FINAL
ENVIRONMENTAL IMPACT REPORT NO. 604
FOR THE RELOOC STRATEGIC PLAN – FRANK R. BOWERMAN LANDFILL IMPLEMENTATION

VOLUME I

State Clearinghouse Number 2005071102

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August 2006

DRAFT
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GLOSSARY

GLOSSARY OF ACRONYMS

A	drainage area
AB	Assembly Bill
ACOE	United States Army Corps of Engineers
ADC, ADCs	Alternative daily cover, covers
AES	Advanced Engineering Software
AMSL	Above mean sea level
APE	Area of Potential Effect
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ATMS	Advanced Transportation Management System
BAS	Bryan A. Stirrat and Associates
BMP, BMPs	Best Management Practice, Practices
BOS	Board of Supervisors
BRM	Biological Resources Monitor
BTUs	British Thermal Units
C	runoff coefficient
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CACW	coastal cactus wren
CADD	computer-aided design and drafting
CAGN	coastal California gnatcatcher
CAP	Corrective Action Program
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDWR	California Department of Water Resources
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CFS	cubic feet per second
CGS	California Geological Survey
CHRIS	California Historical Resource Information System
CIP	Community Involvement Program
CIWMB	California Integrated Waste Management Board
CMP	Congestion Management Plan
CNA	community noise analyzers
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon monoxide
COC	Constituent of Concern

COSP	Conservation Open Space Preservation
CQA	Construction Quality Assurance
CRHR	California Register of Historical Resources
CRTs	Cathode ray tubes
CSC	California Species of Special Concern
CSE	County-wide Siting Element
CSS	coastal sage scrub
CSUF	California State University, Fullerton
CWRCB	California Water Resources Control Board
cy	cubic yards
dB	decibel, decibels
dBA	A-weighed decibel
DEIR	Draft Environmental Impact Report
DMP	Detection Monitoring Program
DPM	diesel particulate matter
DPR	State of California Department of Parks and Recreation
du	dwelling units
DWR	California Department of Water Resources
EC	electrical conductivity
EHD	Environmental Health Division
EIR	Environmental Impact Report
EMFAC2002	Emissions Factor Model 2002
EPA	Environmental Protection Agency
f	feet
FESA	federal Endangered Species Act
FFT	Fast Fourier Transform
FHWA	Federal Highway Administration
FRB	Frank R. Bowerman Landfill
FSR	Feasibility Study Report
FTA	Federal Transit Administration
GCL	geosynthetic clay liner
GIR	Geotechnical Investigation Report
GLA	GeoLogic Associates
GP, GPs	General Plan, Plans
HARP	HotSpots Analysis and Reporting Program
HBP	Harbor, Beaches and Parks Department
HCM	Highway Capacity Manual
HCP	Habitat Conservation Plan
HCP	Hazard Communication Program
HDPE	high density polyethylene
HHW	household hazardous waste

HHWE, HHWEs	Household Hazardous Waste Element, Elements
HI	Hazard Index
HRA	health risk assessment
HWSP	hazardous waste screening program
Hz	hertz
I	rainfall intensity
I-5	Santa Ana Freeway, Interstate 5
I-405	San Diego Freeway, Interstate 405
ICU	Intersection Capacity Utilization
IGR	Intergovernmental Review
IML	Intermediate mariposa lily
in/sec	inches per second
IOD	Irrevocable Offer of Dedication
IS	Initial Study
ITAM	Irvine Transportation Analysis Model
IWMD	Integrated Waste Management Department
JTD	Joint Technical Document
LBV	Least Bell's vireo
L_{01}	noise level exceeded one-percent of the time during a stated period
$L_{1.6}$	noise level exceeded 1.6 percent of the time during a stated period
$L_{8.3}$	noise level exceeded 8.3 percent of the time during a stated period
L_{10}	noise level exceeded 10 percent of the time during a stated period
L_{25}	noise level exceeded 25 percent of the time during a stated period
L_{50}	noise level exceeded 50 percent of the time during a stated period
L_{90}	noise level exceeded 90 percent of the time during a stated period
L_{dn}	day-night average sound or noise level
LEA	Local Enforcement Agency
L_{eq}	equivalent continuous sound or noise level
L_{eqH}	hourly noise levels
LFG	Landfill gas
L_{max}	maximum noise level
L_{min}	minimum noise level
LCWP	Laguna Coast Wilderness Park
LOS	Level of Service
LCRS	leachate collection and recovery system
LLRW	low level radioactive waste
LS	Landfill Site
LT	long-term
L_v	vibration velocity level in decibels
m	meters
MCAS	Marine Corps Air Station
MCE	Maximum Credible Earthquake

mcy	million cubic yard
MDL	Method Detection Level
MDP	Master Development Plan
MDPT	Maximum Daily Permitted Tonnage
MEA	Master Environmental Assessment
MEI	Maximum Exposed Individual
MEIR	Maximally Exposed Individual Resident
MHA_{rock}	Maximum Credible Earthquake acceleration
MHEA	MCE Maximum Horizontal Earthquake Acceleration
MICR	Maximum Individual Cancer Risk
MPAH	Master Plan of Arterial Highways
mph	miles per hour
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MRFs	Materials Recovery And Recycling Facilities
MSDP	Master Storm Drain Plan
MSW	municipal solid waste
M&RP	Mitigation and Reporting Program
mya	million years ago
NAAQS	National Ambient Air Quality Standards
NCCP	Natural Community Conservation Plan
NCHRP	National Cooperative Highway Research Program
NDFEs	Non-disposal Facility Element, Elements
NEPA	National Environmental Policy Act
NLC	North-end Landslide Complex
NO_2	nitrogen oxide
NOP	Notice of Preparation
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NROC	Nature Reserve of Orange County
O_3	ozone
OCBS	Orange County Board of Supervisors
OCFA	Orange County Fire Authority
OCHCA	Orange County Health Care Agency
OCHCS	Orange County Habitual Classification System
OCP	Orange County Projections
OCTA	Orange County Transportation Authority
OCTAM	Orange County Transportation Analysis Model
OCWD	Orange County Water District
OEHHA	Office of Environmental Health Hazard Assessment
OSP	Open Space Preservation
OSR	Open Space Reserve
OTW	orange-throated whiptail

PA	Planning Area
Pb	lead
PC	Planned Community
PCE	Passenger Car Equivalent
PGM	processed green material
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
PMI	Point of Maximum Impact
ppm	parts per million
PPV	peak particle velocity
PQL	Practical Quantitation Level
PRC	Public Resources Code
PSD	perimeter storm drainage
Q	direct peak runoff
RDMD	Watershed and Coastal Resources Division of the County of Orange Resources and Development Management Department
REL	reference exposure level
RELOOC	Regional Landfill Options for Orange County
RMS	root-mean-square
RPLI	Regional Paleontologic Locality Inventory
RTA	Real Time Analyzer
RWQCB	Regional Water Quality Control Board
SBCM	San Bernardino County Museum
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCCIC	South Central Coastal Information Center
SCS	United States Soil Conservation Service
sf	square foot
SHPO	State Historic Preservation Office
SLM	sound level meter
SO_2	sulfur dioxide
SOI	Sphere of Influence
So_x	sulfuroxides
SR 133	Eastern Transportation Corridor, State Route
SR 241	Foothill Transportation Corridor
SRRE, SRREs	Source Reduction and Recycling Element, Elements
ST	short-term
Stu	students
SWF	southwestern willow flycatcher
SWFP, SWFPs	Solid Waste Facilities Permit, Permits
SWPPP	Storm Water Pollution Prevention Plan
SWWG	Solid Waste Working Group

TACs	toxic air contaminants
TC	time of concentration
T-BACT	Toxics – Best Available Control Technology
TDS	total dissolved solids
TNM®	Traffic Noise Model
TOC	total organic compounds
TPD	tons per day
tsf	thousand square feet
TSP	total suspended particulate
$\mu g/m^3$	micrograms per cubic meter
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
V	vibration
VdB	velocity in decibels
VOC, VOCs	volatile organic compounds
vphgl	vehicles per hour of green time per lane
V/C	volume-to-capacity
WAN	wide area network
WDA	Waste Disposal Agreements
WDRs	Waste Discharge Requirements
ZO, ZOs	Zoning Ordinance, Ordinances

SECTION 1.0
EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

1.1 DESCRIPTION OF THE PROPOSED PROJECT

1.1.1 PURPOSE OF THE PROPOSED PROJECT

The Regional Landfill Options for Orange County (RELOOC) effort is a long range strategic planning program initiated by the County of Orange Integrated Waste Management Department (IWMD). The purpose of RELOOC is to assess the County's existing disposal system capabilities and develop viable short- and long-term solid waste disposal options for the County. As part of this strategic planning program, IWMD operates three municipal solid waste (MSW) landfills strategically located throughout Orange County (Frank R. Bowerman (FRB), Olinda Alpha, and Prima Deshecha landfills). The proposed project includes the vertical and horizontal expansion of Frank R. Bowerman (FRB) Landfill to help meet the County's near term solid waste disposal needs.

This environmental impact report (EIR) analyzes the potential environmental impacts associated with the continued operation of the FRB Landfill until closure, estimated to occur in the year 2053. Environmental impacts associated with the County's solid waste options if the FRB Landfill is not expanded are discussed under the Alternatives 1a and 1b - No Project in Section 9.0 of this EIR.

1.1.2 PROJECT LOCATION

The project site is located in unincorporated Orange County, at 11002 Bee Canyon Access Road, near the City of Irvine. Access to the landfill is from the Santa Ana Freeway, (Interstate 5, I-5); San Diego Freeway (Interstate 405, I-405) and the Eastern Transportation Corridor (State Route 133, SR 133). The major cross streets in the vicinity of the landfill are Sand Canyon Avenue and Portola Parkway, with access to the landfill from Bee Canyon Access Road.

1.1.3 CURRENT SITE STATUS

1.1.3.1 Operations

The FRB Landfill opened in 1990 and its currently permitted closure date is 2022. The landfill property covers approximately 725 acres with 341 acres permitted for waste disposal. The FRB Landfill facility is open Monday through Saturday, 7:00 A.M. to 4:00 P.M. for all commercial customers. Transfer trucks only are permitted from 4:00 P.M. to 5:00 P.M. Only MSW from commercial haulers and self-haul vehicles operating under commercial status is accepted at this landfill. Commercial status is verified by either showing a business license or current tax return to a fee booth attendant or participating in the County's deferred payment account process. Hazardous materials such as asbestos, batteries, chemicals, paints, medical waste and other substances considered hazardous are not accepted at the landfill.

The FRB Landfill is located on the southwestern flank of the Santa Ana Mountains near Irvine in Orange County, California. The Santa Ana Mountains are a northwest trending chain that is part of the Peninsular Range Geomorphic Province that separates the Orange County Coastal Plain from the Elsinore Basin.

The FRB Landfill is situated in the headwaters of the Bee Canyon drainage. Cut and fill grading has been performed to allow for placement of liner on the bottom of the canyon, and adjacent side slopes. The highest slopes are located in the northeast corner of the site, and rise to a maximum elevation of 1,770 feet above mean sea level (AMSL). The mouth of Bee Canyon opens to the south near the 241 Foothill Transportation Corridor and the former El Toro Marine Station and constitutes the lowest portion of the site at an elevation of approximately 600 feet AMSL.

To determine the tipping fees, vehicles are weighed by scales before entering the facility and are then driven to a designated area of the landfill for waste disposal. Upon acceptance of waste for disposal at the scale house, the fee collector directs the haulers to the working face of the landfill. Signs are posted along the on-site access road to guide customers to the unloading areas. No waste is left uncovered at the end of the working day.

At the FRB Landfill, the canyon fill methodology is used for refuse placement. Under this methodology refuse is typically placed in lifts up to 20-feet high. Each lift is made up of numerous cells and generally consists of 19-feet of refuse topped with one foot of compacted soil cover or an approved alternative daily cover. No waste is left uncovered at the end of the working day. Daily refuse cells are built in this manner repeatedly across the landfill, up to the desired grades.

The FRB Landfill complies with all federal, state and local requirements for landfills. Site staff conducts daily inspections to ensure that the site is in compliance with all the permit conditions imposed by regulatory agencies having jurisdiction over landfills. These permitted conditions include specific procedures for controlling fires, leachate, landfill gas (LFG), dust, vectors, birds, noise, odor, drainage, erosion and traffic.

1.1.3.2 Regulatory Controls

Although the County of Orange is the owner and operator of the FRB Landfill, landfill operations in California are highly regulated and monitored by federal, state and local agencies. The FRB Landfill must comply with applicable California Code of Regulations (CCR) (primarily Title 27) and the Code of Federal Regulations (CFR), Title 40 , Parts 257 and 258 (Subtitle D) and Part 60, Subpart WWW (NSPS-New Source Performance Standards). The FRB Landfill is a Class III landfill permitted for the disposal of non-hazardous MSW. State law requires that landfills operate under the various regulatory requirements of the California Integrated Waste Management Board (CIWMB) that exercises its authority through the approval of Solid Waste Facilities Permits (SWFPs) issued by the Local Enforcement Agency (LEA). The LEA for the FRB Landfill is the County of Orange Health Care Agency (OCHCA), Environmental Health Division (EHD).

Additionally, the Regional Water Quality Control Board (RWQCB) regulates landfill design and operation to ensure protection of surface water and groundwater. The RWQCB exercises its authority through issuance of Waste Discharge Requirements (WDR). The South Coast Air Quality Management District (SCAQMD) regulates landfill operations related to LFG emissions and fugitive dust control for Orange County landfills. The LEA regulates subsurface LFG migration from the landfill. Environmental monitoring of air, LFG and groundwater is conducted at all IWMD landfills including the FRB Landfill to detect LFG migration or groundwater contamination. A LFG extraction system and flare station is located at all IWMD landfills for LFG control. In addition, the use of LFG for energy production is currently being conducted at the Olinda Alpha and Prima Deshecha landfills and a pilot program for the conversion of LFG to liquefied natural gas is in the development stages for the FRB Landfill. Additional LFG extraction wells and increased groundwater monitoring have been implemented at the FRB landfill to address a previously detected groundwater impacts. Adjustments to the LFG extraction system have effectively controlled groundwater impacts at the FRB Landfill.

Although the CIWMB has primary oversight and regulatory responsibilities for the landfills in Orange County, landfills are also subject to regulations through other laws enforced by agencies at the federal, state and local regulatory levels. In addition to the RWQCB and SCAQMD, these agencies include the United States Environmental Protection Agency (EPA), United States Fish and Wildlife Service (USFWS), United States Army Corps of Engineers (ACOE), California Department of Fish and Game (CDFG), Orange County Fire Authority (OCFA) and the County of Orange Resource & Development Management Department (RDMD). Continued adherence to applicable laws and regulations would be required as part of project approval and operating conditions for the proposed expansion project at the FRB Landfill.

1.1.3.3 Capacity of the FRB Landfill

A variety of factors are used to determine landfill system capacity including total air space, refuse volume, liner volume, refuse-to-soil ratio and other factors. Based on these factors, IWMD's records show that the current (as of June 30, 2005) permitted remaining refuse capacity for Olinda Alpha, FRB and Prima Deshecha landfills is 19.7, 44.6 and 78.6 million tons, respectfully.

The permitted daily tonnage limit for the FRB Landfill is 8,500 tons per day (TPD) of refuse except for 36 days per year that a higher tonnage of 10,625 TPD is allowed. The permitted daily tonnage limit for Olinda Alpha Landfill is 8,000 TPD of refuse. However, under a Memorandum of Understanding with the City of Brea, waste disposal is limited to an annual average of 7,000 TPD. The permitted daily tonnage for Prima Deshecha Landfill is 4,000 TPD.

A number of landfill agreements and permits are currently in place with Orange County cities, waste haulers and regulatory agencies responsible for oversight of the County's landfills. In addition to those regulatory agency permits and city agreements described above, the County also has Waste Disposal Agreements (WDAs) with contract cities through 2010 that are subject to renegotiation in 2007. Approval of the proposed project at the FRB Landfill is a key component of the future waste system which will form the basis for negotiation of WDAs for an additional ten-year period.

1.1.4 PROJECT DESCRIPTION

1.1.4.1 Project Modifications

Increased Tonnage and Expansions at the FRB Landfill

The expansion of the FRB Landfill would provide an additional MSW capacity of 130 million cubic yards (mcy) over the current permitted capacity. This would extend the life of the landfill from its permitted closure date of 2022 to approximately 2053, based on an annual average refuse inflow rate at the currently permitted limit of 8,500 TPD in accordance with the existing City of Irvine Settlement Agreement for the landfill.

An increase in the permitted daily tonnage rate of 8,500 TPD to a maximum of 11,500 TPD is being proposed to accommodate high tonnage days within the limits of the RELOOC projected system demand. The EIR for the proposed project will analyze the impacts of an 11,500 TPD maximum daily refuse inflow rate while maintaining the current 8,500 TPD limit as an annual average. The increase in maximum daily tonnage to 11,500 TPD would address long term planning goals established in the RELOOC Strategic Plan and could also accommodate the existing, approved high tonnage days at the FRB Landfill.

The total airspace capacity of the FRB Landfill is based on the Master Development Plan (MDP) for the site completed in November 2004. The MDP provides a remaining capacity of 226,300,000 cubic yards (cy), as of October, 2002 (base topographic date for the MDP) through Phase XI. The refuse capacity for the site used to determine site life assumed a refuse density of 1,450 pounds lbs/cy and a 4:1 refuse-to-soil ratio consistent with the RELOOC Strategic Plan recommendations.

As proposed, the height of the FRB Landfill would be increased from its current permitted level of 1,100 feet AMSL to about 1,350 feet AMSL or a net vertical increase of approximately 250 feet. This maximum build out elevation does account for final cover (estimated to be approximately four (4) additional feet of soil over the intermediate cover). It should be noted that the existing landfill elevation is approximately 950 feet AMSL.

The horizontal expansion would include landform modifications to provide for approximately 193 additional acres of refuse footprint area over the currently permitted refuse footprint of 341 acres (total proposed project refuse footprint approximately 534 acres). Expansion of the refuse footprint would be contained within the existing 725 acre landfill property. A total of 130 additional acres is proposed to be disturbed beyond the permitted disturbance area of 525 acres (total proposed project disturbance area approximately 655 acres).

Slope Stabilization

Slope stabilization is required for the site to remediate future lined areas underlain by landslides in order to provide a stable subgrade for the landfill liner containment system. Slope stabilization proposed in the northern portion of the site is required for the next phase of development and is proposed to be initiated immediately upon obtaining project approvals.

Approximately 34 acres outside the landfill property boundary (to the north and east) are currently proposed to be included within the disturbance limits for landslide remedial grading. This acreage does not include previous disturbance area outside the southern property boundary for the Phase VD development. Remedial grading is authorized in off-site areas under a Fourth Amendment to the Irrevocable Offer of Dedication (IOD) for Limestone-Whiting Wilderness Park, dated May 2004. The IOD identifies a total of 50 acres outside the landfill property boundary which encompasses the 34 acres identified for remedial grading. After construction of the slope stabilization measures is complete, the disturbed areas outside the landfill property will be revegetated in native plant species similar to the species located in that area prior to the project disturbance. The IOD places other permit conditions on the remedial grading for erosion control and drainage.

Soil Management Plan

The FRB Master Development Plan proposes several on site stockpile locations for soil excavated as part of landfill phase development and operations. All soil stockpiles are proposed within the landfill property to avoid impacts on adjacent off-site canyons. The MDP, which provides remediation of on site landslides and maximizes capacity, results in a dirt shortage prior to landfill closure. Therefore, the site's soil management plan includes recommendations to accept free soil for stockpiling and to consider alternative daily covers that may be available in the future which further increase refuse-to-soil ratios.

Native Plant and Animal Preservation

The conceptual excavation and refuse fill plans for the proposed project were developed to avoid the existing biological mitigation sites on the landfill property which were implemented as a result of previous permits and mitigation associated with the existing operations at the landfill. All soil management activities, excavation and refuse fill locations and the associated movement and storage of heavy equipment, hauling routes and ancillary activities protect these areas by avoiding them during the operations associated with the proposed project.

1.1.4.2 Project Phasing

The vertical and horizontal expansions of the FRB Landfill would be implemented in phases and would not disturb all parts of the landfill site at once. The development of the site is proposed in incremental phases to provide for sufficient operations area and capacity and to spread capital costs over time. IWMD recently completed the last sub-phase of development for Phase VII (Phase VIIB completed in 2004). The currently permitted phasing plan for the site includes development through Phase VIII in the northern portion of the property. Thus, the new Master Development Plan includes three Phase VIII subareas (VIII A, B and C) in the general area of the previous Phase VIII (northern portion of site) and a Phase IX which brings the fill elevations in the northern portion of the site up to final grades. A Phase X is proposed for the western portion of the site which would require the relocation of the scale facilities, office buildings and flare facilities. Potential sites for relocation of the entrance facilities could be along the access road to the landfill and the flare station relocation would be dependent upon air modeling. The final location for those facilities will be determined closer to the time for development of that phase of operation. The final phase of development for the site is Phase XI in the southwest portion of the property.

Preliminary grading plans indicate that approximately 37 million cubic yards (mcy) of soil would be excavated throughout the life of the proposed expansion of the FRB Landfill. The majority of the soil to be used for daily and intermediate cover, liner, road construction and other related uses is available on the FRB Landfill property. Although there is adequate soil available in the near term for landfill operations with proposed on-site excavation at the FRB Landfill, prior to site closure the site is projected to have a dirt shortfall assuming a 4:1 refuse-to-soil ratio. This shortfall is proposed to be remedied by accepting free soil at the site when stockpile capacity is available and/or through the use of additional alternative daily covers (ADCs) that increase refuse-to-soil ratios in order to provide the total soil requirements for landfill operations. ADCs currently approved by the LEA and RWQCB for year round use at the FRB Landfill are geosynthetic blankets (tarps) and PGM. No other ADCs are proposed for the site at this time.

1.1.4.3 Waste Composition

The waste composition at the FRB Landfill under the proposed project would not differ from that currently received at this landfill. Non-hazardous MSW would comprise the waste stream and existing screening safety mechanisms would continue to be employed to ensure that hazardous materials are not accepted.

1.1.4.4 Other Project Features

The project may require that additional buildings and structures be constructed at the FRB Landfill and will require relocation of existing entrance facilities, scales/scale house, LFG control facilities and other landfill support facilities in a later phase of development (Phase X). The number of employees and equipment at the landfill is not expected to change substantially as a result of the proposed project. However, for purposes of environmental impact analysis, an increase in personnel by seven employees and, in equipment use, by up to six pieces of equipment was assumed for a continuous operation at 11,500 TPD. The proposed project is to accept 11,500 TPD on a periodic basis to accommodate high tonnage days and to maintain an annual average of 8,500 TPD. Employees would continue to perform landfill operations including administration, landfill cover operations and other landfill related operations. As part of the proposed project, IWMD is considering changing in the landfill operating hours from 7:00 A.M. - 5:00 P.M. to 6:00 A.M. - 4:00 P.M. The landfill will continue to operate six days per week, Monday through Saturday, and will be closed on the six major holidays.

Surface water drainage systems, LFG collection and control systems, and leachate and groundwater collection and recovery systems on the landfill property will be expanded, as necessary, to accommodate the proposed vertical and horizontal expansion of the FRB Landfill.

1.1.5 PROJECT OBJECTIVES

The objectives of the proposed project at the FRB Landfill, which were derived from the adopted RELOOC Strategic Plan goals and objectives, are:

- Ensure that the long term disposal needs of the County's Solid Waste System are met.
- Maximize capacity of the existing landfills, including the FRB Landfill.
- Ensure adequate revenue and maintain local control of waste disposal for as long as possible to provide consistent and reliable public fees/rates.
- Maintain efficient, cost effective and high quality IWMD operations.
- Minimize adverse environmental impacts.

In addition, the FRB Landfill project includes slope stabilization associated with remediation of on-site landslides. A major landslide which occurred in 2002 has effectively reduced the permitted remaining disposal area for the site, which in turn has decreased the available airspace by over 40 mcy. The decrease in remaining available air space has, in effect, reduced the projected site life to 2014. As a result, IWMD re-evaluated and re-designed the site's Master Development Plan for future operations. The new Master Development Plan includes slope stabilization for the remediation of on-site landslides, including areas both within and immediately outside the property boundary for the landfill. The following project objective addresses the intent of the proposed project to provide for landslide remediation:

- Remediate and stabilize landslide areas to comply with 27 CCR in the landfill area and to protect and provide for future landfilling capacity on the landfill property.

The following objective addresses the intent to reduce potential impacts on biological resources associated with cover soil acquisition and stockpiling:

- Provide for soil management needs on-site to avoid impacts on adjacent canyons.

1.2 SUMMARY OF IMPACTS

Section 5.0 (Existing Conditions, Impacts, Mitigation Measures and Level of Significance) of this EIR documents the technical analyses of the potential impacts of the proposed project related to land use and planning, geology and soils, hydrogeology and water quality, surface water hydrology, transportation and circulation, air quality, noise, biological resources, aesthetics, cultural and scientific resources, and hazards/risk of upset. Alternatives are described in Section 9.0 (Project Alternatives) and are summarized in Section 1.3. Section 6.0 (Cumulative Impacts) and Section 8.0 (Growth Inducing) describe the potential for the proposed project to result in cumulative and growth inducing impacts, respectively. Section 7.0 (Unavoidable Adverse Impacts) summarizes the potentially significant adverse impacts of the proposed project which cannot be avoided or mitigated to below a level of significance.

The potential for the proposed project to result in adverse impacts related to these environmental parameters is summarized in Table 1-1.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Implementation of the proposed project will not result in significant adverse impacts related to existing and future land uses.	No mitigation is required.	No Impact.
Summary of Impacts Related to Geology and Soils		
Implementation of the proposed project has the potential to impact the landfill's slope stability in the North end Landslide Complex (NLC).	G-1 Landslides will be mitigated by exploration of the geometry of the failure surface, development of a remediation plan (removal of driving weight using grading equipment, construction of shear keys and/or buttresses and/or dewatering), and implementation of a remediation plan. Measures implemented will be similar to those performed in response to the 2002 NLC as described in the Geotechnical Investigation Report, Master Development Plan, FRB Landfill (GeoLogic Associates, 2004) and will be designed to limit impacts to off-site areas, avoid impacts to future landfill operations, and minimize potential hazards to on-site personnel. G-2 During construction of landslide remediation projects, it will be necessary to monitor landslide movement and groundwater levels in and around the landslide and to sequence construction in a manner that limits the extent of buttress backcut exposed at any one time, prior to completion of buttress construction. G-3 Prior to construction of each phase of lateral expansion area, IWMD will be responsible for having additional geologic data obtained and subsequent slope stability analyses conducted to verify assumptions made for the stability analysis included in the Geotechnical Investigation Report, Master Development Plan, FRB Landfill, (GeoLogic Associates, 2004).	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	G-4 Prior to construction of each phased grading plan, IWMD will be responsible for having the excavation and grading plan meet stability requirements for all proposed cut, fill, and lined slopes. Slopes shall be designed to withstand the most credible earthquake or as required by current regulations. Liner design plans shall be submitted to the Santa Ana Regional Water Quality Control Board in a Design Report for approval. G-5 Prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the expansion, the IWMD shall present a liner design concept in a Joint Technical Document (JTD) to be submitted to the RWQCB and LEA for approval and to the CIWMB for concurrence. As part of the JTD, the IWMD shall present the assumptions, methods, and calculations used to demonstrate seismic safety.	
Summary of Impacts Related to Hydrogeology and Water Quality		
Implementation of the proposed project has the potential to impact groundwater or groundwater quality.	HW-1 As part of each new phase of development, a composite liner or an alternative to the prescriptive composite liner and leachate collection and removal system will be constructed in the lateral expansion area to intercept and collect leachate for storage and proper disposition (disposal off-site or use as dust control), as approved by the RWQCB. A subdrain system will be installed to intercept perched and bedrock groundwater below the liner. Horizontal drains may also be installed below the North-end Landslide Complex (NLC) for the purposes of reducing the forces driving the landslide and to bring the piezometric head level below the design grades. The existing NLC horizontal drains are expected to remain active through future landfill development and additional horizontal drains will be installed as necessary. The prescriptive or alternative liner, leachate collection and removal system and subdrain will be approved by the RWQCB in a Design Report and will comply with federal and state requirements (27 CCR).	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	HW-2 As part of a Joint Technical Document to be prepared by IWMD prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the expansion, the liner design concept shall be submitted to the RWQCB and Local Enforcement Agency for approval and to the CIWMB for concurrence. As part of a Joint Technical Document, the IWMD shall also present the assumptions, methods, and calculations used to demonstrate seismic safety. HW-3 During ongoing landfill operations (including the expansion areas), IWMD will continue to comply with the site's Waste Discharge Requirements and Monitoring and Reporting Program requirements imposed by the RWQCB for the protection of water quality. HW-4 The Corrective Action Program in place at the landfill will continue to be implemented by IWMD if Volatile Organic Compounds are detected in groundwater.	
Summary of Impacts Related to Surface Water Hydrology		
Implementation of the proposed project has the potential to result in impacts due to erosion and soil loss.	H-1 Prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the proposed expansion, the IWMD shall submit to the RWQCB, LEA and CIWMB a Joint Technical Document which presents the assumptions, methods and calculations used to calculate the potential flow quantities for run-on, run-off and sediment content of storm water flow used in sizing drainage and sediment control facilities for the FRB Landfill in conformance with 27 CCR regulations.	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	H-2 Prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the proposed expansion, the IWMD shall submit to the RWQCB, LEA and CIWMB a Joint Technical Document which includes surface water drainage plans for the FRB Landfill expansion final grading plans, including any berms, down drain systems, perimeter drainage channel improvements and the location of off-site discharge points for run-off water in compliance with 27 CCR regulations. H-3 Prior to construction, drainage facilities for the landfill expansion shall be designed, according to 27 CCR, to prevent washout of the waste management unit during a 100-year storm event. H-4 During ongoing landfill operations, diversion and drainage facilities shall be evaluated, designed, constructed and operated to accommodate the anticipated volume of precipitation and peak flows from surface run-off under the precipitation conditions specified in 27 CCR. H-5 During ongoing landfill operations (including the expansion area), IWMD will continue to operate the landfill under a National Pollutant Discharge Elimination System (NPDES) Permit to discharge storm flows. The criteria and restrictions of the NPDES Permit and the Storm Water Pollution Prevention Plan and Best Management Practices that accompany the NPDES Permit will be adhered to. H-6 During ongoing landfill operations (including the expansion area), IWMD will continue to provide positive drainage by maintaining a two to three percent slope on all landfill deck surfaces.	

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	H-7 During ongoing landfill operations (including the expansion area), IWMD will continue to prepare and implement sediment and erosion control plans on an annual basis to reduce sediment and control erosion on the landfill site. H-8 During ongoing landfill operations (including the expansion area) IWMD will remove silt and maintain the drainage and desilting basin facilities in order to provide proper drainage and erosion control. The proper maintenance of the Southeast Inlet Basin is particularly important to minimize silt buildup in the twin 60-inch pipes providing drainage for the eastern portion of the landfill.	
Summary of Impacts Related to Transportation and Circulation		
Sand Canyon Avenue at its intersection with Trabuco Road will experiences a significant adverse impact as a result of project traffic in 2030.	T-1 <u>Sand Canyon Avenue at Trabuco Road.</u> Extend the Advanced Transportation Management System (ATMS) strategies to encompass the intersection of Sand Canyon Avenue at Trabuco Road. The ATMS strategies at Sand Canyon Avenue at Trabuco Road will be installed in 2025 but will be discontinued at buildout conditions in 2030 based on information provided by the City of Irvine. The ATMS strategies apply the latest traffic control systems to improve traffic flow through the intersections. These traffic control systems include the use of interconnect, closed circuit television and communication system, upgraded traffic signal cabinets, controllers and detection systems, and a changeable message board. The ATMS strategies will only be operational during the A.M. and P.M. peak periods, when the intersection experiences the most traffic.	Less than significant.
Jeffrey Road at its intersection with Walnut Avenue will experiences a significant adverse impact as a result of project traffic in 2030.	T-2 <u>Jeffrey Road at Walnut Avenue.</u> Provide the westbound right-turn lane with a protected right-turn phase that is overlapped with the southbound left-turn phase in 2030.	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Summary of Impacts Related to Air Quality		
Implementation of the proposed project will result in significant adverse impacts to regional air quality (fugitive dust, NO_x and VOC emissions) during construction and operation.	AQ-1 Applicable dust suppression techniques from Rule 403 shall be implemented. These techniques are summarized below. Additional dust suppression measures in the SCAQMD *CEQA Air Quality Handbook* are included as part of the project's mitigation. Implementation of these dust suppression techniques will reduce fugitive dust generation (and thus the PM_{10} component). • Apply surfactants to or vegetate (i.e., grow grass) all inactive construction areas (previously graded areas inactive for 10 days or more). • Water active sites at least twice daily (water or other surfactants should be applied as needed to active site grading areas to minimize fugitive dust). • All trucks hauling dirt, sand, soil, or other loose materials should have a cover over the top of the material, spray water to minimize wind blown dust, or should maintain at least six inches two feet of freeboard in accordance with the requirements of California Vehicle Code section 23114 (freeboard means vertical space between the top of the load and top of the trailer). • If feasible, place base material or keep unpaved access roads moist to minimize dust on access road. • Traffic speeds on all unpaved roads shall be reduced to 15 mph or less. • Revegetate disturbed areas as quickly as possible.	Significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	• All excavating and grading operations shall be suspended when wind speeds (as instantaneous gusts) exceed 25 mph and dust plumes are visible. • All on-site streets shall be swept once a day if visible soil materials are carried to adjacent streets (recommend water sweepers with reclaimed water). • Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash trucks and any equipment leaving the site each trip. AQ-2 Dust generated by the construction activities shall be retained on site and kept to a minimum by the following dust control measures. • During clearing, grading, earth moving, excavation, or transportation of cut or fill materials, water trucks or sprinkler systems shall be used to prevent dust from leaving the site and to create a crust after each day's activities cease. • During construction, water trucks or sprinkler systems shall be used to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this would include wetting down such areas in the late morning and after work is completed for the day and whenever wind exceeds 15 mph. • Immediately after clearing, grading, earth moving, or excavation is completed, the entire area of disturbed soil should be treated or properly maintained so that dust generation will not occur.	

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	• Soil stockpiled for more than two days should be covered, kept moist, or treated with soil binders to prevent dust generation. • Trucks transporting soil, sand, cut or fill materials, and/or construction debris to or from the site shall be tarped, sufficient amount of water applied to minimize dust, or maintain six inches of freeboard from the point of origin.	
Summary of Impacts Related to Noise		
No significant adverse noise impacts at existing or planned noise-sensitive receptors will occur from construction or operational activities as a result of this project.	No mitigation is required.	No Impact.
No significant adverse vibration impacts at existing or planned noise-sensitive receptors will occur from construction or operational activities as a result of this project.	No mitigation is required.	No Impact.
The project will not cause significant off-site noise impacts from increased project-related traffic including heavy trucks.	No mitigation is required.	No Impact.
No significant adverse impact would result from traffic vibration associated with the proposed project.	No mitigation is required.	No Impact.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Summary of Impacts Related to Biological Resources		
Implementation of the proposed project will result in a significant adverse impact related to the removal of approximately 138.34 acres of coastal sage scrub.	B-1 The IWMD will prepare a NCCP Major Amendment to address impacts associated with the unauthorized loss of 138.34 acres of CSS at the FRB Landfill during MDP implementation. As part of the Major Amendment, the County of Orange's IWMD will tailor a plan to enhance subregional habitat values and balance important solid waste infrastructure requirements. A component of the plan will be focused on executing a strategy to ensure no net loss of subregional habitat values as a result of the development and implementation of the FRB MDP. The plan will include the conversion of Oso Nursery to open space by restoring the site with CSS to enhance connectivity between the Central Subregion and Southern Subregion of the NCCP. As an additional supplement to Oso Nursery, Santiago Canyon Landfill will receive treatment to restore 66 acres and compensate for 33 acres (2:1) of CSS take authorization. In addition, and part of the supplemental program, the Santiago Canyon Landfill easement restoration of 56.7 acres will compensate for 28 acres (2:1). To cover the balance and create a surplus at FRB Landfill, IWMD will transfer existing County CSS Take Authorizations totaling 45 acres (1:1).	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS		MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Implementation of the proposed project will result in significant adverse impacts on jurisdictional Waters of the U.S. and wetlands and state jurisdictional waters. The impact area contains 2.81 acres of waters of the U.S. (2.06 acres of the overall total are considered jurisdictional wetlands by the ACOE standards) and 6.37 acres of CDFG jurisdictional waters of the State (including 5.62 acres of riparian habitat). In addition, the proposed project will result in significant adverse impacts to southern willow scrub and southern sycamore riparian woodland.	B-2	The IWMD will mitigate for impacts to southern willow scrub and southern sycamore riparian woodland and jurisdictional areas. The IWMD will work with the ACOE, CDFG and Regional Water Quality Control Board (RWQCB) to develop appropriate mitigation measures. The IWMD has proposed preliminary mitigation for the project. Conceptual mitigation for project impacts is proposed to include: (1) Giant reed eradication in the headwaters of Oso Creek on the County owned parcel at the Oso Nursery site (commences FY 06-07), which will include five years of maintenance and monitoring, and (2) payment of an in-lieu fee for restoration and enhancement activities in the San Diego Creek watershed. With the above action, it is the intent of IWMD to mitigate for the lost functions and values of the wetland/riparian community, consistent with resource agency requirements and conditions presented in Section 404 Corps permit and 1602 CDFG Streambed Alteration Agreement and meet the regulatory standards for the applicable state and/or federal regulatory programs.	Significant. (temporal loss of wetland habitat values and functions)
Implementation of the proposed project will result in significant adverse impacts to sensitive biological resources.	B-3	During final design of the project, the Project Biologist will review the design plans and make recommendations for avoidance and minimization of sensitive biological resources. The IWMD or other implementing agency/agencies staff shall determine the feasible and practicable implementation of those recommendations.	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES		LEVEL OF SIGNIFICANCE AFTER MITIGATION
Implementation of the proposed project will result in significant adverse impacts to sensitive biological resources.	B-4	In conjunction with the development of final design plans and specifications for construction, or other activities involving vegetation/habitat removal, the Project Biologist shall approve the final design map of all sensitive habitats (Environmentally Sensitive Areas) within 152.4 meters (500 feet) of the grading limits on the grading plans.	Less than significant.
Implementation of the proposed project will result in significant adverse impacts to sensitive biological resources, including plant communities and plant and wildlife species.	B-5	A Biological Resources Management Plan (BRMP) will be prepared prior to construction. The BRMP will provide specific design and implementation features of the biological resources mitigation measures outlined in resource agency approval documents. Issues during construction and operation to be addressed in the BRMP should include, but are not limited to, resource avoidance, minimization, and restoration guidelines, performance standards, maintenance criteria, and monitoring requirements. The primary goal of the BRMP will be to ensure the long term perpetuation of the existing diversity of habitats through restoration in the project area and adjacent urban interface zones, if any, and to prevent offsite or indirect effects. The BRMP should contain, at a minimum, the following: • Identification of all Environmentally Sensitive Areas (ESA). ESAs are defined as sensitive habitats including, but not limited to, areas subject to the jurisdiction of the CDFG, ACOE, and USFWS and identified in the Central and Coastal Subregion NCCP/HCP. • Design of protective fencing (i.e., t-bar or yellow rope) around ESAs and the construction staging areas.	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	• For areas that will be restored, the quality of the adjacent habitat should be characterized. This characterization should include species composition, density, coverage, and presence of nonnatives. This characterization will provide a baseline to compare the success of the restoration. The site preparation plan for each restoration site should include: • Sources of plant materials and methods of propagation. • Site preparation (clearing, grading, weed eradication, soil amendment, topsoil storage), irrigation, planting (container plantings, seeding), and maintenance (weed control, irrigation system checks, replanting) of restoration areas. Specification of parameters for maintenance and monitoring of restoration areas, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas. • Remedial measures to be taken if performance standards are not met. • Methods and requirements for monitoring of the restoration efforts. • Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within restoration areas.	

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES		LEVEL OF SIGNIFICANCE AFTER MITIGATION
		• Specific measures should be identified for the protection of sensitive habitats to be preserved in and adjacent to the FRB property to ensure that construction does not increase beyond the impacts identified in the EIR. These measures should include, but are not limited to, erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements.	
Implementation of the proposed project will result in significant adverse impacts to sensitive biological resources, including plant communities and plant and wildlife species.	B-6	IWMD or other implementing agency/agencies will continue to employ a Project Biologist at the FRB Landfill responsible for overseeing biological monitoring, regulatory compliance, and restoration activities associated with construction of the proposed project in accordance with the adopted mitigation measures and applicable law. The Project Biologist's duties include: • Review of design plans and recommends ways to minimize impacts. • Review final design and specifications of projects impacting resources or those within 500 feet of sensitive habitats for compliance with BRMP and/or applicable resource agency permits. • Monitor grading and document compliance with minimization measures.	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES		LEVEL OF SIGNIFICANCE AFTER MITIGATION
Implementation of the proposed project will result in significant adverse impacts to sensitive biological resources, including plant communities and plant and wildlife species.	B-7	During grading activities and construction operations, the Project Biologist will conduct monitoring within and adjacent to sensitive habitats including monitoring of the installation of protective devices (silt fencing, sandbags, fencing, etc.), installation and/or removal of creek crossing fill, construction of access roads, vegetation removal, and other associated construction activities, as deemed appropriate by the Project Biologist. Biological monitoring should be conducted to document adherence to habitat avoidance and minimization measures addressed in the project mitigation measures and as listed in the USFWS, CDFG, and ACOE permits/agreements.	Less than significant.
Implementation of the proposed project will result in significant adverse impacts to sensitive biological resources, including plant communities and plant and wildlife species.	B-8	IWMD will implement the standard mandatory construction condition mitigation measures below as defined in the NCCP Compliance Procedural Guidelines for Landfill Related Projects: • To the extent practicable, clearing and grading of CSS habitat will occur outside of the breeding and nesting season for the CAGN (February 15 through July 15) and other bird species, including Southern California rufous-crowned sparrow and raptors. • Prior to the commencement of clearing or grading activities, a survey will be conducted within the project site to determine the presence/absence of CAGN or cactus wren. The survey will extend 100 feet from the grading limits. The locations of CAGN or cactus wren observed within the survey area will be clearly marked and identified on the construction/grading plans.	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES		LEVEL OF SIGNIFICANCE AFTER MITIGATION
		• Prior to the commencement of grading, all areas of CSS habitat located outside of the project footprint will be fenced or marked with materials clearly visible to construction personnel. No construction access, parking or storage of equipment or materials will be permitted within these marked areas. Waste dirt or rubble will not be deposited on adjacent CSS. • Pre-construction meetings will be conducted and documented by the monitoring biologist to educate construction supervisors, equipment operators, and other site employees on the importance of adherence to conservation measures. • A qualified monitoring biologist will be on site during the clearing of CSS. The IWMD will advise the USFWS/CDFG at least seven (7) calendar days (and preferably fourteen [14] calendar days) prior to the clearing of any habitat occupied by target species to allow USFWS/CDFG to coordinate with the monitoring biologist. It will be the responsibility of the monitoring biologist to ensure that CAGNs and cactus wrens are not directly harmed by brush-clearing and earth-moving equipment. • Access roads shall be periodically sprayed with water to reduce the potential for dust accumulation on the leaves of CSS species, as recommended by the monitoring biologist.	
Implementation of the proposed project will result in significant adverse impacts to sensitive plant species (thread-leaved brodiaea, many-stemmed dudleya, vernal barley and chaparral beargrass).	B-9	IWMD shall conduct pre-construction surveys for thread-leaved brodiaea, many-stemmed dudleya, vernal barley and chaparral beargrass in areas of suitable habitat prior to construction. If any of these plant species are found within the project limits, a conceptual mitigation plan will be prepared by IWMD for any significant impacts that would be expected on these species as a result of the proposed project.	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
Implementation of the proposed project will result in significant adverse impacts to CSS.	B-10 IWMD shall implement the following mitigation measures below: IWMD shall implement a duff (i.e., seed material) and/or re-vegetation plan within the NCCP Reserve to reestablish CSS impacted by the proposed project. The plan shall be implemented and monitored by a qualified Restoration Ecologist familiar with the biology and ecology of the Southern California plant communities and that of the project site. Location of candidate duff and/or re-vegetation areas within the landfill will be coordinated with IWMD operations staff. Where appropriate, duff shall be collected from areas in which CSS is removed. This material shall be placed in areas deemed appropriate by IWMD for re-vegetation and weed abatement, or temporarily inactive disposal area slopes. IWMD is currently implementing a successful revegetation program at the FRB Landfill site for the restoration of CSS. As the Landfill is developed, upon completion of each phase, and the beginning of a new phase, CSS duff material from the new phase is collected and transported to the completed phase, where the duff is revegetated on the side slopes of the Landfill. The completed phase is then hydroseeded with CSS. A maintenance crew, directed by the on-site restoration ecologist, is responsible for maintaining all of the CSS revegetation areas on the project site, keeping theses areas free of invasive non-native weeds, debris and litter. IWMD will continue to perform maintenance and monitoring of each CSS revegetation area until the sites have reached their performance objectives.	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES		LEVEL OF SIGNIFICANCE AFTER MITIGATION
Implementation of the proposed project will result in significant adverse impacts to Intermediate Mariposa Lily (IML).	B-11	The impacts to IML occur during Phases VIII A, VIII B, IX, and X Excavations of the FRB MDP. Under NCCP/HCP regulations, if a population of more than twenty (20) individual plants is identified, then the County is required to prepare a mitigation plan that: (1) addresses design modifications or other on-site measures that are consistent with the project's purpose, minimizes impacts to IML habitat, and provides appropriate protections for any adjoining conserved IML habitat; (2) provides for an evaluation of salvage, restoration/enhancement/ management of other conserved IML, or other mitigation techniques to determine the most appropriate mitigation measures to offset impacts, and implements mitigation consistent with the foregoing evaluation; and, (3) provides for monitoring and adaptive management of IML consistent with Chapter 5 of the NCCP/HCP. This mitigation plan must also be developed in coordination with USFWS, CDFG, and Nature Reserve of Orange County (NROC), and approved by the USFWS. The IWMD will be required to develop a transplantation program for impact to IML in accordance with requirements noted above and in coordination with the NROC, CDFG and USFWS. In order to pre-mitigate for FRB MDP impacts to the IML, IWMD is already implementing a long-term mitigation plan as the FRB site that includes the excavation and transplantation of bulbs, seed collection, nursery propagation, experimental studies and long term performance monitoring. The first phase of the IML Mitigation Plan was completed in August 2004, when 234 IML bulbs were transplanted to four receptor sites in the northeast corner of the FRB property, outside of the future FRB MDP development limits.	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES		LEVEL OF SIGNIFICANCE AFTER MITIGATION
Implementation of the proposed project will result in significant adverse impacts to many-stemmed dudleya.	B-12	The impacts to many-stemmed dudleya occur during Phase IX Excavation of the FRB MDP. IWMD shall prepare a mitigation plan for the transplantation of a population of 1,838 plants located within the MDP disturbance footprint to avoid direct impacts.	Less than significant.
Summary of Impacts Related to Aesthetics			
Implementation of the proposed project will result in significant adverse impacts to views in the study area.	AS-1	The interim and final slopes of the landfill will be seeded with CSS species that are found on hills adjacent to the landfill. Interim slopes will be seeded as each lift is completed. Implementation of this measure will assist in blending the landfill with the adjacent undeveloped hills.	Significant.
Implementation of the proposed project will result in significant adverse impacts due to light and glare.	AS-2	All outdoor lighting, including any construction-related lighting, shall be designed, installed, and operated in a manner that ensures that all direct rays from project lighting are contained within the landfill property, and that residences and undeveloped areas that may provide wildlife value are protected from spillover light and glare.	Less than significant.
Summary of Impacts Related to Cultural and Scientific Resources			
Two sites within the proposed project's disturbance limits are considered potentially eligible for NRHP status. No additional cultural resources were noted within the project disturbance limits. However, there is the potential for uncovering previously unknown cultural resources during ground disturbing activities.	CR-1	Prior to the issuance of grading permit(s), the project developer(s) shall retain a qualified cultural resource specialist, to the satisfaction of the County of Orange IWMD, to monitor the project's subsurface areas during grubbing and land disturbance from construction activities that previously were not effectively surveyed. The cultural resource specialist shall examine, evaluate, and determine the most appropriate disposition of any potential artifact and shall have the authority to temporarily halt work until any identified artifacts can be recovered, handled, and/or surveyed in the appropriate manner.	Less than significant.

TABLE 1-1
SUMMARY OF IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

POTENTIAL IMPACTS	MITIGATION MEASURES	LEVEL OF SIGNIFICANCE AFTER MITIGATION
	CR-2 Prior to issuance of grading permit(s) and prior to excavation to a depth of more than 15 feet below the modern ground surface, the project developer(s) shall retain an archaeological and paleontological resource specialist, to the satisfaction of the County of Orange IWMD, to conduct archaeological and paleontological resource monitoring.	Less than significant.
Summary of Impacts Related to Hazards/Risk of Upset		
Implementation of the proposed project will not result in significant adverse impacts related hazards/risk of upset.	No mitigation is required.	No impact.

1.3 ALTERNATIVES

1.3.1 SUMMARY OF ALTERNATIVES

In addition to the No Project Alternative and the proposed project, this EIR analyzes three other project alternatives and alternatives that were considered but rejected. Discussed below is a brief description of the Alternatives and their assumptions. For a detailed description of these Alternatives, refer to Section 6.0 (Project Alternatives).

1.3.1.1 Alternatives 1a and 1b - No Project: No FRB Expansion and No Daily Tonnage Increase

The No Project Alternative proposes no change to the FRB Landfill, neither an increase in capacity (through a vertical or horizontal expansion) nor an increase in daily tonnage. The No Project Alternative considers a closure date for the Olinda Alpha Landfill of a) 2013 with no expansion and b) 2021, with an approved expansion. The No Project Alternative also proposes no change at the Prima Deshecha Landfill with its operation complying with current permit conditions.

No Project Alternatives 1a and 1b specifically assume the following for the FRB Landfill:

- No vertical and horizontal expansions at the FRB Landfill.
- No extension in the life of the FRB Landfill and no change in the current effective closure date of 2014.
- No planned slope remediation for on site landslides.
- No change in the currently permitted daily tonnage limit of 8,500 TPD except for 36 high tonnage days per year in which 10,625 TPD is allowed.
- No change in the existing access to/from the landfill.
- No change in on site equipment, operations and staff at this landfill.
- No change in the number of daily truck trips to the FRB Landfill.
- There would be no change in the level and scope from the level and scope anticipated in the existing regulatory permits or in the levels anticipated in the Settlement Agreement with the City of Irvine.

No Project Alternatives 1a and 1b assume no change in the design or operations at Prima Deshecha Landfill. There would be no increase in the long-term physical capacity or permitted daily tonnage limit of 4,000 TPD and there would be no change in the permitted capacity or closure date of 2067 at Prima Deshecha Landfill.

No Project Alternative 1a assumes that the currently proposed expansion at Olinda Alpha Landfill does not occur and that the assumptions for this landfill are the same as the existing operations and design at this landfill in mid-2005. Under Alternative 1a, the Olinda Alpha Landfill will close in 2013. No Project Alternative 1b assumes that the currently proposed expansion at Olinda Alpha Landfill does occur. Under Alternative 1b, the Olinda Alpha Landfill will close in 2021.

The No Project Alternative would include no action by the County of Orange. Under this Alternative, none of the proposed project components at the FRB Landfill would occur. As such, under this Alternative, the FRB Landfill would continue to receive up to an annual average of 8,500 TPD of MSW, except for 36 days of the year in which a high tonnage rate of 10,625 TPD is allowed under the current landfill operating permits and Settlement Agreement between the City of Irvine and IWMD and would operate until its current effective closure date of 2014.

Under the No Project Alternative, importation of waste into the Orange County disposal system will end in either 2013 or 2015, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Exportation of waste from Orange County would occur in either 2013 or 2021, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Out-of-County landfills would have to be permitted to accept the excess tonnage from Orange County and may include El Sobrante Landfill in Riverside County and/or the Mid-Valley Landfill in San Bernardino County.

1.3.1.2 Alternatives 2a and 2b - FRB Expansion: No Daily Tonnage Increase

Alternatives 2a and 2b propose the vertical and horizontal expansions for the FRB Landfill and no increase in the maximum daily tonnage for either the FRB Landfill or the Prima Deshecha Landfill. Under Alternatives 2a and 2b, out-of-County export of waste will be required when the Olinda Alpha Landfill closes in a) 2013, with no expansion or b) 2021, with an approved expansion. Alternatives 2a and 2b assume no change for the Prima Deshecha Landfill with its operation complying with current permit conditions.

Alternatives 2a and 2b specifically assume the following for the FRB Landfill:

- The same vertical and horizontal expansions at the FRB Landfill as under the proposed project.
- Extension of the life of the FRB Landfill to 2053.
- The same slope remediation for on site landslides as under the proposed project.
- The same Soil Management Plan as under the proposed project.
- Similar protection of native plant and animal species and habitats as under the proposed project.
- No change in the currently permitted daily tonnage limit of 8,500 TPD except for 36 high tonnage days per year in which 10,625 TPD is allowed.
- No change in the existing access to/from the FRB Landfill.
- No change in on site equipment, operations and staff at this landfill.
- No change in the number of daily truck trips to the FRB Landfill.
- If the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project.

Alternatives 2a and 2b assume no change in operations or design at Prima Deshecha Landfill. There would be no increase in the long term physical capacity or permitted daily tonnage limit of

4,000 TPD at Prima Deshecha Landfill and there would be no change in the permitted capacity or closure date of 2067 at Prima Deshecha Landfill.

Alternative 2a assumes that the currently proposed expansion at Olinda Alpha Landfill does not occur and that the assumptions for this landfill are the same as the existing operations and design at this landfill in mid-2005. Under Alternative 2a, the Olinda Alpha Landfill will close in 2013. Alternative 2b assumes that the currently proposed expansion at Olinda Alpha Landfill does occur. Under Alternative 2b, the Olinda Alpha Landfill will close in 2021.

Alternatives 2a and 2b would require action by the County of Orange for the FRB Landfill. Under this Alternative, all the proposed project components at the FRB Landfill, except an increase in TPD, would occur. Under Alternatives 2a and 2b, the FRB Landfill would continue to receive up to an annual average of 8,500 TPD of MSW, except for 36 days of the year in which a high tonnage rate of 10,625 TPD is allowed. There would be an increase in the long term physical capacity at the FRB Landfill based on the vertical and horizontal expansions and the effective closure date would be extended from 2014 to 2053.

Under Alternatives 2a and 2b, importation of waste into the Orange County disposal system will end in either 2013 or 2015, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Exportation of waste from Orange County would occur in either 2013 or 2021, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Out-of-County landfills would have to be permitted to accept the excess tonnage from Orange County and may include El Sobrante Landfill in Riverside County and/or the Mid-Valley Landfill in San Bernardino County.

1.3.1.3 Alternatives 3a and 3b - FRB Expansion: Daily Tonnage (Annual Average) Increase to 11,500 TPD

Alternatives 3a and 3b proposes an increase in the permitted annual average refuse inflow rate of 8,500 TPD at FRB to 11,500 TPD which meets the RELOOC demand projection of 15,500 TPD by 2039 with the Prima Deshecha Landfill maintaining its permitted waste inflow rate of 4,000 TPD. Alternatives 3a and 3b also consider a closure date for the Olinda Alpha Landfill of a) 2013, with no expansion and b) 2021, with an approved expansion.

Alternatives 3a and 3b specifically assume the following for the FRB Landfill:

- The same vertical and horizontal expansions at the FRB Landfill as under the proposed project.
- Extension of the life of the FRB Landfill to 2044 under Alternative 3a.
- Extension of the life of the FRB Landfill to 2047 under Alternative 3b.
- The same slope remediation for on-site landslides as under the proposed project.
- The same Soil Management Plan as under the proposed project.
- Similar protection of native plant and animal species and habitats as under the proposed project.

- Change in the maximum daily TPD to 11,500 TPD and a change in the annual average TPD to 11,500 TPD to meet the County's long-term system demand for the RELOOC study period.
- No change in the existing access to/from the FRB Landfill.
- Increase in on site equipment, operations and staff at this landfill.
- Increase in the number of daily truck trips to the FRB Landfill.
- Since the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill, adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project.

Alternatives 3a and 3b assume no change in operations or design at Prima Deshecha Landfill. There would be no change in the long term physical capacity or permitted daily tonnage limit of 4,000 TPD at Prima Deshecha Landfill under Alternatives 3a and 3b and there would be no change in the permitted capacity or closure date of 2067 at Prima Deshecha Landfill. The permitted daily tonnage limit and closure date for Prima Deshecha Landfill is taken from the 2001 Prima Deshecha General Development Plan Final Environmental Impact Report No. 575 (Keeton Kreitzer Consulting, 2001).

Alternative 3a assumes that the currently proposed expansion at Olinda Alpha Landfill does not occur and that the assumptions for this landfill are the same as the existing operations and design at this landfill in mid-2005. Under Alternative 3a, the Olinda Alpha Landfill will close in 2013. Alternative 3b assumes that the currently proposed expansion at Olinda Alpha Landfill does occur. Under Alternative 3b, the Olinda Alpha Landfill will close in 2021. Assumptions of the Olinda Alpha Landfill were taken from the Draft Environmental Impact Report for the RELOOC Strategic Plan-Olinda Alpha Landfill Implementation (P&D Consultants, 2004) and the Final Environmental Impact Report, Olinda/Olinda Alpha Access Road (County of Orange, 1997).

Alternatives 3a and 3b would require action by the County of Orange for the FRB Landfill. Under this Alternative, all the proposed project components at the FRB Landfill would occur. In addition, this Alternative, unlike the proposed project, would increase the Annual Average TPD at the FRB Landfill from 8,500 TPD to 11,500 TPD. There would also be an increase in the long term physical capacity at the FRB Landfill based on the vertical and horizontal expansions.

Under Alternatives 3a and 3b, importation of waste into the Orange County disposal system will end in either 2013 or 2015, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Under Alternatives 3a and 3b, the County's projected waste disposal needs will be met and export of waste would not occur during the RELOOC study period (through 2039).

1.3.1.4 Alternatives 4a and 4b - FRB Expansion: Daily Tonnage Increase at Prima

Alternatives 4a and 4b propose a balance of waste inflow into the two remaining County landfills after the Olinda Alpha Landfill closes and is consistent with the RELOOC long-term strategies. These alternatives propose approval of a daily tonnage increase at the Prima Deshecha Landfill from 4,000 TDP to 7,000 TDP when the Olinda Alpha Landfill closes which meets the RELOOC demand projection of 15,500 TDP by 2039 (with the FRB Landfill maintaining its permitted annual average waste inflow rate of 8,500 TDP). Alternatives 4a and 4b also consider a closure date for the Olinda Alpha Landfill of a) 2013, with no expansion and b) 2021, with an approved expansion.

Alternatives 4a and 4b specifically assume the following for the FRB Landfill:

- The same vertical and horizontal expansions at the FRB Landfill as under the proposed project.
- Extension of the life of this landfill to 2053.
- The same slope remediation for on site landslides as under the proposed project.
- The same Soil Management Plan as under the proposed project.
- Similar protection of native plant and animal species and habitats as under the proposed project.
- No changes in the currently permitted daily tonnage limit of 8,500 TDP except for 36 high tonnage daily per year in which 10,625 TDP is allowed.
- No change in the existing access to/from the FRB Landfill.
- No increase in on site equipment, operations and staff at this landfill.
- No increase in the number of daily truck trips to the FRB Landfill.
- Since the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill, adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project.

Alternatives 4a and 4b assume an increase in the TPD at Prima Deshecha Landfill from the existing permitted 4,000 TPD to 7,000 TPD to meet the County's long-term system demand by the end of the RELOOC study period. This increase is proposed to be approved in either 2013 or 2021, depending on whether the proposed expansion at Olinda Alpha Landfill is implemented. Although this alternative proposes an increase in the maximum daily tonnage inflow rate from 4,000 to 7,000 TPD when the Olinda Alpha Landfill closes, the RELOOC tonnage projections indicate a gradual increase in the daily tonnage rate for the Prima Deshecha Landfill; reaching 7,000 TPD in approximately 2050. Based on the RELOOC tonnage projections, the Prima Deshecha Landfill would close in 2057 (under Alternative 4a) and in 2059 (under Alternative 4b).

Alternative 4a assumes that the currently proposed expansion at Olinda Alpha Landfill does not occur and that the assumptions for this landfill are the same as the existing operations and design at this landfill in mid-2005. Under Alternative 4a, the Olinda Alpha Landfill will close in 2013. Alternative 4b assumes that the currently proposed expansion at Olinda Alpha Landfill does occur. Under Alternative 4b, the Olinda Alpha Landfill will close in 2021.

Alternatives 4a and 4b would require action by the County of Orange for the FRB and Prima Deshecha landfills. Under this Alternative, all the proposed project components at the FRB Landfill, except the increase in TPD, would occur. In addition, this Alternative would increase the TPD at Prima Deshecha Landfill from 4,000 TPD to 7,000 TPD. There would be an increase in the long term physical capacity at the FRB Landfill based on the vertical and horizontal expansions. There would be a reduction in lifespan at Prima Deshecha Landfill under Alternatives 4a and 4b, resulting in an earlier closure date for that landfill than the currently permitted closure date of 2067.

Under Alternatives 4a and 4b, importation of waste into the Orange County disposal system will end in either 2013 or 2015, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Under Alternatives 4a and 4b, the County's projected waste disposal needs will be met and export of waste would not occur during the RELOOC study period (through 2039).

1.3.2 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Each of the build alternatives would result in environmental impacts greater than would occur under the No Project Alternative. Therefore, the No Project Alternative is the environmentally superior alternative, although it would not meet project objectives as discussed earlier. Section 15126.6(e) of the CEQA Guidelines states that if the No Project Alternative is selected as the environmentally superior alternative, then the EIR shall also identify an environmental superior alternative among the other alternatives. The remaining alternatives have similar environmental impacts. However, the proposed project would not have environmental impacts related to land use and planning; therefore, the proposed project is the environmentally superior alternative.

It should be noted that Alternatives 3a and 3b do result in an increase in typical average daily traffic volumes, air quality emissions and noise and vibration as a result of increased daily tonnage from 8,500 to 11,500. The local circulation network will experience increased volumes of truck trips as a result of the tonnage increase. However, the duration of the landfill life will be shortened as a result, requiring the need for additional landfill capacity at that time. The trade-off between additional truck trips over a shorter duration versus keeping the landfill open for a longer duration with less truck trips is difficult to assess for comparative purposes. Certainly, for the more near term, Alternatives 3a and 3b would be considered to have a more substantive impact for traffic, air quality and noise exposure as compared to Alternatives 2 and 4, or compared to the proposed project. In this case, the near term is a substantial amount of time and therefore Alternatives 3a and 3b would presumably rank as having more substantive impacts accordingly.

SECTION 2.0
INTRODUCTION

SECTION 2.0
INTRODUCTION

2.1 PURPOSE OF THE EIR

2.1.1 AUTHORITY

This Environmental Impact Report (EIR) was prepared in accordance with the California Environmental Quality Act (CEQA) of 1970, as amended (California Public Resources Code Section 21000 et seq.) and the CEQA Guidelines (California Code of Regulations Section 15000 et seq.). This EIR assesses the potential impacts associated with the proposed Regional Landfill Options for Orange County (RELOOC) Strategic Plan – Frank R. Bowerman (FRB) Landfill Implementation (proposed project). The County of Orange is the Lead Agency for the proposed project pursuant to the CEQA.

As stated in Section 15121 of the CEQA Guidelines, an EIR is an informational document which will inform decision-makers, public agencies and the general public about the potential significant environmental effects of a proposed project. It also identifies possible ways to minimize the significant adverse effects of the project and addresses reasonable alternatives to the project. CEQA requires that an EIR contain, at a minimum, the following elements:

- Executive Summary
- Project Description
- Environmental Settings, Impacts and Mitigation Measures
- Alternatives to the Proposed Project
- Growth Inducing Impacts
- Cumulative Impacts
- Effects Not Found to be Significant
- List of Preparers and Persons Consulted

2.1.2 PREPARATION OF THE EIR

This EIR was prepared pursuant to Section 15161 of the CEQA Guidelines which states that a project EIR "…examines the environmental impacts of a specific development project. This type of EIR should focus primarily on the changes in the environment that would result from the development proposed project. The EIR shall examine all the phases of the project including planning, construction, and operation." The RELOOC Strategic Plan - FRB Landfill Implementation EIR analyzes the environmental consequences that could be anticipated to occur from the construction and operation of this proposed landfill expansion project.

2.1.3 INCORPORATION BY REFERENCE

Various technical studies, analyses and reports were used in the preparation of this EIR and are incorporated by reference in accordance with Section 15150 of the CEQA Guidelines. Information from these documents which have been incorporated by reference has been briefly summarized in the appropriate section(s) of this EIR. The documents and other sources used in preparation of this EIR are identified in Section 13.0 (References). In accordance with the CEQA Guidelines, Section 15150(b), the location where the public may obtain or review these referenced documents is also identified in Section 13.0.

2.1.4 INTENDED USES OF THE EIR

The EIR process is specifically designed to facilitate the objective evaluation of the significance of direct, indirect and cumulative impacts, provide analysis of alternatives, identify mitigation measures for significant adverse impacts, and provide implementation methods for those mitigation measures. It should be noted that just because a particular issue is addressed in this EIR, it does not mean that a significant adverse impact occurs. In several cases, impacts are not significant and adverse; the analysis is included to demonstrate the process leading to that conclusion.

Because approval and implementation of the RELOOC Strategic Plan - FRB Landfill Implementation would result in potentially significant adverse impacts on the environment, this EIR was prepared in conjunction with the project plan. This was done to identify the potential significant adverse impacts and to identify what measures could be incorporated into the project to minimize or eliminate these impacts.

Prior to the certification of the EIR, the Draft EIR will be circulated for a 45-day public review period. All interested persons and/or agencies wishing to comment on the information contained in the EIR must do so within the 45-day public review period.

The County of Orange is responsible for reviewing site plans for the RELOOC Strategic Plan - FRB Landfill Implementation project for land use regulations and design guidelines which will outline development standards. Additionally, the County of Orange will be responsible for issuing any necessary County permits and project approvals for all project construction. The County of Orange Board of Supervisors (BOS) will be responsible for certification of the Final EIR.

2.1.5 AGENCIES HAVING JURISDICTION/POTENTIAL DISCRETIONARY ACTIONS

The principal agency having jurisdiction over the proposed project is the County of Orange because the project site is located in an unincorporated area of Orange County. However, the proposed project is in the Sphere of Influence of the City of Irvine. The project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill. To the extent required by law, adjustments and modifications to some or all of these documents will be sought to reflect the changes contemplated by the project.

In addition to the County of Orange and City of Irvine, other public agencies that may also have oversight over the project or may be responsible for issuing subsequent permits necessary to implement the proposed project are identified in Table 2-1.

TABLE 2-1
LIST OF POTENTIAL RESPONSIBLE AGENCIES

Agency	Approval/Permit
Federal Agencies	
United States Army Corps of Engineers	United States Clean Water Act Section 404 permit.
United States Fish and Wildlife Service	Major Amendment to the Central and Coastal Subregion NCCP/HCP and Reserve.
State Agencies	
California Department of Fish and Game	Major Amendment to the Central and Coastal Subregion NCCP/HCP and Reserve.
	Streambed Alteration Agreement, per Section 1602 of the California Fish and Game Code.
California Integrated Waste Management Board	Revision to Solid Waste Facility Permit (SWFP).
Regional Agencies	
Regional Water Quality Control Board - Santa Ana Region	Storm Water Management Plans (in compliance with National Pollution Discharge Elimination System Permit). Revision of the existing Waste Discharge Requirements (WDR). Water Quality Certification, per Section 401 of the Clean Water Act.
South Coast Air Quality Management District	Permits to Construct Expanded Gas Control Systems. Permits to Operate Expanded Gas Control Systems.
County Agencies	
Local Enforcement Agency (Health Care Agency)	Revision of the existing SWFP.
County of Orange Board of Supervisors	Certification of the Final EIR.
County of Orange Resources and Development Management Department	Grading/Miscellaneous Permits.

2.1.6 AVAILABILITY OF THE EIR

Agencies, organizations and individuals wishing to comment on the information presented in this EIR may do so during the 45-day public review period. All written comments on the EIR will be addressed in the Responses to Comments Report. The Responses to Comments Report will be part of the Final EIR and will be presented to the BOS for their consideration of the EIR and the proposed project. Copies of the EIR and relevant technical studies are available for review during regular business hours at the following locations:

Integrated Waste Management Department 320 North Flower Street, Suite 400 Santa Ana	California State University, Fullerton Library, Document Section Fullerton
Orange County Public Library 31495 El Camino Real San Juan Capistrano	Orange County Public Library 14361 Yale Avenue Irvine
Orange County Public Library 33841 Niguel Road Dana Point	Orange County Public Library 242 Avenida Del Mar San Clemente

Orange County Public Library 1 Civic Center Circle Brea	Orange County Public Library 30341 Crown Valley Parkway Laguna Niguel
Orange County Public Library 4512 Sandburg Way Irvine	University of California, Irvine Main Library, Government Publications Microfilms Irvine

2.2 METHODOLOGY

Each environmental parameter discussed in Section 5.0 of the EIR is organized and analyzed as discussed below.

2.2.1 EXISTING CONDITIONS

This section describes the existing environmental conditions in the vicinity of the proposed project, as they existed at the time the Notice of Preparation (NOP) was published. The environmental setting constitutes the baseline physical conditions against which the Lead Agency (the County of Orange) determines whether an impact is considered significant and adverse.

2.2.2 THRESHOLDS OF SIGNIFICANCE

Thresholds of significance which are the basis for determining project related potential impacts are presented in this section of the EIR. These thresholds are derived from local (County of Orange), state and/or federal policies and programs that may apply; and other accepted standards determined to be appropriate by the Lead Agency (County of Orange) pursuant to Section 15064.7 of the CEQA Guidelines. This analysis is intended to be consistent with the Guidelines as revised following the decision in *Communities for a Better Environment v. California Resources Agency*, 103 Cal. App. 4^{th} 98 (2002).

2.2.3 METHODOLOGY RELATED TO EACH ENVIRONMENTAL PARAMETER

The procedures and rules used to analyze impacts of the proposed project on each environmental parameter are presented in this section of the EIR.

2.2.4 ENVIRONMENTAL IMPACT ANALYSIS

The environmental analysis for each environmental parameter for which the proposed project may or would result in potentially significant adverse impacts is contained in this section of the EIR. These parameters were identified in the findings of the Initial Study (IS) which was included as part of the NOP. Environmental parameters not discussed in this section are described in Section 3.0 (Effects Found Not To Be Significant).

2.2.5 MITIGATION MEASURES

If the analysis contained in the environmental impacts section concludes that the proposed project will create significant adverse impacts on the environment, mitigation measures are identified in this section to minimize or eliminate the significant adverse impacts.

2.2.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

This section identifies unavoidable significant adverse impacts which cannot be mitigated or that remain significant even after mitigation is incorporated in the proposed project. If significant unavoidable adverse impacts are identified, it will be necessary for the County of Orange BOS to determine if the benefits from implementing the proposed project outweigh and override the unavoidable adverse effects created by the proposed project and to adopt a Statement of Overriding Considerations.

2.3 BACKGROUND

2.3.1 INITIAL STUDY AND NOTICE OF PREPARATION

As required by CEQA, an IS and NOP for the proposed project were prepared by the County of Orange. The IS indicated that the proposed project did have the potential for significant adverse impacts on the environment and that an EIR was required. A copy of the IS/NOP is included in Appendix A. The IS/NOP was released on July 21, 2005 for a 30-day public review period which concluded on August 19, 2005. The IS/NOP was distributed to the State Clearinghouse Office of Planning and Research, public agencies, interested parties, libraries and service providers. The distribution list for the IS/NOP is provided in Appendix B.

The County of Orange received 13 written responses to the NOP. Copies of these comment letters are provided in Appendix C. Table 2-2 summarizes the comment letters and indicates where in the IS and/or in the EIR each specific issue raised in these comment letters is located.

2.3.2 PUBLIC SCOPING AND CITIZEN CONCERNS

A public scoping meeting was held on August 4, 2005 to solicit input for consideration in this EIR. A public notice was published in the Orange County Register on July 30, 2005 to inform the general public of the scoping meeting time and location. Seven people attended the meeting at the Lakeview Senior Center, located at 20 Lake Road, Irvine, CA. The public notice and the attendance list are provided in Appendix D. Following the presentation of the project by County staff, attendees expressed their concerns about the elements and potential impacts of the proposed project. Table 2-3 summarizes the verbal comments received at the scoping meeting. Transcripts of the verbal comments are also provided in Appendix D.

This EIR was prepared based on the information provided in the IS and the issues expressed in the responses to the NOP and at the scoping meetings.

TABLE 2-2
SUMMARY OF COMMENTS IN RESPONSE TO THE NOP

Respondent	Summary of Comments	Where Comment is Addressed in the EIR
Governor's Office of Planning and Research State Clearinghouse	Confirmed the filing of the NOP and identified the review period.	Comment noted.
South Coast Air Quality Management District	Use guidance from the SCAQMD CEQA Air Quality Handbook (1993) in air quality analysis.	Section 5.6 (Air Quality).
	Include all phases of the project including construction and operational phases.	Section 5.6 (Air Quality).
	Include impacts from indirect sources.	Section 5.6 (Air Quality).
	It is recommended that a localized significance analysis be performed by using localized significance thresholds or perform dispersion modeling as necessary.	Section 5.6 (Air Quality).
	It is recommended that a mobile source health risk assessment be performed and an analysis of toxic air contaminant impacts should be included.	Section 5.6 (Air Quality).
	If the project generates significant air quality impacts, CEQA requires that all feasible mitigation measures be used during project construction and operation to minimize or eliminate significant air quality impacts. Some may be found in CEQA Air Quality Handbook.	Section 5.6 (Air Quality).
Bob Oda (resident)	Is there a Regional Master Plan on land use?	Section 5.1 (Land Use and Planning).
	What will happen if the Bowerman Landfill closes in the next 10 years? What are the Project alternatives? Will the County of Orange export waste out of the County.	Section 4.0 (Project Description) and Section 9.0 (Project Alternatives).
David Law (City of Irvine)	Provide analysis of alternative waste disposal methods and technology with emphasis on reuse of solid waste.	Section 4.0 (Project Description) and Section 9.0 (Project Alternatives).
	Provide documentation or evidence that existing procedures are in place to minimize harmful impacts on surrounding land uses generated by rodents, insects, odors and groundwater conditions.	Section 5.6 (Air Quality), Section 5.11 (Hazards/Risk of Upset).
	Correctly state that the City of Irvine General Plan designates FRB property as COSP in Planning Area 3. Also, note that land to the west of FRB property is designated in the City's General Plan for open space preservation.	Section 5.1 (Land Use and Planning).

TABLE 2-2
SUMMARY OF COMMENTS IN RESPONSE TO THE NOP

Respondent	Summary of Comments	Where Comment is Addressed in the EIR
California Department of Fish and Game	Include a complete assessment of the flora and fauna within and the adjacent area with emphasis upon identifying endangered, threatened, and locally unique species.	Section 5.8 (Biological Resources).
	A discussion of direct, indirect and cumulative impacts expected to affect biological resources.	Sections 5.8 (Biological Resources) and Section 6.0 (Cumulative Impacts).
	A range of alternatives should be analyzed to ensure that alternatives to the proposed project are fully considered and evaluated.	Section 9.0 (Project Alternatives).
	Mitigation measures for adverse impacts related to biological resources.	Section 5.8 (Biological Resources).
	A California Endangered Species Act (CESA) permit must be obtained if the project has the potential to result in "take" of species of plants or animals listed under CESA.	Section 5.8 (Biological Resources).
	Strongly discourages development in wetland and riparian habitats.	Section 5.8 (Biological Resources).
California Department of Transportation	Change route number from 231 to 241 and 133 on Figure 1 of the NOP.	Section 5.5 (Transportation and Circulation).
	Include a detailed traffic study as part of the Draft EIR	Section 5.5 (Transportation and Circulation).
California Integrated Waste Management Board	The Draft Environmental Impact Report must detail all provisions in order to indicate the ability of the facility to meet State Minimum Standards for environmental protection.	Comment noted.
	Clarify the peak elevation on the landfill and whether that is the peak elevation with final cover or peak elevation of buried waste	Section 4.0 (Project Description).
	Discuss the specific types of alternative daily cover proposed for use at the landfill and any positive or negative impacts from the use of alternative daily cover proposed.	Section 5.11 (Hazards/Risk of Upset).
	Be clear that while the site may only be opened six days per week from 4:00 A.M. until 6:00 P.M., the site in fact may be open 24 hours per day, seven days per week without the benefit of further environmental analysis.	Section 4.0 (Project Description).
	Indicate the amount of material entering the land fill as alternative daily cover, soil/contaminated soil for daily cover, material for recycling, etc.	Section 4.0 (Project Description).
	Include a section or discussion about Environmental Justice as it pertains to the Proposed Project.	Section 5.1 (Land Use and Planning).
	Indicate the types of waste to be accepted at the landfill as well as the types of waste to be excluded.	Section 4.0 (Project Description) and Section 5.11 (Hazards/Risk of Upset).

TABLE 2-2
SUMMARY OF COMMENTS IN RESPONSE TO THE NOP

Respondent	Summary of Comments	Where Comment is Addressed in the EIR
	Discuss load checking/screening procedures.	Section 4.0 (Project Description) and Section 5.11 (Hazards/Risk of Upset).
	Describe procedures for handling hazardous waste and/or Household Hazardous Waste that may enter the landfill in self-haul and commercial loads.	Section 5.11 (Hazards/Risk of Upset).
	Describe any "free dump" days when peak tonnage might be exceeded and the public might bring in items otherwise not normally acceptable such as Household Hazardous Waste, e-waste, tires, batteries, etc.	Section 5.11 (Hazards/Risk of Upset). (FRB Landfill does not have "free dump" days)
	Include figures that indicate on site facilities (offices, waste management units, landfill gas flares/generators, processing and storage areas, etc.), indicate traffic flow and indicate zoning and land use within 1000 feet of the proposed landfill expansion boundaries.	Section 4.0 (Project Description), Section 5.5 (Transportation and Circulation) Section 5.1 (Land Use and Planning).
	Include an Odor Impact Minimization Plan (if IWMD to handle compostable material) in the Mitigation Reporting and Monitoring Program and/or the Report of Facilities Information.	Section 4.0 (Project Description). (IWMD not proposing to handle compostable material)
	Address cumulative impacts resulting from the proposed project.	Section 6.0 (Cumulative Impacts).
	Identify surrounding land use with a description of the density of occupancy for commercial and residential areas.	Section 5.1 (Land Use and Planning).
	Be specific regarding the distance to the nearest sensitive receptors.	Section 5.6 (Air Quality) and Section 5.7 (Noise).
	The local government in whose jurisdiction the facility will be located must make a finding that the facility is consistent with the General Plan and is identified in the most recent County Integrated/Solid Waste Management Plan.	Section 5.1 (Land Use and Planning).
	The Mitigation Monitoring and Reporting Program should indicate that agencies designated to enforce mitigation measures have reviewed the Mitigation Monitoring and Reporting Program and agreed that they have the authority and means to accomplish the designated enforcement responsibilities.	This comment will be addressed when the Mitigation Monitoring and Reporting Program is completed and submitted when the EIR is certified.
North Irvine Villagers Association	Include a discussion about additional buildings and structures and the reasons for these.	Section 4.0 (Project Description).
	Include a schedule that corresponds with completion of various sections of the site and revegetation of completed sections.	Section 4.0 (Project Description).

TABLE 2-2
SUMMARY OF COMMENTS IN RESPONSE TO THE NOP

Respondent	Summary of Comments	Where Comment is Addressed in the EIR
	Determine whether there will be increased risk of damage to the underlying landfill membrane due to potential earth movement that may cause leachate to enter soil and groundwater.	Section 5.2 (Geology and Soils), Section 5.3 (Hydrogeology and Water Quality), Section 5.11 (Hazards/Risk of Upset).
	Include information about installation of land movement sensors.	Section 5.2 (Geology and Soils).
	Include details about the water drainage system modifications.	Section 5.4 (Surface Water Hydrology).
	Consider off-site preservation opportunities in mitigation measures.	Section 5.8 (Biological Resources) and Section 11.0 (Inventory of Mitigation Measures).
	Discuss compensation of the delay of the previously agreed upon ultimate use of the landfill as a regional park.	Not an environmental issue under CEQA.
	Address traffic impacts in relation to City of Irvine standards.	Section 5.5 (Transportation and Circulation).
	Address what percentage of trucks access the landfill via I-5 and Sand Canyon versus other roadways in Irvine.	Section 5.5 (Transportation and Circulation).
	Address the possibility of an increase in the probability of landslides.	Section 5.2 (Geology and Soils), Section 5.11 (Hazards/Risk of Upset).
	Include a figure that delineates the recent landslide and indicates where the landslide will be located within the new landfill area.	Section 4.0 (Project Description).
	Provide information regarding monitoring of any future movement of the landslide.	Section 5.2 (Geology and Soils), Section 5.11 (Hazards/Risk of Upset).
	Include view analyses from areas of Irvine such as Northwood, Woodbury, Woodbridge and the Great Park area.	Section 5.9 (Aesthetics).
	Include a discussion regarding imported fill that indicates an estimate of the maximum amount of imported fill required, routes of delivery and maximum rate of delivery.	Section 4.0 (Project Description) and Section 5.5 (Transportation and Circulation).
	Consider excluding exportation of waste from the Alternatives discussion.	Section 9.0 (Project Alternatives).
	Address the need and feasibility of growing vegetation on or off-site specifically for use in revegetation.	Section 5.8 (Biological Resources).
	Discussion of compensation to the City of Irvine for the increased life of the landfill.	Not an environmental issue under CEQA.
Southern California Association of Governments	Indicates that the RELOOC Strategic Plan – FRB Landfill Implementation is not regionally significant per SCAG Intergovernmental Review (IGR) Criteria and California Environmental Quality Act (CEQA) Guidelines (Section 15206) therefore SCAG indicates that the proposed project does not warrant comments at this time.	Comment noted.

TABLE 2-2
SUMMARY OF COMMENTS IN RESPONSE TO THE NOP

Respondent	Summary of Comments	Where Comment is Addressed in the EIR
County of Orange Health Care Agency	Provide detailed tonnage for waste to be landfilled on-site, recovered recyclables from incoming waste, exempt materials as defined by FRB's Solid Waste Facility Permit and solid waste with beneficial reuse as defined in 27 CCR Section 20686.	Section 4.0 (Project Description) and JTD.
	The DEIR should be consistent with in-place refuse density in site capacity calculations indicated in the Joint Technical Document Section B.1.5 and Annual Capacity Reports.	Section 4.0 (Project Description). JTD and Annual Capacity Reports to be consistent with DEIR refuse density.
	Clarify if the 34 acres indicated to be outside the landfill boundary and proposed for slope stabilization include the area outside of FRB's southern boundary that was disturbed as a result of Phase V-D development.	Section 4.0 (Project Description).
	Include a discussion of the use of alternative daily cover at FRB.	Section 4.0 (Project Description).
	Include a list of all heavy equipment at FRB available for and operating on the face of the landfill, a list of all heavy equipment operators that are qualified and available to operate the above equipment, the productivity (as MSW handled per hour) of each type of heavy equipment, the average rate of incoming MSW (tons per hour) under the proposed 11,500 TPD operations alternative and a list of standby heavy equipment and operators that can be mobilized to assist in operations at the working face.	Section 10.0 (Irretrievable and Irreversible Commitment of Resources).
	Account for vehicles delivering waste for disposal, vehicles delivering exempt materials from use as ADC and/or beneficial reuse, employee and personal vehicles, and construction vehicles for service contractors typically present at FRB.	Section 5.5 (Transportation and Circulation).
Transportation Corridor Agencies	No comments at this time.	Comment noted.
Orange County Fire Authority	All standard conditions with regard to development or permitting, including water supply, built in fire protection systems, road grades and width, access, building materials, and the like will be applied to this project at the time of plan submittal.	Comment noted.
City of Lake Forest	Use the latest population projections, such as OCP 2004.	Comment noted.

TABLE 2-2
SUMMARY OF COMMENTS IN RESPONSE TO THE NOP

Respondent	Summary of Comments	Where Comment is Addressed in the EIR
	The City of Lake Forest is considering a large General Plan Amendment and Zone Change to redesignate approximately 800 acres of vacant land from industrial and commercial land uses to residential mixed uses. This will allow up to 5,415 new residences in the City of Lake Forest which are not accounted for in the latest population projections.	Section 6.0 (Cumulative Impacts).

TABLE 2-3
SUMMARY OF VERBAL COMMENTS AND QUESTIONS – AUGUST 4, 2005 SCOPING MEETING

Comment	Response to Comments	Where Comment is addressed in the EIR
Edison Miller (resident)	Address all alternative approaches to landfills especially consider reducing waste going to landfills by using waste to energy technology.	Section 9.0 (Project Alternatives).
Dave Melvold (resident)	Address all alternative approaches to landfills.	Section 9.0 (Project Alternatives).
	Include an alternative that is similar to Alternative 2 but does not include export of waste.	Section 9.0 (Project Alternatives).
	Include a schedule for revegetation following phase completion.	Section 4.0 (Project Description) and Section 5.8 (Biological Resources).
	Include an analysis of whether the existing membrane will be able to tolerate an increase in waste and landfill height especially during any earthquake movements.	Section 5.2 (Geology and Soils), Section 5.3 (Hydrogeology and Water Quality) and Section 5.11 (Hazards/Risk of Upset).
	Include details of the surface water drainage system.	Section 5.4 (Surface Water Hydrology).
	Include mitigation measures that address destruction of vegetation perhaps including a measure that proposes preservation off-site.	Section 5.8 (Biological Resources) and Section 11.0 (Inventory of Mitigation Measures).
	Analyze impacts associated with the delay in converting the landfill to a regional park. Include mitigation for the loss.	Initial Study Environmental Analysis Checklist, page 20 and 25.
	Address the possibility of landslides that may result from expansion of the excavation and fill area.	Section 5.2 (Geology and Soils), Section 5.11 (Hazards/Risk of Upset).
	Include view analyses for Woodbridge, Woodbury, Northwood and various park areas of Irvine that have views of the landfill.	Section 5.9 (Aesthetics).
	Include analysis of the impacts associated with additional truck trips required to import fill for cover.	Section 5.5 (Transportation and Circulation).

TABLE 2-3
SUMMARY OF VERBAL COMMENTS AND QUESTIONS – AUGUST 4, 2005 SCOPING MEETING

Comment	Response to Comments	Where Comment is addressed in the EIR
	Use the City of Irvine traffic standards in the traffic analysis.	Section 5.5 (Transportation and Circulation).
	Address the additional buildings proposed as part of the project.	Section 4.0 (Project Description).

SECTION 3.0
EFFECTS FOUND NOT TO BE SIGNIFICANT

SECTION 3.0
EFFECTS FOUND NOT TO BE SIGNIFICANT

3.1 OVERVIEW

The analysis of the proposed project determined there are a number of environmental parameters that are not expected to incur significant adverse impacts resulting from implementation of the proposed project. This section summarizes those potential adverse impacts related to the proposed project that were determined in the Initial Study (IS) to be below a level of significance or which could be mitigated to below a level of significance based on mitigation measures. For detailed information regarding this analysis for each environmental parameter, refer to Appendix A (Initial Study). The environmental analysis for each environmental parameter for which the proposed project may or would result in potentially significant adverse impacts is provided in Section 5.0 (Existing Conditions, Impacts, Mitigation Measures and Level of Significance After Mitigation) of the EIR.

3.2 LAND USE AND PLANNING

The FRB Landfill is located in rapidly urbanizing central Orange County. Land uses in the area include undeveloped land, agriculture, residential and commercial. A number of planned residential communities are being and will be constructed in proximity to the landfill. These residential uses were subject to the County of Orange and City of Irvine planning procedures and land use controls which considered their proximity to this active landfill. The proposed improvements at the FRB Landfill entail both vertical and horizontal expansions within the landfill property and slope stabilization in off-site areas which are undeveloped areas with no existing or planned residential uses. Moreover, these areas are designated by the Orange County General Plan as Open Space Reserve (OSR) and by the City of Irvine General Plan as Conservation Open Space Preservation (COSP), and are part of the Orange County Central and Coastal Subregion NCCP/HCP and Reserve. Implementation of the proposed project would not disrupt or divide the physical arrangement of an established community. No mitigation is required.

3.3 AGRICULTURE

The proposed vertical and horizontal expansions of the FRB Landfill will not impact any Prime, or Unique land or Farmland of Statewide Importance. There are no existing agricultural preserves on the site or in the expansion area, and no preserves will be impacted under the proposed project. Existing roads will be used to haul MSW to the FRB Landfill under the proposed project. No new roads and/or modifications to existing roads are proposed for access as part of the project. Therefore, the proposed project will not result in impacts related to the conversion of farmlands listed as Prime, Unique or Farmland of Statewide Importance to non-agricultural uses. No mitigation is required.

The proposed project would not result in the cancellation of any Williamson Act contracts or conflict with any existing zoning for agricultural uses. No mitigation is required.

The proposed vertical and horizontal expansions at the FRB Landfill will not result in the conversion of designated Farmland to non-agricultural uses. There is no designated Farmland within the horizontal expansion areas of the existing landfill property or in the off-site areas proposed for slope stabilization. The proposed project would not involve changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural uses. No mitigation is required.

3.4 POPULATION AND HOUSING

The proposed project will continue the existing MSW disposal and landfilling operations at the FRB Landfill. None of the improvements under the proposed project would entail new residences or extending any major infrastructure (i.e., sewer or water lines, roads, etc.) that could support additional development. Employment associated with landfill operations will be provided by existing on site employment. There may be brief temporary periods requiring additional personnel, such as during site development activities. No substantial new employment will be generated by the proposed project that could potentially contribute to additional demand for housing or services in the surrounding area. No mitigation is required.

The proposed project will not result in the removal or demolition of any existing residential units because there are no existing residential uses on the Landfill property or in the off-site areas proposed for slope stabilization. The proposed project would not entail the displacement of any residential uses or the use of any land designated for residential uses. No mitigation is required.

The proposed project will not result in the removal or demolition of any existing residential uses. The proposed project would not entail the displacement of a substantial number of people because there are no residential uses on the landfill property or the off site areas proposed for slope stabilization. No mitigation is required.

3.5 GEOLOGY AND SOILS

There are no residences or other immediately adjacent structures where people congregate on the FRB Landfill or the off site area for slope stabilization. The improvements to the FRB Landfill under the proposed project (relocation of existing entrance facilities, scales/scale house, LFG control facilities and other support facilities) will be designed to meet stringent building code requirements that provide mitigation for any potential impacts to structures that would result from expansive soils. No mitigation is required.

3.6 HYDROLOGY AND WATER QUALITY

The existing the FRB Landfill is approved under the Waste Discharge Requirements (WDRs) issued by the Regional Water Quality Control Board (RWQCB) and is designed to comply with water quality standards and waste discharge requirements for a non-hazardous waste landfill. Semi-annual water quality testing at the landfill is conducted for volatile organic compounds (VOCs), minerals, total dissolved solids (TDS), pH, electrical conductivity (EC), nitrates and metals. The ongoing groundwater monitoring program at this landfill is expected to be sufficient for monitoring water quality under the proposed project. Any modification of the existing landfill design will require coordination with the Landfill Section of the RWQCB to revise the existing National Pollutant Discharge Elimination System (NPDES) permit and WDRs for the FRB Landfill in accordance with federal and state requirements for the protection of water quality. Therefore, the proposed project is not anticipated to result in significant adverse impacts related to water quality standards or WDRs at the FRB Landfill. No mitigation is required.

The proposed project does not include any components that would propose groundwater extraction. The current remediation of the landslide area at the FRB Landfill includes dewatering and the lowering of localized groundwater underneath the site which is being conducted as part of an ongoing program. The proposed project would not result in significant adverse impacts related to groundwater depletion that would contribute to a net deficit in aquifer volume or lowering of the regional groundwater table. The horizontal and vertical expansions and associated drainage patterns will channel runoff downstream to existing detention/desilting basins. The reduction in recharge due to the horizontal expansion areas is not anticipated to substantially reduce recharge in the regional groundwater basin. No mitigation is required.

The proposed project does not include the development of residential uses or other structures that would be located within a 100-year flood hazard area.

The FRB Landfill currently includes drainage structures which direct surface water on the site around the perimeter of the site to downstream surface water courses. Under the proposed project, the existing drainage system may need to be expanded to accommodate increased runoff associated with the vertical and horizontal expansions. However, no new structures are anticipated to be developed in a 100-year flood hazard area. Therefore, the proposed project is not anticipated to result in a significant adverse impact related to structures which would impede or redirect flood flows in a 100-year flood hazard area at the FRB Landfill. No mitigation is required.

The proposed project is not anticipated to result in any impacts related to flooding as a result of the failure of a levee or dam, inundation by seiche, tsunami or mudflow. There are no levees or dams located near or upstream of the landfill property. There are no major water bodies near the Landfill that could potentially generate a seiche or tsunami. Mudflows occur in unstable oversaturated soils; soils and slopes on and immediately adjacent to the landfill property have been or will be stabilized as part of the existing operations or the proposed project, as appropriate. Therefore, mudflows are not anticipated as a result of the proposed project at the FRB Landfill. No mitigation is required.

3.7 TRANSPORTATION AND CIRCULATION

The FRB Landfill is outside the defined airspace of any airport. The proposed project at the FRB Landfill would not result in changes in air traffic patterns. The proposed project will not generate demand for air passenger or cargo trips. The project will not result in changes in air traffic levels in this area. Therefore, the proposed project will not result in adverse impacts related to air traffic patterns. No mitigation is required.

Access to the FRB Landfill is currently provided via existing public and private roads, designed to local jurisdictions' standards, which are suitable for use by waste disposal trucks. Private access roads provide connections from public roads to and onto the landfill property. These access roads are adequate for use by waste disposal trucks. These private access roads are restricted to use by waste disposal vehicles, landfill employee vehicles and commercial self-haul vehicles who are destined for the landfill for waste disposal purposes. The proposed project does not include road improvements or the use of vehicles not compatible with the existing public and private access roads serving the landfill. Therefore, the proposed project at the FRB Landfill will not result in impacts related to safety hazards from design features or incompatible uses. No mitigation is required.

Access to the FRB Landfill is currently provided via public and private roads. Private roads provide connections from public roads (namely Bee Canyon Access Road) to and onto the landfill property and are restricted to use by waste disposal vehicles, landfill employee vehicles and site visitor/contractor commercial vehicles. Emergency vehicles can use these private roads if necessary to respond to fire, medical or police emergencies on the landfill property or the immediately adjacent areas, as appropriate. Consistent with the California Vehicle Code and local restrictions, trucks using public roads to access the landfill should not block emergency vehicles and should not block access to adjacent uses. At the landfill, trucks do not queue off the landfill site and, therefore, do not block emergency access in the area. On the landfill site, truck queuing is managed to ensure that emergency vehicles can access the site, if necessary. The proposed project does not include any features that would alter traffic operations or emergency access onto or off the landfill site. Therefore, the proposed project at the FRB Landfill will not result in adverse impacts related to emergency access or access to other land uses. No mitigation is required.

Parking for employees and vehicles waiting for inspection or to deposit loads is currently provided on the FRB Landfill site. In the event that additional parking is temporarily needed as a result of the proposed project, it also would be provided on the landfill property. No off-site parking will be required under the proposed project. Therefore, the proposed project at the FRB Landfill will not result in any impacts related to inadequate parking capacity. No mitigation is required.

Trucks transporting solid waste to the FRB Landfill, including the areas for the proposed vertical and horizontal expansions, would operate on public roads consistent with laws and regulations controlling vehicle traffic, similar to existing conditions associated with trucks currently accessing the landfill. Alternative modes, including rail, bus, transit, bicycling, carpooling and vanpooling would not be adversely affected by these truck operations on public roads. Therefore, the proposed project at the FRB Landfill would not result in conflicts with adopted policies regarding alternative transportation. No mitigation is required.

3.8 NOISE

The FRB Landfill is not within two miles of an existing public airport and is not within an adopted Airport Land Use Plan. Therefore, the landfill will not result in exposure of people in this area to excessive aviation related noise levels. No mitigation is required.

3.9 BIOLOGICAL RESOURCES

The proposed project at the FRB Landfill will not impact locally designated species such as heritage trees because the County of Orange has no officially adopted heritage tree ordinance or policy. Therefore, the proposed project will not result in impacts on locally designated heritage tree species. No mitigation is required.

3.10 AESTHETICS

There are no state- or county-designated scenic highways in the immediate vicinity of the landfill. Santiago Canyon Road north and east of the landfill is designated by the County of Orange as a scenic viewscape corridor. However, there would be no views of the proposed landfill from this road, as the Santiago Hills including Loma Ridge would block views of the landfill. Therefore, there would be no visual impacts related to designated scenic highways associated with implementation of the proposed landfill expansion. No mitigation is required.

Potential light and glare impacts associated with the proposed project at the FRB Landfill would be the same as existing impacts associated with the permitted landfill. Sources of light at this landfill, including lighting for access roads, parking areas, buildings and security, would not change appreciably under the proposed project. Although there are no plans to install additional lighting as part of the proposed project, the potential exists that additional lighting may be installed with the proposed expansion. Impacts associated with this additional lighting could be significantly adverse. A detailed discussion on this issue and mitigation are addressed in Section 5.9 (Aesthetics).

3.11 RECREATION

The proposed project at the FRB Landfill would not entail the construction of residential or commercial uses that would result in an increased use of area parks or recreational facilities. There may be brief temporary periods requiring additional personnel, such as during site development activities. Although the number of employees may increase, it is not anticipated that this increase in employees will contribute significantly to the use of existing neighborhood or regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated. During slope stabilization of the landslide, the proposed project may result in significant temporary adverse impacts to Limestone Canyon Regional Park. However, remedial grading is authorized in off-site areas under a Fourth Amendment to Irrevocable Offer of Dedication (IOD) for Limestone Canyon Regional Park, dated May, 2004. After construction of the slope stabilization measures is complete, the disturbed areas outside the landfill property will be revegetated in native plant species similar to the species located on that area prior to the project disturbance. The IOD places other permit conditions on the remedial grading for erosion control and drainage. Therefore, there would be no impacts related to the physical deterioration of a park associated with the proposed project at the FRB Landfill. No mitigation is required.

The proposed project does not include the construction of recreational facilities either on or off the FRB Landfill property. Therefore, the proposed project will not result in adverse impacts related to the provision of recreation resources. No mitigation is required.

The ultimate use for the FRB Landfill, after the termination of landfilling, is a passive regional park. That post closure park use is identified on the County of Orange Master Plan of Regional Recreational Facilities and is not part of the proposed project.

3.12 MINERAL RESOURCES

There are no known mineral resources on or in the immediate vicinity of the FRB Landfill site as documented in the County of Orange and City of Irvine GPs and the City of Irvine Master Environmental Assessment (MEA). Therefore, the proposed project at the FRB Landfill will not result in impacts to known mineral resources of possible state or regional value. No mitigation is required.

There are no known locally important mineral resource recovery sites identified in the County of Orange GP, City of Irvine GP and the City of Irvine MEA on or in the immediate vicinity of the FRB Landfill site. Therefore, the proposed project will not result in impacts related to the loss of availability of mineral resource recovery sites documented on local plans. No mitigation is required.

3.13 HAZARDS

The FRB Landfill is a permitted Class III non-hazardous waste landfill that does not accept hazardous, radioactive or explosive wastes for on site disposal. There is an IWMD program in place at the FRB Landfill to prevent hazardous wastes from entering the landfill and to provide protection for landfill workers from potentially hazardous substances. This includes visual inspection of loads at the fee booths and the active face of the landfill. In addition, low level radioactive waste (LLRW) monitors were installed in the scale houses. Any vehicles whose loads are identified with LLRW are segregated and prevented from unloading. The County of Orange Health Care Agency/Environmental Health Division is notified and repeat offenders are referred to the Hazardous Waste Strike Force. Studies on the composition of MSW indicate the amount of hazardous wastes contained in MSW is small and is not likely to pose a threat of exposure to the public. Landfill activities at the FRB Landfill under the proposed project would continue to be monitored by personnel trained to inspect incoming refuse and waste being deposited on the active landfill face to identify and remove potentially hazardous wastes.

Hazardous materials used on site for existing operations and under the proposed project would be handled according to existing and applicable state and federal regulations and would be limited to fuels, oils and other materials used in the operation and maintenance of landfill equipment and vehicles. The operation and refueling of heavy construction equipment does have the potential to result in spills and leaks of fuels, oils and other liquids. Vehicles used in existing landfill operations are maintained and fueled on site. A vehicle maintenance facility is used to service the equipment, including oil changes, fueling and other typical maintenance activities. Waste oil currently is collected in an on site storage tank which is emptied and hauled away by a certified commercial hauler. Disposal of waste oil, either in a certified landfill or by recycling, is the responsibility of the waste hauler. The use of hazardous materials and generation of hazardous wastes would continue under these existing on site programs over the extended life of the FRB Landfill under the proposed project.

The nearest existing and/or planned residential use is approximately 0.3 mile from the existing boundary of the FRB Landfill. Similar to existing conditions, no hazardous wastes would be disposed of at the landfill under the proposed project. Required compliance with CIWMB, AQMD and IWMD programs and applicable OCFA, safety and hazardous waste regulations would reduce potential impacts related to hazardous wastes at the FRB Landfill under the proposed project to below a level of significance. No mitigation is required.

There are no existing or proposed schools within one-quarter mile of the FRB Landfill and no hazardous wastes will be disposed of in this landfill under the proposed project. The existing landfill design, including methane gas collection and groundwater monitoring facilities, provides environmental controls for the landfill to operate in a safe and sanitary manner. Therefore, the proposed expansion will not result in impacts related to hazardous emissions within one-quarter mile of a school near the FRB Landfill. No mitigation is required.

The FRB Landfill project site is not listed as a hazardous materials site. The landfill accepts only Class III municipal solid wastes. No mitigation is required.

The FRB Landfill is within two miles of the former Marine Corps Air Station (MCAS) El Toro. The adopted land use plan for the former MCAS property includes recreation, educational, cultural, residential, office, industrial and public use facilities but does not include any aviation uses. There are no existing or planned airports or airport land use plans within two miles of the FRB Landfill. No mitigation is required.

There are no private airstrips in the immediate vicinity of the FRB Landfill. Therefore, the proposed project would not result in significant adverse impacts related to safety hazards for people residing or working in this area. No mitigation is required.

The FRB Landfill is in unincorporated Orange County and is in the Sphere of Influence (SOI) of the City of Irvine. The County has not adopted an emergency response plan or an emergency evacuation plan for unincorporated areas. The City of Irvine has adopted an emergency response plan; however, the City's GP Safety Element does not identify designated evacuation routes. Trucks carrying refuse to the FRB Landfill use Sand Canyon Avenue and a segment of Portola Parkway. These trucks do not substantially affect traffic on roads surrounding the landfill property and are not expected to impede evacuation or emergency response plans in the event of a major emergency. The proposed project would result in an increase in the permitted number of daily refuse truck trips to the FRB Landfill but would not result in significant adverse impacts related to interference with an adopted emergency response plan or emergency evacuation plan since. No mitigation is required.

The City of Irvine GP designates the area surrounding the FRB Landfill as a hazardous fire area due to the presence of dry vegetation. There is a remote possibility of fire at the landfill itself from combustible refuse, vegetation or litter being ignited by sparks from vehicles, lighted cigarettes or matches thrown from vehicles. However, this potential risk is addressed in the design and daily operations of the landfill. Landfilling under the proposed project is not anticipated to have a significant adverse impact on the occurrence of wildland fires in the area. In fact, because most of the potential fuel or combustible material is native and non-native vegetation, the risk for potential wildland fires may be reduced as a result of the grubbing, grading and vegetation removal associated with continued operation of the FRB Landfill under the proposed project. Therefore, exposure of people or structures to the risk or loss, or death involving wild land fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands would be less than significant by continued compliance with these regulations and landfill procedures. No mitigation is required.

3.14 PUBLIC SERVICES

Since 1999, the FRB Landfill has been served by OCFA Fire Station 55 located at 4955 Portola Parkway (OCFA Dispatch, personal communication, 2005).

The landfill may be subject to surface fires started by burning waste materials deposited on the working landfill face. Should this occur, the fire would be limited to the materials deposited prior to the daily application of cover materials, as fire will not generally propagate through cover soil. The Orange County Fire Authority (OCFA) has procedures for the prevention of fires at waste disposal sites. Current practices at this landfill to reduce the potential for fire and for rapid control of fires, should they occur, include keeping fire extinguishers on site, frequent site watering for dust control, on site water storage, prohibiting smoking on site, clearing vegetation and fire breaks.

Fires could be caused at this landfill when combustible refuse, vegetation or litter in the landfill is ignited by sparks from vehicles, lighted cigarettes or matches thrown from vehicles or from tipping of hot or smoldering loads. The design and operation of the landfill incorporates fire safety requirements. The proposed project at the FRB Landfill would potentially result in a minor increase in demand for fire protection associated with the increased life of the landfill under the proposed project. It is anticipated that existing personnel and equipment at Fire Station 55 will be adequate to provide fire protection services to the FRB Landfill under the proposed project. No mitigation is required.

The FRB Landfill is served by the Orange County Sheriff’s Department. The nearest Sheriff’s facility to the FRB Landfill is located at 550 N. Flower Street in Santa Ana. The existing Sheriff's services in the area would be adequate to meet the demand for police protection services under the proposed project since extending the life of the landfill would not require additional services beyond those currently provided. In addition, private security is provided at this landfill for patrol purposes. Therefore, the proposed project will not result in adverse impacts related to police services at the FRB Landfill. No mitigation is required.

The proposed project will not adversely impact schools because no population increase or shifts in population will occur as a result of the project at the FRB Landfill. No mitigation is required.

The proposed project at the FRB Landfill would not entail the construction of residential or commercial uses that would result in an increase in park usage. Therefore, the proposed project is not anticipated to contribute substantially to the need for new/altered government facilities/services in parks. No mitigation is required.

The ultimate use for the FRB Landfill, after the termination of landfilling, is a passive regional park. That post closure park use is identified on the County of Orange Master Plan of Regional Recreational Facilities and is not part of the proposed project.

The proposed project will require some permit processing by the County of Orange. However, the proposed project is not anticipated to adversely affect the County's overall ability to provide permitting services Countywide. There may be brief temporary periods requiring additional personnel, such as during site development activities; however, the potential increase in employees and any other changes are not anticipated to result in the need for new or altered government facilities or services such as libraries or jails. Therefore, the proposed project at the FRB Landfill will not result in adverse impacts related to other governmental services. No mitigation is required.

The proposed project will result in an incremental increase in the need for road maintenance because the traffic generated on roads leading to the FRB Landfill would occur over a longer timeframe due to their extended lives. However, this increased maintenance responsibility for the County of Orange and City of Irvine will be minor and will be financed by the General Fund revenues and other funding sources budgeted by these agencies for road maintenance. Therefore, the proposed project at the FRB Landfill will not result in significant adverse impacts related to road maintenance. No mitigation is required.

3.15 UTILITIES AND SERVICE SYSTEMS

There may be brief temporary periods requiring additional personnel, such as during site development activities. The FRB Landfill has a septic system (for operations building and crew quarter buildings) in place that is periodically serviced which would be sufficient enough to accommodate additional personnel. There are no wastewater, sewage or sewage lines at the FRB Landfill. Therefore, the proposed project would not result in the construction of new or expanded water or wastewater treatment facilities.

The proposed project would not result in the need for the off-site construction of new or expanded stormwater drainage facilities. Under the proposed project, the existing on site storm water collection system, which consists of a series of drainage channels, berms, interceptor ditches and sedimentation basins, would be expanded for the proposed landfill expansion areas, as necessary. The project related storm flows and runoff from the landfill property will be controlled on site to discharge at pre-developed flows. Therefore, no new or expanded off site storm drain facilities will be required. The proposed project will not result in adverse impacts related to storm water drainage facilities. No mitigation is required.

The proposed project at the FRB Landfill would extend the operating life of this landfill. Therefore, the proposed project will result in an increase in the total amount of water needed over time at the landfill, for employee sanitary uses, dust control for earthwork, on site road construction and other on site improvements. However, the proposed expansion is not anticipated to result in a substantial increase in the amount of water currently used daily at the landfill because the additional personnel would be temporary during site development and the increase in TPD at the landfill will not increase substantially under the proposed project. The existing water facilities and supplies serving the landfill are anticipated to be adequate to continue providing water to the landfill over the extended life of the FRB Landfill under the proposed project. Therefore, the proposed project will not result in significant adverse impacts related to water treatment and distribution facilities. No mitigation is required.

The proposed project expansion at the FRB Landfill will increase the life of the landfill and will result in an increase in the total amount of sewage generated by the IWMD land uses (office, administrative, maintenance) at the landfill over the extended life of the landfill. There may be brief temporary periods requiring additional personnel, such as during site development activities. However, the existing septic system at the landfill is adequate to accommodate the additional personnel over the extended life of the landfill under the proposed project. The existing septic system would be relocated or extended to accommodate the relocation of the entrance facilities and scales/scale house but, no wastewater facilities upgrades or total expansion of wastewater would be required. Therefore, the proposed project will not result in significant adverse impacts related to wastewater treatment capacity. No mitigation is required.

The proposed project will extend the life and capacity of the FRB Landfill. The proposed project itself will not result in the generation of MSW and is proposed to meet existing and future needs for MSW disposal in Orange County. Therefore, the proposed project will not result in adverse impacts to MSW disposal. No mitigation is required.

SECTION 4.0
PROJECT DESCRIPTION

SECTION 4.0
PROJECT DESCRIPTION

4.1 PROJECT LOCATION

The project site is located in unincorporated Orange County, at 11002 Bee Canyon Access Road, near the City of Irvine. Access to the landfill is from the Santa Ana Freeway, (Interstate 5, I-5); San Diego Freeway (Interstate 405, I-405), and the Eastern Transportation Corridor (State Route 133, SR 133). The major cross streets in the vicinity of the landfill are Sand Canyon Avenue, and Portola Parkway, with access to the landfill from Bee Canyon Access Road. Figure 4-1 shows the location of the Frank R. Bowerman (FRB) Landfill.

4.2 ENVIRONMENTAL SETTING

The FRB Landfill is located on the southwestern flank of the Santa Ana Mountains near Irvine in Orange County, California. The Santa Ana Mountains are a northwest trending chain that is part of the Peninsular Range Geomorphic Province that separates the Orange County Coastal Plain from the Elsinore Basin.

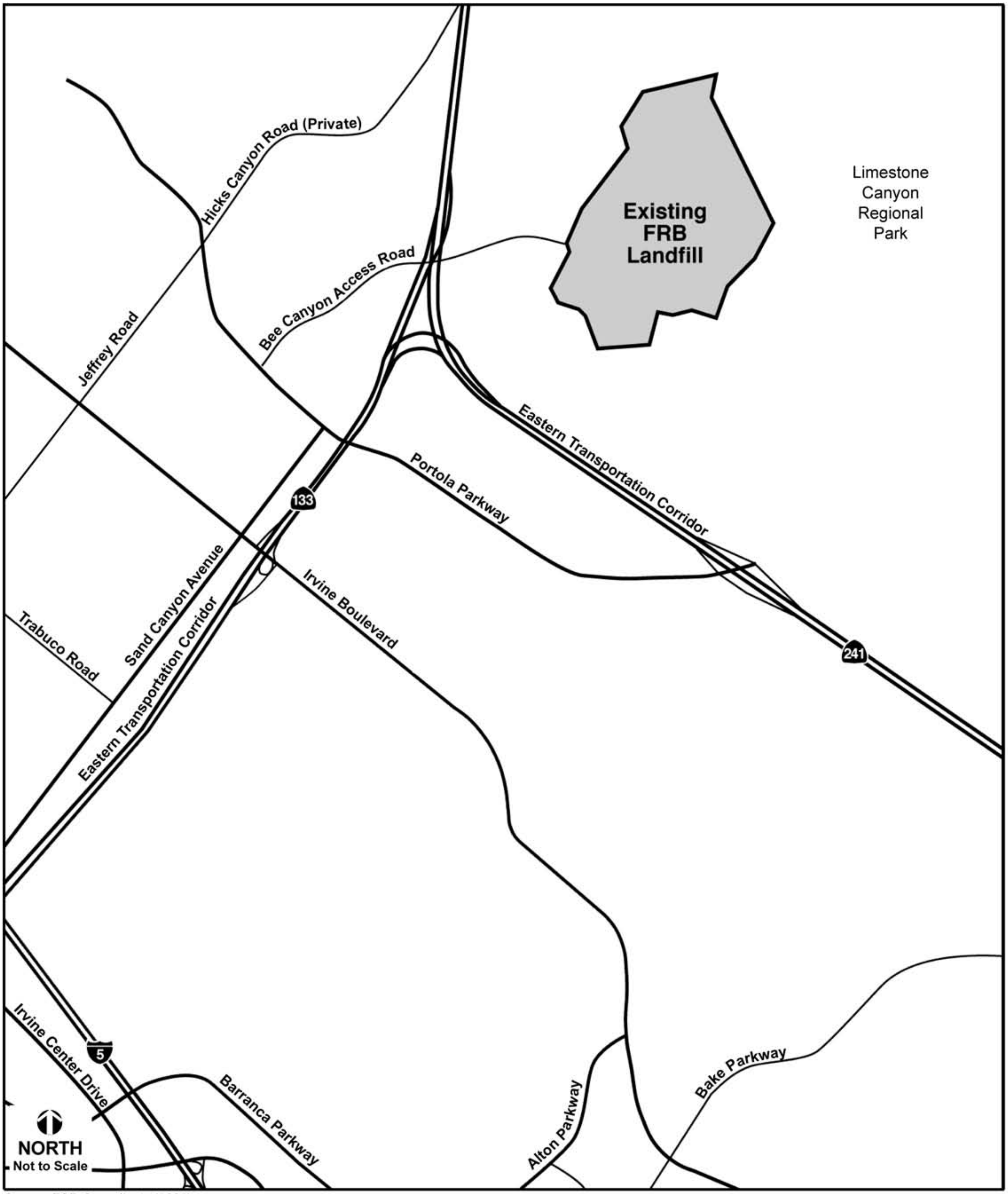
The FRB Landfill is situated in the headwaters of the Bee Canyon drainage which has been modified by cut and fill grading to allow for placement of liner on the bottom of the canyon and adjacent side slopes. The highest slopes are located in the northeast corner of the site, and rise to a maximum elevation of approximately 1,760 feet above mean sea level (AMSL). The mouth of Bee Canyon opens to the south near the 241 Foothill Transportation Corridor and the former El Toro Marine Station. The lowest portion of the site is coincident with the Bee Canyon drainage at an elevation of approximately 550 feet AMSL.

The FRB Landfill property covers approximately 725 acres with 341 acres currently permitted for waste disposal. Figure 4-2 shows the landfill property and the currently permitted horizontal and vertical limits of landfilling. The FRB Landfill is located in an area designated by the Orange County General Plan as Open Space Reserve (OSR) and by the City of Irvine General Plan as Conservation Open Space Preservation (COSP) and is part of the Orange County Central and Coastal Sub region Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) Reserve. A more detailed discussion of land use designations is included in Section 5.1 with land use plan designations for the FRB Landfill area presented in Figure 5.1-1 for the City of Irvine and Figure 5.1-2 for the Orange County General Plans.

4.3 PROJECT DESCRIPTION

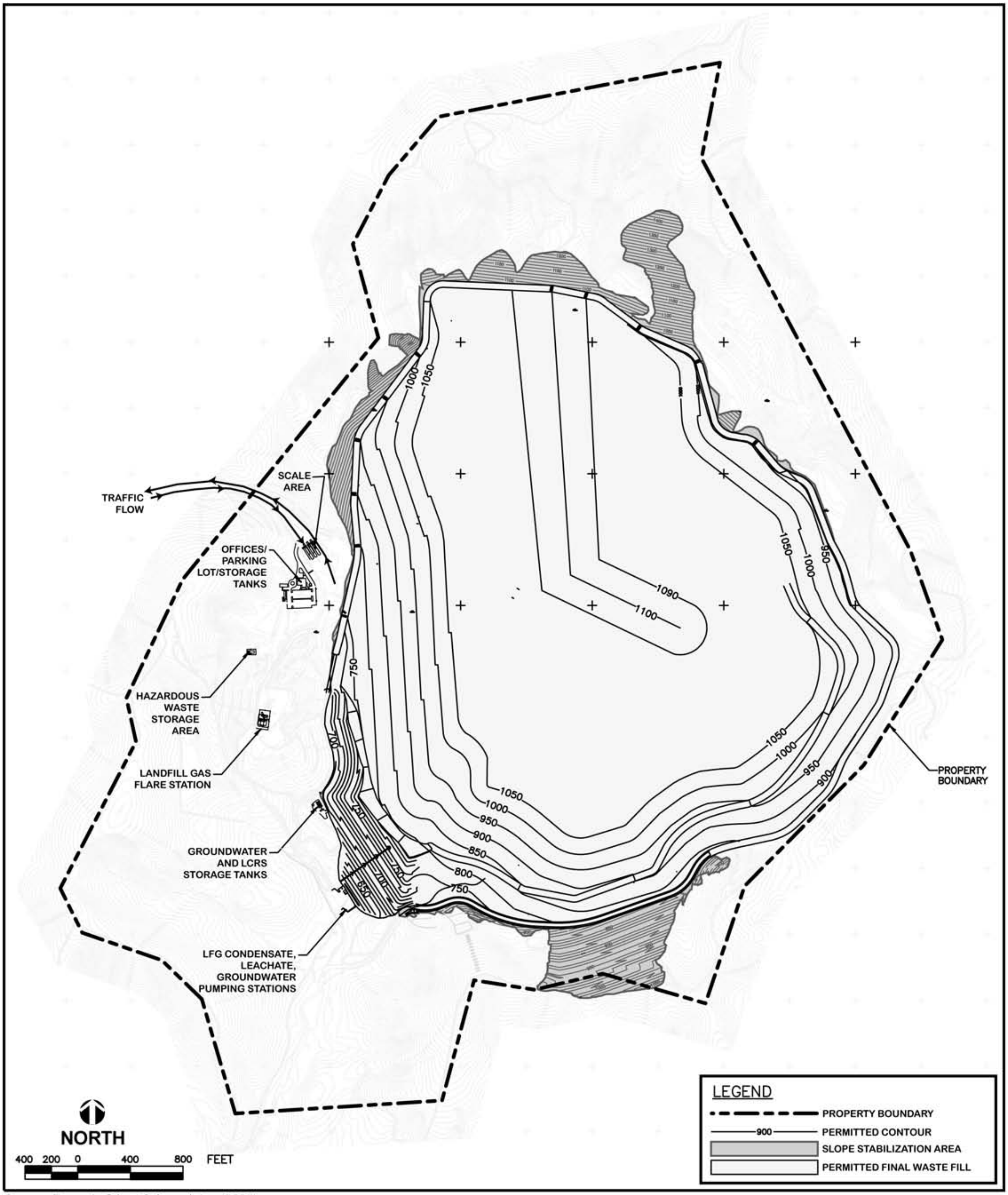
4.3.1 PROJECT OBJECTIVES

The objectives of the proposed project at the FRB Landfill, which were derived from the adopted Regional Landfill Options for Orange County (RELOOC) Strategic Plan goals and objectives, are:



Source: P&D Consultants (2005).

Figure 4-1
Frank R. Bowerman Landfill



Source: Bryan A. Stirrat & Associates (2005).

Figure 4-2
Permitted Landfill Limits

- Ensure that the long term disposal needs of the County's Solid Waste System are met.
- Maximize capacity of the existing landfills, including the FRB Landfill.
- Ensure adequate revenue and maintain local control of waste disposal for as long as possible to provide consistent and reliable public fees/rates.
- Maintain efficient, cost effective and high quality IWMD operations.
- Minimize adverse environmental impacts.

In addition, the FRB Landfill project includes slope stabilization associated with remediation of on-site landslides. A major landslide which occurred in 2002 has effectively reduced the permitted remaining disposal area for the site, which in turn has decreased the available airspace by over 40 mcy. The decrease in remaining available air space has, in effect, reduced the projected site life to 2014. As a result, IWMD re-evaluated and re-designed the site's Master Development Plan for future operations. The new Master Development Plan includes slope stabilization for the remediation of on-site landslides, including areas both within and immediately outside the property boundary for the landfill. The following project objective addresses the intent of the proposed project to provide for landslide remediation:

- Remediate and stabilize landslide areas to comply with 27 CCR in the landfill area and to protect and provide for future landfilling capacity on the landfill property.

The following objective addresses the intent to reduce potential impacts on biological resources associated with cover soil acquisition and stockpiling:

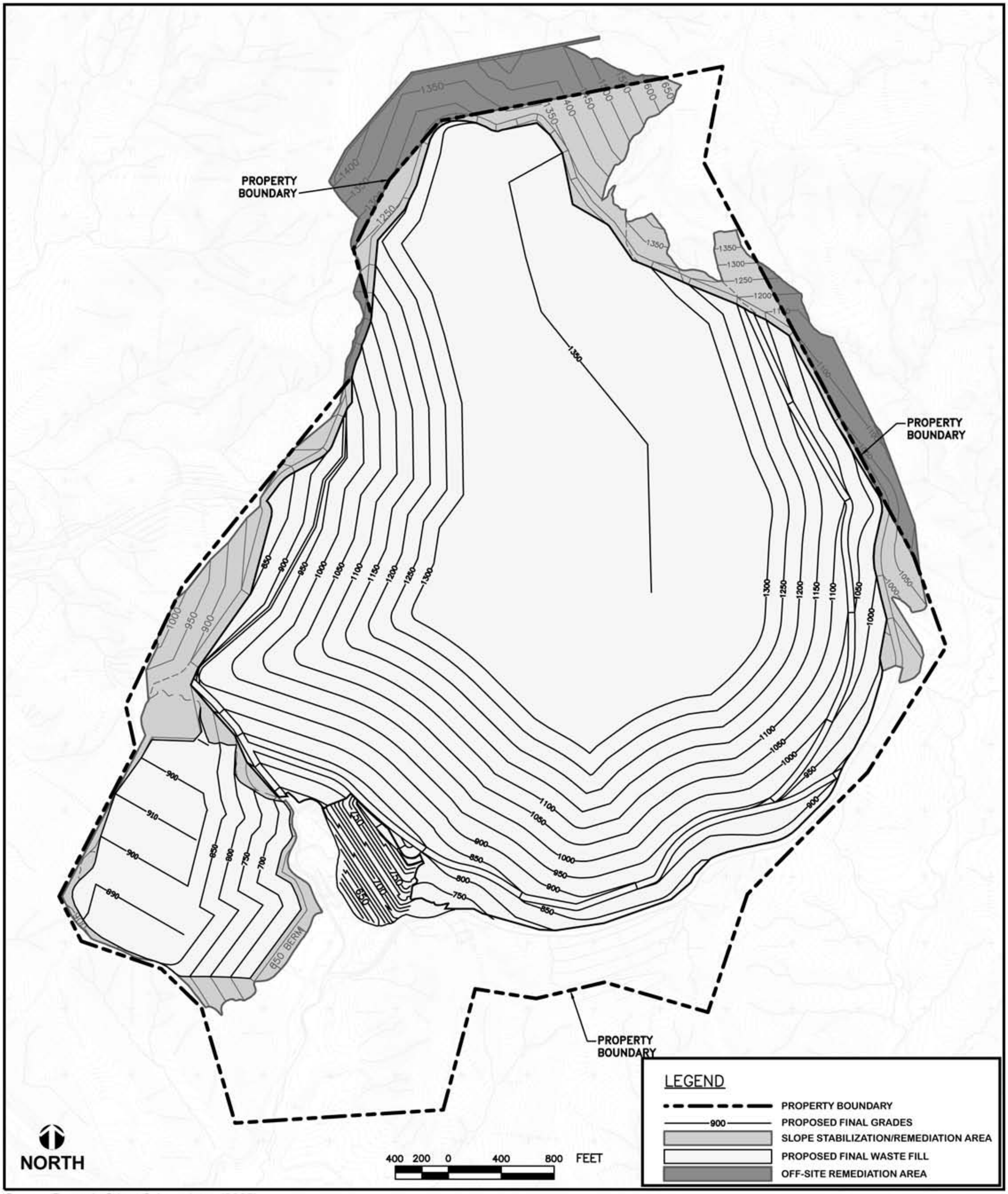
- Provide for soil management needs on-site to avoid impacts on adjacent canyons.

4.3.2 PROPOSED PROJECT

The RELOOC Strategic Plan identified a number of proposed short- and long-term improvements to the three existing MSW landfills operated by IWMD. A detailed discussion of the RELOOC Strategic Plan is provided in Section 4.5.1. The RELOOC improvements proposed for the existing the FRB Landfill are:

1. Maximize capacity at the FRB Landfill which would be accomplished with phased vertical and horizontal expansions of the FRB refuse footprint within the existing property boundary, as shown on Figure 4-3. These phased expansions would result in increased capacity (approximately 130 mcy of additional capacity over the permitted capacity) at this landfill and would result in an extension of the life of this landfill from the current effective closure date of 2014 (and the permitted closure date of 2022) to approximately 2053. An increase in refuse density is also proposed to maximize capacity due to the use of better compaction equipment.

2. An annual average of 8,500 TPD of MSW, with an increase in the daily maximum TPD of 11,500 TPD.



Source: Bryan A. Stirrat & Associates (2005).

Figure 4-3
Proposed Landfill Expansion

In addition, the following project component addresses remediation of the on-site landslides:

3. Temporary disturbance outside the property boundary to remediate on-site landslides through slope stabilization.

The following project component reflects the desire of IWMD to reduce potential biological resources impacts associated with cover soil acquisition and stockpiling at the FRB Landfill:

4. A Soil Management Plan that preserves adjacent canyons by stockpiling operational dirt on the landfill site.

The following project component reflects the desire of IWMD to minimize impacts of the landfill design and operations on native plant and animal species:

5. Provisions to ensure that plant and animal habitats on the landfill property continue to be planned for and protected. These provisions are based in part on the adopted Natural Communities Conservation Plan (NCCP) for the Central Coastal region of Orange County and that requires no net loss of subregional habitat value. In addition, the project has been configured to avoid disturbance to existing biological mitigation-sites on the landfill property.

The following project component reflects the desire of IWMD to minimize impact of landfill operations on the circulation network.

6. IWMD is considering changing the hours of operation at the landfill from 7:00 A.M. to 5:00 P.M. to 6:00 A.M. to 4:00 P.M. Under changed operating hours of 6:00 A.M. to 4:00 P.M., transfer trucks only are proposed from 6:00 A.M. to 7:00 A.M.

This Draft EIR for the proposed project will analyze the potential environmental impacts associated with these project components and with continued operation of the FRB Landfill.

4.3.3 PROJECT MODIFICATIONS

4.3.3.1 Increased Tonnage and Expansions at the FRB Landfill

An increase in the permitted daily tonnage rate of 8,500 TPD to a maximum of 11,500 TPD is being proposed to accommodate high tonnage days within the limits of the RELOOC projected system demand (assuming the existing Prima Deshecha Landfill permitted refuse inflow rate of 4,000 TPD). The EIR for the proposed project will analyze the impacts of an 11,500 TPD maximum daily refuse inflow rate while maintaining the current 8,500 TPD limit as an annual average. The increase in maximum daily tonnage to 11,500 TPD would address long term planning goals established in the RELOOC Strategic Plan and could also accommodate the existing, approved high tonnage days at the FRB Landfill.

The expansion of the FRB Landfill would provide an additional MSW capacity of 130 million cubic yards (mcy) over the current permitted capacity which would extend the remaining life of the landfill from its current effective closure date of 2014 (based on remaining capacity reduction without landslide stabilization) and permitted closure date of 2022 to approximately 2053, based on an annual average refuse inflow rate at the currently permitted limit of 8,500 TPD. The annual average refuse inflow rate of 8,500 TPD is the base assumption for the proposed project and all the alternatives except those that propose an increase in the annual average to 11,500 TPD when Olinda Alpha Landfill closes.

The total airspace capacity of the FRB Landfill is based on the Master Development Plan (MDP) completed by Bryan A. Stirrat & Associates for the site in November 2004. The MDP provides a remaining capacity of 226,300,000 cubic yards (cy), as of October, 2002 (base topographic date for the MDP) through Phase XI. The refuse capacity for the site used to determine site life assumed a refuse density of 1,450 pounds lbs/cy and a 4:1 refuse-to-soil ratio consistent with the RELOOC Strategic Plan recommendations.

As proposed, the height of the FRB Landfill would be increased from its current permitted level of 1,100 feet AMSL to about 1,350 feet AMSL or a net vertical increase of approximately 250 feet. This maximum build out elevation does account for final cover (estimated to be approximately 4 additional feet of soil over the intermediate cover). It should be noted that the current elevation for landfill operation is approximately 950 feet AMSL.

The horizontal expansion would include landform modifications to provide for approximately 193 additional acres of refuse footprint area over the currently permitted refuse footprint of 341 acres (total proposed project refuse footprint approximately 534 acres). Expansion of the refuse footprint would be contained within the existing 725 acre landfill property. A total of 130 additional acres is proposed to be disturbed beyond the permitted disturbance area of 525 acres (total proposed project disturbance area approximately 655 acres).

4.3.3.2 Slope Stabilization

Slope stabilization is required for the site to remediate future lined areas underlain by landslides in order to provide a stable subgrade for the landfill liner containment system. Slope stabilization proposed in the northern portion of the site is required for the next phase of development and is proposed to be initiated immediately upon obtaining project approvals. Approximately 34 acres outside the landfill property boundary (to the north and east) are currently proposed to be included within the disturbance limits for landslide remedial grading. This acreage does not include previous disturbance area outside the southern property boundary for the Phase VD development (see Figure 4-2). Remedial grading is authorized in off-site areas under a Fourth Amendment to the Irrevocable Offer of Dedication (IOD) for Limestone-Whiting Wilderness Park, dated May 2004. The IOD identifies a total of 50 acres outside the landfill property boundary which encompasses the 34 acres identified for remedial grading.

After construction of the slope stabilization measures is complete, the disturbed areas outside the landfill property will be revegetated in native plant species similar to the species located in that area prior to the project disturbance. The IOD places other permit conditions on the remedial grading for erosion control and drainage. The proposed on-site slope stabilization and off-site remediation areas are shown on Figure 4-3.

4.3.3.3 Soil Management Plan

The FRB Master Development Plan proposes several on-site stockpile locations for soil excavated as part of landfill phase development and operations. All soil stockpiles are proposed within the landfill property to avoid impacts on adjacent off-site canyons. The MDP, which provides remediation of on-site landslides and maximizes capacity, results in a dirt shortage prior to landfill closure. Therefore, the site's soil management plan includes recommendations to accept free soil for stockpiling and to consider alternative daily covers (ADCs) that may be available in the future which further increase refuse-to-soil ratios (as further discussed in Section 4.3.5).

4.3.3.4 Native Plant and Animal Preservation

The conceptual excavation and refuse fill plans for the proposed project were developed to avoid the existing biological mitigation sites on the landfill property which were implemented as a result of previous permits and mitigation associated with the existing operations at the landfill. All soil management activities, excavation and refuse fill locations and the associated movement and storage of heavy equipment, hauling routes and ancillary activities protect these areas by avoiding them during the operations associated with the proposed project.

4.3.4 ENVIRONMENTAL PROTECTION ELEMENTS

The design for landfill operations includes a number of environmental protection elements which respond to applicable local, state and federal regulations. These elements include compliance with surface and groundwater monitoring and protection requirements, and air and LFG monitoring and protection requirements. The following controls exist for the current landfill operations and will be expanded in support of the proposed project.

4.3.4.1 Groundwater Protection Systems

Leachate is liquid which passes through a landfill, coming in contact with disposed wastes and possibly absorbing contaminants. The sources of moisture in a landfill may include rainfall which infiltrates the surface cover and moisture in the refuse.

Landfill regulations impose requirements to minimize the production of leachate by reducing the potential for infiltration. Infiltration reduction is accomplished by prohibiting disposal of liquid wastes in the landfill, effective drainage management which diverts surface water flows away from the landfill, placement of a subdrain system on the slope and at the bottom of the landfill, and placement of daily, intermediate and final cover. Figure 4-4 presents typical drainage and leachate controls for a landfill.

All fill areas at the FRB Landfill are lined in accordance with the prescriptive design standards required by federal regulations in 40 CFR, Section 258.40. The liner system design for the FRB Landfill consists of the following components:

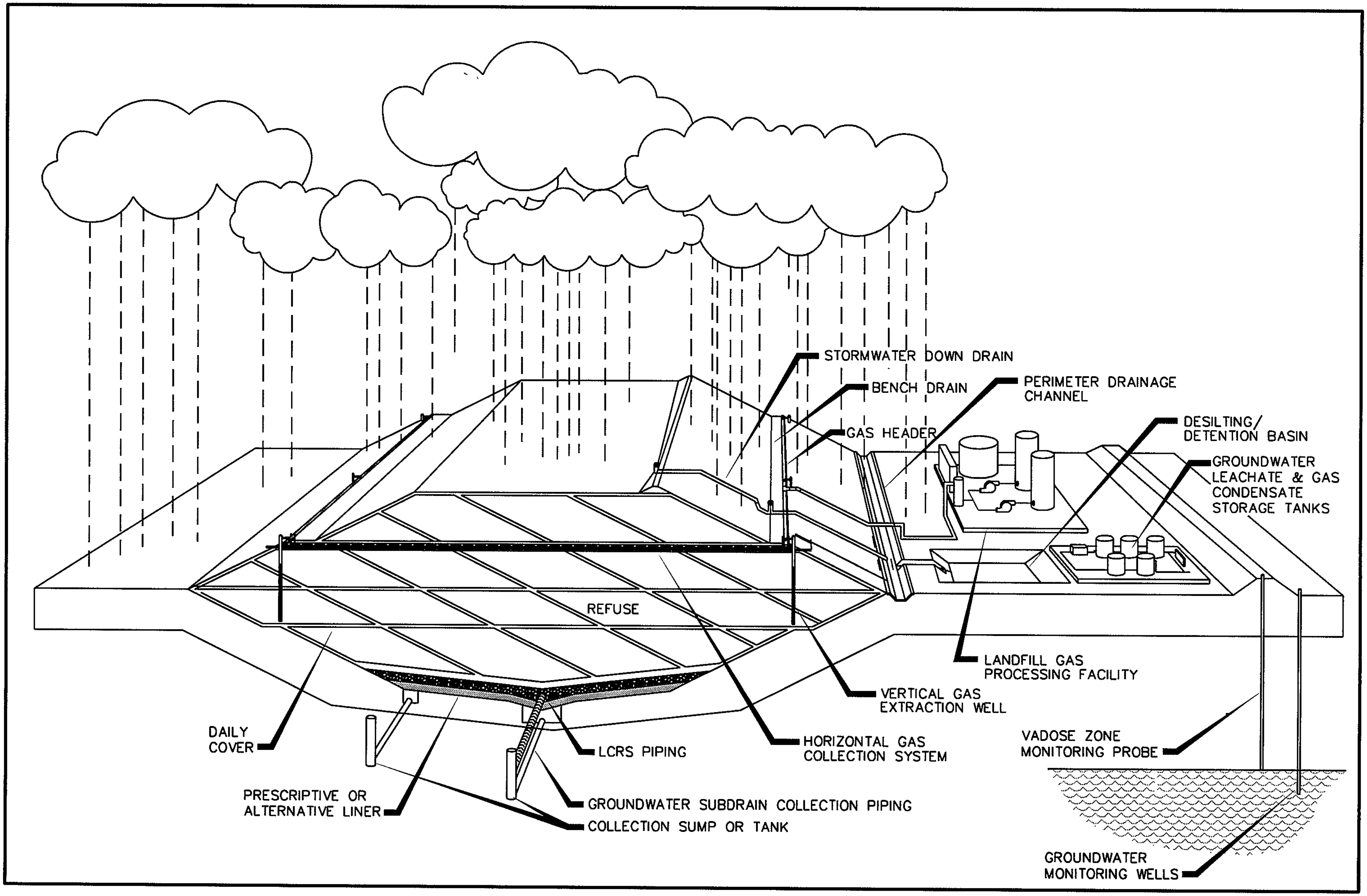


Figure 4-4
Typical Landfill Drainage and Leachate Controls

- **Bottom Liner System Design.** The bottom area liner section includes (from top to bottom):

  - Minimum 24-inch thick protective soil cover layer.
  - Geotextile.
  - 12-inch thick drainage gravel layer for leachate collection.
  - Geotextile.
  - 60-mil high density polyethylene (HDPE) geomembrane or a 80-mil HDPE geomembrane.
  - 24-inch thick compacted low-permeability ($1x10^{-7}$ cm/sec) soil liner or geosynthetic clay liner (GCL) and 12-inch low-permeability ($1x10^{-6}$ cm/sec) soil liner.
  - Subdrain system.

- **Slope Liner System Design.** The slope liner system design (e.g., sections with gradients greater than 5:1), includes (from top to bottom):

  - 24-inch thick protective soil cover layer.
  - Geotextile (16 ounce).
  - 60-mil minimum HDPE geomembrane or a 80-mil HDPE geomembrane. No side slope liner was constructed in Phase IIIB.
  - GCL or 24-inch thick low-permeability ($1x10^{-7}$ cm/sec) soil layer.
  - Geotextile for upper GCL only (Phases I, II and III).
  - A subdrain system.

- **Geosynthetic Materials.** Three types of geosynthetic materials are used in the construction of the liner system. These include:

  - **Geomembrane.** 27 CCR, Section 29330, specifies a minimum geomembrane thickness of 60 mils if HDPE geomembrane is utilized. The existing liner system for the FRB Landfill utilizes both 60- and 80-mil HDPE geomembranes.
  - **Geotextiles.** Although geotextiles are not required by regulation, geotextiles are used in the FRB Landfill liner system to minimize fine soil particle migration from the liner and protective soil layers into the various underlying subdrains and LCRS drainage layers and to provide cushioning protection of the HDPE geomembranes.

- **Geosynthetic Clay Liner.** A geosynthetic clay liner is comprised of carrier geosynthetic components (either two geotextiles or a single geomembrane) bonded to a layer of low-permeability sodium bentonite clay. GCL's are used typically to replace the soil liner component (24-inch thick low-permeability soil) of a composite liner system.

- **Low Permeability Soil Liner Component.** Liner construction is monitored under extensive Construction Quality Assurance (CQA) guidelines. The material for the low-permeability liner is prepared by using on-site or off-site material processed by crushing, screening and moisture conditioning to achieve the required low-permeability performance criteria.

The leachate collection and removal system (LCRS) consists of a free draining sand or gravel layer and a network of leachate collection pipes. The drainage layer consists of either granular coarse sand or pea gravel with a permeability greater than 1×10^{-2} cm/sec. Future phases of the landfill leachate control system drainage layer are proposed to consist of a gravel layer with a minimum 1×10^{-2} cm/sec permeability or an equivalent geocomposite drainage layer (subject to agency approval). Gravel is not available on-site so it must be imported to the site. The leachate piping system is composed of a dendritic system of pipes connected to trunk lines which carry the leachate towards a collection sump at the toe of the landfill (Phases I through VD) where the leachate is pumped to above-ground storage tanks. The Phase VII-A and VII-B leachate control system is a separate system of dendritic leachate lines connected to a main trunk line. The trunk line drains to the southwest corner of Phase VII-A into a leachate sump at the main landfill access road. A dual wall pipe (6-inch carrier pipe in 8-inch containment pipe) gravity drains leachate from the leachate sump to above-ground storage tanks located at the toe of the landfill.

The spacing of the leachate pipes is dictated by the slope of the liner and the permeability of the drainage blanket material. The spacing is designed to limit the build-up of a leachate hydraulic head on the underlying composite liner to no more than one foot.

The leachate collection pipe is a slotted 6-inch or 8-inch diameter Schedule 80 PVC or HDPE pipe embedded within the drainage layer. The particle size of the gravel around the pipe is selected to prevent particles smaller than the specified slot dimensions from entering and clogging the collection pipes. Collected leachate is either pumped or drained by gravity into above-ground storage tanks at the toe of the landfill.

A subdrain system is installed 1) where groundwater seeps are encountered, 2) where horizontal buttress drains have been installed to drain landslide areas and/or 3) under the proposed base liner and side slope liner areas . The subdrain system underneath the bottom liner system consists of a 4” or 6” slotted HDPE or PVC pipe encased in a gravel-filled trench.

The groundwater monitoring program for the FRB Landfill was developed to comply with 27 CCR Article 1 requirements as implemented through site-specific WDR Order Nos. R8 2002-0049, 98-99, 97-70, 96-67 and 89-01 issued by the Santa Ana RWQCB.

The overall objectives of the water quality monitoring system for the FRB Landfill are to:

- Characterize background groundwater quality.
- Detect changes in water quality that may result from changes in groundwater recharge or possible landfill leakage or landfill gas impacts.
- Monitor groundwater elevations and gradients to determine groundwater flow directions and velocities around the FRB Landfill.
- Monitor the effectiveness of the implemented Corrective Action Program (CAP) and make recommendations for subsequent upgrades and improvements.

4.3.4.2 Air Quality Protection Systems

Landfills which receive organic wastes eventually produce landfill gas. This gas generally consists of equal amounts of methane and carbon dioxide along with traces of other constituents. State and federal regulations require the control of landfill gas to prevent it from migrating away from the landfill boundaries and accumulating in off-site structures. In addition, local air pollution control districts and state and federal air quality regulations require the control of emission into the atmosphere.

The gas recovery and disposal system at the FRB Landfill consists of a network of horizontal and vertical collection wells and a series of flares. Horizontal collection pipes are installed across the fill area where refuse has been placed. Vertical extraction wells have been placed at the FRB Landfill along the benches at the existing westerly and northerly slope areas. Collected gas is currently destroyed in the flares. The system, including additional horizontal and vertical collection wells and flares, will be expanded as the landfill is developed to provide ongoing control within the performance criteria established and mandated by the SCAQMD and state and federal regulations.

LFG monitoring is performed at the FRB Landfill in general accordance with Rule 1150.1 Permit Compliance Plan which was approved by the SCAQMD on March 10, 2000 and in accordance with 27 CCR monitoring requirements. The monitoring program includes integrated surface monitoring, instantaneous surface monitoring, ambient air monitoring, LFG sampling from the collection system (i.e. raw gas analysis), perimeter gas (vadose zone) monitoring, and gas condensate monitoring.

As LFG flows through the LFG collection system, it cools and moisture in the landfill gas condenses, resulting in a liquid called condensate. Gas condensate is collected in an above-ground condensate storage tank located adjacent to the above-ground leachate storage tanks. Secondary containment is provided for the condensate storage tank. In addition, the IWMD has the potential to retrofit the flare to combust condensate and other liquids in the future.

4.3.4.3 Drainage and Erosion Control Systems

The primary function of the surface water drainage and erosion control system is to minimize erosion and to convey surface waters around the refuse cells and off the landfill in order to minimize surface water infiltration into the refuse prism. The primary surface water drainage control system for the FRB Landfill is designed to accommodate a 100-year, 24-hour storm event. The drainage system is comprised of drainage ditches and channels, various down-drain structures, and desilting basins. The primary drainage channels are the east and west perimeter drainage channels. The west perimeter drainage channel drains into the permanent concrete-lined west desilting basin that is located to the southwest of the active fill area. For the eastern perimeter drainage system, twin 60-inch corrugated HDPE pipes have been installed as of December 2005. A small inlet desilting basin located upstream of the twin pipes traps sediments prior to entering the twin drainage conduits. The east and west drainage channels converge at a location south of the landfill for final discharge into the Bee Canyon Retarding Basin (owned by the County of Orange Flood Control District). Both channels are lined with reinforced concrete.

Both channels and the west desilting basin are easily accessible from an adjacent service road for regular cleaning and maintenance work. Down drains consisting of corrugated metal flumes or corrugated steel pipes are installed to divert runoff from the deck areas as well as to transport collected runoff from the drainage benches. V-shaped drainage benches are generally maintained along the benches to collect runoff from the slope areas. Temporary desilting basins and drainage control facilities are constructed as necessary for proper drainage control throughout the life of the landfill.

The final deck areas are designed and will be constructed to a minimum slope of three percent to accommodate proper drainage and to reduce the impacts of future settlement at closure. Special attention is paid to all deck area grading and interim and final drainage control features prior to the rainy season. Erosion gullies formed during storm events on the refuse deck and slopes areas are repaired as soon as equipment can access these areas. Soil is placed, as necessary, to fill gullies and the area is track-walked by a crawler tractor to recompact the soil.

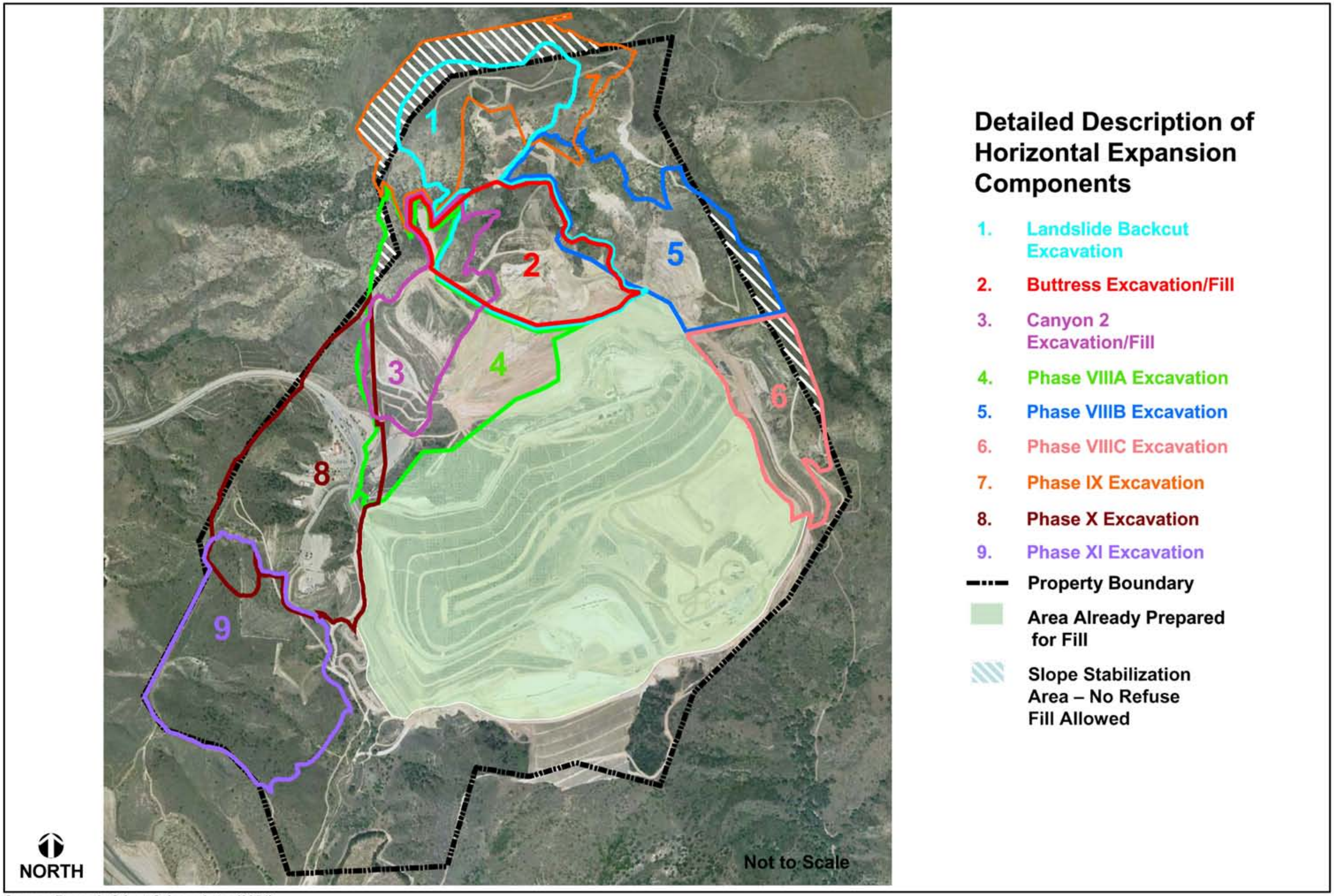
For erosion control on the refuse working face, processed green material (PGM) is spread to achieve a thickness of approximately 18 inches with a bulldozer to provide uniform coverage. The PGM is then compacted using heavy equipment to an average thickness of twelve inches.

Other erosion control Best Management Practices include hydro-seeding of excavation slopes, placement of fiber roll slope erosion checks, use of silt fences and sand bags.

The above-mentioned drainage and erosion control procedures will be continued and the system expanded as the FRB Landfill is developed.

4.3.5 PROJECT PHASING

The vertical and horizontal expansions of the FRB Landfill would be implemented in phases and would not disturb all parts of the landfill site at once (see Figure 4-5). The development of the site is proposed in incremental phases to provide for sufficient operations area and capacity and to spread capital costs over time. IWMD recently completed the last sub-phase of development for Phase VII (Phase VIIB completed in 2004). The currently permitted phasing plan for the site includes development through Phase VIII in the northern portion of the property. Thus, the new Master Development Plan includes three Phase VIII subareas (VIII A, B and C) in the general area of the previous Phase VIII (northern portion of site) and a Phase IX which brings the fill elevations in the northern portion of the site up to final grades (see Figure 4-5). A Phase X is proposed for the western portion of the site which would require the relocation of the scale facilities, office buildings and flare facilities. Potential sites for relocation of the entrance facilities could be along the access road to the landfill and the flare station relocation would be dependent upon air modeling. The final location for those facilities will be determined closer to the time for development of that phase of operation. The final phase of development for the site is Phase XI in the southwest portion of the property. Figure 4-5 presents the excavation phasing limits for the new MDP through Phase XI.



Source: Bryan A. Stirrat & Associates (2004).

Figure 4-5
Master Development Excavation Phasing

Preliminary grading plans indicate that approximately 37 million cubic yards (mcy) of soil would be excavated throughout the life of the proposed expansion of the FRB Landfill. The majority of the soil to be used for daily and intermediate cover, liner, road construction and other related uses is available on the FRB Landfill property. Although there is adequate soil available in the near term for landfill operations with proposed on-site excavation at the FRB Landfill, prior to site closure the site is projected to have a dirt shortfall assuming a 4:1 refuse-to-soil ratio. This shortfall is proposed to be remedied by accepting free soil at the site when stockpile capacity is available and/or through the use of additional ADCs that increase refuse-to-soil ratios in order to provide the total soil requirements for landfill operations. ADCs currently approved by the LEA and RWQCB for year round use at the FRB Landfill are geosynthetic blankets (tarps) and PGM. No other ADCs are proposed for the site at this time.

4.3.6 OTHER PROJECT FEATURES

The project may require that additional buildings and structures be constructed at the FRB Landfill and will require relocation of existing entrance facilities, scales/scale house, LFG control facilities and other landfill support facilities in a later phase of development (Phase X). The number of employees and equipment at the landfill is not expected to change substantially as a result of the proposed project. However, for purposes of environmental impact analysis, an increase in personnel by seven employees and, in equipment use, by up to six pieces of equipment was assumed for a continuous operation at 11,500 TPD. The proposed project is to accept 11,500 TPD on a periodic basis to accommodate high tonnage days and to maintain an annual average of 8,500 TPD. Employees would continue to perform landfill operations including administration, landfill cover operations and other landfill related operations. The operating hours and schedule at the FRB Landfill may change as a result of the proposed project. IWMD is considering changing the hours of operation at the landfill from 7:00 A.M. to 5:00 P.M. to 6:00 A.M. to 4:00 P.M. The site would continue operating six days a week, except for holidays (307 days a year).

As discussed in Section 4.3.4, surface water drainage systems, LFG collection and control systems, liner and leachate collection and recovery systems on the landfill property will be expanded, as necessary, to accommodate the proposed vertical and horizontal expansion of the FRB Landfill.

4.3.7 PROJECT APPROVALS

The principal agency having jurisdiction over the proposed project is the County of Orange because the project site is located in an unincorporated area of Orange County. However, the proposed project is within the Sphere of Influence of the City of Irvine. The project activities differ in level and scope from the level and scope anticipated in the existing Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill. To the extent required by law, adjustments and modifications to some or all of these documents will be sought to reflect the changes contemplated by the project.

In addition to the County of Orange and City of Irvine, other public agencies or entities that may also have oversight over the project or may be responsible for issuing subsequent permits necessary to implement the proposed project are identified below.

FEDERAL AGENCIES

United States Environmental Protection Agency (EPA).
United States Army Corps of Engineers (ACOE).
United States Fish and Wildlife Service (USFWS)

STATE AGENCIES

California Integrated Waste Management Board (CIWMB).
California Water Resources Control Board (CWRCB).
California Department of Fish and Game (CDFG).

REGIONAL AGENCIES

Regional Water Quality Control Board - Santa Ana Region (RWQCB).
South Coast Air Quality Management District (SCAQMD).

COUNTY AGENCIES

Orange County Health Care Agency (OCHCA)/Local Enforcement Agency (LEA).
Orange County Board of Supervisors (OCBS).
Orange County Fire Authority (OCFA).
Orange County Resources and Development Management Department (RDMD) including the Harbors, Beaches and Parks Department (HBP).

CITY AGENCIES

The Irvine Company (for use of off-site, adjacent property)

4.4 CONTINUED OPERATIONS AT THE FRB LANDFILL

The FRB Landfill opened in 1990 and its currently permitted closure date is 2022. The landfill property covers approximately 725 acres with 341 acres permitted for waste disposal. The following describes the current site operations which are proposed to continue for the proposed expansion project.

4.4.1 OPERATING HOURS

The FRB Landfill facility is open Monday through Saturday, 307 days a year. Only MSW from commercial haulers and vehicles operating under commercial status is accepted at this landfill. Commercial status is verified by either showing a business license or current tax return to a fee booth attendant or participating in the County's deferred payment account process. Hazardous materials such as asbestos, batteries, chemicals, paints, medical waste and other substances considered hazardous are not accepted at the landfill.

4.4.2 PERMITTED DAILY TONNAGE

Under the Settlement Agreement with the City of Irvine, the FRB Landfill is currently allowed to accept an annual average of 7,921 TPD (as of December, 2004) of MSW and can increase this average daily rate by 1.75 percent per year until it reaches a daily maximum of 8,500 TPD. The current SWFP for the FRB Landfill allows for a maximum daily tonnage limit of 8,500 TPD of MSW except for 36 days a year that a high tonnage limit of 10,625 TPD is allowed. These increased tonnage days are floating (not designated) and by the end of the year all 36 days may not be used. Unused floating days do not roll over to the next year. It is anticipated that most of the increased tonnage days fall immediately preceding or following a holiday. The proposed project is to maintain a limit of 8,500 TPD of MSW as an annual average and to increase the daily maximum to 11,500 TPD.

It should be noted that the 8,500 TPD inflow rate is for MSW only. Approximately 900 TPD (average for 307 days) of exempt waste (asphalt, demolition, dirt, green waste and shredder waste) was accepted at the site in 2004.

4.4.3 WASTE COMPOSITION

The waste composition at the FRB Landfill under the proposed project would not differ from that currently received at this landfill. Non-hazardous MSW comprise the waste stream and existing screening safety mechanisms would continue to be employed to ensure that hazardous materials are not accepted. Wastes received at the FRB Landfill consist of non-hazardous residential, commercial, industrial and inert waste classified in accordance with 27 CCR as Class III wastes. The Class III municipal solid waste categories are:

- Non-hazardous commercial and residential waste;
- Non-hazardous industrial wastes (except those having high liquid content [>50% liquid by weight] or other physical properties [powdery or dusty materials] which could cause health and safety or operational problems without special handling); and
- Construction/Demolition wastes destined for direct disposal.

Typical residential non-hazardous waste includes household refuse, tree and lawn clippings, leaves and brush, scrap lumber and metal, appliances, furniture, wood chips, plastic containers, newspapers, cardboard and glass containers. Commercial and industrial waste typically includes food wastes, paper, corrugated cardboard, plastic, rubber, glass, mixtures of concrete, asphalt, wood, steel, brick and block. Cathode ray tubes (CRTs) are not accepted at the FRB Landfill, which was effective for all IWMD sites as of August 2001. Universal Waste (fluorescent lamps, CRTs, instruments that contain mercury, batteries, electronics) will be prohibited for disposal at the site as of February 9, 2006. The FRB Landfill also does not handle compostable material.

The total waste stream for the FRB Landfill has been characterized and consists of 50% Commercial and Residential Waste, 30% Construction and Demolition, 20% Industrial. The percentage mix may change over time due to ongoing recycling and source reduction.

4.4.4 HAZARDOUS WASTE SCREENING

A hazardous waste screening program (HWSP) for the FRB Landfill was implemented to complement the load checking program and comply with state and federal regulations under 27 CCR. The HWSP for the FRB Landfill was developed to discover and discourage attempts to dispose hazardous or other unacceptable wastes, including polychlorinated biphenyls and CRTs at the landfill.

The waste inspectors are trained to spot hazardous wastes which may be inadvertently contained within incoming refuse loads. As part of the overall HWSP, the waste inspectors randomly select commercial, demolition and dirt loads for a detailed load check on a regular basis. The driver of the load is asked to tip or dump the load in a flat area near the working face, but away from the commercial unloading area. Designated landfill personnel then inspect, search, and sort through the load looking for prohibited wastes. If no prohibited wastes are observed, a dozer will push the load to the working face. If prohibited wastes are observed, the material is either returned to the driver or stored in the hazardous waste area until the generator can be notified.

Low level radioactive waste (LLRW) monitors were installed in the scale houses. Any vehicles whose loads are identified with LLRW are segregated and prevented from unloading. The County of Orange Health Care Agency/Environmental Health Division is notified and repeat offenders are referred to the Hazardous Waste Strike Force.

A material regulation program is also in place at the FRB Landfill, primarily for soils, where staff inspect certain material at the generator's site and determine which laboratory tests are necessary to ascertain the levels of potentially hazardous constituents present in the materials. Test samples and results are handled in a strict chain-of-custody protocol. If the test results indicate that the material is in compliance with the established guidelines it is cleared for landfilling. A Material Recovery Specialist then arranges the time and place for the disposal and informs site staff to expect the material at the landfill.

Waste Inspectors routinely inspect for and remove any hazardous materials deposited for burial which have escaped detection in the screening process or load check program. Any hazardous waste found at the site is immediately collected, categorized, and properly stored in a specially constructed storage area. IWMD contracts with a licensed hazardous waste disposal firm to remove and properly dispose of the collected materials. At no time will any materials be stored on-site more than 90 days.

4.4.5 WASTE HANDLING

To determine the tipping fees, vehicles are weighed by scales before entering the facility and are then driven to a designated area of the landfill for waste disposal. Upon acceptance of waste for disposal at the scale house, the fee collector directs the haulers to the working face of the landfill. Signs are posted along the on-site access road to guide customers to the unloading areas.

The active daily working face is approximately 150 feet wide, 150 feet deep and an average of 20 feet in height, which is sufficient to accommodate unloading of waste during an operating day. This unloading area is generally maintained at the toe of the working face so that wastes can be immediately spread and compacted. The refuse is then spread over the working face in about two-foot thick layers. The working face is sloped to 3:1 or 4:1 (horizontal to vertical) to allow proper compaction. A compactor or bulldozer then makes repeated passes over the working face to thoroughly compact the refuse. All refuse is spread and compacted in this manner to reduce voids in the daily refuse cells to inhibit vector propagation and maximize capacity. As part of the RELOOC study, more efficient compaction equipment was proposed for the FRB Landfill as a means of maximizing capacity. A higher refuse density of 1,450 lb/cy (versus 1,333 lb/cy previously assumed in the SWFP) is, therefore, assumed for future operation of the FRB Landfill.

At the FRB Landfill, the canyon fill methodology is used for refuse placement. Figure 4-6 presents a typical landfill operation. Under this methodology refuse is typically placed in lifts up to 20-feet high. Each lift is made up of numerous cells and generally consists of 19-feet of refuse topped with one foot of compacted soil cover or an approved alternative daily cover. No waste is left uncovered at the end of the working day. Daily refuse cells are built in this manner repeatedly across the landfill, up to the desired grades.

The FRB Landfill complies with all federal, state and local requirements for operation of a Class III Sanitary landfill. Site staff conduct daily inspections to ensure that the site is in compliance with all the permit conditions imposed by regulatory agencies having jurisdiction on landfills. These permitted conditions include specific procedures involving daily cover application and nuisance controls such as fire, leachate, dust, vector, bird, noise and odor control.

4.4.6 DAILY/INTERMEDIATE AND FINAL COVER PLACEMENT

4.4.6.1 Daily Cover Placement

The purpose of daily cover soil or an equivalent ADC, as approved by the LEA, is to provide a suitable barrier to the emergence of flies, prevent windblown trash and debris, minimize the escape of odors, prevent excess infiltration of surface water, and hinder the progress of potential combustion within the landfill. Daily cover in the form of soil material or an ADC is placed over all exposed refuse at the end of each working day. Daily cover consisting of soil is compacted to a minimum thickness of six inches. Soil cover is transported by scrapers to the refuse disposal area where the dirt is spread over the compacted refuse. A compactor makes two additional passes to further increase the compaction rate. In the morning, the previous night's cover is scraped off the front face of the previous day's cell in order to conserve soil.

Alternative Daily Covers (ADC)

ADCs approved by the LEA and RWQCB for year round use at the FRB Landfill are PGM and geosynthetic blankets (tarps). The benefits of ADC use are the reduction in on-site soil cover demands and maximization of airspace capacity.

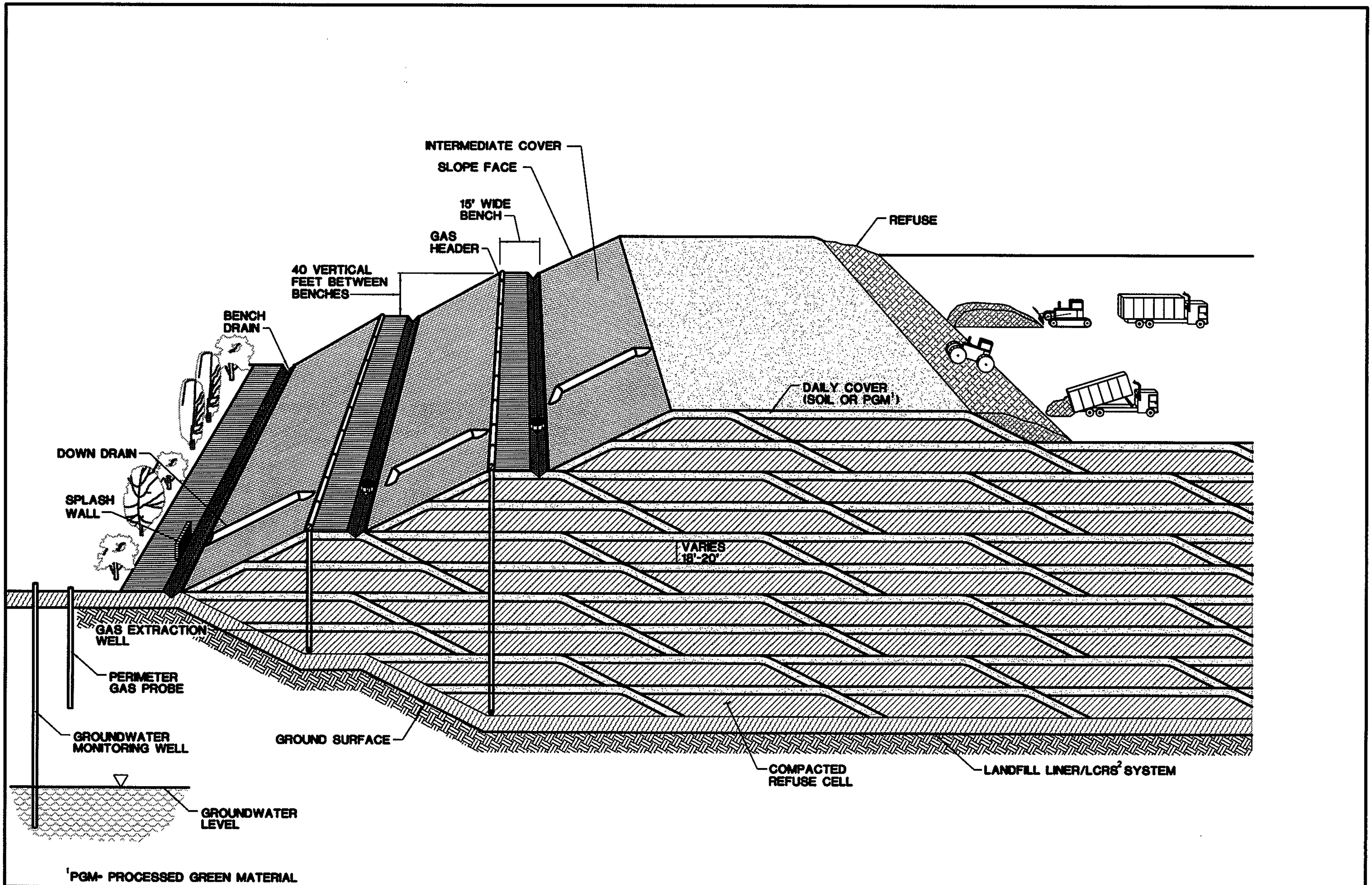


Figure 4-6
Typical Landfill Operations

Processed Green Material (PGM)

IWMD has conducted two demonstration projects using PGM and soil. Rainfall was simulated to determine moisture infiltration through the cover materials. The PGM successfully met all the requirements listed in 27 CCR, Section 20690, for use as ADC and the data demonstrated that the PGM allowed less moisture infiltration than soil and performed as well as or better than the soil as daily cover in all performance categories.

PGM is spread at a thickness of approximately 18 inches by a bulldozer to provide for complete coverage and then compacted using heavy equipment to an average thickness of 12 inches. Whenever possible, the largest equipment available is used to compact the PGM to maximize efficiency. PGM placed as cover shall not be exposed for greater than 21 days. PGM cover will be placed mainly at the end of the day, once the final refuse face for that particular day has been compacted properly.

Geosynthetic Blankets (Tarps)

The use of geosynthetic blankets as ADC at the FRB Landfill was approved by the LEA and RWQCB. The IWMD has conducted demonstration projects which showed that tarps functioned as well as or better than traditional soil cover in the following performance categories: minimizing vector attraction and emergence; controlling refuse odors; minimizing litter; controlling surface water infiltration; and maintaining fire control.

The blankets are composed of coated polyethylene woven fabric; the sides are reinforced with heavy-duty straps, which attach to construction equipment to facilitate the placement of tarps over the refuse. When the tarps are used, they are placed only on the cell's side slopes; the top deck is covered with soil. The use of tarps is restricted by weather conditions, such as rain and wind. Under these conditions, soil is used for daily cover.

Tarps are placed at the end of the day once all the refuse has been placed and compacted within the daily cell. Tarps are placed using a tarpomatic machine which is attached to a Dozer D-9. Tarps are removed early in the morning before any refuse arrives to the working face.

4.4.6.2 Intermediate Cover Placement

Intermediate cover is defined in 27 CCR as cover material on areas where additional cells are not to be constructed for 180 days or more to control vectors, fires, odors, blowing litter, scavenging, and drainage. In accordance with 27 CCR, Section 20700, a minimum 12-inch thick layer of soil cover material or equivalent (as approved by the LEA) is placed over the top, side slopes and working face of the advancing lift, refuse cell or portions of the disposal area where no additional refuse is to be deposited within 180 days. Currently, only the side slopes of the refuse fill would require intermediate cover.

4.4.6.3 Final Cover Placement

The final cover system for the FRB Landfill will be constructed in accordance with regulatory requirements and an approved Final Closure Plan. The final cover for the FRB Landfill is proposed to consist of a minimum five-foot thick compacted soil layer as an alternative cover in lieu of the prescribed final cover with a low-permeability layer. The federal regulations under 40 CFR, Section 258.60 and State regulations under 27 CCR, Section 20080(b) allow an operator to propose an alternative final cover design in lieu of the prescriptive standards. Consequently, an alternative cover design has been developed for the front face of the FRB Landfill. The design is based on an alternative cover performance evaluation performed by GeoLogic Associates (GLA) in 2001 which included office and field investigations and computer modeling. Modeling completed by GLA and available literature indicates that an alternative final cover system constructed using available on-site soils would be consistent with the performance goal addressed by the prescriptive standard and would afford equivalent or superior protection against water quality impairment. The cover design consists of a monolithic alternative final cover constructed using a minimum five-foot total thickness of soils derived from the on-site fine-grained portions of either the Sespe Formation or Vaqueros Formation and compacted to 90 percent of the maximum dry density according to ASTM D1557 (as verified through a Construction Quality Assurance program). The five-foot thickness is considered sufficient to host the root systems of the local plant communities and is of a sufficient thickness to maximize the moisture limiting characteristics of the final cover system. A field demonstration project for the proposed alternative cover was initiated in 2002. Results to date show cover performance consistent with or better than the performance of a prescriptive cover.

Closure and post-closure maintenance is not part of the proposed project. The final cover design for the site will be determined in a Partial Final Closure Plan or in a Final Closure Plan (which would be developed two years prior to closure). A cover design to support a final end use (at the time of closure) would be developed as part of a Final Closure Plan. CEQA documentation for closure and post-closure maintenance will be developed at that time.

4.4.7 NUISANCE CONTROLS

The following describes nuisance controls employed at the site in compliance with requirements in 27 CCR. Periodic inspections are performed by the LEA and CIWMB to monitor compliance.

4.4.7.1 Fire Control

Fire protection control is coordinated with local authorities and is within the requirements of the Fire Safety Program prepared by the Orange County Board of Supervisors in cooperation with the Forest Fire Protection Agencies. Fire breaks are constructed each year in compliance with the State and County Fire Protection Agencies. All flammable materials are kept a minimum distance of 150 feet from all structures. The facility is in compliance with Public Resources Code, Section 4373.

The landfill has a 96,000 gallon recycled water tank, a 4,500 gallon potable water tank, and two water trucks on-site available for fire control. Fire extinguishers with a minimum rating of 2A10

BC are required on all heavy equipment and in office/lunchroom facilities. A fire extinguisher with a minimum rating of 40 BC is located within 50 feet of any aboveground flammable liquid tanks. Flammable debris is removed from heavy equipment on a daily basis. All County issued vehicles are equipped with fire extinguishers.

Compacted soil or alternative daily covers create individual cells that would confine a fire to a relatively small area. The daily cover would also serve to limit the oxygen availability required for combustion. Fires within the vicinity of the refuse disposal areas would be extinguished immediately and covered with soil. All fires are immediately reported to the Orange County Fire Authority.

LFG-related fires (i.e. subsurface fires) typically occur inside the refuse cells. In case of a subsurface fire, one or more of the following measures are immediately implemented:

- shutting off all LFG collectors in the area of the suspected fire;
- placement of water and additional compacted soil cover, especially in/on any cracks and/or fissures in the fire area;
- installation of probes in the fire area for follow-up weekly pressure/vacuum monitoring;
- weekly monitoring of LFG temperature and carbon monoxide concentrations in wells/probes in the area; and
- operating the LFG collection system conservatively and avoiding reactionary adjustments.

4.4.7.2 Leachate Control

Leachate is liquid which passes through a landfill, coming in contact with disposed wastes and possibly absorbing contaminants. To minimize leachate generation, IWMD maintains proper grading on the landfill decks to ensure positive drainage and to minimize ponding, provides adequate daily and interim cover on refuse fills to minimize any run-off infiltration, and installs and maintains drainage and erosion controls (interim and permanent) around active and completed areas. Routine inspections are conducted and any suspected seeps are investigated and mitigated. The leachate collection system is further described in 4.5.4.1. The leachate collected is utilized for dust control on the lined portion of the landfill.

4.4.7.3 Dust Control

A Fugitive Dust Emission Control Plan for all the active landfill sites in Orange County was submitted by IWMD and was subsequently approved by SCAQMD to comply with SCAQMD Rule 403 regarding fugitive dust emission. The dust control program primarily consists of proper maintenance and watering of the haul roads and, if applicable; water spraying of soil cover work areas when conditions exist which may result in the formation of fugitive dust. Interior cut and fill slopes within the landfill are also re-vegetated to minimize dust generation.

4.4.7.4 Vector and Bird Control

The use of daily cover prevents the invasion/attraction of rodents, insects and birds. The Orange County Vector Control District is available on an as-needed basis to bait for rodents in the cut slopes, along the access road, and adjacent to the office area.

Personnel at the site are responsible for bird control. Currently, bird control entails the use of cracker shells.

4.4.7.5 Noise Control

The majority of the noise resulting from landfilling operations is minimized by the physical setting of the site. Natural canyon topography and vegetation acts to shield noise generated by routine operations at the landfill. The buffer between the landfill and any sensitive receptors further mitigates noise impacts. Noise from site equipment is suppressed by the installation of appropriate exhaust mufflers. IWMD has included "environmental cabs" on all new heavy equipment purchases. Noise emission tests are conducted and updated periodically. Noise emission is a factor when considering the purchase of new equipment. Landscaping, in addition to a chain link fence with wood slats, also helps reduce noise generated by refuse hauling traffic along the access road.

Noise studies previously conducted by the IWMD for fee booth and equipment operators, as well as drivers, resulted in the implementation of the current comprehensive hearing conservation program that includes annual training, engineering controls, yearly audiometric testing, and the use of hearing protection devices. The hearing conservation training program is provided for all employees potentially exposed to noise beyond the action level. Disposable ear plugs are readily available to all employees to provide hearing protection.

4.4.7.6 Odor Control

The primary means of controlling odor from refuse at the site is the application of daily cover. The working face of the landfill is covered at the end of refuse disposal operations each day and is confined to as small an area as practicable to help control odors. The landfill gas control system is also designed to maximize the collection of gas and minimize fugitive emissions that may contain odors. According to IWMD staff, the site has not received odor complaints to date from residents in the City of Irvine.

4.4.7.7 Litter Control

The primary cause for litter around the landfill is wind, which at times carries refuse (primarily plastic bags and paper) away from the unloading area and from vehicles transporting wastes to the site. The application of cover materials is the primary means of controlling litter at the site. In addition, vehicles transporting waste to the site are required to be covered. The judicious use of litter fences also helps to reduce the volume of litter on the site. The entrance area, interior roads, and site perimeter are routinely policed for litter. Litter is collected on a weekly basis from the outside perimeter of the site. Additional help in collecting litter from the outside perimeter is available from the work crews assigned to work under the jurisdiction of the Inmate Supervisor at the landfill. Crews assigned to litter pickup are either inmates or laborers from the work release program. Litter on the inside perimeter of the landfill is collected on an as-needed basis.

Occasionally, during high wind conditions, additional manpower is assigned for litter collection to assure prompt collection of litter. However, due to employee's safety consideration, litter caught in trees above levels that cannot be easily reached in a safe manner are removed with special equipment. The refuse unloading area is reduced in size, and whenever possible, placed in a portion of the facility that affords some protection from the wind. Temporary fencing is installed at the periphery of the active disposal area to help contain litter within the site. Additional equipment may be utilized to expedite the spreading and compacting of the refuse. Cover operations may begin earlier in the day to reduce the area of exposed waste on the working face.

4.4.8 RESTORATION OF BIOLOGICAL RESOURCES AT THE FRB LANDFILL

Restoration of biological resources at FRB is overseen by a full-time on-site Biological Resources Monitor (BRM). During daily landfill construction and operations, the BRM ensures the protection of existing native vegetation communities outside of the current construction and operation areas and monitors the progress of native revegetation areas including coastal sage scrub (CSS) and riparian communities.

IWMD is currently implementing a duff (partially and fully decomposed organic matter on the CSS floor) replacement/re-vegetation plan within the NCCP Reserve that has been successfully used to restore CSS impacted by ongoing site operations. Where appropriate, duff material is collected from areas in which CSS is removed. The process for CSS restoration includes crushing existing CSS plant material with heavy equipment which is then harvested as a mulch duff. The duff is then placed in areas deemed appropriate by IWMD for re-vegetation or temporarily inactive disposal area slopes. The duff is track-rolled in a process called "imprinting" that improves the contact between duff and native earth. Finally, a CSS hydroseed mix, inoculated with mycorrhizae, is applied over the CSS duff. After installation, re-vegetation sites are monitored and reported upon annually to the Resource Agencies for at least two years by the BRM. During the monitoring phase, the BRM observes the progress of the revegetated CSS. Factors that may adversely affect the development and overall health of the native plant habitat, such as weed infestation, grazing/predation by herbivores, or drought, are monitored and documented by the BRM. The BRM is responsible for procuring and mobilizing the maintenance personnel and materials to address issues affecting the health of the native plant community. The maintenance, monitoring, and reporting obligation have been fulfilled when the revegetation site has met the success criteria and attains resource agency concurrence.

The West Channel Biomitigation and the Irvine Park mitigation sites were installed in 1989/1990 as mitigation for impacts to jurisdictional areas by the original FRB Landfill operation. The Irvine Park mitigation area was approved by the U.S. Army Corps of Engineers (ACOE) in 1998. The West Channel Biomitigation area was reestablished in 1997 following the construction of two concrete channels in the vicinity of the original mitigation site. The channels were constructed to protect the original mitigation site and surrounding areas from erosion damage.

The existing West Channel Biomitigation was developed as compensation for project impacts to 2.7 acres of existing riparian mitigation sites and is described in the Frank R. Bowerman Landfill Channel Mitigation Plan (February 1996, P&D Environmental Services [now P&D Consultants]). The mitigation plan was developed in compliance with requirements set forth in the following ACOE and CDFG permits:

- 404 Permit No. 96-00159-LTM
- 1601 Streambed Agreement 5-055-96

Initial revegetation installation activities adjacent to the concrete flood control channels and a desilting basin within the FRB Landfill were completed in April 1997 and consisted of establishing a total of 2.7 acres of riparian scrub, sycamore woodland, CSS, and oak woodland habitats.

Mitigation program requirements include: 1) the performance of a minimum five-year maintenance program within the site that includes weed control and supplemental plant establishment as needed; and 2) the performance of a minimum five-year site monitoring program that includes regular assessments of site conditions, annual quantitative site assessments, documentation of site conditions (including the development of annual site status reports), and the development of appropriate remedial maintenance measures. The BRM is responsible for procuring and mobilizing the maintenance personnel and materials to address issues affecting the health of the native plant community. A maintenance crew, directed by the BRM, is responsible for maintaining the West Channel Biomitigation area, keeping it free of invasive non-native weeds, debris and litter. IWMD will continue to perform maintenance and monitoring of the West Channel Biomitigation area until the site has reached its performance objectives and attains resource agency concurrence.

4.5 HISTORY AND EVOLUTION OF THE PROPOSED PROJECT

4.5.1 REGIONAL LANDFILL OPTIONS FOR ORANGE COUNTY

4.5.1.1 Strategic Planning

Strategic planning for MSW needs in Orange County is the responsibility of the County of Orange Integrated Waste Management Department (IWMD). IWMD's mission is "…to meet the solid waste disposal needs of Orange County through efficient operations, sound environmental practices, strategic planning, innovation and technology." The Regional Landfill Options for Orange County (RELOOC) is a short- and long-term strategic planning project initiated by IWMD in 1998 to address existing disposal system capabilities and future needs, and to develop viable short- (Phase I) and long-term (Phase II) solid waste disposal options for the County. Following completion of the planning and feasibility phases of RELOOC, the Orange County Board of Supervisors (BOS) selected the Strategic Plan (described below) as the preferred alternative to be evaluated in compliance with the requirements of the California Environmental Quality Act (CEQA). The RELOOC Strategic Plan provides a framework for solid waste management over the next 40 years in the most cost-effective manner. The RELOOC Strategic Plan includes a two-phased approach to accomplishing this goal.

Phase I (short-term) strategies are proposed for immediate implementation and include fully using the existing landfill system capacity in Orange County by:

- Maximizing operational efficiency at the three existing County landfills.
- Expanding the existing FRB and Olinda Alpha landfills.
- Promoting diversion, recycling and market development with the public and haulers.
- Seeking to resolve community concerns related to the extended use of the existing landfills.

Annually reviewing the RELOOC Strategic Plan and modifying it as appropriate in response to disposal industry trends and advances in technology.

Phase II (long-term) strategies are proposed after the Phase I strategies are implemented and consist of a series of studies which will:

- Determine if there is a need to increase the daily amount of MSW permitted at the Prima Deshecha Landfill five years prior to the closure of Olinda Alpha Landfill.
- Identify strategies to support, develop, and implement feasible, viable alternative technologies or other approaches to maximize landfill capacity.
- Complete a study to determine the feasibility of expanding the FRB Landfill into adjacent Round Canyon prior to re-negotiation of the 2017 to 2027 Waste Disposal Agreements (WDAs).

The purpose of this current Environmental Impact Report (EIR) is to analyze potential impacts of and provide environmental documentation for the proposed expansion at the FRB Landfill, identified as a Phase I strategy in the RELOOC Strategic Plan.

According to the RELOOC Strategic Plan, the only other Phase I strategy component requiring CEQA analysis is the expansion of the Olinda Alpha Landfill, which has been addressed in a separate EIR since the Olinda Alpha Landfill and the FRB Landfill components are independent of each other. The Phase II strategies are considered studies and are anticipated by IWMD to be exempt from CEQA requirements. The Phase II strategies are long-term RELOOC program components and, if determined to be feasible as a result of future studies, may be selected for analysis in accordance with CEQA requirements at a later date during the RELOOC 40-year planning timeframe.

4.5.1.2 RELOOC Planning Process

The RELOOC planning process included a Steering Committee to provide policy guidance for the strategic planning process. The Committee was developed in consultation with the County of Orange Waste Management Commission. Membership in the Steering Committee consisted of representatives from the:

- Orange County community at-large.
- City Managers Solid Waste Working Group (SWWG).
- Landfill Host Cities (i.e., Brea, Irvine, San Juan Capistrano, and San Clemente).

- Waste Management Commission.
- League of California Cities (Orange County Division).
- IWMD.
- County of Orange (County Executive Office).

The RELOOC Steering Committee directed the Consultant Team (consisting of landfill engineers, environmental experts and other individuals under contract with IWMD) to assess the County's existing disposal system capabilities and develop viable long range solid waste disposal options for the County. Key tasks assigned to the Consultant Team were:

- Identification of available options.
- Capacity analysis.
- Demand analysis.
- Economic analysis.
- Environmental impacts analysis.
- Evaluation of options.
- Recommended Strategic Plan.

The RELOOC planning process involved extensive community and government agency outreach which was an important element in the evaluation and selection of available options. In the ranking of options, community acceptance was one of five criteria used and was evaluated through a Community Involvement Program (CIP) developed specifically for RELOOC. The CIP and preliminary findings of the RELOOC Feasibility Study Report (FSR) were presented to the Orange County City Managers Association's SWWG. As an outcome of input received from the SWWG and concurrence by the RELOOC Steering Committee, a phased approach to implementing RELOOC was developed. The phased approach to RELOOC was presented in a series of meetings and briefings to community groups, City Councils, Chambers of Commerce, and the community at large, primarily within the landfill host cities affected by the phased approach. These meetings were conducted between August 23, 2001 and October 18, 2001. Based on recommendations from the community, the SWWG, and subsequent action by the RELOOC Steering Committee, a phased approach for the RELOOC Strategic Plan was selected by the County Board of Supervisors in May 2002.

Since the selection of the RELOOC Strategic Plan in 2002, the IMWD has initiated CEQA evaluation for two components of the Strategic Plan:

- A Final EIR has been prepared for the proposed vertical and horizontal expansion at the Olinda Alpha Landfill and was submitted to the Orange County Planning Commission. The Planning Commission recommended to the board of Supervisors that the final EIR was adequate in November, 2004. The Final EIR is pending certification by the County Board of Supervisors.
- Preparation of an EIR for the FRB Landfill Master Development Plan proposing vertical and horizontal expansions and other project components began in April, 2005. A major landslide

that occurred at the FRB Landfill in early 2002 required extensive geotechnical investigation, landslide remediation design, biological resource evaluation and coordination/permitting with resource agencies in developing a remediation design for full development of the site. A new Master Plan was completed for the FRB Landfill in November, 2004, which incorporates a landslide remediation design for the site while maximizing capacity, consistent with RELOOC planning goals.

4.5.1.3 Tonnage Projections for RELOOC

As part of the RELOOC planning and evaluation process, tonnage projections were developed for the RELOOC Feasibility Study (report dated December 2001) which support the total daily tonnage requirements assumed in this EIR for the proposed expansion at the FRB Landfill. In developing the system configurations for each option analyzed for the RELOOC Feasibility Study time period, a capacity analysis was performed to determine remaining disposal capacity at the three existing Orange County landfills. January 1, 1999 was used as the basis for evaluation of remaining capacity at the existing landfills since the latest topographic maps available for the landfill properties at the beginning of the RELOOC study were October 1998.

Using the remaining capacity as of January 1, 1999, for the existing landfills, a system demand computer model was developed by the RELOOC consultant team to project future tonnages and disposal demand for each of the options evaluated in the RELOOC Feasibility Study. The projected tonnage was based on population projections provided by IWMD, which uses the Center for Demographic Research at California State University, Fullerton (CSUF) statistics for its database. Historical and current tonnage information was also provided by IWMD. Assumptions made for the demand model were:

- All waste is first routed to the Orange County landfill system within limits of daily permits (as applicable for each option) and total capacity constraints until waste cannot be accommodated by the system.
- Projected tonnage disposed was based on projected changes in population and assumes no additional diversion achieved after 1998. Although cities may increase diversion to try to achieve the state’s 50 percent mandate, it was conservatively assumed for the RELOOC Feasibility Study that a majority of diversion had been achieved by 1998. Therefore, no increases in diversion were projected beyond the January 1, 1999 baseline for the tonnage estimates.
- Population projections through 2020 were from the Center for Demographic Research at CSUF. Growth rates for years after 2020 were assumed to be equal to the growth rates for the year 2020.
- Importation continues at tonnage levels as of January 1, 1999 until 2015 based on the County’s existing policy, except for options which have exportation occurring with the Olinda Alpha Landfill closing in 2013, which requires that importation ceases when exportation begins in 2013.
- All County landfills operate 307 days per year.

These assumptions were used in the RELOOC demand model for several system configurations evaluated for the RELOOC Feasibility Study. The demand model output is available at IWMD headquarters and a summary of the model results for the final five options is provided in the RELOOC Feasibility Study report.

Based on these assumptions, the RELOOC demand model projected annual disposal tonnage for each City and unincorporated area in Orange County from 1999 to 2039; and out-of-county import was projected annually through 2013 (if Olinda Alpha Landfill closes in 2013) or 2015 (if Olinda Alpha Landfill is expanded). The demand model projected total system demand for each year from 1999 to 2039. The model results show the total system demand projected for the year 2039 is approximately 4,460,000 tons. Assuming that the County landfills each operate 307 days per year, the total system daily tonnage requirement including a buffer of 1,000 TPD, is forecast to be approximately 15,500 (rounded) tons per day (TPD) by the end of the RELOOC study period in 2039.

Upon closure of the Olinda Alpha Landfill in 2013 or 2021 (with the expansion), the total daily maximum permitted capacity would be 12,500 TPD with the maximum daily permitted tonnage at the FRB Landfill of 8,500 TPD and at the Prima Deshecha Landfill of 4,000 TPD. This permitted daily system capacity is approximately 3,000 TPD (15,500 – 12,500 = 3,000 TPD) short of the daily tonnage demand projected for the system in 2039. For the analysis of the proposed project herein and the alternatives to the proposed project for the FRB Landfill expansion, this 3,000 TPD shortfall was assumed.

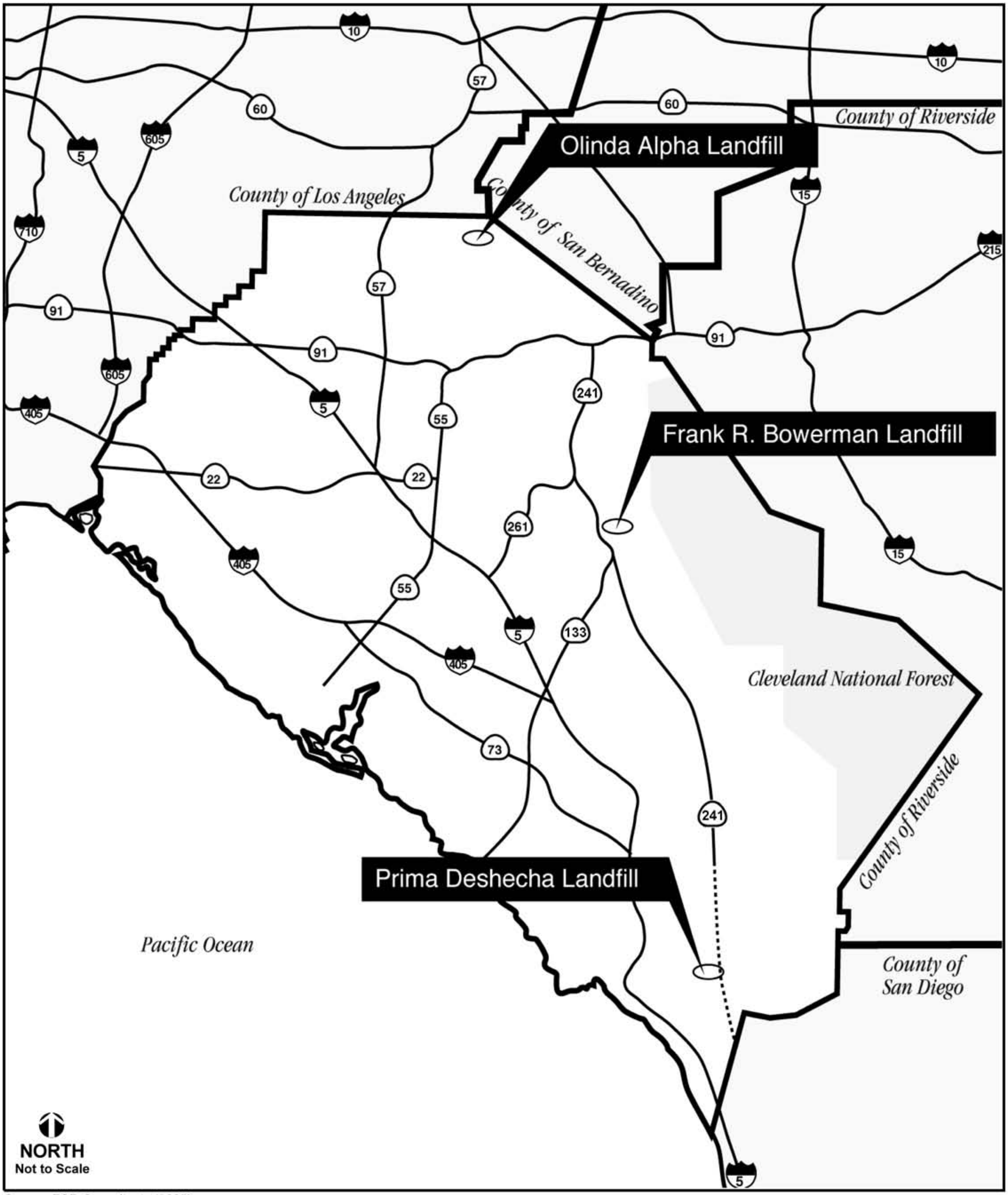
Refer to Section 9.0 (Project Alternatives) for additional discussion of the No Project Alternative and Alternatives to the proposed project which are based on the above assumptions.

4.5.2 COUNTY OF ORANGE SOLID WASTE DISPOSAL SYSTEM

4.5.2.1 Active Landfills and Former Refuse Disposal Stations

IWMD operates three MSW landfills strategically located throughout the County. Figure 4-7 shows the locations of the three active landfills in Orange County: Frank R. Bowerman (FRB), Olinda Alpha, and Prima Deshecha landfills. Orange County landfills accept Orange County waste except for waste brought in under contract via importation agreement. The FRB Landfill serves the central area of the County and also receives MSW from southeastern Los Angeles County. The FRB Landfill is the newest landfill in the system. Olinda Alpha Landfill serves northern Orange County and also receives MSW from Los Angeles, San Bernardino, and Riverside Counties. Prima Deshecha Landfill serves the southern areas of Orange County and also receives MSW from cities in northern San Diego County and southern Los Angeles County. Importation of MSW to these Orange County landfills from Los Angeles, San Bernardino, San Diego, and Riverside Counties will cease in 2015 (or 2013 if the Olinda Alpha Landfill closes and in-County waste would need to be exported).

In addition to the management of the landfill disposal system, the IWMD is responsible for a range of activities at a number of former refuse disposal stations including the closed Coyote Canyon and Santiago Canyon landfills.



Source: P&D Consultants (2005).

Figure 4-7
Locations of Existing Orange County Landfills

4.5.2.2 Household Hazardous Waste Collection Centers

IWMD operates four household hazardous waste (HHW) collection centers in the County that provide accessible disposal facilities for Orange County residents to properly dispose of HHW free of charge, thereby, reducing the amount of HHW being improperly delivered to the landfills.

4.5.2.3 Landfill Operations

All three active County landfills are deep canyon, cut and cover facilities where the majority of MSW is brought to the sites from commercial haulers. To determine tipping fees, trucks are weighed by scales before entering the facility and then driven to a designated area of the landfill for waste disposal. IWMD personnel use compactors, bulldozers and large earthmovers to push and compact waste for ultimate burial and daily covering by soil or an approved alternative. No waste is left uncovered at the end of the working day.

4.5.2.4 Environmental Regulations

Landfill operations in California are highly regulated and monitored by federal, state and local agencies. The three Orange County landfills comply with applicable California Code of Regulations, primarily Title 27 (27 CCR), and the Code of Federal Regulations, Title V (Clean Air Act) and Title 40 (CFR), Parts 257 and 258 (Subtitle D) for landfills. The FRB Landfill is a Class III landfill permitted for the disposal of non-hazardous MSW. State law requires that landfills operate under the regulatory requirements of the California Integrated Waste Management Board (CIWMB) that exercises its authority through the approval of Solid Waste Facilities Permits (SWFPs) issued by Local Enforcement Agencies (LEAs). The LEA for the FRB Landfill is the County of Orange Health Care Agency (OCHCA), Environmental Health Division (EHD).

Additionally, the Regional Water Quality Control Board (RWQCB) regulates landfill design and operation to ensure protection of surface water and groundwater. The RWQCB exercises its authority through issuance of Waste Discharge Requirements (WDR). The South Coast Air Quality Management District (SCAQMD) regulates landfill operations related to landfill gas (LFG) emissions and fugitive dust control for Orange County landfills. The LEA regulates subsurface LFG migration from the landfill. Environmental monitoring of air, LFG and groundwater is conducted at all three landfills to detect LFG migration or groundwater contamination. An LFG extraction system and flare station is located at each landfill for LFG control. In addition, the use of LFG for energy production is currently being conducted at the Olinda Alpha and Prima Deshecha landfills and a pilot program for the conversion of LFG to liquefied natural gas is in the development stages for the FRB Landfill. A groundwater remediation program including extraction wells and treatment is currently ongoing at Olinda Alpha Landfill. Additional LFG extraction wells and increased groundwater monitoring have been implemented at the FRB landfill to address a previously detected groundwater release. Adjustments to the LFG extraction system have effectively controlled groundwater releases at the FRB Landfill.

Although the CIWMB has primary oversight and regulatory responsibilities for the landfills in Orange County and has designated the OC HCA as its LEA, landfills are also regulated through other laws enforced by agencies at the federal, state and local regulatory levels. In addition to the RWQCB and SCAQMD, these agencies include the EPA, USFWS, ACOE, CDFG, OCFA and the RDMD. Continued adherence to applicable laws and regulations would be required as part of project approval and operating conditions for the proposed expansion project at the FRB Landfill.

In summary, the three existing County of Orange landfills are required to comply with numerous landfill regulations from federal, state and local regulatory agencies. The landfills are also subject to regular inspections from the CIWMB, LEA, RWQCB and SCAQMD to assure compliance with applicable regulations.

4.5.2.5 Landfill System Capacity

A variety of factors are used to determine landfill system capacity including total air space, refuse volume, liner volume, refuse-to-soil ratio and other factors. Based on these factors, IWMD's records show that the current (as of June 30, 2005) permitted remaining refuse capacity for Olinda Alpha, FRB and Prima Deshecha landfills is 19.7, 44.6 and 78.6 million tons, respectfully.

The permitted daily tonnage limit for the FRB Landfill is 8,500 TPD of refuse except for 36 days per year that a higher tonnage of 10,625 TPD is allowed. The project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill. The permitted daily tonnage limit for Olinda Alpha Landfill is 8,000 TPD of refuse. However, under a Memorandum of Understanding with the City of Brea, waste disposal is limited to an annual average of 7,000 TPD. The permitted daily tonnage for Prima Deshecha Landfill is 4,000 TPD.

4.5.2.6 Existing Landfill Agreements and Permits

A number of landfill agreements and permits are currently in place with Orange County cities, waste haulers and regulatory agencies responsible for oversight of the County's landfills. In addition to those regulatory agency permits and city agreements described above, the County also has Waste Disposal Agreements (WDA) with all Orange County cities through 2010 that are subject to renegotiation in 2007. Approval of the proposed project at the FRB Landfill is a key component of the future waste system which will form the basis for negotiation of WDAs for an additional ten-year period.

4.5.2.7 Existing Landfill Characteristics

<u>Frank R. Bowerman Landfill</u>

The FRB Landfill is the newest landfill in Orange County's waste disposal system. The FRB Landfill property covers approximately 725 acres with 341 acres permitted for waste disposal. Figure 4-2 shows the landfill property and the currently permitted horizontal and vertical limits for landfilling. This landfill opened in 1990 and its currently permitted closure date is 2022. The permitted airspace for waste disposal is 127 mcy. The permitted acreage, airspace and closure date were determined based on operational assumptions made prior to a major landslide at the FRB Landfill in 2002. The landslide effectively reduced the available disposal area, which in turn decreased the available airspace by over 40 mcy and reduced the projected site life to 2014. As a result, IWMD re-evaluated and re-designed the site's Master Development Plan for future operations. The new Master Development Plan includes slope stabilization for the remediation of this landslide, including areas both within and immediately outside the property boundary for the landfill. The new Master Development Plan for the landfill site will be the basis for this EIR. The currently proposed end use after landfill closure is a passive regional park.

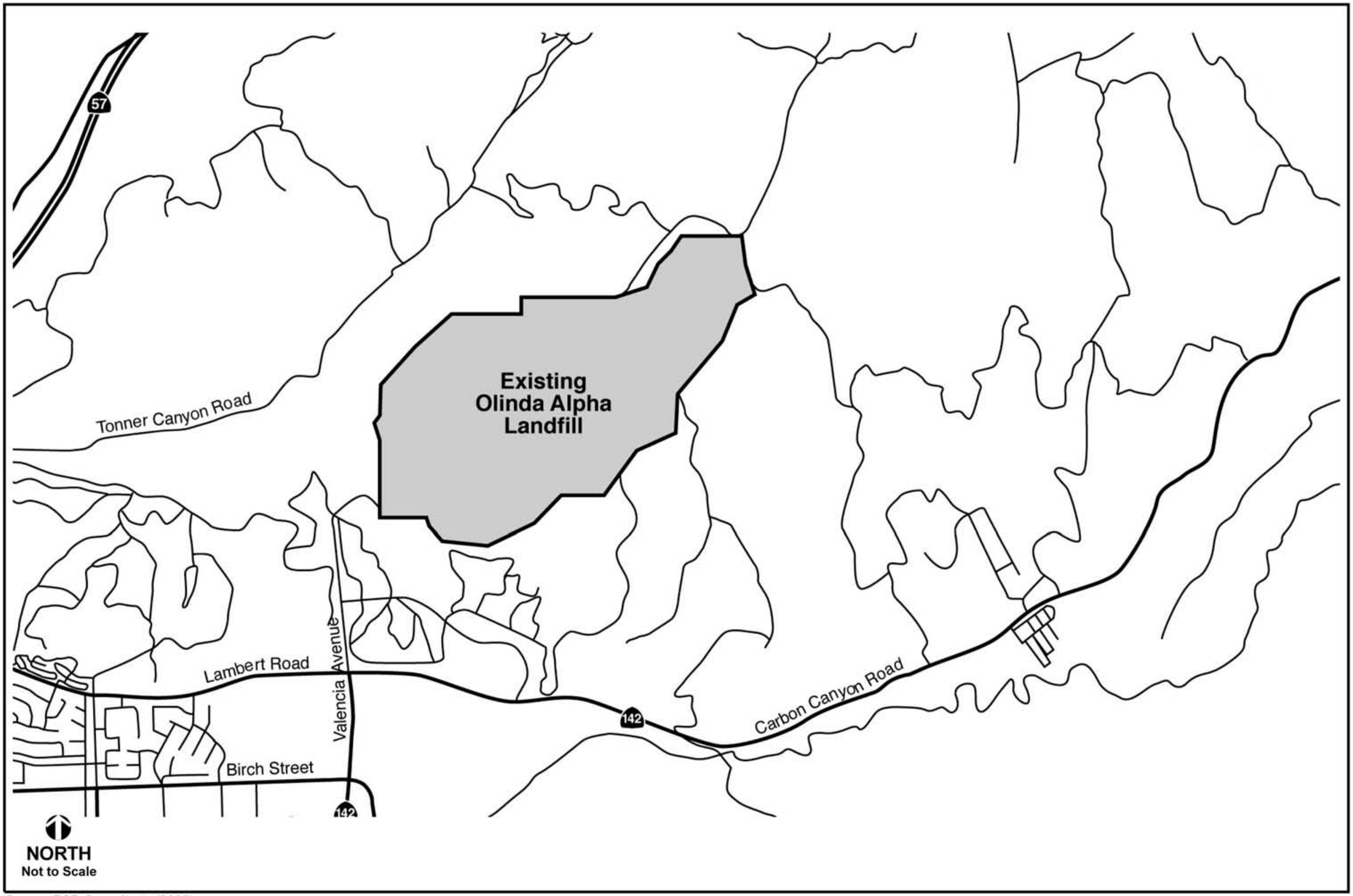
Olinda Alpha Landfill

The Olinda Alpha Landfill is located in unincorporated Orange County, at 1942 North Valencia Avenue near the City of Brea, as shown on Figure 4-8. This landfill opened in 1960. The landfill property covers 565 acres with approximately 420 acres permitted for refuse disposal. Access to this landfill is via Valencia Avenue as shown in Figure 4-8. The landfill is open Monday through Saturday from 6:00 A.M. to 7:00 A.M. for transfer trucks only and from 7:00 A.M. to 4:00 P.M. for all commercial and non-commercial deliveries. Commercial haulers based within and outside Orange County deliver to this facility. Refuse disposal by private citizens is allowed and is limited to Orange County residents. Only MSW is accepted at the landfill, although limited special wastes are also accepted. Hazardous materials such as asbestos, batteries, chemicals, paints, non-autoclaved medical waste and other substances considered hazardous are not accepted at this landfill.

A Memorandum of Understanding (MOU) between the County and the City of Brea limits daily waste disposal to an annual average of 7,000 TPD. However, the Olinda Alpha Landfill SWFP currently allows a daily maximum of 8,000 TPD of MSW. The annual average TPD at the Olinda Alpha Landfill will remain at 7,000 TPD.

As part of RELOOC, a Draft EIR was prepared to analyze a vertical and horizontal expansion at the Olinda Alpha Landfill which would extend the life of the landfill from 2013 to 2021. The horizontal expansion would increase the disposal area by a maximum of 33 acres and the vertical expansion would increase the height of the landfill from 1,300 feet to 1,415 feet. The end use after closure proposed for the Olinda Alpha Landfill is a passive use regional park. The Final EIR was submitted to the Orange County Planning Commission on November 17, 2004. The Planning Commission recommended to the Board of Supervisors that the Final EIR was adequate. The Final EIR is pending certification by the County Board of Supervisors.

As described earlier in this section, the proposed RELOOC Strategic Plan-the FRB Landfill Implementation project does not propose any additional modifications or changes to the design and operations of Olinda Alpha Landfill. The background conditions for Olinda Alpha Landfill for the FRB Landfill project and the project alternatives assume either the existing conditions at Olinda Alpha Landfill in mid-2005 or the proposed vertical and horizontal expansions which are currently under consideration as a separate RELOOC project.



Source: P&D Consultants (2005).

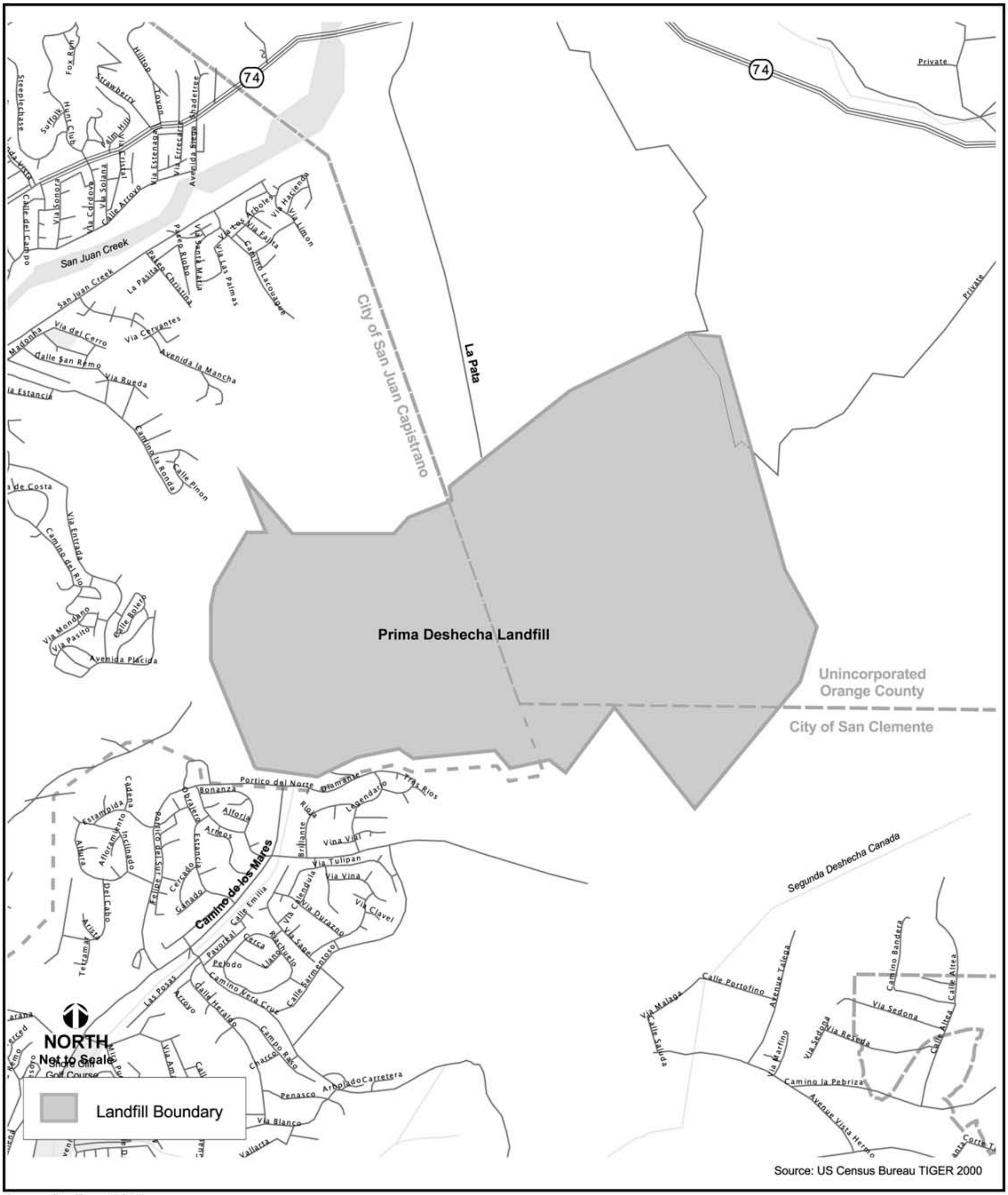
Figure 4-8
Olinda Alpha Landfill

Prima Deshecha Landfill

Prima Deshecha Landfill is located at 32250 La Pata Avenue as shown on Figure 4-9. Parts of the landfill property are in the City of San Juan Capistrano, the City of San Clemente and unincorporated Orange County. The facility is open Monday through Saturday from 7:00 A.M. to 4:00 P.M. for all customers. Commercial trucks and dump trucks are exclusively permitted from 4:00 P.M. to 5:00 P.M. MSW from commercial haulers and the public is accepted at this landfill. Public access is for Orange County residents only. Commercial haulers from within and outside the County deliver to this landfill. Commercial and public access to this landfill is available from Ortega Highway and La Pata Avenue. Prima Deshecha Landfill is permitted to accept up to 4,000 TPD of MSW. A limited amount of de-watered sewage sludge is accepted at this landfill.

The Prima Deshecha Landfill property covers approximately 1,530 acres with 699 acres permitted for refuse disposal operations. The landfill opened in 1976 and is scheduled to close in approximately 2067 based on the amended 2001 General Development Plan (GDP), dated October 2002 for this landfill. The GDP for Prima Deshecha Landfill indicates a County regional park as its end use after landfill closure.

As described earlier in this section, the proposed RELOOC Strategic Plan-the FRB Landfill Implementation project and most of the alternatives do not propose modifications or changes to the design and operations of Prima Deshecha Landfill. The background conditions for Prima Deshecha Landfill for the FRB Landfill project and most of the project alternatives assume the existing conditions in 2005 at Prima Deshecha Landfill. One alternative to the proposed project at the FRB Landfill assumes an increase in the TPD of MSW disposed of at Prima Deshecha Landfill.



Source: BonTerra (2005).

Figure 4-9
Prima Deshecha Landfill

SECTION 5.0
EXISTING CONDITIONS, IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

SECTION 5.0
EXISTING CONDITIONS, IMPACTS, MITIGATION MEASURES AND LEVEL OF SIGNIFICANCE AFTER MITIGATION

This section documents the environmental analysis for those environmental parameters for which the proposed project may or would result in potentially significant adverse impacts. These parameters were identified in the Initial Study (IS) which was included as part of the Notice of Preparation (NOP). Environmental parameters not included in this section were discussed in Section 2.0 (Effects Found Not To Be Significant).

5.1 LAND USE AND PLANNING

This section describes the existing land uses in the project area, potential environmental impacts, recommended mitigation measures to help reduce or avoid identified land use impacts and the level of significance of adverse impacts after mitigation. The assessment of land use impacts is based primarily on General Plans supplemented by zoning maps and other planning documents from the County of Orange and the City of Irvine.

5.1.1 EXISTING CONDITIONS

5.1.1.1 Regional Setting

The FRB Landfill is generally located in the central and eastern portion of Orange County. Access to the landfill is available from the Santa Ana Freeway (Interstate 5, I-5) and the San Diego Freeway (Interstate 405, I-405). The major cross streets in the vicinity of the landfill are Sand Canyon Avenue and Portola Parkway, with access to the landfill from Bee Canyon Access Road. Figure 4-1 in the Project Description shows the location of the FRB Landfill. Much of the area surrounding the project site consists of undeveloped land, open space, agricultural, commercial and residential land uses. Limestone Canyon Regional Park is located to the north and east of the landfill.

5.1.1.2 Local Setting

The FRB Landfill is located at 11002 Bee Canyon Access Road near the City of Irvine. The property covers approximately 725 acres with 341 acres permitted for waste disposal. The FRB Landfill is located in unincorporated Orange County in the City of Irvine’s Sphere of Influence (SOI). Figure 4-2 in the Project Description shows the landfill property and the currently permitted horizontal and vertical limits for landfilling. The FRB Landfill opened in 1990 and its currently permitted closure date is 2022.

5.1.1.3 Surrounding Land Uses

The proposed improvements at the FRB Landfill entail both vertical and horizontal expansions within the landfill property and slope stabilization in off-site areas which are undeveloped areas with no existing or planned residential uses. Moreover, these areas are designated by the Orange County General Plan as Open Space Reserve (OSR) and by the City of Irvine General Plan as Open

Space Preservation (OSP) and are part of the Orange County Central and Coastal Subregion Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) and Reserve. Figure 5.1-1 shows the land use designations for the City of Irvine.

As stated above, surrounding land uses in the project vicinity consist of undeveloped land, open space, agricultural, commercial and residential land uses. Limestone Canyon Regional Park is located to the north and east of the landfill and Round Canyon watershed is located immediately east of the landfill. Local access to the FRB Landfill is provided via Bee Canyon Access Road, Sand Canyon Avenue and Portola Parkway, and regional access is provided via I-5 and I-405. A number of planned residential communities have been constructed in proximity to the landfill. These residential uses were subject to the County of Orange and City of Irvine planning procedures and land use controls which considered their proximity to this active landfill. In addition, a number of residential communities have been planned and proposed for future development in proximity to the landfill. Much of the planned and proposed new development will occur adjacent to Sand Canyon Avenue in the City of Irvine. The FRB Landfill is located in an area of Orange County that is experiencing rapid urbanization; Table 5.1-1 summarizes planned and proposed development in the project vicinity at various stages of approval within both the City and County surrounding jurisdictions. As shown in Figure 5.1-1, the immediately surrounding land use is designated for preservation by the City of Irvine General Plan. As shown in Figure 5.1-2, the immediately surrounding land use is designated for open space reserve by the County of Orange General Plan

5.1.1.4 Existing Facilities on the FRB Landfill Site

The FRB Landfill has the following facilities to support its daily operations: access roads, scalehouse/entrance facility, four scales, customer service area, maintenance area, operations office, crew quarters, hazardous waste storage area and utilities.

5.1.1.5 Relevant Plans and Policies

The FRB Landfill is located in an unincorporated area of Orange County. The landfill is also located in the City of Irvine's SOI. An SOI is a planning boundary outside of an agency's legal boundary (such as the city limit line) which promotes cooperative planning efforts among cities, the county and special districts to address concerns regarding land use and development standards. The establishment of this boundary is necessary to determine which governmental agencies can provide services in the most efficient way to a property in any given area, and to facilitate the orderly incorporation of areas to cities. The following section discusses the relevant General Plan land use designations and policies concerning the FRB Landfill for the County of Orange and City of Irvine respectively. In addition, other relevant plans and policies which currently or in the future may govern this facility are discussed.

TABLE 5.1-1
PLANNED AND PROPOSED LAND USES IN THE VICINITY OF FRB LANDFILL

Name/Location	Jurisdiction	Type of Development	Acres/DU/SF/TSF	Status
PA1, PA2 and PA 9	City of Irvine			Approved
PA 1 & 2		Conservation/Open Space	2,789 Acres	
		Residential	1,388 or 1,369[1] Acres	
		Institutional	45 Acres	
		Commercial	13-32[2]	
PA 9		Residential-Medium	221 Acres	
		Residential-High	60 Acres	
		Multi-Use	60 Acres	
East Orange	City of Orange			Pending City Council Approval
Santiago Hills II Planned Community		Low Density Residential	551 DU	
		Low-Medium Residential	630 DU	
		Medium	605 DU	
		Open Space	--	
East Orange Planned Community Area 1		Open Space	69 Acres	
		Low Density Residential	350 DU	
		Low-medium Density Residential	750 DU	
East Orange Planned Community Area 2		Open Space	136 Acres	
		Commercial Recreation	212 Acres	
		Low Density Residential	850 DU	
		Low-medium Density Residential	350	
East Orange Planned Community Area 3 Remaining Areas		Low Density Residential	50 DU	
		Open Space	4,040 Acres	
		Irvine Lake	597 Acres	
		Commercial Recreation	6 Acres	
		Institutional	12 Acres	
		SR-241/261 right-of-way	258 Acres	
Northern Sphere	City of Irvine	Residential	12,350 DU,	Approved
		Retail use	730,000 SF	
		Research and Industrial facilities	6,566,000 SF	
		Open space	4,650 Acres	
Great Park[3]	City of Irvine and portions of unincorporated County of Orange	Auto Center	50 TSF	Approved
		Retail	3,000 TSF	
		University Residential	60 DU	
		Interim Housing	350 DU	
		Senior Housing	--	
		Transitional Housing	--	
		Research & Development (N&S)	300 TSF	
		Institutional Warehouse	263 TSF	

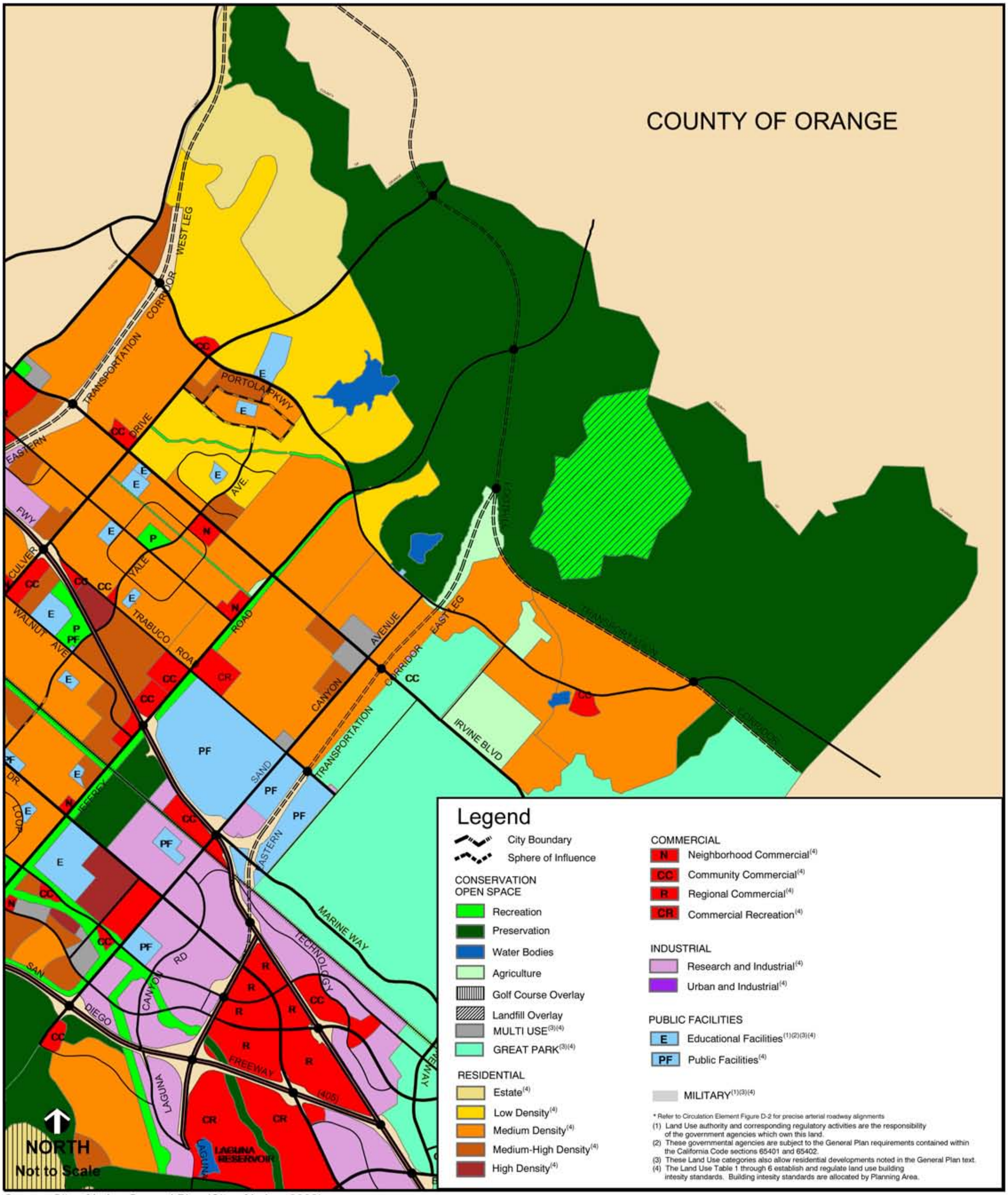
TABLE 5.1-1
PLANNED AND PROPOSED LAND USES IN THE VICINITY OF FRB LANDFILL

Name/Location	Jurisdiction	Type of Development	Acres/DU/SF/TSF	Status
		OCTA Facility/Fly-Away Facility	54 TSF	
		Cultural/Institutional/ Exposition	500 TSF	
		Agriculture	1,218 Acres	
		Golf Course	576 Acres	
		Habitat, Wildlife Corridor & Nature Walk	1,382 Acres	
		OS Park	-- Acres	
		Cemetery	-- Acres	
		Chapel/Mortuary1	-- TSF	
		Sports Park	192 Acres	
		TOD Residential	--	
		TOD Retail	--	
		TOD Office	--	
		Residential/Golf Village	--	
Planning Area 12	City of Irvine	Biotechnology/Industrial Park	602,559 SF	Approved
Planning Area 6	City of Irvine	Single Family Detached	937 DU	Approved
		Condominium	608 DU	
		Apartment	892 DU	
		Commercial	141.5 TSF	
		Restaurant	20 TSF	
		Fast Food Restaurant	7 TSF	
		Gas Station	1 Site	
		Bank	4 TSF	
		Elementary, Middle School	750 STU	
		Child Care Center	10 TSF	
Opportunities Study Area	City of Lake Forest	Sports Park/Community/Civic Center	45 Acres	EIR is being prepared
		New neighborhood Parks	70 Acres	
		Open Spaces	100 Acres	
		Residential	5,415 DU	
		Commercial	560,000 SF	

Sources: *PA1/PA2/PA9 Project Draft EIR, Santiago Hills and East Orange Planned Communities Draft SEIR/EIR, Northern Sphere EIR, Orange County Great Park EIR, City of Irvine, City of Lake Forest, County of Orange.*
Tony Raeker, Planner, City of Irvine, October 20, 2005.
Cheryl Kuta, Senior Planner, City of Lake Forest, October 20, 2005.

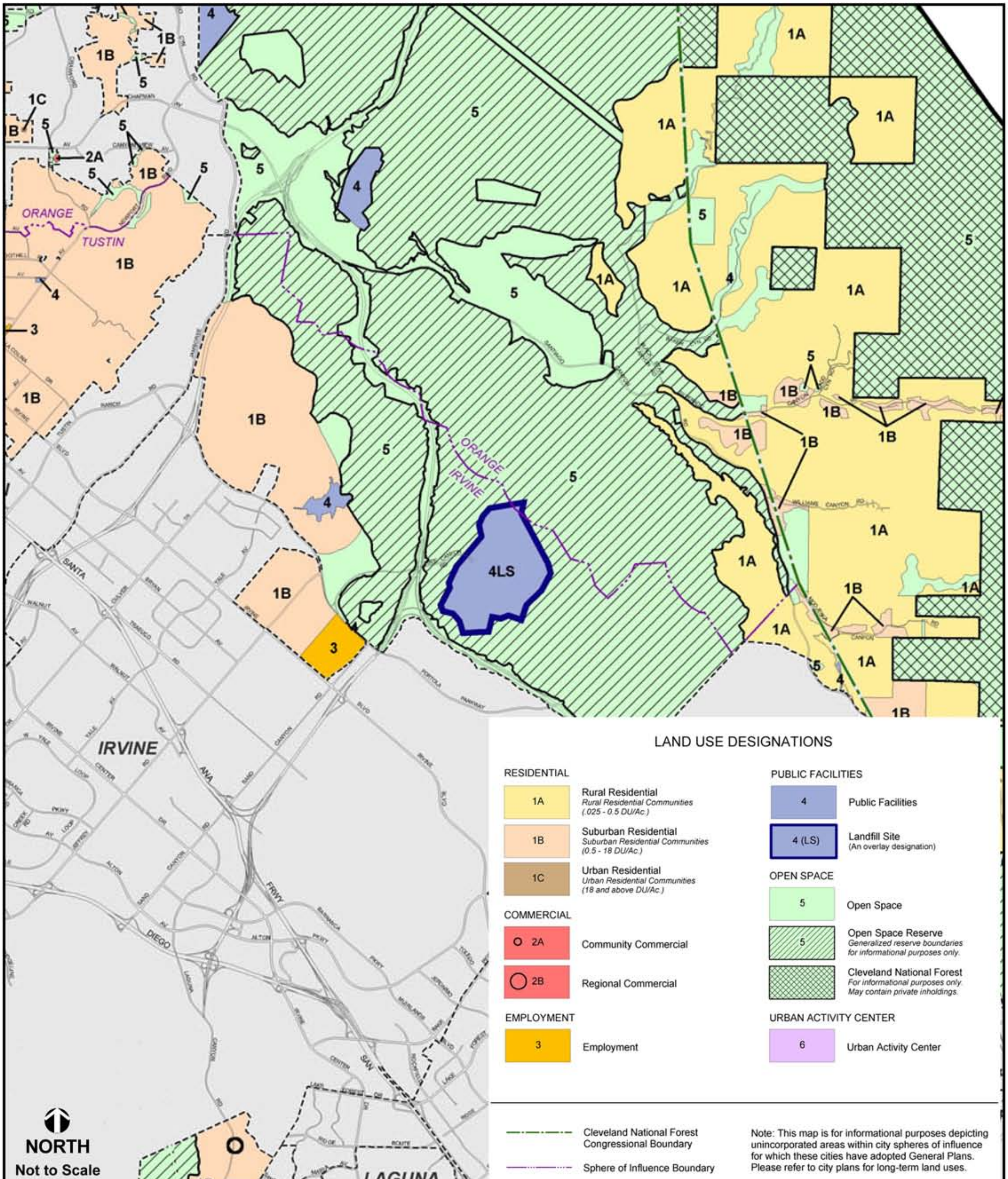
DU = dwelling units
SF = square foot
TSF = thousand square feet
STU = students

[1] *Square footage is dependent on which design option is selected for the Project entry, with Design Option A proposing the greater amount of Commercial acreage and the smaller amount of residential acreage.*
[2] *This total includes acreage that is not owned by The Irvine Company and is part of the City initiated General Plan Amendment and Zone Change. The total acreage owned by The Irvine Company equals 3,827 acres.*
[3] *Information from the Great Park EIR and reflects the 2007 Base Plan Land Use Summary.*



Source: City of Irvine General Plan (City of Irvine, 2003)

Figure 5.1-1
City of Irvine Land Use Designations



Source: Orange County General Plan (County of Orange, 2004)

Figure 5.1-2
Orange County Land Use Designations

Overview of General Plans and Zoning

General Plans

Section 65302 of the California Government Code requires that all cities and counties adopt General Plans (GPs) containing seven mandatory elements: Land Use, Circulation, Housing, Conservation, Open Space, Noise and Safety. The GP is the basic planning document that provides a blueprint for growth and development.

Zoning

Zoning is essentially the division of a county or city into districts and the application of different regulations in each district. Zoning regulations are generally divided into two classes: (1) those that regulate the height or bulk of buildings within certain designated districts (i.e., structure and architectural design); and (2) those that prescribe the use of the building. Zoning Ordinances (ZOs) developed by a county or city must be consistent with the GP.

County of Orange General Plan and Zoning Designations

The County of Orange has adopted each of the previously mentioned GP Elements, and also Public Services and Facilities, Resources, Recreation and Growth Management Elements (General Plan 1999). The FRB Landfill is designated Public Facilities (4) in the County of Orange GP. This designation allows for use of the site for solid waste disposal. The Solid Waste Facility-Landfill Site (LS) Overlay is also applied to the land use designation of the FRB Landfill in the County of Orange GP. The Overlay indicates that the current and near term use of the land is limited to landfill operations, including materials recovery and recycling facilities (MRFs), and associated uses such as borrow site areas, buffer area and access roads, until the landfill has been closed. The FRB Landfill is designated as Public Facilities in the County Zoning Code. Site development is regulated by the County of Orange and the Local Enforcement Agency (LEA) for the California Integrated Waste Management Board (CIWMB).

GP land use designations surrounding the FRB Landfill property include Open Space (5) to the north, west and east, Suburban Residential (1B) to the northwest and west and Employment (3) to the southwest. Rural Residential (1A) interspersed with Suburban Residential (1B) is located further to the northeast, east and southeast. The Open Space (5) designation provides for limited land uses that do not require a commitment of significant urban infrastructure. Compatible uses include land containing non-renewable and renewable resource areas, prime agricultural soils and water resources.

Suburban Residential (1B) permits a wide range of housing types, from estates on large lots to attached dwelling units (e.g., townhomes, condominiums and clustered arrangements). This designation also permits the greatest flexibility for residential development. Building density and standards for this designation permit the construction of 0.5 to 18 dwelling units per acre. Rural Residential (1A) limits residential uses which are compatible with the surrounding rural area. Development in this designation requires special consideration to the natural characteristic of the terrain. Building density and standards for this designation permit the construction of 0.025 to 0.5 dwelling units per acre. The Employment (3) designation identifies uses for employment generators typically consisting of light and service industries or professional administrative office uses.

City of Irvine General Plan (GP) and Zoning Designations

The City of Irvine's General Plan was adopted by the City Council on March 9, 1999. The City of Irvine GP addresses all geographic areas of the City and its sphere of influence. A specific buildout year was not determined as part of the 1999 General Plan; however, the plan is a forward-looking document which determines facilities and programs to support future land uses. The FRB Landfill is located in the City of Irvine's Planning Area 3 (PA 3) and is designated for OPS land use with a Landfill Overlay. This designation allows for use of the site for municipal waste disposal. The City of Irvine GP Objective L-11, Landfill Overlay, Policy (b) encourages that recreational opportunities and uses be considered as part of the landfill closure plan, at the time of the closure of the landfill.

The City's GP focuses on the long-term development of the City. Land use policies are defined and implemented through the City's Zoning Ordinance. Within the City's SOI area, the FRB Landfill is in Zoning District 1.7 Landfill Overlay. The purpose of the Landfill Overlay District is to provide for the operation and post-closure development of Class III solid waste facilities in this Zoning District. It should be noted that even though the FRB Landfill is located within the City's SOI, a facility (FRB Landfill) owned and operated by the County is not subject to the City GP.

Natural Community Conservation Plan

The Orange County Board of Supervisors approved the Central-Coastal Subregional Natural Community Conservation Plan and Habitat Conservation Plan (NCCP/HCP) on April 16, 1996 and executed an Implementation Agreement along with all the "participating" public and private landowners and state and federal resources agencies on July 17, 1996. The FRB Landfill is part of the Orange County Central and Coastal Subregion NCCP Reserve area, established for the preservation of land in designated areas of Orange County. Specifically, the FRB Landfill is in the Central Subregion area of the NCCP Reserve. The Section 10a Permit, issued as part of the NCCP program, authorizes take of coastal sage scrub within areas of the FRB Landfill designated as Special Linkage and areas designated as Reserve.

Projects within the NCCP must comply with the requirements of the program, including Construction Minimization Measures and pre-development special condition species surveys and associated mitigation plans if such species are detected.

Settlement Agreement

Although it is not a land use control, the Settlement Agreement, created to resolve a specific legal dispute, is discussed here for informational purposes to provide context in this overview of matters related to the development and operation of the landfill.

On August 1, 1984 the County Board of Supervisors entered into a Settlement Agreement with the City of Irvine to resolve then pending litigation between the City and the County regarding the County's proposed FRB Landfill. This Settlement Agreement addressed issues related to the commencement and operation of the landfill and other matters of concern. On May 27, 1997 the Irvine City Council approved the first amendment to the Settlement Agreement. This Amendment allowed the County's Integrated Waste Management Department (IWMD) to use other materials which meet or exceed the soil performance standards required by Section 17683, Title 14, California Code of Regulations (CCR). In addition, this Amendment updated the first Settlement Agreement to reflect the action taken by the County Board of Supervisors to change the name of the landfill from Bee Canyon Landfill to Frank R. Bowerman Landfill. All other provisions of the Agreement remained the same.

The permitted daily tonnage limit for the FRB Landfill is 8,500 tons per day (TPD) of refuse except for 36 days per year that a higher tonnage of 10,625 TPD is allowed. The Settlement Agreement provides for the FRB Landfill to accept an annual average of 7,921 TPD (as of December 2004) and provides for an increase in the average daily rate by 1.75 percent per year until it reaches a daily maximum of 8,500 TPD. The current Solid Waste Facilities Permit (SWFP) for the FRB Landfill allows for a maximum daily tonnage limit of 8,500 TPD except for 36 days a year that a high tonnage limit of 10,625 TPD is allowed. These increased tonnage days are floating (not designated) and by the end of the year all 36 days may not be used. Unused floating days would not roll over to the next year. It is anticipated that most of the increased tonnage days will fall immediately preceding or following a holiday.

The Settlement Agreement provides for increased tonnage once CEQA requirements have been satisfied and required permits have been obtained.

<u>California Integrated Waste Management Board</u>

The California Integrated Waste Management Act of 1989, (IWMA, AB 939, Sher, Chapter 1095, Statutes of 1989 as amended) enacted through passage of Assembly Bill (AB) 939 and accompanying legislation AB 2707, established a requirement for each county and its cities to implement integrated waste management strategies to divert 50 percent of solid waste from landfills by 2000. Discussion of the requirements of these laws and their applicability to the County of Orange is provided in the following sections.

Countywide Integrated Waste Management Plan

Counties are required to prepare and submit to the CIWMB an Integrated Waste Management Plan (IWMP) which includes all Source Reduction and Recycling Elements (SRREs), all Household Hazardous Waste Elements (HHWEs), a County-wide Siting Element (CSEs), all Non-Disposal Facility Elements (NDFEs), all applicable Regional SRREs, HHWEs and an applicable Regional Siting Element if regional agencies have been formed.

The County IWMP summarizes waste management issues facing the respective cities. It also provides an overview of the actions that will be taken to meet Public Resources Code (PRC) Section 41780 requirements. County IWMPs and any amendments are approved by the County and by a majority of the cities within that County. If cities fail to act on the County IWMP or amendments within 90 days of receipt, then failure to act is deemed to be approval of the plan as submitted. County IWMPs are required to be updated every five years, if necessary. The County of Orange's IWMP was updated in 2001 and was approved by the CIWMB in September 2003. Goals and policies that are relevant to the IWMP include:

- The County and its cities will operate an environmentally sound solid waste management system that protects public health and safety, protects natural resources and uses the best available technology to accommodate the needs of the County.

Countywide Siting Element

Counties are required to prepare a CSE that describes areas that may be used for developing new disposal facilities. The CSE also provides an estimate of the total permitted disposal capacity needed for a 15-year period if counties determine that their existing disposal capacity will be exhausted within 15 years or if additional capacity is desired.

Proposed regulations have been prepared to clarify and provide guidance to counties who will be preparing their CSEs. The CSE is addressed in Chapter 9, Article 6.5 of Title 14, Natural Resources Division 7, CIWMB, which specifies requirements for goals, policies, criteria, location, GP consistency, strategies for disposal when disposal sites are not available and an implementation schedule. According to the CIWMB's jurisdiction profile for Orange County, the County's CSE was approved in 1996. The following CSE goals and objectives are relevant to the proposed project at the FRB Landfill:

- The County will minimize the amount of waste requiring disposal through source reduction, recycling and composting.

- The County will provide adequate long term landfill disposal capacity for wastes that will need to be landfilled after maximizing source reduction, recycling and composting.

- The County will operate an environmentally sound solid waste management system that protects public health and safety, protects natural resources and uses the best available technology to accommodate the needs of the County.

- The County will have at all times a minimum of 15 years of available disposal capacity. This disposal capacity will be preferably located within the County to minimize transportation costs. If subsequent studies indicate that no suitable sites can be identified in the County for future landfills, the County will establish agreements with public or private facilities outside the County.

- The County will ensure that new or expanded disposal facilities will at all times be in compliance with applicable federal, state and local statutes, permits, minimum operating standards and monitoring requirements. This includes, but is not limited to, the requirements of the CIWMB, regional water quality control boards, the LEA, local air pollution control districts, local jurisdictions, and all utilities or agencies that either have jurisdiction over the installation of improvements or provide services to disposal facilities.

5.1.2 THRESHOLDS OF SIGNIFICANCE

Land use impacts would be considered significant and adverse if the proposed project would result in one or more of the following conditions:

- Physically divide an established community.
- Conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

5.1.3 METHODOLOGY

The proposed project was compared to the County of Orange and City of Irvine GP Land Use Elements for consistency with land use designations and regulations. In addition, the proposed project was also compared to the zoning designations in both jurisdictions.

5.1.4 IMPACTS

There are no established communities on the landfill property including the proposed expansion area. Based on analysis in the Initial Study (see Appendix A of this EIR), it was determined that implementation of the proposed project would not disrupt or divide the physical arrangement of an established community.

5.1.4.1 Consistency with City and County General Plans

As noted in Section 5.1.1.5 (Relevant Plans and Policies) there are no site development regulations for landfill facilities regulated by municipal or county zoning codes. Site development is regulated by the County of Orange and the LEA. As such, the impact analysis provided below is limited to compatibility with County and City of Irvine GP designations.

Under the County's GP designation of 4(LS) Public Facilities/Landfill Site, the FRB Landfill is considered a compatible use. As noted previously, this designation allows for the use of this site for municipal solid waste (MSW) disposal. Land outside the landfill boundary is designated in the GP as OSR and does not permit landfill operations or MSW disposal.

The City of Irvine's GP OSP, Landfill Overlay designation considers the operation of Class III MSW facilities such as the FRB Landfill as a compatible use. Areas to the west, north, east and south of the landfill property are designated as OSP and Zoning District 1.4 Preservation Area by the GP and Irvine Zoning Ordinance, respectively.

As noted in Section 4.0 (Project Description) none of the project components (excluding slope stabilization) would entail landfill activities or MSW disposal outside of the FRB Landfill property boundary. In addition, the relocation and/or construction of additional structures and facilities (e.g., scale house, LFG control facilities, etc.) necessary to operate the landfill would occur entirely within the facility. As such, implementation of the proposed project would be consistent with both County and City of Irvine GP designations and would not result in significant adverse impacts. Therefore, no mitigation is required.

As previously noted, slope stabilization is required within the northern and eastern parts of the landfill site to provide a stable subgrade designated for the landfill within areas underlain by landslides. As such, approximately 34 acres outside of the landfill property boundary would be included within the disturbance limits for slope stabilization. The proposed project would entail the use of areas outside the current landfill property boundary for cut slope stabilization only; no MSW disposal or landfill activities are proposed outside the existing boundary of the FRB Landfill. As such, implementation of the proposed project would be consistent with County and City of Irvine land use controls and would not result in significant adverse impacts. Therefore, no mitigation is required.

5.1.4.2 Consistency with the Central and Coastal Subregion NCCP

The discussion provided below is limited to the proposed project's consistency with the Central and Coastal Subregion NCCP goals, policies and intent. Section 5.8 (Biological Resources) of this EIR contains; (1) a detailed description of compliance requirements (including compensation requirements and framework) for projects proposed within the reserve; (2) an evaluation of the proposed project's potential biological impacts to plants and wildlife species; and (3) mitigation measures proposed to reduce project-related impacts. The proposed project will result in greater CSS take than was originally allocated for the FRB site by the NCCP/HCP Plan. Therefore, IWMD will prepare a Major Amendment to the NCCP/HCP Plan, which is more fully described in Section 5.8 (Biological Resources) within this document. With the implementation of the Major Amendment, the proposed project would not result in any unavoidable significant adverse impacts to the NCCP/HCP for the Central and Coastal Subregion.

The use of land outside the current permitted landfill property boundary, proposed for slope stabilization, at the FRB Landfill would affect part of the NCCP Reserve by temporarily eliminating a total of 10 acres of coastal sage scrub (CSS).

The Central and Coastal Subregion NCCP permits a range of activities to occur within the reserve that are recognized as vital and necessary public services and which must be conducted in a safe and efficient manner. Most of these activities include normal operations and maintenance of facilities, but also include provisions for emergency action and/or remediation to ensure public safety and well being is maintained. The slope stabilization required for the northern and eastern parts of the landfill constitute a necessary remedial activity that was contemplated within the NCCP and for which action is required for public safety. However, because the NCCP reserve boundaries and size were predicated upon biological assumptions designed to ensure that target species (e.g., coastal California gnatcatcher, cactus wren, etc.) would not be affected by urban development and operational activities, a "no net loss of reserve acreage" policy is in place. Signatory parties to the

Implementation Agreements, such as the County, utilize a system of credits which are deducted when CSS is removed. In exchange for these credits, signatory parties contributed land, monetary support or other resources necessary in creation of the reserve. Because removal of CSS within the reserve must be compensated for by either the use of credits or some other approved means (e.g., land exchange, etc.) the County would be required to comply with these requirements. As such, because slope stabilization activities would be consistent with emergency actions contemplated under the NCCP, impacts and compensation for CSS would be required and therefore impacts from implementation of the proposed project would be less than significant.

5.1.4.3 Consistency with the Countywide Integrated Waste Management Plan/Countywide Siting Element

The proposed project will extend the life and capacity of the FRB Landfill. The proposed project itself will not result in the generation of MSW and is proposed to meet existing and future needs for MSW disposal in Orange County. Each city in the County as well as the County's unincorporated areas have several planning documents that outline their proposals for waste diversion methods which include source reduction, recycling and composting and environmentally safe transformation land disposal. Therefore, the proposed project is consistent with the Countywide Integrated Waste Management Plan/Countywide Siting Element.

5.1.4.4 Environmental Justice

It should be noted that environmental justice would not be an issue associated with the proposed project. As defined by the National Environmental Policy Act (NEPA), environmental justice refers to the fair and equitable treatment and meaningful involvement of people, regardless of race and income level, in the implementation of environmental laws, regulations and polices. Since the proposed project is not a federal project, it is not subject to NEPA review and analysis. Therefore, an environmental justice analysis is not required under CEQA. However, due to the sensitivity of landfill operations near residential uses, demographic information from the County of Orange and the City of Irvine was reviewed. Future land uses in the area south of the FRB Landfill will be residential but will not be predominantly lower-income residential uses. For 2005, the Countywide median income is estimated at $78,606 and for the City of Irvine the median family income for 2005 is estimated at $85,624. Therefore, environmental justice would not be an issue associated with the proposed project.

5.1.5 MITIGATION MEASURES

The proposed project will not result in significant adverse impacts related to land use and planning. No mitigation measures are required.

5.1.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the proposed project will not result in significant adverse impacts related to existing and future land uses.

5.2 GEOLOGY AND SOILS

This section summarizes information obtained from reports prepared for various projects related to operations and on going landfilling at the Frank R. Bowerman Landfill. These reports are available from IWMD. All technical reports and relevant material used in the preparation of this section are listed in Section 13.0 (References).

The primary source of technical information for the impact analysis in this section is the Geotechnical Investigation Report (GIR) FRB Landfill Master Development Plan (GeoLogic Associates, 2004) which was previously transmitted to the County of Orange Health Care Agency (as Local Enforcement Agency) and the Santa Ana Regional Water Quality Control Board on April 11, 2005.

5.2.1 EXISTING CONDITIONS

The FRB Landfill is located on the southwestern flank of the Santa Ana Mountains near Irvine in Orange County, California. The Santa Ana Mountains are a northwest trending chain that is part of the Peninsular Range Geomorphic Province that separates the Orange County Coastal Plain from the Elsinore Basin. Ridge tops attain maximum elevations of about 1,770 feet above mean sea level (AMSL), rising approximately 1,100 feet above the adjacent floor of the Bee Canyon streambed.

The FRB Landfill occupies the Bee Canyon drainage, and cut and fill grading has been performed to allow for placement of liner on the bottom of the canyon and adjacent side slopes. The highest slopes are located in the northeast corner of the site and rise to a maximum elevation of 1,770 feet AMSL. The mouth of Bee Canyon opens to the south near the State Route 241 Foothill Transportation Corridor and the former El Toro Marine Corps Air Station and constitutes the lowest portion of the site at an elevation of approximately 600 feet AMSL.

In the area of the FRB Landfill, the stratigraphic section of the Santa Ana Mountains is composed of rock of the Williams, Santiago, Sespe, Vaqueros, Topanga, and Puente formations. A summary of the bedrock formation ages and lithology types is presented below.

The geology of the northern Santa Ana Mountains was mapped and described by Schoellhamer et al (1991) in United States Geological Survey Professional Paper 420-D. Site specific mapping of the geology has primarily been performed by the Earth Technology Corporation (EarthTech) in 1988, Moore & Taber (1990), and GeoLogic Associates (2004).

5.2.1.1 Site Geology

The FRB Landfill is situated in the headwaters of the Bee Canyon drainage. The Sespe and Vaqueros Formations are the dominant rock units represented on-site. The dominant geologic structure is a broad east-west trending anticline (dome-like structure) dipping north on the north side of the canyon and south on the south side of the canyon. Bedding planes near the south side of the anticline range in dip from 10 to 28 degrees to the south. Near the north side of the anticline the bedding ranges in dip from 9 to 38 degrees to the north.

The site has been faulted since the folding responsible for the anticline. The faults divide the site into five distinct geologic regimes based on similarity of structure as further described in the Geotechnical Investigation Report (GIR) FRB Landfill Master Development Plan (GeoLogic Associates, 2004).

5.2.1.2 Site Stratigraphy

The site is underlain by Cretaceous through Miocene marine and non-marine sedimentary rocks that have been folded, tilted, and faulted. As shown in Figure 5.2-1, the lithologic units have been divided into geologic formations based on the lithology and age of deposition by Schoellhamer et al (1991). None of the bedrock formations present on-site is associated with adverse engineering phenomena of liquefaction, lateral spreading, or subsidence which are typical of softer, less indurated and competent formations. These bedrock units are mantled by Quaternary surficial soils and landslide debris.

<u>Williams Formation (Pleasants Sandstone Member)</u>

Distribution

The Cretaceous (>70 Million years ago or Ma) Pleasants Sandstone Member of the Williams Formation is poorly exposed on the southwest ridge of the landfill property and is in fault contact with the Santiago, Vaqueros, and Sespe formations.

Lithology

The Pleasants Sandstone Member consists of light colored, poorly- to well-bedded, fossiliferous and micaeous sandstone.

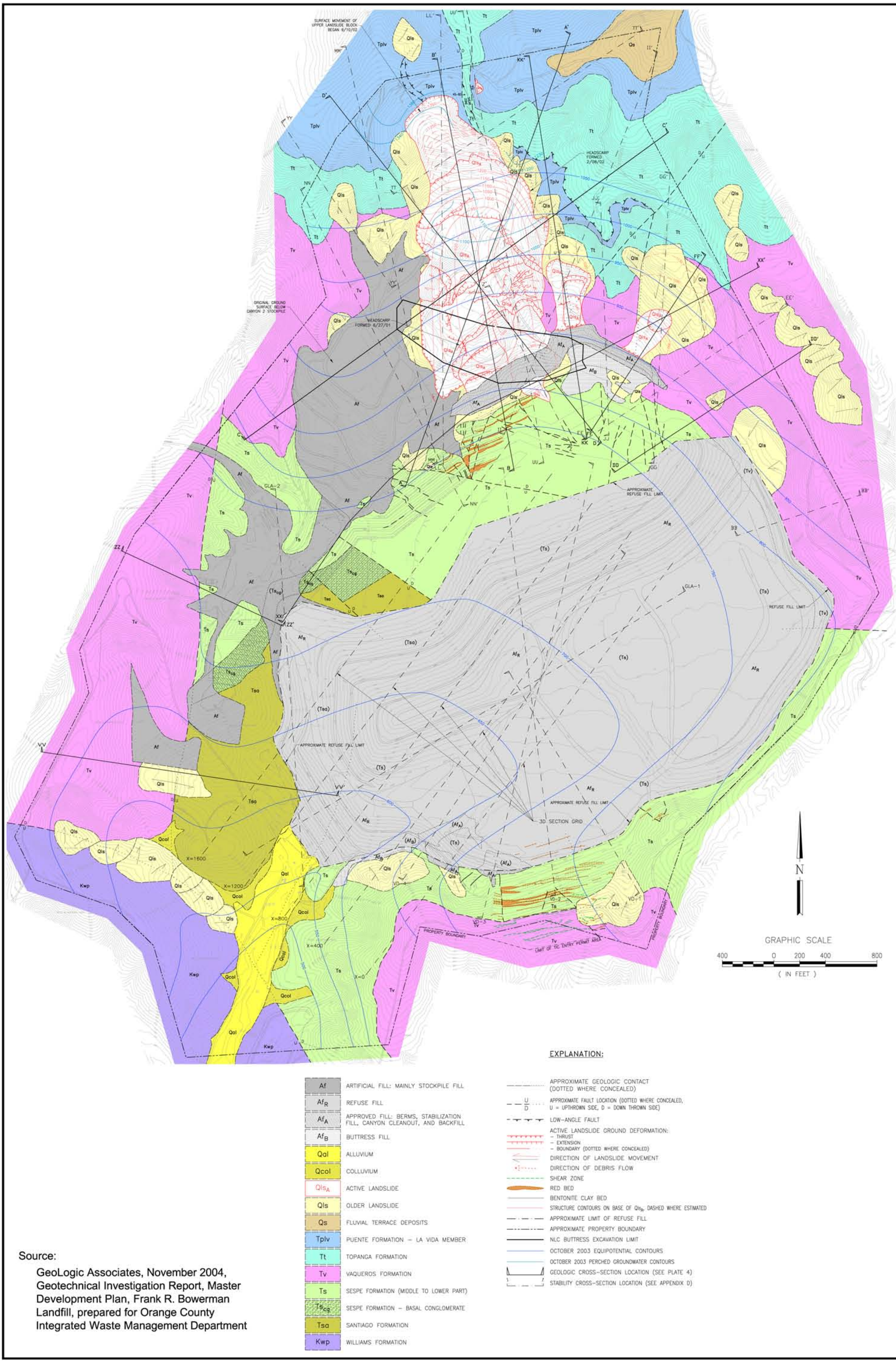
Engineering Properties

Rocks of the Pleasants Sandstone Member are poorly to well cemented. They are not prone to landslide problems where exposed on-site owing to their granular nature. The materials have not undergone a complete battery of testing because of the limited exposures along the southwest ridge of the site. Although some of the Pleasants Sandstone Member is well cemented, the formation can very likely be excavated with conventional earthmoving equipment as evidenced by the road cuts on the southwest ridge which were pioneered using a track mounted bulldozer.

<u>Santiago Formation</u>

Distribution

The Santiago Formation is exposed in excavations near the western edge of the landfill. It underlies the southwest desilting basin and a portion of the flare station.



Source:

GeoLogic Associates, November 2004, Geotechnical Investigation Report, Master Development Plan, Frank R. Bowerman Landfill, prepared for Orange County Integrated Waste Management Department

Figure 5.2-1
August 2004 Site Geologic Map

Lithology

The Eocene (>35 Ma) Santiago Formation consists of marine and non-marine, interbedded, micaceous and arkosic sandstone and conglomerate. It is conformably overlain and in fault contact with the overlying Sespe Formation.

Engineering Properties

The Santiago Formation was encountered during excavation of the Phase II landfill cell and was poorly to well cemented. The conglomerate portions of the formation were difficult to excavate using a single shank ripper tooth attached to a D-10 bulldozer. Blasting, however, was not required.

<u>Sespe Formation</u>

Distribution

The Sespe Formation underlies most of the existing landfill and is exposed along most of the lower portions of the slopes surrounding the landfill.

Lithology

The Eocene to Miocene (>20 Ma) Sespe Formation consists of continental silty and clayey fine- to medium-grained sandstone with interbedded siltstone and claystone. The basal contact with the underlying Santiago Formation consists of a thick, distinctive coarse-grained conglomerate marker bed. The middle part of the Sespe Formation consists of non-marine, massive to thick-bedded, gray or white, medium- to coarse-grained sandstone and conglomeratic sandstone. The upper part of the formation consists of clayey sandstone with interbeds of red and green sandy and clayey siltstone, with red-colored, highly plastic claystone beds. Fossils present in the Sespe Formation consist of small mammalian fauna. In the area between the active landfill and the proposed Phase VIII development the contact between the Vaqueros Formation and the overlying Sespe Formation is gradational over a stratigraphic interval of about 100 feet and marked by the presence of fine to medium-grained sandstone punctuated by sheared clay "red beds". Schoelhammer et al. (1981) did not differentiate the Sespe and Vaqueros Formations in the area of the site.

Engineering Properties

The Sespe Formation is moderately to well cemented and well indurated. Conventional grading equipment has been used to excavate the Sespe Formation; however, the basal conglomerate is very hard. The red beds of the Sespe Formation are very well indurated and very hard. Most of the red beds are very granular despite their origin as overbank/debris flow deposits.

Vaqueros Formation

Distribution

The Vaqueros Formation is exposed mostly in the lower portions of the slopes in the Bee Canyon drainage and is conformable and transitional with the underlying Sespe Formation.

Lithology

The Eocene to Miocene (>20 Ma) Vaqueros Formation consists of marine, fine-grained, micaceous clayey to silty sandstone interbedded with siltstone, fine- to medium-grained sandstone, and conglomeratic sandstone. The formation exhibits distinctive coloration including yellow-brown, olive, gray, purple and reddish hues. The basal portion of the formation includes interbeds of clayey siltstone and plastic claystone. Fossils present in the Vaqueros Formation consist of marine mollusk and echinioid fauna. Schoelhammer et al. (1981) did not differentiate the Sespe and Vaqueros Formations in the area of the site.

Engineering Properties

The Vaqueros Formation is strongly associated with landslides throughout the Bee Canyon drainage. Many of the landslides appear to move along the plastic claystone beds which have been sheared by deformation related to folding and uplift of the Santa Ana Mountains. The Vaqueros Formation can be easily excavated using conventional grading equipment. The high clay content of the formation yields low permeability, blended soils that can be used for barrier soil layers in landfill construction.

Topanga Formation

Distribution

The Middle Miocene (>10 Ma) Topanga Formation outcrops along the ridgelines within the northern portion of the property.

Lithology

The Topanga Formation consists of marine, tan to gray, massive to thick-bedded feldspathic sandstone. Where exposed on-site, the basal Topanga Formation consists of pebbly sandstone several feet thick containing marine invertebrate fossils. The contact with the underlying Vaqueros Formation is an angular unconformity.

Engineering Properties

The Topanga Formation sandstones are well cemented to loose and friable and can generally be excavated using conventional heavy equipment such as scrapers and bulldozers. Several extensive areas of resistant, well cemented Topanga Formation sandstone were encountered in the excavation made to partially control large landslides in the northern portion of the site.

Puente Formation

Distribution

The Upper Miocene (>5 Million years ago) La Vida Member of the Puente Formation is exposed on the northern ridgeline of the site, where it lies over a pronounced angular unconformity above the Topanga Formation. The section is duplicated by a low angle fault with the Topanga Formation.

Lithology

The La Vida Member of the Puente Formation is predominantly a dark gray to black, massive to laminated siltstone with occasional beds of siliceous shale, altered tuff or bentonite, and feldspathic sandstone. The bentonite beds are often highly deformed due to uplift and folding of the Santa Ana Mountains and the bentonite is often squeezed into joints and fractures that deviate from bedding.

Engineering Properties

The siliceous shale beds within the La Vida Member are generally resistant to breaking down from weathering although they do undergo a color change due to mild oxidation. Rocks of the La Vida Member are generally hard but can be excavated using conventional earthmoving equipment. Because the shale units are diatomaceous, the hydraulic conductivity of the derived soils is generally too high to be used as low permeability barrier soils in landfill construction without blending with other onsite clayey soils.

Quaternary Deposits

Distribution

Late Pleistocene (<1.0 Million years ago to 10,000 years before present) fluvial deposits unconformably overlie the La Vida member of the Puente Formation near the northeast ridge line of the site. Other Quaternary deposits consist of landslides (discussed below), and shallow silty or sandy alluvium and colluvium in canyon areas.

Lithology

Considered to be remnants of once-extensive alluvium and terrace deposits, the Quaternary deposits are typically composed of oxidized reddish sandy gravel.

Engineering Properties

The deposits are not cemented and are easily excavated using conventional earthmoving equipment. They are well graded, meaning they contain a wide range of particle sizes. As a result, they generally contain too much fine sand, silt, and clay to be used as drainage materials but too much sand and cobbles to be used as low permeability barrier soils.

Landslide Debris

Distribution

An extensive, ancient landslide complex was mapped on the north side of Bee Canyon prior to development of the landfill (Schoellhamer et al. 1981). This landslide is referred to as the North End Landslide Complex and was reactivated as a result of site grading activities in February 2002 (GeoLogic Associates, 2004). Subsequent to reactivation of the North-end Landslide Complex (NLC), IWMD installed 12,000 linear feet of horizontal dewatering galleries and removed approximately 800,000 cubic yards of soil from the head of the landslide to reduce the weight driving the landslide and to fill in tension cracks so as to inhibit the infiltration of water into the landslide, thus reducing the likelihood of further landslide movement (GeoLogic Associates, 2004). Additional exploratory work is expected to be performed in support of engineering design of future phases in this area. Numerous additional landslides were also mapped by EarthTech (1988), Moore & Taber (1991), and GeoLogic Associates (2004) along the oversteepened north, west, and east slopes of the canyon. A portion of an ancient landslide was also mapped during excavation of the south slope part of Phase VD (GeoLogic Associates, 2003).

Lithology

Landslide deposits typically move along the base of the Vaqueros Formation and include some of the overlying deposits in the slide mass. Along the north ridge of Bee Canyon, the landslides consist mostly of La Vida Member siltstone from the Puente Formation.

Engineering Properties

Landslide debris is easy to excavate and yields mixed sandy and clayey soils that are considered suitable for use as general purpose fill. Some of the soils derived from the Vaqueros Formation may be suitable for use as low permeability barrier layers (GeoLogic Associates, 2003); however, soils derived from the La Vida Member of the Puente Formation were found to be marginal for use as barrier layers in the landfill application without extensive preparation.

5.2.1.3 Structural Geology

The dominant bedrock structure underlying the FRB Landfill site is a faulted anticline that features bedding dipping to the north in the north half of the site and to the south in the south half (Figure 5.2-1). However, a complex pattern of high to low angle faults offset stratigraphic units and complicates the bedrock geology. Faults are difficult to trace in ungraded areas because landslide debris or other surficial deposits obscure bedrock, but they are clearly revealed in excavations and evident also in boreholes and cores. Faults with the largest displacements segment the site bedrock into five structural domains.

Across the site, the structural dip of bedding has been found to be neutral or into the perimeter slopes of the Bee Canyon drainage (an anticline). Attitudes vary because of local deformation of the bedrock or because of segmentation of the site into structural domains by the larger faults. Few out-of-slope bedding conditions have been identified with respect to bedrock slope stability.

Bedrock shears are varied in type and orientation; they consist of bedding parallel shears in clayey strata, and three subsets of structures that crosscut bedding, listed below:

- Faults and faults zones with clayey gouge zones, which are mapable features in outcrop or discernible in boreholes by a significant interval of shear.
- Cataclastic shear bands, which are minor faults in granular formations without clayey gouge.
- Shear fractures, which are fracture planes with slickensides, indicating shear but only minor displacement.

The dominant strike trend of these cross cutting features is northerly; however they vary between NW and NE. Dips of these cross cutting features are both westerly and easterly. Therefore, many shears will be adversely oriented with respect to proposed Master Development Plan cut slopes shown on Figure 5.2-2.

A fourth category of cross cutting feature, extensional fractures with and without mineral infilling, was also observed in the northern ridgeline area adjacent to the NLC. These fractures are defined by the absence of slickensides. Two sets of extension fractures were identified. Set 1 fractures strike nearly north-south and dip steeply west and east; Set 2 fractures strike approximately N70W, and dip approximately 70 SW

With respect to bedrock slope stability, shears and extension fractures can form planar elements in wedge failure geometries as detailed in the Geotechnical Investigation Report, Master Development Plan, FRB Landfill (GeoLogic Associates, 2004). Wedge failures generally occur under high pore pressure conditions. Extensional fractures will probably respond to, or develop in slope areas related to removals in the headscarp area of the NLC, and the interim and final cuts in the northern ridge.

Although the structure of Bee Canyon can be characterized as a large anticline (where bedding dips away from the axis of folding), faults and variations in the type of rock exposed at the surface have different impacts on the stability and engineering qualities as they relate to future development. As a result, the site has been divided into structural zones that have common rock types or similar bedding plane orientations or will have similar slope stability concerns during construction. The reader is directed to the Geotechnical Investigation Report, Master Development Plan, FRB Landfill (GeoLogic Associates, 2004) for additional information on and nomenclature of the structural zones.

5.2.1.4 Recent Slope Stability History

Landslides on the FRB Landfill site occur mainly in the Vaqueros, Topanga, and Puente formations, located mostly in the north portion of the site. Landfill development in the past has partially or completely removed small to moderate-sized landslides (GeoLogic Associates, 2004).

Landslides that remain in the proposed landfill development area range in size and type. Some are continuously active as indicated on the geologic map, and all others should be considered only marginally stable. Small to moderate-sized landslides are typically rotational failures or flow slides that exhibit typical landslide geomorphology. These landslides failed across the bedding direction and occurred where slopes were high and slope gradients steepest. Landslides in this small to moderate sized category are active or marginally stable owing to seasonal fluctuations in perched water zones.

A second category of landslide is defined by large block-like failures, and associated deposits, that occur in the north-central part of the site. These landslides appear to be ancient because they are dissected and undercut by the modern Bee Canyon drainage system (now largely covered by the landfill or modified by grading). The NLC is the name given to the landslide reactivated in 2002, which includes most of the deposits in this category. Much of the NLC and associated deposits were recognized and mapped in the earliest geotechnical investigations well before the recent movement; however, neither the depth nor the slide plane geometry were anticipated by these studies. The current limits of the active slide are constrained by the presence of the Canyon 2 Stockpile, and the graded south facing slopes adjoining Phase VII.

5.2.1.5 Seismicity

No known active faults cross or trend toward the FRB Landfill site. However, earthquakes originating on many of the larger regional faults, including the San Andreas Fault, the San Jacinto Fault, the Whittier-Elsinore Fault, and the Newport-Inglewood Fault, have the ability to generate large magnitude, long-duration, and potentially damaging ground motions at the site. The closest documented active fault to the site is Elsinore-Glen Ivy Fault/Chino-Central Avenue, strand located approximately 10 miles (16 km) east of the landfill.

5.2.2 THRESHOLDS OF SIGNIFICANCE

The CEQA Guidelines indicate that a project will have significant effect on the environment related to geology, seismicity, soils, and groundwater if it will "…expose people or structures to major geologic hazards…" The NOP, Environmental Analysis Checklist, 4.0 Geology and Soils, considered the following potential significant impacts for the proposed project:

- Expose people or structures to potential substantial adverse effects including risk of loss, injury or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure (including liquefaction) or landslides.
- Result in substantial soil erosion or the loss of topsoil.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal system where sewers are not available for the disposal of wastewater.

For this EIR, the FRB Landfill expansion plan was determined to have a significant effect on the environment related to geology, seismicity, and soils if a project impact met the language of the CEQA Guidelines or was not able to be designed to existing seismic standards for a landfill. Appropriate designs and construction practices can avoid or substantially reduce potentially significant adverse effects of the project.

Title 27 of the California Code of Regulations (CCR) sets rules and guidelines for the siting, design, construction, management, and closure and post closure maintenance of all Class III municipal solid waste landfills. These rules are enforced by the California Integrated Waste Management Board, its local enforcement agency (LEA) and the California State Water Quality Control Board.

Specific matters of geological importance for the proposed landfill expansion concern the static and dynamic stability of proposed bedrock cut slopes, landslide remediation, and refuse fill slopes. For design purposes, the static factor of safety against slope failure involving landfill containment systems (i.e., liner, final cover systems) is 1.5 (forces acting against failure versus forces acting to cause failure). Factors of safety less than 1.5 can be considered for interim slope conditions that do not support a landfill containment system.

Dynamic stability concerns the performance of slopes during seismic events. 40 CFR Parts 257 and 258 (commonly referred to as Subtitle D) requires that new municipal solid waste facilities or lateral expansions located in seismic impact zones be designed to resist the maximum horizontal acceleration in lithified earth material at the site. As an "approved state" under Subtitle D, State of California minimum standards have been found to be functionally equivalent to federal (Subtitle D) minimum criteria and provide the design basis for this expansion project. With regards to seismicity, Title 27 of the California Code of Regulations (CCR Title 27) requires that landfills be designed to accommodate the maximum probable earthquake (MPE) event. As defined by CDMG (1975), the MPE is the maximum earthquake that is likely to occur during a 100-year interval but not lower than the largest earthquake that has occurred historically. Estimation of the MPE includes consideration of regional seismicity, type, and activity of faults within 60 miles (100 km) of the site and the seismic recurrence interval for the area and faults. Recently, however, the Santa Ana RWQCB and the CIWMB have been requesting that the landfill design conform to the Maximum Credible Earthquake (MCE) event. The MCE is defined as the largest earthquake that a specific fault is capable of producing under the presently known tectonic framework.

In the current standard of practice, a horizontal seismic coefficient of 0.15 is applied during stability analyses. If the factor of safety against slope failure involving landfill containment systems is not equal to or greater than 1.5, then a more rigorous method of stability analysis must be employed. The more rigorous dynamic stability analysis consists of calculating the amount of displacement that is expected to occur as a result of seismic forces acting on the site. The seismic forces are calculated either deterministically or probabilistically and the amount of displacement of the slope or landfill liner system can be calculated.

5.2.3 METHODOLOGY

5.2.3.1 General

The methodology for the geology, seismicity and soils analysis was based on compilation and review of existing readily available reports; and review of aerial photographs, geologic mapping, geologic logging of exploratory trenches, test pits, boreholes, soil and bedrock sampling and geotechnical analyses, piezometer construction, groundwater sampling and chemical analyses, aquifer testing, and slope stability analyses of subgrade, interim refuse fill and final landfill slopes. These geotechnical studies were undertaken to establish the design parameters for the landfill which meet current regulatory requirements. The reports used to prepare this section included site specific geologic, geotechnical and hydrogeologic information collected by consultants for the IWMD; regional geologic data compiled by the California Division of Mines and Geology (now California Geological Survey (CGS)) and the United States Geological Survey (USGS); and published reports from the United States Soil Conservation Service (SCS) and the California Department of Water Resources.

The information presented here regarding impacts and potential mitigation measures for the development of landfill areas is based on site specific data and or conservative estimates or interpretations where required. Engineering analyses of proposed cut and fill slopes and final landfill slopes were performed using engineering data obtained during previous landfill development investigations. The technical citations for this data collection and analyses are provided in Section 13.0 (References).

5.2.3.2 Structural Geology

Three methods were employed to gather structural data on bedding, faults (shears), and fractures for statistical analysis of bedrock: 1) geological mapping and reconnaissance, 2) core logging, including downhole geophysical logging and paleomagnetic orienting of selected core runs, and 3) down-hole logging of boreholes. Bedding, shear, and fracture plane orientation data were collected and organized by structural domains.

Geological Mapping and Reconnaissance

Structural data derived from conventional surface mapping and shallow backhoe test pits was compiled from various sources representing site investigations performed in the last sixteen years (EarthTech, 1988; EarthTech, 1990; EarthTech, 1991; Moore & Taber, 1991; Geomatrix, 1996; Geomatrix, 1997; GLA, 2001; GLA, 3/2003; BAS, 4/2003).

Down-Hole Logging of Boreholes

Conventional down-hole logging of 30, 24-inch diameter bucket-auger borings was performed throughout the site (Figure 5.2-1). The borings were excavated to depths as great as 178 feet below ground surface and were logged by scraping the boring side walls to expose bedding, shears, and fractures.

Core Logging

Core holes were drilled perpendicular to ground surface on flat level pads; however, the retrieved core was not oriented with respect to north during drilling. Bedding, shears, faults, and fractures were measured in the field from the unoriented core (dip angle only) and recorded on conventional logs. Paleomagnetic analysis was later performed on selected sample intervals from each core to orient bedding and relevant structural features. Two more coreholes, C-5 and C-6, were both logged with a downhole optical televiewer, and oriented using paleomagnetic analysis.

5.2.3.3 Slope Stability Analytical Methodology

Slope stability analyses were performed to determine the stability of 1) final front-face refuse fill over liner, 2) landfill cover, 3) interim and final bottom-grade slopes relating to NLC remediation, 4) other landslide remediation associated with Phase VII-B, and 5) interim and final bedrock slopes proposed for Phases VIII-A/B/C, Landslide/Backcut Excavation, Phase IX, Phase X, and Phase XI. Excavation phasing, bottom grades, and cross-section locations are shown in Figure 5.2-2

Conventional static stability analyses were performed using the computer program SLOPE/W (Geo-Slope, 2004). CLARA-W, Version 1 (O. Hunger, 2003) was utilized for 3-dimensional analysis of gross liner stability. The method of Bray and Rathje (1998) and Bray et. al (1998) were adopted for displacement calculations for gross liner stability. The stability of bedrock slopes was also evaluated in terms of statistically prevalent bedding planes, shears, and fractures adversely oriented with respect to proposed cut slopes using methods described in GeoLogic Associates (2004) Appendix D. Analysis of generic adverse wedge failures was performed using the method of Hoek and Bray (1981) for each of the structural domains identified for the site (GeoLogic Associates, 2004).

Geotechnical Parameters

Soil and rock strength characteristics were obtained from direct shear testing of in-situ and remolded soil and bedrock samples. Direct shear tests were performed at normal stresses within the range of anticipated loads under saturated conditions. A summary of shear test results obtained for previous GLA investigations (2001, 2002), the Master Development Plan, and previous investigations by others were used to determine material properties for analysis. Though grouped by formation and material type, test results vary widely. The material properties used in SLOPE/W analyses are summarized in Appendix D, Table 5.2-1 in the Geotechnical Investigation Report, Master Development Plan, FRB Landfill (GeoLogic Associates, 2004), and are based on previous select test data and interpretation of the results. In addition, slip surface strength parameters for the NLC were back calculated from analysis of the sections considering pre-failure conditions. Refuse properties are from the literature; liner section properties are noted in the gross liner stability sections and on the numbered stability sections in GeoLogic Associates (2004) Appendix D.

5.2.4 IMPACTS

5.2.4.1 Gross Liner Stability

The stability of the proposed liner containment system was analyzed early in the FRB Landfill design (Earth Tech 1989; Moore and Taber, 1991). The stability analysis by Moore & Taber indicated that the refuse slopes had an adequate factor of safety for slopes designed to be at or less steep than an inclination of 2.5:1 (a ratio of the horizontal to vertical distance, i.e. a 2:1 slope is steeper than 3:1). Further analysis was performed as part of the Geotechnical Investigation Report Master Development Plan, FRB Landfill, (GLA 2004) in critical areas of the landfill with the new MDP grades. Cross sections GLA-1 (along the axis of Canyon 1) and GLA-2 (along the western portion of the axis of Canyon 2) were developed to analyze the gross landfill (liner) stability in areas along the south-west portion of the landfill where the refuse has the least passive resistance. These cross section locations are shown in Figure 5.2-2. The analysis used refuse parameters and liner parameters from Moore and Taber, 1991. The static factor of safety for these two cross sections is greater than 1.5 (results of the analysis are presented in GeoLogic Associates, 2004, Appendix D).

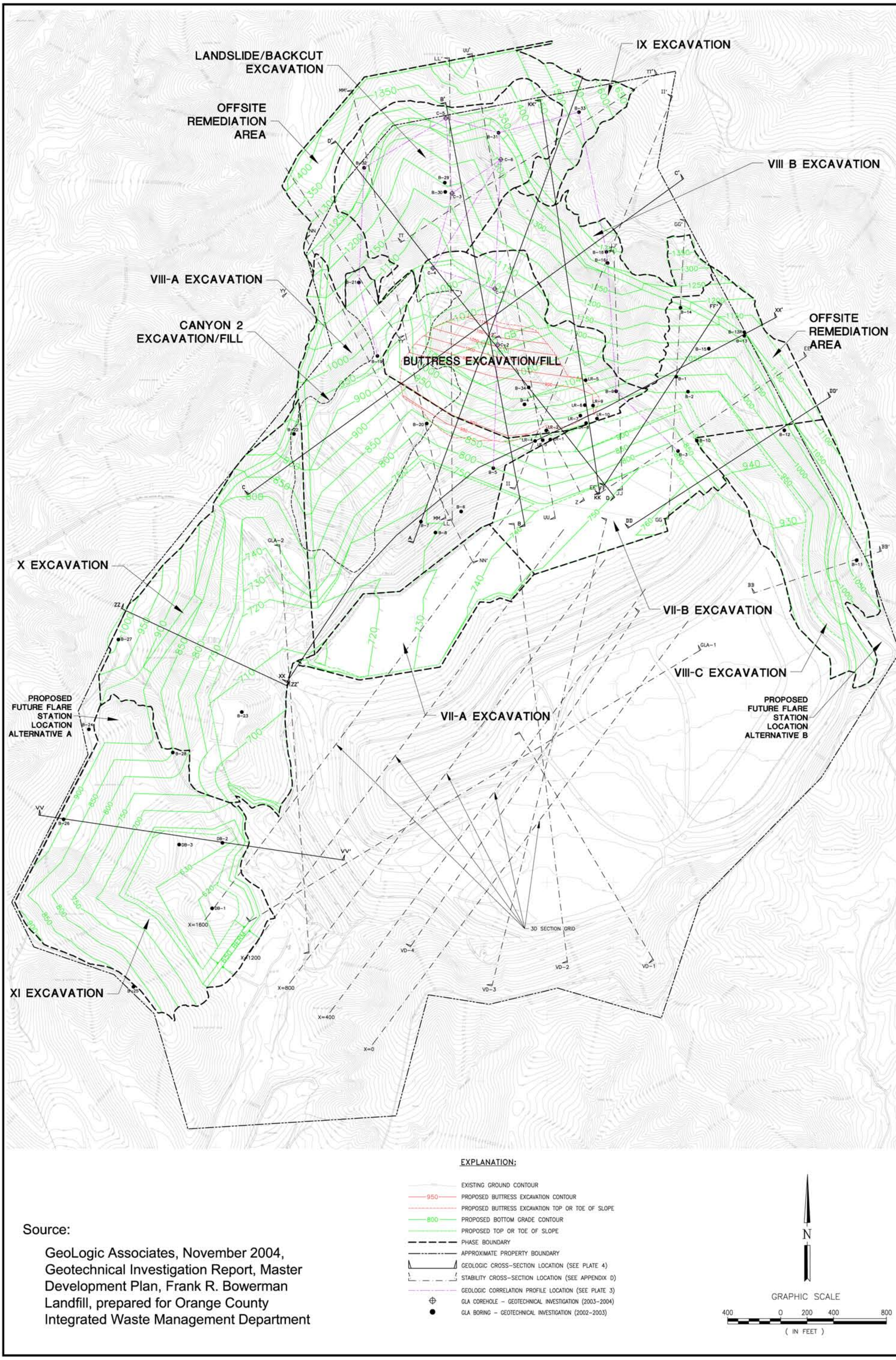
Analysis of the gross landfill stability along a third section perpendicular to the cover contours yielded a static factor of safety less than 1.5 using typical two-dimensional methods. Accordingly, a three-dimensional analysis was performed to further evaluate the static factor of safety in this area of the landfill. The three-dimensional analysis was performed using the computer program CLARA-W, Version 1, 2003 (by O. Hunger, Vancouver British Columbia, Canada). The analysis used refuse parameters described above and liner parameters from Moore and Taber, 1991. The results of the analysis indicated that the static factor of safety for this portion of the landfill is 1.6.

Similarly, for cross sections VD-1 through VD-4, shown in Figure 5.2-2, the static factor of safety was 1.5 or greater (IT Corp, 2001).

Seismic displacement of the proposed landfill geometry was calculated using the Bray and Rathje (1998) method and a Maximum Credible Earthquake acceleration ($MHA_{rock)}$ of 0.27g. Cross sections GLA-1 and GLA-2 were chosen for analysis since the yield accelerations for these two sections were less than the yield acceleration for the three dimensional case. The maximum permanent displacement was calculated to be negligible since the yield acceleration was greater than the MCE Maximum Horizontal Earthquake Acceleration (MHEA).

5.2.4.2 Landfill Cover Stability

The stability of the landfill's final cover configuration was evaluated using limit equilibrium procedures and considering the interface shear strength properties of the cover component. The analysis assumes a 5-foot thick cover of onsite soils directly on refuse. The overall slope gradient is 2.8:1. A 2.5:1 final cover slope gradient (since the bench design and spacing has not been finalized) was assumed. The final cover was assumed to have a moist unit weight with a free-draining cover (i.e., no excess pore-pressure). The cohesion between the cover and refuse layer was assumed to be one-half of the refuse cohesion to account for saturation. The cover



Source:

GeoLogic Associates, November 2004, Geotechnical Investigation Report, Master Development Plan, Frank R. Bowerman Landfill, prepared for Orange County Integrated Waste Management Department

Figure 5.2-2
Excavation Phasing, Bottom Grades and Cross-Section Locations

layer on refuse yields a calculated factor of safety of greater than 1.5 (GeoLogic Associates, 2004).

For landfill geometries having refuse ranging from 50 to 600 feet thick, the maximum displacement of cover soils under MCE seismic loads was calculated using the Bray and Rathje (1998) method to be in the negligible range. Such displacements are considered acceptable, within the tolerance of the final cover components, and within the standard of practice for landfill cover systems.

5.2.4.3 NLC Stability and Remediation

Phase VII-A and VII-B Slopes

Completed Phases VII-A and VII-B adjoin the southern limit of the NLC remediation area. Slopes in Phase VII-B are contiguous with bottom grades in the Buttress Excavation/Fill area and Phase VIII-B. Therefore, they are discussed here as part of the overall sequence of remedial construction related to the NLC.

The current Phase VII-A southeast facing bedrock slope is an interim condition to be regraded during Phase VIII-A. Southeast and southwest facing final bedrock slopes of Phase VII-B were recently constructed (in 2004). The Phase VII design report (GLA, 3/2003) was amended to address the stability of the Phase VII-B slopes in light of construction in-grading observations, geologic mapping, and subsurface exploration.

Across-bedding rotational failures and fully specified landslide geometries were analyzed for Sections D, DD, EE, FF, GG, JJ, and KK, which cross Phase VII-B slopes as shown on Figures 5.2-1 and 5.2-3. Slope configurations are based on the grading plan presented on Figure 5.2-2. Results of these slope stability analyses are summarized in the Geotechnical Investigation Report, Master Development Plan, FRB Landfill, Slope Stability Section (GeoLogic Associates, 2004).

Landslide Backcut Excavation and Buttress Excavation/Fill

Remediation of the NLC will consist of partial headscarp removal and construction of a buttress fill at the landslide toe to achieve a minimum factor of safety of 1.5 for the final graded configuration. The headscarp area will be graded to, or near, the design configuration in order to remove an amount of material from the head of the NLC sufficient to reduce driving forces and permit the buttress excavation. The adjacent slopes in the headscarp area will be steeper than final grades as a temporary condition, and will be graded to their final 3:1 (horizontal to vertical) configuration during Phase IX as shown on Figure 5.2-2. The proposed buttress configuration, shown on Figure 5.2-2, will extend across the width of the toe of the NLC at an approximate elevation 900 feet and have an average base width of approximately 400 feet. The resulting final buttress fill slopes will be contiguous with Phase VII-B and Phase VIII-A slopes. The Geotechnical Investigation Report, Master Development Plan, FRB Landfill, (GeoLogic Associates, 2004) presents results of the analyses of Sections A, B, C, D, II, LL and UU for the following conditions:

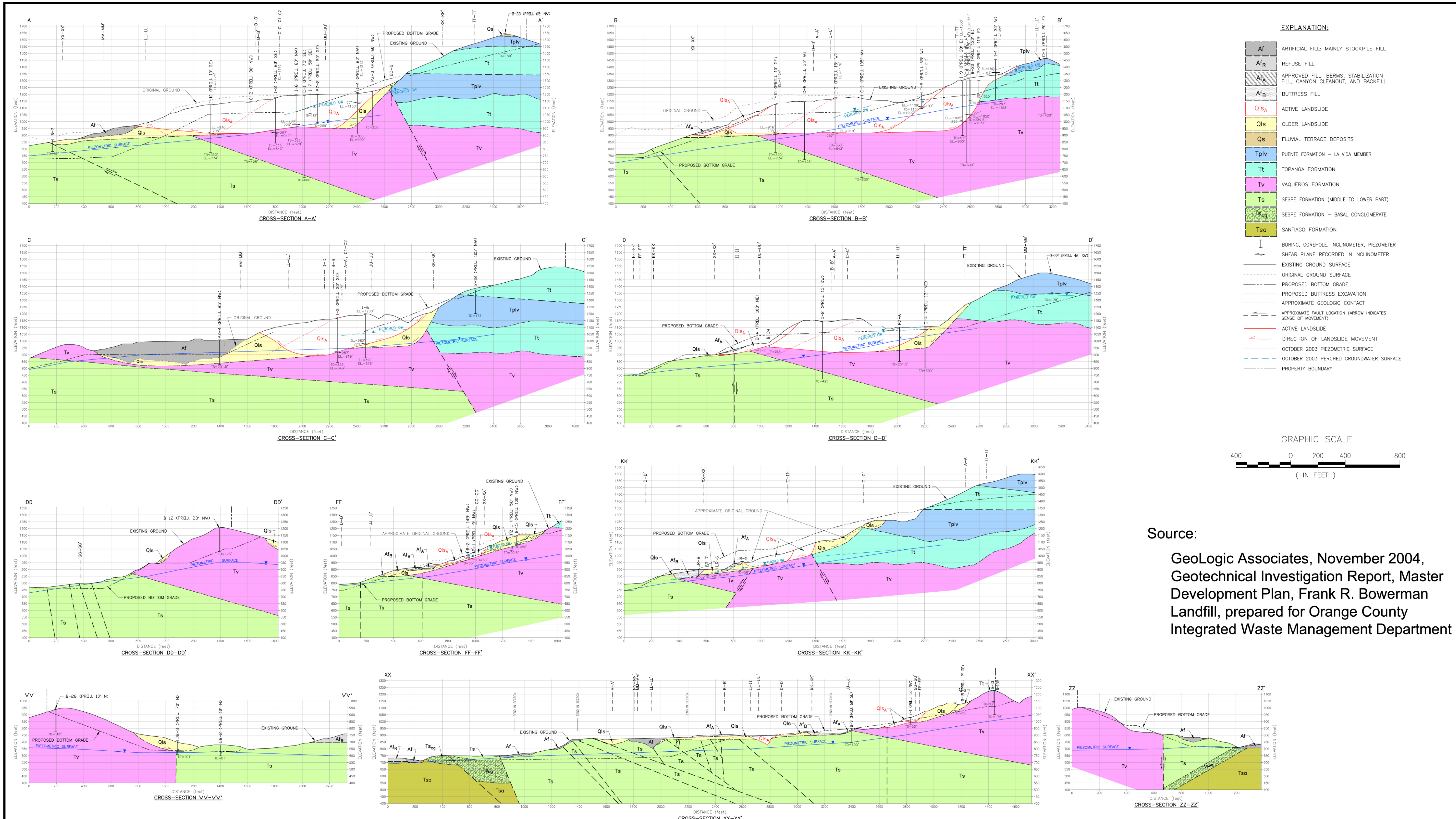


Figure 5.2-3

Geologic Cross-Sections A-A' through D-D', DD-DD', FF-FF', KK-KK', VV-VV', XX-XX' and ZZ-ZZ'

Condition 1: Existing landslide stability along each line of section, based on back calculated slide plane strengths from Section B-B'.

Condition 2: Temporary stability of the slide mass assuming completed headscarp removal and buttress back-cut excavation, prior to placement of buttress fill.

Condition 3: Temporary stability of the slide mass from Condition 2, with buttress fill in front, prior to establishing final grades.

Condition 4: Long term stability of the slide mass after buttress construction and final design grades are established.

The analyses were conducted assuming groundwater conditions as they exist today, which are believed to be conservative because 1) pore pressure distribution is not uniform as we have assumed, 2) the analyses do not account for any future dewatering of the slide mass or bedrock, and 3) the analyses do not account for decreasing groundwater recharge that will result from surface grading and drainage control. As noted above, however, there is uncertainty associated with the effect of future wet climate cycles on groundwater conditions. It will be necessary to continuously monitor NLC movement and groundwater levels in and around the slide until completion of the buttress construction to ensure that this potential effect is accounted for in final design and construction.

It is anticipated that stability of the slide mass under Condition 2 above will be marginal, as is the case at present for the existing NLC. However, it is also anticipated that construction will be sequenced in a manner that limits the extent of back-cut exposed at any one time, and that the overall stability of the slide mass will improve incrementally as buttress construction proceeds. Such sequencing is commonly employed to control unstable excavations and should be addressed in future plans and specifications.

In addition, the back-cut itself will be subject to slope failures due to the relatively weakened condition of much of the slide debris, perched groundwater, and the presence of several through-going internal shears. Further subsurface exploration of the proposed back-cut in the NLC will be required to address this issue as part of construction engineering design, but in any case construction will need to be implemented in a manner that limits the size of back-cut failures.

In addition, older landslide debris if encountered below the nominal buttress base elevation of 900 feet should be removed where it would daylight in proposed cuts in Phase VIII-A. Older landslide debris if encountered elsewhere in Phase VIII-A in areas now covered by the Canyon 2 stockpile should similarly be removed.

Bedrock Failure Models

Rotational, block, and wedge failure models were evaluated for bedrock slopes. Analysis of final bottom grades was made problematic because they are generally deeper than the range of conventional exploratory methods, or the proposed grades are now in bedrock below or behind the NLC. Models of bedrock stability were therefore developed by extrapolating locally observed structural data (i.e., trends of bedding, shears and fractures) to proposed slopes and evaluating potentially adverse geometries (unfavorable geologic structure). Slope stabilization (measures to provide greater slope stability such as a shear key, buttressing, dewatering, regrading) may be required if the likelihood of encountering adverse geometries is rated high for a slope configuration.

Across-Bedding Rotational Failure

The most common stability condition anticipated in bedrock slopes is represented by rotational failures through or across the stratigraphic layers or bed orientation. These are contrasted to bedding plane type failures where the plane of movement is parallel to the stratigraphic layers. These cases are treated with conventional critical circle analyses performed with SLOPE/W.

Block Failure Model

The block failure model identifies the orientation of unfavorable (dipping in the same direction as the slope) planes relative to the orientation of proposed cut slopes. The model assumes slip along a back scarp or basal plane but does not specify lateral boundaries.

Generic block failure configurations were analyzed with SLOPEW/W.

Wedge Failure Model

The wedge failure model identifies unfavorably oriented intersections of planes relative to the orientation of proposed cut slopes shown in Figure 5.2-2. The model assumes slip along the intersecting planes in the direction of the line of intersection. The Geotechnical Investigation Report, FRB Landfill Master Development Plan (GeoLogic Associates, 2004) summarizes the relative likelihood of encountering adverse wedge failure geometries based on the percentage of adverse planes and the orientation of the failure direction relative to the proposed slope.

Generic wedge failure configurations were analyzed with the method of Hoek and Bray (1981).

5.2.4.4 Slope Stability of MDP Phases

<u>Landslide Backcut Excavation</u>

Removal of mass from the NLC headscarp area will entail excavation of temporary cuts at 2:1 in bedrock of the Topanga Formation and La Vida Member. The excavation will be sequenced with construction of the buttress described above. As discussed in Section 5.2.4.3 above, temporary stability of the landslide backcut excavation will be marginal (as is the case for the existing NCL condition) prior to placement of a buttress fill. Mitigation measures are proposed to minimize impacts due to marginally stable interim slope conditions. Final grades will be cut at 3:1 during Phase IX which will likely require slope stabilization for block and wedge failure potential, as discussed below.

Rotational Failure

For temporary slopes, factors of safety may be less than 1.5, but stabilization is not anticipated owing to their short-term nature.

Block and Wedge Failures

The relative likelihood of encountering adverse geometries for either block or wedge failure modes is high for several interim slope conditions. Therefore, stabilization may be required for these failure modes depending on the length of time for the interim condition and the risk posed to landfill construction or operation.

Phase VIII-A/B/C Excavation

Phase VIII-A/B/C grading will create cut slopes in bedrock in the Topanga and Vaqueros Formations and the La Vida Member. Final grades will be at 3:1.

Rotational Failure

The results of across bedding analyses of final bottom-grades show that all final slopes achieve a minimum factor of safety of 1.5 under current or modified groundwater conditions.

Block and Wedge Failure

The relative likelihood of encountering adverse geometries for either block or wedge failure modes is rated high for several slope configurations. Therefore, slope stabilization will probably be required for these failure modes.

Phase IX Excavation

Phase IX grading in the northern portion of the site will involve making 3:1 cuts in the La Vida Member, and the Topanga and Vaqueros Formations behind bedrock slopes initially excavated at 2:1 during landslide remediation.

Rotational Failure

All final slopes achieve a minimum factor of safety of 1.5 under current or modified groundwater conditions.

Block and Wedge Failure

The relative likelihood of encountering adverse geometries for either block or wedge failure modes is rated high for several slope configurations. Therefore, slope stabilization will probably be required for these failure modes.

Phase X Excavation

Phase X grading in the southwest portion of the site will involve making five proposed cuts at 3:1 in the Vaqueros and Sespe Formations.

Rotational Failure

All final slopes achieve a minimum factor of safety of 1.5 under current or modified groundwater conditions.

Block and Wedge Failure

The relative likelihood of encountering adverse geometries for either block or wedge failure modes is rated high for only one slope configuration. Therefore, slope stabilization will probably be required for this failure mode.

Phase XI

Phase XI grading in the southwest portion of the site will involve making four proposed cuts at 3:1 in the Santiago Formation.

Rotational Failure

All final slopes achieve a minimum factor of safety of 1.5 under current or modified groundwater conditions.

Block and Wedge Failure

The relative probability of encountering adverse geometries for either block or wedge failure modes is rated low to moderate for these slopes. Therefore, slope stabilization will probably not be required for these failure modes.

5.2.4.5 Summary of Results

Mineral Resources

Economically useful geologic resources do not occur in the proposed lateral expansion footprint area, with the exception of materials that may be suitable for cover or construction in further development of the landfill. The site is not located directly in a Mineral Resource Zone as defined by the CGS.

Soils

On-site topsoils consist of a thin layer of colluvium which is composed of weathered bedrock with organic matter derived from decayed plants. Most of the topsoils in the areas to be developed are stripped from the site during clearing and grubbing of the slopes that precedes excavation and fill activities. The plant materials and colluvial soils are sometimes disposed of in the landfill or are stockpiled for use in covering graded areas to re-establish native vegetation for erosion control.

Most materials that are used for clay liner and for daily/intermediate cover at the landfill are derived from bedrock formations around the site. Some of the bedrock formations are soft, friable, and easily eroded while others are not.

Slope Stability

Since the proposed expansion will encroach upon the NLC, 3-Dimensional stability analyses were performed to search for critical potential failure surfaces that include portions of the landslide that will remain in place. The potential failure surfaces also included portions of the buttress fill at the toe of the landslide as well as how those failure surfaces might impact the lined portions of the landfill. Based on the analyses presented in the Master Development Plan, the proposed final graded configuration for slopes and landslide remediation are demonstrated to have an adequate factor of safety under static conditions, and the displacements likely to occur under dynamic conditions are calculated to be at acceptable levels (GeoLogic Associates, 2004). Interim slope failures are expected during landslide remediation construction which will be required to be addressed during construction engineering design. It is anticipated that construction will be sequenced in a manner that limits the extent of back-cut exposed at any one time and that the overall stability of the slide mass will improve incrementally as buttress construction proceeds.

Seismicity

No known active faults cross or trend toward the FRB Landfill site. However, earthquakes originating on many of the larger regional faults, including the San Andreas Fault, San Jacinto Fault, Whittier-Elsinore Fault, and the Newport- Inglewood Fault, have the ability to generate large magnitude, long-duration, and potentially damaging ground motions at the site. The closest documented active fault to the site is Elsinore-Glen Ivy Fault/Chino-Central Avenue strand, located approximately 10 miles (16 km) east of the landfill.

To determine the design acceleration for the FRB Landfill, a search of historic earthquake epicenters within a 100 km radius of the site was performed using the software program EQSEARCH (Blake, 2000). Based on the available historic data, the FRB Landfill site has experienced a maximum acceleration of about 0.15 g during a Magnitude 7.0 earthquake which occurred on December 16, 1858 at distance of about 23 miles (37 km).

Deterministic seismic risk assessments for the FRB Landfill site were performed using the program EQFAULT. The deterministic seismic risk assessment evaluates the peak horizontal ground accelerations for specific faults within the search radius, based on the MCE assigned to each fault and a user-specified earthquake attenuation formula. The result from the deterministic analysis indicates that the peak horizontal bedrock acceleration expected at the landfill site is about 0.27g and would result from a 6.7 Magnitude event on the Elsinore-Glen Ivy Fault. The maximum permanent displacement was calculated to be negligible since the yield acceleration was greater than the MCE Maximum Horizontal Earthquake Acceleration (MHEA). The results of the deterministic seismic risk analysis on the Elsinore-Glen Ivy Fault and other faults within a 100-km radius of the site, their respective MCEs, and the respective Peak Ground Acceleration (PGA) as well as outputs from the EQSEARCH, and EQFAULT programs used for seismicity evaluation are included in the Geotechnical Investigation Report, Master Development Plan, FRB Landfill (GLA, 2004).

Liquefaction, Lateral Spreading, and Subsidence

Problems pertaining to liquefaction, lateral spreading, and subsidence are not anticipated at the FRB Landfill due to the geologic conditions at the site. These phenomena are typically observed in areas with deep, soft soils and a high groundwater table which is not the case for the site.

5.2.5 MITIGATION MEASURES

G-1 Landslides will be mitigated by exploration of the geometry of the failure surface, development of a remediation plan (removal of driving weight using grading equipment, construction of shear keys and/or buttresses and/or dewatering), and implementation of a remediation plan. Measures implemented will be similar to those performed in response to the 2002 NLC as described in the Geotechnical Investigation Report, Master Development Plan, FRB Landfill (GeoLogic Associates, 2004) and will be designed to limit impacts to off-site areas, avoid impacts to future landfill operations, and minimize potential hazards to on-site personnel.

G-2 During construction of landslide remediation projects, it will be necessary to monitor landslide movement and groundwater levels in and around the landslide and to sequence construction in a manner that limits the extent of buttress backcut exposed at any one time, prior to completion of buttress construction.

G-3 Prior to construction of each phase of lateral expansion area, IWMD will be responsible for having additional geologic data obtained and subsequent slope stability analyses conducted to verify assumptions made for the stability analysis included in the Geotechnical Investigation Report, Master Development Plan, FRB Landfill, (GeoLogic Associates, 2004).

G-4 Prior to construction of each phased grading plan, IWMD will be responsible for having the excavation and grading plan meet stability requirements for all proposed cut, fill, and lined slopes. Slopes shall be designed to withstand the most credible earthquake or as required by current regulations. Liner design plans shall be submitted to the Santa Ana Regional Water Quality Control Board in a Design Report for approval.

G-5 Prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the expansion, the IWMD shall present a liner design concept in a Joint Technical Document (JTD) to be submitted to the RWQCB and LEA for approval and to the CIWMB for concurrence. As part of the JTD, the IWMD shall present the assumptions, methods, and calculations used to demonstrate seismic safety.

5.2.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

With implementation of the above mitigation measures, the potential for impacts to geology and soils will be less than significant.

5.3 HYDROGEOLOGY AND WATER QUALITY

This section summarizes information obtained from reports prepared for ongoing operations and regulatory compliance at the Frank R. Bowerman Landfill. These reports are available from IWMD. All technical reports and relevant material used in the preparation of this section are listed in Section 13.0 (References).

5.3.1 EXISTING CONDITIONS

5.3.1.1 Regional Hydrogeology

The Frank R. Bowerman (FRB) Landfill is located on the southwestern flank of the Santa Ana Mountains near Irvine in Orange County, California. The Santa Ana Mountains are a northwest trending chain that is part of the Peninsular Range Geomorphic Province that separates the Orange County Coastal Plain from the Elsinore Basin. The bedrock of the Santa Ana Mountains is not regarded as a water bearing resource due to the low hydraulic conductivities and poor water quality that make its commercial exploitation impractical (California Department of Water Resources (CDWR), 1961 and 1967). A water bearing resource, as defined by the CDWR, is an aquifer or a rock or alluvium (sandy, coarse, riverbed material) body capable of storing and conveying appreciable amounts of water. The FRB Landfill bedrock is classified as an aquitard (soil or bedrock that can store minor amounts of groundwater and can only transmit it slowly).

In contrast, fresh water-yielding sand and gravel aquifers occur throughout the Quaternary sedimentary section in the Tustin Plain Area of the Orange County Groundwater Basin located downgradient from the FRB Landfill (OCWD, 1992). According to the Orange County Water District (OCWD, 1992), these permeable units are separated from each other by silty or clayey intervals, which in some instances act as confining horizons. According to the Department of Water Resources (1967) and OCWD (1992), Bee Canyon empties into the forebay area of the Orange County Groundwater Basin. The primary area of recharge is located to the north along the Santa Ana River and the northern Santa Ana Mountains.

According to the Santa Ana Regional Water Quality Control Board Basin Objectives Plan (RWQCB, 1995), the Bee Canyon drainage is a tributary of San Diego Creek which is in turn a tributary of the upper Newport Bay. The hydrologic unit is classified as the East Coastal Plain of the lower Santa Ana River Basin (RWQCB, 1995). According to the RWQCB (1995), the beneficial uses for the East Coastal Plain of the lower Santa Ana River hydrologic unit are as follows:

- Municipal and Domestic Water Supply
- Groundwater Recharge
- Recreational Use 1 (includes body contact with water)
- Recreational Use 2 (no body contact with water)
- Warm Freshwater Habitat
- Wildlife Habitat

In addition to the regional aquifers and bedrock aquitard, the alternating sequence of sandstones and siltstones typical of the Williams, Santiago, Sespe, Vaqueros, Topanga, and Puente Formations leads to the development of small volume perched groundwater zones where a siltstone interval retards the downward migration of water through a body of sandstone. Daylighting of these perched groundwater zones is responsible for the low yield seeps and springs sometimes exposed by grading on the FRB Landfill property.

Finally, Holocene unconsolidated deposits (recent uncompressed soils), such as landslide debris or canyon alluvium, could also have high hydraulic conductivities (the speed at which water moves through the soil or bedrock under saturated conditions), but their limited thicknesses do not allow for the storage or transmission of large volumes of water. Landslide slip surfaces disrupt the downward flow of groundwater and cause locally perched conditions (GeoLogic Associates, 2004). From a hydrogeologic standpoint, they can best be regarded as small perched groundwater zones with limited continuity with the underlying aquitard.

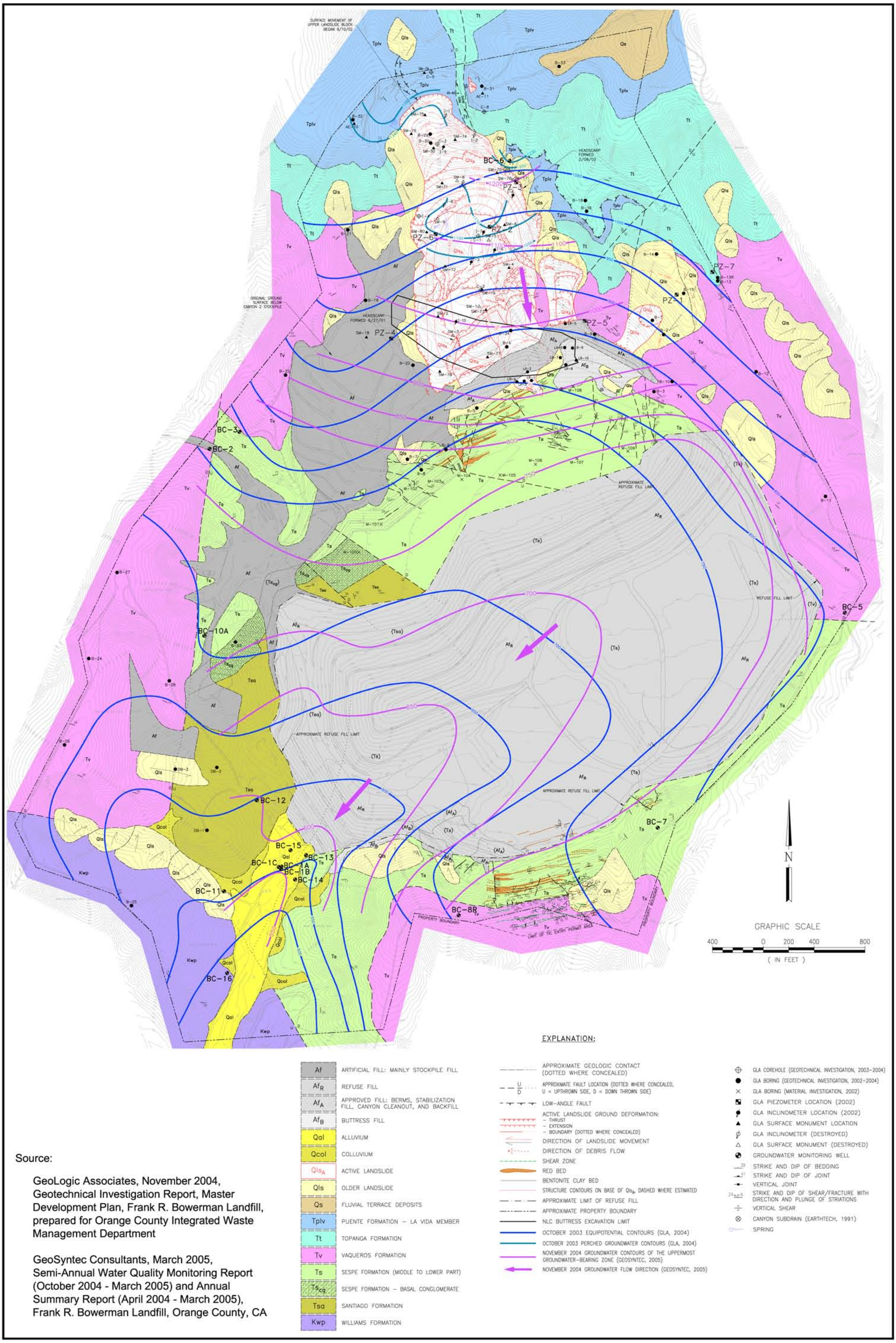
5.3.1.2 Local Hydrogeology

Local hydrogeologic conditions on the FRB Landfill property have historically been monitored by 17 groundwater monitoring wells and seven piezometers. The groundwater monitoring wells are part of an ongoing Detection Monitoring Program (DMP) and Corrective Action Program (CAP) for the site. The piezometers were installed to gather information for Phase VII and VIII development. The piezometers are not monitored as part of the DMP or CAP. As part of the MDP geotechnical investigation conducted in 2003, the piezometers were installed to monitor groundwater conditions that could impact slope stability for future phases of the landfill.

Monitoring well data has consistently shown flow from the ridges toward the canyon floor then southwest towards the Tustin Plain/East Coastal Plain as shown on Figure 5.3-1. Locally, especially along the ridge tops surrounding the landfill property, the groundwater flow direction is away from the ridge tops towards the adjacent canyons. Within the North-end Landslide Complex (NLC) on the FRB Landfill property, perched groundwater occurs locally and is controlled by well cemented sandstone layers and low permeability siltstone layers. Some perched groundwater also occurs within the landslides around the NLC.

Deeper bedrock groundwater equipotential lines (the potential for groundwater to reach lines of equal elevation) developed by Geosyntec (2005) are based on the wells designated as part of the Detection Monitoring Program and the Corrective Action Program. They show a continuous groundwater table that extends across the site and connects the groundwater in well BC-6 (located within the limits of the NLC in the northern portion of the site) with the groundwater from the rest of the site. These groundwater equipotential lines developed by GeoSyntec (2005) are shown on Figure 5.3-1.

Bedrock groundwater equipotential lines based on the MDP geotechnical investigation piezometers (GeoLogic, 2004) indicate that the main groundwater table in the northern portion of the site is deeper than depicted by GeoSyntec (2005) and that the water level recorded from well BC-6 is indicative of perched conditions. The piezometers drilled for the MDP were much deeper than BC-6 resulting in the deeper groundwater equipotential lines for bedrock.



Source:

GeoLogic Associates, November 2004, Geotechnical Investigation Report, Master Development Plan, Frank R. Bowerman Landfill, prepared for Orange County Integrated Waste Management Department

GeoSyntec Consultants, March 2005, Semi-Annual Water Quality Monitoring Report (October 2004 - March 2005) and Annual Summary Report (April 2004 - March 2005), Frank R. Bowerman Landfill, Orange County, CA

Figure 5.3-1
Site Hydrogeology

The groundwater equipotential lines based on the MDP geotechnical investigation by GeoLogic Associates are also shown on Figure 5.3-1.

Groundwater interpretation based on the DMP and CAP wells and the MDP geotechnical investigation piezometers all show flows in the same direction; to the south-southwest. Although bedrock groundwater elevations in the northern portion of the site are observed at a greater depth in the MDP piezometers than in the DMP/CAP monitoring wells, the proposed bottom grades of the future MDP phases of development for the site are projected to intercept the bedrock groundwater or perched groundwater in some areas, thereby requiring a subdrain system to collect groundwater flows.

Groundwater occurs primarily in sand layers and fractures below the FRB Landfill property. Field tests in wells and boreholes were used to calculate the hydraulic conductivity of the water bearing alluvium near the mouth of Bee Canyon. The values range from 0.28 feet/day (1.0e-04 centimeters/second) to 2.8 feet/day (1.0e-03 centimeters/second) (Earth Technology Corporation, 1987). Field tests were also used to calculate a range of hydraulic conductivity values in the bedrock formations from 1.0e-06 centimeters/second (0.0028 feet/day) to 1.0e-08 centimeters/second (0.000028 feet/day) (Earth Technology Corporation, 1987). The quantity of groundwater stored and capable of being conveyed from the bedrock below the FRB Landfill is very low when compared to the storage capacity and hydraulic conductivity of the East Coastal Plain aquifers downgradient from the site.

Groundwater dewatering was performed in the northeast portion of the site, specifically to assist in remediating the NLC, by drilling 27 horizontal dewatering wells to drain excess groundwater pressure head from inside and below the landslide. The water produced never exceeded a total combined flow of more than about 25 gallons per minute and quickly decreased to a few gallons per minute (GeoLogic Associates, 2004). The dewatering wells have had some impacts on the groundwater levels around the site; however, the slow rate at which groundwater flows beneath the site limits the total flow from the drains (GeoLogic Associates, 2004).

5.3.1.3 Groundwater Monitoring

Groundwater underlying the FRB Landfill property is monitored by wells that are sampled as required by the site Waste Discharge Requirements (WDRs) and Monitoring and Reporting Program (M&RP) (Order No. 98-99). Groundwater monitoring is performed semi-annually with an annual summary report prepared as required by the WDRs (WDR Order No. 98-99 and M&RP Order No. 98-99-01). A more rigorous Constituent of Concern (COC) testing program is employed every five years under which a larger, more broad-based list of analytes is analyzed for and reported. The COC testing is a method of re-evaluating the site groundwater chemistry, and the M&RP can be amended or altered to reflect changes to the groundwater regime or chemistry. The site is currently in a CAP to remediate volatile organic compounds (VOCs) detected in groundwater downgradient of the landfill toe.

The M&RP specifies two types of groundwater monitoring programs to be implemented at the FRB Landfill. The DMP monitors and analyzes groundwater samples from approved points of compliance for the landfill to identify potential releases. The DMP includes an analysis of groundwater chemistry to identify trends or changes in the organic/inorganic qualities of the groundwater. The CAP currently in place monitors the efficacy of the site remediation system which consists of source controls in the form of enhanced landfill gas extraction.

The monitoring network consists of a total of 16 wells (BC-1A, BC-1B, BC-1C, BC-2, BC-3, BC-5, BC-6, BC-7, BC8R, BC-9, BC-10A, BC-12, BC-13, BC-14, BC-15, and BC-16 (M&RP 98-99-01). A description of each well in the existing site monitoring system is shown in Table 5.3-1.

TABLE 5.3-1
FRANK R. BOWERMAN LANDFILL MONITORING SYSTEM WELLS

WELL	AQUIFER	STATUS	MONITORING PROGRAM
BC-1A	Alluvium-Santiago	Remediation	CAP
BC-1B	Bedrock	Remediation	Elevation Monitoring
BC-1C	Bedrock	Remediation	Elevation Monitoring
BC-2	Bedrock		Elevation Monitoring
BC-3	Bedrock		Elevation Monitoring
BC-5	Bedrock		Elevation Monitoring
BC-6	Puente	Background Monitoring	DMP
BC-7	Sespe	Compliance Monitoring	DMP
BC-8R	Sespe	Compliance Monitoring	DMP
BC-9	Bedrock		Elevation Monitoring
BC-10A	Sespe	Compliance Monitoring	DMP
BC-11	Vaqueros	Abandoned	DMP
BC-12	Santiago	Compliance Monitoring	DMP
BC-13	Santiago	Remediation-Monitoring	CAP
BC-14	Santiago		Elevation Monitoring
BC-15	Santiago	Remediation	CAP
BC-16	Sespe? Williams?	Compliance Monitoring	DMP

Source: GeoSyntec, 2005.
GeoLogic Associates, 2004.

As shown above, six of the wells (BC-6, BC-7, BC-8R, BC-10A, BC-12, and BC-16) comprise the DMP system, three wells (BC-1A, BC-13, and BC-15) comprise the CAP system, and seven of the wells (BC-1B, BC-1C, BC-2, BC-3, BC-5, BC-9, and BC-14) are used to monitor groundwater elevations only.

As new phases of development are constructed, the groundwater monitoring network may be revised in accordance with regulatory agency requirements.

5.3.1.4 Groundwater Quality

Groundwater beneath the site is of poor quality and is not regarded as a significant groundwater resource (GeoSyntec, 2005). Concentrations of inorganic chemical compounds and parameters (e.g., pH, nitrate as nitrogen, chloride, sulfate, and total dissolved solids) are historically variable in groundwater around the FRB Landfill property and are used as a surrogate for metals analyses. Although groundwater samples collected from some wells have historically had variable concentrations, they are still within the range of values for all wells across the site. The variability in inorganic parameters in some of the wells is regarded as statistically insignificant. Volatile organic compounds were not detected above the practical quantitation limits in samples collected from wells during the 2004-2005 annual summary report (GeoSyntec, 2005) and are not typical of groundwater conditions during the last several years.

Prior to revamping the landfill gas extraction system, VOCs were detected in wells BC-13 and BC-15 at the FRB Landfill. The VOCs that were present were fluorocarbons and other compounds typical of landfill gas impacts to groundwater. An evaluation monitoring program was instituted in 1996 (GeoSyntec, 1996b) to determine the lateral and vertical extent of groundwater impacts. An evaluation feasibility study and proposed CAP were then implemented (GeoSyntec, 1996). A CAP consists of measures implemented to control a problem that adversely impacts groundwater quality. These programs are undertaken whenever the detection monitoring program identifies contamination in the groundwater. None of the groundwater impacts detected at the FRB Landfill were detected offsite and no beneficial uses were impacted as a result of the release.

5.3.1.5 Site Corrective Action Program

The CAP was instituted to remediate VOCs present in groundwater wells adjacent to the toe of the landfill (GeoSyntec, 1996). The CAP consists of improvements to the landfill gas extraction system to control gas emissions near the toe of the landfill. VOC concentrations in wells BC-13 and BC-15 have diminished since enhancement of the landfill gas controls. According to GeoSyntec (2005), the total VOC concentration in well BC-13 has decreased from 55 ppb in 1999 to 2 ppb (estimated trace concentrations, i.e. not above the practical quantitation limits) in 2005. VOCs have not been detected above the method detection limit since 1999. Single trace detections of the VOC 1,1-DCA in well BC-1A starting in 2004 have been attributed to residual effects of the VOC impacts recorded in 1999 in the wells further upgradient (GeoSyntec, 2005).

5.3.2 THRESHOLDS OF SIGNIFICANCE

Groundwater chemistry data collected from the DMP and CAP at the FRB Landfill is subject to statistical analysis to determine whether or not a release of contaminants (inorganic constituents, VOCs, or metals which are monitored by use of inorganic surrogates such as pH and chloride) has occurred. The statistical analysis methods are specified in CCR Title 27. If a release is confirmed, the Regional Water Quality Control Board - Santa Ana (RWQCB) is notified and the landfill operators are required to perform a study to evaluate the impacts and propose remedial activities to alleviate the problem. In referencing CEQA Guidelines Appendix G and the NOP, Environmental Analysis Checklist, impacts to hydrogeology and water quality would be considered significant and adverse if the proposed project would result in a significant adverse impact on groundwater quality or otherwise substantially degrade water quality.

For metal “surrogates” the data can be compared within the pooled data set for each respective well or by comparison of the downgradient data with the upgradient well chemistry. The statistical methods require that the effects of seasonality (the effects of the cyclic nature of the weather systems in southern California) be accounted for. In addition, the statistical approach requires an analysis for long term trends that may occur within the data set.

Because VOCs are not typical of the upgradient groundwater chemistry at the FRB Landfill, a non-statistical approach to inspection of the groundwater database is undertaken. A VOC release is indicated if one of the following two conditions occurs:

- Two or more of the VOCs in the required testing schedule exceed the laboratory Method Detection Level (MDL).
- One or more of the VOCs in the required testing schedule exceeds the laboratory Practical Quantitation Level (PQL).

Confirmation testing for VOCs is required if a tentative VOC release is indicated.

5.3.3 METHODOLOGY

Potential impacts on water quality are assessed by comparing the groundwater and surface water quality data available for the site with water quality objectives established by local, state, and federal regulatory agencies. Surface water, groundwater and landfill-impacted liquids are currently monitored on a semi-annual basis in accordance with the terms of Waste Discharge Requirements Order No. 98-99 issued by the RWQCB. Groundwater, surface water (rainfall runoff in drainage courses), leachate, and condensate samples are collected from established monitoring wells or designated sampling locations and analyzed for a suite of constituents including general minerals, metals, and VOCs. The chemistry results are statistically or deterministically analyzed to evaluate whether or not a release has occurred, or whether the nature of a release is changing over time. This assessment was based on the latest groundwater monitoring reports provided by IWMD (GeoSyntec, 2005).

5.3.4 IMPACTS

The FRB Landfill Master Development Plan (MDP) consists of eleven major phases of landfill development, seven existing and four planned (Phases VIII through XI), and landslide remediation activities. A Detection Monitoring Program is in place for the site which may need to be augmented, as required by the RWQCB, as the MDP is implemented. Groundwater beneath the site is of poor quality and is not regarded to be a significant groundwater resource (GeoSyntec, 2005).

The groundwater protection system, including the landfill liner and overlying leachate collection and removal system (LCRS) underneath the existing landfill and proposed for the four planned major lateral expansion areas, is intended to continue to protect groundwater beneath and downgradient from the site. The existing landfill and future lateral expansion areas will have a composite liner system that meets federal and state requirements and has been approved by the RWQCB. The federal and state required prescriptive liner design may be amended based on the geologic conditions encountered and if allowed by the RWQCB. In addition, the LCRS system currently in use and proposed for the expansion area consists of perforated pipes in a bed of sand or gravel that conveys leachate (fluids derived from direct contact with refuse) off of the liner to a storage tank facility for testing and proper disposition.

Impacts on hydrogeology and water quality from the expansion are expected to be insignificant due to the redundant nature of the regulatory required liner system and LCRS, and the landfill gas source controls implemented as part of the CAP.

VOCs have been detected in groundwater downgradient of the toe of the landfill. A CAP is in place at the site which includes enhanced collection of landfill gas generated from the landfill. The remediation system consists of additional gas extraction wells and groundwater monitoring wells to demonstrate system effectiveness. Detections of VOCs in groundwater are expected to be less than significant during the extended operations of the MDP and throughout the post-closure period if CAP mitigation measures are implemented. The implementation of these project design features and the mitigation measures included in Section 5.3.5 are intended to ensure that the proposed project will not result in adverse impacts to groundwater or groundwater quality, or conflict with water quality objectives established by local, State and Federal agencies.

The proposed project may likely involve dewatering associated with landslide remediation activities; however, this dewatering will not result in any significant impacts associated with groundwater drawdown, loss of beneficial groundwater for downgradient uses, nor would this result in any significant change in the direction or flow of groundwater movement off-site.

5.3.5 MITIGATION MEASURES

HW-1 As part of each new phase of development, a composite liner or an alternative to the prescriptive composite liner and leachate collection and removal system will be constructed in the lateral expansion area to intercept and collect leachate for storage and proper disposition (disposal off-site or use as dust control), as approved by the RWQCB. A subdrain system will be installed to intercept perched and bedrock groundwater below the liner. Horizontal drains may also be installed below the North-end Landslide Complex (NLC) for the purposes of reducing the forces driving the landslide and to bring the piezometric head level below the design grades. The existing NLC horizontal drains are expected to remain active through future landfill development and additional horizontal drains will be installed as necessary. The prescriptive or alternative liner, leachate collection and removal system and subdrain will be approved by the RWQCB in a Design Report and will comply with federal and state requirements (27 CCR).

HW-2 As part of a Joint Technical Document to be prepared by IWMD prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the expansion, the liner design concept shall be submitted to the RWQCB and Local Enforcement Agency for approval and to the CIWMB for concurrence. As part of a Joint Technical Document, the IWMD shall also present the assumptions, methods, and calculations used to demonstrate seismic safety.

HW-3 During ongoing landfill operations (including the expansion areas), IWMD will continue to comply with the site's Waste Discharge Requirements and Monitoring and Reporting Program requirements imposed by the RWQCB for the protection of water quality.

HW-4 The Corrective Action Program in place at the landfill will continue to be implemented by IWMD if Volatile Organic Compounds are detected in groundwater.

5.3.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

With implementation of the above mitigation measures, the potential for impacts to groundwater will be less than significant.

5.4 SURFACE WATER HYDROLOGY

This section summarizes information obtained from reports prepared for ongoing operations and regulatory compliance at the Frank R. Bowerman Landfill. These reports are available from IWMD. All technical reports and relevant material used in the preparation of this section are listed in Section 13.0 (References).

5.4.1 EXISTING CONDITIONS

According to the Watershed and Coastal Resources Division of the Resources and Development Management Department (RDMD) of Orange County, the Frank R. Bowerman (FRB) Landfill is located in Bee Canyon Wash which is within the northeast part of the San Diego Creek Watershed that drains to the Pacific Ocean at Upper Newport Harbor nine miles to the west. Adjacent tributaries include Hicks Canyon to the north and west, and Round Canyon to the east.

According to the FRB Landfill's Waste Discharge Requirements, the Santa Ana Regional Water Quality Control Board's (RWQCB) Water Quality Control Plan, Santa Ana River Basin (1995), identifies beneficial uses of Bee Canyon Wash and San Diego Creek, Reach 2, including:

a) Groundwater Recharge,
b) Recreational Use 1 (body contact with water),
c) Recreational Use 2 (no body contact with water),
d) Warm Freshwater Habitat, and
e) Wildlife Habitat.

Precipitation in the watershed is nearly all in the form of rain. Typically, most of the rainfall occurs during the 4-month period from December through March. Rainless periods of several months in the summer are not uncommon. Precipitation data was obtained from the California Irrigation Management Information System (http://wwwcimis.water.ca.gov/cimis/welcome.jsp). Data for the Santiago Dam Station was available from 1948 to 1997 and averaged 12.6 inches per year. The Irvine Station #75 has data available from October 1987 to November 2005 and averages 15.01 inches per year. The Irvine Station dataset is skewed above the long term average because of the large amounts of precipitation received during the 2004/2005 water year.

The primary function of the surface water drainage control system for the FRB Landfill is to minimize erosion and the potential infiltration of surface water run-on into the refuse disposal areas. On-site drainage features are designed and constructed to control storm water that falls on the landfill and run-on from the surrounding watershed. The flatter surface areas or decks of the disposal area are graded to promote lateral sheet flow run-off to downdrains on the slopes. Surface water run-off from the disposal area slopes are controlled by intermediate benches or access roads which are graded to direct flows toward the inside of the bench or road and then into one of the downdrain inlets on the bench or into perimeter drainage channels. The gradients of these downdrains follow the surface of the refuse slope and maintain a minimum three percent grade across the benches. All surface waters collected by the various drainage controls on the landfill property are eventually directed to the drainage channels which run along the perimeter of the disposal areas and discharge into Bee Canyon Wash downstream.

The perimeter storm drainage (PSD) channels are constructed of various materials and include concrete channels, High Density Polyethylene (HDPE) pipes, and articulated concrete block channels (over refuse). Completed fill phases IIIA and VA, B and C have perimeter drainage systems along the westerly and southwesterly perimeter of the landfill. For Phase VII-A, a trapezoidal channel (the Northwest Channel) was constructed at the top of the Phase VII-A north excavation slope and a trapezoidal channel (North Channel) was constructed at the toe of the north excavation slope shown on Figure 5.4-1 to carry run-off from the north side of the Phase VII-A and Phase VII-B refuse fill slopes. Twin 60-inch diameter corrugated HDPE pipes have been constructed in the V-D stockpile fill to continue flows from the northeasterly side of the landfill. A small desilting basin (Southeast Inlet Basin) located upstream of the twin pipes traps sediment prior to entering the twin drainage conduits shown on Figure 5.4-1. The remainder of the PSD channels will be completed as future phases are developed. The PSD is intended to control run-on (from surfaces adjacent to the landfill) that might otherwise flow onto the landfill as well as to serve as a conveyance for on-site flow. The stormwaters conveyed by the PSD system discharge into the Bee Canyon Wash at the south side of the landfill. The Bee Canyon Retarding Basin below the landfill property line ultimately discharges to off-site drainage courses.

The Joint Technical Document (BAS, 2002) drainage plan for the FRB Landfill (currently approved in the site's landfill Waste Discharge Requirements and Solid Waste Facilities Permit) divided the FRB site into two main tributaries that drain generally from the north in a southerly direction around the landfill on both the easterly and westerly sides. The hydrologic analysis for the Joint Technical Document indicated in a peak flow rate of 1429 cubic feet per second (CFS) for the 621 acres of the total tributary area shown on Figure 5.4-2.

The surface water drainage control systems (both existing and permitted) for the FRB Landfill are to be designed to accommodate 100-year, 24-hour storm event run-off volumes. Interim drainage control features and procedures are instituted during active disposal operations and include fill area grading, downdrains, earthen berms and desilting basins. This system provides continuous storm water collection and conveyance in a controlled manner and minimizes erosion, ponding, and the potential for excess leachate generation and surface water contamination. Some of the interim drainage control system facilities (e.g., desilting basins) will be utilized as part of the final drainage control system for the site.

The permitted final drainage control system will include exterior slope downdrains, engineered deck area gradients and drainage berms, deck inlets, bench drains and inlets, trapezoidal perimeter channels and a permanent desilting basin or basins. Currently there are several on-site desilting basins. As the landfill progresses into the future development phases, these basins will be replaced with new on-site desilting basins to accommodate potential sediment volumes from their respective tributary areas.

The existing Bee Canyon Retarding Basin shown on Figure 5.4-1 located immediately south of the FRB Landfill property boundary provides for storage of sediment and debris from the landfill area not contained by the on-site erosion control measures and desilting basins. This downstream retarding basin is owned and operated by the Orange County Flood Control District. After each major storm and annually, all drainage facilities are inspected and required

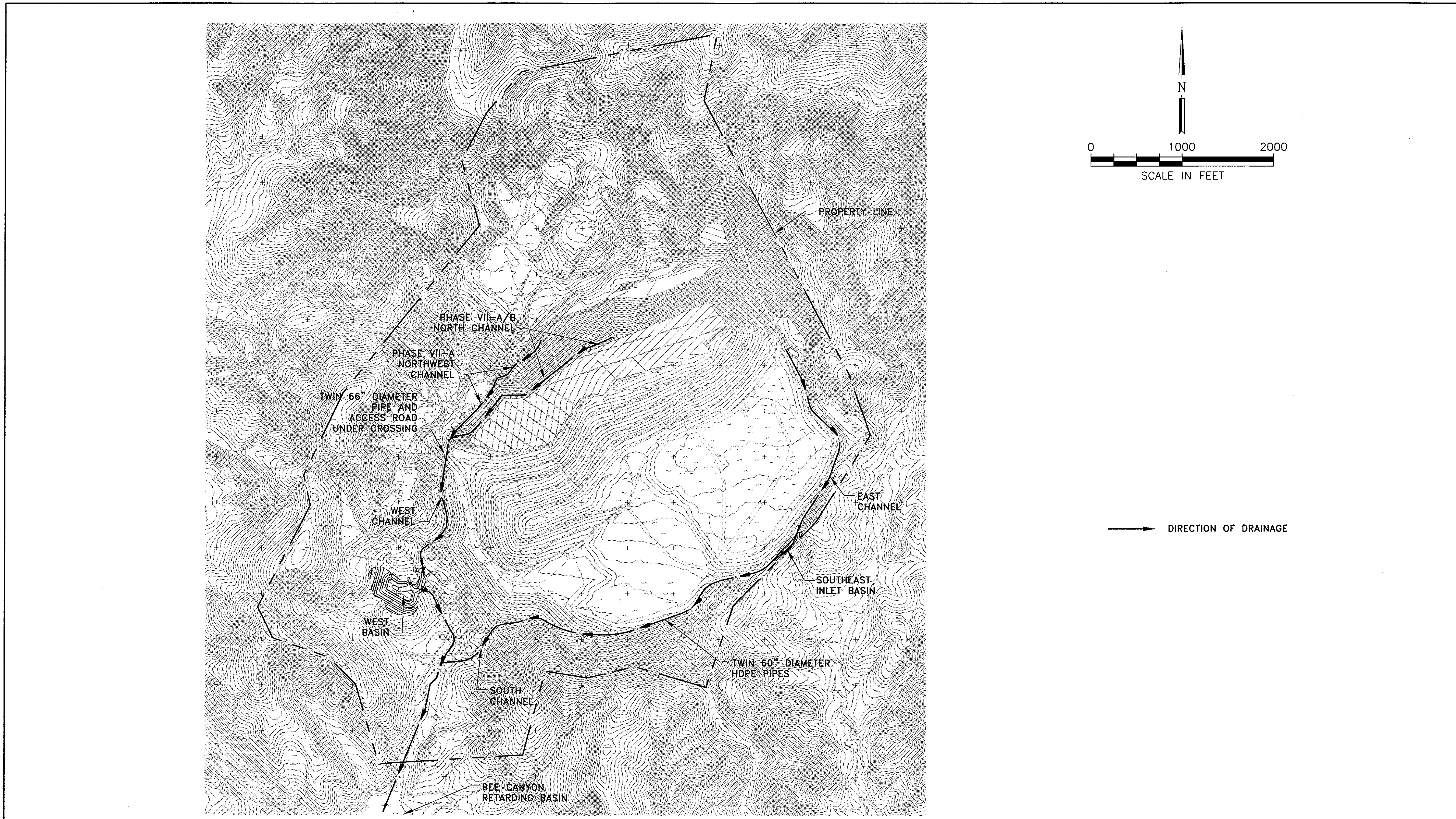
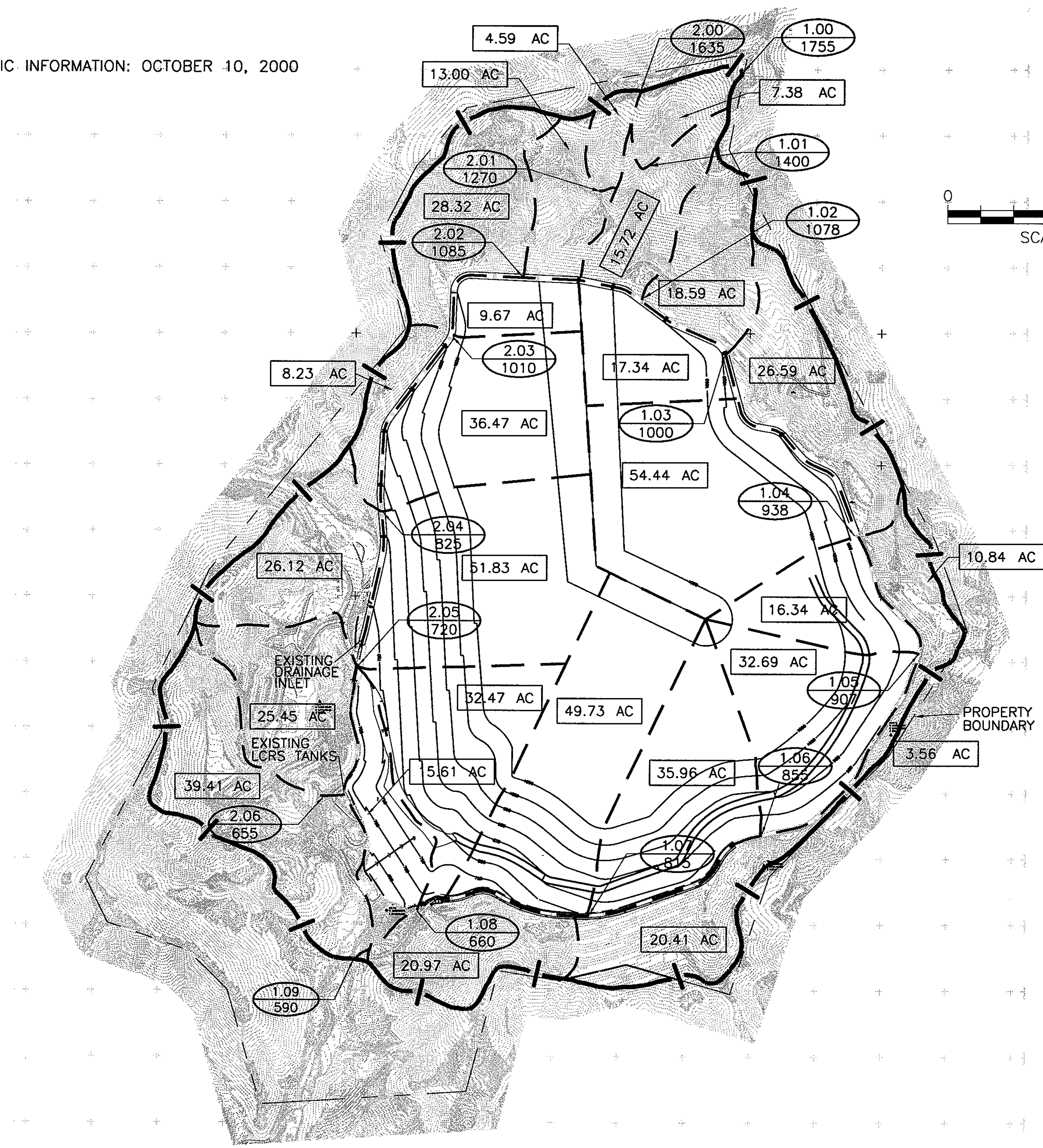


Figure 5.4-1
Existing Drainage System Plan

NOTE:

1) DATE OF TOPOGRAPHIC INFORMATION: OCTOBER 10, 2000



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SCALE IN FEET

LEGEND

- PROPERTY BOUNDARY
- EXISTING GROUND CONTOUR
- 900 PROPOSED CONTOUR
- 1.00 AC — AREA IN ACRES
- 1.00 NODE NAME / 1000 ELEVATION — NODE DESCRIPTION
- DRAINAGE SUB-AREA
- DRAINAGE TRIBUTARY AREA

HYDROLOGY

100 – YEAR, 24 – HOUR STORM SUMMARY TABLE

NODE NO.	SUBAREA (ACRES)	RUNOFF (CFS)	Σ AREA (ACRES)	Σ RUNOFF (CFS)	COMMENTS
1.00 – 1.01	7.38	21.77	7.38	21.77	INITIAL AREA
1.01 – 1.02	15.72	43.52	23.10	63.95	
1.02 – 1.03	35.93	98.96	59.03	161.07	
1.03 – 1.04	81.03	210.24	140.06	360.38	
1.04 – 1.05	27.18	68.33	167.24	418.78	
1.05 – 1.06	36.25	88.07	203.49	485.92	
1.06 – 1.07	56.37	130.31	259.86	599.51	
1.07 – 1.08	70.70	161.14	330.56	749.90	
1.08 – 1.09			330.56	749.90	CONFLUENCE
2.00 – 2.01	4.59	14.14	4.59	14.14	INITIAL AREA
2.01 – 2.02	13.00	37.22	17.59	50.36	
2.02 – 2.03	37.99	105.56	55.58	153.84	
2.03 – 2.04	44.70	123.22	100.28	271.63	
2.04 – 2.05	77.95	207.30	178.23	471.22	
2.05 – 2.06	57.92	149.74	236.15	610.23	
2.06 – 1.90	55.02	136.54	291.17	731.11	
1.09			621.73	1429.12	CONFLUENCE

Figure 5.4-2
Hydrology Map

maintenance is performed so that the drainage channels and the desilting and retarding basins function properly.

5.4.2 THRESHOLDS OF SIGNIFICANCE

The CEQA Guidelines define the potential impacts of a project as normally significant if it will "…cause substantial flooding, erosion or siltation…" The NOP, Environmental Analysis Checklist, 5.0 Hydrology and Water Quality, considered the following a potential significant impact due to Hydrology for the proposed project:

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on or off site;

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface run-off in a manner which would result in flooding on or off site; and

e) Create or contribute run-off water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted run-off.

For flood events, Section A.2 of the Orange County Hydrology Manual states "It is the goal of the Agency to provide 100-year return frequency flood protection for all habitable structures and other non-flood proof structures." This requires flood protection from a rainfall storm event with an intensity that is experienced approximately once every 100 years. Landfill regulatory requirements in Title 27 of the California Code of Regulations (27 CCR) dictate separation and desiltation of all storm flows coming in contact with landfilling operations. Section 20365(a) and Table 4.1 of 27 CCR require that landfill "Units and their respective containment structures (i.e. liner, drainage, final cover systems) shall be designed and constructed to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtipping under the precipitation conditions specified in Table 4.1 for each class of waste management unit." For the Frank R. Bowerman Landfill, Table 4.1 of 27 CCR requires surface water drainage systems to be designed for a 100-year, 24-hour storm event. Finally, federal law dictates that landfills operate under an Industrial National Pollution Discharge Elimination System (NPDES) Permit for discharging storm flows off-site. The criteria and restrictions of the NPDES Permit and the Storm Water Pollution Prevention Plan (SWPPP) and Best Management Practices (BMPs) that accompany the NPDES Permit were also considered in assessing the hydrologic impacts of the proposed Frank R. Bowerman Landfill expansion.

For the purposes of evaluating the potential hydrological impacts of the expansion MDP, a significant impact was defined as an impact which does not meet the language and intent of the CEQA Guidelines, the site regulations for landfills (27 CCR), the Orange County Hydrology Manual, the project description or the applicable NPDES guidelines and BMPs.

5.4.3 METHODOLOGY

The Orange County Hydrology Manual and the Advance Engineering Software (AES, 2005) computer program Rational Method were used to calculate the 100-year, 24-hour run-off peak for the entire FRB Landfill with the proposed expansion. The AES computer program was specifically designed for Orange County and uses the latest rainfall data, nomographs, charts and equations for the Rational Method required in the hydrology manual. AES is also the accepted software used by RDMD which is the agency responsible for the major flood control facilities downstream of the landfill.

The Rational Method (Q=CIA) described in the Hydrology Manual relates rainfall intensity (I), run-off coefficient (C) and the drainage area (A) to the direct peak run-off (Q) from the drainage area. The values of C and I are based on drainage area characteristics such as land use, soil type, land surface and the time of concentration. Time of concentration (TC) is defined as the interval of time required for the flow at any point to reach its maximum flow rate under uniform rainfall intensity.

The methodology and general parameters for the routing of the 100-year, 24-hour storm event were consistent with previous hydrology studies. However, rainfall data for Orange County has been updated and, therefore, previously calculated peak values for the proposed project have changed and are presented in Section 5.4.4.

5.4.4 IMPACTS

5.4.4.1 Master Development Plan Master Storm Drain Plan

The conceptual design of the final drainage facilities in the FRB Landfill Master Development Plan (MDP), dated November, 2004, prepared by Bryan A. Stirrat & Associates (BAS, 2004), as well as interim drainage facilities, is intended to control and convey a 24-hour, 100-year storm event. Final design of these structures may vary based on updated information at the time of construction. The final drainage facilities are shown on Figure 5.4-3. A discussion of interim phase drainage features is included in Section 3.0 of the FRB Landfill MDP (BAS, 2004).

<u>On-Site Drainage Features</u>

The on-site drainage features in the MDP, which are similar to those in the permitted drainage plan, are intended to control on-site run-off or run-on from surrounding tributary areas within the landfill property. Storm water on the landfill deck will sheet flow until it is intercepted by berms located around the deck perimeter. The deck berms will direct run-off flows into downdrains for conveyance to perimeter channels. The downdrains will be 24- or 36-inch diameter corrugated steel pipe or rectangular metal flumes laid perpendicular to slope contours and located atop, and anchored into, the final landfill surface. They will be extended up completed sideslopes of the landfill as the filling progresses. The downdrains will also accommodate inlets at each bench. The downdrains will outlet into perimeter drainage channels or interim channels which, in turn, outlet to interim desilting basins. Storm water from the landfill sideslopes will sheet flow onto

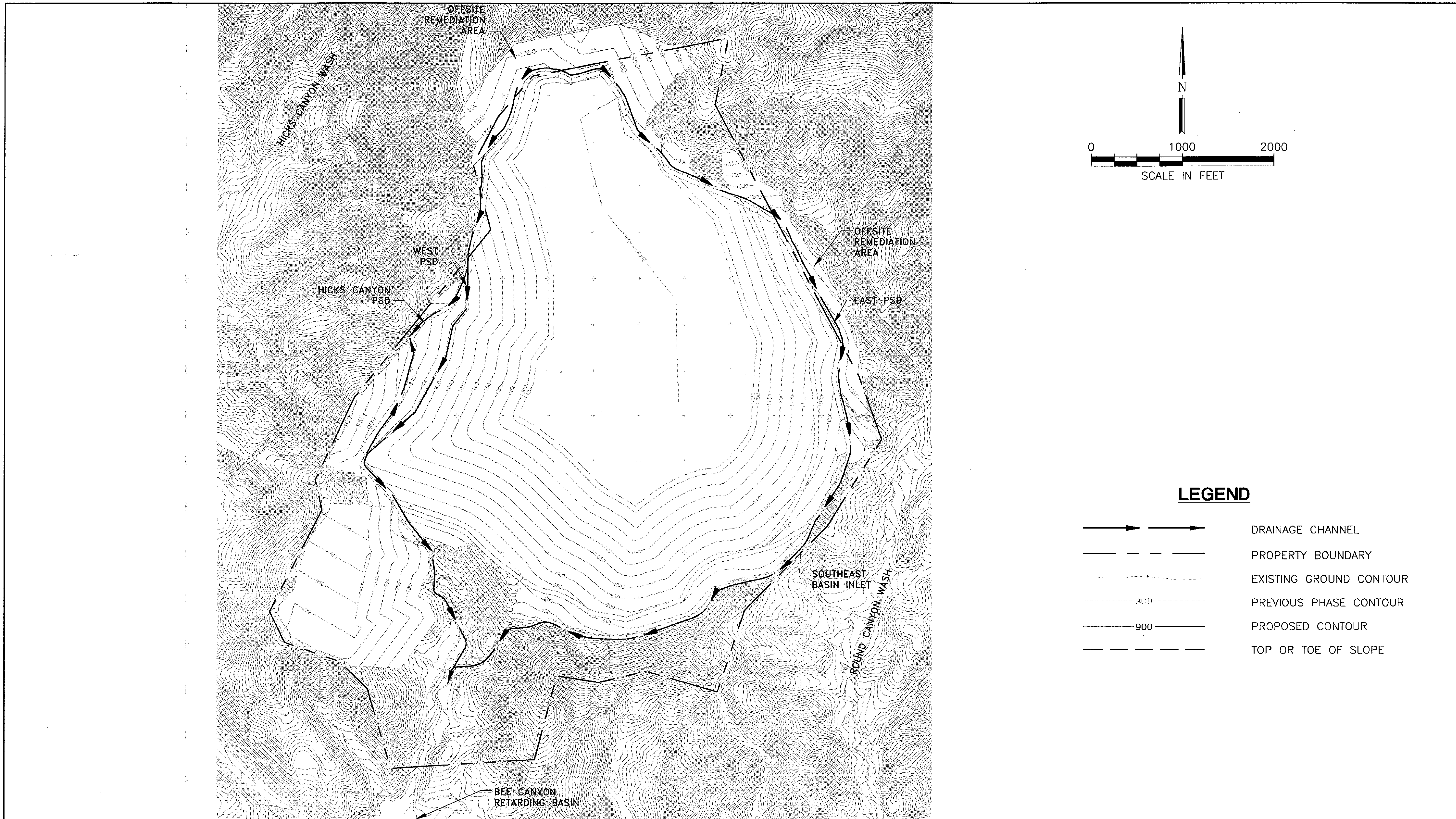


Figure 5.4-3
Master Development Plan Drainage System

the intermediate benches which will convey flows to downdrain inlets. Storm water from the surrounding tributaries will sheet flow directly into the perimeter drainage channels.

Drainage channels of various sizes and shapes are utilized to control and convey storm water flows to and from the downdrains and to the desilting basins. Compacted earth berms around the deck perimeter and the working face, used in conjunction with V-ditches on intermediate benches, direct storm water to the downdrain inlets. Trapezoidal-shaped channels are predominately utilized around the perimeter of the waste fill. Run-off conveyance structures will have a minimum slope of one percent.

Perimeter Storm Drain (PSD) System

The existing drainage system for the site is shown on Figure 5.4-1. The PSD system designed for the FRB Landfill MDP (BAS, 2004) final landfill build-out is shown on Figure 5.4-3. The PSD system will also provide vehicle access around the perimeter of the waste fill. The PSD will consist of a Portland cement concrete channel, trapezoidal in shape. Closed conduits may be utilized in reaches of high velocity, high turbulence or small radius bends in the alignment that cannot be mitigated with a diverter or splash wall. Articulated block channels may also be used in areas susceptible to settlement. A final determination of drain type will be made during the final design.

It should be noted that, as the landfill is developed, the ultimate location and configuration of the PSD may change to accommodate site-specific conditions encountered. Any design modifications will conform to 27 CCR drainage requirements.

Storm Water Desilting Facilities

The West Basin, shown on Figure 5.4-1, as it currently exists will be utilized as the primary sediment control basin for the north and west side of the landfill tributary area until the final phase (Phase XI) of landfill development. The Southeast Inlet Basin (above the inlet to the twin 60-inch pipes) will serve as a sediment basin for the east and south side of the landfill. Interim desilting basins for phase development will be provided as part of ongoing landfill operations, as necessary.

For full build out of the landfill, there is limited space for the development of additional permanent storm water desilting facilities within the portion of the landfill property that will be undeveloped or is not being utilized as a habitat restoration area. The FRB Landfill MDP (BAS, 2004) MDP recommended that a permanent downstream desilting basin be evaluated for controlling silt prior to flows entering the Bee Canyon Retarding Basin.

Erosion Control

As mentioned above, the east side of the landfill site has no additional room to develop a permanent sediment basin for erosion and sediment control. It is imperative that the twin 60-inch High Density Polyethylene pipes remain open and operational and do not become plugged with sediment. An inlet sedimentation basin was constructed with the Phase VII-A liner construction project to provide what sedimentation capacity the available area could accommodate. The Phase VII-B project includes the incorporation of an additional sedimentation basin that will capture silt originating from the Phase VII-B excavation area. The Phase VII-A/B design report hydrology study and the FRB Landfill MDP (BAS, 2004) included recommendations that additional sedimentation facilities and erosion control BMPs be included with each phase of construction for the landfill.

5.4.4.2 Surface Water Flows

The run-off tributaries used for the FRB Landfill MDP (BAS, 2004) hydrologic analysis are consistent with the permitted conditions, including associated flows. The FRB Landfill MDP (BAS, 2004) hydrology map is presented in Figure 5.4-4, and backup calculations are included in Appendix E. As discussed in Section 5.4.3, the methodology and general parameters for the routing of the 100-year, 24-hour storm event were consistent with previous hydrology studies. However, rainfall data for Orange County and soil modeling parameters have been updated. Therefore, the previously calculated peak values have changed and are presented in Table 5.4-1. As shown on Table 5.4-1, the updated peak run-off for the FRB Landfill MDP (BAS, 2004) is slightly less than the updated peak run-off for the permitted (JTD) plan.

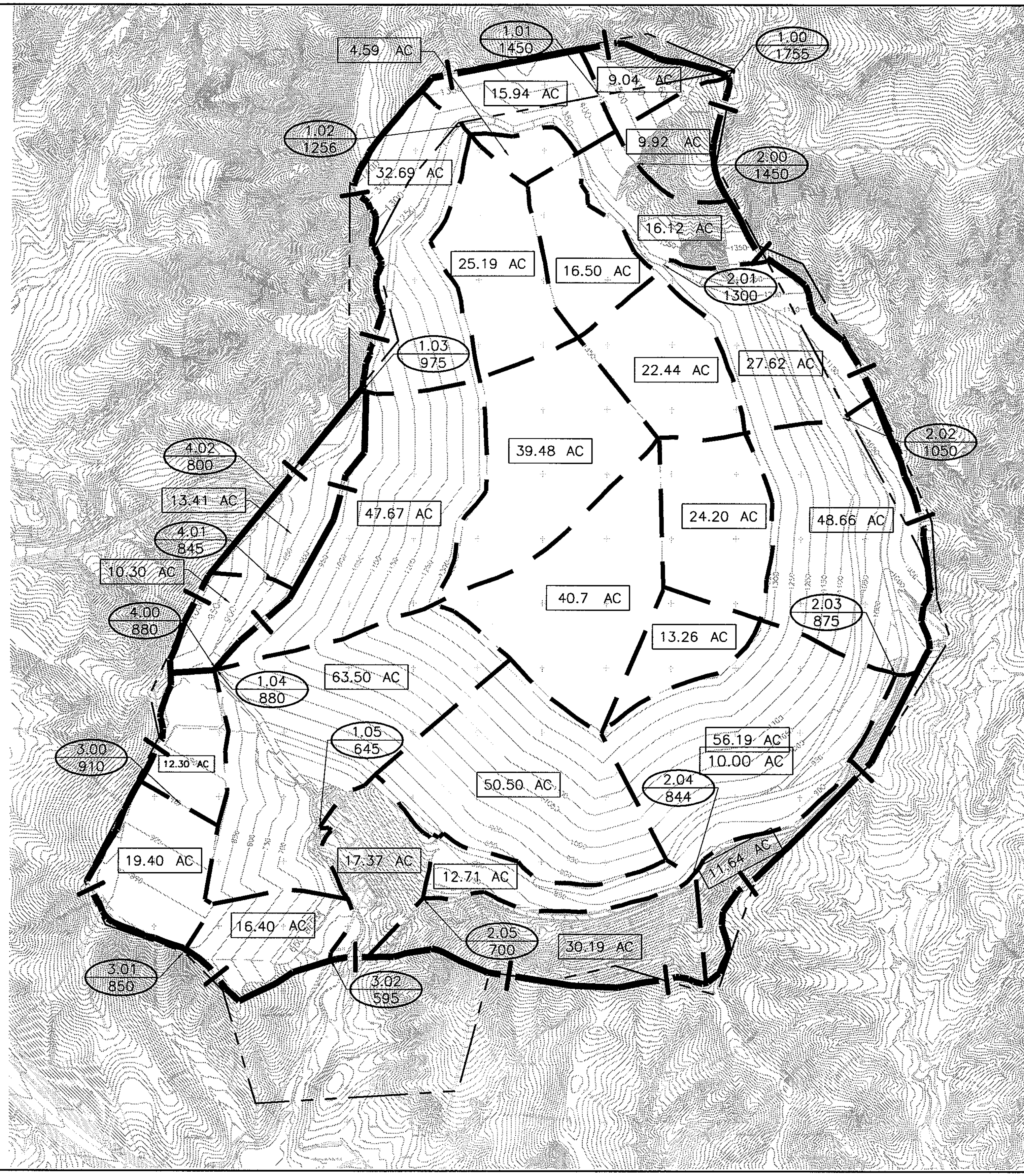
TABLE 5.4-1
FRANK R. BOWERMAN LANDFILL EXPANSION STORM WATER PEAK RUN-OFF

	Peak Run-off Original Values (CFS)	**Peak Run-off Updated 2005 Values (CFS)**
Permitted (JTD) Hydrology Study	1,429	1,949
MDP Hydrology Study	1,586	1,831

As discussed earlier, the tributary area for the waste footprint of the FRB Landfill discharges into the Bee Canyon Wash tributary area. However, the FRB Landfill property line extends into tributary areas that convey run-off into both Hicks Canyon Wash and Round Canyon Wash. As proposed in the FRB Landfill MDP (BAS, 2004), approximately 17 acres adjacent to the scales that currently drain into the Bee Canyon Wash tributary would be graded during Phase X to convey run-off northwesterly into Hicks Canyon Wash. It is also proposed that an area approximately 34 acres in size along the north side of the landfill that drains into Hicks Canyon Wash would be graded during Phase IX to eventually drain into Bee Canyon Wash to offset the diversion into Hicks Canyon Wash shown on Figure 5.4-5.

5.4.4.3 Erosion and Soil Loss

Erosion in and around active landfill areas is potentially significant because of the large area of exposed soil during construction and the requisite final cover upon closure. The calculated soil loss for the FRB Landfill after closure (for the proposed MDP expansion) averages 1.8 tons per acre per year which is within the industry standard of less than 2 tons per acre per year. Appendix E provides the soil loss calculations and Figure 5.4-6 shows the FRB Landfill MDP developed condition soil loss map. Erosion will be controlled on the face of the active landfill by maintaining a three percent minimum slope on all exposed surfaces. Similar to existing landfill operations, the slopes will be designed with benches at 40-foot intervals; fiber rolls will be



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SCALE IN FEET

100 YEAR RUNOFF STUDY
SUMMARY TABLE

NODES NO.	SUB AREA (ACRES)	SUB AREA RUNOFF (CFS)	TOTAL AREA (ACRES)	PEAK RUNOFF (CFS)	DESCRIPTION
1.00–1.01	9.04	31.19	9.04	31.19	INITIAL
1.01–1.02	20.53	68.37	29.57	98.48	
1.02–1.03	57.88	179.14	87.45	270.66	
1.03–1.04	87.15	248.54	174.60	497.93	
1.04–1.05	167.00	464.17	341.60	949.47	
1.05–3.03	17.37	47.57	358.97	983.04	
1.00–2.00	9.92	34.37	9.92	34.37	INITIAL
2.00–2.01	32.62	110.95	42.54	144.70	
2.01–2.02	50.06	161.20	92.60	298.19	
2.02–2.03	72.86	221.55	165.46	503.12	
2.03–2.04	81.09	225.53	246.55	685.74	
2.04–2.05	42.90	114.65	289.45	773.54	
2.05–3.03	0.00	0.00	289.45	773.54	
3.00–3.01	19.40	53.22	19.40	53.22	INITIAL
3.01–3.02	16.40	43.94	35.80	95.92	
3.03			675.55	1586.08	CONFLUENCE
4.00–4.01	10.30	30.20	10.30	30.20	INITIAL
4.01–4.02	13.41	38.19	23.71	67.52	

LEGEND

DRAINAGE TRIBUTARY AREA

DRAINAGE SUB-AREA

PROPERTY LINE

1.00 / 725 — NODE NAME / ELEVATION — NODE DESCRIPTION

10.00 AC — AREA IN ACRES

Figure 5.4-4
Master Development Plan Hydrology Map

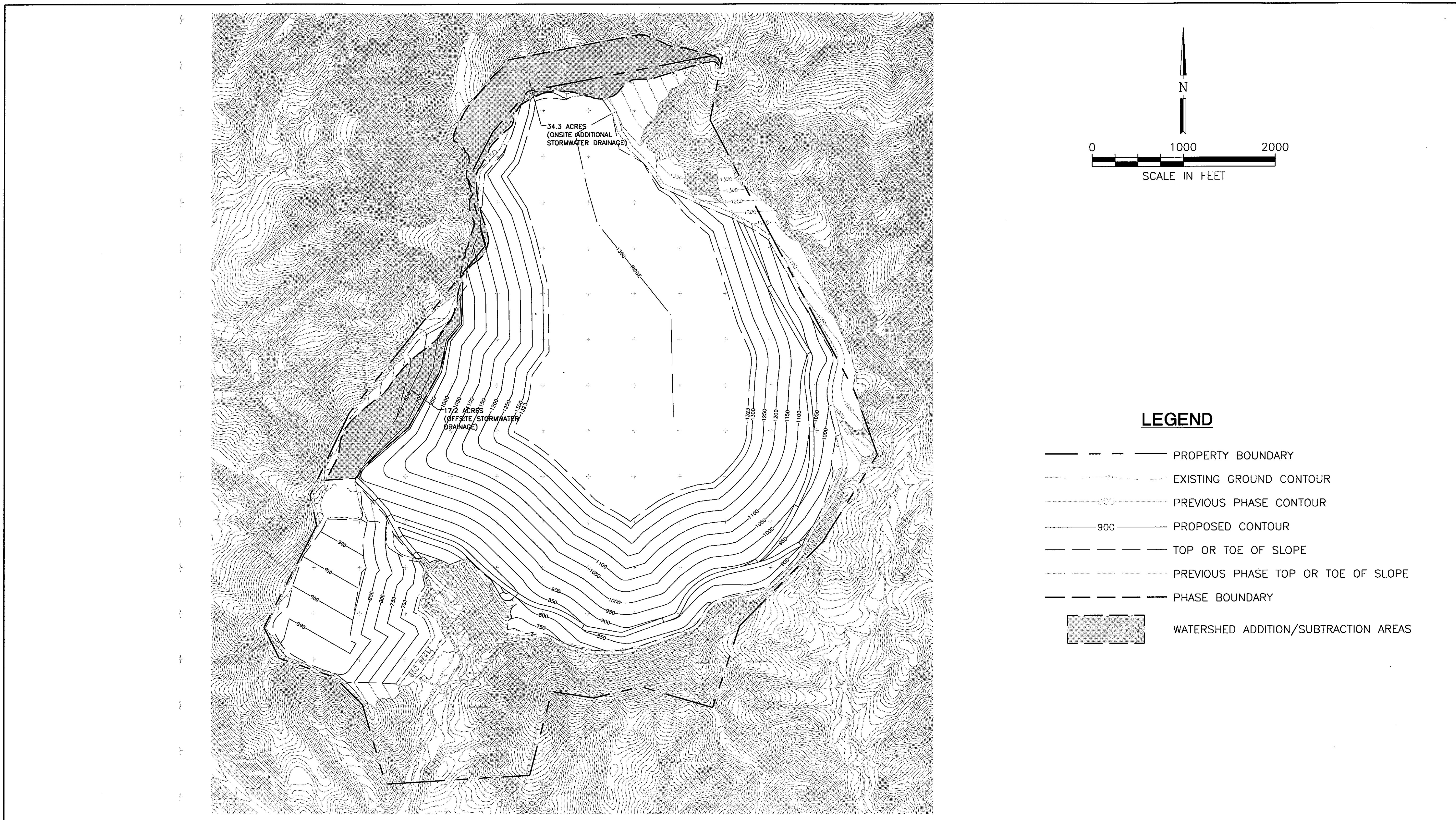
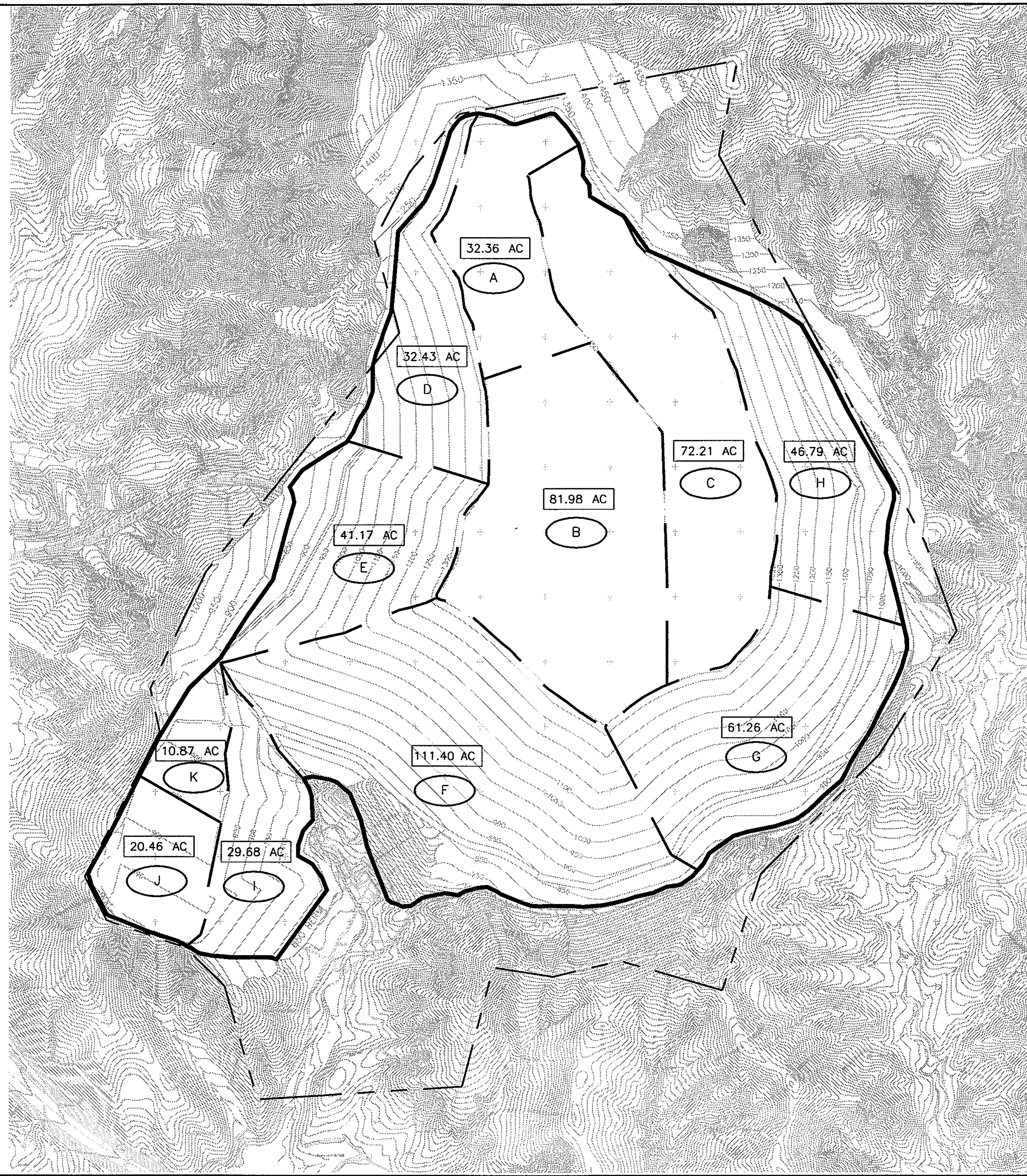
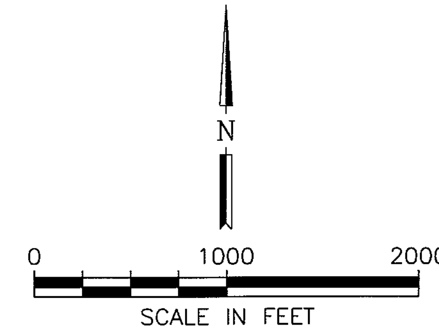


Figure 5.4-5
Master Development Plan Site Watershed Balance





AVERAGE DENSITY OF SOIL (PCF) = 130

STUDY AREA	AREA (ACRES)	R FACTOR	K FACTOR	LS FACTOR	C FACTOR	P FACTOR	TONS PER ACRE	ANNUAL SOIL LOSS (TONS/YEAR)	VOLUME (CY)
A	32.63	50	0.24	0.5	0.03	1.0	0.2	5.87	3.35
B	81.98	50	0.24	0.5	0.03	1.0	0.2	14.76	8.41
C	72.21	50	0.24	0.5	0.03	1.0	0.2	13.00	7.41
D	32.43	50	0.24	8.0	0.03	1.0	2.9	93.40	53.22
E	41.17	50	0.24	8.0	0.03	1.0	2.9	118.57	67.56
F	114.41	50	0.24	8.0	0.03	1.0	2.9	329.50	187.75
G	61.26	50	0.24	8.0	0.03	1.0	2.9	176.43	100.53
H	46.79	50	0.24	8.0	0.03	1.0	2.9	134.76	76.78
I	29.68	50	0.24	8.0	0.03	1.0	2.9	85.48	48.71
J	20.46	50	0.24	0.5	0.03	1.0	0.2	4.09	2.33
K	10.87	50	0.24	0.5	0.03	1.0	0.2	2.17	1.24
TOTAL	*543.9*			*AVERAGE VALUE (tons/acre/year)=*			*1.8*	*978.0*	*557.3*

LEGEND

- STUDY AREA BOUNDARY
- STUDY SUB-AREA BOUNDARY
- A — SUB-AREA NAME
- 1.83 AC — AREA IN ACRES

Figure 5.4-6
Master Development Plan Soil Loss Map

placed on the slopes in between the benches to reduce soil erosion; processed green material (PGM) may be used as an erosion control measure; prior to the winter season, sand bags are also placed (as necessary) at strategic locations at the site; and benches and decks are regraded to have positive flows to downdrains. The amount of silt picked up on the active landfill surface will be reduced further by on-site desilting basins.

As discussed above, there is limited space for the development of additional permanent storm water desilting facilities within the southerly undeveloped landfill property that is not currently native habitat or being utilized as a habitat remediation area. The West Basin as it currently exists will be utilized as the primary sediment control basin for the north and west side of the landfill tributary area until Phase XI. The Southeast Inlet Basin (at the twin 60-inch pipes) will be the only sediment basin for the entire east and south side of the landfill. It is imperative that the twin 60-inch corrugated HDPE pipes remain open and operational and do not become plugged with sediment. The MDP (BAS, 2004) recommends that additional sedimentation facilities and erosion control BMPs be included with each phase of construction for the landfill and that a permanent basin downstream of the landfill be evaluated to further control silt prior to discharge into the Bee Canyon Retarding Basin.

Another soil loss potential for the site is the occurrence of landslides which may impact the storm water drainage control system through direct damage to structures or through increased siltation. Any impacts to the storm drain system caused by landslides or surficial soil sloughing will be mitigated by removing soil and excess silt from the drainage structures as soon as feasible.

The FRB Landfill will continue to comply with its NPDES permit requirements including implementation of a SWPPP and employment of BMPs. Annual reports will continue to be submitted to the RWQCB and will be updated as the landfill development progresses.

5.4.5 MITIGATION MEASURES

H-1 Prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the proposed expansion, the IWMD shall submit to the RWQCB, LEA and CIWMB a Joint Technical Document which presents the assumptions, methods and calculations used to calculate the potential flow quantities for run-on, run-off and sediment content of storm water flow used in sizing drainage and sediment control facilities for the FRB Landfill in conformance with 27 CCR regulations.

H-2 Prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the proposed expansion, the IWMD shall submit to the RWQCB, LEA and CIWMB a Joint Technical Document which includes surface water drainage plans for the FRB Landfill expansion final grading plans, including any berms, down drain systems, perimeter drainage channel improvements and the location of off-site discharge points for run-off water in compliance with 27 CCR regulations.

H-3 Prior to construction, drainage facilities for the landfill expansion shall be designed, according to 27 CCR, to prevent washout of the waste management unit during a

100-year storm event.

H-4 During ongoing landfill operations, diversion and drainage facilities shall be evaluated, designed, constructed and operated to accommodate the anticipated volume of precipitation and peak flows from surface run-off under the precipitation conditions specified in 27 CCR.

H-5 During ongoing landfill operations (including the expansion area), IWMD will continue to operate the landfill under a National Pollutant Discharge Elimination System (NPDES) Permit to discharge storm flows. The criteria and restrictions of the NPDES Permit and the Storm Water Pollution Prevention Plan and Best Management Practices that accompany the NPDES Permit will be adhered to.

H-6 During ongoing landfill operations (including the expansion area), IWMD will continue to provide positive drainage by maintaining a two to three percent slope on all landfill deck surfaces.

H-7 During ongoing landfill operations (including the expansion area), IWMD will continue to prepare and implement sediment and erosion control plans on an annual basis to reduce sediment and control erosion on the landfill site.

H-8 During ongoing landfill operations (including the expansion area) IWMD will remove silt and maintain the drainage and desilting basin facilities in order to provide proper drainage and erosion control. The proper maintenance of the Southeast Inlet Basin is particularly important to minimize silt buildup in the twin 60-inch pipes providing drainage for the eastern portion of the landfill.

5.4.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The potential short and long term hydrological impacts of the proposed landfill expansion will be mitigated to a less than significant level after implementation of mitigation measures H-1 to H-8, described above.

5.5 TRANSPORTATION AND CIRCULATION

This section of the EIR is based on the Traffic Impact Study (P&D Consultants, 2005) conducted for the proposed vertical and horizontal expansion of the FRB Landfill. The Traffic Impact Study, which is provided in Appendix F of this EIR, was prepared to evaluate the potential traffic impacts and mitigation measures associated with the FRB Landfill expansion project.

5.5.1 EXISTING CONDITIONS

This section summarizes existing 2005 traffic and conditions in the study area and on the road system which provides access to and from the landfill.

5.5.1.1 General Characteristics of the Existing Landfill

The FRB Landfill is located at 11002 Bee Canyon Access Road in unincorporated Orange County near the City of Irvine. Orange County Integrated Waste Management Department (IWMD) also operates two other active landfills in Orange County; Olinda Alpha Landfill in unincorporated Orange County near the City of Brea, and Prima Deshecha Landfill in unincorporated Orange County, the City of San Juan Capistrano and the City of San Clemente. The landfill is open Monday through Saturday, 7:00 A.M. to 4:00 P.M. for all commercial customers. Transfer trucks are only permitted from 4:00 P.M. to 5:00 P.M.

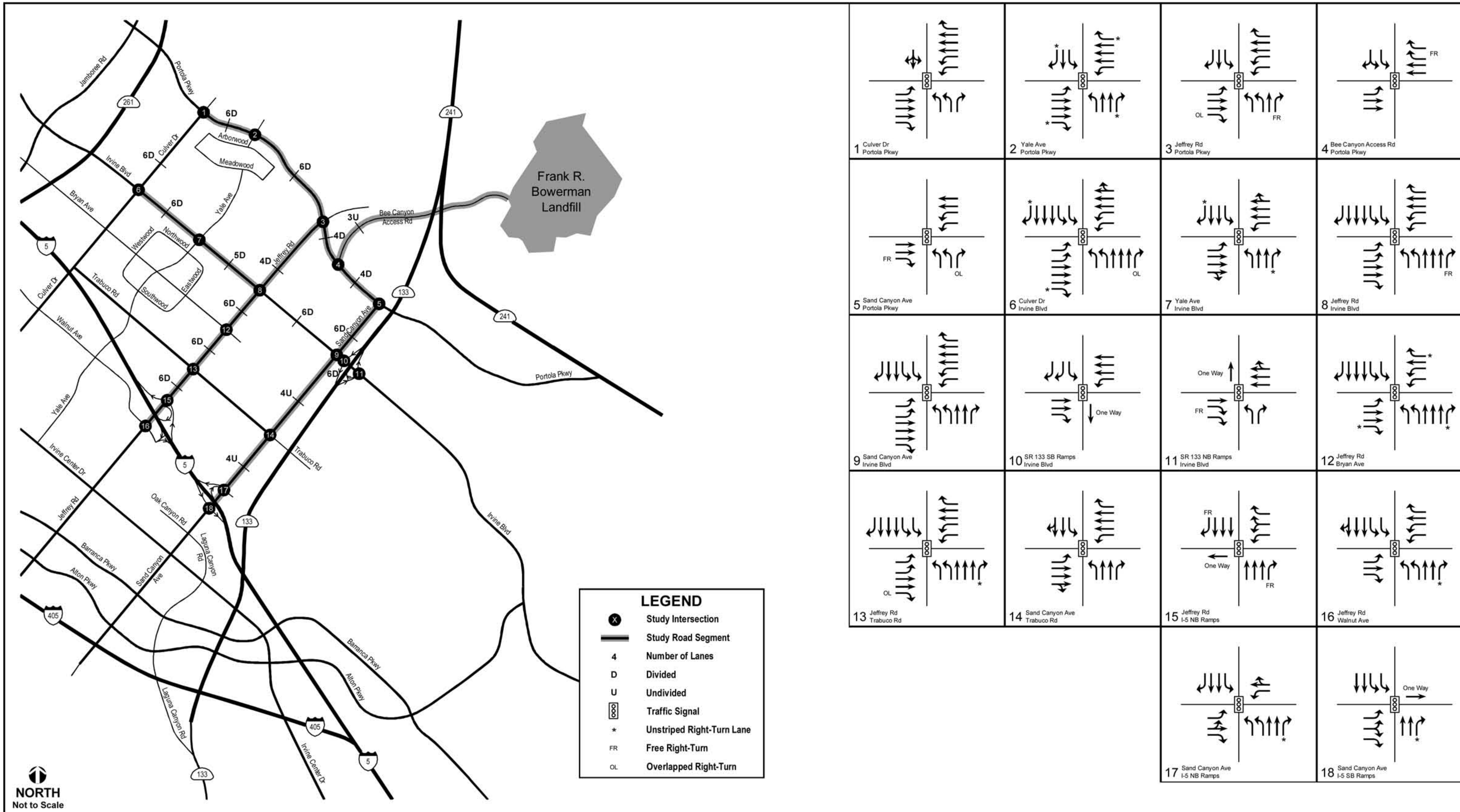
The current FRB Landfill Solid Waste Facility Permit (SWFP) allows a daily maximum of no more than 8,500 tons per day (TPD) of municipal solid waste (MSW) except for 36 days per year that a higher tonnage of 10,625 TPD is allowed. However, under the Settlement Agreement with the City of Irvine, the FRB Landfill currently is allowed to accept an annual average of 7,921 TPD (as of December 2004) and can increase this average daily rate by 1.75 percent per year until it reaches the permitted maximum of 8,500 TPD.

5.5.1.2 Existing Circulation Network

The FRB Landfill is served by an extensive existing road system which provides access to the landfill as well as to other existing development and inter-regional traffic throughout the area. Figure 5.5-1 shows the locations of traffic control devices, lane configurations at key intersections and the number of lanes on major roads in the study area for the traffic analysis.

<u>Current Road Operational Characteristics</u>

Culver Drive is a six-lane north-south Major Arterial as classified on the Orange County Master Plan of Arterial Highways (MPAH). The road has a raised median and striped bike lanes on both sides. Parking is prohibited on Culver Drive. The posted speed limit is 50 miles per hour (mph).



Source: P&D Consultants (2005).

Figure 5.5-1
Existing Circulation Network

Yale Avenue is a two-lane north-south Commuter in the vicinity of Portola Parkway and a four-lane north-south Primary Arterial in the vicinity of Irvine Boulevard as classified on the MPAH. The road has a painted median in the vicinity of Portola Parkway and a raised median in the vicinity of Irvine Boulevard. The road has striped bike lanes on both sides and parking is prohibited on Yale Avenue. The posted speed limit is 45 mph.

Jeffrey Road is a four-lane north-south Primary Arterial between Portola Parkway and Irvine Boulevard and is a six-lane north-south Major Arterial between Irvine Boulevard and Interstate 5 (I-5) as classified on the MPAH. The road has a painted median between Portola Parkway and Irvine Boulevard and a raised median between Irvine Boulevard and I-5. The road has striped bike lanes between Irvine Boulevard and I-5. Parking is prohibited on Jeffrey Road. The posted speed limit is 60 mph between Portola Parkway and Trabuco Road and is 55 mph between Trabuco Road and I-5.

Bee Canyon Access Road is a three-lane north-south undivided commuter road with two northbound lanes and one southbound lane. Bee Canyon Access Road provides access to the FRB Landfill. The posted speed limit is 35 mph.

Sand Canyon Avenue is a four-lane north-south Primary Arterial between Portola Parkway and Irvine Boulevard and a four-lane north-south Secondary Arterial between Irvine Boulevard and I-5 as classified on the MPAH. The road has a painted median between Portola Parkway and Irvine Boulevard and no median between Irvine Boulevard and I-5. Parking is prohibited on Sand Canyon Avenue. Sand Canyon Avenue is currently being widened between Irvine Boulevard and I-5; and therefore, a construction speed limit of 35 mph is imposed.

Portola Parkway is a six-lane east-west Major Arterial between Culver Drive and Jeffrey Road and a four-lane east-west Secondary Arterial between Jeffrey Road and Sand Canyon Avenue as classified on the MPAH. The road has a raised median between Culver Drive and Jeffrey Road and a painted median between Jeffrey Road and Sand Canyon Avenue. The road has striped bike lanes on both sides and parking is prohibited on Portola Parkway. The posted speed limit is 55 mph between Culver Drive and Yale Avenue and 60 mph between Yale Avenue and Sand Canyon Avenue.

Irvine Boulevard is a six-lane east-west Major Arterial as classified on the MPAH. For a short portion just east of Jeffrey Road, Irvine Boulevard provides three eastbound lanes and two westbound lanes. The road has a raised median and striped bike lanes on both sides. Parking is prohibited on Irvine Boulevard. The posted speed limit is 50 mph between Culver Drive and Jeffrey Road and 60 mph east of Jeffrey Road.

Bryan Avenue is a four-lane east-west Primary Arterial as classified on the MPAH. The road has a raised median and striped bike lanes on both sides with a posted speed limit of 50 mph. Parking is prohibited on Bryan Avenue.

Trabuco Road is a six-lane east-west Major Arterial as classified on the MPAH. The road has a raised median, and has striped bike lanes on both sides. Parking is prohibited on Trabuco Road.

Walnut Avenue is a four-lane east-west Secondary Arterial as classified on the MPAH. The road has a raised median, and has striped bike lanes on both sides. Parking is prohibited on Walnut Avenue.

5.5.1.3 Existing Vehicular Traffic Volumes

Existing traffic counts were conducted on September 2005. Intersection turning movement counts were conducted at the study intersections during the circulation network morning peak period of 7-9 A.M. and the second landfill peak period of 9-11 A.M. The first landfill peak period coincides with the circulation network morning peak period of 7-9 A.M. Road segment daily traffic counts were taken at the study road segments during the same weekday. These traffic counts represent existing traffic conditions and are shown in Figure 5.5-2 (page 5.5-6).

5.5.1.4 Existing Level of Service

Road Segments

As shown in Table 5.5-1, all study road segments are currently operating at Level of Service (LOS) A. Table 5.5-1 summarizes the existing LOS for the study road segments based on the volume to capacity (V/C) ratio standards. Sand Canyon Avenue between Trabuco Road and I-5 has the worst V/C ratio of 0.469.

TABLE 5.5-1
ROAD SEGMENT DAILY LEVELS OF SERVICE – EXISTING CONDITIONS

Road Segment	Section Limits	Street Classification	Lane Configuration	Daily Volume	Capacity	V/C	LOS
Portola Parkway	Culver Drive to Yale Avenue	Major Arterial	6 Divided	11,113	54,000	0.206	A
	Yale Avenue to Jeffrey Road	Major Arterial	6 Divided	9,304	54,000	0.172	A
Portola Parkway[1]	Jeffrey Road to Bee Canyon Access Road	Primary Arterial	4 Divided	8,777	37,500	0.234	A
	Bee Canyon Access Road to Sand Canyon Avenue	Primary Arterial	4 Divided	9,388	37,500	0.250	A
Irvine Boulevard	Culver Drive to Yale Avenue	Major Arterial	6 Divided	20,036	54,000	0.371	A
	Yale Avenue to Jeffrey Road	Primary Arterial	5 Divided	16,563	43,000	0.385	A
	Sand Canyon Avenue to State Route 133	Major Arterial	6 Divided	17,702	54,000	0.328	A
Jeffrey Road[1]	Portola Parkway to Irvine Boulevard	Primary Arterial	4 Divided	6,264	37,500	0.167	A
Jeffrey Road	Irvine Boulevard to Bryan Avenue	Major Arterial	6 Divided	10,356	54,000	0.192	A
	Bryan Avenue to Trabuco Road	Major Arterial	6 Divided	23,540	54,000	0.436	A
	Trabuco Road to Interstate-5	Major Arterial	6 Divided	22,918	54,000	0.424	A
Bee Canyon Access Road	FRB Landfill to Portola Parkway	Collector	3 Undivided	2,622	18,750	0.140	A

TABLE 5.5-1
ROAD SEGMENT DAILY LEVELS OF SERVICE – EXISTING CONDITIONS

Road Segment	Section Limits	Street Classification	Lane Configuration	Daily Volume	Capacity	V/C	LOS
Sand Canyon Avenue	Portola Parkway to Irvine Boulevard	Primary Arterial	4 Divided	7,471	32,000	0.233	A
	Irvine Boulevard to Trabuco Road	Secondary Arterial	4 Undivided	8,606	28,000	0.307	A
	Trabuco Road to Interstate-5	Secondary Arterial	4 Undivided	13,132	28,000	0.469	A

Source: P&D Consultants (2005).
[1] The road segment is in unincorporated Orange County.

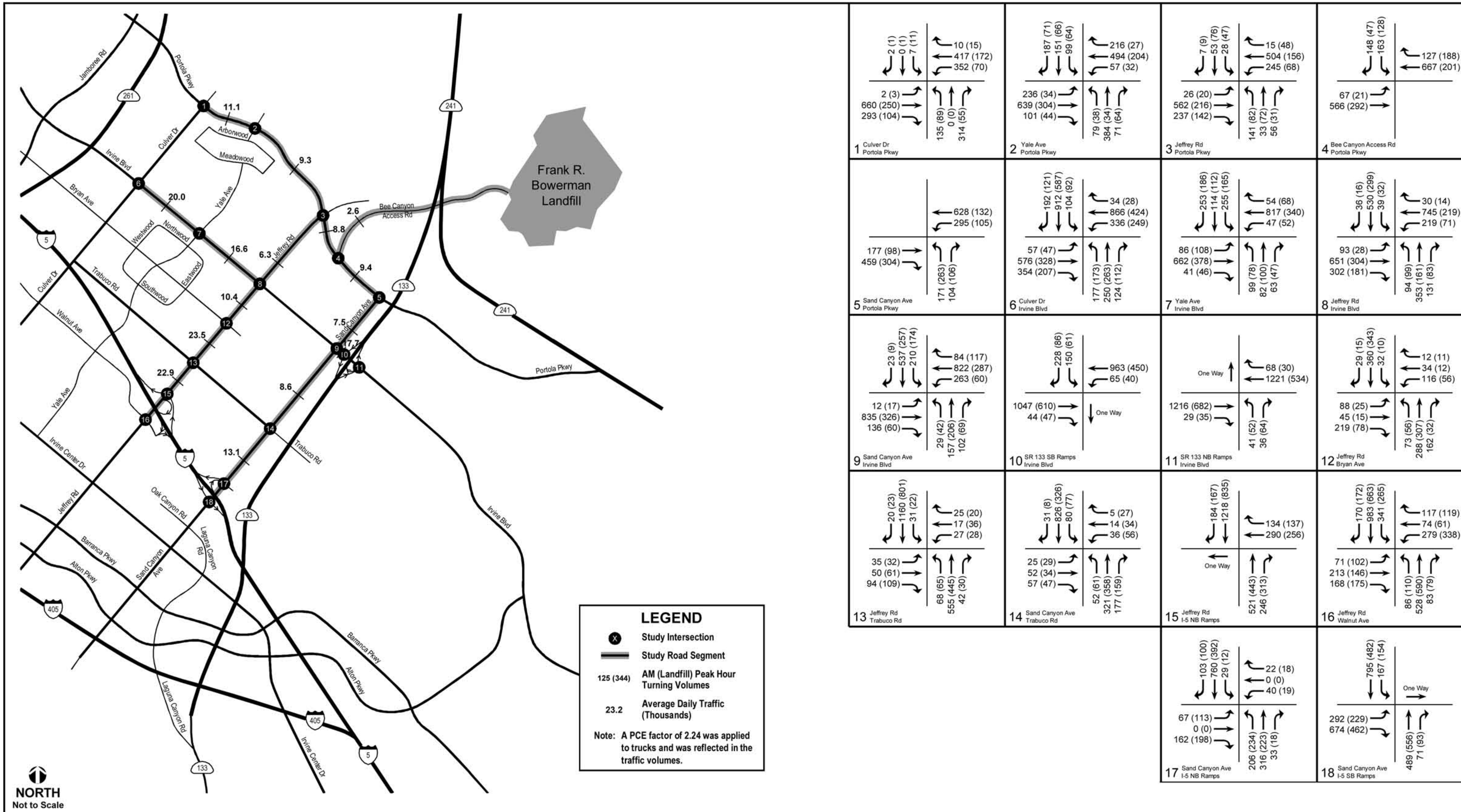
<u>Signalized Intersections</u>

As shown in Table 5.5-2, all study intersections are operating at acceptable LOS. The SR 133 northbound ramps intersection at Irvine Boulevard has an LOS C, the worst A.M. peak hour LOS. This is because Irvine Boulevard just east of the intersection is under construction and the number of eastbound through lanes as well as the capacity is reduced. The detailed LOS calculation worksheets are included in Appendix F.

TABLE 5.5-2
SIGNALIZED INTERSECTION LEVELS OF SERVICE – EXISTING CONDITIONS

Index	Intersection	A.M. Peak Hour		Landfill Peak Hour	
		ICU	LOS	ICU	LOS
1	Culver Drive at Portola Parkway	0.516	A	0.172	A
2	Yale Avenue at Portola Parkway	0.487	A	0.204	A
3[1]	Jeffrey Road at Portola Parkway	0.360	A	0.204	A
4[1]	Bee Canyon Access Road at Portola Parkway	0.377	A	0.187	A
5[1]	Sand Canyon Avenue at Portola Parkway	0.285	A	0.187	A
6	Culver Drive at Irvine Boulevard	0.588	A	0.411	A
7	Yale Avenue at Irvine Boulevard	0.478	A	0.349	A
8	Jeffrey Road at Irvine Boulevard	0.437	A	0.265	A
9	Sand Canyon Avenue at Irvine Boulevard	0.458	A	0.261	A
10	SR 133 southbound ramps at Irvine Boulevard	0.484	A	0.304	A
11	SR 133 northbound ramps at Irvine Boulevard	0.789	C	0.489	A
12	Jeffrey Road at Bryan Avenue	0.318	A	0.196	A
13	Jeffrey Road at Trabuco Road	0.341	A	0.279	A
14	Sand Canyon Avenue at Trabuco Road	0.387	A	0.261	A
15	Jeffrey Road at I-5 northbound ramps	0.374	A	0.291	A
16	Jeffrey Road at Walnut Avenue	0.513	A	0.504	A
17	Sand Canyon Avenue at I-5 northbound ramps	0.444	A	0.362	A
18	Sand Canyon Avenue at I-5 southbound ramps	0.482	A	0.395	A

Source: P&D Consultants (2005).
[1] The intersection is in unincorporated Orange County.



Source: P&D Consultants (2005).

Figure 5.5-2
Existing Traffic Volumes

5.5.2 THRESHOLDS OF SIGNIFICANCE

The City of Irvine and Orange County have established LOS D or better as the acceptable LOS for road segments and intersections within the City or County.[1] Any road segment in the City of Irvine operating at LOS E or F would require additional analysis based on the highest peak hour V/C ratio established for the peak direction. For this traffic study, if the road segment is operating at LOS E or F during the peak hour, then the road segment is considered to be deficient. Any intersection operating at LOS E or F was considered to be deficient.

A significant adverse traffic impact would occur in the City of Irvine if implementation of the proposed project would result in one or more of the following:

- The road segment to operate at an unacceptable LOS; increase in the daily V/C ratio of greater than 0.02 when rounded to the nearest hundredth; and the road segment operates at an unacceptable peak hour LOS.
- The intersection to operate at an unacceptable LOS, and an increase in the ICU of greater than 0.02 when rounded to the nearest hundredth.

A significant adverse traffic impact would occur in Orange County if implementation of the proposed project would result in one or more of the following:

- The road segment to operate at an unacceptable LOS, and an increase in the daily V/C ratio of greater than 0.01.
- The intersection to operate at an unacceptable LOS, and an increase in the ICU of greater than 0.01.
- The intersection that is presently operating at LOS D or better and is projected to operate at worse than LOS D with the project, at intersections already operating at LOS D to which additional traffic is added by the project and traffic added to deficient intersections.

5.5.3 METHODOLOGY

The following section describes the transportation and circulation methodology used to forecast project traffic and to analyze potential impacts on the circulation system in the study area.

5.5.3.1 Assumptions

It is assumed that future operations at the FRB Landfill will increase proportionally from existing conditions. It is assumed that the truck type percentage splits and truck trip distributions for future conditions will remain the same as existing conditions. It is assumed that the landfill peak hours will remain the same as existing conditions. The first landfill peak hour occurs between 7:00 A.M. and 9:00 A.M. The second landfill peak hour occurs between 9:00 A.M. and 11:00 A.M.

[1] City of Irvine, *Traffic Impact Analysis Guidelines*, 2004.
Orange County, *Growth Management Plan, Transportation Implementation Manual*, 1994.

For year 2010, it is assumed that the boundary between the City of Irvine and unincorporated Orange County will remain the same as existing conditions. However, for year 2030, it is assumed that the City of Irvine will annex the area just north of the City of Irvine city boundary from Orange County. Therefore, all the study road segments and intersections will be under the jurisdiction of the City of Irvine. The year 2030 is considered full buildout of the area.

5.5.3.2 Traffic Counts

P&D Consultants conducted traffic counts through a subcontract with Southland Car Counters. The 24-hour (daily) machine counts were taken on Wednesday, September 14, 2005. The detailed traffic counts are provided in Appendix F.

5.5.3.3 Future Background Traffic Volumes

Future background traffic volumes for year 2010 and 2030 were supplied by Orange County Transportation Authority (OCTA) and the City of Irvine. OCTA supplied the daily road segment traffic volumes generated by the Orange County Transportation Analysis Model (OCTAM). The City of Irvine supplied the daily road segment volumes and the A.M. peak hour turning volumes generated by the Irvine Transportation Analysis Model (ITAM). The forecasted daily traffic volumes for year 2010 and 2030 are provided in Appendix F.

OCTAM is a regional travel demand forecasting model used for transportation planning and analysis in Orange County and is maintained by OCTA. ITAM is a sub-area travel demand forecasting model derived from OCTAM and is used and maintained by the City of Irvine. ITAM was found to be consistent with OCTAM by OCTA. Therefore, ITAM was certified for use by OCTA.

OCTAM and ITAM forecast daily traffic volumes for the year 2010 and 2030 based on the circulation network on the MPAH by applying the traffic modeling processes and socioeconomic demographics data. The traffic modeling processes include trip generation, trip distribution/ mode choice and traffic assignment. ITAM uses the Orange County Projections 2000 (OCP-2000) socioeconomic demographics. OCTA recently incorporated the latest socioeconomic demographics, OCP-2004, into OCTAM.

After comparing the traffic volume results generated by OCTAM and ITAM, ITAM generally generated higher daily road segment traffic volumes than OCTAM. The more conservative ITAM forecasted traffic volumes were used in this Study to determine significant adverse traffic impacts. ITAM also generated the A.M. peak hour intersection turning volumes. To establish the second landfill peak hour intersection turning volumes, the ITAM daily traffic volumes for 2010 and 2030 were post-processed according the procedures outlined in the National Cooperative Highway Research Program (NCHRP) Report 255.

5.5.3.4 Project Trip Generation

Project trip generation is defined as the number of trips that originate or terminate at a project site. The amount of traffic generated is a function of the extent and type of land use. The amount of trips generated at the FRB Landfill is dependent on amount of waste accepted at the landfall on a daily basis and the number of employees. In 2004, the landfill accepted an annual average of 7,921 TPD of MSW. The landfill can accept an additional 1.75 percent of the 2004 average TPD of MSW per year up to the annual average of 8,500 TPD. For 36 days of the year, the landfall can accept up to 10,625 TPD of MSW. These days typically occur before or after a holiday.

For projects in which trucks are the main source of traffic, a Passenger Car Equivalence (PCE) factor is applied to the trucks to account for the effects of their larger sizes and slower movements on traffic operations. The waste hauling trucks currently arriving at the landfill are divided into three categories; transfer trucks, packer trucks, and self-haul trucks. The transfer trucks have gross weights over 21.5 tons and are considered to be heavy trucks. The packer trucks have gross weights between 5.2 to 21.5 tons and are considered to be medium trucks. The self-haul trucks have gross weights under 5.2 tons and are considered to be light trucks. A PCE factor of 3.0, 2.0 and 1.0 was applied to heavy, medium and light trucks, respectively. Based on information provided by IWMD, approximately 36 percent of the waste hauling trucks are heavy trucks, 52 percent are medium trucks and 12 percent are light trucks. Based on the PCE factors and the truck-type distributions, a single PCE factor of 2.24 was applied to all project-related trucks.

In 2004, the landfill generated 1,346 daily truck trips for MSW on the 85th percentile day and 152 daily truck trips for non-MSW on the 85th percentile day for a total of 1,498 daily truck trips. The summary of daily truck trips can be found in Appendix F. The landfill currently has 90 employees that generate 180 daily trips. It was assumed that the increase in trips was directly proportional to operations at the landfill in 2004. This assumption was considered conservative for the number of employees required because the increase in employees would be less than proportional. The landfill would generate 1,806 daily truck trips for MSW if the landfill accepts the maximum of 10,625 TPD of MSW and 152 daily truck trips for non-MSW for a total of 1,958 daily truck trips. No increase for non-MSW was anticipated because the operations for non-MSW would remain the same as existing conditions. Of the 1,958 daily truck trips, approximately 315 trucks trips would occur during the A.M. peak hour and 303 truck trips would occur during the second landfill peak hour. It was assumed that the employees arrived before the A.M. peak hour. Table 5.5-3 summarizes the daily, A.M. peak hour and second landfill peak hour trip generation if the landfill accepts the maximum of 10,625 TPD of MSW without (Raw) and with the applied PCE factor of 2.24. These landfill trips will remain on the circulation network until the landfill permitted closure in 2022.

TABLE 5.5-3
FRB LANDFILL TRIPS AT THE MAXIMUM ALLOWABLE 10,625 TONS PER DAY OF MUNICIPAL SOLID WASTE

Year	Trip Generator	Trip Generation: Daily Raw	Daily PCE[1]	A.M. Peak Hour Raw	A.M. Peak Hour PCE[1]	Landfill Peak Hour Raw	Landfill Peak Hour PCE[1]
Existing Conditions	**Trucks**	1,958	4,386	315	706	303	679
	Employees	180	180	0	0	0	0
	Total	2,138	4,566	315	706	303	679

Source: P&D Consultants (2005).
[1] A passenger car equivalence (PCE) of 2.24 was applied to trucks to account for the effects of their larger sizes and slower movements on traffic operations.

Under the proposed project, the daily maximum acceptance of MSW would increase from 10,625 TPD to 11,500 TPD. It was assumed that the increase in trips was directly proportional to operations at the landfill. By the year 2010, the daily truck trips would increase by 148 to accommodate the increase in MSW from 10,625 TPD to 11,500 TPD. An additional seven employees was conservatively assumed to be required because of the increase of MSW acceptance; and therefore, 14 daily employee trips was assumed to be added to the circulation network. Of the 148 daily truck trips, approximately 23 truck trips would occur during the A.M. peak hour and 22 truck trips during the second landfill peak hour. It was assumed that the employees will arrive before the A.M. peak hour. Overall, the FRB Landfill will generate 2,300 daily trips with 338 trips during the A.M. peak hour and 325 trips during the second landfill peak hour in 2010 with the proposed project. Table 5.5-4 summarizes the daily, a.m. peak hour and second landfill peak hour trip generation for year 2010 without (Raw) and with the applied PCE factor of 2.24.

TABLE 5.5-4
FRB LANDFILL TRIP GENERATION – 2010

Conditions	Trip Generator	Trip Generation: Daily Raw	Daily PCE[1]	A.M. Peak Hour Raw	A.M. Peak Hour PCE[1]	Landfill Peak Hour Raw	Landfill Peak Hour PCE[1]
2010 without the Project	**Trucks**	1,958	4,386	315	706	303	679
	Employees	180	180	0	0	0	0
	Total	2,138	4,566	315	706	303	679
Proposed Project	**Trucks**	148	332	23	52	22	49
	Employees	14	14	0	0	0	0
	Total	162	346	23	52	22	49
2010 with the Project	**Trucks**	2,106	4,717	338	757	325	728
	Employees	194	194	0	0	0	0
	Total	2,300	4,911	338	757	325	728

Source: P&D Consultants (2005).
[1] A passenger car equivalence (PCE) of 2.24 was applied to trucks to account for the effects of their larger sizes and slower movements on traffic operations.

As described previously, implementation of the proposed project would extend the landfill service life from a permitted closure date of 2022 to 2053. Operating at full capacity of 11,500 TPD of MSW, the landfill would generate approximately 1,954 daily truck trips for the MSW and 152 a daily truck trips for non-MSW for a total 2,106 daily truck trips. Operating at full capacity, the landfill would require 97 employees; and therefore, 194 daily employee trips would be added to the circulation network. Of the 2,106 daily truck trips, approximately 338 truck trips would occur during the A.M. peak hour and 325 truck trips during the second landfill peak hour. It is assumed that the employees will arrive before the A.M. peak hour. Table 5.5-5 summarizes the daily, A.M. peak hour and second landfill peak hour trip generation for year 2030 without (Raw) and with the applied PCE factor 2.24.

TABLE 5.5-5
FRB LANDFILL TRIP GENERATION – 2030

Conditions	Trip Generator	Trip Generation					
		Daily		A.M. Peak Hour		Landfill Peak Hour	
		Raw	PCE[1]	Raw	PCE[1]	Raw	PCE[1]
2030 without the Project	Trucks	0	0	0	0	0	0
	Employees	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Proposed Project	Trucks	2,106	4,717	338	757	325	728
	Employees	194	194	0	0	0	0
	Total	2,300	4,911	338	757	325	728
2030 with the Project	Trucks	2,106	4,717	338	757	325	728
	Employees	194	194	0	0	0	0
	Total	2,300	4,911	338	757	325	728

Source: P&D Consultants (2005).
[1] A passenger car equivalence (PCE) of 2.24 was applied to trucks to account for the effects of their larger sizes and slower movements on traffic operations.

5.5.3.5 Proposed Project Trip Distribution

Project trip distribution is defined as the general directions of project-related traffic on various road segments and intersections in the study area. As discussed previously, it was assumed that the truck distributions in the future will remain the same as existing conditions. To establish the existing truck trip distributions, Southland Car Counters tabulated the waste hauling trucks separately from the general traffic. The detailed waste hauling truck traffic counts are provided in Appendix F.

Approximately 13 percent of the waste hauling trucks travel on Portola Parkway west of Jeffrey Road, approximately 15 percent on Irvine Boulevard east of Sand Canyon Avenue, approximately 15 percent on Jeffrey Road and approximately 50 percent between I-5 and Irvine Boulevard. Based on the waste hauling truck traffic counts, approximately five percent of the trucks travel on Sand Canyon Avenue south of I-5. Therefore, the intersections on Sand Canyon Avenue south of I-5 were not included in the study area.

Based on field observations, most of the transfer trucks traversed on the designated truck route to the landfill. The designated transfer truck route to the landfill are I-5, I-405, Sand Canyon Avenue, Portola Parkway, and Bee Canyon Access Road as established in the Settlement Agreement between Orange County and the City of Irvine. The remaining packer trucks and self-hauling trucks are permitted to use alternative routes to the landfill.

The trip distribution for the employees was determined based on information provided by IWMD. Approximately 70 percent of the employees reside to the north of the landfill, and 30 percent of the employees reside to the south. The major travel routes from the north would include I-5, I-405, Jeffrey Road, Portola Parkway, and Irvine Boulevard. The major travel routes from the south would include I-5, Sand Canyon Avenue, Portola Parkway, and Irvine Boulevard.

5.5.3.6 Proposed Project Trip Assignment

Project trip assignment is defined as the specific routes or travel paths the project-related traffic will use based on the project trip distribution. The major factors affecting route selection are the minimum time path and minimum- distance path. Often, the minimum-time and distance paths are the same. When the two paths are different, the minimum time path will usually take precedence, assuming all other factors are equal. Project trips were assigned to the road system based on the pattern of existing trip distribution for the waste hauling trucks and employees. The results of the project trip assignment for year 2010 and 2030 are shown in Figures 5.5-3 and 5.5-4.

5.5.3.7 Level of Service

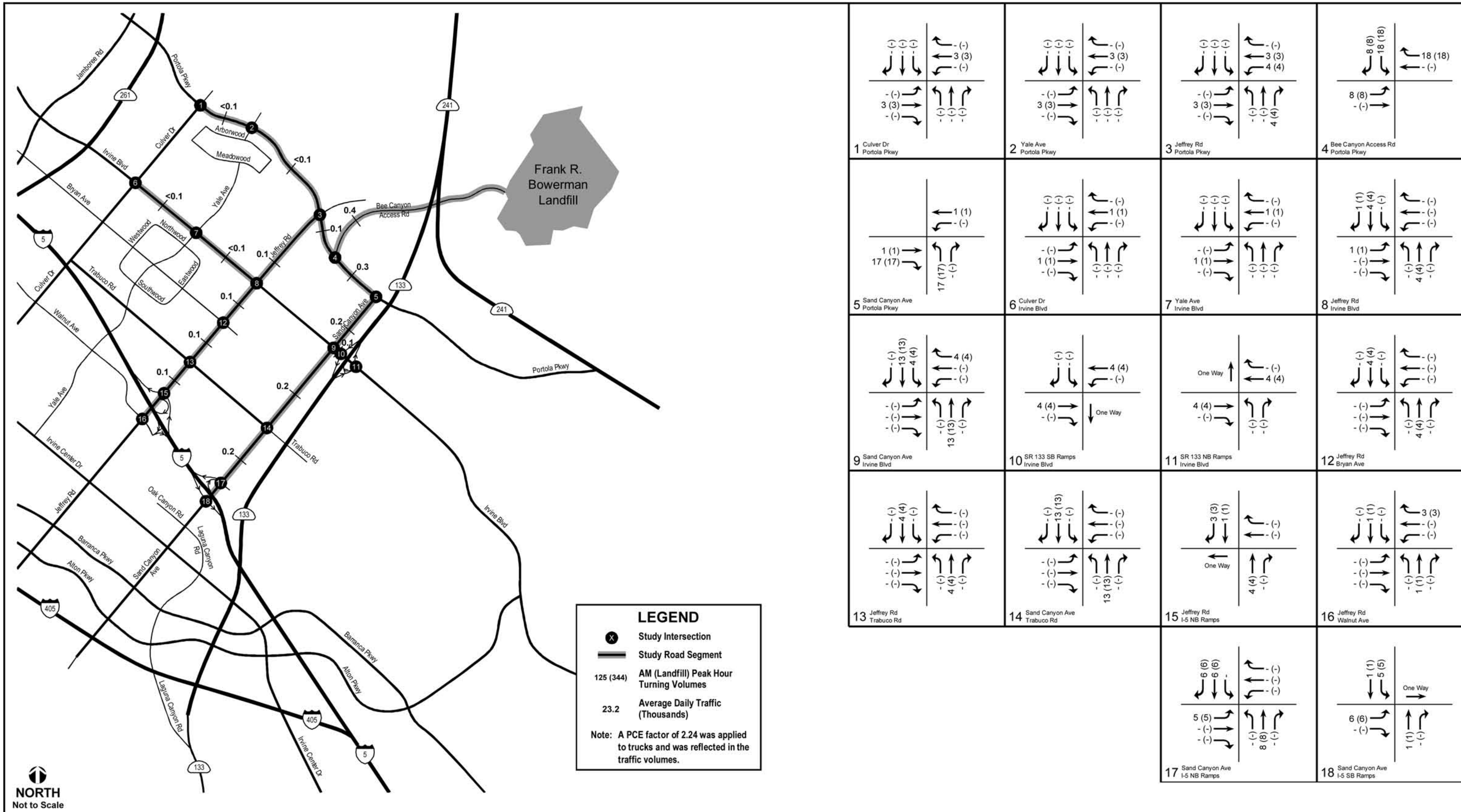
The concept of Level of Service (LOS) was developed to evaluate the operating conditions of the circulation network. The Highway Capacity Manual (HCM) defines LOS as a qualitative measure which describes the operational conditions of a traffic stream, generally in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. LOS is rated A through F, with LOS A representing the best operating conditions and LOS F representing the worst. Specific criteria are used to define LOS for different types of facilities as discussed below. These criteria can also vary among cities and transportation agencies.

<u>Road Segments</u>

Orange County and the City of Irvine have established maximum daily road capacities corresponding to different LOS designations based on road classifications, as shown in Tables 5.5-6 and 5.5-7. The LOS for road segments was calculated by comparing the daily traffic volumes to the LOS E capacity (V/C = 1.0). This comparison yields a volume-to-capacity (V/C) ratio from which the LOS is determined.

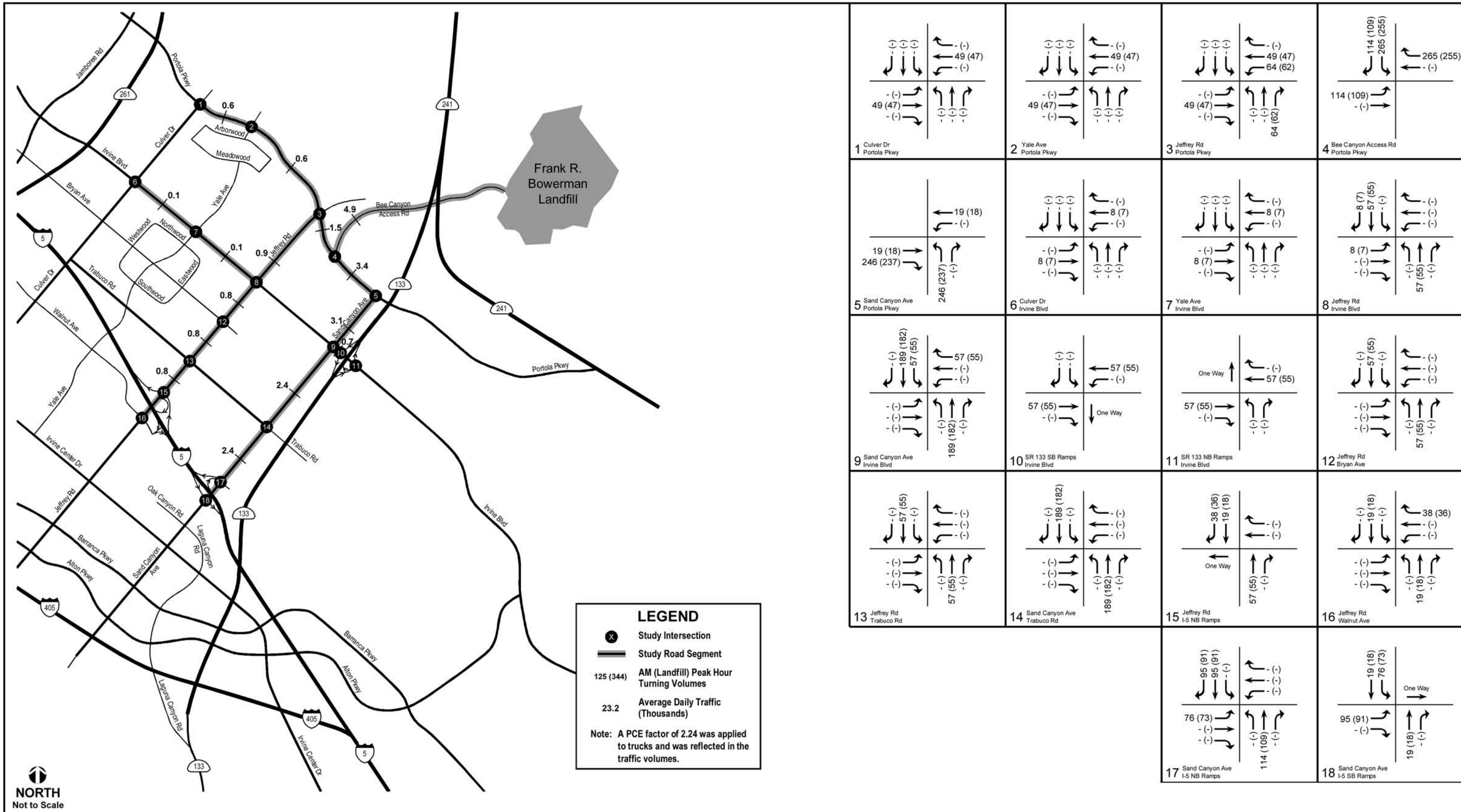
For peak hour operational purposes, the peak hour road segment capacity was determined by multiplying the number of mid-block lanes for each direction by a lane capacity of 1,600 vehicles per hour.[2] The LOS for road segments during the peak hour was calculated by comparing the maximum directional peak hour traffic volumes to the LOS E capacity (V/C = 1.0). This comparison yields a volume-to-capacity (V/C) ratio from which the peak hour road segment LOS is determined.

[2] City of Irvine, *Traffic Impact Analysis Guidelines*, 2004.



Source: P&D Consultants (2005).

Figure 5.5-3
Proposed Project Trip Assignment
2010



Source: P&D Consultants (2005).

Figure 5.5-4
Proposed Project Trip Assignment
2030

TABLE 5.5-6
MAXIMUM AVERAGE DAILY TRAFFIC FOR ARTERIAL ROADS – ORANGE COUNTY

Road Classification	Lane Configuration	LOS A (V/C=0.6)	LOS B (V/C=0.7)	LOS C (V/C=0.8)	LOS D (V/C=0.9)	LOS E (V/C=1.0)	LOS F (V/C>1.0)
Principal Arterial	8 Lanes Divided	45,000	52,500	60,000	67,500	75,000	> 75,000
Major Arterial	6 Lanes Divided	33,900	39,400	45,000	50,600	56,300	> 56,300
Primary Arterial	4 Lanes Divided	22,500	26,300	30,000	33,600	37,500	> 37,500
Secondary Arterial	4 Lanes Undivided	15,000	17,500	20,000	22,500	25,000	> 25,000
Collector	2 Lanes Undivided	7,500	8,800	10,000	11,300	12,500	> 12,500

Source: Orange County, *Transportation Implementation Manual*, 1994.

TABLE 5.5-7
MAXIMUM AVERAGE DAILY TRAFFIC FOR ARTERIAL ROADS – CITY OF IRVINE

Road Classification	Lane Configuration	LOS A (V/C=0.6)	LOS B (V/C=0.7)	LOS C (V/C=0.8)	LOS D (V/C=0.9)	LOS E (V/C=1.0)	LOS F (V/C>1.0)
Major Arterial	8 Lanes Divided	43,200	50,400	57,600	64,800	72,000	> 72,000
Major Arterial	6 Lanes Divided	32,400	37,800	43,200	48,600	54,000	> 54,000
Primary Arterial	4 Lanes Divided	19,200	22,400	25,600	28,800	32,000	> 32,000
Secondary Arterial	4 Lanes Undivided	16,800	19,600	22,400	25,200	28,000	> 28,000
Commuter	2 Lanes Undivided	7,800	9,100	10,400	11,700	13,000	> 13,000
Commuter (Rural)	2 Lanes Undivided	10,800	12,600	14,400	16,200	10,800	> 10,800

Source: City of Irvine, *Traffic Impact Analysis Guidelines*, 2004.

Signalized Intersections

Signalized intersections were analyzed using the Intersection Capacity Utilization (ICU) methodology adopted by Orange County and the City of Irvine. The ICU value is a quantitative ratio which compares intersection volume to capacity. Based on the ICU, intersection LOS is defined as shown in Table 5.5-8.

TABLE 5.5-8
LEVEL OF SERVICE CRITERIA – SIGNALIZED INTERSECTIONS

LOS	Description	ICU
A	At this LOS, traffic volumes are low and speed is not restricted by other vehicles. All signal cycles clear with no vehicles waiting through more than one original cycle.	0.00 to 0.60
B	At this LOS, traffic volumes begin to be affected by other traffic. Between one and 10 percent of the signal cycles have one or more vehicles which wait through more than one signal/cycle during the peak traffic periods.	0.61 to 0.70
C	At this LOS, operating speeds and maneuverability are closely controlled by other traffic. Between 11 and 30 percent of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods.	0.71 to 0.80
D	At this LOS, traffic will operate at tolerable operating speeds, although with restricted maneuverability. More than 30 percent of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic hours.	0.81 to 0.90
E	Traffic will experience restricted speeds. Vehicles will frequently have to wait through two or more cycles at signalized intersections, and any additional traffic will result in breakdown of the traffic carrying ability of the system.	0.91 to 1.00
F	Long queues of traffic, unstable flow, stoppages of long duration where traffic volumes and traffic speed can drop to zero. Traffic volumes will be less than the volume which occurs at LOS E.	Above 1.00

Source: City of Irvine, *General Plan – Circulation Element*, 2000.

The ICU analysis for this study used standard parameters currently followed by the City of Irvine and Orange County and was applied to the intersections within each respective City or County.[3] These standard parameters include default saturation flow rates defined as the maximum number of vehicles that can pass through a lane per hour of green time at a signalized intersection. The parameters also include clearance interval defined as a percentage of the overall intersection capacity utilized by vehicles to clear the intersection during the amber or yellow signal. Both the City of Irvine and Orange County assumed an unstriped right-turn lane exists when the distance to the inside edge of the outside through lane was at least 19 feet and parking was prohibited during the peak period. Both the City of Irvine and Orange County use a default saturation flow rate of 1,700 vehicles per hour per lane (vphpl) for all lanes. A clearance interval of five percent was used for all signalized intersections.

5.5.4 IMPACTS

This section discusses the 2010, 2030 and post-2030 traffic impacts of the proposed project. This section includes an analysis of traffic conditions without and with the project in 2010 and 2030 by determining the LOS. Year 2030 was assumed to represent full buildout of the area. This section also provides a qualitative analysis of traffic conditions with the project post-2030.

5.5.4.1 Traffic Impact Analysis for 2010

It is important to understand the several improvements to the circulation network will occur between 2005 and 2010. All of the circulation improvements in the study area are fully funded, and therefore, are assumed to exist in 2010. The circulation improvements are either Capital

[3] City of Irvine, *Traffic Impact Analysis Guidelines*, 2004.
Orange County, *Growth Management Plan, Transportation Implementation Manual*, 1994.

Improvement Projects (CIP) or mitigation measures to other nearby planned projects. It was assumed that the study road segments and intersections in unincorporated Orange County would not be annexed by the City of Irvine by 2010 but would be annexed by 2030. Tables 5.5-9 and 5.5-10 summarize the planned improvements to the road segments and intersections. Figure 5.5-5 (page 5.5-18) shows the circulation network in 2010.

TABLE 5.5-9
ROAD SEGMENT PLANNED IMPROVEMENTS – 2010

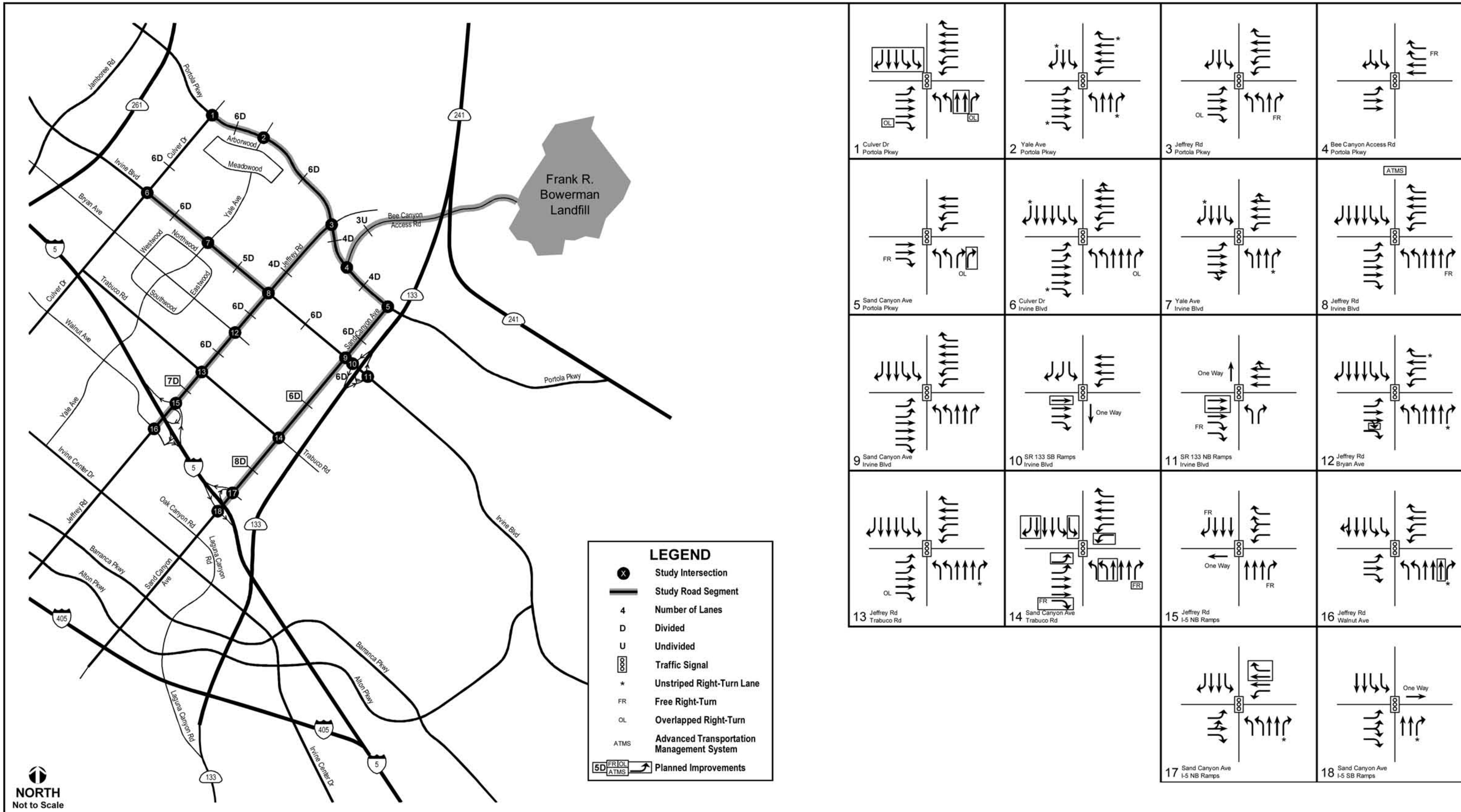
Road Segment	Section Limits	Planned Improvement
Jeffrey Road	Trabuco Road to I-5	- Provide one additional southbound lane.
Sand Canyon Avenue	Irvine Boulevard to Trabuco Road	- Provide one additional northbound and southbound lane. - Construct a raised median.
Sand Canyon Avenue	Trabuco Road to I-5	- Provide two additional northbound and southbound lanes. - Construct a raised median.

Source: City of Irvine (2005).

TABLE 5.5-10
SIGNALIZED INTERSECTION PLANNED IMPROVEMENTS – 2010

Index	Intersection	Planned Improvement
1	Culver Drive at Portola Parkway	- Add two northbound through lanes. - Reconfigure southbound approach to provide two left-turn lanes, two through lanes and one right-turn lane. - Provide the northbound right-turn lane with a protected right-turn phase that is overlapped with the westbound left-turn phase. - Provide the eastbound right-turn lane with a protected right-turn phase that is overlapped with the northbound left-turn phase.
5	Sand Canyon Avenue at Portola Parkway	- Reopen one northbound right-turn lane.
8	Jeffrey Road at Irvine Boulevard	- Apply ATMS strategies.[1]
10	SR 133 southbound ramps at Irvine Boulevard	- Reopen one eastbound through lane.
11	SR 133 northbound ramps at Irvine Boulevard	- Reopen two eastbound through lanes.
12	Jeffrey Road at Bryan Avenue	- Restripe one through lane to one shared through/right-turn lane.
14	Sand Canyon Avenue at Trabuco Road	- Add one northbound and southbound through lane. - Add one left-turn lane on all approaches. - Add one southbound and eastbound right-turn lane. - Reconfigure the northbound and eastbound right-turn lanes to free right-turn lanes.
16	Jeffrey Road at Walnut Avenue	- Add one northbound through lane.
17	Sand Canyon Avenue at I-5 northbound ramps	- Add one eastbound through lane and right-turn lane.

Source: City of Irvine (2005).
[1] The Advanced Transportation Management System (ATMS) strategies apply the latest traffic control systems to improve traffic flow through the intersections. These traffic control systems include the use of interconnect, closed circuit television and communication systems, upgraded traffic signal cabinets, controllers and detection systems, and a changeable message board.



Source: P&D Consultants (2005).

Figure 5.5-5
Circulation Network
2010

The City of Irvine provided the 2010 daily and the A.M. peak hour intersection turning traffic volumes generated by ITAM. The 2010 daily traffic volumes were post-processed from ITAM according to the procedures outlined in the NCHRP Report 255 to obtain the second landfill peak hour intersection turning volumes. The landfill is currently permitted to operate in 2010 and to accept the maximum allowable MSW of 10,625 TPD. The proposed project trip generation by 2010 only consisted of the projected traffic increase from the maximum allowable MSW of 10,625 TPD to 11,500 TPD. Figures 5.5-6 and 5.5-7 (page 5.5-21 and 5.5-22) show the traffic volumes in the study area without and with the project scenarios in 2010.

Project-related traffic impacts were determined by comparing the road segment and intersection LOS without and with the project. Significant adverse traffic impacts were identified based on the City of Irvine's or Orange County's criteria for significant adverse project impacts.

Road Segments

As shown in Table 5.5-11, all study road segments will operate at an acceptable LOS D or better without the project in 2010. Jeffrey Road between Trabuco Road and I-5 will have the worst V/C ratio of 0.810 and will operate at LOS D.

TABLE 5.5-11
ROAD SEGMENT DAILY LEVELS OF SERVICE – 2010 WITHOUT THE PROJECT

Road Segment	Section Limits	Street Classification	Lane Configuration	Daily Volume	Capacity	V/C	LOS
Portola Parkway	Culver Drive to Yale Avenue	Major Arterial	6 Divided	22,000	54,000	0.407	A
	Yale Avenue to Jeffrey Road	Major Arterial	6 Divided	25,000	54,000	0.463	A
Portola Parkway[1]	Jeffrey Road to Bee Canyon Access Road	Primary Arterial	4 Divided	15,000	37,500	0.400	A
	Bee Canyon Access Road to Sand Canyon Avenue	Primary Arterial	4 Divided	15,000	37,500	0.400	A
Irvine Boulevard	Culver Drive to Yale Avenue	Major Arterial	6 Divided	34,000	54,000	0.630	B
	Yale Avenue to Jeffrey Road	Primary Arterial	5 Divided	34,000	43,000	0.791	C
	Sand Canyon Avenue to State Route 133	Major Arterial	6 Divided	36,000	54,000	0.667	B
Jeffrey Road[1]	Portola Parkway to Irvine Boulevard	Primary Arterial	4 Divided	23,000	37,500	0.613	B
Jeffrey Road	Irvine Boulevard to Bryan Avenue	Major Arterial	6 Divided	38,000	54,000	0.704	C
	Bryan Avenue to Trabuco Road	Major Arterial	6 Divided	40,000	54,000	0.741	C
	Trabuco Road to Interstate-5	Major Arterial	7 Divided	51,000	63,000	0.810	D
Bee Canyon Access Road	FRB Landfill to Portola Parkway	Collector	3 Undivided	4,543	18,750	0.242	A
Sand Canyon Avenue	Portola Parkway to Irvine Boulevard	Primary Arterial	4 Divided	21,000	32,000	0.656	B
	Irvine Boulevard to	Major	6 Divided	33,000	54,000	0.611	B

TABLE 5.5-11
ROAD SEGMENT DAILY LEVELS OF SERVICE – 2010 WITHOUT THE PROJECT

Road Segment	Section Limits	Street Classification	Lane Configuration	Daily Volume	Capacity	V/C	LOS
	Trabuco Road	Arterial					
	Trabuco Road to Interstate-5	Major Arterial	8 Divided	44,000	72,000	0.611	B

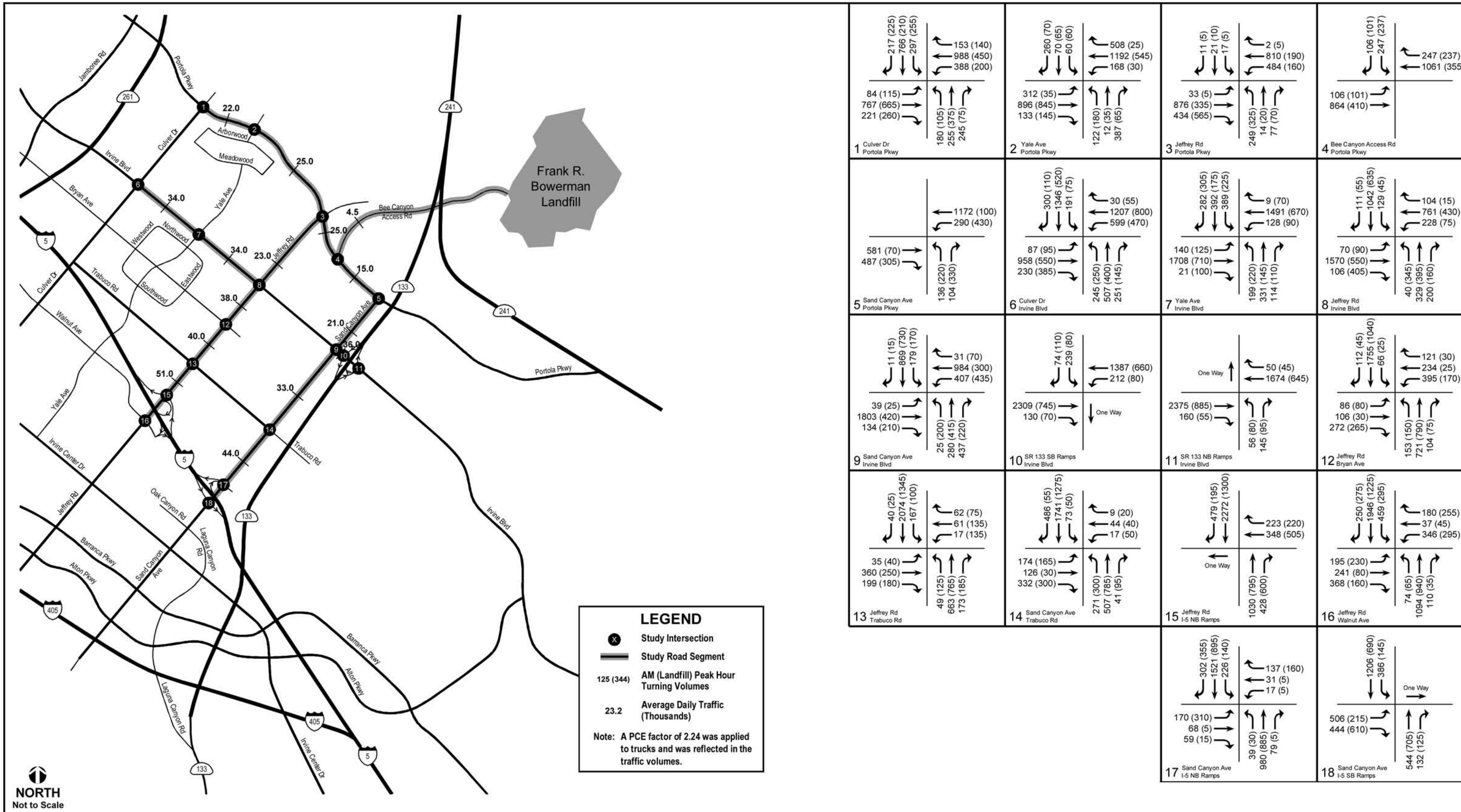
Source: P&D Consultants (2005).
[1] The road segment is in unincorporated Orange County.

As shown in Table 5.5-12, all study road segments will operate at an acceptable LOS D or better with the project in 2010. Jeffrey Road between Trabuco Road and I-5 will have the worst V/C ratio of 0.810 and will operate at LOS D.

TABLE 5.5-12
ROAD SEGMENT DAILY LEVELS OF SERVICE – 2010 WITH THE PROJECT

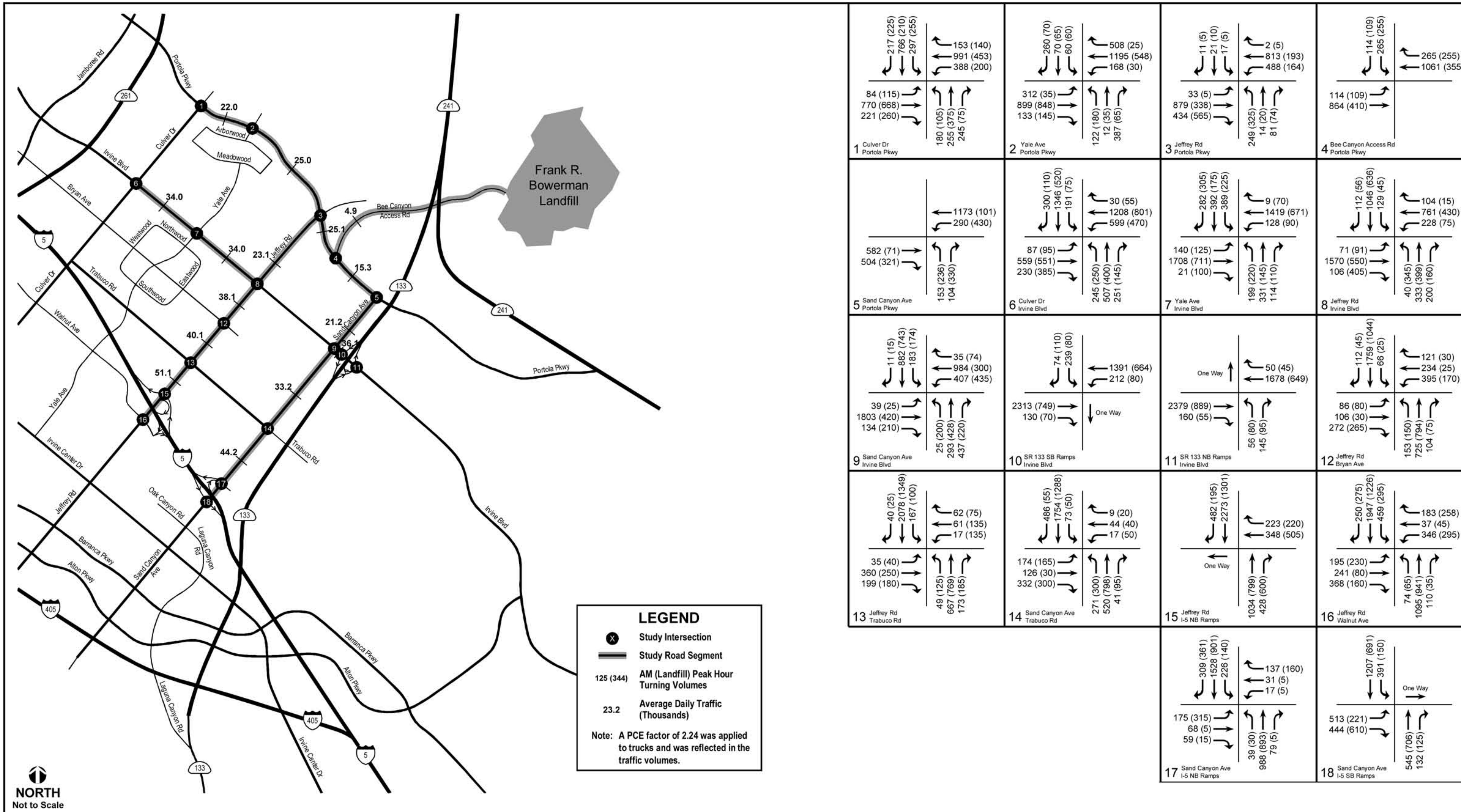
Road Segment	Section Limits	Street Classification	Lane Configuration	Daily Volume	Capacity	V/C	LOS
Portola Parkway	Culver Drive to Yale Avenue	Major Arterial	6 Divided	22,048	54,000	0.408	A
	Yale Avenue to Jeffrey Road	Major Arterial	6 Divided	25,048	54,000	0.464	A
Portola Parkway[1]	Jeffrey Road to Bee Canyon Access Road	Primary Arterial	4 Divided	25,115	37,500	0.670	B
	Bee Canyon Access Road to Sand Canyon Avenue	Primary Arterial	4 Divided	15,253	37,500	0.407	A
Irvine Boulevard	Culver Drive to Yale Avenue	Major Arterial	6 Divided	34,008	54,000	0.630	B
	Yale Avenue to Jeffrey Road	Primary Arterial	5 Divided	34,008	43,000	0.791	C
	Sand Canyon Avenue to State Route 133	Major Arterial	6 Divided	36,054	54,000	0.668	B
Jeffrey Road[1]	Portola Parkway to Irvine Boulevard	Primary Arterial	4 Divided	23,067	37,500	0.615	B
Jeffrey Road	Irvine Boulevard to Bryan Avenue	Major Arterial	6 Divided	38,059	54,000	0.705	C
	Bryan Avenue to Trabuco Road	Major Arterial	6 Divided	40,059	54,000	0.742	C
	Trabuco Road to Interstate-5	Major Arterial	7 Divided	51,059	63,000	0.810	D
Bee Canyon Access Road	FRB Landfill to Portola Parkway	Collector	3 Undivided	4,911	18,750	0.262	A
Sand Canyon Avenue	Portola Parkway to Irvine Boulevard	Primary Arterial	4 Divided	21,234	32,000	0.664	B
	Irvine Boulevard to Trabuco Road	Major Arterial	6 Divided	33,180	54,000	0.614	B
	Trabuco Road to Interstate-5	Major Arterial	8 Divided	44,180	72,000	0.613	B

Source: P&D Consultants (2005).
[1] The road segment is in unincorporated Orange County.



Source: P&D Consultants (2005).

Figure 5.5-6
Traffic Volumes
2010 without Project



Source: P&D Consultants (2005).

Figure 5.5-7
Traffic Volumes
2010 with Project

As shown in Table 5.5-13, all road segments will operate at an acceptable LOS with the proposed project. Therefore, the road segments will not require an additional peak hour V/C analysis and implementation of the proposed project will not create a significant adverse impact related to traffic in 2010.

TABLE 5.5-13
ROAD SEGMENT SIGNIFICANT ADVERSE IMPACT SUMMARY – 2010

Road Segment	Section Limits	Change in V/C	Unacc. LOS?[1]	Peak Hour				Sig. Adv. Imp.?[2]
				Highest Volume	Capacity	V/C	LOS	
Portola Parkway	Culver Drive to Yale Avenue	0.001	No	Not Applicable				No
	Yale Avenue to Jeffrey Road	0.001	No	Not Applicable				No
Portola Parkway[3]	Jeffrey Road to Bee Canyon Access Road	0.003	No	Not Applicable				No
	Bee Canyon Access Road to Sand Canyon Avenue	0.007	No	Not Applicable				No
Irvine Boulevard	Culver Drive to Yale Avenue	0.000	No	Not Applicable				No
	Yale Avenue to Jeffrey Road	0.000	No	Not Applicable				No
	Sand Canyon Avenue to State Route 133	0.001	No	Not Applicable				No
Jeffrey Road[3]	Portola Parkway to Irvine Boulevard	0.002	No	Not Applicable				No
Jeffrey Road	Irvine Boulevard to Bryan Avenue	0.001	No	Not Applicable				No
	Bryan Avenue to Trabuco Road	0.001	No	Not Applicable				No
	Trabuco Road to Interstate-5	0.001	No	Not Applicable				No
Bee Canyon Access Road	FRB Landfill to Portola Parkway	0.020	No	Not Applicable				No
Sand Canyon Avenue	Portola Parkway to Irvine Boulevard	0.007	No	Not Applicable				No
	Irvine Boulevard to Trabuco Road	0.003	No	Not Applicable				No
	Trabuco Road to Interstate-5	0.003	No	Not Applicable				No

Source: P&D Consultants (2005).
[1] Unacc. LOS: Unacceptable LOS.
[2] Sig. Adv. Imp.: Significant Adverse Impact.
[3] The road segment is in unincorporated Orange County.

<u>Signalized Intersections</u>

As shown in Table 5.5-14, all study intersections will operate at an acceptable LOS D or better without the proposed project in 2010 during the A.M. and second landfill peak hour. Sand Canyon Avenue at Irvine Boulevard will have the worst A.M. peak hour ICU of 0.833 and will operate at LOS D during the A.M. peak hour. The detailed LOS calculation worksheets are included in Appendix F.

TABLE 5.5-14
SIGNALIZED INTERSECTION LEVELS OF SERVICE – 2010 WITHOUT THE PROJECT

Index	Intersection	A.M. Peak Hour		Landfill Peak Hour	
		ICU	LOS	ICU	LOS
1	Culver Drive at Portola Parkway	0.593	A	0.425	A
2	Yale Avenue at Portola Parkway	0.795	C	0.377	A
3[1]	Jeffrey Road at Portola Parkway	0.536	A	0.313	A
4[1]	Bee Canyon Access Road at Portola Parkway	0.528	A	0.171	A
5[1]	Sand Canyon Avenue at Portola Parkway	0.435	A	0.262	A
6	Culver Drive at Irvine Boulevard	0.750	C	0.590	A
7	Yale Avenue at Irvine Boulevard	0.790	C	0.577	A
8[2]	Jeffrey Road at Irvine Boulevard	0.745	C	0.536	A
9	Sand Canyon Avenue at Irvine Boulevard	0.833	D	0.575	A
10	SR 133 southbound ramps at Irvine Boulevard	0.698	B	0.308	A
11	SR 133 northbound ramps at Irvine Boulevard	0.601	B	0.279	A
12	Jeffrey Road at Bryan Avenue	0.635	B	0.426	A
13	Jeffrey Road at Trabuco Road	0.582	A	0.464	A
14	Sand Canyon Avenue at Trabuco Road	0.531	A	0.445	A
15	Jeffrey Road at I-5 northbound ramps	0.607	B	0.453	A
16	Jeffrey Road at Walnut Avenue	0.821	D	0.649	B
17	Sand Canyon Avenue at I-5 northbound ramps	0.659	B	0.579	A
18	Sand Canyon Avenue at I-5 southbound ramps	0.591	A	0.479	A

Source: P&D Consultants (2005).
[1] The intersection is in unincorporated Orange County.
[2] The Advanced Transportation Management System (ATMS) strategies are applied to the intersection. Therefore, a 0.05 credit is applied to the ICU during the A.M. peak hour.

As shown in Table 5.5-15, all study intersections will operate at an acceptable LOS D or better with the proposed project during the A.M. and second landfill peak hour. Sand Canyon Avenue at Irvine Boulevard will have the worst A.M. peak hour ICU of 0.834 and will operate at LOS D during the A.M. peak hour. The detailed LOS calculation worksheets are included in Appendix F.

TABLE 5.5-15
SIGNALIZED INTERSECTION LEVELS OF SERVICE – 2010 WITH THE PROJECT

Index	Intersection	A.M. Peak Hour		Landfill Peak Hour	
		ICU	LOS	ICU	LOS
1	Culver Drive at Portola Parkway	0.593	A	0.425	A
2	Yale Avenue at Portola Parkway	0.795	C	0.378	A
3[1]	Jeffrey Road at Portola Parkway	0.538	A	0.326	A
4[1]	Bee Canyon Access Road at Portola Parkway	0.541	A	0.178	A
5[1]	Sand Canyon Avenue at Portola Parkway	0.440	A	0.267	A
6	Culver Drive at Irvine Boulevard	0.750	C	0.590	A
7	Yale Avenue at Irvine Boulevard	0.790	C	0.578	A
8[2]	Jeffrey Road at Irvine Boulevard	0.746	C	0.537	A
9	Sand Canyon Avenue at Irvine Boulevard	0.834	D	0.579	A
10	SR 133 southbound ramps at Irvine Boulevard	0.699	B	0.309	A

TABLE 5.5-15
SIGNALIZED INTERSECTION LEVELS OF SERVICE – 2010 WITH THE PROJECT

Index	Intersection	A.M. Peak Hour		Landfill Peak Hour	
		ICU	LOS	ICU	LOS
11	SR 133 northbound ramps at Irvine Boulevard	0.602	B	0.280	A
12	Jeffrey Road at Bryan Avenue	0.636	B	0.427	A
13	Jeffrey Road at Trabuco Road	0.583	A	0.465	A
14	Sand Canyon Avenue at Trabuco Road	0.533	A	0.447	A
15	Jeffrey Road at I-5 northbound ramps	0.608	B	0.454	A
16	Jeffrey Road at Walnut Avenue	0.821	D	0.650	B
17	Sand Canyon Avenue at I-5 northbound ramps	0.663	B	0.583	A
18	Sand Canyon Avenue at I-5 southbound ramps	0.593	A	0.481	A

Source: P&D Consultants (2005).
[1] The intersection is in unincorporated Orange County.
[2] The Advanced Transportation Management System (ATMS) strategies are applied to the intersection. Therefore, a 0.05 credit is applied to the ICU during the A.M. peak hour.

As shown in Table 5.5-16**,** all intersections will operate at an acceptable LOS and the changes in the ICU are not significant. Therefore, implementation of the proposed project will not create a significant adverse impact on signalized intersections.

TABLE 5.5-16
SIGNALIZED INTERSECTION SIGNIFICANT ADVERSE IMPACT SUMMARY – 2010

Index	Intersection	A.M. Peak Hour			Landfill Peak Hour		
		Change in ICU	Unacc. LOS?[1]	Sig. Adv. Imp.?[2]	Change in ICU	Unacc. LOS?	Sig. Adv. Imp.?
1	Culver Drive at Portola Parkway	0.000	No	No	0.000	No	No
2	Yale Avenue at Portola Parkway	0.000	No	No	0.001	No	No
3	Jeffrey Road at Portola Parkway	0.002	No	No	0.001	No	No
4	Bee Canyon Access Road at Portola Parkway	0.013	No	No	0.013	No	No
5	Sand Canyon Avenue at Portola Parkway	0.005	No	No	0.005	No	No
6	Culver Drive at Irvine Boulevard	0.000	No	No	0.000	No	No
7	Yale Avenue at Irvine Boulevard	0.000	No	No	0.001	No	No
8	Jeffrey Road at Irvine Boulevard	0.001	No	No	0.001	No	No
9	Sand Canyon Avenue at Irvine Boulevard	0.001	No	No	0.004	No	No
10	SR 133 southbound ramps at Irvine Boulevard	0.001	No	No	0.001	No	No
11	SR 133 northbound ramps at Irvine Boulevard	0.001	No	No	0.001	No	No
12	Jeffrey Road at Bryan Avenue	0.001	No	No	0.001	No	No
13	Jeffrey Road at Trabuco Road	0.001	No	No	0.001	No	No
14	Sand Canyon Avenue at Trabuco Road	0.002	No	No	0.002	No	No
15	Jeffrey Road at I-5 northbound ramps	0.001	No	No	0.001	No	No
16	Jeffrey Road at Walnut Avenue	0.000	No	No	0.001	No	No
17	Sand Canyon Avenue at I-5 northbound ramps	0.004	No	No	0.004	No	No
18	Sand Canyon Avenue at I-5 southbound ramps	0.002	No	No	0.002	No	No

Source: P&D Consultants (2005).
[1] Unacc. LOS: Unacceptable LOS.
[2] Sig. Adv. Imp.: Significant Adverse Impact.

Therefore, no mitigation measures would be required in 2010 because none of the study road segments or intersections will be significantly adversely impacted by implementation of the proposed project.

5.5.4.2 Traffic Impact Analysis for 2030

Several improvements to the circulation network will occur between 2010 and 2030. These planned road segment and intersection improvements are summarized in Tables 5.5-17 and 5.5-18. The year 2030 assumes buildout conditions for the circulation network. The circulation improvements are either CIPs, mitigation measures to other nearby planned projects, or unfunded General Plan improvements. For 2030, it was assumed that study road segments and intersections in unincorporated Orange County will be annexed by the City of Irvine. Figure 5.5-8 shows the circulation network in 2030.

TABLE 5.5-17
ROAD SEGMENT PLANNED IMPROVEMENTS – 2030

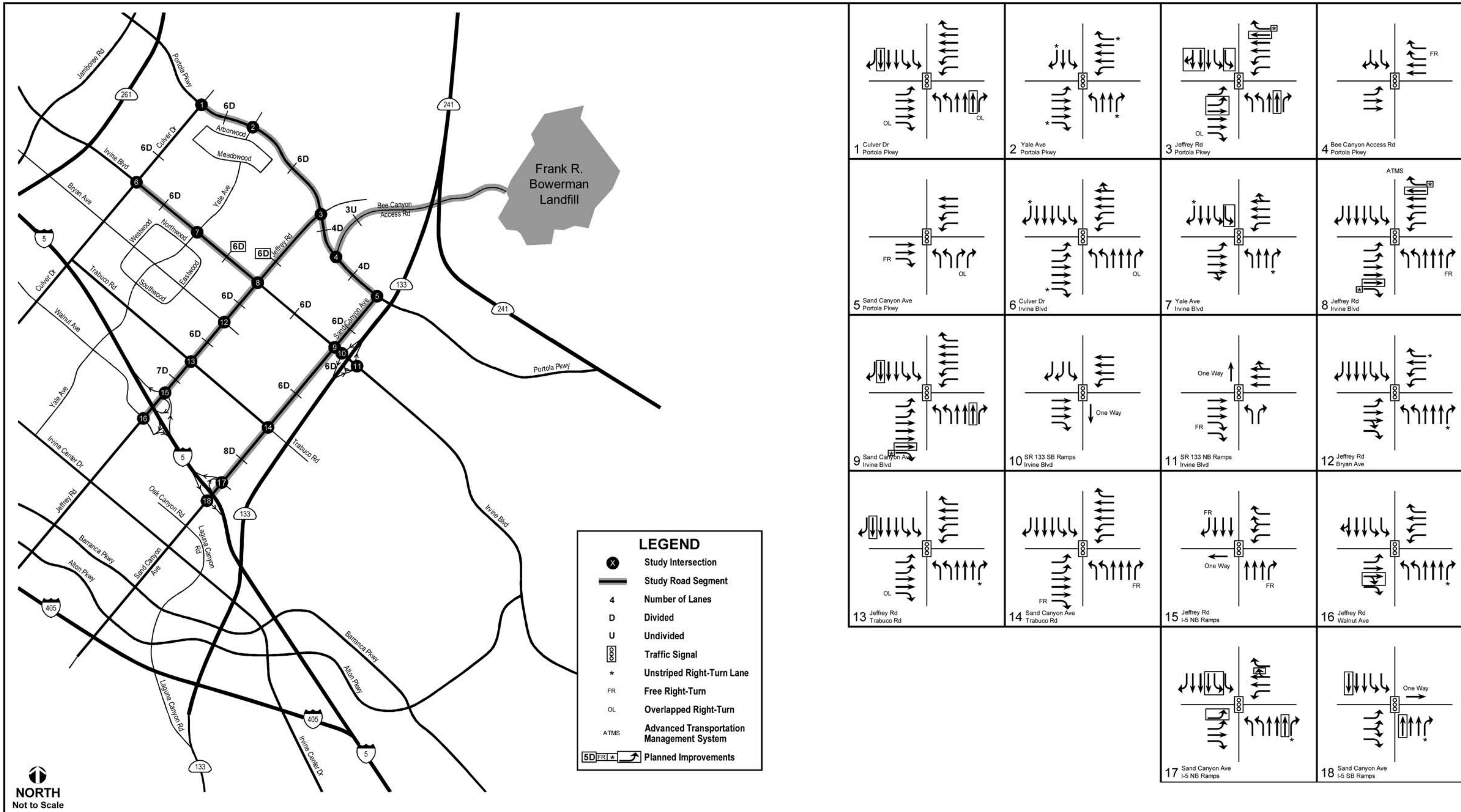
Road Segment	Section Limits	Planned Improvement
Irvine Boulevard	Culver Drive to Jeffrey Road	- Provide one additional westbound lane.
Jeffrey Road	Portola Parkway to Irvine Boulevard	- Provide one additional northbound and southbound lane. - Construct a raised median.

Source: City of Irvine (2005).

TABLE 5.5-18
SIGNALIZED INTERSECTION PLANNED IMPROVEMENTS – 2030

Index	Intersection	Planned Improvement
1	Culver Drive at Portola Parkway	- Add one northbound and southbound through lanes.
3	Jeffrey Road at Portola Parkway	- Add one northbound, southbound and eastbound through lane. - Add one southbound shared through/right-turn lane. - Add one southbound and eastbound left-turn lane. - Convert one westbound right-turn lane to one through lane and one unstriped right-turn lane.
7	Yale Avenue at Irvine Boulevard	- Add one southbound left-turn lane.
8	Jeffrey Road at Irvine Boulevard	- Convert one eastbound and westbound right-turn lane to one through lane and one unstriped right-turn lane.
9	Sand Canyon Avenue at Irvine Boulevard	- Add one northbound and southbound through lane. - Convert one eastbound right-turn lane to one through lane and one unstriped right-turn lane.
13	Jeffrey Road at Trabuco Road	- Add one southbound through lane.
16	Jeffrey Road at Walnut Avenue	- Add one eastbound shared through/right-turn lane.
17	Sand Canyon Avenue at I-5 northbound ramps	- Add one northbound and southbound through lane. - Add one southbound and eastbound left-turn lane. - Convert one westbound through lane to one shared through/right-turn lane.
18	Sand Canyon Avenue at I-5 southbound ramps	- Add one northbound and southbound through lane.

Source: City of Irvine (2005).



Source: P&D Consultants (2005).

Figure 5.5-8
Circulation Network
2030

The City of Irvine provided the 2030 daily and the A.M. peak hour intersection turning traffic volumes generated by ITAM. The 2030 daily traffic volumes were post-processed from ITAM according to the procedures outlined in the NCHRP Report 255 to obtain the second landfill peak hour intersection turning volumes. The landfill is currently scheduled to close in 2022; and therefore, the landfill related traffic will not exist without the proposed project. The proposed project trip generation in 2030 consisted of all the traffic generated by the landfill if the landfill accepts the maximum allowable MSW of 11,500 TPD. Figures 5.5-9 and 5.5-10 show the traffic volumes in the study area without and with the project scenarios in 2030.

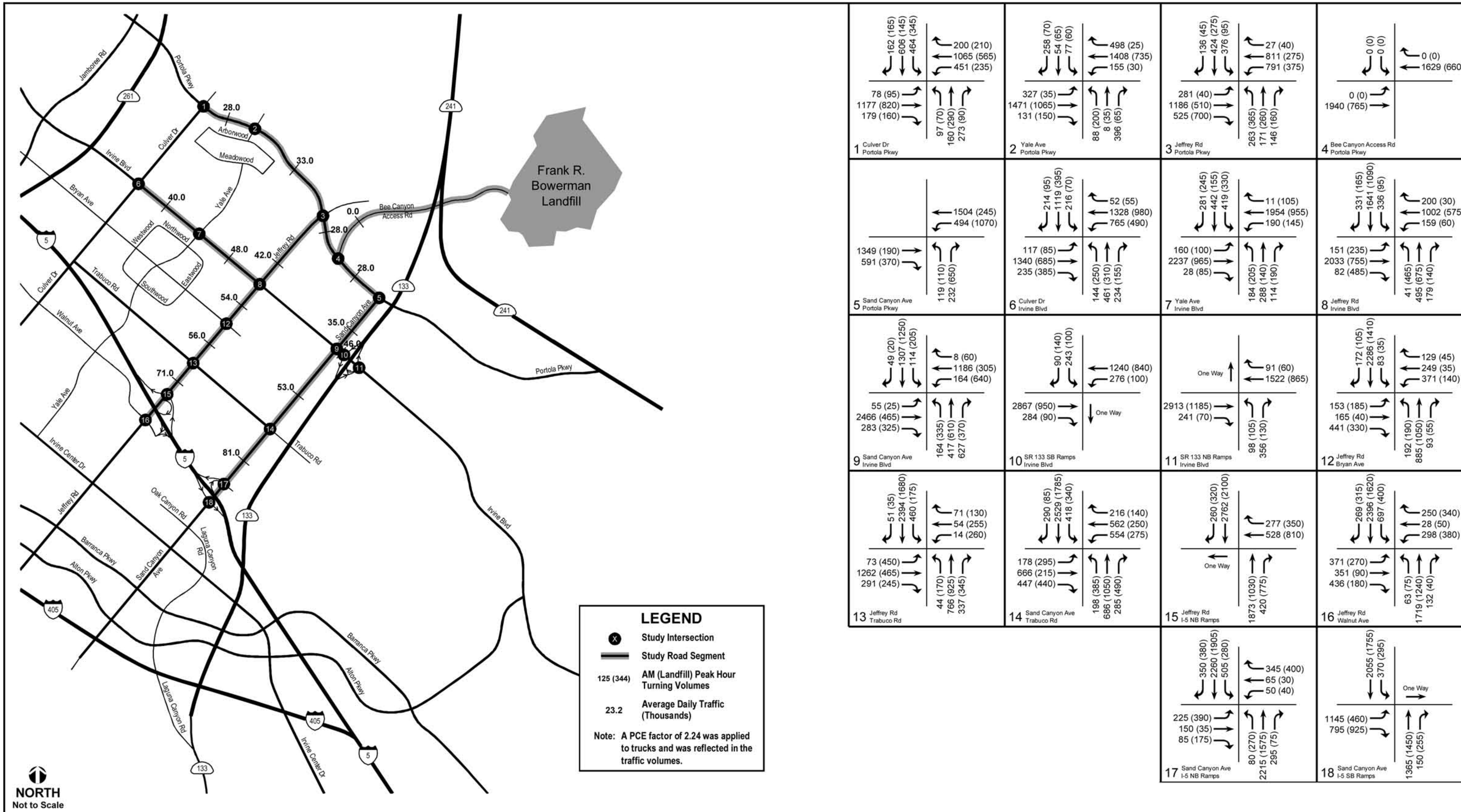
Project-related traffic impacts were determined by comparing the road segment and intersection LOS without and with the project. Significant adverse traffic impacts were identified based on the City of Irvine's or Orange County's criteria for significant adverse project impacts.

<u>Road Segments</u>

As shown in Table 5.5-19, six study road segments will operate at unacceptable LOS E or F. Jeffrey Road between Irvine Boulevard and Bryan Avenue, and Sand Canyon Avenue between Irvine Boulevard and Trabuco Road will operate at unacceptable LOS E in 2030 without the proposed project. Jeffrey Road between Bryan Avenue and I-5, Sand Canyon Avenue between Portola Parkway and Irvine Boulevard, and Sand Canyon Avenue between Trabuco Road and I-5 will operate unacceptable LOS F in 2030 without the proposed project.

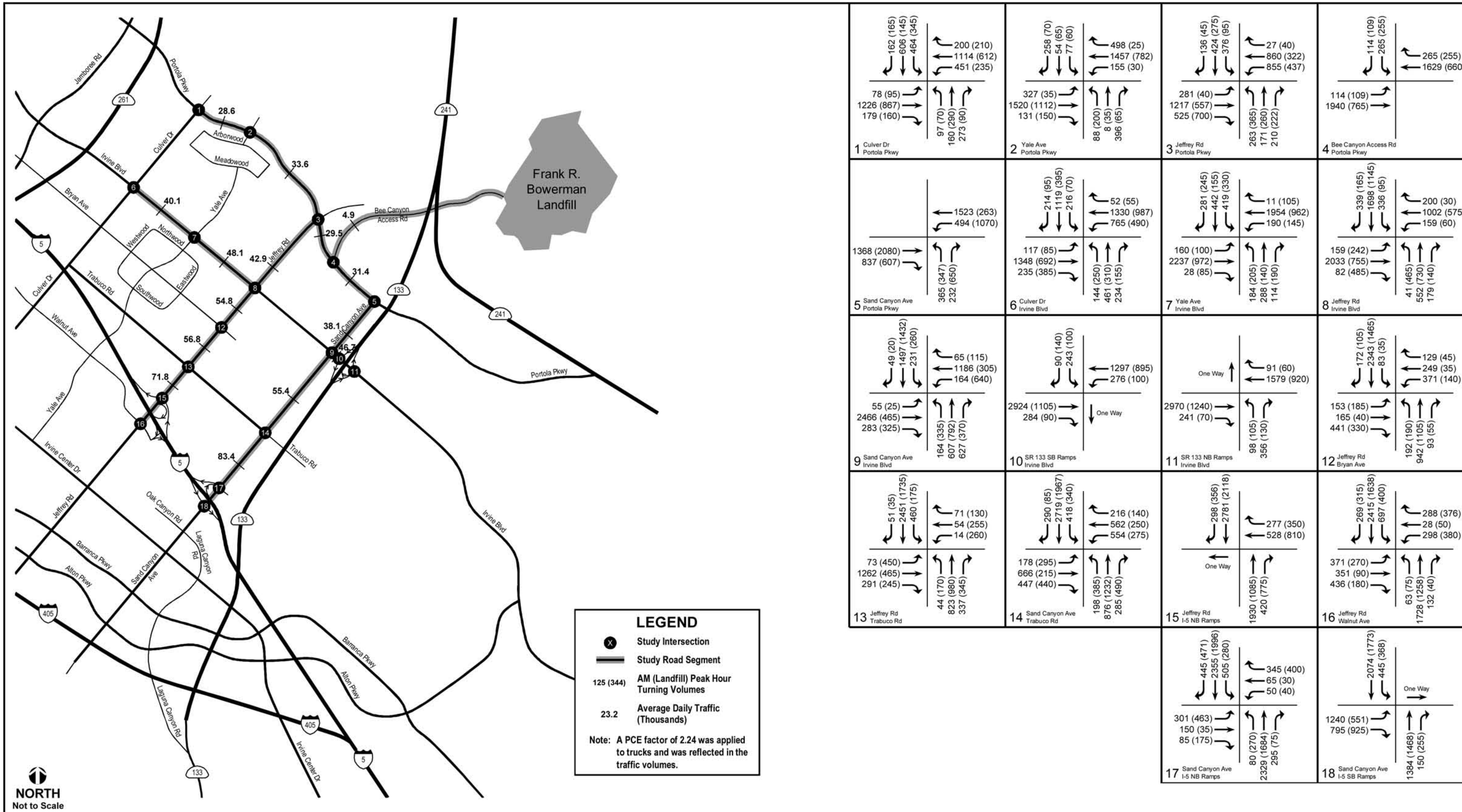
TABLE 5.5-19
ROAD SEGMENT DAILY LEVELS OF SERVICE – 2030 WITHOUT THE PROJECT

Road Segment	Section Limits	Street Classification	Lane Configuration	Daily Volume	Capacity	V/C	LOS
Portola Parkway	Culver Drive Yale Avenue	Major Arterial	6 Divided	28,000	54,000	0.519	A
	Yale Avenue Jeffrey Road	Major Arterial	6 Divided	33,000	54,000	0.611	B
	Jeffrey Road Bee Canyon Access Road	Primary Arterial	4 Divided	28,000	32,000	0.875	D
	Bee Canyon Access Road Sand Canyon Avenue	Primary Arterial	4 Divided	28,000	32,000	0.875	D
Irvine Boulevard	Culver Drive Yale Avenue	Major Arterial	6 Divided	40,000	54,000	0.741	C
	Yale Avenue Jeffrey Road	Major Arterial	6 Divided	48,000	54,000	0.889	D
	Sand Canyon Avenue State Route 133	Major Arterial	6 Divided	46,000	54,000	0.852	D
Jeffrey Road	Portola Parkway Irvine Boulevard	Major Arterial	6 Divided	42,000	54,000	0.778	C
	Irvine Boulevard Bryan Avenue	Major Arterial	6 Divided	54,000	54,000	**1.000**	**E**
	Bryan Avenue Trabuco Road	Major Arterial	6 Divided	56,000	54,000	**1.037**	**F**
	Trabuco Road Interstate-5	Major Arterial	7 Divided	71,000	63,000	**1.127**	**F**



Source: P&D Consultants (2005).

Figure 5.5-9
Traffic Volumes
2030 without Project



Source: P&D Consultants (2005).

Figure 5.5-10
Traffic Volumes
2030 with Project

TABLE 5.5-19 (Continued)
ROAD SEGMENT DAILY LEVELS OF SERVICE – 2030 WITHOUT THE PROJECT

Road Segment	Section Limits	Street Classification	Lane Configuration	Daily Volume	Capacity	V/C	LOS
Bee Canyon Access Road	FRB Landfill Portola Parkway	Collector	3 Undivided	0	18,750	0.000	A
Sand Canyon Avenue	Portola Parkway Irvine Boulevard	Primary Arterial	4 Divided	35,000	32,000	**1.094**	**F**
	Irvine Boulevard Trabuco Road	Major Arterial	6 Divided	53,000	54,000	**0.981**	**E**
	Trabuco Road Interstate-5	Major Arterial	8 Divided	81,000	72,000	**1.125**	**F**

Source: P&D Consultants (2005). **Bolded** items indicate road segments would be operating at below-standard LOS.

As shown in Table 5.5-20, eight study road segments will operate at unacceptable LOS E or F. Portola Parkway between Jeffrey Road and Sand Canyon Avenue will operate at unacceptable LOS E in 2030 with the proposed project. Jeffrey Road between Irvine Boulevard and I-5 and Sand Canyon Avenue between Portola Parkway and I-5 will operate at unacceptable LOS F with the proposed project.

TABLE 5.5-20
ROAD SEGMENT DAILY LEVELS OF SERVICE – 2030 WITH THE PROJECT

Road Segment	Section Limits	Street Classification	Lane Configuration	Daily Volume	Capacity	V/C	LOS
Portola Parkway	Culver Drive Yale Avenue	Major Arterial	6 Divided	28,642	54,000	0.530	A
	Yale Avenue Jeffrey Road	Major Arterial	6 Divided	33,642	54,000	0.623	B
	Jeffrey Road Bee Canyon Access Road	Primary Arterial	4 Divided	29,541	32,000	**0.923**	**E**
	Bee Canyon Access Road Sand Canyon Avenue	Primary Arterial	4 Divided	31,370	32,000	**0.980**	**E**
Irvine Boulevard	Culver Drive Yale Avenue	Major Arterial	6 Divided	40,104	54,000	0.743	C
	Yale Avenue Jeffrey Road	Major Arterial	6 Divided	48,104	54,000	0.891	D
	Sand Canyon Avenue State Route 133	Major Arterial	6 Divided	46,717	54,000	0.865	D
Jeffrey Road	Portola Parkway Irvine Boulevard	Major Arterial	6 Divided	42,899	54,000	0.794	C
	Irvine Boulevard Bryan Avenue	Major Arterial	6 Divided	54,795	54,000	**1.015**	**F**
	Bryan Avenue Trabuco Road	Major Arterial	6 Divided	56,795	54,000	**1.052**	**F**
	Trabuco Road Interstate-5	Major Arterial	7 Divided	71,795	63,000	**1.140**	**F**
Bee Canyon Access Road	FRB Landfill Portola Parkway	Collector	3 Undivided	4,911	18,750	0.262	A

TABLE 5.5-20
ROAD SEGMENT DAILY LEVELS OF SERVICE – 2030 WITH THE PROJECT

Road Segment	Section Limits	Street Classification	Lane Configuration	Daily Volume	Capacity	V/C	LOS
Sand Canyon Avenue	Portola Parkway Irvine Boulevard	Primary Arterial	4 Divided	38,125	32,000	**1.191**	**F**
	Irvine Boulevard Trabuco Road	Major Arterial	6 Divided	55,407	54,000	**1.026**	**F**
	Trabuco Road Interstate-5	Major Arterial	8 Divided	83,407	72,000	**1.158**	**F**

Source: P&D Consultants (2005). **Bolded** items indicate road segments would be operating at below-standard LOS.

As shown in Table 5.5-21, eight road segments would operate at an unacceptable LOS. Implementation of the proposed project would not result in a significant adverse impact to Jeffrey Road between Trabuco Road and I-5 because the increase in the V/C ratio was less than 0.02 when rounded to the nearest hundredth. The remaining seven road segments may be significantly adversely impacted with implementation of the proposed project because the increase in the V/C ratio was greater than 0.02 when rounded to the nearest hundredth. Therefore, the seven remaining road segments required an additional peak hour V/C analysis. As shown in the Peak Hour column of the Table 5.5-21, the seven remaining road segments would operate at acceptable LOS C or better during the peak hour. Therefore, implementation of the proposed project would not result in significant adverse impacts to these road segments.

TABLE 5.5-21
ROAD SEGMENT SIGNIFICANT ADVERSE IMPACT SUMMARY – 2030

Road Segment	Section Limits	Change in V/C	Unacc. LOS?[1]	Peak Hour				Sig. Adv. Imp.?[2]
				Highest Volume	Capacity	V/C	LOS	
Portola Parkway	Culver Drive to Yale Avenue	0.011	No	Not Applicable				No
	Yale Avenue to Jeffrey Road	0.012	No	Not Applicable				No
	Jeffrey Road to Bee Canyon Access Road	0.048	Yes	2,054 A.M. – EB	3,200	0.642	B	No
	Bee Canyon Access Road to Sand Canyon Avenue	0.105	Yes	2,205 A.M. – EB	3,200	0.689	B	No
Irvine Boulevard	Culver Drive to Yale Avenue	0.002	No	Not Applicable				No
	Yale Avenue to Jeffrey Road	0.002	No	Not Applicable				No
	Sand Canyon Avenue to State Route 133	0.013	No	Not Applicable				No
Jeffrey Road	Portola Parkway to Irvine Boulevard	0.016	No	Not Applicable				No
	Irvine Boulevard to Bryan Avenue	0.015	Yes	2,598 A.M. – SB	4,800	0.541	A	No
	Bryan Avenue to Trabuco Road	0.015	Yes	3,155 A.M. - SB	4,800	0.657	B	No
	Trabuco Road to Interstate-5	0.013	Yes	Not Applicable				No

TABLE 5.5-21
ROAD SEGMENT SIGNIFICANT ADVERSE IMPACT SUMMARY – 2030

Road Segment	Section Limits	Change in V/C	Unacc. LOS?[1]	Peak Hour				Sig. Adv. Imp.?[2]
				Highest Volume	Capacity	V/C	LOS	
Bee Canyon Access Road	FRB Landfill to Portola Parkway	0.262	No	Not Applicable				No
Sand Canyon Avenue	Portola Parkway to Irvine Boulevard	0.097	Yes	1,771 A.M. – SB	3,200	0.553	A	No
	Irvine Boulevard to Trabuco Road	0.045	Yes	3,427 A.M. – SB	4,800	0.714	C	No
	Trabuco Road to Interstate-5	0.033	Yes	3,710 A.M. – SB	6,400	0.580	A	No

Source: P&D Consultants (2005).
[1] Unacc. LOS: Unacceptable LOS.
[2] Sig. Adv. Imp.: Significant Adverse Impact.

Signalized Intersections

As shown in Table 5.5-22, all study intersections will operate at acceptable LOS D or better except for the intersection of Jeffrey Road at Walnut Avenue during the A.M. peak hour. Jeffrey Road at Walnut Avenue has an ICU of 0.957 and will operate at LOS E during the A.M. peak hour without the proposed project. The detailed LOS calculation worksheets are included in Appendix F.

TABLE 5.5-22
SIGNALIZED INTERSECTION LEVELS OF SERVICE – 2030 WITHOUT THE PROJECT

Index	Intersection	A.M. Peak Hour		Landfill Peak Hour	
		ICU	LOS	ICU	LOS
1	Culver Drive at Portola Parkway	0.581	A	0.438	A
2	Yale Avenue at Portola Parkway	0.814	D	0.432	A
3	Jeffrey Road at Portola Parkway	0.708	C	0.635	B
4	Bee Canyon Access Road at Portola Parkway	0.621	B	0.275	A
5	Sand Canyon Avenue at Portola Parkway	0.627	B	0.453	A
6	Culver Drive at Irvine Boulevard	0.800	C	0.572	A
7	Yale Avenue at Irvine Boulevard	0.879	D	0.606	B
8[1]	Jeffrey Road at Irvine Boulevard	0.779	C	0.703	C
9	Sand Canyon Avenue at Irvine Boulevard	0.881	D	0.773	C
10	SR 133 southbound ramps at Irvine Boulevard	0.846	D	0.377	A
11	SR 133 northbound ramps at Irvine Boulevard	0.831	D	0.359	A
12	Jeffrey Road at Bryan Avenue	0.794	C	0.518	A
13	Jeffrey Road at Trabuco Road	0.790	C	0.560	A
14	Sand Canyon Avenue at Trabuco Road	0.895	D	0.682	B
15	Jeffrey Road at I-5 northbound ramps	0.749	C	0.700	B
16	Jeffrey Road at Walnut Avenue	**0.957**	**E**	0.810	D
17	Sand Canyon Avenue at I-5 northbound ramps	0.801	D	0.735	C
18	Sand Canyon Avenue at I-5 southbound ramps	0.834	D	0.691	B

Source: P&D Consultants (2005). **Bolded** items indicate intersections are operating at below-standard LOS.
[1] The Advanced Transportation Management System (ATMS) strategies are applied to the intersection. Therefore, a 0.05 credit is applied to the ICU during the A.M. peak hour.

As shown in Table 5.5-23, all study intersections will operate at acceptable LOS D or better except for the intersection of Sand Canyon Avenue at Trabuco Road and the intersection of Jeffrey Road at Walnut Avenue during the A.M. peak hour. Sand Canyon Avenue at Trabuco Road has an ICU of 0.932 and will operate at LOS E during the A.M. peak hour in 2030 with the proposed project. Jeffrey Road at Walnut Avenue has an ICU of 0.982 and will operate at LOS E during the A.M. peak hour with the proposed project. The detailed LOS calculation worksheets are included in Appendix F.

TABLE 5.5-23
SIGNALIZED INTERSECTION LEVELS OF SERVICE – 2030 WITH THE PROJECT

Index	Intersection	A.M. Peak Hour		Landfill Peak Hour	
		ICU	LOS	ICU	LOS
1	Culver Drive at Portola Parkway	0.591	A	0.447	A
2	Yale Avenue at Portola Parkway	0.806	D	0.442	A
3	Jeffrey Road at Portola Parkway	0.774	C	0.653	B
4	Bee Canyon Access Road at Portola Parkway	0.732	C	0.415	A
5	Sand Canyon Avenue at Portola Parkway	0.705	C	0.528	A
6	Culver Drive at Irvine Boulevard	0.801	D	0.572	A
7	Yale Avenue at Irvine Boulevard	0.881	D	0.607	B
8[1]	Jeffrey Road at Irvine Boulevard	0.790	C	0.714	C
9	Sand Canyon Avenue at Irvine Boulevard	0.898	D	0.809	D
10	SR 133 southbound ramps at Irvine Boulevard	0.857	D	0.388	A
11	SR 133 northbound ramps at Irvine Boulevard	0.842	D	0.370	A
12	Jeffrey Road at Bryan Avenue	0.805	D	0.528	A
13	Jeffrey Road at Trabuco Road	0.799	C	0.568	A
14	Sand Canyon Avenue at Trabuco Road	**0.932**	**E**	0.718	C
15	Jeffrey Road at I-5 northbound ramps	0.753	C	0.704	C
16	Jeffrey Road at Walnut Avenue	**0.982**	**E**	0.835	D
17	Sand Canyon Avenue at I-5 northbound ramps	0.842	D	0.774	C
18	Sand Canyon Avenue at I-5 southbound ramps	0.856	D	0.736	C

Source: P&D Consultants (2005). **Bolded** items indicate intersections would operate at below-standard LOS.
[1] The Advanced Transportation Management System (ATMS) strategies are applied to the intersection. Therefore, a 0.05 credit is applied to the ICU during the A.M. peak hour.

As shown in Table 5.5-24, implementation of the proposed project would have significant adverse impacts on two study intersections during the A.M. peak hour. The increases in ICU would be greater than 0.02 when rounded to the nearest hundredth and the two intersections would operate at an unacceptable LOS.

5.5.4.3 Traffic Impact Analysis for Post-2030

The circulation network for post-2030 will remain the same as year 2030 because year 2030 is assumed to be the buildout year for the MPAH.

TABLE 5.5-24
SIGNALIZED INTERSECTION SIGNIFICANT ADVERSE IMPACT SUMMARY – 2030

Index	Intersection	A.M. Peak Hour			Landfill Peak Hour		
		Change in ICU	Unacc. LOS?[1]	Sig. Adv. Imp.?[2]	Change in ICU	Unacc. LOS?	Sig. Adv. Imp.?
1	Culver Drive at Portola Parkway	0.010	No	No	0.009	No	No
2	Yale Avenue at Portola Parkway	0.000	No	No	0.010	No	No
3	Jeffrey Road at Portola Parkway	0.066	No	No	0.018	No	No
4	Bee Canyon Access Road at Portola Parkway	0.111	No	No	0.140	No	No
5	Sand Canyon Avenue at Portola Parkway	0.078	No	No	0.075	No	No
6	Culver Drive at Irvine Boulevard	0.001	No	No	0.000	No	No
7	Yale Avenue at Irvine Boulevard	0.002	No	No	0.001	No	No
8	Jeffrey Road at Irvine Boulevard	0.011	No	No	0.011	No	No
9	Sand Canyon Avenue at Irvine Boulevard	0.017	No	No	0.036	No	No
10	SR 133 southbound ramps at Irvine Boulevard	0.011	No	No	0.011	No	No
11	SR 133 northbound ramps at Irvine Boulevard	0.011	No	No	0.011	No	No
12	Jeffrey Road at Bryan Avenue	0.011	No	No	0.010	No	No
13	Jeffrey Road at Trabuco Road	0.009	No	No	0.008	No	No
14	Sand Canyon Avenue at Trabuco Road	**0.037**	**Yes**	**Yes**	0.036	No	No
15	Jeffrey Road at I-5 northbound ramps	0.004	No	No	0.004	No	No
16	Jeffrey Road at Walnut Avenue	**0.025**	**Yes**	**Yes**	0.025	No	No
17	Sand Canyon Avenue at I-5 northbound ramps	0.041	No	No	0.039	No	No
18	Sand Canyon Avenue at I-5 southbound ramps	0.022	No	No	0.045	No	No

Source: P&D Consultants (2005). **Bolded** items indicate the intersection is significantly adversely impacted.
[1] Unacc. LOS: Unacceptable LOS.
[2] Sig. Adv. Imp.: Significant Adverse Impact.

Traffic volumes for post-2030 may either increase or decrease based on the implementation of amended General Plan land uses for the jurisdictions near the FRB Landfill. Traffic volumes will increase when the density of the existing land uses increases. For example, traffic volumes will increase when an amendment from a Low Density Residential Zone to a Medium Density Residential Zone is implemented. Traffic volumes will also increase when the existing land use zones are amended to land uses that typically generate more traffic. For example, traffic volumes will increase when a Residential Zone is amended to a Commercial Zone.

Conversely, traffic volumes will decrease when the density of the existing land uses decreases. For example, traffic volumes will decrease when an amendment from a Medium Density Residential Zone to a Low Density Residential Zone is implemented. Traffic volumes will also decrease when the existing land use zones are amended to land uses that typically generate less traffic. For example, traffic volumes will decrease when a Commercial Zone is amended to a Residential Zone.

The intersections and road segments that may generate a significant adverse traffic impact in post-2030 include road segments and intersections that are forecasted to operate at LOS D, E or F. Road Segments and intersections operating at LOS D, E or F indicate the road segment or intersection is approaching its capacity limits, and therefore, these road segments and intersections shall be included in supplemental traffic impact studies. The amendments to the land uses in the General Plans for the jurisdictions near the FRB Landfill that increase the traffic volumes may cause these road segments and intersections to operate at an unacceptable LOS E or F. Significant adverse traffic impacts shall be identified based on the latest City of Irvine's *Traffic Impact Analysis Guidelines* available at the time of preparation of the supplemental traffic impact studies.

Tables 5.5-25 and 5.5-26 summarize the operating conditions for the road segments and intersections in the study area that will operate at LOS D, E, or F in 2030 with the proposed project, respectively. As shown in Tables 5.5-25 and 5.5-26, ten road segments and eleven intersections will operate at LOS D, E or F in 2030 with the proposed project. Sand Canyon Avenue at Irvine Boulevard and Jeffrey Road at Walnut Avenue will also operate at LOS D during the second landfill peak hour. Therefore, implementation of the proposed project has the potential to significantly impact a total of ten road segments and thirteen intersections.

TABLE 5.5-25
ROAD SEGMENTS OPERATING AT LEVEL OF SERVICE D, E OR F SUMMARY – 2030 WITH THE PROJECT

Road Segment	Section Limits	LOS
Portola Parkway	Jeffrey Road to Bee Canyon Access Road	E
	Bee Canyon Access Road to Sand Canyon Avenue	E
Irvine Boulevard	Yale Avenue to Jeffrey Road	D
	Sand Canyon Avenue to SR 133	D
Jeffrey Road	Irvine Boulevard to Bryan Avenue	F
	Bryan Avenue to Trabuco Road	F
	Trabuco Road to I-5	F
Sand Canyon Avenue	Portola Parkway to Irvine Boulevard	F
	Irvine Boulevard to Trabuco Road	F
	Trabuco Road to I-5	F

Source: P&D Consultants (2005).

TABLE 5.5-26
SIGNALIZED INTERSECTIONS OPERATING AT LEVEL OF SERVICE D, E OR F SUMMARY – 2030 WITH THE PROJECT

Index	Intersection	Peak Hour	LOS
2	Yale Avenue at Portola Parkway	A.M.	D
6	Culver Drive at Irvine Boulevard	A.M.	D
7	Yale Avenue at Irvine Boulevard	A.M.	D
9	Sand Canyon Avenue at Irvine Boulevard	A.M.	D
		Landfill	D
10	SR 133 southbound ramps at Irvine Boulevard	A.M.	D
11	SR 133 northbound ramps at Irvine Boulevard	A.M.	D
12	Jeffrey Road at Bryan Avenue	A.M.	D
14	Sand Canyon Avenue at Trabuco Road	A.M.	E

TABLE 5.5-26
SIGNALIZED INTERSECTIONS OPERATING AT LEVEL OF SERVICE D, E OR F SUMMARY – 2030 WITH THE PROJECT

Index	Intersection	Peak Hour	LOS
16	Jeffrey Road at Walnut Avenue	A.M.	E
		Landfill	D
17	Sand Canyon Avenue at I-5 northbound ramps	A.M.	D
18	Sand Canyon Avenue at I-5 southbound ramps	A.M.	D

Source: P&D Consultants (2005).

5.5.4.4 Other Traffic Issues

Several other traffic issues which were a result of observations made during the course of this study or issues raised by community members or others are discussed in the following sections.

Congestion Management Program (CMP) Traffic Analysis

A CMP Traffic Analysis is required when a proposed project generates more than 2,400 daily trips or more than 1,600 daily trips with direct access to a CMP Highway. The CMP Highways in the vicinity of the FRB Land fill are I-5, I-405, SR 133 and Irvine Boulevard. Therefore, the FRB Landfill does not have direct access to a CMP Highway. The proposed project would result in an additional 162 daily trips in 2010 and 2,300 daily trips in 2030. The daily trips generated in 2010 and 2030 would be less than the minimum 2,400 daily trips required for a CMP Traffic Analysis. Therefore, a CMP Traffic Analysis is not required for the proposed project.

Lake Forest General Plan Sensitivity Analysis

The City of Lake Forest is proposing to rezone approximately 800 acres of vacant land on six separate properties from primarily commercial and industrial land uses to primarily residential and community center land uses. The City of Lake Forest is currently in the process of completing the Draft Environmental Impact Report (DEIR) for the General Plan Amendment and Zone Change called the Opportunities Study.

Preliminary traffic analysis for the Opportunities Study shows that implementation of the proposed residential land uses would generate approximate 72,800 daily trips verses the 152,800 daily trips that would have occurred with the existing commercial and industrial land uses. The proposed project would eliminate approximately 80,000 daily trips at buildout conditions. However, traffic generated for either scenario would not differ greatly during the A.M. peak hour.[4]

Because the Opportunities Study would generate 80,000 fewer daily trips, the daily volumes in the City of Irvine and in the FRB Landfill Implementation project traffic study area would be less. Therefore, the road segments and intersections LOSs would either remain stable or improve. No additional significant adverse traffic impacts are anticipated if the Opportunities Study is approved by the City of Lake Forest.

[4] City of Lake Forest.

FRB Landfill Hours of Operation Sensitivity Analysis

A sensitivity analysis was performed to determine the traffic impacts the implementation of the proposed project would have on the circulation network if the operating hours at the landfill were changed. The landfill currently operates 10 hours a day from 7:00 A.M. to 5:00 P.M. All waste hauling trucks can access the landfill between 7:00 A.M. to 4:00 P.M. However, only transfer trucks are allowed between 4:00 P.M. and 5:00 P.M. This sensitivity analysis evaluated the traffic impacts if the landfill changed its operation hours to 6:00 A.M. to 4:00 P.M. with transfer trucks only allowed between 6:00 A.M. to 7:00 A.M.

If the landfill was to open one hour earlier at 6:00 A.M., it was assumed that the 29 transfer trucks that previously arrived during the peak hour of the A.M. peak period would arrive between 6:00 A.M. to 7:00 A.M., that the 29 transfer trucks that previously arrived during the second landfill peak hour would arrive during the A.M. peak hour and that less than or equal to 29 transfer trucks per hour would arrive after 9:00 A.M. Because the shift in transfer trucks is less than or equal to the maximum 29 transfer trucks per hour, no additional significant adverse traffic impacts would result if IWMD changes the hours of operation.

Bicycle Circulation Impacts

Class II Bikeways are provided on Portola Parkway between Culver Drive and Sand Canyon Avenue, Irvine Boulevard between Culver Drive and SR 133, and Jeffrey Road between Portola Parkway and I-5. The Class II Bikeways provide eight-foot striped bike lanes.

In the future, Class II Bikeways will be constructed on Sand Canyon Avenue between Portola Parkway and I-5. These bikeways will also provide eight-foot bike lanes. Because the existing and future bikeways would be constructed to the City of Irvine and Orange County Standard Plans, the implementation of the proposed project will not result in significant adverse impacts to the bikeways.

5.5.5 MITIGATION MEASURES

Sand Canyon Avenue at its intersection with Trabuco Road and Jeffrey Road at its intersection with Walnut Avenue will experiences a significant adverse impact as a result of project traffic in 2030. The following mitigation measures address these adverse impacts.

T-1 Sand Canyon Avenue at Trabuco Road. Extend the Advanced Transportation Management System (ATMS) strategies to encompass the intersection of Sand Canyon Avenue at Trabuco Road. The ATMS strategies at Sand Canyon Avenue at Trabuco Road will be installed in 2025 but will be discontinued at buildout conditions in 2030 based on information provided by the City of Irvine. The ATMS strategies apply the latest traffic control systems to improve traffic flow through the intersections. These traffic control systems include the use of interconnect, closed circuit television and communication system, upgraded traffic signal cabinets, controllers and detection systems, and a changeable message board. The ATMS strategies will only be operational during the A.M. and P.M. peak periods, when the intersection experiences the most traffic.

T-2 Jeffrey Road at Walnut Avenue. Provide the westbound right-turn lane with a protected right-turn phase that is overlapped with the southbound left-turn phase in 2030.

As identified in Section 5.5.4.3, the proposed project has the potential to impact ten road segments and thirteen intersections in post-2030. Although mitigation measures for post-2030 are not available at this time, as the year 2030 approaches, the supplemental traffic impact studies will identify the significant adverse traffic impacts and will provide recommended mitigation measures to reduce the significant adverse traffic impacts to less than significant levels.

5.5.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The mitigation measures described above for the intersections of Sand Canyon at Trabuco Road and Jeffrey Road at Walnut Avenue will mitigate the significant adverse traffic related impacts to below a level of significance.

5.6 AIR QUALITY

5.6.1 EXISTING CONDITIONS

5.6.1.1 Climate and Meteorology

The FRB Landfill is located in the western foothills of the northern Santa Ana Mountains. These mountains form the northernmost extension of the Peninsular Ranges Geomorphic province, a region characterized by northwest-trending mountain ranges bounded by right-lateral strike-slip faults. The Santa Ana Mountains are bounded to the east by the Elsinore fault and to the west by the Coastal Plain of the Los Angeles Basin. The Santa Ana River cuts a westward draining canyon separating the Santa Ana Mountains to the south from the Puente Hills to the north. The project site is located in Orange County, in the southwest corner of the South Coast Air Basin (SCAB). The SCAB is bounded by the Pacific Ocean to the west with connecting broad valleys and low hills including mountain ranges that are located in close proximity to each other along the eastern boundaries. The proximity of these mountain ranges forms a crescent-shaped wall-like barrier around the SCAB. The SCAB lies in the semi-permanent high pressure zone of the eastern Pacific resulting in a semi-arid, Mediterranean climate that is mild and tempered by cool ocean breezes. This climatological pattern is rarely interrupted. However, periods of very hot weather, winter storms, or Santa Ana wind conditions do occur. The crescent-shaped barrier along with the mild climate is not conducive to disperse air pollutants from large, urban areas within the SCAB such as Orange County and Los Angeles counties, thereby creating a severe air pollution problem within the SCAB region.

Annual average temperatures vary little throughout the SCAB. Moreover, as a result of oceanic effects, coastal locations have less variability in annual maximum and minimum temperatures than inland areas. Temperature and precipitation data for the period from 1927 to 2003 from the nearest station, Tustin Irvine Ranch, were obtained from the Western Regional Climate Center and are summarized in Table 5.6-1. The average maximum monthly temperatures ranged from 67°F in January to 85.5°F in August, with an annual average maximum of 75.6°F. The monthly average minimum ranged from 40.5°F in January to 59.5°F in August with an average annual minimum of 49.6°F.

During the summer, rainfall is minimal and is generally limited to scattered thundershowers in coastal regions and heavier storms in the inland portion of the SCAB and along the coastal side of the mountains. The majority of the area’s precipitation occurs from December through March. Average monthly rainfall varied from 0.01 inches in July to 2.73 inches in February, with an average total annual rainfall of 12.82 inches.

Although the SCAB has a semiarid climate, air near the surface is generally moist because of the presence of a shallow marine layer. With very low average wind speeds, there is a limited capacity to disperse air contaminants horizontally. The dominant daily wind pattern is an onshore 8 to 12 miles per hour (mph) daytime breeze and an offshore 3 to 5 mph nighttime breeze. The typical wind flow pattern fluctuates only with occasional winter storms or strong northeasterly (Santa Ana) winds from the mountains and deserts northeast of the SCAB.

Summer wind flow patterns represent worst-case conditions, as this is the period of higher temperatures and more sunlight, which results in ozone (O_3) formation.

TABLE 5.6-1
AVERAGE TEMPERATURES AND PRECIPITATION AT ORANGE COUNTY TUSTIN IRVINE RANCH (1927-2003)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Average Max Temperature (F)	67.0	68.1	69.4	72.9	75.4	79.0	84.0	85.5	84.7	79.7	73.9	68.2	75.6
Average Min Temperature (F)	40.5	42.4	44.3	47.7	52.2	55.8	59.2	59.5	57.0	51.9	44.4	40.7	49.6
Precipitation (in)	2.53	2.73	2.21	1.01	0.26	0.07	0.01	0.08	0.27	0.36	1.32	1.99	12.82

Source: Western Regional Climate Center (http://www.wrcc.dri.edu/)

During spring and early summer, pollution produced during any one day is typically blown out of the SCAB through mountain passes or lifted by warm vertical currents adjacent to mountain slopes. Air contaminants can be transported 60 miles or more from the SCAB by ocean air during the afternoons. From early fall to winter, the transport is less pronounced because of slower average wind speed and the appearance of drainage winds earlier in the day. During stagnant wind conditions, offshore drainage winds may begin by late afternoon. Pollutants remaining in the SCAB are trapped and begin to accumulate during the night and the following morning. A low morning wind speed in pollutant source areas is an important indicator of air stagnation and the build-up potential for primary air contaminants.

Atmospheric temperature normally decreases with altitude, and a reversal of this atmospheric state, where temperature increases with altitude, is called an inversion. The height from the earth to the inversion base is known as the mixing height. Persistent low inversions and cool coastal air tend to create morning fog and low stratus clouds. Cloudy days are less likely in the eastern portions of the SCAB, and are about 25% more likely along the coast. The vertical dispersion of air pollutants in the SCAB is limited by temperature inversions in the atmosphere close to the earth's surface. Inversions are generally lower in the nighttime, when the ground is cool, than during daylight hours when the sun warms the ground and, in turn, the surface air layer. As this heating process continues, the temperature of the surface air layer approaches the temperature of the inversion base, causing heating along its lower edge. If enough warming takes place, the inversion layer becomes weak and opens up to allow the surface air layers to mix upward. This can be seen in the middle to late afternoon on a hot summer day when the smog appears to clear up suddenly.

Winter inversions typically break earlier in the day, preventing excessive contaminant build-up. The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. Ambient air pollutant concentrations are lowest on days of no inversion or higher wind speeds. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into western Riverside and

San Bernardino counties. In the winter, the greatest pollution problem is accumulation of carbon monoxide (CO) and oxides of nitrogen (NOx) due to low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and oxides of nitrogen to form photochemical smog.

5.6.1.2 Air Quality Standards and Attainment Status of the Project Area

Federal Air Quality Standards

The Clean Air Act of 1970 (CAA) establishes the principal framework for national, state, and local efforts to protect air quality in the United States. Pursuant to the CAA, the U.S. Environmental Protection Agency (EPA) established national ambient air quality standards (NAAQS). The NAAQS have been established for specific air pollutants, termed "criteria" pollutants, including O_3, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and airborne lead (Pb). For purposes of this AQA, criteria pollutants are defined as those pollutants for which the federal and/or state governments have established ambient air quality standards, or criteria, for outdoor concentrations in order to protect public health.

Nonattainment areas are subjected to additional restrictions with regard to emissions. The CAA requires that each short-term NAAQS, established by the EPA, be exceeded no more than once each year. Data collected at permanent monitoring stations are used by the EPA to classify regions as "attainment" or "nonattainment," depending on whether the regions meet the requirements stated in the primary NAAQS. An area where one or more NAAQS is exceeded more than three times in three years is designated a nonattainment for that pollutant or pollutants, and is subject to planning requirements and more stringent pollution control requirements than in an attainment area.

The EPA has designated the Southern California Association of Governments (SCAG) as the Metropolitan Planning Organization (MPO) responsible for ensuring compliance with the requirements of the CAA for the SCAB.

State Air Quality Standards

The state of California began to set California ambient air quality standards (CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. The CAAQS are generally more stringent than the NAAQS. In addition to the six criteria pollutants covered by the NAAQS, there are CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles.

Attainment Planning

Originally, there were no attainment deadlines for the CAAQS. However, the California Clean Air Act (CCAA) of 1988 provided a time frame and a planning structure to promote their attainment. The CCAA required nonattainment areas in the state to prepare attainment plans and proposed to classify each such area on the basis of the submitted plan, as follows: moderate, if CAAQS attainment could not occur before December 31, 1994; serious, if CAAQS attainment could not occur before December 31, 1997; and severe, if CAAQS attainment could not be conclusively demonstrated at all.

The attainment plans are required to achieve a minimum five percent annual reduction in the emissions of nonattainment pollutants, unless all feasible measures have been implemented. The Basin is currently classified as a nonattainment area for three criteria pollutants: ozone (O_3), CO, and coarse particulates. The project site is located in the County, which is part of the SCAB, and is under the jurisdiction of the SCAQMD.

Both California and federal air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and damage to materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, 1 month or one year). Some pollutants have standards for more than one averaging time in order to protect against both short-term and longer-term adverse effects. Table 5.6-2 presents the federal and California ambient standards for regulated criteria pollutants, and Table 5.6-3 provides information on typical emission sources and the primary health effects that are attributed to these pollutants. The California standards are generally set at concentrations lower than the federal standards and in some cases have shorter averaging periods.

TABLE 5.6-2
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California	Federal
Ozone	1 hour 8 hours	0.09 ppm (180μg/m^3) 0.07 ppm (137μg/m^3)	0.12 ppm (235μg/m^3) 0.08 ppm (157μg/m^3) [a]
Carbon Monoxide	1 hour 8 hours	20 ppm (23000μg/m^3) 9.0 ppm (10000μg/m^3)	35 ppm (40000μg/m^3) 9.0 ppm (10000μg/m^3)
Nitrogen Dioxide	1 hour Annual Average	0.25 ppm (470μg/m^3) ---	--- 0.053 ppm (100μg/m^3)
Sulfur Dioxide	1 hour 3 hours 24 hours Annual Average	0.25 ppm (655μg/m^3) --- 0.04 ppm (105μg/m^3) ---	--- 0.5 ppm (1300 μg/m^3) [b] 0.14 ppm (365 μg/m^3) 0.03 ppm (80 μg/m^3)
Suspended Particulate Matter (10 Micron)	24 hours Annual Arithmetic Mean	50 μg/m^3 20 μg/m^3	150 μg/m^3 50 μg/m^3
Suspended Particulate Matter (2.5 Micron)	24 hours Annual Arithmetic Mean	--- 12 μg/m^3	65 μg/m^3 [d] 15 μg/m^3 [c]
Sulfates	24 hours	25 μg/m^3	---
Lead	30 Day Average Quarterly	1.5 μg/m^3	--- 1.5 μg/m^3
Hydrogen Sulfide	1 hour	0.03 ppm (42 μg/m^3)	---
Vinyl Chloride	24 hours	0.01 ppm (26 μg/m^3)	---
Visibility Reducing Particles	8 hours (10 am to 6 pm PST)	[e]	---

Source: CARB Air Quality Standards website (http://www.arb.ca.gov/aqs/aqs.htm)
[a] 3-year average of annual 4th-highest daily maximum

[b] This is a national secondary standard, which is designed to protect public welfare
[c] 3-year average
[d] 3-year average of 98th percentiles
[e] In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent

TABLE 5.6-3
PRIMARY SOURCES AND EFFECTS OF CRITERIA POLLUTANTS

Pollutants	Source	Primary Health Effects
Lead (Pb)	Contaminated soil	Impairment of blood function and nerve construction Behavioral and hearing problems in children
Sulfur Dioxide (SO_2)	Combustion of sulfur-containing fossil fuels Smelting of sulfur-bearing metal industrial ores processes	Plant injury Reduced visibility Deterioration of metals, textiles, leather, finishes, coatings, etc. Irritation of eyes Reduced lung function Aggravation of respiratory diseases (asthma, emphysema)
Carbon Monoxide (CO)	Incomplete combustion of fuels and other carbon-containing substances, such as motor vehicle exhaust Natural events, such as decomposition of organic matter	Plant injury Reduced visibility Deterioration of metals, textiles, leather, finishes, coatings, etc. Irritation of eyes Reduced lung function Aggravation of respiratory diseases (asthma, emphysema)
Nitrogen Dioxide (NO_2)	Motor vehicle exhaust High-temperature stationary combustion Atmospheric reactions	Aggravation of respiratory illness Reduced visibility Reduced plant growth Formation of acid rain
Ozone (O_3)	Atmospheric reaction of organic gases with nitrogen oxides in sunlight	Plant leaf injury Irritation of eyes Aggravation of respiratory and cardiovascular diseases Impairment of cardiopulmonary function
Fine Particulate Matter (PM2.5)	Stationary combustion of solid fuels Construction activities Industrial processes Atmospheric chemical reactions	Soiling Reduced visibility Aggravation of the effects of gaseous pollutants Increased cough and chest discomfort Reduced lung function Aggravation of respiratory and cardio-respiratory diseases

In July 1997, the EPA issued a new NAAQS for O_3, which became effective on September 16, 1997. For O_3, the previous one-hour standard of 0.12 parts per million (ppm) was replaced by an eight-hour average standard at a level of 0.08 ppm. Compliance with this standard was to be based on the three-year average of the annual fourth-highest daily maximum eight-hour average concentration measured at each monitor within an area.

The federal standards for particulates have been revised in several respects during recent years. First, compliance with the current 24-hour PM_{10} standard would now be based on the 99th percentile of 24-hour concentrations at each monitor within an area. Two new $PM_{2.5}$ standards were added: a standard of 15 micrograms per cubic meter (µg/m^3), based on the three-year average of annual arithmetic means from single or multiple monitors (as available); and a standard of 65 µg/m^3, based on the three-year average of the 98th percentile of 24-hour average concentrations at each monitor within an area. In addition, the California Air Resources Board (CARB) has amended the particulate matter air quality standards by lowering the annual average PM10 level to 20 µg/m^3 (currently 30 µg/m^3), and establishing an annual average $PM_{2.5}$ standard of 12 µg/m^3.

Table 5.6-4 presents information on the current attainment status of the SCAB with respect to the California and federal ambient air quality standards.

TABLE 5.6-4
CRITERIA POLLUTANTS ATTAINMENT STATUS IN THE SOUTH COAST AIR BASIN

	State	Federal
O_3 (one-hour)	Nonattainment	Extreme Nonattainment
O_3 (eight-hour)	Not Applicable	Nonattainment (Preliminary)
PM_{10}	Nonattainment	Serious Nonattainment
$PM_{2.5}$	Not Applicable	Nonattainment (Preliminary)
CO	Nonattainment (Los Angeles County only)	Nonattainment
NO_2	Attainment	Attainment/Maintenance
Lead	Attainment	Attainment
All others	Attainment/Unclassified	Attainment/Unclassified

Source: CARB 2003.

<u>Local Air Quality-Recent Ambient Air Pollutant Concentrations</u>

All ambient air quality data presented in this section were derived from the website maintained by the CARB and EPA.

Ambient air concentrations of O_3, NO_2, SO_2, CO, $PM_{10,}$ and airborne Pb are measured and recorded at monitoring stations throughout the County. The nearest monitoring station to the FRB Landfill is located in Mission Viejo, 12 miles to the south. The Mission Viejo monitoring station also collects data on O_3, CO, PM_{10}, and $PM_{2.5}$. The next closest station that monitors NO_2 is the Anaheim station located 17 miles northeast of the project site. SO_2 is measured at the Costa Mesa station located about 17 miles to the southwest of the landfill.

<u>Ozone.</u> O_3 is an end product of complex reactions between volatile organic compounds (VOCs) and NO_x in the presence of intense ultraviolet radiation. VOC and NO_x emissions from vehicles and stationary sources, combined with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight, result in high O_3 concentrations. For purposes of state and federal air quality planning, the entire SCAB is in non-attainment for O_3.

Table 5.6-5 shows the background O_3 levels recorded at the Mission Viejo station for the three most recent monitoring years. As seen in the tables, the one-hour O_3 NAAQS of 0.12 ppm had been exceeded four times in 2003 with a maximum concentration of 0.153 ppm. The more stringent state O_3 CAAQS of 0.09 ppm was exceeded each year (16 times in 2003). The federal 8-hour O_3 average NAAQS requires that the three-year average of the fourth-highest daily maximum value be less than 0.08 ppm. Therefore, the number of days that the maximum concentration exceeds the standard concentration is not the number of violations of the standard

for the year. The highest three-year (2001-2003) average of the fourth-highest 8-hour concentrations from the Mission Viejo station is 0.105 ppm in 2003.

TABLE 5.6-5
OZONE LEVELS AT MISSION VIEJO (PPM)

Mission Viejo, Orange County	2002	2003	2004
Maximum 1-Hour Average	0.136	0.153	0.116
Number of Days Exceeding California 1-Hour Standard (0.09 ppm)	9	16	11
Number of Days Exceeding Federal 1-Hour Standard (0.12 ppm)	2	4	0
Maximum 8-Hour Average	0.095	0.105	0.089
Number of Days Exceeding Federal 8-Hour Standard (0.08 ppm)	2	8	2

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
EPA AIRS website (www.epa.gov/air/data/index.html)

Nitrogen Dioxide. NO_2 is formed primarily from reactions in the atmosphere between NO (nitric oxide) and oxygen or O_3. NO is formed during high-temperature combustion processes, when the nitrogen and oxygen in the combustion air combine. Although NO is much less harmful than NO_2, it can be converted to NO_2 in the atmosphere within a matter of hours, or even minutes, under certain conditions. The control of NO_2 is also important because of its role in the formation of O_3. Historical data indicate that for purposes of state and federal air quality planning, the SCAB is in attainment for NO_2. Table 5.6-6 shows the maximum one-hour NO_2 levels recently recorded at the Anaheim station. During the last three years, there were no violations of the CAAQS one-hour standard. The highest one- hour concentration recorded was 0.13 ppm in 2003. The table also shows that maximum annual average was 0.024 ppm in 2002 and 2003, which is well below the NAAQS of 0.053 ppm.

TABLE 5.6-6
NITROGEN DIOXIDE LEVELS AT ANAHEIM (PPM)

Anaheim, Orange County	2002	2003	2004
Maximum 1 Hour Average	0.10	0.13	0.12
Maximum Annual Average	0.024	0.024	0.020
Days Over State Standard (0.25 ppm, 1-hour)	0	0	0

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
EPA AIRS website (www.epa.gov/air/data/index.html)

Carbon Monoxide. CO is a product of incomplete fuel combustion, and is emitted principally from automobiles and other mobile sources of pollution, although it is also a product of combustion from stationary sources (both industrial and residential) burning fossil fuels. Peak CO levels occur typically during winter months due to a combination of higher emission rates and stagnant weather conditions. The County is designated as being in attainment for CO.

Table 5.6-7 shows the available data on maximum 1-hour and 8-hour average CO levels recorded at the Mission Viejo station from 2002 to 2004. The data indicate maximum 1-hour average CO levels comply with the federal and CAAQS (30.0 ppm and 20.0 ppm, respectively). The maximum 1-hour concentration was 3 ppm at the Mission Viejo station in 2002 and 2003. The data in the table also show that maximum 8-hour average CO levels comply with the federal and CAAQS of 9.0 ppm. During the last three years, the maximum 8-hour concentration was 3.6 ppm in 2002.

TABLE 5.6-7
CARBON MONOXIDE LEVELS AT MISSION VIEJO (PPM)

Mission Viejo, Orange County	2002	2003	2004
Maximum 1 Hour Average	3	3	2
Maximum 8 Hour Average	3.6	1.8	1.6
Days Over the 8-Hour California Standard (9 ppm)	0	0	0
Days Over the 8-Hour Federal Standard (9 ppm)	0	0	0

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
EPA AIRS website (www.epa.gov/air/data/index.html)

Sulfur Dioxide. SO_2 is produced by the combustion of any sulfur-containing fuel. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains nearly negligible sulfur, while fuel oils may contain much larger amounts. Because of the complexity of the chemical reactions that convert SO_2 to other compounds (such as sulfates), peak concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. The SCAB is considered to be in attainment for SO_2 for purposes of state and federal air quality planning.

Background SO_2 data are provided in Table 5.6-8 for the Costa Mesa station, which is the closest monitoring station that collects SO_2 data. The maximum 1-hour average SO_2 levels presented in Table 3-8 show that the CAAQS of 0.25 ppm has not been exceeded in the past three years, with a maximum 1-hour level of 0.031 ppm in 2004. The 3-hour federal standard of 0.5 ppm has not been exceeded, with a maximum concentration of 0.020 ppm in 2002 and 2004. The SO_2 data in Table 3-8 show that neither the 24-hour average CAAQS of 0.04 ppm nor the NAAQS standard of 0.14 ppm has been exceeded in the past five years. The highest 24-hour average was 0.011 ppm in 2003. The annual SO_2 data are also presented in the tables and the annual arithmetic mean concentrations are well below the federal ambient air quality standard of 0.03 ppm with a maximum level of 0.002 ppm for all three years.

Particulate Matter. Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources (usually carbon particles); and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides (SO_x), and nitrogen oxides aerosols formed in the air from emitted hydrocarbons. In 1984, the CARB adopted standards for PM_{10}, and phased out the total suspended particulate (TSP) standards that had previously been in effect. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of respirable particulates related to human health. In 1987, EPA also replaced national TSP standards with PM_{10} standards. For air quality planning purposes, the SCAB is designated as being in nonattainment.

TABLE 5.6-8
SULFUR DIOXIDE LEVELS AT COSTA MESA (PPM)

2850 Mesa Verde Dr East, Costa Mesa, Orange County	2002	2003	2004
Highest 1-hour average	0.027	0.021	0.031
Highest 3-hour average	0.020	0.017	0.020
Highest 24-hour average	0.009	0.011	0.008
Annual Average	0.002	0.002	0.002
Days Over 1-hour State Standard (0.25 ppm)	0	0	0
Days Over 24-hour State Standard (0.04 ppm)	0	0	0
Days Over 3-hour Federal Standard (0.5 ppm)	0	0	0
Days Over 24-hour Federal Standard (0.14 ppm)	0	0	0
Days Over the Annual Federal Standard (0.03 ppm)	0	0	0

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.6-9 shows the maximum PM_{10} levels recorded at the Mission Viejo monitoring station from 2002 through 2004 as well as the arithmetic annual averages for the same period. (The arithmetic annual average is simply the arithmetic mean of all observations.) At the Mission Viejo station, the maximum 24-hour PM_{10} levels exceed the CAAQS state standard of 50 $\mu g/m^3$ five times in 2002 with a maximum 24-hour concentration of 80.0 $\mu g/m^3$. The maximum annual arithmetic mean concentration recorded at Mission Viejo was 31.3 $\mu g/m^3$ in 2002. Based on the most recent data, levels of particulates have been steadily improving each year, with the most recent data indicating no exceedances of either the state or federal standards.

TABLE 5.6-9
PARTICULATE MATTER (PM_{10}) LEVELS AT MISSION VIEJO ($\mu g/m^3$)

Mission Viejo, Orange County	2002	2003	2004
Maximum 24-hour average	80.0	64	47
Annual Arithmetic Mean	31.3	26.7	23.7
Estimated Number of Days Exceeding Federal Standard	0	0	0
Estimated Number of Days Exceeding California Standard	5	2	0

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
EPA AIRS website (www.epa.gov/air/data/index.html)

Fine Particulates. The $PM_{2.5}$ data in Table 5.6-10 show that the federal 24-hour average NAAQS of 65 $\mu g/m^3$ has not been exceeded in the past three years. The maximum 24-hour $PM_{2.5}$ background concentration of 58.5 $\mu g/m^3$ was measured at the Mission Viejo monitoring station in 2002. The annual $PM_{2.5}$ data are also presented in the tables. Data of the annual arithmetic mean indicate that it has exceeded the federal standard of 15 $\mu g/m^3$ in 2002 and state standards of 12 $\mu g/m^3$ each of those years with a maximum concentration of 15.5 $\mu g/m^3$ in 2002. SCAB is designated as being in nonattainment for $PM_{2.5}$.

TABLE 5.6-10
PARTICULATE MATTER ($PM_{2.5}$) LEVELS AT MISSION VIEJO (μg/m^3)

Mission Viejo, Orange County	2002	2003	2004
Daily Maximum	58.5	50.6	49.4
Annual Arithmetic Mean	15.5	13.1	12.1
Estimated Number of Days Exceeding Standard	0	0	0

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Airborne Lead. Pb pollution was predominantly emitted from the combustion of fuels. However, legislation in the early 1970s required gradual reduction of the lead content of gasoline. Coupled with the introduction of unleaded gasoline in 1975, Pb levels have been dramatically reduced and ambient air emission violations have essentially been eliminated. For air quality planning purposes, SCAB is in attainment for Pb.

There are no data for Pb levels in Orange County. However, historical data for surrounding counties indicate that Pb levels for Los Angeles, San Bernardino, and Riverside Counties have not exceeded either state or federal standards of 1.5 μg/m^3 (NAAQS references a quarterly average, while CAAQS references a 30-day average). The maximum quarterly average of all three counties in the past three years was 0.09 μg/m^3 in 2003 for Los Angeles County.

Particulate Sulfates. Particulate sulfates are the product of further oxidation of SO_2. Sulfate compounds consist of primary and secondary particles. Primary sulfate particles are directly emitted from open pit mines, dry lakebeds, and desert soils. Fuel combustion is another source of sulfates, both primary and secondary. Secondary sulfate particles are produced when SO_X emissions are transformed into particles through physical and chemical processes in the atmosphere. Particles can be transported long distances. The SCAB is in attainment with the state standard for sulfates, and there is no federal standard.

Other Criteria Pollutants. Along with sulfates, California has promulgated ambient standards for hydrogen sulfide and visibility-reducing particles, in addition to the Federal criteria pollutants. The project area is designated as being in attainment with the state standards for both pollutants.

5.6.1.3 Regional Air Quality Planning Framework

The 1976 Lewis Air Quality Management Act established the SCAQMD and other air districts throughout the state. The Federal Clean Air Act Amendments of 1977 required that each state adopt a State Implementation Plan (SIP) outlining pollution control measures to attain the Ambient Air Quality Standards (AAQS) in nonattainment areas of the state.

The CARB coordinates and oversees both State and federal air pollution control programs in California. CARB oversees activities of local air quality management agencies and is responsible for incorporating Air Quality Management Plans for local air basins into a SIP for EPA approval. CARB maintains air quality monitoring stations throughout the State in conjunction with local air districts. Data collected at these stations are used by CARB to classify air basins as “attainment” or “nonattainment” with respect to each pollutant and to monitor progress in attaining the AAQS. CARB has divided the state into 15 air basins. Significant authority for air quality control within these air basins has been given to local air districts that regulate stationary source emissions and develop local nonattainment plans.

The SCAQMD and SCAG are responsible for formulating and implementing the Air Quality Management Plan (AQMP) for the SCAB. Regional AQMPs were adopted for the SCAB for 1979, 1982, 1989, 1991, 1994, 1997, and 2003. Compliance with the provisions of the federal CAA and CCAA is the primary focus of the AQMP.

The 1997 AQMP was prepared pursuant to federal and state clean air legislation and addresses 1990 CAA requirements with respect to the particulate matter AAQS. Under the CAA, the AQMP must demonstrate attainment of PM_{10} AAQS by 2006 for both 24-hour and annual average AAQS. The 1997 AQMP responds to this requirement, relying mostly on a continuation of the control measures outlined in the 1994 AQMP. The 1997 AQMP also updates the demonstration of attainment of the federal O_3 and CO AAQS, and includes a maintenance plan for NO_2, as the SCAB now qualifies for attainment of the federal NO_2 AAQS.

According to the 1997 AQMP, attainment of all federal AAQS was to occur no later than the year 2000 for CO, the year 2006 for PM_{10}, and the year 2010 for O_3. State AAQS were proposed to be attained no later than the year 2000 for CO. State AAQS for O_3 and PM_{10} would not be required to be achieved until after the year 2010.

The 1997 AQMP carried forward the approach and key elements in the 1994 AQMP by focusing on market-based strategies and incentives versus command and control regulations. New elements to the 1997 Plan included: 1) improved emission inventory and current air quality information; 2) refined control strategy, which allows for alternative approaches; 3) elimination of future indirect source measures; 4) amendments to the federal post-1996 Rate of Progress Plan and Federal Attainment Plans for O_3 and CO; 5) a maintenance plan for NO_X; and 6) an attainment demonstration and SIP revision for PM_{10}.

Implementation of the AQMP is based on a series of control measures that vary by source type, as well as by the pollutant targeted. Similar to the 1994 AQMP, the Plan proposed two tiers of control measures, based on the availability and readiness of specific emission control technologies. Short- and immediate-term measures rely on known technologies, and were expected to be implemented between 1997 and 2005. Long-term measures relied on the advancement of technologies and control methods that could be reasonably expected to occur between 2000 and 2010.

Control measures focus on adoption of new regulations or enhancement of existing regulations for stationary sources, implementation/facilitation of advanced transportation technologies (i.e., telecommunication, zero emission and alternative fuel vehicles and infrastructure, and both capital and noncapital based transportation improvements). Capital based improvements consist of high occupancy vehicle (HOV) lanes, transit improvements, traffic flow improvements, park and ride and intermodal facilities, and urban freeway, bicycle, and pedestrian facilities. Noncapital-based improvements consist of rideshare matching and CMP based transportation demand management activities.

The SCAQMD Governing Board approved the 1997 AQMP on November 15, 1996. After approval, the AQMP was submitted to the CARB for its review and approval. CARB approved the O_3 and PM_{10} parts of the 1997 AQMP on January 23, 1997, and submitted the AQMP to the EPA as proposed revisions to the SIP. The EPA rejected the District's revision of its 1997 AQMP in January 1999. The rejection, however, covers only the provisions of the AQMP designed to attain the federal O_3 AAQS. Separate parts of the 1997 AQMP relating to CO and NO_2 have previously been approved, and the EPA has yet to act on that portion of the 1997 AQMP related to PM_{10}. As a result of the rejection, SCAQMD prepared a draft "Proposed 1999 Amendment to the 1997 O_3 SIP Revision for the SCAB" on October 7, 1999 for public review and comment. The 1999 Amendment proposed to revise the O_3 part of the 1997 AQMP that was submitted to the EPA as a revision to the SCAB portion of the 1994 California O_3 SIP. The SCAQMD Governing Board adopted the "1999 Amendment to the 1997 O_3 SIP Revision for the SCAB" on December 10, 1999. The EPA approved the 1999 Amendment for O_3 in 2001, and currently there is no approved SIP for CO and PM_{10}. In addition, the SCAQMD governing board settled with three environmental organizations on its litigation of the 1994 O_3 SIP.

The SCAQMD adopted a comprehensive plan update, the 2003 AQMP for the SCAB, in August 2003. The 2003 AQMP seeks to demonstrate attainment with the state and federal AAQS and incorporates a revised emissions inventory, the latest modeling techniques, and updated control measures remaining from the 1997/1999 SIP and new control measures. The CARB approved the 2003 AQMP, with minor modifications. The CARB forwarded the modified 2003 AQMP to the EPA for approval in October 2003.

5.6.2 THRESHOLDS OF SIGNIFICANCE

Per the California Environmental Quality Air (CEQA) Guidelines, a project would normally be considered to have a significant effect on air quality if the project would:

- Violate any AAQS, contribute substantially to an existing or projected air quality violation.
- Expose sensitive receptors to substantial pollutant concentrations or odors.
- Conflict with the adopted environmental plans and goals of the community in which it is located.

Impacts associated with a given project may result from short-term activities associated with the construction of new facilities within the site boundary and/or long-term impacts associated with ongoing operations on the site. An air quality impact analysis is generally structured to evaluate activities that will cause quantifiable off-site levels of air pollutants that can be compared with regulatory criteria. To assist in determining the potential significance of air quality impacts from projects undergoing CEQA review, SCAQMD has published *de minimis* emission levels and health risk thresholds that are considered to be the levels below which an air quality impact is not significant. The SCAQMD has established these significance criteria in its *CEQA Air Quality Handbook* (SCAQMD, April 1993), which are presented in Table 5.6-11. Revisions to parts of the Handbook have been posted on SCAQMD's website, and these changes are reflected in Table 5.6-11 as well.

TABLE 5.6-11
SCAQMD AIR QUALITY SIGNIFICANCE THRESHOLDS

Mass Daily Thresholds		
Pollutant	**Construction**	**Operation**
NO_x	100 pounds per day (lbs/day)	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
SO_x	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Pb	3 lbs/day	3 lbs/day
TACs and Odor Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million HI ≥ 1.0 (project increment) HI ≥ 3.0 (facility-wide)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
Ambient Air Quality for Criteria Pollutants[a]		
NO_2 1-hour average annual average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.25 ppm (state) 0.053 ppm (federal)	
PM_{10} 24-hour average annual geometric average annual arithmetic mean	 10.4 μg/m^3 (recommended for construction) [b] 2.5 μg/m^3 (operation) 1.0 μg/m^3 20 μg/m^3	
Sulfate 24-hour average	 1 μg/m^3	
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) 9.0 ppm (state/federal)	

[a] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
[b] Ambient air quality threshold based on SCAQMD Rule 403.

lbs/day = pounds per day
ppm = parts per million
μg/m^3 = microgram per cubic meter
≥ greater than or equal to

5.6.3 METHODOLOGY

A number of air quality modeling tools are available to assess air quality impacts of projects. In addition, certain air districts, such as the SCAQMD, have created guidelines and requirements to conduct air quality analyses. SCAQMD's current guidelines, the *CEQA Air Quality Handbook*, and the more recent updates posted on the District's website form the basis for the assessment methodologies used to evaluate the FRB Landfill expansion's potential impacts to air quality. As stated in Section 5.6.2, the significance criteria established in the *SCAQMD Handbook* were also used as thresholds for evaluating project impacts.

The assessment of construction impacts focuses on the activities that will prepare portions of the FRB Landfill property for future waste disposal, while operational impacts are considered to be associated with continuing waste transport and handling activities. For purposes of this analysis, the impacts due to the construction and operational aspects of the proposed project are described and quantified separately. For an operational landfill, such as the FRB Landfill, construction activities will overlap active operational activities.

5.6.3.1 Methodology Related to Analyzing Construction Impacts

Construction impacts to air quality were evaluated using the calculation of worst-case daily emissions. These calculations were then compared with the SCAQMD significance criteria pollutant thresholds established for construction activities to determine if impacts to air quality will be significant and adverse. Based on data provided by the project engineers, the maximum daily quantity of earth that may be moved in support of landslide remediation and new cell construction combined will not exceed 40,000 cy. However, the average volume of earth moving over an extended period will be about half this level, or about 20,000 cy per day. Accordingly, the estimates developed for the maximum daily and annual emissions are based on these assumptions. Specific activities that have been included in the estimation of construction emissions include:

- Exhaust from diesel equipment involved in earth-moving work;
- Fugitive dust generated by the equipment's activities within the site boundaries, including dirt pushing or bulldozing, grading, travel on unpaved surfaces and truck loading/unloading operations;
- Exhaust and fugitive dust from heavy trucks delivering materials to the site for environmental controls;
- Exhaust and fugitive dust from employee vehicle trips to and from the site.

Table 5.6-12 shows the assumptions and emissions estimation techniques used in developing emissions information for each source category of the construction effort.

5.6.3.2 Methodology Related to Analyzing Operations Impacts

Operations impacts to air quality were evaluated by determining the quantities of criteria pollutants released by the following source categories and then comparing the calculated quantities to the SCAQMD significance criteria pollutant thresholds to determine if impacts to air quality will be significant and adverse:

- Exhaust emissions and fugitive dust generation from waste transport in diesel trucks traveling to and from the site on (paved) offsite roads and (unpaved) on-site roads.

TABLE 5.6-12
CONSTRUCTION PHASE EMISSIONS SOURCES AND ESTIMATION METHODS

Source Type	Specific Source(s)	Pollutants	Emission Factors	Comments/Assumptions
Earth-moving equipment on-site	Equipment exhaust	NO_x, CO, VOC, SO_2, PM_{10}	"Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition", EPA 2004.	• Equipment fleet specifications from project engineers • Typical equipment horsepower ratings from Caterpillar and other vendors • Equipment load factors based SCAQMD CEQA Handbook Table A9-8-D • 20,000 cy of earth moved per day on average; 40,000 cy for maximum day • Work conducted 10 hours per day, 307 days per year • 50% dust reduction credit for site watering
	Fugitive dust from earth disturbance	PM_{10}	EPA AP-42 emission factor compilation and tables from SCAQMD CEQA Handbook	
Material delivery trucks	Truck Exhaust	NO_x,	Vehicle emission factors calculated using EMFAC2002 model	• Assume 3 trucks per day for worst-day calculations • 20 mile round trip distance assumed per delivery
	Fugitive Dust	NO_x,	SCAQMD CEQA Handbook Table A9-9-D	
Employee commuter trips	Vehicle Exhaust	NO_x, CO, VOC, SO_2, PM_{10}	Vehicle emission factors calculated using EMFAC2002 model	• 57 employees • 23.2 miles average worker commute round trip
	Dust from vehicle travel on paved roads	PM_{10}	SCAQMD CEQA Handbook Table A9-9-B	

Source: URS Corporation

- Diesel equipment exhaust emissions and fugitive dust generation from unloading waste and applying daily cover at the active face of the landfill, including emissions associated with the transport of cover material from on-site storage piles and dust from the storage piles.

- Exhaust emissions and fugitive dust generation from employee commute vehicles traveling to and from the site on (paved) off-site roads.

- Flaring of LFG captured by the gas collection system throughout the landfill.

- Fugitive leakage of LFG not captured by the site collection system.

Table 5.6-13 summarizes the methods and assumptions used in the development of emissions estimates for each source category of the operational facility.

5.6.3.3 Methodology Related to Analyzing General Criteria Pollutant Impacts

The proposed project's potential impacts to local criteria pollutant levels were evaluated by quantifying the maximum emissions that will result from the landfill expansion and comparing with the resulting emission totals with SCAQMD significant emission thresholds for operational projects. CO emissions from vehicles serving the landfill were evaluated using the methodology given in Section 5.6.3.4.

5.6.3.4 Methodology Related to CO Hotspots Analysis

A CO hot spots analysis was performed for several intersections in the vicinity of the FRB Landfill to evaluate potential effects of increased traffic to and from the landfill that would result from the proposed expansion project.

The morning volumes for the 2030 traffic scenarios, "with Project" and "without Project," were used in the hot spots analysis.

CARB's Emission Factors (EMFAC2002) model Version 2.2 was used to generate aggregate emission data for waste hauling trucks and employee commuters during morning peak hours at the selected intersections. The vehicular mix for the SCAB and equipment model years ranging from 2000 through 2030 were selected in developing the input to this emissions model. Model default options were used for all other input parameters. At each intersection, one set of emission factors was selected for through traffic and a second set was selected for turning traffic. The idling or turning traffic used the highest emission factors for 0 to 5 mph and the through traffic used the highest emission factors for 10 to 45 mph.

CALINE4 (Caltrans, 1989) was also used for a more detailed CO analysis. The following CALINE4 model inputs were used in the CO hotspots analysis for the proposed landfill expansion project:

- 1.8 meters receptor height.

TABLE 5.6-13
OPERATIONAL PHASE EMISSIONS SOURCES AND ESTIMATION METHODS

Source Type	Specific Source(s)	Pollutants	Emission Factors	Comments/Assumptions
On-site landfilling equipment	Equipment exhaust	NO_x, CO, VOC, SO_2, PM_{10} (diesel particulates)	"Exhaust and Crankcase Emission Factors for Non-road Engine Modeling--Compression-Ignition", EPA 2004.	• Equipment fleet specifications from project engineers • Additional equipment needed for high tonnage days (1 trash tractor, 1 trash compactor and 1 scraper) • Up to 50% of annual operating days could be high tonnage days • Typical equipment horsepower ratings from Caterpillar and other vendors • Equipment load factors based SCAQMD CEQA Handbook Table A9-8-D • Work occurs 10 hours per day, 307 days per year • 50% dust reduction credit for site watering
	Fugitive dust from earth disturbance	PM_{10}	EPA AP-42 emission factor compilation and tables from SCAQMD CEQA Handbook	
Landfill gas generation	Fugitive gas not captured by collection system	VOC, various toxic air contaminants	EPA Landfill Air Emissions Estimation model equation from AP-42 document used to estimate gas generation rates for every year between 1990 and 2103 with and without expansion project	• 80% of LFG captured by gas collection/flare system • Toxic constituents in gas include Core Group compounds in SCAQMD Rule 1150.1, these are currently monitored at FRB Landfill • LFG air toxics constituent concentrations from maximum source test data presented in the annual air emissions report
Landfill gas flares	Gas captured by collection system and flared	NO_x, CO, VOC, SO_2, PM_{10}, various toxic air contaminants	Source test data on existing flares at FRB landfill for TAC concentrations and flare destruction efficiencies	• Currently five flares • Up to two additional new flares may be required for the expansion

TABLE 5.6-13
OPERATIONAL PHASE EMISSIONS SOURCES AND ESTIMATION METHODS

Source Type	Specific Source(s)	Pollutants	Emission Factors	Comments/Assumptions
Trash Hauling Trucks	Truck Exhaust	NO_x, CO, VOC, SO_2, PM_{10} (diesel particulates)	Truck emission factors calculated using the EMFAC2002 model	• Trucks travel a maximum round trip distance of 0.73 miles on-site (unpaved roads) and 20 miles round trip offsite (paved roads) • Number of daily truck trips from 2023 – 2053 reflects the maximum annual waste volume that is expected to occur throughout those years.
	Dust from travel on paved (offsite) and unpaved (on-site) roads	PM_{10}	Unpaved and paved road dust emission formulas from SCAQMD CEQA Handbook Table A9-9-D and A9-9, respectively	
Employee commuter trips	Vehicle Exhaust	NO_x, CO, VOC, SO_2, PM_{10} (diesel particulates)	Vehicle emission factors calculated using EMFAC2002 model	• 97 employees • 23.2 miles average worker commute round trip
	Dust from vehicle travel on paved roads	PM_{10}	SCAQMD CEQA Handbook Table A9-9-B	

Source: URS Corporation

- Twelve receptors were placed at least 10 feet (3 m) from the road.

- The road links were selected as at grade.

- Traffic links for through and turning traffic were used for each intersection.

- The projected baseline ambient CO concentration from the SCAQMD web site for year 2020 was used - specifically, the highest expected hourly concentration in the vicinity of the project site (5.8 ppm at the Anaheim monitoring station) was used to define a worst-case future baseline condition.

- Worst-case meteorology conditions were selected, which include the following:

  - Worst-case wind angle,
  - 1.0 meter per second wind speed,
  - Surface roughness height of 100 centimeters corresponding to a suburban area,
  - Stability class G (7), night/stable,
  - Settling velocity and deposition velocity are zero,
  - Default 1,000 meter mixing height,
  - Ambient temperature of 48°F (9°C),
  - Wind directions at increments of 10°.

The CALINE4 model was run for the intersections of Sand Canyon Avenue at Trabuco Road, Jeffrey Road at Walnut Avenue, and Sand Canyon Avenue at Irvine Boulevard.

5.6.3.5 Methodology Related to Air Toxics Health Risk Assessment

A health risk assessment (HRA) was conducted to evaluate the potential impacts of the proposed landfill expansion project's emissions of toxic air contaminants (TACs) on public health. This HRA was conducted according to the latest guidance from the SCAQMD and the California Office of Environmental Health Hazard Assessment (OEHHA).

The four principal steps of an HRA include:

- Emissions of TACs are quantified and segregated according to source types.

- Ground-level impacts resulting from the atmospheric transport and dilution of these emissions are assessed by dispersion modeling.

- Potential public exposure to these compounds resulting from these emissions is evaluated.

- Potential cancer and non-cancer health risks resulting from the calculated exposures are estimated using dose-response relationships developed from toxicological data.

The following project-related sources of TACs are considered potential contributors to the proposed expansion project's impacts on human health:

- Combustion by on-site flares of LFG recovered by a gas collection system throughout the facility (assumed to be 80% of the total LFG generated).

- Leakage through the landfill surface to the atmosphere of gas that is generated by waste decomposition and not collected (assumed to be 20% of total LFG).

- Diesel landfilling equipment operating on site.

- Trash-hauling trucks operating within and outside the FRB Landfill boundaries.

Health risks associated with diesel trucks and landfill equipment were addressed in terms of emissions and predicted exposures to diesel particulate matter (DPM), which is regulated as a TAC in the state of California. Emissions of DPM are the same as those reported as PM_{10} emissions from these sources in the evaluation of criteria pollutant impacts.

SCAQMD requires that the FRB Landfill monitor for TACs. Individual constituent concentrations measured at the inlets of the FRB facility flares and the measured destruction efficiency, along with LFG generation volumes for each year of the landfill's lifetime, were used to estimate emission rates of these compounds in the fugitive LFG and from the flares themselves. LFG quantities for each year of the landfill operations were estimated using the EPA Landfill Air Emissions Estimation model equation in the AP-42 emission factor compilation volume. TAQs included in the FRB Landfill HRA are listed in Table 5.6-14.

The following assumptions were used to ensure that the HRA results provided a conservative estimate of health risks resulting from the proposed project:

- As a worst case in the evaluation of acute health effects, all on-site, diesel-fired landfilling equipment was assumed to be concentrated in the Phase XI area on the south end of the landfill property (i.e., the landfill area nearest to residential areas and other potentially sensitive receptors). These emissions were represented as one area source in the dispersion modeling. The emissions from this equipment were assumed to be in a different area source spread over all landfilling areas within the FRB site for purposes of the chronic non-cancer and cancer risk calculations.

TABLE 5.6-14
TACS INCLUDED IN THE FRB LANDFILL EXPANSION HRA

Chemical	CAS	Acute Target Organs	Chronic Target Organs	Inhalation Cancer Risk
Diesel engine exhaust, particulate matter	9901	Respiratory System	Respiratory system	yes
Benzene	71432	Reproductive/Developmental; Immune System; Hematologic System;	Hematopoietic system; development; nervous system	yes
Chlorobenzene	108907		Alimentary system; kidney; reproductive system	
Dichlorobenzene (1,4-Dichlorobenzene)	106467		Nervous system; respiratory system; alimentary system; kidney	yes
1,1-Dichloroethane (ethylidene dichloride)	75343		Alimentary system	yes
1,2-Dichloroethane (ethylene dichloride)	107062		Alimentary system (liver)	yes
1,1-Dichloroethylene (vinylidene chloride)	75354			
Dichloromethane (Methylene Chloride)	75092	Nervous System	Cardiovascular system; nervous system	yes
Perchloroethylene (tetrachloroethylene)	127184	Nervous system; Eye; Respiratory System	Kidney; alimentary system (liver)	yes
Toluene	108883	Nervous System; Eye;	Nervous system; respiratory system; development	
1,1,1-Trichloroethane (methyl chloroform)	71556	Respiratory System; Reproductive/developmental	Nervous system	
Trichloroethylene (trichloroethene)	79016		Nervous system; eyes	yes
Vinyl chloride	75014	Nervous System; Eye; Respiratory System		yes
m,p-Xylene	1210	Eye; Respiratory System	Nervous system; respiratory system	
o-Xylene	95476	Eye; Respiratory System	Nervous system; respiratory system	

- Emissions of TACs from up to seven flares (i.e., five existing and up to two future units) were assumed to be released from a single point source in the FRB flare area. The estimated maximum future projected gas flaring rates that will result from the proposed expansion project were assumed.

- The fugitive LFG emissions are assumed to consist of all LFG not captured by the gas collection system, despite procedures that are in place as a result of federal New Source Performance Standards and SCAQMD regulations to minimize leakage and off-site migration of the gas. For HotSpots Analysis and Reporting Program (HARP) dispersion modeling purposes, these emissions were represented by one large rectangular area source covering most of the FRB Landfill site, slightly biased toward the southern edge of the property. This is conservative as it puts the emissions closer to the sensitive receptors.

- Emissions from waste-hauling trucks were included in the HRA to a distance of 5 miles outside the landfill to ensure that the maximum effects of truck traffic on any residential or other sensitive receptor area would be addressed. For purposes of health risk modeling, the DPM emissions from these trucks were represented by five on-site volume sources located between the Phase XI landfill area and the entrance to the FRB facility, with the remaining emissions distributed over 90 volume sources spread over the primary local roadway routes to the landfill.

- The previously described conventions for delineating the incremental emissions and impacts of criteria pollutant emissions were similarly applied to define the incremental TAC emissions and health risks due to the proposed expansion project. Specifically,

  - The evaluation of cancer risks, as well as acute and chronic non-cancer risks related to operations of diesel trucks and landfilling equipment, is based on the DPM emissions from the entire fleet of trucks and equipment that would operate after 2022, because without the expansion project these emissions would cease to occur upon the closure of the facility.

  - The evaluation of cancer, chronic, and acute non-cancer risks due to the proposed expansion project's TAC emissions of fugitive LFG and flaring is based on the maximum predicted difference between the emissions from these sources that would occur with and without the expansion project. This maximum occurs in year 2053, because TAC emissions from LFG would continue to occur for many years after 2022 if the project were not approved, but would grow to higher rates if the project is implemented.

Consistent with the requirements from the SCAQMD "Supplemental Guidelines", a Tier 1 evaluation was conducted using the HotSpots Analysis and Reporting Program (HARP). HARP is designed for HRAs conducted to comply with the AB2588 Air Toxics "Hotspots" Information and Assessment Act, the principal regulatory program for quantifying and identifying health risks from emissions of TACs in California. HARP is a program that combines facility emissions information, air dispersion modeling (with ISCST3), and risk assessment analysis. For this application the HARP model was used with the following options selected for evaluation of specific health risks:

- Cancer risk was assessed at all receptors with an assumed 70 year exposure, using the "Derived (Adjusted) Method".
- Chronic non-cancer risk was evaluated at all receptors using the "Derived (OEHHA) Method".

An exhaustive determination of sensitive receptors within 10 kilometers of the landfill was conducted to ensure that the effects of incremental TAC emissions would be evaluated at the areas most susceptible to health impacts. A total of 285 sensitive receptors, including schools, daycare centers, hospitals, convalescent homes, residences, and playgrounds and athletic areas were identified. These receptors are shown in Table 5.6-15. Some sites have more than one location to ensure that the maximum risk was evaluated for each site. In addition 2,093 receptors determined from census data were deployed out to a distance of 10 kilometers from the FRB Landfill to ensure that all nearby population potentially affected would be included in the analysis. Finally, an additional grid of receptors spaced at 1 kilometer intervals was established to cover other locations within 10 kilometers that were not specifically identified as sensitive or census receptors. Results at receptors outside the FRB property boundary, but within the permanent buffer zone surrounding the facility, were not included in the HRA results. This area currently contains no sensitive receptors, residences, or businesses and is permanently protected against future development pursuant to the City of Irvine General Plan.

The ISCST3 dispersion model is incorporated within the HARP simulations. Based on SCAQMD guidance, the inputs for this model included hourly meteorological data recorded at the SCAQMD El Toro monitoring station throughout calendar year 1981 and emissions and receptor data described above. A wind rose showing the distribution of wind speeds and directions for that year is provided on Figure 5.6-1. Urban dispersion coefficients and the “no calms processing” were selected for this application.

The results of the HRA, including the predicted maximum individual cancer risk (MICR) and cancer burden, as well as the acute and chronic non-carcinogenic hazard indices at the Point of Maximum Impact (PMI) and the Maximally Exposed Individual Resident (MEIR), are presented in Appendix G. Per SCAQMD and OEHHA guidance, the information provided by this HRA and the criteria used in evaluating the significance of predicted impacts must include:

- The cumulative increase in MICR (i.e., the sum of the calculated MICR values for all TACs emitted from the proposed project), is considered significant if any of the following criteria are exceeded:

  A. An increased MICR greater than one in one million (1.0 x 10-6) at any receptor location, if the project is constructed without Toxic Best Available Control Technology (T-BACT).

  B. An increased MICR greater than ten in one million (1.0 x 10-5) at any receptor location, if the project is constructed with T-BACT.

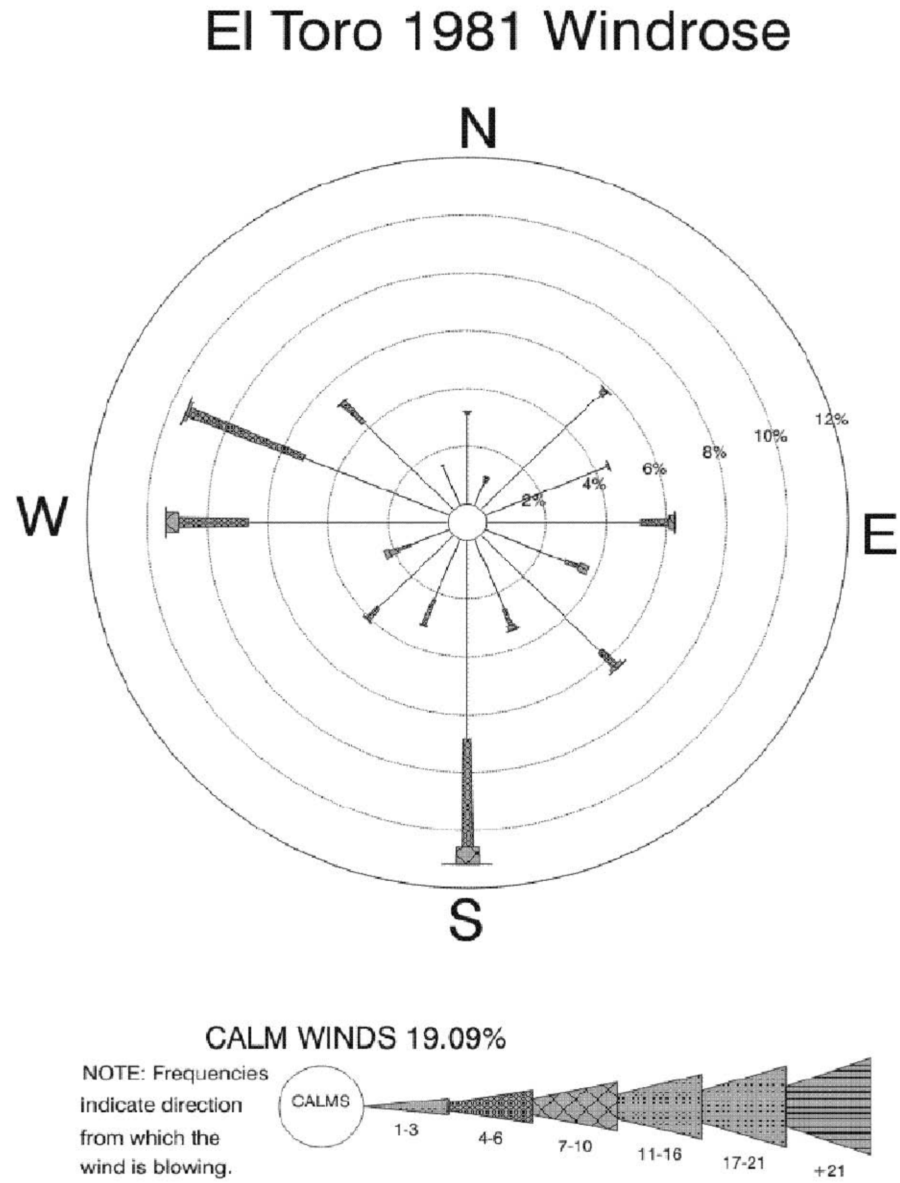
  C. A cancer burden greater than 0.5.

- The cumulative increase in total Chronic Non-Cancer Hazard Index (HI) for any target organ system due to total emissions from the project is considered significant if it will exceed 1.0 at any receptor location.

- The cumulative increase in total Acute Non-Cancer HI for any target organ system due to total emissions from the project is considered significant if it will exceed 1.0 at any receptor location.

TABLE 5.6-15
SENSITIVE RECEPTORS WITHIN FIVE MILES FROM THE FRB LANDFILL USED IN HRA MODELING

Receptor Type	Name	Receptor Type	Name	Receptor Type	Name	Receptor Type	Name	Receptor Type	Name
School	Arroyo Elementary School	School	Home Preschool Program	Daycare	Mommyworks Inc	School	Montessori on the Lake	School	Sierra Vista Middle School
School	Barbara Benson Elementary School	School	Horizon High Misn Viejo	Daycare	Mulberry Child Care & Preschool: Irvine	School	Montessori Preschool and Elementary	School	Spirit Preparatory Academy
School	Brea-Olinda High School: Office	School	Tustin Unified School District: Peters Canyon Elementary School	Daycare	Nelson Child Development Center	School	Irvine Unified School District: Oak Creek	School	Springbrook Elementary School
School	Bryant Ranch Elementary School: Child Care	School	Tustin Unified School District: Tustin Ranch Elementary School	Daycare	Poppin Day Care Inc	School	Irvine Unified School District: San Joaquin	School	St Michael the Archangel Academy
School	Brywood Elementary School	School	Tutor Time Child Care Ctr	School	Irvine Unified School District: Oak Creek	School	Irvine Unified School District: Santiago Hills	School	Stone Creek Elementary School
School	C E Utt Middle School	School	Tutor Time Childcare Learning	School	Irvine Unified School District: San Joaquin	School	Irvine Unified School District: Westwood Basics Plus	School	Trabuco Hills High School
School	Canyon View Elementary School	School	Tutor Time Learning Ctr	School	Irvine Unified School District: Santiago Hills	School	Irvine Unified School District: Alderwood Basic Plus	School	Tustin First Baptist Christian School
School	Celebrate	School	Veeh Marjorie L Elementary School	School	Irvine Unified School District: Westwood Basics Plus	School	Irvine Unified School District: El Camino Real Elementary	School	Tustin High School
School	Christian Montessori Academy	School	Venado Middle School	School	J De Casas Academy	School	Irvine Community Nursery School	Daycare	Rainbow Rising Meadow Park
School	Country Village Pre-School	School	We Are Kids First Inc	School	Jenny Hart Early Education Ctr	School	Irvine High School	Daycare	Rainbow Rising-College Park
School	Creative Arts Academy	School	Woodbridge High School	School	Keynotes Music School	School	Newport Avenue Preschool	School	Jenny Hart Early Education Ctr
School	Deerfield Elementary School	School	Woodcrest Preschool Inc	School	Kid's Gym	School	Norbertine Fathers' St Michael's Abbey (Portola Hills Elementary)	School	Keynotes Music School
School	Direct Access School Worship	Daycare	Aldersgate Children's Center	School	Kinder Care Learning Ctr	School	Northwood Elementary School	School	Kid's Gym
School	Dolphin Club-Eastshore School	Daycare	Allbright Family Daycare	School	La Madera Elementary School	School	Northwood High School	School	Kinder Care Learning Ctr
School	Edgewood Pre Primary Academy	Daycare	Best Daycare	School	La Monte Academie	School	Northwood Montessori School	School	Tustin Ranch Golf Club: Teaching School
School	Edu Dyne Foundation	Daycare	Beswick Kids Center	School	Ladera Elementary School	School	Orange Unified School District: Auto Shop	School	Tustin Unified School District: Beckman High School
School	El Toro High School	Daycare	Davies Daycare	School	Lake Forest Montessori School	School	Oxford Tutoring Center	School	Irvine Cheer Academy
School	Fairmont Private School at Edgewood Campus	Daycare	Day Care Gallo Barbara	School	Lake Forest Years of Discovery	School	Pacific Coast High School	Daycare	Quality Day Care
School	Fibel Yvette CCC	Daycare	Guin FOSS Child Development Center	School	Lakeside Middle School	School	Panorama Elementary School	School	J De Casas Academy
School	First School	Daycare	Hillside Montessori School	School	Lawalker.Com	School	Pioneer Middle School	School	Tustin Memorial Elementary School
School	Foothill High School: Information	Daycare	Just 4 Kids Daycare	School	Leport Schools	School	Portola Hills Elementary School		
School	Foothill Ranch Elementary School	Daycare	Kathy's Family Daycare	School	Los Naranjos Elementary School	School	Rancho Canada Elementary School		
School	Fulbright Montessori Academy	Daycare	Kid's Island Daycare	School	Lutheran Schools: Red Hill Lutheran School	School	Red Hill Elementary School		
School	Good Shepherd Preschool	Daycare	Kindercare Learning Centers: Foothill Ranch	School	Main Place Children's Center The	School	Saddleback Academy of Music		
School	Greentree Elementary School	Daycare	Kindercare Learning Centers: Irvine	School	Making Faces	School	Santiago Canyon College: High School & Community Outreach		
School	Gymboree	Daycare	Lakeview Learning Center	School	Miss Jodi's Learning Garden	School	Santiago Elementary School		
School	Hillview High School	Daycare	Little Doll Day Care	School	Mission Renaissance	School	Serrano Intermediate School		



Source: URS Corporation, 2005.

Figure 5.6-1
Wind Rose - El Toro Station

For purposes of this analysis:

- MICR is the estimated probability of a potential maximally exposed individual (MEI) contracting cancer as a result of exposure to TACs over a period of 70 years for all receptor locations including residential locations. The MICR calculations include multi-pathway considerations, if applicable.

- Cancer burden means the estimated increase in the occurrence of cancer cases in a population subject to a MICR of greater than or equal to one in one million (1.0 x 10-6) resulting from exposure to TACs.

- The Chronic Non-Cancer HQ is the ratio of the estimated long-term level of exposure to a specific TAC for a potential MEI to its chronic reference exposure level (REL). The chronic HI is the accumulated value obtained by summing the HQ values over multiple TACs that affect the same target organ and these calculations may include considerations of multiple pathways, if applicable.

- The Acute Non-Cancer HQ is the ratio of the estimated short-term level of exposure to a specific toxic air contaminant for a potential MEI to its acute REL. The acute HI is the accumulated value obtained by summing the HQ values over multiple TACs that affect the same target organ.

The use of a LFG collection system and flare is considered T-BACT for a municipal waste disposal facility such as the FRB Landfill. Accordingly, the appropriate incremental cancer risk threshold of significance is ten in one million (10^{-5}). The HRA for the proposed FRB Landfill expansion considered all pathways except the drinking water, fish from local waters, and beef/dairy pasture pathways, since none exist nearby, in the evaluation of TACs from fugitive LFG and flaring. Only the inhalation pathway was considered in the evaluation of DPM from diesel equipment and trucks, because OEHHA and SCAQMD have determined that the potential cancer risk for this substance from the inhalation pathway will outweigh the potential risk from non-inhalation pathways. Accordingly, a multi-pathway risk analysis for DPM is not normally necessary.

5.6.4 IMPACTS

5.6.4.1 Construction Impacts

Based on data provided by the project engineers, the maximum daily quantity of earth that may be moved in support of landslide remediation and new cell construction combined will not exceed 40,000 cy. However, the average volume of earth moving over an extended period will be about half this level, or about 20,000 cy per day. Accordingly, the estimates developed for the maximum daily and annual emissions are based on these assumptions. Specific activities that have been included in the estimation of construction emissions are:

- Exhaust from diesel equipment involved in earth-moving work;

- Fugitive dust generated by the equipment's activities within the site boundaries, including dirt pushing or bulldozing, grading, travel on unpaved surfaces, truck loading and unloading operations;

- Exhaust and fugitive dust from heavy trucks delivering materials to the site for environmental controls;

- Exhaust and fugitive dust from employee vehicle trips to and from the site.

Table 5.6-16 summarizes the maximum daily and average annual pollutant emissions for this phase of the proposed project. Detailed emission spreadsheets for project construction are provided in Appendix G.

TABLE 5.6-16
SUMMARY OF MAXIMUM ESTIMATED CONSTRUCTION PHASE EMISSIONS

		Maximum Daily Emissions (lbs/day)					Average Annual Emissions (ton/yr)				
Operation	**Emission source**	**PM_{10}**	**CO**	**VOC**	**NO_x**	**SO_x**	**PM_{10}**	**CO**	**VOC**	**NO_x**	**SO_x**
Construction Equipment	Combustion exhaust	17.93	47.53	76.29	1,224.75	2.79	1.44	3.93	6.28	97.36	0.23
Construction Equipment	Fugitive dust	388.08	-	-	-	-	36.66	-	-	-	-
Material Delivery Trucks	Combustion exhaust	0.01	0.29	0.03	0.16	0.00	0.00	0.04	0.00	0.02	0.00
Material Delivery Trucks	Fugitive dust	12.04					1.85				
Commuter Vehicles	Combustion exhaust	0.22	3.61	0.25	0.27	0.03	0.02	0.34	0.02	0.03	0.003
Commuter Vehicles	Fugitive dust	8.46	-	-	-	-	0.80	-	-	-	-
Total Construction Emissions		**426.7**	**51.4**	**76.6**	**1,225.2**	**2.8**	**40.8**	**4.3**	**6.3**	**97.4**	**0.2**
SCAQMD significance thresholds for construction		**150**	**550**	**75**	**100**	**150**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
Significant		**Yes**	**No**	**Yes**	**Yes**	**NO**					

Source: URS Corporation.

The emissions calculations represented in Table 5.6-15 indicate that maximum daily construction emissions of NO_x, VOCs, and PM_{10} will exceed the SCAQMD significance thresholds and are thus considered to constitute a significant air quality impact. Both the landslide remediation and new cell excavation and lining activities will occur over many years, and the associated emissions will thus be concurrent with those from the ongoing landfill operations, both before and after the operational changes related to the proposed expansion.

5.6.4.2 Operations Impacts

Table 5.6-17 shows that maximum daily operational emissions of PM_{10}, NO_x, and VOCs, will exceed the SCAQMD significance thresholds for operational emissions. As such, the operation of the landfill would create significant impact to air quality. However, the unique nature of a landfill expansion project complicates the issue of identifying the incremental emissions associated with such projects, as described below.

TABLE 5.6-17
SUMMARY OF MAXIMUM ESTIMATED OPERATIONAL EMISSIONS

		Daily Emissions (lbs/day)					**Maximum Annual Emissions (tons/yr)**				
Source	**Emission source**	**PM_{10}**	**CO**	**VOC**	**NO_x**	**SO_x**	**PM_{10}**	**CO**	**VOC**	**NO_x**	**SO_x**
Landfill	Fugitive LFG	-	-	462.56	-	-	-	-	84.42	-	-
Flares	Combusted LFG	117.81	245.8	14.80	313.8	103.96	21.50	44.9	2.70	57.27	18.97
Operations Equipment	Combustion exhaust	2.12	9.56	14.50	112.1	0.53	0.30	1.34	2.02	15.55	0.07
Operations Equipment	Fugitive dust	242.25	-	-	-	-	36.74	-	-	-	-
Cover Movement & Storage	Fugitive dust	49.72	-	-	-	-	7.53	-	-	-	-
Trash Hauling Trucks - On site	Combustion exhaust	0.09	1.81	0.17	1.03	0.02	0.01	0.28	0.03	0.16	0.003
Trash Hauling Trucks - On site	Fugitive dust	512.4	-	-	-	-	78.66	-	-	-	-
Trash Hauling Trucks - Off site	Combustion exhaust	2.34	49.45	4.76	28.33	0.56	0.36	7.59	0.73	4.35	0.09
Trash Hauling Trucks - Off site	Fugitive dust	2010.8	-	-	-	-	308.7	-	-	-	-
Commuter Vehicles	Combustion exhaust	0.37	6.15	0.43	0.47	0.05	0.06	0.94	0.07	0.07	0.008
Total Operations Emissions		**2952.4**	**312.8**	**497.2**	**455.7**	**105.1**	**456.0**	**55.0**	**90.0**	**77.4**	**19.1**
CEQA significance threshold for operations		**150**	**550**	**55**	**55**	**150**	**-**	**-**	**-**	**-**	**-**
Significant		**Yes**	**No**	**Yes**	**Yes**	**No**	**-**	**-**	**-**	**-**	**-**

Source: URS Corporation

Since the FRB Landfill is an existing facility, the emphasis in this analysis is to identify the maximum incremental emissions changes that will result from the proposed expansion project. Because of the nature of landfill emission sources, however, delineation of the incremental emissions in this case is less straightforward than for an expansion of most industrial facilities. For example, even if the expansion project does not occur and the landfill ceases to accept waste after 2022, the existing facility will continue to generate fugitive LFG and gas flaring emissions for many years thereafter. Thus, if the project goes forward, not all the emissions in those later years will be attributable to the expansion. On the other hand, emissions associated with the delivery of waste and its handling on site would cease on the date when the landfill is closed, but will continue to occur for 31 additional years if the proposed expansion is implemented.

Thus, while the magnitude of the daily and annual emissions from the operational landfill will be generally similar to those already occurring at the existing facility, the proposed expansion project, with its associated increase in the facility's operational lifetime, will, in effect, postpone until 2053 the decrease in emissions that would otherwise have occurred beginning in 2022. In this sense, the entirety of these emissions after 2022, unlike those from LFG generation, is considered to be incremental. This approach has been adopted based on the guidance on this issue that was provided by SCAQMD CEQA specialists (SCAQMD, 2005).

5.6.4.3 CO Hotspots Impacts

The EMFAC2002 model yielded the following results for CO:

- Normal running emissions for CO were calculated as 3.14 grams/mile.
- Normal idling emissions for CO were calculated as 1.13 grams/hour.

Table 5.6-18 shows the results for the CALINE4 model.

TABLE 5.6-18
CARBON MONOXIDE CONCENTRATIONS (PPM*) PREDICTED USING CALINE4 FOR FUTURE (YEAR 2030) CONDITIONS WITH AND WITHOUT THE PROPOSED PROJECT**

Intersection	**2020 SCAQMD CO 1-hour / 8-hour Background Concentrations**	**Predicted Intersection CO Concentration 1-hour**	**Predicted Intersection CO Concentration 8-hour**	**Predicted Total CO Concentration with Background 1-hour**	**Predicted Total CO Concentration with Background 8-hour**
Sand Canyon Avenue & Trabuco Road	5.8 / 3.9	0.4	0.3	6.2	4.2
Jeffrey Road & Walnut Avenue	5.8 / 3.9	0.5	0.4	6.3	4.3
Sand Canyon Avenue & Irvine Boulevard	5.8 / 3.9	0.4	0.3	6.2	4.2

Source: URS Corporation
Notes:
CAAQS – 1-hour = 20 ppm; 8-hour = 9.0 ppm
* ppm = parts per million
** model results are the same for "with Project" and "without Project" scenarios
8-hour background concentration incorporates 0.7 persistence factor applied to 1-hour background concentration
Background concentrations determined based on data collected at the SCAQMD Anaheim monitoring station

As described for the EMFAC2002 model and as shown in Table 5.6-18 for the CALINE4 model, the CO hot spots analysis indicates that no adverse CO impacts are expected from an increase in traffic at the any of the three intersections analyzed for CO. Since these intersections were selected as worst-case intersections, no adverse CO impacts are expected from any intersections in the vicinity of the FRB Landfill. The results of the CO hot spot analysis for the “with Project” and “without Project” scenarios indicate there is virtually no change in the maximum predicted CO concentrations, because the morning peak traffic counts for the two scenarios differ by only a small percentage. In either case, the projected maximum impacts at all modeled intersections are well below the ambient standards for CO.

5.6.4.4 Odor Impacts

Reconnaissance conducted by landfill staff around the perimeter of the facility has failed to result in odor detection. The proposed project would not change the allowable annually averaged rate of waste acceptance at the FRB Landfill and, accordingly, would not be expected to materially change the potential for odor impacts compared with the existing site operations However, it is possible that increasing the height and footprint of the landfill, in combination with the buildout of the neighboring community, may result in future conditions wherein objectionable odors may be experienced at nearby residences or businesses or on adjacent roadways.

The potential odor impacts that are associated directly with landfilling activities include odors due to both fresh waste and decomposed waste. In addition, the use of green waste as alternate cover material on the active face of the landfill and for slope stabilization elsewhere on the facility can create strong odors.

The principal odor control measures that are implemented for the current FRB landfill operations are the application of cover material on the active face on at least a daily basis and the operation of efficient landfill gas (LFG) and leachate collection systems throughout the facility and a flaring system to destroy collected LFG. These practices will continue for the expanded facility and the scope of the gas and leachate collection system will be expanded as required to keep pace with the landfill’s growth. In addition, the active working face will continue to be contained in as small an area as practicable to help control odors from daily landfilling operations.

Cover material will continue to be used to provide a minimum six-inch-thick cover of soil or other alternative daily covers over refuse. Intermediate cover is applied as soon as possible on areas where it is required by Title 27 of the California Code of Regulations to control vectors, fires, odors, blowing litter, and scavenging. One of the most important benefits of applying daily cover soil is to provide a suitable barrier to the escape of odorous gases. As noted previously, the use of green waste as an alternative cover material and for slope stabilization at various landfill locations may increase the probability of offsite odorous impacts.

Prevailing winds at the FRB site carry landfill emissions toward unpopulated areas to the east, but occasional Santa Ana winds from the northeast will transport emissions toward future residential and commercial development areas to the south and west of the facility, potentially blowing odorous materials in those directions.

SCAQMD Rule 402 prohibits any source from discharging "such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property." Thus an odor judged by nearby residents to be unpleasant either inside or outside their homes would be considered unacceptable and would constitute a significant impact of the project. This includes odors generated within the landfill or by trash hauling trucks passing through populated areas en route to the landfill, although the latter effects would normally be much more transitory and localized (and thus less likely to impact "any considerable number of persons or the public" than the former.

A reliable quantitative assessment of the potential future odors that may result from the types of changes associated with the proposed landfill expansion is not feasible. As stated previously, current odor management practices and the maintenance of a permanent buffer area around the FRB Landfill for at least one quarter mile from any landfilling activity will be successful in avoiding adverse odor impacts for some years. In addition, the proposed expansion will not increase the average quantity of wastes delivered to the landfill and should therefore represent no appreciable change in the exposure to odors from trash hauling trucks relative to the presently permitted operations. However, it is possible that the horizontal and vertical expansion of the landfill and concurrent residential development closer to the facility could eventually create a condition wherein odor impacts may become problematic. Inasmuch as SCAQMD Rule 402 explicitly prohibits the creation of nuisance odors at sensitive receptors, including residences, it will be imperative that the landfill apply all feasible controls to minimize odor generation and plan for the eventuality of increased odor impacts in the future. Although unlikely, should odors become problematic in the future, IWMD could potentially implement a combination of the following operational controls, if deemed necessary.

- Increase the application frequency of cover material at the active working face of the landfill during periods of sustained windflow toward the residential areas where an odor problem has been identified.

- Discontinue the use of green waste as an alternate cover and for erosion control on slopes adjacent to major nearby roadways.

- Use screening berms on top of each new landfill lift and between the waste disposal area and major nearby roadways.

- Apply odor masking chemicals at the landfill working face to reduce/eliminate offsite detection of unpleasant odors.

- Implement a public outreach program to canvas the neighborhood and provide a phone number to contact if odor is an issue so that the IWMD staff could take the necessary action to reduce odor.

Implementation of the existing FRB Landfill odor control measures and the addition of operational controls described above, if deemed necessary and on an as-needed basis is expected to prevent off-site odor impacts from reaching a level of significance.

5.6.4.5 Criteria Pollutant Impacts

The analysis of criteria pollutant impacts indicates that the FRB Expansion Project will result in construction and operational emissions of NO_x, VOCs, and PM_{10} above the SCAQMD significance thresholds for these pollutants. These results reflect the conservative impact evaluation approach described previously, whereby all of the emissions associated with waste transport and handling after 2022 are considered to represent an incremental increase due to the expansion project, because these emissions would cease in 2023 without the expansion. However, the annual operational emissions of the landfill will continue at levels near those that presently occur for the existing landfill. Construction activities associated with the proposed expansion represent an incremental increase compared with current emission levels. Emissions from LFG flaring and fugitive LFG leaks will grow to levels higher than those that currently occur as a result of the increased size and waste capacity of the landfill with the expansion project. The proposed project will result in emissions of NOx, VOC and PM_{10} for both construction and operational activities that constitute unavoidable significant impacts to air quality based on the SCAQMD significance thresholds.

5.6.4.6 Health Risk Impacts

An air toxics HRA was carried out using the methods approved by the SCAQMD and OEHHA to evaluate the potential for adverse health impacts in the neighboring communities due to emissions associated with landfill operations.

The maximum off-site cancer risk of 9.04 in one million (9.04×10^{-6}) and the maximum chronic non-cancer risk are predicted to occur along Interstate 5 (I-5) away from the FRB Landfill, and are mostly attributed to the emissions of waste hauling trucks traveling along I-5, rather than the TAC constituents associated with fugitive LFG or flaring at the landfill. The highest cancer risk, as well as the peak non-cancer risks (both acute and chronic), at residences (MEIR values) are predicted to occur on Irvine Boulevard, but these values are below the significance threshold.

Additional model results regarding the proposed projects expected impacts on local cancer levels are summarized below:

- Estimated number of persons exposed to cancer risk greater than 10^{-4} = 0.
- Estimated number of persons exposed to cancer risk greater than 10^{-5} = 0.
- Estimated number of persons exposed to cancer risk greater than 10^{-6} = 21,903.
- Cancer burden – the number of predicted excess cancer cases in the exposed population = 0.0334.

Per SCAQMD and OEHHA guidance, the cancer burden value reported above was obtained by multiplying the population at each census receptor by the predicted cancer risk at that receptor and then summing over all of the receptors with a predicted cancer risk greater than 1 in a million. SCAQMD considers a cancer burden value less than 0.5 to be below a level of significance.

The maximum acute risks at any receptor and at any residence are predicted to be 0.0002 and 0.0001, respectively. Similarly, the highest projected value for the non-cancer chronic HI at any receptor is 0.0057, with the maximum residential value at just 0.0054. These values for acute and chronic non-cancer risks are below the significance threshold of 1.0.

5.6.5 MITIGATION MEASURES

The proposed project will result in significant adverse impacts to air quality due to fugitive dust and criteria air pollutants during construction and operation. The following mitigation measures will assist in reducing air quality impacts.

AQ-1 Applicable dust suppression techniques from Rule 403 shall be implemented. These techniques are summarized below. Additional dust suppression measures in the SCAQMD *CEQA Air Quality Handbook* are included as part of the project's mitigation. Implementation of these dust suppression techniques will reduce fugitive dust generation (and thus the PM_{10} component).

- Apply surfactants to or vegetate (i.e., grow grass) all inactive construction areas (previously graded areas inactive for 10 days or more).

- Water active sites at least twice daily (water or other surfactants should be applied as needed to active site grading areas to minimize fugitive dust).

- All trucks hauling dirt, sand, soil, or other loose materials should have a cover over the top of the material, spray water to minimize wind blown dust, or should maintain at least six inches of freeboard in accordance with the requirements of California Vehicle Code section 23114 (freeboard means vertical space between the top of the load and top of the trailer).

- If feasible, place base material or keep unpaved access roads moist to minimize dust on access road.

- Traffic speeds on all unpaved roads shall be reduced to 15 mph or less.

- Revegetate disturbed areas as quickly as possible.

- All excavating and grading operations shall be suspended when wind speeds (as instantaneous gusts) exceed 25 mph and dust plumes are visible.

- All on-site streets shall be swept once a day if visible soil materials are carried to adjacent streets (recommend water sweepers with reclaimed water).

- Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash trucks and any equipment leaving the site each trip.

AQ-2 Dust generated by the construction activities shall be retained on site and kept to a minimum by the following dust control measures.

- During clearing, grading, earth moving, excavation, or transportation of cut or fill materials, water trucks or sprinkler systems shall be used to prevent dust from leaving the site and to create a crust after each day's activities cease.

- During construction, water trucks or sprinkler systems shall be used to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this would include wetting down such areas in the late morning and after work is completed for the day and whenever wind exceeds 15 mph.

- Immediately after clearing, grading, earth moving, or excavation is completed, the entire area of disturbed soil should be treated or properly maintained so that dust generation will not occur.

- Soil stockpiled for more than two days should be covered, kept moist, or treated with soil binders to prevent dust generation.

- Trucks transporting soil, sand, cut or fill materials, and/or construction debris to or from the site shall be tarped, sufficient amount of water applied to minimize dust, or maintain six inches of freeboard from the point of origin.

5.6.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of Measures AQ-1 and AQ-2 would reduce construction-and operational emissions further, as required by SCAQMD. However, after mitigation, fugitive dust, as well as NO_x and VOC emissions will remain above the SCAQMD's daily construction and operation emission thresholds. Therefore, construction and operation of the project would have significant unavoidable adverse impact on regional air quality.

5.7 NOISE

This section of the EIR is based on the Noise and Vibration Study for the Frank R. Bowerman (FRB) Landfill (URS Corporation, 2005). The Noise and Vibration Study, which is provided in Appendix H of this EIR, was prepared to evaluate the potential noise and vibration impacts and provides mitigation measures associated with the FRB Landfill expansion project.

5.7.1 EXISTING CONDITIONS

5.7.1.1 Noise Terminology

Noise is generally defined as unwanted sound. It may be loud, unpleasant, unexpected or undesired sound typically associated with human activity and which interferes with or disrupts normal noise-sensitive ongoing activities of others. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance and suitability of the noise in a particular setting, the time of day and type of activity during which the noise occurs and the sensitivity of the individual. The response to vibration is similar; first, the vibration needs to be of sufficient magnitude to be perceived, and second, it would typically have to interfere with a desirable activity to cause annoyance.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium such as air that are sensed by the human ear. Sound is generally characterized by frequency and intensity. Frequency describes the sound's pitch and is measured in Hertz (Hz), while intensity describes the sound's level, volume or loudness and is measured in decibels (dB). Sound frequency is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates at a certain number of times per second. The vibration of the drum skin at a rate of 100 times (or cycles) per second generates a sound pressure wave that is said to be oscillating at 100 Hz, and this pressure oscillation is perceived as a tonal pitch of 100 Hz. Sound frequencies between 20 Hz and 20,000 Hz are within the range of sensitivity of the best human hearing.

Sound from a tuning fork contains a single frequency and may therefore be referred to as a pure tone. However, most sounds heard in the environment do not consist of a single frequency, but rather a broad band of frequencies differing in individual sound level. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound according to a weighting system that reflects that human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This frequency-dependent modification is called A-weighting, and the decibel level measured is called the A-weighted sound level (dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

For informational purposes, typical community sound levels are presented in Table 5.7-1. A sound level of 0 dBA is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately

60 dBA. Sound levels above about 120 dBA begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

TABLE 5.7-1
SOUND LEVELS OF TYPICAL NOISE SOURCES AND NOISE ENVIRONMENTS (dBA)

Example Noise Source (at Given Distance)	Scale of A-Weighted Sound Level in Decibels	Example Noise Environment	Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 Decibels*)
Military Jet Take-off with After-burner (50ft)	140	Carrier Flight Deck	
Civil Defense Siren (100 ft)	130		
Commercial Jet Take-off (200 ft)	120		Threshold of Pain
			*32 times as loud
Pile Driver (50 ft)	110	Rock Music Concert	*16 times as loud
Ambulance Siren (100 ft)	100		Very Loud
Newspaper Press (5 ft)			*8 times as loud
Power Lawn Mower (3 ft)			
Motorcycle (25 ft)	90	Boiler Room	*4 times as loud
Propeller Plane Flyover (1,000 ft)		Printing Press Plant	
Diesel Truck, 40 mph (50 ft)			
Garbage Disposal (3 ft)	80	High Urban Ambient Sound	*2 times as loud
Passenger Car, 65 mph (25 ft)			Moderately loud
Living Room Stereo (15 ft)			*70 decibels
Vacuum Cleaner (3 ft)	70		(Reference Loudness)
Electronic Typewriter (10 ft)			
Normal Conversation (3 ft)	60	Data Processing Center	*1/2 as loud
Air Conditioning Unit (100 ft)		Department Store	
Light Traffic (100 ft)	50	Private Business Office	*1/4 as loud
Bird Calls (distant)	40	Lower Limit of Urban	Quiet
		Ambient Sound	*1/8 as loud
Soft Whisper (5 ft)	30	Quiet Bedroom	Very quiet
	15	Recording Studio	Extremely quiet
	0		Threshold of Hearing

Source: URS Corporation, 2005.

The minimum change in the sound level of individual events that an average human ear can reliably detect in a community environment is approximately 1 to 2 dBA. Changes of 3 to 5 dBA are more easily perceived. A change in sound level of 10 dBA is usually perceived by the average person as a doubling (or halving) of the sound's loudness; this relation holds true for loud sounds and for quiet sounds. Because of the logarithmic scale of the decibel unit, sound levels cannot be added or subtracted arithmetically and are somewhat cumbersome to handle mathematically. However, a simple rule of thumb is useful in dealing with sound levels: if a sound's physical intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example, 60 dB plus 60 dB equals 63 dB, and 80 dB plus 80 dB equals 83 dB. A perception of doubling of sound level requires about a 10 decibel increase.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that create a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent continuous sound or noise level (L_{eq}) (equivalent sound level) is used to describe the average acoustical energy in a time-varying sound. L_{eq} is the energy-mean A-weighted sound level present or predicted to occur during a specified interval. It is the equivalent constant sound level that a given source would need to produce to equal the fluctuating level of measured sound. It is also beneficial to know the range of acoustic levels of the noise source being measured. This is accomplished through the maximum noise level (L_{max}) and (L_{min}) noise descriptors. They represent the root-mean-square maximum and minimum obtainable noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location represents the quietest moment occurring during the measurement period and is often called the acoustic floor for that location. Likewise the loudest momentary sound during the measurement is represented by the L_{max}.

To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} (or other percentile values) may be used. They are the noise levels equaled or exceeded 10, 50, and 90 percent, respectively, of the time during the measured interval. The percentile descriptors are most commonly found in nuisance noise ordinances to allow for different noise levels for various portions of an hour. For example, the L_{50} value would represent 30 minutes of an hour period, the L_{25} would be associated with 15 minutes of an hour, and so on. Of particular interest in this analysis are other descriptors of noise that are commonly used to help determine noise/land use compatibility and to predict an average community reaction to adverse effects of environmental noise, including traffic-generated and industrial noise. One of the most universal descriptors is the Day-Night Average Sound Level (L_{dn}). As a result of recommendation by the State Health Department and state planning law, this descriptor is used by planning agencies. The L_{dn} noise metric represents a 24-hour period and applies a time-weighted factor designed to penalize noise events that occur during nighttime hours, when relaxation and sleep disturbance is of more concern. Noise occurring during the daytime hours between 7:00 A.M. and 10:00 P.M. receives no penalty. Noise occurring between 10:00 P.M. and 7:00 A.M. is penalized by adding 10 dB to the measured level. In California, the use of the Community Noise Equivalent Level (CNEL) descriptor is still permitted and is utilized by the City of Irvine. CNEL is identical to L_{dn} except CNEL adds a 5 dB penalty for noise occurring during evening hours between 7:00 P.M. and 10:00 P.M.

5.7.1.2 Vibration Terminology

Ground-borne vibration is a small, rapidly fluctuating motion transmitted through the ground. Ground-borne vibration diminishes (or attenuates) fairly rapidly over distance. Some soil types transmit vibration quite efficiently; other types (primarily sandy soils) do not. There are several basic measurement units commonly used to describe the intensity of ground vibration. The descriptor used by FTA is the velocity decibel, abbreviated VdB. The velocity parameter best correlates with human perception of vibration. Thus, the response of humans to vibration is described in this section in terms of the root-mean square (RMS) velocity level in VdB units. As a point of reference, the average person can just barely perceive vibration velocity levels around

65 VdB (typically in the vertical direction). Caltrans uses the Peak Particle Velocity (PPV) in inches per second (in/sec) as its vibration descriptor. It is more closely associated with damage criteria for buildings and structures (beginning at 0.2 in/sec PPV) but also provides a human perception threshold (0.02 in/sec PPV).

5.7.1.3 Noise Regulations

The FRB Landfill is located in an unincorporated area of Orange County. Currently no noise/vibration-sensitive receptors are located within the unincorporated area near the FRB Landfill. All sensitive receptors are now (or are expected to be) located within the municipal boundaries of the City of Irvine. Thus, for noise and vibration emissions from the FRB Landfill the jurisdictional regulations applicable to this project are those of the City of Irvine. Noise emission from licensed vehicles operating lawfully on public roads is pre-empted from local control and is controlled by state law. However, local and state law enforcement officers are authorized to enforce the vehicle noise regulations contained in the California Vehicle Code. Local jurisdictions are permitted (and encouraged by state legislation) to establish planning guidelines for compatibility between land-use and noise/vibration sources. The City of Irvine's General Plan Noise Element (Element F) contains interior and exterior noise standards for a variety of land use types, using the CNEL noise metric. As listed in Table F-1 of the Noise Element, for residential land uses the exterior (i.e., private yard, patio or balcony) noise standard is 65 dBA CNEL. For single-family and multi-family residential units the interior noise standard is 45 dBA CNEL with windows closed and 55 dBA CNEL with windows open.

The City of Irvine regulates nuisance noise in Title 6 – Public Works, Division 8 – Pollution, Chapter 2 – Noise, of the Irvine Municipal Code. Section 6-8-204 designates noise zones to similar types of land uses. The Irvine noise zone designations are:

- Noise Zone 1 – All hospitals, libraries, churches, schools and residential properties.
- Noise Zone 2 – All professional office and public institutional properties.
- Noise Zone 3 – All commercial properties excluding professional office properties.
- Noise Zone 4 – All industrial properties.

Per Section 6-8-204, the exterior noise at receptors in the above-described noise zones is not to exceed the levels given in Table 5.7-2.

TABLE 5.7-2
CITY OF IRVINE EXTERIOR NOISE STANDARDS

Noise Zone	Daytime Level					Nighttime Level				
	L_{50}	L_{25}	$L_{8.3}$	$L_{1.6}$	L_{max}	L_{50}	L_{25}	$L_{8.3}$	$L_{1.6}$	L_{max}
1	55	60	65	70	75	50	55	60	65	70
2	55	60	65	70	75	55	60	65	70	75
3	60	65	70	75	80	60	65	70	75	80
4	70	75	80	85	90	70	75	80	85	90

Source: Irvine Municipal Code, Title 6, Division 8, Chapter 2, Section 6-8-204.

The City of Irvine regulates construction noise in Section 6-8-205 of the Municipal Code. Per Section 6-8-205(A), construction activities are permitted between 7:00 A.M. and 7:00 P.M, Mondays through Fridays, and between 9:00 A.M. and 6:00 P.M. on Saturdays. No construction activities are permitted on Sundays or federal holidays. The section also states that "[t]rucks, vehicles, and equipment that are making or are involved with material deliveries, loading, or transfer of materials … for or within any construction project shall not be operated or driven on City streets outside of these hours or on Sundays or federal holidays".

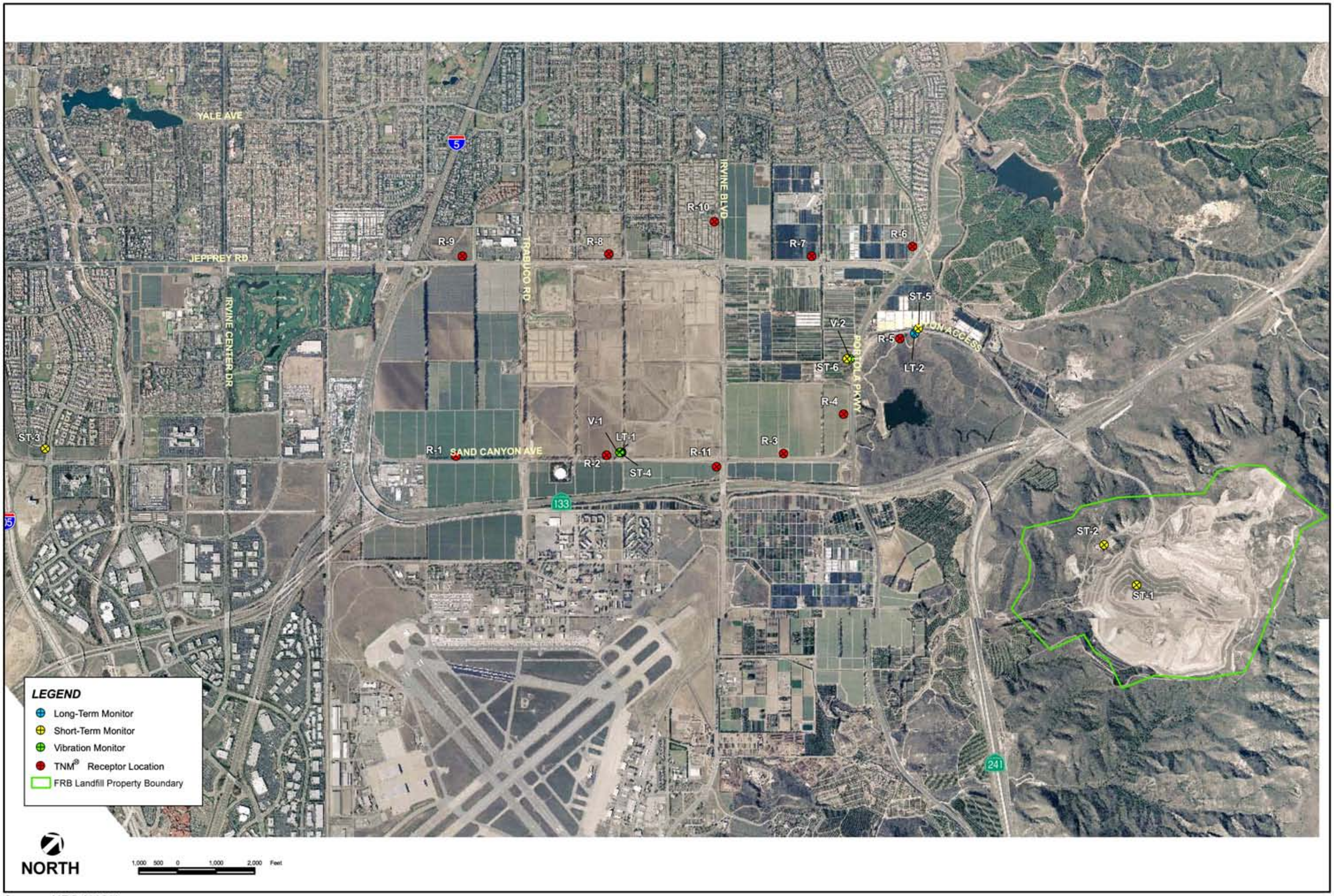
In Title 6 – Public Works, Division 7 – Refuse, Chapter 4 – Equipment Standards, Section 6-7-401 – Vehicles, the Irvine Municipal Code requires that vehicles used in the collection and disposal of solid waste conform to the California Vehicle Code. The section incorporates Title 6, Division 8, and Chapter 2 of the Municipal Code and requires that waste collection vehicles conform to the allowable exterior noise levels, which are shown in Table 5.7-2.

5.7.1.4 Ambient Noise Survey

A noise survey was conducted on Wednesday and Thursday, September 7 and 8, 2005 to evaluate existing noise conditions in the project area. The survey included noise measurements at the project site and adjacent to nearby existing and planned future noise-sensitive receptors. The measurement locations are shown in Figure 5.7-1. During the measurement survey, traffic noise was found to be the primary source of noise within the general area, while noise associated with landfill activities was found to be the primary noise source on the FRB Landfill site. The noise associated with transport of waste to the FRB Landfill was a contributor to noise adjacent to Bee Canyon Access Road, Sand Canyon Avenue and Portola Parkway in the City of Irvine. Noise from on-site landfill activities was not audible at nearby existing and planned future noise-sensitive receptors during the noise survey.

Eleven noise measurements were conducted at six locations. These measurement locations were on the FRB Landfill site and along the primary route from the San Diego Freeway (I-405) to the FRB Landfill. Two of the measurements were unattended, long-term (25+ hours duration, LT). The other nine short-term (10 to 15 minutes duration, ST) measurements were conducted by an experienced noise engineer. Weather conditions during the measurements were characterized by clear sunny skies, mild to moderate temperatures (68 to 85 degrees Fahrenheit) and variable, light winds (2 to 10 miles per hour). Relative humidity ranged from 37 to 59 percent. These climatic conditions did not adversely affect the sound measurement accuracy.

LT noise measurements were made with Larson Davis 820 Type 1 (Precision grade) and Metrosonics dB 308 Type 2 (Engineering grade) community noise analyzers (CNA). For both of the LT noise measurements, the CNA was enclosed in a lockable, weather-resistant metal box. The box was positioned so that the microphone was approximately five feet above the ground. The CNA was set to slow time response mode on the A-weighted decibel (dBA) scale. To ensure accuracy, the laboratory calibration of the CNA was field checked before and after each measurement.



Source:URS (2005).

Figure 5.7-1
Noise Measurement Locations

The 24 hour noise data from LT-1 and LT-2 and the calculated CNEL value is shown in Table 5.7-3. The hourly noise levels (in dBA L_{eq}) for LT-1 and LT-2 are presented in Figures 5.7-2 and 5.7-3.

TABLE 5.7-3
LONG-TERM NOISE MEASUREMENT DATA

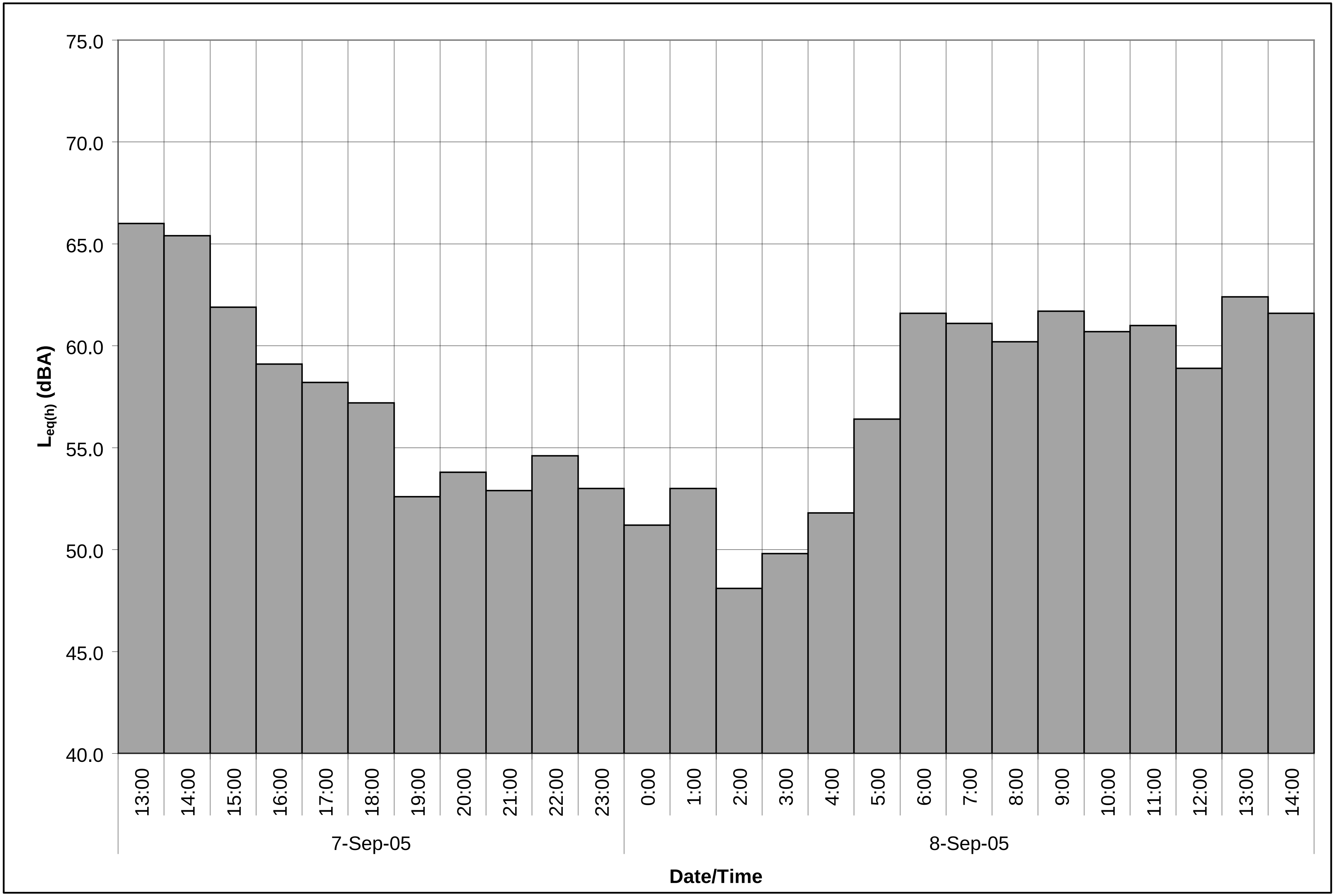
Site ID	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Start Date	Start Time	Duration (hh:mm)		L_{eq}	L_{90}	L_{50}	L_{10}	L_{dn}	CNEL
LT-1	SW corner of Sand Canyon & Towngate (future street) 200 feet from centerline of existing Sand Cyn	9/7/2005	14:00	24:00	traffic on Sand Canyon, excavation/ grading north of Towngate	59	43	53	62	63	63
LT-2	E side of Bee Canyon Access @ 1st turnout north of Portola, 80 feet from centerline	9/7/2005	16:00	24:00	truck traffic on Bee Canyon Access Road	66	40	47	69	68	69

Source: URS Corporation, 2005.

Based on observations, many of the heavy trucks using Sand Canyon were associated with the FRB Landfill activity. However, numerous other heavy trucks and all other vehicles (e.g., autos, pick-ups, SUVs, busses) and local construction equipment were not associated with the FRB Landfill. Conversely, all traffic on Bee Canyon Access Road was associated with the FRB Landfill activities.

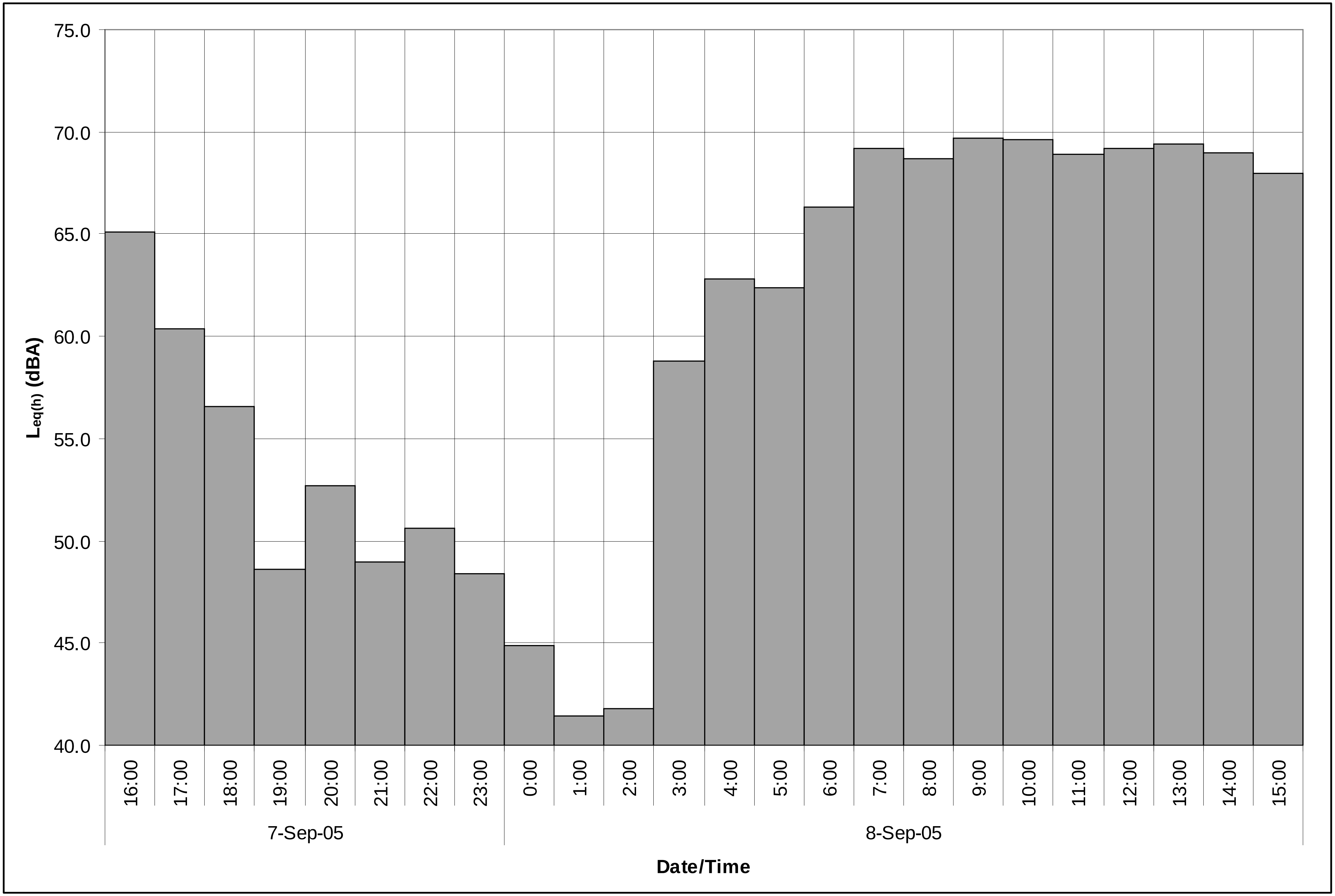
ST noise measurements were made with a Brüel and Kjær Model 2231 Type 1 (Precision grade) sound level meter (SLM). For all of the ST noise measurements, the SLM was positioned so that the microphone was approximately 5 feet above the ground. The SLM was set to slow time response mode on the A-weighted decibel (dBA) scale. Instruments requiring certification (e.g., SLM, acoustic calibrator, and CNA described previously) were laboratory-calibrated by the respective equipment suppliers, with calibration traceable to the National Institute of Standards and Technology. To ensure accuracy, the laboratory calibration of the SLM was field checked before and after each measurement.

On-site noise measurements (ST-1 and 2) were conducted to quantify noise levels from existing landfill activities, while the off-site measurements (ST-3 thru 6) focused upon ambient noise conditions at nearby existing and planned residential areas (generally southerly of the project site). Table 5.7-4 shows the results of the short-term noise measurements in terms of L_{eq}, L_{max}, L_{min} , L_{90} L_{50} and L_{10} noise metrics.



Source:URS (2005).

Figure 5.7-2
Hourly Noise Levels (Sand Canyon Avenue)



Source:URS (2005).

Figure 5.7-3
Hourly Noise Levels (Bee Canyon Access Road)

TABLE 5.7-4
SHORT-TERM NOISE MEASUREMENT DATA

Measurement ID	Measurement Location	Measurement Period			Noise Sources	Measurement Results, dBA					
		Date	Start Time	Duration (minutes)		L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
ST-1	Dumping/compacting area east of flare site at 250 feet	9/7/2005	9:35	15:00	Landfill Tipping & Compacting Activities	75	83	68	72	75	77
ST-2	Flare station at 100 feet	9/7/2005	10:30	10:00	Flares machinery noise	63	66	62	63	63	64
ST-3	Alton, 400 feet west of Sand Canyon	9/7/2005	11:20	10:00	Traffic & construction activity	63	72	55	57	61	67
ST-4a	Southwest Corner of Sand Canyon & Towngate approximately 100 feet west of existing traffic lanes	9/7/2005	13:45	15:00	Traffic & heavy construction equipment	63	76	49	52	61	65
ST-4b		9/7/2005	14:00	15:00		62	76	49	52	61	65
ST-5a	Bee Canyon Access Road first driveway north of Portola	9/7/2005	14:50	5:00	Traffic	74	86	44	47	60	80
ST-5b		9/7/2005	14:55	15:00		75	95	42	45	60	80
ST-6a	Portola Parkway south of Bee Canyon, at Hines Nursery	9/7/2005	15:35	5:00	Traffic; Distant Irrigation (Rainbirds)	50	58	44	46	48	53
ST-6b		9/7/2005	15:40	15:00		53	67	44	46	48	46

Source: URS Corporation, 2005.

5.7.1.5 Ambient Vibration Survey

Ambient vibration measurements were also conducted during the September 8, 2005 survey period. Six attended vibration (V) measurements were made at two different off-site locations along the primary truck route to the FRB Landfill. The vibration measurement sites were chosen to represent potentially vibration-sensitive land uses. The measurement locations are shown on Figure 5.7-1 and are described in Table 5.7-5. Measurements were made during periods of normal traffic volumes (including numerous heavy trucks) in order to collect typical background vibration data.

TABLE 5.7-5
SHORT-TERM VIBRATION MEASUREMENT DATA

Site ID	Location	8/3/2005 Start Time	Duration (min:sec)	Vibration Sources	L_V* (VdB re inch / second)	PPV** (inch /second)
V-1a	SW Corner of Sand Canyon & Towngate (south of Irvine Blvd, north of Trabuco)	13:33	5:00	Traffic on existing Sand Canyon; 7 Heavy Trucks, 1 Med Truck, CAT330C excavator & CAT front end loader across townhome, ~250'	48	0.0010
V-1b		13:40	5:00	7 Heavy, 1 Medium Trucks, spike @~66.5Hz, lo-freq (0-30Hz) from construction?	47	0.0009
V-2a	Hines Nursery, SE of Portola Pkwy/Bee Canyon Intersection	15:34	5:00	on Portola: 3 Heavy Trucks, 7 Medium Trucks	46	0.0008
V-2b		15:41	5:00	on Portola: 2 Heavy Trucks, 5 Medium Trucks, None visible in eastbound lanes	47	0.0009
V-2c		15:49	5:00	on Portola: 3 heavy trucks, 4 medium trucks, 2 heavy trucks and 2 medium trucks in close lane	51	0.0014
V-2d		15:55	5:00	on Portola: some heavy & medium trucks in close lane, tractor drive-by on path	47	0.0009

* $L_v = 20\times\log_{10}(V_{rms}/V_{ref})$, where V_{rms} is the average particle velocity and V_{ref} is the reference particle velocity of 10^{-6} inches per second

** $PPV \approx 4*V_{rms}$

Source: URS Corporation, 2005.

Because local jurisdictions have not developed methods for measuring and evaluating ground vibration and its effects, the methodology promulgated by the Federal Transit Administration (FTA) was used in this study. The FTA *Transit Noise and Vibration Impact Assessment Manual* (1995) provides vibration impact criteria and recommended methodologies and guidance for assessment of vibration effects. Consistent with the FTA recommended methodology, the vibration measurements were performed with a SLM/Real Time Analyzer (RTA) in Fast Fourier Transform (FFT) mode using an accelerometer as the vibration sensor. Refer to Appendix A for the complete equipment list. The accelerometer was mounted with a threaded steel stud to a 10 kilogram seismic mass. For each vibration measurement, the mass was placed on the ground and leveled, coupling the sensor to the ground and ensuring maximum response to vibrations in the vertical axis. The measured frequency range was 5 Hz to 200 Hz with a resolution of 0.5 Hz. The vibration spectrum was sampled twice per second and averaged over a period of five minutes. Six separate measurements were conducted. All of the measurements were of the ambient environment that included typical traffic. While conducting the ground vibration measurements in proximity to future residences none of the measured ground vibration was perceptible to any of the field survey personnel.

Post-processing was performed to calculate the overall velocity vibration level (L_v) in units of decibels (VdB) relative to 1 micro-inch per second. Appendix C, of the Noise and Vibration Study, contains the vibration spectra and Table 5.7-5 summarizes the calculated L_v values. The decibel L_v values were also converted to their equivalent linear root-mean-square particle velocity and peak particle velocity using the following relations:

$$V_{rms} = 10^{-6} \times 10^{\frac{L_v}{20}} \qquad\qquad PPV \cong 4V_{rms}$$

Where Vrms is the average particle velocity across all frequencies and PPV is the peak particle velocity. The peak particle velocity is approximately equal to four times the rms velocity, as discussed in Section 7.1.2 of the FTA manual.

5.7.2 THRESHOLDS OF SIGNIFICANCE

CEQA requires that an EIR identify the significant environmental effects of the project (CEQA Guidelines Section 15126), but does not promulgate specific thresholds for significance. Instead, CEQA Guidelines Section 15064(b) states that “the determination . . . calls for careful judgment on the part of the public agency involved . . . “and that “an ironclad definition of significant effect is not possible because the significance of an activity may vary with the setting.” CEQA encourages lead agencies to develop and publish their own thresholds of significance for the purpose of determining the significant effects of their projects.

The City of Irvine has no standardized significance criteria for CEQA documents but develop such criteria for each project based on the methods outlined in the CEQA guidelines. The fundamental definition of significant effect under CEQA is “a substantial adverse change in physical conditions.” This criterion underlies the evaluation of environmental impacts for most of the impact issues identified in the CEQA Environmental Checklist Form (Guidelines Appendix G). Some impact categories lend themselves to scientific or mathematical analysis, and therefore to quantification. Some categories have significance thresholds established by regulatory agencies, such as the regional air quality management district. For other impact categories that are more qualitative or are entirely dependent on the immediate setting, a hard-and-fast threshold is not generally feasible, and the "substantial adverse change in physical conditions" is applied as the significance criterion. Thus, based on CEQA Guidelines and its Appendix G Checklist, plus Caltrans and FTA Vibration Criteria, the following was used in the determination of significant adverse impact under CEQA. A significant project impact would occur if the project would result in any of the following:

- Exposure of persons to or generation of noise levels in excess of standards established in local general plans or noise ordinances.

- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels (frequent vibration levels in excess of 72 VdB are generally considered intrusive for residential uses).

- A substantial permanent increase in ambient noise in the project vicinity (an increase of 5 to10 dBA is generally considered substantial).

- A substantial temporary or periodic increase in ambient noise levels in the project vicinity (an increase of 15 dBA is generally considered substantial for this type of noise increase).

5.7.3 METHODOLOGY

Potential impacts from short-term and long-term stationary and mobile noise and vibration sources associated with the proposed FRB Landfill expansion were quantitatively assessed. The sources include on-site construction activities (i.e., preparation of new cells as applicable); refuse activities, including tipping, spreading, compacting and overcovering; landfill gas recovery and combustion; and trash truck/transfer truck traffic on adjacent roadways. Noise and vibration levels from short- and long-term stationary and mobile noise/vibration sources associated with the proposed project were compared to City of Irvine and Caltrans/FTA standards. Changes in noise levels due to the project were evaluated. This included an evaluation of whether noise generated from on-site operations could impact local residences or other noise-sensitive land uses. Noise would be generated from heavy equipment involved in grading and construction, which could add to existing on-site noise levels. Off-site truck trips would increase as a result of the project, which would incrementally increase traffic noise in the area. The size and configuration of the landfill activity locations will change in the future (e.g., construction activity will shift within the FRB Landfill and the landfill gas flare may be relocated), and the landfill operations will be extended further into the future. The proposed project has two distinct components that are similar acoustically: construction activities and operational (i.e., refuse) activities, as well as a fixed location noise source (gas flare) and a future LNG facility.

5.7.4 IMPACTS

5.7.4.1 Construction Noise

Noise from construction activities for the proposed project would be essentially the same as operational noise from refuse processing. Operational noise was measured and is identified in Table 5.7-4 as ST-1. Large earth movers, wheeled tractor scrapers, tracked spreader-compactors, large bulldozers, and heavy trucks were monitored as the refuse activities were fully in progress on the FRB Landfill site[1]. From the noise monitoring location overlooking the construction site, there was an unobstructed view of the construction/refuse activity. As shown in Table 5.7-4, the noise level during the 15-minute measurement was 75 dBA L_{eq} and L_{50}. The distance from the SLM to the nominal acoustic center of the refuse/construction activity was approximately 250 feet.

Noise levels from construction/operational activity decrease at a rate of 6 decibels or more per doubling of distance. At a distance of 1,600 feet (the approximate distance from the construction activity to the nearest existing or planned residential land use), the noise level from construction activity would be approximately 59 dBA L_{eq}/L_{50}. Attenuation due to soft ground effects and atmospheric absorption would reduce these noise levels by approximately 4.5 dB and 1.5 dB, respectively, yielding 53 dBA L_{eq}/L_{50}. This noise level is within the noise limits permitted by City of Irvine regulations. Also, this noise level would not substantially increase the ambient noise level either permanently, temporarily or intermittently in noise-sensitive locations. Project construction activity would not cause an adverse environmental impact. To be conservative, the noise analysis prepared by URS Corporation did not take credit where intervening terrain between the construction/refuse activity and the nearest planned residences acts as a noise barrier providing an additional 5 dB noise reduction**.** This would be the case for much of the activity at the FRB Landfill. Thus, the noise level from on-site FRB Landfill activities at the nearest existing or planned residential land use would typically be approximately 48 dBA L_{50} or less.

5.7.4.2 Operational Noise

Operational noise (also referred to as refuse noise) is the same as the construction noise discussed above and the analysis applies identically.

An additional on-site operational noise source is the flaring station. Based on the ST-2 measurements, the overall noise from the flaring station is 62 dBA L_{eq}/L_{50} at a distance of 100 feet. This noise level would reduce to 38 dBA L_{eq}/L_{50} at a distance of 1600 feet away, without accounting for soft ground propagation, atmospheric absorption or landform shielding. Thus, flare noise would likely be inaudible at any off-site location and is an insignificant noise source.

An LNG facility was previously analyzed and approved for construction at the FRB Landfill. After incorporation of noise reducing features the noise level produced will be 50 dBA L_{50}, or

[1] The active vehicles were six large transfer trucks, three trash trucks, plus specialized heavy vehicles (spreader/compactors, bulldozers, dirt haulers, etc.) consisting of Caterpillar equipment # 836G, 836, D10R, D92, D9R, D9N, and two 657E.

less, at the FRB Landfill property boundary. Thus, similar to the flare station, LNG noise would likely be inaudible at any off-site location and is an insignificant noise source.

The operational noise level is within the noise limits permitted by City of Irvine regulations. Also, this noise level would not substantially increase the ambient noise level in noise-sensitive locations either permanently, temporarily or intermittently. Project operational activity would not cause a significant adverse impact.

5.7.4.3 Off-Site Project-Related Traffic Noise

Off-site noise associated with the proposed project (from waste hauling trucks and employee vehicles) was assessed using the Federal Highway Administrations (FHWA) Traffic Noise Model (TNM®) version 2.5. The model uses national Reference Mean Emission Levels for several types of vehicles including automobiles, medium trucks, heavy trucks, buses and motorcycles to compute hourly noise levels (L_{eqH}). Using traffic volumes, speeds, and typical setback distances for the Irvine area, the resultant predicted future-with-project and future-without-project noise levels were compared to existing noise levels to assess the project's potential noise effects. Future predicted noise levels were computed for representative locations within the project area at which noise-sensitive uses (residential) are planned or are currently being constructed. The projected traffic volumes, vehicle mixes and travel speeds used in the noise analysis were gathered from the traffic study completed for the project. Based upon field observations and input from City of Irvine staff, a typical source-receptor distance of 100 feet from model receiver to roadway centerline was used.

Traffic noise impacts, evaluated against City of Irvine noise impact criteria, were estimated for 11 representative noise-sensitive receivers. The detailed results of the noise impact assessment are presented in Tables 5.7-6 and 5.7-7. Table 5.7-6 presents the results of the noise modeling using the assumption that soundwalls are not constructed as part of planned construction within the project area. Table 5.7-7 presents the predicted results using the same traffic volumes and other parameters, but with the assumption that soundwalls, berms or equivalent traffic noise abatement features would be constructed as part of the planned residences, in conformance with City of Irvine design standards. Specifically, Table 5.7-7 reflects the noise modeling assumption that 7-foot high walls would be constructed as part of the planned residential uses.

As shown in Table 5.7-6, existing noise levels at the representative receptors are predicted to range from 67 dBA CNEL at Receptor #7 (Jeffrey Road between Irvine Boulevard and Portola Parkway) to 72 dBA CNEL at Receptors 8, 9 and 11 (locations along Jeffrey Road and Irvine Boulevard). In 2030, noise levels are predicted to range from 48 dBA CNEL at Receptor #5 in the Future-without-Project scenario to 78 dBA CNEL at Receptor #1 (Sand Canyon Avenue between I-5 and Trabuco Road). At Receptor #5, the noise levels are predicted to decrease under the Future-without-Project scenario compared to existing conditions because project traffic would cease to travel within the project area following the closure of the landfill. With the exception of Receptor #5, noise levels in Year 2030 would increase 4 to 9 decibels either with or without the proposed project. The project itself would not perceptibly increase noise levels.

As shown in Table 5.7-7, existing noise levels with anticipated soundwalls at the representative receptors are predicted to range from 59 dBA CNEL at Receptor #7 to 64 dBA CNEL at Receptors 8 and 9 (locations along Jeffrey Road). In 2030, noise levels with the project are predicted to range from 55 dBA CNEL at Receptor #5 in the Future-without-Project scenario to 70 dBA CNEL at Receptor # 1. With the exception of Receptor #5, noise levels in 2030 would increase 4 to 9 decibels either with or without the proposed project. The project itself would not perceptibly increase noise levels. The proposed project would not result in a significant adverse noise impact from off-site traffic operations.

TABLE 5.7-6
PREDICTED EXTERIOR NOISE LEVELS ASSUMING NO SOUNDWALLS

Receptor #	Receptor Location	Modeled[1] Existing Ambient Peak-Noise-Hour (dBA L_{eqH} / CNEL[2])	Modeled[1] Future (Year 2030) without Project Peak-Hour Noise Level (dBA L_{eqH} / CNEL[2])	Modeled[1] Future (Year 2030) with Project Peak-Hour Noise Level (dBA L_{eqH} / CNEL[2])	Estimated Future with Project Increase Over Existing Noise Level (dBA)	Estimated Project-Related Noise Increase (dBA)
1	Sand Canyon Avenue / I-5 Freeway to Trabuco Rd	70	78	78	8	0
2	Sand Canyon Avenue / Trabuco Rd to Irvine Blvd	68	76	76	8	0
3	Sand Canyon Avenue / Irvine Rd to Portola Pkwy	69	75	76	7	1
4	Portola Parkway / Sand Canyon Ave to Landfill Entrance	70	74	75	5	1
5	Bee Canyon Access Road	69	48	70	1	22
6	Portola Parkway / Jeffrey Road to Yale Avenue	70	75	75	5	0
7	Jeffrey Road / Irvine Blvd to Portola Pkwy	67	76	76	9	0
8	Jeffrey Road / Irvine Blvd to Trabuco Rd	72	76	76	4	0
9	Jeffrey Road / I-5 Freeway Trabuco Rd	72	77	77	5	0
10	Irvine Boulevard /Jeffrey Rd to Yale Ave	70	75	75	5	0
11	Irvine Boulevard / Sand Cyn toSR-133	72	76	76	4	0

1. Existing and Future peak-noise-hour noise level from proposed project, derived from the FHWA TNM® noise model, using peak-hour traffic volumes, P & D Consultants.
2. Based upon an examination of the long-term noise measurements, peak-noise-hour noise level and CNEL are approximately equivalent for this area.

Source: URS Corporation, 2005.

TABLE 5.7-7
PREDICTED EXTERIOR NOISE LEVELS ASSUMING 7-FOOT HIGH SOUNDWALLS

Receptor #	Receptor Location	Modeled[1] Existing Ambient Peak-Noise-Hour (dBA L_{eqH} / CNEL[2])	Modeled[1] Future (Year 2030) without Project Peak-Hour Noise Level (dBA L_{eqH} / CNEL[2])	Modeled[1] Future (Year 2030) with Project Peak-Hour Noise Level (dBA L_{eqH} / CNEL[2])	Estimated Future with Project Increase Over Existing Noise Level (dBA	Estimated Project-Related Noise Increase (dBA)
1	Sand Canyon Avenue / I-5 Freeway to Trabuco Rd	62	70	70	8	0
2	Sand Canyon Avenue / Trabuco Rd to Irvine Blvd	60	68	68	8	0
3	Sand Canyon Avenue / Irvine Rd to Portola Pkwy	60	67	67	7	0
4	Portola Parkway / Sand Canyon Ave to Landfill Entrance	61	66	66	5	0
5	Bee Canyon Access Road	62	47	63	1	16
6	Portola Parkway / Jeffrey Road to Yale Avenue	61	67	67	6	0
7	Jeffrey Road / Irvine Blvd to Portola Pkwy	59	67	68	9	1
8	Jeffrey Road / Irvine Blvd to Trabuco Rd	64	68	68	4	0
9	Jeffrey Road / I-5 Freeway Trabuco Rd	64	69	69	5	0
10	Irvine Boulevard /Jeffrey Rd to Yale Ave	62	67	67	5	0
11	Irvine Boulevard / Sand Cyn toSR-133	63	67	67	4	0

1. Existing and Future peak-noise-hour noise level from proposed project, derived from the FHWA TNM® noise model, using peak-hour traffic volumes as provided by P & D Consultants.
2. Based upon an examination of the long-term noise measurements, peak-noise-hour noise level and CNEL are approximately equivalent for this area.

Source: URS Corporation, 2005.

5.7.4.4 6 A.M. To 7 A.M. Hour Traffic Noise Levels

Traffic noise levels were also calculated for the period from 6 A.M. to 7 A.M., because the project proponents are considering beginning operations of transfer trucks during the 6 A.M. to 7 A.M. hour. During the 6 A.M. to 7 A.M. hour, transfer trucks would travel along the designated truck route (i.e., Sand Canyon and Portola Parkway). Traffic data from the project's traffic report was used to predict noise levels during the 6 A.M. to 7 A.M. hour using the FHWA TNM® noise model. The resultant levels are shown in Tables 5.7-8 and 5.7-9. Table 5.7-8 presents the results of the noise modeling using the assumption that soundwalls are not constructed as part of planned construction within the project area. Table 5.7-9 presents the predicted results using the same traffic volumes and other parameters, but with the assumption that soundwalls, berms or equivalent traffic noise abatement features would be constructed as part of the planned residences, in conformance with City of Irvine design standards.

As shown in Table 5.7-8, existing noise levels during the 6 A.M. to 7 A.M. hour at the representative receptors are predicted to range from 67 dBA L_{eqh} at Receptors 4 and 5 to 70 dBA L_{eqh} at Receptor #11. In 2030, noise levels are predicted to range from 41 dBA L_{eqh} at Receptor #5 in the Future-without-Project scenario to 75 dBA L_{eqh} at Receptors 1 and 2. At Receptor #5, the noise levels are predicted to decrease under the Future-without-Project scenario compared to existing conditions because project traffic would cease to travel within the project area following the closure of the landfill. With the exception of Receptor #5, noise levels in 2030 would increase 4 to 8 decibels either with or without the proposed project. The project itself would not perceptibly increase noise levels.

As shown in Table 5.7-9, existing noise levels during the 6 A.M. to 7 A.M. hour at the representative receptors are predicted to range from 59 dBA L_{eqh} at Receptor 4 to 61 dBA L_{eqh} at Receptor 11. In the Year 2030, noise levels are predicted to range from 41 dBA L_{eqh} at Receptor #5 in the Future-without-Project scenario to 67 dBA L_{eqh} at Receptors 1 and 2. At Receptor #5, the noise levels are predicted to decrease under the Future-without-Project scenario compared to existing conditions because project traffic would cease to travel within the project area following the closure of the landfill. With the exception of Receptor #5, noise levels in Year 2030 would increase 4 to 8 decibels either with or without the proposed project. The noise levels during the 6 A.M. to 7 A.M. hour would be several decibels lower overall than the noise levels during the peak noise hour. The project itself would not perceptibly increase noise levels.

TABLE 5.7-8
PREDICTED EXTERIOR NOISE LEVELS (6 TO 7 AM HOUR) ASSUMING NO SOUNDWALLS

Receptor #	Receptor Location	Modeled[1] Existing Ambient Peak-Noise-Hour (dBA L_{eqH})	Modeled[1] Future (Year 2030) without Project Peak-Hour Noise Level (dBA L_{eqH})	Modeled[1] Future (Year 2030) with Project Peak-Hour Noise Level (dBA L_{eqH})	Estimated Future with Project Increase Over Existing Noise Level (dBA)	Estimated Project-Related Noise Increase (dBA)
1	Sand Canyon Avenue / I-5 Freeway to Trabuco Rd	67	75	75	8	0
2	Sand Canyon Avenue / Trabuco Rd to Irvine Blvd	68	75	75	8	0
3	Sand Canyon Avenue / Irvine Rd to Portola Pkwy	68	73	73	5	0
4	Portola Parkway / Sand Canyon Ave to Landfill Entrance	67	71	72	5	1
5	Bee Canyon Access Road	67	N/A	67	0	N/A
11	Irvine Boulevard / Sand Cyn toSR-133	70	74	74	4	0

1. Existing and Future peak-noise-hour noise level from proposed project, derived from the FHWA TNM® noise model, using peak-hour traffic volumes as provided by P & D Consultants.

Source: URS Corporation, 2005.

TABLE 5.7-9
PREDICTED EXTERIOR NOISE LEVELS (6 TO 7 AM HOUR) ASSUMING 7-FOOT HIGH SOUNDWALLS

Receptor #	Receptor Location	Modeled[1] Existing Ambient Peak-Noise-Hour (dBA L_{eqh})	Modeled[1] Future (Year 2030) without Project Peak-Hour Noise Level (dBA L_{eqh})	Modeled[1] Future (Year 2030) with Project Peak-Hour Noise Level (dBA L_{eqh})	Estimated Future with Project Increase Over Existing Noise Level (dBA)	Estimated Project-Related Noise Increase (dBA)
1	Sand Canyon Avenue / I-5 Freeway to Trabuco Rd	59	67	67	8	0
2	Sand Canyon Avenue / Trabuco Rd to Irvine Blvd	60	67	67	7	0
3	Sand Canyon Avenue / Irvine Rd to Portola Pkwy	60	65	65	5	0
4	Portola Parkway / Sand Canyon Ave to Landfill Entrance	59	63	63	4	0
5	Bee Canyon Access Road	60	N/A	60	0	N/A
11	Irvine Boulevard / Sand Cyn toSR-133	61	65	65	4	0

1. Existing and Future peak-noise-hour noise level from proposed project, derived from the FHWA TNM® noise model, using peak-hour traffic volumes as provided by P & D Consultants.

Source: URS Corporation, 2005.

5.7.4.5 Vibration

Vibration generated by any contemplated on-site construction or operational activity will be confined to the FRB Landfill site due to attenuation with distance from the source. Vibration from this activity will not cause any significant adverse impact and no mitigation is required.

Vibration from off-site project-related heavy truck traffic was evaluated based on modeling and field measurements. At approximately 90 feet from travel routes (e.g., Sand Canyon, Portola) the ground vibration due to loaded trucks would be 0.011 inches/second Peak Particle Velocity (PPV), well below the Caltrans threshold of perception (0.02 in/sec PPV) and substantially below the minimum building damage threshold (0.20 in/sec PPV).

Measured vibration levels (from Table 5.7-5) were 46 to 51 VdB at distances ranging from 80 to 200 feet from the travel lane. These levels are well below the FTA perception threshold of 65 VdB and the impact criteria shown in Table 5.7-10 below. Worst case vibration would start to be perceived when closer than 20 feet to the road. In summary, vibration from project-related heavy truck activity on local roads will not cause any significant adverse impact and no mitigation is required.

TABLE 5.7-10
CRITERIA FOR IMPACT FOR HUMAN ANNOYANCE AND INTERFERENCE WITH USE OF VIBRATION-SENSITIVE EQUIPMENT*

		Ground-borne Vibration (VdB re 1 micro in/sec)	
		Events*	
Land Use Category	Category Comment	Frequent	Infrequent
1	Low interior ambient is essential	65	65
2	Residential & sleep	72	80
3	Institutional & daytime	75	83

* Frequent is defined as greater than or equal to 70 events per day
** See section 12.2.2 of FTA Manual re potential for structural damage to fragile structures if operational during transit events
Source: FTA, 1995

5.7.5 MITIGATION MEASURES

No significant adverse noise impacts at existing or planned noise-sensitive receptors will occur from construction or operational activities as a result of this project. Therefore, no mitigation measures are required for these activities.

No significant adverse vibration impacts at existing or planned noise-sensitive receptors will occur from construction or operational activities as a result of this project. Therefore, no mitigation measures are required for these activities.

The project will not cause significant off-site impacts from increased project-related traffic including heavy trucks and no mitigation measures are required.

No impact would result from traffic vibration associated with the proposed project and no mitigation measures are required.

5.7.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The potential impacts of the proposed project related to short-term and long-term noise and vibration will be below a level of significance.

5.8 BIOLOGICAL RESOURCES

This section describes the existing biological resources on the project site and in the project area, potential biological resources impacts, recommended mitigation measures to help reduce or avoid impacts to identified biological resources, and the level of significance after mitigation. The analysis in this section was summarized from the Frank R. Bowerman Landfill Master Development Plan Biological Resources Technical Report (P&D, 2005). This report is included as Appendix I of this EIR.

5.8.1 EXISTING CONDITIONS

5.8.1.1 Vegetation Communities and Wildlife Species

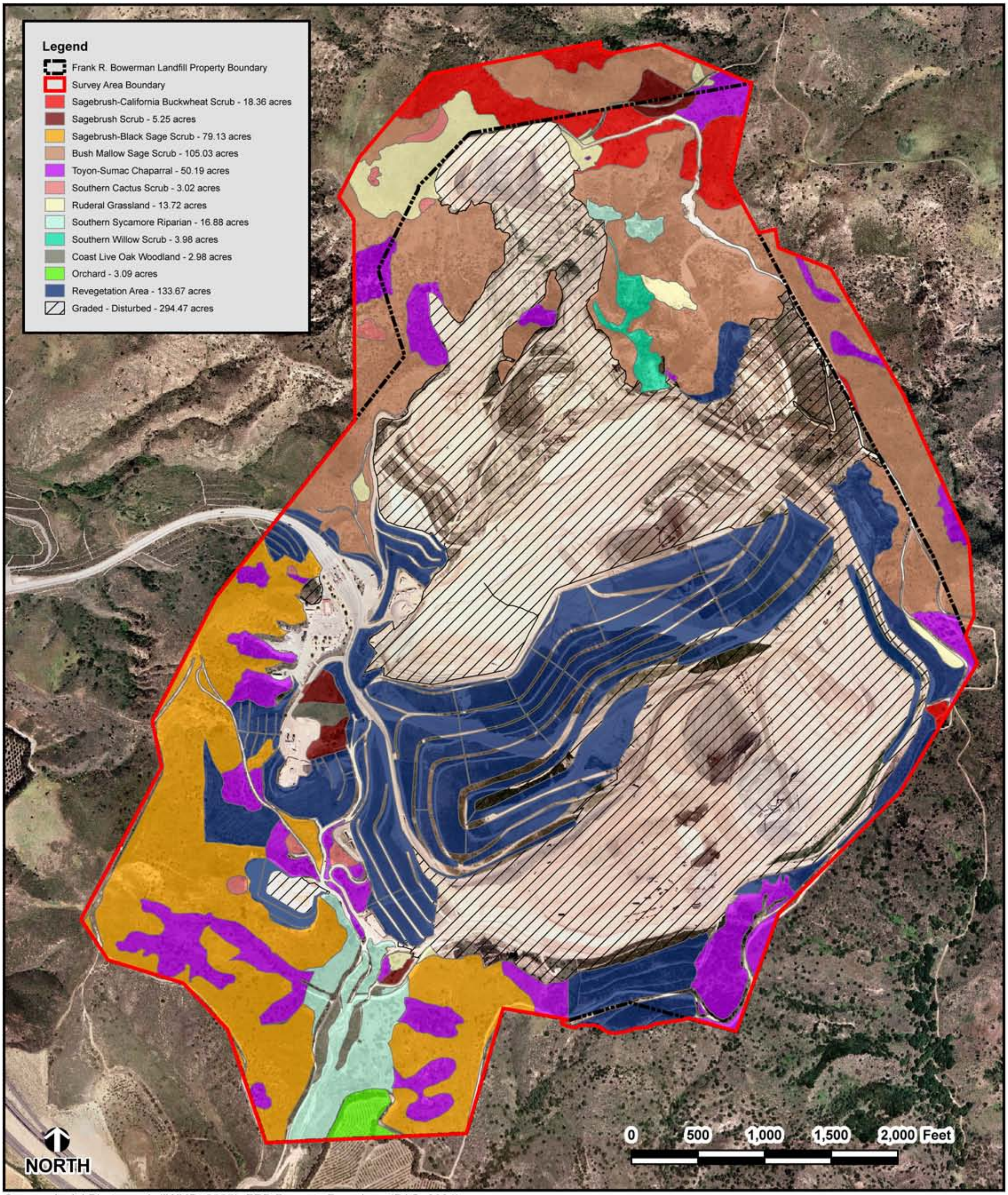
The survey area (as discussed in Section 5.8.3 Methodology) includes the FRB Landfill property boundary as well as the areas located off-site to the north and northeast. Twelve vegetation communities and subassociations were identified and mapped within the FRB Landfill survey area. These vegetation communities are shown in Figure 5.8-1. An in-depth description of each of these vegetation communities and their acreage totals in the survey area are provided below.

<u>Venturan-Diegan Transitional Coastal Sage Scrub</u>

Venturan-Diegan transitional coastal sage scrub (CSS) is a dominant scrub association throughout the survey area, with 207.77 total acres of CSS comprised of four subassociations occurring within the survey area. This scrub association is dominated by low stature, mesophyllous, drought deciduous species. This transitional association often contains elements of two recognized geographical associations of CSS: Venturan and Diegan. The Orange County Habitat Classification System (OCHCS) recognizes 12 subassociations of Venturan-Diegan transitional CSS, five of which occur in the survey area and which are described below and are shown in Figure 5.8-1. In addition to the subassociations, this association often integrates with grassland and chaparral communities.

The CSS plant community provides habitat for many special status animal and plant species. In particular, the coastal California gnatcatcher (CAGN) is highly dependent on this plant community for breeding and foraging habitat. Both the Diegan and Venturan CSS communities are ranked as very threatened by the California Department of Fish and Game (CDFG) (California Natural Diversity Database (CNDDB) 2005).

Wildlife species that would be expected in this CSS plant community (and its subassociations discussed below), include a moderate variety of reptiles, birds and small mammals. Examples of these would typically include western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), California quail (*Callipepla californica*), Bewick's wren (*Thryomanes bewickii*), California towhee (*Pipilo crissalis*), white-crowned sparrow (*Zonotrichia leucophrys*), Audubon's cottontail (*Sylvilagus auduboni*) and white-footed deer mouse (*Peromyscus maniculatus*).



Source: Aerial Photograph (IWMD, 2005); FRB Property Boundary (BAS, 2004)
Vegetation Communities (P&D, 2005).

Figure 5.8-1
Vegetation Communities

Sagebrush-California Buckwheat Scrub. California Sagebrush-California buckwheat scrub occupies 18.36 acres of the survey area. Vegetative cover varies from open to dense. This subassociation is dominated by California sagebrush (*Artemisia californica*) and California buckwheat (*Eriogonum* fasciculatum), and often includes other sage scrub species where the distribution is determined by factors such as slope, aspect and soil type. Other sage scrub species that may be co-dominant or sub-dominant include white sage (*Salvia apiana*), black sage (*Salvia mellifera*), California sunflower (*Helianthus californicus*), narrow-leaved bedstraw (*Galium angustifolium*), California wishbone bush (*Mirabilis californica*) and coastal goldenbush (*Isocoma menziesii var. menziesii*). Two woody shrub species that are also common chaparral components, lemonade berry (*Rhus integrifolia*) and laurel sumac (*Malosma laurina*), are also common as subdominants in this community. Native bunchgrasses, including purple needlegrass (*Nassella pulchra*), foothill needlegrass (*Nassella lepida*) and coast range melic (*Melica imperfecta*), often occur as understory in the spaces between the shrubs in this plant community.

The understory of this association is rich and includes a large number of spring, summer and fall annuals. Included in the annual plants are bulbiferous plants (e.g., mariposa lilies [*Calochortus* spp.]) and plants that overwinter by means of a caudex (e.g., East jepsonia [*Jepsonia parryi*]). Common spring annuals include rattlesnake weed (*Daucus pusillus*), California fluffweed (*Filago californica*), southern rosinweed (*Osmadenia tenella*), California chicory (*Rafinesquia californica*), Fremont's forget-me-not (*Cryptantha fremontii*), common forget-me-not (*Cryptantha intermedia*), bajada lupine (*Lupinus concinnus*), collar lupine (*Lupinus truncatus*), common eucrypta (*Eucrypta chrysanthemifolia*), Parry's phacelia (*Phacelia parryi*), chia (*Salvia columbariae*), radishroot woodsorrel (*Oxalis albicans*), California plantain (*Plantago erecta*), ground pink (*Linanthus dianthiflorus*), Turkish rugging (*Chorizanthe staticoides*), Padres' shooting star (*Dodecatheon clevelandii*), Nuttall’s snapdragon (*Antirrhinum nuttallianum*), Johnny jump-up (*Viola pedunculata*) and splendid mariposa lily (*Calochortus splendens*). Common summer and fall annuals include bicolored cudweed (*Gnaphalium bicolor*), cotton-batting plant (*Gnaphalium stramineum*), twiggy wreath plant (*Stephanomeria virgata*), California figwort (*Scrophularia californica*) and soap plant (*Chlorogalum pomeridianum*). Non-native species include non-native annual grasses such as oats, bromes and rattail fescue (*Vulpia myuros*), as well as forbs such as tocalote (*Centaurea melitensis*) and horehound (*Marrubium vulgare*).

Wildlife species expected in the sagebrush-California buckwheat scrub subassociation would be similar to that previously described for the Venturan-Diegan transitional coastal sage scrub association.

Sagebrush Scrub. Sagebrush scrub occupies 5.25 acres of the survey area in the northeastern corner of the property and off-site area. This subassociation occurs on more mesic sites and is dominated by monotypic stands of California sagebrush. Vegetative cover is typically dense and understory is sparse.

Wildlife species expected in the sagebrush scrub subassociation would be similar to that previously described for the Venturan-Diegan transitional coastal sage scrub association.

Sagebrush-Black Sage Scrub. This subassociation occupies 79.13 acres of the survey area and is equally dominated by California sagebrush and black sage. It is typically found on south-facing slopes, and vegetative cover is dense, approaching 100 percent. Associated species include sticky monkeyflower (*Mimulus aurantiacus*), coastal prickly pear (*Opuntia littoralis*) and occasional individuals of lemonade berry and laurel sumac.

Wildlife species expected in the sagebrush-black sage scrub subassociation would be similar to that previously described for the Venturan-Diegan transitional coastal sage scrub association.

Bush Mallow Sage Scrub. The bush mallow sage scrub subassociation occupies 105.03 acres of the survey area. It is typically found on moderate to steep hillsides, which are dominated by chaparral bush mallow (*Malacothamnus fasciculatus*). A secondary species commonly present in this subassociation is black sage.

Wildlife species expected in the bush mallow scrub subassociation would be similar to that previously described for the Venturan-Diegan transitional coastal sage scrub association.

Toyon-Sumac Chaparral

Toyon-sumac chaparral occupies 50.19 acres scattered throughout the survey area. This association occurs primarily on north- and east-facing slopes and is dominated in the survey area by lemonade berry, laurel sumac and toyon (*Heteromeles arbutifolia*). Occasional individuals of scrub oak (*Quercus dumosa*) are also present. Vegetative cover is typically dense, approaching 100 percent with little or no understory. This association integrates with scrub oak chaparral and maritime chaparral-sagebrush. In the survey area, chaparral often integrates with subassociations of Venturan-Diegan transitional CSS.

Wildlife species occurring in the more upland toyon-sumac chaparral community favor the dense cover and foraging opportunities this community provides. Typical wildlife species here might include California king snake (*Lampropeltis getula*), Anna's hummingbird (*Calypte anna*), bushtit (*Psaltriparus minimus*), house wren (*Troglodytes aedon*), California thrasher (*Toxostoma redivivum*), wrentit (*Chamaea fasciata*), spotted towhee (*Pipilo maculatus*) and dusky-footed woodrat (*Neotoma fuscipes*).

Southern Cactus Scrub

Southern cactus scrub occurs in limited locations, occupying 3.02 acres in the survey area. Vegetative cover is typically dense, approaching 100 percent. Prickly pear (*Opuntia* species) comprises a minimum of 20 percent relative cover with other sage scrub species including California sagebrush, California buckwheat, black sage, white sage, blue elderberry (*Sambucus mexicana*) and California brickellbush (*Brickellia californica*). In some areas, coast range melic is a subdominant in this community. This plant community provides highly suitable habitat for the coastal cactus wren (*Campylorhynchus brunneicapillus*, CACW), CAGN and orange-throated whiptail (*Aspidoscelis hyperythrus*, OTW).

Wildlife species in this subassociation would be similar to those previously described under Venturan-Diegan CSS. Additional animals with adaptations to cactus dominated habitats, however, might also include cactus mouse (*Peromyscus eremicus*) and San Diego desert woodrat (*Neotoma lepida*).

Ruderal Grassland Community

The ruderal grassland community occupies 13.72 acres in the survey area. This community is characterized by both native bunchgrasses and non-native annual grasses. Native bunchgrasses may occur in nearly pure stands, or stands may contain a substantial component of non-native annual grasses. Where native bunchgrasses comprise at least 10 percent of the relative cover, the area is mapped as native grassland (Keeley 1989). Both the native and non-native grasslands within the survey area support a large number of native and non-native forbs. Ruderal habitat occurs throughout the survey area, with extensive stands located in the northern part of the survey area. It is typically associated with areas subject to substantial disturbance. The types of vegetation vary according to the nature and severity of the disturbance and generally include black mustard, shortpod mustard (*Hirshfeldia incana*), tocalote, Russian thistle (*Salsola tragus*), cardoon, milk thistle (*Silybum marianum*), Australian saltbush and cheeseweed (*Malva parviflora*). Non-native annual grasses such as oats, bromes and barleys are often a substantial component of the ruderal areas. However, ruderal areas can be distinguished from annual grassland by a greater dominance of species such as mustard rather than grass species.

Although grasslands might support a less diverse assemblage of wildlife species, a number of animals are specifically adapted to nesting, burrowing or foraging in this relatively open habitat. A variety of raptor species favor grasslands to more easily detect prey species. Typical wildlife representatives of this habitat include side-blotched lizard (*Uta stansburiana*), coachwhip (*Masticophis flagellum*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), western kingbird (*Tyrannus verticalis*), western meadowlark (*Sturnella neglecta*) and California ground squirrel (*Spermophilus beecheyi*).

Southern Sycamore Riparian Woodland

A total of 16.88 acres of southern sycamore riparian woodland are located within the survey area. Of this total, 15.24 acres occur in the FRB Landfill Bio-mitigation Site, and 1.64 acres are in the north-central section of the landfill. The dominant species is western sycamore (*Platanus racemosa*). Associated species include coast live oak (*Quercus agrifolia*), blue elderberry, arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*) and Goodding's willow (*Salix gooddingii*). Understory shrubs include poison oak (*Toxicodendron diversilobum*), which often forms dense monocultures, along with mulefat (*Baccharis salicifolia*), Douglas' nightshade (*Solanum douglasii*) and mugwort (*Artemisia douglasiana*). This association often integrates with southern coast live oak riparian forest and southern arroyo willow riparian forest, although at FRB, this integration only occurs within the FRB Landfill Bio-mitigation Site in the southern portion of the landfill property.

Wildlife species that would be expected in the southern sycamore riparian woodland include a variety of animals adapted to more mesic environments. These might include pacific treefrog

(*Hyla regila*), red-shouldered hawk (*Buteo lineatus*), Nuttall's woodpecker (*Picoides nuttallii*), northern flicker (*Colaptes auritus*), ash-throated flycatcher (*Myiarchus cinerascens*), western bluebird (*Sialia mexicana*), Bullock's oriole (*Icterus bullockii*) and opossum (*Didelphis virginiana*). Mountain lions were observed within the FRB Landfill Bio-mitigation Site in August 2005 (IWMD).

<u>Southern Willow Scrub</u>

A total of 3.98 acres of southern willow scrub are located within the northern portion of the survey area. This plant community is dominated by various species of scrubby willows which form dense stands and is considered a riparian community. The most common species include arroyo willow, red willow and sandbar willow (*Salix hindsiana*). Other plant species also present but in lesser amounts are Goodding's willow and mulefat. The understory of this plant community includes mugwort, curly dock (*Rumex crispus*), stinging nettle (*Urtica dioica*), beard grass species (*Polypogon* species), cocklebur species (*Xanthium* species), bermuda grass (*Cynodon dactylon*), purple nightshade (*Solanum xanti*) and western ragweed (*Ambrosia psilostachya*).

Wildlife species expected in the southern willow scrub community would be more closely associated with aquatic habitats. Many species of birds prefer willow scrub habitat for nesting cover. Typical species in this community would include western toad (*Bufo boreas*), southern alligator lizard (*Elgaria multicarinata*), black phoebe (*Sayornis nigricans*), common yellowthroat (*Geothlypis trichas*), song sparrow (*Melospiza melodia*), American goldfinch (*Carduelis tristis*) and raccoon (*Procyon lotor*).

<u>Coast Live Oak Woodland</u>

A total of 2.98 acres of coast live oak woodland is located within the survey area. Of this total, 1.17 acres is found near the FRB entrance facilities, and 1.81 acres is associated with the FRB Landfill Bio-mitigation Site. The majority of the coast live oak woodland at FRB is naturally occurring, although a small area of the FRB Landfill Bio-mitigation Site was also planted with oak container plants. This habitat has only one dominant tree species, coast live oak, which can reach 35 to 80 feet in height. The shrub layer in coast live oak woodland is poorly developed and includes hollyleaf redberry (*Rhamnus ilicifolia*) California coffeeberry (*Rhamnus californica*), toyon, blue elderberry, snowberry species (*Symphoricarpos* species) and poison oak (*Toxicodendron diversilobum*). At FRB, this community usually has a well-developed understory component under the canopy of the oaks, including western flat-topped goldenrod (*Euthamia occidentalis*), blue wildrye (*Elymus glaucus*), onion grass species (*Melica* species), starwort species *(Stellaria* species), ripgut brome (*Bromus diandrus*) and other associated herbs. Coast live oak woodland is listed as a sensitive plant community by the CDFG (2005).

A variety of wildlife species, including larger mammals, find important cover, nesting and foraging opportunities in coast live oak woodland habitat. Some of the typical animal species encountered here might include garden slender salamander (*Batrachoseps major*), red-tailed hawk (*Buteo jamaicensis*), acorn woodpecker (*Melanerpes formicivorus*), western scrub-jay (*Aphelocoma californica*), oak titmouse (*Baeolophus inornatus*), black-headed grosbeak

(*Pheucticus melanocephalus*), lesser goldfinch (*Carduelis psaltria*) and mule deer (*Odocoiles hemionus*).

Orchard

A total of 3.09 acres of orchards are located within the southern boundary of the survey area and currently supports agricultural production. This area is comprised of active citrus orchards with windrows of mature eucalyptus (*Eucalyptus* sp.) trees. Native vegetation is generally lacking in this area and the associated wildlife habitat value is low.

Revegetation Area

A total of 133.67 acres of revegetation areas are located within the survey area and are principally located on the built-up cut-slopes where previous ground disturbance and landfilling activities occurred. These areas were hydroseeded by Integrated Waste Management Department (IWMD) with approximately 15 native plant species, including deerweed (*Lotus scoparius*), California buckwheat, arroyo lupine (*Lupinus succulentus*), California brome (*Bromus carinatus*), black sage, white sage and California sagebrush. The hydroseeding has created a plant assemblage that is dominated by California buckwheat and deerweed.

Wildlife usage of the revegetation areas within the survey area are considered to be relatively low until they achieve the maturity and cover offered by native plant communities in the area. Once these areas mature, assuming success of the revegetation program, they would be expected to support a similar wildlife usage as that previously described for the Venturan-Diegan transitional coastal sage scrub association.

5.8.1.2 Wildlife Corridors

The regional context of the survey area is an important consideration in the analysis of wildlife movement. The survey area is located on the west edge of the Santa Ana Mountains, within Bee Canyon. The nearest canyons to the northwest and east are Hicks and Round Canyons, respectively. Currently, the survey area is immediately surrounded by open space. To the northwest, north and northeast, the open space is extensive. South of Bee Canyon, agriculture and urbanization dominate.

Within the active landfilling areas in the survey area, conditions are largely unsuitable for wildlife movement. Because of the existing landfilling activities, wildlife movement is restricted due to the lack of vegetative cover. However, non-active landfilling areas support sufficient vegetative cover that dispersal is more prevalent, particularly to mammalian carnivores. Mammalian carnivores are not typically deterred by the open conditions within the survey area away from the active landfilling areas because they are less dependent on cover. Movements by species such as mule deer would likely be more constrained due to the lack of escape cover from predators. Although some species may use the Landfill for movement, the majority of species would tend to avoid the area and to use the more natural adjacent canyons and watersheds. In addition, it is likely that the ridgelines on and off the Landfill property, notably Lomas de

Santiago to the north, would serve as the principal wildlife movement and dispersal corridors for most species found on or in the immediate vicinity of the survey area.

As a part of an effort to address wildlife corridors statewide, the California Wilderness Coalition, The Nature Conservancy, the Biological Resources Division of the USGS, the Center for Reproduction of Endangered Species and the California Department of Parks published a report titled "Missing Linkages: Restoring Connectivity to the California Landscape" (November 2, 2000). The survey area is located near linkage 48, as defined by the Missing Linkages report. Mammal species were primarily used in the report findings to identify this theoretical linkage, including mountain lion, bobcat, coyote, gray fox and mule deer. If established, the linkage would create a passage from the Santa Ana Mountains to the San Joaquin Hills, using mixed land uses (e.g., parks, open space, etc.) along Jeffrey Road. Urbanization and roads were listed as the major threats to this linkage. The Irvine Ranch Land Reserve (The Irvine Company, 2004) also presents this theoretical linkage along Jeffrey Road in its reserve area map, as a connection between the Santa Ana Mountains and the San Joaquin Hills. The survey area is located in an area that does not interfere or block wildlife movement between the Santa Ana Mountains and San Joaquin Hills. Remaining areas for this connection are few and located several miles to the south at Marine Corps Air Station (MCAS) El Toro, or along El Toro Road in the Rancho Santa Margarita area.

5.8.1.3 Special Interest Habitats and Species

The CNDDB, administered by the CDFG, provides an inventory of plant and animal species, as well as plant communities, which are considered sensitive by state and federal resource agencies, academic institutions and conservation groups such as the California Native Plant Society (CNPS). This section describes sensitive biological resources that are either known to occur or potentially occur in the survey area or in the immediate vicinity based on query of the database or the presence of suitable habitat and/or other requisite components. Sensitive plant communities, sensitive plant and wildlife species and wetlands that are known or that may potentially occur in the survey area are discussed below.

<u>Vegetation Communities</u>

<u>Venturan-Diegan Transitional Coastal Sage Scrub.</u> Venturan-Diegan transitional CSS is located throughout the undeveloped parts of the foothills of Orange and northern San Diego Counties. Both the Diegan and Venturan CSS communities are ranked as very threatened by the CDFG (CNDDB 2005). This community also supports breeding and foraging habitat for the federally threatened CAGN. Venturan CSS is shown by its subassociations on Figure 5.8-1. A total of 207.77 acres (includes subassociation acreages noted previously) of this vegetation community occur within the survey area.

<u>Southern Cactus Scrub.</u> Southern cactus scrub supports breeding and foraging habitat for the CAGN and is, therefore, considered a sensitive natural community. Although southern cactus scrub is defined as a separate plant community in this report, the CNDDB (2005), does not distinguish this community from Diegan and Venturan CSS communities (see Figure 5.8-1). A total of 3.02 acres of this CSS subassociation occur within the survey area.

Southern Sycamore Riparian Woodland. Southern sycamore riparian woodland occurs along perennial and intermittent drainages and adjacent alluvial terraces. In the survey area, it occurs along two ephemeral drainages in the northern part of the site. The habitat is dominated by California sycamore with coast live oak as a subdominant. The understory component consists of mulefat. In the coastal floodplain of southern California, as much as 95 to 97 percent of riparian habitat, including southern sycamore riparian woodland, has been lost to activities such as channelization for flood control and sand and gravel mining (Faber et al. 1989). Because this community is considered riparian habitat, it is regarded as sensitive (see Figure 5.8-1). A total of 16.88 acres of this plant community occurs within the survey area including 15.24 acres in the FRB Landfill Bio-mitigation Site, and 1.64 acres in the north-central portion of the landfill.

Southern Willow Scrub. Southern willow scrub is dominated by dense stands of shrubby arroyo willow (*Salix lasiolepis*) and may also include mulefat and black willow. It occurs within the northern part of the survey area and comprises a wetland area (part of Drainage 1; discussed below). Because this community is considered riparian habitat, it is regarded as sensitive (see Figure 5.8-1). A total of 3.98 acres of this plant community occurs within the survey area.

Coast Live Oak Woodland. Coast live oak woodland provides valuable habitat and food sources (acorns) for a range of plant and wildlife species. This community is listed as a sensitive plant community by the CDFG (CNDDB 2005) (see Figure 5.8-1). A total of 2.98 acres of this plant community occurs within the survey area (southwestern part of the Landfill) including 1.81 acres in the FRB Landfill Bio-mitigation Site and 1.17 acres near the FRB entrance facilities.

Plants

Thread-Leaved Brodiaea (*Brodiaea filifolia*). Thread-leaved brodiaea, a member of the lily family, is listed as a federally threatened, state endangered and CNPS List 1B species. It can be found on gently rolling to level terrain, in grasslands, vernal pools and openings within chaparral and CSS plant communities, primarily where clay soils are present. The historical range of this species extended from the foothills of the San Gabriel and San Bernardino Mountains, south through eastern Orange and western Riverside Counties to Carlsbad, in northwestern San Diego County. It typically blooms during May and June. During the 2002 through 2005 rare plant surveys conducted for the proposed MDP, no individuals of the thread-leaved brodiaea were located in the survey area.

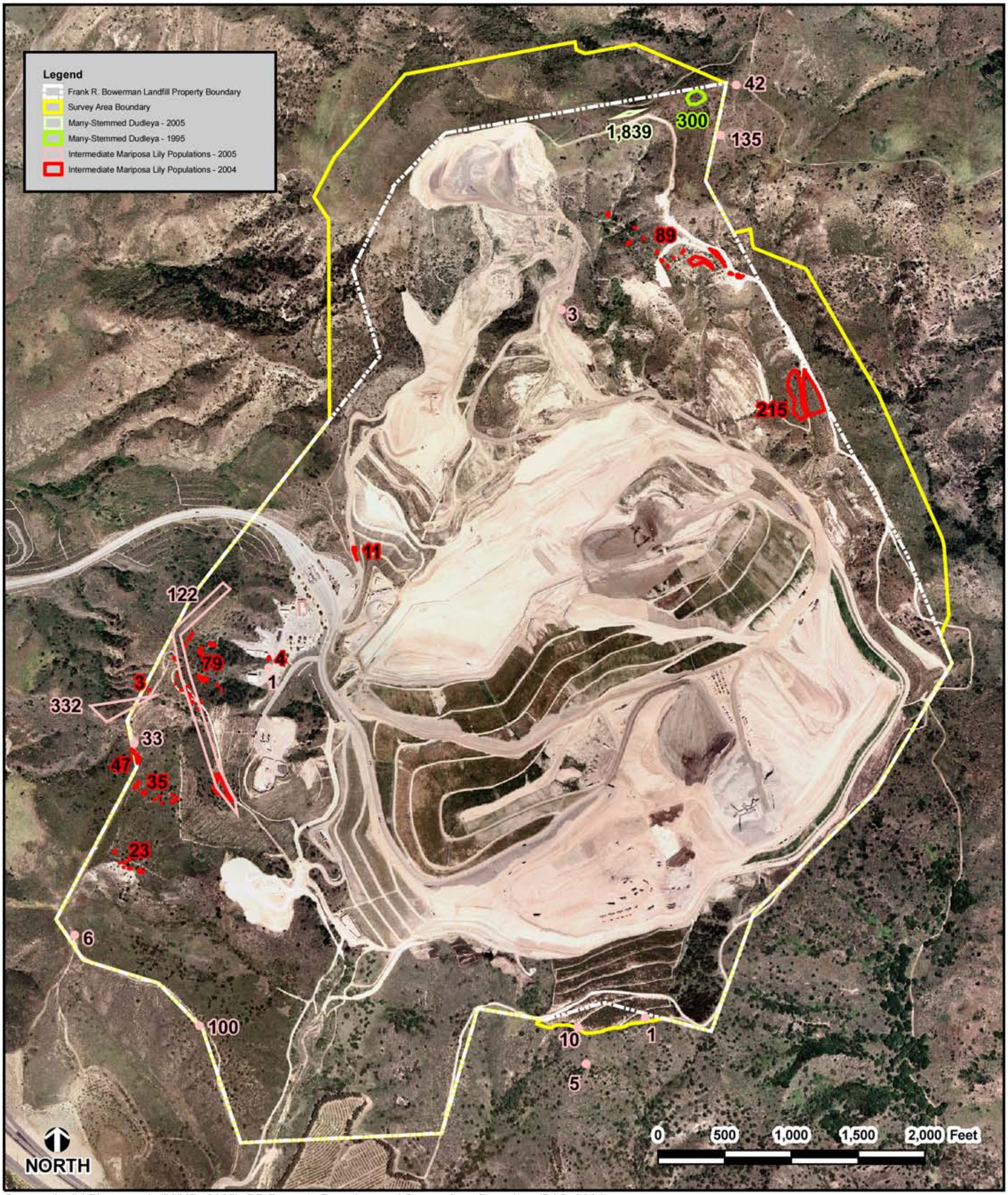
Intermediate (Foothill) Mariposa Lily (*Calochortus weedii* var. *intermedius*). Intermediate mariposa lily (IML), a member of the lily family, is listed by the CNPS as a 1B species. List 1B species are those plants which are considered rare, threatened or endangered in California and elsewhere. This species is also included as a Conditionally Covered species by the Central and Coastal Subregion Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). IML is found in several plant communities including chaparral, CSS, and valley and foothill grasslands, especially in thin or rocky soils. This species has a limited distribution which includes southeastern Los Angeles County, Orange County and western Riverside County. It blooms primarily from May through July. During the 2003 rare plant surveys of the survey area, a total of 556 individual IML plants were recorded, with the largest population concentrated in the northeast part of the survey area. Other populations were located southwest of the FRB Landfill facility headquarters and in the upper southwest part of the survey area. A total of 790 individual IML plants were recorded during the 2005 survey. IML populations from 2003 and 2005 are shown on Figure 5.8-2.

Catalina Mariposa Lily (*Calochortus catalinae*). Catalina mariposa lily is listed by the CNPS as a List 4 species. List 4 species are those plants that are of limited distribution in California, but their susceptibility to threat appears low at this time. This species is included as an Identified Species within the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). While these plants may not be necessarily rare from a statewide or even local perspective, they are uncommon enough to warrant regular monitoring. The Catalina mariposa lily typically occurs in grassland, often in the ecotone with CSS. It blooms primarily from February to May. Suitable habitat for this lily species occurs within the survey area. During the 2005 survey, by BonTerra, plants were located throughout the study area. Surveys conducted by Jones and Stokes Associates in 1995, found ten plants in the northern section of the landfill property. This area was subsequently eliminated by a landslide. No plants were recorded during the 2003 through 2004 survey seasons.

Many-Stemmed Dudleya (*Dudleya multicaulis*). Many-stemmed dudleya is listed by the CNPS as a List 1B species. The CNPS has proposed a change in the status of this species from List 1B to List 4 because of the many new populations that have recently been identified throughout its range. However, the current status remains as List 1B until comments have been received on the proposed change. This small, perennial species is found in Los Angeles, San Bernardino, Riverside, Orange and San Diego Counties. It blooms primarily from May though July, and remains dormant the rest of the year as a corm (a modified stem base that remains underground during the dormant season). Many-stemmed dudleya occurs in grasslands and openings within CSS and chaparral plant communities, especially where thin, or clay-dominated, soils are present. In 1995, Jones and Stokes Associates located two populations of many-stemmed dudleya within the FRB property boundary. One of the populations contained over 1,000 plants but was eliminated by a landslide. The other population of approximately 300 plants was located within the northern part of the survey area, as shown on Figure 5.8-2. Another population of many-stemmed dudleya, that contained 1,839 plants, was located in 2005. This location is also shown on Figure 5.8-2. During the 2002 through 2004 rare plant surveys, no individuals of this species were located.

Vernal Barley (*Hordeum intercedens*). Vernal barley is listed by the CNPS as a List 3 species, which is defined as a plant for which more information is needed to determine its sensitivity status. This variety of native grass is generally associated with valley grasslands, in vernal pools or on alkali flats. During the 2002 through 2005 rare plant surveys, no individuals of this species were located in the survey area.

Chaparral Beargrass (*Nolina cismontana*). Chaparral beargrass, also known as Santa Ana Mountains beargrass, is listed by the CNPS as a List 1B species. This member of the lily family is generally associated with calcareous soils within its known range of Ventura, Orange and San Diego Counties. It typically flowers from May through July, and produces an inflorescence that



Source: Aerial Photograph (IWMD, 2005); RB Property Boundary and Survey Area Boundary (BAS, 2004); Many-Stemmed Dudleya (Jones & Stokes, 1995 and Bonterra, 2005); Intermediate Mariposa Lily (P&D, 2004 and Bonterra, 2005).

Figure 5.8-2
Sensitive Plants

grows as much as ten feet high, which is often twisted or contorted. Chaparral beargrass was not located in the survey area during the 2002 through 2005 rare plant surveys conducted within the survey area.

Coulter's Matilija Poppy (*Romneya coulteri*). Coulter's matilija poppy is listed by the CNPS as a List 4 species. It is a rhizomatous, perennial subshrub that often forms dense clumps in CSS and chaparral. This relatively large plant has showy flowers that bloom typically from May to July. Although potential habitat for this species may be present in the survey area, no individuals of this species were found during the 2002 through 2005 rare plant surveys. Because this plant is quite distinctive in appearance, supporting numerous large white and yellow flowers, lack of detection indicates that there is a low potential for this species to be present in the survey area.

Wildlife

Western Spadefoot Toad (*Scaphiopus hammondii*). The western spadefoot toad is considered a California Species of Special Concern (CSC) by CDFG and is included as an Identified Species in the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). It breeds in vernal pools, as well as in other temporary pools associated with streams and floodplains. Ranging from the northern Central Valley of California to northern Baja California in Mexico, this secretive toad is rarely seen outside the breeding season. Primarily a lowland species, the western spadefoot is found in washes, alluvial fans and alkali flats, and is known to inhabit grasslands, CSS and other habitats (Stebbins 1985). This species has not been recorded within the survey area, although limited areas of marginally suitable habitat for this species may be present in mesic areas of the survey area.

Orange-Throated Whiptail (*Aspidoscelis hyperythrus*). The orange-throated whiptail is a CSC and a Target Species in the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). The preferred habitat for this species includes chaparral, CSS and oak woodland. This species relies on perennial vegetation because its major food source, termites, requires perennial plants as a food base. California buckwheat, a colonizing species of disturbed, sandy soils, is an important indicator of favorable habitat for orange-throated whiptail. This species prefers inter-shrub spacing of 10 to 40 percent bare ground cover, which is required for foraging and thermoregulatory behavior. The survey area contains suitable habitat for the orange-throated whiptail. Observations of this species occurred in 1995 by Jones and Stokes Associates, in 1999 by Varanus Biological Services (up to four individuals) and in July 2001 by P&D.

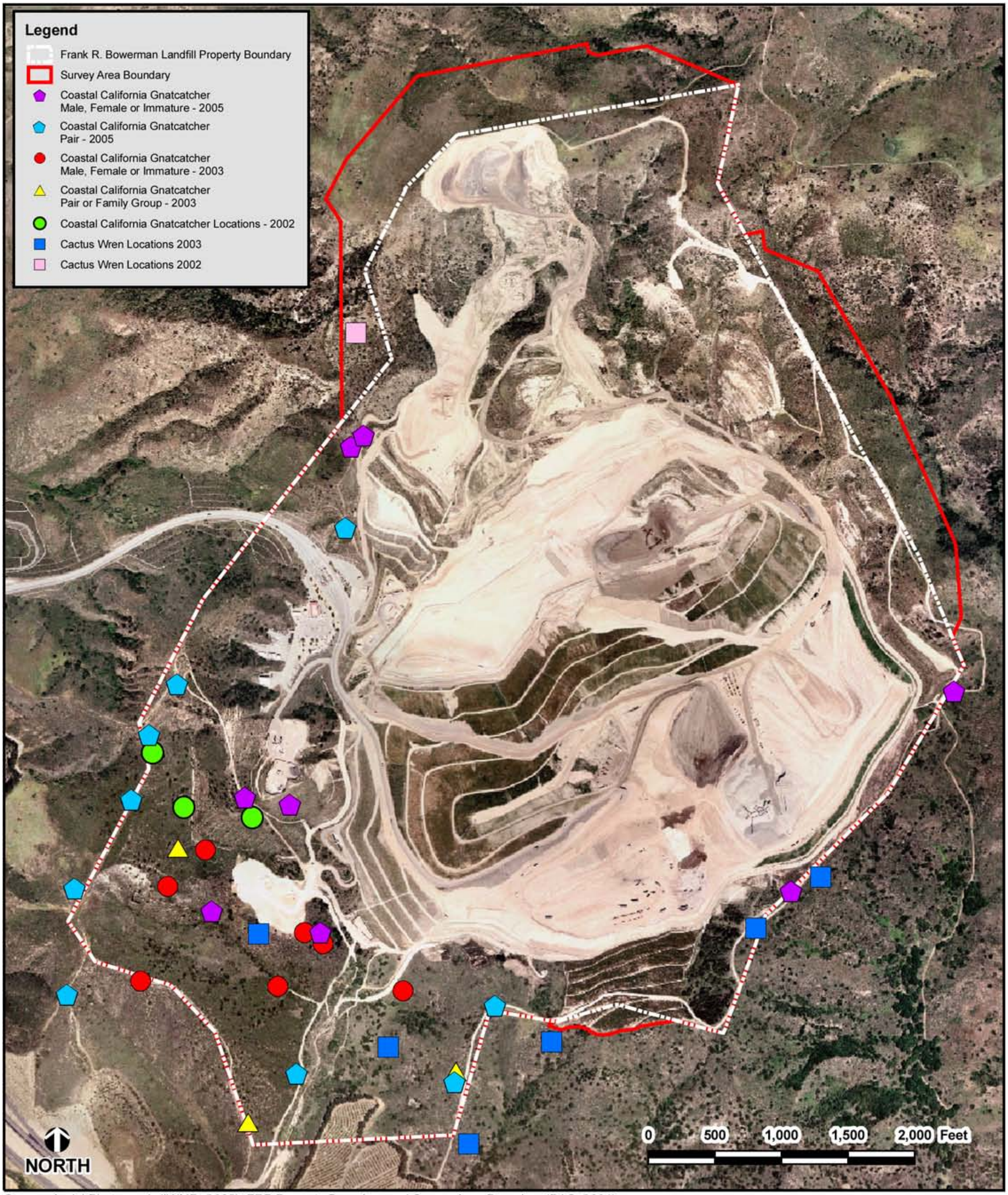
San Diego Horned Lizard (*Phrynosoma coronatum blainvillei*). The San Diego horned lizard is a CSC and an Identified Species under the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). This fairly small, spiny lizard can be found in a wide variety of vegetation types, including CSS and chaparral. This lizard typically prefers more open areas for thermoregulation requirements and loose friable soil for burrowing (Stebbins 1985). The loss of habitat, collection and replacement of native ants (its primary food source) by exotic ant species are factors that have contributed to the decline of this species. Potential habitat for the San Diego horned lizard is present in the survey area. Although none were detected by P&D during biological surveys conducted during 2002 through 2004, the species was recorded in 1995 by Jones and Stokes Associates and was sited during a field visit by P&D and URS in 2005.

<u>Red Diamond Rattlesnake (*Crotalus rubber*).</u> The red diamond rattlesnake is a CSC and an Identified Species under the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). It inhabits open scrub, chaparral and grassland communities. This species ranges from southern San Bernardino County to Baja California, and from sea level to about 5,000 feet above mean sea level (amsl) in elevation (Stebbins 1985). It is primarily found along the coastal slope of the transverse and peninsular ranges. No red diamond rattlesnakes were found during surveys conducted within the survey area, although potential habitat for this species is present in CSS and chaparral plant communities within the survey area.

<u>Coastal California Gnatcatcher (*Polioptila californica californica*).</u> The CAGN was listed as a federally threatened species in 1993, and is identified as a Target Species in the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). Habitat preferences of the CAGN primarily include CSS communities. CSS is composed of relatively low-growing, dry-season deciduous and succulent plants. The gnatcatcher prefers CSS with an open or broken canopy but is also found in low scrub with a closed canopy. It is generally scarce in scrub dominated by tall shrubs (e.g. taller than approximately five feet). The USFWS proposed critical habitat for the California gnatcatcher (2003) which does not include the survey area, largely because its boundary is within an approved HCP that includes the CAGN as a covered species. However, parts of the survey area provide highly suitable CSS habitat for the CAGN. During surveys in 2002, three individual CAGN were located within the southwestern part of the survey area and are shown in Figure 5.8-3. During surveys in 2003, seven individuals (male, female and/or juveniles) and three breeding pairs (13 individuals total) were identified in the southern part of the survey area, as shown in Figure 5.8-3. During surveys in 2005, eight individuals (male, female and/or juveniles) and nine breeding pairs (18 individuals total) were identified in the southwestern and eastern parts of the survey area, as shown in Figure 5.8-3. The preferred habitat contained within the survey area includes the following subassociations of CSS: California sagebrush-California buckwheat scrub and sagebrush scrub.

The north and east parts of the survey area were surveyed for the presence of CAGN by P&D in 2002 and by Jones and Stokes Associates in 1995. Neither survey determined the presence of CAGN in these areas. At the time of the 2002 survey, the habitat surveyed in the north and east parts of the survey area was mostly dominated by bush mallow, which is not a preferred habitat component for the CAGN. Some of the plant communities and habitat characteristics in this area were affected by a fire in 1998. Bush mallow is an early perennial colonizer after a fire, and is common in this area.

<u>Least Bell's Vireo (*Vireo bellii pusillus*).</u> Least Bell's vireo (LBV) is a federally endangered (USFWS 1986) species and a Conditionally Covered species under the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). The LBV prefers riparian habitat with a dense understory of young willows, mulefat, Mexican elderberry (*Sambucus mexicana*) and a variety of other shrubby species. LBV is



Source: Aerial Photograph (IWMD, 2005); FRB Property Boundary and Survey Area Boundary (BAS, 2004); Cactus Wren and CAGN (P&D, 2002, 2003 and 2004); CAGN (Bonterra, 2005).

Figure 5.8-3
Coastal California Gnatcatcher and Cactus Wren Locations

generally found in riparian areas dominated by one or more willow species, especially where there is a mixed age composition. Within the survey area, there are limited areas where the plant communities could provide suitable foraging and breeding habitat for LBV. One such plant community would be southern willow scrub. This on-site community was determined to be of low quality due to the lack of stratified vegetation layers. Focused surveys for LBV were conducted within riparian habitat at the FRB Landfill, in 2005, by BonTerra Consulting. Focused survey results were negative for LBV.

Coastal Cactus Wren (*Campylorhynchus brunneicapillus*). The coastal cactus wren (CACW) is a CSC and a Target Species in the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). It is also an obligate, non-migratory resident of the CSS plant community. It is closely associated with three species of cacti and occurs in thickets of cholla (*Opuntia prolifera*) and prickly pear (*Opuntia littoralis*) dominated stands of CSS below 1,500 feet amsl in elevation. Characteristic shrubs associated with habitat occupied by the CACW include California buckwheat, California sagebrush, several sage species and scattered large shrubs, such as laurel sumac and lemonade berry.

Parts of the survey area provide suitable habitat for the CACW, particularly within the southern cactus scrub plant community. In 1995, Jones and Stokes Associates located five adult cactus wrens on the Landfill property. One CACW was detected within the survey area in 2002 by P&D. In 2003, a total of six coastal cactus wrens were identified within the survey area. CACW found during the 2003 surveys are shown in Figure 5.8-3. CACW was also recorded within the survey area during 2005 surveys by BonTerra Consulting. These locations were not mapped.

Cooper's Hawk (*Accipiter cooperi*). The Cooper's hawk is a CSC. This raptor is fairly common in Orange County as a winter visitor, when southern California receives migrants from more northerly breeding populations. Although the breeding population of Cooper's hawk is relatively small in comparison to wintering numbers, this population is fairly widespread and appears to be on the increase in recent years (Willick, pers. obs.). This species forages over a variety of scrub and woodland habitats, including urban parks and neighborhoods, where concentrations of its preferred prey (i.e., small birds) are found. They breed in a variety of woodlands, including oak and willow riparian. This species was recorded frequently in the survey area, by the P&D survey team and may potentially breed in the limited areas where trees are present away from areas of disturbance.

Sharp-shinned Hawk (*Accipiter striatus*). The sharp-shinned hawk is a CSC and an Identified Species under the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). This species is a regular winter visitor to southern California, but does not breed in the region. It is a relatively uncommon winter visitor throughout Orange County, typically preferring riparian and woodland communities for foraging. As with the Cooper's hawk, this raptor preys primarily on small birds. Although this species has not been reported during biological surveys of the survey area, it undoubtedly occurs as an occasional winter visitor in areas where concentrations of small birds may be present.

Northern Harrier (*Circus cyaneus*). The northern harrier is a CSC and an Identified Species under the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). It is a regular winter visitor in Orange County, and although individuals can be seen at any month of the year, it is now a very rare, localized breeder in the County. A maximum of one or two pairs may breed in undeveloped areas of the County in any given year (Pete Bloom, pers. obs.). It forages over a variety of open habitats, including grasslands, rangeland, agricultural areas, marsh, and open scrub and riparian communities, although relatively undisturbed grasslands and marshes are required for nesting. Suitable foraging habitat for the harrier is present within the survey area, and it has been recorded over various areas of the survey area. The probability of suitable breeding habitat for this species, however, in the survey area, is considered low.

Golden Eagle (*Aquila chrysaetos*). The golden eagle is a CSC. In addition, it is protected by the federal Bald Eagle Act and included as a conditionally covered species under the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). This large raptor is a rare to uncommon resident in the larger tracts of undeveloped land remaining in southern California. It has declined as a breeder, especially along the coastal parts of the region, due to habitat loss from urban and agricultural development, combined with intolerance of human disturbance. Golden eagles will forage in a variety of open habitats, including grasslands, scrub and open woodlands and will typically nest in more remote, rugged terrain. Very few breeding pairs likely remain in Orange County, with up to four pairs being estimated in 1996 (Hamilton and Willick 1996). The golden eagle is not expected to breed within the survey area, although individuals may rarely forage over the site. No eagles were observed within the survey area during recent or past biological surveys conducted by P&D, Jones and Stokes Associates, Varanus Biological Services or BonTerra Consulting.

Peregrine Falcon (*Falco peregrinus*). The peregrine falcon was formerly a federally listed endangered species that occurs in the southern California region as a fairly rare, though increasing resident and as an uncommon migrant and winter visitor. Although this raptor was recently removed from the federal endangered species list, it is still State listed as endangered. The peregrine falcon preys almost exclusively on birds and can use a variety of habitats. It is most frequently observed in Orange County in wetland areas along the coast, such as the Seal Beach National Wildlife Refuge, Bolsa Chica Ecological Reserve and the Upper Newport Bay Reserve. This species is occasionally recorded at scattered inland locations throughout Orange County, especially near bodies of water, such as lakes and reservoirs (Willick, pers. obs.). Due to the location of the survey area, and the lack of typical habitat, the peregrine falcon is expected to be a very infrequent, non-breeding visitor to the survey area.

Prairie Falcon (*Falco mexicanus*). The prairie falcon is a CSC and a Conditionally Covered Species under the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). This species is an uncommon migrant and winter visitor throughout most of southern California and breeds locally in the arid interior of the state. Because of foraging habitat loss, few areas remain in Orange County where prairie falcons can be consistently observed. Although this species historically bred in the County, no nest sites have been documented here since 1922 (Hamilton and Willick 1996). Preferred foraging habitat includes grasslands, scrub communities and estuaries. The prairie falcon would not be expected to breed within the survey area, although individuals may occasionally forage over the site during the non-breeding season.

Loggerhead Shrike (*Lanius ludovicianus*). The loggerhead shrike is a CSC. It is generally an uncommon breeding species in southern California, but it has declined significantly in the more coastal parts of its range in recent years. The loggerhead shrike inhabits grasslands, rangeland and other open, relatively dry habitats in the lowlands and foothills of the region. This species is now a rare resident in Orange County, with a small influx of non-breeders (apparently from more northerly breeding populations) occurring during the winter months (Willick, pers. obs.). Suitable foraging and potential breeding habitat is present within the survey area, although only one recent record exists for this species (November 2003, in future Phase VIII B Excavation).

Yellow Warbler (*Dendroica petechia brewsteri*). The yellow warbler, a CSC, breeds most commonly in wet, deciduous thickets, especially those dominated by willows and in disturbed and early successional habitats. Yellow warblers in southern California breed in lowland and foothill riparian woodlands dominated by cottonwoods, alders or willows and other small trees and shrubs typical of low, open-canopy riparian woodland. Potential habitat for yellow warbler occurs within the southern willow scrub or sycamore woodland plant communities, but none were detected in the survey area during any of surveys conducted by P&D, Jones and Stokes Associates and Varanus Biological Services.

Yellow-breasted Chat (*Icteria virens*). The yellow-breasted chat is a CSC. In southern California it is primarily found in dense, relatively wide riparian woodlands and thickets of willows, vine tangles and dense brush with well-developed understories. Nesting areas are associated with streams, swampy ground and the borders of small ponds. Grinnell and Miller (1944) suggested that the plant cover in breeding habitat must be dense to provide shade and concealment. Potential habitat for yellow-breasted chat occurs within southern willow scrub or sycamore woodland plant communities, but none were detected within the survey area during recent or past surveys conducted by P&D, Jones and Stokes Associates, Varanus Biological Services, P&D or BonTerra Consulting.

Rufous-crowned sparrow (*Aimophila ruficeps canescens*). The rufous-crowned sparrow is a CSC species and an Identified Species under the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). Suitable habitat for this species includes moderate to steep CSS and chaparral, and it often occurs near the edges of the denser scrub and chaparral associations. The rufous-crowned sparrow prefers stands of California sagebrush but also colonizes sparse CSS and chaparral recovering from a burn. Optimal habitat consists of sparse, low brush on slopes preferably interspersed with boulders and outcrops. It is generally absent from dense, unbroken stands of CSS and chaparral. The dominant overstory shrubs associated with the habitats used by rufous-crowned sparrow include California sagebrush, purple sage, black sage, California encelia, coyote brush (*Baccharis pilularis*), mock heather (*Ericameria ericoides*), deer weed, giant rye (*Leymus condensatus*) and buckwheat. This species was detected by BonTerra Consulting in 2005, as well as during previous surveys by P&D, Jones and Stokes and Varanus Biological Services.

Bell's Sage Sparrow (*Amphispiza belli belli*). The Bell's sage sparrow is a CSC species. The sage sparrow prefers semi-open habitats with evenly spaced shrubs three to six feet high. Vertical structure, habitat patchiness and vegetation density may be more important in habitat selection by the sage sparrow than the specific shrub species. Tall, overgrown chaparral stands generally have fewer sage sparrows than shorter shrubs. The Bell's sage sparrow seeks cover in fairly dense stands in chaparral and scrub habitats in the breeding season, and they forage on the ground beneath and between shrubs. In general, this species is closely associated with sagebrush. CSS plant species associated with Bell's sage sparrow include *Artemisia, Purshia* and *Atriplex* as well as mixed brush and cactus patches in arid washes. The survey area provides habitat characteristics that are suitable for Bell's sage sparrow, but none were detected in the survey area during any of the surveys.

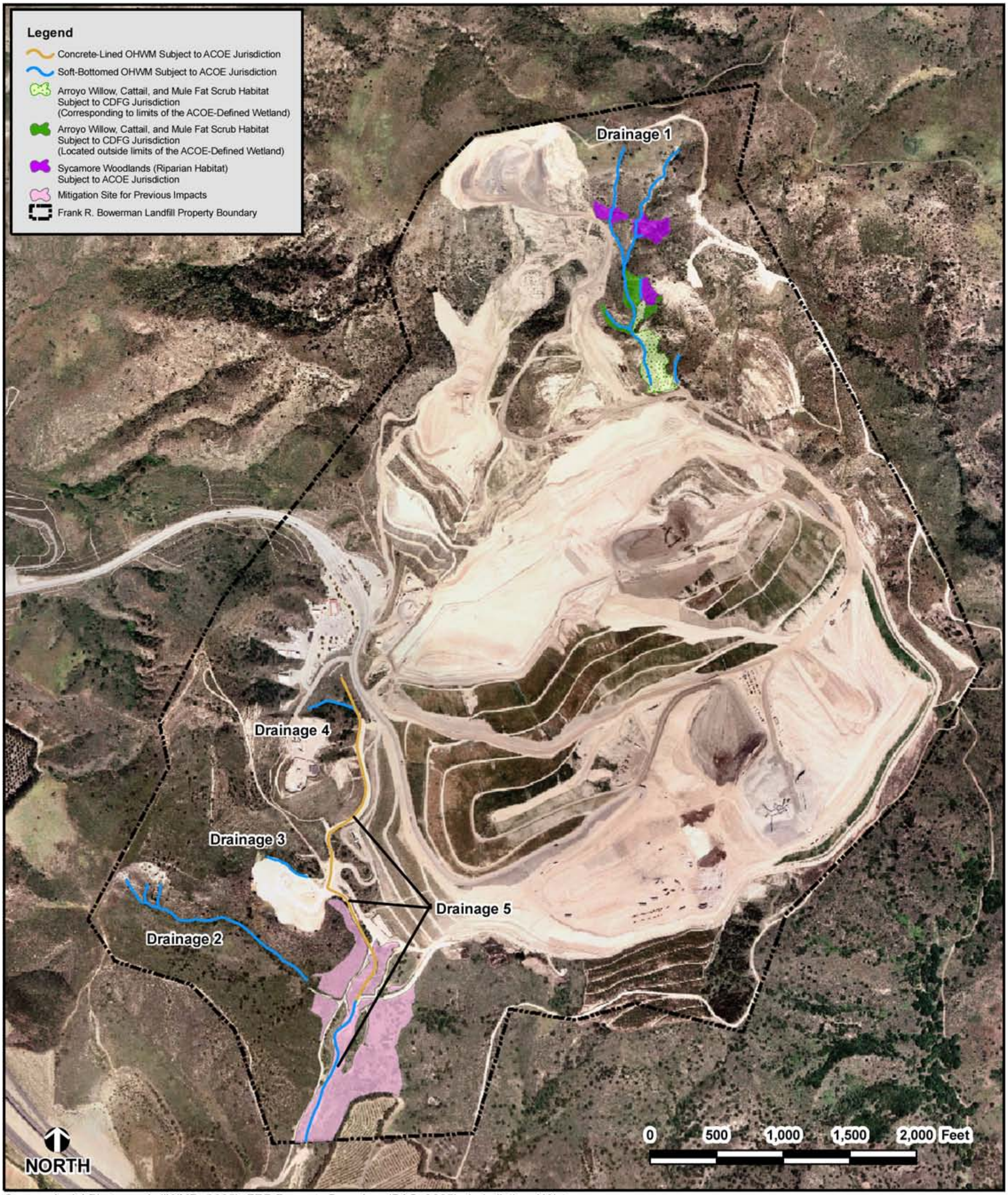
Southwestern Willow Flycatcher (*Empidonax traillii extimus*). The southwestern willow flycatcher (SWF) is a FE, SE and a conditionally covered species under the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). This species is restricted to riparian woodlands along streams and rivers with mature, dense stands of willows (Salix spp.), cottonwoods (Populus spp.) or smaller spring fed or boggy areas with willows or alders (Alnus spp.). Riparian habitat provides both breeding and foraging habitat for the species. The SWF nests from zero to 13 feet above ground in thickets of trees and shrubs approximately 13 to 23 feet tall with a high percentage of canopy cover and dense foliage. Within the survey area, there are limited areas where the plant communities could provide suitable foraging and breeding habitat for SWF. One such plant community would be southern willow scrub. This on-site community was determined to be of low quality due to the lack of stratified vegetation layers. Focused surveys for SWF were conducted within riparian habitat at the FRB Landfill, in 2005, by BonTerra Consulting. Focused survey results were negative for SWF.

San Diego Desert Woodrat (*Neotoma lepida intermedia*). The San Diego desert woodrat is a CSC and an Identified Species under the Central and Coastal Subregion NCCP/HCP (see Section 5.8.3.3 Orange County Central and Coastal Subregion NCCP). This species occupies arid areas and habitats, such as CSS, with sparse vegetation. They frequently prefer vegetation containing cactus and other thorny plants, and in areas with rocky outcrops (NCCP 1996). The woodrat commonly builds its nest with cactus parts, twigs and similar materials. This subspecies is restricted to the coastal slopes in a range that stretches from San Luis Obispo County to northwestern Baja California. Suitable habitat for this species is contained within the survey area. San Diego desert woodrats were detected by BonTerra Consulting in 2005 during surveys for CAGN.

Wetlands

The survey area contains a number of drainages that are subject to state and federal regulatory requirements. The following provides a summary of the findings of the *Delineation of Jurisdictional Waters and Wetlands for the Frank R. Bowerman Landfill Master Development Plan* (P&D Consultants and URS, October 2005).

The delineation of jurisdictional waters and wetlands was conducted by P&D in June and July 2003 and updated by URS in July 2005. The delineation identified five drainages subject to the United States Army Corps of Engineers (ACOE) and CDFG jurisdiction, which are shown in Figure 5.8-4. Drainage 1 is located within the northern part of the survey area and was determined to contain wetlands (i.e., natural and atypical or man made). Drainages 2, 3, 4 and 5



Source: Aerial Photograph (IWMD, 2005); FRB Property Boundary (BAS, 2005), Jurisdictional Waters and Wetlands (P&D, 2004 and URS, 2005).

Figure 5.8-4
Jurisdictional Waters and Wetlands

are located in the southwestern part of the survey area and were determined not to contain wetlands, but do include waters of the U.S. and waters of the State.

5.8.2 THRESHOLDS OF SIGNIFICANCE

Implementation of the FRB MDP was determined to result in a significant adverse impact if it resulted in exceedances of the California Environmental Quality Act (CEQA) and NCCP thresholds defined below.

- The project has a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special status species in local or regional plans, policies or regulations or by the CDFG or the United States Fish and Wildlife Service (USFWS).
- The project has a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations or by the CDFG or the USFWS.
- The project has a substantial adverse effect on state or federally protected wetlands as defined by Section 404 of the Federal Clean Water Act (CWA), CDFG or California Coastal Commission, including but not limited to marsh, coastal, etc. through direct removal, filling, hydrological interruption or other means.
- The project interferes substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites.
- The project conflicts with any local policies or ordinances protecting biological resources such as a tree preservation policy or ordinance.
- The project conflicts with the provisions of an adopted Habitat Conservation Plan (HCP), NCCP or other approved local, regional or state HCP.
- The project would exceed authorized take of CSS and/or Target, Identified or Conditionally Covered species as identified in the NCCP for the FRB Landfill.
- Proposed activities would result in a Major Amendment to the NCCP.

5.8.3 METHODOLOGY

5.8.3.1 Sensitive Species Determinations

In general, the principal reason an individual taxon (species, subspecies or variety) is considered sensitive is the documented or perceived decline or limitation of its population size or geographical extent and/or distribution resulting in most cases from habitat loss. Sources used to determine the sensitive status of biological resources are as follows:

- Plants ─ CNDDB, 2005; and CNPS, 2005.
- Wildlife ─ CNDDB, 2005.
- Plant Communities ─ CNDDB, 2005.

5.8.3.2 Listed Species

A federally endangered species is defined as a species facing extinction throughout all or a significant part of its geographic range. A federally threatened species is defined as a species that is likely to become endangered within the foreseeable future throughout all or a significant part of its range. The State of California defines an endangered species as one whose prospects of survival and reproduction are in immediate jeopardy, a threatened species as one present in such small numbers throughout its range that it is likely to become an endangered species in the near future in the absence of special protection or management, and a rare species as one present in such small numbers throughout its range that it may become endangered if its present environment worsens. Rare species applies to California native plants.

5.8.3.3 Orange County Central and Coastal Subregion NCCP

The Orange County Central and Coastal Subregion NCCP also identifies and provides coverage for 39 sensitive species and considers impacts to these species fully authorized for participating landowners, provided conditions identified in the IA are adhered to. Many of the species identified in the NCCP are considered sensitive by the USFWS, CDFG, CNPS and/or other conservation groups. The inclusion of these species in the NCCP elevates and/or affords many of these species heightened protection not normally given to these species outside the NCCP. Table 5.8-1 lists those species, identified as Target and Identified species under the NCCP, that are fully mitigated and for which no additional mitigation is required. Table 5.8-1 also lists those species identified as Conditionally Covered under the NCCP that require specific additional mitigation measures. A detailed overview of the NCCP is located in Section 3.2 of the Biological Resources Technical Report in Appendix I.

5.8.3.4 Sensitive Species Surveys

Rare plant surveys have been conducted within the survey area for various projects since 1995. P&D conducted rare plant surveys over a three year period from 2002 to 2004 which covered the survey area. Most recently, BonTerra conducted rare plant surveys in 2005. Multiple survey years were undertaken due to adverse survey conditions (i.e., lack of sufficient precipitation) in 2002 and 2004. The rare plant surveys were conducted by botanists within the survey area (see Figure 5.8-2) to determine the presence or potential presence of sensitive plant species and suitable habitats. The surveys included all rare plants covered by the NCCP for which suitable habitat was present. The surveys also covered species on the CNPS' 1B list and/or those included on the California Endangered Species Act (CESA) and federal Endangered Species Act (FESA). All surveys were conducted in accordance with standard botanical survey guidelines developed by the USFWS, CDFG and CNPS.

TABLE 5.8-1
TARGET, IDENTIFIED AND CONDITIONALLY COVERED SPECIES RECEIVING REGULATORY COVERAGE UNDER THE NCCP/HCP (1996)

Target Species Coastal California gnatcatcher Coastal cactus wren Orange-throated whiptail	**Identified Amphibians** Arboreal salamander Western spadefoot toad Black-bellied slender salamander
Identified Mammals San Diego desert woodrat Coyote Gray fox	**Identified Reptiles** Coastal western whiptail San Bernardino ringneck snake Red diamond rattlesnake San Diego horned lizard Coronado skink Coastal rosy boa
Identified Birds Northern harrier Sharp-shinned hawk Peregrine falcon Red-shouldered hawk Rough-legged hawk Southern California rufous-crowned sparrow	**Identified Plants** Catalina mariposa lily Laguna beach dudleya Santa Monica Mountains dudleya Nuttal's scrub oak Small-flowered mountain mahogany Heart-leaved pitcher sage Coulter's mantilija poppy Tecate cypress
Conditionally Covered Species Least Bell's vireo Southwestern willow flycatcher Southwestern arroyo toad Quino checkerspot butterfly Golden eagle Prairie falcon Riverside fairy shrimp San Diego fairy shrimp Pacific pocket mouse Foothill (intermediate) mariposa lily	

Source: Orange County Central and Coastal Subregion NCCP/HCP (1996).

In addition, preliminary field investigations were also undertaken including querying the CNDDB and CNPS databases for records of these species within the survey area and within adjacent USGS topographical quadrangles. A literature search for these species was also conducted to determine blooming periods and other indicators useful in determining their presence and/or absence. Botanists familiar with these species and with work experience in Orange County were also consulted to develop additional background information on habitat requirements and flowering conditions. Known reference populations in proximity to the survey area were also identified; these included the Laguna Coast Wilderness Park (LCWP). Intermediate foothill mariposa lily and foothill dudleya populations were monitored at the LCWP site prior to initiating surveys. On-site surveys were conducted on foot throughout the entire survey area during April, May and June of 2002 through 2005. Areas of the survey area containing steep terrain determined dangerous and/or inaccessible were not surveyed on foot but were evaluated based on visual observations using binoculars and confirming appropriate plant community type.

CAGN surveys within the survey area (see Figure 5.8-3) were conducted by permit qualified biologists during appropriate survey periods (i.e., June and July of 2002, 2003 and 2005), as defined by the USFWS' February 28, 1997 survey protocol. All surveys were conducted by systematically walking suitable habitat and noting all CAGN encountered. During these surveys, all birds species encountered were noted, including CACW. All surveys were conducted in strict accordance with requirements identified in the USFWS February 28, 1997 protocol for CAGN.

LBV and SWF surveys within the survey area were conducted by permit qualified biologists during the appropriate survey periods (i.e., April, May, June and July 2005), as recommended by USFWS survey protocol for both species , including the July 11, 2000, revision to the survey protocol for SWF. A total of ten surveys were conducted in three specified time periods and at least five days apart. Riparian habitats were systematically surveyed by walking slowly and methodically along their margins. Taped vocalizations of SWF were used to elicit a response from any potentially territorial SWF. Taped vocalizations of LBV were not used.

5.8.3.5 Plant Community Mapping

The vegetation mapping was compiled with the use of aerial photography, topography and some field verification to provide reasonable accuracy for the purpose of establishing the setting, forecasting impacts and presenting reasonable mitigation for direct and indirect impacts. This analysis was conducted over a two year time frame and minor modifications were made during that time. It is understood that some succession and changes occur over time and that at the time of actual impact, months or years could pass since the mapping was conducted due to the long-term planning nature of the MDP phasing. Consequently, it is anticipated that the IWMD may verify the vegetation communities within future phases prior to implementation.

The Orange County Habitat Classification System (OCHCS; Gray and Bramlet 1992) was used to classify the plant communities within the survey area based on characteristic plant species and structure. The OCHCS divides plant communities into associations and divides associations into subassociations. An association is a particular type of plant community that has been described sufficiently and repeatedly in several locations such that it is considered to have a relatively consistent species composition, a characteristic physiognomy (growth form or structure), and a distribution that is characteristic of a particular habitat (Barbour et al. 1987). A subassociation is an additional division of an association into more discrete units based on floristic composition.

During the plant community field mapping of the survey area (conducted in 2003 and 2004), a 2002 aerial photograph was used as the base map (see Figure 5.8-1). The boundaries of plant communities evident on the aerial were ground-truthed, with notes made on dominant plant species. In addition, plant communities and/or associations evident in the field but not on the aerial were added. Based on this information, each plant community was placed within the class from the OCHCS that most closely fit the plant species observed. A limiting factor to this mapping was the age of the aerial photograph or access within the survey area due to steep slopes or rugged terrain. Some areas exhibiting these characteristics were not surveyed directly on foot but through the use of binoculars. In particular, access to the landslide area was limited during the mapping component due to safety concerns and the potential for a slide event.

There is evidence that a fire had burned areas of the site in the recent past. In these areas, evaluation of the recovering plant community was challenging because the vegetation was in an early successional stage. During earlier stages of succession, certain plant species are more prevalent and some less prevalent than what will occupy the site in the future. Non-native annuals are species that have an ability to quickly recolonize a burn area. It will take up to several years for post-fire annuals to dwindle in number. The plant community map represents the current condition of the vegetation found on-site within the survey area at the time in which the mapping was performed in 2003 and 2004.

5.8.4 IMPACTS

Direct biological impacts involve the temporary or permanent physical loss of plant communities, wildlife habitat and special interest plant and wildlife species resulting from site preparation activities such as clearing, grubbing and grading. Direct impacts may also include habitat degradation, fragmentation or modification. Direct impacts would occur on plant communities, wildlife habitat, special interest species and special interest habitats as a result of implementation of the FRB MDP.

Indirect impacts on plant communities include the potential for increased susceptibility of adjacent, native habitats to invasion by non-native plant species. The establishment of non-native plants lead to increased competition between native and non-native plants for available resources and decreased native species diversity in adjacent, native habitats. Fugitive dust created during project-related construction activities may settle on plants adjacent to the construction zone. This dust can at least temporarily result in reductions in plant photosynthesis, growth and reproduction.

Indirect impacts on wildlife species include the potential for noise, human intrusions into sensitive habitats, and night-lighting, as well as potential disruptions in local movement patterns for wildlife during construction.

Short-term impacts are those that would result in the temporary removal of a biological resource. Long-term impacts are those that would result in permanent changes to these biological resources.

5.8.4.1 Vegetation Communities

Short Term Impacts

For the purposes of this discussion, all direct impacts of the FRB MDP are considered permanent and consequently no short-term direct impacts are identified. However, plant communities and wildlife habitat outside the limits of disturbance of the FRB MDP may indirectly be affected during construction and operation of the landfill. These temporary indirect impacts would include excessive dust and airborne debris, which could compromise the ability of the surrounding plants to carry on respiration and photosynthesis. In addition, during construction, noise, motion and startle impacts could temporarily impact adjacent wildlife resulting in temporary movement away from the area. These indirect impacts would be considered adverse but not significant.

Long Term Impacts

The new FRB MDP implementation is proposed to occur over a 47 year period (2006 to 2053) and will be implemented in phases (see Section 4.0 Project Description). During each of these phases, the on-site plant communities and the associated wildlife habitat will be incrementally impacted by MDP activities. Table 5.8-2 contains the schedule and acreages for incremental CSS take proposed for each phase of the FRB MDP. The take schedule reflects the earliest anticipated take impact by IWMD forces or construction contractors. Permanent direct impacts would include the removal of on-site plant communities and wildlife species utilizing them for shelter. Direct impacts would be associated with the removal of plant communities used by animal species for foraging, nesting and cover. The conversion of native plant communities to landfill operations will create conditions unsuitable to most wildlife species.

TABLE 5.8-2
FRANK R. BOWERMAN MASTER DEVELOPMENT PLAN
INCREMENTAL COASTAL SAGE SCRUB TAKE BY PHASE

MASTER DEVELOPMENT PLAN PHASE	TAKE SCHEDULE	ACRES
LANDSLIDE BACKCUT EXCAVATION		
Southern Cactus Scrub	2006	0.26
Venturan-Diegan Coastal Sage Scrub		12.14
BUTTRESS EXCAVATION/FILL		
Venturan-Diegan Coastal Sage Scrub	2006	5.73
CANYON 2 EXCAVATION/FILL		
Venturan-Diegan Coastal Sage Scrub	2009	0.81
PHASE VIIIA EXCAVATION		
Venturan-Diegan Coastal Sage Scrub	2012	5.66
PHASE VIIIB EXCAVATION		
Venturan-Diegan Coastal Sage Scrub	2015	23.08
PHASE VIIIC EXCAVATION		
Venturan-Diegan Coastal Sage Scrub	2016	8.63
PHASE IX EXCAVATION		
Southern Cactus Scrub	2017	0.82
Venturan-Diegan Coastal Sage Scrub		20.37
PHASE X EXCAVATION		
Southern Cactus Scrub	2023	0.09
Venturan-Diegan Coastal Sage Scrub		26.62
PHASE XI EXCAVATION		
Southern Cactus Scrub	2041	0.72
Venturan-Diegan Coastal Sage Scrub		33.41
SUBTOTAL		
Southern Cactus Scrub		1.89
Venturan-Diegan Coastal Sage Scrub		136.45
TOTAL		138.34

Source: Frank R. Bowerman Master Development Plan July 2004. BAS and P&D Consultants, 2005.

The adverse impacts to the following plant communities within the survey area are not considered significant because they are either non-native, have limited value, are not recognized by resource agencies or the NCCP as special status plant communities, or are found abundantly on a local or regional scale:

- 19.96 acres of toyon-sumac chaparral
- 12.02 acres of ruderal grassland
- 35.21 acres of revegetation areas

Impacts to the following native plant communities within the survey area are considered significant and adverse because they support a variety of native species, provide habitat for sensitive species listed as threatened or endangered by the resource agencies, are covered by the NCCP or are in and of themselves considered threatened or sensitive:

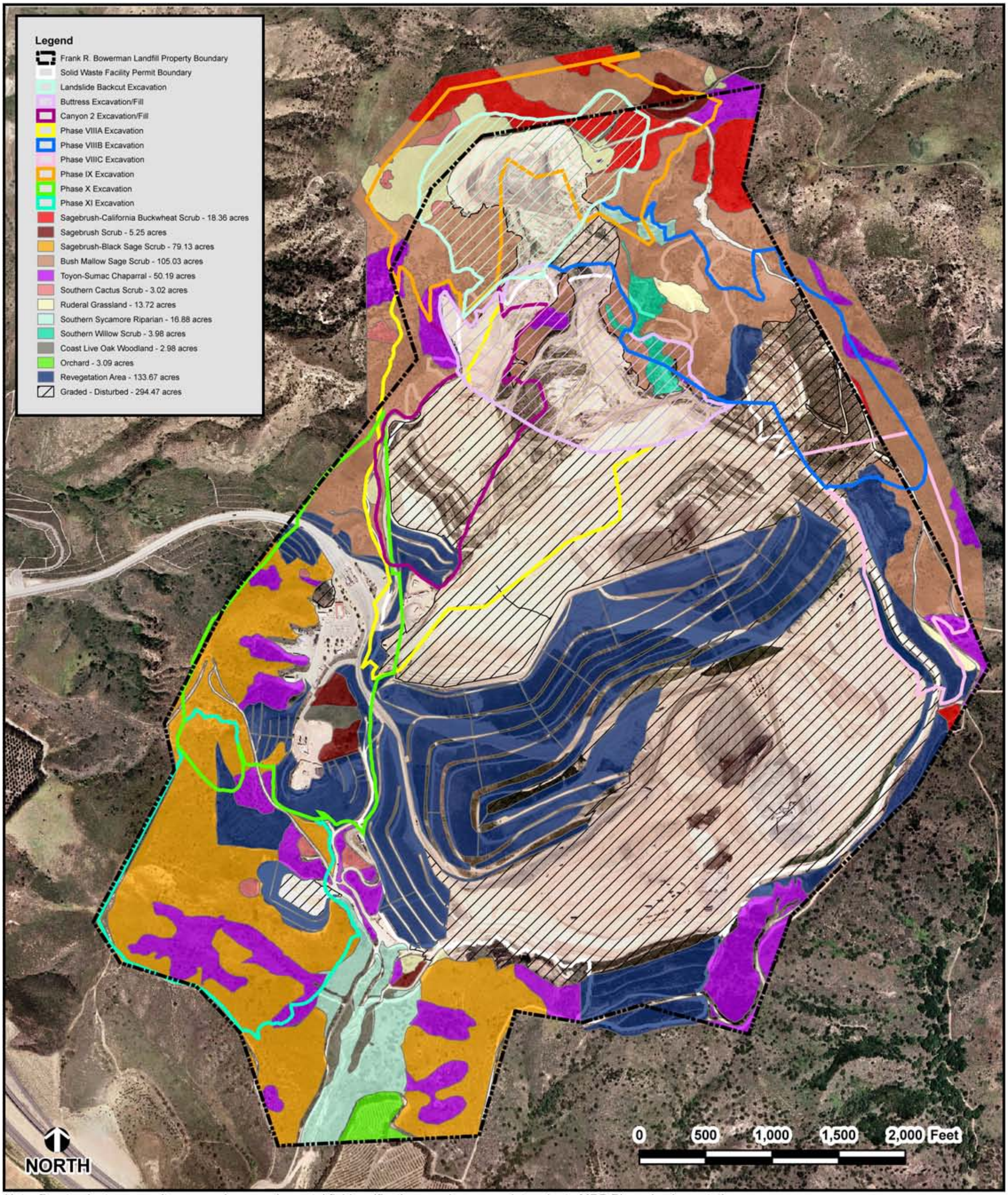
- 136.45 acres of Venturan-Diegan coastal sage scrub
- 1.89 acres of southern cactus scrub
- 1.58 acres of southern sycamore riparian
- 1.17 acres of coast live oak woodland
- 3.98 acres of southern willow scrub

As noted previously, the MDP will occur in phases over a 47 year period (2006 to 2053) and will result in the direct removal of native vegetation during this period of time. As MDP phases are implemented, some areas would be re-vegetated on-site consistent with duff management programs currently in place. The duff management program is described in Section 5.8.5 (Mitigation Measures) under Mitigation Measure B-11. These areas will likely be focused within inactive slopes contained within the landfill or as deemed appropriate based upon operations and erosion control requirements. Figure 5.8-5 shows the location of plant communities/wildlife habitat affected by the FRB MDP.

5.8.4.2 Sensitive Biological Resources

<u>Short Term Impacts</u>

For the purposes of this discussion, all direct impacts of the FRB MDP are considered permanent and consequently no short-term direct impacts are identified. However, temporary indirect impacts to sensitive plant communities and plant species would include fugitive dust. Additional impacts to sensitive animal species would include night-lighting, and startle from noise and motion due to construction-related grading and landfill activities. Some of these indirect impacts may be considered significant for certain sensitive resources, as are discussed below under the specific resource potentially affected.



Note: Due to plant community succession, supplemental field verification may be appropriate prior to MDP Phase implementation
Source: Aerial Photograph (IWMD, 2005); FRB MDP Phases (BAS, 2004), Vegetation (P&D, 2005).

Figure 5.8-5
FRB Master Development Plan Phase Summary and Vegetation Communities

Long Term Impacts

There would be long-term indirect and direct impacts to the sensitive biological resources present within the survey area. Indirect impacts to the plant communities and plants species would include degradation of remaining habitat values due to weedy invasive plant species. Many native plant species are unable to compete with fast growing weedy species, which could jeopardize the sustainability of the population. However, IWMD has an ongoing weed abatement program that effectively removes invasive weeds in adjacent native habitat.

During the implementation phases of the FRB MDP, there would be resulting indirect impacts to the plant and animal species, including edge effects and human-related disturbances, including road kill, noise and motion, as well as the possible attraction of mesopredators (such as skunks, opossums and raccoons) and brown-headed cowbirds (*Molothrus ater*). The FRB MDP will result in the continuation of these impacts over time. However, though adverse, they are not significant as these impacts occur within existing conditions at the FRB Landfill.

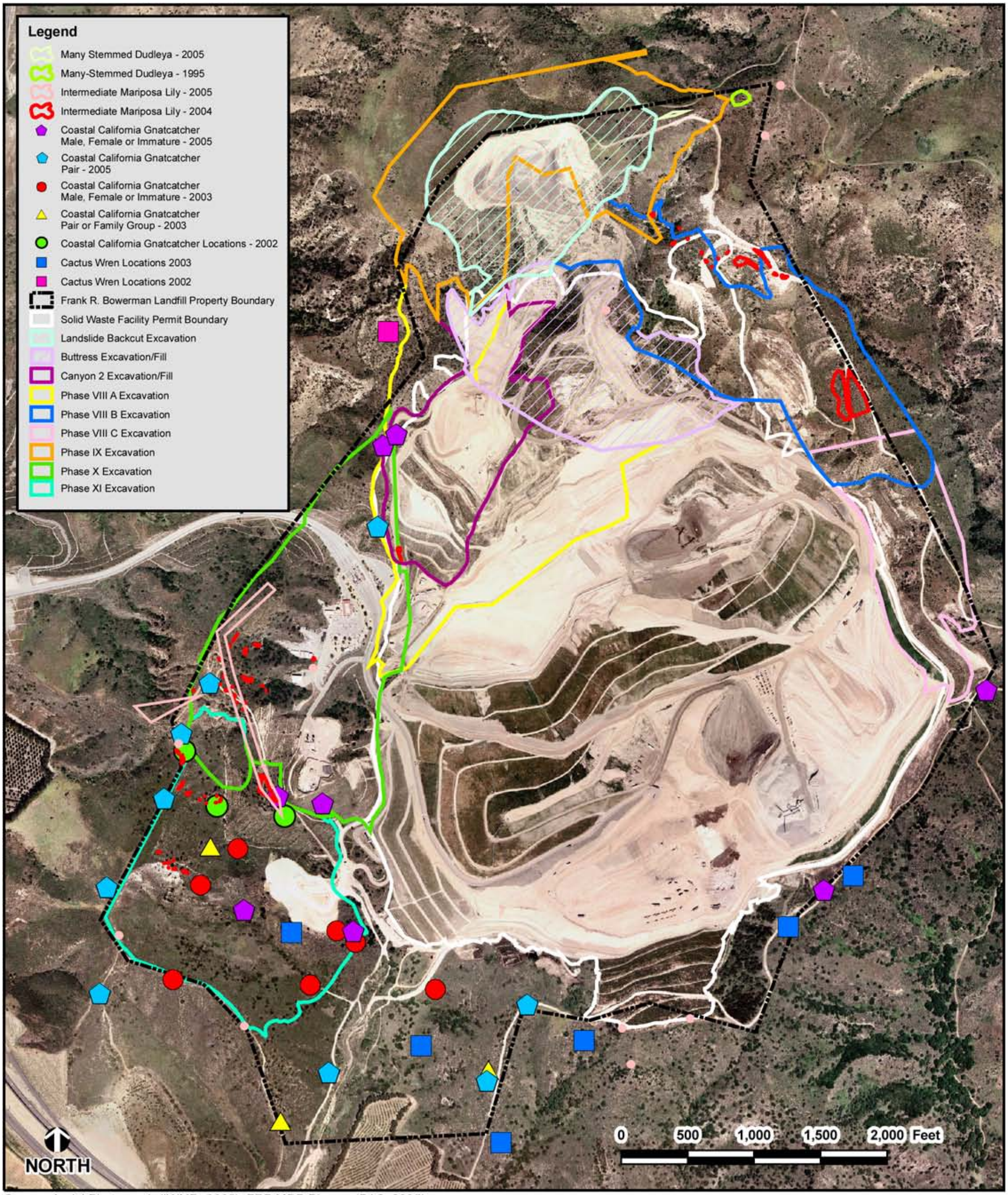
Permanent direct impacts on sensitive biological resources within the FRB MDP would occur as each phase is cleared and ultimately graded. The initial clearing and conversion of native plant communities to landfill operations would create conditions largely unsuitable to all the sensitive biological resources. These areas would permanently be unable to support native plant communities or populations of plant and wildlife species. Permanent long-term direct impacts to sensitive biological resources, including plant communities and plant and wildlife species, would occur. Sensitive species previously identified during focused surveys including IML, Catalina mariposa lily, many-stemmed dudleya, San Diego horned lizard, orange-throated whiptail (OTW), CAGN, CACW, rufous-crowned sparrow, loggerhead shrike, Cooper’s hawk and San Diego desert woodrat would be directly affected by implementation of the MDP.

Intermediate Mariposa Lily

The NCCP indicates that impacts of less than 20 individual IML plants do not require mitigation beyond that already accommodated in the NCCP. Impacts to greater than 20 to 100 plants require implementation of a mitigation plan and are considered to be a significant adverse impact. Based on the 2004 and 2005 data, the FRB MDP would directly impact approximately 963 individual IML plants. Figure 5.8-6 shows the IML populations affected relative to their location within the MDP, for both 2004 and 2005.

Catalina Mariposa Lily

The Catalina mariposa lily was found during 1995 and 2005 biological surveys of the FRB Landfill. Subsequent to the 1995 survey, a landslide eliminated the area where the first population was recorded. The 2005 survey noted individuals scattered throughout the study area. The FRB MDP is not expected to result in significant impacts to this species because the species is considered adequately conserved in accordance with FESA Section 10 standards under the NCCP.



Source: Aerial Photograph (IWMD, 2005); FRB MDP Phases (BAS, 2005), Sensitive Plants (Jones & Stokes, 1995; P&D, 2004; Bonterra, 2005), Sensitive Species (P&D, 2002, 2004 and Bonterra, 2005).

Figure 5.8-6

FRB Master Development Plan Phase Summary and Sensitive Biological Resources

Many-stemmed Dudleya

Two populations of many-stemmed dudleya have been mapped within the study area. A population of 1,838 plants is located within the MDP disturbance footprint and will be transplanted in the fall of 2006 to avoid direct impacts. The second population of many-stemmed dudleya consists of 300 plants and is located outside of the MDP disturbance footprint. However, the MDP disturbance footprint would occur within close proximity to this population and may result in indirect impacts. Indirect impacts to many-stemmed dudleya may include airborne dust and debris generated from construction and operation activities and potential elimination of some plants due to increased landslide activities. Indirect impacts from the FRB MDP to many-stemmed dudleya are considered adverse but not significant. Figure 5.8-6 shows the many-stemmed dudleya populations.

Coastal Sage Scrub

The NCCP has allocated a total of 66 acres of authorized CSS take (including 36 acres for Special Linkages) to occur within the FRB landfill boundary. IWMD has also purchased an additional 15 acres of take credit from the County of Orange Resources Development and Management Department (RDMD) bringing the total authorized take to 81 acres. Implementation of the new MDP will require the direct removal of approximately 138.34 acres of additional CSS (including 1.89 acres of southern cactus scrub, see Table 5.8-2).

In addition, the removal of CSS is also anticipated to result in direct and indirect impacts to Target, Identified and Conditionally Covered species addressed in the NCCP as well other species occurring within this community considered sensitive by the CDFG and CNPS. California gnatcatcher is the most sensitive species that would be adversely and significantly impacted by the removal 138.34 acres of CSS.

California Gnatcatcher, Cactus Wren and Orange-throated Whiptail

The removal of CSS and associated habitat values will directly impact the California gnatcatcher (CAGN) and cactus wren (CACW). Figure 5.8-6 shows the location of these species in relation to the MDP. The OTW is present in small to moderate numbers throughout the survey area. Impacts to CAGN associated with the FRB MDP would be considered adverse and significant, particularly due to its Federally-threatened status. Both long-term permanent and construction-related minimization measures exist for these species, which are addressed in the mitigation section (see Section 5.8.5 Mitigation Measures). These species occur in CSS and the additional take of 138.34 acres includes the presence of these species. The loss of these species habitat is considered adverse and significant.

CAGN, CACW and OTW outside of the FRB MDP may be affected by indirect impacts. These would include dust, night-lighting, and startle effects from noise and motion due to construction-related grading and landfill activities. These indirect impacts may be considered significant if there was a substantial interference with nesting activities for these species (such as for the CAGN and CACW), or in the unlikely event that individuals were to permanently abandon significant portions of their territories.

Other Sensitive Wildlife

Additional sensitive animal species known to be present on site would be directly impacted by implementation of the MDP through habitat removal. These species include: San Diego horned lizard, Cooper's hawk, northern harrier, loggerhead shrike, rufous-crowned sparrow and San Diego desert woodrat. Suitable habitat is present for the following species which have not been detected but which may be present and thus impacted by habitat removal: western spadefoot toad, red diamond rattlesnake, sharp-shinned hawk, golden eagle, peregrine falcon, prairie falcon, yellow warbler, yellow-breasted chat and Bell's sage sparrow. The LBV and SWF are not expected to occur on-site due to limited acreage, isolation, and marginal habitat value. Focused surveys conducted for LBV and SWF in 2005 were negative.

Impacts to these species would be similar to those previously described for CAGN, CACW and OTW and would generally include loss of foraging, nesting and/or cover sites. As previously discussed, Table 5.8-1 lists those species, identified as Target and Identified species under the NCCP. Table 5.8-1 also lists those species identified as Conditionally Covered under the NCCP that require specific additional mitigation measures. For those species not included under the NCCP but identified as sensitive by the CDFG, CNPS or other conservation organization, adverse impacts to these species are not considered significant because of 1) their abundance on a regional scale, and 2) the fact that no substantial or unique populations are known to exist in the survey area.

5.8.4.3 Wildlife Dispersal

Short Term Impacts

For the purposes of this discussion, all direct impacts are considered permanent and as such, no short-term direct impacts are discussed. However, temporary indirect impacts on wildlife movement may include the generation of dust, noise and light emissions that could potentially disturb animal behavior. However, the majority of wildlife species using movement corridors would do so during evening hours when there is no landfill activity occurring because operations terminate at dark. The indirect effects of dust on wildlife movement are not expected to be significant. The County of Orange IWMD, as operator of the landfill, already implements a dust control program to minimize particulate matter from entering the air during existing landfill operations. The indirect effects of noise on wildlife movement are not expected to be significant or different than that under existing conditions. After a period of acclimation to noise events, wildlife, including mountain lions (IWMD 2005), have used adjacent areas normally. These indirect impacts are not considered to be significant.

Long Term Impacts

The direct impacts of native plant community conversion to active landfilling operations would further decrease the use of the area as a wildlife corridor or activity area. The lack of vegetative cover, human-related disturbance, and the decrease in food resources would all contribute to the reduction of the area for purposes of wildlife movement and dispersion. There is no functioning wildlife corridor in the survey area other than the ridgeline for the Lomas de Santiago.

For some species, such as mule deer and small mammals (rodents), the utilization of the area for wildlife dispersion would be reduced with the FRB MDP. However, some species may still utilize the active landfill as a dispersion route, though very limited. As a top predator, mammalian carnivores do not necessarily always require vegetative cover for escape and hiding and may utilize the active landfill occasionally. The current FRB landfill has created conditions that are not ideal for wildlife movement. Therefore, the build-out of the FRB MDP is not expected to create any additional significant impacts to wildlife corridors on a regional level, but would adversely but not significantly impact movement on a local level.

5.8.4.4 Wetlands

The impact area contains 2.81 acres of waters of the U.S. (2.06 acres of the overall total are considered jurisdictional wetlands by the ACOE standards) and 6.37 acres of CDFG jurisdictional waters of the State (including 5.62 acres of riparian habitat). Tables 5.8-3 and 5.8-4 identify the on-site drainages that will be affected by the FRB MDP and the resulting acres affected by ACOE and CDFG jurisdiction, respectively. All anticipated project impacts are expected to be permanent and, therefore, no temporary impacts are presented in Tables 5.8-3 and 5.8-4. As noted in the *Delineation of Jurisdictional Waters and Wetlands for the Frank R. Bowerman Landfill Master Development Plan* (P&D Consultants and URS, October 2005), Drainages 2, 3, 4 and 5 generally are denuded of vegetation and, therefore, the ACOE and CDFG jurisdictions are similar. Drainage 1 includes waters of the U.S., wetlands and riparian vegetation extending outside of the bed and bank resulting in additional acreage for CDFG. Figure 5.8-7 illustrates on-site jurisdictional resources and their location relative to the MDP phasing limits.

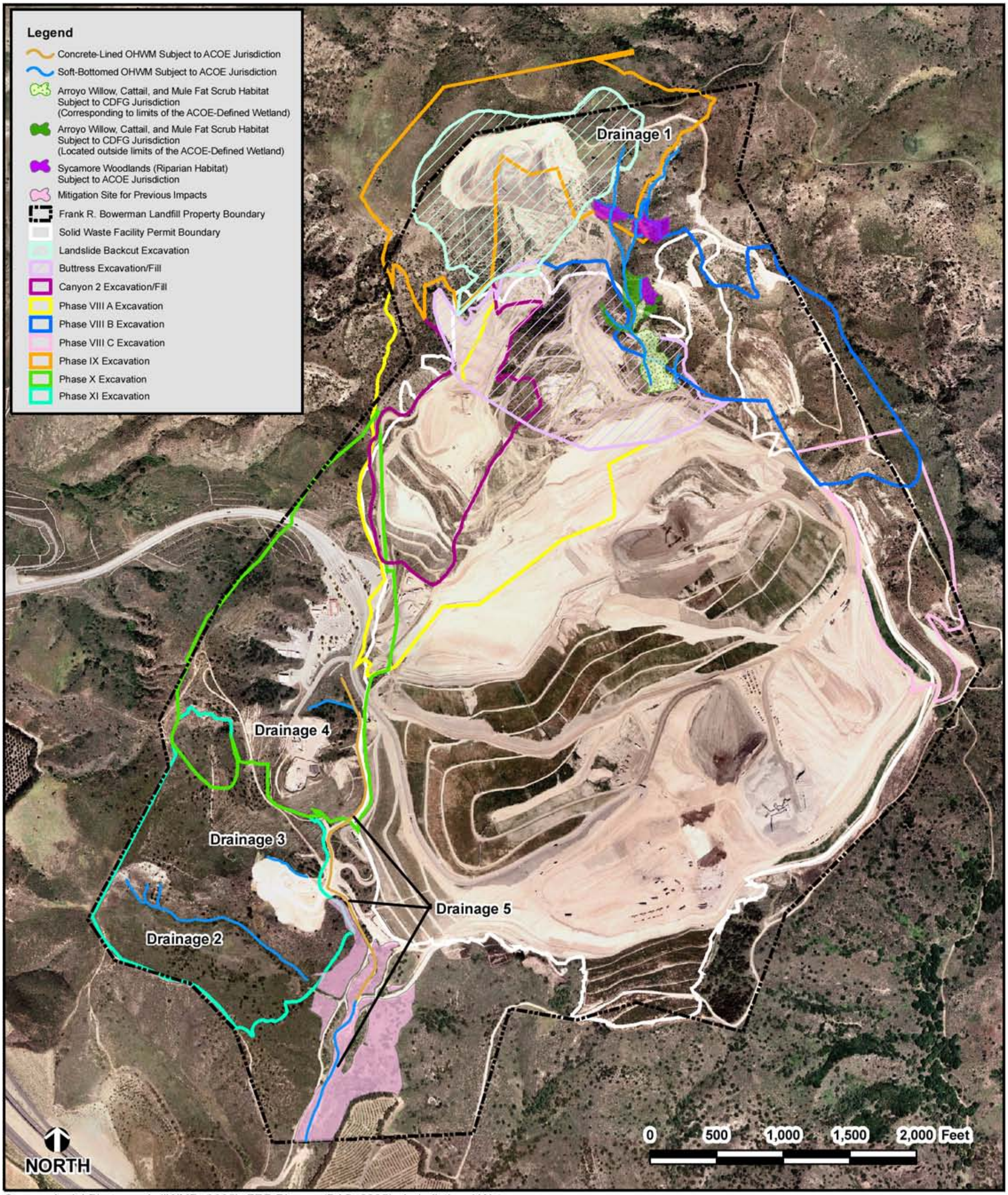
Most of Drainage 1, including the two wetland areas, would be impacted with the landslide remediation construction. Other portions of Drainage 1 would be impacted in subsequent Phase VIIIB Excavation. Drainages 2 and 3 are within the Phase XI Excavation limit and Drainages 4 and 5 are within the Phase X Excavation limit.

The impacts to wetlands and jurisdictional areas are both adverse and significant.

TABLE 5.8-3
IMPACTS TO ACOE JURISDICTION

Drainage Name	Other Waters (Acres)	ACOE-Defined Wetlands (Acres)	Total ACOE Jurisdiction (Acres)
1	0.11	2.06	2.17
2	0.29	None	0.29
3	0.06	None	0.06
4	0.04	None	0.04
5	0.25	None	0.25
Total	0.75	2.06	2.81

Source: P&D/URS, 2005.



Source: Aerial Photograph (IWMD, 2005); FRB Phases (BAS, 2005), Jurisdictional Waters and Wetlands (P&D, 2004 and URS, 2005).

Figure 5.8-7
FRB Master Development Plan Phase Summary and Jurisdictional Waters and Wetlands

TABLE 5.8-4
IMPACTS TO CDFG JURISDICTION

Drainage Name	Unvegetated Channel (Acres)	Riparian Vegetation (Acres)	Total CDFG Jurisdiction (Acres)
1	0.11	5.62	5.73
2	0.29	None	0.29
3	0.06	None	0.06
4	0.04	None	0.04
5	0.25	None	0.25
Total	0.75	5.62	6.37

Source: P&D/URS, 2005.

5.8.5 MITIGATION MEASURES

The following mitigation measures are recommended to address those adverse impacts determined to be significant, or are precautionary and relevant to the protection of biological resources to the extent practicable as part of the FRB MDP implementation:

B-1 The IWMD will prepare a NCCP Major Amendment to address impacts associated with the unauthorized loss of 138.34 acres of CSS at the FRB Landfill during MDP implementation. As part of the Major Amendment, the County of Orange's IWMD will tailor a plan to enhance subregional habitat values and balance important solid waste infrastructure requirements. A component of the plan will be focused on executing a strategy to ensure no net loss of subregional habitat values as a result of the development and implementation of the FRB MDP.

The plan will include the conversion of Oso Nursery to open space by restoring the site with CSS to enhance connectivity between the Central Subregion and Southern Subregion of the NCCP. As an additional supplement to Oso Nursery, Santiago Canyon Landfill will receive treatment to restore 66 acres and compensate for 33 acres (2:1) of CSS take authorization. In addition, and part of the supplemental program, the Santiago Canyon Landfill easement restoration of 56.7 acres will compensate for 28 acres (2:1). To cover the balance and create a surplus at FRB Landfill, IWMD will transfer existing County CSS Take Authorizations totaling 45 acres (1:1).

B-2 The IWMD will mitigate for impacts to southern willow scrub and southern sycamore riparian woodland and jurisdictional areas. The IWMD will work with the ACOE, CDFG and Regional Water Quality Control Board (RWQCB) to develop appropriate mitigation measures. The IWMD has proposed preliminary mitigation for the project. Conceptual mitigation for project impacts is proposed to include: (1) Giant reed eradication in the headwaters of Oso Creek on the County owned parcel at the Oso Nursery site (commences FY 06-07), which will include five years of maintenance and monitoring, and (2) payment of an in-lieu fee for restoration and enhancement activities in the San Diego Creek watershed.

With the above action, it is the intent of IWMD to mitigate for the lost functions and values of the wetland/riparian community, consistent with resource agency requirements and conditions presented in Section 404 Corps permit and 1602 CDFG Streambed Alteration Agreement and meet the regulatory standards for the applicable state and/or federal regulatory programs.

B-3 During final design of the project, the Project Biologist will review the design plans and make recommendations for avoidance and minimization of sensitive biological resources. The IWMD or other implementing agency/agencies staff shall determine the feasible and practicable implementation of those recommendations.

B-4 In conjunction with the development of final design plans and specifications for construction, or other activities involving vegetation/habitat removal, the Project Biologist shall approve the final design map of all sensitive habitats (Environmentally Sensitive Areas) within 152.4 meters (500 feet) of the grading limits on the grading plans.

B-5 A Biological Resources Management Plan (BRMP) will be prepared prior to construction. The BRMP will provide specific design and implementation features of the biological resources mitigation measures outlined in resource agency approval documents. Issues during construction and operation to be addressed in the BRMP should include, but are not limited to, resource avoidance, minimization, and restoration guidelines, performance standards, maintenance criteria, and monitoring requirements.

The primary goal of the BRMP will be to ensure the long term perpetuation of the existing diversity of habitats through restoration in the project area and adjacent urban interface zones, if any, and to prevent offsite or indirect effects. The BRMP should contain, at a minimum, the following:

- Identification of all Environmentally Sensitive Areas (ESA). ESAs are defined as sensitive habitats including, but not limited to, areas subject to the jurisdiction of the CDFG, ACOE, and USFWS and identified in the Central and Coastal Subregion NCCP/HCP.

- Design of protective fencing (i.e., t-bar or yellow rope) around ESAs and the construction staging areas.

- For areas that will be restored, the quality of the adjacent habitat should be characterized. This characterization should include species composition, density, coverage, and presence of nonnatives. This characterization will provide a baseline to compare the success of the restoration. The site preparation plan for each restoration site should include:

    - Sources of plant materials and methods of propagation.

    - Site preparation (clearing, grading, weed eradication, soil amendment, topsoil storage), irrigation, planting (container plantings, seeding), and maintenance (weed control, irrigation system checks, replanting) of restoration areas. Specification of parameters for maintenance and monitoring of restoration areas, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas.

- Remedial measures to be taken if performance standards are not met.
- Methods and requirements for monitoring of the restoration efforts.
- Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within restoration areas.

- Specific measures should be identified for the protection of sensitive habitats to be preserved in and adjacent to the FRB property to ensure that construction does not increase beyond the impacts identified in the EIR. These measures should include, but are not limited to, erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements.

B-6 IWMD or other implementing agency/agencies will continue to employ a Project Biologist at the FRB Landfill responsible for overseeing biological monitoring, regulatory compliance, and restoration activities associated with construction of the proposed project in accordance with the adopted mitigation measures and applicable law.

The Project Biologist's duties include:

- Review of design plans and recommend ways to minimize impacts.
- Review final design and specifications of projects impacting resources or those within 500 feet of sensitive habitats for compliance with BRMP and/or applicable resource agency permits.
- Monitor grading and document compliance with minimization measures.

B-7 During grading activities and construction operations, the Project Biologist will conduct monitoring within and adjacent to sensitive habitats including monitoring of the installation of protective devices (silt fencing, sandbags, fencing, etc.), installation and/or removal of creek crossing fill, construction of access roads, vegetation removal, and other associated construction activities, as deemed appropriate by the Project Biologist. Biological monitoring should be conducted to document adherence to habitat avoidance and minimization measures addressed in the project mitigation measures and as listed in the USFWS, CDFG, and ACOE permits/agreements.

B-8 IWMD will implement the standard mandatory construction condition mitigation measures below as defined in the NCCP Compliance Procedural Guidelines for Landfill Related Projects:

- To the extent practicable, clearing and grading of CSS habitat will occur outside of the breeding and nesting season for the CAGN (February 15 through July 15) and other bird species, including Southern California rufous-crowned sparrow and raptors.

- Prior to the commencement of clearing or grading activities, a survey will be conducted within the project site to determine the presence/absence of CAGN or cactus wren. The survey will extend 100 feet from the grading limits. The locations of CAGN or cactus wren observed within the survey area will be clearly marked and identified on the construction/grading plans.

- Prior to the commencement of grading, all areas of CSS habitat located outside of the project footprint will be fenced or marked with materials clearly visible to construction personnel. No construction access, parking or storage of equipment or materials will be permitted within these marked areas. Waste dirt or rubble will not be deposited on adjacent CSS.

- Pre-construction meetings will be conducted and documented by the monitoring biologist to educate construction supervisors, equipment operators, and other site employees on the importance of adherence to conservation measures.

- A qualified monitoring biologist will be on site during the clearing of CSS. The IWMD will advise the USFWS/CDFG at least seven (7) calendar days (and preferably fourteen [14] calendar days) prior to the clearing of any habitat occupied by target species to allow USFWS/CDFG to coordinate with the monitoring biologist. It will be the responsibility of the monitoring biologist to ensure that CAGNs and cactus wrens are not directly harmed by brush-clearing and earth-moving equipment.

- Access roads shall be periodically sprayed with water to reduce the potential for dust accumulation on the leaves of CSS species, as recommended by the monitoring biologist.

B-9 IWMD shall conduct pre-construction surveys for thread-leaved brodiaea, many-stemmed dudleya, vernal barley and chaparral beargrass in areas of suitable habitat prior to construction. If any of these plant species are found within the project limits, a conceptual mitigation plan will be prepared by IWMD for any significant impacts that would be expected on these species as a result of the proposed project.

B-10 IWMD shall implement the following mitigation measures below:

IWMD shall implement a duff (i.e., seed material) and/or re-vegetation plan within the NCCP Reserve to reestablish CSS impacted by the proposed project. The plan shall be implemented and monitored by a qualified Restoration Ecologist familiar with the biology and ecology of the Southern California plant communities and that of the project site. Location of candidate duff and/or re-vegetation areas within the landfill will be coordinated with IWMD operations staff. Where appropriate, duff shall be collected from areas in which CSS is removed. This material shall be placed in areas deemed appropriate by IWMD for re-vegetation and weed abatement, or temporarily inactive disposal area slopes.

IWMD is currently implementing a successful revegetation program at the FRB Landfill site for the restoration of CSS. As the Landfill is developed, upon completion of each phase, and the beginning of a new phase, CSS duff material from the new phase is collected and transported to the completed phase, where the duff is revegetated on the side slopes of the Landfill. The completed phase is then hydroseeded with CSS. A maintenance crew, directed by the on-site restoration ecologist, is responsible for maintaining all of the CSS revegetation areas on the project site, keeping theses areas free of invasive non-native weeds, debris and litter. IWMD will continue to perform maintenance and monitoring of each CSS revegetation area until the sites have reached their performance objectives.

B-11 The impacts to IML occur during Phases VIII A, VIII B, IX, and X Excavations of the FRB MDP. Under NCCP/HCP regulations, if a population of more than twenty (20) individual plants is identified, then the County is required to prepare a mitigation plan that: (1) addresses design modifications or other on-site measures that are consistent with the project's purpose, minimizes impacts to IML habitat, and provides appropriate protections for any adjoining conserved IML habitat; (2) provides for an evaluation of salvage, restoration/enhancement/management of other conserved IML, or other mitigation techniques to determine the most appropriate mitigation measures to offset impacts, and implements mitigation consistent with the foregoing evaluation; and, (3) provides for monitoring and adaptive management of IML consistent with Chapter 5 of the NCCP/HCP. This mitigation plan must also be developed in coordination with USFWS, CDFG, and Nature Reserve of Orange County (NROC), and approved by the USFWS. The IWMD will be required to develop a transplantation program for impact to IML in accordance with requirements noted above and in coordination with the NROC, CDFG and USFWS.

In order to pre-mitigate for FRB MDP impacts to the IML, IWMD is already implementing a long-term mitigation plan as the FRB site that includes the excavation and transplantation of bulbs, seed collection, nursery propagation, experimental studies and long term performance monitoring. The first phase of the IML Mitigation Plan was completed in August 2004, when 234 IML bulbs were transplanted to four receptor sites in the northeast corner of the FRB property, outside of the future FRB MDP development limits.

B-12 The impacts to many-stemmed dudleya occur during Phase IX Excavation of the FRB MDP. IWMD shall prepare a mitigation plan for the transplantation of a population of 1,838 plants located within the MDP disturbance footprint to avoid direct impacts.

Note: *Development activities and uses that are addressed by the NCCP/HCP are considered fully mitigated under the NCCP Act and the state and federal ESAs for impacts to habitat occupied by listed and other "identified species" and to species dependent upon or associated with "covered habitats". Species that have been located on the FRB landfill site that qualify as* *identified species include coastal California gnatcatcher, coastal cactus wren, orange-throated whiptail, coastal western whiptail, San Diego horned lizard, coyote, gray fox, northern harrier, red-shouldered hawk, and southern California rufous-crowned sparrow. Conditionally covered species are addressed in the NCCP with specific conditions. Provided adherence to NCCP policies and procedures are undertaken, no further mitigation is necessary.*

5.8.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed project would result in significant adverse impacts to certain biological resources. Implementation of mitigation measures B-1 through B-12, above, will reduce most of these potential impacts of the proposed landfill expansion to below a level of significance. It is anticipated that with the conversion of Oso Nursery to coastal sage scrub, in combination with slope revegetation at Santiago Landfill and take credit transfers, there will be a surplus of coastal sage scrub credits; resulting in less than significant adverse impacts. The temporal loss of wetland habitat values and functions is considered to be significant after mitigation.

5.9 AESTHETICS

5.9.1 EXISTING CONDITIONS

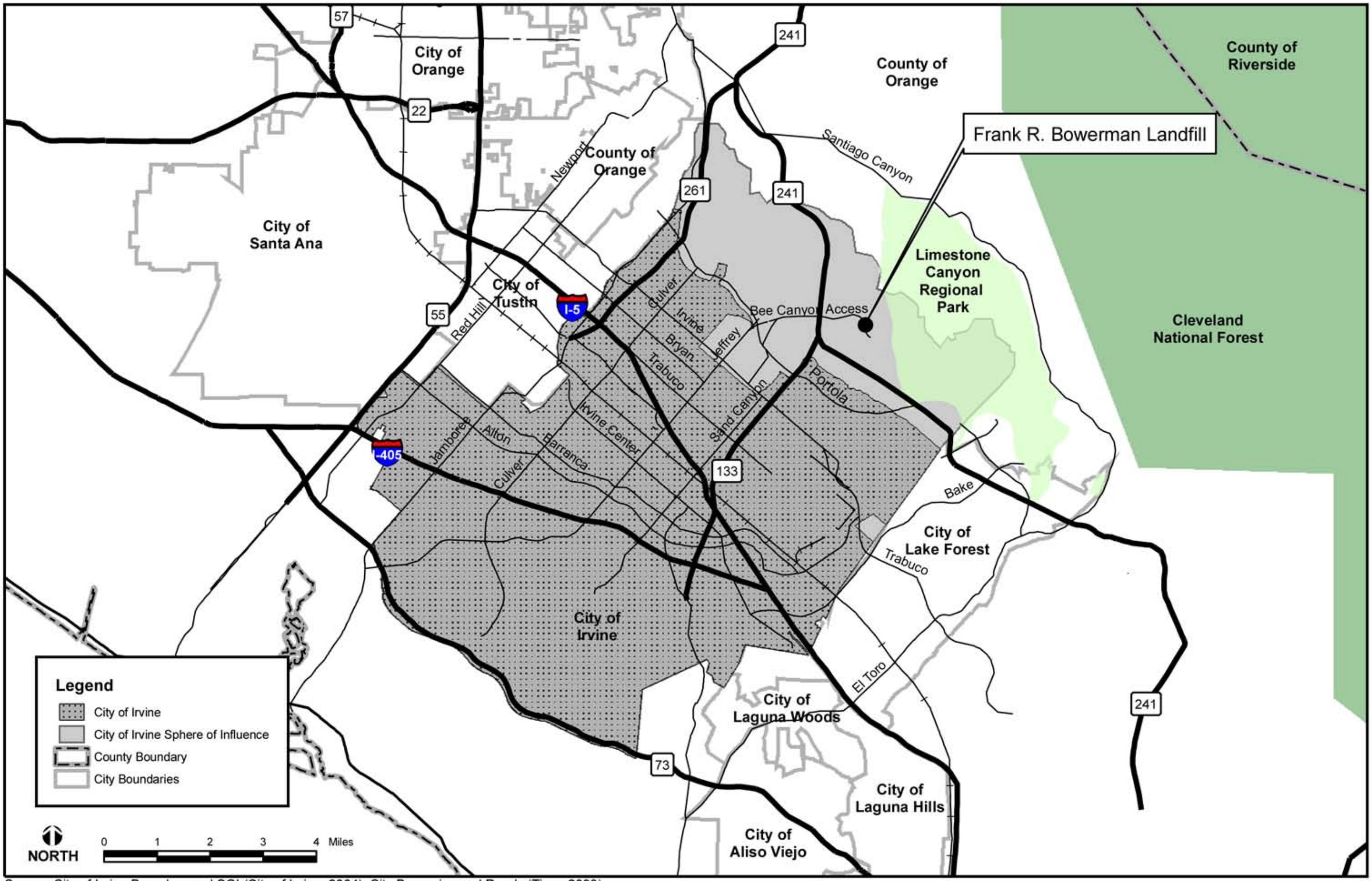
5.9.1.1 Existing Views

The FRB Landfill is in unincorporated Orange County, northeast of the City of Irvine jurisdictional boundary but within the City's Sphere of Influence (SOI), as shown on Figure 5.9-1. The landfill is east of the intersection of the Foothill Transportation Corridor (SR 241) and SR 133 immediately adjacent to Loma Ridge of the Santiago Hills. Cities and jurisdictions surrounding the landfill include unincorporated Orange County to the north, south, east, and west; Orange to the northwest; Tustin to the west; Irvine to the south and southwest; Laguna Hills, Laguna Woods, and Aliso Viejo to the south beyond Irvine; and Lake Forest to the southeast beyond Irvine and unincorporated Orange County. The landfill property covers approximately 725 acres with approximately 341 acres currently permitted for refuse disposal under the existing permit. Most of the 341 acres have been graded and/or excavated for landfill purposes and part of the area has been filled with MSW, covered with soil, and in some areas vegetated. The currently permitted height of the landfill is 1,100 feet. At this time, the highest elevation within the active landfill area is approximately 950 feet and the highest elevation of excavation is 1,150 feet in Phase VII B.

Land uses in the vicinity of the landfill include plant nurseries, agriculture, park, and existing and planned residential and commercial/industrial uses. Limestone Canyon Regional Park is north and east of landfill property. The closest existing and planned residential uses are in the City of Irvine south and southwest of the landfill.

From most developed residential, park, and commercial/industrial locations south, southeast, and southwest of the landfill, views of the landfill are blocked by buildings, landscape trees, and/or intervening topography. However, the landfill can be seen from the following locations where topography, vegetation, or structures do not obstruct views: points along I-5, I-405, SR 241, and SR 261; areas in the southwest part of Limestone Canyon Regional Park; community parks, existing residential and planned residential, commercial, industrial, and transportation land uses in the City of Irvine; residential and commercial land uses in the City of Lake Forest; areas, including residential uses, in the Cities of Laguna Hills, Laguna Woods, and Aliso Viejo; and areas in Tustin. Visible parts of the landfill, depending on the viewing location, include soil stockpiles, graded and filled areas, the emergency landslide repair area, and the Bee Canyon Access Road. From elevated areas north and northeast of the landfill in the southwest part of Limestone Canyon Regional Park the existing landfilling operations are visible including refuse deposition, application of daily cover, waste hauling vehicles, and operations equipment including compactors, bulldozers, and earthmovers.

With the exception of Limestone Canyon Regional Park that is on the Santiago Hills, views of the landfill from most land uses to the north, east, and west are obstructed by the topography of the Santiago Hills.



Source: City of Irvine Boundary and SOI (City of Irvine, 2004); City Bounaries and Roads (Tiger, 2000).

Figure 5.9-1
Landfill and Surrounding Area

Residents in Irvine have views of waste hauling vehicles on the City streets making their way to the Bee Canyon Access Road along Sand Canyon Road, which is the designated access to the FRB Landfill through the City of Irvine. The Bee Canyon Access Road and waste hauling vehicles are also visible from SR 261 and SR 241, as the access road crosses over SR 241, as shown on Figure 5.9-1.

Seven photographs of existing views of the landfill are provided. Views 1, 2, and 3 are from existing or planned land uses between 1.47 miles and 2.05 miles from the landfill. Views 4, 5 and 6 are from more distant locations and view 7, from SR 241, is the closest view of the landfill. Figure 5.9-2 identifies the locations from which these photographs of the landfill were taken and the direction of the view. The City of Irvine General Plan Land Use map is shown as an overlay on Figure 5.9-2 to depict the planned land uses. Figure 5.9-3 shows the existing views.

5.9.1.2 View 1

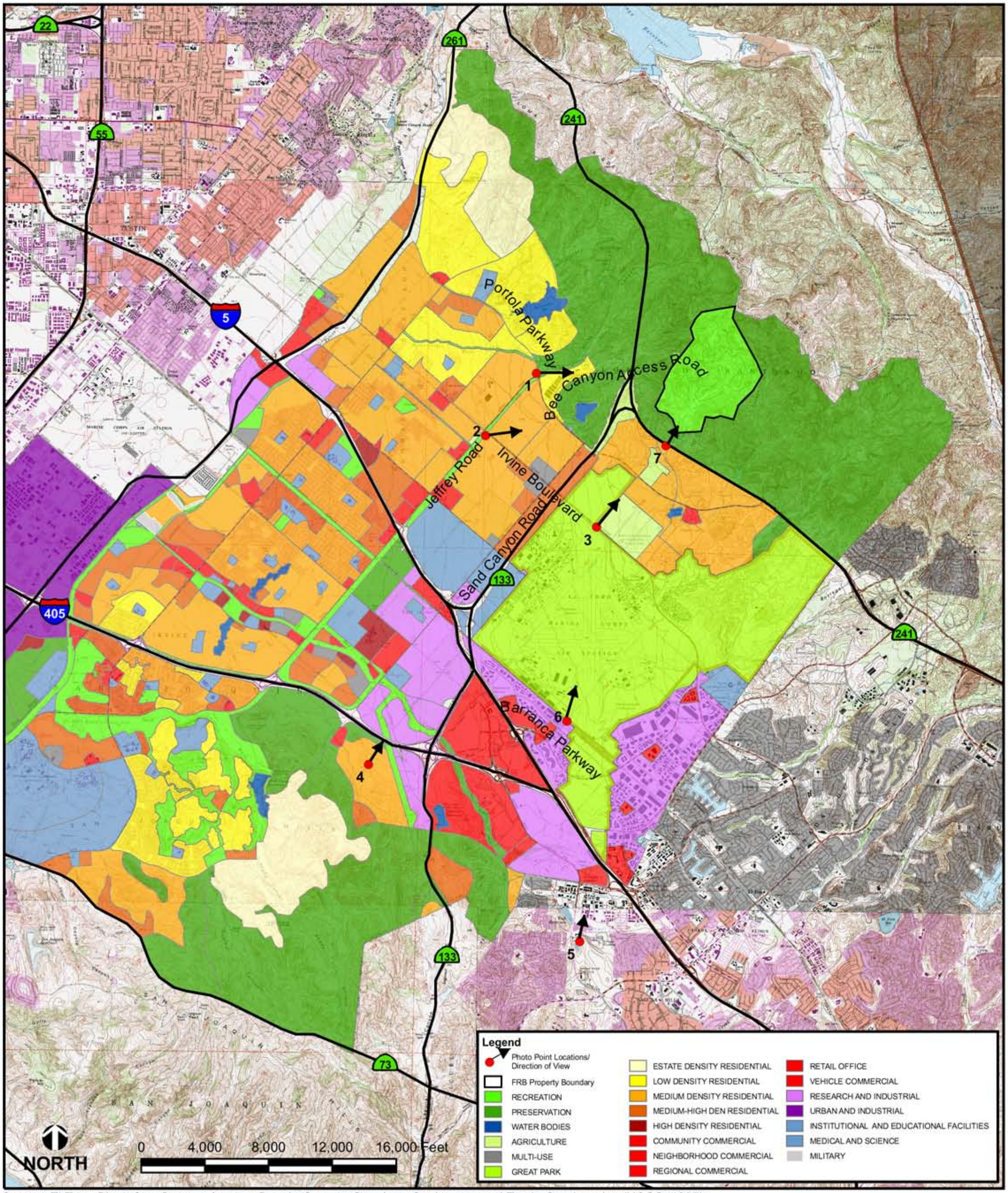
View 1 of Figure 5.9-3 is from the south edge of Portola Parkway west of Jeffrey Road in the City of Irvine approximately 1.47 miles southwest of the landfill. The view is to the northeast. The view point is just south of the NorthWood Pointe planned community (PC) and south of Hicks Canyon Bikeway. The location is at the east edge of an area that is currently occupied by a nursery but designated in the Irvine General Plan (GP) as medium density residential. Portola Parkway is in the foreground and Hicks Canyon Haul Road, the extension of Jeffrey Road to the northeast, is visible on the right of the photograph. The area across Jeffrey Road in the foreground to the left of the traffic signal is designated planned preserve in the Irvine GP. The area east of Hicks Canyon Haul Road (in the right and center of the photograph) is currently a nursery but is designated in the Irvine GP as low density residential.

The Canyon 2 stockpile of the landfill is visible as the light tan-colored area in the center of the photograph, in the background below Loma Ridge.

5.9.1.3 View 2

View 2 of Figure 5.9-3 is from a knoll at the north edge of the Jeffrey Open Space Trail in the City of Irvine. The view point is southwest of Irvine Boulevard and southeast of Jeffrey Road, approximately 2.05 miles from the landfill. Irvine Boulevard is the foreground of the photograph and the existing nursery is on the northeast side of Irvine Boulevard. The area that includes the nursery is designated in the Irvine GP as medium density residential. The landfill is visible as the light tan-colored areas in the center-background of the photograph below Loma Ridge. The visible components of the landfill are labeled including an historic landslide and the Canyon 2 stockpile.

There is a residential community southeast of this view point with ornamental trees along the northeast edge of the development adjacent to Irvine Boulevard. These trees partially screen views of the landfill from some points near the edge of the residential community, but the landfill is visible from residential properties where trees do not obstruct the view. These unobstructed views would be similar to View 2 shown in Figure 5.9-3.



Source: El Toro, Black Star Canyon, Laguna Beach, Orange, San Juan Capistrano, and Tustin Quadrangles (USGS, 1997);
FRB Property Boundary (based on DWG files by BAS, 2004); City of Irvine General Plan (City of Irvine, 2003).

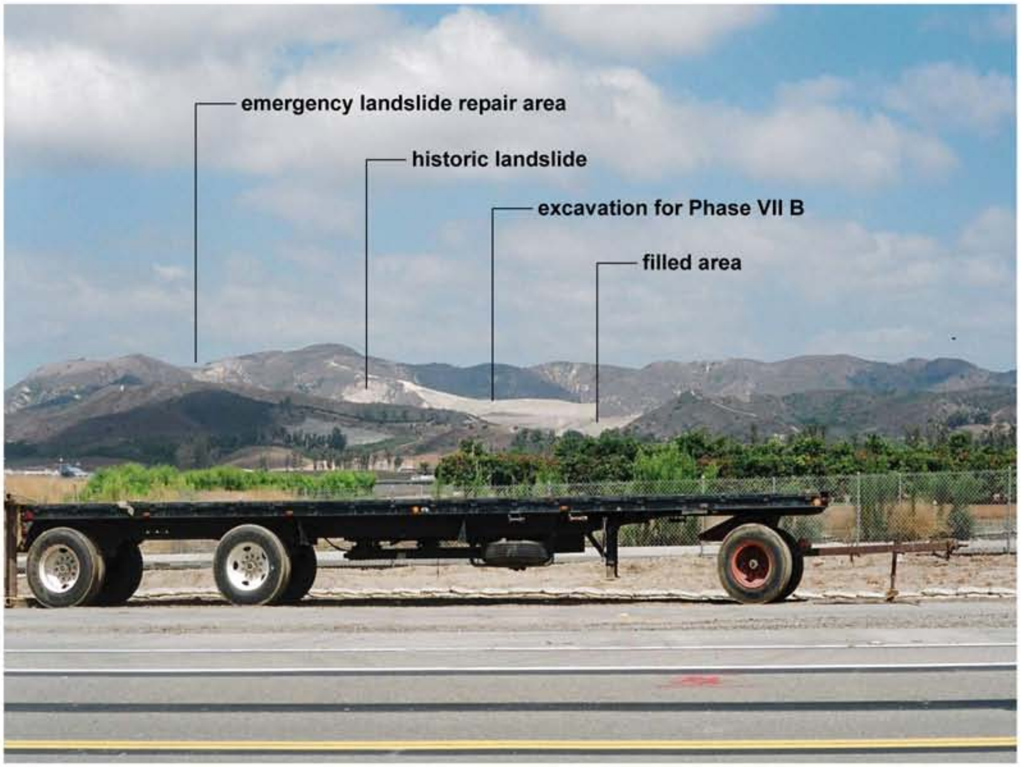
Figure 5.9-2
View Points

View 1
From Portola Parkway west of Jeffrey Road looking northeast toward the landfill.

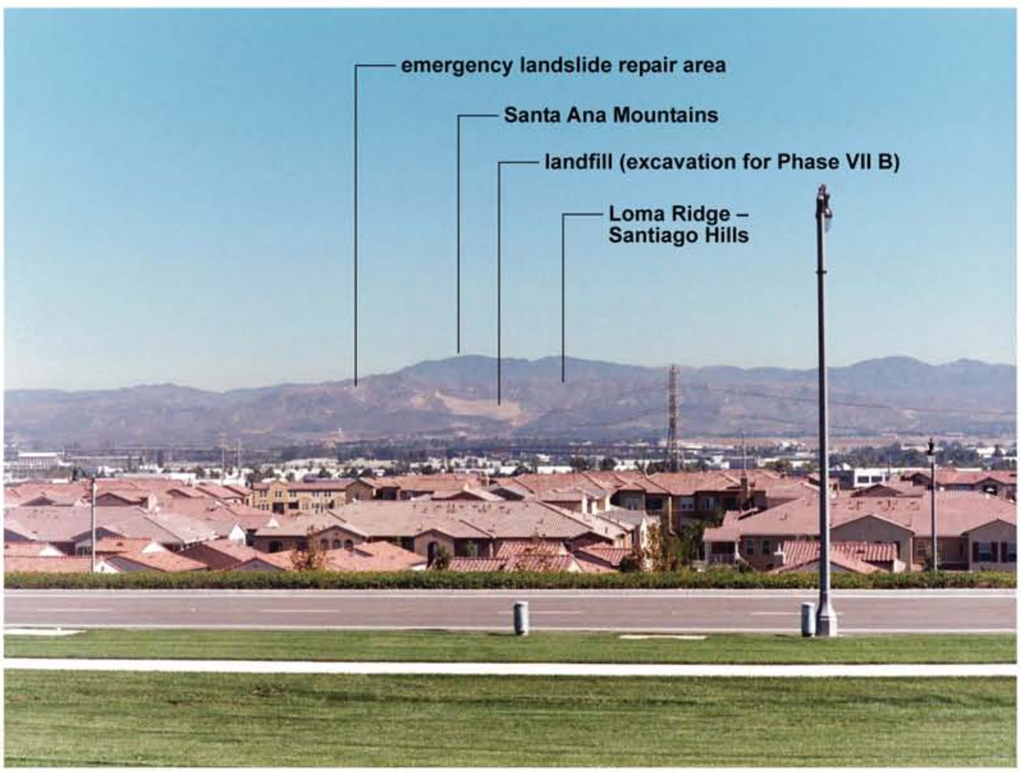
View 2
From the north edge of the Jeffrey Open Space Trail looking northeast toward the landfill.

Source: P&D Consultants (2005).

Figure 5.9-3
Existing Views (Page 1 of 4)



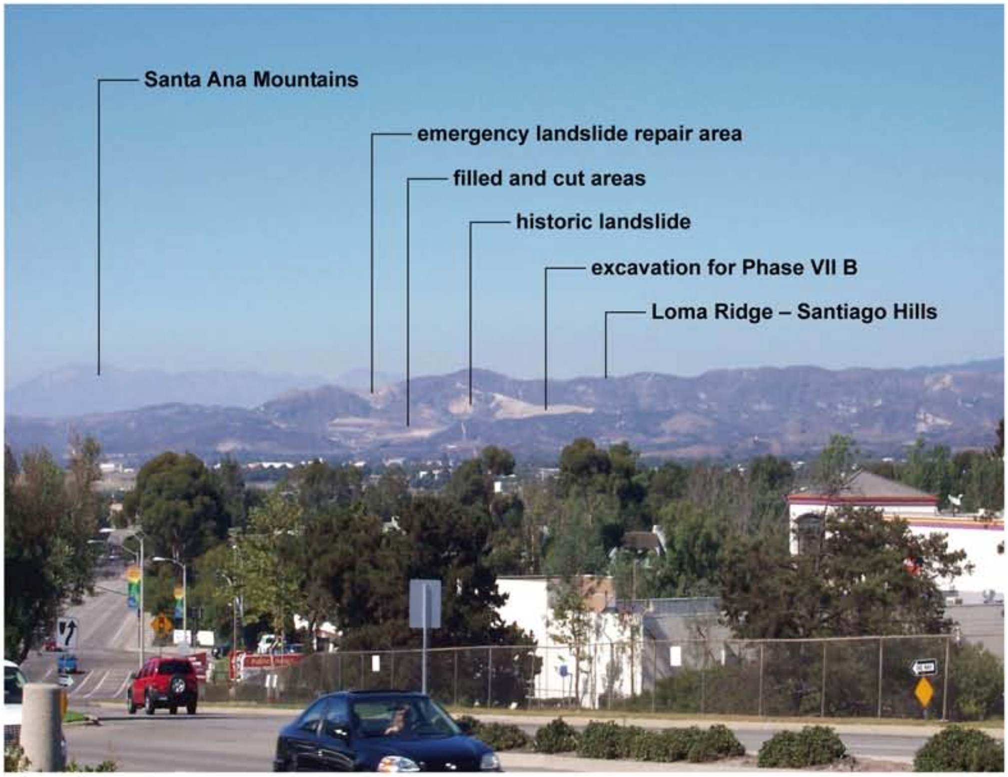
View 3
From the southwest side of Irvine Boulevard looking north – northeast toward the landfill.



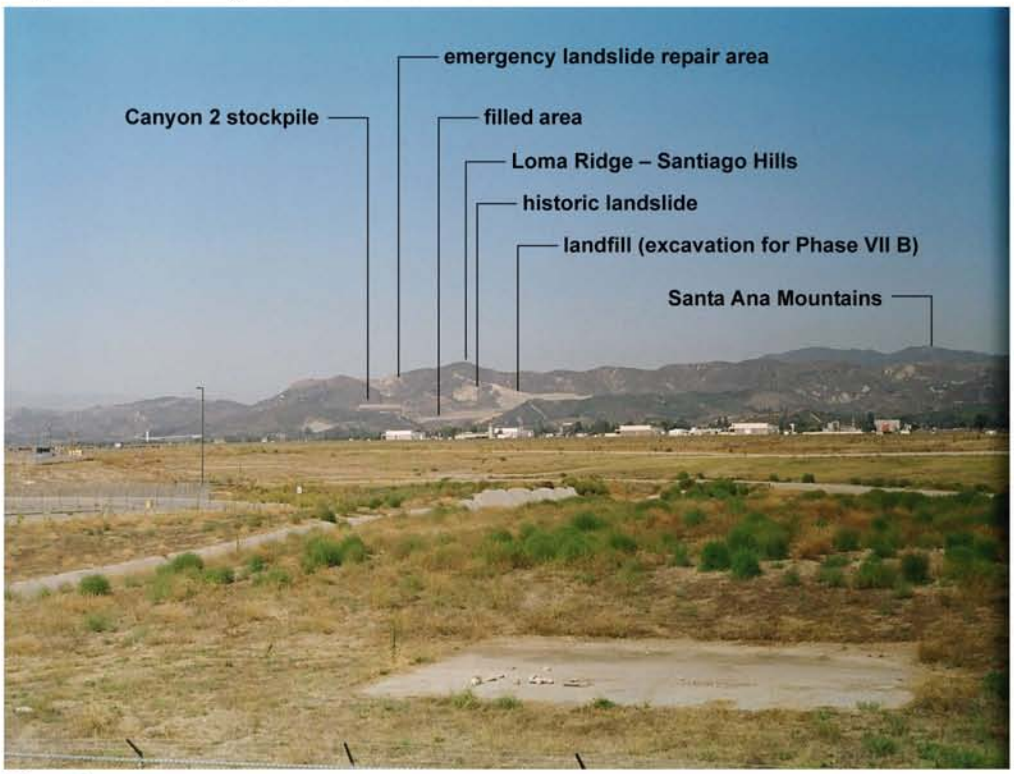
View 4
From the north edge of Knollcrest Park looking northeast toward the landfill.

Source: P&D Consultants (2005).

Figure 5.9-3
Existing Views (Page 2 of 4)



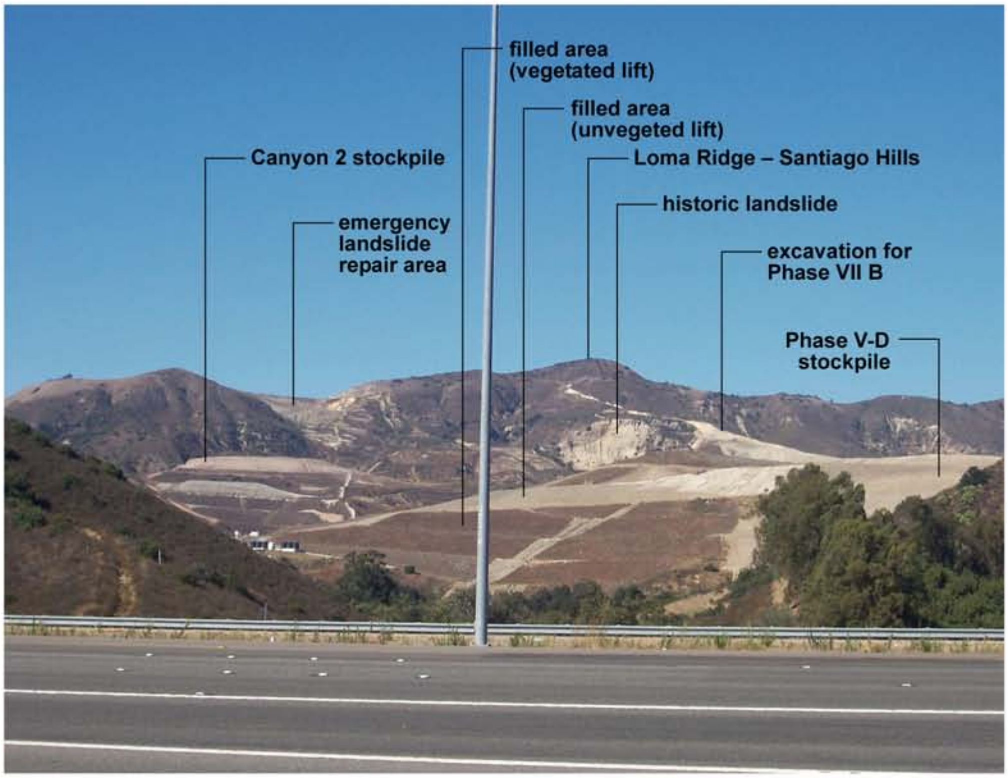
View 5
From the northwest corner of Moulton Parkway and Santa Maria Avenue in Laguna Hills looking northeast toward the landfill.



View 6
From the Irvine Multimodal Transportation Center in Irvine looking north toward the landfill.

Source: P&D Consultants (2005).

Figure 5.9-3
Existing Views (Page 3 of 4)



View 7
From west of a toll plaza on SR 241 looking north toward the landfill.

Source: P&D Consultants (2005).

Figure 5.9-3
Existing Views (Page 4 of 4)

The Jeffrey Open Space Trail is a trail and linear park that extends between Trabuco Road and Irvine Boulevard along Jeffrey Road. The landfill is visible from a number of points within the park where it is not obscured by ornamental trees in the park or by residential structures and ornamental trees to the east of the park.

5.9.1.4 View 3

View 3 is from the southwest side of Irvine Boulevard in the City of Irvine, approximately 0.85 miles southeast of Sand Canyon Road and 1.48 miles from the landfill. The view point is from the edge of the designated Great Park area looking north-northeast toward the landfill. This view is across an area that is currently in agricultural use and is designated as agriculture in the City of Irvine GP.

The landfill is visible as the light-colored areas in the center of the photograph, in the background below Loma Ridge. The visible components of the landfill are labeled including: the emergency landslide repair area; an historic landslide; the excavation for Phase VII B; and filled area.

5.9.1.5 View 4

View 4 is from the north edge of Knollcrest Park in the City of Irvine at the southwest corner of Quail Hill Parkway and Knollcrest looking northeast toward the landfill. The view point is approximately 5.39 miles from the landfill. The park is in the foreground, Quail Hill Parkway is immediately adjacent to the park and the roof tops of residential structures are beyond the road. The landfill is visible as the light-colored area in the background-center of the photograph, below Loma Ridge of the Santiago Hills. The visible components of the landfill are labeled including the emergency landslide repair area and the excavation for Phase VII B. The Santa Ana Mountains are the most distant feature in the background and are seen above Loma Ridge of the Santiago Hills.

5.9.1.6 View 5

View 5 is from the northwest corner of Moulton Parkway and Santa Maria Avenue in Laguna Hills adjacent to Laguna Woods. The view point is approximately 6.17 miles from the landfill. This view is to the northeast across Moulton Parkway and Leisure World toward the Santiago Hills and the landfill in the background. The visible components of the landfill are labeled on the photograph including: the Canyon 2 stockpile; the emergency landslide repair area; filled and cut areas; an historic landslide; and the excavation for Phase VII B. Residences in Laguna Woods and Laguna Hills to the southwest of this view point and at a slightly higher elevation would have views similar to view 5, where the views are not obscured by ornamental trees and structures.

5.9.1.7 View 6

View 6 is from the Irvine Multimodal Transportation Center on Barranca Parkway in Irvine looking north toward the landfill across the former El Toro Marine Base, now the planned Great

Park. The view point is approximately 3.67 miles from the landfill. The Santiago Hills and landfill are in the background and the Santa Ana Mountains are visible beyond the Santiago Hills in the right of the photograph. The visible components of the landfill are labeled including: the Canyon 2 stockpile; the emergency landslide repair area; filled area; an historic landslide; and the excavation for Phase VII B.

5.9.1.8 View 7

View 7 is from a point west of a toll plaza on SR 241, approximately 0.20 mile from the landfill, looking north. SR 241 is in the foreground of the photograph, the filled area of the landfill is beyond in the center of the photograph, and Loma Ridge of the Santiago Hills is in the background. The visible components of the landfill are labeled including: the Canyon 2 stockpile; emergency landslide repair area; filled areas with vegetated and unvegetated lifts; historic landslide; excavation for Phase VII B; and the Phase V-D stockpile.

The technique for landfilling operations can be seen in this photograph. The filled area of the landfill is created in layers or lifts. All deposited trash is covered daily with soil or other approved cover material. After each lift is completed, it is seeded with a coastal sage scrub (CSS) seed mix of species occurring on nearby undeveloped hills. The completed lifts that are vegetated are a brownish color, while the incomplete and unvegetated lifts are a light tan. Soil stockpiles for cover and excavated areas are also a light tan color.

5.9.1.9 Scenic Resources, Scenic Highways, Scenic View Points

Natural hills and ridgelines are identified as visual resources in the City of Irvine and County of Orange GPs. Loma Ridge of the Santiago Hills, shown in the views on Figure 5.9-3 is the closest natural ridgeline to the landfill.

There are no state- or county-designated scenic highways in the immediate vicinity of the landfill. Santiago Canyon Road north and east of the landfill is designated by the County of Orange as a scenic viewscape corridor. However, there are no views of the landfill from this road, as the Santiago Hills including Loma Ridge block views of the landfill.

There are no designated scenic view points within the proposed expansion area of the landfill property or within other parts of the landfill property boundary. Likewise, there are no designated scenic view points from which the landfill is visible.

5.9.1.10 Existing Light and Glare

The landfill is open Monday through Saturday from 7:00 A.M. to 4:00 P.M. for all commercial customers. Transfer trucks are only permitted from 4:00 P.M. to 5:00 P.M. Therefore, existing sources of night light at the landfill are minimal because the landfill is not operational after daylight hours. The scale booth and offices in the southwest part of the property have outdoor lights, and there is a LFG flare station in this area. These light sources are sited and designed so that light from the landfill site does not spill over onto adjacent land uses. There are small amounts of glare associated with light reflecting off of vehicles traveling to and from the landfill and using the on-site access road to deposit refuse**.**

5.9.2 THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines indicates that a project will normally have a significant effect on the environment related to aesthetics, light, and glare if it will:

- Have a substantial adverse effect on a scenic vista.
- Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
- Substantially degrade the existing visual character or quality of the site and its surroundings.
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

5.9.3 METHODOLOGY

To determine the visual impacts related to the proposed landfill expansion, sensitive viewers who would have views of the expansion areas of the landfill property were identified. These sensitive viewers include viewers from existing and planned residential and park uses. Four sensitive viewer locations close to the landfill were selected as locations for visual simulations. Visual simulations were developed from each of these locations that represent what the views of the landfill will be when the currently permitted height of 1,100 feet is reached and the views with the proposed expanded height of 1,350 feet. The change in the view between the currently permitted height and the proposed height was evaluated for each location against the thresholds of significance for aesthetics.

The visual simulations were prepared through computer modeling and digital compositing with base photographs taken from each view point. The first step of the simulation process was to photograph existing conditions. Next, three-dimensional computer models of the landfill were developed using computer-aided design and drafting (CADD) data provided by the project engineers. The computer models were scaled and matched to the site photographs using common reference points. After electronically compositing the computer model with the site photograph, vegetation cover was manually added using digital editing software.

To determine the impacts of the proposed landfill expansion related to light and glare, uses sensitive to light and glare in the vicinity of the proposed project were identified. These sensitive uses include existing and planned residential uses and park areas that provide habitat for wildlife. The sources and amounts of light and glare that would occur on the landfill site until 2022 were compared with the amount of light and glare that would occur at the landfill between 2022 and the closure of the proposed landfill in 2053.

5.9.4 IMPACTS

5.9.4.1 View Impacts

Figure 5.9-4 shows visual simulations of the landfill with the currently permitted 1,100 foot elevation and the proposed 1,350 foot expansion from view points 1, 2, 3, and 4 shown previously on Figure 5.9-2. The existing views from these view points were shown previously on Figure 5.9-3. In the visual simulations on Figure 5.9-4, the landfill is shown as it would appear approximately four years following seeding of the slopes with native CSS plant species occurring on nearby hillsides. The color is representative of the late-fall hues of these plants which would be greener later in the spring**.** View points 1, 2, and 3 were selected for simulation because they represent currently unobstructed views of the landfill from fairly close sensitive receptors, including existing and future residential areas and an existing public trail/park. Simulation 4 was selected because it is representative of more distant views of the landfill from a park in a residential area.

Mitigation measure AS-1 provided later in section 5.9.5 addresses seeding of the slopes during landfill construction and following closure to assist in blending the landfill property with the surrounding undeveloped hillsides. This seeding assists in blending the slopes with adjacent open space areas while the landfill is still under construction.

5.9.4.2 Visual Simulations 1A and 1B from Portola Parkway West of Jeffrey Road Looking Northeast

Visual Simulations 1A and 1B of Figure 5.9-4 are from Portola Parkway west of Jeffrey Road in the City of Irvine looking northeast toward the landfill. Visual simulation 1A shows the currently permitted 1,100 foot elevation of the landfill and 1B shows the proposed 1,350 foot height. The permitted landfill in Simulation 1A blends with the surrounding Santiago Hills because of the vegetative cover of CSS. However, it can be identified by the horizontal line of the flat top of the landfill that is well below Loma Ridge. In the distance, the landfill extends on either side of the traffic signal post at approximately the point where the arm extends over the road.

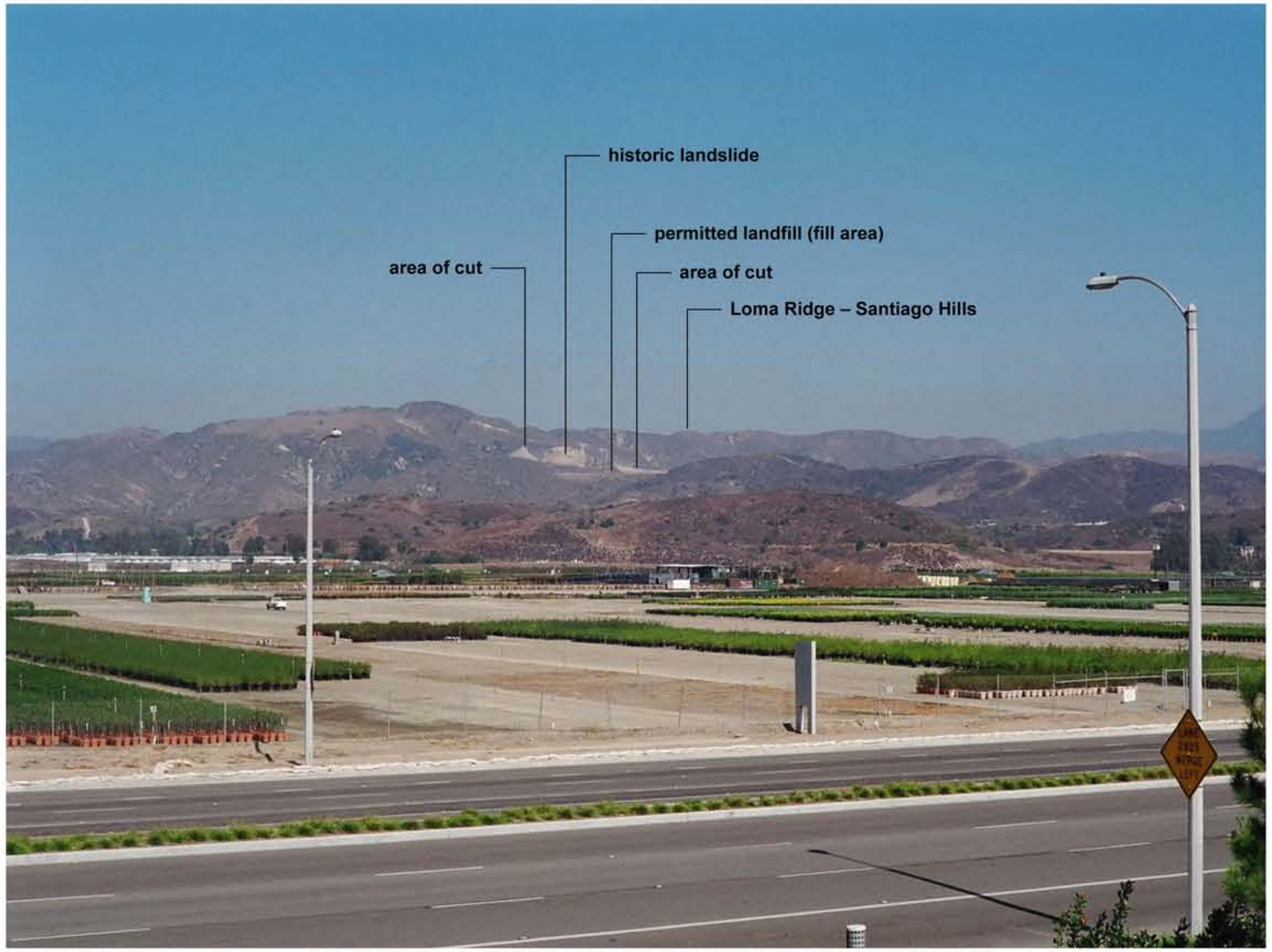
The proposed landfill in simulation 1B is obvious in the view because the flat-topped, manufactured shape of the landfill highly contrasts with the natural form of the adjacent Santiago Hills. From this view point, the proposed landfill would also hide Loma Ridge that the City of Irvine and County of Orange consider a visual resource. The view would change from an undeveloped curvilinear ridgeline to that of a large, man-made form that highly contrasts with the adjacent rolling hills. Therefore, implementation of the proposed landfill would result in a significant adverse visual impact from this view point.

Visual Simulation 1A
Permitted (1,100 foot) landfill from Portola Parkway west of Jeffrey Road looking northeast.

Visual Simulation 1B
Proposed (1,350 foot) landfill from Portola Parkway west of Jeffrey Road looking northeast.

Source: P&D Consultants (2005).

Figure 5.9-4
Visual Simulations (Page 1 of 4)

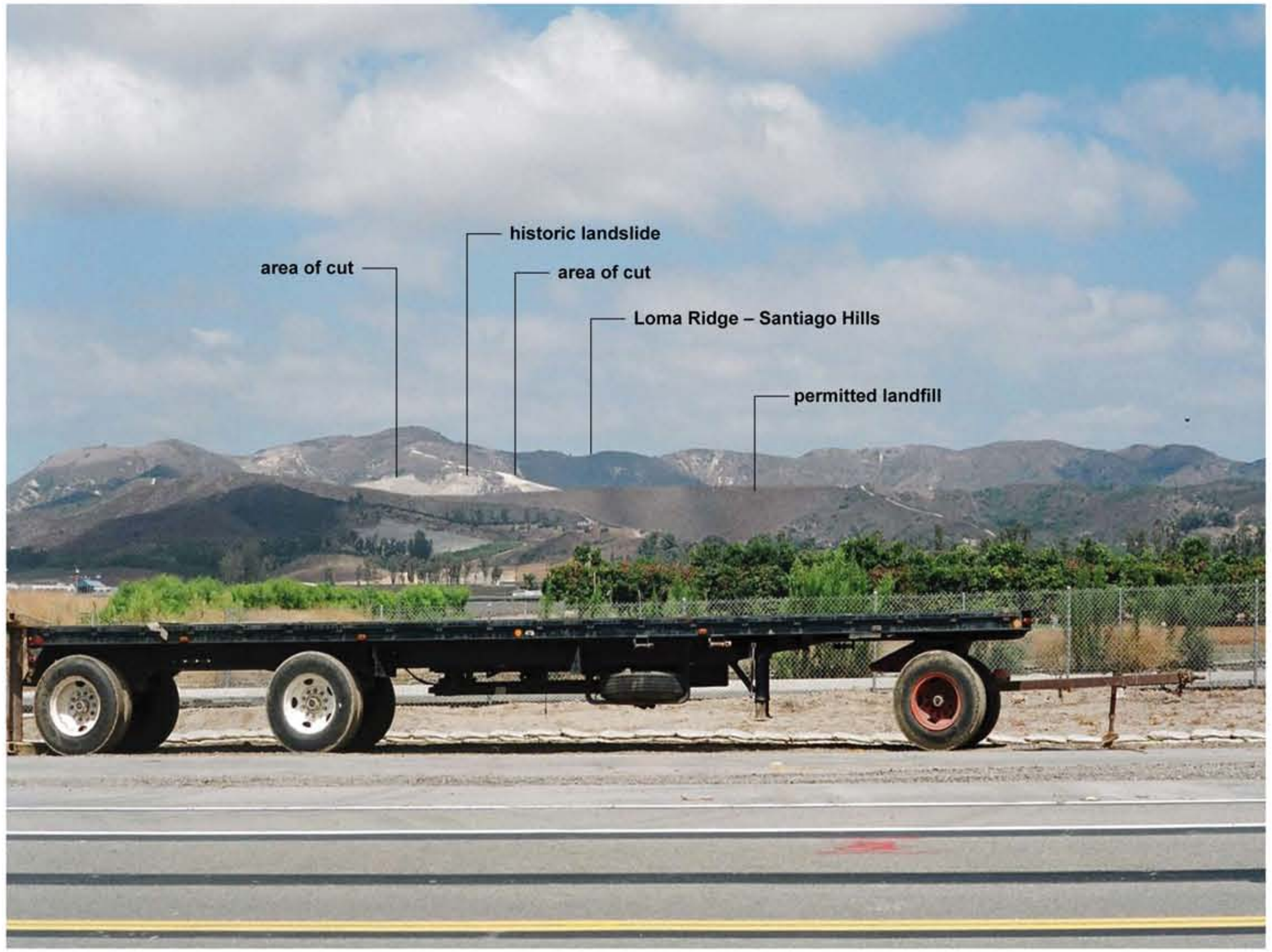


Visual Simulation 2A
Permitted (1,100 foot) landfill from the north edge of the Jeffrey Open Space Trail looking northeast.

Visual Simulation 2B
Proposed (1,350 foot) landfill from the edge of the Jeffrey Open Space Trail looking northeast.

Source: P&D Consultants (2005).

Figure 5.9-4
Visual Simulations (Page 2 of 4)



Visual Simulation 3A
Permitted (1,100 foot) landfill from the southwest side of Irvine Boulevard looking north – northeast.

Visual Simulation 3B
Proposed (1,350 foot) landfill from the southwest side of Irvine Boulevard looking north – northeast.

Source: P&D Consultants (2005).

Figure 5.9-4
Visual Simulations (Page 3 of 4)

Visual Simulation 4A
Permitted (1,100 foot) landfill from the north edge of Knollcrest Park looking northeast.

Visual Simulation 4B
Proposed (1,350 foot) landfill from the north edge of Knollcrest Park looking northeast.

Source: P&D Consultants (2005).

Figure 5.9-4
Visual Simulations (Page 4 of 4)

As described previously, the area in the right of the view beyond Hicks Canyon Haul Road is designated in the City of Irvine GP as low density residential. Therefore, as residential development occurs in this area, much or all of the view of the proposed landfill from this view point is likely to be obscured by residential structures and ornamental trees. However, future residents of the area may have views of the landfill where structures and landscaping do not obstruct the view.

5.9.4.3 Visual Simulations 2A and 2B from the North Edge of the Jeffery Open Space Trail Looking Northeast

Visual Simulations 2A and 2B of Figure 5.9-4 are from the north edge of the Jeffrey Open Space Trail looking northeast toward the landfill. Simulation 2A depicts the currently permitted 1,100 foot elevation and 2B shows the proposed 1,350 foot elevation. Two areas of cut are visible on either side of the existing historic landslide. The fill area of the permitted landfill, which blends with the surrounding Santiago Hills because of the vegetative cover of CSS, can be identified by the horizontal line of the flat top of the landfill just below the historic landslide.

The proposed landfill in simulation 2B is obvious in the view because the flat-topped, manufactured shape of the landfill highly contrasts with the natural form of the adjacent Santiago Hills. The proposed landfill would also hide Loma Ridge that the City of Irvine and County of Orange consider a visual resource. The view would change from an undeveloped curvilinear ridgeline to that of a large, man-made form that highly contrasts with the adjacent rolling hills. Therefore, implementation of the proposed landfill would result in a significant adverse visual impact from this view point.

As described previously, the area of the nursery beyond Irvine Boulevard in the foreground is designated in the City of Irvine GP as medium density residential. As residential development occurs in this area, structures and ornamental trees are likely to obscure lower parts of the landfill from this view point. As trees reach mature heights, they may obscure part or all of the top of the landfill as well. However, future residents of the area may have views of the landfill where structures and landscaping do not obstruct the view.

5.9.4.4 Visual Simulations 3A and 3B from the Southwest Side of Irvine Boulevard Looking North-Northwest

Visual Simulations 3A and 3B of Figure 5.9-4 are from the southwest edge of Irvine Boulevard at the northeast edge of the planned Great Park looking north-northeast toward the landfill. Simulation 3A depicts the currently permitted 1,100 foot elevation and 3B shows the proposed 1,350 foot elevation. Two areas of cut are visible on either side of the existing historic landslide. The fill area of the landfill, which blends with the adjacent Santiago Hills because of the vegetative cover of CSS, can be identified by the horizontal line of the flat top of the landfill just below the historic landslide. The permitted landfill is more easily identified in this visual simulation than in simulation 2A, because view point 3 is closer to the landfill than view point 2, and thus, the landfill appears larger and more prominent from view point 3.

The proposed landfill in simulation 3B is obvious in the view because the flat-topped, manufactured shape of the landfill highly contrasts with the natural form of the adjacent Santiago Hills. The proposed landfill would also hide part of Loma Ridge which the City of Irvine and County of Orange consider a visual resource. The view would change from the straight line of the permitted landfill below the undeveloped curvilinear ridgeline to that of a large, man-made form that blocks part of the natural ridgeline and highly contrasts with the adjacent rolling hills. Therefore, implementation of the proposed landfill would result in a significant adverse visual impact from this view point.

The area in the right part of the visual simulation beyond the flatbed truck is designated in the City of Irvine GP as agriculture. Therefore, it is unlikely that this view of the proposed landfill will be obstructed in the future.

5.9.4.5 Visual Simulations 4A and 4B

Visual Simulations 4A and 4B of Figure 5.9-4 are from the north edge of Knollcrest park in the City of Irvine at the southwest corner of Quail Hill Parkway and Knollcrest looking northeast toward the landfill. Simulation 4A depicts the currently permitted 1,100 foot elevation and 4B shows the proposed 1,350 foot elevation. In Simulation 4A, two areas of cut are visible, with the permitted landfill below these cut areas. The most prominent elements in the view are the areas of cut because of the high contrast of the light tan color with the surrounding area. The fill area of the landfill, which blends with the surrounding Santiago Hills because of the vegetative cover of CSS, can be identified by the horizontal line of the flat top of the landfill just below the areas of cut.

The flat-topped, manufactured shape of the proposed landfill in simulation 4B can be distinguished from the natural form of the adjacent Santiago Hills, even though the color of the vegetative cover causes the landfill to blend into the surrounding hills. As with the permitted landfill, the proposed landfill is lower in the view than Loma Ridge, the Santiago Hills and the Santa Ana Mountains. These ridges are the most prominent features in the view and provide a backdrop or frame for it. The proposed landfill hides the high-contrast cut areas that are so distinctive in visual simulation 4A of the permitted landfill. This causes the much larger proposed landfill to appear less prominent than the features of the smaller permitted landfill from this view point. In summary, the proposed landfill would not obstruct views of ridgelines, the color would help to blend the manufactured shape with surrounding hills, and the landfill would hide the high-contrast areas of cut visible with the permitted landfill. For these reasons, implementation of the proposed landfill would result in an adverse but less than significant visual impact from this view point.

This simulation of the proposed landfill is representative of distant views from the south. There are more locations that would have unobstructed views similar to this simulation than from the closer locations represented in simulations 1, 2, and 3.

5.9.4.6 Views from Other locations

As described earlier, the landfill is visible from the southwest part of Limestone Canyon Regional Park that is on Loma Ridge at an elevation above the landfill. Views from the park of the landfill also include extensive areas of the surrounding communities and developed land uses in these communities described earlier in this section. The proposed landfill will be below Loma Ridge and will obscure some of the lower elevations of the Santiago Hills, but would not substantially change the views of the surrounding urban area. Therefore, implementation of the proposed landfill expansion would not result in adverse visual impacts from Limestone Canyon Regional Park.

5.9.4.7 Interim View Impacts Prior to Landfill Closure

The technique for landfilling operations was described previously in Existing Conditions of this section. As each new lift is constructed, these lifts will appear like soil piles until vegetation becomes established. Therefore, the appearance of the expansion during this period will be similar to the appearance of the existing conditions, except that the proposed landfill would be higher than the permitted landfill and would be more evident from locations that have views. Mitigation measure AS-1 provided later in this section requires interim vegetation of the slopes of the lifts.

Slope stabilization is required in the emergency landslide repair area to provide a stable subgrade for landfilling operations. Approximately 34 acres outside of the landfill property would be included in the disturbance limits of the slope stabilization. After construction of the slope stabilization measures is complete, the disturbed areas outside the landfill property will be revegetated in native plant species similar to the species located in the area prior to the disturbance. The emergency landslide repair area is visible in views 3, 4, 5, 6, and 7 of Figure 5.9-3. The slope stabilization process will be visible from these view points and the area will appear as a lighter color as soils are removed and replaced prior to the area being revegetated.

5.9.4.8 Impacts to Scenic Resources, Scenic Highways, and Scenic View Points

As described previously, scenic resources in the area of the landfill include the adjacent natural hills and ridges. Impacts of the proposed project to the resources of the Santiago Hills and Loma Ridge have been described previously for visual simulations 1, 2, and 3. As the proposed landfill would obscure part of the Santiago Hills and Loma Ridge from these view points, the impacts would be adverse and significant.

There are no state- or county-designated scenic highways in the immediate vicinity of the landfill. Santiago Canyon Road north and east of the landfill is designated by the County of Orange as a scenic viewscape corridor. However, there would be no views of the proposed landfill from this road, as the Santiago Hills including Loma Ridge would block views of the landfill. Therefore, there would be no visual impacts related to designated scenic highways associated with implementation of the proposed landfill expansion.

There are no designated scenic vistas or view points on or adjacent to the landfill property, and there are no designated scenic vistas that would include views of the proposed landfill. Therefore, there would be no adverse impacts on designated scenic view points related to the proposed landfill expansion.

5.9.4.9 Light and Glare Impacts

The same types of night lighting as currently exist on the landfill site will be used for the proposed expansion. Although there are no plans to install additional lighting as part of the proposed project, the potential exists that additional lighting may be installed with the proposed expansion. Impacts associated with this additional lighting would be considered substantially adverse if the light spilled over onto adjacent sensitive residential and wildlife habitat areas. Mitigation measure AS-2 is provided to reduce this impact.

5.9.5 MITIGATION MEASURES

AS-1 The interim and final slopes of the landfill will be seeded with CSS species that are found on hills adjacent to the landfill. Interim slopes will be seeded as each lift is completed. Implementation of this measure will assist in blending the landfill with the adjacent undeveloped hills.

AS-2 All outdoor lighting, including any construction-related lighting, shall be designed, installed, and operated in a manner that ensures that all direct rays from project lighting are contained within the landfill property, and that residences and undeveloped areas that may provide wildlife value are protected from spillover light and glare.

5.9.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Mitigation measure AS-1 requires that the landfill expansion areas be vegetated with native CSS species occurring in adjacent areas to assist in blending the expanded landfill with surrounding undeveloped hills. With implementation of this measure, the appearance of the expanded landfill will be as shown in the visual simulations on Figure 5.9-4. However, as described earlier for visual simulations 1, 2, and 3, the adverse visual impacts of the proposed expansion would be significant even with implementation of mitigation measure AS-1. This is because the proposed landfill expansion would obstruct part of the Santiago Hills and Loma Ridge, which are scenic resources, from view points 1, 2, and 3. Also, these views would change from an undeveloped curvilinear ridgeline to that of a large, man-made form that highly contrasts with the adjacent rolling hills.

There will be no adverse impacts of the proposed landfill expansion related to scenic highways or scenic view points. No mitigation is necessary.

Mitigation measure AS-2 will reduce potential adverse impacts related to light to below a level of significance because all direct rays from project lighting will be contained within the landfill property.

5.10 CULTURAL AND SCIENTIFIC RESOURCES

This section describes the existing cultural and scientific resources on the project site and in the project area, potential environmental impacts, recommended mitigation measures to help reduce or avoid impacts to identified cultural and scientific resources, and the level of significance after mitigation. The analysis in this section was summarized from the Cultural Resource Assessment for the Frank R. Bowerman Landfill Master Development Plan (URS, 2005). This report is included as Appendix J of this EIR.

5.10.1 EXISTING CONDITIONS

5.10.1.1 Cultural Resources

<u>Prehistory of the Project Area</u>

Chronological Overview

Archaeological research in southern California has resulted in a scheme for regional prehistory that is generally accepted and represented by three broad temporal periods. Wallace (1955) and Warren (1968) have developed chronologies for southern California. These periods are the Paleoindian period (12,000 to 8,000 years before present [B.P.]), the Archaic period, beginning between 9,000 and 7,000 B.P. and transitioning to the Late Prehistoric period at approximately 1,000 B.P. Various traditions occupied, or at minimum traversed, the San Gabriel Mountains until the arrival of the Spanish settlers in the mid-18th century. It is important to note that the beginning and end for each period is not certain because slight changes in archaeological assemblages, including artifacts and botanical and faunal materials, are used to characterize each period and technological innovations often occur at different times. Archaeological assemblages are distinctive enough, however, to provide a summary of the major stages of the major cultural chronologies represented in southern California and Orange County.

Several regional cultural chronologies have been developed for the Orange County area (Rogers 1941; Wallace 1955; True 1958, 1966; Meighan 1959; Moriarty 1966). Early archaeological sites in southern California are associated with the Paleoindian Period (Period I) (Wallace 1955) and date to roughly 10,000 B.P. In the region, this cultural period is referred to as the San Dieguito tradition and is characterized by stemmed projectile points, leaf-shaped knives and crescents (Wallace 1955). The San Dieguito tradition is best documented in areas where sites dating to this period are associated with nomadic hunter-gatherers who focused on large game, shellfish collection and fishing as primary subsistence resources (Wallace 1955). Prior to the Late Period occupation by Shoshonean-speaking peoples, the region was occupied for millennia based on discoveries in the Ballona Creek area of the Los Angeles Basin, the La Brea Tar Pits, and Malaga Cove. Work at the La Brea Tar Pits as well as other sites points to a rather generalized hunting and gathering economy in existence at a very early time.

Around 6,000 B.P., a time known as the Milling Stone Period (Period II), subsistence and settlement practices of people living in southern California began to shift in response to changing environmental conditions associated with increasing aridity. The shift in environmental conditions caused Native

Americans living in the region to be increasingly dependent on seeds and acorns for subsistence, which is reflected by greater frequencies of groundstone artifacts (hand manos and metates) in archaeological sites (Wallace 1955). New technological innovations were also expressed in the archaeological record, with the larger projectile points associated with early occupations slowly replaced with smaller arrowheads.

Around 3500 years ago there was an economic shift to more reliance on hunting. There also appears to have been increased exploitation of the native acorn, a subtle transition from the prior period where hard seed processing appeared to be more predominant. Sites attributed to this period appear to have been occupied by small groups of people. This period persisted over thousands of years without great change.

The first appearance of groundstone assemblages in southern California is associated with the La Jolla Complex. In coastal areas, this complex focused on mollusks and small game for subsistence Inland groups focused on seed gathering and acorn processing. Later cultural horizons known as the Modified Milling Stone (Period III, 3,000 B.P. to 2000 B.P.) are characterized by an increased use of mortars and pestles and the first manifestation of discoidals, spanning. Internment is the form of burial associated with the San Dieguito and La Jolla periods (Strudwick et al. 1995).

The Intermediate Period dates from roughly 1000 B.C. to A.D. 1000. Sites attributed to this time period indicate an increased reliance on coastal resources with continued reliance on hunting and collecting. Around 500 B.P., the region saw another major shift in technological innovation with the introduction of the bow and arrow, which is identified by the appearance of very small projectile points in archaeological assemblages (William Self Associates [WSA] 1999). In addition, the appearance of increased quantities of bone tools, and increased reliance on the mortar and pestle, typify this time period. Ceramics also became widely used during this period, millingstone assemblages are more prevalent, obsidian from the Salton Sea appears with greater frequency, and the dead were cremated rather than buried (Moratto 1984).

The Late Period, which begins around A.D. 750-1000, is characterized by increasing political-economic-social complexity. Villages tend to be larger, with a more varied assemblage, and there appears to be an increase in smaller satellite sites, established to support the main village, and reflecting seasonal use of a particular area. There seems to be more intensive exploitation of localized resources, and social contacts and economic influences appear accelerated through trade and social interaction. There is an increase in the number of sites in the area which some researchers believe is the result of a population increase.

Paleoindian Period (Period I)

The academic community generally accepts the “La Brea Woman” remains as the earliest confirmed Paleoindian evidence in the Los Angeles Basin. The “La Brea Woman” remains consist of a cranium, mandible, and post-cranial fragments of a twenty-five-year old adult female that was recovered from Pit 10 at the Rancho La Brea tar pits (Note: a mano was recovered in proximity to the remains). The remains were assigned to the Early Holocene due to their geological association with avifaunal remains typical from that period (Dixon 1999:130). Berger (1975) provides a radiometric date of 9,000 +/- 80 B.P. (uncalibrated). This would make the “La

Brea Woman" contemporaneous with the so-called 'big game hunting tradition' found at that time across most of the North American continent (Willey 1966:37-38; Dixon 1999:45-89).

The earliest substantial evidence of occupation in the general project vicinity comes from the Del Rey bluffs along the southern coastal fringes of the ancient outlet of the Los Angeles River, approximately thirty miles south of the project site (Lambert 1983). This evidence, mainly in the form of non-fluted points with a few crescents, appears to have typological connections with early desert sites to the east. Points collected by Lambert include Lake Mohave types (Campbell *et al.* 1937), San Dieguito types (Rogers 1939), and Borax Lake points (Harrington 1948). Based on the chronologies established at these inland regions, many of the Del Rey bluff artifacts might date as far back as 9,000 B.P. (Dillon 1990:7).

Millingstone Period (Period II and Period III)

In Southern California, the Millingstone Period, also called the Millingstone Culture, extends to at least 6,000 B.P. and probably as far back to 8,500 B.P. (Warren 1968; Wallace 1955). Hard seed processing became one of the major components of subsistence during this period. Overall, the economy was based on plant collecting, but was supplemented by fishing and hunting. Evident in near-shore and coastal locations, there also appears to have been infrequent exploitation of marine and estuarine resources (Wallace 1955).

The Millingstone Period is typified by large, heavy ground stone milling tools such as deep basin metates and wedge-shaped manos, and large core/cobble choppers and scrapers (Dillon 1990:8). The portable manos and metates that characterize the Millingstone lithic assemblage were undoubtedly used as portable processing equipment for collected plant materials. The reliance on this subsistence strategy and associated tools is further supported by the apparent scarcity of faunal remains at Millingstone sites. The flaked lithic tools generally represent a larger and cruder assemblage than is characteristic in the later periods. Projectile points and apparent hunting-type tools tend to be absent from Millingstone Culture assemblages. The so-called cogged stones, made by a characteristic pecking and grinding process, also are present in the Millingstone Horizon assemblages (Eberhart 1961:361-370).

Millingstone Horizon sites are found from Santa Barbara to Los Angeles County and into San Diego County, in both coastal and inland settings. In the Los Angeles area, the Millingstone Culture is typified by the so-called Topanga Culture, with type sites from the Topanga Canyon area just south of Malibu (Wallace 1955; Leonard 1971). Topanga Culture sites have the typical Millingstone assemblage materials such as core/cobble tools and an abundance of ground stone implements (manos, metates), while projectile points tend to occur less frequently.

Meighan indicated that the Topanga Culture sites may date as far back as 8,000 B.C. (1959:289), and excavations at CA-LAN-1, also known as the 'Tank Site', have revealed a multi-phase evolution of the Millingstone Culture probably going back to the aforementioned date (Treganza and Bierman 1958:75). Based on the excavations at the Tank Site, it appears that Phase I ranges from roughly 8,000 and 4,000 B.C., while Phase II ranges roughly between 5,000 B.C. and 2,500 B.C. Excavations at the nearby CA-LAN-2 site indicate that the Millingstone cultural tradition may have prevailed until 1,000 B.C. - much later than previously thought - though it is important to note that pestles and mortars (as opposed to mano/metates) prevail in the assemblage (Johnson 1966).

Intermediate Period

This period has also been called the 'Hunting Period' or 'Middle Horizon.' About 5,000 years ago, people of the Millingstone traditions (which relied heavily on vegetal food sources) began increasing utilization of animal proteins and marine resources. Procurement of plants for caloric intake was not necessarily replaced in kind by game hunting, but rather the local Millingstone dietary regimen began to expand in breadth to incorporate additional resources. In the Los Angeles Basin, a higher percentage of projectile points and smaller chipped stone tools appear. Marine resources such as estuarine and saltwater shellfish, marine mammals, and fish were now abundant in the diets of the local inhabitants.

However, as excavations at sites such as the Little Sycamore shellmound in coastal Ventura County (Wallace *et al.* 1956), the CA-LAN-2 site in Topanga (Johnson 1966), and the Gilmore Ranch site in eastern Ventura County (Wallace 1955) indicate, the transition in the archaeological record from the typical Millingstone assemblage to the Intermediate mortar/pestle and hunting tool kit is not well-marked. Specifically, manos and pestles appear in some instances as being contemporaneous, while at other sites, there is an adherence to the traditional Millingstone lifestyle. At Gilmore Ranch, more refined stemmed projectile points (unlike those in the Millingstone Horizon) are present and yet the types are not necessarily akin to refined points typical of the Late Prehistoric Period.

Late Prehistoric Period

Meighan (1954) first characterized the Late Prehistoric Period in Southern California. The period probably began sometime around the B.C./A.D. transition, but probably expanded culturally around 500 A.D. with the introduction of the bow and arrow. The end of the period is recognized as the end of the 18^{th} Century, when the Spanish mission system was fully implemented. During the Late Prehistoric period, the ethnographic Luiseño and Juaneño lived in large villages along the southern California coastline, which included northern San Diego County and lands south of Los Angeles in Orange County. In addition, their lands extended for about 30 miles to the wide valleys leading into the California interior. Neighboring groups to the north, east and south included the Gabrieliño, Serrano, Cahuila, Cupeño, and the Diegueño. Both the Luiseño and Juaneño are included among the groups of so-called Mission Indians. They are considered Mission Indians since the Spanish named them after the Mission San Luis Rey, and the Mission San Juan Capistrano. The Luiseño and Juaneño languages derives from Takic branch of the Uto-Aztecan stock, which suggests that the group may have originated from the southeast, perhaps from the eastern California deserts or the southern Great Basin (Kroeber 1925:578-580). Unfortunately, there is not much archaeological evidence for the Gabrieliño occupation of the Los Angeles Basin, because rapid development within the last century has destroyed much of the archaeological database of the area.

Certain indicators such as diagnostic shell beads and finely worked projectile points help identify many Late Prehistoric sites in Southern California archaeologically (Bean and King 1974). Among the coastal Luiseño and Juaneño, a maritime tradition at least partially carried over from the Millingstone and Intermediate Period cultures (Harrington 1978). By 1,000 B.P. the Canaliño/Chumash/ Luiseño/Juaneño maritime traditions were using blue-water vessels in an exploitation strategy partially based on deep-sea fishing and marine mammal hunting. During the Late Period, *circa* 900 to 200 years ago, a highly advanced fishing and hunting strategy developed that included the exploitation of a wider variety of fish and shellfish. These new subsistence strategies, coupled with the appearance of the bow and arrow, enabled a substantial increase in local populations, the development of permanent settlements, and a 'money' economy based on the shell trade.

Ethnography: The Luiseño and Juaneño

At the time of European contact, the project area was inhabited by the Luiseño (Figure 2). The Luiseño territory comprised an area stretching from Aliso Creek to Agua Hedionda Creek and from the Pacific Ocean to the Sierra Santa Ana, in the north, and Polamar, in the south, Mountains. Originally believed to be two distinct sub-linguistic groups, the Luiseño and Juaneño were likely only divided based on their association with Spanish Missions—the Luiseño were nearest the San Luis Rey Mission (southern portion of their territory), while the Juaneño were located nearer to the San Juan Capistrano Mission (northern portion of their territory); Bean and Shipek consider the Juaneño part of the Luiseño ethnological and linguistic group (1978:550). In either case, both groups may have been so similarly related, that modern historians, archaeologists and ethnographers would not be able to distinguish one village or group from another based on their cultural remains. The Juaneño (and Luiseño) spoke a dialect of the Uto-Aztecan language family and were closely related to many of the southern coastal groups, including the Ipai, to the south, and Gabrielino, to the north.

Ethnographic accounts of the Luiseño from early contact through the 20th century provide a pretty good idea, although likely a bit flawed, of how this culture existed for several hundred years before the arrival of Europeans. Population estimates of pre-European Luiseño village sizes range approximately 4000 to 5000 (Bean and Shipek 1978:557; Kroeber 1925:646) to nearly 10,000 (Bean and Shipek 1978:557; White 1963:104). Villages were located along streams in narrow valleys and typically sheltered from the harsh climate and in a defensible location. The houses of the Luiseño were conical and partially subterranean, with thatched brush roofs.

Most ethnographers agree that the single most important food source was the acorn. Although the acorn is high in protein, the flour derived from the grinding of the acorn requires a tremendous amount of energy, through flushing repeatedly the acorn-mush with water to remove the tannins. The Luiseño used a wide variety of foodstuffs found locally in their environment other than just acorns however. Meat was derived from rabbits, deer, antelope, quails, ducks, even small vermin and lizards; small bows with wooden-shafted, stone projectile-tipped arrows were used to hunt game, including rabbits and deer. Meat dishes were often accompanied with yucca, which when cooked is rather starchy, various cacti, sunflower, pine nuts and fruits and berries. Food items were then processed in clay bowls, stored in coiled baskets and possibly processed in steatite bowls originating from the Chumash of the Catalina Islands.

History of the Project Area (1750 A.D. to Present)

The Colonial Period (1769 to 1821)

The Spanish arrival on the west coast of North America had one primary purpose: the search for the illusive "Northwest Passage" that would enable European merchants a quick route to markets of the Far East. In 1542, Juan Jimenez Cabrillo landed in California (New Spain), where he first encountered the local native Ipai population. Cabrillo continued sailing north past Santa Catalina Island and San Pedro, near present day Los Angeles, in an attempt to find this northwest passage. Although unsuccessful, the Spanish would return to this region in the 18th century with a two-fold objective: attempt to Christianize the native population and to block the Russians fur-trading merchants, who had expanded their fur-trade monopoly throughout northwestern North America and had already established a foothold in northern California, thus, threatening Spain's colonial enterprise in the New World (Weber 1992:246-247). With the establishment of missions within the Luiseño territory—Mission San Luis Rey was constructed in 1776 and San Juan Capistrano was constructed in 1796—the native population was immediately moved, sometimes forcibly, into the missions; several Friars at various times attempted to leave the Luiseño in existing villages. In any case, one resultant of contact with Europeans was the introduction of contagions to a population who had no natural self-defense, ultimately decimating a large percentage of the native populations throughout the New World.

By the first decade of the 19th century, Spain's colonial enterprise in North America was waning. Spain ceded the entire Mississippi drainage to the French, who in turn sold it to the newly formed United States. By 1810, Anglo-Americans had established settlements throughout the middle of the continent and were encroaching on the Spanish colony of Mexico. In 1812, the first of a long series of drawn out battles was begun over Texas. In 1819, Spain and the United States opened formal negotiations to arrange delineation of their borders in the Americas. As a component of this treaty, known as the Adams-Onis Treaty, the 42nd parallel was used as a demarcation line between United States territory, to the north, and Spanish territory, to the south. The 42nd parallel remains the northern boundary of present day California.

At the about the time of the U.S.-Mexican conflict, Hipolito Bouchard, a pirate from Argentina, docked his fleet in the cove, now known as Dana Point Harbor, and released his sailors to pillage the countryside. In the process, San Juan Capistrano, for some unknown reason, was set the torch.

Mexican Independence (1821 to 1848)

In 1821, as various Anglo-American insurgents attempted to rest control of the Texas territory from Spain, a Spanish-Mexican officer, Agustin de Iturbide, led a successful coup over the Spanish-controlled government in New Spain, thereby forming the new independent country of Mexico, which stretched from Alta California to Texas and south to Guatemala. By the mid-1830s, the missions of California had been secularized and systems of land grants, known as the rancho system, were established to promote Hispano-Mexican settlement. Mexican control of Texas and California lasted for only 20 years. In 1845, the United States annexed Texas and acquired California after the successful invasion of Mexico in 1846 to 1848. Through the Treaty of Guadalupe Hidalgo, the United States also acquired all Mexican territory west of the Rio Grande and north of the Gila River, which included Alta California.

Early California Period (1848 to 1880)

Combined, Spain and Mexico controlled California for nearly 70 years, yet the population composition of California was quite mixed at the time of annexation. In 1850, only two years after California was acquired by the United States, it was admitted as the 31st state; mainly due to the discovery of gold in 1848 by the American James Marshall. Although gold had been discovered in California by 1842, Marshall's discovery led to one of the greatest "gold rushes" in American history. Upon discovery of gold, California was transformed from a Hispanic backwoods frontier to the new Anglo-American "Golden State." The settlement of northern California reflected this new influx of "gold-diggers," while southern California remained sparsely settled, mostly by rural agriculturalists and herders. By the end of this Early California Period, California had two of the largest cities in the United States: San Francisco and Los Angeles.

5.10.1.2 Paleontological Resources

<u>Regional Paleontology History</u>

The proposed project is located on several different rock units ranging in age from the late Cretaceous (89-65 million years ago (mya)) through the Holocene (past 10,000 years). Each of these rock units have surface exposures in the project area. Fossils generally are recovered from rock formations that originated as either marine sediments (sands and silts) or terrestrial sediments (sands, silts and alluvium) that have not undergone significant deformation from volcanism or metamorphic processes. In Orange County, land emergence began during the late Mezosoic Era (the Cretaceous Period) and the county was covered by a warm shallow sea (http://www.ivc.edu/geology/ocgeo.aspx). This was the final period of the "Age of Reptiles."

Formations located in the project area that have the potential to contain fossils and trace fossils include (from oldest to youngest) the: (1) Williams Formation, (2) Sespe Formation, (3) Vaqueros Formation, and (4) Puente Formation (including the Soquel and La Vida Members), and the Topanga Formation. Each of these formations and the types of fossils they contain is discussed in greater detail below. In addition to the aforementioned formations, Holocene fan deposits and recent landslide deposits are also present. Landslides from older geologic units may contain significant fossils and trace fossils even though these materials have been displaced from their original setting. Of all the units identified in the project area, the Holocene fan deposits are the only ones that have a low potential to contain significant nonrenewable paleontologic resources. These sediments are assigned a low paleontologic sensitivity. In contrast, the Williams Formation, the Sespe Formation, the Vaqueros Formation, the Puente Formation, and the Topanga Formation all have high potential to yield significant paleontologic resources, and so are assigned high paleontologic sensitivity.

The Williams Formation (later Cretaceous Period: Senonian: 89-65 mya)

The Williams Formation is divided into the Pleasants Silty Sandstone and the Schulz Ranch Sandstone Members (http://www.ivc.edu/geology/ocgeo.aspx). The Pleasants Sandstone Member is the only member mapped as being present within the project area (Morton 2004). This member consists of marine sandstones and locally has produced abundant fossil mollusks, and reflects pronounced shallowing of the Cretaceous sea. Fossiliferous concretions are common in the Pleasants Sandstone Member, and fossil remains of terrestrial vertebrates including hadrosaurian dinosaurs (Hilton 2003) have also been recovered. The Pleasants Sandstone Member of the Williams Formation is assigned high paleontologic sensitivity.

The Sespe and Vaqueros Formations (late Eocene to early Miocene Epochs)

In Orange County, the Sespe and Vaqueros Formations are interbedded and are almost impossible to separate. At locations where these deposits can be differentiated, the Sespe Formation is a red-colored continental deposit and the Vaqueros Formation is a buff-colored marine deposit. The formations represent a period of transition from a nonmarine to a marine depositional environment. These interbedded sediments appear to have accumulated along the shore of a fluctuating sea basin or deposition occurred in desert bays, "alternating with shallow sea incursions" (http://www.ivc.edu/geology/ocgeo.aspx).

In Orange County, the Sespe Formation consists of massive- to thick-bedded, nonmarine conglomeratic sandstone and clayey and silty sandstone (Morton 2004). The sediments of the Sespe Formation were deposited millions of years before the inception of the San Andreas Fault in what today would be Baja California. The Sespe Formation contains a diverse and very significant vertebrate fossil assemblage of great importance to the understanding of the evolution of mammals in the early Tertiary Eocene and Oligocene times. The marine Vaqueros Formation has yielded shallow water marine megafossils (Morton 2004). Both of these formations are therefore assigned high paleontologic sensitivity.

The Puente Formation (Miocene Epoch)

The marine Puente Formation was originally divided into three members (English 1926): a lower shale, a middle sandstone, and an upper sequence of siltstone, sandstone and conglomerate. Nearly thirty years later, the overlying Sycamore Canyon conglomerate was identified as being a part of the formation (Schoellhamer et al. 1954). In ascending order, the four members include the: La Vida, Soquel, Yorba, and Sycamore Canyon. Of these, the La Vida and Soquel members have been mapped within the boundaries of the project area (Morton 2004). All the members of the Puente Formation are highly fossiliferous, and several varied assemblages of marine and terrestrial invertebrates, vertebrates, and plants have been observed and recovered. This formation is assigned high paleontologic sensitivity.

The Topanga Formation (middle Miocene Epoch ca. 18 to 16 mya)

The Topanga Formation is a sandstone unit which was deposited during the Early-Middle Miocene in a shallow, warm sea. It contains abundant marine fossils ranging from sharks' teeth to sea shells and microfossils (http://www.ivc.edu/geology/ocgeo.aspx). Exposures of the Topanga Formation in Orange County are highly fossiliferous. Marine vertebrates found in the unit include pinnipeds, whales, dolphins and sea cows. Microplankton, clams, snails, bony fish, sharks, sea turtles and birds have also been collected. The Topanga Formation has a high paleontologic sensitivity throughout its extent.

5.10.2 THRESHOLDS OF SIGNIFICANCE

The County has not established CEQA significance thresholds for cultural resources. Therefore, the CEQA Guidelines Appendix G is used to identify potentially significant impacts on such cultural resources. For purposes of this analysis, an impact of the proposed MDP is considered significant if the project would:

- Cause a substantial adverse change in the significance of a historical or archaeological resource as defined in 15064.5 of the CEQA Guidelines.
- Directly or indirectly destroy a unique paleontological resource or site or unique geological feature.
- Disturb any human remains, including those interred outside of formal cemeteries.

For potential impacts to historical resources to be considered significant, the resources in question must be listed in or determined to be eligible for listing in the California Register of Historical Resources (CRHR), be included in a local register of historical resources, or be determined by the lead agency to be historical resources. The term historical resource may also apply to archaeological sites. However, for an archaeological site that does not meet the criteria of historical resources, a determination must be made as to whether it qualifies as a unique archaeological resource.

5.10.3 METHODOLOGY

5.10.3.1 Cultural Resources

On August 16, 2005, URS conducted a records search at the South Central Coastal Information Center (SCCIC) of the California Historical Resource Information System (CHRIS) at California State University, Fullerton. Documents and literature regarding known cultural resources and previous archaeological studies within a half mile of the landfill property were reviewed (the SCCIC summary letter is included in Appendix B of the Cultural Resources Assessment).

The SCCIC records indicated that nine previous cultural resource surveys have been conducted within the Area of Potential Effect (APE). In addition, fourteen previous cultural resource surveys have been conducted within the half-mile search radius. One known historic and six prehistoric archaeological resources have been recorded within the APE, while twelve known archaeological resources have been recorded within the half-mile radius of the project site.

URS also reviewed the State of California Department of Parks and Recreation (DPR) 523A forms for previously recorded sites. Pertinent data from the forms were tabulated in the literature review prepared for the study. Locations of previous surveys and known cultural resources are plotted on the El Toro 7.5' USGS Quadrangle of the project study area and copies of the maps will be presented in an appendix.

Historic maps of the study area were reviewed to determine whether historic structures and roads were present in the project area, which may now be represented by archaeological remains. Additionally, relevant archaeological and historical literature was reviewed to develop a context for interpreting cultural resources encountered by the project. The Survey Report is Confidential and will not be available for public review.

A cultural resource reconnaissance survey was performed within the project APE by URS staff archaeologist Dustin Kay on 22 September 2005. Information obtained from the literature review was used to identify areas within the project site that will require an intensive field survey. Lands that will require survey will include areas within the APE that have never been surveyed or areas that have not been surveyed within five (5) years of the undertaking. Previously surveyed areas must be resurveyed after 5 years because they are subject to erosion which can expose cultural resources not formerly identified. The archaeological survey was performed in conformance with the Secretary of Interior's Standards and Guidelines [36 CFR § 61.1 Sections 101(f), (g), and (h), and Section 110], by an archaeologist who met the Secretary of Interior's Professional Qualification Standards for Archaeology [36 CFR § 61]. Archaeological sites and isolates identified within the project area would be documented on DPR 523A and isolate forms, as appropriate, and their location would be plotted using a hand held GPS instrument accurate to within approximately 15 feet or 3 meters.

The Cultural Resources Assessment addresses cultural resources within the project's APE, including archaeological sites, buildings, structures, or objects that are listed in or eligible for inclusion in the CRHR or National Register of Historic Places (NRHP). The report provides detailed information on the types of cultural resources located in the project area (previously recorded and newly recorded) and shows the locations of these resources.

<u>Regulatory Environment and Compliance</u>

The cultural resources studies for the proposed Master Development Plan (MDP) for the Frank R. Bowerman Landfill were conducted by URS in compliance with the guidelines and regulations set forth by, and procedures within Section 106 of the National Historic Preservation Act, and its implementing regulations, set forth at 36 Code of Regulations (CFR) Section (§) 800, and regulations implementing the National Environmental Policy Act (NEPA), set forth at 18 CFR § 380.12(f)(1)(i) and (2). Native American burials and burial goods, should they be encountered, will be dealt with in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA) as amended in 43 CFR § 10 (1999).

State Historic Preservation Office (SHPO) Consultation

As a first step in the process, URS consulted with the Integrated Waste Management Department (IWMD) and the State Historic Preservation Office (SHPO) to determine the level of information the SHPO would like to receive regarding cultural resources during the course of the project. It is anticipated that the SHPO will request the opportunity to review survey reports and monitoring and treatment plans to ensure that the proposed recommendations and methods are consistent with current SHPO requirements. SHPO may also request information pertaining to the results of Native American consultation.

5.10.3.2 Paleontology

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) completed a literature review and records search for the FRB Landfill near El Toro in Orange County, California. The study area is located in and around Bee Canyon near Loma Ridge, as seen on the El Toro, California 7.5' United States Geological Survey topographic quadrangle map (1968 edition). The search identified the following paleontologically sensitive formations within the Project area: Williams Formation; the continental Sespe Formation; the marine Vaqueros Formation; the marine Puente Formation, including the Soquel and the La Vida Members; and the marine Topanga Formation. Holocene fan deposits are also present but these are not paleontologically sensitive. The search of SBMC records did not identify any previously-known paleontologic resource localities within the boundaries of the proposed project property, nor from within at least one mile in any direction.

URS conducted a search of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no previously-known paleontologic resource localities are recorded by the SBCM from within the boundaries of the proposed project property, nor within at least one mile in any direction.

In October 2005, a literature review and records search of paleontological resources located within the Project area was performed by the Division of Geological Sciences, San Bernardino County Museum (SBCM) (Appendix C). The search identified the following paleontologically sensitive formations within the Project area: Williams Formation; the continental Sespe Formation; the marine Vaqueros Formation; the marine Puente Formation, including the Soquel and the La Vida Members; and the marine Topanga Formation. Holocene fan deposits are also present but these are not paleontologically sensitive. The search of SBMC records did not identify any previously-known paleontologic resource localities within the boundaries of the proposed project property, nor within at least one mile in any direction.

5.10.4 IMPACTS

5.10.4.1 Cultural Resources

Archaeological Survey

The majority of the project APE has previously been or is currently impacted by landfill construction activities. A reconnaissance of areas previously unsurveyed or areas surveyed more than five years ago was conducted. Dense vegetation added to extreme ground coverage making for poor visibility (0 – 5%). As stated in the Cultural Resources Assessment, due to poor ground surface visibility, the potential for identifying cultural resources was limited. In addition, large portions of the survey area are on ridge lines or in canyons of excessive slope (greater than 30 degrees). The potential for additional cultural resources is high due to the content of previously identified resources. There were no additional archaeological resources identified on the FRB Landfill site.

As noted in the Cultural Resources Assessment, an attempt to relocate the previously recorded cultural resources was conducted. Only two previously recorded cultural resources of the seven known resources previously documented were relocated within the project APE. The additional five cultural resources (CA-ORA-520, 521, 717, 718 and 1326) were plotted incorrectly, destroyed by previous construction activities or destroyed by erosion conditions. The two relocated cultural resource sites consist of a prehistoric site (CA-ORA-1349) and a historic site (CA-ORA-1350H). Descriptions of the cultural resources are provided below.

Prehistoric Cultural Resources

<u>CA-ORA-520</u>

This site is a flake scatter located on a small open terrace up slope from Bee Canyon Road, outside of the entrance gate to the landfill. Artifacts consist of waste flakes and possible chalcedony core. No evidence of the site exists. The site area is heavily vegetated and consists of concrete terraced drainage channels. The site could not be relocated.

<u>CA-ORA-521</u>

This site is a milling station. The site consists of four identified and 10-15 possible bedrock mortars within a large sandstone outcrop and a flake scatter surrounding the outcrop. In addition, a possible burial was identified but bone was identified as human. Within the “burial”, associated artifacts were found, consisting of a cardium shell bowl, ovate chert knife and lithic debitage.

Several sandstone bedrock outcrops were identified with the area. None contained mortar features. In addition, no artifacts were relocated. The area is within a recent erosion slump and has been heavily impacted. The site was not relocated.

CA-ORA-717

This site is a camp site located above a large cliff face to the southwest. The site overlooked a large flat area next to the dirt road to mountain top. The artifacts included a surface lithic scatter of metate fragments (large and small), handstones (whole/frags) and hammerstones. The site was not relocated. When the site was recorded in 1977, the area was designated for refuse disposal. It is assumed the site was destroyed by erosion conditions and construction impacts.

CA-ORA-718

This site is a camp site with a surface scatter of associated lithics, large metate and metate fragment, five handstones and two hammerstones. The location of site is currently under concrete and paved access roads. No evidence of the site exists.

CA-ORA-1326

This site is a quarry and tool processing site. The site was located west of a graded dirt road atop a finger ridge between two large ravines. The artifacts consist of a chert biface and point, denticulate and drill blanks, flakes, cores: felsite, flakes, scraper and a large granitic metate. The site area has been heavily impacted by erosion and grading activities. No evidence of the site exists; therefore, the site was not relocated.

CA-ORA-1349

This site is a sparse lithic scatter of groundstone and chipped lithic artifacts. Artifacts include chert and metavolcanic cores; a metasedimentary hammerstone; chert and metavolcanic flakes; and a Granitic bifacial mano fragment. The site is located at the southern portion of the project APE, within an avocado orchard on the top of a steep sided ridge/hill approximately 320 feet (ft) (100 meters (m)) southeast of Bee Canyon Wash. The site is currently within a fence line and a row of Eucalyptus trees planted on the western bluff overlooking Bee Canyon. The site is located outside of the proposed FRB Landfill boundary and slope stabilization areas. Therefore the site will not be impacted and no further work is justified.

Historic Cultural Resources

CA-ORA-1350H (Bee 2)

This site is a historic homestead, consisting of two standing structures and a small refuse pile of construction debris. Feature 1 is a front gabled single room structure constructed of tongue and groove vertical siding and plain board roof (see photos 6 and 7 in the Cultural Resources Assessment). The foundation of the structure is poured concrete pilings. A set of cabinets with shelves extends from the room to the east and a single shelf is built into the north wall. Another shelf is in the south wall. A single bed frame and springs is also located inside. The structure is in disrepair but still standing. Feature 2 is a shed roof single room structure with a small cellar (photos 8 thru 10). The structure is constructed of tar paper, chicken wire and hand applied stucco over a wood frame. The foundation is poured concrete. The structure is no longer standing. A cellar with an opening was noted below the east wall. Two retaining walls constructed of broken concrete chunks and mortar extend from both sides of the cellar entrance approximately 9 ft. A "Coolerator" brand icebox with the door removed is located within the structure. When the site was originally identified in 1993, a truck bed was also identified. No evidence of the truck bed was found. Dense vegetation made observation of the ground surface difficult. The site is located outside of the proposed FRB Landfill boundary and slope stabilization areas. Therefore, the site will not be impacted and no further work is necessary.

Architectural Historical Resources

No architecturally historic resources were identified in the literature search or from the reconnaissance survey.

Potential NRHP Eligibility of Resources

The intensive field survey of the project APE was positive for two previously recorded cultural resources (CA-ORA-1349 and CA-ORA-1350H). Of the two sites, only CA-ORA-1349 has potential for NRHP eligibility status, since no previous testing for size, depth and artifact content of the site have been conducted. No additional cultural resources were noted within the project APE, although dense vegetation added to extreme ground coverage making for poor visibility (0 – 5 %). Due to poor ground surface visibility, the potential for identifying cultural resources was limited. In addition, large portions of the survey area are on ridge lines or in canyons of excessive slope (greater than 30 degrees). The potential for additional cultural resources is high due to the content of previously identified resources within and surrounding the project APE. Although the potential for encountering prehistoric resources is high, potential effects to additional historic properties or historical resources (cultural resources listed, eligible, or potentially eligible for listing on the NRHP) are not anticipated.

5.10.5 MITIGATION MEASURES

To minimize adverse impacts to cultural, historic, archaeological and paleontological resources the following measures shall be implemented:

CR-1 Prior to the issuance of grading permit(s), the project developer(s) shall retain a qualified cultural resource specialist, to the satisfaction of the County of Orange IWMD, to monitor the project's subsurface areas during grubbing and land disturbance from construction activities that previously were not effectively surveyed. The cultural resource specialist shall examine, evaluate, and determine the most appropriate disposition of any potential artifact and shall have the authority to temporarily halt work until any identified artifacts can be recovered, handled, and/or surveyed in the appropriate manner.

CR-2 Prior to issuance of grading permit(s) and prior to excavation to a depth of more than 15 feet below the modern ground surface, the project developer(s) shall retain an archaeological and paleontological resource specialist, to the satisfaction of the County of Orange IWMD, to conduct archaeological and paleontological resource monitoring.

5.10.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of mitigation measures CR-1 and CR-2, described above, will ensure that potential impacts related to cultural, historic, archaeological, or paleontological resources are reduced to below a level significance.

5.11 HAZARDS/RISK OF UPSET

This section describes and evaluates the potential risks related to public health and safety/risk of upset for the proposed FRB Landfill expansion project. This section summarizes information obtained from the Joint Technical Document (JTD) (2004) for ongoing operations and regulatory compliance at the FRB Landfill. The JTD is available from IWMD and referenced in Section 13.0 of this EIR.

Issues related to public health and safety/risk of upset fall into the following categories:

- Vehicle traffic to and from the site and within the site boundary
- Potential for unintentional disposal of hazardous materials, accidental spills of refuse and/or hazardous materials on-site
- Potential for combustion of waste or brush fires
- Potential landfill gas and condensate generation hazards
- Health and safety hazards
- Landslide hazards

5.11.1 EXISTING CONDITIONS

5.11.1.1 Vehicle Access and Circulation

The FRB Landfill is located in unincorporated Orange County near the City of Irvine at 11002 Bee Canyon Access Road. Access to the landfill is provided via Bee Canyon Access Road. An access gate is located at the entrance to the landfill and is locked after operating hours. Most on-site roads are paved and used by landfill personnel and waste haulers as well as consultants and contractors.

Traffic issues relevant to public safety and risk of upset include access to the project site, on-site circulation, operation of landfill equipment, commercial and public traffic on-site, on-site traffic controls and potential for traffic accidents on public streets that provide direct access to the landfill. Traffic accidents on public streets can result in the spillage of solid waste, which could potentially create public health hazards for persons exposed to the solid waste spillage.

Detailed information regarding current access routes and traffic volumes in the vicinity of the landfill is provided in Section 5.5 (Transportation and Circulation). The landfill is open Monday through Saturday from 7:00 A.M. to 4:00 P.M. for all commercial customers and from 4:00 P.M. to 5:00 P.M. for transfer trucks. Commercial haulers within and outside the County deliver municipal solid waste (MSW) to the landfill. The annual average truck trips at the FRB Landfill is 1,456 truck trips which is based on a maximum capacity of 8,500 tons per day (TPD).

5.11.1.2 Hazardous Materials

The FRB Landfill is a Class III non-hazardous facility and, as such, no hazardous materials, pesticides, radioactive or explosive wastes are accepted for on-site disposal. Only MSW from commercial haulers and vehicles operating under commercial status is accepted. Commercial status is verified by either showing a business license or current tax return to the fee booth attendant. The waste types received at the FRB Landfill consists of non-hazardous residential, commercial, industrial and inert waste. In August 1991, the Integrated Waste Management District (IWMD) began a program for the collection and transfer of household hazardous waste (HHW). There are four Household Hazardous Waste collection centers in Orange County.

Established programs are in place at the landfill to prevent hazardous materials from entering the landfill and to ensure that landfill workers are protected from potentially hazardous substances. The FRB Landfill has implemented a hazardous waste screening program (HWSP) to monitor waste entering the site for hazardous substances. Under the Load Checking Program, refuse unloading activities are continuously observed by waste inspectors. The random load check procedure is used during the HWSP in which waste inspectors, on a regular basis, randomly select commercial, demolition and soil loads for a detailed check. During the random load check, the refuse from the load is spread out in a designated area and checked for hazardous wastes. Vehicles containing hazardous materials are rejected and all returning offenders are referred to the County of Orange Hazardous Waste Strike Force for investigation. Low level radioactive waste monitors are installed in the scale houses. Any vehicle carrying waste identified as radioactive by the monitors is rejected. All hazardous waste found during burial operations is collected, categorized and either returned to the generator/hauler, or if the hauler cannot be identified, properly stored on-site until removed for disposal by a licensed hazardous waste disposal firm. Any hazardous materials found during burial operations are stored in a covered containment area on a concrete slab, in secondary cells, segregated by material type. The hazardous waste storage area is located in the western portion of the landfill site and is enclosed by a chain link fence with a locked gate. Access to the storage area is provided by paved roads. No hazardous wastes are stored on-site for more than ninety days.

IWMD has an existing contract with a private equipment contractor to service the landfill equipment on-site. The area designated for equipment maintenance will not be affected by landfill development. The landfill has on-site fuel storage tanks, a reclaimed water tank and a supplies storage facility. The fuel storage tanks have approved secondary containment systems and are properly permitted. Waste oils, lubricants, filters, etc. generated by on-site equipment maintenance activities are stored in a covered concrete containment area, in secondary cells, segregated by material type prior to being picked up by licensed recyclers. The reporting and cleanup of any spill must comply with federal, state and local landfill regulations. Under these regulations, landfill staff must be trained in hazardous materials reporting and cleanup procedures.

Leachate is generated when water passing through the refuse reacts chemically and biologically with refuse contents. Potential sources of leachate formation at the FRB Landfill include infiltration of rainfall, surface water from surrounding areas draining into the landfill and/or water contained within the solid waste received at the landfill. Leachate is a potentially potent polluter of soil and groundwater. The leachate management system at the FRB Landfill is intended to prevent or minimize leachate generation, contain and collect generated leachate and reclaim or dispose of wastewater collected in the leachate control system. Landfill leachate is collected via the leachate collection and recovery system (LCRS). The leachate at the site has been permitted by the Regional Water Quality Control Board (RWQCB) to be blended with groundwater and condensate for use as dust control within the refuse footprint areas underlain by a composite liner system. During rainy weather, when the soil above the lined areas is saturated from the rain, the liquids (groundwater, leachate and condensate) are hauled off site to an approved treatment facility.

Groundwater collected in the subdrain system either drains by gravity or is extracted and pumped to three 13,000 gallon groundwater storage tanks where it is blended with landfill gas (LFG) condensate (two 11,000 gallon tanks) and leachate (three 13,000 gallon tanks) for dust control on the lined area of the landfill. The groundwater, leachate and condensate tanks are installed within separate concrete secondary containment structures.

5.11.1.3 Fire Hazards

The City of Irvine GP designates the area surrounding the FRB Landfill as a hazardous fire area due to the presence of dry vegetation and the amount of fuel on the slopes. The landfill is equipped with heavy construction equipment and water trucks available for fire fighting purposes. The FRB Landfill has a current Orange County Fire Authority (OCFA) fire permit. Fire breaks are constructed each year in compliance with the requirements of the State and County fire protection agencies.

All flammable materials are kept at a minimum distance of 150 feet from all structures. The landfill has a 96,000 gallon recycled water tank, a 4,500 gallon potable water tank and two water trucks on-site for fire fighting purposes. Fire extinguishers are required on all heavy equipment and in offices and lunchroom facilities. A fire extinguisher is located within 50 feet of the aboveground flammable liquid tanks and all County-issued official vehicles are equipped with fire extinguishers. Flammable debris is removed from heavy equipment on a daily basis.

In the event of a LFG fire, IWMD staff are trained and equipped to respond to the event and would coordinate closely with the LFG consultant, contractors and OCFA. LFG-related fires, or subsurface fires, typically occur inside the refuse cell and the IWMD has procedures in place to immediately respond to such an event. Compacted daily cover creates individual cells that confine a fire to a relatively small area and also limits the available oxygen required for combustion. Any fires within the vicinity of the refuse areas would be extinguished and covered with soil. All fires on-site are immediately reported to the OCFA.

5.11.1.4 Landfill Gas and Condensate Generation

The decomposition of organic waste contained in the solid waste received at the FRB Landfill produces LFG as a by-product. Typically organic waste buried at the landfill consists of paper, yard clippings, food waste, agricultural residues and other materials which undergo aerobic decomposition. As the oxygen in this refuse is depleted, anaerobic decomposition processes begin, resulting in the generation of LFG. LFG generally consists of equal amounts of methane and carbon dioxide along with traces of other constituents. Methane in concentrations between five and 15 percent by volume is flammable and poses a health and safety risk. In addition, there are potential impacts to air quality posed by volatile organic compounds (VOCs) produced in trace amounts in LFG. Many of these compounds react in the atmosphere to form ozone or photochemical smog.

The existing LFG control/recovery system collects LFG and condensate via horizontal collection lines and vertical extractions wells within the disposal area. LFG collected by these lines and wells is piped to ground flares at the landfill to be burned. The flare station for the destruction of LFG is located in the southwest portion of the landfill. The flare station consists of five flares, six blowers, piping and other associated equipment.

LFG is saturated with moisture. The moisture that condenses in the collection of piping systems (condensate) is directed to a double contained storage location and is either used for dust control or hauled off site (see Section 5.11.1.2 above).

5.11.1.5 Landfill Gas Monitoring

LFG monitoring is performed at the FRB Landfill in accordance with South Coast Air Quality Management District (SCAQMD) Rule 1150.1 and with Title 27 CCR monitoring requirements. The monitoring program includes integrated surface monitoring, instantaneous surface monitoring, ambient air monitoring, LFG samples from the collection system (i.e. raw gas) analysis, perimeter gas (vadose zone) monitoring and gas condensate monitoring.

5.11.1.6 Health and Safety Hazards

<u>On-Site Safety Procedures</u>

The landfill has on-site sanitary facilities for employees, visitors and customers. Personnel quarters are equipped with a locker room, shower, changing facilities and restroom. Separate restroom facilities are available to customers in the Customer Facilities Building located near the scales area. Potable water is supplied to the site by Irvine Ranch Water District and bottled water is also available at all personnel facilities. All necessary safety equipment and clothing is provided to landfill personnel as necessary. Safety equipment may include: hard hats, reflective vests, ear and eye protection and filtration masks.

Landfill personnel communicate via phones in the site office and operations trailers and at the fee booth. The Landfill Operations Supervisor and Waste Inspectors carry mobile radios and most of the County trucks are equipped with radios. The Site Manager, Landfill Operations Supervisor and Engineering staff are equipped with cell phones. The site office and fee booth are connected on a wide area network (WAN) to headquarters and other IWMD landfill sites. FRB personnel follow emergency response procedures outlined in the Hazard Communication Program (HCP) developed by IWMD. HCP also contains details of IWMD's chemical container labeling policy and Material Safety Data Sheets for every hazardous chemical used on-site.

<u>Emergency Response Plans</u>

The Orange County Emergency Response Plan addresses the County's planned response to extraordinary situations associated with natural disasters and technological incidents including both peacetime and national security operations. It provides an overview of operational concepts relating to various emergency situations, identifies components of the Local Emergency Organization and describes the overall responsibilities of the organization for protection of life and property and assuring the overall well being of the population. It also identifies the sources of outside support which might be provided via mutual aid agreement by other jurisdictions.

The Plan serves as a basic reference and training document for emergency preparedness, response, and recovery and mitigation and provides the authority and basis for the development of more detailed departmental and functional standard operating procedures.

Vector Control

Animals or insects such as rats, mosquitoes, flies and ticks that can transmit diseases to humans are called vectors. Vectors typically associated with landfills include burrowing mammals such as mice, rats and gophers, and insects such as mosquitoes and flies and occasionally coyotes. Birds such as gulls, pigeons and crows are also associated with landfills and may act as hosts for insect vectors such as mosquitoes. These mammals, birds and flies are primarily attracted to the food and vegetative material in the solid waste received at landfills.

Mosquitoes can carry diseases such as encephalitis and malaria. Mosquitoes proliferate if there is standing and stagnant water present. Some mosquito species capable of transmitting West Nile Virus are able to breed in very small amounts of water, even in a flowerpot tray or a clogged rain gutter. Ticks can carry Lyme disease, Rocky Mountain Spotted Fever and other diseases. Rodents such as mice and rats may carry disease agents such as certain bacteria, or may have fleas, which can carry plague or typhus. Plague and typhus are usually transmitted by fleas associated with rodents; however, Hantavirus, a disease associated with rodents, can be transmitted by exposure to the droppings of a virus-infected deer mouse species. Deer mice are prevalent in the foothills, canyons and coastal bluffs of Orange County. Flies are considered a nuisance and can be vectors of certain intestinal diseases. Flies are common around solid waste and decaying animal matter. Coyotes are opportunistic feeders and will commonly scavenge for food. Coyotes pose more of a nuisance to humans than a health hazard. Birds, such as gulls, also pose more of nuisance but they may also serve as vector hosts. However, pigeons have been found to serve as hosts for encephalitis.

Currently there is no problem with vector control at the FRB Landfill. Existing practices at the site, including daily covering of the disposed waste and overall site litter control, continue to be effective control of the vectors mentioned. Litter control consists of the application of cover materials, requiring vehicles transporting waste to the site to be covered, and routine surveillance of the entrance, interior roads and site perimeter for litter.

5.11.1.7 Landslide Hazards

An extensive, ancient landslide complex was mapped on the north side of Bee Canyon prior to development of the landfill (Schoellhamer, 1981). This landslide is referred to as the North End Landslide Complex and was reactivated as a result of site grading activities in February 2002 (GeoLogic Associates, 2004). Grading was performed at the head of the landslide to reduce the likelihood of further landslide movement (GeoLogic Associates, 2004) and additional exploratory work is expected to be performed in support of engineering design of future phases. Numerous additional landslides were also mapped by EarthTech (1988), Moore & Taber (1991), and GeoLogic Associates (2004) along the oversteepened north, west, and east slopes of the canyon. A portion of an ancient landslide was also mapped during excavation of the south slope part of Phase V-D (GeoLogic Associates, 2003).

5.11.2 THRESHOLDS OF SIGNIFICANCE

5.11.2.1 Vehicle Access and Circulation

The proposed project would result in a significant adverse impact related to vehicle access and circulation if it would:

- Result in an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system.
- Substantially increases hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment).
- Result in inadequate emergency access.

5.11.2.2 Hazardous Materials

The proposed project would result in a significant adverse impact related to hazardous materials if it would:

- Create a significant hazard to the public or the environment through the routine use, transport or disposal of hazardous materials.
- Create 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.
- Be on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and which would create a significant hazard to the public or the environment.

5.11.2.3 Fire Hazards

The proposed project would result in a significant adverse impact related to fire hazards if it would:

- Expose people or structures to a significant risk or loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

5.11.2.4 Landfill Gas Generation

The proposed project would result in a significant adverse impact related to LFG if it would:

- Create 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.
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

5.11.2.5 Health and Safety Hazards

The proposed project would result in a significant adverse impact related to health and safety hazards if it would:

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Include a new or retrofitted storm water treatment control Best Management Practices (BMPs) (e.g., water quality treatment basin, constructed treatment wetlands), the operation of which results in significant environment effects such as increased vectors and odors.

5.11.2.6 Landslide Hazards

The proposed project would result in a significant adverse impact related to landslide hazards if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death related to landslides.

5.11.3 METHODOLOGY

To evaluate hazardous materials and waste handling procedures, the Joint Technical Document (JTD) (2002) was reviewed. Permits for any on-site areas for fuel or hazardous materials storage were also reviewed to ensure that permits for these materials were current.

The Safety Elements of the City of Irvine and the County of Orange General Plans were reviewed to ensure that the proposed projected would not conflict with existing emergency and evacuation routes.

To determine the potential of LFG release and migration during the decomposition of wastes in the landfill, the most recent SCAQMD Rule 1150.1 Monitoring Reports available from IWMD were reviewed.

The design drawings were used to determine if any new BMPs were proposed and if the proposed project included adequate storage areas for hazardous materials used on-site or those found during burial operations.

The reports used to evaluate potential landslide hazards included site specific geologic, geotechnical and hydrogeologic information collected by consultants for the IWMD; regional geologic data compiled by the California Division of Mines and Geology (now California Geological Survey (CGS)) and the United States Geological Survey (USGS); and published reports from the United States Soil Conservation Service (SCS) and the California Department of Water Resources (DWR).

The information presented here regarding landslide impacts and potential mitigation measures for the development of landfill areas is based on site specific data and/or conservative estimates or interpretations where required. Engineering analyses of proposed cut and fill slopes and final landfill slopes were performed using engineering data obtained during previous landfill development investigations. The technical citations for this data collection and analysis are provided in the References.

5.11.4 IMPACTS

5.11.4.1 Vehicle Access and Circulation

The FRB Landfill is currently permitted to process a maximum of 8,500 TPD of MSW. The adopted High Tonnage Days project increases the maximum TPD accepted at the FRB Landfill from 8,500 TPD to 10,625 TPD for 36 days per year. The proposed expansion of the FRB Landfill includes an increase in the maximum permitted TPD from 10,625 TPD to 11,500 TPD (8,500 is average TPD, which will remain the same). The proposed project will result in increased truck trips from the permitted 1,958 truck trips to 2,106 truck trips. The potential impacts on the capacity of the local street system are discussed in detail in Section 5.5 (Transportation and Circulation). The proposed project will result in an increase in the permitted number of daily refuse truck trips to the FRB Landfill and will create a significant adverse impact to Sand Canyon Avenue at Trabuco Road during the A.M. peak hour in 2030 and to Jeffrey Road at Walnut Avenue during the A.M. peak hour in 2025 and 2030. The mitigation measure for Sand Canyon Avenue at Trabuco Road in 2030 is to apply the Advanced Transportation Management System (ATMS) strategies. The mitigation measure for Jeffrey Road at Walnut Avenue in 2025 and 2030 is to provide the westbound right-turn lane with a protected right-turn phase that is overlapped with the southbound left-turn phase. These mitigation measures, detailed in Section 5.5 (Transportation and Circulation), will reduce the significant adverse impacts to below a level of significance.

Access to the landfill is provided via Bee Canyon Access Road and other existing public and private roads, designed to local jurisdictions' standards, which are suitable for use by waste disposal trucks. Private access roads provide connections from public roads to and onto the landfill property. These access roads are adequate for use by waste disposal trucks. These private access roads are restricted to use by waste disposal vehicles and landfill employee vehicles. The proposed project does not include road improvements or the use of vehicles not compatible with the existing public and private access roads serving the landfill. Therefore, implementation of the proposed project will not result in safety hazards from design features or incompatible uses.

Emergency vehicles use the existing public and private roads to respond to fire, medical or police emergencies at the FRB Landfill or the immediately adjacent areas. Consistent with the California Vehicle Code and local restrictions, trucks using public roads to access the landfill should not block emergency vehicles and should not block access to adjacent uses. At the landfill, trucks do not queue off the landfill site and, therefore, do not block emergency access in the area. On the landfill site, truck queuing is managed to ensure that emergency vehicles can access the site, if necessary. The proposed project does not include any features that would alter traffic operations or emergency access onto or off the landfill site. Therefore, the proposed project will not result in adverse impacts related to emergency access or access to other land uses.

5.11.4.2 Hazardous Materials

There is an IWMD program in place at the FRB Landfill to prevent hazardous wastes from entering the landfill and to provide protection for landfill workers from potentially hazardous substances. This includes visual inspection of loads at the fee booths and the active face of the landfill and the rejection of loads containing hazardous wastes. In addition, the landfill is in compliance with federal, state and local landfill regulations pertaining to hazardous waste exclusion control. As part of the implementation of the proposed project, these procedures will continue to be in operation; therefore, impacts due to disposal of hazardous materials will be less than significant.

No new fuel storage facilities or fuel pumping stations at the landfill are proposed as part of the project. Hazardous materials used on-site for existing operations and under the proposed project would be handled according to existing and applicable state and federal regulations and would be limited to fuels, oils and other materials used in the operation and maintenance of landfill equipment and vehicles. Potential spills or releases of gasoline, diesel and stored hazardous materials from landfill equipment during expansion of the landfill may occur outside the isolation of secondary containment systems. Due to provisions of the National Pollutant Discharge Elimination System (NPDES) permit requirements and those associated Best Management Practices (BMPs) that specifically address accidental spills, the potential impacts due to accidental release of diesel, gasoline, stored hazardous waste, waste oils and lubricants are less than significant. Continued compliance with required California Integrated Waste Management Board (CIWMB), SCAQMD and IWMD programs and applicable OCFA, safety and hazardous waste regulations reduce potential impacts related to hazardous wastes at the FRB Landfill under the proposed project to below a level of significance.

Groundwater and leachate collection systems will be augmented as required by the Orange County Health Care Agency/Local Enforcement Agency, CIWMB and RWQCB for the landfill expansion areas. All collected groundwater and leachate will be subject to existing processes for treatment and containment. Because the existing leachate collection and removal system (LCRS) will be augmented to include the expansion areas, potential adverse impacts due to accidental release of untreated groundwater and leachate will be less than significant. For additional information regarding the leachate collection system and the potential for leachate to be released into groundwater, refer to Section 5.3 (Hydrogeology and Water Quality) of this EIR.

As stated above, traffic accidents off-site on public streets can result in the spillage of solid waste. This could potentially create public safety and health hazards; however, this type of spill would not result in a hazardous situation to public health because hazardous materials are not accepted at the FRB Landfill. Therefore, issues related to public health and safety during spillage of MSW is not considered a significant adverse impact. Should a traffic accident occur on-site, FRB personnel would be responsible for the immediate cleanup which would minimize potential safety and health hazards related to the spillage of MSW.

The project is not on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, therefore, would not create a significant hazard to the public or the environment.

5.11.4.3 Fire Hazards

The City of Irvine GP designates the area surrounding the FRB Landfill as a hazardous fire area due to the presence of natural combustible vegetation and the amount of fuel on the slopes; as such, wind driven fires from adjacent areas could create damage to structures at the landfill. As stated above, the landfill is equipped with heavy construction equipment and water trucks available for fire fighting purposes.

There is also a remote possibility of fire at the landfill itself from combustible refuse, vegetation or litter being ignited by sparks from vehicles or other sources. Should this occur, the fire would be limited to the materials deposited prior to the daily application of cover materials, as fire will not generally propagate through cover soil. The OCFA has procedures for the prevention of fires at waste disposal sites. Current practices at the FRB Landfill to reduce the potential for fire and for rapid control of fires, should they occur, include keeping fire extinguishers on-site, frequent site watering for dust control, on site water storage, prohibiting smoking on site and the posting of “No Smoking” signs, clearing vegetation, creating fire breaks and general safe operating procedures. These procedures and requirements will continue to be executed with implementation of the proposed project.

The potential risk of fires on-site, due to fires adjacent to the landfill and from fires occurring on-site, is low due to the design and operation of the landfill which incorporates fire safety requirements. Combustible vegetative material is removed from the surface of the landfill during grading, grubbing and vegetation removal operations on the landfill. Fire breaks are constructed each year in compliance with State and County Fire Authorities and all flammable materials are kept minimum distance of 150 feet from structures. This routine maintenance reduces the risk of fire hazards to below a level of significance. Subsurface fires from the combustion of buried loads would cause localized settling and may impact landfill operations but would not result in significant adverse impacts to users of the landfill or the general public because few people have access to the covered areas of the landfill.

5.11.4.4 Landfill Gas/Monitoring and Condensate Generation

Pursuant to 27 CCR Sections 20919 and 20919.5 existing LFG recovery systems will be extended into the landfill expansion areas as refuse is added to the landfill's expansion area and monitoring of LFG perimeter probes will continue as waste is added to the landfill. It is anticipated that perimeter probes will be moved or added to the edge of the 193-acre expansion area. The LFG recovery systems, including additional horizontal and vertical collection wells and flares, are required to be expanded as the landfill is developed to provide ongoing control of LFG in accordance with federal and state regulations.

Because the current landfill operations control total organic compounds (TOCs) below limits defined by the SCAQMD in Rule 1150.1(e) and because additional LFG recovery systems will be added to the expansion area and additional monitoring probes will be placed at the perimeter to comply with 27 CCR Sections 20919 and 20919.5 and SCAQMD requirements, potential impacts due to accidental release of LFG or lateral migration of LFG will be less than significant. In addition, it is not anticipated that the proposed project will cause TOC to exceed SCAQMD limits due to controls that will be in place during operations of the expansion area. For additional information regarding LFG and the potential for it to be released into the atmosphere, refer to Section 5.6 (Air Quality) of this EIR.

5.11.4.5 Health and Safety Hazards

On-site Safety Procedures

Existing procedures at the landfill governing the health and safety of landfill personnel and visitors to the site will not change as a result of project implementation. Therefore, the proposed project will not result in any interference with existing health and safety procedures established by IWMD.

Vector Control

Vector control methods currently used at the landfill have been effective in reducing the impact of landfill activities on the surrounding community by limiting the risks associated with vector borne diseases. The current daily covering of the disposed waste and overall site litter control will continue with implementation of the proposed project; therefore, implementation of the proposed project will not result in a significant adverse impact related to the transport of disease vectors and will not create a public health hazard.

As previously stated, there is no problem with vector control at the FRB Landfill due to existing practices at the landfill. Although there is no current problem at the landfill with vectors, the proposed project will include the addition of new or retrofitted BMPs (e.g., water quality treatment basin, constructed treatment wetlands). The proposed project BMPs will be substantially similar in nature to the existing BMPs because on-site drainage features such as berms and drainage ditches/channels in the MDP Master Storm Drainage Plan (MSDP) are designed to intercept sheet flow and direct it toward on-site desilting basins. The MSDP requires that drainage channels and desilting and retarding basins be maintained annually and after each storm. Maintenance includes visual inspection and clearing of debris. Due to implementation of BMPs, water and debris are not anticipated to attract vectors by collecting for long periods ensuring that expansion of the landfill will not result in health hazards related to vectors. Therefore, potential adverse impacts due to vectors or other environmental effects will be less than significant.

<u>Emergency Response Plan</u>

The FRB Landfill is in unincorporated Orange County and is in the sphere of influence (SOI) of the City of Irvine. The County has not adopted an emergency response plan or an emergency evacuation plan for unincorporated areas. The City of Irvine has adopted an emergency response plan; however, the City's GP Safety Element does not identify designated evacuation routes. Trucks carrying refuse to the FRB Landfill use Sand Canyon Avenue and a segment of Portola Parkway. These trucks do not substantially affect traffic on roads surrounding the landfill property and are not expected to impede evacuation or emergency response plans in the event of a major emergency. The proposed project will result in an increase in the permitted number of daily refuse truck trips to the FRB Landfill but will not result in a significant adverse impact related to existing emergency response plans.

5.11.4.6 Landslide Hazards

The potential impacts related to the vertical and horizontal expansions of the landfill and the off-site slope stabilization will result in changes in topography and are discussed in detail in Section 5.2 (Geology and Soils) of this EIR. Since the proposed expansion will encroach upon the NLC, 3-D stability analyses were performed to search for critical potential failure surfaces that include portions of the landslide that will remain in place. The potential failure surfaces also included portions of the buttress fill at the toe of the landslide. The analysis determined how those failures surfaces might impact the lined portions of the landfill. Based on the analyses presented in the Master Development Plan, the proposed slopes and landslide remediation are demonstrated to have an adequate factor of safety under static conditions and the displacements likely to occur under dynamic conditions are calculated to be at acceptable levels (GeoLogic Associates, 2004). The potential for impacts to geology and soils will be less than significant with mitigation measures G-1 through G-4 in Section 5.2 (Geology and Soils).

5.11.5 MITIGATION MEASURES

The FRB Landfill is governed by existing federal, state and local regulations and procedures that control landfill operations. These existing regulations and procedures will be extended to include the operation of the FRB Landfill expansion; therefore, no mitigation is required.

5.11.6 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Impacts related to public health and safety/risk of upset will be less than significant because the landfill expansion will comply with federal, state and local landfill regulations that currently govern landfill procedures. In addition, with implementation of various mitigation measures identified in previous sections, potential impacts will be less than significant.

SECTION 6.0
CUMULATIVE IMPACTS

SECTION 6.0
CUMULATIVE IMPACTS

6.1 DEFINITION OF CUMULATIVE IMPACTS

Section 15130 of the California Environmental Quality Act (CEQA) Guidelines requires that an Environmental Impact Report (EIR) discuss cumulative impacts of a project when the project's incremental effect is potentially cumulatively considerable. As defined by the CEQA Guidelines, a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. An EIR should not discuss impacts which do not result in part from the project evaluated in the EIR. To facilitate the discussion of potentially cumulative impacts that could result from implementation of the proposed project, each impact category evaluated in Section 5.0 (Existing Conditions, Impacts, Mitigation Measures and Level of Significance After Mitigation) is addressed individually in this cumulative impacts analysis.

A simple comparison of the cumulative environment contrasted with the increment of impact on its face is not an adequate rationale for concluding that a project does not have a cumulative effect. This is known as the ratio theory approach. Neither is the one molecule rule of change or addition an appropriate standard, where any increment, no matter how small, would be considered cumulatively significant. The most current interpretation of the standard is whether "any additional amount of effect should be considered significant in the context of the existing cumulative effect" (*Communities For A Better Environment V. California Resources Agency,* 126 California Reporter, 2d. 441, Cal.App.3 Dist., 2002). The same case states further:

> "[T]his does not mean, however, that *any* additional effect in a nonattainment area for that effect *necessarily* creates a significant cumulative impact; the "one [additional] molecule rule" is not the law. …[t]he lead agency shall consider whether the cumulative impact is significant and whether the proposed project's incremental effects are cumulatively considerable."

The objective of cumulative impact analysis is to look at trends with regard to each environmental parameter and ensure that past, present and future projects in an area are aggregated to examine impacts in a big picture contextual approach. In the context of the proposed Frank R. Bowerman Landfill expansion there are conditions that must be considered in the local and, depending on the parameter, regional contexts of the project.

The cumulative impacts analysis provided here is consistent with the process contemplated by Section 15130(a) of the CEQA Guidelines in which the analysis of cumulative effects in an EIR is based on two determinations: Is the combined impact of this project and other projects significant? Is the project's incremental effect cumulatively considerable? The cumulative impact must be analyzed only if the combined impact is significant and the project's incremental effect is found to be cumulatively considerable (CEQA Guidelines 15130(a)(2) and (3). When an EIR determines that a cumulative impact is not significant, or that the project's incremental effect is not cumulatively considerable, the EIR should briefly describe the basis for that determination (CEQA Guidelines 15130(a)(2) and (3)).

6.2 CUMULATIVE PROJECTS IN THE FRB LANDFILL STUDY AREA

An adequate discussion of significant cumulative impacts requires either: "…a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency…" or "…a summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact." A number of residential communities have been planned and proposed for future development in proximity to the landfill. Much of the planned and proposed new development will occur adjacent to Sand Canyon Avenue in the City of Irvine. Table 6-1 summarizes planned and proposed development in the project vicinity at various stages of approval within both the City and County surrounding jurisdictions.

TABLE 6-1
PLANNED AND PROPOSED LAND USES IN THE VICINITY OF FRB LANDFILL

Name/Location	Jurisdiction	Type of Development	Acres/DU/SF/TSF	Status
PA1, PA2 and PA 9	City of Irvine			Approved
PA 1 & 2		Conservation/Open Space	2,789 Acres	
		Residential	1,388 or 1,369[1] Acres	
		Institutional	45 Acres	
		Commercial	13-32[2]	
PA 9		Residential-Medium	221 Acres	
		Residential-High	60 Acres	
		Multi-Use	60 Acres	
East Orange	City of Orange			Pending City Council Approval
Santiago Hills II Planned Community		Low Density Residential	551 DU	
		Low-Medium Residential	630 DU	
		Medium	605 DU	
		Open Space	--	
East Orange Planned Community Area 1		Open Space	69 Acres	
		Low Density Residential	350 DU	
		Low-medium Density Residential	750 DU	
East Orange Planned Community Area 2		Open Space	136 Acres	
		Commercial Recreation	212 Acres	
		Low Density Residential	850 DU	
		Low-medium Density Residential	350	
East Orange Planned Community Area 3 Remaining Areas		Low Density Residential	50 DU	
		Open Space	4,040 Acres	
		Irvine Lake	597 Acres	
		Commercial Recreation	6 Acres	

TABLE 6-1
PLANNED AND PROPOSED LAND USES IN THE VICINITY OF FRB LANDFILL

Name/Location	Jurisdiction	Type of Development	Acres/DU/SF/TSF	Status
		Institutional	12 Acres	
		SR-241/261 right-of-way	258 Acres	
Northern Sphere	City of Irvine	Residential	12,350 DU,	Approved
		Retail use	730,000 SF	
		Research and Industrial facilities	6,566,000 SF	
		Open space	4,650 Acres	
Great Park[3]	City of Irvine and portions of unincorporated County of Orange	Auto Center	50 TSF	Approved
		Retail	3,000 TSF	
		University Residential	60 DU	
		Interim Housing	350 DU	
		Senior Housing	--	
		Transitional Housing	--	
		Research & Development (N&S)	300 TSF	
		Institutional Warehouse	263 TSF	
		OCTA Facility/Fly-Away Facility	54 TSF	
		Cultural/Institutional/Exposit ion	500 TSF	
		Agriculture	1,218 Acres	
		Golf Course	576 Acres	
		Habitat, Wildlife Corridor & Nature Walk	1,382 Acres	
		OS Park	-- Acres	
		Cemetery	-- Acres	
		Chapel/Mortuary1	-- TSF	
		Sports Park	192 Acres	
		TOD Residential	--	
		TOD Retail	--	
		TOD Office	--	
		Residential/Golf Village	--	
Planning Area 12	City of Irvine	Biotechnology/Industrial Park	602,559 SF	Approved
Planning Area 6	City of Irvine	Single Family Detached	937 DU	Approved
		Condominium	608 DU	
		Apartment	892 DU	
		Commercial	141.5 TSF	
		Restaurant	20 TSF	
		Fast Food Restaurant	7 TSF	
		Gas Station	1 Site	
		Bank	4 TSF	
		Elementary, Middle School	750 STU	
		Child Care Center	10 TSF	
Opportunities Study Area	City of Lake Forest	Sports Park/Community/Civic Center	45 Acres	EIR is being prepared
		New neighborhood Parks	70 Acres	
		Open Spaces	100 Acres	
		Residential	5,415 DU	
		Commercial	560,000 SF	

Sources: PA1/PA2/PA9 Project Draft EIR, Santiago Hills and East Orange Planned Communities Draft SEIR/EIR, Northern Sphere EIR, Orange County Great Park EIR, City of Irvine, City of Lake Forest, County of Orange.
Tony Raeker, Planner, City of Irvine, October 20, 2005.
Cheryl Kuta, Senior Planner, City of Lake Forest, October 20, 2005.

DU = dwelling units
SF = square foot
TSF = thousand square feet
STU = students

[1] *Square footage is dependent on which design option is selected for the Project entry, with Design Option A proposing the greater amount of Commercial acreage and the smaller amount of residential acreage.*
[2] *This total includes acreage that is not owned by The Irvine Company and is part of the City initiated General Plan Amendment and Zone Change. The total acreage owned by The Irvine Company equals 3,827 acres.*
[3] *Information from the Great Park EIR and reflects the 2007 Base Plan Land Use Summary.*

6.3 CUMULATIVE ENVIRONMENTAL IMPACTS

6.3.1 LAND USE AND PLANNING

The proposed expansion of the FRB Landfill would not result in any cumulative land use impacts. While development around the landfill property represents incremental growth of the area and the intensification of uses incumbent with that growth, the landfill operations would remain the same under both existing conditions and the proposed project. The only change is that the landfilling operation would continue from 2022 to the estimated horizon or closure year 2053, and that there would be an increase in the permitted daily tonnage rate of 8,500 TPD to a maximum of 11,500 TPD to accommodate high tonnage days. The landfill property is designated Public Facilities (4) in the County of Orange General Plan which allows for the disposal of MSW. The Solid Waste Facility-Landfill Site (LS) Overlay is also applied to the land use designation of the FRB Landfill in the County of Orange General Plan. In addition, the landfill is located in the City of Irvine's Planning Area 3 (PA 3) and is designated for Open Space Preservation (OSP) land use with a Landfill Overlay. Therefore, the extension of landfilling on the landfill property would not have cumulative impacts on the planned land uses in the City of Irvine or the County of Orange.

6.3.2 GEOLOGY AND SOILS

Geotechnical impacts are site-specific; through City and County development review processes, planned and proposed future development projects would be evaluated for potential geotechnical impacts. Where needed, mitigation measures would be required to minimize or avoid potential geotechnical impacts. Therefore, the project would not have cumulatively adverse impacts related to geology.

On-site soil to be used for daily cover, road construction and other related uses is available on the FRB Landfill property. There is adequate soil available in the near term for landfill operations with proposed on-site excavation at the FRB Landfill. However, prior to site closure the site is projected to have a dirt shortfall assuming a 4:1 refuse-to-soil ratio. The MDP includes recommendations to accept free soil at the site when stockpile capacity is available and to increase refuse-to-soil ratios through the use of alternative daily covers in order to provide the total soil requirements for daily cover operations and closure. Fill and cover techniques at the landfill would be similar to the methods currently employed. Waste would be deposited, compacted and covered daily using appropriate landfilling methods. Therefore, the project would not have cumulatively adverse impacts related to soils.

6.3.3 HYDROGEOLOGY AND WATER QUALITY

Section 5.3 (Hydrogeology and Water Quality) concluded that there is a potential for impacts to groundwater as a result of the proposed project. However, with implementation of the mitigation measures identified in Section 5.3, the impacts would be considered less than significant. Given that the leachate collection and removal system (LCRS) for landfilling operations is subject to approval by the RWQCB-SA and must comply with federal and state requirements (27 CCR), no cumulatively considerable impacts would occur to groundwater as a result of the proposed project.

6.3.4 SURFACE WATER HYDROLOGY

Section 5.4 (Surface Water Hydrology) concluded that there is a potential for impacts to surface flow as a result of the proposed project. However, with implementation of the mitigation measures identified in Section 5.4, the impacts would be considered less than significant. Given that the drainage facilities for the landfill expansion will be designed, constructed and operated to accommodate the anticipated volume of precipitation and peak flows from surface run-off under the precipitation conditions specified in Title 27 of the CCR, no cumulatively considerable impacts would occur to surface water as a result of the proposed project. The landfill expansion will continue to operate under an NPDES Permit to discharge storm flows. The project will comply with the criteria and restrictions of the NPDES Permit and the SWPPP and BMPs that accompany that permit.

6.3.5 TRANSPORTATION AND CIRCULATION

As discussed in Section 5.5 (Transportation and Circulation), future background traffic volumes for year 2010 and 2030 were supplied by Orange County Transportation Authority (OCTA) and the City of Irvine. OCTA supplied the daily road segment traffic volumes generated by the Orange County Transportation Analysis Model (OCTAM). The City of Irvine supplied the daily road segment volumes and the A.M. peak hour turning volumes generated by the Irvine Transportation Analysis Model (ITAM).

OCTAM is a regional travel demand forecasting model used for transportation planning and analysis in Orange County and is maintained by OCTA. ITAM is a sub-area travel demand forecasting model derived from OCTAM and is used and maintained by the City of Irvine. ITAM was found to be consistent with OCTAM by OCTA. Therefore, ITAM was certified for use by OCTA.

OCTAM and ITAM forecast daily traffic volumes for the year 2010 and 2030 based on the circulation network on the Orange County Master Plan of Arterial Highways (MPAH) by applying the traffic modeling processes and socioeconomic demographics data. The traffic modeling processes include trip generation, trip distribution/ mode choice and traffic assignment. ITAM uses the Orange County Projections 2000 (OCP-2000) socioeconomic demographics.

OCTA recently incorporated the latest socioeconomic demographics, OCP-2004, into OCTAM. After comparing the traffic volume results generated by OCTAM and ITAM, ITAM generally generated higher daily road segment traffic volumes than OCTAM. The more conservative ITAM forecasted traffic volumes were used in this transportation analysis to determine significant adverse traffic impacts. ITAM also generated the A.M. peak hour intersection turning volumes. To establish the second landfill peak hour intersection turning volumes, the ITAM daily traffic volumes for 2010 and 2030 were post-processed according to the procedures outlined in the National Cooperative Highway Research Program (NCHRP) Report 255.

As discussed in Section 5.5 (Transportation and Circulation), the proposed expansion of the FRB Landfill includes an increase in the permitted daily tonnage rate of 8,500 TPD to maximum of 11,500 TPD (maintaining 8,500 TPD as an annual average). The proposed project will result in increased truck trips from the permitted 1,958 truck trips to 2,106 truck trips. The potential impacts on the capacity of the local street system are discussed in detail in Section 5.5 (Transportation and Circulation). The proposed project will result in an increase in the permitted number of daily refuse truck trips to the FRB Landfill and will create a significant adverse impact to Sand Canyon Avenue at Trabuco Road during the A.M. peak hour in 2030 and to Jeffrey Road at Walnut Avenue during the A.M. peak hour in 2025 and 2030. However, with implementation of the mitigation measures detailed in Section 5.5 (Transportation and Circulation), traffic related impacts will be reduced to below a level of significance. In addition, other projects in the study area also provide mitigation measures for their traffic related impacts. Therefore, no cumulatively considerable transportation and circulation impacts are anticipated as a result of the proposed project.

6.3.6 AIR QUALITY

Emissions associated with cumulative construction are based on the quantity and types of construction equipment working concurrently on any given day during project construction. Estimates of when and what types of equipment would be used for construction of projects in the local area are extremely speculative. The combined emissions from concurrent construction of cumulative projects would likely exceed the SCAQMD thresholds and would result in a significant adverse regional air quality impact As stated in Section 5.6 (Air Quality), the proposed project exceeds established SCAQMD thresholds (NO_x, VOCs, and PM_{10}) during construction and operation. Therefore, the impact from the proposed project plus related cumulative projects would additionally contribute to cumulatively significant adverse emissions to the South Coast Air Basin, which is already a nonattainment area. This impact is significant and adverse and cannot be mitigated to levels of insignificance. Regional programs to reach air quality goals and standards will be adhered to by the cumulative projects, reducing the impact. However, the incremental increase must be considered significant and adverse when added to the existing nonattainment levels of the South Coast Air Basin.

Implementation of Measures AQ-1 and AQ-2 listed in Section 5.6 (Air Quality) would reduce construction and operational emissions further, as required by SCAQMD. However, after mitigation, NO_x, VOCs, and PM_{10}emissions will remain above the SCAQMD's daily construction and operation emission thresholds. Therefore, project emissions would contribute to the nonattainment of these pollutants and thereby result in a significant cumulative regional air quality impact.

6.3.7 NOISE

Because the proposed project expansion is not in the vicinity of off-site sensitive uses, noise associated with construction and daily operations on the project site would have little or no cumulative noise impacts on off-site uses.

There are several development projects approved for the incorporated area in the vicinity of the FRB Landfill, generally southwesterly and southerly of the landfill. These development projects will incrementally contribute to increases in traffic and will increase the number of noise-sensitive uses in the vicinity of roads utilized by project-related trucks, including heavy-duty waste/refuse trucks. This interface of sensitive uses and increased truck traffic may result in adverse noise impact exceeding local noise standards. However, the application of City of Irvine development standards requiring developers/builders to construct soundwalls or incorporate other design features to reduce environmental noise affecting their projects will avoid potential significant adverse impacts. Therefore, no significant cumulative noise impacts are anticipated from the proposed project.

6.3.8 BIOLOGICAL RESOURCES

As discussed in Section 5.8 (Biological Resources), permanent direct impacts on sensitive biological resources within the FRB MDP would occur as each phase is cleared and ultimately graded. The initial clearing and conversion of native plant communities to landfill operations would create conditions largely unsuitable to all the sensitive biological resources listed in Table 5.8-1 in Section 5.8 (Biological Resources). These areas would permanently be unable to support native plant communities or populations of plant and wildlife species. Permanent long-term direct impacts to sensitive biological resources, including plant communities and plant and wildlife species, would occur. Sensitive species previously identified during focused surveys including Intermediate Mariposa Lily, Catalina mariposa lily, many-stemmed dudleya, California gnatcatcher and California cactus wren would be directly affected by implementation of the MDP. However, as detailed in Section 5.8 (Biological Resources), the proposed project would not result in significant adverse impacts to biological resources after mitigation as the CSS restoration allocation credit and long-term conservation strategies offset these potentially significant adverse impacts.

As other development in the area occurs, such as the PA1/PA2/PA9 Project and the Northern Sphere Project, the potential for cumulative impacts related to biological resources is increased. According to the PA1/PA2/PA9 Project Draft EIR, adherence to the mitigation measures listed in the Draft EIR will reduce any potential impact on biological resources to less than significant. According to the Northern Sphere Project EIR, implementation for the adopted NCCP/HCP and the mitigation measures listed in the Draft EIR will reduce all project-specific and cumulative biological impacts to a less than significant level. The PA1/PA2/PA9 Project and the Northern Sphere Project in conjunction with the landfill expansion would not contribute to adverse impacts to biological resources.

As stated previously in this EIR, the FRB Landfill is part of the Orange County Central and Coastal Subregion NCCP Reserve area, established for the preservation of land in designated areas of Orange County. Specifically, the FRB Landfill is in the Central Subregion area of the NCCP Reserve. The Section 10a Permit, issued as part of the NCCP program, authorizes take of coastal sage scrub within areas of the FRB Landfill designated as Special Linkage and areas designated as Reserve. The NCCP provides regional biological benefits which would be unlikely to occur on a project-by-project basis. Implementation of the NCCP, dedication of lands and the endowment by the participating land owners mitigate impacts of proposed and future development on covered habitats and identified species. As a result, cumulative biological impacts are considered to be mitigated to a less than significant level.

While development in the project area is expected to increase, the proposed landfill expansion would not contribute to cumulative adverse impacts related to biological resources.

Note: *Development activities and uses that are addressed by the NCCP/HCP are considered fully mitigated under the NCCP Act and the state and federal ESAs for impacts to habitat occupied by listed and other "identified species" and to species dependent upon or associated with "covered habitats". Species that have been located on the FRB landfill site that qualify as identified species include coastal California gnatcatcher, coastal cactus wren, orange-throated whiptail, coastal western whiptail, San Diego horned lizard, coyote, gray fox, northern harrier, red-shouldered hawk, and southern California rufous-crowned sparrow. Conditionally covered species are addressed in the NCCP with specific conditions. Provided adherence to NCCP policies and procedures are undertaken, no further mitigation is necessary.*

6.3.9 AESTHETICS

The FRB Landfill expansion project in conjunction with other development projects in proximity of the landfill would not result in cumulative aesthetic impacts. Through City and County development review processes, planned and proposed future development projects would be evaluated for potential aesthetic impacts. Where needed, mitigation measures would be required to minimize or avoid potential aesthetic impacts. Implementation of the FRB Landfill expansion project would result in project-related aesthetic impacts. However, it is speculative that other development projects proposed in the project vicinity would also result in aesthetic impacts. Therefore, the project would have no cumulatively adverse impacts related to aesthetics.

6.3.10 CULTURAL AND SCIENTIFIC RESOURCES

Section 5.10 (Cultural and Scientific Resources) concluded there was a very low likelihood for finding significant resources on the site. Precautionary mitigation measures were added to the project and described in Section 5.10 to ensure that any previously unknown resources on the site would be protected should they be discovered during grading operations. Given the low likelihood of resources being on-site and the fact that other projects in the area are typically subject to similar protective mitigation for cultural and paleontological resources, no cumulatively considerable impacts would occur to these resources as a result of the proposed project.

6.3.11 HAZARDS/RISK OF UPSET

Only municipal solid waste (MSW) is accepted at the FRB Landfill. Hazardous materials such as asbestos, batteries, chemicals, paints, non-autoclaved medical waste, and other substances considered hazardous are not accepted. The landfill operates under existing regulations related to hazardous materials and follows standard procedures in the event of hazards which could affect the site such as fire or earthquake. These practices would continue under the extension of landfill operations from 2022 to the estimated horizon or closure year of 2053. Additionally, there are no nearby uses which, when considered with the landfill operations, increase any hazard risks on-site or to areas surrounding the landfill property. Therefore, there are no cumulatively considerable impacts related to hazards/risk of upset from the implementation of the proposed project.

SECTION 7.0
UNAVOIDABLE AND ADVERSE IMPACTS

SECTION 7.0
UNAVOIDABLE ADVERSE IMPACTS

7.1 CEQA GUIDELINES SECTION 15126(b)

This section summarizes the unavoidable adverse impacts associated with proposed project. Specifically, Section 15126(b) of the California Environmental Quality Act (CEQA) Guidelines requires that an Environmental Impact Report (EIR):

> "Describe any significant impacts, including those which can be mitigated, but not reduced to a level of insignificance. Where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons why the project is being proposed, notwithstanding their effect, should be described."

7.2 UNAVOIDABLE ADVERSE IMPACTS OF THE PROPOSED PROJECT

Section 5.0 (Existing Conditions, Impacts, Mitigation Measures and Level of Significance) documents the analysis of the potentially significant adverse impacts associated with the project. The proposed project will result in an unavoidable adverse air quality impact after mitigation as noted in the analysis in Section 5.0.

As described in Section 5.6, Air Quality, after mitigation, fugitive dust, as well as NO_x and VOC emissions will remain above the SCAQMD's daily construction and operation emission thresholds after mitigation. Therefore, construction and operation of the project would have significant unavoidable adverse impact on regional air quality.

As described in Section 5.8, Biological Resources, implementation of the proposed project would result in the temporal loss of wetland habitat values and functions. The temporal loss of wetland habitat values and functions is considered to be a significant unavoidable adverse impact after mitigation.

As described in Section 5.9, Aesthetics, the proposed landfill expansion would obstruct part of the Santiago Hills and Loma Ridge (which are scenic resources from view points 1, 2, and 3 as shown in visual simulations in Section 5.9), resulting in a significant adverse impact even with implementation of mitigation measures. Also, these views would change from an undeveloped curvilinear ridgeline to that of a large, man-made form that highly contrasts with the adjacent rolling hills. Therefore, this will be an unavoidable significant adverse impact of the proposed project related to aesthetics.

SECTION 8.0
GROWTH INDUCING IMPACTS

SECTION 8.0
GROWTH INDUCING IMPACTS

8.1 INTRODUCTION

Section 15126.2(d) of the California Environmental Quality Act (CEQA) Guidelines requires that an Environmental Impact Report (EIR) describe the potential growth inducing impacts of a proposed project. Specifically, Section 15126.2(d) states:

> "Discuss the ways in which the proposed project could foster economic development or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.... Also discuss the characteristics of some projects which may encourage and facilitate other activities that could substantially affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental or of little significance to the environment."

8.2 GROWTH INDUCING IMPACTS RELATED TO THE PROPOSED PROJECT

The number of employees at the FRB Landfill will not change substantially with implementation of the proposed project. Employees will continue to perform landfill operations including administration, landfill cover operations and other landfill-related operations. The numbers and types of pieces of equipment used at the FRB Landfill would not change substantially. As part of the proposed project, IWMD is considering changing in the landfill operating hours from 7:00 A.M. - 5:00 P.M. to 6:00 A.M. - 4:00 P.M. The landfill will continue to operate six days per week, Monday through Saturday, and will be closed on the six major holidays.

The major extension of local infrastructure improvements such as water, sewer, natural gas and electrical lines or roads into undeveloped areas that previously did not have these improvements is an inducement to growth. In fact, development into new areas cannot occur without these improvements. However, the expansion of a solid waste landfill would not in itself be an inducement to growth. Local development will continue to occur with or without the landfill expansion. More distant landfills would be available to serve new development but at a potentially much greater financial cost. The improvements under the proposed project would not entail new residences or the extension of major infrastructure facilities (i.e., sewer, or water lines, roads, etc.) that would result in secondary or indirect growth in and around the area. Therefore, growth inducing impacts would not occur from the proposed project.

SECTION 9.0
PROJECT ALTERNATIVES

SECTION 9.0
PROJECT ALTERNATIVES

9.1 INTRODUCTION

This section of the Environmental Impact Report (EIR) describes alternatives to the proposed expansion project at the FRB Landfill. In addition to the evaluation of the proposed project discussed in Section 5.0 (Existing Conditions, Impacts, Mitigation Measures and Level of Significance), Section 15126.6 of the California Environmental Quality Act (CEQA) Guidelines requires that an EIR describe a range of reasonable alternatives to the proposed project that could feasibly attain most of the basic objectives of the project and are capable of avoiding or substantially lessening any of the significant effects of the proposed project. Section 15126.6 also requires that a No Project Alternative shall be evaluated along with its impacts. The No Project Alternative described in this section considers the environmental consequences if the proposed project is not implemented.

In addition to the No Project Alternative discussed below and the proposed project analyzed in Section 5.0, this section discusses three other project alternatives and alternatives that were considered but rejected. Potential environmental impacts associated with the three alternatives to the proposed project are discussed in this section for the same environmental parameters addressed for the proposed project. A summary discussing the feasibility of the two alternatives is also provided.

9.2 ALTERNATIVES 1a and 1b - NO PROJECT: NO FRB EXPANSION AND NO DAILY TONNAGE INCREASE

9.2.1 DESCRIPTION OF ALTERNATIVES 1a and 1b

The No Project Alternative proposes no change to the FRB Landfill, neither an increase in capacity (through a vertical or horizontal expansion) nor an increase in daily tonnage. The No Project Alternative considers a closure date for the Olinda Alpha Landfill of a) 2013 with no expansion and b) 2021, with an approved expansion. The No Project Alternative also proposes no change at the Prima Deshecha Landfill with its operation complying with current permit conditions.

No Project Alternatives 1a and 1b specifically assume the following for the FRB Landfill:

- No vertical and horizontal expansions at the FRB Landfill.
- No extension in the life of the FRB Landfill and no change in the current effective closure date of 2014.
- No planned slope remediation for on site landslides.
- No change in the currently permitted daily tonnage limit of 8,500 TPD except for 36 high tonnage days per year in which 10,625 TPD is allowed.
- No change in the existing access to/from the landfill.
- No change in on site equipment, operations and staff at this landfill.
- No change in the number of daily truck trips to the FRB Landfill.

- There would be no change in the level and scope from the level and scope anticipated in the existing regulatory permits or in the levels anticipated in the Settlement Agreement with the City of Irvine.

No Project Alternatives 1a and 1b assume no change in the design or operations at Prima Deshecha Landfill. There would be no increase in the long-term physical capacity or permitted daily tonnage limit of 4,000 TPD and there would be no change in the permitted capacity or closure date of 2067 at Prima Deshecha Landfill.

No Project Alternative 1a assumes that the currently proposed expansion at Olinda Alpha Landfill does not occur and that the assumptions for this landfill are the same as the existing operations and design at this landfill in mid-2005. Under Alternative 1a, the Olinda Alpha Landfill will close in 2013. No Project Alternative 1b assumes that the currently proposed expansion at Olinda Alpha Landfill (described in Section 2.2.7) does occur. Under Alternative 1b, the Olinda Alpha Landfill will close in 2021.

The No Project Alternative would include no action by the County of Orange. Under this Alternative, none of the proposed project components at the FRB Landfill would occur. As such, under this Alternative, the FRB Landfill would continue to receive up to an annual average of 8,500 TPD of MSW, except for 36 days of the year in which a high tonnage rate of 10,625 TPD is allowed under the current landfill operating permits and Settlement Agreement between the City of Irvine and IWMD and would operate until its current effective closure date of 2014.

Under the No Project Alternative, importation of waste into the Orange County disposal system will end in either 2013 or 2015, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Exportation of waste from Orange County would occur in either 2013 or 2021, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Out-of-County landfills would have to be permitted to accept the excess tonnage from Orange County and may include El Sobrante Landfill in Riverside County and/or the Mid-Valley Landfill in San Bernardino County.

9.2.2 IMPACTS OF ALTERNATIVES 1a and 1b

9.2.2.1 Land Use and Planning

<u>Alternative 1a</u>

Alternative 1a would not have any significant adverse impacts on planned land uses or land use policies within Orange County or within the City of Irvine because there would be no landfill expansion or extended landfill life under Alternative 1a. There would be no need to renegotiate the Settlement Agreement between the County and the City of Irvine. However, there would be land use policy impacts with out-of-County landfilling since the excess TPD of MSW would need to be disposed of out of Orange County. Negotiations between the Counties and development of a MOU to increase daily tonnage limits be required, pending tonnage limit surplus capacity at those landfills. Therefore, adverse impacts related to land use policy for out-of-County landfilling are anticipated under the Alternative 1a.

Alternative 1b

Alternative 1b would not have any significant adverse impacts on planned land uses or land use policies within Orange County or within the City of Irvine because there would be no landfill expansion or extended landfill life at the FRB Landfill under Alternative 1b. However, because this Alternative assumes that expansion at Olinda Alpha Landfill would occur, the MOU between the County and the City of Brea would have to be renegotiated. Also, there would be land use policy impacts with out-of-County landfilling since the excess TPD of MSW would need to be disposed of out of Orange County. Negotiations between the Counties and development of a MOU to increase daily tonnage limits would be required. Therefore, adverse impacts related to land use policy for out-of-County landfilling are anticipated under the Alternative 1b.

9.2.2.2 Geology and Soils

Alternative 1a

Under Alternative 1a, there would be no disruption or displacement of soils on the FRB Landfill property other than that which would occur under existing operations and permits including closure. In addition, there would be no disruption or displacement of soils other than what has been permitted at landfills outside of the County, including the Olinda Alpha Landfill. Therefore, no adverse impacts related to geology and soils are anticipated under the Alternative 1a.

Alternative 1b

Under Alternative 1b, there would be no disruption or displacement of soils on the FRB Landfill property other than that which would occur under existing operations and permits including closure. In addition, there would be no disruption or displacement of soils other than what has been permitted at landfills outside of the County. Under Alternative 1b, there would be no disruption or displacement of soils other than what has been permitted in support of the Olinda Alpha expansion. Therefore, no adverse impacts related to geology and soils are anticipated under the Alternative 1b.

9.2.2.3 Hydrogeology and Water Quality

Alternative 1a

Under Alternative 1a, there would be no additional refuse placement or potential leachate generation on the project site that would require coordination with the landfill section of the Regional Water Quality Control Board (RWQCB-SA). In addition, out-of-County landfilling would not have additional refuse placement or potential leachate generation other than what has been permitted. Out-of-County landfilling would still be required to coordinate with the landfill section of the RWQCB-SA. Therefore, no adverse impacts related to hydrogeology and water quality are anticipated under Alternative 1a.

Alternative 1b

Under Alternative 1b, there would be no additional refuse placement or potential leachate generation at the FRB Landfill that would require coordination with the landfill section of the RWQCB-SA. In addition, out-of County landfilling would not have additional refuse placement or potential leachate generation other than what has been permitted. Out-of-County landfilling would still be required to coordinate with the landfill section of the RWQCB-SA. Under Alternative 1b, there would be no additional refuse replacement or potential leachate generation other than what has been permitted as part of the Olinda Alpha Landfill expansion. Olinda Alpha Landfill would still be required to coordinate with the landfill section of the RWQCB-SA. Therefore, no adverse impacts related to hydrogeology and water quality are anticipated as a result of Alternative 1b.

9.2.2.4 Surface Water Hydrology

Alternative 1a

Under Alternative 1a, there would be no additional surface water flow on the FRB Landfill that would require a NPDES Permit and the SWPPP and BMPs that accompany the NPDES Permit. Out-of-County landfilling would not have additional surface water flow other than what has been permitted under the federally required industrial NPDES Permit to discharge storm flows. Therefore, no adverse impacts related to surface water hydrology are anticipated under Alternative 1a.

Alternative 1b

Under Alternative 1b, there would be no additional surface water flow on the FRB Landfill that would require a NPDES Permit and the SWPPP and BMPs that accompany the NPDES Permit. Out-of-County landfilling would not have additional surface water flow other than what has been permitted under the federally required industrial NPDES Permit to discharge storm flows. Also, there would be no additional surface water flow other than what has been permitted under the federally required industrial NPDES Permit to discharge storm flows at the Olinda Alpha Landfill as part of the expansion. Therefore, no adverse impacts related to surface water hydrology are anticipated under Alternative 1b.

9.2.2.5 Transportation and Circulation

Alternative 1a

Alternative 1a would not result in any significant adverse traffic impacts to the circulation network because the FRB landfill would not increase its maximum high tonnage limit to 11,500 TPD or extend the life of the landfill by expanding vertically and horizontally. However, exportation of waste will occur when the FRB Landfill closes in 2022. Therefore, there would be greater traffic occurring on road systems leading to the alternate landfill locations for diverted the FRB Landfill MSW after closure in 2022.

Alternative 1b

Alternative 1a would not result in any significant adverse traffic impacts to the circulation network because the FRB landfill would not increase its maximum high tonnage limit to 11,500 TPD or extend the life of the landfill by expanding vertically and horizontally. However, exportation of waste will occur when the FRB Landfill closes in 2022. Therefore, there would be greater traffic occurring on road systems leading to the alternate landfill locations for diverted the FRB Landfill MSW after closure in 2022.

9.2.2.6 Air Quality

Alternative 1a

Under Alternative 1a, there would be an increase in air quality impacts once the FRB Landfill is closed in 2022. The increased mileage for truck trips required to transport MSW outside the County would result in an increase in disposal vehicle exhaust. On-site equipment use at the other in-County and out-of-County landfills will be expected to be the same as those used for the FRB Landfill because quantities of MSW that need to be disposed of after closure of the FRB Landfill will be the same. Because on-site equipment use is projected to be the same as required at the FRB Landfill, emissions from this equipment would likewise be the same. Stationary sources of emissions (flares/power generation) would be provided at the other landfills accepting the diverted MSW. Because of the greater travel distance to transport MSW from the FRB Landfill service area to other landfills, there would be a greater generation of air pollutant emissions under Alternative 1a.

Alternative 1b

Under Alternative 1b, there would be an increase in air quality impacts once the FRB Landfill is closed in 2022. The increased mileage for truck trips required to transport MSW outside the County would result in an increase in disposal vehicle exhaust. On-site equipment use at the other in-County and out-of-County landfills will be expected to be the same as those used for the FRB Landfill because quantities of MSW that need to be disposed of after closure of the FRB Landfill will be the same. Because on-site equipment use is projected to be the same as required at the FRB Landfill, emissions from this equipment would likewise be the same. Stationary sources of emissions (flares/power generation) would be provided at the other landfills accepting the diverted MSW. Because of the greater travel distance to transport MSW from the FRB Landfill service area to other landfills, there would be a greater generation of air pollutant emissions under Alternative 1b.

9.2.2.7 Noise

Alternative 1a

Under Alternative 1a, there may be the potential for adverse increased noise impacts on sensitive receptors located along the travel routes of trucks hauling MSW to other in-County and out-of-County landfills after the FRB Landfill closes in 2022. The destination and route of travel for diverted MSW subsequent to the closure of the FRB Landfill is speculative. The potential for these impacts to occur would be dependent on the routes traveled by these trucks in Orange County and on the route to out-of-County landfills. On-site noise at landfills for which the FRB Landfill MSW would be diverted can be expected to increase due to the necessity for an increase in on-site equipment to dispose of the MSW. The potential for noise impacts at noise sensitive receptors in the vicinity of the landfills accepting diverted the FRB Landfill MSW is dependant on the proximity of these noise sensitive receptors to the landfill.

<u>Alternative 1b</u>

Under Alternative 1b, there may be the potential for adverse increased noise impacts on sensitive receptors located along the travel routes of trucks hauling MSW to other in-County and out-of-County landfills after the FRB Landfill closes in 2022. The destination and route of travel for diverted MSW subsequent to the closure of the FRB Landfill is speculative. The potential for these impacts to occur would be dependent on the routes traveled by these trucks in Orange County and on the route to out-of-County landfills. On-site noise at landfills for which the FRB Landfill MSW would be diverted can be expected to increase due to the necessity for an increase in on-site equipment to dispose of the MSW. The potential for noise impacts at noise sensitive receptors in the vicinity of the landfills accepting diverted the FRB Landfill MSW is dependant on the proximity of these noise sensitive receptors to the landfill.

9.2.2.8 Biological Resources

<u>Alternative 1a</u>

Under Alternative 1a, biological resources on the FRB Landfill property would remain as they currently exist. The existing vegetation would remain on the project site. Other out-of-County landfilling has the potential to impact biological resources assuming the limits of disturbance expand as a result. However, the biological resources anticipated to be disturbed have already been assessed and permitted at those landfills. No new significant adverse impacts related to biological resources are anticipated under Alternative 1a.

<u>Alternative 1b</u>

Under Alternative 1b, biological resources on the FRB Landfill property would remain as they currently exist. The existing vegetation would remain on the project site. Other out-of-County landfilling has the potential to impact biological resources assuming the limits of disturbance expand as a result. However, the biological resources anticipated to be disturbed have already been assessed and permitted at those landfills. No adverse impacts related to biological resources are anticipated under Alternative 1b. However, Alternative 1b has the potential to impact biological resources at Olinda Alpha Landfill. The biological resources anticipated to be disturbed under Alternative 1b have already been assessed in the permits for the Olinda Alpha Landfill expansion. Alternative 1b would not result in new significant adverse impacts related to biological resources.

9.2.2.9 Aesthetics

<u>Alternative 1a</u>

Alternative 1a would not result in changes to the aesthetic quality of views of the FRB Landfill because no expansion of the landfill or changes in landfilling practices would occur under this Alternative. Under Alternative 1a, the FRB Landfill would close in 2022 and Olinda Alpha Landfill would close in 2013, as currently permitted. Therefore, under Alternative 1a, MSW would need to be exported to landfills outside of Orange County sooner than under the proposed project which includes an extension of the closure date of the FRB Landfill to 2053 and of Olinda Alpha Landfill to 2021. The exportation of MSW would have the potential for adverse impacts related to the aesthetic quality of views of landfills outside of Orange County. Adverse impacts could occur if accommodation of the exported MSW resulted in the expansion of existing landfills or construction of new landfills.

<u>Alternative 1b</u>

Alternative 1b would not result in changes to the aesthetic quality of views of the FRB Landfill because no expansion of the landfill or changes in landfilling practices would occur under this Alternative. Under Alternative 1b, the FRB Landfill would close in 2022, as currently permitted. The Olinda Alpha Landfill would be expanded horizontally and vertically and the closure date would be extended from the currently permitted date of 2013 to 2021. Therefore, under Alternative 1b, MSW would need to be exported to landfills outside of Orange County sooner than under the proposed project which includes an extension of the closure date of the FRB Landfill to 2053. Out-of-county exportation under Alternative 1b would occur later than under Alternative 1a because the closure date of Olinda Alpha Landfill under 1b is eight years later than under Alternative 1a. The exportation of MSW would have the potential for adverse impacts related to the aesthetic quality of views of landfills outside of Orange County. Adverse impacts could occur if accommodation of the exported MSW resulted in the expansion of existing landfills or construction of new landfills.

As described in the Olinda Alpha Expansion Implementation EIR, the adverse impacts of the expansion and new closure date related to aesthetics at the Olinda Alpha Landfill would be less than significant after mitigation.

9.2.2.10 Cultural and Scientific Resources

<u>Alternative 1a</u>

Alternative 1a would not involve excavation or grading on the FRB Landfill site beyond that which is currently permitted including final closure of the FRB Landfill. Even though other out-of-County landfilling includes the disruption or displacement of soils which has the potential to result in archeological or paleontological resources impacts, the areas anticipated to be disturbed have already been assessed under current landfilling permits. Alternative 1a will not result in new significant adverse impacts related to cultural resources and scientific resources assuming the limits of disturbance do not expand as a result.

Alternative 1b

Alternative 1b would not involve excavation or grading on the FRB Landfill site beyond that which is currently permitted including final closure of the FRB Landfill. Even though other out-of-County landfilling includes the disruption or displacement of soils which has the potential to result in archeological or paleontological resources impacts, the areas anticipated to be disturbed have already been assessed under current landfilling permits. Alternative 1b will not result in new significant adverse impacts related to cultural resources and scientific resources assuming the limits of disturbance do not expand as a result.

9.2.2.11 Hazards/Risk of Upset

Alternative 1a

Under Alternative 1a, there would be no change from existing conditions at the FRB Landfill related to hazards and hazardous materials. Hazardous material disposal at out-of-County landfilling would not be permitted. However, there would be a limited and shorter time use of hazardous materials at the FRB Landfill such as fuels, oils and other materials used in the operation and maintenance of landfill equipment and vehicles. This creates the potential for spills and leaks of fuel, oils and other liquids at out-of-County landfills. Potential for spills and leaks would be similar to existing conditions and to the impacts under the proposed project. Therefore, potential impacts related to hazards would be similar under Alternative 1a and the proposed project.

Alternative 1b

Under Alternative 1b, there would be no change from existing conditions at the FRB Landfill related to hazards and hazardous materials. Hazardous material disposal at Olinda Alpha Landfill and out-of-County landfilling would not be permitted. However, there would be a limited and shorter time use of hazardous materials at the FRB Landfill such as fuels, oils and other materials used in the operation and maintenance of landfill equipment and vehicles. This creates the potential for spills and leaks of fuel, oils and other liquids at out-of-County landfills. Potential for spills and leaks would be similar to existing conditions and to the impacts under the proposed project. Therefore, potential impacts related to hazards would be similar under Alternative 1b and the proposed project.

9.2.3 SUMMARY OF ALTERNATIVES 1a and 1b

Alternative 1a

Under Alternative 1a, no change from existing conditions, no expansion and no extension of the life of the FRB Landfill would occur. This Alternative would be the environmentally superior alternative in the vicinity of the landfill because there would be less physical change to existing environmental conditions compared to the proposed project and the project alternatives. However, environmental impacts associated with hauling/disposing of waste at alternate disposal sites would occur and the effective life expectancy at out of county landfills would be shortened.

Alternative 1b

Under Alternative 1b, no change from existing conditions, no expansion and no extension of the life of the FRB Landfill would occur. This Alternative would be the environmentally superior alternative in the vicinity of the landfill because there would be less physical change to existing environmental conditions compared to the proposed project and the project alternatives. However, environmental impacts associated with hauling/disposing of waste at alternate disposal sites would occur and the effective life expectancy at out of county landfills would be shortened.

9.3 ALTERNATIVES 2a and 2b - FRB EXPANSION: NO DAILY TONNAGE INCREASE

9.3.1 DESCRIPTION OF ALTERNATIVES 2a and 2b

Alternatives 2a and 2b propose the vertical and horizontal expansions for the FRB Landfill and no increase in the maximum daily tonnage for either the FRB Landfill or the Prima Deshecha Landfill. Under Alternatives 2a and 2b, out-of-County export of waste will be required when the Olinda Alpha Landfill closes in a) 2013, with no expansion or b) 2021, with an approved expansion. Alternatives 2a and 2b assume no change for the Prima Deshecha Landfill with its operation complying with current permit conditions.

Alternatives 2a and 2b specifically assume the following for the FRB Landfill:

- The same vertical and horizontal expansions at the FRB Landfill as under the proposed project.
- Extension of the life of the FRB Landfill to 2053.
- The same slope remediation for on site landslides as under the proposed project.
- The same Soil Management Plan as under the proposed project.
- Similar protection of native plant and animal species and habitats as under the proposed project.
- No change in the currently permitted daily tonnage limit of 8,500 TPD except for 36 high tonnage days per year in which 10,625 TPD is allowed.
- No change in the existing access to/from the FRB Landfill.
- No change in on site equipment, operations and staff at this landfill.
- No change in the number of daily truck trips to the FRB Landfill.
- If the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project.

Alternatives 2a and 2b assume no change in operations or design at Prima Deshecha Landfill. There would be no increase in the long term physical capacity or permitted daily tonnage limit of 4,000 TPD at Prima Deshecha Landfill and there would be no change in the permitted capacity or closure date of 2067 at Prima Deshecha Landfill.

Alternative 2a assumes that the currently proposed expansion at Olinda Alpha Landfill does not occur and that the assumptions for this landfill are the same as the existing operations and design at this landfill in mid-2005. Under Alternative 2a, the Olinda Alpha Landfill will close in 2013. Alternative 2b assumes that the currently proposed expansion at Olinda Alpha Landfill (described in Section 2.2.7) does occur. Under Alternative 2b, the Olinda Alpha Landfill will close in 2021

Alternatives 2a and 2b would require action by the County of Orange for the FRB Landfill. Under this Alternative, all the proposed project components at the FRB Landfill, except an increase in TPD, would occur. Under Alternatives 2a and 2b, the FRB Landfill would continue to receive up to an annual average of 8,500 TPD of MSW, except for 36 days of the year in which a high tonnage rate of 10,625 TPD is allowed. There would be an increase in the long term physical capacity at the FRB Landfill based on the vertical and horizontal expansions and the effective closure date would be extended from 2014 to 2053.

Under Alternatives 2a and 2b, importation of waste into the Orange County disposal system will end in either 2013 or 2015, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Exportation of waste from Orange County would occur in either 2013 or 2021, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Out-of-County landfills would have to be permitted to accept the excess tonnage from Orange County and may include El Sobrante Landfill in Riverside County and/or the Mid-Valley Landfill in San Bernardino County.

9.3.2 IMPACTS OF ALTERNATIVES 2a and 2b

9.3.2.1 Land Use and Planning

Alternative 2a

Alternative 2a would result in similar impacts as the proposed project. This alternative would result in impacts to areas outside the property boundary for slope stabilization. This will not result in significant adverse impacts because no refuse will be placed within areas outside of the FRB Landfill property boundary. Slope stabilization activities associated with this Alternative would result in impacts to the NCCP. These impacts would be addressed by compensation for and replacement of CSS removed in the slope stabilization area. However, if project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill, adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project. In 2013, when Olinda Alpha Landfill closes, exportation of waste from Orange County would occur. Out of County landfills would have to be permitted to accept additional waste from Orange County. This may require revisions to landfill permits and land use agreements associated with those landfills.

Alternative 2b

Alternative 2b would result in similar impacts as the proposed project. This alternative would result in impacts to areas outside the property boundary for slope stabilization. This will not result in significant adverse impacts because no refuse will be placed within areas outside of the FRB Landfill property boundary. Slope stabilization activities associated with this Alternative would result in impacts to the NCCP. These impacts would be addressed by compensation for and replacement of CSS removed in the slope stabilization area. However, if the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill, adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project. This Alternative also requires revisions to the existing landfill permits at both the FRB Landfill and Olinda Alpha Landfill. In 2021, when Olinda Alpha Landfill closes, exportation of waste from Orange County would occur. Out of County landfills would have to be permitted to accept additional waste from Orange County. This may require revisions to landfill permits and land use agreements associated with those landfills.

9.3.2.2 Geology and Soils

Alternative 2a

Alternative 2a would result in similar impacts related to geology and soils as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for geology and soils would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance.

Alternative 2b

Alternative 2b would result in similar impacts related to geology and soils as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for geology and soils would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. In this Alternative, the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce impacts to geology and soils at Olinda Alpha Landfill to below a level of significance.

9.3.2.3 Hydrogeology and Water Quality

Alternative 2a

Alternative 2a would result in similar impacts related to hydrogeology and water quality as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for hydrogeology and water quality would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance.

Alternative 2b

Alternative 2b would result in similar impacts related to hydrogeology and water quality as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for hydrogeology and water quality would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. In this Alternative the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce hydrogeology and water quality impacts at Olinda Alpha Landfill to below a level of significance.

9.3.2.4 Surface Water Hydrology

Alternative 2a

Alternative 2a would result in similar impacts related to surface water hydrology as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for surface water hydrology would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance.

Alternative 2b

Alternative 2b would result in similar impacts related to surface water hydrology as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for surface water hydrology would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. In this Alternative the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce surface water hydrology impacts at Olinda Alpha Landfill to below a level of significance.

9.3.2.5 Transportation and Circulation

Alternative 2a

Alternative 2a would not result in any significant adverse traffic impacts to the road segments in 2030. This is because daily traffic generated by Alternative 2a would be less than the proposed project and the proposed project did not result in any significant adverse traffic impacts to the road segments. Alternative 2a would result in significant adverse impacts to two intersections; Sand Canyon Avenue at Trabuco Road, and Jeffrey Road at Walnut Avenue. The proposed project would result in significant adverse impacts at these two intersections in 2030. Therefore, the same recommended mitigation measure would apply. Exportation of waste from Orange

County would be required in 2013 when the Olinda Alpha Landfill closes. Traffic related to the FRB Landfill would be removed from the circulation network. This traffic, however, would be relocated to landfills outside of Orange County.

Alternative 2b

Alternative 2b would not result in any significant adverse traffic impacts to the road segments in 2030. This is because daily traffic generated by Alternative 2b would be less than the proposed project and the proposed project did not result in any significant adverse traffic impacts to the road segments. Alternative 2b would result in significant adverse impacts to two intersections; Sand Canyon Avenue at Trabuco Road, and Jeffrey Road at Walnut Avenue. The proposed project would result in significant adverse impacts at these two intersections in 2030. Therefore, the same recommended mitigation measure would apply. Exportation of waste from Orange County would be required in 2021 when the Olinda Alpha Landfill closes. Traffic related to the FRB Landfill would be removed from the circulation network. This traffic, however, would be relocated to landfills outside of Orange County.

9.3.2.6 Air Quality

Alternative 2a

Construction activities and their associated air pollutant emissions and impacts under Alternative 2a would be the same as for the proposed project. Annual waste receipts under Alternative 2a would be the same as for the proposed project. However, the proposed increase in days with an allowable waste receipts rate greater than 8,500 tons per day under the proposed project would not occur under this Alternative. Therefore, the annual average emissions from annual operations, and the corresponding effects on cancer and chronic non-cancer health impacts would be similar to those estimated for the proposed project. However, the peak short-term air quality impacts and acute non-cancer health risk effects will be lower than those for the proposed project. Once the FRB Landfill closes, MSW will be transported to Prima Deshecha Landfill and out-of-County landfills. This will result in increased mileage for truck trips required to transport MSW to these landfills. Because of the greater travel distance to transport MSW from the FRB Landfill service area to other landfills, there would be a greater generation of air pollutant emissions under Alternative 2a.

Alternative 2b

Construction activities and their associated air pollutant emissions and impacts under Alternative 2b would be the same as for the proposed project. Annual waste receipts under Alternative 2b would be the same as for the proposed project. However, the requested increase in days with an allowable waste receipts rate greater than 8,500 tons per day under the proposed project would not occur under this Alternative. Therefore, the annual average emissions from annual operations, and the corresponding effects on cancer and chronic non-cancer health impacts would be similar to those estimated for the proposed project. However, the peak short-term air quality impacts and acute non-cancer health risk effects will be lower than those for the proposed project. Once the FRB Landfill closes, MSW will be transported to Prima Deshecha

Landfill and out-of-County landfills. This will result in increased mileage for truck trips required to transport MSW to these landfills. Because of the greater travel distance to transport MSW from the FRB Landfill service area to other landfills, there would be a greater generation of air pollutant emissions under Alternative 2b.

9.3.2.7 Noise

Alternative 2a

Alternative 2a would not result in any significant adverse noise or vibration impacts to the project area. This is because daily truck traffic and on-site operations generated under Alternative 2a would be less than the proposed project, and the proposed project is not anticipated to cause significant adverse noise or vibration impacts. Exportation of waste from Orange County would be required after Olinda Alpha Landfill closes in 2013. Off-site truck traffic noise and on-site operations noise related to the FRB Landfill would be removed from the area. This traffic and operations noise, however, would be relocated to other truck routes and landfills outside of Orange County.

Alternative 2b

Alternative 2b would not result in any significant adverse noise or vibration impacts to the project area. This is because daily truck traffic and on-site operations generated under Alternative 2b would be less than the proposed project, and the proposed project is not anticipated to cause significant adverse noise or vibration impacts. Exportation of waste from Orange County would be required after the Olinda Alpha Landfill closure in 2021. Off-site truck traffic noise and on-site operations noise related to the FRB Landfill would be removed from the area. This traffic and operations noise, however, would be relocated to other truck routes and landfills outside of Orange County.

9.3.2.8 Biological Resources

Alternative 2a

Alternative 2a would result in similar impacts related biological resources as the proposed project because excavation and filling activities associated with the MDP phases would occur and the limits of disturbance are the same. As such all mitigation associated with the proposed project for biological resources would apply also.

Alternative 2b

Alternative 2b would result in similar impacts related to biological resources as the proposed project because excavation and filling activities associated with the MDP phases would occur and limits of disturbance are the same. As such all mitigation associated with the proposed project for biological resources would apply.

9.3.2.9 Aesthetics

Alternative 2a

Alternative 2a would result in similar impacts related aesthetics as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for aesthetics would apply. Although the expansion area would be revegetated after closure of the landfill under Alternative 2a, the expansion area would obstruct views of the Santiago Hills and Loma Ridge from some locations. Also, these views would change from an undeveloped curvilinear ridgeline to that of a large man-made form that highly contrasts with the adjacent rolling hills. This is considered to be a significant adverse impact after mitigation.

Alternative 2b

Alternative 2b would result in similar impacts related aesthetics as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for aesthetics would apply. Although the expansion area would be revegetated after closure of the landfill under Alternative 2b, the expansion area would obstruct views of the Santiago Hills and Loma Ridge from some locations. Also, these views would change from an undeveloped curvilinear ridgeline to that of a large man-made form that highly contrasts with the adjacent rolling hills. This is considered to be a significant adverse impact after mitigation. In this Alternative the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation provided in the Olinda Alpha Landfill Implementation EIR would reduce aesthetics impacts at Olinda Alpha Landfill to below a level of significance.

9.3.2.10 Cultural and Scientific Resources

Alternative 2a

Alternative 2a would result in similar impacts related to cultural and scientific resources as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for cultural and scientific resources would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance.

Alternative 2b

Alternative 2b would result in similar impacts related to cultural and scientific resources as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for cultural and scientific resources would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. In this Alternative, the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce impacts to cultural and scientific resources at Olinda Alpha Landfill to below a level of significance.

9.3.2.11 Hazards/Risk of Upset

Alternative 2a

Under Alternative 2a, the FRB Landfill would be required to comply with federal state and local landfill regulations that currently govern landfill procedures. With the implementation of mitigation measures described for the proposed project for geology and soils and hydrogeology and water quality, impacts due to landslide hazards and leachate control would be mitigated to below a level of significance.

Alternative 2b

Under Alternative 2b, the FRB Landfill would be required to comply with federal state and local landfill regulations that currently govern landfill procedures. With the implementation of mitigation measures described for the proposed project for geology and soils and hydrogeology and water quality, impacts due to landslide hazards and leachate control would be mitigated to below a level of significance. In this Alternative, the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce impacts related to hazards and risk of upset at Olinda Alpha Landfill to below a level of significance.

9.3.3 SUMMARY OF ALTERNATIVES 2a and 2b

Alternative 2a

Alternative 2a is similar to the proposed project. This Alternative would result in impacts to aesthetics, traffic, noise, and air quality. However, the impacts to traffic and noise would be slightly less than that for the proposed project because less MSW would be transported and interred at the FRB Landfill. Alternative 2a would result in significant adverse impacts to aesthetics because the character of views would be significantly changed and some views to visual resources would be obstructed. The impacts to air quality have the potential to be greater than that for the proposed project because MSW will be transported to Prima Deshecha Landfill and other out-of-County landfills when the FRB Landfill closes.

Alternative 2b

Alternative 2b is similar to the proposed project. This Alternative would result in impacts to aesthetics, traffic, noise, and air quality. However, the impacts to traffic and noise would be slightly less than that for the proposed project because less MSW would be transported and interred at the FRB Landfill. Alternative 2b would result in significant adverse impacts to aesthetics because the character of views would be significantly changed and some views to visual resources would be obstructed. The impacts to air quality have the potential to be greater than that for the proposed project because MSW will be transported to Prima Deshecha Landfill and other out-of-County landfills when the FRB Landfill closes.

9.4 ALTERNATIVES 3a and 3b - FRB EXPANSION: DAILY TONNAGE (ANNUAL AVERAGE) INCREASE TO 11,500 TPD

9.4.1 DESCRIPTION OF ALTERNATIVES 3a and 3b

Alternatives 3a and 3b propose an increase in the permitted annual average refuse inflow rate of 8,500 TPD at FRB to 11,500 TPD which meets the RELOOC demand projection of 15,500 TPD by 2039 with the Prima Deshecha Landfill maintaining its permitted waste inflow rate of 4,000 TPD. Alternatives 3a and 3b also consider a closure date for the Olinda Alpha Landfill of a) 2013, with no expansion and b) 2021, with an approved expansion.

Alternatives 3a and 3b specifically assume the following for the FRB Landfill:

- The same vertical and horizontal expansions at the FRB Landfill as under the proposed project.
- Extension of the life of the FRB Landfill to 2044 under Alternative 3a.
- Extension of the life of the FRB Landfill to 2047 under Alternative 3b.
- The same slope remediation for on-site landslides as under the proposed project.
- The same Soil Management Plan as under the proposed project.
- Similar protection of native plant and animal species and habitats as under the proposed project.
- Change in the maximum daily TPD to 11,500 TPD and a change in the annual average TPD to 11,500 TPD to meet the County's long-term system demand for the RELOOC study period.
- No change in the existing access to/from the FRB Landfill.
- Increase in on site equipment, operations and staff at this landfill.
- Increase in the number of daily truck trips to the FRB Landfill.
- Since the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project.

Alternatives 3a and 3b assume no change in operations or design at Prima Deshecha Landfill. There would be no change in the long term physical capacity or permitted daily tonnage limit of 4,000 TPD at Prima Deshecha Landfill under Alternatives 3a and 3b and there would be no change in the permitted capacity or closure date of 2067 at Prima Deshecha Landfill.

Alternative 3a assumes that the currently proposed expansion at Olinda Alpha Landfill does not occur and that the assumptions for this landfill are the same as the existing operations and design at this landfill in mid-2005. Under Alternative 3a, the Olinda Alpha Landfill will close in 2013. Alternative 3b assumes that the currently proposed expansion at Olinda Alpha Landfill (described in Section 2.2.7) does occur. Under Alternative 3b, the Olinda Alpha Landfill will close in 2021

Alternatives 3a and 3b would require action by the County of Orange for the FRB Landfill. Under this Alternative, all the proposed project components at the FRB Landfill would occur. In addition, this Alternative, unlike the proposed project, would increase the Annual Average TPD at the FRB Landfill from 8,500 TPD to 11,500 TPD. There would also be an increase in the long term physical capacity at the FRB Landfill based on the vertical and horizontal expansions.

Under Alternatives 3a and 3b, importation of waste into the Orange County disposal system will end in either 2013 or 2015, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Under Alternatives 3a and 3b, the County's projected waste disposal needs will be met and export of waste would not occur during the RELOOC study period (through 2039).

9.4.2 IMPACTS OF ALTERNATIVE 3a and 3b

9.4.2.1 Land Use and Planning

<u>Alternative 3a</u>

Alternative 3a would result in similar impacts as the proposed project. This alternative would result in impacts to areas outside the property boundary for slope stabilization. This will not result in significant adverse impacts because no refuse will be placed within areas outside of the FRB Landfill property boundary. Slope stabilization activities associated with this Alternative would result in impacts to the NCCP. These impacts would be addressed by compensation for and replacement of CSS removed in the slope stabilization area. Since the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill, adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project. Exportation of waste from Orange County would not be required because the increase of annual average of 8,500 TPD to 11,500 TPD would meet the projected disposal needs of Orange County.

<u>Alternative 3b</u>

Alternative 3b would result in similar impacts as the proposed project. This alternative would result in impacts to areas outside the property boundary for slope stabilization. This will not result in significant adverse impacts because no refuse will be placed within areas outside of the FRB Landfill property boundary. Slope stabilization activities associated with this Alternative would result in impacts to the NCCP. These impacts would be addressed by compensation for and replacement of CSS removed in the slope stabilization area. Since the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill, adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project. This Alternative also requires revisions to the existing landfill permits at both the FRB Landfill and Olinda Alpha Landfill. Exportation of waste from Orange County would not be required because the increase of annual average of 8,500 TPD to 11,500 TPD would meet the projected disposal needs of Orange County.

9.4.2.2 Geology and Soils

Alternative 3a

Alternative 3a would result in similar impacts related to geology and soils as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for geology and soils would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance.

Alternative 3b

Alternative 3b would result in similar impacts related to geology and soils as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for geology and soils would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. In this Alternative the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce impacts to geology and soils at Olinda Alpha Landfill to below a level of significance.

9.4.2.3 Hydrogeology and Water Quality

Alternative 3a

Alternative 3a would result in similar impacts related to hydrogeology and water quality as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for hydrogeology and water quality would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance.

Alternative 3b

Alternative 3b would result in similar impacts related to hydrogeology and water quality as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for hydrogeology and water quality would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. In this Alternative the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce hydrogeology and water quality impacts at Olinda Alpha Landfill to below a level of significance.

9.4.2.4 Surface Water Hydrology

Alternative 3a

Alternative 3a would result in similar impacts related to surface water hydrology as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for surface water hydrology would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance.

Alternative 3b

Alternative 3b would result in similar impacts related to surface water hydrology as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for surface water hydrology would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. In this Alternative the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce surface water hydrology impacts at Olinda Alpha Landfill to below a level of significance.

9.4.2.5 Transportation and Circulation

Alternative 3a

Alternative 3a would not result in any significant adverse traffic impacts to the road segments in 2030. This is because daily traffic generated by Alternative 3a would essentially be the same as the proposed project and the proposed project did not result in any significant adverse traffic impacts to the road segments. Although it is recognized, that the proposed project traffic only includes a fraction of the number of days that the landfill would accommodate 11,500 TPD compared to the annual average for this alternative. Alternative 3a would result in significant adverse impacts to two intersections, Sand Canyon Avenue at Trabuco Road, and Jeffrey Road at Walnut Avenue. The proposed project would result in significant adverse impacts at these two intersections in 2030. Therefore, the same recommended mitigation measure would apply. However, it is important to note that the severity of impacts for this alternative is greater than the proposed project as the average daily tonnage is substantially greater. Exportation of waste from Orange County would not be required because the increase of annual average of 8,500 TPD to 11,500 TPD would meet the projected disposal needs of Orange County.

Alternative 3b

Alternative 3b would not result in any significant adverse traffic impacts to the road segments in 2030. This is because daily traffic generated by Alternative 3a would essentially be the same as the proposed project and the proposed project did not result in any significant adverse traffic impacts to the road segments. Although it is recognized, that the proposed project traffic only includes a fraction of the number of days that the landfill would accommodate 11,500 TPD and associate traffic compared to the annual average for this alternative. Alternative 3b would result in significant adverse impacts to two intersections, Sand Canyon Avenue at Trabuco Road, and Jeffrey Road at Walnut Avenue. The proposed project would result in significant adverse impacts at these two intersections in 2030. Therefore, the same recommended mitigation measure would apply. However, it is important to note that the severity of impacts for this alternative is greater than the proposed project as the average tonnage is substantially greater. Exportation of waste from Orange County would not be required because the increase of annual average of 8,500 TPD to 11,500 TPD would meet the projected disposal needs of Orange County.

9.4.2.6 Air Quality

Alternative 3a

Construction activities and their associated air pollutant emissions and impacts under Alternative 3a would be the same as for the proposed project (during the high tonnage days). Under this alternative, the allowable daily and annual tonnages of wastes received at the FRB Landfill would be allowed to increase, resulting in higher short-term and long-term emissions of criteria pollutant and toxic air contaminant and correspondingly higher impacts to air quality. Increased activity levels relative to the proposed project would occur for all emission-producing activities, including waste hauling truck trips, landfill equipment operations and landfill gas generation and flaring. The air quality and health risk impacts associated with Alternative 3a would occur over a shorter duration than the proposed project because the FRB Landfill would close in 2044 under Alternative 3a.

Alternative 3b

Construction activities and their associated air pollutant emissions and impacts under Alternative 3b would be the same as for the proposed project (during the high tonnage days). Under this alternative, the allowable daily and annual tonnages of wastes received at the FRB Landfill would be allowed to increase, resulting in higher short-term and long-term emissions of criteria pollutant and toxic air contaminant and correspondingly higher impacts to air quality. Increased activity levels relative to the proposed project would occur for all emission-producing activities, including waste hauling truck trips, landfill equipment operations and landfill gas generation and flaring. The air quality and health risk impacts associated with Alternative 3b would occur over a shorter duration than the proposed project because the FRB Landfill would close in 2047 under Alternative 3b.

9.4.2.7 Noise

Alternative 3a

Alternative 3a proposes a vertical and horizontal expansion for the FRB Landfill and an increase of the permitted annual average MSW from 8,500 TPD to 11,500 TPD. The vertical and horizontal expansion for the landfill would be the same as the proposed project. This extends the closure date to 2044 when Olinda Alpha Landfill closes in 2013. Alternative 3a would not result in any significant adverse noise or vibration impacts to the road segments in 2030. This is because daily traffic noise and operations noise generated by Alternative 3a would be the same as for the proposed project and the proposed project is not anticipated to result in significant adverse traffic or operations impacts within the project area. Exportation of waste from Orange County would not be required because the increase of annual average of 8,500 TPD to 11,500 TPD would meet the projected disposal needs of Orange County.

Alternative 3b

Alternative 3b proposes a vertical and horizontal expansion for the FRB Landfill and an increase of the permitted annual average MSW from 8,500 TPD to 11,500 TPD. The vertical and horizontal expansion for the landfill would be the same as the proposed project. This extends the closure date to 2047 when Olinda Alpha Landfill closes in 2021. Alternative 3b would not result in any significant adverse noise or vibration impacts to the road segments in 2030. This is because daily traffic noise and operations noise generated by Alternative 3b would be the same as for the proposed project and the proposed project is not anticipated to result in significant adverse traffic or operations impacts within the project area. Exportation of waste from Orange County would not be required because the increase of annual average of 8,500 TPD to 11,500 TPD would meet the projected disposal needs of Orange County.

9.4.2.8 Biological Resources

Alternative 3a

Alternative 3a would result in similar impacts related biological resources as the proposed project because excavation and filling activities associated with the MDP phases would occur and the limits of disturbance are the same. As such all mitigation associated with the proposed project for biological resources would apply.

Alternative 3b

Alternative 3b would result in similar impacts related to biological resources as the proposed project because excavation and filling activities associated with the MDP phases would occur and the limits of disturbance are the same. As such all mitigation associated with the proposed project for biological resources would apply.

9.4.2.9 Aesthetics

Alternative 3a

Alternative 3a would result in the same impacts related to aesthetics as the proposed project because the same vertical and horizontal expansions would occur under Alternative 3a. As such, all mitigation associated with the proposed project for aesthetics would apply. Although the expansion area would be revegetated after closure of the landfill under Alternative 3a, the expansion area would obstruct views of the Santiago Hills and Loma Ridge from some locations. Also, these views would change from an undeveloped curvilinear ridgeline to that of a large man-made form that highly contrasts with the adjacent rolling hills. This is considered to be a significant adverse impact after mitigation under both Alternative 3a and the proposed project.

Alternative 3b

Alternative 3b would result in similar impacts related to aesthetics as the proposed project because the same vertical and horizontal expansions would occur under Alternative 3a. As such, all mitigation associated with the proposed project for aesthetics would apply. Although the expansion area would be revegetated after closure of the landfill under Alternative 3b, the expansion area would obstruct views of the Santiago Hills and Loma Ridge from some locations. Also, these views would change from an undeveloped curvilinear ridgeline to that of a large man-made form that highly contrasts with the adjacent rolling hills from some locations. This is considered to be a significant adverse impact after mitigation. In this Alternative, the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation provided in the Olinda Alpha Landfill Implementation EIR reduce aesthetics impacts at Olinda Alpha Landfill to below a level of significance.

9.4.2.10 Cultural and Scientific Resources

Alternative 3a

Alternative 3a would result in similar impacts related to cultural and scientific resources as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for cultural and scientific resources would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance.

Alternative 3b

Alternative 3b would result in similar impacts related to cultural and scientific resources as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such all mitigation associated with the proposed project for cultural and scientific resources would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. In this Alternative, the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce impacts to cultural and scientific resources at Olinda Alpha Landfill to below a level of significance.

9.4.2.11 Hazards/Risk of Upset

Alternative 3a

Under Alternative 3a, the FRB Landfill would be required to comply with federal state and local landfill regulations that currently govern landfill procedures. With the implementation of mitigation measures described for the proposed project for geology and soils and hydrogeology and water quality, impacts due to landslide hazards and leachate control would be mitigated to below a level of significance.

Alternative 3b

Under Alternative 3b, the FRB Landfill would be required to comply with federal state and local landfill regulations that currently govern landfill procedures. With the implementation of mitigation measures described for the proposed project for geology and soils and hydrogeology and water quality, impacts due to landslide hazards and leachate control would be mitigated to below a level of significance. In this Alternative, the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce impacts related to hazards and risk of upset at Olinda Alpha Landfill to below a level of significance.

9.4.3 SUMMARY OF ALTERNATIVES 3a and 3b

Alternative 3a

Alternative 3a is similar to the proposed project. This Alternative will result in significant adverse impacts to aesthetics, traffic, and air quality. Impacts related to this alternative would be less than that for the proposed project since the duration of landfill operations will be shorter than that under the proposed project. Under Alternative 3a, the FRB Landfill would close in 2044.

Alternative 3b

Alternative 3b is similar to the proposed project. This Alternative will result in significant adverse impacts to aesthetics, traffic, and air quality. Impacts related to this alternative would be less than that for the proposed project since the duration of landfill operations will be shorter than that under the proposed project. Under Alternative 3b, the FRB Landfill would close in 2047.

9.5 ALTERNATIVES 4a and 4b - FRB EXPANSION: DAILY TONNAGE INCREASE AT PRIMA

9.5.1 DESCRIPTION OF ALTERNATIVES 4a and 4b

Alternatives 4a and 4b propose a balance of waste inflow into the two remaining County landfills after the Olinda Alpha Landfill closes and is consistent with the RELOOC long-term strategies. These alternatives propose approval of a daily tonnage increase at the Prima Deshecha Landfill from 4,000 TDP to 7,000 TDP when the Olinda Alpha Landfill closes which meets the RELOOC demand projection of 15,500 TDP by 2039 (with the FRB Landfill maintaining its permitted annual average waste inflow rate of 8,500 TDP). Alternatives 4a and 4b also consider a closure date for the Olinda Alpha Landfill of a) 2013, with no expansion and b) 2021, with an approved expansion.

Alternatives 4a and 4b specifically assume the following for the FRB Landfill:

- The same vertical and horizontal expansions at the FRB Landfill as under the proposed project.
- Extension of the life of this landfill to 2053.
- The same slope remediation for on site landslides as under the proposed project.
- The same Soil Management Plan as under the proposed project.
- Similar protection of native plant and animal species and habitats as under the proposed project.
- No changes in the currently permitted daily tonnage limit of 8,500 TDP except for 36 high tonnage daily per year in which 10,625 TDP is allowed.
- No change in the existing access to/from the FRB Landfill.
- No increase in on site equipment, operations and staff at this landfill.
- No increase in the number of daily truck trips to the FRB Landfill.
- Since the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill, adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project.

Alternatives 4a and 4b assume an increase in the TPD at Prima Deshecha Landfill from the existing permitted 4,000 TPD to 7,000 TPD to meet the County's long-term system demand by the end of the RELOOC study period. This increase is proposed to be approved in either 2013 or 2021, depending on whether the proposed expansion at Olinda Alpha Landfill is implemented. Although this alternative proposes an increase in the maximum daily tonnage inflow rate from 4,000 to 7,000 TPD when the Olinda Alpha Landfill closes, the RELOOC tonnage projections indicate a gradual increase in the daily tonnage rate for the Prima Deshecha Landfill; reaching 7,000 TPD in approximately 2050. Based on the RELOOC tonnage projections, the Prima Deshecha Landfill would close in 2057 (under Alternative 4a) and in 2059 (under Alternative 4b).

Alternative 4a assumes that the currently proposed expansion at Olinda Alpha Landfill does not occur and that the assumptions for this landfill are the same as the existing operations and design at this landfill in mid-2005. Under Alternative 4a, the Olinda Alpha Landfill will close in 2013. Alternative 4b assumes that the currently proposed expansion at Olinda Alpha Landfill (described in Section 2.2.7) does occur. Under Alternative 4b, the Olinda Alpha Landfill will close in 2021.

Alternatives 4a and 4b would require action by the County of Orange for the FRB and Prima Deshecha landfills. Under this Alternative, all the proposed project components at the FRB Landfill, except the increase in TPD, would occur. In addition, this Alternative would increase the TPD at Prima Deshecha Landfill from 4,000 TPD to 7,000 TPD. There would be an increase in the long term physical capacity at the FRB Landfill based on the vertical and horizontal expansions. There would be a reduction in lifespan at Prima Deshecha Landfill under Alternatives 4a and 4b, resulting in an earlier closure date for that landfill than the currently permitted closure date of 2067.

Under Alternatives 4a and 4b, importation of waste into the Orange County disposal system will end in either 2013 or 2015, depending on whether the proposed expansion project at Olinda Alpha Landfill is implemented. Under Alternatives 4a and 4b, the County's projected waste disposal needs will be met and export of waste would not occur during the RELOOC study period (through 2039).

9.5.2 IMPACTS OF ALTERNATIVES 4a and 4b

9.5.2.1 Land Use and Planning

Alternative 4a

Alternative 4a would result in similar impacts as the proposed project. This alternative would result in impacts to areas outside the property boundary for slope stabilization. This will not result in significant adverse impacts because no refuse will be placed within areas outside of the FRB Landfill property boundary. Slope stabilization activities associated with this Alternative would result in impacts to the NCCP. These impacts would be addressed by compensation for and replacement of CSS removed in the slope stabilization area. Since the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill, adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project. Under this Alternative 4a, the appropriate Prima Deshecha Landfill permit (i.e., MOU with San Clemente, San Juan Capistrano; CUP with San Juan Capistrano, SWFP and WDRS) would be revised so that maximum daily tonnage accepted would be 7,000 TPD instead of 4,000 TPD. Revisions to applicable permits/agreements would reduce this impact (i.e., inconsistency) to below a level of significance.

Alternative 4b

Alternative 4b would result in similar impacts as the proposed project. This alternative would result in impacts to areas outside the property boundary for slope stabilization. This will not result in significant adverse impacts because no refuse will be placed within areas outside of the FRB Landfill property boundary. Slope stabilization activities associated with this Alternative would result in impacts to the NCCP. These impacts would be addressed by compensation for and replacement of CSS removed in the slope stabilization area. Since the project activities differ in level and scope from the level and scope anticipated in the Settlement Agreement with the City of Irvine and existing regulatory agencies with jurisdictional oversight for the FRB Landfill, adjustments and modifications to some or all of these documents may be necessary if required by law, to reflect the changes contemplated by the project. Under this Alternative 4b, the appropriate Prima Deshecha Landfill permits (i.e., MOU with San Clemente, San Juan Capistrano; CUP with San Juan Capistrano, SWFP and WDRS) would be revised so that maximum daily tonnage accepted would be 7,000 TPD instead of 4,000 TPD. Revisions to applicable permits/agreements would reduce this impact (i.e., inconsistency) to below a level of significance.

9.5.2.2 Geology and Soils

Alternative 4a

Alternative 4a would result in similar impacts related to geology and soils as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for geology and soils would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2057 instead of 2067. Additional tonnage accepted at this landfill may result in more aggressive or accelerated excavation and filling activities. Mitigation measures related to geology and soil management plans already in place at Prima Deshecha Landfill would reduce these impacts to below a level of significance.

Alternative 4b

Alternative 4b would result in similar impacts related to geology and soils as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for geology and soils would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2059 instead of 2067. Additional tonnage accepted at this landfill may result in more aggressive or accelerated excavation and filling activities. Mitigation measures related to geology and soil management plans already in place at Prima Deshecha Landfill would reduce these impacts to below a level of significance.

9.5.2.3 Hydrogeology and Water Quality

Alternative 4a

Alternative 4a would result in similar impacts related to hydrogeology and water quality as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for hydrology and water quality would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2057 instead of 2067. Additional tonnage accepted at this landfill will not result in additional impacts since the limits of disturbance will not change on the local drainage system. Mitigation measures already in place related to hydrogeology and water quality in place at Prima Deshecha Landfill would reduce these impacts to below a level of significance.

Alternative 4b

Alternative 4b would result in similar impacts related to hydrogeology and water quality as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for hydrology and water quality would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2059 instead of 2067. Additional tonnage accepted at this landfill will not result in additional impacts since the limits of disturbance will not change on the local drainage system. Mitigation measures already in place related to hydrogeology and water quality in place at Prima Deshecha Landfill would reduce these impacts to below a level of significance.

9.5.2.4 Surface Water Hydrology

Alternative 4a

Alternative 4a would result in similar impacts related to surface water hydrology as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for surface water hydrology would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2057 instead of 2067. Additional tonnage accepted at this landfill will not result in impacts since the limits of disturbance will not change on the local drainage system. Mitigation measures already in place related to surface water hydrology in place at Prima Deshecha Landfill would reduce these impacts to below a level of significance.

Alternative 4b

Alternative 4b would result in similar impacts related to surface water hydrology as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for surface water hydrology would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2059 instead of 2067. Additional tonnage accepted at this landfill will not result in additional impacts since the limits of disturbance will not change on the local drainage system. Mitigation measures already in place related to surface water hydrology in place at Prima Deshecha Landfill would reduce these impacts to below a level of significance.

9.5.2.5 Transportation and Circulation

Alternative 4a

Alternative 4a would not result in any significant adverse traffic impacts to the road segments in 2030. This is because daily traffic generated by Alternative 4a would be less than the proposed project and the proposed project did not result in any significant adverse traffic impacts to the road segments. Alternative 4a would result in significant adverse impacts to two intersections; Sand Canyon Avenue at Trabuco Road, and Jeffrey Road at Walnut Avenue. The proposed project would result in significant adverse impacts at these two intersections in 2030. Therefore, the same recommended mitigation measure would apply.

Traffic impacts related to the increase of the annual average MSW of 4,000 TPD to 7,000 TPD at Prima Deshecha Landfill. It is anticipated that the increase in annual average MSW at Prima Deshecha Landfill would result in an increase of waste hauling truck trips near Prima Deshecha Landfill results in decreasing levels of service along the access routes. Six intersections near the Prima Deshecha Landfill were projected to operate at unacceptable LOS E or F in 2020.[1] The increase of the annual average MSW at Prima Deshecha Landfill would contribute to further degradation of LOS at these intersections, but significant adverse traffic impacts cannot be determined at this time without a traffic impact study.

Exportation of waste from Orange County would not be required because the increase of annual average MSW at the Prima Deshecha Landfill would meet the projected disposal needs of Orange County.

Alternative 4b

Alternative 4b would not result in any significant adverse traffic impacts to the road segments in 2030. This is because daily traffic generated by Alternative 4b would be less than the proposed project and the proposed project did not result in any significant adverse traffic impacts to the road segments. Alternative 4b would result in significant adverse impacts to two intersections; Sand Canyon Avenue at Trabuco Road, and Jeffrey Road at Walnut Avenue. The proposed project would result in significant adverse impacts at these two intersections in 2030. Therefore, the same recommended mitigation measure would apply.

Traffic impacts related to the increase of the annual average MSW of 4,000 TPD to 7,000 TPD at Prima Deshecha Landfill. It is anticipated that the increase in annual average MSW at Prima Deshecha Landfill would result in a decreasing levels of service along the access routes due to an increase of waste hauling truck trips near Prima Deshecha Landfill. Six intersections near the Prima Deshecha Landfill were projected to operate at unacceptable LOS E or F in 2020.[2] The increase of the annual average MSW at Prima Deshecha Landfill would contribute to further degradation of LOS at these intersections, but significant adverse traffic impacts cannot be determined at this time without a traffic impact study.

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[1] Austin-Foust Associates, Inc., *Prima Deshecha General Plan Development EIR Traffic Analysis*, 2000.
[2] Austin-Foust Associates, Inc., *Prima Deshecha General Plan Development EIR Traffic Analysis*, 2000.

Exportation of waste from Orange County would not be required because the increase of annual average MSW at the Prima Deshecha Landfill would meet the projected disposal needs of Orange County.

9.5.2.6 Air Quality

Alternative 4a

Construction activities and their associated air pollutant emissions and impacts under Alternative 4a would be the same as for the proposed project. Under this alternative, the operations at the FRB Landfill would be the same as for the proposed project, but an increase in daily average waste tonnage accepted at the Prima Deshecha Landfill would occur instead of at FRB. Thus, the air quality and health risk impacts in the vicinity of the Prima Deshecha facility would be expected to increase relative to those that would occur under the proposed project, but there would be no such difference at the FRB site.

Alternative 4b

Construction activities and their associated air pollutant emissions and impacts under Alternative 4b would be the same as for the proposed project. Under this alternative, the operations at the FRB Landfill would be the same as for the proposed project, but an increase in daily average waste tonnage accepted at the Prima Deshecha Landfill would occur instead of at FRB. Thus, the air quality and health risk impacts in the vicinity of the Prima Deshecha facility would be expected to increase relative to those that would occur under the proposed project, but there would be no such difference at the FRB site.

9.5.2.7 Noise

Alternative 4a

Alternative 4a would not result in significant adverse noise or vibration impacts to sensitive land uses in the project area. This is because daily traffic generated by Alternative 4a would be less than for the proposed project, and the proposed project is not anticipated to result in significant adverse noise or vibration impacts. Traffic noise or operations noise/vibration impacts related to the increase of the annual average MSW of 4,000 TPD to 7,000 TPD at and around the Prima Deshecha Landfill assumes that the number of truck trips and other activities increase proportionally with the increase in annual average MSW, the noise from landfill activities at Prima Deshecha would increase approximately 2 decibels. The effect of such an increase upon overall, ambient levels would vary depending upon the existing and future noise environment in the area. If background noise levels are relatively high, an increase in landfill noise levels would be “masked” and thus would be difficult to perceive. However if background noise levels are substantially lower than noise associated with the landfill, the increase may be perceptible but probably not significant. Exportation of waste from Orange County would not be required because the increase of annual average MSW of 4,000 TPD to 7,000 TPD at the Prima Deshecha Landfill would meet the projected disposal needs of Orange County.

Alternative 4b

Alternative 4b would not result in significant adverse noise or vibration impacts to sensitive land uses in the project area. This is because daily traffic generated by Alternative 4b would be less than for the proposed project, and the proposed project is not anticipated to result in significant adverse noise or vibration impacts. Traffic noise or operations noise/vibration impacts related to the increase of the annual average MSW of 4,000 TPD to 7,000 TPD at and around the Prima Deshecha Landfill assumes that the number of truck trips and other activities increase proportionally with the increase in annual average MSW, the noise from landfill activities at Prima Deshecha would increase approximately 2 decibels. The effect of such an increase upon overall, ambient levels would vary depending upon the existing and future noise environment in the area. If background noise levels are relatively high, an increase in landfill noise levels would be "masked" and thus would be difficult to perceive. However if background noise levels are substantially lower than noise associated with the landfill, the increase may be perceptible but probably not significant. Exportation of waste from Orange County would not be required because the increase of annual average MSW of 4,000 TPD to 7,000 TPD at the Prima Deshecha Landfill would meet the projected disposal needs of Orange County.

9.5.2.8 Biological Resources

Alternative 4a

Alternative 4a would result in similar impacts related biological resources as the proposed project because excavation and filling activities associated with the MDP phases would occur and the limits of disturbance remain the same. As such, all mitigation associated with the proposed project for biological resources would apply. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2057 instead of 2067. Additional tonnage accepted at this landfill will not result in impacts since the limits of disturbance remain the same. Mitigation measures related to biological resources already in place at Prima Deshecha Landfill would still apply.

Alternative 4b

Alternative 4b would result in similar impacts related biological resources as the proposed project because excavation and filling activities associated with the MDP phases would occur and the limits of disturbance remain the same. As such, all mitigation associated with the proposed project for biological resources would apply. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2059 instead of 2067. Additional tonnage accepted at this landfill will not result in impacts since the limits of disturbance remain the same. Mitigation measures related to biological resources in place at Prima Deshecha Landfill would still apply.

9.5.2.9 Aesthetics

Alternative 4a

Alternative 4a would result in similar impacts related aesthetics as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for aesthetics would apply. Although the expansion area would be revegetated after closure of the landfill under Alternative 4a, the expansion area would obstruct views of the Santiago Hills and Loma Ridge from some locations. Also, these views would change from an undeveloped curvilinear ridgeline to that of a large man-made form that highly contrasts with the adjacent rolling hills. This is considered to be a significant adverse impact after mitigation. Additional impacts related to aesthetics at Prima Deshecha Landfill will not occur as part of this alternative. The landform at Prima Deshecha Landfill will not change and will not result in new significant adverse impacts.

Alternative 4b

Alternative 4b would result in similar impacts related aesthetics as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for aesthetics would apply. Although the expansion area would be revegetated after closure of the landfill under Alternative 4b, the expansion area would obstruct views of the Santiago Hills and Loma Ridge from some locations. Also, these views would change from an undeveloped curvilinear ridgeline to that of a large man-made form that highly contrasts with the adjacent rolling hills. This is considered to be a significant adverse impact after mitigation. Under Alternative 4b, the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, mitigation in place would reduce aesthetics impacts at Olinda Alpha Landfill to below a level of significance. Additional impacts related to aesthetics at Prima Deshecha Landfill will not occur as part of this alternative. The landform at Prima Deshecha Landfill will not change significantly and will not result in new adverse impacts.

9.5.2.10 Cultural and Scientific Resources

Alternative 4a

Alternative 4a would result in similar impacts related to cultural and scientific resources as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for cultural and scientific resources would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2057 instead of 2067. Additional tonnage accepted at this landfill has the potential to create new impacts during excavation and filling activities. However, the mitigation measures related to cultural resources already in place at Prima Deshecha Landfill would still apply and would reduce impacts associated with this Alternative to below a level of significance.

Alternative 4b

Alternative 4b would result in similar impacts related to cultural and scientific resources as the proposed project because excavation and filling activities associated with the MDP phases would occur. As such, all mitigation associated with the proposed project for cultural and scientific resources would apply. Implementation of mitigation measures would reduce impacts associated with this Alternative to below a level of significance. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2059 instead of 2067. Additional tonnage accepted at this landfill will not result in any new impacts. Mitigation measures related to cultural resources already in place at Prima Deshecha Landfill would still apply.

9.5.2.11 Hazards/Risk of Upset

Alternative 4a

Under Alternative 4a, the FRB Landfill would be required to comply with federal, state and local landfill regulations that currently govern landfill procedures. With implementation of mitigation measures described for the proposed project regarding geology and soils and hydrogeology and water quality, impacts due to landslide hazards and leachate control would be mitigated to below a level of significance. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2057 instead of 2067. Additional tonnage accepted at this landfill may result in impacts due to additional excavation and filling activities. Mitigation measures related to hazards/risk of upset in place at Prima Deshecha Landfill would reduce these impacts to below a level of significance.

Alternative 4b

Under Alternative 4b, the FRB Landfill would be required to comply with federal, state and local landfill regulations that currently govern landfill procedures. These regulations relate to hazards materials, fire hazards, landfill gas/monitoring and condensate generation, and health and safety hazards. In addition, with implementation of mitigation measures described for the proposed project regarding geology and soils and hydrogeology and water quality, impacts due to landslide hazards and leachate control would be mitigated to below a level of significance. Under this Alternative, the Olinda Alpha Landfill would be expanded and its closure date would be extended until 2021. However, since the expansion of the Olinda Alpha Landfill would be required to comply with federal, state and local landfill regulation, potential impacts related to hazards and risk of upset at Olinda Alpha Landfill would be below a level of significance. In addition, with implementation of various mitigation measures in place at the Olinda Alpha Landfill, potential impacts will be less than significant. As part of this Alternative, Prima Deshecha Landfill would accept 7,000 TPD maximum daily tonnage instead of 4,000 TPD and close in 2059 instead of 2067. Additional tonnage accepted at this landfill may result in impacts due to additional excavation and filling activities. However, since the Prima Deshecha Landfill would be required to comply with federal, state and local landfill regulation, potential impacts related to hazards and risk of upset would be below a level of significance. In addition, the mitigation measures related to hazards and risk of upset in place at Prima Deshecha Landfill would reduce these impacts to below a level of significance.

9.5.3 SUMMARY OF ALTERNATIVES 4a and 4b

Alternative 4a

Alternative 4a will result in impacts to aesthetics, traffic, noise, and air quality. Impacts related to this alternative would be greater than that for the proposed project because more MSW would be transported and interred at the FRB Landfill and Prima Deshecha Landfill.

Alternative 4b

Alternative 4b will result in impacts to aesthetics, traffic, noise, and air quality. Impacts related to this alternative would be greater than that for the proposed project because more MSW would be transported and interred at the FRB Landfill and Prima Deshecha Landfill.

9.6 ALTERNATIVES CONSIDERED BUT REJECTED

CEQA requires that an EIR address only those alternatives necessary to permit a reasoned choice. These alternatives must foster informed decision-making and public participation. The EIR must also provide the rationale for the selection or rejection of various alternatives.

The CEQA Guidelines state that an EIR should "…identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts."

The alternatives to the proposed expansion at the FRB Landfill which were considered but rejected and not evaluated in detail in this EIR are described in this section. As discussed in section 4.3 (History and Evolution of the proposed project), the RELOOC process consisted of not only a Feasibility Study, but an inter-governmental coordination process and public outreach program. The RELOOC Strategic Plan was formulated based on feedback on a variety options for waste disposal for Orange County. The options in the Feasibility Study that were not carried forward in the Strategic Plan are considered as alternatives to the proposed project that were rejected and not evaluated in detail in this EIR.

9.6.1 EARLY CESSATION OF MSW IMPORTATION FROM OUTSIDE THE COUNTY

As discussed under the existing conditions for the FRB Landfill, all three Orange County landfills are currently under contract to import MSW from San Diego, Riverside, San Bernardino and Los Angeles Counties. Cessation of these import activities could meet several of the project objectives.

The effects of importation were studied by the County to understand its role in capacity considerations at the Orange County landfills. Importation is a revenue generator from the tipping fees and is linked to the County's Plan of Adjustment [Bankruptcy] Recovery program. It is estimated that approximately 1,175,000 tons per year of import are deposited in Orange County's landfills system-wide. Importation is scheduled to continue until 2015 when the importation agreements expire. If importation were to cease earlier than 2015 (the earliest estimate of when that could occur is 2005), the life span of the three County landfills is anticipated to be increased by just under three years assuming the annual system demand of 4,062,000 tons per year discussed in Section 4.3.1.2 (1,175,000 tons/yr [10 yrs] ÷ 4,062,000 tons/yr = 2.9 yrs). Therefore, cessation of importation does not address overall capacity needs because, while it does preserve some capacity, it does not preserve enough to address the County's future short and long term capacity needs.

In addition, discontinuing importation would constitute a change of conditions specified in bond documents and County Plan of Adjustment, necessitating a return to bankruptcy court. This would create the risk of an adverse effect on the County's bond ratings and possibly the need to defease the bonds. The fact that the tipping fee revenue from importation is a part of the County's Bond Recovery program makes the cessation of importation a complicated legal and fiscal matter, making the feasibility of this alternative uncertain. Therefore, an alternative to cease importation of MSW from outside Orange County was not evaluated in detail in this EIR.

9.6.2 RELOOC FEASIBILITY STUDY ALTERNATIVES

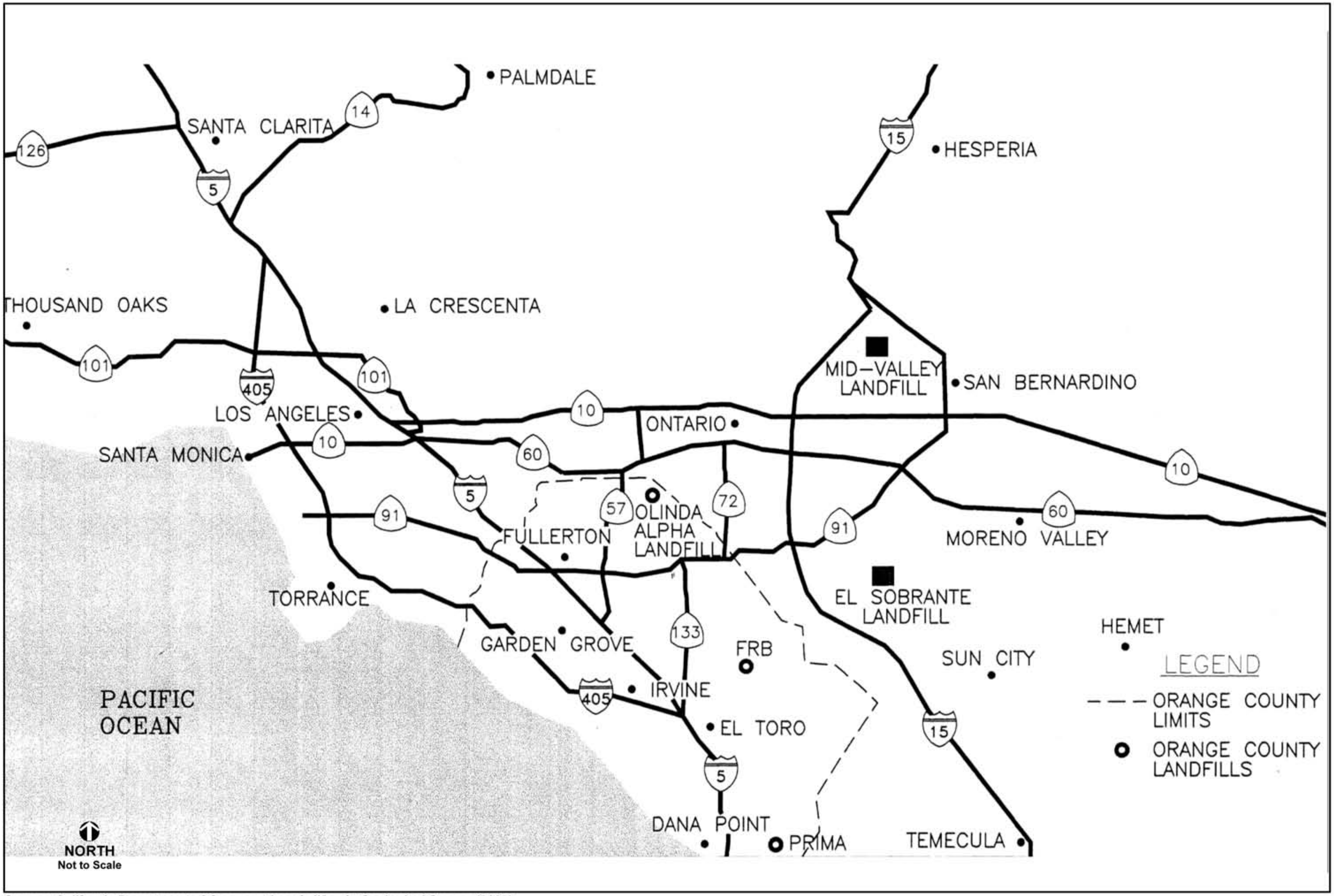
The RELOOC Strategic Plan recommendations were based on the RELOOC Feasibility Study which investigated a full range of disposal options for MSW disposal for Orange County including maximization of in-County capacity, out-of-County export, alternative disposal technologies and other possible programs that could accommodate the County's future waste disposal needs. Several of those options were incorporated in the RELOOC Strategic Plan including the proposed expansion of the FRB Landfill. A number of options were considered and rejected in that effort and are briefly described below along with the reasons why they were rejected as viable options for the County waste disposal needs and as alternatives to the proposed project at the FRB Landfill.

9.6.2.1 Export

Both truck and rail haul export are options for MSW disposal which the County of Orange may need to consider in the future once capacity at the three existing County landfills is exhausted. The cost for export versus maximizing the capacity of the existing County landfills was a serious factor is the consideration of export as either a short or long term solution for waste disposal options for the County. These options are described below, but were not carried forward in the RELOOC process because of cost, environmental and other considerations.

<u>Truck Export to Out-of-County Landfills</u>

Two landfills outside Orange County were evaluated for the possibility of accepting exported MSW from Orange County: Mid-Valley Sanitary Landfill in the City of Rialto and El Sobrante Landfill in unincorporated Riverside County. Both are operating Class III landfills similar to the FRB Landfill. The locations of these landfills are shown on Figure 9-1.
Mid-Valley Sanitary Landfill (MVSL)



Source: California Department of Conservation, California Geological Survey (2005).

Figure 9-1
Out-of-County Landfill Sites for Truck Export

The MVSL is currently operating as a Class III, non-hazardous solid waste landfill in the City of Rialto in San Bernardino County. The existing landfill area covers 142 acres. An EIR evaluated expanding the landfill disposal area by 266 acres. The total landfill area, including the existing acreage and the proposed expansion, would be 408 acres. The EIR evaluated increasing the permitted average TPD limit to 7,500 maximum TPD. In 1998, the MVSL accepted an average of 880 TPD. In 1997, the permitted capacity of the MVSL was 24.4 million cubic yards (mcy). The EIR evaluated increasing the capacity of the MVSL to 82 mcy. The estimated average TPD that will be deposited in MVSl in 2006 is 3,027 TPD which is 973 TPD less than the daily capacity (4,000 TPD) evaluated in the EIR. This daily capacity limit will need to be revised if waste from Orange County is transported to this site. The estimated closure date assumed in the EIR for MVSL is 2036. (Source: Mid-Valley Sanitary Landfill Expansion Final Environmental Impact Report (January 29, 1998) and the Addendum to the Final EIR (June 1998)).

El Sobrante Landfill

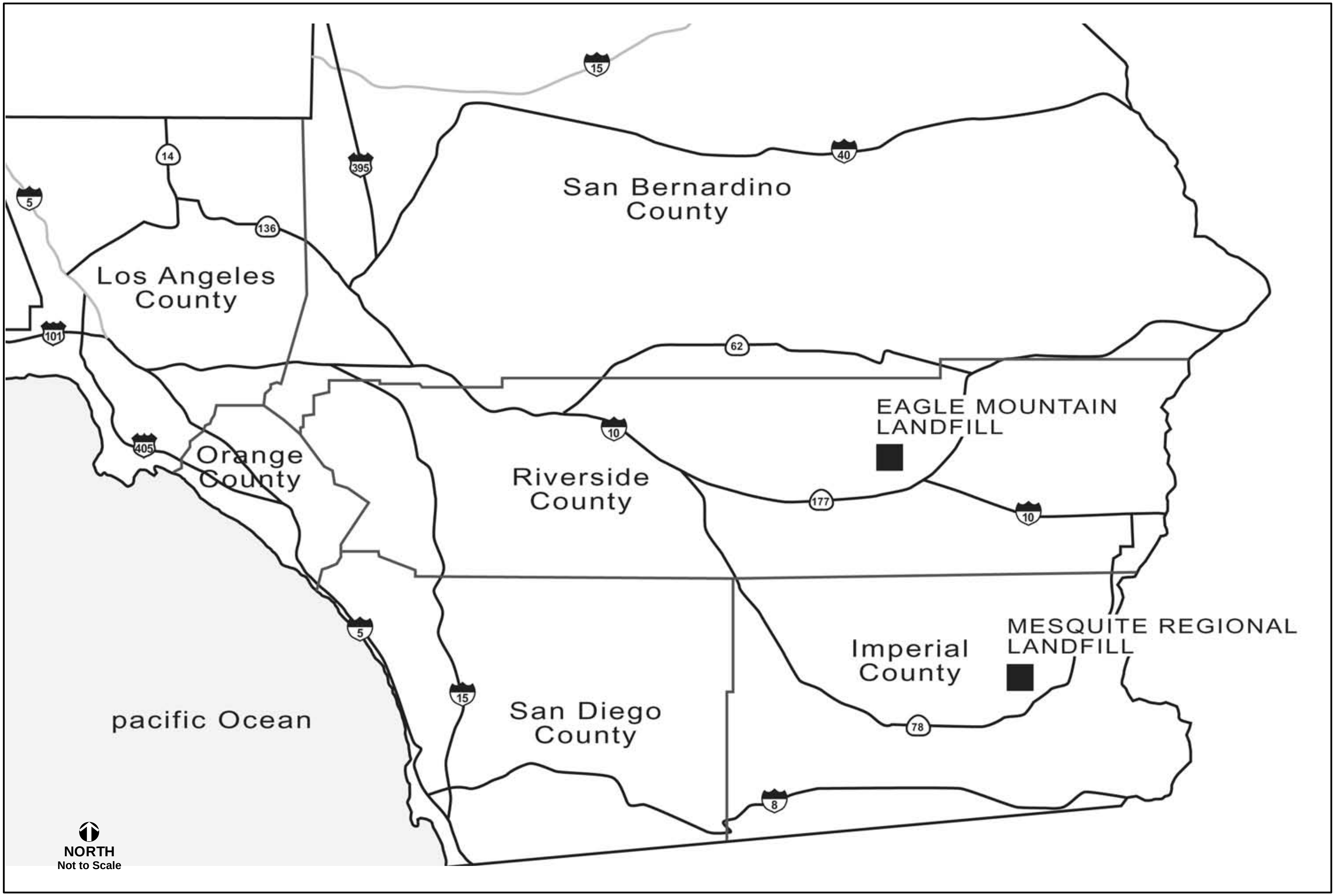
The El Sobrante Landfill, approximately two miles south of Lake Matthews in western Riverside County, is currently operating as a Class III, non-hazardous solid waste landfill. The existing landfill site described in that landfill EIR covered 1,322 acres. The 1,322 acres consisted of approximately 178 acres of landfill area and 1,144 acres of open space. In 1996, the landfill footprint occupied 90 acres of the total 178 acres planned for landfilling. The EIR evaluated the expansion of the graded footprint of the landfill to 656 acres and increasing the existing permitted daily capacity from 4,000 TPD to 10,000 TPD, for a net increase of 6,000 TPD. The EIR evaluated the expansion of the capacity of El Sobrante Landfill from the approximately nine million tons to 109 million tons, a net increase of 100 million tons. The El Sobrante Landfill is estimated to close in 2026. (Source: El Sobrante Landfill Expansion Final Environmental Impact Report (April 1996) and an Update to the final EIR (July 1998)).

Rail Haul Export to Distant Landfills

Two landfills some distance from Orange County were evaluated for the possibility of accepting exported Orange County MSW via rail haul: Eagle Mountain Landfill in eastern Riverside County and Mesquite Regional Landfill in Imperial County. These alternatives would involve the use of an inter-modal facility in the City of Industry as a waste transfer station where the waste for landfilling would be loaded on rail cars and exported to one of these two landfills. The locations of these two facilities is shown on Figure 9-2.

Eagle Mountain Landfill

This is a planned and fully permitted Class III, non-hazardous solid waste landfill in an unused, open pit mine on approximately 4,654 acres in Riverside County. Landfilling will occur on approximately 2,164 acres. The anticipated capacity of this landfill is 700 million tons. The anticipated maximum permitted capacity is up to 20,000 TPD with approximately 16,000 TPD delivered by rail and approximately 4,000 TPD by truck. The anticipated life of this landfill is 117 years.



Source: California Department of Conservation, California Geological Survey (2005).

Figure 9-2
Out-of-County Landfill Sites for Rail Haul Export

The landfill project includes the existing 52 mile Kaiser-owned rail line, which extends from Rail Yard I on the landfill site to the existing Southern Pacific Transportation Company (SPTC) main line. An approximately five-mile long rail spur, extending from about the mid-point of the 52 mile long Kaiser line to Rail Yard II on the landfill site is also part of the project. As stated in the EIR/Environmental Impacts Statement (EIS) for this landfill, the majority of solid waste collected in population centers in the seven southern California Counties would be trucked to existing or future transfer stations/materials recovery facilities (MRFs). At these stations, recyclable materials and potentially hazardous materials would be removed for separate disposal. The resulting solid waste residue would be loaded into 20 to 53 foot long containers which will be loaded on rail cars for transport to Eagle Mountain Landfill. The rail cars would be covered to control litter, vectors and odor. Although not specified in the EIR/EIS, it is assumed that the majority of the rail transport would occur on the SPTC line. (Source: Eagle Mountain Landfill Project, Riverside County, California, Draft Environmental Impact Statement /Environmental Impact Report (July 1996)).

Mesquite Regional Landfill

This is a planned and fully permitted Class III, non-hazardous solid waste landfill on approximately 4,250 acres in Imperial County, with the landfill itself occupying approximately 2,290 acres. The anticipated capacity of this landfill is 600 million tons. The anticipated maximum permitted capacity is 20,000 TPD. The anticipated life of this landfill is 100 years.

The landfill project includes an approximately five-mile long railroad spur from the existing SPTC main line track to the landfill site. MSW collected in population centers in a seven County area would be trucked to existing or future transfer stations/MRFs. At these transfer stations, recyclable materials and potentially hazardous materials would be removed for separate disposal. The resulting MSW residue would be transported to an intermodal rail facility where it would be loaded on to rail cars for transport to Mesquite Regional Landfill. The rails cars would be approximately 40 feet long, have capacity for 25 tons of waste and would be covered to control litter, vectors and odor. At the maximum disposal rate of 20,000 TPD, five 16-car trains would serve the landfill each day. Truck delivery of solid waste to the landfill will not occur, except for certain circumstances, from Imperial County and in the event the SPTC tracks are closed temporarily as a result of an accident or damage to the tracks.

The EIS/EIR for this landfill assumed the existing SPTC Intermodal Station in the City of Industry would be used as the transfer station in early years of the operation of the landfill. The EIS/EIR further noted that waste loading could later be moved to Los Angeles Transportation Center or to other new intermodal facilities that may be constructed in the future. (Source: Final Environmental Impact Statement and Environmental Impact Report for the Proposed Mesquite Regional Landfill (June 1995) and two Addenda to the EIR (July 14, 1995 and September 10, 1996)).

9.6.2.2 Off-Site Alternative: New Landfill in Gypsum Canyon

Construction of a new landfill in Gypsum Canyon was evaluated. Gypsum Canyon is north of the FRB Landfill near State Route 91 and the Orange/Riverside County line. Gypsum Canyon is in private ownership. The area where the landfill would be located has been pre-zoned by the City of Anaheim for residential development making the entitled land prohibitively expensive for acquisition. In addition, the site is not available for purchase by the County from the property owner. Therefore, this Alternative was not brought forward in the RELOOC Strategic Plan and was not considered further in this EIR.

9.6.2.3 Alternative Technology Assessment

The following alternative technologies were evaluated in the RELOOC Feasibility Study (report dated December, 2001):

- Bio-refining (the transformation of organic material to bio-fuels and bio-chemicals).
- Bio-diesel (the conversion of cooking oils to diesel fuel).
- Composting (the conversion of MSW for a soil additive).
- Anaerobic digestions (the conversion of organics to fuel gas, and fiber and liquid for a soil additive).
- Fixation (the chemical transformation of waste into inert construction products).
- Gasification (the thermal breakdown of waste to synthetic gas, ash, and water).
- Kinetic disintegration (the breakdown of waste by sound waves into aggregate and other products).
- Plasma arch technology (the thermal transformation of waste to gases and stable products).
- Pyrolysis (the thermal breakdown of waste in the absence of oxygen to gas, liquids, and solid products).
- Waste-to-energy (combustion of MSW, either mass-burn or RDF, for the creation of steam and electricity.

These technologies were researched and, with the exception of composting technologies, there was only one full scale, reference plant processing MSW in North America for any of the alternative technologies researched. That was an anaerobic digestion plant in Newmarket, Ontario which is designed to process 650 TPD. Therefore, while these technologies hold promise for the future, their application for use in Orange County at this time is speculative given the exclusivity of the technology application in the United States. Most of these alternative technologies have only been tested on small scale pilot projects which would not be applicable to the waste volume to be handled for the FRB Landfill or other Orange County landfills. Further discussion of the alternative technologies evaluated for RELOOC is included in the RELOOC Feasibility Study report available at IWMD's offices. Technologies resulting in more efficient use of the available capacity at the landfills continue to be studied, but as an adjunct to capacity needs not as an alternative to the proposed FRB Landfill project.

9.7 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 9-1 shows a comparison of the environmental effects of the proposed project, the project alternatives and the No Project Alternatives. Each of the build alternatives would result in environmental impacts greater than would occur under the No Project Alternative. Therefore, the No Project Alternative is the environmentally superior alternative, although it would not meet project objectives as discussed earlier. Section 15126.6(e) of the CEQA Guidelines states that if the No Project Alternative is selected as the environmentally superior alternative, then the EIR shall also identify an environmental superior alternative among the other alternatives. The remaining alternatives have similar environmental impacts. However, the proposed project would not have environmental impacts related to land use and planning; therefore, the proposed project is the environmentally superior alternative.

TABLE 9-1
COMPARISON OF THE ENVIRONMENTAL IMPACTS OF ALL PROJECT ALTERNATIVES

Environmental Parameter	**Proposed Project**	**Alternative 1a and 1b**	**Alternative 2a and 2b**	**Alternative 3a and 3b**	**Alternative 4a and 4b**
Land Use and Planning	1	1	2	2	2
Geology and Soils	2	1	2	2	2
Hydrology and Water Quality	2	1	2	2	2
Transportation and Circulation	2	2	2	2	2
Air Quality	3	3	3	3	3
Noise	2	2	2	2	2
Biological Resources	2	1	2	2	2
Aesthetics	3	1	3	3	3
Cultural and Scientific Resources	2	1	2	2	2
Hazards/Risk of Upset	2	2	2	2	2

Legend
1. Insignificant or no impact.
2. Impact that can be mitigated to a level of insignificance.
3. Impact that can not be mitigated to a level of insignificance.
Source: P&D Consultants (2005).

It should be noted that Alternatives 3a and 3b do result in an increase in typical average daily traffic volumes, air quality emissions and noise and vibration as a result of increased daily tonnage from 8,500 to 11,500. The local circulation network will experience increased volumes of truck trips as a result of the tonnage increase. However, the duration of the landfill life will be shortened as a result, requiring the need for additional landfill capacity at that time. The trade-off between additional truck trips over a shorter duration versus keeping the landfill open for a longer duration with less truck trips is difficult to assess for comparative purposes. Certainly, for the more near term, Alternatives 3a and 3b would be considered to have a more substantive impact for traffic, air quality and noise exposure as compared to Alternatives 2 and 4, or compared to the proposed project. In this case, the near term is a substantial amount of time and therefore Alternatives 3a and 3b would presumably rank as having more substantive impacts accordingly.

9.8 ABILITY OF THE ALTERNATIVES TO MEET THE PROJECT OBJECTIVES

As shown in Table 9-2, the only Alternative which meets all the project objectives is the proposed project. The Alternative 1a and 1b is the only alternative which does not meet any of the project objectives. Alternatives 2, 3 and 4 meet all the project objectives but to varying in degrees. However, Alternatives 2, 3 and 4 do not meet the other project objectives to the same degree as the proposed project.

TABLE 9-2
ABILITY OF THE ALTERNATIVES TO MEET THE PROJECT OBJECTIVES

Project Objectives	Proposed Project	Alternatives 1a and 1b	Alternatives 2a and 2b	Alternatives 3a and 3b	Alternatives 4a and 4b
	Does the Alternative meet the Project Objective?				
Ensure that the long term disposal needs of the County's Solid Waste System are met.	Yes	No	Yes	Yes	Yes
Maximize capacity of the existing landfills, including the FRB Landfill.	Yes	No	No	Yes	Yes
Ensure adequate revenue and maintain local control of waste disposal for as long as possible to provide consistent and reliable public fees/rates.	Yes	No	No	Yes	Yes
Maintain efficient, cost effective and high quality IWMD operations.	Yes	No	Yes	Yes	Yes
Minimize adverse environmental impacts.	Yes	Yes	Yes	Yes	Yes
Remediate and stabilize landslide areas to minimize the risk for future slope failures in the area and to protect and provide for future landfilling capacity on those parts of the landfill property.	Yes	No	Yes	Yes	Yes
Provide for soil management needs on-site to avoid impacts on adjacent canyons.	Yes	No	Yes	Yes	Yes

Source: P&D Consultants, (2005).

SECTION 10.0
IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

SECTION 10.0
IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

Section 15126.2(c) of the California Environmental Quality Act (CEQA) Guidelines requires that an Environmental Impact Report (EIR) discuss significant adverse irreversible environmental changes that would be caused by implementation of the proposed project. In addition, irretrievable commitments of resources should be evaluated. Implementation of the proposed project would result in both short and long term commitments of natural resources.

10.1 EXISTING COMMITMENT OF RESOURCES RELATED TO ENERGY

Implementation of the proposed project will result in impacts to energy resources including diesel, gasoline and electricity. Existing daily operations (including interment of waste on normal and high tonnage days), construction operations and waste hauling use approximately 2,974,915,826,296 British Thermal Units (BTUs)/year of electricity, diesel and gasoline. Waste hauling vehicles consume approximately 96% of the energy used by the landfill.

On normal tonnage days, or days during which the landfill accepts 8,500 tons of trash or less, the landfill uses approximately 50,154,391,552 BTUs/year. Table 10-1 describes energy used per year to run on-site facilities and equipment on normal tonnage days.

TABLE 10-1
EXISTING EQUIPMENT (NORMAL TONNAGE DAYS) AND FACILITIES USE

Facilities/Equipment (number of pieces used)	Equipment Use (hours/day)	Energy Consumed (BTUs/year)
Trash Tractor (4)	10	18,104,112,000
Dirt Tractor (1)	10	4,526,028,000
Scrapers (2)	5	8,297,718,000
Cat 824 w/BG (1)	10	2,501,070,000
Water Truck (2)	10	4,764,240,000
Trash compactor (2).	10	7,511,618,400
Motor Grader (1)	1	170,718,600
Backhoe (1)	1	70,669,560
Loader (1)	1	238,212,000
Light Plant (Light Tower) (1)	1	4,992
On-Site Facilities	N/A	3,970,000,000

Approximately 36 days per year, FRB accepts the Maximum Daily Permitted Tonnage (MDPT). Table 10-2 describes energy used by additional equipment. High tonnage days at FRB require the use of an additional 3,913,090,200 BTUs/year.

TABLE 10-2
ADDITIONAL TONNAGE EQUIPMENT ENERGY USE

Equipment (Number of Pieces Required)	Equipment Use (hours/day)	Energy Consumed (BTUs/year)
Trash Tractor (1)	10	2,088,936,000
Trash compactor (1).	10	957,429,000
Scrapers (1)	5	866,725,200

As stated in the Section 5.5 (Transportation and Circulation), 1,346 waste hauling vehicles bring waste to the landfill each day. This results in the use of 2,851,975,222,720 BTUs/year. Table 10-3 describes energy consumed by waste hauling vehicles transporting waste to the FRB Landfill.

TABLE 10-3
EXISTING WASTE HAULING VEHICLE ENERGY USE

Equipment (Number of Pieces Required)	Equipment Use (hours/day)	Energy Consumed (BTUs/year)
Waste Hauling Vehicles (1,346)	8	2,851,975,222,720

Existing soil excavation, construction of landfill liners and landfill remediation requires the use of heavy equipment to move approximately 20,000 cubic yards (cy) of soil per day. Construction at the landfill occurs approximately 260 days per year. This results in the use of 68,873,121,824 BTUs/year. Table 10-4 describes energy used by construction equipment at the FRB Landfill.

TABLE 10-4
EXISTING CONSTRUCTION EQUIPMENT ENERGY USE

Equipment (Number of Pieces Required)	Equipment Use (hours/day)	Energy Consumed (BTUs/year)
Scrapers (8)	8	44,326,297,600
Dozers (6)	8	13,908,794,016
Motorgrader (1)	8	1,456,232,336
Loader (1)	8	6,961,500,000
Water Truck (1)	8	1,588,080,000
Backhoe (1)	8	632,217,872

10.2 PROPOSED COMMITMENT OF RESOURCES RELATED TO ENERGY

Energy use under the proposed project will be similar to existing energy use at the FRB Landfill; however, this use is anticipated to occur over a longer period due to the extension in years that the landfill will operate under the proposed project. Also, implementation of the proposed project will result in the occasional use of additional equipment for operation and construction and will result in additional waste hauling vehicles transporting waste to the landfill which will increase energy use at the landfill by 4,522,982,428,544 BTUs/year to a total of 7,497,898,254,840 BTUs/year. Waste hauling vehicles will consume approximately 98% of the proposed project's energy use. It is anticipated that this energy consumption will not be wasteful, inefficient or unnecessary, and therefore no significant impacts from energy consumption would occur.

Table 10-5 describes the energy used to power construction equipment that will move 40,000 cy of soil per day approximately 260 days per year. Increased construction at the landfill will result in the use of approximately 127,879,383,424 BTUs/year. This represents an increase in energy use of 59,006,261,600 BTUs/year over and above existing construction equipment energy use.

TABLE 10-5
CONSTRUCTION EQUIPMENT ENERGY USE

Equipment (Number of Pieces Required)	Equipment Use (hours/day)	Energy Consumed (BTUs/year)
Scrapers (17)	8	94,193,382,400
Dozers (9)	8	21,459,890,816
Motorgrader (1)	8	1,456,232,336
Loader (1)	8	6,961,500,000
Water Truck (2)	8	3,176,160,000
Backhoe (1)	8	632,217,872

Additional, impacts will result from the increase in waste hauling vehicles transporting waste to the FRB Landfill. The Traffic Impact Analysis indicates that in 2010 and 2030, the number of waste hauling vehicles will increase to 1,494 and 3,452, respectively. In 2010, the increase will result in the use of 3,165,565,366,080 BTUs/year. In 2030, the increase will result in the use of 7,314,278,208,640 BTUs/year. Table 10-6 describes energy use by waste hauling vehicles for the years 2010 and 2030.

TABLE 10-6
ADDITIONAL WASTE HAULING VEHICLES ENERGY USE

Equipment (Number of Pieces Required)	Equipment Use (hours/day)	Energy Consumed (BTUs/year)
2010		
Waste Hauling Vehicles (1,494)	8	3,165,565,366,080
2030		
Waste Hauling Vehicles (3,452)	8	7,314,278,208,640

During future operations, 14 additional blowers will be required to extract landfill gas. These blowers will operate 24 hours per day, 365 days per year and will consume 1,673,181,024 BTUs/year.

10.3 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

The proposed project would not result in the wasteful, inefficient or unnecessary consumption of energy during construction. Therefore, no significant impacts from energy consumption would occur. This project would not result in any significant impacts to local or regional energy supplies, would not impact peak or base energy standards, would not violate existing energy standards or result in significant impacts to energy resources. However, the proposed project will result in the irretrievable and irreversible commitment of energy resources in the form of diesel fuel, gasoline and electricity. Because these types of resources are anticipated to be in adequate supply into the foreseeable future, impacts due to this irretrievable and irreversible commitment of resources are not considered significant.

Construction of the proposed project would require the commitment of a relatively small amount of building materials because the nature of the project improvements is mostly a cut and fill process. The small quantity of building materials used during implementation of the proposed project will not result in a significant impact because these types of resources are anticipated to be in adequate supply into the foreseeable future.

Dust control and watering activities that will occur as a result of the proposed project would require the commitment of water over the life of the landfill. This is not considered to be a wasteful, inefficient or unnecessary use of water. Because water is anticipated to be in adequate supply into the foreseeable future, impacts due to this irretrievable and irreversible commitment of resources are not considered significant.

SECTION 11.0
INVENTORY OF MITIGATION MEASURES

SECTION 11.0
INVENTORY OF MITIGATION MEASURES

This section provides a complete inventory of the mitigation measures developed in response to the findings of the impacts analysis in Section 5.0 (Existing Conditions, Impacts, Mitigation Measures and Level of Significance after Mitigation). These mitigation measures will form the basis for the Mitigation Reporting and Monitoring Program for the proposed project. The agency responsible for the implementation of these mitigation measures is the County of Orange Integrated Waste Management Department (IWMD).

11.1 MITIGATION MEASURES FOR LAND USE AND PLANNING

No mitigation is required.

11.2 MITIGATION MEASURES FOR GEOLOGY AND SOILS

G-1 Landslides will be mitigated by exploration of the geometry of the failure surface, development of a remediation plan (removal of driving weight using grading equipment, construction of shear keys and/or buttresses and/or dewatering), and implementation of a remediation plan. Measures implemented will be similar to those performed in response to the 2002 NLC as described in the Geotechnical Investigation Report, Master Development Plan, FRB Landfill (GeoLogic Associates, 2004) and will be designed to limit impacts to off-site areas, avoid impacts to future landfill operations, and minimize potential hazards to on-site personnel.

G-2 During construction of landslide remediation projects, it will be necessary to monitor landslide movement and groundwater levels in and around the landslide and to sequence construction in a manner that limits the extent of buttress backcut exposed at any one time, prior to completion of buttress construction.

G-3 Prior to construction of each phase of lateral expansion area, IWMD will be responsible for having additional geologic data obtained and subsequent slope stability analyses conducted to verify assumptions made for the stability analysis included in the Geotechnical Investigation Report, Master Development Plan, FRB Landfill, (GeoLogic Associates, 2004).

G-4 Prior to construction of each phased grading plan, IWMD will be responsible for having the excavation and grading plan meet stability requirements for all proposed cut, fill, and lined slopes. Slopes shall be designed to withstand the most credible earthquake or as required by current regulations. Liner design plans shall be submitted to the Santa Ana Regional Water Quality Control Board in a Design Report for approval.

G-5 Prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the expansion, the IWMD shall present a liner design concept in a Joint Technical Document (JTD) to be submitted to the RWQCB and LEA for approval and to the CIWMB for concurrence. As part of the JTD, the IWMD shall present the assumptions, methods, and calculations used to demonstrate seismic safety.

11.3 MITIGATION MEASURES FOR HYDROGEOLOGY AND WATER QUALITY

HW-1 As part of each new phase of development, a composite liner or an alternative to the prescriptive composite liner and leachate collection and removal system will be constructed in the lateral expansion area to intercept and collect leachate for storage and proper disposition (disposal off-site or use as dust control), as approved by the RWQCB. A subdrain system will be installed to intercept perched and bedrock groundwater below the liner. Horizontal drains may also be installed below the North-end Landslide Complex (NLC) for the purposes of reducing the forces driving the landslide and to bring the piezometric head level below the design grades. The existing NLC horizontal drains are expected to remain active through future landfill development and additional horizontal drains will be installed as necessary. The prescriptive or alternative liner, leachate collection and removal system and subdrain will be approved by the RWQCB in a Design Report and will comply with federal and state requirements (27 CCR).

HW-2 As part of a Joint Technical Document to be prepared by IWMD prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the expansion, the liner design concept shall be submitted to the RWQCB and Local Enforcement Agency for approval and to the CIWMB for concurrence. As part of a Joint Technical Document, the IWMD shall also present the assumptions, methods, and calculations used to demonstrate seismic safety.

HW-3 During ongoing landfill operations (including the expansion areas), IWMD will continue to comply with the site's Waste Discharge Requirements and Monitoring and Reporting Program requirements imposed by the RWQCB for the protection of water quality.

HW-4 The Corrective Action Program in place at the landfill will continue to be implemented by IWMD if Volatile Organic Compounds are detected in groundwater.

11.4 MITIGATION MEASURES FOR SURFACE WATER HYDROLOGY

H-1 Prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the proposed expansion, the IWMD shall submit to the RWQCB, LEA and CIWMB a Joint Technical Document which presents the assumptions, methods and calculations used to calculate the potential flow quantities for run-on, run-off and sediment content of storm water flow used in sizing drainage and sediment control facilities for the FRB Landfill in conformance with 27 CCR regulations.

H-2 Prior to obtaining a revised Solid Waste Facilities Permit and Waste Discharge Requirements for the proposed expansion, the IWMD shall submit to the RWQCB, LEA and CIWMB a Joint Technical Document which includes surface water drainage plans for the FRB Landfill expansion final grading plans, including any berms, down drain systems, perimeter drainage channel improvements and the location of off-site discharge points for run-off water in compliance with 27 CCR regulations.

H-3 Prior to construction, drainage facilities for the landfill expansion shall be designed, according to 27 CCR, to prevent washout of the waste management unit during a 100-year storm event.

H-4 During ongoing landfill operations, diversion and drainage facilities shall be evaluated, designed, constructed and operated to accommodate the anticipated volume of precipitation and peak flows from surface run-off under the precipitation conditions specified in 27 CCR.

H-5 During ongoing landfill operations (including the expansion area), IWMD will continue to operate the landfill under a National Pollutant Discharge Elimination System (NPDES) Permit to discharge storm flows. The criteria and restrictions of the NPDES Permit and the Storm Water Pollution Prevention Plan and Best Management Practices that accompany the NPDES Permit will be adhered to.

H-6 During ongoing landfill operations (including the expansion area), IWMD will continue to provide positive drainage by maintaining a two to three percent slope on all landfill deck surfaces.

H-7 During ongoing landfill operations (including the expansion area), IWMD will continue to prepare and implement sediment and erosion control plans on an annual basis to reduce sediment and control erosion on the landfill site.

H-8 During ongoing landfill operations (including the expansion area) IWMD will remove silt and maintain the drainage and desilting basin facilities in order to provide proper drainage and erosion control. The proper maintenance of the Southeast Inlet Basin is particularly important to minimize silt buildup in the twin 60-inch pipes providing drainage for the eastern portion of the landfill.

11.5 MITIGATION MEASURES FOR TRANSPORTATION AND CIRCULATION

T-1 Sand Canyon Avenue at Trabuco Road. Extend the Advanced Transportation Management System (ATMS) strategies to encompass the intersection of Sand Canyon Avenue at Trabuco Road. The ATMS strategies at Sand Canyon Avenue at Trabuco Road will be installed in 2025 but will be discontinued at buildout conditions in 2030 based on information provided by the City of Irvine. The ATMS strategies apply the latest traffic control systems to improve traffic flow through the intersections. These traffic control systems include the use of interconnect, closed circuit television and communication system, upgraded traffic signal cabinets, controllers and detection systems, and a changeable message board. The ATMS strategies will only be operational during the A.M. and P.M. peak periods, when the intersection experiences the most traffic.

T-2 Jeffrey Road at Walnut Avenue. Provide the westbound right-turn lane with a protected right-turn phase that is overlapped with the southbound left-turn phase in 2030.

11.6 MITIGATION MEASURES FOR AIR QUALITY

AQ-1 Applicable dust suppression techniques from Rule 403 shall be implemented. These techniques are summarized below. Additional dust suppression measures in the SCAQMD *CEQA Air Quality Handbook* are included as part of the project's mitigation. Implementation of these dust suppression techniques will reduce fugitive dust generation (and thus the PM_{10} component).

- Apply surfactants to or vegetate (i.e., grow grass) all inactive construction areas (previously graded areas inactive for 10 days or more).
- Water active sites at least twice daily (water or other surfactants should be applied as needed to active site grading areas to minimize fugitive dust).
- All trucks hauling dirt, sand, soil, or other loose materials should have a cover over the top of the material, spray water to minimize wind blown dust, or should maintain at least six inches of freeboard in accordance with the requirements of California Vehicle Code section 23114 (freeboard means vertical space between the top of the load and top of the trailer).
- If feasible, place base material or keep unpaved access roads moist to minimize dust on access road.
- Traffic speeds on all unpaved roads shall be reduced to 15 mph or less.
- Revegetate disturbed areas as quickly as possible.
- All excavating and grading operations shall be suspended when wind speeds (as instantaneous gusts) exceed 25 mph and dust plumes are visible.
- All on-site streets shall be swept once a day if visible soil materials are carried to adjacent streets (recommend water sweepers with reclaimed water).
- Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash trucks and any equipment leaving the site each trip.

AQ-2 Dust generated by the construction activities shall be retained on site and kept to a minimum by the following dust control measures.

- During clearing, grading, earth moving, excavation, or transportation of cut or fill materials, water trucks or sprinkler systems shall be used to prevent dust from leaving the site and to create a crust after each day's activities cease.
- During construction, water trucks or sprinkler systems shall be used to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a

minimum, this would include wetting down such areas in the late morning and after work is completed for the day and whenever wind exceeds 15 mph.

- Immediately after clearing, grading, earth moving, or excavation is completed, the entire area of disturbed soil should be treated or properly maintained so that dust generation will not occur.

- Soil stockpiled for more than two days should be covered, kept moist, or treated with soil binders to prevent dust generation.

- Trucks transporting soil, sand, cut or fill materials, and/or construction debris to or from the site shall be tarped, sufficient amount of water applied to minimize dust, or maintain six inches of freeboard from the point of origin.

11.7 MITIGATION MEASURES FOR NOISE

No mitigation is required.

11.8 MITIGATION MEASURES FOR BIOLOGICAL RESOURCES

B-1 The IWMD will prepare a NCCP Major Amendment to address impacts associated with the unauthorized loss of 138.34 acres of CSS at the FRB Landfill during MDP implementation. As part of the Major Amendment, the County of Orange's IWMD will tailor a plan to enhance subregional habitat values and balance important solid waste infrastructure requirements. A component of the plan will be focused on executing a strategy to ensure no net loss of subregional habitat values as a result of the development and implementation of the FRB MDP.

The plan will include the conversion of Oso Nursery to open space by restoring the site with CSS to enhance connectivity between the Central Subregion and Southern Subregion of the NCCP. As an additional supplement to Oso Nursery, Santiago Canyon Landfill will receive treatment to restore 66 acres and compensate for 33 acres (2:1) of CSS take authorization. In addition, and part of the supplemental program, the Santiago Canyon Landfill easement restoration of 56.7 acres will compensate for 28 acres (2:1). To cover the balance and create a surplus at FRB Landfill, IWMD will transfer existing County CSS Take Authorizations totaling 45 acres (1:1).

B-2 The IWMD will mitigate for impacts to southern willow scrub and southern sycamore riparian woodland and jurisdictional areas. The IWMD will work with the ACOE, CDFG and Regional Water Quality Control Board (RWQCB) to develop appropriate mitigation measures. The IWMD has proposed preliminary mitigation for the project. Conceptual mitigation for project impacts is proposed to include: (1) Giant reed eradication in the headwaters of Oso Creek on the County owned parcel at the Oso Nursery site (commences FY 06-07), which will include five years of maintenance and monitoring, and (2) payment of an in-lieu fee for restoration and enhancement activities in the San Diego Creek watershed.

With the above action, it is the intent of IWMD to mitigate for the lost functions and values of the wetland/riparian community, consistent with resource agency requirements and conditions presented in Section 404 Corps permit and 1602 CDFG Streambed Alteration Agreement and meet the regulatory standards for the applicable state and/or federal regulatory programs.

B-3 During final design of the project, the Project Biologist will review the design plans and make recommendations for avoidance and minimization of sensitive biological resources. The IWMD or other implementing agency/agencies staff shall determine the feasible and practicable implementation of those recommendations.

B-4 In conjunction with the development of final design plans and specifications for construction, or other activities involving vegetation/habitat removal, the Project Biologist shall approve the final design map of all sensitive habitats (Environmentally Sensitive Areas) within 152.4 meters (500 feet) of the grading limits on the grading plans.

B-5 A Biological Resources Management Plan (BRMP) will be prepared prior to construction. The BRMP will provide specific design and implementation features of the biological resources mitigation measures outlined in resource agency approval documents. Issues during construction and operation to be addressed in the BRMP should include, but are not limited to, resource avoidance, minimization, and restoration guidelines, performance standards, maintenance criteria, and monitoring requirements.

The primary goal of the BRMP will be to ensure the long term perpetuation of the existing diversity of habitats through restoration in the project area and adjacent urban interface zones, if any, and to prevent offsite or indirect effects. The BRMP should contain, at a minimum, the following:

- Identification of all Environmentally Sensitive Areas (ESA). ESAs are defined as sensitive habitats including, but not limited to, areas subject to the jurisdiction of the CDFG, ACOE, and USFWS and identified in the Central and Coastal Subregion NCCP/HCP.

- Design of protective fencing (i.e., t-bar or yellow rope) around ESAs and the construction staging areas.

- For areas that will be restored, the quality of the adjacent habitat should be characterized. This characterization should include species composition, density, coverage, and presence of nonnatives. This characterization will provide a baseline to compare the success of the restoration. The site preparation plan for each restoration site should include:

  - Sources of plant materials and methods of propagation.

  - Site preparation (clearing, grading, weed eradication, soil amendment, topsoil storage), irrigation, planting (container plantings, seeding), and maintenance (weed control, irrigation system checks, replanting) of restoration areas. Specification of parameters for maintenance and monitoring of restoration areas, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas.

  - Remedial measures to be taken if performance standards are not met.
  - Methods and requirements for monitoring of the restoration efforts.
  - Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within restoration areas.

- Specific measures should be identified for the protection of sensitive habitats to be preserved in and adjacent to the FRB property to ensure that construction does not increase beyond the impacts identified in the EIR. These measures should include, but are not limited to, erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements.

B-6 IWMD or other implementing agency/agencies will continue to employ a Project Biologist at the FRB Landfill responsible for overseeing biological monitoring, regulatory compliance, and restoration activities associated with construction of the proposed project in accordance with the adopted mitigation measures and applicable law.

The Project Biologist's duties include:

- Review of design plans and recommends ways to minimize impacts.
- Review final design and specifications of projects impacting resources or those within 500 feet of sensitive habitats for compliance with BRMP and/or applicable resource agency permits.
- Monitor grading and document compliance with minimization measures.

B-7 During grading activities and construction operations, the Project Biologist will conduct monitoring within and adjacent to sensitive habitats including monitoring of the installation of protective devices (silt fencing, sandbags, fencing, etc.), installation and/or removal of creek crossing fill, construction of access roads, vegetation removal, and other associated construction activities, as deemed appropriate by the Project Biologist. Biological monitoring should be conducted to document adherence to habitat avoidance and minimization measures addressed in the project mitigation measures and as listed in the USFWS, CDFG, and ACOE permits/agreements.

B-8 IWMD will implement the standard mandatory construction condition mitigation measures below as defined in the NCCP Compliance Procedural Guidelines for Landfill Related Projects:

- To the extent practicable, clearing and grading of CSS habitat will occur outside of the breeding and nesting season for the CAGN (February 15 through July 15) and other bird species, including Southern California rufous-crowned sparrow and raptors.

- Prior to the commencement of clearing or grading activities, a survey will be conducted within the project site to determine the presence/absence of CAGN or cactus wren. The survey will extend 100 feet from the grading limits. The locations of CAGN or cactus wren observed within the survey area will be clearly marked and identified on the construction/grading plans.

- Prior to the commencement of grading, all areas of CSS habitat located outside of the project footprint will be fenced or marked with materials clearly visible to construction personnel. No construction access, parking or storage of equipment or materials will be permitted within these marked areas. Waste dirt or rubble will not be deposited on adjacent CSS.

- Pre-construction meetings will be conducted and documented by the monitoring biologist to educate construction supervisors, equipment operators, and other site employees on the importance of adherence to conservation measures.

- A qualified monitoring biologist will be on site during the clearing of CSS. The IWMD will advise the USFWS/CDFG at least seven (7) calendar days (and preferably fourteen [14] calendar days) prior to the clearing of any habitat occupied by target species to allow USFWS/CDFG to coordinate with the monitoring biologist. It will be the responsibility of the monitoring biologist to ensure that CAGNs and cactus wrens are not directly harmed by brush-clearing and earth-moving equipment.

- Access roads shall be periodically sprayed with water to reduce the potential for dust accumulation on the leaves of CSS species, as recommended by the monitoring biologist.

B-9 IWMD shall conduct pre-construction surveys for thread-leaved brodiaea, many-stemmed dudleya, vernal barley and chaparral beargrass in areas of suitable habitat prior to construction. If any of these plant species are found within the project limits, a conceptual mitigation plan will be prepared by IWMD for any significant impacts that would be expected on these species as a result of the proposed project.

B-10 IWMD shall implement the following mitigation measures below:

IWMD shall implement a duff (i.e., seed material) and/or re-vegetation plan within the NCCP Reserve to reestablish CSS impacted by the proposed project. The plan shall be implemented and monitored by a qualified Restoration Ecologist familiar with the biology and ecology of the Southern California plant communities and that of the project site. Location of candidate duff and/or re-vegetation areas within the landfill will be coordinated with IWMD operations staff. Where appropriate, duff shall be collected from areas in which CSS is removed. This material shall be placed in areas deemed appropriate by IWMD for re-vegetation and weed abatement, or temporarily inactive disposal area slopes.

IWMD is currently implementing a successful revegetation program at the FRB Landfill site for the restoration of CSS. As the Landfill is developed, upon completion of each phase, and the beginning of a new phase, CSS duff material from the new phase is collected and transported to the completed phase, where the duff is revegetated on the side slopes of the Landfill. The completed phase is then hydroseeded with CSS. A maintenance crew, directed by the on-site restoration ecologist, is responsible for maintaining all of the CSS revegetation areas on the project site, keeping theses areas free of invasive non-native weeds, debris and litter. IWMD will continue to perform maintenance and monitoring of each CSS revegetation area until the sites have reached their performance objectives.

B-11 The impacts to IML occur during Phases VIII A, VIII B, IX, and X Excavations of the FRB MDP. Under NCCP/HCP regulations, if a population of more than twenty (20) individual plants is identified, then the County is required to prepare a mitigation plan that: (1) addresses design modifications or other on-site measures that are consistent with the project's purpose, minimizes impacts to IML habitat, and provides appropriate protections for any adjoining conserved IML habitat; (2) provides for an evaluation of salvage, restoration/enhancement/management of other conserved IML, or other mitigation techniques to determine the most appropriate mitigation measures to offset impacts, and implements mitigation consistent with the foregoing evaluation; and, (3) provides for monitoring and adaptive management of IML consistent with Chapter 5 of the NCCP/HCP. This mitigation plan must also be developed in coordination with USFWS, CDFG, and Nature Reserve of Orange County (NROC), and approved by the USFWS. The IWMD will be required to develop a transplantation program for impact to IML in accordance with requirements noted above and in coordination with the NROC, CDFG and USFWS.

In order to pre-mitigate for FRB MDP impacts to the IML, IWMD is already implementing a long-term mitigation plan as the FRB site that includes the excavation and transplantation of bulbs, seed collection, nursery propagation, experimental studies and long term performance monitoring. The first phase of the IML Mitigation Plan was completed in August 2004, when 234 IML bulbs were transplanted to four receptor sites in the northeast corner of the FRB property, outside of the future FRB MDP development limits.

B-12 The impacts to many-stemmed dudleya occur during Phase IX Excavation of the FRB MDP. IWMD shall prepare a mitigation plan for the transplantation of a population of 1,838 plants located within the MDP disturbance footprint to avoid direct impacts.

11.9 MITIGATION MEASURES FOR AESTHETICS

AS-1 The interim and final slopes of the landfill will be seeded with CSS species that are found on hills adjacent to the landfill. Interim slopes will be seeded as each lift is completed. Implementation of this measure will assist in blending the landfill with the adjacent undeveloped hills.

AS-2 All outdoor lighting, including any construction-related lighting, shall be designed, installed, and operated in a manner that ensures that all direct rays from project lighting are contained within the landfill property, and that residences and undeveloped areas that may provide wildlife value are protected from spillover light and glare.

11.10 MITIGATION MEASURES FOR CULTURAL AND SCIENTIFIC RESOURCES

CR-1 Prior to the issuance of grading permit(s), the project developer(s) shall retain a qualified cultural resource specialist, to the satisfaction of the County of Orange IWMD, to monitor the project's subsurface areas during grubbing and land disturbance from construction activities that previously were not effectively surveyed. The cultural resource specialist shall examine, evaluate, and determine the most appropriate disposition of any potential artifact and shall have the authority to temporarily halt work until any identified artifacts can be recovered, handled, and/or surveyed in the appropriate manner.

CR-2 Prior to issuance of grading permit(s) and prior to excavation to a depth of more than 15 feet below the modern ground surface, the project developer(s) shall retain an archaeological and paleontological resource specialist, to the satisfaction of the County of Orange IWMD, to conduct archaeological and paleontological resource monitoring.

11.11 MITIGATION MEASURES FOR HAZARDS/RISK OF UPSET

No mitigation is required.

SECTION 12.0
LIST OF PREPARERS

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SECTION 13.0
REFERENCES

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