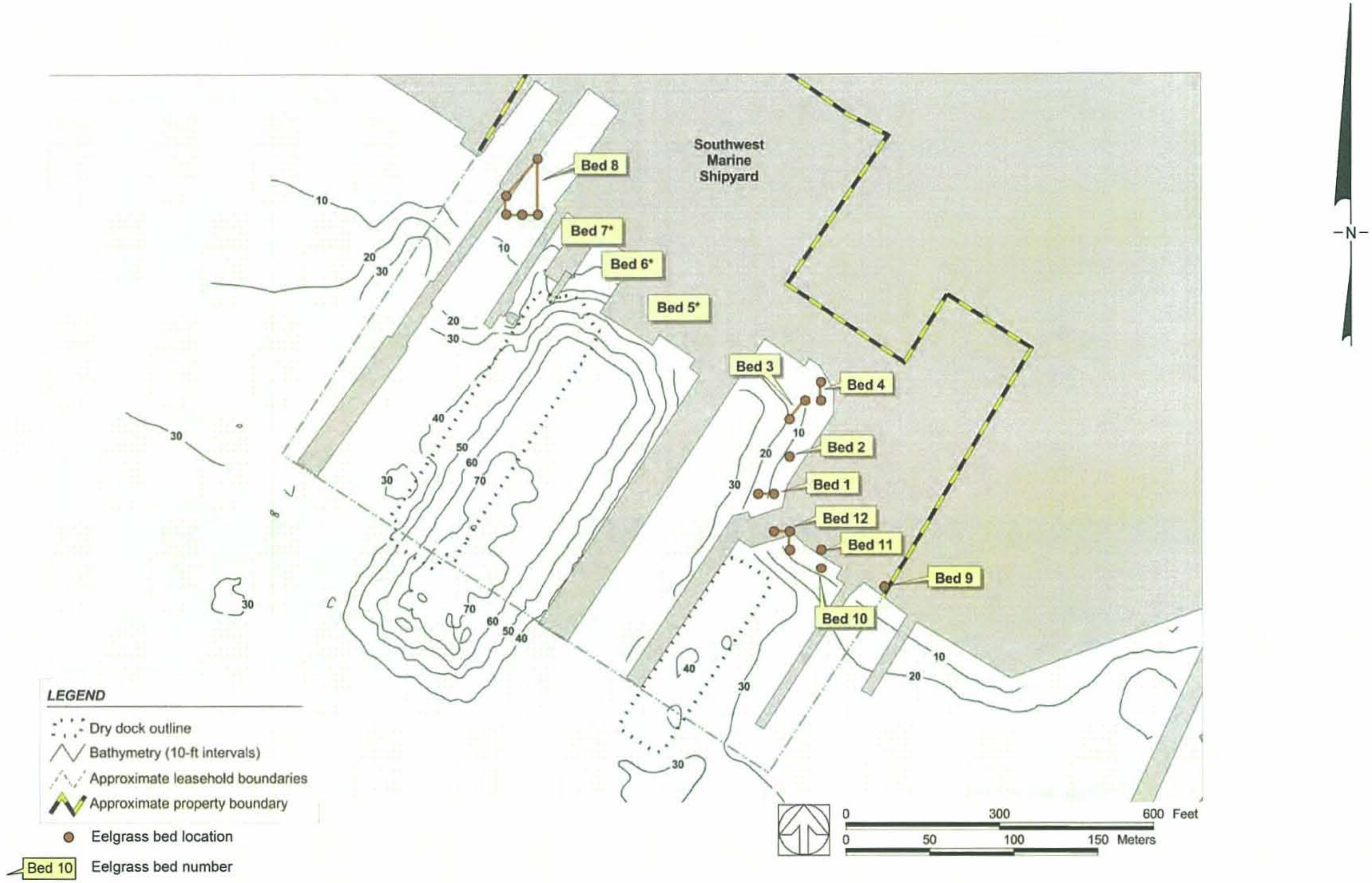

Note: * Approximate location of eelgrass bed

REFERENCE:
EXPONENT 2003 "NASSCO AND SOUTHWEST MARINE DETAILED SEDIMENT INVESTIGATION" REPORT

BATHYMETRY AND DISTRIBUTION OF EELGRASS AT BAE SYSTEMS MARINE BIOLOGICAL RESOURCES ASSESSMENT SHIPYARD SEDIMENT SITE PROJECT SAN DIEGO, CALIFORNIA		
Geosyntec consultants	DATE: APRIL 2011	FIGURE
	PROJECT NO. SC0552	3

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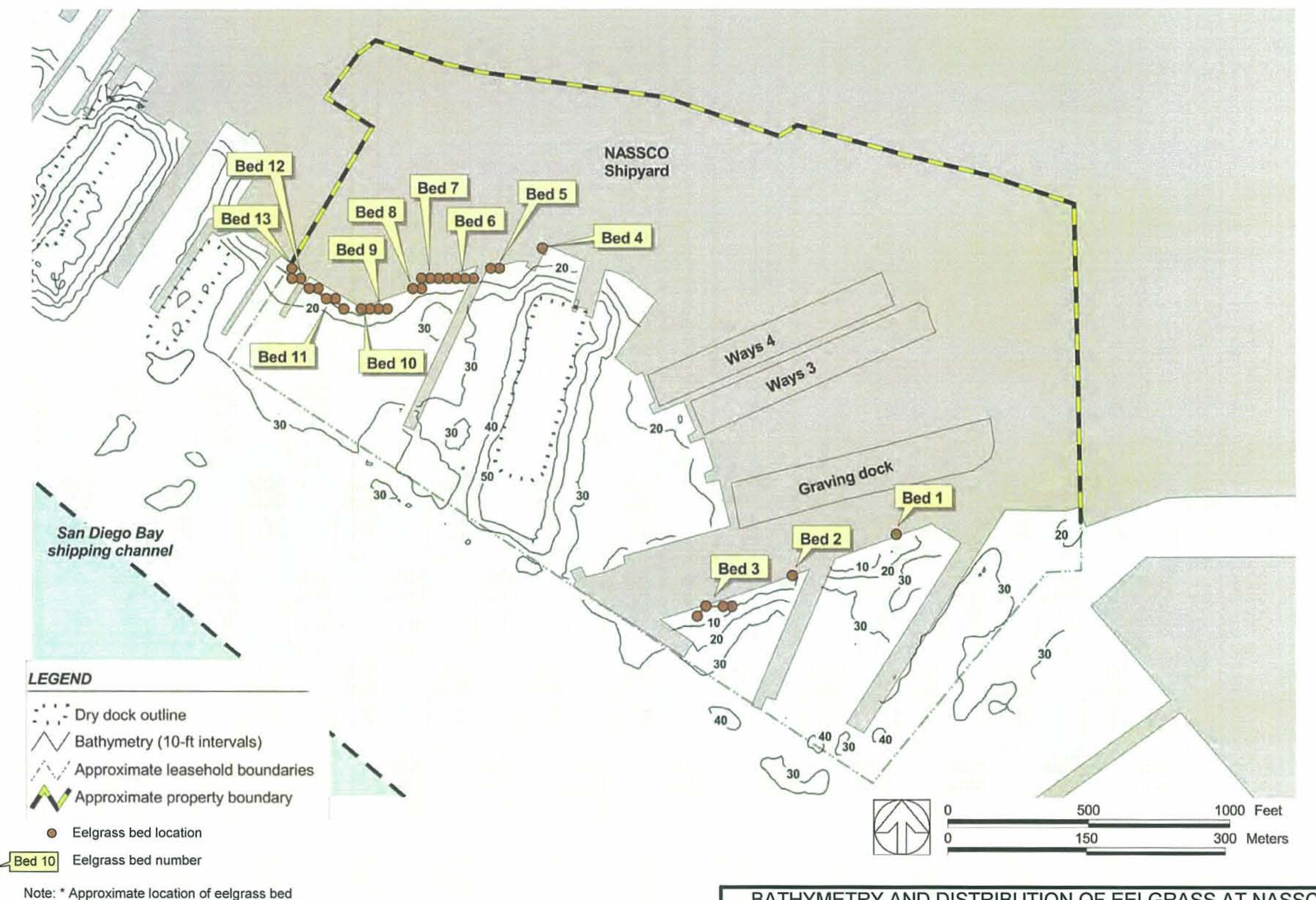

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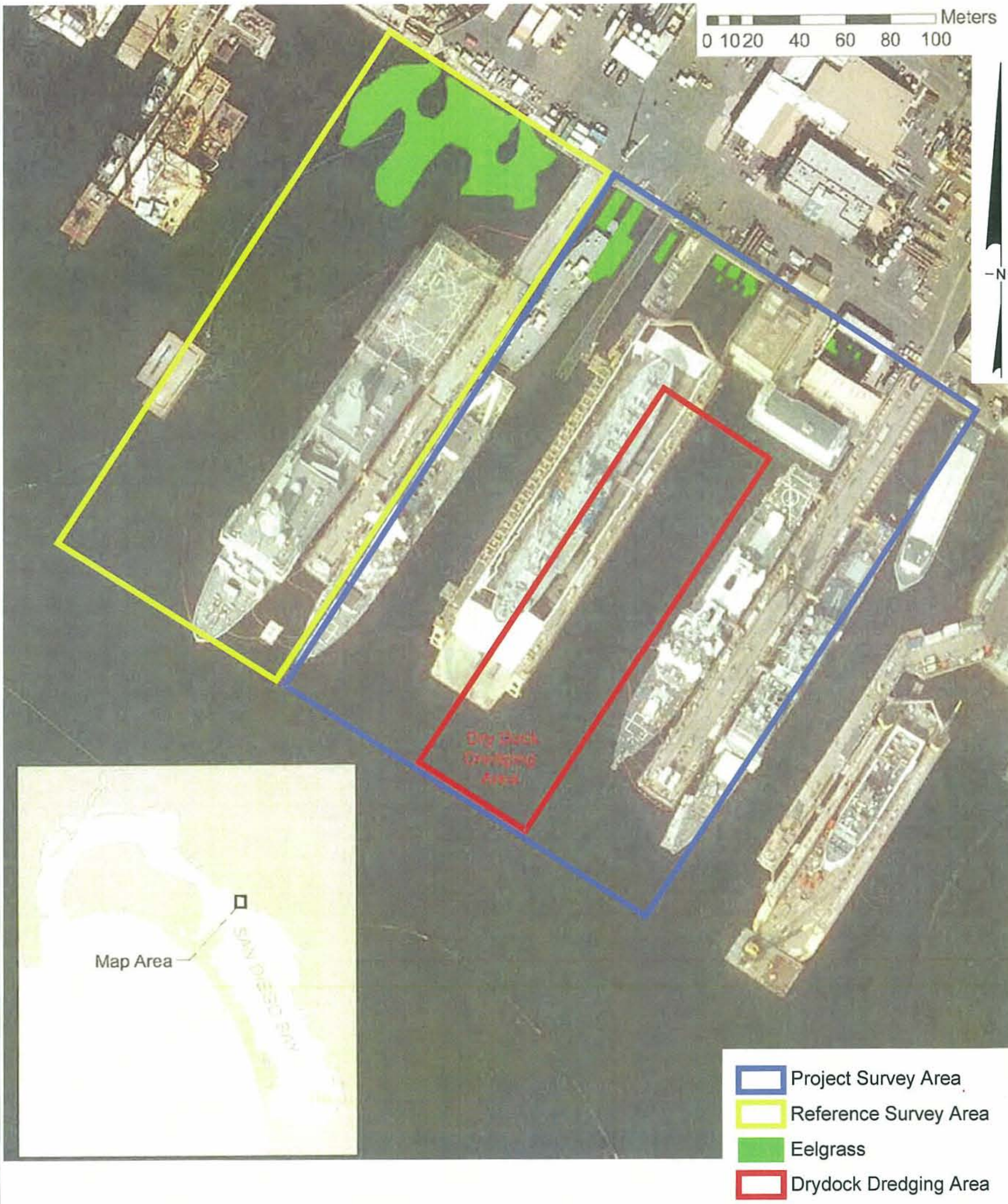
REFERENCE:
EXPONENT 2003 "NASSCO AND SOUTHWEST MARINE DETAILED SEDIMENT INVESTIGATION" REPORT

BATHYMETRY AND DISTRIBUTION OF EELGRASS AT NASSCO
MARINE BIOLOGICAL RESOURCES ASSESSMENT
SHIPYARD SEDIMENT SITE PROJECT
SAN DIEGO, CALIFORNIA

Geosyntec consultants	DATE: APRIL 2011	FIGURE 4
	PROJECT NO. SC0552	



REFERENCE:
MERKEL & ASSOCIATES 2010
ESSENTIAL FISH HABITAT
ASSESSMENT FOR THE BAE SYSTEMS
LEASEHOLD PROJECTS, SAN DIEGO
BAY, CALIFORNIA.

EELGRASS SURVEY FOR 2010 BAE SYSTEMS
DRY DOCK SUMP MAINTENANCE DREDGE PROJECT
SAN DIEGO, CALIFORNIA

Geosyntec consultants	DATE:	APRIL 2011	FIGURE
	PROJECT NO.	SC0552	5

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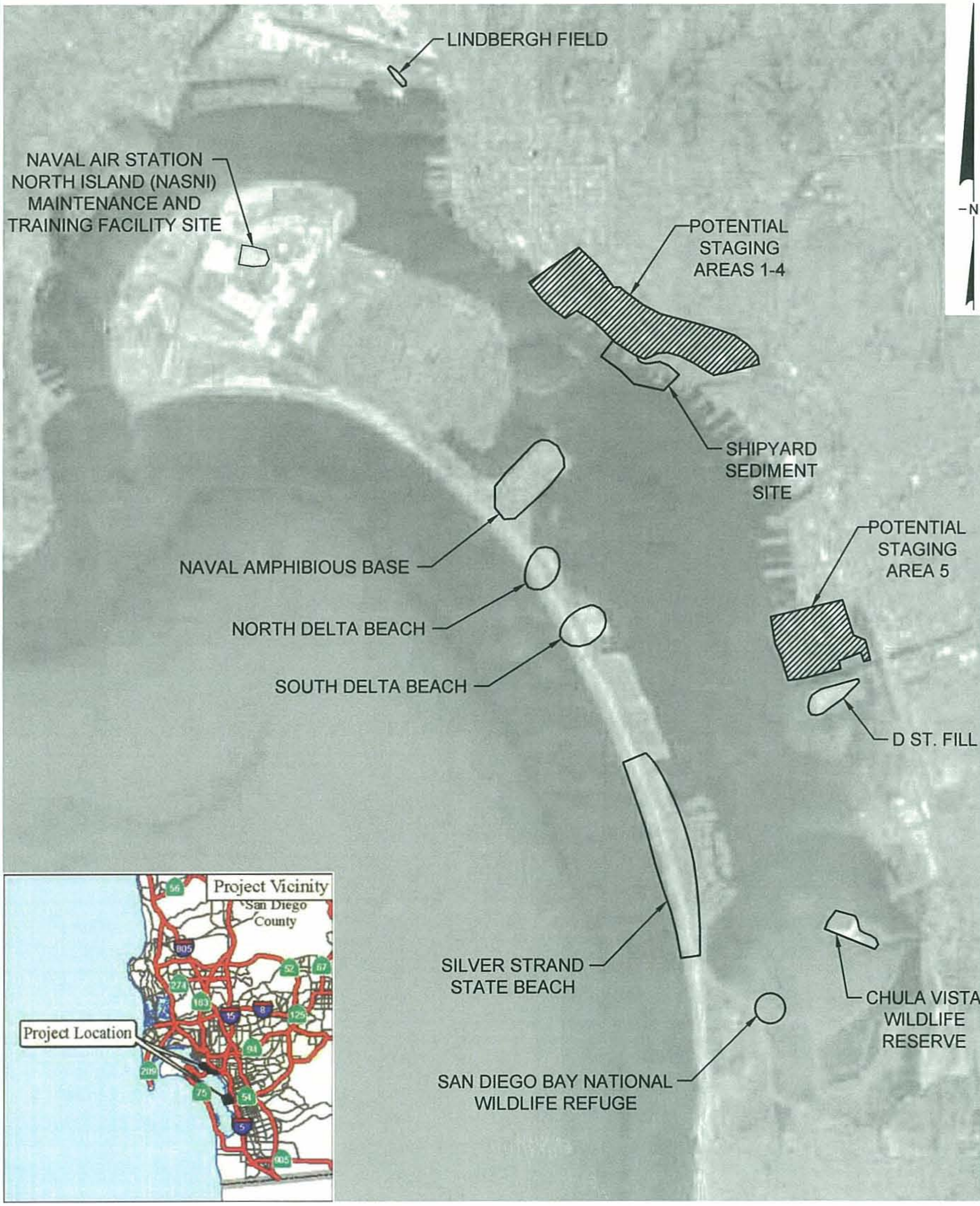

CALIFORNIA LEAST TERN NESTING LOCATIONS IN SAN DIEGO BAY IN RELATIONSHIP TO THE SHIPYARD SEDIMENT SITE AND THE POTENTIAL STAGING AREAS
SAN DIEGO, CALIFORNIA

Geosyntec consultants	DATE: APRIL 2011	FIGURE
	PROJECT NO. SC0552	6

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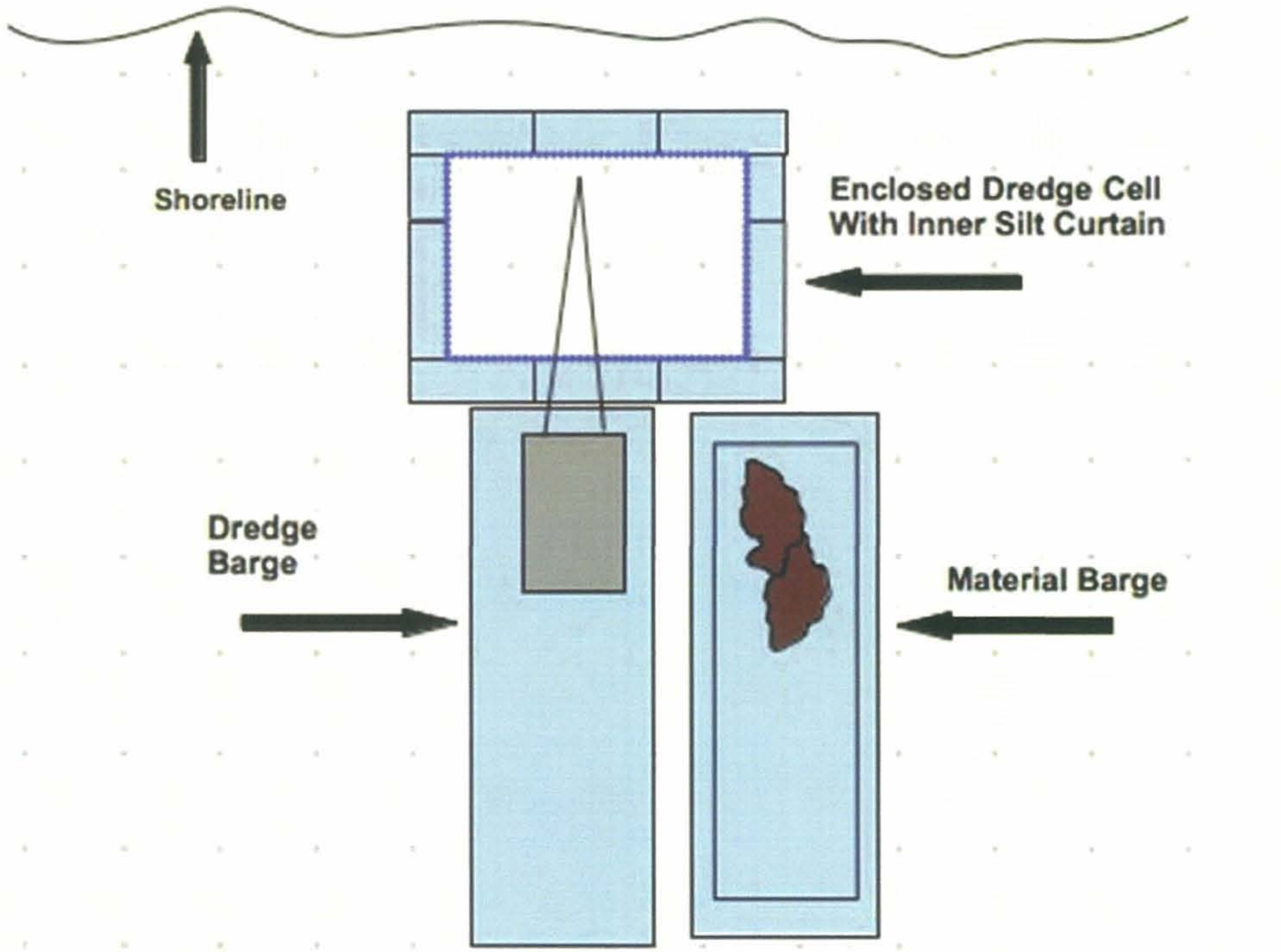

SILT CURTAIN CONTAINMENT: FLOATING DREDGE CELL
MARINE BIOLOGICAL RESOURCES ASSESSMENT
SHIPYARD SEDIMENT SITE PROJECT
SAN DIEGO, CALIFORNIA

Geosyntec consultants	DATE: APRIL 2011	FIGURE 7
	PROJECT NO. SC0552	

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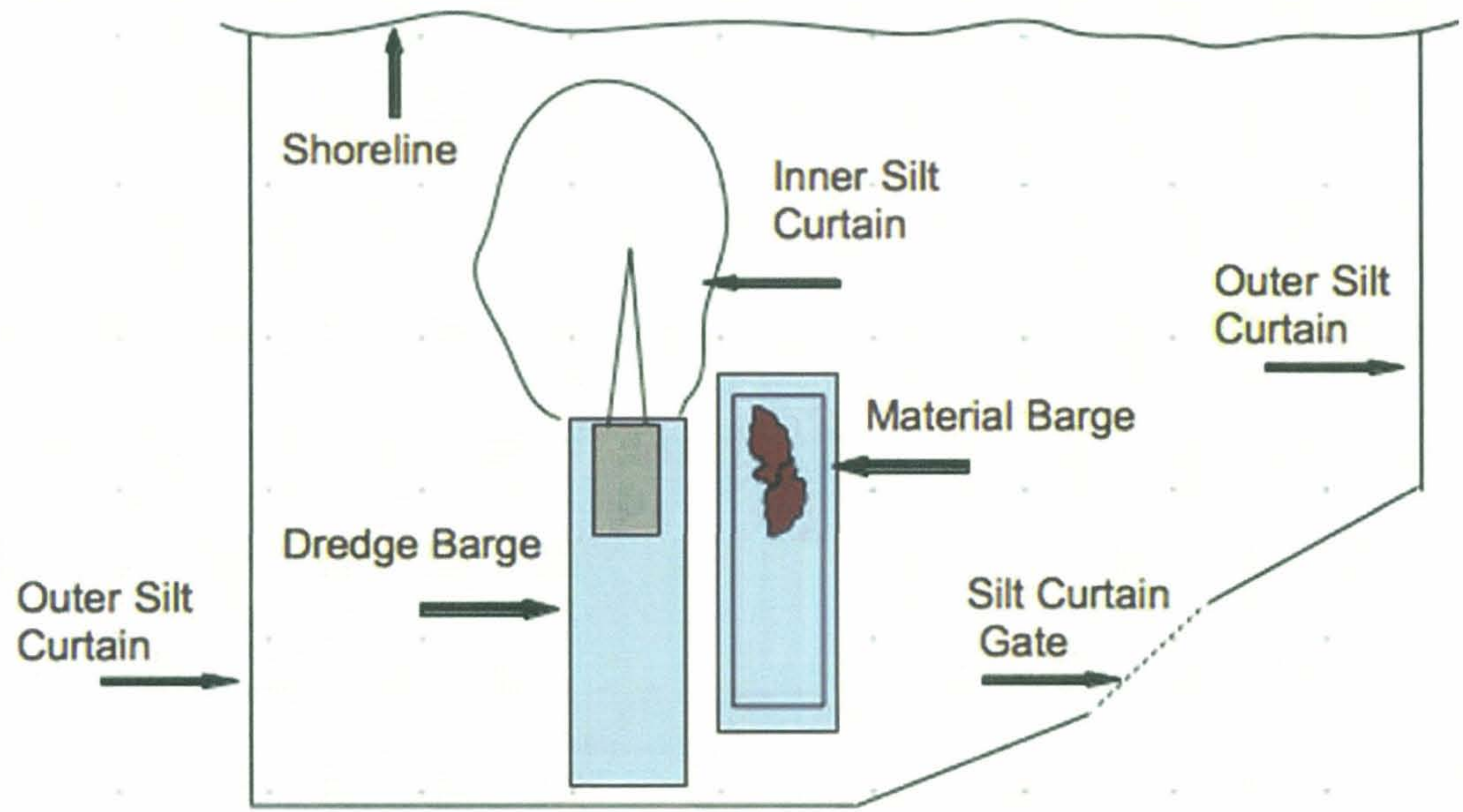

SILT CURTAIN CONTAINMENT: DOUBLE SILT CURTAIN
MARINE BIOLOGICAL RESOURCES ASSESSMENT
SHIPYARD SEDIMENT SITE PROJECT
SAN DIEGO, CALIFORNIA

Geosyntec consultants

DATE:	APRIL 2011	FIGURE
PROJECT NO.	SC0552	8

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APPENDIX A

California Natural Diversity Database (CNDDB) San Diego County Sensitive Species Descriptions

Record	COUNTY NAME	ELEMENT CODE	SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	CALIFORNIA STATUS	DEPT FISH GAME STATUS	CALIFORNIA NATIVE PLANT SOCIETY LIST
1	San Diego	AAAAD04013	*Ensatina klauberi*	large-blotched salamander	None	None	SSC	
2	San Diego	AAAAF02032	*Taricha torosa*	Coast Range newt	None	None	SSC	
3	San Diego	AAABB01230	*Anaxyrus californicus*	arroyo toad	Endangered	None	SSC	
4	San Diego	AAABF02020	*Spea hammondii*	western spadefoot	None	None	SSC	
5	San Diego	AAABH01022	*Rana draytonii*	California red-legged frog	Threatened	None	SSC	
6	San Diego	AAABH01330	*Rana muscosa*	Sierra Madre yellow-legged frog	Endangered	Candidate Endangered	SSC	
7	San Diego	ABNFC01021	*Pelecanus occidentalis californicus*	California brown pelican	Delisted	Delisted	FP	
8	San Diego	ABNFD01020	*Phalacrocorax auritus*	double-crested cormorant	None	None	WL	
9	San Diego	ABNGA02010	*Ixobrychus exilis*	least bittern	None	None	SSC	
10	San Diego	ABNGE02020	*Plegadis chihi*	white-faced ibis	None	None	WL	
11	San Diego	ABNKC01010	*Pandion haliaetus*	osprey	None	None	WL	
12	San Diego	ABNKC06010	*Elanus leucurus*	white-tailed kite	None	None	FP	
13	San Diego	ABNKC11010	*Circus cyaneus*	northern harrier	None	None	SSC	
14	San Diego	ABNKC12040	*Accipiter cooperii*	Cooper's hawk	None	None	WL	
15	San Diego	ABNKC19120	*Buteo regalis*	ferruginous hawk	None	None	WL	
16	San Diego	ABNKC22010	*Aquila chrysaetos*	golden eagle	None	None	FP | WL	
17	San Diego	ABNKD06071	*Falco peregrinus anatum*	American peregrine falcon	Delisted	Delisted	FP	
18	San Diego	ABNKD06090	*Falco mexicanus*	prairie falcon	None	None	WL	
19	San Diego	ABNME03041	*Laterallus jamaicensis coturniculus*	California black rail	None	Threatened	FP	
20	San Diego	ABNME05014	*Rallus longirostris levipes*	light-footed clapper rail	Endangered	Endangered	FP	
21	San Diego	ABNNB03031	*Charadrius alexandrinus nivosus*	western snowy plover	Threatened	None	SSC	
22	San Diego	ABNNM08103	*Sternula antillarum browni*	California least tern	Endangered	Endangered	FP	
23	San Diego	ABNRB02022	*Coccyzus americanus occidentalis*	western yellow-billed cuckoo	Candidate	Endangered		
24	San Diego	ABNSB10010	*Athene cunicularia*	burrowing owl	None	None	SSC	
25	San Diego	ABNSB13010	*Asio otus*	long-eared owl	None	None	SSC	
26	San Diego	ABPAE33043	*Empidonax traillii extimus*	southwestern willow flycatcher	Endangered	Endangered		
27	San Diego	ABPAT02011	*Eremophila alpestris actia*	California horned lark	None	None	WL	
28	San Diego	ABPAU01010	*Progne subis*	purple martin	None	None	SSC	
29	San Diego	ABPAU08010	*Riparia riparia*	bank swallow	None	Threatened		
30	San Diego	ABPBG02095	*Campylorhynchus brunneicapillus sandiegensis*	coastal cactus wren	None	None	SSC	

Record	COUNTY NAME	ELEMENT CODE	SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	CALIFORNIA STATUS	DEPT FISH GAME STATUS	CALIFORNIA NATIVE PLANT SOCIETY LIST
31	San Diego	ABPBJ08081	*Polioptila californica californica*	coastal California gnatcatcher	Threatened	None	SSC	
32	San Diego	ABPBR01030	*Lanius ludovicianus*	loggerhead shrike	None	None	SSC	
33	San Diego	ABPBW01114	*Vireo bellii pusillus*	least Bell's vireo	Endangered	Endangered		
34	San Diego	ABPBX03018	*Dendroica petechia brewsteri*	yellow warbler	None	None	SSC	
35	San Diego	ABPBX24010	*Icteria virens*	yellow-breasted chat	None	None	SSC	
36	San Diego	ABPBX91091	*Aimophila ruficeps canescens*	southern California rufous-crowned sparrow	None	None	WL	
37	San Diego	ABPBX96010	*Chondestes grammacus*	lark sparrow	None	None		
38	San Diego	ABPBX97021	*Amphispiza belli belli*	Bell's sage sparrow	None	None	WL	
39	San Diego	ABPBX99015	*Passerculus sandwichensis beldingi*	Belding's savannah sparrow	None	Endangered		
40	San Diego	ABPBXA0020	*Ammodramus savannarum*	grasshopper sparrow	None	None	SSC	
41	San Diego	ABPBXB0020	*Agelaius tricolor*	tricolored blackbird	None	None	SSC	
42	San Diego	AFCHA0209J	*Oncorhynchus mykiss irideus*	southern steelhead - southern California DPS	Endangered	None	SSC	
43	San Diego	AFCJB1303H	*Siphateles bicolor mohavensis*	Mohave tui chub	Endangered	Endangered	FP	
44	San Diego	AFCJB13120	*Gila orcuttii*	arroyo chub	None	None	SSC	
45	San Diego	AFCNB02060	*Cyprinodon macularius*	desert pupfish	Endangered	Endangered		
46	San Diego	AFCPA03011	*Gasterosteus aculeatus williamsoni*	unarmored threespine stickleback	Endangered	Endangered	FP	
47	San Diego	AFCQN04010	*Eucyclogobius newberryi*	tidewater goby	Endangered	None	SSC	
48	San Diego	AMACB01010	*Macrotus californicus*	California leaf-nosed bat	None	None	SSC	
49	San Diego	AMACB02010	*Choeronycteris mexicana*	Mexican long-tongued bat	None	None	SSC	
50	San Diego	AMACC01020	*Myotis yumanensis*	Yuma myotis	None	None		
51	San Diego	AMACC01070	*Myotis evotis*	long-eared myotis	None	None		
52	San Diego	AMACC01090	*Myotis thysanodes*	fringed myotis	None	None		
53	San Diego	AMACC01110	*Myotis volans*	long-legged myotis	None	None		
54	San Diego	AMACC01140	*Myotis ciliolabrum*	western small-footed myotis	None	None		
55	San Diego	AMACC02010	*Lasionycteris noctivagans*	silver-haired bat	None	None		
56	San Diego	AMACC05030	*Lasiurus cinereus*	hoary bat	None	None		
57	San Diego	AMACC05060	*Lasiurus blossevillii*	western red bat	None	None	SSC	
58	San Diego	AMACC05070	*Lasiurus xanthinus*	western yellow bat	None	None	SSC	
59	San Diego	AMACC07010	*Euderma maculatum*	spotted bat	None	None	SSC	
60	San Diego	AMACC08010	*Corynorhinus townsendii*	Townsend's big-eared bat	None	None	SSC	

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61	San Diego	AMACC10010	*Antrozous pallidus*	pallid bat	None	None	SSC	
62	San Diego	AMACD02011	*Eumops perotis californicus*	western mastiff bat	None	None	SSC	
63	San Diego	AMACD04010	*Nyctinomops femorosaccus*	pocketed free-tailed bat	None	None	SSC	
64	San Diego	AMACD04020	*Nyctinomops macrotis*	big free-tailed bat	None	None	SSC	
65	San Diego	AMAEB03051	*Lepus californicus bennettii*	San Diego black-tailed jackrabbit	None	None	SSC	
66	San Diego	AMAFD01041	*Perognathus longimembris brevinasus*	Los Angeles pocket mouse	None	None	SSC	
67	San Diego	AMAFD01042	*Perognathus longimembris pacificus*	Pacific pocket mouse	Endangered	None	SSC	
68	San Diego	AMAFD01044	*Perognathus longimembris internationalis*	Jacumba pocket mouse	None	None	SSC	
69	San Diego	AMAFD03100	*Dipodomys stephensi*	Stephens' kangaroo rat	Endangered	Threatened		
70	San Diego	AMAFD03144	*Dipodomys merriami collinus*	Earthquake Merriam's kangaroo rat	None	None		
71	San Diego	AMAFD05021	*Chaetodipus californicus femoralis*	Dulzura pocket mouse	None	None	SSC	
72	San Diego	AMAFD05031	*Chaetodipus fallax fallax*	northwestern San Diego pocket mouse	None	None	SSC	
73	San Diego	AMAFD05032	*Chaetodipus fallax pallidus*	pallid San Diego pocket mouse	None	None	SSC	
74	San Diego	AMAFF06022	*Onychomys torridus ramona*	southern grasshopper mouse	None	None	SSC	
75	San Diego	AMAFF08031	*Neotoma albigula venusta*	Colorado Valley woodrat	None	None		
76	San Diego	AMAFF08041	*Neotoma lepida intermedia*	San Diego desert woodrat	None	None	SSC	
77	San Diego	AMAJF04010	*Taxidea taxus*	American badger	None	None	SSC	
78	San Diego	AMALE04012	*Ovis canadensis nelsoni DPS*	peninsular bighorn sheep	Endangered	Threatened	FP	
79	San Diego	ARAAA02010	*Chelonia mydas*	green turtle	Threatened	None		
80	San Diego	ARAAD02030	*Emys marmorata*	western pond turtle	None	None	SSC	
81	San Diego	ARACC01012	*Anniella pulchra pulchra*	silvery legless lizard	None	None	SSC	
82	San Diego	ARACD01031	*Coleonyx variegatus abbotti*	San Diego banded gecko	None	None		
83	San Diego	ARACD01040	*Coleonyx switaki*	barefoot gecko	None	Threatened		
84	San Diego	ARACF12040	*Phrynosoma mcallii*	flat-tailed horned lizard	None	None	SSC	
85	San Diego	ARACF12100	*Phrynosoma blainvillii*	coast horned lizard	None	None	SSC	
86	San Diego	ARACF15020	*Uma notata*	Colorado Desert fringe-toed lizard	None	None	SSC	
87	San Diego	ARACH01114	*Plestiodon skiltonianus interparietalis*	Coronado Island skink	None	None	SSC	
88	San Diego	ARACJ02060	*Aspidoscelis hyperythra*	orangethroat whiptail	None	None	SSC	
89	San Diego	ARACJ02143	*Aspidoscelis tigris stejnegeri*	coastal whiptail	None	None		
90	San Diego	ARACK01040	*Xantusia gracilis*	sandstone night lizard	None	None	SSC	

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91	San Diego	ARADA01020	*Charina trivirgata*	rosy boa	None	None		
92	San Diego	ARADB1001A	*Diadophis punctatus similis*	San Diego ringneck snake	None	None		
93	San Diego	ARADB19063	*Lampropeltis zonata (pulchra)*	California mountain kingsnake (San Diego population)	None	None	SSC	
94	San Diego	ARADB30033	*Salvadora hexalepis virgultea*	coast patch-nosed snake	None	None	SSC	
95	San Diego	ARADB3613F	*Thamnophis sirtalis ssp.*	south coast garter snake	None	None	SSC	
96	San Diego	ARADB36160	*Thamnophis hammondii*	two-striped garter snake	None	None	SSC	
97	San Diego	ARADE02090	*Crotalus ruber*	red-diamond rattlesnake	None	None	SSC	
98	San Diego	CTT21230CA	*Southern Foredunes*	Southern Foredunes	None	None		
99	San Diego	CTT21330CA	*Southern Dune Scrub*	Southern Dune Scrub	None	None		
100	San Diego	CTT32400CA	*Maritime Succulent Scrub*	Maritime Succulent Scrub	None	None		
101	San Diego	CTT34220CA	*Mojave Mixed Steppe*	Mojave Mixed Steppe	None	None		
102	San Diego	CTT37C30CA	*Southern Maritime Chaparral*	Southern Maritime Chaparral	None	None		
103	San Diego	CTT42110CA	*Valley Needlegrass Grassland*	Valley Needlegrass Grassland	None	None		
104	San Diego	CTT44321CA	*San Diego Mesa Hardpan Vernal Pool*	San Diego Mesa Hardpan Vernal Pool	None	None		
105	San Diego	CTT44322CA	*San Diego Mesa Claypan Vernal Pool*	San Diego Mesa Claypan Vernal Pool	None	None		
106	San Diego	CTT52120CA	*Southern Coastal Salt Marsh*	Southern Coastal Salt Marsh	None	None		
107	San Diego	CTT52200CA	*Coastal Brackish Marsh*	Coastal Brackish Marsh	None	None		
108	San Diego	CTT61300CA	*Southern Riparian Forest*	Southern Riparian Forest	None	None		
109	San Diego	CTT61310CA	*Southern Coast Live Oak Riparian Forest*	Southern Coast Live Oak Riparian Forest	None	None		
110	San Diego	CTT61330CA	*Southern Cottonwood Willow Riparian Forest*	Southern Cottonwood Willow Riparian Forest	None	None		
111	San Diego	CTT61700CA	*Mojave Riparian Forest*	Mojave Riparian Forest	None	None		
112	San Diego	CTT61810CA	*Sonoran Cottonwood Willow Riparian Forest*	Sonoran Cottonwood Willow Riparian Forest	None	None		
113	San Diego	CTT61820CA	*Mesquite Bosque*	Mesquite Bosque	None	None		
114	San Diego	CTT62300CA	*Desert Fan Palm Oasis Woodland*	Desert Fan Palm Oasis Woodland	None	None		
115	San Diego	CTT62400CA	*Southern Sycamore Alder Riparian Woodland*	Southern Sycamore Alder Riparian Woodland	None	None		
116	San Diego	CTT63300CA	*Southern Riparian Scrub*	Southern Riparian Scrub	None	None		
117	San Diego	CTT63320CA	*Southern Willow Scrub*	Southern Willow Scrub	None	None		
118	San Diego	CTT83140CA	*Torrey Pine Forest*	Torrey Pine Forest	None	None		
119	San Diego	CTT83230CA	*Southern Interior Cypress Forest*	Southern Interior Cypress Forest	None	None		
120	San Diego	ICBRA03060	*Branchinecta sandiegonensis*	San Diego fairy shrimp	Endangered	None		

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121	San Diego	ICBRA07010	*Streptocephalus woottoni*	Riverside fairy shrimp	Endangered	None		
122	San Diego	IICOL02080	*Cicindela gabbii*	western tidal-flat tiger beetle	None	None		
123	San Diego	IICOL02101	*Cicindela hirticollis gravida*	sandy beach tiger beetle	None	None		
124	San Diego	IICOL02113	*Cicindela latesignata latesignata*	western beach tiger beetle	None	None		
125	San Diego	IICOL02121	*Cicindela senilis frosti*	senile tiger beetle	None	None		
126	San Diego	IICOL30050	*Anomala carlsoni*	Carlson's dune beetle	None	None		
127	San Diego	IICOL4A010	*Coelus globosus*	globose dune beetle	None	None		
128	San Diego	IIHYM73010	*Parnopes borregoensis*	Borrego parnopes cuckoo wasp	None	None		
129	San Diego	IIHYM74010	*Melitta californica*	A mellitid bee	None	None		
130	San Diego	IIHYM75010	*Halictus harmonius*	haromonius halictid bee	None	None		
131	San Diego	IILEP38021	*Pyrgus ruralis lagunae*	Laguna Mountains skipper	Endangered	None		
132	San Diego	IILEP84030	*Panoquina errans*	wandering (=saltmarsh) skipper	None	None		
133	San Diego	IILEPC1160	*Lycaena hermes*	Hermes copper butterfly	None	None		
134	San Diego	IILEPE2150	*Callophrys thornei*	Thorne's hairstreak	None	None		
135	San Diego	IILEPK405L	*Euphydryas editha quino*	quino checkerspot butterfly	Endangered	None		
136	San Diego	IILEPP2010	*Danaus plexippus*	monarch butterfly	None	None		
137	San Diego	IMGASC2530	*Helminthoglypta coelata*	mesa shoulderband	None	None		
138	San Diego	IMGASC2560	*Helminthoglypta milleri*	peak shoulderband	None	None		
139	San Diego	IMGASC5100	*Rothelix warnerfontis*	Warner Springs shoulderband	None	None		
140	San Diego	IMGASJ7040	*Tryonia imitator*	mimic tryonia (=California brackishwater snail)	None	None		
141	San Diego	NBHEP1C010	*Geothallus tuberosus*	Campbell's liverwort	None	None		1B.1
142	San Diego	NBHEP35030	*Sphaerocarpos drewei*	bottle liverwort	None	None		1B.1
143	San Diego	NBMUS7L090	*Tortula californica*	California screw moss	None	None		1B.2
144	San Diego	NBMUS7S010	*Triquetrella californica*	coastal triquetrella	None	None		1B.2
145	San Diego	NBMUSA1010	*Schizymenium shevockii*	Shevock's copper moss	None	None		1B.2
146	San Diego	NLT0018660	*Mobergia calculiformis*	light gray lichen	None	None		
147	San Diego	NLTEST7980	*Texosporium sancti-jacobi*	woven-spored lichen	None	None		
148	San Diego	PDACA07010	*Carlowrightia arizonica*	Arizona carlowrightia	None	None		2.2
149	San Diego	PDANA080B5	*Rhus trilobata var. simplicifolia*	single-leaved skunkbrush	None	None		2.3
150	San Diego	PDAPI0Z042	*Eryngium aristulatum var. parishii*	San Diego button-celery	Endangered	Endangered		1B.1

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151	San Diego	PDAPI0Z120	*Eryngium pendletonense*	Pendleton button-celery	None	None		1B.1
152	San Diego	PDAPI23020	*Spermolepis echinata*	bristly scaleseed	None	None		2.3
153	San Diego	PDASC0A0J0	*Matelea parvifolia*	spear-leaf matelea	None	None		2.3
154	San Diego	PDAST0C080	*Ambrosia chenopodiifolia*	San Diego bur-sage	None	None		2.1
155	San Diego	PDAST0C0M0	*Ambrosia pumila*	San Diego ambrosia	Endangered	None		1B.1
156	San Diego	PDAST0S160	*Artemisia palmeri*	San Diego sagewort	None	None		4.2
157	San Diego	PDAST0W0P0	*Baccharis vanessae*	Encinitas baccharis	Threatened	Endangered		1B.1
158	San Diego	PDAST20042	*Chaenactis carphoclinia var. peirsonii*	Peirson's pincushion	None	None		1B.3
159	San Diego	PDAST20095	*Chaenactis glabriuscula var. orcuttiana*	Orcutt's pincushion	None	None		1B.1
160	San Diego	PDAST200D0	*Chaenactis parishii*	Parish's chaenactis	None	None		1B.3
161	San Diego	PDAST2L0L0	*Leptosyne maritima*	sea dahlia	None	None		2.2
162	San Diego	PDAST2M025	*Corethrogyne filaginifolia var. incana*	San Diego sand aster	None	None		1B.1
163	San Diego	PDAST2M027	*Corethrogyne filaginifolia var. linifolia*	Del Mar Mesa sand aster	None	None		1B.1
164	San Diego	PDAST3L062	*Ericameria cuneata var. macrocephala*	Laguna Mountains goldenbush	None	None		1B.3
165	San Diego	PDAST3L0C1	*Ericameria palmeri var. palmeri*	Palmer's goldenbush	None	None		1B.1
166	San Diego	PDAST42020	*Geraea viscida*	sticky geraea	None	None		2.3
167	San Diego	PDAST440C0	*Pseudognaphalium leucocephalum*	white rabbit-tobacco	None	None		2.2
168	San Diego	PDAST470D4	*Grindelia hallii*	San Diego gumplant	None	None		1B.2
169	San Diego	PDAST4H070	*Hazardia orcuttii*	Orcutt's hazardia	Candidate	Threatened		1B.1
170	San Diego	PDAST4N0Z2	*Helianthus niveus ssp. tephrodes*	Algodones Dunes sunflower	None	Endangered		1B.2
171	San Diego	PDAST4R070	*Deinandra conjugens*	Otay tarplant	Threatened	Endangered		1B.1
172	San Diego	PDAST4R0B0	*Deinandra floribunda*	Tecate tarplant	None	None		1B.2
173	San Diego	PDAST4R0K0	*Deinandra mohavensis*	Mojave tarplant	None	Endangered		1B.3
174	San Diego	PDAST4R0P4	*Centromadia parryi ssp. australis*	southern tarplant	None	None		1B.1
175	San Diego	PDAST4R0R4	*Centromadia pungens ssp. laevis*	smooth tarplant	None	None		1B.1
176	San Diego	PDAST4V0K2	*Heterotheca sessiliflora ssp. sessiliflora*	beach goldenaster	None	None		1B.1
177	San Diego	PDAST4Z030	*Hulsea californica*	San Diego hulsea	None	None		1B.3
178	San Diego	PDAST4Z050	*Hulsea mexicana*	Mexican hulsea	None	None		2.3
179	San Diego	PDAST50010	*Ambrosia monogyra*	singlewhorl burrobrush	None	None		2.2
180	San Diego	PDAST57091	*Isocoma menziesii var. decumbens*	decumbent goldenbush	None	None		1B.2

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181	San Diego	PDAST580A0	*Iva hayesiana*	San Diego marsh-elder	None	None		2.2
182	San Diego	PDAST5L0A1	*Lasthenia glabrata ssp. coulteri*	Coulter's goldfields	None	None		1B.1
183	San Diego	PDAST5S022	*Lessingia glandulifera var. tomentosa*	Warner Springs lessingia	None	None		1B.3
184	San Diego	PDAST64131	*Dieteria asteroides var. lagunensis*	Mount Laguna aster	None	Rare		2.1
185	San Diego	PDAST67010	*Malperia tenuis*	brown turbans	None	None		2.3
186	San Diego	PDAST8H060	*Senecio aphanactis*	chaparral ragwort	None	None		2.2
187	San Diego	PDAST8H1F0	*Packera ganderi*	Gander's ragwort	None	Rare		1B.2
188	San Diego	PDAST8Y070	*Stylocline citroleum*	oil neststraw	None	None		1B.1
189	San Diego	PDAST9T0S0	*Viguiera purisimae*	La Purisima viguiera	None	None		2.3
190	San Diego	PDASTA1040	*Xylorhiza orcuttii*	Orcutt's woody-aster	None	None		1B.2
191	San Diego	PDASTE80C0	*Symphyotrichum defoliatum*	San Bernardino aster	None	None		1B.2
192	San Diego	PDBER06060	*Berberis fremontii*	Fremont barberry	None	None		3
193	San Diego	PDBER060A0	*Berberis nevinii*	Nevin's barberry	Endangered	Endangered		1B.1
194	San Diego	PDBOR0A120	*Cryptantha ganderi*	Gander's cryptantha	None	None		1B.1
195	San Diego	PDBOR0H010	*Harpagonella palmeri*	Palmer's grapplinghook	None	None		4.2
196	San Diego	PDBRA064D0	*Arabis hirshbergiae*	Hirshberg's rock-cress	None	None		1B.2
197	San Diego	PDBRA0M0H0	*Caulanthus simulans*	Payson's jewel-flower	None	None		4.2
198	San Diego	PDBRA16010	*Erysimum ammophilum*	sand-loving wallflower	None	None		1B.2
199	San Diego	PDBRA1M0B1	*Lepidium flavum var. felipense*	Borrego Valley pepper-grass	None	None		1B.2
200	San Diego	PDBRA1M114	*Lepidium virginicum var. robinsonii*	Robinson's pepper-grass	None	None		1B.2
201	San Diego	PDBRA2G060	*Streptanthus bernardinus*	Laguna Mountains jewel-flower	None	None		4.3
202	San Diego	PDBRA2G0B0	*Streptanthus campestris*	southern jewel-flower	None	None		1B.3
203	San Diego	PDBRA32010	*Sibaropsis hammittii*	Hammitt's clay-cress	None	None		1B.2
204	San Diego	PDBUR01020	*Bursera microphylla*	little-leaf elephant tree	None	None		2.3
205	San Diego	PDCAC08060	*Ferocactus viridescens*	San Diego barrel cactus	None	None		2.1
206	San Diego	PDCAC0D1P0	*Opuntia wigginsii*	Wiggins' cholla	None	None		3.3
207	San Diego	PDCAC0D2U0	*Cylindropuntia xfosbergii*	pink cholla	None	None		3
208	San Diego	PDCAC0D2Y1	*Opuntia californica var. californica*	snake cholla	None	None		1B.1
209	San Diego	PDCAC11010	*Bergerocactus emoryi*	golden-spined cereus	None	None		2.2
210	San Diego	PDCAM06041	*Downingia concolor var. brevior*	Cuyamaca Lake downingia	None	Endangered		1B.1

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211	San Diego	PDCAM07023	*Githopsis diffusa ssp. filicaulis*	Mission Canyon bluecup	None	None		3.1
212	San Diego	PDCHE02010	*Aphanisma blitoides*	aphanisma	None	None		1B.2
213	San Diego	PDCHE040E0	*Atriplex coulteri*	Coulter's saltbush	None	None		1B.2
214	San Diego	PDCHE041C0	*Atriplex pacifica*	South Coast saltscale	None	None		1B.2
215	San Diego	PDCHE041D0	*Atriplex parishii*	Parish's brittlescale	None	None		1B.1
216	San Diego	PDCHE041T1	*Atriplex serenana var. davidsonii*	Davidson's saltscale	None	None		1B.2
217	San Diego	PDCHE0P0D0	*Suaeda esteroa*	estuary seablite	None	None		1B.2
218	San Diego	PDCPP09015	*Wislizenia refracta ssp. palmeri*	Palmer's jackass clover	None	None		2.2
219	San Diego	PDCRA04031	*Dudleya attenuata ssp. orcuttii*	Orcutt's dudleya	None	None		2.1
220	San Diego	PDCRA04051	*Dudleya blochmaniae ssp. blochmaniae*	Blochman's dudleya	None	None		1B.1
221	San Diego	PDCRA04053	*Dudleya brevifolia*	short-leaved dudleya	None	Endangered		1B.1
222	San Diego	PDCRA040H0	*Dudleya multicaulis*	many-stemmed dudleya	None	None		1B.2
223	San Diego	PDCRA040R0	*Dudleya variegata*	variegated dudleya	None	None		1B.2
224	San Diego	PDCRA040T0	*Dudleya viscida*	sticky dudleya	None	None		1B.2
225	San Diego	PDERI040E8	*Arctostaphylos glandulosa ssp. crassifolia*	Del Mar manzanita	Endangered	None		1B.1
226	San Diego	PDERI040Y0	*Arctostaphylos otayensis*	Otay manzanita	None	None		1B.2
227	San Diego	PDERI042T0	*Arctostaphylos rainbowensis*	Rainbow manzanita	None	None		1B.1
228	San Diego	PDERI0B011	*Comarostaphylis diversifolia ssp. diversifolia*	summer holly	None	None		1B.2
229	San Diego	PDERI0W010	*Ornithostaphylos oppositifolia*	Baja California birdbush	None	Endangered		2.1
230	San Diego	PDEUP0D010	*Chamaesyce abramsiana*	Abrams' spurge	None	None		2.2
231	San Diego	PDEUP0D060	*Chamaesyce arizonica*	Arizona spurge	None	None		2.3
232	San Diego	PDEUP0D1X0	*Chamaesyce platysperma*	flat-seeded spurge	None	None		1B.2
233	San Diego	PDEUP0Q1B0	*Euphorbia misera*	cliff spurge	None	None		2.2
234	San Diego	PDEUP1C010	*Tetracoccus dioicus*	Parry's tetracoccus	None	None		1B.2
235	San Diego	PDFAB0F2R0	*Astragalus deanei*	Dean's milk-vetch	None	None		1B.1
236	San Diego	PDFAB0F303	*Astragalus douglasii var. perstrictus*	Jacumba milk-vetch	None	None		1B.2
237	San Diego	PDFAB0F491	*Astragalus insularis var. harwoodii*	Harwood's milk-vetch	None	None		2.2
238	San Diego	PDFAB0F532	*Astragalus magdalenae var. peirsonii*	Peirson's milk-vetch	Threatened	Endangered		1B.2
239	San Diego	PDFAB0F6B0	*Astragalus oocarpus*	San Diego milk-vetch	None	None		1B.2
240	San Diego	PDFAB0F6G1	*Astragalus pachypus var. jaegeri*	Jaeger's milk-vetch	None	None		1B.1

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241	San Diego	PDFAB0F8R2	*Astragalus tener var. titi*	coastal dunes milk-vetch	Endangered	Endangered		1B.1
242	San Diego	PDFAB0N040	*Calliandra eriophylla*	pink fairy-duster	None	None		2.3
243	San Diego	PDFAB2A092	*Hosackia crassifolius var. otayensis*	Otay Mountain lotus	None	None		1B.1
244	San Diego	PDFAB2A0H0	*Acmispon haydonii*	pygmy lotus	None	None		1B.3
245	San Diego	PDFAB2A0V0	*Lotus nuttallianus*	Nuttall's lotus	None	None		1B.1
246	San Diego	PDFAB2B1J5	*Lupinus excubitus var. medius*	Mountain Springs bush lupine	None	None		1B.3
247	San Diego	PDFAB3Z013	*Thermopsis californica var. semota*	velvety false lupine	None	None		1B.2
248	San Diego	PDFAB491X0	*Senna covesii*	Cove's cassia	None	None		2.2
249	San Diego	PDFAG050D0	*Quercus dumosa*	Nuttall's scrub oak	None	None		1B.1
250	San Diego	PDFAG05650	*Quercus cedrosensis*	Cedros Island oak	None	None		2.2
251	San Diego	PDFRA01040	*Frankenia palmeri*	Palmer's frankenia	None	None		2.1
252	San Diego	PDGER01070	*California macrophylla*	round-leaved filaree	None	None		1B.1
253	San Diego	PDGRO02070	*Ribes canthariforme*	Moreno currant	None	None		1B.3
254	San Diego	PDGRO021P0	*Ribes viburnifolium*	Santa Catalina Island currant	None	None		1B.2
255	San Diego	PDHYD0A0H0	*Nama stenocarpum*	mud nama	None	None		2.2
256	San Diego	PDHYD0C510	*Phacelia stellaris*	Brand's star phacelia	Candidate	None		1B.1
257	San Diego	PDHYD0D011	*Pholistoma auritum var. arizonicum*	Arizona pholistoma	None	None		2.3
258	San Diego	PDLAM01010	*Acanthomintha ilicifolia*	San Diego thorn-mint	Threatened	Endangered		1B.1
259	San Diego	PDLAM08030	*Satureja chandleri*	San Miguel savory	None	None		1B.2
260	San Diego	PDLAM0V020	*Lepechinia cardiophylla*	heart-leaved pitcher sage	None	None		1B.2
261	San Diego	PDLAM0V040	*Lepechinia ganderi*	Gander's pitcher sage	None	None		1B.3
262	San Diego	PDLAM180A2	*Monardella hypoleuca ssp. lanata*	felt-leaved monardella	None	None		1B.2
263	San Diego	PDLAM180D4	*Monardella viminea*	willowy monardella	Endangered	Endangered		1B.1
264	San Diego	PDLAM180E1	*Monardella macrantha ssp. hallii*	Hall's monardella	None	None		1B.3
265	San Diego	PDLAM180F2	*Monardella nana ssp. leptosiphon*	San Felipe monardella	None	None		1B.2
266	San Diego	PDLAM180Y0	*Monardella stoneana*	Jennifer's monardella	None	None		1B.2
267	San Diego	PDLAM1K010	*Pogogyne abramsii*	San Diego mesa mint	Endangered	Endangered		1B.1
268	San Diego	PDLAM1K040	*Pogogyne nudiuscula*	Otay Mesa mint	Endangered	Endangered		1B.1
269	San Diego	PDLAM1S140	*Salvia munzii*	Munz's sage	None	None		2.2
270	San Diego	PDLAM1U0A1	*Scutellaria bolanderi ssp. austromontana*	southern mountains skullcap	None	None		1B.2

Record	COUNTY NAME	ELEMENT CODE	SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	CALIFORNIA STATUS	DEPT FISH GAME STATUS	CALIFORNIA NATIVE PLANT SOCIETY LIST
271	San Diego	PDLIM02052	*Limnanthes gracilis ssp. parishii*	Parish's meadowfoam	None	Endangered		1B.2
272	San Diego	PDLOA02020	*Eucnide rupestris*	annual rock-nettle	None	None		2.2
273	San Diego	PDLOA030K0	*Mentzelia hirsutissima*	hairy stickleaf	None	None		2.3
274	San Diego	PDMAL0F010	*Herissantia crispa*	curly herissantia	None	None		2.3
275	San Diego	PDMAL110J0	*Sidalcea neomexicana*	Salt Spring checkerbloom	None	None		2.2
276	San Diego	PDNYC010P1	*Abronia villosa var. aurita*	chaparral sand-verbena	None	None		1B.1
277	San Diego	PDOLE040K0	*Fraxinus parryi*	chaparral ash	None	None		2.2
278	San Diego	PDONA050D0	*Clarkia delicata*	delicate clarkia	None	None		1B.2
279	San Diego	PDORO040A2	*Orobanche parishii ssp. brachyloba*	short-lobed broomrape	None	None		4.2
280	San Diego	PDPGN040G0	*Chorizanthe orcuttiana*	Orcutt's spineflower	Endangered	Endangered		1B.1
281	San Diego	PDPGN040K1	*Chorizanthe polygonoides var. longispina*	long-spined spineflower	None	None		1B.2
282	San Diego	PDPGN040Z1	*Chorizanthe xanti var. leucotheca*	white-bracted spineflower	None	None		1B.2
283	San Diego	PDPGN08780	*Eriogonum evanidum*	vanishing wild buckwheat	None	None		1B.1
284	San Diego	PDPGN0G011	*Nemacaulis denudata var. denudata*	coast woolly-heads	None	None		1B.2
285	San Diego	PDPGN0G012	*Nemacaulis denudata var. gracilis*	slender cottonheads	None	None		2.2
286	San Diego	PDPLM030B1	*Eriastrum harwoodii*	Harwood's eriastrum	None	None		1B.2
287	San Diego	PDPLM060J0	*Ipomopsis tenuifolia*	slender-leaved ipomopsis	None	None		2.3
288	San Diego	PDPLM09070	*Linanthus bellus*	desert beauty	None	None		2.3
289	San Diego	PDPLM090J3	*Leptosiphon floribundus ssp. hallii*	Santa Rosa Mountains leptosiphon	None	None		1B.3
290	San Diego	PDPLM090X0	*Linanthus orcuttii*	Orcutt's linanthus	None	None		1B.3
291	San Diego	PDPLM0C080	*Navarretia fossalis*	Moran's nosegay	Threatened	None		1B.1
292	San Diego	PDPLM0C0L0	*Navarretia peninsularis*	Baja navarretia	None	None		1B.2
293	San Diego	PDPLM0C0Q0	*Navarretia prostrata*	prostrate vernal pool navarretia	None	None		1B.1
294	San Diego	PDPOR04010	*Lewisia brachycalyx*	short-sepaled lewisia	None	None		2.2
295	San Diego	PDRAF01010	*Pilostyles thurberi*	Thurber's pilostyles	None	None		4.3
296	San Diego	PDRAN0B0U1	*Delphinium hesperium ssp. cuyamacae*	Cuyamaca larkspur	None	Rare		1B.2
297	San Diego	PDRAN0H031	*Myosurus minimus ssp. apus*	little mousetail	None	None		3.1
298	San Diego	PDRHA01010	*Adolphia californica*	California adolphia	None	None		2.1
299	San Diego	PDRHA04070	*Ceanothus cyaneus*	Lakeside ceanothus	None	None		1B.2
300	San Diego	PDRHA041J0	*Ceanothus verrucosus*	wart-stemmed ceanothus	None	None		2.2

Record	COUNTY NAME	ELEMENT CODE	SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	CALIFORNIA STATUS	DEPT FISH GAME STATUS	CALIFORNIA NATIVE PLANT SOCIETY LIST
301	San Diego	PDRHA04430	*Ceanothus otayensis*	Otay Mountain ceanothus	None	None		1B.2
302	San Diego	PDROS0W045	*Horkelia cuneata ssp. puberula*	mesa horkelia	None	None		1B.1
303	San Diego	PDROS0W0G0	*Horkelia truncata*	Ramona horkelia	None	None		1B.3
304	San Diego	PDROS1J1B0	*Rosa minutifolia*	small-leaved rose	None	Endangered		2.1
305	San Diego	PDROS1K2N1	*Rubus glaucifolius var. ganderi*	Cuyamaca raspberry	None	None		1B.3
306	San Diego	PDRUB0N042	*Galium angustifolium ssp. borregoense*	Borrego bedstraw	None	Rare		1B.3
307	San Diego	PDRUB0N04C	*Galium angustifolium ssp. jacinticum*	San Jacinto Mountains bedstraw	None	None		1B.3
308	San Diego	PDRUB0N1V0	*Galium proliferum*	desert bedstraw	None	None		2.2
309	San Diego	PDSAX0E050	*Heuchera brevistaminea*	Laguna Mountains alumroot	None	None		1B.3
310	San Diego	PDSAX0E106	*Heuchera rubescens var. versicolor*	San Diego County alumroot	None	None		2.3
311	San Diego	PDSCR0J0C2	*Chloropyron maritimum ssp. maritimum*	salt marsh bird's-beak	Endangered	Endangered		1B.2
312	San Diego	PDSCR0J0G0	*Dicranostegia orcuttiana*	Orcutt's bird's-beak	None	None		2.1
313	San Diego	PDSCR1U010	*Stemodia durantifolia*	purple stemodia	None	None		2.1
314	San Diego	PDSOL0G0D0	*Lycium parishii*	Parish's desert-thorn	None	None		2.3
315	San Diego	PDSTE01020	*Ayenia compacta*	California ayenia	None	None		2.3
316	San Diego	PDSTE03020	*Fremontodendron mexicanum*	Mexican flannelbush	Endangered	Rare		1B.1
317	San Diego	PGCUP040B0	*Hesperocyparis stephensonii*	Cuyamaca cypress	None	None		1B.1
318	San Diego	PGCUP040C0	*Hesperocyparis forbesii*	Tecate cypress	None	None		1B.1
319	San Diego	PGPIN04152	*Pinus torreyana ssp. torreyana*	torrey pine	None	None		1B.2
320	San Diego	PMAGA010P0	*Agave shawii*	Shaw's agave	None	None		2.1
321	San Diego	PMAGA08070	*Nolina interrata*	Dehesa nolina	None	Endangered		1B.1
322	San Diego	PMAGA080E0	*Nolina cismontana*	chaparral nolina	None	None		1B.2
323	San Diego	PMJUN013J0	*Juncus luciensis*	Santa Lucia dwarf rush	None	None		1B.2
324	San Diego	PMLIL0C050	*Brodiaea filifolia*	thread-leaved brodiaea	Threatened	Endangered		1B.1
325	San Diego	PMLIL0C0B0	*Brodiaea orcuttii*	Orcutt's brodiaea	None	None		1B.1
326	San Diego	PMLIL0D0C0	*Calochortus dunnii*	Dunn's mariposa-lily	None	Rare		1B.2
327	San Diego	PMLIL1A0J0	*Lilium parryi*	lemon lily	None	None		1B.2
328	San Diego	PMLIL1H010	*Bloomeria clevelandii*	San Diego goldenstar	None	None		1B.1
329	San Diego	PMPOA27050	*Digitaria californica*	Arizona cottontop	None	None		2.3
330	San Diego	PMPOA48020	*Muhlenbergia appressa*	appressed muhly	None	None		2.2
331	San Diego	PMPOA4G010	*Orcuttia californica*	California Orcutt grass	Endangered	Endangered		1B.1
332	San Diego	PMPOA4Z0A0	*Poa atropurpurea*	San Bernardino blue grass	Endangered	None		1B.2
333	San Diego	PMPOA5T030	*Sphenopholis obtusata*	prairie wedge grass	None	None		2.2
334	San Diego	PPSEL010G0	*Selaginella eremophila*	desert spike-moss	None	None		2.2

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APPENDIX G

AIR QUALITY ANALYSIS

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AIR QUALITY ANALYSIS

SHIPYARD SEDIMENT REMEDIATION PROJECT

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

LSA

May 2011

AIR QUALITY ANALYSIS

SHIPYARD SEDIMENT REMEDIATION PROJECT

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

Prepared for:

Craig L. Carlisle, PG, CEG
San Diego Water Board
9174 Sky Park Court, Suite 100
San Diego, California 92123-4353

Prepared by:

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614
(949) 553-0666

LSA Project No. SWB1001A

LSA

May 2011

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FIGURES

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APPENDICES

1.0 EXECUTIVE SUMMARY

LSA Associates, Inc. (LSA) was retained to prepare an air quality study for the proposed dredging of sediments adjacent to shipyards in the San Diego Bay, and the upland treatment of dredged sediments located at potential sites in the Cities of San Diego and National City, California.

The air quality study provides a discussion of the proposed project, the physical setting of the project area, and the regulatory framework for air quality. The report provides data on existing air quality, evaluates potential air quality impacts associated with the proposed project, and identifies mitigation measures recommended for potentially significant impacts.

Emissions generated during construction of the Shipyard Sediment Remediation Project. (proposed project) would exceed the City of San Diego's oxides of nitrogen (NO_X) threshold. Compliance with the San Diego Air Pollution Control District's (SDAPCD) Rules and Regulations during construction will reduce construction-related air quality impacts from fugitive dust emissions and construction equipment emissions. However, these emissions would remain significant and unavoidable.

The proposed project would not result in any long-term on-site stationary sources and would have a minimal change in the off-site vehicle trips. The project's long-term air quality impacts would be less than significant because there would be no increase in stationary or mobile source emissions. Because the proposed project would have little to no change in off-site vehicle trips, no significant CO contributions would occur in the project vicinity. A health risk assessment shows that no existing resident will be exposed to a significant health risk from diesel haul truck emissions.

The potential of the project to affect global climate change is also discussed. Short-term construction and long-term operational emissions of the principal greenhouse gases (GHGs), including carbon dioxide (CO_2) and methane (CH_4), are quantified, and significance relative to Assembly Bill (AB) 32 is discussed.

The evaluation was prepared in conformance with appropriate standards. Air quality data posted on the California Air Resources Board (ARB) and United States Environmental Protection Agency (EPA) websites are included to document the local air quality environment.

2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

The proposed project is the dredging of sediment adjacent to the shipyards in the San Diego Bay, the dewatering, solidification and possible solidification of the dredged material on-shore, potential treatment of decanted water, and the transport of the removed material to an appropriate landfill for disposal. The purpose of the project is to implement a Tentative Cleanup and Abatement Order issued by the California Regional Water Quality Control Board, San Diego Region (hereinafter the San Diego Water Board). The San Diego Water Board is the Lead Agency under California Environmental Quality Act (CEQA) for the proposed project. The dredging will occur in an area of the Bay defined in the CAO. The San Diego Water Board is considering the use of one or more staging sites for the dewatering and treatment of the dredge, as further described below. The sediment removal footprint and the optional staging sites comprise the project site for the purpose of this study.

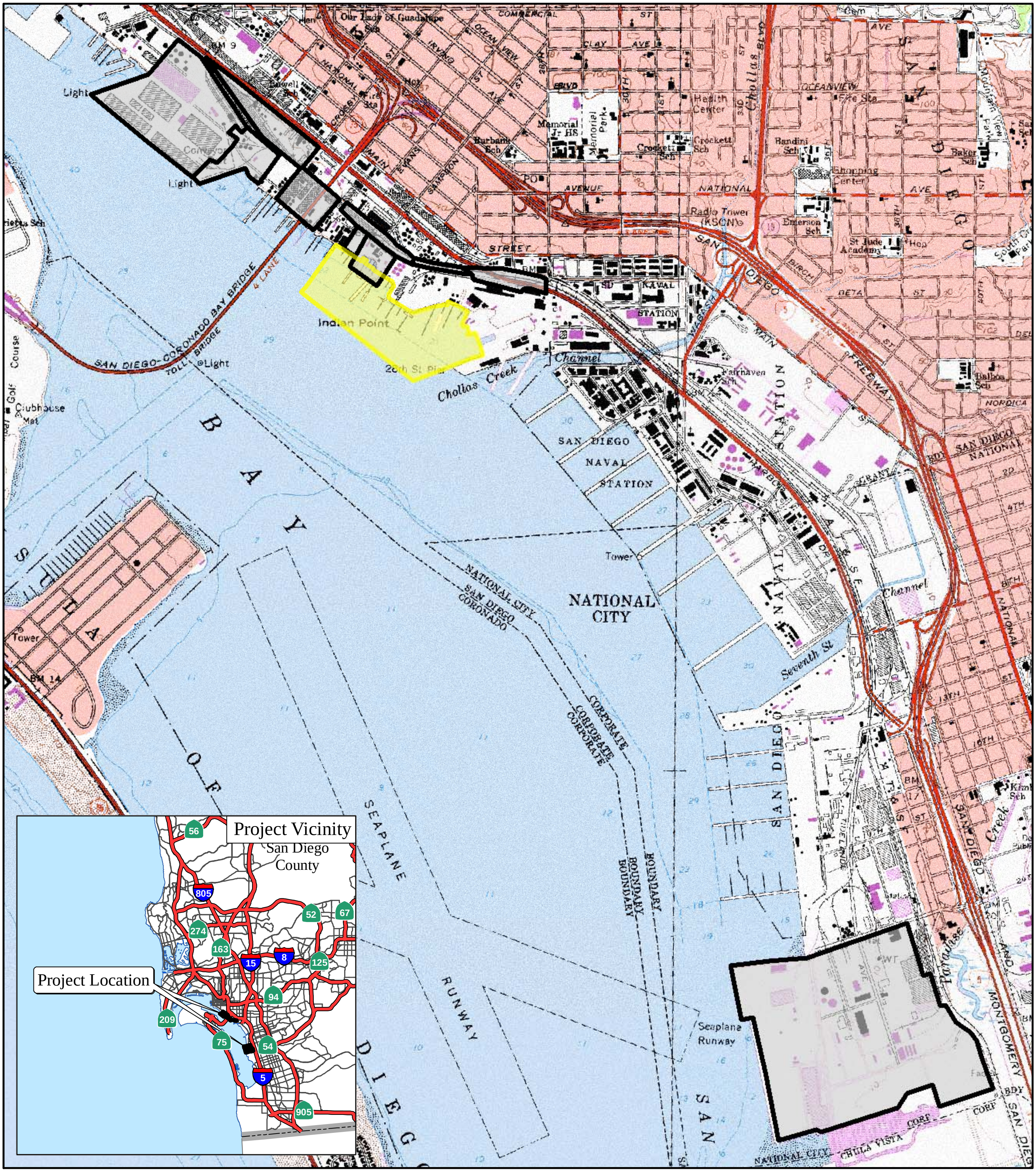
2.2 PROJECT LOCATION

The sediment removal site (Shipyard Sediment Site) is located along the eastern shore of central San Diego Bay, extending approximately from the Sampson Street Extension on the northwest to Chollas Creek on the southeast, and from the shoreline out to the San Diego Bay main shipping channel to the west, as shown in Figure 1. The project consists of marine sediments in the bottom bay waters that contain elevated levels of pollutants greater than San Diego Bay background conditions. This area is hereinafter collectively referred to as the "Shipyard Sediment Site."

The Shipyard Sediment Site is more specifically bounded by the waters of R.E. Staite facility on the north, the 28th Street Pier on the south, the open waters and shipways of San Diego Bay on the west, and the shorelines of two shipyard facilities on the east (the BAE Systems San Diego Ship Repair Facility [BAE Systems] and the National Steel and Shipbuilding Company Shipyard Facility [NASSCO]). The Shipyard Sediment Site encompasses 63 water acres (46 within the NASSCO leasehold and 17 within the BAE leasehold[1]) of the NASSCO and BAE Systems leaseholds.

The removal of the marine sediments will require upland areas for dewatering, solidification and stockpiling of the materials, and potential treatment of decant waters prior to off-site disposal. Therefore, in addition to the open waters of the Shipyard Sediment Site, five upland areas have been identified by the San Diego Water Board as potential sediment staging areas.

1 Per the Exponent 2003 SI Report and the 2010 Tentative CAO.



LSA

FIGURE 1

LEGEND

Shipyard Sediment Project Site

Potential Sediment Staging Areas

N

0 1250 2500

FEET

San Diego Sediment Project

Project Location

SOURCE: USGS 7.5' Quad - National City (1975), Point Loma (1994). CA

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Each of the potential staging areas has more defined usable areas, which are illustrated in Figures 2 through 7 and further described below.

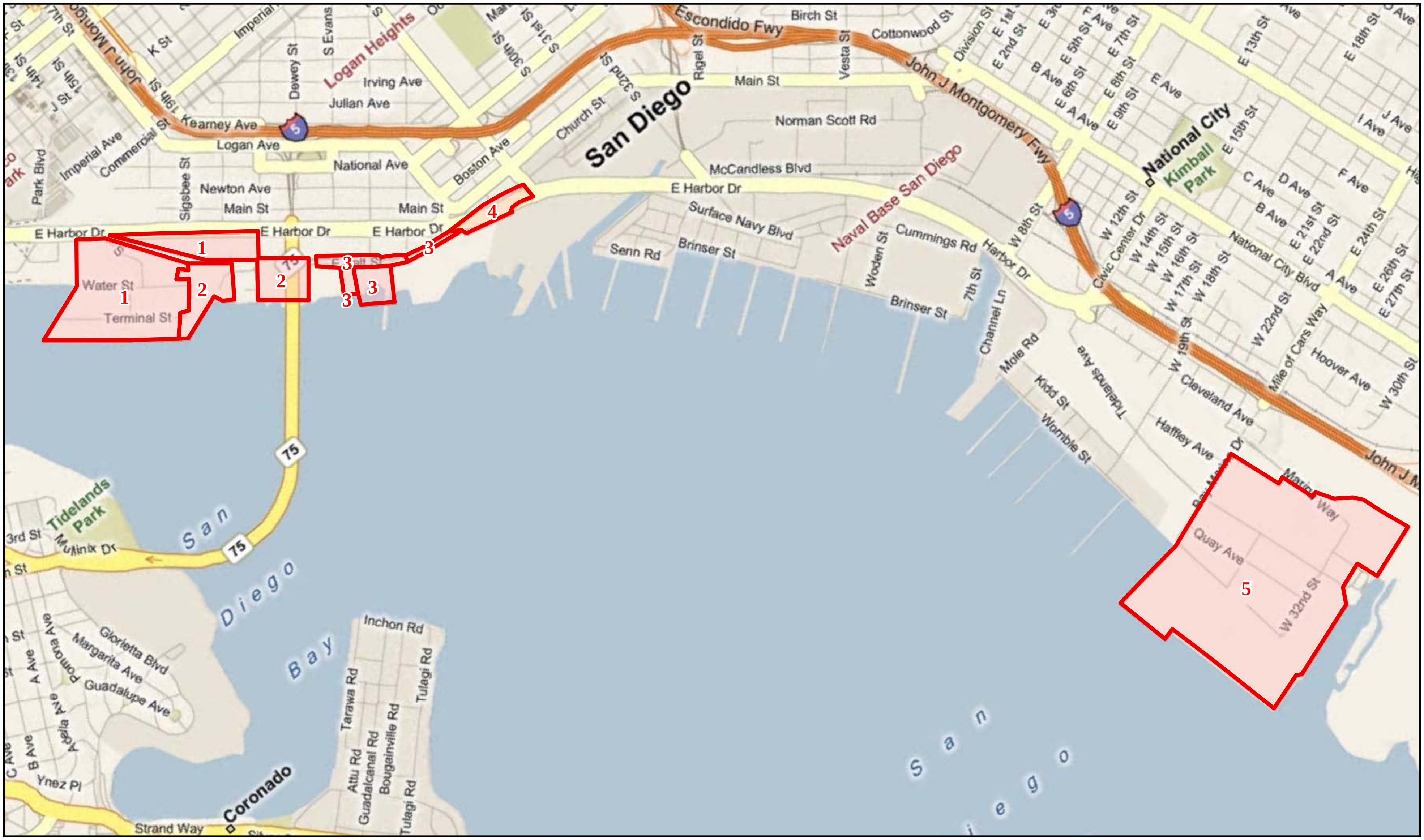
- **Staging Area 1:** 10th Avenue Marine Terminal and Adjacent Parking (approximately 49.66 potentially usable acres).
- **Staging Area 2:** Commercial Berthing Pier and Parking Lots Adjacent to Coronado Bridge (approximately 11.66 potentially usable acres).
- **Staging Area 3:** SDG&E/BAE/BAE and NASSCO Parking Lot (approximately 7.27 potentially usable acres).
- **Staging Area 4:** NASSCO/NASSCO Parking and Parking Lot North of Harbor Drive (approximately 3.85 potentially usable acres).
- **Staging Area 5:** 24th Street Marine Terminal and Adjacent Parking Lots (approximately 145.31 potentially usable acres).

2.3 PROJECT SETTING AND SITE DESCRIPTION

The project site is under the planning jurisdiction of the San Diego Unified Port District (Port District) and is identified as District 4 in the certified Port Master Plan. The Port District is a special government entity, created in 1962 by the San Diego Unified Port District Act, California Harbors and Navigation Code, in order to manage San Diego Harbor and administer certain public lands along San Diego Bay. The Port District holds and manages as trust property on behalf of the People of the State of California, including the land occupied by NASSCO and BAE. The Port Master Plan water use designation within the limits of the proposed project is Industrial–Specialized Berthing.

San Diego Bay is designated as a State Estuary under Section 1, Division 18 (commencing with Section 28000) of the Public Resources Code. The San Diego Bay shoreline between Sampson and 28th Streets is listed in the Federal Clean Water Act Section 303(d) List of Water Quality Limited Segments for elevated levels of copper, mercury, zinc, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) in the marine sediment. These pollutants impair the aquatic life, aquatic-dependent wildlife, and human health beneficial uses designated for San Diego Bay. The northeast boundary of the Shipyard Sediment Site occupies this shoreline.

The principal structural components within the Shipyard Sediment Site include the concrete bulkheads, piers, and dry dock facilities associated with the two shipyard facilities. Bathymetry at the site varies substantially due to the presence of shipways, dry docks, and berths and ranges from -2 Mean Lower Low Water (MLLW) along the bulkheads to -70 feet MLLW at the BAE dry dock sump area.



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LEGEND

Potential Sediment Staging Areas

FIGURE 2

0 1250 2500

FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Locations Index

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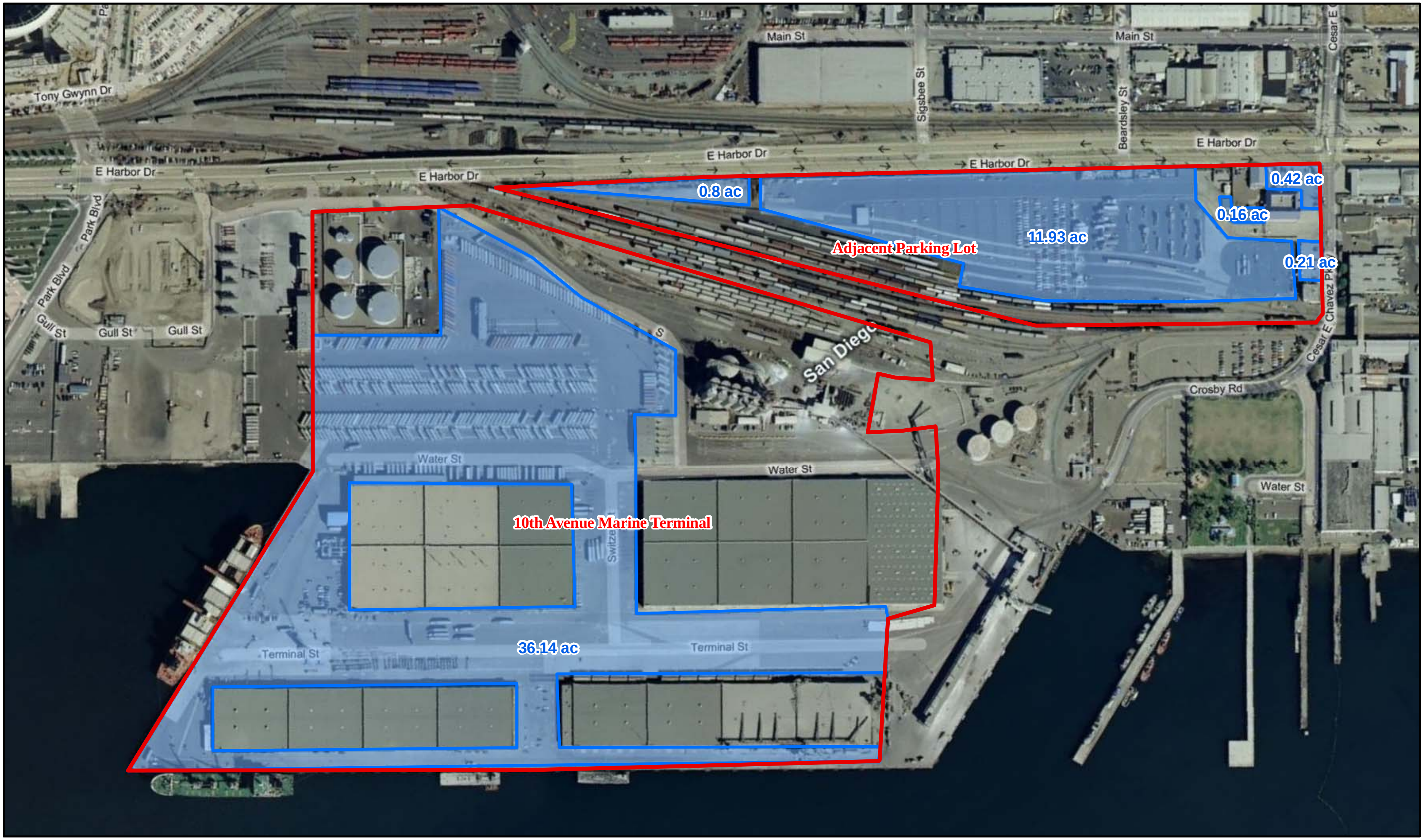

LSA

FIGURE 3

LEGEND

Potential Sediment Staging Area 1

Usable Areas (with Acreage)

0 225 450
FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Area 1
10th Avenue Marine Terminal and Adjacent Parking Lot

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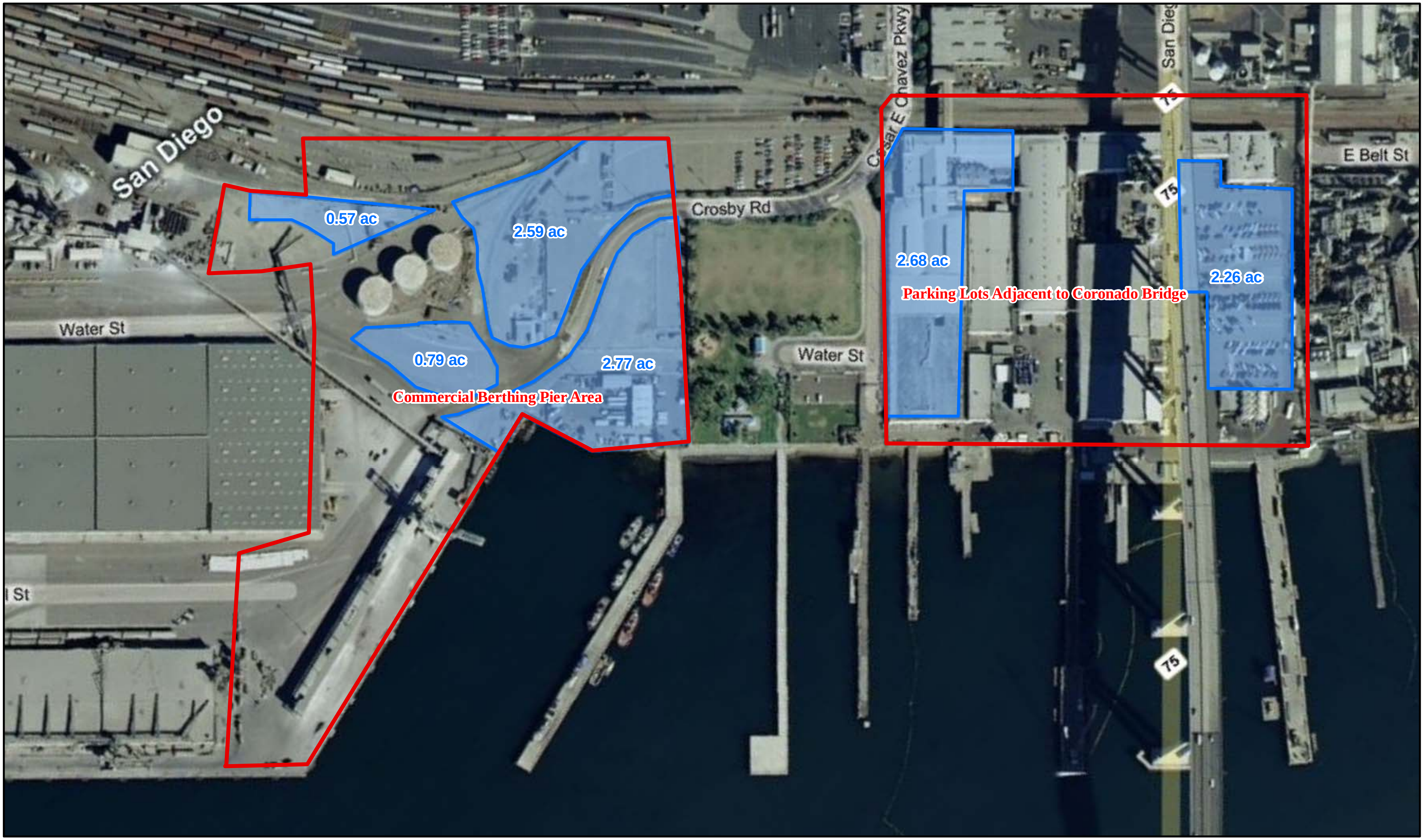

LSA

FIGURE 4

LEGEND

Potential Sediment Staging Area 2

Usable Areas (with Acreage)

0 150 300
FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Area 2
Commercial Berthing Pier Area and Parking Lots Adjacent to Coronado Bridge

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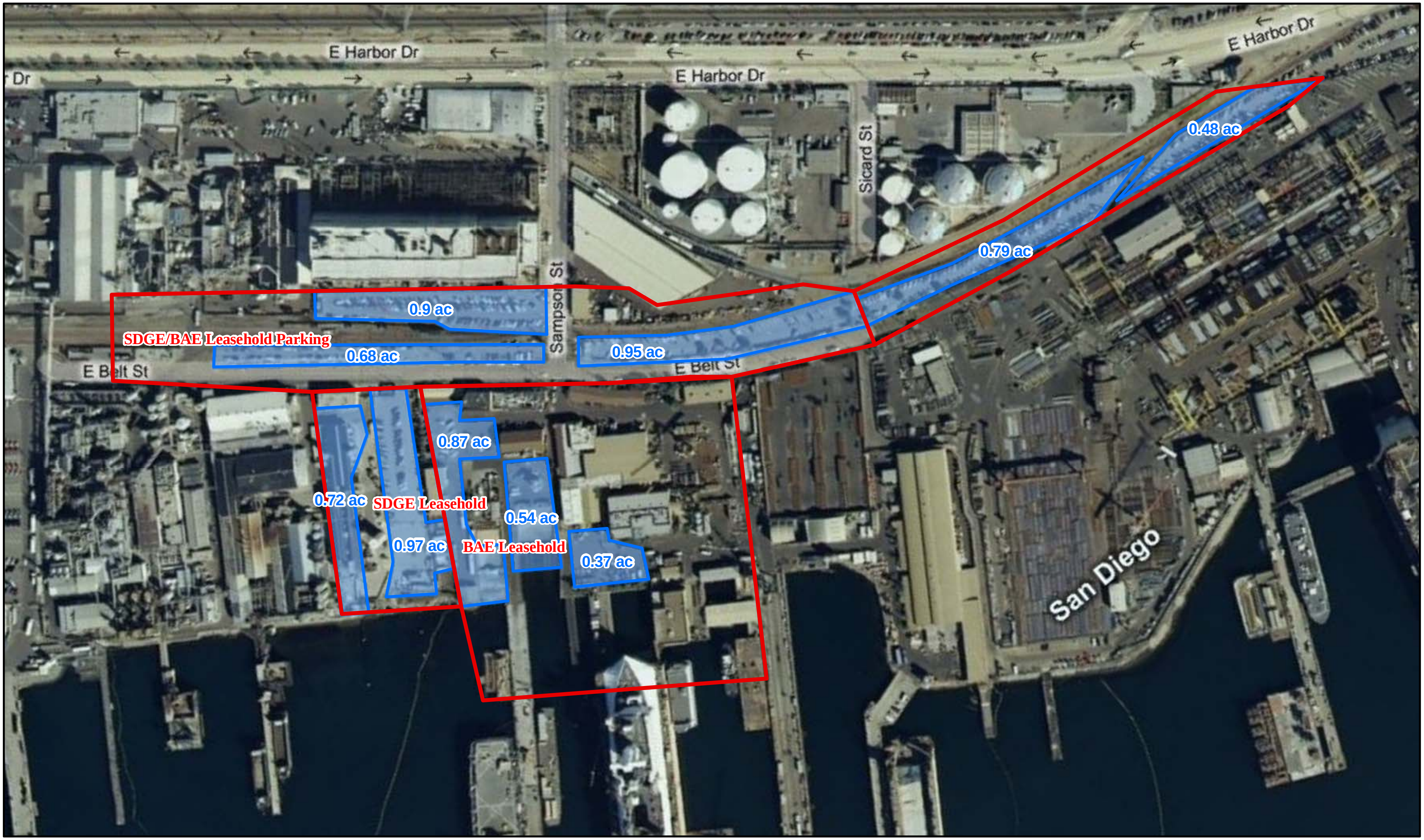

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LEGEND

- Potential Sediment Staging Area 3
- Usable Areas (with Acreage)

FIGURE 5

0 150 300
FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Area 3
SDG&E Leasehold/BAE Leasehold/BAE and NASSCO Parking

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FIGURE 6

LEGEND

Potential Sediment Staging Area 4

Usable Areas (with Acreage)

N

0 100 200
FEET

San Diego Sediment Project

Potential Sediment Staging Area 4
NASSCO Parking and Parking Area North of Harbor Drive

SOURCE: Bing Maps (2008)

R:\SWB1001\GIS\NASSCO_and_Area_North_Harbor_Drive_Parking.mxd (1/26/11)

LSA

FIGURE 7

LEGEND

Potential Sediment Staging Area 5

Usable Areas (with Acreage)

0 400 800
FEET

SOURCE: Bing Maps (2008)

San Diego Sediment Project

Potential Sediment Staging Area 5
24th Street Marine Terminal and Adjacent Parking Areas

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The marine habitat within the Shipyard Sediment Site consists of 63 open water acres (46 within the NASSCO leasehold and 17 within the BAE leasehold) containing both vegetated and unvegetated subtidal soft bottom habitats, pier pilings, and bulkhead walls. The vegetated habitat species include sparse beds of eelgrass (*Zostera marina*). The entire extent of the Shipyard Sediment Site shoreline is artificially stabilized, generally consisting of a vertical sheet pile bulkhead and a seawall. The marine habitat types include vertical bulkhead walls and dock structures, vegetated and non-vegetated soft bottom subtidal habitats, and open water. These habitats support marine plants, invertebrates, and fishes.

The five potential Staging Areas consist primarily of leasehold lands and associated parking areas in the immediate vicinity of the Shipyard Sediment Site. The actual usable areas within each potential Staging Area comprise open, paved portions that could be used for the dewatering, solidifying, and drying of the dredged marine sediments. Staging Areas 1 through 4 are located within the City of San Diego and are designated in the City's General Plan as Mixed Use and Industrial Employment. Staging Area 5 is located approximately 3.5 miles from the shipyards and within the City of National City. It is currently designated in the City's General Plan as Industrial–Tidelands Manufacturing, and is under the jurisdiction of the Port District. National City is currently updating its General Plan; the proposed land use designation for Staging Area 5 in the updated General Plan is "San Diego Unified Port District," indicating that land uses are governed by the San Diego Port Master Plan. The currently adopted (1996) combined General Plan/zoning map identifies an overlay zone in Staging Area 5 as subject to the "Unified Port District" overlay zone, also indicating that land uses are governed by the San Diego Port Master Plan.

2.4 PROJECT BACKGROUND

The California Regional Water Quality Control Board (RWQCB), San Diego Region, hereinafter referred to as the San Diego Water Board, alleges that several agencies and/or parties caused or permitted the discharge of waste to the Shipyard Sediment Site resulting in the accumulation of waste in the marine sediment. The contaminated marine sediment has caused conditions of contamination or nuisance in San Diego Bay that adversely affect aquatic life, aquatic-dependent wildlife, human health, and San Diego Bay beneficial uses. The San Diego Water Board determined that issuance of a Cleanup and Abatement Order (CAO) was the appropriate regulatory tool to use for correcting the impairment at the Shipyard Sediment Site.

CAOs are issued under the authority of the California Water Code (Section 13304). As defined in the State Water Board's Water Quality Enforcement Policy (adopted November 17, 2009), "CAOs may be issued to any person who has discharged or discharges waste into State waters in violation of any waste discharge requirement or other order or prohibition issued by a Regional Water Board or the State Water Board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the State and creates, or threatens to create, a condition of pollution or nuisance (discharger). The CAO requires the discharger to clean up the waste or abate the effects of the waste, or both, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including, but not limited to, overseeing cleanup and abatement efforts."

A CAO requires dischargers to clean up the pollution to background levels or the best water quality that is reasonable. At a minimum, cleanup levels must fully support beneficial uses, unless the Regional Water Board allows a containment zone. The CAO determined that cleaning up to a background sediment quality level at the Shipyard Sediment Site is economically infeasible. Therefore, the CAO established alternative cleanup levels for the project that are the lowest technologically and economically achievable levels, as required under the California Code of Regulations Title 23 section 2550.4(e). These alternative levels are described below in the Project Characteristics section.

This Program EIR addresses the cleanup project as identified in the Tentative Cleanup and Abatement Order No. R9-2011-0001, dated September 15, 2010.

2.5 PROJECT GOALS AND OBJECTIVES

The primary goal of the project is to improve water quality in San Diego Bay, consistent with the provisions of the Tentative CAO. The specific project objectives are:

- Protect the quality of the waters of San Diego Bay for use and enjoyment by the people of the state by executing a shipyard sediment clean-up project consistent with the provisions of Tentative CAO No. R9-2011-0001.
- Attain cleanup levels as included in the Tentative CAO No. R9-2011-0001 (judged to be technologically and economically feasible as defined in Section 2550.4 of Title 23 of the CCR, pursuant to Resolution No. 92-49).
- Remediate areas identified in Attachment 2 of Tentative CAO No. R9-2011-0001.
- Minimize adverse effects to aquatic life beneficial uses, including Estuarine Habitat (EST), Marine Habitat (MAR), and Migration of Aquatic Organisms (MIGR).
- Minimize adverse effects to aquatic-dependent wildlife beneficial uses, including Wildlife Habitat (WILD), Preservation of Biological Habitats of Special Significance (BIOL), and Rare, Threatened, or Endangered Species (RARE).
- Minimize adverse effects to human health beneficial uses, including Contact Water Recreation (REC-1), Non-contact Water Recreation (REC-2), Shellfish Harvesting (SHELL), and Commercial and Sport Fishing (COMM).
- Implement a clean-up plan that will have long-term effectiveness.

- Minimize adverse effects to the natural and built environment.
- Avoid or minimize adverse impacts to residential areas.
- Result in no long-term loss of use of shipyard and other San Diego Bay-dependent facilities.
- Minimize short-term loss of use of shipyard and other San Diego Bay-dependent facilities.

2.6 PROJECT CHARACTERISTICS

The project addressed in this Program EIR is the implementation of Tentative CAO No. R9-2011-000, which requires that remedial actions be implemented within the Shipyard Sediment Site. Remedial actions may include dredging, capping, and/or natural recovery depending upon a number of factors, including levels of contamination in the sediment and site accessibility. The CAO determined that dredging and disposal of sediments is the proposed remedy for approximately 15.2 acres of the site and is expected to generate approximately 143,400 cubic yards of contaminated marine sediment. The CAO also indicated that if cleanup criteria for chemical constituents of concern in the sediments cannot be attained by dredging (for example, contaminants extend more deeply than anticipated or there is an obstacle due to a hard substrate) some dredge areas may be capped in-place with sand. In addition to the 15.2 acres targeted for dredging, approximately 2.3 acres of the project site are inaccessible or under-pier areas that will be remediated by one or more methods other than dredging, most likely by sand capping.

There are two scheduling options for completion of the remedial action. The first scheduling option is expected to take 2 to 2.5 years to complete. Under this option, the dredging operations would occur for 7 months of the year and would cease from April through August during the endangered California least tern breeding season.

The second option is to implement the remedial plan with continuous dredging operations, which would be expected to take approximately 12.5 months to complete. This scenario assumes that the dewatering, solidification, and stockpiling of the materials would occur simultaneously and continuously with the dredging. Also assumed under this compressed schedule option is that dredging operations could proceed year-round, including during the breeding season of the endangered California least tern.

Both scheduling options would be followed by a period of post-remedial monitoring. The preferred schedule will be determined during the final design phase. However, both schedule options are included in the analysis for the technical studies and Program EIR.

The project includes the dredging and/or capping of the contaminated soils; vessel transport to shore; dewatering, stockpiling and testing of dredged materials at a landside staging location; and truck transport of dredge materials to the appropriate landfill disposal facility. Each of these components is further described below.

2.6.1 Dredging and Capping Operations

The project involves environmental dredging which, unlike navigational or construction dredging, is performed specifically for the removal of contaminated sediment while minimizing the spread of contaminants to the surrounding environment during dredging operations. The proposed project includes the dredging and removal of approximately 143,400 cubic yards of contaminated sediment from the Shipyards Sediment Site. The cubic yard amount was identified in the CAO and includes a one-foot over-dredge assumption.

Silt curtains and/or air curtains will be placed around the dredge area, including the dredge barges. The silt curtain will consist of a geotextiles fabric curtain with a floatation boom at the upper hem and ballast weights at the lower hem. The silt curtain will act as a physical barrier that will limit access to the portions of the site where the dredging operations are occurring. The silt curtain will also contain any re-suspended particles from migrating outside of the active dredging area. Air curtains have been used successfully during the removal operations on the St. Lawrence River in Massena, NY, and the KK River in Milwaukee, WS. These air curtains were used in conjunction with silt curtains to contain re-suspended sediment but specifically to enhance worker safety and allow barges to transit into and out of the work area without the need to open and close silt curtain gates.

It is anticipated that the dredging would utilize a derrick barge equipped with a closed environmental bucket such as the Cable Arm® Environmental Clamshell in order to maintain water quality. The dredge material will be placed on material barges and transported with the help of tug boats to a landside staging area. All barges will be outfitted with a water recovery system to collect the water deposited on the barges during dredging operations; the objective is to ensure that no water collected during the operations reenters the Bay.

Due to the presence of infrastructure, such as piers and pilings, dredging is constrained in several locations within the project site. Therefore, contaminated areas under piers and pilings will be remedied through subaqueous, or in-situ, capping. In-situ capping is the placement of clean material on top of the contaminated sediment. The capping material is typically clean sand, silty to gravelly sand, and/or armoring material. Effective capping requires sufficient cap thickness, careful cap placement to avoid disturbance, and maintenance to ensure cap integrity from future disturbances. Sand capping would involve the transport of capping material to the site (possibly via truck or barge) and placement of the materials over contaminated sediment. The capping operations will require a materials barge outfitted with a stone slinger truck, hoppers, and conveyors to move and place the capping materials over the contaminated marine sediments.

2.6.2 Onshore Dewatering and Treatment

The proposed project requires a landside sediment management site with sufficient space and access to stockpile, dewater, and transport the removed dredge material. Although the exact area required for sediment management will be determined during the final design phase, it is estimated that 2 to 2.5 acres would be required. Five potential staging areas have been identified.

The staging area will require site preparation and construction of a pad. The site will be graded and compacted (if necessary) and a sealing liner will be put in place. An asphalt pad will then be constructed. The drying area will be surrounded by k-rails and sealed with foam and impervious fabric to form a confined area.

The dredged sediment, depending upon physical characteristics, will either be off-loaded from the materials barge by an excavator and put into dump trucks for placement in the staging area or treated with pozzilonics in the barge, then off-loaded into trucks for placement in the staging area for curing and sampling. In either event, the sediment will then be mixed with a cement-based reagent (pozzilonics) to accelerate the drying. The sediment will be spread out and rotated frequently to further accelerate the drying process. The drains located in the drying area will be isolated from the rest of the stormwater system at the site. If the excess water from the drying area does not meet industrial wastewater permit requirements, and cannot be discharged into the City sewage system, the water will be dealt with as contaminated waste and removed from the site by a licensed waste hauler. All collected water will be tested and disposed of in accordance with local, state, and federal requirements. After drying, soil sampling will be conducted and all dredged material will be loaded directly onto trucks for disposal at an approved upland landfill.

2.6.3 Transportation and Disposal

Once the dredge materials have been dried and tested, they will be loaded onto trucks for disposal at an approved landfill. For purposes of this project, it is assumed that 85 percent of the material will be transported from the staging area to Otay Landfill, approximately 15 miles southeast of the Shipyard Sediment Site. Trucks departing from potential Staging Areas 1 through 4 would access I-5 south via E. Harbor Drive and 28th Street; trucks departing from Staging Area 5 would access I-5 south either directly from Bay Marina Drive or from W. 32nd Street to Marina Way to Bay Marina Drive. The preferred route to Otay Landfill is via I-5 south to Highway 54 east, to I-805 south (Figure 8).

Although the sediment is not known to be classified as California hazardous material, it will be tested upon removal and prior to disposal. It is assumed for the purposes of this study that up to 15 percent of the material will require transport to a Class III facility, most likely the Kettleman Hills Landfill in Kings County, California, near Bakersfield. Based on the excavation quantity of 143,400 cubic yards, and accounting for an additional 15 percent of

L S A

FIGURE 8

LEGEND

- Census Tracts
- Census Block Groups
- Potential Sediment Staging Areas
- Shipyard Sediment Project Site
- Potential Haul Routes

0 1000 2000
FEET

SOURCE: Bing Maps (2008), U.S. Census Bureau (2000)

R:\SWB1001\GIS\Census_HaulRoutes_FIG8.mxd (3/31/2011)

San Diego Sediment Project

Study Area Census Tracts and Haul Routes bulk material due to the dewatering and treatment process, it is estimated that up to 250 truck trips per week could be required over an approximately 12.5-month period to remove the material. These estimates are a worst-case scenario and will be finalized during the design phase.

3.0 SETTING

The project site is located within the Cities of San Diego and National City, an area within the San Diego Air Basin (Basin) that includes the entire San Diego County area. Air quality regulation in the Basin is administered by the San Diego Air Pollution Control District (SDAPCD).

3.1 REGIONAL AIR QUALITY

Both the State of California (State) and the Federal Government have established health-based ambient air quality standards (AAQS) for seven air pollutants. As shown in Table A, these pollutants include ozone (O_3), Carbon Monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), coarse particulate matter with a diameter of 10 microns or less (PM_{10}), fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead. In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

In addition to setting out primary and secondary AAQS, the State of California has established a set of episode criteria for O_3, CO, NO_2, SO_2, and PM_{10}. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage One to Stage Three. An alert level is that concentration of pollutants at which initial stage control actions are to begin. An alert will be declared when any one of the pollutant alert levels is reached at any monitoring site and meteorological conditions are such that the pollutant concentrations can be expected to remain at these levels for 12 or more hours or to increase; or, in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

Pollutant alert levels:

- O_3: 392 micrograms per cubic meter ($\mu g/m^3$) (0.20 parts per million [ppm]), 1-hour average.
- CO: 17 milligrams per cubic meter (mg/m^3) (15 ppm), 8-hour average.
- NO_2: 1,130 $\mu g/m^3$ (0.6 ppm) 1-hour average; 282 $\mu g/m^3$ (0.15 ppm) 24-hour average.
- SO_2: 800 $\mu g/m^3$ (0.3 ppm), 24-hour average.
- Particulates, measured as PM_{10}: 350 $\mu g/m^3$, 24-hour average.

Table A: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1-Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.070 ppm (137 $\mu g/m^3$)		0.075 ppm (147 $\mu g/m^3$)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		—		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	15.0 $\mu g/m^3$		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm(40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)	Gas Phase Chemiluminescence	53 ppb (100 $\mu g/m^3$) (see footnote 8)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (339 $\mu g/m^3$)		100 ppb (188 $\mu g/m^3$) (see footnote 8)	None	
Sulfur Dioxide (SO_2)	24-Hour	0.04 ppm (105 $\mu g/m^3$)	Ultraviolet Fluorescence	—	—	Spectrophotometry (Pararosaniline Method)
	3-Hour	—		—	0.5 ppm (1300 $\mu g/m^3$) (see footnote 9)	
	1-Hour	0.25 ppm (655 $\mu g/m^3$)		75 ppb (196 $\mu g/m^3$) (see footnote 9)	—	
Lead[10]	30 Day Average	1.5 $\mu g/m^3$	Atomic Absorption	—	—	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 $\mu g/m^3$	Same as Primary Standard	
	Rolling 3-Month Average[11]	—		0.15 $\mu g/m^3$		
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates	24-Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24-Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

Source: California Air Resources Board, September 8, 2010.
Table footnotes are provided on the following page.

Footnotes for Table A:

1 California standards for ozone; carbon monoxide (except Lake Tahoe); sulfur dioxide (1- and 24-hour); nitrogen dioxide; suspended particulate matter - PM_{10}, $PM_{2.5}$ and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2 National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth-highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the EPA for further clarification and current Federal policies.

3 Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4 Any equivalent procedure which can be shown to the satisfaction of ARB to give equivalent results at or near the level of the air quality standard may be used.

5 National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6 National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7 Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

8 To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010). Note that the EPA standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards, the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.

9 On June 2, 2010, the EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The EPA also proposed a new automated Federal Reference Method (FRM) using ultraviolet technology, but will retain the older pararosaniline methods until the new FRM has adequately permeated State monitoring networks. The EPA also revoked both the existing 24-hour SO_2 standard of 0.14 ppm and the annual primary SO_2 standard of 0.030 ppm, effective August 23, 2010. The secondary SO_2 standard was not revised at this time; however, the secondary standard is undergoing a separate review by the EPA. Note that the new standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the new primary national standard to the California standard, the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

10 The ARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

11 National lead standard, rolling 3-month average: final rule signed October 15, 2008.

°C = degrees Celsius
EPA = United States Environmental Protection Agency
$\mu g/m^3$ = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
ppm = parts per million
ppb = parts per billion

Table B lists the primary health effects and sources of common air pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety (EPA), these health effects will not occur unless the standards are exceeded by a large margin or for a prolonged period of time. State AAQS are more stringent than Federal AAQS. Among the pollutants, O_3 and particulate matter ($PM_{2.5}$ and PM_{10}) are considered regional pollutants, while the others have more localized effects.

Table B: Summary of Health Effects of the Major Criteria Air Pollutants

Pollutant	Health Effects	Examples of Sources
Particulate matter (PM_{10}: less than or equal to 10 microns)	• Increased respiratory disease • Lung damage • Premature death	• Cars and trucks, especially diesels • Fireplaces, wood stoves • Windblown dust from roadways, agriculture, and construction
Ozone (O_3)	• Breathing difficulties • Lung damage	• Formed by chemical reactions of air pollutants in the presence of sunlight; common sources are motor vehicles, industries, and consumer products
Carbon monoxide (CO)	• Chest pain in heart patients • Headaches, nausea • Reduced mental alertness • Death at very high levels	• Any source that burns fuel such as cars, trucks, construction and farming equipment, and residential heaters and stoves
Nitrogen dioxide (NO_2)	• Lung damage	• See CO sources
Toxic air contaminants	• Cancer • Chronic eye, lung, or skin irritation • Neurological and reproductive disorders	• Cars and trucks, especially diesels • Industrial sources such as chrome platers • Neighborhood businesses such as dry cleaners and service stations • Building materials and products

Source: ARB 2005.
ARB = California Air Resources Board

The California Clean Air Act (CCAA) provides the SDAPCD and other air districts with the authority to manage transportation activities at indirect sources. Indirect sources of pollution are generated when minor sources collectively emit a substantial amount of pollution. Examples of this would be the motor vehicles at an intersection, a mall, and on highways. The SDAPCD also regulates stationary sources of pollution throughout its jurisdictional area. Direct emissions from motor vehicles are regulated by the ARB.

3.1.1 Climate/Meteorology

The Basin climate is influenced by its terrain and geographical location. The Basin is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the western boundary, and high mountains surround the rest of the Basin. The region lies in the semi-permanent high pressure zone of the eastern Pacific. The resulting climate is mild and tempered by cool ocean breezes.

The annual average temperature varies little throughout the Basin, ranging from the low to middle 60s, measured in degrees Fahrenheit. With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site monitoring temperature is the San Diego Airport Station.[1] The annual average maximum temperature recorded between 1914 and 2010 at this station is 69.9°F, and the annual average minimum is 56.5°F. January is typically the coldest month in this area of the Basin.

The majority of annual rainfall in the Basin occurs between November and April. Summer rainfall is minimal and generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the Basin along the coastal side of the mountains. The climatological station closest to the site that monitors precipitation is the San Diego Airport Station. Average rainfall measured at this station between 1979 and 2010 varied from 2.03 inches in January to 0.78 inch or less between April and October, with an average annual total of 10.18 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

3.1.2 Description of Global Climate Change and Its Sources

Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other significant changes in climate (such as precipitation or wind) that last for an extended period of time. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures.

Climate change refers to any change in measures of weather (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from natural factors, such as changes in the sun's intensity; natural processes within the climate system, such as changes in ocean circulation; or human activities, such as the burning of fossil fuels, land clearing, or agriculture. The primary observed effect of global climate change has been a rise in the average global tropospheric[2] temperature of 0.36°F per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling shows that further warming could occur, which would induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include

1 Western Regional Climatic Center, at website wrcc.dri.edu, 2011.

2 The troposphere is the zone of the atmosphere characterized by water vapor, weather, winds, and decreasing temperature with increasing altitude.

higher sea levels, drier or wetter weather, changes in ocean salinity, changes in wind patterns, or more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and increased intensity of tropical cyclones. Specific effects in California might include a decline in the Sierra Nevada snowpack, erosion of California's coastline, and seawater intrusion in the Delta.

Global surface temperatures have risen by 1.33°F ± 0.32°F over the last 100 years (1906 to 2005). The rate of warming over the last 50 years is almost double that over the last 100 years.[1] The latest projections, based on state-of-the art climate models, indicate that temperatures in California are expected to rise 3–10.5°F by the end of the century.[2] The prevailing scientific opinion on climate change is that "most of the warming observed over the last 50 years is attributable to human activities."[3] Increased amounts of CO_2 and other GHGs are the primary causes of the human-induced component of warming. The observed warming effect associated with the presence of GHGs in the atmosphere (from either natural or human sources) is often referred to as the greenhouse effect.[4]

GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:[5]

- CO_2
- CH_4
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF_6)

Over the last 200 years, human activities have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, and enhancing the natural greenhouse effect, which is believed to be causing global warming. While GHGs produced by human activities include naturally-occurring

1 Intergovernmental Panel on Climate Change (IPCC), 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.*

2 California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* July.

3 Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: The Physical Science Basis*, http://www.ipcc.ch.

4 The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse lets heat from sunlight in and reduce the amount of heat that escapes, greenhouse gases like carbon dioxide, methane, and nitrous oxide in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, although an excess of greenhouse gas results in global warming, the *naturally occurring* greenhouse effect is necessary to keep our planet at a comfortable temperature.

5 The greenhouse gases listed are consistent with the definition in Assembly Bill (AB) 32 (Government Code 38505), as discussed later in this section.

GHGs such as CO_2, CH_4, and N_2O, some gases, like HFCs, PFCs, and SF_6 are completely new to the atmosphere. Certain other gases, such as water vapor, are short-lived in the atmosphere as compared to these GHGs that remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is generally excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the purposes of this Environmental Impact Report (EIR), the term "GHGs" will refer collectively to the six gases identified in the bulleted list provided above.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The global warming potential is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to CO_2, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of metric tons[1] of "CO_2 equivalents" (CO_2e). Table C shows the GWPs for each type of GHG. For example, sulfur hexafluoride is 22,800 times more potent at contributing to global warming than carbon dioxide.

Table C: Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-year Time Horizon)
Carbon Dioxide (CO_2)	50–200	1
Methane (CH_4)	12	25
Nitrous Oxide (NO_x)	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Tetrafluoromethane (CF_4)	50,000	7,390
PFC: Hexafluoromethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Source: IPCC, 2007. *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.
HFC = Hydrofluorocarbons
IPCC = Intergovernmental Panel on Climate Change
PFC = Perfluorocarbons

The following discussion summarizes the characteristics of the six primary GHGs.

1 A metric ton is equivalent to approximately 1.1 standard tons.

Carbon Dioxide. In the atmosphere, carbon generally exists in its oxidized form, as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals and plants, volcanic outgassing, decomposition of organic matter, and evaporation from the oceans. Human-caused sources of CO_2 include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. The Earth maintains a natural carbon balance, and when concentrations of CO_2 are upset, the system gradually returns to its natural state through natural processes. Natural changes to the carbon cycle work slowly, especially compared to the rapid rate at which humans are adding CO_2 to the atmosphere. Natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of human-made CO_2, and consequently the gas is building up in the atmosphere. The concentration of CO_2 in the atmosphere has risen approximately 30 percent since the late 1800s.[1]

In 2002, CO_2 emissions from fossil fuel combustion accounted for approximately 98 percent of human-made CO_2 emissions and approximately 84 percent of California's overall GHG emissions (CO_2e). The transportation sector accounted for California's largest portion of CO_2 emissions, with gasoline consumption making up the greatest portion of these emissions. Electricity generation was California's second-largest category of GHG emissions.

Methane. CH_4 is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Anthropogenic sources include rice cultivation, livestock, landfills and waste treatment, biomass burning, and fossil fuel combustion (burning of coal, oil, natural gas, etc.). Decomposition occurring in landfills accounts for the majority of human-generated CH_4 emissions in California, followed by enteric fermentation (emissions from the digestive processes of livestock).[2] Agricultural processes such as manure management and rice cultivation are also significant sources of human-made CH_4 in California. CH_4 accounted for approximately 6 percent of gross climate change emissions (CO_2e) in California in 2002.[3] It is estimated that over 60 percent of global methane emissions are related to human-related activities.[4] As with CO_2, the major removal process of atmospheric CH_4—a chemical breakdown in the atmosphere—cannot keep pace with source emissions, and CH_4 concentrations in the atmosphere are increasing.

Nitrous Oxide. N_2O is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the

1 California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.
2 California Air Resources Board, Greenhouse Gas Inventory Data - 1990 to 2004. http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed November 2008.
3 Ibid.
4 IPCC, 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

majority of natural source emissions. N_2O is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N_2O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated N_2O emissions in California. N_2O emissions accounted for nearly 7 percent of human-made GHG emissions (CO_2e) in California in 2002.

Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride. HFCs are primarily used as substitutes for ozone-depleting substances regulated under the Montreal Protocol.[1] PFCs and SF_6 are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry, which is active in California, leads to greater use of PFCs. HFCs, PFCs, and SF_6 accounted for about 3.5 percent of human-made GHG emissions (CO_2e) in California in 2002.[2]

Emissions Sources and Inventories. An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing climate change. This section summarizes the latest information on global, National, California, and local GHG emission inventories. However, because GHGs persist for a long time in the atmosphere (see previously referenced Table C), accumulate over time, and are generally well-mixed, their impact on the atmosphere and climate cannot be tied to a specific point of emission.

Global Emissions. Worldwide emissions of GHGs in 2004 were 27 billion metric tons of CO_2e per year.[3] Global estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change (UNFCCC).

United States Emissions. In 2008, the United States emitted approximately 7.0 billion metric tons of CO_2e or approximately 25 tons per year per person. Of the six major sectors

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1 The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

2 California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.

3 Combined total of Annex I and Non-Annex I Country CO_2eq emissions. United Nations Framework Convention on Climate Change (UNFCCC), 2007. ***Greenhouse Gas Inventory Data.*** Information available at http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php and http://maindb.unfccc.int/library/view_pdf.pl?url=http://unfccc.int/resource/docs/2005/sbi/eng/18a02.pdf.

nationwide— electric power industry, transportation, industry, agriculture, commercial, residential— the electric power industry and transportation sectors combined account for approximately 62 percent of the GHG emissions; the majority of the electrical power industry and all of the transportation emissions are generated from direct fossil fuel combustion. Between 1990 and 2006, total United States GHG emissions rose approximately 14.7 percent.[1]

State of California Emissions. According to California ARB emission inventory estimates, California emitted approximately 474 million metric tons of CO_2e ($MMTCO_2e$) emissions in 2008.[2] This large number is due primarily to the sheer size of California compared to other states. By contrast, California has the fourth-lowest per-capita CO_2 emission rate from fossil fuel combustion in the country, due to the success of its energy efficiency and renewable energy programs and commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise.[3]

The Cal/EPA Climate Action Team stated in its March 2006 report that the composition of gross climate change pollutant emissions in California in 2002 (expressed in terms of CO_2e) was as follows:

- CO_2 accounted for 83.3 percent;
- CH_4 accounted for 6.4 percent;
- N_2O accounted for 6.8 percent; and
- HFCs, PFC, and SF_6 accounted for 3.5 percent.[4]

The California ARB estimates that transportation is the source of approximately 38 percent of the State's GHG emissions in 2004, followed by electricity generation (both in-State and out-of-State) at 23 percent, and industrial sources at 20 percent. The remaining sources of GHG emissions are residential and commercial activities at 9 percent, agriculture at 6 percent, high global warming potential gases at 3 percent, and recycling and waste at 1 percent.[5]

1 U.S. Environmental Protection Agency (EPA). 2010. The 2010 U.S. Greenhouse Gas Inventory Report. http://www.epa.gov/climatechange/emissions/usinventoryreport.html. Accessed September 2010.

2 California Air Resources Board, Greenhouse Gas Inventory Data - 1990 to 2004. http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed September 2010.

3 California Energy Commission (CEC), 2007. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004 - Final Staff Report, publication # CEC-600-2006-013-SF, Sacramento, CA, December 22, 2006; and January 23, 2007, update to that report.

4 California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.

5 California Air Resources Board (ARB), 2008. http://www.climatechange.ca.gov/inventory/index.html. September.

The California ARB is responsible for developing the California Greenhouse Gas Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State of California and supports the AB 32 Climate Change Program. The California ARB's current GHG emission inventory covers the years 1990–2004 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, agricultural lands). The emission inventory estimates are based on the actual amount of all fuels combusted in the State, which accounts for over 85 percent of the GHG emissions within California.

The California ARB staff has projected statewide unregulated GHG emissions for 2020, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions, will be 596 MMT CO_2e. GHG emissions from the transportation and electricity sectors as a whole are expected to increase, but remain at approximately 38 percent and 23 percent of total CO_2e emissions, respectively. The industrial sector consists of large stationary sources of GHG emissions, and the percentage of the total 2020 emissions is projected to be 17 percent of total CO_2e emissions. The remaining sources of GHG emissions in 2020 are high global warming potential gases at 8 percent, residential and commercial activities at 8 percent, agriculture at 5 percent, and recycling and waste at 1 percent.[1]

3.1.3 Air Pollution Constituents and Attainment Status

The ARB coordinates and oversees both State and Federal air pollution control programs in California. The ARB oversees activities of local air quality management agencies and maintains air quality monitoring stations throughout the State in conjunction with the EPA and local air districts. The ARB has divided the State into 15 air basins based on meteorological and topographical factors of air pollution. Data collected at these stations are used by the ARB and EPA to classify air basins as attainment, nonattainment, nonattainment-transitional, or unclassified, based on air quality data for the most recent 3 calendar years compared with the AAQS. Nonattainment areas are imposed with additional restrictions as required by the EPA. The air quality data are also used to monitor progress in attaining air quality standards. Table D lists the attainment status for the criteria pollutants in the Basin.

Table D: Attainment Status of Criteria Pollutants in the San Diego Air Basin

Pollutant	State	Federal
O_3 1-hour	Serious Nonattainment	N/A
O_3 8-hour	Nonattainment	Nonattainment
PM_{10}	Nonattainment	Attainment/Unclassified
$PM_{2.5}$	Nonattainment	Attainment/Unclassified
CO	Attainment	Attainment

[1] Ibid.

Table D: Attainment Status of Criteria Pollutants in the San Diego Air Basin

Pollutant	State	Federal
NO_2	Attainment	Attainment/Unclassified
SO_2	Attainment	Attainment
All others	Attainment/Unclassified	Attainment/Unclassified

Source: ARB 2010 (http://www.arb.ca.gov/desig/desig.htm).
ARB = California Air Resources Board
N/A = not applicable
O_3 = ozone
$PM_{2.5}$ = particulate matte less than 2.5 microns in diameter
CO = carbon monoxide
NO_2 = nitrogen dioxide
PM_{10} = particulate matter less than 10 microns in diameter
SO_2 = sulfur dioxide

Ozone. O_3 (smog) is formed by photochemical reactions between oxides of nitrogen and reactive organic gases (ROGs) rather than being directly emitted. O_3 is a pungent, colorless gas typical of Southern California smog. Elevated O_3 concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem is particularly acute in sensitive receptors such as the sick, the elderly, and young children. O_3 levels peak during summer and early fall. The entire Basin is designated as a serious nonattainment area for the State one-hour O_3 standard. Effective June 15, 2005, the United States Environmental Policy Act (EPA) revoked, in full, the Federal one-hour O_3 ambient air quality standard, including associated designations and classifications. The EPA has officially designated the status for the Basin regarding the Federal eight-hour O_3 standard as nonattainment.

Carbon Monoxide. CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. The entire Basin is in attainment for the Federal and State standards for CO.

Nitrogen Oxides. NO_2, a reddish brown gas, and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature or pressure. These compounds are referred to as nitrogen oxides, or NO_X. NO_X is a primary component of the photochemical smog reaction. It also contributes to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition (i.e., acid rain). NO_2 decreases lung function and may reduce resistance to infection. The entire Basin is designated as an attainment area for the Federal and State standards.

Sulfur Dioxide. SO_2 is a colorless irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight. The entire Basin is in attainment with both Federal and State SO_2 standards.

Lead. Lead is found in old paints and coatings, plumbing, and a variety of other materials. Once in the bloodstream, lead can cause damage to the brain, nervous system, and other body systems. Children are highly susceptible to the effects of lead. The entire Basin is in attainment for the Federal and State standards for lead.

Particulate Matter. Particulate matter (PM) is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles (all particles less than or equal to 10 micrometers in diameter, or PM_{10}) derive from a variety of sources, including windblown dust and grinding operations. Fuel combustion and resultant exhaust from power plants and diesel buses and trucks are primarily responsible for fine particle (less than 2.5 microns in diameter, or $PM_{2.5}$) levels. Fine particles can also be formed in the atmosphere through chemical reactions. PM_{10} can accumulate in the respiratory system and aggravate health problems such as asthma. The EPA's scientific review concluded that $PM_{2.5}$, which penetrate deeply into the lungs, are more likely than coarse particles to contribute to the health effects listed in a number of recently published community epidemiological studies at concentrations that extend well below those allowed by the current PM_{10} standards. These health effects include premature death and increased hospital admissions and emergency room visits (primarily the elderly and individuals with cardiopulmonary disease); increased respiratory symptoms and disease (children and individuals with cardiopulmonary disease such as asthma); decreased lung functions (particularly in children and individuals with asthma); and alterations in lung tissue and structure and in respiratory tract defense mechanisms. The entire Basin is a nonattainment area for the State PM_{10} and $PM_{2.5}$ standard. The EPA has designated the Basin as an attainment area for PM_{10} and $PM_{2.5}$.

Reactive Organic Compounds. Reactive organic compounds (ROCs; also known as ROGs and volatile organic compounds [VOCs]) are formed from the combustion of fuels and the evaporation of organic solvents. ROCs are not defined as criteria pollutants, but are a prime component of the photochemical smog reaction. Consequently, ROC accumulates in the atmosphere more quickly during the winter when sunlight is limited and photochemical reactions are slower. There are no attainment designations for ROC.

3.2 LOCAL AIR QUALITY

SDAPCD, together with the ARB, maintains ambient air quality monitoring stations in the Basin. The air quality monitoring station closest to the site is the San Diego-Beardsley Street station. This station monitors all criteria pollutants. This monitoring station characterizes the air quality representative of the ambient air quality in the project area.[1] The ambient air quality data in Table E shows that CO, NO_2, and SO_2 levels are consistently below the relevant State and Federal standards in the project vicinity. Ozone and PM_{10} levels exceed State standards. $PM_{2.5}$ levels exceeded State and Federal standards.

Table E: Ambient Air Quality Monitored in San Diego

Pollutant	Standard	2007	2008	2009
Carbon Monoxide (CO)				
Maximum 1-hr concentration (ppm)		4.4	3.1	ND
Number of days exceeded:	State: > 20 ppm	0	0	ND
	Federal: > 35 ppm	0	0	ND
Maximum 8-hr concentration (ppm)		3.01	2.60	2.77
Number of days exceeded:	State: ≥ 9.0 ppm	0	0	0
	Federal: ≥ 9 ppm	0	0	0
Ozone (O_3)				
Maximum 1-hr concentration (ppm)		0.087	0.087	0.085
Number of days exceeded:	State: > 0.09 ppm	0	0	0
Maximum 8-hr concentration (ppm)		0.073	0.073	0.063
Number of days exceeded:	State: > 0.07 ppm	1	1	0
	Federal: > 0.075 ppm	0	0	0
Coarse Particulates (PM_{10})				
Maximum 24-hr concentration (μg/m^3)		111	59	60
Number of days exceeded:	State: > 50 μg/m3	4	4	3
	Federal: > 150 μg/m3	0	0	0
Annual arithmetic average concentration (μg/m^3)		31.2	29.3	29.4
Exceeded for the year:	State: > 20 μg/m^3	Yes	Yes	Yes
Fine Particulates ($PM_{2.5}$)				
Maximum 24-hr concentration (μg/m^3)		69.6	42.0	52.1
Number of days exceeded:	Federal: > 35 μg/m^3	8	3	3
Annual arithmetic average concentration (μg/m^3)		13	13	12
Exceeded for the year:	State: > 12 μg/m3	Yes	Yes	No
	Federal: > 15 μg/m3	No	No	No
Nitrogen Dioxide (NO_2)				
Maximum 1-hr concentration (ppm)		0.098	0.091	0.078
Number of days exceeded:	State: > 0.18 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.018	0.019	0.017
Exceeded for the year:	State: > 0.030 ppm	No	No	No
	Federal: > 0.053 ppm	No	No	No
Sulfur Dioxide (SO_2)				
Maximum 24-hr concentration (ppm)		0.006	0.007	0.006
Number of days exceeded:	State: > 0.04 ppm	0	0	0
	Federal: > 0.14 ppm	0	0	0

[1] Air quality data, 2007–2009; EPA and ARB websites.

Table E: Ambient Air Quality Monitored in San Diego

Pollutant	Standard	2007	2008	2009
Annual arithmetic average concentration (ppm)		0.002	0.003	0.001
Exceeded for the year:	Federal: > 0.030 ppm	No	No	No

Sources: EPA and ARB websites: www.epa.gov/air/data/index.html and www.arb.ca.gov/adam/welcome.html.
μg/m^3 = micrograms per cubic meter
ARB = California Air Resources Board
EPA = United States Environmental Protection Agency
ppm = parts per million
ND = No Data

3.3 REGULATORY SETTINGS

3.3.1 Federal Regulations/Standards

Pursuant to the Federal Clean Air Act (CAA) of 1970, the EPA established national ambient air quality standards (NAAQS). The NAAQS were established for six major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the Federal and State governments have established AAQS, or criteria, for outdoor concentrations in order to protect public health.

Data collected at permanent monitoring stations are used by the EPA to classify regions as "attainment" or "nonattainment," depending on whether the regions met the requirements stated in the primary NAAQS. Nonattainment areas are imposed with additional restrictions as required by the EPA.

The EPA has designated the San Diego Association of Governments (SANDAG) as the Metropolitan Planning Organization (MPO) responsible for ensuring compliance with the requirements of the CAA for the Basin.

The EPA established new national air quality standards for ground-level O_3 and fine particulate matter in 1997. On May 14, 1999, the Court of Appeals for the District of Columbia Circuit issued a decision ruling that the CAA, as applied in setting the new public health standards for O_3 and particulate matter, was unconstitutional as an improper delegation of legislative authority to the EPA. On February 27, 2001, the U.S. Supreme Court upheld the way the government sets air quality standards under the CAA. The court unanimously rejected industry arguments that the EPA must consider financial cost as well as health benefits in writing standards. The justices also rejected arguments that the EPA took too much lawmaking power from Congress when it set tougher standards for O_3 and soot in 1997. Nevertheless, the Court threw out the EPA's policy for implementing new O_3 rules, saying that the agency ignored a section of the law that restricts its authority to enforce such rules.

In April 2003, the EPA was cleared by the White House Office of Management and Budget (OMB) to implement the 8-hour ground-level O_3 standard. The EPA issued the proposed rule implementing the 8-hour O_3 standard in April 2003. The EPA completed final 8-hour nonattainment status on April 15, 2004. The EPA revoked the 1-hour O_3 standard on June 15, 2005, and lowered the 8-hour O_3 standard from 0.08 ppm to 0.075 ppm on April 1, 2008.

The EPA issued the final $PM_{2.5}$ implementation rule in fall 2004. The EPA lowered the 24-hour $PM_{2.5}$ standard from 65 to 35 $\mu g/m^3$ and revoked the annual PM_{10} standard on December 17, 2006. The EPA issued final designations for the 2006 24-hour $PM_{2.5}$ standard on December 12, 2008.

The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the EPA has the authority to regulate CO_2 emissions under the CAA. While there currently are no adopted Federal regulations for the control or reduction of GHG emissions, the EPA commenced several actions in 2009 that are required to implement a regulatory approach to global climate change.

On September 30, 2009, the EPA announced a proposal that focuses on large facilities emitting over 25,000 tons of GHG emissions per year. These facilities would be required to obtain permits that would demonstrate they are using the best practices and technologies to minimize GHG emissions.

On December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to global climate change. This EPA action does not impose any requirements on industry or other entities. However, the findings are a prerequisite to finalizing the GHG emission standards for light-duty vehicles mentioned below.

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a final joint rule to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. The EPA is finalizing the first-ever national GHG emissions standards under the CAA, and NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. The EPA GHG standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile in model year 2016, equivalent to 35.5 miles per gallon (mpg).

3.3.2 State Regulations/Standards

In 1967, the California Legislature passed the Mulford-Carrell Act, which combined two Department of Health bureaus, the Bureau of Air Sanitation and the Motor Vehicle Pollution Control Board, to establish the ARB. Since its formation, the ARB has worked with the public, the business sector, and local governments to find solutions to California's air pollution problems.

In a response to the transportation sector's significant contribution to California's CO_2 emissions, AB 1493 (Pavley) was enacted on July 22, 2002. AB 1493 requires the ARB to set GHG emission standards for passenger vehicles and light-duty trucks (and other vehicles whose primary use is noncommercial personal transportation in the State) manufactured in 2009 and all subsequent model years. In setting these standards, the ARB considered cost effectiveness, technological feasibility, and economic impacts. The ARB adopted the standards in September 2004. When fully phased in, the near-term (2009 to 2012) standards would result in a reduction in GHG emissions of approximately 22 percent compared to the emissions from the 2002 fleet, while the midterm (2013 to 2016) standards would result in a reduction of approximately 30 percent. To set its own GHG emissions limits on motor vehicles, California must receive a waiver from the EPA. However, in December 2007, the EPA denied the request from California for the waiver. In January 2008, the California Attorney General filed a petition for review of the EPA's decision in the Ninth Circuit Court of Appeals; however, no decision on that petition has been published as of January 2009. On January 26, 2009, President Barack Obama issued an Executive Memorandum directing the EPA to reassess its decision to deny the waiver and to initiate any appropriate action.[1] On May 18, 2009, the President announced the enactment of a 35.5 mpg fuel economy standard for automobiles and light-duty trucks, which will begin to take effect in 2012. This standard is approximately the same standard that was proposed by California; therefore, the California waiver request was shelved.

The ARB identified particulate emissions from diesel-fueled engines (diesel particulate matter [DPM]) as toxic air contaminants (TACs) in August 1998. Following the identification process, the ARB was required by law to determine whether there is a need for further control. In September 2000, the ARB adopted the Diesel Risk Reduction Plan (Diesel RRP), which recommends many control measures to reduce the risks associated with DPM and to achieve goals of 75 percent DPM reduction by 2010 and 85 percent by 2020.

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order (EO) S-3-05. This EO established the following goals for the State of California: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80 percent below 1990 levels by 2050.

California's major initiative for reducing GHG emissions is outlined in AB 32, the "Global Warming Solutions Act," passed by the California State legislature on August 31, 2006. AB 32 will require the ARB to:

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1 President Barack Obama. 2009. Memorandum to the Administrator of the EPA. State of California Request for Waiver Under 42 United States Code (U.S.C.) 7543(b), the Clean Air Act. January 26.

- Establish a statewide GHG emissions cap for 2020, based on 1990 emissions, by January 1, 2008;
- Adopt mandatory reporting rules for significant sources of GHG emissions by January 1, 2008;
- Adopt an emissions reduction plan by January 1, 2009, indicating how emissions reductions will be achieved via regulations, market mechanisms, and other actions; and
- Adopt regulations to achieve the maximum technologically feasible and cost-effective reductions of GHGs by January 1, 2011.

The ARB has established the level of GHG emissions in 1990 at 427 $MMTCO_2e$. The emissions target of 427 MMT requires the reduction of 169 MMT from the State's projected business-as-usual 2020 emissions of 596 MMT. AB 32 requires the ARB to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline and to reduce GHGs that contribute to global climate change. The Scoping Plan was approved by the ARB on December 11, 2008, and includes measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures.[1] Emission reductions that are projected to result from the recommended measures in the Scoping Plan are expected to total 174 $MMTCO_2e$, which would allow California to attain the emissions goal of 427 $MMTCO_2e$ by 2020. The Scoping Plan includes a range of GHG reduction actions that may include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. The Scoping Plan, even after Board approval, remains a recommendation. The measures in the Scoping Plan will not be binding until after they are adopted through the normal rulemaking process. The ARB rule-making process includes preparation and release of each of the draft measures, public input through workshops, and a public comment period, followed by an ARB Board hearing and rule adoption.

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed the ARB and the newly created Climate Action Team (CAT)[2] to identify a list of "discrete early action GHG reduction measures" that can be adopted and made enforceable by January 1, 2010. On January 18, 2007, Governor Schwarzenegger signed EO S-1-07, further solidifying California's dedication to reducing GHGs by setting a new Low Carbon Fuel Standard. This EO sets a target to reduce the carbon intensity of California transportation fuels by at least 10 percent by 2020 and directs the ARB to consider the Low Carbon Fuel Standard as a discrete early action measure.

1 ARB. 2008. *Climate Change Proposed Scoping Plan: a Framework for Change*. October.
2 CAT is a consortium of representatives from State agencies who have been charged with coordinating and implementing GHG emission reduction programs that fall outside of ARB's jurisdiction.

In June 2007, the ARB approved a list of 37 early action measures, including three discrete early action measures (Low Carbon Fuel Standard, Restrictions on High Global Warming Potential Refrigerants, and Landfill Methane Capture). Discrete early action measures are measures that were required to be adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code (HSC) Section 38560.5. The ARB adopted additional early action measures in October 2007[1] that tripled the number of discrete early action measures. These measures relate to truck efficiency, port electrification, reduction of perfluorocarbons from the semiconductor industry, reduction of propellants in consumer products, proper tire inflation, and SF_6 reductions from the non-electricity sector. The combination of early action measures is estimated to reduce State-wide GHG emissions by nearly 16 MMT.[2]

To assist public agencies in the mitigation of GHG emissions or analyzing the effects of GHGs under CEQA, including the effects associated with transportation and energy consumption, Senate Bill (SB) 97 (Chapter 185, 2007) requires the Governor's Office of Planning and Research (OPR) to develop CEQA guidelines on how to minimize and mitigate a project's GHG emissions. The OPR prepared, developed, and transmitted these guidelines in May 2009 the Resources Agency certified and adopted them December 30, 2009, and they became effective on March 18, 2010. The amendments encourage lead agencies to consider many factors in performing a CEQA analysis, but preserve the discretion granted by CEQA to lead agencies in making their own determinations.

SB 375, signed into law on October 1, 2008, is intended to enhance the ARB's ability to reach AB 32 goals by directing the ARB to develop regional GHG emissions reduction targets to be achieved within the automobile and light truck sectors for 2020 and 2035. The ARB will work with California's 18 metropolitan planning organizations to align their regional transportation, housing, and land use plans and prepare a "Sustainable Communities Strategy" to reduce the number of vehicle miles traveled in their respective regions and demonstrate the region's ability to attain its GHG reduction targets.

Additionally, SB 375 provides incentives for creating attractive, walkable, and sustainable communities and revitalizing existing communities. The bill exempts home builders from certain CEQA requirements if they build projects consistent with the new sustainable community strategies. It will also encourage the development of more alternative transportation options to promote healthy lifestyles and reduce traffic congestion.

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1 ARB. 2007. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration*. October.

2 ARB. 2007. "ARB approves tripling of early action measures required under AB 32." News Release 07-46. http://www.arb.ca.gov/newsrel/nr102507.htm. October 25.

3.3.3 Regional Air Quality Planning Framework

The 1976 Lewis Air Quality Management Act established the SDAPCD and other air districts throughout the State. The Federal CAA Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the Federal standards in nonattainment areas of the state.

The ARB is responsible for incorporating air quality management plans for local air basins into a State Implementation Plan (SIP) for EPA approval. Significant authority for air quality control within them has been given to local air districts that regulate stationary source emissions and develop local nonattainment plans.

3.3.4 Regional Air Quality Management Plan

The SDAPCD and SANDAG are responsible for formulating and implementing air quality plans for the Basin. Regional air quality plans were adopted for the Basin for 1979, 1982, 1989, 1991, 1994, 1997, 2001, and 2004. The San Diego Air Basin 2009 Triennial Regional Air Quality Strategy Revision (RAQS) was adopted by the SDAPCD on April 22, 2009.

4.0 METHODOLOGY

This air quality assessment includes estimated emissions associated with short-term construction and long-term operation of the proposed project. Criteria pollutants with regional impacts would be emitted by project-related vehicular trips, as well as by emissions associated with stationary sources used on site.

The net increase in pollutant emissions determines the significance and impact on regional air quality as a result of the proposed project. The results also allow the local government to determine whether the proposed project will deter the region from achieving the goal of reducing pollutants in accordance with the air quality plan in order to comply with Federal and State ambient air quality standards.

4.1 THRESHOLDS OF SIGNIFICANCE

4.1.1 Criteria Pollutants with Regional Effects

The SDAPCD has not established guidelines on emissions thresholds for CEQA purposes. Therefore, the following thresholds established in the *City of San Diego California Environmental Quality Act Significance Determination Thresholds* (January 2011) (City Guidelines) were used. The thresholds listed in the City's Guidelines are based on the SDAPCD's stationary source emission thresholds. The City of National City has not established air quality CEQA thresholds. Therefore, the San Diego thresholds were applied to the entire project site. Based on the criteria set forth in the City Guidelines, a project would have a significant impact with regard to construction or operational emissions if it would exceed any of the following:

- 137 pounds per day (lbs/day) of VOCs;
- 250 lbs/day of NO_X;
- 250 lbs/day of SO_X;
- 550 lbs/day of CO; and/or
- 100 lbs/day of PM_{10};

The Federal Clean Air Act requires EPA to set the health-based or "primary" standards at a level judged to be "requisite to protect the public health with an adequate margin of safety" and establish secondary standards that are "requisite" to protect public welfare from "any known or anticipated adverse effects associated with the pollutant in the ambient air" including effects on vegetation, soils, water, wildlife, buildings and national monuments, and visibility. Therefore, the emissions thresholds were established based on the attainment status of the air basin in regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety, these emissions thresholds are regarded as conservative and would overstate an individual project's contribution to health risks.

If in conjunction with other past, present, or reasonably foreseeable future projects, the proposed project's incremental contribution to impacts would exceed the daily emission thresholds identified above, the project may be considered to have a cumulatively significant air quality impact.

4.1.2 Local Microscale Concentrations Standards

The significance of localized project impacts under CEQA depends on whether ambient CO levels in the vicinity of the project are above or below State and Federal CO AAQS. Following are the local emission concentration standards for CO:

- California State 1-hour CO standard of 20.0 ppm; and/or
- California State 8-hour CO standard of 9.0 ppm.

4.1.3 Health Risk Assessment Thresholds

For pollutants without defined significance standards or air contaminants not covered by the standard criteria cited above, the definition of substantial pollutant concentrations varies. For TACs, "substantial" is taken to mean that the individual cancer risk exceeds a threshold considered to be a prudent risk management level. If best available control technology for toxics (T-BACT) has been applied, the individual cancer risk to the maximum exposed individual (MEI) must not exceed 10 in 1 million in order for an impact to be determined not to be significant.

Airborne impacts are also derived from materials considered to be a nuisance for which there may not be associated standards. Odors or the deposition of large-diameter dust particles outside the PM_{10} size range would be included in this category.

The following limits for maximum individual cancer risk (MICR), cancer burden, and the non-cancer acute and chronic hazard index (HI) from project emissions of TACs are considered appropriate for use in determining the health risk for projects in the Basin:

- **Maximum Individual Cancer Risk:** MICR is the estimated probability of an MEI contracting cancer as a result of exposure to TACs over a period of 70 years for residential and 40 years for worker receptor locations. The MICR calculations include multi-pathway consideration when applicable.

The cumulative increase in MICR that is the sum of the calculated MICR values for all TACs emitted from the project would be considered significant if it would result in an increased MICR greater than 10 in 1 million (1.0×10^{-5}) at any sensitive receptor location, assuming the project is constructed with T-BACT.

- **Chronic Hazard Index:** Chronic HI is the ratio of the estimated long-term level of exposure to a TAC for a potential MEI to its chronic reference exposure level. The chronic HI calculations include multi-pathway consideration when applicable.

  The project would be considered significant if the cumulative increase in total chronic HI for any target organ system due to total emissions from the project would exceed 1.0 at any receptor location.

- **Acute Hazards Index:** Acute HI is the ratio of the estimated maximum 1-hour concentration of a TAC for a potential MEI to its acute reference exposure level.

  The project would be considered significant if the cumulative increase in total acute HI for any target organ system due to total emissions from the project would exceed 1.0 at any receptor location.

4.2 GREENHOUSE GAS EMISSIONS/GLOBAL CLIMATE CHANGE

Currently, neither the CEQA statutes, OPR guidelines, nor the CEQA Guidelines prescribe specific quantitative thresholds of significance or a particular methodology for performing an impact analysis. Significance criteria are left to the judgment and discretion of the Lead Agency. The discussion below provides an overview of the regulatory considerations and methodological approach for this EIR.

In June 2008, OPR issued a Technical Advisory titled "CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review." The recommended approach for GHG analysis included in the Governor's OPR June 2008 Technical Advisory (TA) is to: (1) identify and quantify GHG emissions, (2) assess the significance of the impact on GCC, and (3) if significant, identify alternatives and/or mitigation measures to reduce the impact below significance.[1] The June 2008 OPR guidance provides some additional direction regarding planning documents as follows: "CEQA can be a more effective tool for GHG emissions analysis and mitigation if it is supported and supplemented by sound development policies and practices that will reduce GHG emissions on a broad planning scale and that can provide the basis for a programmatic approach to project-specific CEQA analysis and mitigation. For local government Lead Agencies, adoption of General Plan policies and certification of General Plan EIRs that analyze broad jurisdiction-wide impacts of GHG emissions can be part of an effective

[1] State of California, 2008. Governor's Office of Planning and Research. *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act Review*. June 19.

strategy for addressing cumulative impacts and for streamlining later project-specific CEQA reviews."

The ARB released a preliminary draft staff proposal in October 2008 that included initial suggestions for significance criteria related to industrial, commercial, and residential projects. Although the ARB anticipated adopting the significance criteria in 2009 to allow coordination with OPR's efforts on GCC, no formal announcement of adoption has been made.[1] Currently, it appears that the ARB is deferring action on the adoption of final thresholds.

AB 32 does not prohibit all new GHG emissions; rather, it requires a reduction in statewide emissions to a given level. Thus, AB 32 recognizes that GHG emissions will continue to occur and that increases will result from certain activities, but that emissions reductions must be achieved overall. Moreover, if all economic development were to cease, the State would very likely be unable to fund the very measures that are needed to combat GCC.

For the purpose of this technical analysis, the concept of CO_2e is used to describe how much global warming a given type and amount of GHG may cause, using the functionally equivalent amount or concentration of CO_2 as the reference. Individual GHGs have varying global warming potentials and atmospheric lifetimes. The CO_2e is a consistent methodology for comparing GHG emissions since it normalizes various GHG to the same metric. The reference gas is CO_2, which has a global warming potential equal to 1.

The equation below provides the basic calculation required to determine CO_2e from the total mass of a given GHG using the global warming potentials published by the Intergovernmental Panel on Climate Change (IPCC).

$$\text{Metric Tons of } CO_2e = \text{Metric Tons of GHG} \times \text{GWP}$$

Where: CO_2e= carbon dioxide equivalent
GHG= greenhouse gas
GWP= global warming potential

This method was used to evaluate GHG emissions during construction and operation of the proposed project. According to the California Greenhouse Gas Inventory,[2] in the years from 2000 to 2008, CO_2 comprised approximately 88 percent of total statewide GHG emissions, CH_4 approximately 6 percent, and N_2O approximately 3 percent, leaving about 3 percent for all the other GHGs combined. Therefore, for this analysis, CO_2, CH_4, and N_2O are considered due to

1 California, State of, 2008. California Air Resources Board (ARB). *Preliminary Draft Staff Proposal: Recommended Approaches for Setting Interim Thresholds for Greenhouse Gases Under the California Environmental Quality Act*. October 24.

2 http://www.arb.ca.gov/cc/inventory/data/data.htm

the relatively large contribution of these gases in comparison to other GHGs produced during the project construction and operation phases.

The GHG emission estimates were calculated using URBEMIS 2007. As described above, URBEMIS stands for "Urban Emissions," and URBEMIS 2007 is an air quality modeling program that estimates air pollution emissions in pounds per day or tons per year for various land uses, area sources, construction projects, and project operations. The URBEMIS 2007 model uses the ARB EMFAC2007 model for on-road vehicle emissions and the OFFROAD2007 model for off-road vehicle emissions. URBEMIS 2007 includes CO_2 emissions factors, the principal GHG constituent. The GHG emissions resulting from increased electricity demand are modeled using GHG emissions factors from the United States Energy Information Administration. The GHG emissions resulting from the energy used for water delivery, treatment, and use are modeled using GHG emissions factors from the California Energy Commission (CEC). The GHG emissions resulting from solid waste disposal are modeled using GHG emissions factors from the California Integrated Waste Management Board, recently renamed the Department of Resources Recycling and Recovery, or CalRecycle.

The analysis included in this report is the result of a thorough investigation of the proposed project's impact on GCC, including a review of EO S-3-05, AB 32, and the legislative intent behind AB 32, as well as an extensive review of scientific literature regarding GCC. Every effort will be made to maximize the disclosure of information to the public, fairly present the project's potential for significant adverse effects on GCC, and identify techniques to minimize any such effects, in light of the fact that there are no generally accepted or adopted numeric standards for GHG emissions.

On June 19, 2008, the Governor's OPR issued a memorandum titled "CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act Review" (the Memorandum).

The Memorandum is intended to provide professional planners, land use officials and CEQA practitioners with guidance on how to approach GCC analysis and GHG emissions in an EIR, pending OPR's adoption of amendments to the CEQA Guidelines that address the topic. OPR will develop, certify, and adopt amendments to the CEQA Guidelines that address GCC on or before January 1, 2010, pursuant to SB 97 (Dutton 2007).

Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects be disclosed and mitigated to the extent feasible whenever the Lead Agency determines that a project contributes to a significant cumulative GCC impact. Until OPR establishes thresholds of significance for GHG emissions, it recommends approaching a GCC analysis as follows:

1. Identify and quantify the GHG emissions of the project;

2. Assess the significance of the impact on GCC; and
3. If impacts are found to be significant, identify alternatives and/or mitigation measures that will reduce impacts below a level of significance.

When assessing a project's GHG emissions, Lead Agencies must describe the existing environmental conditions or setting without the project and determine what constitutes a significant impact "consistent with available evidence and current CEQA practice."

Not every project that emits GHGs will necessarily contribute to a significant cumulative impact on the environment. If it is determined a project will contribute to a significant GHG impact, mitigation should be implemented.

This report identifies and quantifies the GHG emissions of the proposed project. Moreover, it assesses the project's potential to result in a significant GHG impact by determining its consistency with strategies identified in the March 2006 CAT Report to the Governor. The CAT Report is cited by the OPR Technical Advisory Memorandum as a reference and/or information source for Lead Agencies determining what constitutes a significant impact. Accordingly, this method of determining significance is consistent with recent OPR recommendations.

As described above and in consistency with OPR recommendations, the methodology used in the EIR to analyze the project's potential effect on global warming includes a calculation of GHG emissions. The purpose of calculating the emissions is for information purposes, as there is no quantifiable emissions threshold. Rather, the project's incremental contribution to GCC would be considered cumulatively significant if, due to the size or nature of the proposed project, it would generate a substantial increase in GHG emissions relative to existing conditions.

The project's potential for generating a substantial increase in GHG emissions relative to existing conditions is based on a cooperative analysis of the project against the emissions reduction strategies contained in the California CAT Report to the Governor. If it is determined that the proposed project is compatible or consistent with the applicable CAT strategies, the project's cumulative impact on global climate change is considered less than significant."

5.0 IMPACTS AND MITIGATION

Air pollutant emissions associated with the project would occur over the short term from construction activities, such as fugitive dust from site preparation and grading, and emissions from equipment exhaust. Implementation of the proposed project would not alter the long-term operations of any nearby land uses and no increases in traffic would occur after construction activities associated with the proposed project are completed. Therefore, no changes to the long-term emissions are anticipated.

5.1 CONSTRUCTION IMPACTS

Construction activities produce combustion emissions from various sources such as utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, and motor vehicles transporting the construction crew. Exhaust emissions from construction activities envisioned on site would vary daily as construction activity levels change. The use of construction equipment on site would result in localized exhaust emissions.

5.1.1 Equipment Exhaust and Related Construction Activities

The activities required to complete the dredging have been split into multiple tasks. The maximum daily exhaust emissions generated within each of the construction tasks are listed in Table F and detailed in Appendix A. The emissions listed in Table F include the truck trips required to haul the dredge material to Otay Landfill and Kettleman Hills Landfill.

An average trip length of 100 miles was assumed for the haul trips, based on a round trip distance of 30 miles to the Otay Landfill and 480 miles to the Kettleman Landfill, and the anticipated 85–15 percent split in landfill destination.

Table F: Construction Emissions by Task (lb/day)

Task	CO	ROCs	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Debris and Pile Removal	53.8	8.2	148.4	5.2	5.4	4.7	10,846.8
Dredging of Project Site	70.0	14.6	340.7	8.6	11.3	10.3	15,171.9
Landside Staging Area, Pad Construction	83.2	14.3	163.8	20.3	8.7	7.6	14,045.8
Landside Staging Area, Operations	168.6	22.4	333.8	7.7	12.6	11.0	36,201.1
Covering of Sediment Near Structures	30.9	5.5	105.2	3.9	3.9	3.5	5,747.9

Source: LSA Associates, Inc., March 2011.

Throughout the construction schedule, the various construction tasks will overlap. Table G lists the maximum emissions that would be generated on a peak construction day. Table G shows that construction equipment/vehicle emissions would exceed the City's daily emissions threshold for NO_X.

Table G: Peak Daily Construction Emissions (lbs/day)

Activity	CO	ROCs	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2
Pad Construction	83.2	14.3	163.8	20.3	8.7	7.6	14,045.8
Dredging/Landside Operations	323.3	50.7	928.1	25.4	33.2	29.5	67,967.7
San Diego Emissions Threshold	**550**	**137**	**250**	**250**	**100**	**NA**[1]	**NA**
Exceed Significance?	NO	NO	YES	NO	NO	NO	NA

Source: LSA Associates, Inc., March 2011.
[1] No threshold has been established.
Note: Bold face numbers indicate emissions exceeding San Diego City emissions threshold.
CO = carbon monoxide
CO_2 = carbon dioxide
NO_X = nitrogen oxides
SO_X = sulfur oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
ROCs = reactive organic compounds
PM_{10} = particulate matter less than 10 microns in size

5.1.2 Fugitive Dust

Fugitive dust emissions are generally associated with land clearing, exposure, and cut-and-fill operations. Construction of the proposed project improvements largely involves dredging, handling, and removal of wet material. As a result, little fugitive dust is expected to be generated by these operations. However, fugitive dust could be generated as construction equipment or trucks travel on and off the construction site and during the pad construction. These emissions will be relatively small, as shown in previously referenced Tables F and G.

5.1.3 Odors

Heavy-duty equipment in the project area during construction would emit odors. These odors would be limited to the time that construction equipment is operating during the construction period for the project. Mitigation Measure 1 requires that all construction equipment be maintained in accordance with the manufacturer's specifications. Mitigation Measure 2 requires that all construction equipment be turned off when not in use. These measures reduce impacts associated with objectionable odors from the operation of diesel-powered construction equipment. In addition, the closest sensitive receptors to the project site are residences located approximately 300 feet from the Staging Areas. Therefore, odors from construction equipment exhaust would be less than significant after mitigation.

During the dredging phases of the proposed project, the dredged materials will be spread out on site to dry before being hauled off site. It is anticipated that the dredged sediment will contain organic materials and that the decomposition of the organic matter when exposed to air may generate unpleasant odors. Therefore, the dredged material may result in odor impacts at the adjacent and nearby sensitive land uses. Implementation of Mitigation Measure 10 requires the application of a mixture of Simple Green and water to the excavated sediment as part of odor management. Simple Green accelerates the decomposition process and will have the overall result of shortening the duration of odor emissions. Potential odor impacts are expected to be less than significant for residences due to their distance from the project site. However, since it is difficult to predict the nature and duration of odor emissions from decomposition, it is concluded that the odor impacts would remain significant and unavoidable for the closest sensitive receptors, the park uses adjacent to the project site.

5.2 LONG-TERM PROJECT-RELATED EMISSIONS IMPACTS

Long-term air pollutant emission impacts are associated with any change in permanent use of the project site by on-site stationary and off-site mobile sources that substantially increase emissions. Stationary source emissions include those associated with electricity consumption and natural gas usage. Mobile source emissions would result from vehicle trips associated with the proposed project. The proposed project would not result in any long-term on-site stationary sources and would not change the number of long-term off-site vehicle trips. Therefore, no emissions were calculated for the proposed project from long-term mobile source or long-term stationary sources. The project's air quality impact would be less than significant because there would be no increase in stationary or mobile source emissions.

5.2.1 CO Hot-Spot Analysis

The primary mobile source pollutant of local concern is CO, which is a direct function of vehicle idling time caused by traffic conditions. CO transport is extremely limited; it disperses rapidly with distance from the source under normal meteorological conditions. Under certain extreme meteorological conditions, CO concentrations proximate to a congested roadway or intersection may reach unhealthy levels affecting local sensitive receptors (residents, schoolchildren, the elderly, hospital patients, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service or with extremely high traffic volumes. In areas with high ambient CO concentrations, modeling of CO concentrations is recommended in determining a project's effect on local CO levels. Because the proposed project would not change the number of long-term off-site vehicle trips, no significant CO contributions would occur in the project vicinity. Therefore, no CO "hot spots" are expected, and modeling of CO emissions is not necessary.

5.3 HEALTH RISK ASSESSMENT

A health risk assessment (HRA) is included due to the close proximity of current residents to the proposed truck hauling routes that will be exposed to diesel-powered haul trucks, potentially resulting in a significant exposure. An HRA is a process used to estimate the increased risk of health problems in people who are exposed to toxic substances. An HRA combines results of studies on the health effects of various animal and human exposures to toxic air pollutants with results of studies that estimate the level of people's exposures at different distances from the sources of the pollutants. This section examines the short-term and long-term potential health effects from project-related emissions of TAC on existing surrounding sensitive receptors, including single- and multifamily residences.

The only TAC known to be released from the proposed dredging operations in potentially significant quantities is contained in the exhaust of project-related haul trucks. This assessment focuses on the risks from diesel exhaust. For the purposes of an HRA, short-term emissions are of concern for analyzing acute health impacts, and long-term emissions are of concern for analyzing chronic and carcinogenic health impacts. The proposed project includes treatment of the dredged material with binding agents to minimize the spread of contaminants to the surrounding environment during dredging and material handling operations; therefore, it is not expected that there will be any measurable increase to the health risk levels at residences near to the dredging or material staging areas.

A screening-level single pathway analysis has been conducted, analyzing the inhalation pathway. This technique was chosen as recommended in the Office of Environmental Health and Hazards Assessment (OEHHA) Air Toxic Hot Spots Program Risk Assessment Guidelines (August 2003), Appendix D, "Risk Assessment Procedures to Evaluate Particulate Emissions from Diesel-Fueled Vehicles." For risk assessment procedures, the OEHHA specifies that the surrogate for whole diesel exhaust is diesel particulate.

In accordance with OEHHA's revised health risk assessment guidelines (specifically, OEHHA's Technical Support Document [TSD] for Cancer Potency Factors, May 2009), calculation of cancer risk estimates should also incorporate age sensitivity factors (ASFs). The revised TSD for Cancer Potency Factors provides updated calculation procedures used to consider the increased susceptibility of infants and children to carcinogens, as compared to adults. The updated calculation procedure includes the use of age-specific weighting factors in calculating cancer risks from exposures of infants, children and adolescents, to reflect their anticipated special sensitivity to carcinogens. OEHHA recommends weighting cancer risk by a factor of 10 for exposures that occur from the third trimester of pregnancy to 2 years of age, and by a factor of 3 for exposures that occur from 2 years through 15 years of age. These weighting factors should be applied to all carcinogens. For estimating cancer risk for residential receptors, the incorporation of the ASFs results in a cancer risk adjustment factor (CRAF) of 1.7.

The project-related vehicle emissions were characterized for the HRA analysis. Once hauling of the dried dredged material commences, it is anticipated that there would be a total of 100 truck trips per day (50 in each direction), regardless of which staging area is selected. Even though these trucks could be of various sizes, for the HRA, it was assumed that these trucks were all the type of truck that resulted in the greatest exhaust emissions and highest health risk levels.

The ARB model, EMFAC2007, was used to determine diesel truck PM_{10} emission factors for the haul trucks. This HRA is examining long-term, 70-year carcinogenic and chronic effects. Because the HRA model only allows for a single emission rate for the entire period, a median set of emission factors for the 70-year period is typically used. However, to be conservative in this HRA, emissions factors for existing trucks were used.

For the purposes of this analysis, three different truck haul routes were modeled, one for Staging Areas 1 through 4 as 8 discrete sources[1] located along 28th Street and Boston Avenue for access to I-5, a second for the same Staging Areas 1 through 4 as 12 discrete sources located along Harbor Drive and Civic Center Drive, and a third for Staging Area 5 as 11 discrete sources located along Bay Marina Drive and 32nd Street, also for access to I-5.

Model receptors were placed in key locations along the truck haul routes to characterize the risk levels to existing residents. Meteorological data representing the conditions at the project site were obtained using data from the San Diego Lindberg Field meteorological monitoring station. The meteorological data indicate a frequent presence of wind at the project site from the west-northwest, with speeds up to 20 miles per hour. Appendix B includes the windrose figure.

Appendix B includes portions of the AERMOD output file showing all model inputs and important outputs. The HARP model output listing the modeled health risks for the proposed project for all receptors can also be found in Appendix B.

5.3.1 Carcinogenic and Chronic Project-Related Emission Impacts

Tables H through J show the results for carcinogenic and chronic impacts for each truck route. Results of the analysis indicate that the MEI inhalation cancer risk associated with living alongside any of the haul truck routes for 70 years from the proposed project haul truck exhaust would be 0.49 in 1 million, less than the threshold of 10 in 1 million. Actual exposure would be limited to the approximately 12.5-month dredging and hauling period. The maximum chronic Hazard Index would be 0.000179, which is well below the threshold of 1.0.

[1] Discrete sources are emissions sources used in the air dispersion modeling to characterize roadways.

Table H: Health Risk Levels from Project Haul Traffic Using 28th Street and Boston Avenue to Access I-5

Risk Category	Carcinogenic Inhalation Health Risk with CRAF	Chronic Inhalation Health Index	Acute Inhalation Health Index
70-Year Residential Risks	0.49 in 1 million	1.79E-04	2.22E-07
Threshold	10 in 1 million	1	1

Source: LSA Associates, Inc., May 2011.
Note: CRAF = Cancer Risk Age Factor

Table I: Health Risk Levels from Project Haul Traffic Using Harbor Drive and Civic Center Drive to Access I-5

Risk Category	Carcinogenic Inhalation Health Risk with CRAF	Chronic Inhalation Health Index	Acute Inhalation Health Index
70-Year Residential Risks	0.11 in 1 million	4.12E-05	9.50E-08
Threshold	10 in 1 million	1	1

Source: LSA Associates, Inc., May 2011.
Note: CRAF = Cancer Risk Age Factor

Table J: Health Risk Levels from Project Haul Traffic Using 32nd Street and Bay Marina Drive to Access I-5

Risk Category	Carcinogenic Inhalation Health Risk with CRAF	Chronic Inhalation Health Index	Acute Inhalation Health Index
70-Year Residential Risks	0.26 in 1 million	9.47E-05	1.49E-07
Threshold	10 in 1 million	1	1

Source: LSA Associates, Inc., May 2011.
Note: CRAF = Cancer Risk Age Factor

5.3.2 Acute Emission Impacts

The acute inhalation Hazard Index standard for non-carcinogenic contaminants is 1.0. As shown in Tables H through J, for all residents living alongside the proposed project haul truck route, the maximum Acute Hazard Index would be 0.000000222, which is well below the threshold of 1.0. Therefore, the potential for short-term acute exposure would be less than significant.

5.3.3 Conclusion

As shown in Tables H through J, a 70-year outdoor exposure to haul truck emissions, including DPM, at the existing residential units alongside any of the proposed project haul truck routes would result in a maximum exposure of future residents to a risk level that is below the SDAPCD criterion of significance for cancer health effects (10 in 1 million). Key factors affecting HRA results include the distance from the roadway to the residences, truck traffic density, and wind direction and speed. The low amount of truck traffic associated with the project limits the resulting carcinogenic inhalation health risk. High carcinogenic risk levels are typically associated with freeways that carry a high volume of truck traffic; therefore, the increase in health risk from the project's haul truck traffic is relatively low due to its low volume of truck traffic. Wind dispersion also influenced the low risk levels on the project site. Frequent winds from the west-northwest in the vicinity of the haul route prevent elevated concentrations of exhaust from accumulating for prolonged periods of time in the project area.

Historically, the SDAPCD has used the criterion of 10 in 1 million to determine the risk for point sources such as emissions from industrial facilities. The SDAPCD has the authority to regulate point-source emissions but not mobile-source emissions such as vehicles on roadways. The exposure risks indicated in Tables H and I only include exposure to emissions from project-related haul truck traffic. The HRA results indicate that the proposed project would result in an increased exposure to risk that would not exceed the SDAPCD criterion for cancer or chronic or acute health risks.

5.4 GLOBAL CLIMATE CHANGE/GREENHOUSE GAS EMISSIONS

This section evaluates potential significant impacts to GCC that could result from implementation of the proposed project. While an individual project cannot generate enough GHG emissions to significantly influence GCC, individual projects can incrementally contribute to the potential for the cumulative emissions driving GCC. This air quality analysis analyzes whether the project's contributions combined with emissions from all other past, present, and probable future projects contribute to the potential for GCC on a cumulative basis and whether the project's contribution to the impact is "cumulatively considerable."

The ARB has published draft preliminary guidance to agencies on how to establish interim significance thresholds for analyzing GHG emissions called *Recommended Approaches for Setting Interim Thresholds for Greenhouse Gases under the California Environmental Quality Act*. The proposed Guidance is still in draft form. The proposed draft Guidance generally describes three classes of common projects: industrial, commercial, and residential projects. For each type of project, the proposed draft Guidance recommends that a two-pronged threshold be employed, one performance-based and one numerical. For performance standards, the draft guidance suggests that operations and construction of the project be evaluated for their consistency with applicable performance standards contained in plans designed to reduce GHG emissions and/or help meet the State's emission reduction objectives in AB 32. The proposed draft Guidance contains two numerical standards. First, the proposed draft Guidance states that some small residential and commercial projects, emitting 1,600 metric tons of CO_2e per year or less, would clearly not interfere with achieving the State's emission reduction objectives in AB 32 (and EO S-03-05) and thus may be deemed categorically exempt from CEQA. Under this approach, projects emitting less than 1,600 metric tons would not require further analysis. The Guidance does not state or imply that projects emitting more than 1,600 metric tons of CO_2e per year will necessarily result in a significant impact, although at this point the Guidance has no precise numerical threshold for commercial and residential projects. Second, for industrial projects, the proposed draft Guidance proposes that projects that emit less than 7,000 metric tons of CO_2e per year may be considered less than significant, recognizing that AB 32 will continue to reduce or mitigate emissions from these sorts of projects over time.

Thus, while State agencies and local air pollution control districts are currently working to develop CEQA quantitative thresholds of significance that would guide classification of impacts associated with GCC in CEQA documents, to date there is insufficient information to establish formal, permanent thresholds by which to classify projects with relatively small, incremental contributions to the State's total GHG emissions as cumulatively considerable or not.

GHGs would be generated during project construction. The proposed project is not expected to change the long-term operations within the shipyard. Therefore, the project would not generate any long-term operational GHG emissions.

Overall, the following activities associated with the proposed project could directly or indirectly contribute to the generation of GHG emissions:

- **Construction Activities:** During construction of the project, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O.
- **Electricity and Water Use:** Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel. California's water conveyance system is energy-intensive. Approximately one-fifth of the electricity and one-third of the non-power plant natural gas consumed in the State are associated with water delivery, treatment, and use.[1]
- **Solid Waste Disposal:** Solid waste generated by the project could contribute to GHG emissions in a variety of ways. Landfilling and other methods of disposal use energy for transporting and managing the waste, and they produce additional GHGs to varying degrees.

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[1] California Air Resources Board, 2010. *Economic Sectors Portal*. Website: www.arb.ca.gov/cc/ghgsectors/ghgsectors.htm. Accessed January 5, 2010.

- **Motor Vehicle Use:** Transportation associated with the proposed project would result in GHG emissions from fuel combustion in daily automobile and truck trips. CO_2 is the most significant GHG emitted by vehicles, but lesser amounts of CH_4 and N_2O are also emitted in vehicle exhaust.

5.4.1 Global Climate Change/Greenhouse Gas Emissions – Construction GHG Emissions

GHG emissions associated with the project would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. Calculating emissions is for informational purposes, as there is no adopted quantified GHG emissions threshold.

GHG emissions generated by the proposed project would predominantly consist of CO_2. In comparison to criteria air pollutants such as O_3 and PM_{10}, CO_2 emissions persist in the atmosphere for a substantially longer period of time. Construction activities produce combustion emissions from various sources such as site grading, utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, asphalt paving, and motor vehicles transporting the construction crew. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

The modeling conducted for the construction analysis (see Appendix A) shows that emissions of CO_2 would be as high as 34 tons per day (31 metric tons) during project construction. Assuming 250 construction days per year, the project would generate up to 7,750 metric tons of CO_2 per year. As described above, the ARB-proposed draft Guidance states that some small projects, emitting 1,600 metric tons of CO_2e per year or less, would clearly not interfere with achieving the State's emission reduction objectives in AB 32 (and EO S-03-05). While the significance conclusions of this analysis do not rely upon the proposed draft guidance, it is noted that the project's construction GHG emissions are a single-event contribution limited to a short period of time In addition, the projected GHG emissions are only slightly higher than the ARB's proposed 7,000-metric ton threshold for industrial facilities. Therefore, the project's short-term construction GHG emissions are not considered to impede or interfere with achieving the State's emission reduction objectives in AB 32 (and EO S-03-05).

5.4.2 Global Climate Change/GHG Impact Analysis

GHG emissions are considered for their potential to contribute to Global Climate Change. The proposed project will result in short-term emissions associated with the use of construction equipment. There will be no ongoing increase in contribution to global warming because there are no on-site stationary sources, and there is essentially no increase in the number of vehicular trips coming to and from the project site. Therefore, the proposed project's contribution to Global Climate Change in the form of GHG emissions is less than significant.

5.5 AIR QUALITY MANAGEMENT PLAN CONSISTENCY

A regional air quality management plan describes air pollution control strategies to be taken by counties or regions classified as nonattainment areas. The SDAPCD has developed the 2009 RAQS to bring the area into compliance with the requirements of Federal and State air quality standards. CEQA requires that certain proposed projects be analyzed for consistency with the air quality plan. For a project to be consistent with the RAQS adopted by the SDAPCD, the pollutants emitted from the project should not exceed the daily threshold or cause a significant impact on air quality, or the project must already have been included in the RAQS projection. However, if feasible mitigation measures are implemented and shown to reduce the impact level from significant to less than significant, a project may be deemed consistent with the air quality plan. The RAQS uses the assumptions and projections of local planning agencies to determine control strategies for regional compliance status. Since the RAQS is based on local General Plans, projects that are deemed consistent with the General Plan are found to be consistent with the air quality plan. The proposed project would not result in any population growth and is consistent with the City's General Plan. In addition, the proposed project is not expected to result in any increase in long-term regional air quality impacts. Therefore, the project will not conflict with the RAQS, and no significant impact will result with respect to implementation of the air quality plan.

5.6 MITIGATION MEASURES

5.6.1 Construction Impacts

Mitigation Measures 1 through 10 are identified to reduce the proposed project's construction air quality impacts, including odors, to the extent feasible. However, as identified above, the project's construction activities would exceed the City's daily NO_X emission threshold and odor emissions from decomposition are considered significant and unavoidable. All other project-related air quality impacts to adjacent sensitive land uses would be reduced to a less than significant level with implementation of Measures 1 through 10.

Mitigation Measure 1 Prior to and during construction, the construction contractor shall select the construction equipment used on site based on low emission factors and high energy efficiency. The construction contractor shall ensure that construction grading plans include a statement that all construction equipment will be tuned and maintained in accordance with the manufacturer's specifications.

Mitigation Measure 2 Prior to construction, the construction contractor shall ensure that construction grading plans include a statement that work crews will shut off equipment when not in use.

Mitigation Measure 3 During construction, the construction contractor shall time the construction activities so as not to interfere with peak-hour traffic and to minimize obstruction of through traffic lanes adjacent to the site; if necessary, a flagperson shall be retained to maintain safety adjacent to existing roadways.

Mitigation Measure 4 During construction, the construction contractor shall support and encourage ridesharing and transit incentives for the construction crew.

Mitigation Measure 5 During construction, the construction contractor shall ensure that on-site vehicle speed shall be limited to 15 miles per hour (mph).

Mitigation Measure 6 During construction, the construction contractor shall ensure that all on-site roads are paved.

Mitigation Measure 7 During construction, the construction contractor shall adhere to SDAPCD Rule 55 to ensure that all material excavated or graded is sufficiently watered to prevent airborne dust from being visible beyond to property line. Watering, with complete coverage, shall occur at least twice daily, preferably in the late morning and after work is done for the day. Surfactants shall be applied to stock piles of dirt, inactive construction areas, and construction roads.

Mitigation Measure 8 During construction, the construction contractor shall ensure that all earth moving activities cease during periods of high winds (i.e., greater than 25 miles per hour [mph] averaged over 1 hour).

Mitigation Measure 9 During construction, the construction contractor shall ensure that all material transported off site is either sufficiently wet or securely covered to prevent excessive amounts of dust. In addition, per SDAPCD Rule 55, the construction contractor shall ensure that visible roadway dust from track-out/carry-out be minimized.

Mitigation Measure 10 To accelerate the decomposition process, and reduce odor impacts, a mixture of Simple Green and water (10:1) will be lightly applied to the dredged material.

Level of Significance after Mitigation. Implementing measures 1 through 10 would reduce the NO_X emissions from construction equipment and the odors from the decomposing dredge material. However, these impacts would remain significant after mitigation.

5.6.2 Project Operations

The project would not create total (vehicular and stationary) daily emissions that exceed the daily emissions thresholds established by the Cities. No mitigation measures would be required.

5.7 CUMULATIVE IMPACTS

The project would contribute criteria pollutants to the area during project construction. Construction emissions associated with the project would exceed the City's threshold for NO_X. A number of individual projects in the area may be under construction simultaneously with the proposed project. Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction could result in substantial short-term increases in air pollutants. Therefore, the proposed project could have a significant short-term cumulative impact.

Odors resulting from the project's treatment of decomposing sediments could have short-term but significant odor impacts on adjacent park uses. However, because no other similar odor-producing projects are anticipated in the immediate area, odor impacts are not considered cumulatively significant.

The HRA results indicate that exposure to emissions from project-related haul truck traffic would not exceed the SDAPCD criterion for cancer or chronic or acute health risks. The risk levels associated with the proposed project are well below the established thresholds. In addition, the low amount of project truck traffic and the temporary nature of construction limit the resulting health risk. Therefore, the proposed project is not anticipated to contribute significantly to short-term or long-term cumulative health risk impacts.

The project would not result in increases in long-term operational emissions because the project does not create any traffic once construction activities have been completed. The project would not create total (vehicular and stationary) daily emissions that exceed the daily emissions thresholds established by the Cities. Therefore, the project would not contribute cumulatively to long-term local and regional air quality degradation.

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APPENDIX A

CONSTRUCTION EMISSION CALCULATIONS

TOTAL CONSTRUCTION EMISSIONS - Alternative 1

Source [1]	Parameter 1	Parameter 2	CO Emission Factor	CO Emission (lbs/day)	ROC Emission Factor	ROC Emission (lbs/day)	NOx Emission Factor	NOx Emission (lbs/day)	SOx Emission Factor	SOx Emission (lbs/day)	PM10 Emission Factor	PM10 Emission (lbs/day)	PM2.5 Emission Factor	PM2.5 Emission (lbs/day)	CO2 Emission Factor	CO2 Emission (lbs/day)
Debris and Pile Removal																
Excavator	8 hours/day	2 unit	0.469 lb/hr	7.5	0.086 lb/hr	1.4	1.029 lb/hr	16.5	0.243 lb/hr	3.9	0.055 lb/hr	0.9	0.049 lb/hr	0.8	72.280 lb/hr	1,156.5
1650 hp Tug Boat	8 hours	1 unit	1.889 lb/hr	15.1	0.413 lb/hr	3.3	10.141 lb/hr	81.1	0.158 lb/hr	1.3	0.326 lb/hr	2.6	0.300 lb/hr	2.4	435.779 lb/hr	3,486.2
On-site Trucks	4 miles	50 trips per day	6.733 gr/VMT	3.0	0.867 gr/VMT	0.4	13.366 gr/VMT	5.9	0.014 gr/VMT	0.0	0.481 gr/VMT	0.2	0.416 gr/VMT	0.2	1500.110 gr/VMT	661.4
Heavy Duty Trucks	30 miles	50 trips per day	6.733 gr/VMT	22.3	0.867 gr/VMT	2.9	13.366 gr/VMT	44.2	0.014 gr/VMT	0.0	0.481 gr/VMT	1.6	0.416 gr/VMT	1.4	1500.110 gr/VMT	4,960.7
Worker Commute (Light Duty Auto)	40 miles	20 trips per day	3.430 gr/VMT	6.0	0.150 gr/VMT	0.3	0.420 gr/VMT	0.7	0.003 gr/VMT	0.0	0.032 gr/VMT	0.1	0.017 gr/VMT	0.0	330.290 gr/VMT	582.0
<TOTAL>				53.8		8.2		148.4		5.2		5.4		4.7		10,846.8
Dredging of Project Site																
Excavator	8 hours/day	1 unit	0.469 lb/hr	3.8	0.086 lb/hr	0.7	1.029 lb/hr	8.2	0.243 lb/hr	1.9	0.055 lb/hr	0.4	0.049 lb/hr	0.4	72.280 lb/hr	578.2
Small Crane	8 hours/day	1 unit	0.350 lb/hr	2.8	0.080 lb/hr	0.6	0.941 lb/hr	7.5	0.196 lb/hr	1.6	0.049 lb/hr	0.4	0.044 lb/hr	0.3	44.720 lb/hr	357.8
1650 hp Tug Boat	8 hours	4 unit	1.889 lb/hr	60.4	0.413 lb/hr	13.2	10.141 lb/hr	324.5	0.158 lb/hr	5.1	0.326 lb/hr	10.4	0.300 lb/hr	9.6	435.779 lb/hr	13,944.9
Worker Commute (Light Duty Auto)	40 miles	10 trips per day	3.430 gr/VMT	3.0	0.150 gr/VMT	0.1	0.420 gr/VMT	0.4	0.003 gr/VMT	0.0	0.032 gr/VMT	0.0	0.017 gr/VMT	0.0	330.290 gr/VMT	291.0
<TOTAL>				70.0		14.6		340.7		8.6		11.3		10.3		15,171.9

Landside Staging Area - Pad Construction															
Bulldozer	8 hours/day	1 unit	0.952 lb/hr	7.6	0.204 lb/hr	1.6	2.728 lb/hr	21.8	0.452 lb/hr	3.6	0.108 lb/hr	0.9	0.096 lb/hr	0.8	159.590 lb/hr	1,276.7
Grader	8 hours/day	2 unit	0.540 lb/hr	8.6	0.112 lb/hr	1.8	1.331 lb/hr	21.3	0.276 lb/hr	4.4	0.069 lb/hr	1.1	0.061 lb/hr	1.0	85.010 lb/hr	1,360.2
Roller	8 hours/day	5 unit	0.360 lb/hr	14.4	0.068 lb/hr	2.7	0.648 lb/hr	25.9	0.139 lb/hr	5.6	0.046 lb/hr	1.8	0.041 lb/hr	1.6	41.220 lb/hr	1,648.8
Loader	8 hours/day	2 unit	0.421 lb/hr	6.7	0.090 lb/hr	1.4	1.022 lb/hr	16.4	0.221 lb/hr	3.5	0.059 lb/hr	0.9	0.053 lb/hr	0.8	63.810 lb/hr	1,021.0
Paver	8 hours/day	1 unit	0.429 lb/hr	3.4	0.086 lb/hr	0.7	0.745 lb/hr	6.0	0.165 lb/hr	1.3	0.053 lb/hr	0.4	0.047 lb/hr	0.4	52.050 lb/hr	416.4
Telehandler	8 hours/day	2 unit	0.420 lb/hr	6.7	0.122 lb/hr	2.0	0.799 lb/hr	12.8	0.115 lb/hr	1.8	0.083 lb/hr	1.3	0.074 lb/hr	1.2	70.407 lb/hr	1,126.5
Heavy Duty Trucks	40 miles	50 trips per day	6.733 gr/VMT	29.7	0.867 gr/VMT	3.8	13.366 gr/VMT	58.9	0.014 gr/VMT	0.1	0.481 gr/VMT	2.1	0.416 gr/VMT	1.8	1500.110 gr/VMT	6,614.2
Worker Commute (Light Duty Auto)	40 miles	20 trips per day	3.430 gr/VMT	6.0	0.150 gr/VMT	0.3	0.420 gr/VMT	0.7	0.003 gr/VMT	0.0	0.032 gr/VMT	0.1	0.017 gr/VMT	0.0	330.290 gr/VMT	582.0
<TOTAL>				83.2		14.3		163.8		20.3		8.7		7.6		14,045.8
Landside Staging Area - Operations															
Loader	8 hours/day	2 unit	0.421 lb/hr	6.7	0.090 lb/hr	1.4	1.022 lb/hr	16.4	0.221 lb/hr	3.5	0.059 lb/hr	0.9	0.053 lb/hr	0.8	63.810 lb/hr	1,021.0
Excavator	8 hours/day	2 unit	0.469 lb/hr	7.5	0.086 lb/hr	1.4	1.029 lb/hr	16.5	0.243 lb/hr	3.9	0.055 lb/hr	0.9	0.049 lb/hr	0.8	72.280 lb/hr	1,156.5
On-site Trucks	4 miles	50 trips per day	6.733 gr/VMT	3.0	0.867 gr/VMT	0.4	13.366 gr/VMT	5.9	0.014 gr/VMT	0.0	0.481 gr/VMT	0.2	0.416 gr/VMT	0.2	1500.110 gr/VMT	661.4
Heavy Duty Trucks	100 miles	100 trips per day	6.733 gr/VMT	148.4	0.867 gr/VMT	19.1	13.366 gr/VMT	294.7	0.014 gr/VMT	0.3	0.481 gr/VMT	10.6	0.416 gr/VMT	9.2	1500.110 gr/VMT	33,071.2
Worker Commute (Light Duty Auto)	40 miles	10 trips per day	3.430 gr/VMT	3.0	0.150 gr/VMT	0.1	0.420 gr/VMT	0.4	0.003 gr/VMT	0.0	0.032 gr/VMT	0.0	0.017 gr/VMT	0.0	330.290 gr/VMT	291.0
<TOTAL>				168.6		22.4		333.8		7.7		12.6		11.0		36,201.1

Covering of Sediment Near Structures																	
Stone Slinger	8 hours/day	2 unit	0.429 lb/hr	6.9	0.086 lb/hr	1.4	0.745 lb/hr	11.9	0.165 lb/hr	2.6	0.053 lb/hr	0.8	0.047 lb/hr	0.8	40.490 lb/hr	647.8
1650 hp Tug Boat	8 hours	1 unit	1.889 lb/hr	15.1	0.413 lb/hr	3.3	10.141 lb/hr	81.1	0.158 lb/hr	1.3	0.326 lb/hr	2.6	0.300 lb/hr	2.4	435.779 lb/hr	3,486.2
Heavy Duty Trucks	40 miles	10 trips per day	6.733 gr/VMT	5.9	0.867 gr/VMT	0.8	13.366 gr/VMT	11.8	0.014 gr/VMT	0.0	0.481 gr/VMT	0.4	0.416 gr/VMT	0.4	1500.110 gr/VMT	1,322.8
Worker Commute (Light Duty Auto)	40 miles	10 trips per day	3.430 gr/VMT	3.0	0.150 gr/VMT	0.1	0.420 gr/VMT	0.4	0.003 gr/VMT	0.0	0.032 gr/VMT	0.0	0.017 gr/VMT	0.0	330.290 gr/VMT	291.0
<TOTAL>				30.9		5.5		105.2		3.9		3.9		3.5		5,747.9