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

VOLUME II

State Clearinghouse Number 2005071102

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August 2006

TABLE OF CONTENTS

APPENDICES

A. Initial Study/Environmental Checklist and Notice of Preparation (NOP)
B. NOP Distribution List
C. Comment Letters Received on the NOP
D. Scoping Meeting Notice/Attendance List/Scoping Meeting Comments
E. Hydrology and Soil Loss Calculations
F. Traffic Impact Study
G. Air Quality Analysis
H. Noise and Vibration Study
I. Biological Resources
J. Cultural Resource Assessment

APPENDICES

APPENDIX A
INITIAL STUDY/ENVIRONMENTAL CHECKLIST AND NOTICE OF PREPARATION (NOP)

INTEGRATED WASTE MANAGEMENT DEPARTMENT
320 N. FLOWER STREET, SUITE 400
SANTA ANA, CALIFORNIA 92703

POSTED
JUL 21 2005
TOM DALY, CLERK-RECORDER
By _____ DEPUTY

NOTICE OF PREPARATION

DATE: July 21, 2005

SUBJECT: Notice to Prepare a Draft Environmental Impact Report

PROJECT TITLE: Regional Landfill Options for Orange County (RELOOC) Strategic Plan-Frank R. Bowerman (FRB) Landfill Implementation

APPLICANT: County of Orange Integrated Waste Management Department

PROJECT CONTACT: Linda Hagthrop, Public Information Officer
Phone: (714) 834-4176
Fax: (714) 834-4057
E-Mail: FRBEIR@iwmd.ocgov.com

The County of Orange Integrated Waste Management Department (IWMD) prepared an Environmental Analysis Checklist for the proposed RELOOC Strategic Plan-FRB Landfill Implementation project and has determined that an Environmental Impact Report (EIR) is necessary for this proposed project. The County of Orange IWMD will be the Lead Agency for the project and will prepare the EIR. In order for your concerns to be incorporated into the EIR, we request your input as to the scope and content of the environmental information. In the case of some agencies receiving this Notice, your agency must consider the EIR prepared by the County of Orange IWMD when considering a permit or approval for the project. Please restrict your comments to issues to be addressed in the EIR relevant to your agency's statutory responsibilities for the proposed project. The project description, location, a description of alternatives under review and an analysis indicating the probable environmental effects of the proposed project are provided in the attached materials. Interested individuals and groups also are invited to comment on the issues to be addressed in the EIR.

Pursuant to Section 21080.4 of CEQA, your response must be sent as soon as possible but *not later than 30 days after receipt of this notice.*

A public scoping meeting for the EIR for the proposed project is scheduled for August 4, 2005 at Lakeview Senior Center at 7:30 PM. Lakeview Senior Center is located at 20 Lake Road, Irvine, CA. All parties are invited to attend this meeting to provide comments and input on the contents of the EIR for this project.

All parties that have submitted their names and mailing addresses will be notified if any significant changes in the proposed project occur. If you wish to be placed on the mailing list, have any questions or need additional information please submit your contact information to the Project Contact (Ms. Linda Hagthrop) at the address below or by e-mail at the address provided above. Comments related to the Draft EIR and the proposed project should be submitted to Cymantha Atkinson at County of Orange, Integrated Waste Management Department, Office of Public Affairs, 320 North Flower Street, Suite 400, Santa Ana, CA 92703 or by e-mail at the address provided above.

Submitted by:

Cymantha Atkinson

Cymantha Atkinson, Project Manager

Attachment: Notice of Preparation for Draft EIR 604
Initial Study and Environmental Analysis Checklist

NOTICE OF PREPARATION
For Draft EIR 604

Regional Landfill Options for Orange County (RELOOC)
Strategic Plan – Frank R. Bowerman Landfill Implementation

1.0 INTRODUCTION

In compliance with the California Environmental Quality Act (CEQA), the County of Orange's Integrated Waste Management Department (IWMD) is preparing an Environmental Impact Report (EIR) to consider potential impacts from its proposed vertical and horizontal expansions of the Frank R. Bowerman (FRB) Landfill. The Notice of Preparation (NOP) is being provided to responsible, trustee, federal, state and local agencies and other interested parties for the purpose of soliciting comments on the scope of the EIR and potential environmental impacts that may result from this proposed project.

2.0 BACKGROUND

2.1 REGIONAL LANDFILL OPTIONS FOR ORANGE COUNTY (RELOOC)

2.1.1 Strategic Planning

Strategic planning for municipal solid waste (MSW) needs in Orange County is the responsibility of the IWMD. The 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." Regional Landfill Options for Orange County (RELOOC) is a long range strategic planning project initiated by IWMD in 1998 to address existing disposal system capabilities and future needs, and to develop viable short and long term solid waste disposal options for the County. Following completion of the planning and feasibility phases of RELOOC, the Orange County Board of Supervisors selected the Strategic Plan (described below) as the preferred alternative to be evaluated in compliance with the requirements of CEQA. The RELOOC Strategic Plan provides a framework for solid waste management over the next 40 years. The RELOOC Strategic Plan includes a two-phased approach to accomplishing this goal.

Phase I strategies include fully utilizing existing landfill system capacity by:

- Maximizing operational efficiency at the three existing County landfills.
- Vertical and horizontal expansions at the 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 strategies 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 the 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 FRB Landfill into adjacent Round Canyon prior to re-negotiation of the 2017-2027 Waste Disposal Agreements.

The purpose of this current EIR is to analyze potential impacts and provide environmental documentation for the proposed expansion at the FRB Landfill, identified as a Phase I strategy in the RELOOC Strategic Plan. A detailed discussion of the proposed project based on parameters developed pursuant to the RELOOC Strategic Plan is provided later in Section 4.0.

2.1.2 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 on 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).
- County of Orange (County Executive Office).
- IWMD.

The RELOOC Steering Committee directed the Consultant Team (comprised of landfill engineers, environmental experts and other individuals under contract with the IWMD) to assess the County's existing disposal system capabilities and develop viable long range solid waste disposal options for the County. Key tasks performed by the project 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 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 using a Community Involvement Program (CIP) developed specifically for RELOOC. The CIP and preliminary findings of the RELOOC Feasibility Study Report 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 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:

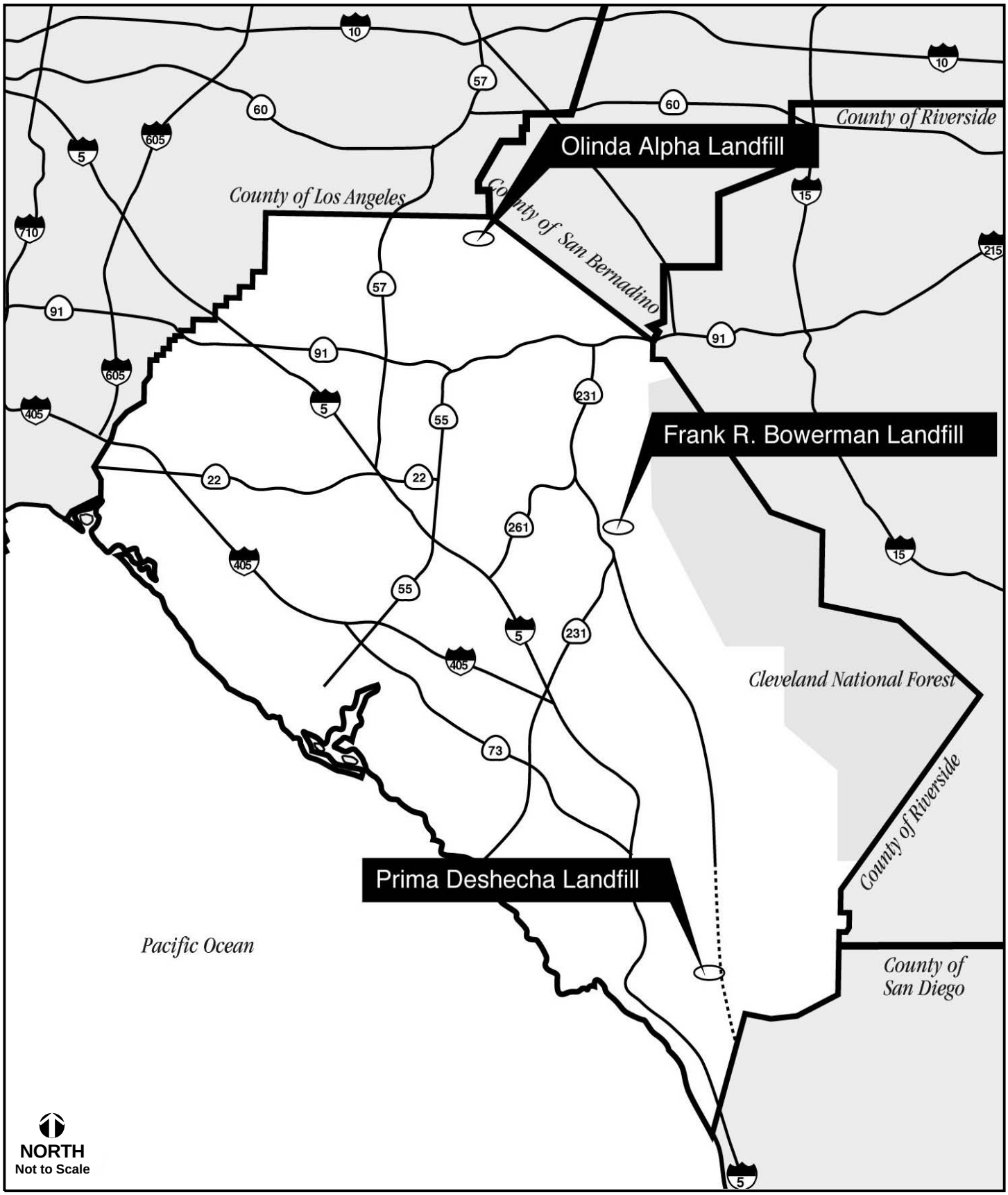
- A Final EIR has been prepared for the proposed vertical and horizontal expansion at the Olinda Alpha Landfill and was submitted to the Orange County Planning Commission. The Planning Commission recommended to the Board of Supervisors that the Final EIR was adequate. The Final EIR is pending certification by the County Board of Supervisors and a revised Memorandum of Understanding between the City of Brea and the County of Orange is currently being negotiated.

- Initiation of the preparation of an EIR for the proposed vertical and horizontal expansions and other project components at FRB Landfill, starting with this NOP.

2.2 COUNTY OF ORANGE SOLID WASTE DISPOSAL SYSTEM

2.2.1 Active Landfills and Former Refuse Disposal Stations

IWMD operates three MSW landfills strategically located throughout the County. Figure 1 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. FRB Landfill serves the central area of the County and also receives MSW from southeastern Los Angeles County. 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 (unless Olinda Alpha Landfill closes in 2013 and in-County waste needs to be exported).



Source: P&D Consultants (2005).

Figure 1
Locations of Existing Orange County Landfills

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.

2.2.2 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.

2.2.3 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.

2.2.4 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 (CCR), primarily Title 27, and the Code of Federal Regulations, Title V (Clean Air Act) and Title 40 (CFR), Parts 257 and 258 (Subtitle D) for landfills. 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 Orange County landfills 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. A LFG extraction system and flare station is located at each landfill for LFG control. In addition, the use of LFG for energy production currently is being conducted at the Olinda Alpha and Prima Deshecha landfills and is in the development stages for FRB Landfill. A groundwater remediation program including extraction wells and treatment currently is ongoing at Olinda Alpha Landfill. Additional LFG extraction wells and increased groundwater monitoring have been implemented at Prima Deshecha and FRB landfills to determine whether groundwater remediation efforts also may be required at these sites.

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 also are 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 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). Adherence to applicable laws and regulations would be required as part of project approval and operating conditions for the proposed expansion project at 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.

2.2.5 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 permitted remaining refuse capacity for Olinda Alpha, FRB and Prima Deshecha landfills is 19.7, 44.6 and 78.6 million tons, as of June 30, 2005. Prima Deshecha Landfill recently underwent a permit revision process (in 2004) that maximized the capacity of that site.

The permitted daily tonnage limit for 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. 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. 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 currently is 4,000 TPD.

2.2.6 Existing Landfill Agreements and Permits

A number of landfill agreements and permits currently are 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 contract cities through 2010 that are subject to renegotiation in 2007. Approval of the proposed project at 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.

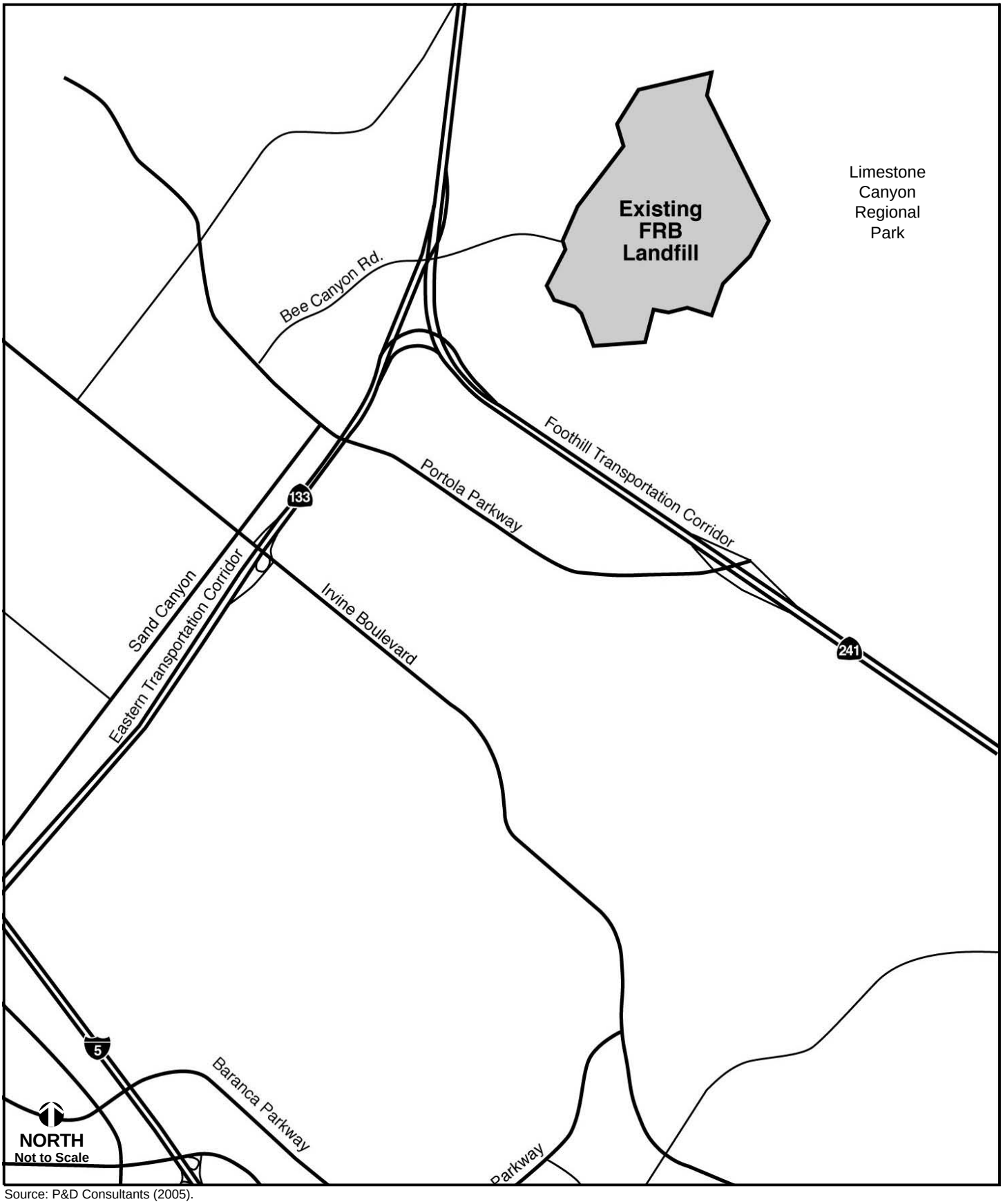
2.2.7 Existing Landfill Characteristics

Frank R. Bowerman Landfill

As shown in Figure 2, FRB Landfill is located in unincorporated Orange County, at 11002 Bee Canyon Access Road, near the City of Irvine. Access to the landfill is available 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. The facility is open Monday through Saturday, 7:00 AM to 4:00 PM for all commercial customers. Transfer trucks only are permitted from 4:00 PM to 5:00 PM. 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 this landfill.

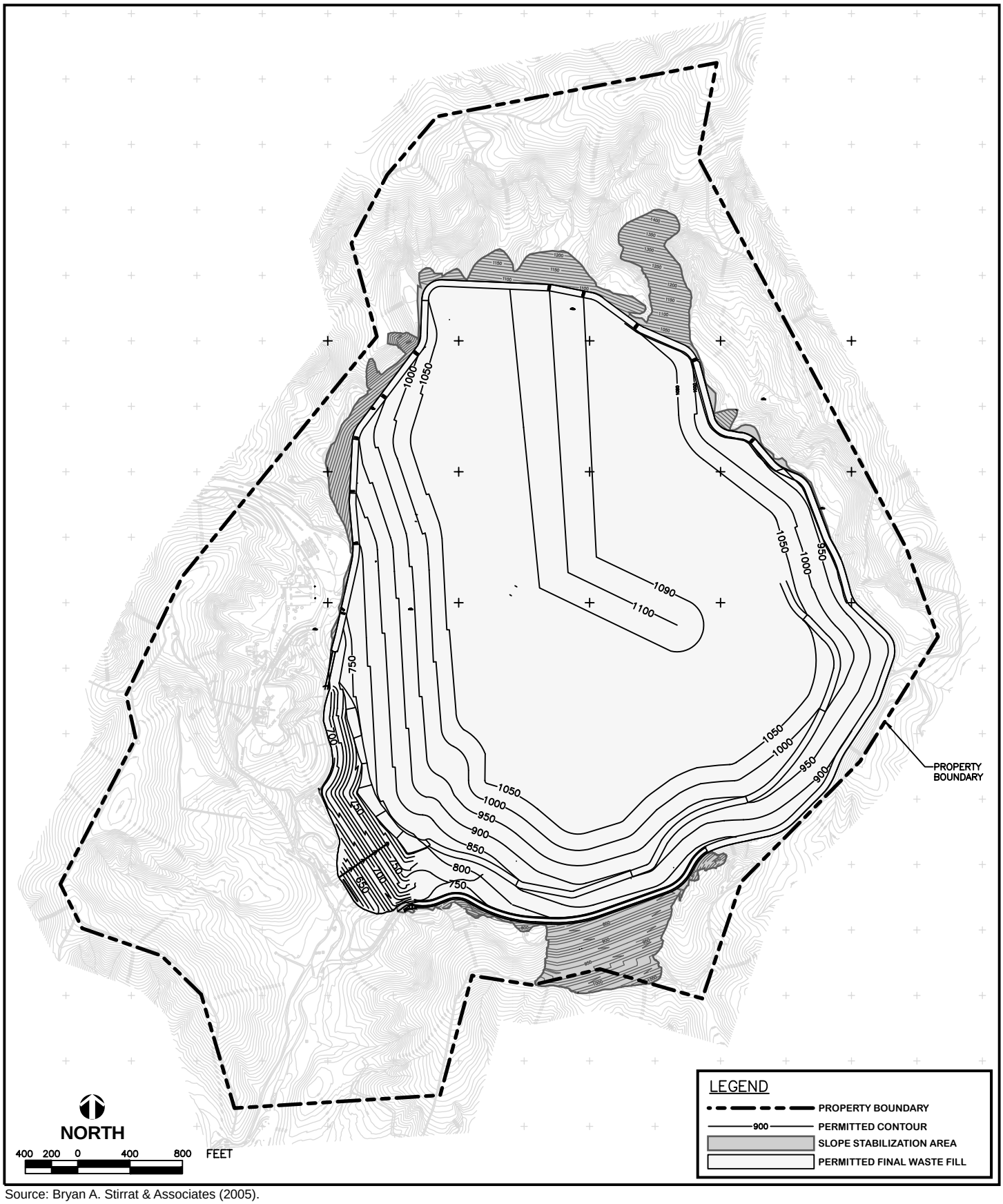
Under the Settlement Agreement with the City of Irvine, FRB Landfill is currently allowed to accept an annual average of 7,921 TPD (as of December, 2004) and can increase this average daily rate by 1.75 percent per year until it reaches a daily maximum of 8,500 TPD. The current SWFP for the FRB Landfill allows for a maximum daily tonnage limit of 8,500 TPD 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 FRB Landfill property covers approximately 725 acres with 341 acres permitted for waste disposal. Figure 3 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 million cubic yards (mcy). The permitted acreage, airspace and closure date were determined based on operational assumptions made prior to a major landslide at FRB Landfill in 2002. The landslide effectively reduced the available disposal area, which in turn reduced the available airspace by over 40 mcy and reduced the site life to 2014. As a result, IWMD re-evaluated and re-designed the site's Master Plan for future development. In addition, the new Master 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 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.



Source: P&D Consultants (2005).

Figure 2
Frank R. Bowerman Landfill



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

Figure 3
Permitted Landfill Limits

Olinda Alpha Landfill

Olinda Alpha Landfill is located in unincorporated Orange County, at 1942 North Valencia Avenue near the City of Brea, as shown on Figure 4. 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. The landfill is open Monday through Saturday from 6:00 AM to 7:00 AM for transfer trucks only and from 7:00 AM to 4:00 PM 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 (i.e., tires) also are accepted. Hazardous materials such as asbestos, batteries, chemicals, paints, non-autoclaved medical waste and other substances considered hazardous are not accepted at this landfill.

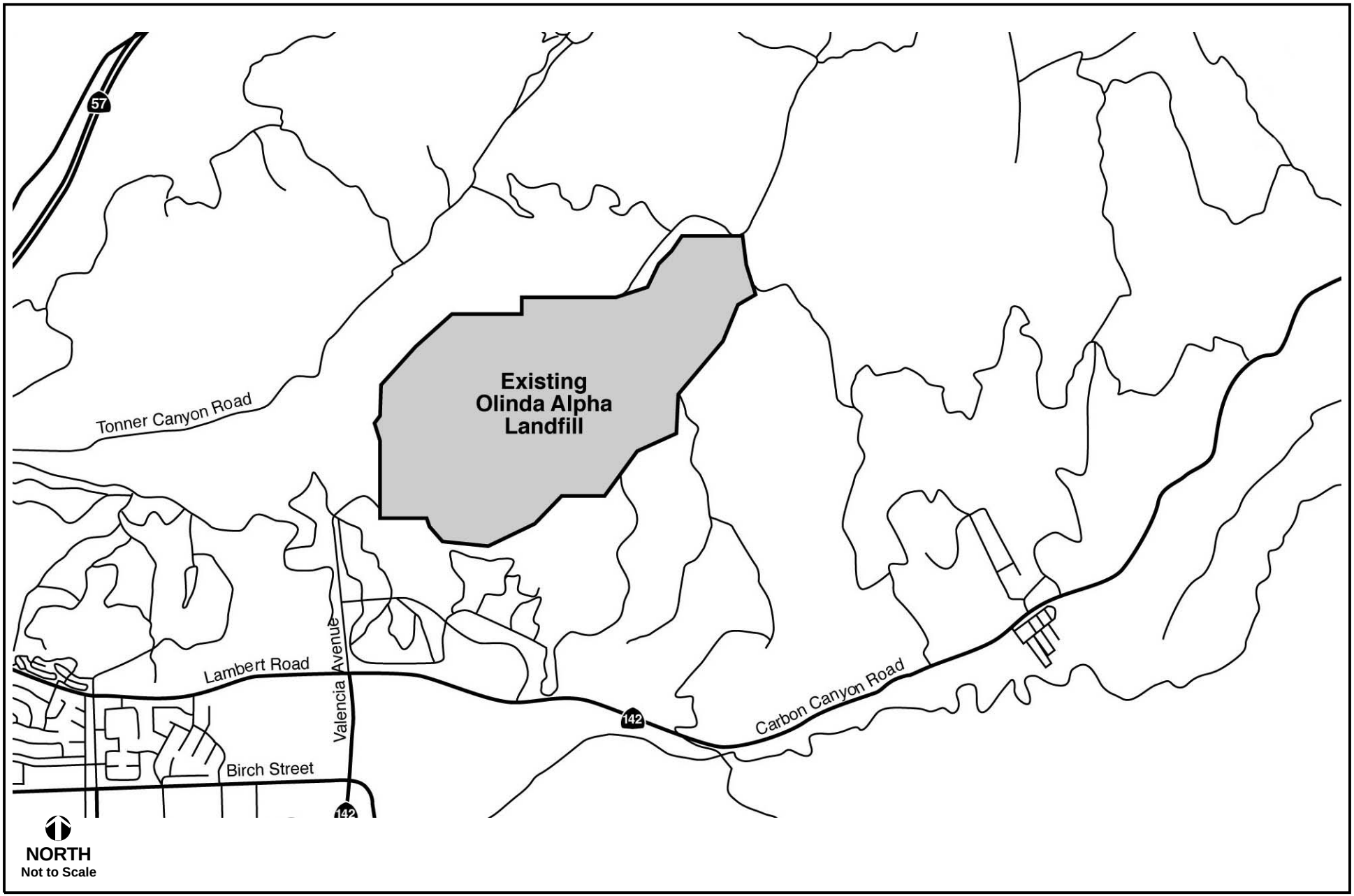
A Memorandum of Understanding (MOU) between the County and the City of Brea limits daily waste disposal to an annual average of 7,000 TPD. However, the Olinda Alpha Landfill SWFP currently allows a daily maximum of 8,000 TPD of MSW. The annual average TPD at the Olinda Alpha Landfill will remain at 7,000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

As part of RELOOC, a Final 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 and a Memorandum of Understanding between the City of Brea and the County of Orange is currently being negotiated.

As described later in this Section, the proposed RELOOC Strategic Plan-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.

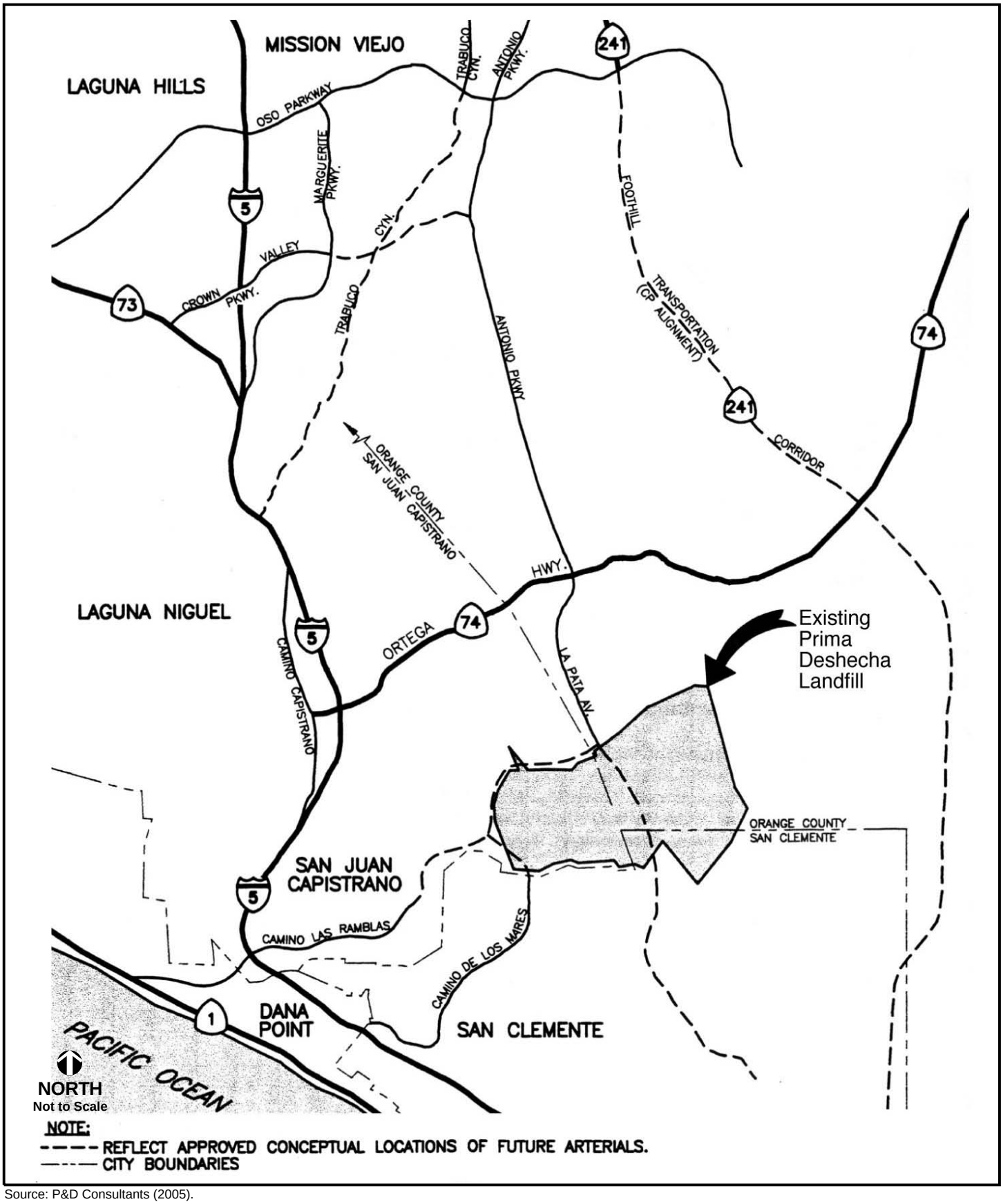
Prima Deshecha Landfill

Prima Deshecha Landfill is located at 32250 La Pata Avenue as shown on Figure 5. 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 AM to 4:00 PM for all customers. Commercial trucks and dump trucks are exclusively permitted from 4:00 PM to 5:00 PM. 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



Source: P&D Consultants (2005).

Figure 4
Olinda Alpha Landfill



Source: P&D Consultants (2005).

Figure 5
Prima Deshecha Landfill

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 later in this Section, the proposed RELOOC Strategic Plan-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 FRB Landfill assumes an increase in the TPD of MSW disposed of at Prima Deshecha Landfill.

3.0 PROJECT OBJECTIVES

The objectives of the proposed project at 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 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. The following project objective addresses the intent of the proposed project to provide for landslide remediation:

- 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.

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.

4.0 PROJECT DESCRIPTION

4.1 PURPOSE OF THE PROJECT

The RELOOC Strategic Plan is a long range strategic plan prepared by the County of Orange IWMD. The purpose of RELOOC was 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 the Strategic Plan, the County identified a number of proposed improvements to the three existing MSW landfills operated by IWMD. The RELOOC improvements proposed at the existing FRB Landfill are:

1. Phased vertical and horizontal expansions of the FRB refuse footprint within the existing property boundary, as shown on Figure 6. 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 in 2014 to approximately 2053.

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

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

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

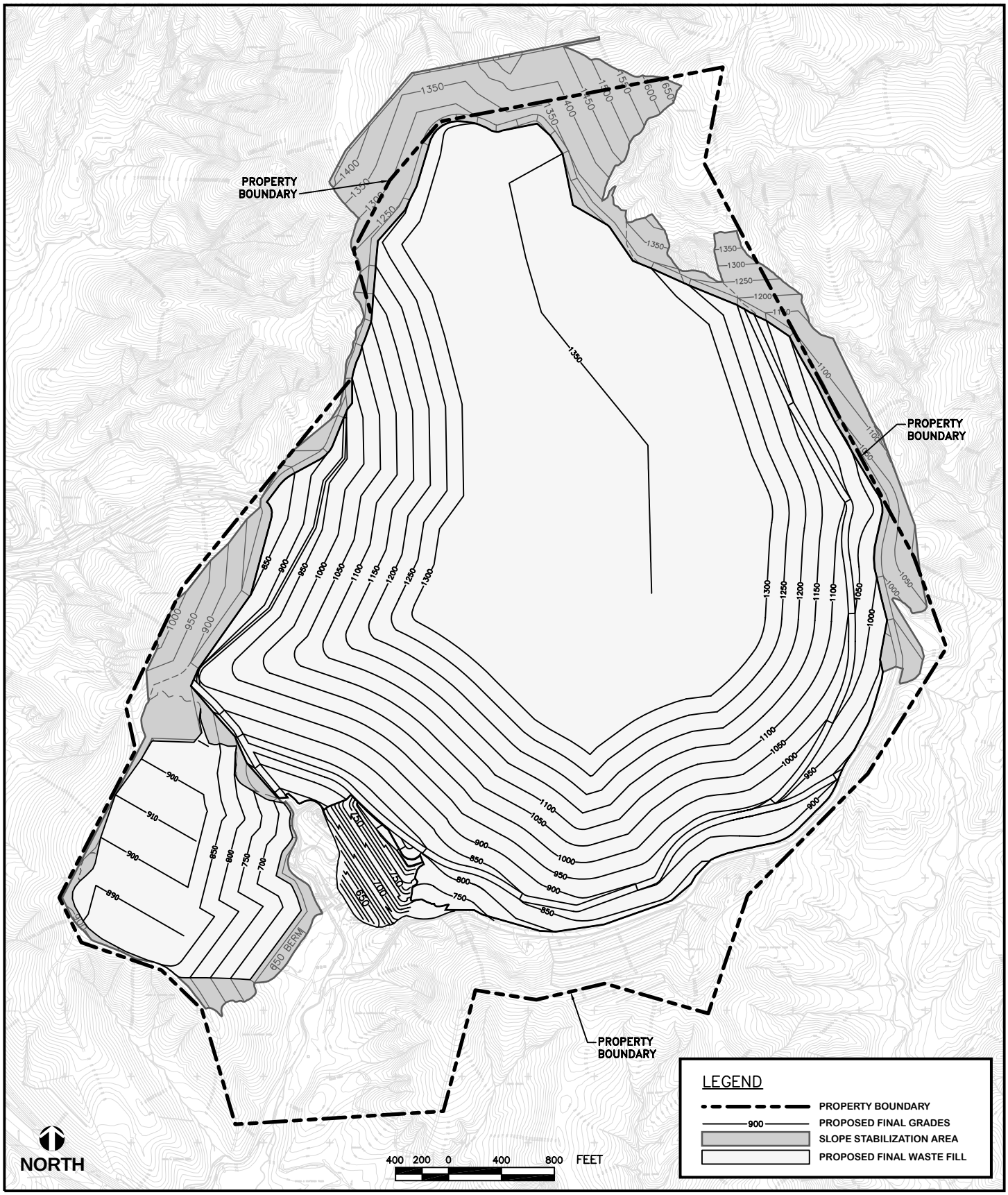
The following project component reflects the desire of IWMD to reduce potential biological resources impacts associated with cover soil acquisition and stockpiling at FRB Landfill:

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. Those provisions are based in part on the adopted Natural Communities Conservation Plan (NCCP) for this part 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 and duff management areas on the landfill property.

The draft EIR for the proposed project will analyze the potential environmental impacts associated with these project components and with continued operation of FRB Landfill from 2022 to the estimated horizon or closure year 2053.



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

Figure 6
Proposed Landfill Expansion

4.2 PROPOSED PROJECT

4.2.1 Increased Tonnage and Expansions at 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 FRB Landfill.

The current operating permits for the FRB Landfill place an 8,500 TPD limit on operations with the exception of 36 days allowed for high tonnage. A Mitigated Negative Declaration (MND) for the Maximum High Tonnage Days project approved for this landfill in 2004 identified the need to accommodate higher volumes of waste disposal due to holidays, large demolition projects (like the removal of military structures and aviation facilities at the decommissioned Marine Corps Air Station El Toro) and other similar high waste circumstances. The adopted high tonnage project assumes a maximum daily high tonnage at the FRB Landfill of 10,625 TPD (a 25 percent increase over 8,500 TPD) for 36 days per year which would include a moderate increase in on site equipment, operations and staff to accommodate the higher tonnage on those days. The increase in daily tonnage to a maximum 11,500 TPD under the proposed project would be analyzed as a worst case daily maximum rate while still maintaining an 8,500 TPD annual average inflow rate.

The expansion of FRB Landfill would provide an additional MSW capacity of 130 million cubic yards (mcy) over the current effective capacity which would extend the life of the landfill from its current effective closure date of 2014 to approximately 2053, based on an annual average refuse inflow rate at the currently permitted limit of 8,500 TPD by 2010 in accordance with the existing City of Irvine Settlement Agreement for the landfill. 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 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 FRB Landfill would be increased from its current permitted level of 1,100 feet above mean sea level (MSL) to about 1,350 above MSL or a net vertical increase of approximately 250 feet. The horizontal expansion would include landform modifications to provide for an additional approximate 193 acres of refuse footprint area (total proposed project

refuse footprint approximately 534 acres), over the currently permitted refuse footprint of 341 acres. Expansion of the refuse footprint would be contained within the existing 725 acre landfill property. A total of 130 additional acres (total proposed project disturbance area approximately 655 acres) is proposed to be disturbed beyond the permitted disturbance area of 525 acres.

4.2.2 Slope Stabilization

Slope stabilization is required in the northern and eastern parts of the landfill site to provide a stable subgrade designated for the landfill within areas underlain by landslides. Approximately 34 acres outside the landfill property boundary would be included within the disturbance limits for slope stabilization. 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 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 on that area prior to the project disturbance. The IOD places other permit conditions on the remedial grading for erosion control and drainage. The proposed slope stabilization areas are shown on Figure 6.

4.2.3 Soil Management Plan for FRB Landfill

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 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 increasing refuse-to-soil ratios through the use of alternative daily covers.

4.2.4 Native Plant and Animal Protection on the FRB Landfill Property

The 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.

4.2.5 Phasing of the Expansions at FRB Landfill

The vertical and horizontal expansions of FRB Landfill would be implemented in phases and would not disturb all parts of the landfill site at once. These phased areas of development currently are being defined in detail and will be provided in the EIR. Preliminary grading plans indicate that approximately 37 million cubic yards (mcy) of soil would be excavated throughout the life of the proposed expansion for FRB Landfill.

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 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 at this landfill. Waste would be deposited, compacted and covered daily using appropriate landfilling methods.

4.2.6 Waste Composition at FRB Landfill

The waste composition at 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.

4.2.7 Access to/from FRB Landfill

Access to FRB Landfill would remain unchanged, with local access provided via Bee Canyon Access Road, Sand Canyon Avenue, Portola Parkway and regional access via I-5 and I-405.

4.2.8 Other Project Features

The project may require that additional buildings and structures be constructed at 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 at the landfill will not change substantially as a result of the proposed project. Employees would 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 FRB Landfill would not change substantially. The operating hours, days and schedule at FRB Landfill would not change as a result of the proposed project.

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

5.0 ALTERNATIVES CONSIDERED

Section 15126.6(a) of the CEQA Guidelines indicates that "...an EIR shall describe a reasonable range of alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." Further, Section 15126(c) of the CEQA Guidelines notes, "...the range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic

objectives of the project and could avoid or substantially lessen one or more of the significant effects."

The alternatives to the proposed project at FRB Landfill include the No Project Alternative and three build alternatives, as described in the following Sections. The build alternatives were developed to meet most or all of the defined project objectives.

5.1 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 FRB Landfill:

- No vertical and horizontal expansions at FRB Landfill.
- No extension in the life of 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 FRB Landfill.
- No change in the County's existing Settlement Agreement with the City of Irvine and existing permits with the CIWMB and other regulatory agencies with jurisdictional oversight for FRB Landfill.

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 requiring an amendment to the existing Memorandum of Understanding between the County and the City of Brea and the existing landfill operating permits.

The No Project Alternative would include no action by the County of Orange. Under this Alternative, none of the proposed project components at FRB Landfill would occur. As such, under this Alternative, 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.

5.2 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 FRB Landfill:

- The same vertical and horizontal expansions at FRB Landfill as under the proposed project.
- Extension of the life of 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 FRB Landfill.
- No change in on site equipment, operations and staff at this landfill.
- No change in the number of daily truck trips to FRB Landfill.
- Amendments to the County's existing Settlement Agreement with the City of Irvine and existing permits with the CIWMB and other regulatory agencies with jurisdictional oversight for FRB Landfill.

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 requiring an amendment to the existing Memorandum of Understanding between the County and the City of Brea and the existing landfill operating permits.

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 FRB Landfill, except an increase in TPD, would occur. Under Alternatives 2a and 2b, 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 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.

5.3 ALTERNATIVES 3a and 3b - FRB EXPANSION: DAILY TONNAGE (ANNUAL AVERAGE) INCREASE TO 11,500 TPD

Alternative 3a/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 FRB Landfill:

- The same vertical and horizontal expansions at FRB Landfill as under the proposed project.
- Extension of the life of FRB Landfill to 2044 under Alternative 3a.
- Extension of the life of 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 FRB Landfill.

- Increase in on site equipment, operations and staff at this landfill.
- Increase in the number of daily truck trips to FRB Landfill.
- Amendments to the County's existing Settlement Agreement with the City of Irvine and existing permits with the CIWMB and other regulatory agencies with jurisdictional oversight for FRB Landfill.

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 requiring an amendment to the existing Memorandum of Understanding between the County and the City of Brea and the existing landfill operating permits.

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 FRB Landfill would occur. In addition, this Alternative, unlike the proposed project, would increase the Annual Average TPD at FRB Landfill from 8,500 TPD to 11,500 TPD. There would also be an increase in the long term physical capacity at 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).

5.4 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 FRB Landfill:

- The same vertical and horizontal expansions at 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 FRB Landfill.
- No increase in on site equipment, operations and staff at this landfill.
- No increase in the number of daily truck trips to FRB Landfill.
- Amendments to the County's existing Settlement Agreement with the City of Irvine and existing permits with the CIWMB and other regulatory agencies with jurisdictional oversight for FRB Landfill.

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 with close in 2021 requiring an amendment to the existing Memorandum of Understanding between the County and the City of Brea and the existing landfill operating permits.

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 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 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).

6.0 RESPONSIBLE AGENCIES

The agencies listed below have oversight over the project or may be responsible for issuing permits for the proposed project.

6.1 FEDERAL AGENCIES

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

6.2 STATE AGENCIES

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

6.3 REGIONAL AGENCIES

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

6.4 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 Planning Department (OCPD).

6.5 CITY AGENCIES

City of Irvine.

GLOSSARY OF ACRONYMS

ACOE	United States Army Corps of Engineers
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CIP	Community Involvement Program
CIWMB	California Integrated Waste Management Board
CWRCB	California Water Resources Control Board
cy	cubic yard/yards
EIR	Environmental Impact Report
EHD	Environmental Health Department
EPA	United States Environmental Protection Agency
FRB	Frank R. Bowerman
GDP	General Development Plan
HHW	household hazardous waste
I-5	Santa Ana Freeway, Interstate 5
I-405	San Diego Freeway, Interstate 405
IWMD	Integrated Waste Management Department
lbs	pounds
LEA, LEAs	Local Enforcement Agency, Agencies
LFG	Landfill gas
mcy	million cubic yards
MDP	Master Development Plan
MOU	Memorandum of Understanding
MSL	mean sea level
MSW	municipal solid waste
MT	million tons
NCCP	Natural Communities Conservation Plan
NOP	Notice of Preparation
OCBS	Orange County Board of Supervisors
OCFA	Orange County Fire Authority
OCHCA	Orange County Health Care Agency
OCPD	Orange County Planning Department

PFRD	Orange County Public Facilities & Resources Department
RELOOC	Regional Landfill Options for Orange County
RWQCB	Regional Water Quality Control Board
SCAQMD	South Coast Air Quality Management District
SWFP, SWFPs	Solid Waste Facilities Permit, Permits
SWWG	Orange County City Managers Association's Solid Waste Working Group
TPD	tons per day
USFWS	United States Fish and Wildlife Service
WDA	Waste Disposal Agreements
WDR	Waste Discharge Requirements

INITIAL STUDY

PROJECT TITLE: Regional Landfill Options for Orange County (RELOOC) Strategic Plan-Frank R. Bowerman (FRB) Landfill Implementation

LEAD AGENCY: County of Orange Integrated Waste Management Department

INITIAL STUDY NUMBER: 604

LEAD DIVISION: Frank R. Bowerman Landfill

PROJECT CONTACT: Linda Hagthrop, Public Information Officer **PHONE:** (714) 834-4176

PROJECT LOCATION: The proposed project is within the existing FRB Landfill located at 11002 Bee Canyon Access Road in the City of Irvine. 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.

PROJECT DESCRIPTION: RELOOC is a long range strategic plan prepared by the County of Orange Integrated Waste Management Department (IWMD). RELOOC was approved by the County Board of Supervisors in May 2002. The purpose of RELOOC was 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 RELOOC, the County considered a number of improvements to the three existing municipal solid waste landfills operated by the County IWMD. The proposed project includes the vertical and horizontal expansions of the existing FRB Landfill to assist in meeting the County's long term solid waste disposal needs.

The proposed project includes: 1) Phased vertical and horizontal expansions of the FRB Landfill within the existing property boundary; 2) Temporary disturbance outside the property boundary for slope stabilization and remediation, to remediate the effects of the 2002 landslide; 3) An annual average of 8,500 tons per day (TPD) with an increase in the daily maximum to 11, 500 TPD; 4) A Soil Management Plan that preserves adjacent canyons by stockpiling operational dirt on the landfill site and 5) Provisions to ensure that plant and animal habitats on the landfill property continue to be planned for and protected.

DECISION-MAKER: County of Orange Board of Supervisors

RESPONSIBLE/TRUSTEE AGENCIES INVOLVED

Federal Agencies

United States Environmental Protection Agency.
United States Fish and Wildlife Service.
United States Army Corps of Engineers.

State Agencies

California Integrated Waste Management Board.
California Regional Water Quality Control Board.
California Department of Fish and Game.

Regional Agencies

Regional Water Quality Control Board - Santa Ana Region.
South Coast Air Quality Management District.

County Agencies

Orange County Health Care Agency/Local Enforcement Agency.
Orange County Board of Supervisors.
Orange County Fire Authority.
Orange County Planning Department.

City Agencies

City of Irvine.

LAND USE ENTITLEMENT SUMMARY

General Plan Land Use Designations

County of Orange designation - Public Facilities/Landfill Site (4(LS)) (for areas within the FRB Landfill boundary) and Open Space Reserve (for areas outside of the FRB Landfill boundary).

City of Irvine designation – Conservation Open Space. (for areas within and outside the FRB Landfill boundary).

Zoning Designations

County of Orange designation – Public Facilities.
City of Irvine designation – Preservation.

PREVIOUS ENVIRONMENTAL DOCUMENTATION

Frank R. Bowerman Master Development Plan, Biological Resources Technical Report. November 2004.

Delineation of Jurisdictional Waters and Wetlands, Frank R. Bowerman Landfill Master Development Plan. November 2004.

Geotechnical Investigation Report, Master Development Plan, Volumes I and II, Frank R. Bowerman Landfill. November 2004.

Joint Technical Document Amendment No. 2, Frank R. Bowerman Landfill, dated September 2001, Revision 1: April 2002, Revision 2: August 2002.

Draft EIR - Northern Sphere Project - December 2001.

Final EIR 018 – Bee and Round Canyon Disposal Station – September 1979.

Bee Canyon Landfill GDP Addendum to EIR 018 (IP 87-026) – June 1988.

Draft EIR Orange County Great Park – February 2003.

Master Development Plan – Frank R. Bowerman Landfill, Orange County, CA. November 2004 – Based on October 2002 Topography.

Limestone Canyon Irrevocable Offer of Dedication – June 1991.

Notice of Intent to Adopt a Negative Declaration Pursuant to the California Environmental Quality Act (Management of High Tonnage Days Project) – December 2003.

Draft SEIR/EIR Santiago Hills II and East Orange Planned Communities (October 2004). Lead Agency: City of Orange.

Draft Environmental Impact Report for the RELOOC Strategic Plan Olinda Alpha Landfill Implementation (June 2004).

INITIAL STUDY DATE: July 21, 2005

ENVIRONMENTAL ANALYSIS CHECKLIST

EIR Number 604 for the RELOOC Strategic Plan - Frank R. Bowerman Landfill Implementation

ISSUES AND SUPPORTING DATA SOURCES	Potential Significant Impact	Less than Significant w/ Mitigation	Less than Significant Impact	No Impact
1. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including, but not limited to the General Plan, Specific Plan, Local Coastal Program or Zoning Ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐
c) Conflict with any applicable Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP)?	☒	☐	☐	☐
2. AGRICULTURE. Would the project:				
a) Convert Prime Farmland, Unique Farmland or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	☒
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	☐	☐	☐	☒
3. POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

ISSUES AND SUPPORTING DATA SOURCES	Potential Significant Impact	Less than Significant w/ Mitigation	Less than Significant Impact	No Impact
4. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☒	☐	☐	☐
ii) Strong seismic ground shaking?	☒	☐	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv) Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
c) 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?	☒	☐	☐	☐
d) Be located on expansive soils, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) 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?	☒	☐	☐	☐
5. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
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?	☒	☐	☐	☐

ISSUES AND SUPPORTING DATA SOURCES	Potential Significant Impact	Less than Significant w/ Mitigation	Less than Significant Impact	No Impact
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 runoff in a manner, which would result in flooding on or off site?	☒	☐	☐	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☒	☐	☐	☐
f) Have a significant adverse impact on groundwater quality or otherwise substantially degrade water quality?	☒	☐	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures, which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒
6. TRANSPORTATION AND CIRCULATION. Would the project:				
a) Result in an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☒	☐	☐	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☒	☐	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Result in inadequate parking capacity?	☐	☐	☐	☒

ISSUES AND SUPPORTING DATA SOURCES	Potential Significant Impact	Less than Significant w/ Mitigation	Less than Significant Impact	No Impact
g) Conflict with adopted policies, plan or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?	☐	☐	☐	☒
7. AIR QUALITY. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☐
8. NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies?	☒	☐	☐	☐
b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?	☒	☐	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
e) For a project located within an airport land use plan or, where such plan has not been adopted, within two miles of a private or public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

ISSUES AND SUPPORTING DATA SOURCES	Potential Significant Impact	Less than Significant w/ Mitigation	Less than Significant Impact	No Impact
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working the project area to excessive noise levels?	☐	☐	☐	☒
9. BIOLOGICAL RESOURCES. Would the project:				
a) Have 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 California Department of Fish and Game (CDFG) or the United States Fish and Wildlife Service (USFWS)?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS?	☒	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with provisions of an adopted HCP, NCCP or other approved local, regional or state HCP?	☒	☐	☐	☐
10. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

ISSUES AND SUPPORTING DATA SOURCES	Potential Significant Impact	Less than Significant w/ Mitigation	Less than Significant Impact	No Impact
11. CULTURAL AND SCIENTIFIC RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse changed in the significance of an archaeological resource pursuant to Section 15064.5?	☒	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐
12. RECREATION. Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☐	☐	☒
13. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local General Plan, Specific Plan, or other land use plan?	☐	☐	☐	☒
14. HAZARDS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?	☐	☐	☒	☐
b) 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?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒

ISSUES AND SUPPORTING DATA SOURCES	Potential Significant Impact	Less than Significant w/ Mitigation	Less than Significant Impact	No Impact
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐
f) For a project within the vicinity of private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) 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?	☐	☐	☒	☐
i) 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 could result in significant environmental effects (e.g. increased vectors and odors)?	☒	☐	☐	☐
15. PUBLIC SERVICES. Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i) Fire protection?	☐	☐	☒	☐
ii) Police protection?	☐	☐	☐	☒
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☒	☐

ISSUES AND SUPPORTING DATA SOURCES	Potential Significant Impact	Less than Significant w/ Mitigation	Less than Significant Impact	No Impact
16. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental impacts?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which would cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state and local statutes and regulations related to solid waste?	☐	☐	☐	☒
MANDATORY FINDINGS				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have possible environmental effects, which are individually limited but cumulatively considerable? ("cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☒	☐	☐	☐

ISSUES AND SUPPORTING DATA SOURCES	Potential Significant Impact	Less than Significant w/ Mitigation	Less than Significant Impact	No Impact
c) Does project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly	☒	☐	☐	☐

DETERMINATION:
Based on the evidence in light of the whole record documented in the attached environmental checklist explanation, cited incorporations and attachments, I find that the proposed project:

COULD NOT have a significant effect on the environment, and a Negative Declaration will be prepared pursuant to CEQA Guidelines Article 6, 15070 through 15075. ☐

COULD have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures have been added to the project. A Negative Declaration will be prepared pursuant to CEQA Guidelines Article 6, 15070 through 15075. ☐

MAY have a significant effect on the environment, which has not been analyzed previously. Therefore, an Environmental Impact Report is required. ☒

Signature: Cymantha Atkinson

Cymantha Atkinson, Project Manager
Integrated Waste Management Department
Telephone: (949) 337-5014

NOTE: All referenced and/or incorporated documents may be reviewed by appointment only, at the County of Orange Integrated Waste Management Department, 320 N. Flower Street, Fourth Floor, Santa Ana, California, unless otherwise specified. An appointment can be made by contacting the CEQA Contact Person identified above.

ENVIRONMENTAL ANALYSIS CHECKLIST
Regional Landfill Options for Orange County (RELOOC) Strategic Plan – Frank R. Bowerman Landfill Implementation

1.0 LEAD AGENCY

The County of Orange will serve as the Lead Agency for the proposed Regional Landfill Options for Orange County (RELOOC) Strategic Plan – Frank R. Bowerman (FRB) Landfill Implementation (proposed project) and the County's Integrated Waste Management Department (IWMD) will act as the designated Lead Agency's agent in preparing notices, conducting public hearings and implementing California Environmental Quality Act (CEQA)-related processing requirements for this proposed project.

1.1 DISCRETIONARY APPROVALS

A number of discretionary approvals will be required as part of the project's approval and implementation. These discretionary approvals will be required from a variety of agencies and are anticipated to include the following:

<u>County of Orange</u>
- Certification of the Final Environmental Impact Report (EIR).
- Minor Amendment to the Central and Coastal Subregion Natural Community Conservation Plan (NCCP)/Habitat Conservation Plan (HCP) and Reserve.
- General Plan Land Use Amendment for temporary use of off-site property.

<u>United States Fish and Wildlife Service</u>
- Minor Amendment to the Central and Coastal Subregion NCCP/ HCP and Reserve.

<u>United States Army Corps of Engineers</u>
- United States Clean Water Act Section 404 permit.

<u>California Department of Fish and Game</u>
- Minor Amendment to the Central and Coastal Subregion NCCP/HCP and Reserve.
- Streambed Alteration Agreement, per Section 1602 of the California Fish and Game Code.

<u>California Regional Water Quality Control Board</u>
- Storm Water Management Plans (in compliance with National Pollutant Discharge Elimination System permit).
- Revision to Waste Discharge Requirements.
- Water Quality Certification, per Section 401 of the Clean Water Act.

California Integrated Waste Management Board and Local Enforcement Agency (County of Orange Health Care Agency)

- Revision to Solid Waste Facility Permit.

South Coast Air Quality Management District (permits required during project implementation)

- Permits to Construct – Gas Control Systems.
- Permits to Operate – Gas Control Systems.

City of Irvine

- Amendment to the current Settlement Agreement or new Agreement.

2.0 PURPOSE OF THE ENVIRONMENTAL ANALYSIS CHECKLIST

The purpose of this Environmental Analysis Checklist (EAC) is to provide preliminary analysis of potential environmental consequences that may result with the implementation of the proposed project. The IWMD prepared this EAC to determine the appropriate level of environmental documentation needed for this project. IWMD has determined that an Environmental Impact Report (EIR) will be prepared for the proposed project based on the anticipated impacts. Although Section 15063 of the CEQA Guidelines indicates that a Lead Agency may bypass the preparation of an Initial Study (i.e., EAC), IWMD has chosen to prepare and circulate this EAC to disclose potential project impacts and obtain specific guidance from responsible agencies and the public on the scope and topics to be covered in the EIR.

3.0 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The following environmental parameters may be potentially affected by implementation of the proposed project:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural and Scientific Resources
- Geology and Soils
- Land Use and Planning
- Noise
- Transportation and Circulation
- Hazards
- Hydrology and Water Quality

A preliminary evaluation of the potential environmental impacts of the proposed project is provided below. A more detailed analysis of the project impacts will be provided in the EIR. The EIR will not discuss those environmental parameters for which the proposed project was determined not to result in impacts or not to result in significant adverse impacts, as discussed in the EAC.

4.0 ENVIRONMENTAL ANALYSIS

This Section of the EAC analyzes the potential for significant environmental impacts that may result from the proposed project. The format for this analysis is based on the Environmental Analysis Checklist previously provided.

For the evaluation of potential project impacts on the environment, specific questions from the Checklist are stated and an answer is provided reflecting the analysis conducted for this impact. To each question, there are four possible responses:

- *No Impact* – The proposed project will not have a measurable impact on the environment.
- *Less than Significant Impact* – The proposed project will have the potential for impacting the environment but at a level less than the significance criterion or criteria used to evaluate the impact.
- *Less than Significant with Mitigation* – The proposed project will have a significant adverse impact unless mitigation measures are implemented to reduce the impact to a less than significant level.
- *Potential Significant Impact* – The proposed project will have impacts considered potentially significant and adverse, and either (1) additional analysis is needed to identify specific mitigation measures to reduce this impact to a less than significant level, (2) feasible mitigation measures are not available to reduce this impact to a less than significant level, or (3) the impacts associated with the project are not known at this time and further analysis in the EIR is warranted.

The existing FRB Landfill has been deliberately designed and is operated in a manner that avoids and mitigates potential adverse environmental impacts, and it is the intent of IWMD to continue this practice in the design and operation of the proposed project. However, in keeping with the purpose of this NOP, even though an environmental issue identified in the checklist is anticipated to be satisfactorily mitigated in the future, the box "Potential Significant Impact" has been checked rather than "Less than Significant with Mitigation." This is to inform the NOP recipient that the issue will be described and analyzed in the EIR, and to invite comments from responsible agencies and interested parties on how the assessment of the issue should be addressed in the EIR and how mitigation or avoidance of the issue could be incorporated into the project.

1. Land Use and Planning

Would the project: (a) Physically divide an established community?

No Impact. 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 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. The proposed improvements at 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. Therefore, this environmental parameter is not proposed for further analysis in the EIR and no mitigation is required. It should be noted that the disturbance to Limestone Canyon Regional Park during slope stabilization is authorized under the Fourth Amendment to the Irrevocable Offer of Dedication agreement. For further discussion on this issue, refer to Section 12 (Recreation).

Would the project: (b) 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?

Potential Significant Impact. Existing FRB Landfill is located in unincorporated Orange County and is designated 4(LS) Public Facilities/Landfill Site in the County of Orange General Plan (GP) Land Use Element (LUE). This designation allows for the use of this site for municipal solid waste (MSW) disposal. The County Public Facilities zoning designation for this site also allows for use of the site for MSW disposal. Land outside the landfill boundary is designated in the GP as OSR and does not permit landfill operations. The proposed project would entail the use of areas outside the current landfill property boundary for cut slope stabilization only; no landfilling activities are proposed outside the existing boundary of FRB Landfill. These off-site cut slope stabilization uses may require an amendment to the GP LUE.

FRB Landfill is also located in the City of Irvine's Sphere of Influence (SOI). The City of Irvine GP designates the FRB Landfill property as COSP in Planning Area 6. This overlay area permits the landfill area to be used for MSW disposal. Land to the west of the Landfill property is designated in the City GP for Residential Estate. Land to the north, east and south of the Landfill property is designated COSP. The areas outside the landfill proposed for cut slope stabilization would be located within an area designated by the City of Irvine GP as COSP.

The use of land outside the current permitted landfill property boundary, proposed for slope stabilization, could conflict with the existing County of Orange and City of Irvine GPs land use designations for those areas and is considered a potentially significant adverse impact of the proposed project. The EIR will evaluate the impacts of the proposed project on the GP land uses for the County of Orange and City of Irvine designations. The EIR will also discuss proposed mitigation measures for identified significant adverse project impacts related to consistency with adopted land use plans.

In addition, the existing Settlement Agreement between the County of Orange and City of Irvine would need to be amended to address the vertical and horizontal expansions of FRB Landfill under the proposed project. FRB Landfill is currently permitted to close in 2022 and the

proposed project would provide additional capacity and extend the life of the landfill to approximately 2053, based on current population projections and existing disposal technologies.

Would the project: (c) Conflict with any applicable Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP)?

Potential Significant Impact. 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, FRB Landfill is in the Central Subregion area of the NCCP Reserve. The proposed project includes grading within the Landfill property and outside the Landfill property which are within the NCCP Reserve. The proposed grading for the project is expected to result in both permanent and temporary (exterior cut slopes) loss of acreage in the Central Subregion area, resulting in potentially significant adverse impacts. The EIR will evaluate the impacts of the proposed project on the County's NCCP Central Subregion Reserve. The EIR will also discuss proposed mitigation measures for identified significant adverse project impacts on the NCCP Reserve.

2. Agriculture

Would the project: (a) Convert Prime Farmland, Unique Farmland or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact. The proposed vertical and horizontal expansions of FRB Landfill will not impact any Prime, Unique 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 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (b) Conflict with existing zoning for agriculture use or a Williamson Act contract?

No Impact. The proposed project would not result in the cancellation of any Williamson Act contracts or conflict with any existing zoning for agricultural uses. Therefore, this environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?

No Impact. The proposed vertical and horizontal expansions at 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. Therefore, this environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

3. Population and Housing

Would the project: (a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

No Impact. The proposed project will continue the existing MSW disposal and landfilling operations at 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. Therefore, this environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

No Impact. 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. Therefore, this environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. 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. Therefore, this environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

4. Geology and Soils

Would the project result: Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving: (a)(i) Rupture of a known earthquake fault; (a)(ii) Strong seismic ground shaking; (a) (iii) Seismic-related ground failure, including liquefaction; (a)(iv) Landslides?

Potential Significant Impact. FRB Landfill is located in southern California, an area known to be geologically active and which is subject to seismic events. There are no residential uses on the landfill property or the off-site areas proposed for slope stabilization. The proposed project would not result in exposing people to impacts beyond those normally anticipated within the region. The vertical and horizontal expansions of the Landfill and the off-site slope stabilization will result in changes in topography and will be designed to meet stringent landfill regulatory requirements for seismic stability identified in the California Code of Regulations (CCR), Title 27.

The EIR will evaluate the potential impacts of the proposed project related to ground failure, including liquefaction and landslides. The EIR will also discuss proposed mitigation measures for identified significant adverse impacts related to seismicity, ground failure, liquefaction and landslides.

Would the project: (b) Result in substantial soil erosion or the loss of topsoil?

Potential Significant Impact. The proposed vertical and horizontal expansions of the Landfill and the off-site slope stabilization will result in changes to the topography because of grading and filling. Erosion control measures and facilities (i.e. desilting basins, straw bales and vegetation) are currently implemented as part of normal landfill operations in accordance with regulatory requirements in CCR, Title 27. These measures are also proposed for the vertical and horizontal expansions and for slope stabilization under the proposed project.

The EIR will evaluate the potential adverse impacts of the proposed project related to soil erosion and will discuss proposed mitigation measures for identified significant adverse impacts.

Would the project: (c) Be located on a geologic unit or soil that is unsuitable, 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?

Potential Significant Impact. The proposed vertical and horizontal expansions of the Landfill and the off-site slope stabilization will result in changes of topography because of grading and filling. These changes will be designed to meet stringent landfill regulatory requirements for stability in the CCR, Title 27.

The EIR will evaluate the potential adverse impacts of the proposed project related to landslides, lateral spreading, subsidence, liquefaction and collapse and will discuss proposed mitigation measures for identified significant adverse impacts.

Would the project: (d) Be located on expansive soils, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Less than Significant Impact. 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 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. Therefore, this environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (e) 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?

Potential Significant Impact. The relocation of existing entrance facilities and scales/scale house under the proposed project will require the use of a septic tank or alternative wastewater disposal systems, similar to the existing septic tank currently in use at the landfill. The septic tank will be designed and constructed according to the UBC, including appropriate design features to address soil conditions at the septic tank location. Therefore, this environmental parameter will be analyzed in the EIR and will discuss proposed mitigation measures for identified significant adverse impacts.

5. Hydrology and Water Quality

Would the project: (a) Violate any water quality standards or waste discharge requirements?

Less than Significant Impact. The existing 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 (VOC), minerals, total dissolved solids (TDS), potential of hydrogen (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 FRB Landfill and is not proposed for further analysis in the EIR. No mitigation is required.

Would the project: (b) Substantially deplete groundwater supplies or interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of a local groundwater table level?

Less than Significant Impact. The proposed project does not include any components that would propose groundwater extraction. The current remediation of the landslide area at 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. Therefore, this environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the 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) Flooding on- or off-site; (e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Potential Significant Impact. The vertical and horizontal expansions at FRB Landfill and the off-site slope stabilization will result in the potential for an increase in erosion. However, landfill engineering design and operational erosion controls and proper design of soil stockpile areas and the slope stabilization will mitigate these impacts to below a level of significance. Erosion control measures may include new or expanded desiltation basins and appropriate periodic removal of silt from the basins, and erosion control measures such as silt fencing, hay bales and vegetation.

The vertical and horizontal expansion at FRB Landfill and the off-site slope stabilization will modify the site's surface hydrology, change storm water runoff rates and remove two remnant blue line streams on site. The change in stormwater runoff is not expected to be substantially different from the existing condition and is not anticipated to result in flooding on- or off-site. Off-site discharge will be controlled to only release pre-development condition flows during a storm event. Landfill engineering design features such as new or expanded drainage structures and new or expanded detention basins will mitigate potential impacts of the proposed project related to surface hydrology to below levels of significance at the FRB Landfill. Special design features for soil stockpile areas would also mitigate impacts to below a level of significance. The EIR will discuss proposed mitigation measures for identified significant adverse project impacts related to surface hydrology.

The proposed project will change stormwater runoff quantities on the FRB Landfill property. However, mitigation will reduce runoff to pre-development levels prior to discharge downstream and will not impact the capacity of existing and planned stormwater drainage systems off-site. The EIR will discuss proposed mitigation measures for identified significant adverse project impacts related to exceeding the capacity of existing and planned stormwater drainage systems.

Surface water quality is discussed in the following section.

Would the project: (f) Have a significant adverse impact on groundwater quality or otherwise substantially degrade water quality?

Potential Significant Impact. The proposed improvements to FRB Landfill under the proposed project must be designed, operated and monitored to preclude any significant adverse impacts to groundwater resources or water quality. In addition, the vertical and horizontal expansions must be approved under WDRs issued by the RWQCB.

Even though the vertical and horizontal expansions at FRB Landfill and the slope stabilization are unlikely to substantially degrade water quality because the proposed improvements would be subject to the RWQCB's regulatory oversight controls designed to protect water quality, the EIR will discuss proposed mitigation measures for identified significant adverse project impacts related to groundwater quality.

Would the project: (g) Place housing within a 100 year flood hazard area; (h) Place structures within a 100-year flood hazard area, which would impede or redirect flood flows?

No Impact. 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.

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 FRB Landfill. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam, or (j) Inundation by seiche, tsunami or mudflow?

No Impact. 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 FRB Landfill.

Therefore, this environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

6. Transportation and Circulation

Would the project: (a) Result in an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system?

Potential Significant Impact. 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 FRB Landfill from 8,500 TPD to 10,625 TPD for 36 days per year. In 2004, the FRB Landfill received an annual average daily tonnage of approximately 7,357 TPD. The proposed expansion of FRB Landfill includes an increase in the maximum permitted TPD from 8,500 TPD to 11,500 TPD. The proposed project will result in increased vehicle trips beyond traffic forecasts assumed for the currently approved annual average of 8,500 TPD and would result in more trips for the maximum daily tonnage rate of 11,500 TPD than currently experienced at FRB Landfill. The potential adverse impacts of the proposed project, in combination with cumulative projects, related to existing and future traffic and the capacity of the area street system will be evaluated in detail in the EIR and appropriate mitigation will be identified for any significant adverse project traffic impacts.

Would the project: (b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

Potential Significant Impact. Interstate 5 (I-5), State Route (SR) 133, SR 241 (the Eastern Transportation Corridor (ETC)) and Irvine Boulevard in the vicinity of FRB Landfill are part of the Orange County Congestion Management Program (CMP) Highway System. The intersections of Irvine Boulevard and SR 133 northbound (NB), and Irvine Boulevard and SR 133 southbound (SB) ramps are identified CMP intersections in the vicinity of FRB Landfill. No other intersections in the project vicinity are identified as CMP intersections in the 2003 Update of the Orange County CMP. The proposed project, in combination with cumulative projects, may result in exceeding the level of service (LOS) standards on designated CMP roads and intersections in the vicinity of the landfill during the anticipated extended life of the landfill under the proposed project.

The EIR will evaluate the potential adverse impacts of the proposed project related to traffic and LOS for designated CMP roads and highways and will also discuss proposed mitigation measures for identified significant adverse impacts related to designated CMP facilities.

Would the project: (c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?

No Impact. The FRB Landfill is outside the defined airspace of any airport. The proposed project at 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?

No Impact. Access to 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 vehicles operated by the public 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 FRB Landfill will not result in impacts related to safety hazards from design features or incompatible uses. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (e) Result in inadequate emergency access?

No Impact. Access to 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 public 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 FRB Landfill will not result in adverse impacts related to emergency access or access to other land uses. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (f) Result in inadequate parking capacity?

No Impact. 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 FRB Landfill will not result in any impacts related to inadequate parking capacity. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (g) Conflict with adopted policies, plans or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?

No Impact. Trucks transporting solid waste to 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 FRB Landfill would not result in conflicts with adopted policies regarding alternative transportation. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

7. Air Quality

Would the project: (a) Conflict with or obstruct implementation of the applicable air quality management plan (AQMP)?

Potential Significant Impact. The proposed project has the potential to result in an obstruction to the implementation of the 2003 Air Quality Management Plan (AQMP). The proposed project would result in additional air pollutant emissions that would be generated by refuse disposal operations, soil disturbance activities, and windblown dust as well as from construction vehicle exhaust associated with the proposed project improvements. Activities associated with the proposed project improvements may potentially result in a significant adverse impact to air quality.

The EIR will evaluate these potential adverse impacts and will also discuss proposed mitigation measures for identified significant adverse impacts of the project related to conflicts with or obstructions to implementation of the AQMP.

Would the project: (b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation; (c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

Potential Significant Impact. The entire South Coast Air Basin (SCAB) is designated as a national-level extreme non-attainment area for ozone (O_3), meaning that national ambient air quality standards are not expected to be met in the SCAB until beyond 2010, and is a non-attainment area for carbon monoxide (CO) and particulate matter greater than ten microns in diameter (PM_{10}). The proposed vertical and horizontal expansions would extend the operational life of the FRB Landfill from 2022 to 2053; thereby, increasing the duration of emissions generated during the operation of the project. In addition, an increase in landfill gas (LFG) would occur due to the larger quantity of refuse to be landfilled for the project. LFG generated on site will be controlled and collected via a LFG control system. Increased LFG generation will require expanded LFG support facilities. The proposed project would also change the number of trucks currently accessing the site each day and the number of vehicle miles traveled (VMT) by project-related vehicles. The number of vehicles and pieces of equipment working on the active landfill face will not change

substantially as the 8,500 TPD annual average refuse inflow rate is not changing and the 11,500 TPD maximum tonnage days can be accommodated with a possible slight increase in equipment. The project, in combination with cumulative projects, may result in a potentially significant adverse impact to air quality due to a longer operational life, increased refuse to be landfilled and truck traffic associated with a maximum daily inflow rate of 11,500 TPD.

Also, the proposed horizontal expansion and slope stabilization at FRB Landfill would result in additional construction related air pollutant emissions that would be generated by preparation of these areas for slope remediation or waste disposal; refuse disposal operations; soil disturbance activities; windblown dust and construction vehicle exhaust. Activities associated with these additional areas may potentially result in a significant adverse air quality impact during project operations. The EIR will evaluate these potential impacts and will also discuss proposed mitigation measures for identified significant adverse impacts related to air quality.

Would the project: (d) Expose sensitive receptors to substantial pollutant concentrations?

Potential Significant Impact. The proposed project at FRB Landfill would increase the potential for windblown dust in the local area. However, the South Coast Air Quality Management District (SCAQMD) Rules 402 and 403 governing nuisance and dust emissions would regulate dust emissions at the landfill under the proposed project.

The proposed project will result in new truck trips to and from the landfill. The project could expose sensitive population groups to substantial pollutant concentrations. The project proposes a maximum daily tonnage increase which would result in increased truck trips. In addition, the project would extend the life of the landfill from 2022 to 2053, thereby increasing the duration of landfill operations. For those projects in the area near the landfill that are planned but are not yet constructed, an extension of the operational life of the landfill could expose future sensitive receptors to adverse pollutant concentrations. The EIR will evaluate these potential impacts and will also discuss proposed mitigation measures for identified significant adverse impacts related to air quality.

Would the project: (e) Create objectionable odors affecting a substantial number of people?

Potential Significant Impact. Air pollutant emissions due to vehicle exhaust from waste haulers may increase due to the increase in truck trips associated with the proposed project. Also, the volume of MSW deposited in FRB Landfill would increase due to the increase in refuse capacity and operating period at the landfill. This increase in the volume of MSW would result in greater methane generation from the decomposition of organic solid waste materials. In addition, odor impacts may result from waste-hauling vehicles transporting solid waste to the landfill. Odors may result from the use of processed green waste material (PGM) at the landfill. PGM is currently used at the FRB Landfill for alternative daily cover and erosion control.

The EIR will evaluate the potential adverse impacts of the proposed project or sensitive receptors related to odors and will discuss proposed mitigation measures for identified significant adverse project impacts related to odors.

8. Noise

Would the project result in: (a) Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies; (b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels; (c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; (d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Potential Significant Impact. The proposed project would extend the operating life of FRB Landfill through vertical and horizontal expansions. This would continue existing noise levels related daily landfill operations and construction for a longer period of time. The proposed project would also increase the daily maximum MSW tonnage that could be deposited in the landfill on a daily basis and change the number of trucks accessing the landfill each day. As such, the proposed project is anticipated to increase noise levels along roads used to access the landfill and to adjacent sensitive land uses. The project, in combination with cumulative projects in the area, could result in noise impacts to adjacent sensitive land uses and to land uses along roads used to access the landfill.

The EIR will evaluate the potential adverse noise impacts resulting from the operation and construction of the proposed project and increased traffic related to a higher daily maximum tonnage. The EIR will also discuss proposed mitigation measures for identified significant adverse noise impacts.

Would the project: (e) For a project located within an airport land use plan or, where such plan has not been adopted, within two miles of a private or public airport or public use airport would the project expose people residing or working in the project area to excessive noise levels; (f) For a project within the vicinity of a private airstrip, would the project expose people residing or working the project area to excessive noise levels?

No Impact. 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

9. Biological Resources

Would the project: (a) Have 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 California Department of Fish and Game (CDFG) or the United States Fish and Wildlife Service (USFWS)?

Potential Significant Impact. The horizontal expansion and slope stabilization grading at FRB Landfill will result in the removal of coastal sage scrub (CSS), a plant community known to be used by coastal California gnatcatcher and coastal cactus wrens. No other endangered, threatened or rare species of wildlife are expected to be adversely impacted by the horizontal

expansion and slope stabilization. The horizontal expansion and slope stabilization at FRB Landfill may result in adverse impacts on the following locally important or listed plant species: intermediate foothill mariposa lily. The vertical expansion at FRB Landfill is not anticipated to result in significant adverse impacts to sensitive species. The EIR will evaluate these potential adverse impacts and will discuss proposed mitigation measures for identified significant adverse impacts of the proposed project related to sensitive species.

Would the project: (b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations, or by CDFG or USFWS?

Potential Significant Impact. The horizontal expansion and the slope stabilization at FRB Landfill will result in the removal of CSS which is a plant community that is considered important as designated in the County's NCCP. The horizontal expansion and slope stabilization at FRB Landfill may also result in significant adverse impacts to jurisdictional waters and wetlands. The EIR will evaluate these potential adverse impacts and will discuss proposed mitigation measures for identified significant adverse impacts related to natural communities.

Would the project: (c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means?

Potential Significant Impact. The vertical expansion at FRB Landfill will not impact wetlands or other watercourses subject to regulatory control. The horizontal expansion and slope stabilization may result in a significant adverse impact to jurisdictional waters and wetlands, and blue line streams outside the currently permitted area for landfilling operations at FRB Landfill. The EIR will evaluate these potential adverse impacts and will discuss proposed mitigation measures for identified significant adverse impacts related to wetlands.

Would the project: (d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Potential Significant Impact. The horizontal expansion and slope stabilization of FRB Landfill under the proposed project may impact the movement of wildlife although it is not expected to be significant because the ridgeline on the northern end of the watersheds between Round and Bee Canyons will not be directly impacted and may continue to function as a wildlife corridor under the proposed project. The EIR will evaluate these potential adverse impacts and will discuss proposed mitigation measures for identified significant adverse impacts related to wildlife movement and corridors.

The proposed vertical expansion at FRB Landfill would have no additional impact on wildlife dispersal or migration corridors over that caused by the horizontal expansion.

Would the project: (e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. The proposed project at 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (f) Conflict with provisions of an adopted HCP, NCCP or other approved local, regional or state HCP?

Potential Significant Impact. The horizontal expansion and slope stabilization at FRB Landfill would impact part of the NCCP Reserve. The horizontal expansion and slope stabilization would result in removal of CSS not originally anticipated and/or permitted for this facility in the Central and Coastal Subregion NCCP. The removal of CSS associated with the horizontal expansion and slope stabilization at FRB Landfill is considered potentially significant and adverse. The EIR will evaluate these potential adverse impacts and will discuss proposed mitigation measures for identified significant adverse impacts of the project related to the NCCP.

10. Aesthetics

Would the project: (a) Have a substantial adverse effect upon a scenic vista?

Less Than Significant Impact. The currently developed landfill areas contrast with the adjacent undeveloped areas in both form and color. The existing landfill is visible from the following locations: points on I-5 and I-405; the Foothill Transportation Corridor (FTC); the Irvine Multimodal Transportation Center; elevated areas further to the west, for example in Laguna Hills, that have views of Loma Ridge to the east; and from the top of Loma Ridge which is within the Limestone Canyon Regional Park. Locations on the northeast side of Loma Ridge will not have views of the landfill because of an intervening ridge. Residential areas in Foothill Ranch and Lake Forest do not have views of the landfill because of intervening topography. The ridges in front of the landfill, which will be retained under the proposed project, screen a large part of the landfill from off site views.

The proposed slope stabilization at FRB Landfill will extend cut slope grading outside the landfill property boundary. The horizontal and vertical expansions of FRB Landfill will alter existing views currently available from off-site viewpoints. The increase in height would affect current off-site views of Loma Ridge because the increased landfill elevation would reduce the amount of the ridge currently visible. This impact is anticipated to be less than significant because many existing views of Loma Ridge currently include views of FRB Landfill and associated landform modifications. The proposed vertical increase would not substantially alter existing scenic vistas or views open to the public and are, therefore, considered less than significant. However, the EIR will provide a detailed analysis evaluating visual impacts and will also identify mitigation measures if required, to address potentially significant adverse aesthetics impacts.

Would the project: (b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings and historic buildings within a state scenic highway?

Less Than Significant Impact. FRB Landfill is briefly visible from the FTC through an opening in Bee Canyon. The FTC is a County of Orange designated Scenic Highway, Type 2, Landscape Corridor. As described in the County of Orange GP, a Landscape Corridor traverses developed or developing areas and is designated for special treatment to provide a pleasant driving environment and community enhancement. The adopted landscape typical section includes a twenty-five foot parkway strip to accommodate highway beautification and paved facilities. The edge of FRB Landfill is set back from the FTC approximately one-half mile and there is ample room for landscaping in the parkway strip. Because FRB Landfill is an existing feature within the current view of motorists using the FTC and the view of the landfill with the proposed additional vertical elevation will be similar to the view at the current permitted height (from the FTC), the impact of the proposed project at FRB Landfill on designated scenic highways will be less than significant. In addition, the design requirements for the FTC as a scenic landscape corridor will not be affected by the proposed project at FRB Landfill. However, as described in (a) above, the EIR will provide a detailed analysis evaluating visual impacts and will also identify mitigation measures, if required, to address potentially significant adverse aesthetics impacts.

Would the project: (c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Potential Significant Impact. Most of the FRB Landfill property has previously been graded and/or excavated for landfill purposes and part of the landfill has been filled with MSW and covered, under existing permits and regulatory approvals. Views of the site with the proposed vertical expansion will be similar to views under the current permit, except that a reduced part of Loma Ridge will be visible because of the additional elevation of the proposed expansion. Therefore, because the site is currently an operating landfill, the proposed expansion will not substantially alter the quality or character of the landfill site and the horizontal expansion area has limited visibility. The EIR will examine impacts of the proposed project related to visual character and quality and identify mitigation measures, if required, to address potentially significant adverse aesthetics impacts.

Would the project: (d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?

No Impact. Potential light and glare impacts associated with the proposed project at 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. Therefore, there would be no impacts related to light and glare associated with the proposed project at FRB Landfill. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

11. Cultural/Scientific Resources

Would the project: (a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

Potential Significant Impact. The currently permitted FRB Landfill areas have been environmentally cleared for impacts on historic resources based on previous environmental documentation for other proposed activities on this landfill site. There are no existing documented historic resources on the previously permitted area of the FRB Landfill site. The proposed project includes a horizontal expansion and slope stabilization outside the landfill property boundary which may have adverse impacts on unknown historic resources in these areas. The EIR will examine impacts of the proposed project related to historical resources and identify mitigation measures, if required, to address potentially significant adverse historical resources impacts.

Would the project: (b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

Potential Significant Impact. The proposed project includes an expansion of the previously permitted area including adjacent off-site areas. Adverse impacts on unknown archeological resources may occur as a result of the proposed project. The EIR will examine impacts of the proposed project related to archaeological resources and identify mitigation measures, if required, to address potentially significant adverse archaeological resources impacts.

Would the project: (c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Potential Significant Impact. The currently permitted FRB Landfill property areas have been environmentally cleared for potential impacts on paleontological resources and unique geologic features based on previous environmental documentation for other proposed activities on this landfill site. However, the horizontal expansion of this landfill and slope stabilization into undisturbed areas may impact previously undocumented paleontological resources and/or unique geologic features. The EIR will evaluate the potential adverse impacts of the proposed project related to paleontological resources and will discuss proposed mitigation measures for identified significant adverse project impacts related to paleontological resources.

Would the project: (d) Disturb any human remains, including those interred outside of formal ceremonies?

Potential Significant Impact. There are no documented human remains interred on the landfill property. However, the proposed horizontal expansion and slope stabilization may impact previously undisturbed areas which may impact previously undocumented human remains. Adverse impacts on unknown human remains may occur as a result of the proposed project. The EIR will examine impacts of the proposed project related to human remains and identify mitigation measures, if required, to address potentially significant adverse impacts.

12. Recreation

Would the project: (a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impact. The proposed project at 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 FRB Landfill. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact. 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

The ultimate use for 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.

13. Mineral Resources

Would the project: (a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Impact. 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 FRB Landfill will not result in impacts to known mineral resources of possible state or regional value. This

environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local General Plan, Specific Plan or other land use plan?

No Impact. 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

14. Hazards

Would the project: (a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials; (b) 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?

Less Than Significant Impact. 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 and the rejection of loads containing hazardous wastes. 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 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 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 FRB Landfill under the proposed project to below a level of significance. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?

No Impact. There are no existing or proposed schools within one-quarter mile of 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 FRB Landfill. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. The FRB Landfill project site is not listed as a hazardous materials site. The landfill accepts only Class III municipal solid wastes. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (e) For a project located within an airport land use plan or, where such plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Less Than Significant Impact. 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 FRB Landfill. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (f) For a project within the vicinity of private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Impact. There are no private airstrips in the immediate vicinity of 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evaluation plan?

Less Than Significant Impact. FRB Landfill is in unincorporated Orange County and is in the 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 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (h) 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?

Less Than Significant Impact. The City of Irvine GP designates the area surrounding 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 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (i) Include a new or retrofitted storm water treatment control Best Management Practice (BMP), (e.g. water quality treatment basin, constructed treatment wetlands), the operation of which could result in significant environmental effects (e.g. increased vectors and odors)?

Potential Significant Impact. The proposed project includes landfill engineering design features such as new or expanded storm water drainage structures and new or expanded desilting basins which will substantially mitigate potential impacts of the proposed project related to storm water collection and treatment. None of the proposed BMPs and new or retrofitted storm water treatment control facilities would cause a significant increase in vectors or odors. The EIR will discuss project design features and proposed mitigation measures for identified significant adverse

project impacts related to new or retrofitted storm water drainage systems. Refer also to response c, Section 5 (Hydrology and Water Quality).

15. Public Services

Would the project: (a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: (i) Fire protection?

Less Than Significant Impact. 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 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 FRB Landfill under the proposed project.

This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project result in need(s) for new/altered government facilities/services in (a)(ii) police protection?

No Impact. FRB Landfill is served by the Orange County Sheriff's Department. The nearest Sheriff's facility to 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 FRB Landfill. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project result in need(s) for new/altered government facilities/services in (a)(iii) schools?

No Impact. 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 FRB Landfill. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project result in need(s) for new/altered government facilities/services in (a)(iv) parks?

No Impact. The proposed project at FRB Landfill would not entail the construction of residential or commercial uses that would result in an increase parks. Therefore, the proposed project is not anticipated to contribute substantially to the need for new/altered government facilities/services in parks. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

The ultimate use for 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.

Would the project result in need(s) for new/altered government facilities/services in (a)(v) other public facilities?

Less Than Significant Impact. 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 FRB Landfill will not result in adverse impacts related to other governmental services. This environmental parameter is not proposed for further analysis in the EIR and 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 FRB Landfill will not result in significant adverse impacts related to road maintenance. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

16. Utilities and Service Systems

Would the project: (a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board; (b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental impacts?

No Impact. There may be brief temporary periods requiring additional personnel, such as during site development activities. However, this minor increase will not substantially increase the demand for potable water at the landfill for employee sanitary uses or in a substantial increase in the amount of wastewater generated at the Landfill. Therefore, the proposed project would not result in the construction of new or expanded water or wastewater treatment facilities. The minor increase in the production of wastewater generated by landfill employees will not be sufficient to exceed capacity at existing wastewater treatment facilities or changes in those existing facilities.

Would the project: (c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which would cause significant environmental effects?

No Impact. 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

No Impact. The proposed project at 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, and 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 FRB Landfill under the proposed project. Therefore, the proposed project will not result in significant adverse impacts related to water treatment and distribution facilities. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (e) Have adequate wastewater treatment capacity?

No Impact. The proposed project expansion at 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, this personnel increase is not anticipated to result in a substantial increase in the amount of sewage currently generated daily at FRB Landfill. The existing wastewater facilities at the landfill and serving the landfill are adequate to accommodate the additional sewage generated at FRB Landfill over the extended life of the landfill under the proposed project. The existing wastewater facilities 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 necessary. Therefore, the proposed project will not result in significant adverse impacts related to wastewater treatment capacity. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Would the project: (f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; (g) Comply with federal, state and local statutes and regulations related to solid waste?

No Impact. The proposed project will extend the life and capacity of 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. This environmental parameter is not proposed for further analysis in the EIR and no mitigation is required.

Mandatory Findings

(a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history?

Potential Significant Impact. As described in this EAC, the proposed project has the potential to degrade the environment. The proposed project would affect biological resources and will result in the removal of CSS within the designated boundaries of the Central Subregion NCCP Reserve. The proposed project would also affect waters of the United States and wetlands within the proposed expansion areas and slope stabilization areas. The proposed horizontal expansion and slope stabilization may result in significant adverse impacts to these resources. The potential for significant adverse impacts to these resources will be evaluated in detail in the EIR and feasible mitigation measures will be identified.

There are no known cultural and scientific resources on the proposed project site. However, the proposed project may result in impacts to cultural and scientific resources because some of the proposed horizontal expansion and the slope stabilization areas have not been previously

disturbed by landfill operations. Therefore, the proposed horizontal expansion and the slope stabilization may result in adverse impacts to cultural resources. The potential for significant adverse impacts to these resources will be evaluated in detail in the EIR and feasible mitigation measures will be identified.

(b). Does the project have possible environmental effects, which are individually limited but cumulatively considerable ("cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects).

Potential Significant Impact. Implementation of the proposed project may result in cumulative impacts when considered with other existing, planned and reasonably foreseeable future projects in this part of Orange County and the City of Irvine. The potential for the proposed project to contribute to cumulative adverse environmental impacts will be evaluated in detail in the EIR.

(c). Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Potential Significant Impact. Implementation of the proposed project may result in adverse environmental effects which could potentially result in substantial adverse effects on humans. The potential for the proposed project to result in significant adverse impacts on humans will be evaluated in detail in the EIR.

Determination

Based upon the evidence in light of the whole record documented in the attached environmental checklist explanation, cited incorporations and attachments, I find that the proposed project:

The proposed project may have a significant effect on the environment which has not been previously analyzed. Therefore, an environmental impact report (EIR) is required.

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APPENDIX B
NOP DISTRIBUTION LIST

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San Clemente Library
242 Avenida Del Mar
San Clemente, CA 92672

Orange County Public Library
Brea Branch Library
1 Civic Center Circle
Brea, CA 92821

Orange County Public Library
Heritage Park Regional Library
14361 Yale Ave.
Irvine, CA 92604

Orange County Public Library
University Park Library
4512 Sandburg Way
Irvine, CA 92612

Orange County Public Library
Foothill Ranch Library
27002 Cabriole Way
Foothill Ranch, CA 92610

Orange County Public Library
San Juan Capistrano Regional Library
31495 El Camino Real
San Juan Capistrano, CA 92675

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209 Avenida Fabricante, Suite 175
San Clemente, CA 92672-7547

Tocayo Hills
c/o Trans-Pacific Management Co.
209 Avenida Fabricante, Suite 175
San Clemente, CA 92672-7547

Rancho San Juan HOA
c/o Trans-Pacific Management. Co
209 Avenida Fabricante, Suite 175
San Clemente, CA 92672-7547

Robert Fraser
Ortega Highway Residents Assoc.
Mountain Trails Preservation Society
1536 E. Washington Ave.
Santa Ana, CA 92701-3246

Pat Gummerson
Los Vista HOA
c/o Total Property Management
2 Corporate Park, Ste. 200
Irvine, CA 92606

Marlene Danielson
Forster Ranch Master HOA
Webb Management
960 Calle Amanecer
San Clemente, CA 92673

Christine Carway
Rancho San Clemente Master HOA
c/o Associated Mgmt. Group
2131 Las Palmas Dr., Suite A
Carlsbad, CA 92009

Luann Dawson
Marblehead Master
c/o Associated Mgmt. & Maintenance
PO Box 2099
Capistrano Beach, CA 92624

Nancy Arakelian
C&N Waste Services
2021 Business Center Dr., #114
Irvine, CA 92715

Efram Ramirez
Park Disposal/EDCO Corp.
PO Box 398
Buena Park
CA, 90621

Jerry Moffat
Rainbow Disposal
PO Box 1026
Huntington Beach, CA 92647

Kris Kazarian
Tierra Verde Industries
PO Box 24
Irvine, CA 92650-0024

Pat Brennan
Orange County Register
625 N. Grand Ave.
Santa Ana, CA 92701

Fred Swegles
Sun Post News
95 Del Mar
San Clemente, CA 92672

Don McIntyre
Orange County Division
League of California Cities
600 W. Santa Ana Blvd., Suite 214
Santa Ana, CA 92701

Dave Mason
Flora Vista Sub Assoc.
c/o Action Property Management
29B Technology Dr., Ste. 100
Irvine, CA 92618

Casa Blanca Condominiums
c/o Webb Management Co.
900 Calle Amanecer
San Clemente, CA 92673

Art Studenbaur
Los Corrales HOA
8251 Paseo Corrales
San Juan Capistrano, CA 92675

Paul Relis
CR&R
11292 Western Ave.
Stanton, CA 90680

Efrain Ramirez
Park Disposal/EDCO Corp.
PO Box 398
Buena Park, CA 90621

Phil Anthony
Solid Waste Association
14101 La Pat Place, Suite 10
Westminster, CA 92683

Judith Ware
Ware Disposal Co.
PO Box 8206
Newport Beach
CA, 92658

Stuart Pfiefer
Los Angeles Times
901 W. Civic Center Dr., Ste. 170
Santa Ana, CA 92701

Kelly Tokarski
Capistrano Valley News
22481 Aspen St.
Lake Forest, CA 92630-1630

Blake Anderson
General Manager
Orange County Sanitation District
10844 Ellis Ave.
Fountain Valley, CA 92708

Dave Mason
Rancho Del Rio Master Assoc.
c/o Action Property Mgmt.
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Irvine, CA 92618

David Weigand
El Encanto
c/o Webb Management Co.
960 Calle Amanecer
San Clemente, CA 92673

Dayton Meyer
Del Cabo Properties, Inc.
c/o Laguna Shores Mgmt. Co.
30100 Crown Valley Pkwy., Suite 18
Laguna Niguel, CA 92677

Don Shubin
Federal Disposal Service
15031 Parkway Loop, Suite A
Irvine, CA 92780

Steve Corneal
24002 Via Fabricante, Ste. 225
Mission Viejo, CA 92691

David Ault
Taormina Industries
PO Box 309
Anaheim, CA 92815

Bob Coyle
Waste Management
1800 S. Grand Ave.
Santa Ana, CA 92705

Peggy Goetz
Irvine World News
2006 McGaw
Irvine, CA 92614

Eric Carpenter
Brea Star Progress
1771 S. Lewis St.
Anaheim, CA 92805

Jennifer Solomon
Orange County Division
League of California Cities
600 W. Santa Ana Blvd., Ste. 214
Santa Ana, CA 92701

Macie Cleary-Milan
TCA
125 Pacifica
Irvine, CA 92618

John Kazarian
Tierra Verde Industries
P.O. Box 279
East Irvine, CA 92650-0279

Olinda Ranch HOA
c/o Merit Property Management
1 Polaris Way, Suite 100
Aliso Viejo, CA 92656-5356

Reserve
c/o Action Property Mgmt.
29B Technology Drive, Suite 100
Irvine, CA 92618-2302

Betsy Lindsay
President/CEO
UltraSystems Environmental
100 Pacifica, Suite 250
Irvine, CA 92618

Eric Noble
Sierra Club
Orange County Gruup
PO Box 6647
Orange, CA 92867

Michael Recupero
President
Recupero and Associates, Inc.
31877 Del Obispo Street, Suite 204
San Juan Capistrano, CA 92675-3228

Del Cabo Properties
c/o Laguna Shores Management Corp.
26131 Marguerite Parkway, Suite D
Mission Viejo, CA 92692-3161

Talega
c/o Merit Property Mgmt.
1 Polaris Way, Suite 100
Aliso Viejo, CA 92656-5356

Stan Oftelie
OC Business Council
2 Park Plaza, Suite 100
Irvine, CA 92614-5904

Transpacific Management Co.
209 Avenida Farbicante, Suite 175
San Clemente, CA 92672-7547

Forster Highlands
c/o Action Property Mgmt.
29B Technology Drive, Suite 200
Irvine, CA 92618-2302

Karen Farrell
60 Middleberry Ln.
Irvine, CA 92620

APPENDIX C
COMMENT LETTERS RECEIVED ON THE NOP

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Sean Walsh
Director

Notice of Preparation

July 21, 2005

To: Reviewing Agencies

Re: Regional Landfill Options for Orange County (RELOOC) Strategic Plan - Frank R. Bowerman (FRB) Landfill Implementation
SCH# 2005071102

Attached for your review and comment is the Notice of Preparation (NOP) for the Regional Landfill Options for Orange County (RELOOC) Strategic Plan - Frank R. Bowerman (FRB) Landfill Implementation draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Cymantha Atkinson
Orange County Integrated Waste Management Department
320 N. Flower Street, Suite 400
Santa Ana, CA 92703

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Rodriguez for:

Scott Morgan
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2005071102
Project Title Regional Landfill Options for Orange County (RELOOC) Strategic Plan - Frank R. Bowerman (FRB) Landfill Implementation
Lead Agency Orange County

Type NOP Notice of Preparation

Description The proposed project includes: (1) phased vertical and horizontal expansions of the FRB Landfill within the existing property boundary; (2) temporary disturbance outside the property boundary for slope stabilization and remediation, to remediate the effects of the 2002 landslide; (3) an annual average of 8,500 tons per day (TPD) with an increase in the daily maximum to 11,500 TPD; (4) a Soil Management Plan that preserves adjacent canyons by stockpiling operational dirt on the landfill site and (5) provisions to ensure that plant and animal habitats on the landfill property continue to be planned for and protected.

Lead Agency Contact

Name Cymantha Atkinson
Agency Orange County Integrated Waste Management Department
Phone (949) 337-5014 **Fax**
email
Address 320 N. Flower Street, Suite 400
City Santa Ana **State** CA **Zip** 92703

Project Location

County Orange
City Irvine
Region
Cross Streets Sand Canyon Avenue and Portola Parkway
Parcel No.
Township 5S **Range** 8W **Section** 118, **Base** El Toro

Proximity to:

Highways SR 133 and SR 241
Airports Marine Corps Air Station El Toro
Railways
Waterways
Schools
Land Use

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Cumulative Effects; Drainage/Absorption; Economics/Jobs; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Growth Inducing; Landuse; Minerals; Noise; Other Issues; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife

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Reviewing Agencies Resources Agency; Regional Water Quality Control Board, Region 8; Department of Parks and Recreation; Native American Heritage Commission; Integrated Waste Management Board; Department of Fish and Game, Region 5; Department of Water Resources; California Highway Patrol; Caltrans, District 12; State Lands Commission

---

Date Received 07/21/2005 **Start of Review** 07/21/2005 **End of Review** 08/19/2005

Note: Blanks in data fields result from insufficient information provided by lead agency.

NOP Distribution List

County: Orange

SCH# 2005071102

Resources Agency

- [x] **Resources Agency**
  Nadell Gayou
- [ ] **Dept. of Boating & Waterways**
  David Johnson
- [ ] **California Coastal Commission**
  Elizabeth A. Fuchs
- [ ] **Colorado River Board**
  Gerald R. Zimmerman
- [ ] **Dept. of Conservation**
  Roseanne Taylor
- [ ] **California Energy Commission**
  Roger Johnson
- [ ] **Dept. of Forestry & Fire Protection**
  Allen Robertson
- [ ] **Office of Historic Preservation**
  Wayne Donaldson
- [x] **Dept of Parks & Recreation**
  B. Noah Tilghman
  Environmental Stewardship Section
- [ ] **Reclamation Board**
  DeeDee Jones
- [ ] **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
- [x] **Dept. of Water Resources**
  Resources Agency
  Nadell Gayou
- [ ] _____
  Conservancy

Fish and Game

- [ ] **Depart. of Fish & Game**
  Scott Flint
  Environmental Services Division
- [ ] **Fish & Game Region 1**
  Donald Koch
- [ ] **Fish & Game Region 2**
  Banky Curtis
- [ ] **Fish & Game Region 3**
  Robert Floerke
- [ ] **Fish & Game Region 4**
  Mike Mulligan
- [x] **Fish & Game Region 5**
  Don Chadwick
  Habitat Conservation Program
- [ ] **Fish & Game Region 6**
  Gabrina Gatchel
  Habitat Conservation Program
- [ ] **Fish & Game Region 6 I/M**
  Tammy Allen
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Game M**
  George Isaac
  Marine Region

Other Departments

- [ ] **Food & Agriculture**
  Steve Shaffer
  Dept. of Food and Agriculture
- [ ] **Depart. of General Services**
  Public School Construction
- [ ] **Dept. of General Services**
  Robert Sleppy
  Environmental Services Section
- [ ] **Dept. of Health Services**
  Veronica Rameriz
  Dept. of Health/Drinking Water

Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Debby Eddy
- [ ] **Office of Emergency Services**
  Dennis Castrillo
- [ ] **Governor's Office of Planning & Research**
  State Clearinghouse
- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [ ] **Public Utilities Commission**
  Ken Lewis
- [x] **State Lands Commission**
  Jean Sarino
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Business, Trans & Housing

- [ ] **Caltrans - Division of Aeronautics**
  Sandy Hesnard
- [ ] **Caltrans - Planning**
  Terri Pencovic
- [x] **California Highway Patrol**
  John Olejnik
  Office of Special Projects
- [ ] **Housing & Community Development**
  Lisa Nichols
  Housing Policy Division

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Katherine Eastham
- [ ] **Caltrans, District 4**
  Tim Sable
- [ ] **Caltrans, District 5**
  David Murray
- [ ] **Caltrans, District 6**
  Marc Birnbaum
- [ ] **Caltrans, District 7**
  Cheryl J. Powell
- [ ] **Caltrans, District 8**
  Dan Kopulsky
- [ ] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Mario Orso
- [x] **Caltrans, District 12**
  Bob Joseph

Cal EPA

Air Resources Board

- [ ] Airport Projects
  Jim Lerner
  - [ ] Transportation Projects
    Kurt Karperos
  - [ ] Industrial Projects
    Mike Tollstrup
- [x] **California Integrated Waste Management Board**
  Sue O'Leary
- [ ] **State Water Resources Control Board**
  Jim Hockenberry
  Division of Financial Assistance
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] **State Water Resouces Control Board**
  Steven Herrera
  Division of Water Rights
- [ ] **Dept. of Toxic Substances Control**
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [ ] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] **RWQCB 3**
  Central Coast Region (3)
- [ ] **RWQCB 4**
  Jonathan Bishop
  Los Angeles Region (4)
- [ ] **RWQCB 5S**
  Central Valley Region (5)
  - [ ] **RWQCB 5F**
    Central Valley Region (5)
    Fresno Branch Office
  - [ ] **RWQCB 5R**
    Central Valley Region (5)
    Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
  - [ ] **RWQCB 6V**
    Lahontan Region (6)
    Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [x] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)

- [ ] **Other** _____

Last Updated on 0720/05

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

July 22, 2005

Ms. Cymantha Atkinson
County of Orange
Integrated Waste Management Dept.
Office of Public Affairs
320 North Flower Street, Suite 400
Santa Ana, CA 92703

Dear Ms. Atkinson:

Notice of Preparation of a Draft Environmental Impact Report for Regional Landfill Options for Orange County (RELOOC) Strategic Plan-Frank R. Bowerman Landfill Implementation

The South Coast Air Quality Management District (SCAQMD) appreciates the opportunity to comment on the above-mentioned document. The SCAQMD's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the Draft Environmental Impact Report (EIR). Please send the SCAQMD a copy of the Draft EIR upon its completion. In addition, please send with the Draft EIR all appendices or technical documents related to the air quality analysis and electronic versions of all air quality modeling and health risk assessment files.

Air Quality Analysis

The SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The SCAQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from the SCAQMD's Subscription Services Department by calling (909) 396-3720. Alternatively, lead agency may wish to consider using the California Air Resources Board (CARB) approved URBEMIS 2002 Model. This model is available on the SCAQMD Website at: www.aqmd.gov/ceqa/models.html.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the analysis.

Consistent with the SCAQMD's environmental justice enhancement I-4, in October 2003, the SCAQMD Governing Board adopted a methodology for calculating localized air quality impacts and localized significance thresholds (LSTs). LST's can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the proposed project, it is recommended that the lead agency perform a localized significance analysis by either using the LSTs developed by the SCAQMD or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at http://www.aqmd.gov/ceqa/handbook/LST/LST.html.

It is recommended that lead agencies for projects generating or attracting vehicular trips, especially heavy-duty diesel-fueled vehicles, perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis") can be found on the SCAQMD's CEQA webpages at the following internet address: http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html. An analysis of all toxic air contaminant impacts due to the decommissioning or use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures

In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize or eliminate significant adverse air quality impacts. To assist the Lead Agency with identifying possible mitigation measures for the project, please refer to Chapter 11 of the SCAQMD CEQA Air Quality Handbook for sample air quality mitigation measures. Additionally, SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook contain numerous measures for controlling construction-related emissions that should be considered for use as CEQA mitigation if not otherwise required. Other measures to reduce air quality impacts from land use projects can be found in the SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. This document can be found at the following internet address: http://www.aqmd.gov/prdas/aqguide/aqguide.html. Pursuant to state CEQA Guidelines §15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed.

Data Sources

SCAQMD rules and relevant air quality reports and data are available by calling the SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the SCAQMD's World Wide Web Homepage (http://www.aqmd.gov).

The SCAQMD is willing to work with the Lead Agency to ensure that project-related emissions are accurately identified, categorized, and evaluated. Please call Charles Blankson, Ph.D., Air Quality Specialist, CEQA Section, at (909) 396-3304 if you have any questions regarding this letter.

Sincerely,

Steve Smith

Steve Smith, Ph.D.
Program Supervisor, CEQA Section
Planning, Rule Development and Area Sources

SS:CB:li

ORC050721-03LI
Control Number

Huard-Spencer, Christine

From: FRBEIR [FRBEIR@iwmd.ocgov.com]
Sent: Monday, August 01, 2005 4:25 PM
To: Huard-Spencer, Christine
Cc: Atkinson, Cymantha; Browning, Sharon; Arnau, John; Arbogast, Christine
Subject: FW: Frank R. Bowerman Landfill Implementation

For the official NOP comments. Received in the FRB in-box. I acknowledged his comments.

Linda Hagthrop
Public Information Officer
Integrated Waste Management Department
Office: (714) 834-4176 Fax: (714) 834-4057
www.oclandfills.com

-----Original Message-----
From: Bob Oda [mailto:mboda1@cox.net]
Sent: Monday, August 01, 2005 1:22 PM
To: frbeir@iwmd.ocgov.com
Cc: Diane Nguyen
Subject: Frank R. Bowerman Landfill Implementation

I have received a transmittal on a Scoping Meeting on August 4, 2005.

I do not believe I will be able to attend. The City of Irvine has a public hearing on August 4, 2005 to approve a Master Plan for Planning Area 1 (PA 1) which is next to the Bowerman Landfill.

I believe what will happen is that the City of Irvine, Irvine Company and future residences of PA 1 (4,300 dwelling units) will try to close down the Bowerman Landfill. East and South of the Bowerman Landfill the City of Irvine plans on adding 16,000 dwelling units.

Why I bring this up is that the BKK Landfill in West Covina and the Montebello Landfill closed prematurely because of encroachment of dwelling units. The landfills were there first. However, since public safety, health and pollution issues are more important the landfills closed.

There is a Environmental Impact Reports (EIR) for PA I and I do not believe that the Bowerman Landfill was evaluated or extensively discussed. Your preparation for a Draft EIR for the Bowerman Landfill states a proposed closure in 2053.

The questions I have are:

Is there a Regional Master Plan on land use especially when multiple jurisdictions are affected?

What happen if Bowerman closes within the next 10 years?

I believe this will lead up to your Project Alternatives i.e., export of refuse out of Orange County. This will be extremely costly and I expect large increases for refuse collection.

I request my comments be added to the August 4, 2005 Scoping Meeting and the your DEIR for reply.

Thank you,

Bob Oda
144 Trellis Lane
Irvine, CA 92620
mboda1@cox.net

August 1, 2005

TO: MIKE BYRNE, MANAGEMENT ANALYST

FROM: DAVID LAW, SENIOR PLANNER

SUBJECT: COMMENTS ON NOTICE OF PREPARATION – COUNTY STRATEGIC PLAN – FRANK R. BOWERMAN (FRB) LANDFILL IMPLEMENTATION

1. To ensure that the proposed project is consistent with the City of Irvine General Plan Objective H-1: Solid Waste and the policies that support this objective provide responses to the following comments:

   1.1. Provide documentation or supporting information demonstrating that alternative waste disposal methods and technology with emphasis on reuse of solid waste materials and on waste-to-energy analysis has or will be conducted as part of the proposal environmental analysis (General Plan Policy H-1 (b)).

   1.2. Provide a documentation or evidence that existing procedures are in place to minimize deleterious effects on surrounding land uses including the possible impacts generated by rodent and insect populations, odors and ground water conditions (General Plan Policy H-1 (d)).

2. *Page 4 of the Environmental Analysis Checklist:* Revise the second paragraph of subsection 1(b) to state, "The City of Irvine GP……in Planning Area ~~6~~3. …. Also, revise the following, "Land to the west of…..in the City GP for ~~Residential Estate~~ the preservation of open space."

State of California - The Resources Agency

ARNOLD SCHWARZENEGGER, *Governor*

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
4949 Viewridge Avenue
San Diego, CA 92123
(858) 467-4201

August 10, 2005

Ms. Cymantha Atkinson
Orange County Integrated Waste Management Department
320 N. Flower Street, Suite 400
Santa Ana, CA 92703

Comments on the Notice of Preparation of a Draft Environmental Impact Report for Regional Landfill Options for Orange County Strategic Plan Project, Orange County (SCH # 2005071102)

Dear Ms. Atkinson:

The Department of Fish and Game (Department) appreciates this opportunity to comment on the above-referenced project, relative to impacts to biological resources. The Department in a Trustee Agency and a Responsible Agency pursuant to the California Environmental Quality Act (CEQA), Sections 15386 and 15381 respectively. As a Trustee Agency, the Department must be consulted by the Lead Agency during the preparation and public review for project-specific CEQA documents. As a Trustee Agency, the Department reviews proposed projects, comments on their impacts, and determines whether the mitigation measures or alternatives proposed are feasible and appropriate. Pursuant to Section 1802 of the Fish and Game Code, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants and habitat necessary for biologically sustainable populations of those species. The Department also administers the Natural Community Conservation Planning Program.

As part of the Strategic Plan, the County identified a number of proposed improvements to the three existing landfills operated the Integrated Waste Management Department. This document will focus on improvements at the Frank R. Bowerman Landfill, located in unincorporated Orange County, at 11002 Bee Canyon Access Road, near the City of Irvine. The proposed project includes: (1) phased vertical and horizontal expansions of the FRB Landfill within the existing property boundary; (2) an annual average of 8,500 tons per day (TPD) of municipal solid waste with an increase in the daily maximum to 11,500 TPD; (3) temporary disturbance outside the property boundary for slope stabilization and remediation, to remediate the effects of the 2002 landslide; (4) a Soil Management Plan that preserves adjacent canyons by stockpiling operational dirt on the landfill site and (5) provisions to ensure that plant and animal habitats on the landfill property continue to be planned for and protected.

General Comments

To enable Department staff to adequately review and comment on the proposed project,

we recommend the following information be included in the Draft Environmental Impact Report (DEIR), as applicable:

1. A complete assessment of the flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, and locally unique species and sensitive habitats.

    a. A thorough assessment of rare plants and rare natural communities, following the Department's May 1984 Guidelines (revised May 2000) for Assessing Impacts to Rare Plants and Rare Natural Communities (Attachment 1).

    b. A complete assessment of sensitive fish, wildlife, reptile, and amphibian species. Seasonal variations in use of the project area should also be addressed. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the Department and the U.S. Fish and Wildlife Service.

    c. Rare, threatened, and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition (see CEQA Guidelines, § 15380).

    d. The Department's California Natural Diversity Data Base in Sacramento should be contacted at (916) 327-5960 to obtain current information on any previously reported sensitive species and habitat, including Significant Natural Areas identified under Division 2, Chapter 12 of the Fish and Game Code.

2. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts, should be included.

    a. CEQA Guidelines, § 15125(c), direct that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region.

    b. Project impacts should be analyzed relative to their effects on off-site habitats. Specifically, this should include nearby public lands, open space, adjacent natural habitats, riparian ecosystems, and any designated and/or proposed Natural Communities Conservation Planning (NCCP) reserve lands. Impacts to and maintenance of wildlife corridor/movement areas, including access to undisturbed habitat in adjacent areas, should be fully evaluated and provided.

    c. A discussion of impacts associated with increased lighting, noise, human activity, changes in drainage patterns, changes in water volume, velocity, and quality, soil erosion, and /or sedimentation in streams and water courses on or near the project

site, with mitigation measures proposed to alleviate such impacts should be included.

d. The zoning of areas for development projects or other uses that are nearby or adjacent to natural areas may inadvertently contribute to wildlife-human interactions. A discussion of possible conflicts and mitigation measures to reduce these conflicts should be included in the environmental document.

e. A cumulative effects analysis should be developed as described under CEQA Guidelines, § 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

3. A range of alternatives should be analyzed to ensure that alternatives to the proposed project are fully considered and evaluated. A range of alternatives which avoid or otherwise minimize impacts to sensitive biological resources should be included. Specific alternative locations should also be evaluated in areas with lower resource sensitivity where appropriate.

a. The Department considers Rare Natural Communities as threatened habitats having both regional and local significance. Thus, these communities should be fully avoided and otherwise protected from project-related impacts (Attachment 2).

4. Mitigation measures for adverse project-related impacts to sensitive plants, animals, and habitats should be discussed. Mitigation measures should emphasize avoidance and reduction of project impacts. For unavoidable impacts, on-site habitat restoration or enhancement should be discussed in detail. If on-site mitigation is not feasible, off-site mitigation through habitat creation and/or acquisition and preservation in perpetuity should be addressed.

a. The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Studies have shown that these efforts are experimental in nature and largely unsuccessful.

b. Areas reserved as mitigation for project impacts should be protected from future direct and indirect impacts. Potential issues to be considered include limitation of access, conservation easements, monitoring and management programs, control of illegal dumping, water pollution, and fire.

c. Plans for restoration and revegetation should be prepared by persons with expertise in southern California ecosystems and native plant revegetation techniques. Each plan should include, at a minimum: (a) the location of the mitigation site; (b) the plant species to be used, container sizes, and seeding rates;

(c) a schematic depicting the mitigation area; (d) planting schedule; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation on site; (g) specific success criteria; (h) a detailed monitoring program; (i) contingency measures should the success criteria not be met; and (j) identification of the party responsible for meeting the success criteria and providing for conservation of the mitigation site in perpetuity.

5. 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, either during construction or over the life of the project. CESA Permits are issued to conserve, protect, enhance, and restore State-listed threatened or endangered species and their habitats. Early consultation is encouraged, as significant modification to a project and mitigation measures may be required in order to obtain a CESA Permit. Revisions to the Fish and Game Code, effective January 1998, may require that the Department issue a separate CEQA document for the issuance of a 2081 permit unless the project CEQA document addresses all project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of a 2081 permit. For these reasons, the following information is requested:

   a. Biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for a CESA Permit.

   b. A Department-approved Mitigation Agreement and Mitigation Plan are required for plants listed as rare under the Native Plant Protection Act.

6. The Department has responsibility for wetland and riparian habitats. It is the policy of the Department to strongly discourage development in wetlands or conversion of wetlands to uplands. We oppose any development or conversion which would result in a reduction of wetland acreage or wetland habitat values, unless, at a minimum, project mitigation assures there will be "no net loss" of either wetland habitat values or acreage. Development and conversion include but are not limited to conversion to subsurface drains, placement of fill or building of structures within the wetland, and channelization or removal of materials from the streambed. All wetlands and watercourses, whether intermittent or perennial, should be retained and provided with substantial setbacks which preserve the riparian and aquatic values and maintain their value to on-site and off-site wildlife populations.

   a. If the site has the potential to support aquatic, riparian, or wetland habitat, a jurisdictional delineation of lakes, streams, and associated riparian habitats should be included in the DEIR, including a delineation of wetlands pursuant to the U. S. Fish and Wildlife Service wetland definition adopted by the Department[1]. Please

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[1] Cowardin, Lewis M., et al. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service.

note that some wetland and riparian habitats subject to the Department's authority may extend beyond the jurisdictional limits of the U.S. Army Corps of Engineers.

b. The project may require a Lake or Streambed Alteration Agreement, pursuant to Section 1600 *et seq.* of the Fish and Game Code, with the applicant prior to the applicant's commencement of any activity that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank (which may include associated riparian resources) of a river, stream or lake, or use material from a streambed. The Department's issuance of a Lake or Streambed Alteration Agreement for a project that is subject to CEQA will require CEQA compliance actions by the Department as a responsible agency. The Department as a responsible agency under CEQA may consider the local jurisdiction's (lead agency) Negative Declaration or Environmental Impact Report for the project. To minimize additional requirements by the Department pursuant to Section 1600 *et seq.* and/or under CEQA, the document should fully identify the potential impacts to the lake, stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the agreement[2].

We appreciate the opportunity to comment on the referenced NOP. Questions regarding this letter and further coordination on these issues should be directed to Leslee Newton-Reed at (858) 467-4281.

Sincerely,

Michael J. Mulligan
Deputy Regional Manager
California Department of Fish and Game

Attachments

cc: State Clearinghouse

LNR:lnr
Regional Landfill Options for Orange County Strategic Plan NOP

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[2] A Streambed Alteration Agreement form may be obtained by writing to: Department of Fish and Game, 4949 Viewridge Avenue, San Diego, CA 92123, by calling (858) 636-3160, or by accessing the Department's web site at www.dfg.ca.gov/1600 .

Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities

State of California
THE RESOURCES AGENCY
Department of Fish and Game
December 9, 1983
Revised May 8, 2000

The following recommendations are intended to help those who prepare and review environmental documents determine **when** a botanical survey is needed, **who** should be considered qualified to conduct such surveys, **how** field surveys should be conducted, and **what** information should be contained in the survey report. The Department may recommend that lead agencies not accept the results of surveys that are not conducted according to these guidelines.

1. Botanical surveys are conducted in order to determine the environmental effects of proposed projects on all rare, threatened, and endangered plants and plant communities. Rare, threatened, and endangered plants are not necessarily limited to those species which have been "listed" by state and federal agencies but should include any species that, based on all available data, can be shown to be rare, threatened, and/or endangered under the following definitions:

A species, subspecies, or variety of plant is "endangered" when the prospects of its survival and reproduction are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, or disease. A plant is "threatened" when it is likely to become endangered in the foreseeable future in the absence of protection measures. A plant is "rare" when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.

Rare natural communities are those communities that are of highly limited distribution. These communities may or may not contain rare, threatened, or endangered species. The most current version of the California Natural Diversity Database's List of California Terrestrial Natural Communities may be used as a guide to the names and status of communities.

2. It is appropriate to conduct a botanical field survey to determine if, or to the extent that, rare, threatened, or endangered plants will be affected by a proposed project when:

a. Natural vegetation occurs on the site, it is unknown if rare, threatened, or endangered plants or habitats occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
b. Rare plants have historically been identified on the project site, but adequate information for impact assessment is lacking.

3. Botanical consultants should possess the following qualifications:

a. Experience conducting floristic field surveys;
b. Knowledge of plant taxonomy and plant community ecology;
c. Familiarity with the plants of the area, including rare, threatened, and endangered species;
d. Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
e. Experience with analyzing impacts of development on native plant species and communities.

4. Field surveys should be conducted in a manner that will locate any rare, threatened, or endangered species that may be present. Specifically, rare, threatened, or endangered plant surveys should be:

a. Conducted in the field at the proper time of year when rare, threatened, or endangered species are both evident and identifiable. Usually, this is when the plants are flowering.

When rare, threatened, or endangered plants are known to occur in the type(s) of habitat present in the project

area, nearby accessible occurrences of the plants (reference sites) should be observed to determine that the species are identifiable at the time of the survey.

b. Floristic in nature. A floristic survey requires that every plant observed be identified to the extent necessary to determine its rarity and listing status. In addition, a sufficient number of visits spaced throughout the growing season are necessary to accurately determine what plants exist on the site. In order to properly characterize the site and document the completeness of the survey, a complete list of plants observed on the site should be included in every botanical survey report.

c. Conducted in a manner that is consistent with conservation ethics. Collections (voucher specimens) of rare, threatened, or endangered species, or suspected rare, threatened, or endangered species should be made only when such actions would not jeopardize the continued existence of the population and in accordance with applicable state and federal permit requirements. A collecting permit from the Habitat Conservation Planning Branch of DFG is required for collection of state-listed plant species. Voucher specimens should be deposited at recognized public herbaria for future reference. Photography should be used to document plant identification and habitat whenever possible, but especially when the population cannot withstand collection of voucher specimens.

d. Conducted using systematic field techniques in all habitats of the site to ensure a thorough coverage of potential impact areas.

e. Well documented. When a rare, threatened, or endangered plant (or rare plant community) is located, a California Native Species (or Community) Field Survey Form or equivalent written form, accompanied by a copy of the appropriate portion of a 7.5 minute topographic map with the occurrence mapped, should be completed and submitted to the Natural Diversity Database. Locations may be best documented using global positioning systems (GPS) and presented in map and digital forms as these tools become more accessible.

5. Reports of botanical field surveys should be included in or with environmental assessments, negative declarations and mitigated negative declarations, Timber Harvesting Plans (THPs), EIR's, and EIS's, and should contain the following information:

a. Project description, including a detailed map of the project location and study area.
b. A written description of biological setting referencing the community nomenclature used and a vegetation map.
c. Detailed description of survey methodology.
d. Dates of field surveys and total person-hours spent on field surveys.
e. Results of field survey including detailed maps and specific location data for each plant population found. Investigators are encouraged to provide GPS data and maps documenting population boundaries.
f. An assessment of potential impacts. This should include a map showing the distribution of plants in relation to proposed activities.
g. Discussion of the significance of rare, threatened, or endangered plant populations in the project area considering nearby populations and total species distribution.
h. Recommended measures to avoid impacts.
i. A list of all plants observed on the project area. Plants should be identified to the taxonomic level necessary to determine whether or not they are rare, threatened or endangered.
j. Description of reference site(s) visited and phenological development of rare, threatened, or endangered plant(s).
k. Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms.
l. Name of field investigator(s).
m. References cited, persons contacted, herbaria visited, and the location of voucher specimens.

ATTACHMENT 2

Sensitivity of Top Priority Rare Natural Communities in Southern California

Sensitivity rankings are determined by the Department of Fish and Game, California Natural Diversity Data Base and based on either number of known occurrences (locations) and/or amount of habitat remaining (acreage). The three rankings used for these top priority rare natural communities are as follows:

S1.# Less than 6 known locations and/or on less than 2,000 acres of habitat remaining.

S2.# Occurs in 6-20 known locations and/or 2,000-10,000 acres of habitat remaining.

S3.# Occurs in 21-100-known locations and/or 10,000-50,000 acres of habitat remaining.

The number to the right of the decimal point after the ranking refers to the degree of threat posed to that natural community regardless of the ranking. For example:

S1.1 = very threatened
S2.2 = threatened
S3.3 = no current threats known

Sensitivity Rankings (February 1992)

Rank	Community Name
S1.1	Mojave Riparian Forest
	Sonoran Cottonwood Willow Riparian
	Mesquite Bosque
	Elephant Tree Woodland
	Crucifixion Thorn Woodland
	Allthorn Woodland
	Arizonan Woodland
	Southern California Walnut Forest
	Mainland Cherry Forest
	Southern Bishop Pine Forest
	Torrey Pine Forest
	Desert Mountain White Fir Forest
	Southern Dune Scrub
	Southern Coastal Bluff Scrub
	Maritime Succulent Scrub
	Riversidean Alluvial Fan Sage Scrub
	Southern Maritime Chaparral
	Valley Needlegrass Grassland
	Great Basin Grassland
	Mojave Desert Grassland
	Pebble Plains
	Southern Sedge Bog
	Cismontane Alkali Marsh

S1.2

Southern Foredunes
Mono Pumice Flat
Southern Interior Basalt Flow Vernal Pool

S2.1

Venturan Coastal Sage Scrub
Diegan Coastal Sage Scrub
Riversidean Upland Coastal Sage Scrub
Riversidean Desert Sage Scrub
Sagebrush Steppe
Desert Sink Scrub
Mafic Southern Mixed Chaparral
San Diego Mesa Hardpan Vernal Pool
San Diego Mesa Claypan Vernal Pool
Alkali Meadow
Southern Coastal Salt Marsh
Coastal Brackish Marsh
Transmontane Alkali Marsh
Coastal and Valley Freshwater Marsh
Southern Arroyo Willow Riparian Forest
Southern Willow Scrub
Modoc-Great Basin Cottonwood Willow Riparian
Modoc-Great Basin Riparian Scrub
Mojave Desert Wash Scrub
Engelmann Oak Woodland
Open Engelmann Oak Woodland
Closed Engelmann Oak Woodland
Island Oak Woodland
California Walnut Woodland
Island Ironwood Forest
Island Cherry Forest
Southern Interior Cypress Forest
Bigcone Spruce-Canyon Oak Forest

S2.2

Active Coastal Dunes
Active Desert Dunes
Stabilized and Partially Stabilized Desert Dunes
Stabilized and Partially Stabilized Desert Sandfield
Mojave Mixed Steppe
Transmontane Freshwater Marsh
Coulter Pine Forest
Southern California Fellfield
White Mountains Fellfield

S2.3

Bristlecone Pine Forest
Limber Pine Forest

DEPARTMENT OF TRANSPORTATION
District 12
3337 Michelson Drive, Suite 380
Irvine, CA 92612-8894

Flex your power!
Be energy efficient!

August 9, 2005

Ms. Cymantha Atkinson
County of Orange IWMD
320 North Flower Street, Suite 400
Santa Ana, CA 92703

File: IGR/CEQA
SCH#: 2005071102
Log #: 1592
SR: 241, 133

Subject: Notice of Preparation for the Regional Landfill Options for Orange County Strategic Plan – Frank R. Bowerman (FRB) Landfill Implementation Draft Environmental Impact Report

Dear Ms. Atkinson,

Thank you for the opportunity to review and comment on the **Notice of Preparation for the regional Landfill Options for Orange County Strategic Plan - Frank R. Bowerman Landfill Implementation Draft Environmental Impact Report.** This project is located in unincorporated Orange County north and within the sphere of influence of the City of Irvine. The proposed project includes: (1).Phased vertical and horizontal expansions of the FRB Landfill within the existing property boundary; (2).Temporary disturbance outside the property boundary for slope stabilization and remediation, to remediate the effects of the 2002 landslide; (3).An annual average of 8,500 tons per day (TPD) with an increase in the daily maximum to 11,500 TPD; (4).A Soil Management Plan that preserves adjacent canyons by stockpiling operational dirt on the landfill site; and (5).Provisions to ensure that plant and animal habitats on the landfill property continue to be planned for and protected.

Caltrans District 12 is a reviewing agency on this project, and has the following comments:

Please change the route number from 231 to 241 and 133 in Figure 1. Also, a detailed traffic impact study needs to be included in the DEIR.

Please continue to keep us informed of this project and any future developments, which could potentially impact the transportation facilities. If you have any questions or need to contact us, please do not hesitate to call Lan Zhou at (949) 756-7827.

Sincerely,

ROBERT F. JOSEPH
Chief of IGR/Community Planning Branch
District 12

c: Terry Roberts, Office of Planning and Research
Terri Pencovic, Caltrans HQ IGR/Community Planning
Raouf Moussa, Traffic Operations

Alan C. Lloyd, Ph.D.
Secretary for Environmental Protection

California Integrated Waste Management Board

Rosario Marin, Chair
1001 I Street • Sacramento, California 95814 • (916) 341-6000
Mailing Address: P. O. Box 4025, Sacramento, CA 95812-4025
www.ciwmb.ca.gov

Arnold Schwarzenegger
Governor

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August 11, 2005

Ms Cymantha Atkinson
Orange County Integrated Waste Management Department
320 North Flower Street, Suite 400
Santa Ana, CA 92703

Subject: **SCH No. 2005071102** – Notice of Preparation of a Draft Environmental Impact Report for the expansion of Frank R. Bowerman Landfill, (SWFP No. 30-AB-0360), Orange County

Dear Ms Atkinson:

Board staff of the California Integrated Waste Management Board (CIWMB or Board) has reviewed the document cited above. Following is a description of the proposed project based on Board staff's understanding of the project as described in the Notice of Preparation. If the proposed Project Description below varies substantially from the project as understood by the Lead Agency; Board staff requests that any significant differences be clarified and included in the Draft Environmental Impact Report.

PROPOSED PROJECT DESCRIPTION

The Orange County Integrated Waste Management Department acting as Lead Agency is proposing an increase in the peak permitted daily tonnage to 11,500 tons per day from 8,500 tons per day. The landfill would remain at an annual average of 8,500 tons per day. It is proposed to increase the height of the landfill from its current permitted level of 1,100 feet above mean sea level to about 1,350 feet above mean sea level, an increase of about 250 feet.

There will be a horizontal expansion which would include landform modifications to provide for an additional approximate 193 acres of refuse footprint area for a total disposal footprint of approximately 534 acres.

Slope stabilization is required in the northern and eastern parts of the landfill site to provide a stable sub-grade designated for the landfill within areas underlain by landslides. After construction of the slope stabilization measures is complete, the disturbed areas outside the landfill property will be re-vegetated in native plant species.

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AUG 1 6 2005

All soil stockpiling will take place within the landfill property and Alternative Daily Cover is proposed for use to increase the refuse-to-soil ratios. Approximately 37.0 million cubic yards of soil will be excavated throughout the life of this proposed expansion. The waste compaction at the landfill under the proposed project will remain at approximately 1,450 pounds per cubic yard.

The number of employees will remain the same and the operating hours, days and schedule at the landfill will not change as a result of the proposed project.

	Existing 2004 Permit	Proposed Expansion
Permitted Area (in acres)	725 acres	725 acres
Disposal Footprint	341 acres	534 acres
Maximum Elevation	1,100 feet above MSL	1,350 feet above MSL
Maximum Depth	600 feet above MSL	600 feet above MSL
Permitted Capacity	127,000,000 cubic yards	257,000,000 cubic yards
Estimated Closure Date	2022	2053
Peak Tonnage	8,500 tons per day	11,500 tons per day
Peak Annual Daily Tonnage	8,500 tons per day	8,500 tons per day
Peak Vehicle Count	None Specified	None Specified

BOARD STAFF'S COMMENTS

For clarity and convenience, questions and comments that Board staff is seeking a specific response to will be *italicized* so the reader can more easily locate and respond to them.

To assist Board staff's analysis and evaluation of this project, and aid in the determination of the adequacy of the Environmental Impact Report and related CEQA document(s), we request that the following comments and questions be addressed in the Draft Environmental Impact Report under preparation by the Lead Agency.

As required by Title 14 California Code of Regulations (14 CCR) Sections 15126.2, 15126.4 and 15126.6, Board staff requests that the Draft Environmental Impact Report contain detailed considerations and discussions of the significant effects, mitigation measures and alternatives for the proposed project including the alternative of "no project."

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 (see 27 CCR §§ 20005 et. seq. and 14 CCR §§ 17000 et. seq.). The following Internet link accesses checklists developed by Board staff as a guide to Lead Agencies in the preparation of Environmental Impact Reports for landfills: http://www.ciwmb.ca.gov/LEACentral/CEQA/disposal.htm.

Peak Landfill Elevation

In the Draft Environmental Impact Report clarify the peak elevation on the landfill and whether that is the peak elevation with final cover or peak elevation of buried waste. If the peak elevation

of 1350 feet above mean sea level is not the final elevation with final cover, what will the maximum elevation of the landfill be with final cover in place?

Alternate Daily Cover

Alternative Daily Cover is mentioned in the Notice of Preparation, in the Draft Environmental Impact Report discuss the specific types of Alternative Daily Cover proposed for use at this landfill. Discuss any positive or negative impacts from the use of the types of Alternative Daily Cover proposed for use.

Days and Hours of Operation

In the Draft Environmental Impact Report be very clear that while the site may only be operated six days per week, 4:00 am through 6:00 pm, that the site in fact may be open 24 hours per day 7 days per week without the benefit of further environmental analysis.

Peak Tonnage

In the Draft Environmental Impact Report discuss in detail the amount of material in tons per day entering the landfill. Board staff would like to know, in addition to the material entering the landfill for disposal, the amount of material entering the landfill for beneficial purposes such as for Alternative Daily Cover, soil/contaminated soil for daily cover, material for recycling and etcetera. What will the peak daily tonnage entering the landfill for all material, excluding supplies and equipment?

Environmental Justice

Environmental Justice is not part of statue or regulations involving CEQA or the operation and evaluation of environmental documents relating to proposed projects that fall under the purview of the Board. Board members have taken a proactive stance towards environmental justice and expect that it be included and considered in projects coming before them for concurrence. The Board has included Environmental Justice as a major component in their Strategic Plan. The Strategic Plan can be found on the Board website at http://www.ciwmb.ca.gov/BoardInfo/StrategicPlan/2001/.

In review of this environmental document, Board staff has not found any discussion of environmental justice. In the Draft Environmental Impact Report, include a section or discussion on Environmental Justice as it pertains to this proposed project.

Acceptable Waste

Indicate in the Draft Environmental Impact Report the types of waste to be accepted as well as those types of waste to be excluded. Discuss load checking/screening procedures. Describe procedures for handling hazardous waste and/or Household Hazardous Waste that may come in

self-haul and commercial loads that are not detected through load checking. Describe policies and procedures for handling Universal Waste. Describe any "free dump" days when the peak permitted tonnage might be exceeded and the public might bring in items otherwise not normally acceptable, such as Household Hazardous Waste, e-waste, tires or batteries, as an example.

Maps and Drawings

In the draft environmental document provide accurate and to scale maps and drawings delineating the different areas of the landfill, indicating offices, waste management units, landfill gas flares/generators, processing and storage area, etcetera, indicate traffic flow and zoning and land use say 1000 feet from the boundaries of the proposed landfill expansion.

Odor Impact Minimization Plan (OIMP)

An Odor Impact Minimization Plan will be necessary if the landfill is to handle compostable material. One should be completed and included in the Mitigation Reporting or Monitoring Program and/or the Report of Facitity Information. Information on an Odor Impact Minimization Plan is available on the Board website at http://www.ciwmb.ca.gov/regulations/Title14/ch31.htm#article3 or refer to 14CCR § 17863.4.

Cumulative Impacts

It is important that the Draft Environmental Impact Report address the cumulative impacts resulting from the proposed project as well as those incremental impacts resulting from the proposed projects' implementation.

Land Use Compatibility

The Draft Environmental Impact Report should identify the proposed facility's surrounding land use with a description of the density of the occupancy for commercial and residential areas. The Draft Environmental Impact Report should be specific regarding the distance to the nearest sensitive receptor(s).

The project's surrounding land use must be designated as compatible with the proposed/current land uses at the project sites. The local government, in whose jurisdiction the facilities will be located, must make a finding that the facility is consistent with the General Plan (Public Resource Code (PRC) § 50000) and is identified in the most recent County Integrated/Solid Waste Management Plan (PRC § 50001).

Mitigation Reporting or Monitoring Program

As required by PRC § 21081.6, the Lead Agency should submit a Mitigation Reporting or Monitoring Program at the time of local certification of an Environmental Impact Report or adoption of a Mitigated Negative Declaration. This plan should identify the environmental impacts associated with the proposed project, identify mitigation measures to reduce impacts to a

less than significant level, identify agencies responsible for ensuring the implementation of the proposed mitigations, and specifies a monitoring/tracking mechanism. PRC § 21080 (c)(2) requires that mitigation measures "...avoid the effects or mitigate the effects to the point where clearly no significant effects on the environment would occur." The Mitigation Reporting or Monitoring Program is also required as a condition of project approval. PRC § 21081.6(b) also requires that "A public agency shall provide the measures to mitigate or avoid significant effects on the environment are fully enforceable through permit conditions, agreements, or other measures."

The Mitigation Reporting or Monitoring Program should also indicate that agencies designated to enforce mitigation measures in the Mitigated Negative Declaration have reviewed the Mitigation Reporting or Monitoring Program and agreed that they have the authority and means to accomplish the designated enforcement responsibilities.

ROLE OF THE BOARD

The Board must ensure that Solid Waste Facilities meet required State Minimum Standards for the protection of public health, safety and the environment. The Board implements this goal through programs such as: permit oversight for Solid Waste Facilities, certification and evaluation of Local Enforcement Agencies (LEA), which administer specific provisions of the Integrated Waste Management Act of 1989. Review of environmental documents for proposed, new or expanded Solid Waste Facilities for compliance with CEQA, enforcement of State Minimum Standards for Solid Waste Facilities, corrective action programs for facilities out of compliance with State Minimum Standards and research and development for special waste management issues.

California Environmental Quality Act Review

CEQA compliance is required for the establishment, expansion or change in operation(s) of a Solid Waste Facility requiring the issuance or revision of a Solid Waste Facilities Permit. Board staff's review of the Draft Environmental Impact Report is to help decision-makers (1) identify potential impacts from proposed projects, (2) determine whether any such impacts are significant, and (3) ascertain whether significant impacts can be mitigated to a level of insignificance in compliance with the CEQA statute and guidelines. In order for Board staff to ascertain that the Draft Environmental Impact Report is complete and adequate for our use in the Solid Waste Facilities Permit permitting process, the proposed project should be described in sufficient detail and the potential environmental impacts must be identified clearly in the environmental assessment/Initial Study Section of the Draft Environmental Impact Report. Mitigating measures to reduce potentially significant environmental impacts should be incorporated into the project, when feasible, in order to avoid potentially significant effects upon project implementation. When a potential significant environmental effect is identified and an argument is made as to why no mitigation is necessary, the discussion/analysis should be in sufficient detail that the reviewer/decision-maker can understand the Lead Agency's reasoning for their determination. In order to expedite document preparation and minimize redundancy - supporting documentation

and/or studies would be helpful and should be incorporated by referenced in the Draft Environmental Impact Report.

CONCLUSION

Board staff requests copies of any subsequent or revised environmental documents in addition to the Draft and Final Environmental Impact Reports. Any subsequent or revised environmental documents should be circulated through the State Clearinghouse as required in 14 CCR §15205(a) of the CEQA Guidelines. The Board requests being noticed of the date, time and location of any public hearings regarding the project proposal at least ten days in advance.

Board staff has no further comments on the project as proposed at this time. Thank you for the opportunity to comment on this project in the early planning stages. Permitting and Inspection staff are available for any planned scoping meetings, workshops or other public meetings.

If you have any questions regarding these comments, please contact me at 916.341.6728 or e-mail me at rseamans@ciwmb.ca.gov.

Sincerely,

Raymond M. Seamans
Permitting and Inspection Branch
Environmental Review, Region 4
Permitting and Enforcement Division
California Integrated Waste Management Board

cc: Tadese Gebre-Hawariat
Permitting and Inspection Branch, Region 4
Permitting and Enforcement Division
California Integrated Waste Management Board

Suzanne Hambleton, Supervisor
Permitting and Inspection Branch, Region 4
Permitting and Enforcement Division
California Integrated Waste Management Board

Patty Henshaw, Supervisor
County of Orange
Health Care Agency
Environmental Health Division
1241 East Dyer Road, Suite 120
Santa Ana, CA 92705-5611

NIVA North Irvine Villages Association

Ms. Cymantha Atkinson
County of Orange Integrated Waste Management Department
320 N. Flower Street, Suite 400
Santa Ana, Calif. 92703

August 12, 2005

Re.: Comments on Notice of Preparation [NOP]
for Draft Environmental Impact Report [Draft EIR] on
Proposed Frank R. Bowerman Landfill Expansion Project

Dear Ms. Atkinson:

NIVA has reviewed the NOP and has the following list of comments to submit for consideration in preparing the Draft EIR. I presented many of these orally at the August 4, 2005 Public Scoping Meeting held at the Irvine Lakeview Senior Center.

1. The NOP mentions additional buildings and structures, the EIR should address the reason(s) for these -- relocation, enlargement and any new purpose.

2. Though revegetation is mentioned upon completion, there is no mention of a schedule to be included. There ought to be some sort of schedule that corresponds with completion of various sections of the site and the timing after each is completed for commencement of the revegetation.

3. With the expansion -- especially increasing the height of the landfill -- what if any increased risk is created in terms of the underlaying membrane installed to prevent letching into the underlying soil and ground water? Specifically, what is the increased possibility of membrane damage from earth movement such as might occur from an earthquake? Will any sort of land movement sensors be installed to detect earth movement prior to large ground movement or actual landslides?

4. Details need to be included on the specifics of the water drainage system modifications?

5. For mitigation measures, consideration ought to be given also to off-site preservation opportunities especially if on-site are limited, unavailable, or possible only out into the distant future.

6. Compensation ought to be discussed and considered for the delay of the previously agreed upon ultimate use of the completed landfill as a regional park. The expansion would delay that public amenity for 30 years or until 2053 -- far beyond the lives of most existing Irvine residents. Delayed receipt of a mitigation measure is in essence a loss which should be compensated. Any such remuneration should occur upfront of at least no later than the currently expected life ending date of Year 2022.

7. The NOP makes mention of roadway access traffic impacts as related to only CMP roadways and only in relation to County performance standards. Since the traffic is and will be passing through the City of Irvine and in some cases on Irvine roadways which are not CMP roadways, the EIR should also address the traffic impacts in relation to City performance standards. Irvine standards are more stringent in many cases. The traffic section should also address what percentage of trucks come via the I-5 and Sand Canyon versus other roadways through Irvine.

4790 IRVINE BOULEVARD, SUITE 105; PMB 254 IRVINE, CALIFORNIA 92620

8. The EIR should address whether the expansion will or can possibly increase the probably of landslides similar to the recent unexpected landslide at the site especially in areas outside the permitted site. A drawing such as Figure 6 (Proposed Landfill Expansion) in the Notice of Preparation should be included clearly indicating the location of the recent landslide and where this area will be located within the new landfill area, i.e., will the site be buried or hidden. If so, what means will be provided to monitor any future movement of this previous fault slippage?

9. Though the NOP mentions the need to do view analysis for areas of Foothill Ranch and Lake Forest, the analysis should also include view analyses from areas of Irvine such as Northwood, Woodbury, Woodbridge, and even the area of Great Park.

10. There is mention of the possibility of brought in fill dirt. The discussion in the EIR should include some estimate of the maximum amount possibly needed, possible routes of such deliveries, and the maximum rate of delivery (i.e., truckloads or tons per day).

11. There ought to be a modification of alternatives considered for Alternative #2 (expansion with no increase in daily tonnage) which would exclude any exportation of waste. Excluding this option, an option which appears to be reasonable, seems to set a course to the proposed project by assuring rejection of all proposed alternatives through "selective poisoning" of alternatives with the very difficult need for exportation of waste.

12. As there will be a need for a considerable amount of nursery growing of specific vegestation not normally carried by commercial nuseries in any quantity, the EIR should address the need and feasibility of the establishment of on-site and/or off-site locations for growing these plants so that they are available in the desired quantity when needed.

13. The immediate neighboring city of Irvine would be impacted by the extended life of the Landfill. These impacts would not shared by any extent by the remaining cities in the County. Consequently, the only fair way to distribute the impacts equitably would be through some sort of mitigation compensation to the City of Irvine. Any such compensation proposed as mitigation to the impacts of the extended landfill useage should be either spread over the life of the Landfill or provided early-on in the life of the Landfill. Either the EIR should address this sharing disparity of impacts amongst the citiies of Orange County and proposed mitigation (compensation) or be addressed in advance in some separate agreement between OCIWMD and the impacted City of Irvine.

NIVA hopes you find this listing helpful in preparing the content of the Draft EIR and would appreciate receipt of a copy of the Draft EIR once made public.. Should there be any need to contact me, I can be reached on (714) 669-0664.

Sincerely,

David Melvold
President

cc Mike Byrne, City of Irvine

SOUTHERN CALIFORNIA

ASSOCIATION of GOVERNMENTS

Main Office

818 West Seventh Street

12th Floor

Los Angeles, California

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Orange County Transportation Authority: Lou Correa, County of Orange

Riverside County Transportation Commission: Robin Lowe, Hemet

Ventura County Transportation Commission: Keith Millhouse, Moorpark

August 15, 2005

Ms. Cymantha Atkinson
County of Orange
Integrated Waste Management Department
Office of Public Affairs
320 N. Flower Street, Suite 400
Santa Ana, CA 92703

RE: SCAG Clearinghouse No. I 20050472 Regional Landfill Options for Orange County (RELOOC) Strategic Plan-Frank R. Bowerman (FRB) Landfill Implementation

Dear Ms. Atkinson:

Thank you for submitting the **Regional Landfill Options for Orange County (RELOOC) Strategic Plan-Frank R. Bowerman (FRB) Landfill Implementation** for review and comment. As areawide clearinghouse for regionally significant projects, SCAG reviews the consistency of local plans, projects and programs with regional plans. This activity is based on SCAG's responsibilities as a regional planning organization pursuant to state and federal laws and regulations. Guidance provided by these reviews is intended to assist local agencies and project sponsors to take actions that contribute to the attainment of regional goals and policies.

We have reviewed the **Regional Landfill Options for Orange County (RELOOC) Strategic Plan-Frank R. Bowerman (FRB) Landfill Implementation**, and have determined that the proposed Project is not regionally significant per SCAG Intergovernmental Review (IGR) Criteria and California Environmental Quality Act (CEQA) Guidelines (Section 15206). Therefore, the proposed Project does not warrant comments at this time. Should there be a change in the scope of the proposed Project, we would appreciate the opportunity to review and comment at that time.

A description of the proposed Project was published in SCAG's **July 16-31, 2005** Intergovernmental Review Clearinghouse Report for public review and comment.

The project title and SCAG Clearinghouse number should be used in all correspondence with SCAG concerning this Project. Correspondence should be sent to the attention of the Clearinghouse Coordinator. If you have any questions, please contact me at (213) 236-1851. Thank you.

Sincerely,

BRIAN WALLACE
Associate Regional Planner
Intergovernmental Review

1865 2798 2005

COUNTY OF ORANGE
HEALTH CARE AGENCY

REGULATORY HEALTH SERVICES
ENVIRONMENTAL HEALTH

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REGULATORY HEALTH SERVICES

STEVEN K. WONG, REHS, MPH
DIRECTOR
ENVIRONMENTAL HEALTH

MAILING ADDRESS:
1241 EAST DYER ROAD, SUITE 120
SANTA ANA, CA 92705-5611

TELEPHONE: (714) 433-6000
FAX: (714) 754-1732
E-MAIL: ehealth@ochca.com

August 22, 2005

Cymantha Atkinson, Project Manager
Office of Public Affairs
County of Orange IWMD
320 North Flower Street, Suite 400
Santa Ana, CA 92703

Subject: **Notice of Preparation of DEIR 604 and Initial Study/Environmental Analysis Checklist (State Clearinghouse Number 2005071102), Frank R. Bowerman Landfill, SWIS No. 30-AB-0360, Irvine**

Dear Ms. Atkinson:

On July 21, 2005, the Solid Waste Local Enforcement Agency (LEA) received a Notice of Preparation (NOP) and Initial Study/Environmental Analysis Checklist (IS/EAC) for draft Environmental Impact Report (DEIR) 604 for FRB Landfill. This CEQA document will analyze the impacts of the proposed RELOOC Strategic Plan – FRB Landfill Implementation project. Among other changes, the project proposes to increase permitted waste tonnage limit, increase landfill capacity through horizontal and vertical increase of waste fill area, and extend closure date to 2053. Orange County Integrated Waste Management Department (OCIWMD) is the Lead Agency preparing this CEQA document.

After review, the LEA has the following comments:

1. NOP, Section 4.1 – Purpose of the Project, page 14 of 26: *"An annual average of 8,500 TPD of MSW, with an increase in the daily maximum TPD of 11,500 TPD"*. Draft EIR should provide detailed tonnage for: a) waste to be landfilled on-site, b) recovered recyclables from incoming waste, c) exempt materials as defined in FRB's Solid Waste Facility Permit (SWFP), and d) solid waste with beneficial reuse as defined in California Code of Regulations, Title 27 (27 CCR), Section 20686. Throughout DEIR 604, analyses should account for all wastes and materials listed above.

2. NOP, Section 4.2.1 – Increase Tonnage and Expansions at FRB Landfill, 4th paragraph, page 16 of 26: Site life was calculated assuming a refuse density of 1,450 lbs/cy. However, OCIWMD has always assumed a 1,333 lbs/cy in-place refuse density in site capacity calculations (see Joint Technical Document Section B.1.5 and Annual Capacity Reports). DEIR 604, Joint Technical Document and OCIWMD's calculations should all have consistent assumptions.

3. NOP, Section 4.2.2 – Slope Stabilization, 1st paragraph, page 17 of 26: *"Approximately 34 acres outside the landfill boundary would be included within the disturbance limits for slope*

stabilization". DEIR 604 should clarify if the 34 acres do include the disturbed area outside of FRB's southern boundary as a result of Phase V-D development back in 2002.

4. NOP, Section 4.2.3 – Soil Management Plan, page 17 of 26: DEIR 604 should elaborate more on *"increasing refuse-to-oil ratios through the use of alternative daily cover"*. Recall FRB already utilizes tarpaulins and processed green material as alternative daily cover (ADC). Will DEIR 604 propose the use of other materials as ADC and analyze their impacts?

5. NOP, Section 4.2.8 – Other Project Features, 1st paragraph, page 18 of 26: With a proposed waste tonnage SWFP limit increase to 11,500 TPD, DEIR 604 should adequately substantiate the preliminary conclusions contained in the NOP: *"The number of employees at the landfill will not change substantially as a result of the proposed project"* and *"The numbers and types of pieces of equipment used at FRB Landfill would not change substantially"*. The following information is needed in order to deem DEIR 604 analysis adequate, the above conclusions substantiated, and State Minimum Standards (as defined in 27 CCR Section 20164) complied with: a) listing of all heavy equipment at FRB landfill typically available for and operating at the working face (e.g. track-type dozers, compactors, scrapers and back-graders), b) list of all heavy equipment operators that are qualified and typically available to operate the above equipment, c) the productivity (in terms of tons of MSW handled per hour) of each type of heavy equipment typically operating at the working face, d) an average rate of incoming MSW (tons per hour) under proposed 11,500 TPD operating condition, and e) list of standby heavy equipment and operators that can be mobilized if the need arise to assist in the "push, spread, compact and cover" operations at the working face. Note some heavy equipment used in landfill's construction and maintenance projects (e.g. motor graders, backhoe loaders, excavators, trucks, front-end loaders, and integrated tool carriers) are not suited for working face operations, therefore, cannot be considered as available/standby equipment.

6. IS/EAC, Section 6 – Transportation and Circulation, page 11 of 30: Traffic analysis in DEIR 604 should account for vehicles: a) delivering waste for disposal, b) delivering exempt materials for use as ADC and/or beneficial reuse, c) personal (i.e. employees), and d) construction and service contractors typically present at FRB landfill.

We look forward to cooperatively work with you on DEIR 604. If you have any questions, please contact me at (714) 433 - 6271.

Sincerely,

Ossama "Sam" Abu-Shaban, PE, DEE
Senior Civil Engineer
Solid Waste Local Enforcement Agency
Environmental Health

cc: Raymond Seamans, CIWMB

San Joaquin Hills
Corridor Agency

Chairman:
Bert Hack
Laguna Woods

TRANSPORTATION CORRIDOR AGENCIES

Foothill/Eastern
Corridor Agency

Chairman:
Ken Ryan
Yorba Linda

August 19, 2005

Ms. Cymantha Atkinson
County of Orange
Integrated Waste Management Department
Office of Public Affairs
320 North Flower Street, Suite 400
Santa Ana, CA 92703

Subject: Notice to Prepare a Draft Environmental Impact Report

Dear Ms. Atkinson:

The Transportation Corridor Agencies (TCA) wishes to thank you for the opportunity to review and comment on the above-mentioned environmental notification. The TCA has reviewed the notification and has no comments at this time.

Should you have any questions or concerns regarding this information, please feel free to contact me at (949) 754-3483.

Sincerely,

Macie Cleary-Milan

Macie Cleary-Milan
Deputy Director
Environmental Planning

125 PACIFICA, SUITE 100, IRVINE CA 92618-3304 • P.O. BOX 53770, IRVINE CA 92619-3770 • 949/754-3400 FAX 949/754-3467
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ORANGE COUNTY FIRE AUTHORITY
P. O. Box 57115, Irvine, CA 92619-7115 • 1 Fire Authority Road, Irvine, CA 92602
Chip Prather, Fire Chief (714) 573-6000 www.ocfa.org

August 16, 2005

County of Orange/Integrated Waste Management Dept.
Attn Linda Hagthrop
320 N Flower St #400
Santa Ana, CA 92703-5000

Re: **FRB Landfill NOP for Strategic Plan**

Dear Ms. Hagthrop:

Thank you for the opportunity to review the subject document. The OCFA has no comments at this time.

Please note that 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.

If you have any additional questions, please contact me at (714) 573-6199.

Sincerely,

Michele Hernandez
Management Analyst, Strategic Services

Post-it® Fax Note 7671	Date 8/30/05	# of pages ▶ 1
To CYNTHIA ATKINSON	From CHERYL KUTA	
Co./Dept. IWMD	Co. CITY OF LAKE FOREST	
Phone #	Phone # (949) 461-3479	
Fax # (714) 834-4057	Fax # (949) 461-3512	

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Peter Herzog

Mayor Pro Tem
Richard T. Dixon

Council Members
Kathryn McCullough
Marcia Rudolph
Mark Tettemer

City Manager
Robert C. Dunek

August 30, 2005

Cynthia Atkinson, Project Manager
County of Orange, Integrated Waste Management Department
320 North Flower Street, Suite 400
Santa Ana, CA 92703

Subject: Notice of Preparation for Frank R Bowerman Landfill Expansion

Dear Ms. Atkinson:

Thank you for the opportunity to review the Notice of Preparation (NOP) for the Frank R Bowerman Landfill Expansion project. The City of Lake Forest received the NOP on August 2, 2005 and respectfully submits the following comment for consideration during preparation of the Draft Environmental Impact Report for the project.

1. The Initial Study indicates that the proposed project would provide additional capacity and extend the life of the landfill to approximately 2053 based on current population projections and existing disposal technologies (4.0 Environmental Analysis, 1(b)). The EIR should use the latest available population projections, such as OCP 2004. The Lead Agency may also note that the City of Lake Forest is currently 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 and mixed uses. If approved, the proposed project could allow up to 5,415 new residences within the City of Lake Forest which are not currently accounted for in the latest population projections.

Please send the Notice of Availability of the Draft EIR to the following contact person:

Gayle Ackerman, Director of Development Services
City of Lake Forest
25550 Commercentre Drive
Lake Forest, CA 92630

If you have any questions about this letter, please contact me at (949) 461-3479 or ckuta@ci.lake-forest.ca.us.

Sincerely,
CITY OF LAKE FOREST

Cheryl Kuta

Cheryl Kuta, AICP
Senior Planner

cc Gayle Ackerman, Development Services Director
Ted Simon, Engineering Services Manager

F:\CKuta\Interjurisdictional\ 2005-02 - Bowerman\ 2005-02 letter.doc

DRUG USE IS CHOICE ABUSE

APPENDIX D
SCOPING MEETING NOTICE/ATTENDANCE LIST/ SCOPING MEETING COMMENTS

July 30, 2005 OC Register Classified – Public Notices

PUBLIC MEETING FOR PROPOSED LANDFILL EXPANSION

The County Integrated Waste Management Department (IWMD) is seeking input from interested parties in development of the environmental analysis of the proposed expansion of Frank R. Bowerman Landfill near the City of Irvine. A public meeting will be held on Thursday, August 4, 2005, 7:30 p.m. at the Lakeview Senior Center, 20 Lake Road, Irvine. For more information e-mail IWMD at FRBEIR@iwmd.ocgov.com or by calling the Public Information Office at (714) 834-4176.

07/30/2005
CNS-849498#6752912
THE REGISTER R1657

Janice V. Goss, Director
320 N. Flower Street, Suite 400
Santa Ana, CA 92703

www.oclandfills.com
Telephone: (714) 834-4000
Fax: (714) 834-4183

COUNTY OF ORANGE

INTEGRATED WASTE MANAGEMENT DEPARTMENT

Regional Landfill Options for Orange County
Strategic Plan – Frank R. Bowerman Landfill Implementation
Scoping Meeting
August 4, 2005

Please Print Clearly.

Name/Address/Zip Code/Email Address
Philip Henderson 904 Reggio Aisle Irvine 92606 philiphender@earthlink.net
David Law ONE Civic Center Plaza Irvine, CA dlaw@ci.irvine.ca.us
AL BRANDT 40 ROCKVIEW IRVINE CA 92715
Kevin Kondru 9 Farragut, Irvine 92620.
DAVE MELVOLD 24 SONRISA IRVINE 92620
Edison W. Miller 12 Primrose Irvine 92604
Marcia Beckett City Irvine Staff

County of Orange, Integrated Waste Management Department

In Re: Regional Landfill Options for Orange County Strategic Plan Frank R. Bowerman Implementation

Environmental Impact Report #604

Public Scoping Meeting, taken at 20 Lake Road, Irvine, California, beginning at 7:41 p.m. and ending at 8:23 p.m. on Thursday, August 4, 2005, before CARMEN HUNTER, Certified Shorthand Reporter No. 12048.

1 APPEARANCES:

2

3 Integrated Waste Management Department:

4 Sharon Browning, Facilitator
Cymantha Atkinson, IWMD

5

6 Public Speakers:

7 Edison Miller
12 Primrose
8 Irvine, California 92604

9

Dave Melvold
10 24 Sunrisa
Irvine, California 92620

11

12

13

14

15

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17

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25

1 Irvine, California, Thursday, August 4, 2005
2 7:41 p.m. - 8:23 p.m.
3
4 MR. MILLER: My name is Edison Miller. I live
5 at 12 Primrose, Irvine.
6 Twenty-six years ago I was appointed to
7 Orange County Board of Supervisors, Third District, by
8 Jerry Brown. This was a problem then. While I attempted
9 to stimulate some interest in politicians, which I
10 wasn't, in (inaudible) look forward -- and I still didn't
11 hear anything tonight, unfortunately. I was really
12 looking forward of how do we get rid of our garbage and
13 make money and eliminate these landfills.
14 Another thing I didn't tell you is I understood
15 26 years ago that landfills produce a lot of methylene
16 gas, which is quite dangerous. And once they're filled
17 up and covered, you can't build on them for 50 years.
18 They keep settling.
19 I did manage to push through the county a
20 contract to sell the methylene gas over -- off some of
21 our closed pits, and the county was making, in those
22 days, 400,000 a year off of methylene. Texaco, right up
23 in Los Angeles, the Japanese, the Germans were all
24 working on combustible burning of waste garbage and
25 converting it into energy.

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1 There is a system that's been available down
2 here in Dallas, Texas -- and I contacted them and they've
3 sent me a few short notes -- that uses the chemical
4 process. And when you talk about how to reduce the load
5 factor, their process will convert waste, solid waste
6 into gas. I think the primary gas is hydrogen, but
7 several other small gases.
8 These gases can be used in a co-generation plant
9 to produce electricity, which can be sold. And everybody
10 has electrical problems as well. The process eliminates
11 1201 factor, your solid waste. I'll read you just a
12 couple things they told me.
13 The TRG process utilizes approximately 11 tons
14 per hour of municipal solid waste. The feed rate
15 produces approximately 350,000 standard cubic feet of
16 clean synthesis gas that can be used to co-generate power
17 in a combined heat-and-power scenario, or passed through
18 a fermentation process to produce ethanol, if we really
19 want ethanol. I don't think we do, but anyway.
20 The synthesis gas produced is free of dioxins
21 and furans, in other words, no pollutants. The TRG
22 process is an environmentally friendly technology and has
23 no operating smoke stack.
24 The secondary products of the TRG process are
25 the recovered metals and organic ash. The organic ash

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1 passed through federal toxic leachate testing and can be
2 used as landfill, if you really want to fill the land
3 somewhere.
4 One ton of typical municipal solid waste will
5 sustain an approximate reduction of 12 to one of
6 garbage-to-solid residue. This can enable the capacities
7 of the existing landfills to be greatly extended. This
8 is just barely scratching the surface of this process.
9 This process came about because my friend in
10 Texas is really in the steel business and has been for
11 40, 50 years. And he was putting in modern,
12 environmentally sound, no-waste steel mills all over the
13 world. But he was finding that very few of these
14 countries even then had power.
15 So he produces synthetic process of converting
16 solid waste or "scrap tighters" into gas that generate
17 electricity.
18 I'll leave these three with you.
19 MS. ATKINSON: And you would like the EIR to
20 explore or does discuss this?
21 MR. MILLER: Absolutely. I spoke to one of the
22 supervisors. I don't remember which one.
23 I have a theory on politicians. Anything that's
24 going to take two or four years to develop, in other
25 words, the next election, they're not interested in.

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They called Jerry Brown "moonbeam" because he was always asking people that wanted to spend billions of dollars, "How would this affect California in ten years or 20 years?" And they'd all look at him and say, "Who cares? Moonbeam Brown, he's out in nowhere again."

I'm concerned. I tried to raise this issue in 1979, and it's gone nowhere. When I came on to -- typical. Another brief example.

When I came in the office in '79, they had been studying the airport problem for 17 years. 17 years they'd been studying the airport problem. They fail to understand.

When I first came to Georgetown in 1950, there was 236,000 people here. We've got almost 3 billion now. You're talking about the garbage going up about 25 percent in the next 40 years? Forget it. If it doesn't go up 100 or 200 percent, I'll be greatly surprise.

Of course, we'd all have to walk. There won't be much movement on the freeway. But we've got some serious problems, and what I don't see, and I'm disappointed, is that nobody is thinking of what the future can do for us, what technology is available today.

And a lot of it -- yes, 26 years ago it was a little more expensive, maybe twice as much, to get into

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burning garbage and converting it into power. Now, today, we have chemicals, synthetic process, that will do it environmently sound and produce electricity. We're not thinking in those lines and that's where we should be.

I spoke to a couple of the county staff. They haven't gone back to me. I spoke to the supervisor's office. They never got back to me. Perhaps there's a stigma in my name. And if you were here 26 years ago, I was a flaming, communist friend of Jane Fonda, whatever.

And if that's the case, please feel free to contact TRG and Zia Enterprises directly. And if there's any press in here just drop my name.

But something's got to be done. I thought something had to be done 26 years ago. We were going to run out of valleys to fill with garbage. We got to stop. We got to think of something better, and there's better stuff out there.

Thank you.

MS. ATKINS: Thank you. Okay. So I believe we need to look at all alternative approaches to landfills and that needs to be addressed in some way in the EIR.

Did you have a question? Do you want to give your name address?

MR. MELVOLD: Dave Melvold. 24 Sunrisa in

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1 Irvine.

2 MS. ATKINS: Dave Melville?

3 MR. MELVOLD: Melvold, M-e-l-v-o-l-d.

4 I have a few questions. I ditto the previous

5 comments on the alternatives. That ought to be looked

6 at.

7 But I also want to know how come -- there ought

8 to be alternative 2B. In other words, the same that you

9 got for two, but without the export of waste. I think by

10 putting the export of waste, you're doomed. Two is a

11 practical one, so I think there ought to be that

12 alternative without the export review looked at.

13 But some of the other questions -- I don't throw

14 them up in any order or priority, but I think they ought

15 to be considered in the EIR.

16 One of them is that in the NOP there's no

17 mention in the timing of the re-vegetation. I think you

18 out to get some details about when it's proposed to be

19 put in. I don't think you're going to wait until 2053,

20 but I think there ought to be some detail.

21 There ought to be some detail also of an

22 analysis to show that the membrane that was designed for

23 the original height of the landfill can take this

24 additional height away or whatnot.

25 And I guess the biggest question I've got is

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1 that that membrane can withhold any feasible, realistic
2 earthquake movements, that there wouldn't be damage to
3 that membrane and, therefore, we could have consequences
4 in our modern permanent. Anyway, I'm just suggesting
5 that that be included in it.
6 I think you're probably going to get into
7 details of the surface water drainage system, a lot of
8 cases for this, but I hope to see that that is in there
9 if you haven't decided you're going to do it.
10 I wanted to mention mitigation measures for
11 destruction, or whatever you want to call it, of the
12 vegetation by this expansion. One of the considerations
13 that you ought to look at is compensation for that damage
14 outside, preservation somewhere else.
15 We could probably suggest other places rather
16 than waiting for years to have you just re-vegetate and
17 say it's equal. There may be a deal preserving another
18 land that may be lost somewhere else.
19 I don't know how to put this into an analysis
20 phrase, but I know now with this item with expansion that
21 the land would not be -- the landfill would not be closed
22 until 2053. So that means the anticipated regional park
23 land that we all anticipated here is long beyond most of
24 our lifetimes.
25 This is a loss to us. At least anybody that's

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1 in this room because we'll never see it. And I think
2 there ought to be some kind of mitigation for that
3 because postponement in another 30 years is a loss. I
4 don't think you'd wait for your check 20 or 30 years out
5 for your salary. I think there is some kind of a loss
6 and there ought to be compensation for that.
7 Can the expansion through the adjacent sites
8 cause the possibility of land slides in those sites like
9 the unexpected one? This would be land slides in
10 off-site locations, in other words, areas that are now
11 looked at as being preserved. Can you possibly do what
12 you're doing and increase the possibility? That may not
13 be addressed in the EIR.
14 You talked in the NOP about the view analysis
15 for Foothill Ranch and Lake Forest. I don't know if you
16 mean by that, that that's all inclusive. I'd like to see
17 also the view analysis for Woodbridge, Woodbury,
18 Northwood and various park areas of Irvine which also
19 have view of that site, how they would be affected. And
20 I think that out to be covered.
21 I'm trying to read my chicken scratch notes.
22 In your consideration of transportation and
23 traffic and whatnot, I know you don't know at this time
24 probably whether you will have to bring in in-fill, but
25 you do mention that as a possibility.

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1 I think you're going to have to come up with
2 some kind of an estimate of at least what could possibly
3 have to be brought in because that takes additional
4 traffic, and we'd like to know the routing of the trucks
5 for that route. And that's in addition to the waste
6 disposal trucks.
7 You've also noted that you would use the
8 county's standards for roads, and you can look at it to
9 see a few roads. But since you are having traffic go
10 through the city of Irvine, we do have a more restrictive
11 standard. I think the standard for the city ought to be
12 used and considered even if not -- you're not obligated
13 to adhere to it. I think it ought to be analyzed to see
14 what the difference would be.
15 You also mentioned the addition -- that there
16 will be additional buildings and structures. I assume
17 these are just for relocation and not for enlargement
18 purposes. If they are, I assume that would be addressed
19 in detail.
20 I guess that's it for right now.
21 MS. ATKINS: Okay. Thank you very much. Any
22 other questions or comments?
23 If you don't care to speak or also you did get
24 some comment forms when you came in, Christine has them
25 over by the front door if you didn't get one. And we'll

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be happy to take any comments in writing or questions you might have in writing.

If there are no other questions or comments at this time, I will close this portion of the meeting. We are accepting, I think, written questions and comments all the way through August 19. Those can be sent to the -- let's see -- 320 North Flower Street, WMD or you can contact the other telephone numbers there.

This end our portion of the meeting, and thank you very much. We have lots of coffee and cookies and, hopefully, you will help yourselves.

Thank you. Good night.

///

///

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I, the undersigned, a Certified Shorthand Reporter of the State of California, do hereby certify:

That the foregoing proceedings were taken before me at the time and place herein set forth; that any witnesses in the foregoing proceedings, prior to testifying, were placed under oath; that a verbatim record of the proceedings was made by me using machine shorthand which was thereafter transcribed under my direction; further, that the foregoing is an accurate transcription thereof.

I further certify that I am neither financially interested in the action nor a relative or employee of any attorney of any of the parties.

IN WITNESS WHEREOF, I have this date subscribed my name.

Dated: AUG 22 2005

CARMEN HUNTER
CSR NO. 12048

APPENDIX E
HYDROLOGY AND SOIL LOSS CALCULATIONS

APPENDIX E

HYDROLOGY AND SOIL LOSS CALCULATIONS

Appendix E-1:	Permitted Plan Hydrology Analysis, Frank R. Bowerman Landfill Joint Technical Document – Amendment No. 2 (Revision 2: August 2002), Appendix O
Appendix E-2:	Permitted Plan Hydrology Analysis, Updated 2005 (updated County rainfall data and transmissivity modelling parameters)
Appendix E-3:	Master Development Plan Hydrology Analysis, Appendix B of Master Development Plan – Frank R. Bowerman Landfill, November 2004
Appendix E-4:	Master Development Plan Hydrology Analysis, Updated 2005
Appendix E-5:	Master Development Plan Soil Loss Analysis, 2005
Appendix E-6:	Bee Canyon Watershed Run-off Volume and Debris/Sediment Yield Analyses

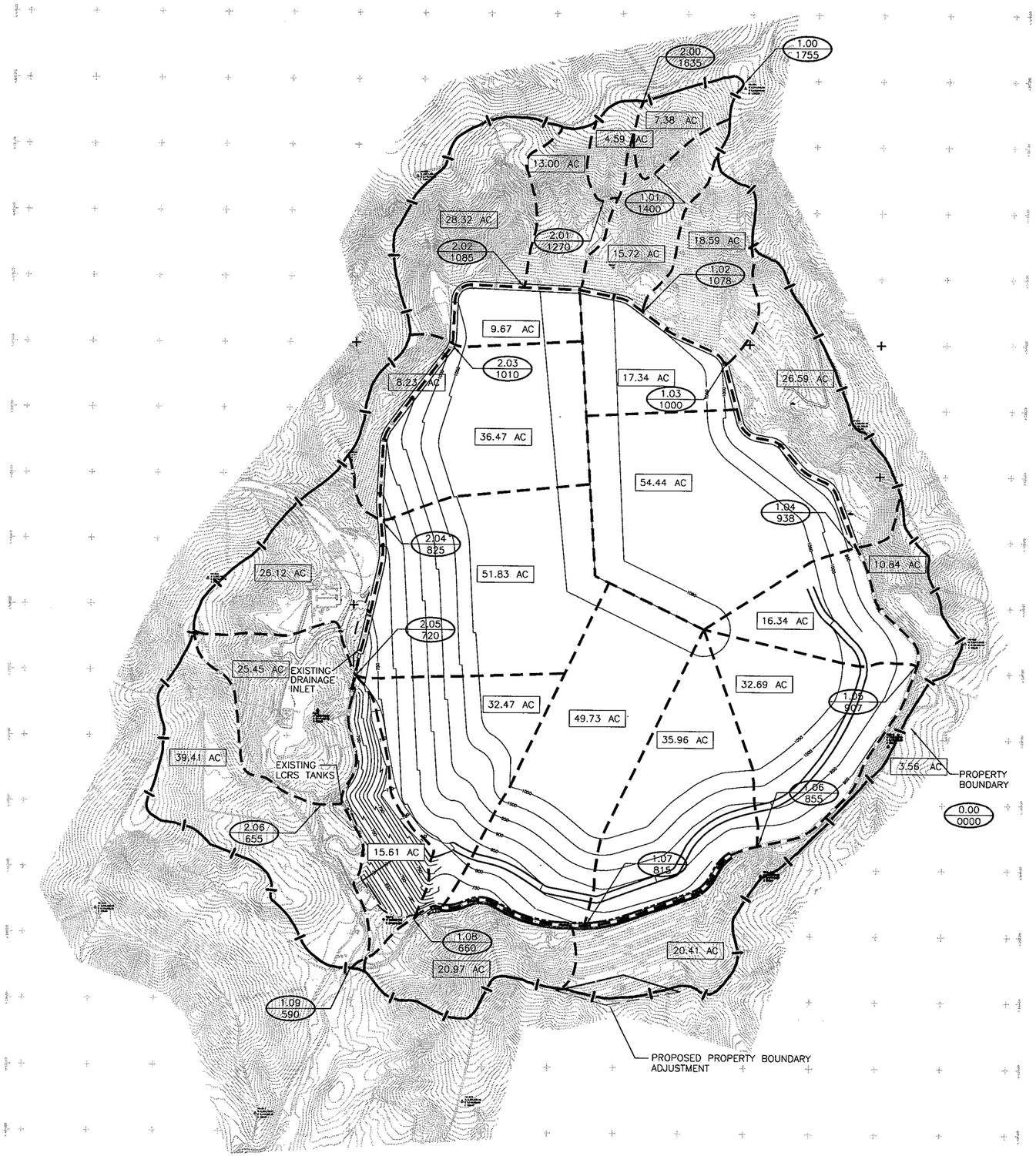
APPENDIX E-1

PERMITTED PLAN HYDROLOGY ANALYSIS
FRANK R. BOWERMAN LANDFILL
JOINT TECHNICAL DOCUMENT – AMENDMENT NO. 2
(REVISION 2: AUGUST 2002)
APPENDIX O

FRANK R. BOWERMAN LANDFILL

DEVELOPED CONDITION HYDROLOGY
100 - YEAR, 24 - HOUR RUNOFF SUMMARY TABLE

NODE NO.	SUBAREA (ACRES)	RUNOFF (CFS)	S AREA (ACRES)	S 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	23.1	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	70.7	161.14	330.56	749.9	
1.08 - 1.09				749.9	
1.09			330.56	749.9	CONFLUENCE
2.00 - 2.01	4.59	14.14	4.59	14.14	INITIAL AREA
2.01 - 2.02	13	37.22	17.59	50.36	
2.02 - 2.03	37.99	105.56	55.58	153.84	
2.03 - 2.04	44.7	123.22	100.28	271.63	
2.04 - 2.05	77.95	207.3	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



GRAPHIC SCALE

400 200 0 400 800

(IN FEET)

N

LEGEND

- PROPERTY BOUNDARY
- 850 — 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

NOTE:

1) DATE OF TOPOGRAPHIC INFORMATION: OCTOBER 10, 2000

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

DRAWING 9

ORANGE COUNTY
INTEGRATED WASTE MANAGEMENT

FRANK R. BOWERMAN LANDFILL

HYDROLOGY MAP

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765
(909) 860-7777

DESIGNED J.J.			SHEET
DRAWN J.P.J.		CHECKED M.A.C.	–
SCALE 1"=400'	DATE 5-2001	DRAWING NO. 24093DB.DWG	OF –

```
****************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 OCEMA HYDROLOGY CRITERION)
       (c) Copyright 1982-90 Advanced Engineering Software (aes)
          Ver. 5.8A  Release Date: 8/28/90  Serial # 7985

                      Analysis prepared by:

                  BRYAN A. STIRRAT & ASSOCIATES
                     1360 VALLEY VISTA DRIVE
                  DIAMOND BAR, CALIFORNIA 91765
             (714) 860-7777   *   FAX (714) 860-8017

 ************************** DESCRIPTION OF STUDY **************************
* 100 YEAR DEVELOPED CONDITION HYDROLOGY                                   *
* FRB LANDFILL (REVISED MASTER GRADING PLAN)                               *
* JI                                                                       *
 ****************************************************************************

  FILE NAME: 501-DEV.DAT
  TIME/DATE OF STUDY: 13:25   5/ 2/2001
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE =  .90
  *DATA BANK RAINFALL USED*


****************************************************************************
  FLOW PROCESS FROM NODE     1.00 TO NODE     1.01 IS CODE =   2
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  NATURAL AVERAGE COVER
  TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]** .20
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  UPSTREAM ELEVATION(FEET) =   1755.00
  DOWNSTREAM ELEVATION(FEET) =   1400.00
  ELEVATION DIFFERENCE(FEET) =    355.00
  TC(MIN.) =  .706*[( 1000.00** 3.00)/(   355.00)]** .20 =   13.764
   100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.478
  SOIL CLASSIFICATION IS "D"
  NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
  SUBAREA RUNOFF(CFS) =     21.77
  TOTAL AREA(ACRES) =      7.38   PEAK FLOW RATE(CFS) =     21.77


****************************************************************************
  FLOW PROCESS FROM NODE     1.01 TO NODE     1.02 IS CODE =   9
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1400.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1078.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00
  "V" GUTTER WIDTH(FEET) =    .00   GUTTER HIKE(FEET) =   .001
```

```
PAVEMENT LIP(FEET) =    .001   MANNING'S N = .0350
PAVEMENT CROSSFALL(DECIMAL NOTATION) =  .20000
MAXIMUM DEPTH(FEET) =   5.00
 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.276
SOIL CLASSIFICATION IS "D"
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.64
AVERAGE FLOW DEPTH(FEET) =    .83   FLOOD WIDTH(FEET) =    8.30
"V" GUTTER FLOW TRAVEL TIME(MIN.) =  1.45   TC(MIN.) =  15.22
SUBAREA AREA(ACRES) =   15.72   SUBAREA RUNOFF(CFS) =   43.52
EFFECTIVE AREA(ACRES) =   23.10   AVERAGED Fm(INCH/HR) =    .20
TOTAL AREA(ACRES) =   23.10   PEAK FLOW RATE(CFS) =    63.95
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =   .97   FLOOD WIDTH(FEET) =    9.67
FLOW VELOCITY(FEET/SEC.) =  13.69   DEPTH*VELOCITY =  13.26

****************************************************************************
 FLOW PROCESS FROM NODE     1.02 TO NODE     1.03 IS CODE =   5
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
 >>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1078.00
 DOWNSTREAM NODE ELEVATION(FEET) =   1000.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   820.00
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
 CHANNEL FLOW THRU SUBAREA(CFS) =    63.95
 FLOW VELOCITY(FEET/SEC.) =  17.34   FLOW DEPTH(FEET) =    .65
 TRAVEL TIME(MIN.) =    .79   TC(MIN.) =  16.00

****************************************************************************
 FLOW PROCESS FROM NODE     1.02 TO NODE     1.03 IS CODE =   8
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.188
 SOIL CLASSIFICATION IS "D"
 NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
 SUBAREA AREA(ACRES) =   18.59   SUBAREA RUNOFF(CFS) =   49.99
 EFFECTIVE AREA(ACRES) =   41.69   AVERAGED Fm(INCH/HR) =    .20
 TOTAL AREA(ACRES) =   41.69
 PEAK FLOW RATE(CFS) =  112.10
 TC(MIN.) =  16.00

****************************************************************************
 FLOW PROCESS FROM NODE     1.02 TO NODE     1.03 IS CODE =   8
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.188
 *USER SPECIFIED(SUBAREA):
 NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
 SUBAREA AREA(ACRES) =   17.34   SUBAREA RUNOFF(CFS) =   48.97
 EFFECTIVE AREA(ACRES) =   59.03   AVERAGED Fm(INCH/HR) =    .16
 TOTAL AREA(ACRES) =   59.03
 PEAK FLOW RATE(CFS) =  161.07
 TC(MIN.) =  16.00
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     1.03 TO NODE     1.04 IS CODE =   5
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
  >>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1000.00
  DOWNSTREAM NODE ELEVATION(FEET) =    938.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1900.00
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =    161.07
  FLOW VELOCITY(FEET/SEC.) =  16.43   FLOW DEPTH(FEET) =   1.51
  TRAVEL TIME(MIN.) =   1.93   TC(MIN.) =  17.93

****************************************************************************
  FLOW PROCESS FROM NODE     1.03 TO NODE     1.04 IS CODE =   8
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.982
  SOIL CLASSIFICATION IS "D"
  NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
  SUBAREA AREA(ACRES) =   26.59   SUBAREA RUNOFF(CFS) =   66.58
  EFFECTIVE AREA(ACRES) =    85.62   AVERAGED Fm(INCH/HR) =    .17
  TOTAL AREA(ACRES) =    85.62
  PEAK FLOW RATE(CFS) =  216.72
  TC(MIN.) =  17.93

****************************************************************************
  FLOW PROCESS FROM NODE     1.03 TO NODE     1.04 IS CODE =   8
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.982
  *USER SPECIFIED(SUBAREA):
  NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
  SUBAREA AREA(ACRES) =   54.44   SUBAREA RUNOFF(CFS) =  143.66
  EFFECTIVE AREA(ACRES) =   140.06   AVERAGED Fm(INCH/HR) =    .12
  TOTAL AREA(ACRES) =   140.06
  PEAK FLOW RATE(CFS) =  360.38
  TC(MIN.) =  17.93

****************************************************************************
  FLOW PROCESS FROM NODE     1.04 TO NODE     1.05 IS CODE =   5
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
  >>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    938.00
  DOWNSTREAM NODE ELEVATION(FEET) =    907.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1060.00
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =    360.38
  FLOW VELOCITY(FEET/SEC.) =  19.71   FLOW DEPTH(FEET) =   2.45
```

```
 TRAVEL TIME(MIN.) =     .90    TC(MIN.) =  18.83

****************************************************************************
 FLOW PROCESS FROM NODE     1.04 TO NODE     1.05 IS CODE =   8
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.903
 SOIL CLASSIFICATION IS "D"
 NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
 SUBAREA AREA(ACRES) =   10.84   SUBAREA RUNOFF(CFS) =   26.37
 EFFECTIVE AREA(ACRES) =   150.90   AVERAGED Fm(INCH/HR) =    .13
 TOTAL AREA(ACRES) =   150.90
 PEAK FLOW RATE(CFS) =  376.82
 TC(MIN.) =  18.83

****************************************************************************
 FLOW PROCESS FROM NODE     1.04 TO NODE     1.05 IS CODE =   8
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.903
 *USER SPECIFIED(SUBAREA):
 NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
 SUBAREA AREA(ACRES) =   16.34   SUBAREA RUNOFF(CFS) =   41.96
 EFFECTIVE AREA(ACRES) =   167.24   AVERAGED Fm(INCH/HR) =    .12
 TOTAL AREA(ACRES) =   167.24
 PEAK FLOW RATE(CFS) =  418.78
 TC(MIN.) =  18.83

****************************************************************************
 FLOW PROCESS FROM NODE     1.05 TO NODE     1.06 IS CODE =   5
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
 >>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =    907.00
 DOWNSTREAM NODE ELEVATION(FEET) =    855.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1960.00
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
 CHANNEL FLOW THRU SUBAREA(CFS) =    418.78
 FLOW VELOCITY(FEET/SEC.) =  19.87   FLOW DEPTH(FEET) =   2.73
 TRAVEL TIME(MIN.) =   1.64   TC(MIN.) =  20.47

****************************************************************************
 FLOW PROCESS FROM NODE     1.05 TO NODE     1.06 IS CODE =   8
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.764
 SOIL CLASSIFICATION IS "D"
 NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
 SUBAREA AREA(ACRES) =    3.56   SUBAREA RUNOFF(CFS) =    8.22
 EFFECTIVE AREA(ACRES) =   170.80   AVERAGED Fm(INCH/HR) =    .12
 TOTAL AREA(ACRES) =   170.80
 PEAK FLOW RATE(CFS) =  418.78
```

```
TC(MIN.) =  20.47

****************************************************************************
 FLOW PROCESS FROM NODE     1.05 TO NODE     1.06 IS CODE =   8
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.764
 *USER SPECIFIED(SUBAREA):
 NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
 SUBAREA AREA(ACRES) =   32.69   SUBAREA RUNOFF(CFS) =   79.85
 EFFECTIVE AREA(ACRES) =   203.49   AVERAGED Fm(INCH/HR) =    .11
 TOTAL AREA(ACRES) =   203.49
 PEAK FLOW RATE(CFS) =  485.92
 TC(MIN.) =  20.47

****************************************************************************
 FLOW PROCESS FROM NODE     1.06 TO NODE     1.07 IS CODE =   5
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
 >>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =    855.00
 DOWNSTREAM NODE ELEVATION(FEET) =    815.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1500.00
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
 CHANNEL FLOW THRU SUBAREA(CFS) =    485.92
 FLOW VELOCITY(FEET/SEC.) =  20.81   FLOW DEPTH(FEET) =   2.94
 TRAVEL TIME(MIN.) =   1.20   TC(MIN.) =  21.67

****************************************************************************
 FLOW PROCESS FROM NODE     1.06 TO NODE     1.07 IS CODE =   8
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.673
 SOIL CLASSIFICATION IS "D"
 NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
 SUBAREA AREA(ACRES) =   20.41   SUBAREA RUNOFF(CFS) =   45.42
 EFFECTIVE AREA(ACRES) =   223.90   AVERAGED Fm(INCH/HR) =    .12
 TOTAL AREA(ACRES) =   223.90
 PEAK FLOW RATE(CFS) =  514.62
 TC(MIN.) =  21.67

****************************************************************************
 FLOW PROCESS FROM NODE     1.06 TO NODE     1.07 IS CODE =   8
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.673
 *USER SPECIFIED(SUBAREA):
 NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
 SUBAREA AREA(ACRES) =   35.96   SUBAREA RUNOFF(CFS) =   84.89
 EFFECTIVE AREA(ACRES) =   259.86   AVERAGED Fm(INCH/HR) =    .11
 TOTAL AREA(ACRES) =   259.86
 PEAK FLOW RATE(CFS) =  599.51
```

```
TC(MIN.) =  21.67

****************************************************************************
 FLOW PROCESS FROM NODE     1.07 TO NODE     1.08 IS CODE =   5
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
 >>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =    815.00
 DOWNSTREAM NODE ELEVATION(FEET) =    660.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1360.00
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
 CHANNEL FLOW THRU SUBAREA(CFS) =    599.51
 FLOW VELOCITY(FEET/SEC.) =  37.48   FLOW DEPTH(FEET) =   2.22
 TRAVEL TIME(MIN.) =    .60   TC(MIN.) =  22.28

****************************************************************************
 FLOW PROCESS FROM NODE     1.07 TO NODE     1.08 IS CODE =   8
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.627
 SOIL CLASSIFICATION IS "D"
 NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
 SUBAREA AREA(ACRES) =   20.97   SUBAREA RUNOFF(CFS) =   45.80
 EFFECTIVE AREA(ACRES) =   280.83   AVERAGED Fm(INCH/HR) =    .12
 TOTAL AREA(ACRES) =   280.83
 PEAK FLOW RATE(CFS) =  634.56
 TC(MIN.) =  22.28

****************************************************************************
 FLOW PROCESS FROM NODE     1.07 TO NODE     1.08 IS CODE =   8
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.627
 *USER SPECIFIED(SUBAREA):
 NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
 SUBAREA AREA(ACRES) =   49.73   SUBAREA RUNOFF(CFS) =  115.34
 EFFECTIVE AREA(ACRES) =   330.56   AVERAGED Fm(INCH/HR) =    .11
 TOTAL AREA(ACRES) =   330.56
 PEAK FLOW RATE(CFS) =  749.90
 TC(MIN.) =  22.28

****************************************************************************
 FLOW PROCESS FROM NODE     1.08 TO NODE     1.09 IS CODE =   5
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
 >>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =    660.00
 DOWNSTREAM NODE ELEVATION(FEET) =    590.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   670.00
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
 CHANNEL FLOW THRU SUBAREA(CFS) =    749.90
```

```
FLOW VELOCITY(FEET/SEC.) =  38.45   FLOW DEPTH(FEET) =   2.57
TRAVEL TIME(MIN.) =    .29   TC(MIN.) =  22.57

****************************************************************************
FLOW PROCESS FROM NODE     1.09 TO NODE     1.09 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  22.57
RAINFALL INTENSITY(INCH/HR) =   2.61
AVERAGED Fm(INCH/HR) =   .11
EFFECTIVE STREAM AREA(ACRES) =  330.56
TOTAL STREAM AREA(ACRES) =  330.56
PEAK FLOW RATE(CFS) AT CONFLUENCE =    749.90

****************************************************************************
FLOW PROCESS FROM NODE     2.00 TO NODE     2.01 IS CODE =   2
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
NATURAL AVERAGE COVER
TC = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]** .20
INITIAL SUBAREA FLOW-LENGTH(FEET) =   890.00
UPSTREAM ELEVATION(FEET) =   1635.00
DOWNSTREAM ELEVATION(FEET) =   1270.00
ELEVATION DIFFERENCE(FEET) =    365.00
TC(MIN.) =  .706*[(  890.00** 3.00)/(   365.00)]** .20 =   12.764
 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.622
SOIL CLASSIFICATION IS "D"
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
SUBAREA RUNOFF(CFS) =     14.14
TOTAL AREA(ACRES) =      4.59   PEAK FLOW RATE(CFS) =     14.14

****************************************************************************
FLOW PROCESS FROM NODE     2.01 TO NODE     2.02 IS CODE =   9
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =   1270.00
DOWNSTREAM NODE ELEVATION(FEET) =   1085.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00
"V" GUTTER WIDTH(FEET) =    .00   GUTTER HIKE(FEET) =   .001
PAVEMENT LIP(FEET) =   .001   MANNING'S N = .0350
PAVEMENT CROSSFALL(DECIMAL NOTATION) =  .20000
MAXIMUM DEPTH(FEET) =   5.00
 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.381
SOIL CLASSIFICATION IS "D"
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.97
AVERAGE FLOW DEPTH(FEET) =    .81   FLOOD WIDTH(FEET) =    8.10
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.67   TC(MIN.) =  14.44
SUBAREA AREA(ACRES) =   13.00   SUBAREA RUNOFF(CFS) =   37.22
EFFECTIVE AREA(ACRES) =   17.59   AVERAGED Fm(INCH/HR) =    .20
TOTAL AREA(ACRES) =   17.59   PEAK FLOW RATE(CFS) =     50.36
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =   .95   FLOOD WIDTH(FEET) =    9.47
```

```
FLOW VELOCITY(FEET/SEC.) =  11.23   DEPTH*VELOCITY =  10.66

****************************************************************************
FLOW PROCESS FROM NODE     2.02 TO NODE     2.03 IS CODE =   5
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
>>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =   1085.00
DOWNSTREAM NODE ELEVATION(FEET) =   1010.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   930.00
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
CHANNEL FLOW THRU SUBAREA(CFS) =     50.36
FLOW VELOCITY(FEET/SEC.) =  15.23   FLOW DEPTH(FEET) =    .59
TRAVEL TIME(MIN.) =   1.02   TC(MIN.) =  15.45

****************************************************************************
FLOW PROCESS FROM NODE     2.02 TO NODE     2.03 IS CODE =   8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.249
SOIL CLASSIFICATION IS "D"
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
SUBAREA AREA(ACRES) =   28.32   SUBAREA RUNOFF(CFS) =   77.72
EFFECTIVE AREA(ACRES) =    45.91   AVERAGED Fm(INCH/HR) =    .20
TOTAL AREA(ACRES) =    45.91
PEAK FLOW RATE(CFS) =  125.99
TC(MIN.) =  15.45

****************************************************************************
FLOW PROCESS FROM NODE     2.02 TO NODE     2.03 IS CODE =   8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.249
*USER SPECIFIED(SUBAREA):
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
SUBAREA AREA(ACRES) =    9.67   SUBAREA RUNOFF(CFS) =   27.84
EFFECTIVE AREA(ACRES) =    55.58   AVERAGED Fm(INCH/HR) =    .17
TOTAL AREA(ACRES) =    55.58
PEAK FLOW RATE(CFS) =  153.84
TC(MIN.) =  15.45

****************************************************************************
FLOW PROCESS FROM NODE     2.03 TO NODE     2.04 IS CODE =   5
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
>>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =   1010.00
DOWNSTREAM NODE ELEVATION(FEET) =    825.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1500.00
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
CHANNEL FLOW THRU SUBAREA(CFS) =    153.84
```

```
FLOW VELOCITY(FEET/SEC.) =  25.77   FLOW DEPTH(FEET) =   1.00
TRAVEL TIME(MIN.) =     .97   TC(MIN.) =  16.42

****************************************************************************
FLOW PROCESS FROM NODE     2.03 TO NODE     2.04 IS CODE =   8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.141
SOIL CLASSIFICATION IS "D"
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
SUBAREA AREA(ACRES) =    8.23   SUBAREA RUNOFF(CFS) =   21.78
EFFECTIVE AREA(ACRES) =    63.81   AVERAGED Fm(INCH/HR) =    .18
TOTAL AREA(ACRES) =    63.81
PEAK FLOW RATE(CFS) =  170.18
TC(MIN.) =  16.42

****************************************************************************
FLOW PROCESS FROM NODE     2.03 TO NODE     2.04 IS CODE =   8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.141
*USER SPECIFIED(SUBAREA):
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
SUBAREA AREA(ACRES) =   36.47   SUBAREA RUNOFF(CFS) =  101.44
EFFECTIVE AREA(ACRES) =   100.28   AVERAGED Fm(INCH/HR) =    .13
TOTAL AREA(ACRES) =   100.28
PEAK FLOW RATE(CFS) =  271.63
TC(MIN.) =  16.42

****************************************************************************
FLOW PROCESS FROM NODE     2.04 TO NODE     2.05 IS CODE =   5
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
>>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    825.00
DOWNSTREAM NODE ELEVATION(FEET) =    720.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1230.00
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
CHANNEL FLOW THRU SUBAREA(CFS) =    271.63
FLOW VELOCITY(FEET/SEC.) =  26.86   FLOW DEPTH(FEET) =   1.54
TRAVEL TIME(MIN.) =    .76   TC(MIN.) =  17.19

****************************************************************************
FLOW PROCESS FROM NODE     2.04 TO NODE     2.05 IS CODE =   8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.055
SOIL CLASSIFICATION IS "D"
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
SUBAREA AREA(ACRES) =   26.12   SUBAREA RUNOFF(CFS) =   67.12
EFFECTIVE AREA(ACRES) =   126.40   AVERAGED Fm(INCH/HR) =    .15
TOTAL AREA(ACRES) =   126.40
```

```
PEAK FLOW RATE(CFS) =  331.04
TC(MIN.) =  17.19

****************************************************************************
FLOW PROCESS FROM NODE     2.04 TO NODE     2.05 IS CODE =   8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.055
*USER SPECIFIED(SUBAREA):
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
SUBAREA AREA(ACRES) =   51.83   SUBAREA RUNOFF(CFS) =  140.18
EFFECTIVE AREA(ACRES) =   178.23   AVERAGED Fm(INCH/HR) =    .12
TOTAL AREA(ACRES) =   178.23
PEAK FLOW RATE(CFS) =  471.22
TC(MIN.) =  17.19

****************************************************************************
FLOW PROCESS FROM NODE     2.05 TO NODE     2.06 IS CODE =   5
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
>>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    720.00
DOWNSTREAM NODE ELEVATION(FEET) =    655.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1110.00
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
CHANNEL FLOW THRU SUBAREA(CFS) =    471.22
FLOW VELOCITY(FEET/SEC.) =  27.46   FLOW DEPTH(FEET) =   2.34
TRAVEL TIME(MIN.) =    .67   TC(MIN.) =  17.86

****************************************************************************
FLOW PROCESS FROM NODE     2.05 TO NODE     2.06 IS CODE =   8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.988
SOIL CLASSIFICATION IS "D"
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
SUBAREA AREA(ACRES) =   25.45   SUBAREA RUNOFF(CFS) =   63.87
EFFECTIVE AREA(ACRES) =   203.68   AVERAGED Fm(INCH/HR) =    .13
TOTAL AREA(ACRES) =   203.68
PEAK FLOW RATE(CFS) =  524.37
TC(MIN.) =  17.86

****************************************************************************
FLOW PROCESS FROM NODE     2.05 TO NODE     2.06 IS CODE =   8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.988
*USER SPECIFIED(SUBAREA):
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
SUBAREA AREA(ACRES) =   32.47   SUBAREA RUNOFF(CFS) =   85.87
EFFECTIVE AREA(ACRES) =   236.15   AVERAGED Fm(INCH/HR) =    .12
TOTAL AREA(ACRES) =   236.15
```

```
PEAK FLOW RATE(CFS) =  610.23
TC(MIN.) =  17.86

****************************************************************************
FLOW PROCESS FROM NODE     2.06 TO NODE     1.09 IS CODE =   5
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL-CHANNEL FLOW<<<<<
>>>>>TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    655.00
DOWNSTREAM NODE ELEVATION(FEET) =    590.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1370.00
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR =  .017   MAXIMUM DEPTH(FEET) =   5.00
CHANNEL FLOW THRU SUBAREA(CFS) =    610.23
FLOW VELOCITY(FEET/SEC.) =  27.28   FLOW DEPTH(FEET) =   2.85
TRAVEL TIME(MIN.) =    .84   TC(MIN.) =  18.70

****************************************************************************
FLOW PROCESS FROM NODE     2.06 TO NODE     1.09 IS CODE =   8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.915
SOIL CLASSIFICATION IS "D"
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .2000
SUBAREA AREA(ACRES) =   39.41   SUBAREA RUNOFF(CFS) =   96.29
EFFECTIVE AREA(ACRES) =   275.56   AVERAGED Fm(INCH/HR) =    .13
TOTAL AREA(ACRES) =   275.56
PEAK FLOW RATE(CFS) =  690.87
TC(MIN.) =  18.70

****************************************************************************
FLOW PROCESS FROM NODE     2.06 TO NODE     1.09 IS CODE =   8
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.915
*USER SPECIFIED(SUBAREA):
NATURAL OR AGRICULTURE SUBAREA LOSS RATE, Fm(INCH/HR) =  .0500
SUBAREA AREA(ACRES) =   15.61   SUBAREA RUNOFF(CFS) =   40.25
EFFECTIVE AREA(ACRES) =   291.17   AVERAGED Fm(INCH/HR) =    .12
TOTAL AREA(ACRES) =   291.17
PEAK FLOW RATE(CFS) =  731.11
TC(MIN.) =  18.70

****************************************************************************
FLOW PROCESS FROM NODE     1.09 TO NODE     1.09 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  18.70
RAINFALL INTENSITY(INCH/HR) =   2.91
AVERAGED Fm(INCH/HR) =   .12
```

```
EFFECTIVE STREAM AREA(ACRES) =  291.17
TOTAL STREAM AREA(ACRES) =  291.17
PEAK FLOW RATE(CFS) AT CONFLUENCE =     731.11

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
        Q(CFS)    Tc(MIN.)    Fm(INCH/HR)    Ae(ACRES)
1      1400.10      22.57         .115        621.73
2      1429.12      18.70         .116        565.03

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =    1429.12   Tc(MIN.) =    18.696
EFFECTIVE AREA(ACRES) =     565.03  AVERAGED Fm(INCH/HR) =    .12
TOTAL AREA(ACRES) =     621.73
==============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)       =     621.73  TC(MIN.) =      18.70
EFFECTIVE AREA(ACRES) =     565.03  AVERAGED Fm(INCH/HR)=    .12
PEAK FLOW RATE(CFS)     =    1429.12
*** PEAK FLOW RATE TABLE ***
        Q(CFS)    Tc(MIN.)    Fm(INCH/HR)    Ae(ACRES)
1      1400.10      22.57         .115        621.73
2      1429.12      18.70         .116        565.03
==============================================================================
==============================================================================
END OF RATIONAL METHOD ANALYSIS
```

APPENDIX E-2

PERMITTED PLAN HYDROLOGY ANALYSIS, UPDATED 2005 (UPDATED COUNTY RAINFALL DATA AND TRANSMISSIVITY MODELLING PARAMETERS)

```
****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2005 Advanced Engineering Software (aes)
              Ver. 11.0  Release Date: 06/01/2005  License ID 1211

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 100 YEAR DEVELOPED CONDITION HYDROLOGY                                  *
* FRB (REVISED MASTER GRADING PLAN) JTD                                   *
* CHM                                                                     *
 ***************************************************************************

  FILE NAME: FRBJTD2.DAT
  TIME/DATE OF STUDY: 10:26 09/06/2005
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   355.00
  ELEVATION DATA: UPSTREAM(FEET) =   1755.00  DOWNSTREAM(FEET) =   1400.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.499
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.859
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
NATURAL POOR COVER
"GRASS"                    D        7.38      0.20     1.000    98    5.50
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA RUNOFF(CFS) =     37.59
TOTAL AREA(ACRES) =      7.38   PEAK FLOW RATE(CFS) =     37.59

****************************************************************************
FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  92
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =   1400.00
DOWNSTREAM NODE ELEVATION(FEET) =   1078.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00
"V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0350
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.283
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       15.72      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     73.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.55
AVERAGE FLOW DEPTH(FEET) =   0.66   FLOOD WIDTH(FEET) =   11.05
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.26   Tc(MIN.) =   6.76
SUBAREA AREA(ACRES) =   15.72       SUBAREA RUNOFF(CFS) =   71.91
EFFECTIVE AREA(ACRES) =   23.10     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =     23.10         PEAK FLOW RATE(CFS) =     105.67

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =   12.35
FLOW VELOCITY(FEET/SEC.) =  16.13   DEPTH*VELOCITY(FT*FT/SEC) =  12.82
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.02 =  1455.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   1078.00  DOWNSTREAM(FEET) =   1000.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   820.00   CHANNEL SLOPE =  0.0951
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.978
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       18.59      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    145.64
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  23.12
AVERAGE FLOW DEPTH(FEET) =   1.04   TRAVEL TIME(MIN.) =   0.59
Tc(MIN.) =   7.35
```

```
SUBAREA AREA(ACRES) =     18.59        SUBAREA RUNOFF(CFS) =    79.94
EFFECTIVE AREA(ACRES) =      41.69      AREA-AVERAGED Fm(INCH/HR) =    0.20
AREA-AVERAGED Fp(INCH/HR) =    0.20  AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =      41.69          PEAK FLOW RATE(CFS) =      179.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.18   FLOW VELOCITY(FEET/SEC.) =  24.64
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.03 =  2275.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =   7.35
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.978
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
AGRICULTURAL GOOD COVER
"SMALL GRAIN,STRAIGHT ROW" D        17.34      0.20     1.000    97
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =    17.34       SUBAREA RUNOFF(CFS) =    74.56
EFFECTIVE AREA(ACRES) =      59.03    AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =      59.03        PEAK FLOW RATE(CFS) =      253.83

****************************************************************************
FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   1000.00  DOWNSTREAM(FEET) =    938.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1900.00   CHANNEL SLOPE =  0.0326
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.469
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D        26.59      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    304.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  19.69
AVERAGE FLOW DEPTH(FEET) =   2.16   TRAVEL TIME(MIN.) =   1.61
Tc(MIN.) =   8.96
SUBAREA AREA(ACRES) =     26.59       SUBAREA RUNOFF(CFS) =  102.15
EFFECTIVE AREA(ACRES) =      85.62     AREA-AVERAGED Fm(INCH/HR) =    0.20
AREA-AVERAGED Fp(INCH/HR) =    0.20  AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =      85.62          PEAK FLOW RATE(CFS) =      328.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  2.25   FLOW VELOCITY(FEET/SEC.) =  20.12
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.04 =  4175.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  MAINLINE Tc(MIN) =   8.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.469
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                     D       54.44      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   54.44      SUBAREA RUNOFF(CFS) =  209.15
  EFFECTIVE AREA(ACRES) =    140.06   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    140.06       PEAK FLOW RATE(CFS) =     538.08

******************************************************************************
  FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    938.00  DOWNSTREAM(FEET) =    907.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1060.00   CHANNEL SLOPE =  0.0292
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.234
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                     D       10.84      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    557.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  22.28
  AVERAGE FLOW DEPTH(FEET) =   3.09   TRAVEL TIME(MIN.) =   0.79
  Tc(MIN.) =   9.75
  SUBAREA AREA(ACRES) =    10.84       SUBAREA RUNOFF(CFS) =   39.36
  EFFECTIVE AREA(ACRES) =    150.90     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    150.90         PEAK FLOW RATE(CFS) =     547.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.06   FLOW VELOCITY(FEET/SEC.) =  22.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.05 =  5235.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN) =   9.75
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.234
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                     D       16.34      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   16.34      SUBAREA RUNOFF(CFS) =   59.32
  EFFECTIVE AREA(ACRES) =    167.24   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
```

```
  TOTAL AREA(ACRES) =     167.24        PEAK FLOW RATE(CFS) =      607.18

****************************************************************************
  FLOW PROCESS FROM NODE       1.05 TO NODE       1.06 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     907.00  DOWNSTREAM(FEET) =     855.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1960.00   CHANNEL SLOPE =  0.0265
  CHANNEL BASE(FEET) =     5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.914
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                      D        3.56      0.20      1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    613.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  22.04
  AVERAGE FLOW DEPTH(FEET) =   3.34   TRAVEL TIME(MIN.) =   1.48
  Tc(MIN.) =  11.23
  SUBAREA AREA(ACRES) =      3.56       SUBAREA RUNOFF(CFS) =   11.90
  EFFECTIVE AREA(ACRES) =    170.80     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    170.80         PEAK FLOW RATE(CFS) =     607.18
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.32   FLOW VELOCITY(FEET/SEC.) =  21.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.06 =  7195.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       1.05 TO NODE       1.06 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  11.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.914
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                      D       32.69      0.20      1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   32.69      SUBAREA RUNOFF(CFS) =  109.26
  EFFECTIVE AREA(ACRES) =    203.49   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    203.49        PEAK FLOW RATE(CFS) =     680.10

****************************************************************************
  FLOW PROCESS FROM NODE       1.06 TO NODE       1.07 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =     855.00  DOWNSTREAM(FEET) =     815.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1500.00   CHANNEL SLOPE =  0.0267
  CHANNEL BASE(FEET) =     5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
```

```
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.696
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D       20.41      0.20      1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    712.21
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  22.97
AVERAGE FLOW DEPTH(FEET) =   3.60   TRAVEL TIME(MIN.) =   1.09
Tc(MIN.) =  12.32
SUBAREA AREA(ACRES) =    20.41       SUBAREA RUNOFF(CFS) =   64.22
EFFECTIVE AREA(ACRES) =    223.90     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    223.90         PEAK FLOW RATE(CFS) =     704.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  3.58   FLOW VELOCITY(FEET/SEC.) =  22.91
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.07 =  8695.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.06 TO NODE      1.07 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  12.32
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.696
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D       35.96      0.20      1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   35.96       SUBAREA RUNOFF(CFS) =  113.14
EFFECTIVE AREA(ACRES) =    259.86   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    259.86        PEAK FLOW RATE(CFS) =     817.59

****************************************************************************
FLOW PROCESS FROM NODE      1.07 TO NODE      1.08 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    815.00  DOWNSTREAM(FEET) =    660.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1360.00   CHANNEL SLOPE =  0.1140
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.606
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D       20.97      0.20      1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    849.74
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  41.07
AVERAGE FLOW DEPTH(FEET) =   2.69   TRAVEL TIME(MIN.) =   0.55
Tc(MIN.) =  12.87
SUBAREA AREA(ACRES) =    20.97       SUBAREA RUNOFF(CFS) =   64.29
```

```
EFFECTIVE AREA(ACRES) =    280.83     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    280.83         PEAK FLOW RATE(CFS) =     860.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  2.71   FLOW VELOCITY(FEET/SEC.) =  41.18
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.08 = 10055.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.07 TO NODE      1.08 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  12.87
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.606
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       49.73      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   49.73      SUBAREA RUNOFF(CFS) =  152.46
EFFECTIVE AREA(ACRES) =    330.56   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    330.56       PEAK FLOW RATE(CFS) =    1013.40

****************************************************************************
FLOW PROCESS FROM NODE      1.08 TO NODE      1.09 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    660.00  DOWNSTREAM(FEET) =    590.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   670.00   CHANNEL SLOPE =  0.1045
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
CHANNEL FLOW THRU SUBAREA(CFS) =   1013.40
FLOW VELOCITY(FEET/SEC.) =  41.73   FLOW DEPTH(FEET) =   3.03
TRAVEL TIME(MIN.) =   0.27   Tc(MIN.) =  13.14
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.09 = 10725.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.08 TO NODE      1.09 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  13.14
RAINFALL INTENSITY(INCH/HR) =   3.57
AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  1.00
EFFECTIVE STREAM AREA(ACRES) =   330.56
TOTAL STREAM AREA(ACRES) =   330.56
PEAK FLOW RATE(CFS) AT CONFLUENCE =   1013.40

****************************************************************************
FLOW PROCESS FROM NODE      2.00 TO NODE      2.01 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   365.00
  ELEVATION DATA: UPSTREAM(FEET) =   1635.00  DOWNSTREAM(FEET) =   1270.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.560
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.901
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    D        4.59      0.20     1.000    98    5.56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     23.55
  TOTAL AREA(ACRES) =      4.59   PEAK FLOW RATE(CFS) =     23.55

****************************************************************************
  FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1270.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1085.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.200   MANNING'S N = .0170
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.477
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    D       13.00      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     54.08
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  20.26
  AVERAGE FLOW DEPTH(FEET) =   0.50   FLOOD WIDTH(FEET) =    7.48
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =   6.38
  SUBAREA AREA(ACRES) =   13.00       SUBAREA RUNOFF(CFS) =   61.74
  EFFECTIVE AREA(ACRES) =   17.59     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     17.59         PEAK FLOW RATE(CFS) =      83.53

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOOD WIDTH(FEET) =    8.71
  FLOW VELOCITY(FEET/SEC.) =  22.80   DEPTH*VELOCITY(FT*FT/SEC) =  14.15
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.02 =  1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1085.00  DOWNSTREAM(FEET) =   1010.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   930.00   CHANNEL SLOPE =  0.0806
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.111
  SUBAREA LOSS RATE DATA(AMC III):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D       28.32      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    146.16
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  21.88
AVERAGE FLOW DEPTH(FEET) =   1.10   TRAVEL TIME(MIN.) =   0.71
Tc(MIN.) =   7.09
SUBAREA AREA(ACRES) =    28.32       SUBAREA RUNOFF(CFS) =  125.17
EFFECTIVE AREA(ACRES) =     45.91     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =     45.91         PEAK FLOW RATE(CFS) =     202.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.33   FLOW VELOCITY(FEET/SEC.) =  24.09
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.03 =  2295.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =   7.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.111
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D        9.67      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =    9.67      SUBAREA RUNOFF(CFS) =   42.74
EFFECTIVE AREA(ACRES) =     55.58   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =     55.58       PEAK FLOW RATE(CFS) =     245.66

****************************************************************************
FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   1010.00  DOWNSTREAM(FEET) =    825.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1500.00   CHANNEL SLOPE =  0.1233
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.777
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D        8.23      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    262.61
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  30.29
AVERAGE FLOW DEPTH(FEET) =   1.36   TRAVEL TIME(MIN.) =   0.83
Tc(MIN.) =   7.92
SUBAREA AREA(ACRES) =     8.23       SUBAREA RUNOFF(CFS) =   33.90
EFFECTIVE AREA(ACRES) =     63.81     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
```

```
  TOTAL AREA(ACRES) =     63.81          PEAK FLOW RATE(CFS) =     262.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.36   FLOW VELOCITY(FEET/SEC.) =  30.31
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.04 =  3795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =   7.92
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.777
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    D       36.47      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   36.47      SUBAREA RUNOFF(CFS) =  150.22
  EFFECTIVE AREA(ACRES) =    100.28   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    100.28       PEAK FLOW RATE(CFS) =     413.06

****************************************************************************
  FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    825.00  DOWNSTREAM(FEET) =    720.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1230.00   CHANNEL SLOPE =  0.0854
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.583
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    D       26.12      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    464.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  31.29
  AVERAGE FLOW DEPTH(FEET) =   2.09   TRAVEL TIME(MIN.) =   0.66
  Tc(MIN.) =   8.57
  SUBAREA AREA(ACRES) =    26.12       SUBAREA RUNOFF(CFS) =  103.03
  EFFECTIVE AREA(ACRES) =    126.40     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    126.40         PEAK FLOW RATE(CFS) =     498.58

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.18   FLOW VELOCITY(FEET/SEC.) =  31.91
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.05 =  5025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =   8.57
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.583
```

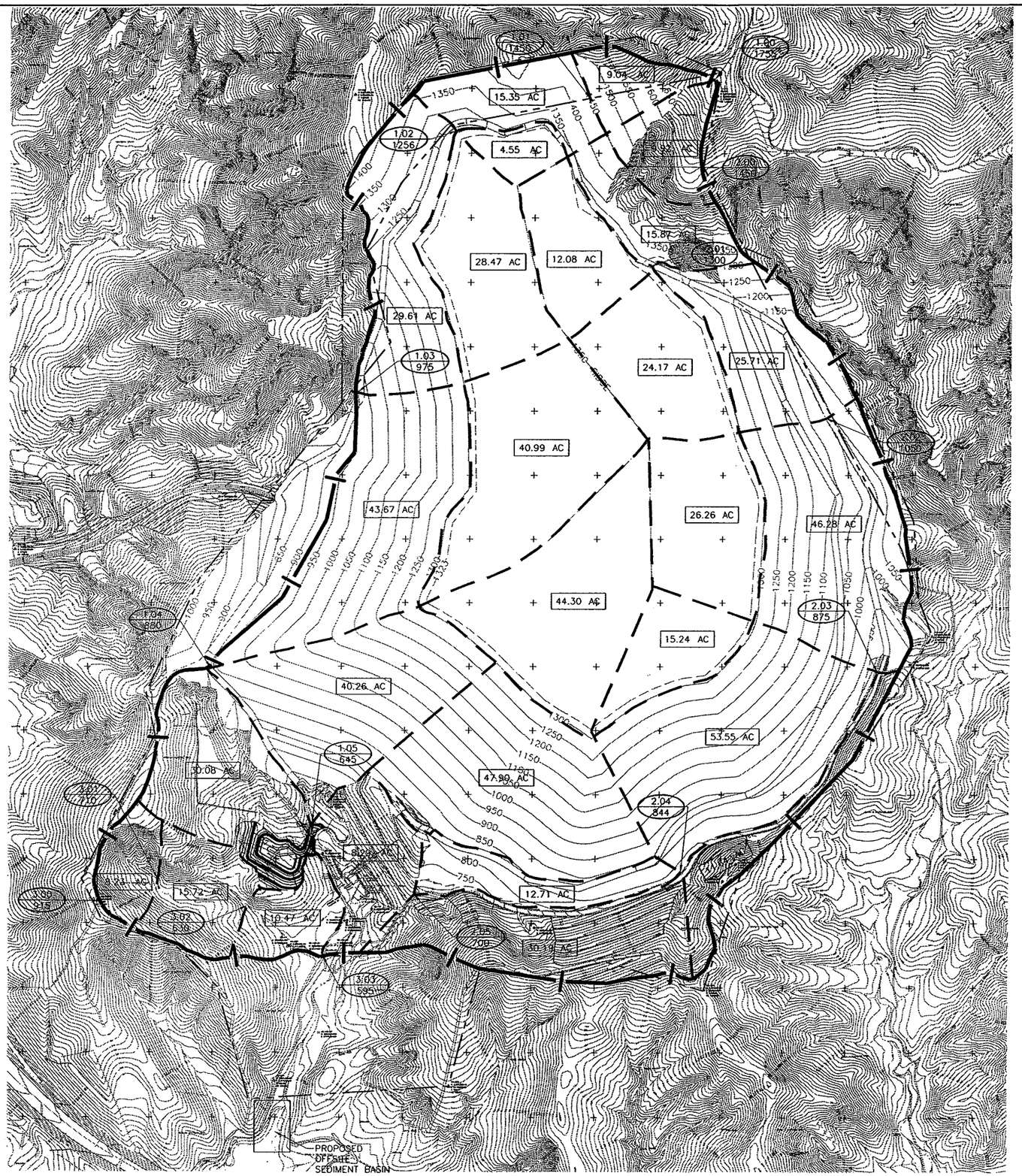
```
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D       51.83      0.20      1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   51.83      SUBAREA RUNOFF(CFS) =  204.44
EFFECTIVE AREA(ACRES) =    178.23   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    178.23       PEAK FLOW RATE(CFS) =     703.03

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    720.00  DOWNSTREAM(FEET) =    655.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1110.00   CHANNEL SLOPE =  0.0586
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.407
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D       25.45      0.20      1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    751.21
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  31.15
AVERAGE FLOW DEPTH(FEET) =   3.01   TRAVEL TIME(MIN.) =   0.59
Tc(MIN.) =   9.17
SUBAREA AREA(ACRES) =    25.45       SUBAREA RUNOFF(CFS) =   96.36
EFFECTIVE AREA(ACRES) =    203.68     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    203.68         PEAK FLOW RATE(CFS) =     771.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  3.05   FLOW VELOCITY(FEET/SEC.) =  31.34
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.06 =  6135.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =   9.17
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.407
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D       32.47      0.20      1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   32.47      SUBAREA RUNOFF(CFS) =  122.94
EFFECTIVE AREA(ACRES) =    236.15   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    236.15       PEAK FLOW RATE(CFS) =     894.12

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.06 TO NODE      1.09 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    655.00  DOWNSTREAM(FEET) =    590.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1370.00   CHANNEL SLOPE =  0.0474
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.187
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "GRASS"                    D       39.41      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    964.84
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  30.75
 AVERAGE FLOW DEPTH(FEET) =   3.63   TRAVEL TIME(MIN.) =   0.74
 Tc(MIN.) =   9.91
 SUBAREA AREA(ACRES) =    39.41       SUBAREA RUNOFF(CFS) =  141.42
 EFFECTIVE AREA(ACRES) =    275.56     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =    275.56         PEAK FLOW RATE(CFS) =     988.82

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  3.68   FLOW VELOCITY(FEET/SEC.) =  30.95
 LONGEST FLOWPATH FROM NODE      2.00 TO NODE      1.09 =  7505.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.06 TO NODE      1.09 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   9.91
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.187
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "GRASS"                    D       15.61      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =   15.61      SUBAREA RUNOFF(CFS) =   56.02
 EFFECTIVE AREA(ACRES) =    291.17   AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =    291.17        PEAK FLOW RATE(CFS) =    1044.84

****************************************************************************
 FLOW PROCESS FROM NODE      2.06 TO NODE      1.09 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.91
 RAINFALL INTENSITY(INCH/HR) =   4.19
 AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =   291.17
```

```
TOTAL STREAM AREA(ACRES) =   291.17
PEAK FLOW RATE(CFS) AT CONFLUENCE =   1044.84

** CONFLUENCE DATA **
 STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
 NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1   1013.40  13.14    3.568  0.20( 0.20) 1.00   330.6       1.00
    2   1044.84   9.91    4.187  0.20( 0.20) 1.00   291.2       2.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
 STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
 NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1   1949.52   9.91    4.187  0.20( 0.20) 1.00   540.4       2.00
    2   1895.95  13.14    3.568  0.20( 0.20) 1.00   621.7       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =   1949.52    Tc(MIN.) =     9.91
EFFECTIVE AREA(ACRES) =   540.43   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    621.73
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.09 = 10725.00 FEET.
==============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =    621.73  TC(MIN.) =      9.91
EFFECTIVE AREA(ACRES) =    540.43  AREA-AVERAGED Fm(INCH/HR)=  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
PEAK FLOW RATE(CFS)    =   1949.52

** PEAK FLOW RATE TABLE **
 STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
 NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1   1949.52   9.91    4.187  0.20( 0.20) 1.00   540.4       2.00
    2   1895.95  13.14    3.568  0.20( 0.20) 1.00   621.7       1.00
==============================================================================
==============================================================================
END OF RATIONAL METHOD ANALYSIS
```

APPENDIX E-3

MASTER DEVELOPMENT PLAN HYDROLOGY ANALYSIS
APPENDIX B
OF
MASTER DEVELOPMENT PLAN –
FRANK R. BOWERMAN LANDFILL
NOVEMBER 2004



DATE OF TOPOGRAPHY: OCTOBER 2, 2002

N

GRAPHIC SCALE

400 200 0 400 800

(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	26.06	9.04	26.06	INITIAL
1.01–1.02	19.90	55.59	28.94	80.84	
1.02–1.03	58.08	153.88	87.02	230.56	
1.03–1.04	84.66	209.16	171.68	424.15	
1.04–1.05	162.54	394.37	334.22	809.48	BASIN
1.05–3.03	18.29	43.79	352.51	841.97	
1.00–2.00	9.92	28.72	9.92	28.72	INITIAL
2.00–2.01	32.95	93.82	42.87	122.07	
2.01–2.02	49.88	136.10	92.75	253.06	
2.02–2.03	72.54	189.11	165.29	430.91	
2.03–2.04	80.43	195.12	245.72	596.09	
2.04–2.05	42.90	100.25	288.62	674.72	
2.05–3.03	0.00	0.00	288.62	674.72	
3.00–3.01	8.23	29.13	8.23	29.13	INITIAL
3.01–3.02	15.72	53.89	23.95	82.10	
3.02–3.03	10.47	34.62	34.42	113.80	
3.03			675.55	1586.08	CONFLUENCE

LEGEND

DRAINAGE TRIBUTARY AREA

DRAINAGE SUB–AREA

1.00 / 725 — NODE NAME / ELEVATION — NODE DESCRIPTION

10.00 AC — AREA IN ACRES

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765
(909) 860–7777

MARK	DATE	DESCRIPTION

REVISIONS

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER BRYAN A. STIRRAT No. 22631 Exp. 12-31-05 CIVIL STATE OF CALIFORNIA

DATE

COUNTY OF ORANGE
INTEGRATED WASTE MANAGEMENT DEPARTMENT

FRANK R. BOWERMAN LANDFILL MASTER DEVELOPMENT PLAN

MASTER PLAN HYDROLOGY MAP

DESIGNED R.M.G./J.W.
DRAWN C.A.L. CHECKED M.A.C.

SCALE	DATE	DRAWING NO.	SHEET
AS SHOWN	7–2004	24170DB	1 OF 1

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****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2005 Advanced Engineering Software (aes)
              Ver. 11.0  Release Date: 06/01/2005  License ID 1211

                          Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* 100 YEAR HYDROLOGY STUDY                                               *
* FRB LANDFILL - MASTER PLAN (2ND RUN)                                   *
* C.M.                                                                   *
 ************************************************************************

  FILE NAME: FRBMP2.DAT
  TIME/DATE OF STUDY: 08:18 09/06/2005
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  ELEVATION DATA: UPSTREAM(FEET) =   1755.00  DOWNSTREAM(FEET) =   1450.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.189
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.404
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  NATURAL FAIR COVER
  "OPEN BRUSH"                D        9.04      0.20     1.000    96   14.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     26.06
  TOTAL AREA(ACRES) =      9.04   PEAK FLOW RATE(CFS) =     26.06

****************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1450.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1256.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.304
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       15.35      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     47.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  23.37
  AVERAGE FLOW DEPTH(FEET) =   0.60   FLOOD WIDTH(FEET) =    6.40
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.78   Tc(MIN.) =  14.97
  SUBAREA AREA(ACRES) =   15.35       SUBAREA RUNOFF(CFS) =   42.88
  EFFECTIVE AREA(ACRES) =   24.39     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     24.39         PEAK FLOW RATE(CFS) =      68.13

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.69   FLOOD WIDTH(FEET) =    7.33
  FLOW VELOCITY(FEET/SEC.) =  25.53   DEPTH*VELOCITY(FT*FT/SEC) =  17.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.02 =  2100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  14.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.304
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D        4.55      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.55      SUBAREA RUNOFF(CFS) =   12.71
  EFFECTIVE AREA(ACRES) =     28.94   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     28.94        PEAK FLOW RATE(CFS) =      80.84

****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  91
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1256.00
  DOWNSTREAM NODE ELEVATION(FEET) =    975.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2200.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.144
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                 D       29.61      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    119.90
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  25.82
  AVERAGE FLOW DEPTH(FEET) =   0.93   FLOOD WIDTH(FEET) =    9.65
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =  16.39
  SUBAREA AREA(ACRES) =   29.61       SUBAREA RUNOFF(CFS) =   78.45
  EFFECTIVE AREA(ACRES) =   58.55     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     58.55         PEAK FLOW RATE(CFS) =     155.13

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.02   FLOOD WIDTH(FEET) =   10.63
  FLOW VELOCITY(FEET/SEC.) =  27.53   DEPTH*VELOCITY(FT*FT/SEC) =  28.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.03 =  4300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN) =  16.39
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.144
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                 D       28.47      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   28.47       SUBAREA RUNOFF(CFS) =   75.43
  EFFECTIVE AREA(ACRES) =     87.02   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     87.02        PEAK FLOW RATE(CFS) =     230.56

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    975.00
  DOWNSTREAM NODE ELEVATION(FEET) =    880.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2400.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.945
```

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SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       43.67      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    284.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  20.43
AVERAGE FLOW DEPTH(FEET) =   1.63   FLOOD WIDTH(FEET) =   16.70
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.96   Tc(MIN.) =  18.35
SUBAREA AREA(ACRES) =   43.67       SUBAREA RUNOFF(CFS) =  107.89
EFFECTIVE AREA(ACRES) =  130.69     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    130.69         PEAK FLOW RATE(CFS) =     322.88

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.71   FLOOD WIDTH(FEET) =   17.52
FLOW VELOCITY(FEET/SEC.) =  21.07   DEPTH*VELOCITY(FT*FT/SEC) =  36.06
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.04 =  6700.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  18.35
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.945
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       40.99      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   40.99       SUBAREA RUNOFF(CFS) =  101.27
EFFECTIVE AREA(ACRES) =    171.68   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    171.68       PEAK FLOW RATE(CFS) =     424.15

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  91
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    880.00
DOWNSTREAM NODE ELEVATION(FEET) =    645.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1450.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.891
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       40.26      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    472.90
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  39.40
AVERAGE FLOW DEPTH(FEET) =   1.51   FLOOD WIDTH(FEET) =   15.50
```

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"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.61   Tc(MIN.) =  18.96
SUBAREA AREA(ACRES) =   40.26       SUBAREA RUNOFF(CFS) =   97.51
EFFECTIVE AREA(ACRES) =  211.94     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    211.94         PEAK FLOW RATE(CFS) =     513.32

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.56   FLOOD WIDTH(FEET) =   15.99
FLOW VELOCITY(FEET/SEC.) =  40.22   DEPTH*VELOCITY(FT*FT/SEC) =  62.69
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.05 =  8150.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  18.96
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.891
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       44.30      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   44.30      SUBAREA RUNOFF(CFS) =  107.29
EFFECTIVE AREA(ACRES) =    256.24   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    256.24       PEAK FLOW RATE(CFS) =     620.61

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  18.96
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.891
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       47.90      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   47.90      SUBAREA RUNOFF(CFS) =  116.01
EFFECTIVE AREA(ACRES) =    304.14   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    304.14       PEAK FLOW RATE(CFS) =     736.62

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  18.96
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.891
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       30.08      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```

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  SUBAREA AREA(ACRES) =    30.08      SUBAREA RUNOFF(CFS) =    72.85
  EFFECTIVE AREA(ACRES) =    334.22   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    334.22       PEAK FLOW RATE(CFS) =     809.48

****************************************************************************
  FLOW PROCESS FROM NODE      1.05 TO NODE      3.03 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    645.00
  DOWNSTREAM NODE ELEVATION(FEET) =    595.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.854
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       18.29      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    831.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  31.53
  AVERAGE FLOW DEPTH(FEET) =   2.26   FLOOD WIDTH(FEET) =   22.97
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.42   Tc(MIN.) =  19.39
  SUBAREA AREA(ACRES) =   18.29       SUBAREA RUNOFF(CFS) =   43.69
  EFFECTIVE AREA(ACRES) =  352.51     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    352.51         PEAK FLOW RATE(CFS) =     841.97

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  2.27   FLOOD WIDTH(FEET) =   23.08
  FLOW VELOCITY(FEET/SEC.) =  31.64   DEPTH*VELOCITY(FT*FT/SEC) =  71.75
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.03 =  8950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.03 TO NODE      3.03 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  19.39
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =   352.51
  TOTAL STREAM AREA(ACRES) =   352.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    841.97

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  ELEVATION DATA: UPSTREAM(FEET) =   1755.00  DOWNSTREAM(FEET) =   1450.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.189
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.417
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                D        9.92      0.20     1.000    96   14.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     28.72
  TOTAL AREA(ACRES) =      9.92   PEAK FLOW RATE(CFS) =     28.72

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.01 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1450.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1300.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       15.87      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     51.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  27.18
  AVERAGE FLOW DEPTH(FEET) =   0.58   FLOOD WIDTH(FEET) =    6.17
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.37   Tc(MIN.) =  14.56
  SUBAREA AREA(ACRES) =   15.87       SUBAREA RUNOFF(CFS) =   45.19
  EFFECTIVE AREA(ACRES) =   25.79     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     25.79         PEAK FLOW RATE(CFS) =      73.44

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.67   FLOOD WIDTH(FEET) =    7.06
  FLOW VELOCITY(FEET/SEC.) =  29.64   DEPTH*VELOCITY(FT*FT/SEC) =  19.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.01 =  1600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.01 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  14.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       17.08      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   17.08       SUBAREA RUNOFF(CFS) =   48.63
```

```
  EFFECTIVE AREA(ACRES) =     42.87   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     42.87       PEAK FLOW RATE(CFS) =     122.07

****************************************************************************
  FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1300.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1050.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1800.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.232
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       25.71      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    157.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  28.46
  AVERAGE FLOW DEPTH(FEET) =   1.01   FLOOD WIDTH(FEET) =   10.52
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =  15.61
  SUBAREA AREA(ACRES) =   25.71       SUBAREA RUNOFF(CFS) =   70.15
  EFFECTIVE AREA(ACRES) =   68.58     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     68.58         PEAK FLOW RATE(CFS) =     187.12

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.08   FLOOD WIDTH(FEET) =   11.23
  FLOW VELOCITY(FEET/SEC.) =  29.73   DEPTH*VELOCITY(FT*FT/SEC) =  32.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.02 =  3400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  15.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.232
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       24.17      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   24.17       SUBAREA RUNOFF(CFS) =   65.95
  EFFECTIVE AREA(ACRES) =     92.75   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     92.75       PEAK FLOW RATE(CFS) =     253.06

****************************************************************************
  FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1050.00
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DOWNSTREAM NODE ELEVATION(FEET) =    875.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  2030.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.097
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       46.28      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    313.33
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  28.08
AVERAGE FLOW DEPTH(FEET) =   1.45   FLOOD WIDTH(FEET) =   14.95
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =  16.82
SUBAREA AREA(ACRES) =   46.28       SUBAREA RUNOFF(CFS) =  120.65
EFFECTIVE AREA(ACRES) =  139.03     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    139.03         PEAK FLOW RATE(CFS) =     362.45

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.54   FLOOD WIDTH(FEET) =   15.79
FLOW VELOCITY(FEET/SEC.) =  29.10   DEPTH*VELOCITY(FT*FT/SEC) =  44.79
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.03 =  5430.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  16.82
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.097
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       26.26      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   26.26       SUBAREA RUNOFF(CFS) =   68.46
EFFECTIVE AREA(ACRES) =    165.29   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    165.29       PEAK FLOW RATE(CFS) =     430.91

****************************************************************************
FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  91
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    875.00
DOWNSTREAM NODE ELEVATION(FEET) =    844.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  2050.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.895
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
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  NATURAL FAIR COVER
  "OPEN BRUSH"                D       53.55      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    495.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  16.27
  AVERAGE FLOW DEPTH(FEET) =   2.43   FLOOD WIDTH(FEET) =   24.69
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.10   Tc(MIN.) =  18.92
  SUBAREA AREA(ACRES) =   53.55       SUBAREA RUNOFF(CFS) =  129.91
  EFFECTIVE AREA(ACRES) =  218.84     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    218.84         PEAK FLOW RATE(CFS) =     530.88

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  2.49   FLOOD WIDTH(FEET) =   25.34
  FLOW VELOCITY(FEET/SEC.) =  16.54   DEPTH*VELOCITY(FT*FT/SEC) =  41.25
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.04 =  7480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  18.92
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.895
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       15.24      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   15.24       SUBAREA RUNOFF(CFS) =   36.97
  EFFECTIVE AREA(ACRES) =    234.08   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    234.08        PEAK FLOW RATE(CFS) =     567.85

****************************************************************************
  FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  18.92
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.895
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       11.64      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.64       SUBAREA RUNOFF(CFS) =   28.24
  EFFECTIVE AREA(ACRES) =    245.72   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    245.72        PEAK FLOW RATE(CFS) =     596.09

****************************************************************************
  FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    844.00
  DOWNSTREAM NODE ELEVATION(FEET) =    700.00
```

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CHANNEL LENGTH THRU SUBAREA(FEET) =  2050.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.797
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       12.71      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    610.95
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  30.57
AVERAGE FLOW DEPTH(FEET) =   1.96   FLOOD WIDTH(FEET) =   20.00
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.12   Tc(MIN.) =  20.03
SUBAREA AREA(ACRES) =   12.71       SUBAREA RUNOFF(CFS) =   29.71
EFFECTIVE AREA(ACRES) =  258.43     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    258.43         PEAK FLOW RATE(CFS) =     604.14

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.95   FLOOD WIDTH(FEET) =   19.92
FLOW VELOCITY(FEET/SEC.) =  30.48   DEPTH*VELOCITY(FT*FT/SEC) =  59.49
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.05 =  9530.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  20.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.797
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       30.19      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   30.19       SUBAREA RUNOFF(CFS) =   70.58
EFFECTIVE AREA(ACRES) =    288.62   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    288.62       PEAK FLOW RATE(CFS) =     674.72

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      3.03 IS CODE =  91
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    700.00
DOWNSTREAM NODE ELEVATION(FEET) =    595.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.767
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
```

```
"OPEN BRUSH"                D        0.01      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    674.73
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  37.94
AVERAGE FLOW DEPTH(FEET) =   1.85   FLOOD WIDTH(FEET) =   18.87
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.40   Tc(MIN.) =  20.43
SUBAREA AREA(ACRES) =    0.01       SUBAREA RUNOFF(CFS) =    0.02
EFFECTIVE AREA(ACRES) =  288.63     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    288.63         PEAK FLOW RATE(CFS) =     674.72
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.85   FLOOD WIDTH(FEET) =   18.87
FLOW VELOCITY(FEET/SEC.) =  37.94   DEPTH*VELOCITY(FT*FT/SEC) =  70.06
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.03 = 10430.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.03 TO NODE      3.03 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  20.43
RAINFALL INTENSITY(INCH/HR) =   2.77
AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  1.00
EFFECTIVE STREAM AREA(ACRES) =   288.63
TOTAL STREAM AREA(ACRES) =   288.63
PEAK FLOW RATE(CFS) AT CONFLUENCE =    674.72

****************************************************************************
FLOW PROCESS FROM NODE      3.00 TO NODE      3.01 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
ELEVATION DATA: UPSTREAM(FEET) =    915.00  DOWNSTREAM(FEET) =    710.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.135
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.133
SUBAREA Tc AND LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH"                D        8.23      0.20     1.000    96   10.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA RUNOFF(CFS) =     29.13
TOTAL AREA(ACRES) =      8.23   PEAK FLOW RATE(CFS) =     29.13

****************************************************************************
FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =  91
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    710.00
DOWNSTREAM NODE ELEVATION(FEET) =    630.00
```

```
CHANNEL LENGTH THRU SUBAREA(FEET) =   750.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.009
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       15.72      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     56.02
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  20.12
AVERAGE FLOW DEPTH(FEET) =   0.71   FLOOD WIDTH(FEET) =    7.48
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.62   Tc(MIN.) =  10.76
SUBAREA AREA(ACRES) =   15.72       SUBAREA RUNOFF(CFS) =   53.89
EFFECTIVE AREA(ACRES) =   23.95     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =     23.95         PEAK FLOW RATE(CFS) =      82.10

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  0.83   FLOOD WIDTH(FEET) =    8.65
FLOW VELOCITY(FEET/SEC.) =  22.02   DEPTH*VELOCITY(FT*FT/SEC) =  18.17
LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.02 =  1250.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.02 TO NODE      3.03 IS CODE =  91
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    630.00
DOWNSTREAM NODE ELEVATION(FEET) =    595.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.874
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       10.47      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     99.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  17.29
AVERAGE FLOW DEPTH(FEET) =   1.03   FLOOD WIDTH(FEET) =   10.74
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =  11.43
SUBAREA AREA(ACRES) =   10.47       SUBAREA RUNOFF(CFS) =   34.62
EFFECTIVE AREA(ACRES) =   34.42     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =     34.42         PEAK FLOW RATE(CFS) =     113.80

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.09   FLOOD WIDTH(FEET) =   11.29
FLOW VELOCITY(FEET/SEC.) =  17.89   DEPTH*VELOCITY(FT*FT/SEC) =  19.49
LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.03 =  1950.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.03 TO NODE      3.03 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.43
  RAINFALL INTENSITY(INCH/HR) =   3.87
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =    34.42
  TOTAL STREAM AREA(ACRES) =    34.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    113.80

  ** CONFLUENCE DATA **
   STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
   NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)       (ACRES)    NODE
      1    841.97  19.39    2.854  0.20( 0.20) 1.00   352.5       1.00
      2    674.72  20.43    2.767  0.20( 0.20) 1.00   288.6       1.00
      3    113.80  11.43    3.874  0.20( 0.20) 1.00    34.4       3.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

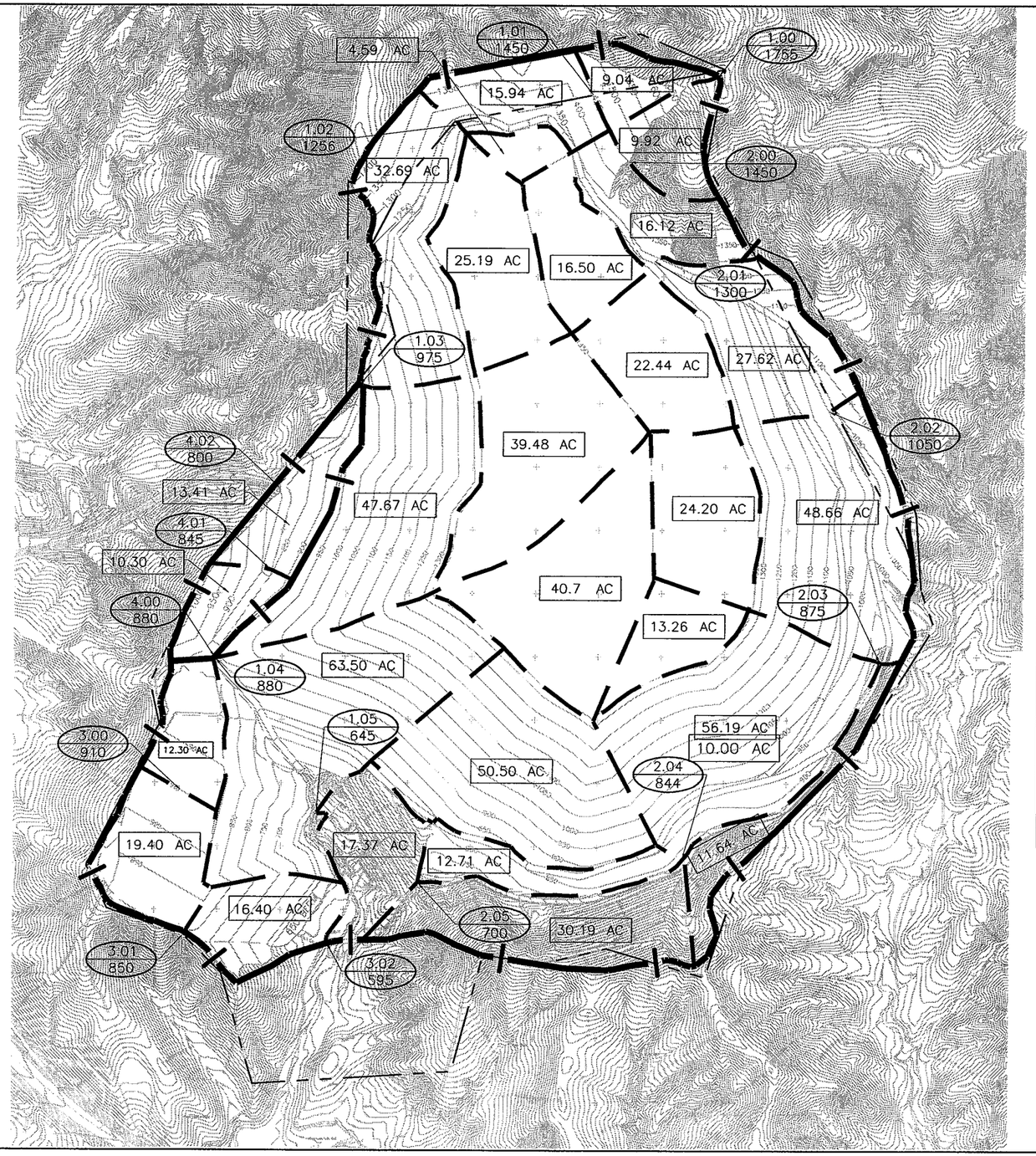
  ** PEAK FLOW RATE TABLE **
   STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
   NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)       (ACRES)    NODE
      1   1341.27  11.43    3.874  0.20( 0.20) 1.00   403.8       3.00
      2   1586.08  19.39    2.854  0.20( 0.20) 1.00   660.9       1.00
      3   1568.79  20.43    2.767  0.20( 0.20) 1.00   675.6       1.00

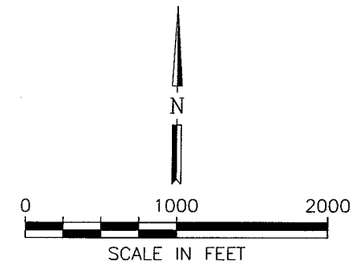
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =   1586.08    Tc(MIN.) =    19.39
  EFFECTIVE AREA(ACRES) =   660.85   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    675.56
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.03 = 10430.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =    675.56  TC(MIN.) =     19.39
  EFFECTIVE AREA(ACRES) =    660.85  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)    =   1586.08

  ** PEAK FLOW RATE TABLE **
   STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
   NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)       (ACRES)    NODE
      1   1341.27  11.43    3.874  0.20( 0.20) 1.00   403.8       3.00
      2   1586.08  19.39    2.854  0.20( 0.20) 1.00   660.9       1.00
      3   1568.79  20.43    2.767  0.20( 0.20) 1.00   675.6       1.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX E-4

MASTER DEVELOPMENT PLAN HYDROLOGY ANALYSIS UPDATED 2005





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 NODE NAME
725 ELEVATION — NODE DESCRIPTION

10.00 AC — AREA IN ACRES

Master Development Plan Hydrology Map

RELOOC Strategic Plan - Frank R. Bowerman Landfill Implementation

```
****************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
      (c) Copyright 1983-2005 Advanced Engineering Software (aes)
          Ver. 11.0  Release Date: 06/01/2005  License ID 1211

                        Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* 100 YEAR HYDROLOGY STUDY MASTER DEVELOPMENT PLAN                       *
* 2005 RERUN OF 2004 PARAMETERS                                          *
* CHM                                                                    *
 ************************************************************************

  FILE NAME: FRBMDP.DAT
  TIME/DATE OF STUDY: 09:53 09/07/2005
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  48.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  =====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  ELEVATION DATA: UPSTREAM(FEET) =   1755.00  DOWNSTREAM(FEET) =   1450.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.551
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.033
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  NATURAL POOR COVER
  "GRASS"                    D        9.04      0.20     1.000    98   10.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     31.19
  TOTAL AREA(ACRES) =      9.04   PEAK FLOW RATE(CFS) =     31.19

****************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1450.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1256.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.900
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    D       15.94      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     57.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  24.53
  AVERAGE FLOW DEPTH(FEET) =   0.65   FLOOD WIDTH(FEET) =    6.88
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =  11.30
  SUBAREA AREA(ACRES) =   15.94       SUBAREA RUNOFF(CFS) =   53.08
  EFFECTIVE AREA(ACRES) =   24.98     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     24.98         PEAK FLOW RATE(CFS) =      83.19

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.75   FLOOD WIDTH(FEET) =    7.90
  FLOW VELOCITY(FEET/SEC.) =  26.76   DEPTH*VELOCITY(FT*FT/SEC) =  20.08
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.02 =  2100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  11.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.900
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    D        4.59      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.59      SUBAREA RUNOFF(CFS) =   15.29
  EFFECTIVE AREA(ACRES) =     29.57   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     29.57        PEAK FLOW RATE(CFS) =      98.48

****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  92
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1256.00
  DOWNSTREAM NODE ELEVATION(FEET) =    975.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2200.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.639
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    D       32.69      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    148.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  27.21
  AVERAGE FLOW DEPTH(FEET) =   1.01   FLOOD WIDTH(FEET) =   10.47
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =  12.65
  SUBAREA AREA(ACRES) =   32.69       SUBAREA RUNOFF(CFS) =  101.18
  EFFECTIVE AREA(ACRES) =   62.26     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     62.26         PEAK FLOW RATE(CFS) =     192.70

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.11   FLOOD WIDTH(FEET) =   11.55
  FLOW VELOCITY(FEET/SEC.) =  28.97   DEPTH*VELOCITY(FT*FT/SEC) =  32.29
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.03 =  4300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN) =  12.65
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.639
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    D       25.19      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   25.19      SUBAREA RUNOFF(CFS) =   77.96
  EFFECTIVE AREA(ACRES) =     87.45   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     87.45       PEAK FLOW RATE(CFS) =     270.66

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    975.00
  DOWNSTREAM NODE ELEVATION(FEET) =    880.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2400.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.369
```

```
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D       47.67      0.20      1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    338.51
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  21.31
AVERAGE FLOW DEPTH(FEET) =   1.74   FLOOD WIDTH(FEET) =   17.83
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.88   Tc(MIN.) =  14.52
SUBAREA AREA(ACRES) =   47.67       SUBAREA RUNOFF(CFS) =  135.95
EFFECTIVE AREA(ACRES) =  135.12     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    135.12         PEAK FLOW RATE(CFS) =     385.34

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.83   FLOOD WIDTH(FEET) =   18.72
FLOW VELOCITY(FEET/SEC.) =  22.00   DEPTH*VELOCITY(FT*FT/SEC) =  40.32
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.04 =  6700.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  14.52
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.369
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D       39.48      0.20      1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   39.48       SUBAREA RUNOFF(CFS) =  112.59
EFFECTIVE AREA(ACRES) =    174.60   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    174.60       PEAK FLOW RATE(CFS) =     497.93

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  92
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    880.00
DOWNSTREAM NODE ELEVATION(FEET) =    645.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1450.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.288
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                     D       63.50      0.20      1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    586.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  41.55
AVERAGE FLOW DEPTH(FEET) =   1.64   FLOOD WIDTH(FEET) =   16.81
```

```
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.58   Tc(MIN.) =  15.10
SUBAREA AREA(ACRES) =   63.50       SUBAREA RUNOFF(CFS) =  176.50
EFFECTIVE AREA(ACRES) =  238.10     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    238.10         PEAK FLOW RATE(CFS) =     661.79

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.72   FLOOD WIDTH(FEET) =   17.60
FLOW VELOCITY(FEET/SEC.) =  42.76   DEPTH*VELOCITY(FT*FT/SEC) =  73.56
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.05 =  8150.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  15.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.288
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       40.70      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   40.70       SUBAREA RUNOFF(CFS) =  113.12
EFFECTIVE AREA(ACRES) =    278.80   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    278.80       PEAK FLOW RATE(CFS) =     774.92

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  15.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.288
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       50.50      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   50.50       SUBAREA RUNOFF(CFS) =  140.36
EFFECTIVE AREA(ACRES) =    329.30   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    329.30       PEAK FLOW RATE(CFS) =     915.28

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  15.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.288
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       12.30      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```

```
  SUBAREA AREA(ACRES) =    12.30      SUBAREA RUNOFF(CFS) =    34.19
  EFFECTIVE AREA(ACRES) =    341.60   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    341.60       PEAK FLOW RATE(CFS) =     949.47

****************************************************************************
  FLOW PROCESS FROM NODE      1.05 TO NODE      3.02 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    645.00
  DOWNSTREAM NODE ELEVATION(FEET) =    595.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.243
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                     D       17.37      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    973.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  32.80
  AVERAGE FLOW DEPTH(FEET) =   2.40   FLOOD WIDTH(FEET) =   24.37
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.41   Tc(MIN.) =  15.51
  SUBAREA AREA(ACRES) =   17.37       SUBAREA RUNOFF(CFS) =   47.57
  EFFECTIVE AREA(ACRES) =  358.97     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    358.97         PEAK FLOW RATE(CFS) =     983.04

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  2.41   FLOOD WIDTH(FEET) =   24.46
  FLOW VELOCITY(FEET/SEC.) =  32.87   DEPTH*VELOCITY(FT*FT/SEC) =  79.09
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.02 =  8950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.05 TO NODE      3.02 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  15.51
  RAINFALL INTENSITY(INCH/HR) =   3.24
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =   358.97
  TOTAL STREAM AREA(ACRES) =   358.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    983.04

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  ELEVATION DATA: UPSTREAM(FEET) =   1755.00  DOWNSTREAM(FEET) =   1450.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.551
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.050
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    D        9.92      0.20     1.000    98   10.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     34.37
  TOTAL AREA(ACRES) =      9.92   PEAK FLOW RATE(CFS) =     34.37

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.01 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1450.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1300.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.979
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    D       16.12      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     61.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  28.43
  AVERAGE FLOW DEPTH(FEET) =   0.62   FLOOD WIDTH(FEET) =    6.61
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.35   Tc(MIN.) =  10.90
  SUBAREA AREA(ACRES) =   16.12       SUBAREA RUNOFF(CFS) =   54.83
  EFFECTIVE AREA(ACRES) =   26.04     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     26.04         PEAK FLOW RATE(CFS) =      88.57

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOOD WIDTH(FEET) =    7.58
  FLOW VELOCITY(FEET/SEC.) =  31.00   DEPTH*VELOCITY(FT*FT/SEC) =  22.26
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.01 =  1600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.01 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  10.90
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.979
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    D       16.50      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   16.50      SUBAREA RUNOFF(CFS) =   56.12
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  EFFECTIVE AREA(ACRES) =     42.54   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     42.54       PEAK FLOW RATE(CFS) =     144.70

****************************************************************************
  FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1300.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1050.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1800.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.778
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                     D       27.62      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    189.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  29.79
  AVERAGE FLOW DEPTH(FEET) =   1.09   FLOOD WIDTH(FEET) =   11.28
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.01   Tc(MIN.) =  11.91
  SUBAREA AREA(ACRES) =   27.62       SUBAREA RUNOFF(CFS) =   88.94
  EFFECTIVE AREA(ACRES) =   70.16     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     70.16         PEAK FLOW RATE(CFS) =     225.93

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.17   FLOOD WIDTH(FEET) =   12.07
  FLOW VELOCITY(FEET/SEC.) =  31.10   DEPTH*VELOCITY(FT*FT/SEC) =  36.28
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.02 =  3400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  11.91
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.778
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                     D       22.44      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   22.44       SUBAREA RUNOFF(CFS) =   72.26
  EFFECTIVE AREA(ACRES) =     92.60   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     92.60       PEAK FLOW RATE(CFS) =     298.19

****************************************************************************
  FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1050.00
```

```
DOWNSTREAM NODE ELEVATION(FEET) =    875.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  2030.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.579
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       48.66      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    372.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  29.29
AVERAGE FLOW DEPTH(FEET) =   1.55   FLOOD WIDTH(FEET) =   15.95
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.16   Tc(MIN.) =  13.07
SUBAREA AREA(ACRES) =   48.66       SUBAREA RUNOFF(CFS) =  147.96
EFFECTIVE AREA(ACRES) =  141.26     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    141.26         PEAK FLOW RATE(CFS) =     429.54

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.64   FLOOD WIDTH(FEET) =   16.84
FLOW VELOCITY(FEET/SEC.) =  30.32   DEPTH*VELOCITY(FT*FT/SEC) =  49.85
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.03 =  5430.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  13.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.579
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       24.20      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   24.20       SUBAREA RUNOFF(CFS) =   73.59
EFFECTIVE AREA(ACRES) =    165.46   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    165.46       PEAK FLOW RATE(CFS) =     503.12

****************************************************************************
FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  92
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    875.00
DOWNSTREAM NODE ELEVATION(FEET) =    844.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  2050.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.290
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
NATURAL POOR COVER
"GRASS"                    D       56.19      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    581.16
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  16.91
AVERAGE FLOW DEPTH(FEET) =   2.58   FLOOD WIDTH(FEET) =   26.22
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.02   Tc(MIN.) =  15.09
SUBAREA AREA(ACRES) =   56.19       SUBAREA RUNOFF(CFS) =  156.28
EFFECTIVE AREA(ACRES) =  221.65     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    221.65         PEAK FLOW RATE(CFS) =     616.49

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  2.64   FLOOD WIDTH(FEET) =   26.82
FLOW VELOCITY(FEET/SEC.) =  17.15   DEPTH*VELOCITY(FT*FT/SEC) =  45.31
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.04 =  7480.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  15.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.290
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       13.26      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   13.26      SUBAREA RUNOFF(CFS) =   36.88
EFFECTIVE AREA(ACRES) =    234.91   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    234.91       PEAK FLOW RATE(CFS) =     653.37

****************************************************************************
FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  15.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.290
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       11.64      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   11.64      SUBAREA RUNOFF(CFS) =   32.37
EFFECTIVE AREA(ACRES) =    246.55   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    246.55       PEAK FLOW RATE(CFS) =     685.74

****************************************************************************
FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  92
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    844.00
DOWNSTREAM NODE ELEVATION(FEET) =    700.00
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CHANNEL LENGTH THRU SUBAREA(FEET) =  2050.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.169
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       12.71      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    702.72
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  31.63
AVERAGE FLOW DEPTH(FEET) =   2.07   FLOOD WIDTH(FEET) =   21.09
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =  16.17
SUBAREA AREA(ACRES) =   12.71       SUBAREA RUNOFF(CFS) =   33.97
EFFECTIVE AREA(ACRES) =  259.26     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    259.26         PEAK FLOW RATE(CFS) =     692.86

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  2.06   FLOOD WIDTH(FEET) =   20.97
FLOW VELOCITY(FEET/SEC.) =  31.55   DEPTH*VELOCITY(FT*FT/SEC) =  64.88
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.05 =  9530.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  16.17
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.169
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       30.19      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   30.19       SUBAREA RUNOFF(CFS) =   80.68
EFFECTIVE AREA(ACRES) =    289.45   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    289.45       PEAK FLOW RATE(CFS) =     773.54

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      3.02 IS CODE =  92
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    700.00
DOWNSTREAM NODE ELEVATION(FEET) =    595.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.127
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
```

```
"GRASS"                    D        0.01      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    773.56
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  39.22
AVERAGE FLOW DEPTH(FEET) =   1.95   FLOOD WIDTH(FEET) =   19.87
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.38   Tc(MIN.) =  16.55
SUBAREA AREA(ACRES) =    0.01       SUBAREA RUNOFF(CFS) =    0.03
EFFECTIVE AREA(ACRES) =  289.46     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    289.46         PEAK FLOW RATE(CFS) =     773.54
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.95   FLOOD WIDTH(FEET) =   19.87
FLOW VELOCITY(FEET/SEC.) =  39.22   DEPTH*VELOCITY(FT*FT/SEC) =  76.36
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.02 = 10430.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      3.02 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  16.55
RAINFALL INTENSITY(INCH/HR) =   3.13
AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  1.00
EFFECTIVE STREAM AREA(ACRES) =   289.46
TOTAL STREAM AREA(ACRES) =   289.46
PEAK FLOW RATE(CFS) AT CONFLUENCE =    773.54

****************************************************************************
FLOW PROCESS FROM NODE      3.00 TO NODE      3.01 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =  1100.00
ELEVATION DATA: UPSTREAM(FEET) =    910.00  DOWNSTREAM(FEET) =    850.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.466
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.248
SUBAREA Tc AND LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL POOR COVER
"GRASS"                    D       19.40      0.20     1.000    98   15.47
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA RUNOFF(CFS) =     53.22
TOTAL AREA(ACRES) =     19.40   PEAK FLOW RATE(CFS) =     53.22

****************************************************************************
FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =  92
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    850.00
DOWNSTREAM NODE ELEVATION(FEET) =    595.00
```

```
CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.177
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL POOR COVER
"GRASS"                    D       16.40      0.20     1.000    98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     75.19
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  29.04
AVERAGE FLOW DEPTH(FEET) =   0.68   FLOOD WIDTH(FEET) =    7.22
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.63   Tc(MIN.) =  16.10
SUBAREA AREA(ACRES) =   16.40       SUBAREA RUNOFF(CFS) =   43.94
EFFECTIVE AREA(ACRES) =   35.80     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =     35.80         PEAK FLOW RATE(CFS) =      95.92

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  0.75   FLOOD WIDTH(FEET) =    7.92
FLOW VELOCITY(FEET/SEC.) =  30.76   DEPTH*VELOCITY(FT*FT/SEC) =  23.12
LONGEST FLOWPATH FROM NODE      3.00 TO NODE      3.02 =  2200.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
TIME OF CONCENTRATION(MIN.) =  16.10
RAINFALL INTENSITY(INCH/HR) =   3.18
AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  1.00
EFFECTIVE STREAM AREA(ACRES) =    35.80
TOTAL STREAM AREA(ACRES) =    35.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =     95.92

** CONFLUENCE DATA **
 STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
 NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)       (ACRES)    NODE
    1    983.04  15.51    3.243  0.20( 0.20) 1.00   359.0       1.00
    2    773.54  16.55    3.127  0.20( 0.20) 1.00   289.5       1.00
    3     95.92  16.10    3.177  0.20( 0.20) 1.00    35.8       3.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  3 STREAMS.

** PEAK FLOW RATE TABLE **
 STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
 NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)       (ACRES)    NODE
    1   1831.34  15.51    3.243  0.20( 0.20) 1.00   664.8       1.00
    2   1823.20  16.10    3.177  0.20( 0.20) 1.00   676.3       3.00
    3   1813.33  16.55    3.127  0.20( 0.20) 1.00   684.2       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =   1831.34    Tc(MIN.) =    15.51
```

```
  EFFECTIVE AREA(ACRES) =   664.78   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    684.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.02 = 10430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   770.00
  ELEVATION DATA: UPSTREAM(FEET) =    880.00  DOWNSTREAM(FEET) =    845.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.907
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.457
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "GRASS"                    D       10.30      0.20     1.000    98   13.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     30.20
  TOTAL AREA(ACRES) =     10.30   PEAK FLOW RATE(CFS) =     30.20

****************************************************************************
  FLOW PROCESS FROM NODE      4.01 TO NODE      4.02 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    845.00
  DOWNSTREAM NODE ELEVATION(FEET) =    800.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   645.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "GRASS"                    D       13.41      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     49.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  16.60
  AVERAGE FLOW DEPTH(FEET) =   0.73   FLOOD WIDTH(FEET) =    7.72
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.65   Tc(MIN.) =  14.55
  SUBAREA AREA(ACRES) =   13.41       SUBAREA RUNOFF(CFS) =   38.19
  EFFECTIVE AREA(ACRES) =   23.71     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     23.71         PEAK FLOW RATE(CFS) =      67.52

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.83   FLOOD WIDTH(FEET) =    8.70
  FLOW VELOCITY(FEET/SEC.) =  17.91   DEPTH*VELOCITY(FT*FT/SEC) =  14.87
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      4.02 =  1415.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =     23.71  TC(MIN.) =     14.55
```

```
  EFFECTIVE AREA(ACRES) =      23.71  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      67.52
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX E-5

MASTER DEVELOPMENT PLAN
SOIL LOSS ANALYSIS
2005

UNIVERSAL SOIL LOSS ANALYSIS

JOB NAME Frank R. Bowerman Landfill
DATE 9/6/2005
CALC BY JMB

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	47	0.24	0.6	0.03	1.0	0.2	6.63	3.78
B	81.98	47	0.24	0.6	0.03	1.0	0.2	16.65	9.48
C	72.21	47	0.24	0.6	0.03	1.0	0.2	14.66	8.35
D	32.43	47	0.24	8.0	0.03	1.0	2.7	87.79	50.03
E	41.17	47	0.24	8.0	0.03	1.0	2.7	111.46	63.51
F	114.41	47	0.24	8.0	0.03	1.0	2.7	309.73	176.48
G	61.26	47	0.24	8.0	0.03	1.0	2.7	165.84	94.50
H	46.79	47	0.24	8.0	0.03	1.0	2.7	126.67	72.18
I	29.68	47	0.24	8.0	0.03	1.0	2.7	80.35	45.78
J	20.46	47	0.24	0.6	0.03	1.0	0.2	4.09	2.33
K	10.87	47	0.24	0.6	0.03	1.0	0.2	2.17	1.24
TOTAL	***543.9***				***AVERAGE VALUE (tons/acre/year)=***		***1.7***	***926.0***	***527.7***

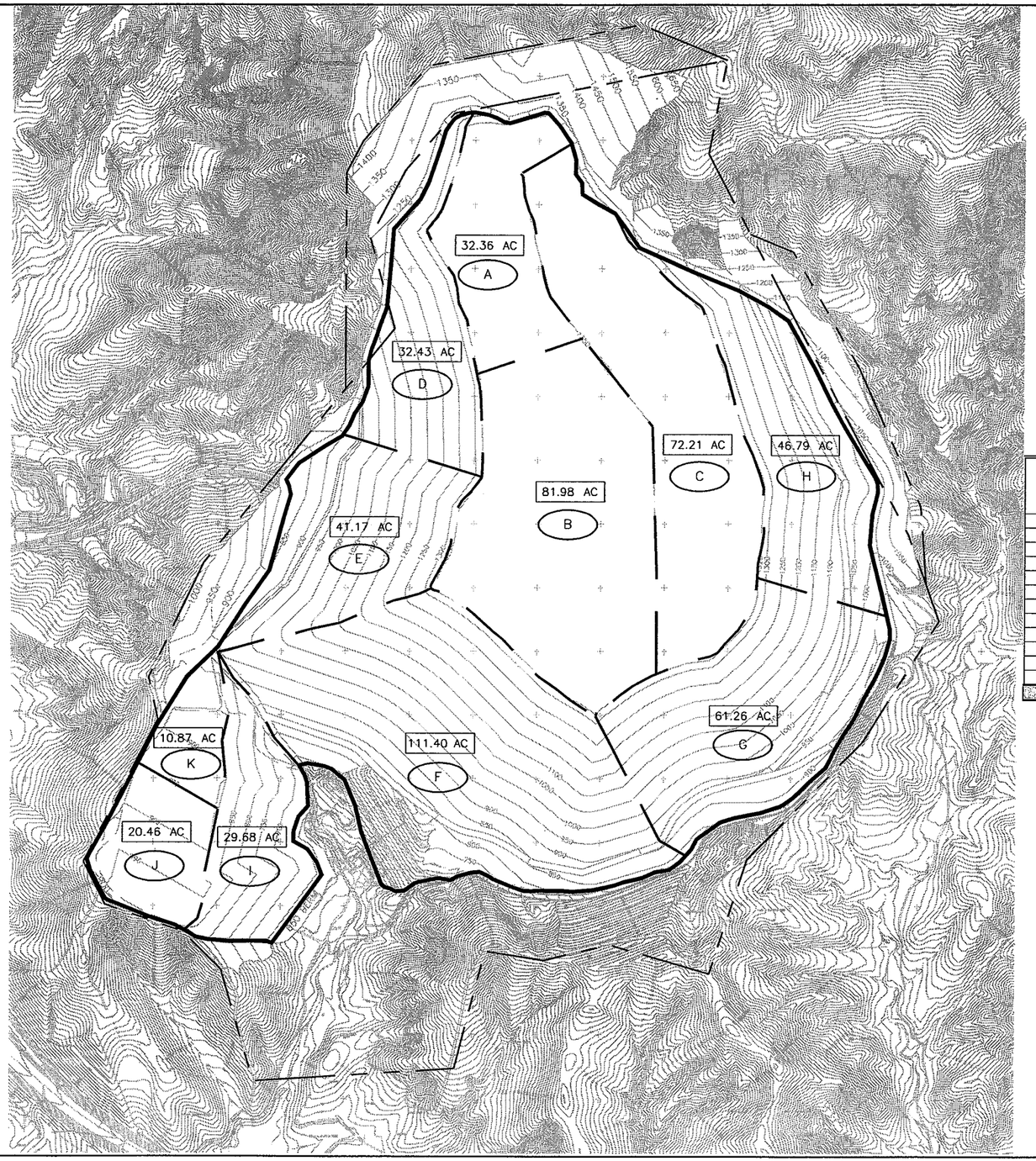
A = RKLSCP

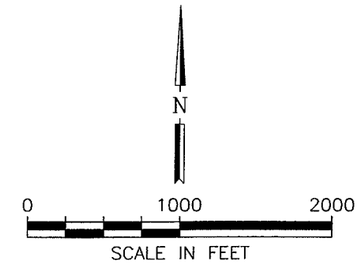
A= average soil loss in tons per acre, for the time period used for the R factor
R = rainfall and runoff erosivity index

$$R = 16.55P^{2.2} = 16.55(1.6)^{2.2} = 47$$

(P= 2 year 6 hour persipitation depth = 1.6 by California isopluvial map)
K = soil erodibility factor
LS = slope-length/steepness factor
C = cover management factor
P = practice factor

See Succeeding Backup Documents





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

Master Development Plan Soil Loss Map

RELOOC Strategic Plan - Frank R. Bowerman Landfill Implementation

California Isopluvial Map

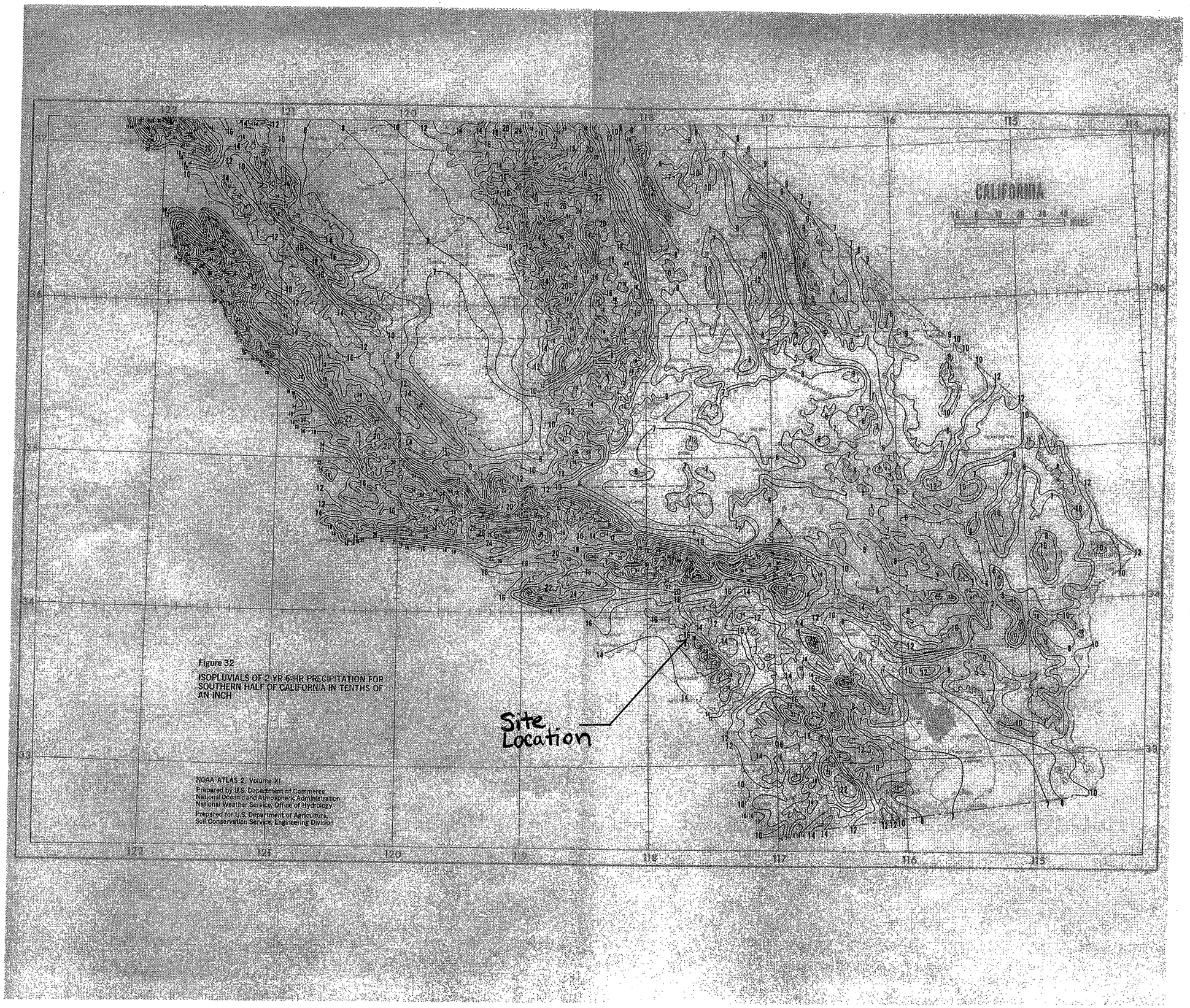


Figure 32

ISOPLUVIALS OF 2 YR 6 HR PRECIPITATION FOR SOUTHERN HALF OF CALIFORNIA IN TENTHS OF AN INCH

K-Factor

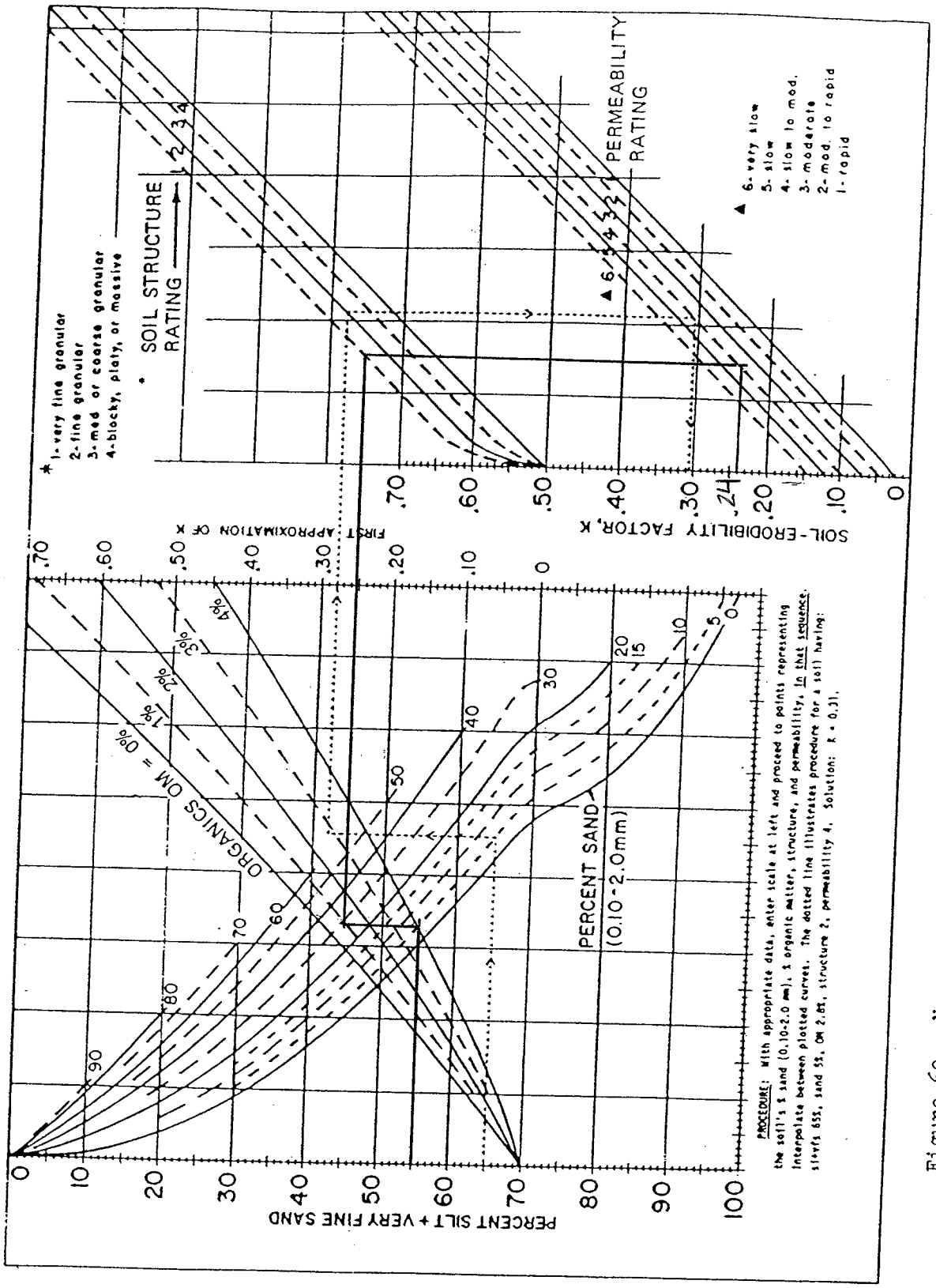


Figure 60. Nomograph for determining soil-erodibility factor K for U. S. Mainland.[79]

LS-Factor

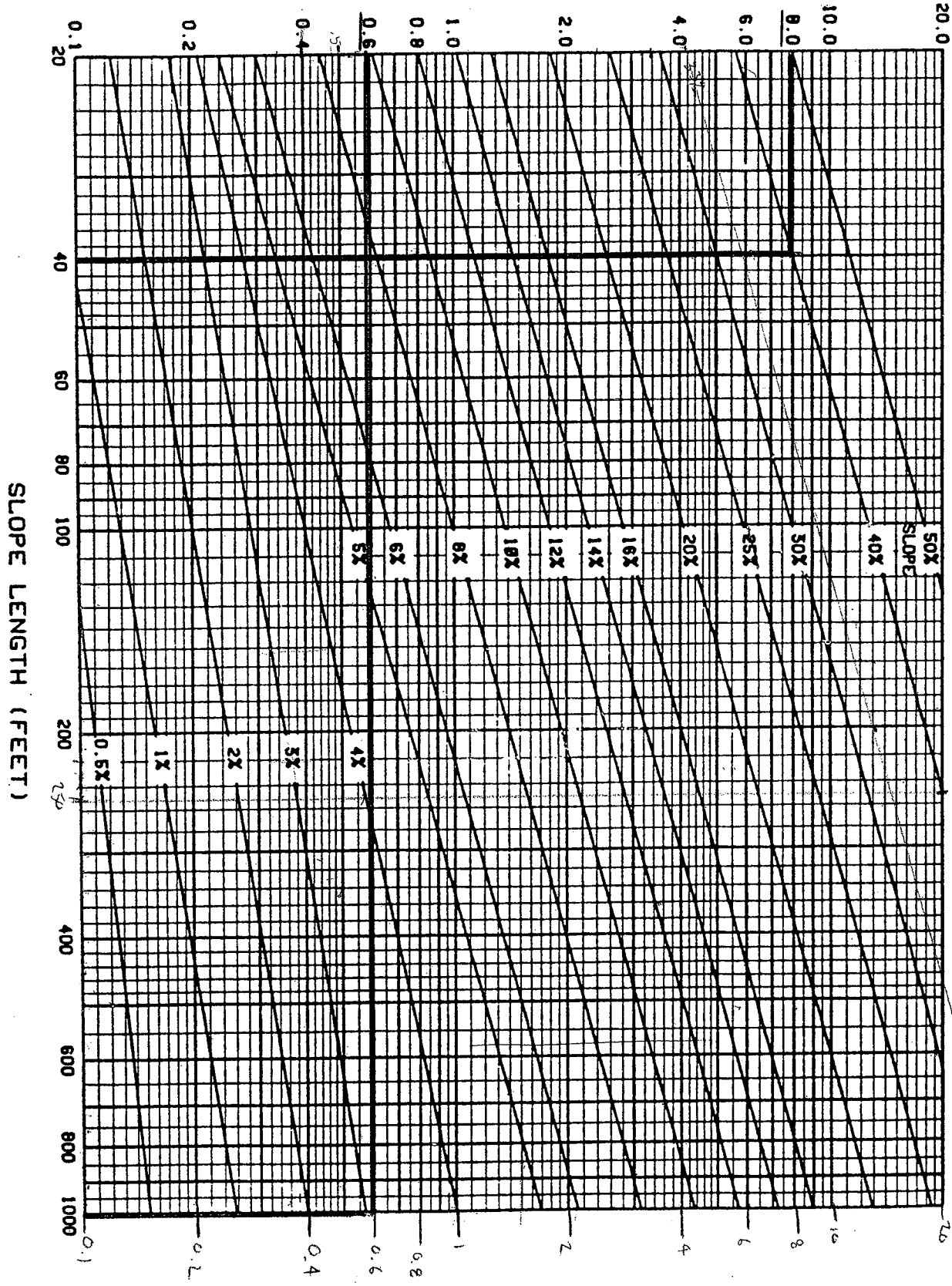


FIGURE 4.—Slope-effect chart (topographic factor, LS). LS = $(\lambda/72.6)^m$ $(65.41 \sin^2(\theta) + 4.56 \sin(\theta) + 0.065)$ where λ = slope length in feet; θ = angle of slope; and m = 0.2 for gradients < 1 percent, 0.3 for 1 to 3 percent slopes, 0.4 for 3.5 to 4.5 percent slopes, and 0.5 for slopes of 5 percent or steeper.

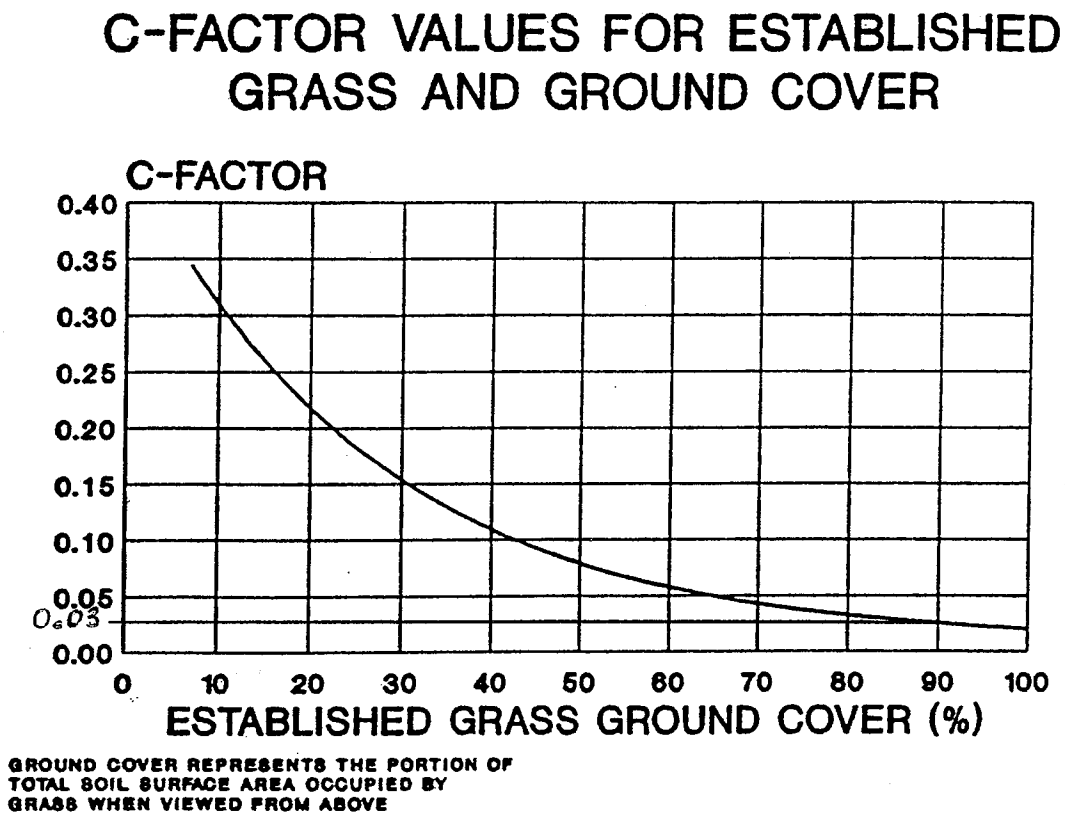


Figure 9: C-Factors for Established Grass (from HDI, Jan, 1991).

P-Factor

Treatment	C-Factor	P-Factor
BARE SOIL		
Packed and Smooth	1.00	1.00
Freshly Disked	1.00	0.90
Rough Irregular Surface	1.00	0.90
SEDIMENT BASIN/TRAP	1.00	0.50[A]
STRAW BALE BARRIER, GRAVEL FILTER, SAND BAGS	1.00	0.80
SILT FENCE BARRIER	1.00	0.50
ASPHALT/CONCRETE PAVEMENT	0.01	1.00
GRAVEL (1/4" TO 1 1/2") @ 135 TONS/ACRE	0.05	1.00
ESTABLISHED NATIVE GRASS	Fig 4	1.00
SOD GRASS	0.01	1.00
TEMPORARY VEGETATION/COVER CROP	0.45[B]	1.00
HYDRAULIC MULCH @ 2 TONS/ACRE	0.10[C]	1.00
SOIL SEALANT	0.01 - 0.60[D]	1.00
EROSION CONTROL MATS/BLANKETS	0.10	1.00
HAY OR STRAW DRY MULCH @ 2 TONS/ACRE & ANCHORED		
Assumes planting of grass seed has occurred prior to application, otherwise C-Factor = 1.00.		
Slope (%)		
1 to 10	0.06	1.00
11 to 15	0.07	1.00
16 to 20	0.11	1.00
21 to 25	0.14	1.00
25 to 33	0.17	1.00
> 33	0.20	1.00
CONTOUR FURROWED SURFACE (long narrow trench, rut or groove)		
Must be maintained throughout construction activities, otherwise P-Factor = 1.00. Maximum length refers to down slope length.		
Slope (%) — Max Length (feet)		
1 to 2 — 400	1.00	0.60
3 to 5 — 300	1.00	0.50
6 to 8 — 200	1.00	0.50
9 to 12 — 120	1.00	0.60
13 to 16 — 80	1.00	0.70
17 to 20 — 60	1.00	0.80
> 20 — 50	1.00	0.80

NOTE: Use of other C-Factor of P-Factor values reported in this table should be substantiated by documentation

A: Should be constructed as the first step in over lot grading
B: Assumes planting occurs within optimal climatic conditions
C: Some limitation on use in arid and semi-arid climates
D: Value used must be substantiated by documentation

APPENDIX E-6

BEE CANYON WATERSHED RUN-OFF VOLUME AND DEBRIS/SEDIMENT YIELD ANALYSES

BEE CANYON WATERSHED
RUN-OFF VOLUME AND DEBRIS/SEDIMENT YIELD ANALYSIS

FRB LANDFILL IMPLEMENTATION
ENVIRONMENTAL IMPACT REPORT NO. 604

RUNOFF VOLUME ANALYSIS

In accordance with Title 27 of the California Code of Regulations (CCR), Section 20635, the) a hydrologic analysis was performed for the Frank R. Bowerman (FRB) Landfill Master Development Plan (MDP, 2004) to show that the landfill will be protected against washout from future surface water conditions. The design storm for the state regulations is a 100-year, 24-hour storm. A subsequent hydrology analysis was performed for Section 5.4 - Surface Water Hydrology of Draft Environmental Impact Report No. 604 to assess hydrology impacts of the MDP project as compared to the permitted plan for the FRB Landfill. Peak flows were analyzed for both the permitted and MDP plans and it was determined that there would be no peak flow impact due to the MDP plan over the peak flow calculated for the permitted plan. Additional analyses was performed herein to verify that impacts on the retarding function of the downstream Bee Canyon Retarding Basin (BCRB) would not be compromised by the MDP project with respect to storage capacity for peak volume and sediment/debris. Although the MDP project impacts on the BCRB were expected to be insignificant, verification of impacts based on previous (see References) and new analyses are included herein (see Attachments 1 through 4).

In the MDP (2004), it has been proposed that the Bee Canyon Watershed (BCW) be modified to accommodate the proposed landfill configuration (including off-site remedial grading). This modification will increase the BCW tributary area from the current 836 acres to 854 acres, an overall increase of approximately 2 percent. Also, in the MDP (2004), it has been proposed to increase the landfill refuse prism laterally and vertically. An analysis was performed to show that the alteration in the BCW area and the proposed expansion would not adversely affect the ability of the BCRB to effectively retard peak runoff volumes.

The BCW generally flows in a southerly direction to the BCRB that is located on the north side of the 241 Toll Road. Based on current topographic survey maps, the base or lowest elevation of the BCRB is at the riser outlet and is at elevation 530 feet and has approximately 481 acre-feet of storage capacity to the top of the box weir outlet, which is at elevation 581 feet. This latest volume calculation is consistent with the "Stage-Storage Curve" (see Attachment 1) provided in a previous hydrologic analysis (John Tettemer & Associates, 1993) performed for the basin. The centerline elevation of the 241 Toll Road is approximately 600 feet. Based upon previous hydrology and hydraulic analyses' (John Tettemer & Associates, 1991 & 1993), the BCRB was sized to protect against a 35,000-year storm event.

Unit hydrographs were performed for the BCW based on the permitted Joint Technical Document (JTD, 2001) and MDP (2004) configurations and were then compared to the original design parameters for the BCRB to verify design functionality. A summary of the results is listed below:

TABLE 1

BEE CANYON WATERSHED & RETARDING BASIN ANALYSES SUMMARY TABLE

	BCW Area (acres)	Inflow Q_{MAX} (cfs)	Outflow Q_{MAX} (cfs)	Runoff Vol (af)	Peak Stage Elevation (ft)	T_c (min.)	Fm	F*
BCRB	848[1]	2110	109	318	566.99	18.9	0.15	0.22
JTD	836	2165	104	297	566.68	20.8	0.21	0.27
MDP	854	2135	104	296	566.64	21.1	0.21	0.30

[1]Calculated area prior to the construction of the 241 Toll Road.

Attached, as backup for the above results, are:

- Pertinent calculations from the Tettemer & Associates (1991 and 1993) studies performed for the original BCRB design (Attachment 1);
- Rational Method and Unit Hydrograph Method hydrology analyses for the JTD and MDP (Attachment 2) including flood routing basin calculations for the BCRB.

DEBRIS AND SEDIMENT YIELD

In the original sediment analysis performed for design of the BCRB, several approaches were used to quantify the estimated sediment and debris flow potential. The author (John Tettemer & Associates, 1989) acknowledged that estimations for these approaches could be anywhere from 50 percent to 100 percent off and the approaches themselves yielded vastly different volumes. The results of the methodologies were evaluated to determine which best met the following conditions:

- It is based on a regionally accepted, reproducible methodology;
- It considers the uncertainties of cleanouts;
- It is conservative.

The methodology selected for the BCRB was that described by Tatum which was used by the Corps of Engineers and San Bernardino County with a 20 percent factor of safety added for conservation (John Tettemer & Associates, 1989).

According to the original analysis, the BCRB was designed to hold approximately 39 acre-feet of sediment and debris. The sediment yield calculations were conservatively estimated using the Tatum Method which assumed sediment and debris produced during a 100-year flood event, 4 to 5 years after 100 percent burning of the entire watershed of the BCRB (see Attachment 3).

In a later study by Bryan A. Stirrat and Associates (BAS), approximately 5 acre-feet (7,580 cubic yards) of sediment and debris (see Attachment 4) was calculated to be generated from the landfill using a Universal Soil Loss Equation which is a widely accepted methodology for landfill analyses (BAS 2000). The two basic assumptions that dramatically reduced the sediment and debris runoff calculations were the current landfill Best Management Practices (BMPs) and the final closure planting assumptions (i.e., a bulk of debris in the BCW would come from trees and large shrubs; the landfill will replace these with grasses and shorter chaparral type vegetation). The maximum volume potential from sediment and debris would decrease as the landfill footprint increases due to BMPs and enhanced vegetative cover which would in turn enhance the ability of the basin to contain higher peak flows and larger volumes.

CONCLUSIONS

In order to provide continuity, the basin analyses for the JTD (2001) and the MDP (2004) hydrologic configurations were performed with the conservative assumption that the BCRB would contain the original recommended 39 acre-feet of sediment and debris in a 100-year storm event (even though later studies show much less sediment and debris would be generated). Based on the reported results, in Table 1, both the volume of runoff and peak flow for both the JTD (2001) and MDP (2004) configurations will not change significantly from that calculated for the original BCRB design capacity. The MDP peak flow for the BCW of 2135 cfs would increase approximately one percent over the original BCRB design peak flow of 2110 cfs and the runoff volume for the MDP of 296 acre-feet is actually less than the BCRB design runoff volume of 318 cfs. With the decreased sediment and debris volume potential as the landfill footprint increases and the minor changes in the peak flow and runoff volume due to the proposed MDP landfill expansion, the impacts on the performance of the BCRB will be less than significant.

REFERENCES

1. Bee Canyon Retarding Basin (BCRB), Drainage and Sediment Evaluation Report for Frank R. Bowerman Sanitary Landfill, by Bryan A. Stirrat and Associates, dated December, 2000.

2. Analyses of the 10-, 25-, 50- and 100-Year Hydrograph Routings for the Bee and Round Canyon Retarding Basins, by John Tettemer & Associates, memorandum, dated August 3, 1993.

3. Bee Canyon Retarding Basin Facility No. F16B02 Calculations, by John M. Tettemer & Associates, dated January, 1991 (BCRB, 1991).

4. Estimate of Sediment Volume Requirement in the Design of Retarding Basins in Upper San Diego Creek Watersheds, Phase I: Proposed Retarding Basins at Agua Chinon, Round & Bee Canyons, John Tettemer & Associates, by M. Gamal Mostafa, Ph.D., P.E., January, 1989.

ATTACHMENT 1
PERTINENT BACK-UP CALCULATIONS
BCRB 1991
(John Tettemer & Associates)

BCRB 1991

(John Tettemer & Associates)

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            FEBRUARY 1981             *
*          REVISED 01 JUN 88           *
*                                      *
*  RUN DATE  05/14/1990  TIME  11:32:49 *
*                                      *
****************************************
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*
*    U.S. ARMY CORPS OF ENGINEERS
*  THE HYDROLOGIC ENGINEERING CENT
*          609 SECOND STREET
*       DAVIS, CALIFORNIA 95616
*          (916) 551-1748
*
*********************************
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JOHN M. TETTEMER & ASSOCIATES, LTD.
BEE CANYON RETARDING BASIN
100-, 200-, 500-, 1000-YEAR 24-HOURS STORM ANALYSIS
39 ACRE-FEET SEDIMENT HAVE BEEN USED (PER G. MOSTAFA JAN. 1989)
POINT RAINFALL DATA PER OCEMA AND LOWER PETERS DAM HYDROLOGY JMTA 1989
100-YEAR RAINFALL: 0.52, 1.09, 1.45, 2.43, 3.36, 5.63 ← RAINFALL DATA
200-YEAR RAINFALL: 0.57, 1.19, 1.59, 2.67, 3.68, 6.17
500-YEAR RAINFALL: 0.64, 1.35, 1.79, 2.99, 4.12, 6.85
1000-YEAR RAINFALL: 0.68, 1.44, 1.91, 3.20, 4.41, 7.40
100-YEAR TC=18.9 MIN, Y-BAR=0.2244, FM=0.15(0.0125), LAG=0.8 TC=0.0105 DAY ← UNIT HYDROGRAPH INPUT DATA
200-YEAR TC=18.7 MIN, Y-BAR=0.2091, FM=0.15,(0.0125) LAG=0.8 TC=0.0104 DAY
500-YEAR TC=18.2 MIN, Y-BAR=0.1927, FM=0.15,(0.0125) LAG=0.8 TC=0.0101 DAY
1000-YEAR TC=18.0 MIN, Y-BAR=0.1812, FM=0.15,(0.0125) LAG=0.8 TC=0.0100 DAY
VALLEY DEVELOPED S-GRAPH USED
FILE NAME: BEEDAM.I/O, 5/3/1990 MPV

```
17 IO        OUTPUT CONTROL VARIABLES
                 IPRNT          5  PRINT CONTROL
                 IPLOT          0  PLOT CONTROL
                 QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT        HYDROGRAPH TIME DATA
                  NMIN          5  MINUTES IN COMPUTATION INTERVAL
                 IDATE     3MAY90,  STARTING DATE
                 ITIME       0000  STARTING TIME
                    NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE     4MAY90  ENDING DATE
                NDTIME       0055  ENDING TIME
                 ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL     .08 HOURS
                 TOTAL TIME BASE   24.92 HOURS

      ENGLISH UNITS
          DRAINAGE AREA          SQUARE MILES
          PRECIPITATION DEPTH    INCHES
          LENGTH, ELEVATION      FEET
          FLOW                   CUBIC FEET PER SECOND
          STORAGE VOLUME         ACRE-FEET
          SURFACE AREA           ACRES
          TEMPERATURE            DEGREES FAHRENHEIT
```

BEEDAM.O

Monday, May 14, 1990 11:40 am

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT BEE CANYON 100-YEAR EVENT	BEE-100	2110.	16.25	392.	160.	155.	1.32		
			PEAK INFLOW							
+	ROUTED TO	ST1	109.	19.08	109.	83.	80.	1.32		
+		PEAK OUTFLOW							PEAK RUNOFF ELEVATION 566.99	19.17
+	HYDROGRAPH AT	BEE200	2354.	16.25	436.	179.	173.	1.32		
+	ROUTED TO	ST1	112.	19.50	112.	86.	83.	1.32		
+									569.05	19.58
+	HYDROGRAPH AT	BEE500	2713.	16.25	496.	202.	195.	1.32		
+	ROUTED TO	ST1	115.	20.00	115.	90.	86.	1.32		
+									571.45	20.08
+	HYDROGRAPH AT	BEE1000	2914.	16.25	537.	221.	213.	1.32		
+	ROUTED TO	ST1	117.	20.58	117.	92.	89.	1.32		
+									573.19	20.67

*** NORMAL END OF HEC-1 ***

JOHN M. TETTEMER & ASSOCIATES, LTD.

Summary of Inflow Hydrology Data

BEE CANYON SUMMARY

Return Frequency (Year)	Peak Flow (CFS)	Time To Peak (HRS)	Hydrograph Volume (AC-FT)
100	2,110	16.25	318
200	2,354	16.25	355
500	2,713	16.25	40[illegible]
1,000	2,914	16.25	438
35,000	4,500	16.25	863

By MPV Date _____ Subject _____ Sheet No. _____ of _____

Checked by _____ Date _____ Job No. _____

Thursday, May 3, 1990 3:14 pm

CUT PAPER ALONG OUTSIDE BORDER-LINE

STUDY NAME: BEE CANYON RETARDING BASIN

CALCULATED BY: MPV
CHECKED BY:

100.0-YEAR STORM RATIONAL METHOD STUDY

PAGE NUMBER 1 OF 2

[ADVANCED ENGINEERING SOFTWARE]

CONCENTRATION POINT NUMBER	AREA (ACRES) SUBAREA	SUM	SOIL TYPE	DEV. TYPE	Tt MIN.	Tc MIN.	I in/h	Fm	Fm (Avg)	Q SUM	PATH (ft)	SLOPE ft/ft	V FPS.	HYDRAULICS AND NOTES
1.00	8.7	8.7	3	7	..	7.5	4.91	.13	.125	37.5	1000	.3820	..	INITIAL SUBAREA
											1000	.2600	12.9	*Qav= 37.5cfs n=.0350 Dn= .5 B= 5.0 Z= 1.0
2.00	12.7	21.4	4	7	1.3	8.8	4.52	.100	.110	84.9	200	.2000	15.6	*Qav= 84.9cfs n=.0350 Dn= .9 B= 5.0 Z= 1.0
3.00	5.3	26.7	4	7	.2	9.0	4.46	.100	.108	104.5	1000	.2400	17.5	*Qav= 104.5cfs n=.0350 Dn= 1.0 B= 5.0 Z= 1.0
4.00	21.4	48.0	4	7	1.0	9.9	4.18	.100	.105	176.2	1000	.0700	13.1	*Qav= 176.2cfs n=.0350 Dn= 1.9 B= 5.0 Z= 1.0
5.00	55.9	104.0	4	9	1.3	11.2	3.92	.140	.124	355.2	1000	.0550	14.6	*Qav= 355.2cfs n=.0350 Dn= 3.0 B= 5.0 Z= 1.0
6.00	73.9	177.9	4	14	1.1	12.3	3.69	.200	.155	566.2	750	.0427	15.1	*Qav= 566.2cfs n=.0350 Dn= 4.1 B= 5.0 Z= 1.0
7.00	70.6	248.6	4	13	.8	13.2	3.56	.170	.160	761.4	400	.0450	16.7	*Qav= 761.4cfs n=.0350 Dn= 4.7 B= 5.0 Z= 1.0
8.00	32.5	281.1	4	9	.4	13.6	3.51	.140	.157	846.9	800	.0425	16.6	*Qav= 846.9cfs n=.0350 Dn= 5.1 B= 5.0 Z= 1.0
					.8									

DEV TYPES: 1=Com,2=MF,3=Apt,4=Con,5=SFR 11+ D/AC,6=8-10D/AC,7=5-7D/AC, SOIL TYPES: 1=A,2=B,3=C,4=D,

CUT PAPER ALONG OUTSIDE BORDER-LINE

STUDY NAME: BEE CANYON DAM

CALCULATED BY: MPV
CHECKED BY:
PAGE NUMBER 2 OF 2

100.0-YEAR STORM RATIONAL METHOD STUDY

[ADVANCED ENGINEERING SOFTWARE]

CONCENTRATION POINT NUMBER	AREA (ACRES) SUBAREA	SUM	SOIL TYPE	DEV. TYPE	Tt MIN.	Tc MIN.	I in/h	Fm	Fm (Avg)	Q SUM	PATH (ft)	SLOPE ft/ft	V FPS.	HYDRAULICS AND NOTES
9.00	89.9	370.9	4	13	----	14.4	3.39	.170	.160	1078.2	----	----	----	----
											750	.0293	15.4	*Qav=1078.2cfs n=.0350 Dn= 6.2 B= 5.0 Z= 1.0
					.8									
10.00	188.0	559.0	4	8	----	15.2	3.28	.120	.147	1575.8	----	----	----	----
											1000	.0140	12.1	*Qav=1575.8cfs n=.0350 Dn= 5.2 B= 20.0 Z= 1.0
					1.4									
11.00	100.9	659.9	4	8	----	16.6	3.12	.120	.143	1771.1	----	----	----	----
											1000	.0450	18.9	*Qav=1771.1cfs n=.0350 Dn= 3.9 B= 20.0 Z= 1.0
					.9									
12.00	24.5	684.4	3	10	----	17.4	3.03	.200	.145	1774.7	----	----	----	----
											1000	.0210	14.5	*Qav=1774.7cfs n=.0350 Dn= 4.9 B= 20.0 Z= 1.0
					1.1									
13.00	146.4	830.8	3	7	----	18.6	2.92	.125	.141	2080.6	----	----	----	----
											250	.0240	16.0	*Qav=2080.6cfs n=.0350 Dn= 5.2 B= 20.0 Z= 1.0
					.3									
14.00	17.0	847.9	3	7	----	18.9	2.90	.125	.141	2106.0	----	----	----	----
14.00		847.9			----	18.9				2106.0	----	----	----	STREAM SUMMARY

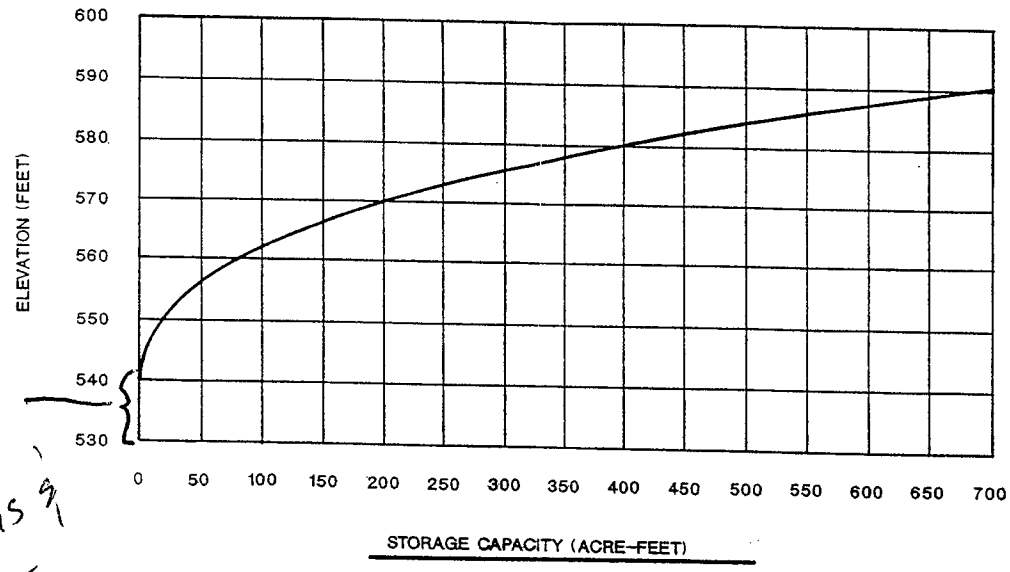
EFFECTIVE AREA(ACRES)= 847.89 TOTAL STUDY AREA(ACRES)= 847.89 PEAK FLOW RATE(CFS)= 2105.97

Tc

DEV TYPES: 1=Com,2=MF,3=Apt,4=Con,5=SFR 11+ D/AC,6=8-10D/AC,7=5-7D/AC, SOIL TYPES: 1=A,2=B,3=C,4=D,

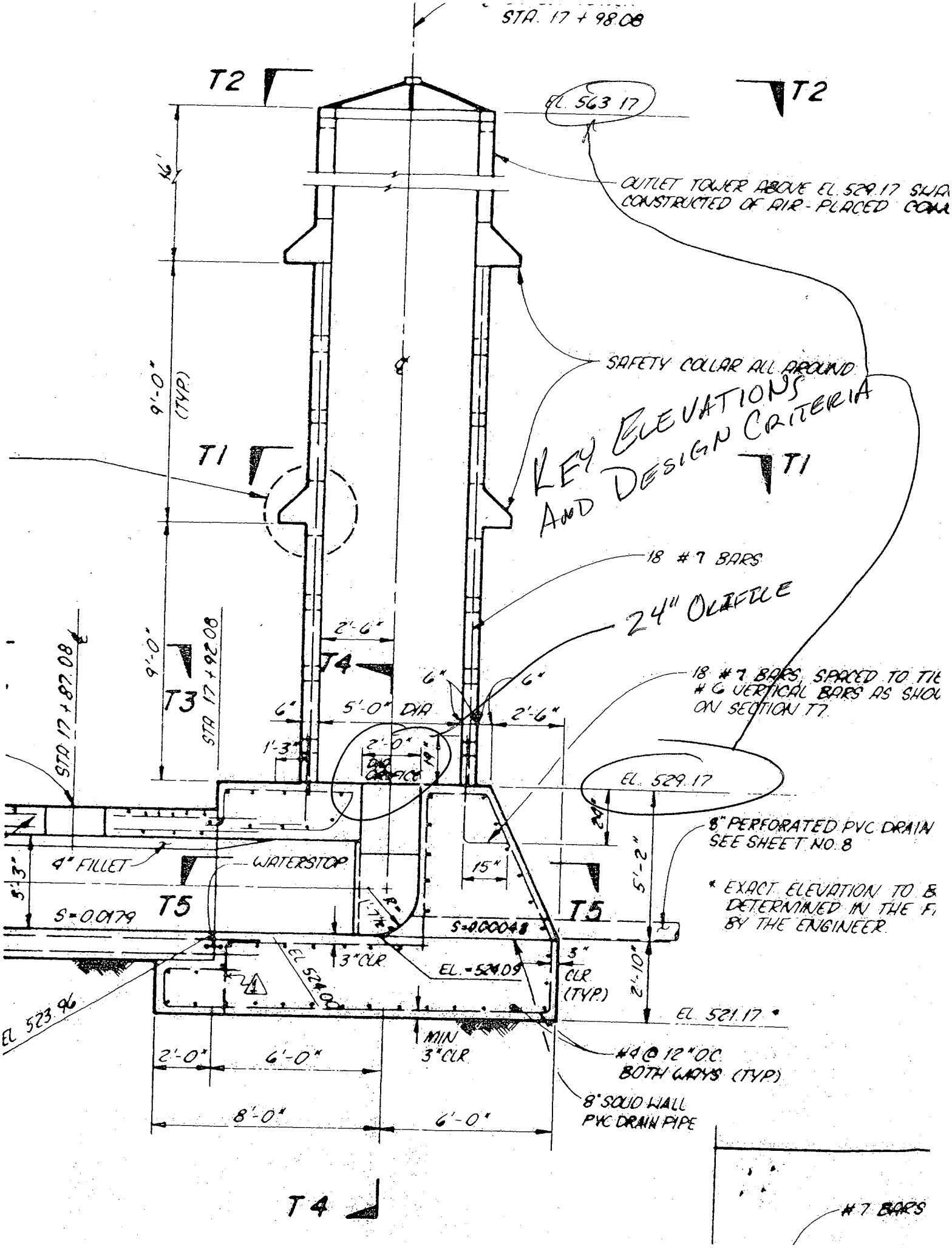
TOTAL DISCHARGE Q=Cs*L*He^1.5 CFS	ELEV. FT.	E.G.L ELEV. FT.	OUTLET DISCHARGE CFS	TOTAL DISCHARGE CFS
0.00	569.50	569.50	112.48	112.48
24.23	570.00	570.00	113.18	137.41
132.21	571.00	571.04	114.50	246.71
298.02	572.00	572.12	115.90	413.92
507.70	573.00	573.24	117.20	624.90
760.60	574.00	574.39	118.50	879.10
1049.84	575.00	575.56	119.85	1169.69
1363.42	576.00	576.74	121.10	1484.52
1691.76	577.00	577.93	122.40	1814.16
2048.85	578.00	579.12	123.69	2172.54
2889.96	579.00	580.87	124.94	3014.90
3432.41	580.00	582.24	126.18	3558.59
4549.19	581.00	584.39	127.40	4676.59

SUMMARY OF COMPUTED DISCHARGES FOR STANDPIPE & WEIR



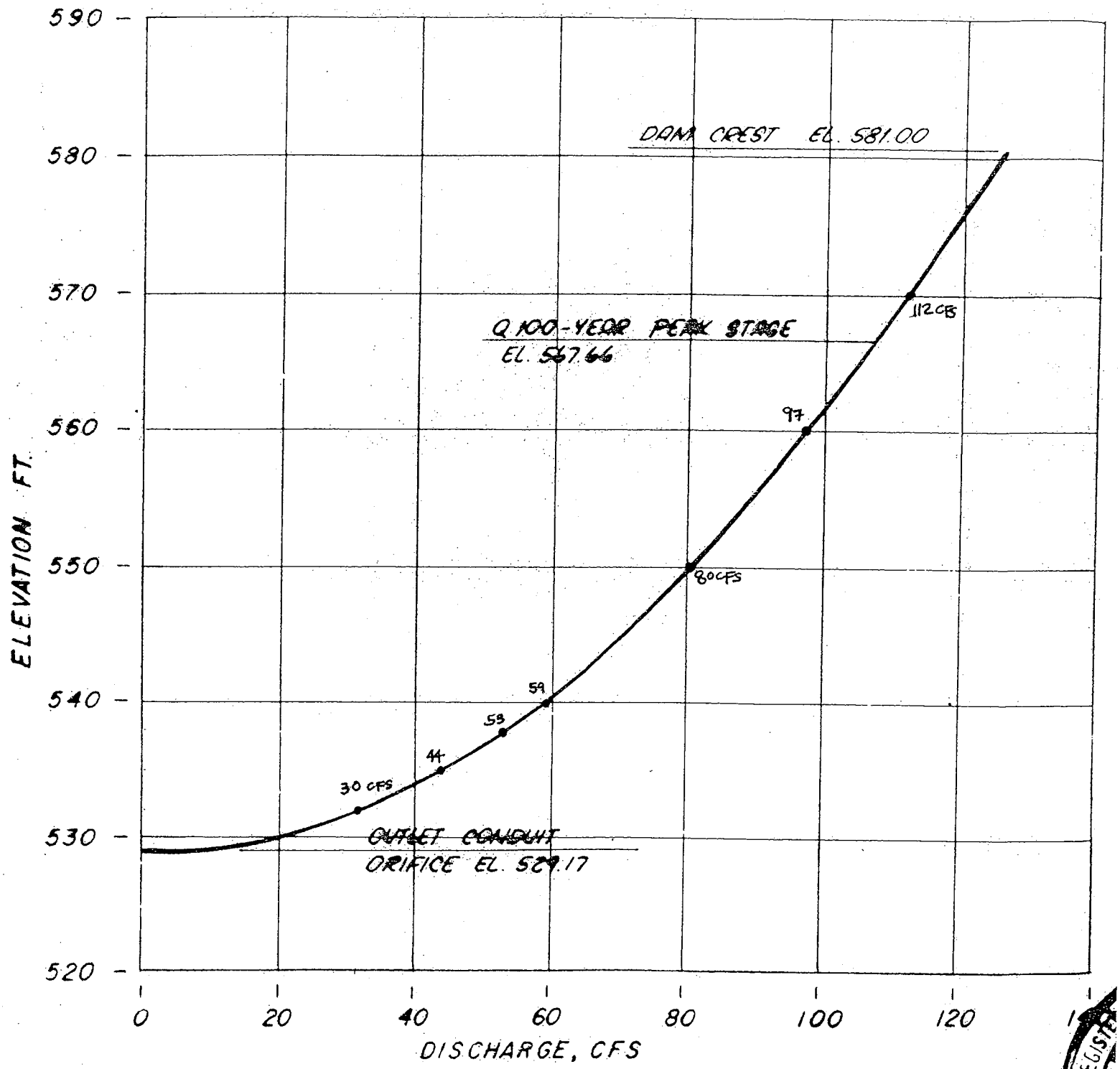
ASSUMED CAPACITY/VOL FOR DEBRIS & SEDIMENT

JOHN M. TETTEMER & ASSOCIATES LTD. ENGINEERING MANAGEMENT PLANNING 1952 Fairburn Avenue Los Angeles, California 90025-5912	BEE CANYON RETARDING BASIN STAGE–STORAGE CURVE	DATE Nov. 1989 FIGURE 4


STA. 17 + 98.08
T2
T2
EL. 563.17
OUTLET TOWER ABOVE EL. 529.17 SWA
CONSTRUCTED OF AIR-PLACED CON
SAFETY COLLAR ALL AROUND
KEY ELEVATIONS AND DESIGN CRITERIA
T1
T1
9'-0" (TYP.)
18 #7 BARS
24" ORIFICE
2'-6"
T4
6"
6"
18 #7 BARS, SPACED TO TIE
#6 VERTICAL BARS AS SHOW
ON SECTION T7
9'-0"
T3
STA 17 + 92.08
STA 17 + 87.08
6"
5'-0" DIA
2'-6"
1'-3"
2'-0"
DIA ORIFICE
EL. 529.17
8" PERFORATED PVC DRAIN
SEE SHEET NO. 8
4" FILLET
WATERSTOP
15"
5'-2"
* EXACT ELEVATION TO B
DETERMINED IN THE F
BY THE ENGINEER
5'-3"
T5
T5
S=0.0179
S=0.00048
3" CLR
EL. 524.09
3" CLR (TYP.)
2'-10"
EL 524.00
EL 523.96
EL. 521.17 *
MIN 3" CLR
#4 @ 12" O.C. BOTH WAYS (TYP.)
2'-0"
6'-0"
8" SOLID WALL PVC DRAIN PIPE
8'-0"
6'-0"
T4
#7 BARS

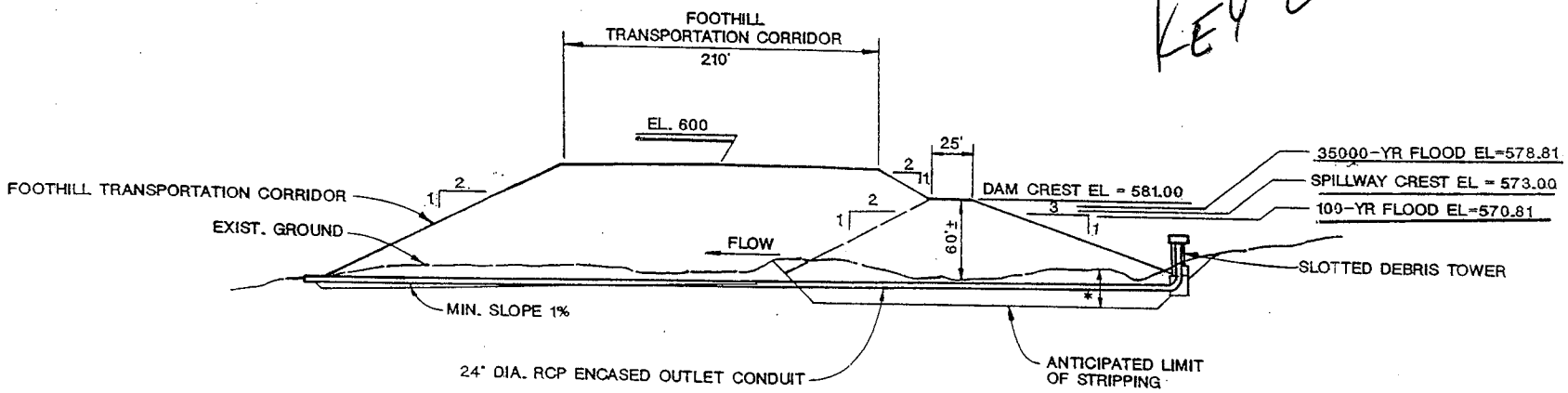
NOTE: MIN. F.T.C. EL. = 603.53
@ STA. 2632+00.00

DATE
APR 28 1992



OUTLET CONDUIT-RATING CURVE

KEY ELEVATIONS



MAXIMUM DAM SECTION

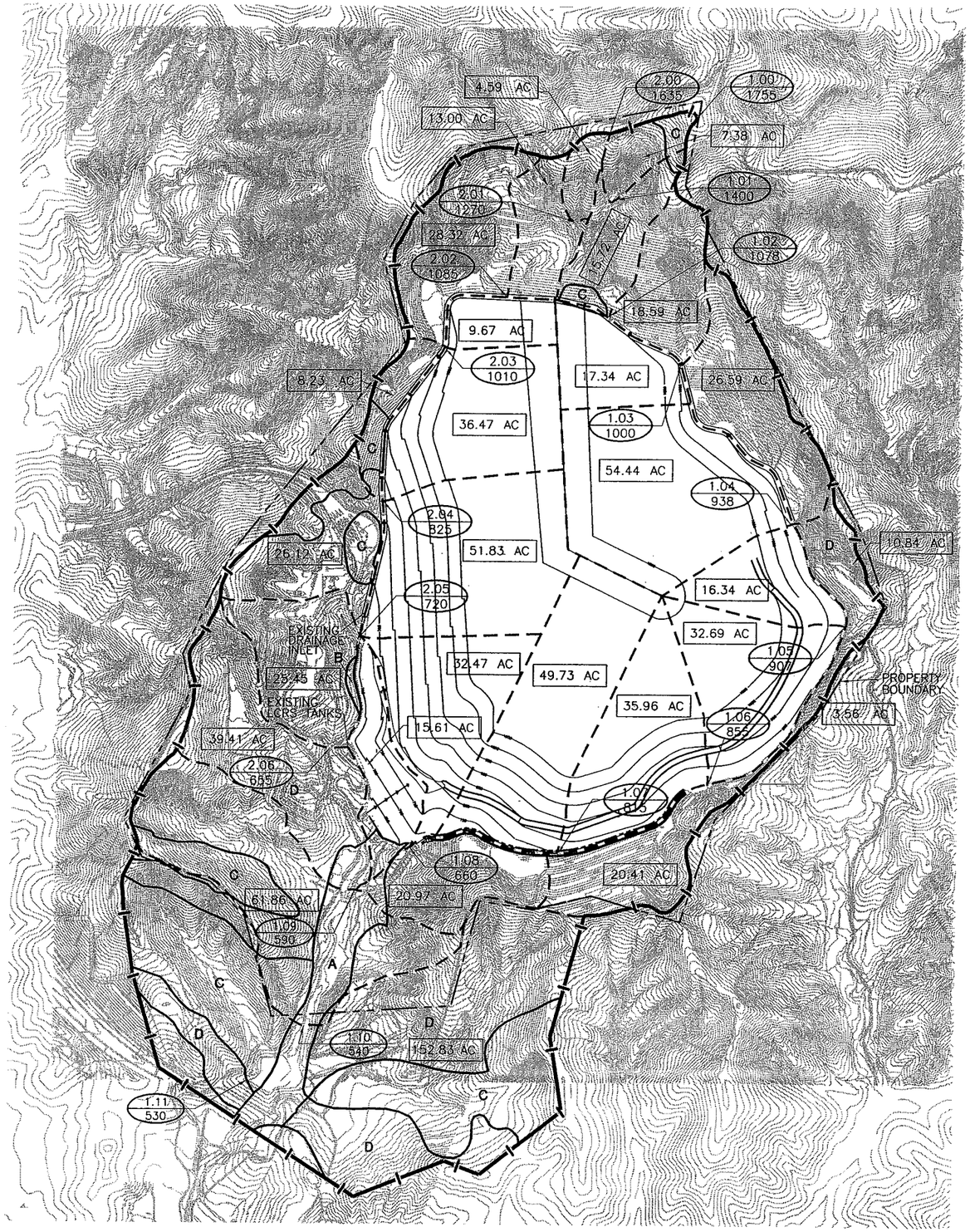
SCALE: 1"=80'

* EXCAVATION DEPTH TO BE DETERMINED BASED ON DETAILED FOUNDATION EXPLORATION

JOHN M. LETTCHER & ASSOCIATES, LTD. ENGINEERING MANAGEMENT PLANNING 1952 Fairburn Avenue Los Angeles, California 90025-5912	BEE CANYON RETARDING BASIN MAXIMUM DAM SECTION	DATE Nov. 1989 FIGURE 3

ATTACHMENT 2
BEE CANYON WATERSHED
HYDROLOGY ANALYSIS
JTD 2002 AND MDP 2005

HYDROLOGY ANALYSIS
JTD 2002



RATIONAL METHOD					
NODE NO.	SUB AREA (ACRES)	SUB AREA RUNOFF (CFS)	TOTAL AREA (ACRES)	Tc MAINLINE (MIN)	DESCRIPTION
1.00–1.01	7.38	21.62	7.38	13.76	INITIAL
1.01–1.02	15.72	43.43	23.10	15.23	
1.02–1.03	35.93	96.89	59.03	15.93	
1.03–1.04	81.03	204.00	140.06	17.76	
1.04–1.05	27.18	66.52	167.24	18.65	
1.05–1.06	36.25	84.10	203.49	20.29	
1.06–1.07	56.37	126.16	259.56	21.49	
1.07–1.08	70.70	155.01	330.56	22.09	
1.08–1.09	0.00	0.00	330.56	22.39	CONFLUENCE
2.00–2.01	4.59	14.14	4.59	12.76	INITIAL
2.01–2.02	13.00	37.16	17.59	14.47	
2.02–2.03	37.99	104.85	55.58	15.30	
2.03–2.04	44.70	118.98	100.28	16.25	
2.04–2.05	77.95	201.38	178.23	17.00	
2.05–2.06	57.92	146.26	236.15	17.66	
2.06–1.09	55.02	135.34	291.17	18.49	CONFLUENCE
1.09			621.73	18.49	CONFLUENCE
1.09–1.10	61.86	143.14	683.59	19.81	
1.10–1.11	152.83	344.61	836.42	20.83	END

UNIT HYDROGRAPH 1.00 – 1.11	
AREA	836.42 ACRES
PEAK RUNOFF	2165 CFS
RUNOFF VOLUME	297 ACRE–FEET
Fm	0.21
F*	0.27

N

GRAPHIC SCALE

500 250 0 500 1000

(IN FEET)

LEGEND

- PROPERTY BOUNDARY
- EXISTING GROUND CONTOUR
- PROPOSED CONTOUR
- 10.10 AC — AREA IN ACRES
- 1.00 / 1000 — NODE NAME / ELEVATION — NODE DESCRIPTION
- DRAINAGE SUB–AREA
- WATERSHED BOUNDARY
- SOIL TYPE BOUNDARY

DATE OF TOPOGRAPHY: OCTOBER 10, 2000

MARK	DATE	DESCRIPTION

REVISIONS

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER BRYAN A. STIRRAT No. 22631 Exp. 12-31-07 CIVIL STATE OF CALIFORNIA

DATE

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765
(909) 860–7777

COUNTY OF ORANGE
INTEGRATED WASTE MANAGEMENT DEPARTMENT

FRANK R. BOWERMAN LANDFILL

JTD PERMITTED PLAN (2002)

HYDROLOGY MAP

DESIGNED R.M.G./J.A.W.			SHEET
DRAWN D.C.R.		CHECKED M.A.C.	1
SCALE	DATE	DRAWING NO.	OF 1
AS SHOWN	03–2006	2421608	

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****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 100 YEAR DEVELOPED CONDITION HYDROLOGY                                  *
* FRB (REVISED MASTER GRADING PLAN) JTD BEE CANYON                        *
* CHM                                                                     *
 **************************************************************************

  FILE NAME: FRBJTD.DAT
  TIME/DATE OF STUDY: 11:40 03/27/2006
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

  UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
    WATERSHED LAG = 0.80 * Tc
    MOUNTAIN S-GRAPH USED.
    SIERRA MADRE DEPTH-AREA FACTORS USED.
                      AREA-AVERAGED
         DURATION    RAINFALL(INCH)
         5-MINUTES         0.52
        30-MINUTES         1.09
         1-HOUR            1.45
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        3-HOUR            2.43
        6-HOUR            3.36
       24-HOUR            5.63
*ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR UNIT HYDROGRAPH METHOD*


****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  ELEVATION DATA: UPSTREAM(FEET) =   1755.00  DOWNSTREAM(FEET) =   1400.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.764
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.463
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               D        6.04      0.20     1.000    96   13.76
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.34      0.25     1.000    92   13.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     21.62
  TOTAL AREA(ACRES) =      7.38   PEAK FLOW RATE(CFS) =     21.62

****************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1400.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1078.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0350
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.274
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       14.35      0.20     1.000    96
  NATURAL FAIR COVER
  "OPEN BRUSH"               C        1.37      0.25     1.000    92
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     43.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.47
  AVERAGE FLOW DEPTH(FEET) =   0.51   FLOOD WIDTH(FEET) =    9.53
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =  15.23
  SUBAREA AREA(ACRES) =   15.72       SUBAREA RUNOFF(CFS) =   43.43
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EFFECTIVE AREA(ACRES) =    23.10      AREA-AVERAGED Fm(INCH/HR) =    0.21
AREA-AVERAGED Fp(INCH/HR) =    0.21  AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =      23.10          PEAK FLOW RATE(CFS) =       63.78

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  0.62   FLOOD WIDTH(FEET) =   10.61
FLOW VELOCITY(FEET/SEC.) =  13.99   DEPTH*VELOCITY(FT*FT/SEC) =   8.70
LONGEST FLOWPATH FROM NODE       1.00 TO NODE       1.02 =  2100.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE       1.02 TO NODE       1.03 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   1078.00  DOWNSTREAM(FEET) =   1000.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   820.00   CHANNEL SLOPE =  0.0951
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.196
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                 D       18.59      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     88.85
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  19.68
AVERAGE FLOW DEPTH(FEET) =   0.78   TRAVEL TIME(MIN.) =   0.69
Tc(MIN.) =  15.93
SUBAREA AREA(ACRES) =    18.59       SUBAREA RUNOFF(CFS) =   50.13
EFFECTIVE AREA(ACRES) =     41.69     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =     41.69          PEAK FLOW RATE(CFS) =     112.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.90   FLOW VELOCITY(FEET/SEC.) =  21.27
LONGEST FLOWPATH FROM NODE       1.00 TO NODE       1.03 =  2920.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE       1.02 TO NODE       1.03 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  15.93
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.196
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                 D       17.34      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   17.34       SUBAREA RUNOFF(CFS) =   46.76
EFFECTIVE AREA(ACRES) =     59.03   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
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  TOTAL AREA(ACRES) =      59.03        PEAK FLOW RATE(CFS) =      159.05

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1000.00  DOWNSTREAM(FEET) =    938.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1900.00   CHANNEL SLOPE =  0.0326
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.997
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                 D       26.59      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    192.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  17.31
  AVERAGE FLOW DEPTH(FEET) =   1.67   TRAVEL TIME(MIN.) =   1.83
  Tc(MIN.) =  17.76
  SUBAREA AREA(ACRES) =    26.59       SUBAREA RUNOFF(CFS) =   66.94
  EFFECTIVE AREA(ACRES) =     85.62     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     85.62         PEAK FLOW RATE(CFS) =     215.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.78   FLOW VELOCITY(FEET/SEC.) =  17.84
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.04 =  4820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  17.76
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.997
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                 D       54.44      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   54.44      SUBAREA RUNOFF(CFS) =  137.06
  EFFECTIVE AREA(ACRES) =    140.06   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    140.06       PEAK FLOW RATE(CFS) =     352.49

****************************************************************************
  FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
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==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    938.00  DOWNSTREAM(FEET) =    907.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1060.00   CHANNEL SLOPE =  0.0292
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.919
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       10.84      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    365.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  19.91
  AVERAGE FLOW DEPTH(FEET) =   2.46   TRAVEL TIME(MIN.) =   0.89
  Tc(MIN.) =  18.65
  SUBAREA AREA(ACRES) =    10.84       SUBAREA RUNOFF(CFS) =   26.53
  EFFECTIVE AREA(ACRES) =    150.90     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    150.90         PEAK FLOW RATE(CFS) =     369.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.47   FLOW VELOCITY(FEET/SEC.) =  19.96
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.05 =  5880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN) =  18.65
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.919
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       16.34      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   16.34       SUBAREA RUNOFF(CFS) =   39.99
  EFFECTIVE AREA(ACRES) =    167.24   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    167.24        PEAK FLOW RATE(CFS) =     409.17

****************************************************************************
  FLOW PROCESS FROM NODE      1.05 TO NODE      1.06 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    907.00  DOWNSTREAM(FEET) =    855.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1960.00   CHANNEL SLOPE =  0.0265
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.778
  SUBAREA LOSS RATE DATA(AMC III):
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 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D        3.56      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    413.30
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  19.84
AVERAGE FLOW DEPTH(FEET) =   2.70   TRAVEL TIME(MIN.) =   1.65
Tc(MIN.) =  20.29
SUBAREA AREA(ACRES) =     3.56       SUBAREA RUNOFF(CFS) =    8.26
EFFECTIVE AREA(ACRES) =    170.80     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    170.80         PEAK FLOW RATE(CFS) =     409.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  2.69   FLOW VELOCITY(FEET/SEC.) =  19.80
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.06 =  7840.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.05 TO NODE      1.06 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  20.29
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.778
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       32.69      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   32.69      SUBAREA RUNOFF(CFS) =   75.84
EFFECTIVE AREA(ACRES) =    203.49   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    203.49       PEAK FLOW RATE(CFS) =     471.99

****************************************************************************
FLOW PROCESS FROM NODE      1.06 TO NODE      1.07 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    855.00  DOWNSTREAM(FEET) =    815.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1500.00   CHANNEL SLOPE =  0.0267
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.687
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       20.41      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
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TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    494.83
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  20.88
AVERAGE FLOW DEPTH(FEET) =   2.97   TRAVEL TIME(MIN.) =   1.20
Tc(MIN.) =  21.49
SUBAREA AREA(ACRES) =    20.41       SUBAREA RUNOFF(CFS) =   45.68
EFFECTIVE AREA(ACRES) =    223.90     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    223.90         PEAK FLOW RATE(CFS) =     501.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  2.99   FLOW VELOCITY(FEET/SEC.) =  20.94
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.07 =  9340.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.06 TO NODE      1.07 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  21.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.687
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       35.96      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   35.96      SUBAREA RUNOFF(CFS) =   80.48
EFFECTIVE AREA(ACRES) =    259.86   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    259.86       PEAK FLOW RATE(CFS) =     581.49

****************************************************************************
FLOW PROCESS FROM NODE      1.07 TO NODE      1.08 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    815.00  DOWNSTREAM(FEET) =    660.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1360.00   CHANNEL SLOPE =  0.1140
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.641
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       19.34      0.20     1.000    96
NATURAL FAIR COVER
"OPEN BRUSH"                A        1.63      0.40     1.000    66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    604.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  37.43
AVERAGE FLOW DEPTH(FEET) =   2.23   TRAVEL TIME(MIN.) =   0.61
Tc(MIN.) =  22.09
SUBAREA AREA(ACRES) =    20.97       SUBAREA RUNOFF(CFS) =   45.77
```

```
EFFECTIVE AREA(ACRES) =    280.83     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    280.83         PEAK FLOW RATE(CFS) =     616.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  2.26   FLOW VELOCITY(FEET/SEC.) =  37.67
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.08 = 10700.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.07 TO NODE      1.08 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  22.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.641
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       49.73      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   49.73      SUBAREA RUNOFF(CFS) =  109.24
EFFECTIVE AREA(ACRES) =    330.56   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    330.56       PEAK FLOW RATE(CFS) =     725.74

****************************************************************************
FLOW PROCESS FROM NODE      1.08 TO NODE      1.09 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    660.00  DOWNSTREAM(FEET) =    590.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   670.00   CHANNEL SLOPE =  0.1045
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
CHANNEL FLOW THRU SUBAREA(CFS) =    725.74
FLOW VELOCITY(FEET/SEC.) =  38.13   FLOW DEPTH(FEET) =   2.53
TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =  22.39
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.09 = 11370.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.08 TO NODE      1.09 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  22.39
RAINFALL INTENSITY(INCH/HR) =   2.62
AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  1.00
EFFECTIVE STREAM AREA(ACRES) =   330.56
TOTAL STREAM AREA(ACRES) =   330.56
PEAK FLOW RATE(CFS) AT CONFLUENCE =    725.74
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   890.00
  ELEVATION DATA: UPSTREAM(FEET) =   1635.00  DOWNSTREAM(FEET) =   1270.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.764
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.622
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                D        4.59      0.20     1.000    96   12.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     14.14
  TOTAL AREA(ACRES) =      4.59   PEAK FLOW RATE(CFS) =     14.14

****************************************************************************
  FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1270.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1085.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0350
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.376
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       13.00      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     32.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.77
  AVERAGE FLOW DEPTH(FEET) =   0.50   FLOOD WIDTH(FEET) =    9.38
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =  14.47
  SUBAREA AREA(ACRES) =   13.00       SUBAREA RUNOFF(CFS) =   37.16
  EFFECTIVE AREA(ACRES) =   17.59     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     17.59         PEAK FLOW RATE(CFS) =      50.29

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOOD WIDTH(FEET) =   10.59
  FLOW VELOCITY(FEET/SEC.) =  11.09   DEPTH*VELOCITY(FT*FT/SEC) =   6.87
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.02 =  1890.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1085.00  DOWNSTREAM(FEET) =   1010.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   930.00   CHANNEL SLOPE =  0.0806
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.267
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       28.32      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     89.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  18.70
  AVERAGE FLOW DEPTH(FEET) =   0.82   TRAVEL TIME(MIN.) =   0.83
  Tc(MIN.) =  15.30
  SUBAREA AREA(ACRES) =    28.32       SUBAREA RUNOFF(CFS) =   78.16
  EFFECTIVE AREA(ACRES) =     45.91     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     45.91         PEAK FLOW RATE(CFS) =     126.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.01   FLOW VELOCITY(FEET/SEC.) =  20.88
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.03 =  2820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  15.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.267
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D        9.67      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    9.67      SUBAREA RUNOFF(CFS) =   26.69
  EFFECTIVE AREA(ACRES) =     55.58   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     55.58       PEAK FLOW RATE(CFS) =     153.40

****************************************************************************
  FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1010.00  DOWNSTREAM(FEET) =    825.00
```

```
CHANNEL LENGTH THRU SUBAREA(FEET) =  1500.00   CHANNEL SLOPE =  0.1233
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.159
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D        6.45      0.20     1.000    96
NATURAL FAIR COVER
"OPEN BRUSH"                C        1.78      0.25     1.000    92
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    164.32
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  26.15
AVERAGE FLOW DEPTH(FEET) =   1.04   TRAVEL TIME(MIN.) =   0.96
Tc(MIN.) =  16.25
SUBAREA AREA(ACRES) =     8.23       SUBAREA RUNOFF(CFS) =   21.84
EFFECTIVE AREA(ACRES) =     63.81     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =     63.81         PEAK FLOW RATE(CFS) =     169.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =  26.52
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.04 =  4320.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  16.25
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.159
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       36.47      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   36.47      SUBAREA RUNOFF(CFS) =   97.14
EFFECTIVE AREA(ACRES) =    100.28   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    100.28       PEAK FLOW RATE(CFS) =     267.02

****************************************************************************
FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    825.00  DOWNSTREAM(FEET) =    720.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1230.00   CHANNEL SLOPE =  0.0854
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.076
SUBAREA LOSS RATE DATA(AMC III):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       16.77      0.20      1.000    96
NATURAL FAIR COVER
"OPEN BRUSH"                C        9.35      0.25      1.000    92
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    300.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  27.66
AVERAGE FLOW DEPTH(FEET) =   1.64   TRAVEL TIME(MIN.) =   0.74
Tc(MIN.) =  17.00
SUBAREA AREA(ACRES) =    26.12       SUBAREA RUNOFF(CFS) =   67.20
EFFECTIVE AREA(ACRES) =    126.40     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    126.40         PEAK FLOW RATE(CFS) =     326.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  1.71   FLOW VELOCITY(FEET/SEC.) =  28.40
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.05 =  5550.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  17.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.076
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       51.83      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   51.83      SUBAREA RUNOFF(CFS) =  134.18
EFFECTIVE AREA(ACRES) =    178.23   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    178.23       PEAK FLOW RATE(CFS) =     460.91

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    720.00  DOWNSTREAM(FEET) =    655.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1110.00   CHANNEL SLOPE =  0.0586
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.006
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       25.45      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    493.04
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  27.78
AVERAGE FLOW DEPTH(FEET) =   2.40   TRAVEL TIME(MIN.) =   0.67
Tc(MIN.) =  17.66
SUBAREA AREA(ACRES) =    25.45       SUBAREA RUNOFF(CFS) =   64.27
EFFECTIVE AREA(ACRES) =    203.68     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    203.68         PEAK FLOW RATE(CFS) =     513.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  2.45   FLOW VELOCITY(FEET/SEC.) =  28.09
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      2.06 =  6660.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  17.66
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.006
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       32.47      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   32.47      SUBAREA RUNOFF(CFS) =   81.99
EFFECTIVE AREA(ACRES) =    236.15   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    236.15       PEAK FLOW RATE(CFS) =     595.83

****************************************************************************
FLOW PROCESS FROM NODE      2.06 TO NODE      1.09 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    655.00  DOWNSTREAM(FEET) =    590.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1370.00   CHANNEL SLOPE =  0.0474
CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.000
MANNING'S FACTOR = 0.017   MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.933
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       39.41      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    644.30
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  27.67
AVERAGE FLOW DEPTH(FEET) =   2.93   TRAVEL TIME(MIN.) =   0.83
Tc(MIN.) =  18.49
SUBAREA AREA(ACRES) =    39.41       SUBAREA RUNOFF(CFS) =   96.94
EFFECTIVE AREA(ACRES) =    275.56     AREA-AVERAGED Fm(INCH/HR) =   0.20
```

```
AREA-AVERAGED Fp(INCH/HR) =    0.20  AREA-AVERAGED Ap =    1.00
TOTAL AREA(ACRES) =     275.56          PEAK FLOW RATE(CFS) =      677.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  3.02   FLOW VELOCITY(FEET/SEC.) =  28.01
LONGEST FLOWPATH FROM NODE      2.00 TO NODE      1.09 =  8030.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.06 TO NODE      1.09 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  18.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.933
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)   CN
NATURAL FAIR COVER
"OPEN BRUSH"                 D       15.61      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =    15.61      SUBAREA RUNOFF(CFS) =    38.40
EFFECTIVE AREA(ACRES) =     291.17   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =     291.17        PEAK FLOW RATE(CFS) =      715.73

****************************************************************************
FLOW PROCESS FROM NODE      2.06 TO NODE      1.09 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  18.49
RAINFALL INTENSITY(INCH/HR) =   2.93
AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  1.00
EFFECTIVE STREAM AREA(ACRES) =   291.17
TOTAL STREAM AREA(ACRES) =   291.17
PEAK FLOW RATE(CFS) AT CONFLUENCE =    715.73

** CONFLUENCE DATA **
 STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
    1    725.74  22.39    2.619  0.20( 0.20) 1.00   330.6       1.00
    2    715.73  18.49    2.933  0.20( 0.20) 1.00   291.2       2.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
 STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
    1   1393.03  18.49    2.933  0.20( 0.20) 1.00   564.1       2.00
    2   1359.04  22.39    2.619  0.20( 0.20) 1.00   621.7       1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =   1393.03    Tc(MIN.) =    18.49
  EFFECTIVE AREA(ACRES) =   564.14   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    621.73
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.09 = 11370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.09 TO NODE      1.10 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    590.00
  DOWNSTREAM NODE ELEVATION(FEET) =    540.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1200.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0350
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.817
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"               D       37.70      0.20      1.000    96
  NATURAL FAIR COVER
  "OPEN BRUSH"               C       13.43      0.25      1.000    92
  NATURAL FAIR COVER
  "OPEN BRUSH"               A       10.73      0.40      1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =   1464.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  15.10
  AVERAGE FLOW DEPTH(FEET) =   3.99   FLOOD WIDTH(FEET) =   44.29
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.32   Tc(MIN.) =  19.81
  SUBAREA AREA(ACRES) =   61.86       SUBAREA RUNOFF(CFS) =  143.14
  EFFECTIVE AREA(ACRES) =  626.00     AREA-AVERAGED Fm(INCH/HR) =   0.21
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    683.59         PEAK FLOW RATE(CFS) =    1470.81

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  4.00   FLOOD WIDTH(FEET) =   44.36
  FLOW VELOCITY(FEET/SEC.) =  15.11   DEPTH*VELOCITY(FT*FT/SEC) =  60.40
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.10 = 12570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.11 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    540.00
  DOWNSTREAM NODE ELEVATION(FEET) =    530.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   650.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0350
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
```

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MAXIMUM DEPTH(FEET) =   7.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.737
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       79.23      0.20     1.000    96
NATURAL FAIR COVER
"OPEN BRUSH"                C       65.97      0.25     1.000    92
NATURAL FAIR COVER
"OPEN BRUSH"                A        7.63      0.40     1.000    66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =   1643.04
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.64
AVERAGE FLOW DEPTH(FEET) =   5.14   FLOOD WIDTH(FEET) =   55.75
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =  20.83
SUBAREA AREA(ACRES) =  152.83       SUBAREA RUNOFF(CFS) =  344.61
EFFECTIVE AREA(ACRES) =  778.83     AREA-AVERAGED Fm(INCH/HR) =   0.21
AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    836.42         PEAK FLOW RATE(CFS) =    1770.58

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  5.29   FLOOD WIDTH(FEET) =   57.33
FLOW VELOCITY(FEET/SEC.) =  10.85   DEPTH*VELOCITY(FT*FT/SEC) =  57.40
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.11 = 13220.00 FEET.
==============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =    836.42  TC(MIN.) =     20.83
EFFECTIVE AREA(ACRES) =    778.83  AREA-AVERAGED Fm(INCH/HR)=  0.21
AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap = 1.000
PEAK FLOW RATE(CFS)    =   1770.58

** PEAK FLOW RATE TABLE **
 STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
 NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1   1770.58  20.83    2.737  0.21( 0.21) 1.00   778.8       2.00
    2   1704.90  24.75    2.475  0.21( 0.21) 1.00   836.4       1.00
==============================================================================
==============================================================================
END OF RATIONAL METHOD ANALYSIS
```

J:\COIWMD\2005.0069 FRB CEQA-MDP Perm\Hydrology\FRBJTD.RES

J:\COIWMD\2005.0069 FRB CEQA-MDP Perm\Hydrology\FRBJTD.RES

FRB JTD (2002)
UNIT HYDROGRAPH CALCULATIONS

Lag Time

Lag Time = 0.8 T_C

Where:
T_C = Time of Concentration = 20.83 min
Note: T_C is obtained from Rational Method Hydrology study at entrance to basin.

Lag Time = 0.8 (20.83 min) (1 hr / 60 min) = 0.27773 hr

Lag Time = 0.278 hr

Maximum Loss Rate

$F_M = a_P F_P$

Where:
F_M = maximum loss rate
a_p = pervious loss rate (inches / hour) =
F_P = maximum loss rate for pervious area (inches / hour)

a_p = 100% or 1.0 (site is 0% impervious = 100% pervious)

$$F_P = \frac{(A_A F_{pA}) + (A_B F_{pB}) + (A_C F_{pC}) + (A_D F_{pD})}{A_A + A_B + A_C + A_D}$$

$$F_P = \frac{((19.22)(0.40)) + ((0)(0.30)) + ((93.24)(0.25)) + ((723.19)(0.20))}{19.22 + 0 + 93.24 + 723.19}$$

$F_P = 0.210$

$F_M = (1.0)\ (.210) = 0.21$

$F_M = 0.21$

Low Loss Rate

$F^* = Y' * I$

Where:
F* = low loss rate (inches / hour)
Y' = catchment low loss fraction = 1 – Y
Y = catchment 24-hour storm runoff yield fraction
I = rainfall intensity = 2.47 (inch / hour)
Note: I is obtained from Rational Method Hydrology study at entrance to basin.

$Y = Y_j$ for single area sites
Y_j = 24-hour storm runoff yield fraction

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

Where:
P_{24} = 24-hour storm rainfall = 5.63 inch
I_a = initial abstraction = (0.2) S

$$S = \frac{1000}{CN} - 10$$

$$CN = \frac{(A_A CN_A) + (A_B CN_B) + (A_C CN_C) + (A_D CN_D)}{A_A + A_B + A_C + A_D}$$

$$CN = \frac{((19.22)(66)) + ((0)(N/A)) + ((93.24)(92)) + ((723.19)(96))}{19.22 + 0 + 93.24 + 723.19}$$

CN = 94.77

$$S = \frac{1000}{94.77} - 10 = 0.56$$

I_a = (0.2) (0.56) = .11

$$Y_j = \frac{(5.63(inch) - 0.11)^2}{(5.63(inch) - 0.11 + 0.56)5.63(inch)}$$

Y_j = 0.89
Y = 0.89
Y' = (1 – Y) = (1 - 0.89) = 0.11

F* = (0.11) (2.47) = 0.272 (inch / hour)

<u>F* = 0.272 (inch / hour)</u>

```
****************************************************************************

                F L O O D   R O U T I N G   A N A L Y S I S
                USING COUNTY HYDROLOGY MANUAL OF ORANGE(1986)
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              Ver. 10.2  Release Date: 01/01/2005  License ID 1211

                          Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* 100 YEAR 24 HOUR RETURN FOR FRB JOINT TECHNICAL DOCUMENT                 *
* BCRB ANALYSIS (ASSUMED 39 AF OF SEDIMENT IN BASIN)                       *
* CHM                                                                      *
 ***************************************************************************

  FILE NAME: FRBJUH.DAT
  TIME/DATE OF STUDY: 14:56 04/03/2006


****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.01 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =     836.400 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.270 HOURS
         STORM RETURN FREQUENCY =  100-YEAR
         FOOTHILL S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.210
         LOW LOSS FRACTION = 0.272
         *HYDROGRAPH MODEL #7 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.52
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.09
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.45
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.43
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.36
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  5.63

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.963
          30-MINUTE FACTOR = 0.963
           1-HOUR FACTOR = 0.963
           3-HOUR FACTOR = 0.994
           6-HOUR FACTOR = 0.997
          24-HOUR FACTOR = 0.998
```

UNIT HYDROGRAPH TIME UNIT = 1.000 MINUTES
UNIT INTERVAL PERCENTAGE OF LAG-TIME = 6.173

RUNOFF HYDROGRAPH LISTING LIMITS:
MODEL TIME(HOURS) FOR BEGINNING OF RESULTS = 14.00
MODEL TIME(HOURS) FOR END OF RESULTS = 18.00

UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	0.401	202.929
2	1.204	405.857
3	2.061	433.751
4	3.172	561.692
5	4.398	620.239
6	5.804	711.044
7	7.675	946.128
8	9.325	834.410
9	11.142	919.257
10	13.481	1182.846
11	16.407	1480.069
12	19.517	1572.734
13	23.150	1837.539
14	28.037	2471.303
15	34.555	3296.613
16	44.342	4949.838
17	51.193	3465.339
18	55.381	2117.763
19	58.638	1647.615
20	61.969	1684.732
21	64.348	1202.754
22	66.254	964.118
23	68.415	1092.916
24	70.157	881.041
25	71.973	918.470
26	73.538	791.845
27	75.145	812.535
28	76.619	745.637
29	77.872	633.625
30	78.927	533.524
31	80.049	567.653
32	81.172	567.653
33	82.389	615.497
34	83.305	463.597
35	84.148	426.226
36	85.057	459.754
37	85.953	453.275
38	86.725	390.302
39	87.473	378.383
40	88.180	357.415
41	88.800	313.650

42	89.417	312.211
43	90.026	307.889
44	90.593	286.609
45	91.154	283.726
46	91.715	283.885
47	92.225	258.043
48	92.683	231.314
49	93.140	231.079
50	93.597	231.395
51	94.030	219.079
52	94.373	173.465
53	94.707	168.827
54	95.041	168.669
55	95.374	168.827
56	95.708	168.665
57	96.015	155.546
58	96.224	105.615
59	96.423	100.657
60	96.622	100.657
61	96.821	100.657
62	97.020	100.657
63	97.220	100.815
64	97.419	100.819
65	97.618	100.495
66	97.817	100.819
67	97.988	86.573
68	98.035	23.522
69	98.067	16.164
70	98.099	16.164
71	98.131	16.322
72	98.163	16.002
73	98.194	16.002
74	98.226	16.322
75	98.258	16.002
76	98.290	16.006
77	98.322	16.322
78	98.354	16.002
79	98.386	16.322
80	98.418	16.002
81	98.449	16.006
82	98.482	16.642
83	98.514	16.002
84	98.545	16.002
85	98.577	16.002
86	98.610	16.642
87	98.641	15.685
88	98.673	16.322
89	98.705	16.322
90	98.737	16.002
91	98.769	16.002
92	98.801	16.322
93	98.833	16.006
94	98.865	16.322
95	98.897	16.002
96	98.929	16.322
97	98.960	16.002
98	98.993	16.322

99	99.024	16.006
100	99.056	16.006
101	99.088	16.006
102	99.119	16.006
103	99.151	16.006
104	99.183	16.006
105	99.214	16.006
106	99.246	16.006
107	99.278	16.006
108	99.309	16.006
109	99.341	16.006
110	99.373	16.006
111	99.404	16.006
112	99.436	16.006
113	99.467	16.006
114	99.499	16.006
115	99.531	16.006
116	99.562	16.006
117	99.594	16.006
118	99.626	16.006
119	99.657	16.006
120	99.689	16.006
121	99.721	16.006
122	99.752	16.006
123	99.784	16.006
124	99.816	16.006
125	99.847	16.006
126	99.879	16.006
127	99.911	16.006
128	99.942	16.006
129	99.974	16.006
130	100.000	13.247

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 93.8946
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 297.6969

---

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN ONE-MINUTE UNIT INTERVALS(CFS)
(Notes: Time indicated is at END of Each Unit Intervals.
Peak 5-minute rainfall intensity is modeled as
a constant value for entire 5-minute period.)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	550.0	1100.0	1650.0	2200.0
14.000	101.6866	213.54	. Q	. V	.	.	.
14.017	101.9819	214.41	. Q	. V	.	.	.
14.033	102.2785	215.36	. Q	. V	.	.	.
14.050	102.5765	216.31	. Q	. V	.	.	.
14.067	102.8758	217.31	. Q	. V	.	.	.
14.083	103.1765	218.33	. Q	. V	.	.	.
14.100	103.4787	219.40	. Q	. V	.	.	.
14.117	103.7825	220.53	. Q	. V	.	.	.
14.133	104.0878	221.65	. Q	. V	.	.	.
14.150	104.3947	222.79	. Q	. V	.	.	.
14.167	104.7032	224.02	. Q	. V	.	.	.
14.183	105.0136	225.33	. Q	. V	.	.	.
14.200	105.3258	226.68	. Q	. V	.	.	.
14.217	105.6400	228.11	. Q	. V	.	.	.
14.233	105.9564	229.72	. Q	. V	.	.	.
14.250	106.2754	231.57	. Q	. V	.	.	.
14.267	106.5976	233.89	. Q	. V	.	.	.
14.283	106.9224	235.81	. Q	. V	.	.	.
14.300	107.2494	237.38	. Q	. V	.	.	.
14.317	107.5783	238.83	. Q	. V	.	.	.
14.333	107.9093	240.31	. Q	. V	.	.	.
14.350	108.2422	241.66	. Q	. V	.	.	.
14.367	108.5768	242.97	. Q	. V	.	.	.
14.383	108.9134	244.31	. Q	. V	.	.	.
14.400	109.2517	245.63	. Q	. V	.	.	.
14.417	109.5918	246.95	. Q	. V	.	.	.
14.433	109.9338	248.27	. Q	. V	.	.	.
14.450	110.2776	249.60	. Q	. V	.	.	.
14.467	110.6233	250.93	. Q	. V	.	.	.
14.483	110.9707	252.25	. Q	. V	.	.	.
14.500	111.3199	253.55	. Q	. V	.	.	.
14.517	111.6710	254.88	. Q	. V	.	.	.
14.533	112.0239	256.23	. Q	. V	.	.	.
14.550	112.3788	257.60	. Q	. V	.	.	.
14.567	112.7355	258.95	. Q	. V	.	.	.
14.583	113.0940	260.31	. Q	. V	.	.	.
14.600	113.4545	261.70	. Q	. V	.	.	.
14.617	113.8169	263.10	. Q	. V	.	.	.
14.633	114.1812	264.51	. Q	. V	.	.	.
14.650	114.5475	265.92	. Q	. V	.	.	.
14.667	114.9158	267.36	. Q	. V	.	.	.
14.683	115.2860	268.80	. Q	. V	.	.	.
14.700	115.6583	270.27	. Q	. V	.	.	.

14.717	116.0326	271.75	.	Q	.	V	.	.	.
14.733	116.4090	273.26	.	Q	.	V	.	.	.
14.750	116.7875	274.78	.	Q	.	V	.	.	.
14.767	117.1681	276.33	.	Q	.	V	.	.	.
14.783	117.5509	277.89	.	Q	.	V	.	.	.
14.800	117.9358	279.48	.	Q	.	V	.	.	.
14.817	118.3230	281.08	.	Q	.	V	.	.	.
14.833	118.7124	282.72	.	Q	.	V	.	.	.
14.850	119.1041	284.37	.	Q	.	V	.	.	.
14.867	119.4982	286.05	.	Q	.	V	.	.	.
14.883	119.8945	287.75	.	Q	.	V	.	.	.
14.900	120.2932	289.49	.	Q	.	V	.	.	.
14.917	120.6944	291.24	.	Q	.	V	.	.	.
14.933	121.0980	293.04	.	Q	.	V	.	.	.
14.950	121.5042	294.85	.	Q	.	V	.	.	.
14.967	121.9128	296.70	.	Q	.	V	.	.	.
14.983	122.3241	298.57	.	Q	.	V	.	.	.
15.000	122.7380	300.48	.	Q	.	V	.	.	.
15.017	123.1545	302.42	.	Q	.	V	.	.	.
15.033	123.5738	304.41	.	Q	.	V	.	.	.
15.050	123.9959	306.43	.	Q	.	V	.	.	.
15.067	124.4209	308.50	.	Q	.	V	.	.	.
15.083	124.8487	310.60	.	Q	.	V	.	.	.
15.100	125.2795	312.76	.	Q	.	V	.	.	.
15.117	125.7133	314.94	.	Q	.	V	.	.	.
15.133	126.1502	317.17	.	Q	.	V	.	.	.
15.150	126.5901	319.43	.	Q	.	V	.	.	.
15.167	127.0333	321.75	.	Q	.	V	.	.	.
15.183	127.4798	324.11	.	Q	.	V	.	.	.
15.200	127.9295	326.55	.	Q	.	V	.	.	.
15.217	128.3827	329.02	.	Q	.	V	.	.	.
15.233	128.8394	331.57	.	Q	.	V	.	.	.
15.250	129.2997	334.16	.	Q	.	V	.	.	.
15.267	129.7637	336.83	.	Q	.	V	.	.	.
15.283	130.2314	339.55	.	Q	.	V	.	.	.
15.300	130.7029	342.36	.	Q	.	V	.	.	.
15.317	131.1785	345.22	.	Q	.	V	.	.	.
15.333	131.6580	348.18	.	Q	.	V	.	.	.
15.350	132.1414	350.90	.	Q	.	V	.	.	.
15.367	132.6282	353.41	.	Q	.	V	.	.	.
15.383	133.1185	355.95	.	Q	.	V	.	.	.
15.400	133.6121	358.41	.	Q	.	V	.	.	.
15.417	134.1092	360.86	.	Q	.	V	.	.	.
15.433	134.6096	363.29	.	Q	.	V	.	.	.
15.450	135.1130	365.45	.	Q	.	V	.	.	.
15.467	135.6197	367.92	.	Q	.	V	.	.	.
15.483	136.1299	370.34	.	Q	.	V	.	.	.
15.500	136.6430	372.53	.	Q	.	V	.	.	.
15.517	137.1586	374.37	.	Q	.	V	.	.	.
15.533	137.6769	376.24	.	Q	.	V	.	.	.
15.550	138.1973	377.83	.	Q	.	V	.	.	.
15.567	138.7189	378.66	.	Q	.	V	.	.	.
15.583	139.2401	378.39	.	Q	.	V	.	.	.
15.600	139.7578	375.87	.	Q	.	V	.	.	.
15.617	140.2753	375.71	.	Q	.	V	.	.	.
15.633	140.7957	377.82	.	Q	.	V	.	.	.
15.650	141.3203	380.84	.	Q	.	V	.	.	.

15.667	141.8494	384.14	Q . V. . .
15.683	142.3844	388.43	Q . V. . .
15.700	142.9264	393.49	Q . V. . .
15.717	143.4756	398.71	Q . V. . .
15.733	144.0331	404.74	Q . V. . .
15.750	144.5994	411.15	Q . V. . .
15.767	145.1757	418.36	Q . V. . .
15.783	145.7626	426.11	Q . V. . .
15.800	146.3614	434.73	Q . V. . .
15.817	146.9734	444.28	Q . V. . .
15.833	147.6001	454.99	Q . V. . .
15.850	148.2430	466.74	Q . V. . .
15.867	148.9040	479.94	Q . V . .
15.883	149.5853	494.60	Q . V . .
15.900	150.2897	511.38	Q. V . .
15.917	151.0199	530.15	Q. V . .
15.933	151.7795	551.47	Q V . .
15.950	152.5725	575.73	Q V . .
15.967	153.4204	615.53	.Q V . .
15.983	154.3425	669.49	. Q V . .
16.000	155.3450	727.83	. Q V . .
16.017	156.4416	796.12	. Q .V . .
16.033	157.6407	870.53	. Q .V . .
16.050	158.9355	940.04	. Q .V . .
16.067	160.3286	1011.38	. Q .V . .
16.083	161.8084	1074.34	. Q.V . .
16.100	163.3745	1136.97	. QV . .
16.117	165.0450	1212.75	. . Q . .
16.133	166.8393	1302.69	. . VQ . .
16.150	168.7448	1383.36	. . V Q . .
16.167	170.7967	1489.69	. . V Q . .
16.183	173.0390	1627.94	. . V Q. .
16.200	175.5164	1798.56	. . V . Q .
16.217	178.3150	2031.77	. . V . Q .
16.233	181.2801	2152.70	. . V . Q.
16.250	184.2633	2165.77	. . V . Q.
16.267	187.1591	2102.37	. . V . Q .
16.283	189.8817	1976.60	. . V . Q .
16.300	192.2250	1701.21	. . V Q .
16.317	194.2751	1488.40	. . VQ . .
16.333	196.1576	1366.66	. . Q V . .
16.350	197.9059	1269.31	. . Q V . .
16.367	199.5274	1177.15	. .Q V . .
16.383	201.0580	1111.25	. Q V . .
16.400	202.5269	1066.41	. Q. V . .
16.417	203.9226	1013.28	. Q . V . .
16.433	205.2566	968.51	. Q . V . .
16.450	206.5225	919.03	. Q . V . .
16.467	207.7366	881.41	. Q . V . .
16.483	208.9006	845.11	. Q . V . .
16.500	210.0258	816.88	. Q . V . .
16.517	211.1115	788.25	. Q . V . .
16.533	212.1661	765.63	. Q . V . .
16.550	213.1921	744.84	. Q . V . .
16.567	214.1907	725.01	. Q . V . .
16.583	215.1548	699.90	. Q . V . .
16.600	216.1000	686.27	. Q . V. .

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16.617    217.0263    672.49  .          . Q        .         V.          .
16.633    217.9256    652.84  .          .Q         .         V.          .
16.650    218.7977    633.18  .          .Q         .         V.          .
16.667    219.6484    617.60  .          .Q         .         V.          .
16.683    220.4768    601.43  .          Q          .         V.          .
16.700    221.2847    586.50  .          Q          .         V.          .
16.717    222.0765    574.91  .          Q          .         V.          .
16.733    222.8506    561.98  .          Q          .         V.          .
16.750    223.6057    548.17  .         Q.          .          V          .
16.767    224.3436    535.75  .         Q.          .          V          .
16.783    225.0651    523.82  .         Q.          .          V          .
16.800    225.7690    511.02  .         Q.          .          V          .
16.817    226.4538    497.14  .         Q.          .          V          .
16.833    227.1216    484.85  .        Q .          .          V          .
16.850    227.7731    473.00  .        Q .          .          V          .
16.867    228.4084    461.26  .        Q .          .          V          .
16.883    229.0289    450.42  .        Q .          .          V          .
16.900    229.6369    441.44  .        Q .          .          V          .
16.917    230.2294    430.17  .       Q  .          .          V          .
16.933    230.8066    419.01  .       Q  .          .          .V         .
16.950    231.3687    408.09  .       Q  .          .          .V         .
16.967    231.9159    397.25  .       Q  .          .          .V         .
16.983    232.4494    387.37  .       Q  .          .          .V         .
17.000    232.9740    380.81  .      Q   .          .          .V         .
17.017    233.4903    374.87  .      Q   .          .          .V         .
17.033    233.9986    369.03  .      Q   .          .          .V         .
17.050    234.4990    363.25  .      Q   .          .          .V         .
17.067    234.9898    356.37  .      Q   .          .          .V         .
17.083    235.4661    345.77  .      Q   .          .          .V         .
17.100    235.9274    334.88  .      Q   .          .          .V         .
17.117    236.3737    324.06  .     Q    .          .          .V         .
17.133    236.8054    313.37  .     Q    .          .          .V         .
17.150    237.2237    303.68  .     Q    .          .          .V         .
17.167    237.6344    298.20  .     Q    .          .          .V         .
17.183    238.0390    293.72  .     Q    .          .          .V         .
17.200    238.4379    289.58  .     Q    .          .          . V        .
17.217    238.8313    285.66  .     Q    .          .          . V        .
17.233    239.2196    281.86  .     Q    .          .          . V        .
17.250    239.6026    278.03  .     Q    .          .          . V        .
17.267    239.9798    273.92  .   Q      .          .          . V        .
17.283    240.3522    270.34  .   Q      .          .          . V        .
17.300    240.7202    267.20  .   Q      .          .          . V        .
17.317    241.0843    264.31  .   Q      .          .          . V        .
17.333    241.4445    261.50  .   Q      .          .          . V        .
17.350    241.8011    258.88  .   Q      .          .          . V        .
17.367    242.1543    256.43  .   Q      .          .          . V        .
17.383    242.5042    254.05  .   Q      .          .          . V        .
17.400    242.8509    251.70  .   Q      .          .          . V        .
17.417    243.1945    249.48  .   Q      .          .          . V        .
17.433    243.5353    247.36  .   Q      .          .          . V        .
17.450    243.8731    245.24  .   Q      .          .          . V        .
17.467    244.2079    243.06  .   Q      .          .          . V        .
17.483    244.5398    241.02  .   Q      .          .          . V        .
17.500    244.8691    239.01  .   Q      .          .          . V        .
17.517    245.1956    237.07  .   Q      .          .          . V        .
17.533    245.5195    235.17  .   Q      .          .          . V        .
17.550    245.8409    233.32  .   Q      .          .          .  V       .
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17.567    246.1598    231.51  .   Q     .         .         .  V     .
17.583    246.4763    229.78  .   Q     .         .         .  V     .
17.600    246.7904    228.04  .   Q     .         .         .  V     .
17.617    247.1022    226.35  .   Q     .         .         .  V     .
17.633    247.4117    224.69  .   Q     .         .         .  V     .
17.650    247.7189    223.08  .   Q     .         .         .  V     .
17.667    248.0240    221.49  .   Q     .         .         .  V     .
17.683    248.3270    219.96  .  Q      .         .         .  V     .
17.700    248.6279    218.45  .  Q      .         .         .  V     .
17.717    248.9268    216.97  .  Q      .         .         .  V     .
17.733    249.2236    215.52  .  Q      .         .         .  V     .
17.750    249.5185    214.10  .  Q      .         .         .  V     .
17.767    249.8115    212.69  .  Q      .         .         .  V     .
17.783    250.1026    211.31  .  Q      .         .         .  V     .
17.800    250.3918    209.96  .  Q      .         .         .  V     .
17.817    250.6791    208.63  .  Q      .         .         .  V     .
17.833    250.9647    207.30  .  Q      .         .         .  V     .
17.850    251.2484    206.00  .  Q      .         .         .  V     .
17.867    251.5304    204.72  .  Q      .         .         .  V     .
17.883    251.8107    203.46  .  Q      .         .         .  V     .
17.900    252.0892    202.20  .  Q      .         .         .  V     .
17.917    252.3660    200.95  .  Q      .         .         .  V     .
17.933    252.6411    199.72  .  Q      .         .         .  V     .
17.950    252.9144    198.48  .  Q      .         .         .  V     .
17.967    253.1862    197.27  .  Q      .         .         .   V    .
17.983    253.4562    196.06  .  Q      .         .         .   V    .
18.000    253.7246    194.85  .  Q      .         .         .   V    .
-------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                  Duration
       Peak Flow Rate                       (minutes)
   ======================                   =========
             0%                              7845.0
            10%                              1100.0
            20%                               335.0
            30%                               200.0
            40%                               135.0
            50%                                90.0
            60%                                65.0
            70%                                40.0
            80%                                30.0
            90%                                25.0

****************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE = 3.2
----------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
============================================================================

                    INFLOW
                  (STREAM 1)
                       |
                       |
```

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        V                    __effective depth
  -----------               |   (and volume)
 |           |     |     |
 |           |     |....V........
 | detention |<-->|            outflow
 |   basin   |     |.........______
  -----------      |    ^    |  \
      |            |  dead   |   basin outlet
      V            | storage |
   OUTFLOW          ---------
 (STREAM 1)
```

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE(AF) = 0.000
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	7.00	67.60	28.000
3	17.00	82.90	97.390
4	26.50	112.48	210.270
5	27.00	137.41	216.210
6	28.00	246.71	232.350

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MODIFIED-PULS BASIN ROUTING MODEL RESULTS(1-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
14.017	0.000	214.41	0.00	10.25	72.5	50.519
14.033	0.000	215.36	0.00	10.27	72.6	50.716
14.050	0.000	216.31	0.00	10.30	72.6	50.914
14.067	0.000	217.31	0.00	10.33	72.7	51.113
14.083	0.000	218.33	0.00	10.36	72.7	51.313
14.100	0.000	219.40	0.00	10.39	72.8	51.515
14.117	0.000	220.53	0.00	10.42	72.8	51.719
14.133	0.000	221.65	0.00	10.45	72.9	51.924
14.150	0.000	222.79	0.00	10.48	72.9	52.130
14.167	0.000	224.02	0.00	10.51	72.9	52.338
14.183	0.000	225.33	0.00	10.54	73.0	52.548
14.200	0.000	226.68	0.00	10.57	73.0	52.760
14.217	0.000	228.11	0.00	10.60	73.1	52.973

14.233	0.000	229.72	0.00	10.63	73.1	53.189
14.250	0.000	231.57	0.00	10.66	73.2	53.407
14.267	0.000	233.89	0.00	10.69	73.2	53.628
14.283	0.000	235.81	0.00	10.73	73.3	53.852
14.300	0.000	237.38	0.00	10.76	73.3	54.078
14.317	0.000	238.83	0.00	10.79	73.4	54.306
14.333	0.000	240.31	0.00	10.82	73.4	54.536
14.350	0.000	241.66	0.00	10.86	73.5	54.768
14.367	0.000	242.97	0.00	10.89	73.5	55.001
14.383	0.000	244.31	0.00	10.93	73.6	55.236
14.400	0.000	245.63	0.00	10.96	73.6	55.473
14.417	0.000	246.95	0.00	10.99	73.7	55.712
14.433	0.000	248.27	0.00	11.03	73.7	55.952
14.450	0.000	249.60	0.00	11.06	73.8	56.194
14.467	0.000	250.93	0.00	11.10	73.8	56.438
14.483	0.000	252.25	0.00	11.13	73.9	56.684
14.500	0.000	253.55	0.00	11.17	74.0	56.931
14.517	0.000	254.88	0.00	11.21	74.0	57.180
14.533	0.000	256.23	0.00	11.24	74.1	57.431
14.550	0.000	257.60	0.00	11.28	74.1	57.684
14.567	0.000	258.95	0.00	11.31	74.2	57.939
14.583	0.000	260.31	0.00	11.35	74.2	58.195
14.600	0.000	261.70	0.00	11.39	74.3	58.453
14.617	0.000	263.10	0.00	11.43	74.3	58.713
14.633	0.000	264.51	0.00	11.46	74.4	58.975
14.650	0.000	265.92	0.00	11.50	74.5	59.239
14.667	0.000	267.36	0.00	11.54	74.5	59.504
14.683	0.000	268.80	0.00	11.58	74.6	59.772
14.700	0.000	270.27	0.00	11.62	74.6	60.041
14.717	0.000	271.75	0.00	11.66	74.7	60.313
14.733	0.000	273.26	0.00	11.70	74.8	60.586
14.750	0.000	274.78	0.00	11.74	74.8	60.862
14.767	0.000	276.33	0.00	11.78	74.9	61.139
14.783	0.000	277.89	0.00	11.82	74.9	61.419
14.800	0.000	279.48	0.00	11.86	75.0	61.700
14.817	0.000	281.08	0.00	11.90	75.1	61.984
14.833	0.000	282.72	0.00	11.94	75.1	62.270
14.850	0.000	284.37	0.00	11.98	75.2	62.558
14.867	0.000	286.05	0.00	12.02	75.3	62.849
14.883	0.000	287.75	0.00	12.06	75.3	63.141
14.900	0.000	289.49	0.00	12.11	75.4	63.436
14.917	0.000	291.24	0.00	12.15	75.4	63.733
14.933	0.000	293.04	0.00	12.19	75.5	64.033
14.950	0.000	294.85	0.00	12.24	75.6	64.335
14.967	0.000	296.70	0.00	12.28	75.6	64.639
14.983	0.000	298.57	0.00	12.32	75.7	64.946
15.000	0.000	300.48	0.00	12.37	75.8	65.256
15.017	0.000	302.42	0.00	12.41	75.8	65.568
15.033	0.000	304.41	0.00	12.46	75.9	65.883
15.050	0.000	306.43	0.00	12.51	76.0	66.200
15.067	0.000	308.50	0.00	12.55	76.1	66.520
15.083	0.000	310.60	0.00	12.60	76.1	66.843
15.100	0.000	312.76	0.00	12.64	76.2	67.169
15.117	0.000	314.94	0.00	12.69	76.3	67.498
15.133	0.000	317.17	0.00	12.74	76.3	67.830
15.150	0.000	319.43	0.00	12.79	76.4	68.164
15.167	0.000	321.75	0.00	12.84	76.5	68.502

15.183	0.000	324.11	0.00	12.89	76.6	68.843
15.200	0.000	326.55	0.00	12.94	76.6	69.187
15.217	0.000	329.02	0.00	12.99	76.7	69.535
15.233	0.000	331.57	0.00	13.04	76.8	69.886
15.250	0.000	334.16	0.00	13.09	76.9	70.240
15.267	0.000	336.83	0.00	13.14	77.0	70.598
15.283	0.000	339.55	0.00	13.19	77.0	70.960
15.300	0.000	342.36	0.00	13.24	77.1	71.325
15.317	0.000	345.22	0.00	13.30	77.2	71.694
15.333	0.000	348.18	0.00	13.35	77.3	72.067
15.350	0.000	350.90	0.00	13.40	77.4	72.444
15.367	0.000	353.41	0.00	13.46	77.4	72.824
15.383	0.000	355.95	0.00	13.52	77.5	73.208
15.400	0.000	358.41	0.00	13.57	77.6	73.595
15.417	0.000	360.86	0.00	13.63	77.7	73.985
15.433	0.000	363.29	0.00	13.68	77.8	74.378
15.450	0.000	365.45	0.00	13.74	77.9	74.774
15.467	0.000	367.92	0.00	13.80	78.0	75.173
15.483	0.000	370.34	0.00	13.86	78.0	75.576
15.500	0.000	372.53	0.00	13.91	78.1	75.982
15.517	0.000	374.37	0.00	13.97	78.2	76.389
15.533	0.000	376.24	0.00	14.03	78.3	76.800
15.550	0.000	377.83	0.00	14.09	78.4	77.212
15.567	0.000	378.66	0.00	14.15	78.5	77.626
15.583	0.000	378.39	0.00	14.21	78.6	78.039
15.600	0.000	375.87	0.00	14.27	78.7	78.448
15.617	0.000	375.71	0.00	14.33	78.8	78.857
15.633	0.000	377.82	0.00	14.39	78.9	79.269
15.650	0.000	380.84	0.00	14.45	79.0	79.685
15.667	0.000	384.14	0.00	14.51	79.0	80.105
15.683	0.000	388.43	0.00	14.57	79.1	80.531
15.700	0.000	393.49	0.00	14.63	79.2	80.964
15.717	0.000	398.71	0.00	14.70	79.3	81.404
15.733	0.000	404.74	0.00	14.76	79.4	81.852
15.750	0.000	411.15	0.00	14.83	79.5	82.309
15.767	0.000	418.36	0.00	14.89	79.6	82.775
15.783	0.000	426.11	0.00	14.96	79.7	83.252
15.800	0.000	434.73	0.00	15.03	79.8	83.741
15.817	0.000	444.28	0.00	15.11	79.9	84.243
15.833	0.000	454.99	0.00	15.18	80.1	84.759
15.850	0.000	466.74	0.00	15.26	80.2	85.292
15.867	0.000	479.94	0.00	15.34	80.3	85.842
15.883	0.000	494.60	0.00	15.42	80.4	86.413
15.900	0.000	511.38	0.00	15.50	80.5	87.006
15.917	0.000	530.15	0.00	15.59	80.7	87.625
15.933	0.000	551.47	0.00	15.69	80.8	88.274
15.950	0.000	575.73	0.00	15.78	81.0	88.955
15.967	0.000	615.53	0.00	15.89	81.1	89.691
15.983	0.000	669.49	0.00	16.01	81.3	90.502
16.000	0.000	727.83	0.00	16.14	81.5	91.392
16.017	0.000	796.12	0.00	16.28	81.7	92.376
16.033	0.000	870.53	0.00	16.43	81.9	93.462
16.050	0.000	940.04	0.00	16.60	82.2	94.644
16.067	0.000	1011.38	0.00	16.79	82.4	95.923
16.083	0.000	1074.34	0.00	16.99	82.7	97.289
16.100	0.000	1136.97	0.00	17.11	83.1	98.741
16.117	0.000	1212.75	0.00	17.24	83.5	100.296

16.133	0.000	1302.69	0.00	17.39	83.9	101.975
16.150	0.000	1383.36	0.00	17.54	84.3	103.764
16.167	0.000	1489.69	0.00	17.70	84.8	105.700
16.183	0.000	1627.94	0.00	17.88	85.4	107.824
16.200	0.000	1798.56	0.00	18.08	85.9	110.183
16.217	0.000	2031.77	0.00	18.30	86.6	112.863
16.233	0.000	2152.70	0.00	18.54	87.3	115.707
16.250	0.000	2165.77	0.00	18.78	88.1	118.569
16.267	0.000	2102.37	0.00	19.02	88.8	121.343
16.283	0.000	1976.60	0.00	19.23	89.5	123.942
16.300	0.000	1701.21	0.00	19.42	90.1	126.161
16.317	0.000	1488.40	0.00	19.58	90.7	128.086
16.333	0.000	1366.66	0.00	19.73	91.2	129.843
16.350	0.000	1269.31	0.00	19.87	91.6	131.465
16.367	0.000	1177.15	0.00	19.99	92.0	132.960
16.383	0.000	1111.25	0.00	20.11	92.4	134.363
16.400	0.000	1066.41	0.00	20.22	92.8	135.705
16.417	0.000	1013.28	0.00	20.33	93.1	136.972
16.433	0.000	968.51	0.00	20.43	93.4	138.177
16.450	0.000	919.03	0.00	20.53	93.7	139.314
16.467	0.000	881.41	0.00	20.62	94.0	140.399
16.483	0.000	845.11	0.00	20.71	94.3	141.433
16.500	0.000	816.88	0.00	20.79	94.6	142.428
16.517	0.000	788.25	0.00	20.87	94.8	143.383
16.533	0.000	765.63	0.00	20.95	95.1	144.307
16.550	0.000	744.84	0.00	21.02	95.3	145.201
16.567	0.000	725.01	0.00	21.10	95.5	146.068
16.583	0.000	699.90	0.00	21.17	95.8	146.900
16.600	0.000	686.27	0.00	21.24	96.0	147.713
16.617	0.000	672.49	0.00	21.30	96.2	148.507
16.633	0.000	652.84	0.00	21.37	96.4	149.274
16.650	0.000	633.18	0.00	21.43	96.6	150.013
16.667	0.000	617.60	0.00	21.49	96.8	150.730
16.683	0.000	601.43	0.00	21.55	97.0	151.425
16.700	0.000	586.50	0.00	21.60	97.1	152.099
16.717	0.000	574.91	0.00	21.66	97.3	152.757
16.733	0.000	561.98	0.00	21.71	97.5	153.397
16.750	0.000	548.17	0.00	21.77	97.7	154.017
16.767	0.000	535.75	0.00	21.82	97.8	154.620
16.783	0.000	523.82	0.00	21.87	98.0	155.207
16.800	0.000	511.02	0.00	21.91	98.1	155.776
16.817	0.000	497.14	0.00	21.96	98.3	156.325
16.833	0.000	484.85	0.00	22.00	98.4	156.857
16.850	0.000	473.00	0.00	22.05	98.6	157.373
16.867	0.000	461.26	0.00	22.09	98.7	157.872
16.883	0.000	450.42	0.00	22.13	98.8	158.357
16.900	0.000	441.44	0.00	22.17	98.9	158.829
16.917	0.000	430.17	0.00	22.21	99.1	159.285
16.933	0.000	419.01	0.00	22.25	99.2	159.725
16.950	0.000	408.09	0.00	22.28	99.3	160.151
16.967	0.000	397.25	0.00	22.32	99.4	160.561
16.983	0.000	387.37	0.00	22.35	99.5	160.957
17.000	0.000	380.81	0.00	22.38	99.6	161.345
17.017	0.000	374.87	0.00	22.41	99.7	161.724
17.033	0.000	369.03	0.00	22.45	99.8	162.094
17.050	0.000	363.25	0.00	22.48	99.9	162.457
17.067	0.000	356.37	0.00	22.51	100.0	162.810

17.083	0.000	345.77	0.00	22.53	100.1	163.149
17.100	0.000	334.88	0.00	22.56	100.2	163.472
17.117	0.000	324.06	0.00	22.59	100.3	163.780
17.133	0.000	313.37	0.00	22.61	100.3	164.074
17.150	0.000	303.68	0.00	22.64	100.4	164.354
17.167	0.000	298.20	0.00	22.66	100.5	164.626
17.183	0.000	293.72	0.00	22.68	100.6	164.892
17.200	0.000	289.58	0.00	22.70	100.6	165.152
17.217	0.000	285.66	0.00	22.72	100.7	165.407
17.233	0.000	281.86	0.00	22.75	100.8	165.657
17.250	0.000	278.03	0.00	22.77	100.8	165.901
17.267	0.000	273.92	0.00	22.79	100.9	166.139
17.283	0.000	270.34	0.00	22.81	100.9	166.372
17.300	0.000	267.20	0.00	22.82	101.0	166.601
17.317	0.000	264.31	0.00	22.84	101.1	166.826
17.333	0.000	261.50	0.00	22.86	101.1	167.047
17.350	0.000	258.88	0.00	22.88	101.2	167.264
17.367	0.000	256.43	0.00	22.90	101.2	167.478
17.383	0.000	254.05	0.00	22.92	101.3	167.688
17.400	0.000	251.70	0.00	22.93	101.3	167.896
17.417	0.000	249.48	0.00	22.95	101.4	168.100
17.433	0.000	247.36	0.00	22.97	101.5	168.300
17.450	0.000	245.24	0.00	22.98	101.5	168.498
17.467	0.000	243.06	0.00	23.00	101.6	168.693
17.483	0.000	241.02	0.00	23.02	101.6	168.885
17.500	0.000	239.01	0.00	23.03	101.7	169.075
17.517	0.000	237.07	0.00	23.05	101.7	169.261
17.533	0.000	235.17	0.00	23.06	101.8	169.445
17.550	0.000	233.32	0.00	23.08	101.8	169.626
17.567	0.000	231.51	0.00	23.09	101.9	169.805
17.583	0.000	229.78	0.00	23.11	101.9	169.981
17.600	0.000	228.04	0.00	23.12	101.9	170.154
17.617	0.000	226.35	0.00	23.14	102.0	170.326
17.633	0.000	224.69	0.00	23.15	102.0	170.495
17.650	0.000	223.08	0.00	23.17	102.1	170.661
17.667	0.000	221.49	0.00	23.18	102.1	170.826
17.683	0.000	219.96	0.00	23.19	102.2	170.988
17.700	0.000	218.45	0.00	23.21	102.2	171.148
17.717	0.000	216.97	0.00	23.22	102.2	171.306
17.733	0.000	215.52	0.00	23.23	102.3	171.462
17.750	0.000	214.10	0.00	23.25	102.3	171.616
17.767	0.000	212.69	0.00	23.26	102.4	171.768
17.783	0.000	211.31	0.00	23.27	102.4	171.918
17.800	0.000	209.96	0.00	23.28	102.4	172.066
17.817	0.000	208.63	0.00	23.30	102.5	172.212
17.833	0.000	207.30	0.00	23.31	102.5	172.357
17.850	0.000	206.00	0.00	23.32	102.6	172.499
17.867	0.000	204.72	0.00	23.33	102.6	172.640
17.883	0.000	203.46	0.00	23.34	102.6	172.779
17.900	0.000	202.20	0.00	23.36	102.7	172.916
17.917	0.000	200.95	0.00	23.37	102.7	173.051
17.933	0.000	199.72	0.00	23.38	102.7	173.185
17.950	0.000	198.48	0.00	23.39	102.8	173.316
17.967	0.000	197.27	0.00	23.40	102.8	173.447
17.983	0.000	196.06	0.00	23.41	102.8	173.575
18.000	0.000	194.85	0.00	23.42	102.9	173.702
18.017	0.000	193.50	0.00	23.43	102.9	173.826

18.033	0.000	192.01	0.00	23.44	102.9	173.949
18.050	0.000	190.48	0.00	23.45	103.0	174.070
18.067	0.000	188.85	0.00	23.46	103.0	174.188
18.083	0.000	187.14	0.00	23.47	103.0	174.304
18.100	0.000	185.34	0.00	23.48	103.1	174.417
18.117	0.000	183.14	0.00	23.49	103.1	174.527
18.133	0.000	180.24	0.00	23.50	103.1	174.633
18.150	0.000	177.30	0.00	23.51	103.2	174.736
18.167	0.000	174.20	0.00	23.52	103.2	174.833
18.183	0.000	170.91	0.00	23.53	103.2	174.927
18.200	0.000	167.75	0.00	23.53	103.2	175.015
18.217	0.000	165.31	0.00	23.54	103.3	175.101
18.233	0.000	162.56	0.00	23.55	103.3	175.183
18.250	0.000	159.33	0.00	23.55	103.3	175.260
18.267	0.000	155.06	0.00	23.56	103.3	175.331
18.283	0.000	151.83	0.00	23.57	103.3	175.398
18.300	0.000	149.53	0.00	23.57	103.4	175.461
18.317	0.000	147.58	0.00	23.58	103.4	175.522
18.333	0.000	145.63	0.00	23.58	103.4	175.581
18.350	0.000	144.03	0.00	23.59	103.4	175.637
18.367	0.000	142.61	0.00	23.59	103.4	175.691
18.383	0.000	141.12	0.00	23.59	103.4	175.742
18.400	0.000	139.79	0.00	23.60	103.4	175.792
18.417	0.000	138.45	0.00	23.60	103.5	175.841
18.433	0.000	137.21	0.00	23.61	103.5	175.887
18.450	0.000	135.96	0.00	23.61	103.5	175.932
18.467	0.000	134.78	0.00	23.61	103.5	175.975
18.483	0.000	133.68	0.00	23.62	103.5	176.017
18.500	0.000	132.66	0.00	23.62	103.5	176.057
18.517	0.000	131.61	0.00	23.62	103.5	176.095
18.533	0.000	130.56	0.00	23.63	103.5	176.133
18.550	0.000	129.50	0.00	23.63	103.5	176.168
18.567	0.000	128.55	0.00	23.63	103.5	176.203
18.583	0.000	127.63	0.00	23.64	103.6	176.236
18.600	0.000	126.70	0.00	23.64	103.6	176.268
18.617	0.000	125.78	0.00	23.64	103.6	176.298
18.633	0.000	124.91	0.00	23.64	103.6	176.328
18.650	0.000	124.06	0.00	23.65	103.6	176.356
18.667	0.000	123.24	0.00	23.65	103.6	176.383
18.683	0.000	122.45	0.00	23.65	103.6	176.409
18.700	0.000	121.67	0.00	23.65	103.6	176.434
18.717	0.000	120.90	0.00	23.65	103.6	176.458
18.733	0.000	120.15	0.00	23.66	103.6	176.480
18.750	0.000	119.41	0.00	23.66	103.6	176.502
18.767	0.000	118.68	0.00	23.66	103.6	176.523
18.783	0.000	117.97	0.00	23.66	103.6	176.543
18.800	0.000	117.29	0.00	23.66	103.6	176.561
18.817	0.000	116.61	0.00	23.66	103.6	176.579
18.833	0.000	115.94	0.00	23.67	103.7	176.596
18.850	0.000	115.28	0.00	23.67	103.7	176.612
18.867	0.000	114.66	0.00	23.67	103.7	176.627
18.883	0.000	114.06	0.00	23.67	103.7	176.642
18.900	0.000	113.45	0.00	23.67	103.7	176.655
18.917	0.000	112.85	0.00	23.67	103.7	176.668
18.933	0.000	112.26	0.00	23.67	103.7	176.680
18.950	0.000	111.68	0.00	23.67	103.7	176.691
18.967	0.000	111.14	0.00	23.67	103.7	176.701

18.983	0.000	110.61	0.00	23.68	103.7	176.710
19.000	0.000	110.09	0.00	23.68	103.7	176.719
19.017	0.000	109.57	0.00	23.68	103.7	176.727
19.033	0.000	109.05	0.00	23.68	103.7	176.735
19.050	0.000	108.54	0.00	23.68	103.7	176.741
19.067	0.000	108.04	0.00	23.68	103.7	176.747
19.083	0.000	107.54	0.00	23.68	103.7	176.753
19.100	0.000	107.04	0.00	23.68	103.7	176.757
19.117	0.000	106.56	0.00	23.68	103.7	176.761
19.133	0.000	106.12	0.00	23.68	103.7	176.765
19.150	0.000	105.70	0.00	23.68	103.7	176.767
19.167	0.000	105.28	0.00	23.68	103.7	176.770
19.183	0.000	104.86	0.00	23.68	103.7	176.771
19.200	0.000	104.46	0.00	23.68	103.7	176.772
19.217	0.000	104.05	0.00	23.68	103.7	176.773
19.233	0.000	103.65	0.00	23.68	103.7	176.773
19.250	0.000	103.25	0.00	23.68	103.7	176.772
19.267	0.000	102.86	0.00	23.68	103.7	176.771
19.283	0.000	102.47	0.00	23.68	103.7	176.769
19.300	0.000	102.08	0.00	23.68	103.7	176.767
19.317	0.000	101.70	0.00	23.68	103.7	176.764
19.333	0.000	101.32	0.00	23.68	103.7	176.761
19.350	0.000	100.95	0.00	23.68	103.7	176.757
19.367	0.000	100.58	0.00	23.68	103.7	176.753
19.383	0.000	100.21	0.00	23.68	103.7	176.748
19.400	0.000	99.84	0.00	23.68	103.7	176.743
19.417	0.000	99.48	0.00	23.68	103.7	176.737
19.433	0.000	99.12	0.00	23.68	103.7	176.730
19.450	0.000	98.77	0.00	23.68	103.7	176.724
19.467	0.000	98.42	0.00	23.68	103.7	176.716
19.483	0.000	98.07	0.00	23.68	103.7	176.709
19.500	0.000	97.72	0.00	23.67	103.7	176.701
19.517	0.000	97.38	0.00	23.67	103.7	176.692
19.533	0.000	97.04	0.00	23.67	103.7	176.683
19.550	0.000	96.71	0.00	23.67	103.7	176.673
19.567	0.000	96.37	0.00	23.67	103.7	176.663
19.583	0.000	96.04	0.00	23.67	103.7	176.653
19.600	0.000	95.71	0.00	23.67	103.7	176.642
19.617	0.000	95.39	0.00	23.67	103.7	176.630
19.633	0.000	95.06	0.00	23.67	103.7	176.618
19.650	0.000	94.74	0.00	23.67	103.7	176.606
19.667	0.000	94.43	0.00	23.67	103.7	176.593
19.683	0.000	94.11	0.00	23.66	103.7	176.580
19.700	0.000	93.80	0.00	23.66	103.6	176.567
19.717	0.000	93.49	0.00	23.66	103.6	176.553
19.733	0.000	93.19	0.00	23.66	103.6	176.538
19.750	0.000	92.88	0.00	23.66	103.6	176.523
19.767	0.000	92.58	0.00	23.66	103.6	176.508
19.783	0.000	92.28	0.00	23.66	103.6	176.493
19.800	0.000	91.98	0.00	23.66	103.6	176.476
19.817	0.000	91.69	0.00	23.65	103.6	176.460
19.833	0.000	91.40	0.00	23.65	103.6	176.443
19.850	0.000	91.10	0.00	23.65	103.6	176.426
19.867	0.000	90.82	0.00	23.65	103.6	176.408
19.883	0.000	90.53	0.00	23.65	103.6	176.390
19.900	0.000	90.25	0.00	23.65	103.6	176.372
19.917	0.000	89.97	0.00	23.65	103.6	176.353

19.933	0.000	89.69	0.00	23.64	103.6	176.334
19.950	0.000	89.41	0.00	23.64	103.6	176.315
19.967	0.000	89.14	0.00	23.64	103.6	176.295
19.983	0.000	88.86	0.00	23.64	103.6	176.274
20.000	0.000	88.59	0.00	23.64	103.6	176.254
20.017	0.000	88.32	0.00	23.64	103.6	176.233
20.033	0.000	88.06	0.00	23.63	103.6	176.211
20.050	0.000	87.79	0.00	23.63	103.6	176.190
20.067	0.000	87.53	0.00	23.63	103.5	176.168
20.083	0.000	87.27	0.00	23.63	103.5	176.145
20.100	0.000	87.01	0.00	23.63	103.5	176.122
20.117	0.000	86.75	0.00	23.62	103.5	176.099
20.133	0.000	86.50	0.00	23.62	103.5	176.076
20.150	0.000	86.24	0.00	23.62	103.5	176.052
20.167	0.000	85.99	0.00	23.62	103.5	176.028
20.183	0.000	85.75	0.00	23.62	103.5	176.003
20.200	0.000	85.52	0.00	23.61	103.5	175.979
20.217	0.000	85.28	0.00	23.61	103.5	175.954
20.233	0.000	85.05	0.00	23.61	103.5	175.928
20.250	0.000	84.81	0.00	23.61	103.5	175.903
20.267	0.000	84.58	0.00	23.61	103.5	175.877
20.283	0.000	84.35	0.00	23.60	103.5	175.850
20.300	0.000	84.13	0.00	23.60	103.5	175.824
20.317	0.000	83.90	0.00	23.60	103.4	175.797
20.333	0.000	83.68	0.00	23.60	103.4	175.769
20.350	0.000	83.45	0.00	23.59	103.4	175.742
20.367	0.000	83.23	0.00	23.59	103.4	175.714
20.383	0.000	83.01	0.00	23.59	103.4	175.686
20.400	0.000	82.79	0.00	23.59	103.4	175.658
20.417	0.000	82.58	0.00	23.58	103.4	175.629
20.433	0.000	82.36	0.00	23.58	103.4	175.600
20.450	0.000	82.15	0.00	23.58	103.4	175.571
20.467	0.000	81.93	0.00	23.58	103.4	175.541
20.483	0.000	81.72	0.00	23.57	103.4	175.511
20.500	0.000	81.51	0.00	23.57	103.4	175.481
20.517	0.000	81.31	0.00	23.57	103.4	175.451
20.533	0.000	81.10	0.00	23.57	103.4	175.420
20.550	0.000	80.89	0.00	23.56	103.3	175.389
20.567	0.000	80.69	0.00	23.56	103.3	175.358
20.583	0.000	80.49	0.00	23.56	103.3	175.327
20.600	0.000	80.28	0.00	23.56	103.3	175.295
20.617	0.000	80.09	0.00	23.55	103.3	175.263
20.633	0.000	79.89	0.00	23.55	103.3	175.231
20.650	0.000	79.69	0.00	23.55	103.3	175.198
20.667	0.000	79.49	0.00	23.55	103.3	175.165
20.683	0.000	79.30	0.00	23.54	103.3	175.132
20.700	0.000	79.10	0.00	23.54	103.3	175.099
20.717	0.000	78.91	0.00	23.54	103.3	175.065
20.733	0.000	78.72	0.00	23.53	103.3	175.032
20.750	0.000	78.53	0.00	23.53	103.2	174.998
20.767	0.000	78.34	0.00	23.53	103.2	174.963
20.783	0.000	78.15	0.00	23.53	103.2	174.929
20.800	0.000	77.97	0.00	23.52	103.2	174.894
20.817	0.000	77.78	0.00	23.52	103.2	174.859
20.833	0.000	77.60	0.00	23.52	103.2	174.824
20.850	0.000	77.42	0.00	23.51	103.2	174.788
20.867	0.000	77.23	0.00	23.51	103.2	174.752

20.883	0.000	77.05	0.00	23.51	103.2	174.716
20.900	0.000	76.87	0.00	23.50	103.2	174.680
20.917	0.000	76.69	0.00	23.50	103.1	174.644
20.933	0.000	76.52	0.00	23.50	103.1	174.607
20.950	0.000	76.34	0.00	23.50	103.1	174.570
20.967	0.000	76.17	0.00	23.49	103.1	174.533
20.983	0.000	75.99	0.00	23.49	103.1	174.496
21.000	0.000	75.82	0.00	23.49	103.1	174.458
21.017	0.000	75.65	0.00	23.48	103.1	174.420
21.033	0.000	75.47	0.00	23.48	103.1	174.382
21.050	0.000	75.30	0.00	23.48	103.1	174.344
21.067	0.000	75.13	0.00	23.47	103.1	174.306
21.083	0.000	74.97	0.00	23.47	103.1	174.267
21.100	0.000	74.80	0.00	23.47	103.0	174.228
21.117	0.000	74.63	0.00	23.46	103.0	174.189
21.133	0.000	74.47	0.00	23.46	103.0	174.150
21.150	0.000	74.30	0.00	23.46	103.0	174.110
21.167	0.000	74.14	0.00	23.45	103.0	174.070
21.183	0.000	73.98	0.00	23.45	103.0	174.030
21.200	0.000	73.81	0.00	23.45	103.0	173.990
21.217	0.000	73.65	0.00	23.44	103.0	173.950
21.233	0.000	73.49	0.00	23.44	103.0	173.909
21.250	0.000	73.34	0.00	23.44	102.9	173.868
21.267	0.000	73.18	0.00	23.43	102.9	173.827
21.283	0.000	73.02	0.00	23.43	102.9	173.786
21.300	0.000	72.87	0.00	23.43	102.9	173.745
21.317	0.000	72.71	0.00	23.42	102.9	173.703
21.333	0.000	72.55	0.00	23.42	102.9	173.661
21.350	0.000	72.40	0.00	23.42	102.9	173.619
21.367	0.000	72.25	0.00	23.41	102.9	173.577
21.383	0.000	72.10	0.00	23.41	102.9	173.535
21.400	0.000	71.94	0.00	23.40	102.8	173.492
21.417	0.000	71.79	0.00	23.40	102.8	173.450
21.433	0.000	71.65	0.00	23.40	102.8	173.407
21.450	0.000	71.50	0.00	23.39	102.8	173.364
21.467	0.000	71.35	0.00	23.39	102.8	173.320
21.483	0.000	71.20	0.00	23.39	102.8	173.277
21.500	0.000	71.06	0.00	23.38	102.8	173.233
21.517	0.000	70.91	0.00	23.38	102.8	173.189
21.533	0.000	70.77	0.00	23.38	102.8	173.145
21.550	0.000	70.62	0.00	23.37	102.7	173.101
21.567	0.000	70.48	0.00	23.37	102.7	173.056
21.583	0.000	70.34	0.00	23.36	102.7	173.012
21.600	0.000	70.20	0.00	23.36	102.7	172.967
21.617	0.000	70.05	0.00	23.36	102.7	172.922
21.633	0.000	69.91	0.00	23.35	102.7	172.877
21.650	0.000	69.77	0.00	23.35	102.7	172.832
21.667	0.000	69.64	0.00	23.35	102.7	172.786
21.683	0.000	69.50	0.00	23.34	102.7	172.740
21.700	0.000	69.36	0.00	23.34	102.6	172.695
21.717	0.000	69.22	0.00	23.33	102.6	172.649
21.733	0.000	69.09	0.00	23.33	102.6	172.602
21.750	0.000	68.95	0.00	23.33	102.6	172.556
21.767	0.000	68.82	0.00	23.32	102.6	172.509
21.783	0.000	68.68	0.00	23.32	102.6	172.463
21.800	0.000	68.55	0.00	23.31	102.6	172.416
21.817	0.000	68.42	0.00	23.31	102.6	172.369

21.833	0.000	68.29	0.00	23.31	102.5	172.322
21.850	0.000	68.16	0.00	23.30	102.5	172.274
21.867	0.000	68.03	0.00	23.30	102.5	172.227
21.883	0.000	67.90	0.00	23.29	102.5	172.179
21.900	0.000	67.77	0.00	23.29	102.5	172.131
21.917	0.000	67.64	0.00	23.29	102.5	172.083
21.933	0.000	67.51	0.00	23.28	102.5	172.035
21.950	0.000	67.38	0.00	23.28	102.5	171.987
21.967	0.000	67.25	0.00	23.27	102.4	171.938
21.983	0.000	67.13	0.00	23.27	102.4	171.890
22.000	0.000	67.00	0.00	23.27	102.4	171.841
22.017	0.000	66.88	0.00	23.26	102.4	171.792
22.033	0.000	66.75	0.00	23.26	102.4	171.743
22.050	0.000	66.63	0.00	23.25	102.4	171.694
22.067	0.000	66.51	0.00	23.25	102.4	171.644
22.083	0.000	66.38	0.00	23.25	102.4	171.595
22.100	0.000	66.26	0.00	23.24	102.3	171.545
22.117	0.000	66.14	0.00	23.24	102.3	171.495
22.133	0.000	66.02	0.00	23.23	102.3	171.445
22.150	0.000	65.90	0.00	23.23	102.3	171.395
22.167	0.000	65.78	0.00	23.22	102.3	171.345
22.183	0.000	65.66	0.00	23.22	102.3	171.294
22.200	0.000	65.54	0.00	23.22	102.3	171.244
22.216	0.000	65.43	0.00	23.21	102.2	171.193
22.233	0.000	65.31	0.00	23.21	102.2	171.142
22.250	0.000	65.19	0.00	23.20	102.2	171.091
22.266	0.000	65.07	0.00	23.20	102.2	171.040
22.283	0.000	64.96	0.00	23.19	102.2	170.989
22.300	0.000	64.84	0.00	23.19	102.2	170.937
22.316	0.000	64.73	0.00	23.19	102.2	170.886
22.333	0.000	64.61	0.00	23.18	102.2	170.834
22.350	0.000	64.50	0.00	23.18	102.1	170.782
22.366	0.000	64.39	0.00	23.17	102.1	170.730
22.383	0.000	64.28	0.00	23.17	102.1	170.678
22.400	0.000	64.16	0.00	23.16	102.1	170.626
22.416	0.000	64.05	0.00	23.16	102.1	170.574
22.433	0.000	63.94	0.00	23.15	102.1	170.521
22.450	0.000	63.83	0.00	23.15	102.1	170.468
22.466	0.000	63.72	0.00	23.15	102.0	170.416
22.483	0.000	63.61	0.00	23.14	102.0	170.363
22.500	0.000	63.50	0.00	23.14	102.0	170.310
22.516	0.000	63.39	0.00	23.13	102.0	170.256
22.533	0.000	63.28	0.00	23.13	102.0	170.203
22.550	0.000	63.18	0.00	23.12	102.0	170.150
22.566	0.000	63.07	0.00	23.12	102.0	170.096
22.583	0.000	62.96	0.00	23.11	101.9	170.042
22.600	0.000	62.86	0.00	23.11	101.9	169.989
22.616	0.000	62.75	0.00	23.11	101.9	169.935
22.633	0.000	62.65	0.00	23.10	101.9	169.881
22.650	0.000	62.54	0.00	23.10	101.9	169.826
22.666	0.000	62.44	0.00	23.09	101.9	169.772
22.683	0.000	62.33	0.00	23.09	101.9	169.718
22.700	0.000	62.23	0.00	23.08	101.8	169.663
22.716	0.000	62.13	0.00	23.08	101.8	169.608
22.733	0.000	62.03	0.00	23.07	101.8	169.554
22.750	0.000	61.92	0.00	23.07	101.8	169.499
22.766	0.000	61.82	0.00	23.06	101.8	169.444

22.783	0.000	61.72	0.00	23.06	101.8	169.388
22.800	0.000	61.62	0.00	23.05	101.8	169.333
22.816	0.000	61.52	0.00	23.05	101.7	169.278
22.833	0.000	61.42	0.00	23.05	101.7	169.222
22.850	0.000	61.32	0.00	23.04	101.7	169.167
22.866	0.000	61.22	0.00	23.04	101.7	169.111
22.883	0.000	61.12	0.00	23.03	101.7	169.055
22.900	0.000	61.02	0.00	23.03	101.7	168.999
22.916	0.000	60.93	0.00	23.02	101.7	168.943
22.933	0.000	60.83	0.00	23.02	101.6	168.887
22.950	0.000	60.73	0.00	23.01	101.6	168.830
22.966	0.000	60.63	0.00	23.01	101.6	168.774
22.983	0.000	60.54	0.00	23.00	101.6	168.717
23.000	0.000	60.44	0.00	23.00	101.6	168.661
23.016	0.000	60.35	0.00	22.99	101.6	168.604
23.033	0.000	60.25	0.00	22.99	101.6	168.547
23.050	0.000	60.16	0.00	22.98	101.5	168.490
23.066	0.000	60.06	0.00	22.98	101.5	168.433
23.083	0.000	59.97	0.00	22.97	101.5	168.375
23.100	0.000	59.87	0.00	22.97	101.5	168.318
23.116	0.000	59.78	0.00	22.96	101.5	168.261
23.133	0.000	59.69	0.00	22.96	101.5	168.203
23.150	0.000	59.59	0.00	22.95	101.4	168.146
23.166	0.000	59.50	0.00	22.95	101.4	168.088
23.183	0.000	59.41	0.00	22.95	101.4	168.030
23.200	0.000	59.32	0.00	22.94	101.4	167.972
23.216	0.000	59.23	0.00	22.94	101.4	167.914
23.233	0.000	59.14	0.00	22.93	101.4	167.856
23.250	0.000	59.05	0.00	22.93	101.4	167.797
23.266	0.000	58.96	0.00	22.92	101.3	167.739
23.283	0.000	58.87	0.00	22.92	101.3	167.681
23.300	0.000	58.78	0.00	22.91	101.3	167.622
23.316	0.000	58.69	0.00	22.91	101.3	167.563
23.333	0.000	58.60	0.00	22.90	101.3	167.504
23.350	0.000	58.51	0.00	22.90	101.3	167.446
23.366	0.000	58.43	0.00	22.89	101.3	167.387
23.383	0.000	58.34	0.00	22.89	101.2	167.327
23.400	0.000	58.25	0.00	22.88	101.2	167.268
23.416	0.000	58.16	0.00	22.88	101.2	167.209
23.433	0.000	58.08	0.00	22.87	101.2	167.150
23.450	0.000	57.99	0.00	22.87	101.2	167.090
23.466	0.000	57.91	0.00	22.86	101.2	167.031
23.483	0.000	57.82	0.00	22.86	101.1	166.971
23.500	0.000	57.74	0.00	22.85	101.1	166.911
23.516	0.000	57.65	0.00	22.85	101.1	166.851
23.533	0.000	57.57	0.00	22.84	101.1	166.791
23.550	0.000	57.48	0.00	22.84	101.1	166.731
23.566	0.000	57.40	0.00	22.83	101.1	166.671
23.583	0.000	57.31	0.00	22.83	101.0	166.611
23.600	0.000	57.23	0.00	22.82	101.0	166.551
23.616	0.000	57.15	0.00	22.82	101.0	166.490
23.633	0.000	57.07	0.00	22.81	101.0	166.430
23.650	0.000	56.98	0.00	22.81	101.0	166.369
23.666	0.000	56.90	0.00	22.80	101.0	166.308
23.683	0.000	56.82	0.00	22.80	101.0	166.248
23.700	0.000	56.74	0.00	22.79	100.9	166.187
23.716	0.000	56.66	0.00	22.78	100.9	166.126

23.733	0.000	56.58	0.00	22.78	100.9	166.065
23.750	0.000	56.50	0.00	22.77	100.9	166.003
23.766	0.000	56.42	0.00	22.77	100.9	165.942
23.783	0.000	56.34	0.00	22.76	100.9	165.881
23.800	0.000	56.26	0.00	22.76	100.8	165.820
23.816	0.000	56.18	0.00	22.75	100.8	165.758
23.833	0.000	56.10	0.00	22.75	100.8	165.696
23.850	0.000	56.02	0.00	22.74	100.8	165.635
23.866	0.000	55.94	0.00	22.74	100.8	165.573
23.883	0.000	55.87	0.00	22.73	100.8	165.511
23.900	0.000	55.79	0.00	22.73	100.7	165.449
23.916	0.000	55.71	0.00	22.72	100.7	165.387
23.933	0.000	55.63	0.00	22.72	100.7	165.325
23.950	0.000	55.56	0.00	22.71	100.7	165.263
23.966	0.000	55.48	0.00	22.71	100.7	165.201
23.983	0.000	55.40	0.00	22.70	100.7	165.138
24.000	0.000	55.33	0.00	22.70	100.6	165.076
24.016	0.000	55.03	0.00	22.69	100.6	165.013
24.033	0.000	54.53	0.00	22.69	100.6	164.950
24.050	0.000	53.99	0.00	22.68	100.6	164.886
24.066	0.000	53.32	0.00	22.67	100.6	164.820
24.083	0.000	52.59	0.00	22.67	100.6	164.754
24.100	0.000	51.77	0.00	22.66	100.5	164.687
24.116	0.000	50.70	0.00	22.66	100.5	164.619
24.133	0.000	49.74	0.00	22.65	100.5	164.549
24.150	0.000	48.70	0.00	22.65	100.5	164.477
24.166	0.000	47.38	0.00	22.64	100.5	164.404
24.183	0.000	45.75	0.00	22.63	100.5	164.329
24.200	0.000	44.02	0.00	22.63	100.4	164.251
24.216	0.000	42.01	0.00	22.62	100.4	164.171
24.233	0.000	39.34	0.00	22.61	100.4	164.087
24.250	0.000	35.79	0.00	22.61	100.4	163.998
24.266	0.000	30.49	0.00	22.60	100.3	163.901
24.283	0.000	26.78	0.00	22.59	100.3	163.800
24.300	0.000	24.50	0.00	22.58	100.3	163.696
24.316	0.000	22.72	0.00	22.57	100.3	163.589
24.333	0.000	20.90	0.00	22.56	100.2	163.480
24.350	0.000	19.60	0.00	22.55	100.2	163.369
24.366	0.000	18.55	0.00	22.54	100.2	163.256
24.383	0.000	17.37	0.00	22.53	100.1	163.142
24.400	0.000	16.41	0.00	22.52	100.1	163.027
24.416	0.000	15.41	0.00	22.51	100.1	162.910
24.433	0.000	14.55	0.00	22.50	100.1	162.792
24.450	0.000	13.67	0.00	22.49	100.0	162.674
24.466	0.000	12.86	0.00	22.48	100.0	162.554
24.483	0.000	12.17	0.00	22.47	100.0	162.433
24.500	0.000	11.59	0.00	22.46	99.9	162.311
24.516	0.000	10.97	0.00	22.45	99.9	162.188
24.533	0.000	10.36	0.00	22.44	99.9	162.065
24.550	0.000	9.69	0.00	22.43	99.8	161.941
24.566	0.000	9.18	0.00	22.42	99.8	161.816
24.583	0.000	8.72	0.00	22.41	99.8	161.691
24.600	0.000	8.22	0.00	22.40	99.7	161.565
24.616	0.000	7.73	0.00	22.39	99.7	161.438
24.633	0.000	7.31	0.00	22.38	99.7	161.311
24.650	0.000	6.89	0.00	22.37	99.6	161.183
24.666	0.000	6.51	0.00	22.36	99.6	161.055

24.683	0.000	6.16	0.00	22.35	99.6	160.926
24.700	0.000	5.83	0.00	22.34	99.5	160.797
24.716	0.000	5.49	0.00	22.33	99.5	160.668
24.733	0.000	5.18	0.00	22.31	99.5	160.538
24.750	0.000	4.87	0.00	22.30	99.4	160.408
24.766	0.000	4.56	0.00	22.29	99.4	160.277
24.783	0.000	4.28	0.00	22.28	99.4	160.146
24.800	0.000	4.03	0.00	22.27	99.3	160.015
24.816	0.000	3.78	0.00	22.26	99.3	159.883
24.833	0.000	3.53	0.00	22.25	99.3	159.751
24.850	0.000	3.30	0.00	22.24	99.2	159.619
24.866	0.000	3.11	0.00	22.23	99.2	159.487
24.883	0.000	2.92	0.00	22.21	99.2	159.354
24.900	0.000	2.74	0.00	22.20	99.1	159.221
24.916	0.000	2.56	0.00	22.19	99.1	159.089
24.933	0.000	2.38	0.00	22.18	99.1	158.955
24.950	0.000	2.21	0.00	22.17	99.0	158.822
24.966	0.000	2.09	0.00	22.16	99.0	158.689
24.983	0.000	1.98	0.00	22.15	98.9	158.555
25.000	0.000	1.87	0.00	22.14	98.9	158.421
25.016	0.000	1.76	0.00	22.13	98.9	158.288
25.033	0.000	1.66	0.00	22.11	98.8	158.154
25.050	0.000	1.55	0.00	22.10	98.8	158.020
25.066	0.000	1.44	0.00	22.09	98.8	157.886
25.083	0.000	1.33	0.00	22.08	98.7	157.752
25.100	0.000	1.22	0.00	22.07	98.7	157.617
25.116	0.000	1.13	0.00	22.06	98.7	157.483
25.133	0.000	1.10	0.00	22.05	98.6	157.349
25.150	0.000	1.08	0.00	22.03	98.6	157.214
25.166	0.000	1.06	0.00	22.02	98.6	157.080
25.183	0.000	1.04	0.00	22.01	98.5	156.946
25.200	0.000	1.03	0.00	22.00	98.5	156.811
25.216	0.000	1.01	0.00	21.99	98.5	156.677
25.233	0.000	0.99	0.00	21.98	98.4	156.543
25.250	0.000	0.97	0.00	21.97	98.4	156.409
25.266	0.000	0.95	0.00	21.96	98.3	156.275
25.283	0.000	0.93	0.00	21.94	98.3	156.141
25.300	0.000	0.91	0.00	21.93	98.3	156.006
25.316	0.000	0.90	0.00	21.92	98.2	155.872
25.333	0.000	0.88	0.00	21.91	98.2	155.738
25.350	0.000	0.86	0.00	21.90	98.2	155.604
25.366	0.000	0.84	0.00	21.89	98.1	155.470
25.383	0.000	0.82	0.00	21.88	98.1	155.336
25.400	0.000	0.81	0.00	21.87	98.1	155.202
25.416	0.000	0.79	0.00	21.85	98.0	155.068
25.433	0.000	0.77	0.00	21.84	98.0	154.934
25.450	0.000	0.75	0.00	21.83	98.0	154.801
25.466	0.000	0.73	0.00	21.82	97.9	154.667
25.483	0.000	0.71	0.00	21.81	97.9	154.533
25.500	0.000	0.70	0.00	21.80	97.9	154.399
25.516	0.000	0.68	0.00	21.79	97.8	154.265
25.533	0.000	0.66	0.00	21.78	97.8	154.131
25.550	0.000	0.64	0.00	21.76	97.8	153.998
25.566	0.000	0.62	0.00	21.75	97.7	153.864
25.583	0.000	0.61	0.00	21.74	97.7	153.730
25.600	0.000	0.59	0.00	21.73	97.6	153.596
25.616	0.000	0.57	0.00	21.72	97.6	153.463

25.633	0.000	0.55	0.00	21.71	97.6	153.329
25.650	0.000	0.53	0.00	21.70	97.5	153.195
25.666	0.000	0.52	0.00	21.69	97.5	153.062
25.683	0.000	0.50	0.00	21.67	97.5	152.928
25.700	0.000	0.48	0.00	21.66	97.4	152.795
25.716	0.000	0.46	0.00	21.65	97.4	152.661
25.733	0.000	0.45	0.00	21.64	97.4	152.528
25.750	0.000	0.43	0.00	21.63	97.3	152.394
25.766	0.000	0.41	0.00	21.62	97.3	152.261
25.783	0.000	0.39	0.00	21.61	97.3	152.127
25.800	0.000	0.38	0.00	21.60	97.2	151.994
25.816	0.000	0.36	0.00	21.58	97.2	151.861
25.833	0.000	0.34	0.00	21.57	97.2	151.727
25.850	0.000	0.32	0.00	21.56	97.1	151.594
25.866	0.000	0.31	0.00	21.55	97.1	151.461
25.883	0.000	0.29	0.00	21.54	97.1	151.327
25.900	0.000	0.27	0.00	21.53	97.0	151.194
25.916	0.000	0.25	0.00	21.52	97.0	151.061
25.933	0.000	0.24	0.00	21.51	96.9	150.928
25.950	0.000	0.22	0.00	21.49	96.9	150.794
25.966	0.000	0.20	0.00	21.48	96.9	150.661
25.983	0.000	0.19	0.00	21.47	96.8	150.528
26.000	0.000	0.17	0.00	21.46	96.8	150.395
26.016	0.000	0.15	0.00	21.45	96.8	150.262
26.033	0.000	0.13	0.00	21.44	96.7	150.129
26.050	0.000	0.12	0.00	21.43	96.7	149.996
26.066	0.000	0.10	0.00	21.42	96.7	149.863
26.083	0.000	0.08	0.00	21.40	96.6	149.730
26.100	0.000	0.07	0.00	21.39	96.6	149.597
26.116	0.000	0.05	0.00	21.38	96.6	149.464
26.133	0.000	0.03	0.00	21.37	96.5	149.331
26.150	0.000	0.01	0.00	21.36	96.5	149.198
26.166	0.000	0.00	0.00	21.35	96.5	149.065
26.183	0.000	0.00	0.00	21.34	96.4	148.932
26.200	0.000	0.00	0.00	21.33	96.4	148.800
26.216	0.000	0.00	0.00	21.32	96.4	148.667
26.233	0.000	0.00	0.00	21.30	96.3	148.534
26.250	0.000	0.00	0.00	21.29	96.3	148.402
26.266	0.000	0.00	0.00	21.28	96.3	148.269
26.283	0.000	0.00	0.00	21.27	96.2	148.137
26.300	0.000	0.00	0.00	21.26	96.2	148.004
26.316	0.000	0.00	0.00	21.25	96.1	147.872
26.333	0.000	0.00	0.00	21.24	96.1	147.739
26.350	0.000	0.00	0.00	21.23	96.1	147.607
26.366	0.000	0.00	0.00	21.22	96.0	147.475
26.383	0.000	0.00	0.00	21.20	96.0	147.342
26.400	0.000	0.00	0.00	21.19	96.0	147.210
26.416	0.000	0.00	0.00	21.18	95.9	147.078
26.433	0.000	0.00	0.00	21.17	95.9	146.946
26.450	0.000	0.00	0.00	21.16	95.9	146.814
26.466	0.000	0.00	0.00	21.15	95.8	146.682
26.483	0.000	0.00	0.00	21.14	95.8	146.550
26.500	0.000	0.00	0.00	21.13	95.8	146.418
26.516	0.000	0.00	0.00	21.12	95.7	146.286
26.533	0.000	0.00	0.00	21.10	95.7	146.154
26.550	0.000	0.00	0.00	21.09	95.7	146.023
26.566	0.000	0.00	0.00	21.08	95.6	145.891

26.583	0.000	0.00	0.00	21.07	95.6	145.759
26.600	0.000	0.00	0.00	21.06	95.6	145.628
26.616	0.000	0.00	0.00	21.05	95.5	145.496
26.633	0.000	0.00	0.00	21.04	95.5	145.365
26.650	0.000	0.00	0.00	21.03	95.5	145.233
26.666	0.000	0.00	0.00	21.02	95.4	145.102
26.683	0.000	0.00	0.00	21.00	95.4	144.970
26.700	0.000	0.00	0.00	20.99	95.4	144.839
26.716	0.000	0.00	0.00	20.98	95.3	144.708
26.733	0.000	0.00	0.00	20.97	95.3	144.576
26.750	0.000	0.00	0.00	20.96	95.2	144.445
26.766	0.000	0.00	0.00	20.95	95.2	144.314
26.783	0.000	0.00	0.00	20.94	95.2	144.183
26.800	0.000	0.00	0.00	20.93	95.1	144.052
26.816	0.000	0.00	0.00	20.92	95.1	143.921
26.833	0.000	0.00	0.00	20.91	95.1	143.790
26.850	0.000	0.00	0.00	20.89	95.0	143.659
26.866	0.000	0.00	0.00	20.88	95.0	143.528
26.883	0.000	0.00	0.00	20.87	95.0	143.397
26.900	0.000	0.00	0.00	20.86	94.9	143.267
26.916	0.000	0.00	0.00	20.85	94.9	143.136
26.933	0.000	0.00	0.00	20.84	94.9	143.005
26.950	0.000	0.00	0.00	20.83	94.8	142.875
26.966	0.000	0.00	0.00	20.82	94.8	142.744
26.983	0.000	0.00	0.00	20.81	94.8	142.613
27.000	0.000	0.00	0.00	20.80	94.7	142.483
27.016	0.000	0.00	0.00	20.78	94.7	142.353
27.033	0.000	0.00	0.00	20.77	94.7	142.222
27.050	0.000	0.00	0.00	20.76	94.6	142.092
27.066	0.000	0.00	0.00	20.75	94.6	141.962
27.083	0.000	0.00	0.00	20.74	94.6	141.831
27.100	0.000	0.00	0.00	20.73	94.5	141.701
27.116	0.000	0.00	0.00	20.72	94.5	141.571
27.133	0.000	0.00	0.00	20.71	94.5	141.441
27.150	0.000	0.00	0.00	20.70	94.4	141.311
27.166	0.000	0.00	0.00	20.69	94.4	141.181
27.183	0.000	0.00	0.00	20.67	94.4	141.051
27.200	0.000	0.00	0.00	20.66	94.3	140.921
27.216	0.000	0.00	0.00	20.65	94.3	140.791
27.233	0.000	0.00	0.00	20.64	94.3	140.661
27.250	0.000	0.00	0.00	20.63	94.2	140.531
27.266	0.000	0.00	0.00	20.62	94.2	140.402
27.283	0.000	0.00	0.00	20.61	94.2	140.272
27.300	0.000	0.00	0.00	20.60	94.1	140.142
27.316	0.000	0.00	0.00	20.59	94.1	140.013
27.333	0.000	0.00	0.00	20.58	94.1	139.883
27.350	0.000	0.00	0.00	20.57	94.0	139.754
27.366	0.000	0.00	0.00	20.55	94.0	139.624
27.383	0.000	0.00	0.00	20.54	94.0	139.495
27.400	0.000	0.00	0.00	20.53	93.9	139.365
27.416	0.000	0.00	0.00	20.52	93.9	139.236
27.433	0.000	0.00	0.00	20.51	93.8	139.107
27.450	0.000	0.00	0.00	20.50	93.8	138.978
27.466	0.000	0.00	0.00	20.49	93.8	138.848
27.483	0.000	0.00	0.00	20.48	93.7	138.719
27.500	0.000	0.00	0.00	20.47	93.7	138.590
27.516	0.000	0.00	0.00	20.46	93.7	138.461

27.533	0.000	0.00	0.00	20.45	93.6	138.332
27.550	0.000	0.00	0.00	20.43	93.6	138.203
27.566	0.000	0.00	0.00	20.42	93.6	138.074
27.583	0.000	0.00	0.00	20.41	93.5	137.945
27.600	0.000	0.00	0.00	20.40	93.5	137.817
27.616	0.000	0.00	0.00	20.39	93.5	137.688
27.633	0.000	0.00	0.00	20.38	93.4	137.559
27.650	0.000	0.00	0.00	20.37	93.4	137.431
27.666	0.000	0.00	0.00	20.36	93.4	137.302
27.683	0.000	0.00	0.00	20.35	93.3	137.173
27.700	0.000	0.00	0.00	20.34	93.3	137.045
27.716	0.000	0.00	0.00	20.33	93.3	136.916
27.733	0.000	0.00	0.00	20.32	93.2	136.788
27.750	0.000	0.00	0.00	20.30	93.2	136.660
27.766	0.000	0.00	0.00	20.29	93.2	136.531
27.783	0.000	0.00	0.00	20.28	93.1	136.403
27.800	0.000	0.00	0.00	20.27	93.1	136.275
27.816	0.000	0.00	0.00	20.26	93.1	136.146
27.833	0.000	0.00	0.00	20.25	93.0	136.018
27.850	0.000	0.00	0.00	20.24	93.0	135.890
27.866	0.000	0.00	0.00	20.23	93.0	135.762
27.883	0.000	0.00	0.00	20.22	92.9	135.634
27.900	0.000	0.00	0.00	20.21	92.9	135.506
27.916	0.000	0.00	0.00	20.20	92.9	135.378
27.933	0.000	0.00	0.00	20.19	92.8	135.250
27.950	0.000	0.00	0.00	20.18	92.8	135.123
27.966	0.000	0.00	0.00	20.16	92.8	134.995
27.983	0.000	0.00	0.00	20.15	92.7	134.867
28.000	0.000	0.00	0.00	20.14	92.7	134.739
28.016	0.000	0.00	0.00	20.13	92.7	134.612
28.033	0.000	0.00	0.00	20.12	92.6	134.484
28.050	0.000	0.00	0.00	20.11	92.6	134.357
28.066	0.000	0.00	0.00	20.10	92.6	134.229
28.083	0.000	0.00	0.00	20.09	92.5	134.102
28.100	0.000	0.00	0.00	20.08	92.5	133.974
28.116	0.000	0.00	0.00	20.07	92.5	133.847
28.133	0.000	0.00	0.00	20.06	92.4	133.719
28.150	0.000	0.00	0.00	20.05	92.4	133.592
28.166	0.000	0.00	0.00	20.04	92.4	133.465
28.183	0.000	0.00	0.00	20.03	92.3	133.338
28.200	0.000	0.00	0.00	20.01	92.3	133.211
28.216	0.000	0.00	0.00	20.00	92.3	133.084
28.233	0.000	0.00	0.00	19.99	92.2	132.957
28.250	0.000	0.00	0.00	19.98	92.2	132.830
28.266	0.000	0.00	0.00	19.97	92.2	132.703
28.283	0.000	0.00	0.00	19.96	92.1	132.576
28.300	0.000	0.00	0.00	19.95	92.1	132.449
28.316	0.000	0.00	0.00	19.94	92.1	132.322
28.333	0.000	0.00	0.00	19.93	92.0	132.195
28.350	0.000	0.00	0.00	19.92	92.0	132.069
28.366	0.000	0.00	0.00	19.91	92.0	131.942
28.383	0.000	0.00	0.00	19.90	91.9	131.815
28.400	0.000	0.00	0.00	19.89	91.9	131.689
28.416	0.000	0.00	0.00	19.88	91.9	131.562
28.433	0.000	0.00	0.00	19.87	91.8	131.436
28.450	0.000	0.00	0.00	19.85	91.8	131.309
28.466	0.000	0.00	0.00	19.84	91.8	131.183

28.483	0.000	0.00	0.00	19.83	91.7	131.056
28.500	0.000	0.00	0.00	19.82	91.7	130.930
28.516	0.000	0.00	0.00	19.81	91.7	130.804
28.533	0.000	0.00	0.00	19.80	91.6	130.678
28.550	0.000	0.00	0.00	19.79	91.6	130.551
28.566	0.000	0.00	0.00	19.78	91.6	130.425
28.583	0.000	0.00	0.00	19.77	91.5	130.299
28.600	0.000	0.00	0.00	19.76	91.5	130.173
28.616	0.000	0.00	0.00	19.75	91.5	130.047
28.633	0.000	0.00	0.00	19.74	91.4	129.921
28.650	0.000	0.00	0.00	19.73	91.4	129.795
28.666	0.000	0.00	0.00	19.72	91.4	129.669
28.683	0.000	0.00	0.00	19.71	91.3	129.544
28.700	0.000	0.00	0.00	19.70	91.3	129.418
28.716	0.000	0.00	0.00	19.68	91.3	129.292
28.733	0.000	0.00	0.00	19.67	91.2	129.166
28.750	0.000	0.00	0.00	19.66	91.2	129.041
28.766	0.000	0.00	0.00	19.65	91.2	128.915
28.783	0.000	0.00	0.00	19.64	91.1	128.790
28.800	0.000	0.00	0.00	19.63	91.1	128.664
28.816	0.000	0.00	0.00	19.62	91.1	128.539
28.833	0.000	0.00	0.00	19.61	91.0	128.413
28.850	0.000	0.00	0.00	19.60	91.0	128.288
28.866	0.000	0.00	0.00	19.59	91.0	128.163
28.883	0.000	0.00	0.00	19.58	90.9	128.037
28.900	0.000	0.00	0.00	19.57	90.9	127.912
28.916	0.000	0.00	0.00	19.56	90.9	127.787
28.933	0.000	0.00	0.00	19.55	90.8	127.662
28.950	0.000	0.00	0.00	19.54	90.8	127.537
28.966	0.000	0.00	0.00	19.53	90.8	127.412
28.983	0.000	0.00	0.00	19.52	90.8	127.287
29.000	0.000	0.00	0.00	19.51	90.7	127.162
29.016	0.000	0.00	0.00	19.50	90.7	127.037
29.033	0.000	0.00	0.00	19.48	90.7	126.912
29.050	0.000	0.00	0.00	19.47	90.6	126.787
29.066	0.000	0.00	0.00	19.46	90.6	126.662
29.083	0.000	0.00	0.00	19.45	90.6	126.538
29.100	0.000	0.00	0.00	19.44	90.5	126.413
29.116	0.000	0.00	0.00	19.43	90.5	126.288
29.133	0.000	0.00	0.00	19.42	90.5	126.164
29.150	0.000	0.00	0.00	19.41	90.4	126.039
29.166	0.000	0.00	0.00	19.40	90.4	125.915
29.183	0.000	0.00	0.00	19.39	90.4	125.790
29.200	0.000	0.00	0.00	19.38	90.3	125.666
29.216	0.000	0.00	0.00	19.37	90.3	125.541
29.233	0.000	0.00	0.00	19.36	90.3	125.417
29.250	0.000	0.00	0.00	19.35	90.2	125.293
29.266	0.000	0.00	0.00	19.34	90.2	125.169
29.283	0.000	0.00	0.00	19.33	90.2	125.044
29.300	0.000	0.00	0.00	19.32	90.1	124.920
29.316	0.000	0.00	0.00	19.31	90.1	124.796
29.333	0.000	0.00	0.00	19.30	90.1	124.672
29.350	0.000	0.00	0.00	19.29	90.0	124.548
29.366	0.000	0.00	0.00	19.28	90.0	124.424
29.383	0.000	0.00	0.00	19.26	90.0	124.300
29.400	0.000	0.00	0.00	19.25	89.9	124.176
29.416	0.000	0.00	0.00	19.24	89.9	124.052

29.433	0.000	0.00	0.00	19.23	89.9	123.929
29.450	0.000	0.00	0.00	19.22	89.8	123.805
29.466	0.000	0.00	0.00	19.21	89.8	123.681
29.483	0.000	0.00	0.00	19.20	89.8	123.558
29.500	0.000	0.00	0.00	19.19	89.7	123.434
29.516	0.000	0.00	0.00	19.18	89.7	123.310
29.533	0.000	0.00	0.00	19.17	89.7	123.187
29.550	0.000	0.00	0.00	19.16	89.6	123.063
29.566	0.000	0.00	0.00	19.15	89.6	122.940
29.583	0.000	0.00	0.00	19.14	89.6	122.817
29.600	0.000	0.00	0.00	19.13	89.5	122.693
29.616	0.000	0.00	0.00	19.12	89.5	122.570
29.633	0.000	0.00	0.00	19.11	89.5	122.447
29.650	0.000	0.00	0.00	19.10	89.4	122.324
29.666	0.000	0.00	0.00	19.09	89.4	122.200
29.683	0.000	0.00	0.00	19.08	89.4	122.077
29.700	0.000	0.00	0.00	19.07	89.4	121.954
29.716	0.000	0.00	0.00	19.06	89.3	121.831
29.733	0.000	0.00	0.00	19.05	89.3	121.708
29.750	0.000	0.00	0.00	19.04	89.3	121.585
29.766	0.000	0.00	0.00	19.03	89.2	121.462
29.783	0.000	0.00	0.00	19.02	89.2	121.339
29.800	0.000	0.00	0.00	19.01	89.2	121.217
29.816	0.000	0.00	0.00	18.99	89.1	121.094
29.833	0.000	0.00	0.00	18.98	89.1	120.971
29.850	0.000	0.00	0.00	18.97	89.1	120.848
29.866	0.000	0.00	0.00	18.96	89.0	120.726
29.883	0.000	0.00	0.00	18.95	89.0	120.603
29.900	0.000	0.00	0.00	18.94	89.0	120.481
29.916	0.000	0.00	0.00	18.93	88.9	120.358
29.933	0.000	0.00	0.00	18.92	88.9	120.236
29.950	0.000	0.00	0.00	18.91	88.9	120.113
29.966	0.000	0.00	0.00	18.90	88.8	119.991
29.983	0.000	0.00	0.00	18.89	88.8	119.869
30.000	0.000	0.00	0.00	18.88	88.8	119.746

PROCESS SUMMARY OF STORAGE:

INFLOW VOLUME = 297.697 AF

BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)

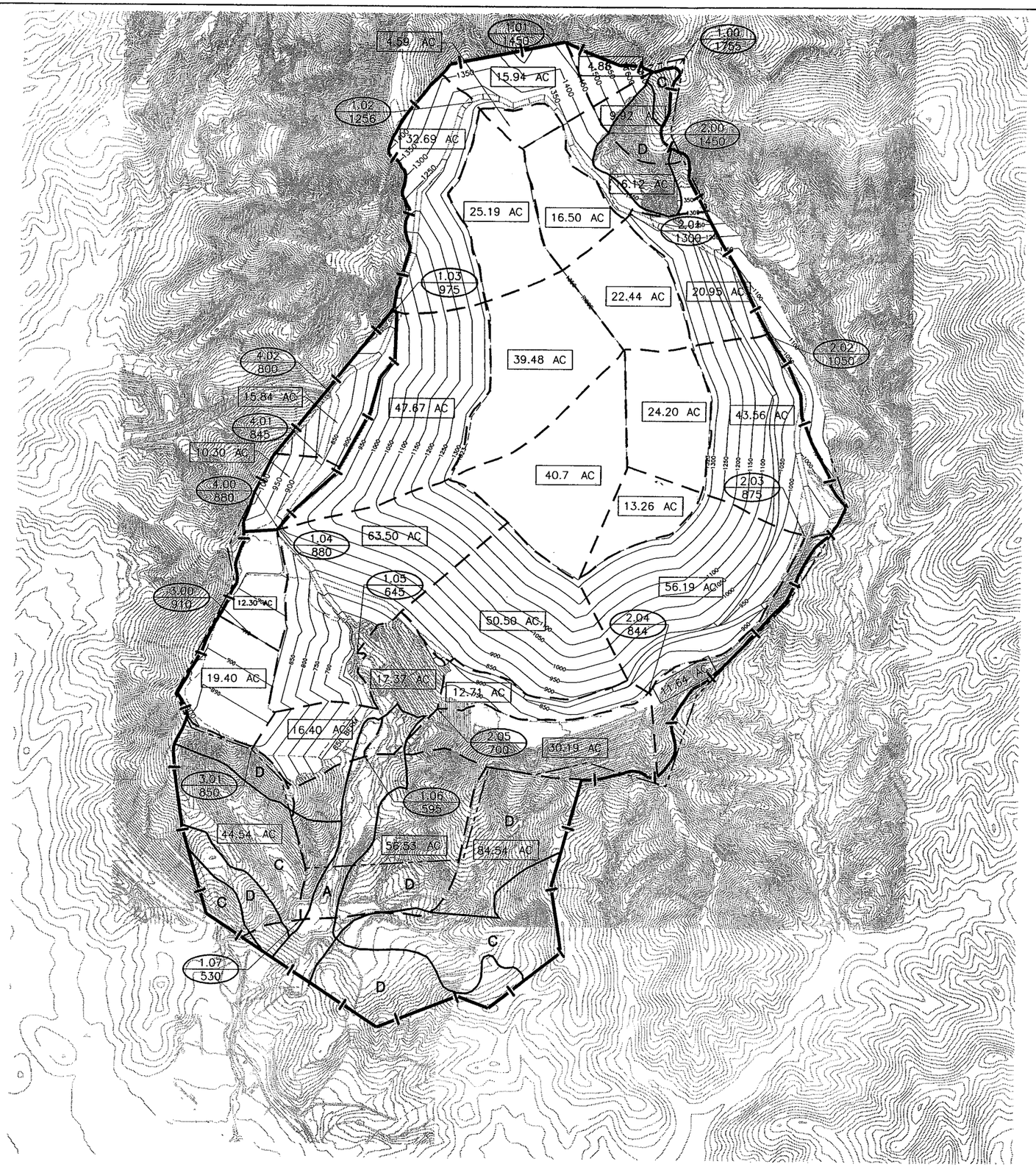
OUTFLOW VOLUME = 297.695 AF

LOSS VOLUME = 0.000 AF

==========

END OF FLOODSCx ROUTING ANALYSIS

HYDROLOGY ANALYSIS
MDP 2005



DATE OF TOPOGRAPHY: OCTOBER 4, 2005

RATIONAL METHOD					
NODE NO.	SUB AREA (ACRES)	SUB AREA RUNOFF (CFS)	TOTAL AREA (ACRES)	Tc MAINLINE (MIN)	DESCRIPTION
1.00–1.01	4.88	14.07	4.88	14.19	INITIAL
1.01–1.02	20.53	57.22	25.41	15.02	
1.02–1.03	57.88	152.96	83.29	16.46	
1.03–1.04	87.15	214.78	170.44	18.43	
1.04–1.05	167.00	403.55	337.44	19.03	
1.05–1.06	17.37	40.79	354.81	19.61	CONFLUENCE
1.00–2.00	9.92	28.58	9.92	14.19	INITIAL
2.00–2.01	32.62	92.89	42.54	14.56	
2.01–2.02	43.39	118.34	85.93	15.62	
2.02–2.03	67.76	176.42	153.69	16.85	
2.03–2.04	81.09	194.90	234.78	19.20	
2.04–2.05	42.90	99.41	277.68	20.33	
2.05–1.06	0.00	0.00	277.68	20.73	CONFLUENCE
3.00–3.01	19.40	44.34	19.40	20.80	INITIAL
3.01–1.06	16.40	36.49	35.80	21.46	CONFLUENCE
1.06			668.30	19.61	CONFLUENCE
1.06–1.07	185.61	412.25	853.91	21.12	END
4.00–4.01	10.30	25.16	10.30	18.70	INITIAL
4.01–4.02	15.84	37.86	26.14	19.37	END

UNIT HYDROGRAPH 1.00 – 1.07	
AREA	853.91 ACRES
PEAK RUNOFF	2135 CFS
RUNOFF VOLUME	296 ACRE–FEET
Fm	0.21
F*	0.30

N

GRAPHIC SCALE

500 250 0 500 1000

(IN FEET)

LEGEND

- EXISTING GROUND CONTOUR
- 900 — PROPOSED CONTOUR
- DRAINAGE TRIBUTARY AREA
- DRAINAGE SUB–AREA
- SOIL TYPE BOUNDARY
- PROPERTY LINE
- 1.00 / 725 — NODE NAME / ELEVATION — NODE DESCRIPTION
- 10.00 AC — AREA IN ACRES

MARK	DATE	DESCRIPTION

REVISIONS

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER BRYAN A. STIRRAT No. 22631 Exp. 12–31–05 CIVIL STATE OF CALIFORNIA

DATE

BAS

BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765
(909) 860–7777

COUNTY OF ORANGE
INTEGRATED WASTE MANAGEMENT DEPARTMENT

FRANK R. BOWERMAN LANDFILL MASTER DEVELOPMENT PLAN

HYDROLOGY MAP

DESIGNED R.M.G./J.A.W.			SHEET
DRAWN D.C.R.		CHECKED M.A.C.	1
SCALE	DATE	DRAWING NO.	OF 1
AS SHOWN	03–2006	2421408	

```
****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
             (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2005 Advanced Engineering Software (aes)
              Ver. 11.0  Release Date: 06/01/2005  License ID 1211

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* 100 YEAR HYDROLOGY STUDY MASTER DEVELOPMENT PLAN                         *
* 2005 RERUN OF 2004 PARAMETERS FOR BASIN BEE CANYON                       *
* CHM                                                                      *
 **************************************************************************

  FILE NAME: FRBMDP.DAT
  TIME/DATE OF STUDY: 13:34 03/27/2006
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  24.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

  UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
    WATERSHED LAG = 0.80 * Tc
    MOUNTAIN S-GRAPH USED.
    SIERRA MADRE DEPTH-AREA FACTORS USED.
                      AREA-AVERAGED
         DURATION    RAINFALL(INCH)
         5-MINUTES         0.52
        30-MINUTES         1.09
         1-HOUR            1.45
```

```
        3-HOUR            2.43
        6-HOUR            3.36
       24-HOUR            5.63
*ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR UNIT HYDROGRAPH METHOD*


****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
  ELEVATION DATA: UPSTREAM(FEET) =   1755.00  DOWNSTREAM(FEET) =   1450.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.189
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.404
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                D        4.88      0.20     1.000    96   14.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     14.07
  TOTAL AREA(ACRES) =      4.88   PEAK FLOW RATE(CFS) =     14.07

****************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1450.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1256.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.297
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       15.94      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     36.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  21.94
  AVERAGE FLOW DEPTH(FEET) =   0.54   FLOOD WIDTH(FEET) =    5.77
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.84   Tc(MIN.) =  15.02
  SUBAREA AREA(ACRES) =   15.94       SUBAREA RUNOFF(CFS) =   44.43
  EFFECTIVE AREA(ACRES) =   20.82     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     20.82         PEAK FLOW RATE(CFS) =      58.04
```

```
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  0.65   FLOOD WIDTH(FEET) =    6.89
FLOW VELOCITY(FEET/SEC.) =  24.60   DEPTH*VELOCITY(FT*FT/SEC) =  15.97
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.02 =  2100.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  15.02
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.297
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D        4.59      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =    4.59      SUBAREA RUNOFF(CFS) =   12.79
EFFECTIVE AREA(ACRES) =     25.41   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =     25.41       PEAK FLOW RATE(CFS) =      70.83

****************************************************************************
FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  91
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =   1256.00
DOWNSTREAM NODE ELEVATION(FEET) =    975.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  2200.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.136
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       32.69      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    113.80
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  25.51
AVERAGE FLOW DEPTH(FEET) =   0.91   FLOOD WIDTH(FEET) =    9.46
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =  16.46
SUBAREA AREA(ACRES) =   32.69       SUBAREA RUNOFF(CFS) =   86.39
EFFECTIVE AREA(ACRES) =   58.10     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =     58.10         PEAK FLOW RATE(CFS) =     153.54

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.02   FLOOD WIDTH(FEET) =   10.59
FLOW VELOCITY(FEET/SEC.) =  27.43   DEPTH*VELOCITY(FT*FT/SEC) =  27.97
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.03 =  4300.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  16.46
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.136
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       25.19      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   25.19      SUBAREA RUNOFF(CFS) =   66.57
  EFFECTIVE AREA(ACRES) =     83.29   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     83.29       PEAK FLOW RATE(CFS) =     220.11

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    975.00
  DOWNSTREAM NODE ELEVATION(FEET) =    880.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2400.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.938
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       47.67      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    278.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  20.34
  AVERAGE FLOW DEPTH(FEET) =   1.62   FLOOD WIDTH(FEET) =   16.56
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =  18.43
  SUBAREA AREA(ACRES) =   47.67      SUBAREA RUNOFF(CFS) =  117.48
  EFFECTIVE AREA(ACRES) =  130.96     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    130.96         PEAK FLOW RATE(CFS) =     322.75

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.71   FLOOD WIDTH(FEET) =   17.52
  FLOW VELOCITY(FEET/SEC.) =  21.06   DEPTH*VELOCITY(FT*FT/SEC) =  36.04
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.04 =  6700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN) =  18.43
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.938
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                 D       39.48      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   39.48       SUBAREA RUNOFF(CFS) =   97.30
  EFFECTIVE AREA(ACRES) =    170.44   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    170.44        PEAK FLOW RATE(CFS) =     420.05

****************************************************************************
  FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
================================================================================
  UPSTREAM NODE ELEVATION(FEET) =    880.00
  DOWNSTREAM NODE ELEVATION(FEET) =    645.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1450.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.885
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                 D       63.50      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    496.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  39.88
  AVERAGE FLOW DEPTH(FEET) =   1.54   FLOOD WIDTH(FEET) =   15.79
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.61   Tc(MIN.) =  19.03
  SUBAREA AREA(ACRES) =   63.50       SUBAREA RUNOFF(CFS) =  153.45
  EFFECTIVE AREA(ACRES) =  233.94     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    233.94         PEAK FLOW RATE(CFS) =     565.32

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.62   FLOOD WIDTH(FEET) =   16.59
  FLOW VELOCITY(FEET/SEC.) =  41.13   DEPTH*VELOCITY(FT*FT/SEC) =  66.59
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.05 =  8150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN) =  19.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.885
```

```
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                 D       40.70      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   40.70      SUBAREA RUNOFF(CFS) =   98.35
EFFECTIVE AREA(ACRES) =    274.64   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    274.64       PEAK FLOW RATE(CFS) =     663.68

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  19.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.885
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                 D       50.50      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   50.50      SUBAREA RUNOFF(CFS) =  122.03
EFFECTIVE AREA(ACRES) =    325.14   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    325.14       PEAK FLOW RATE(CFS) =     785.71

****************************************************************************
FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  19.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.885
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                 D       12.30      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   12.30      SUBAREA RUNOFF(CFS) =   29.72
EFFECTIVE AREA(ACRES) =    337.44   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    337.44       PEAK FLOW RATE(CFS) =     815.43

****************************************************************************
FLOW PROCESS FROM NODE      1.05 TO NODE      1.06 IS CODE =  91
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    645.00
DOWNSTREAM NODE ELEVATION(FEET) =    595.00
```

```
CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.835
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       14.04      0.20     1.000    96
NATURAL FAIR COVER
"OPEN BRUSH"                A        3.33      0.40     1.000    66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.24
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    835.73
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  29.05
AVERAGE FLOW DEPTH(FEET) =   2.36   FLOOD WIDTH(FEET) =   23.99
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.57   Tc(MIN.) =  19.61
SUBAREA AREA(ACRES) =   17.37       SUBAREA RUNOFF(CFS) =   40.59
EFFECTIVE AREA(ACRES) =  354.81     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    354.81         PEAK FLOW RATE(CFS) =     840.69

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  2.37   FLOOD WIDTH(FEET) =   24.05
FLOW VELOCITY(FEET/SEC.) =  29.08   DEPTH*VELOCITY(FT*FT/SEC) =  68.77
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.06 =  9150.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.05 TO NODE      1.06 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  19.61
RAINFALL INTENSITY(INCH/HR) =   2.83
AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  1.00
EFFECTIVE STREAM AREA(ACRES) =   354.81
TOTAL STREAM AREA(ACRES) =   354.81
PEAK FLOW RATE(CFS) AT CONFLUENCE =    840.69

****************************************************************************
FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =  1000.00
ELEVATION DATA: UPSTREAM(FEET) =   1755.00  DOWNSTREAM(FEET) =   1450.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   14.189
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.417
```

```
SUBAREA Tc AND LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA       Fp          Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH"                D        6.82      0.20      1.000    96   14.19
NATURAL FAIR COVER
"OPEN BRUSH"                C        3.10      0.25      1.000    92   14.19
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.22
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA RUNOFF(CFS) =      28.58
TOTAL AREA(ACRES) =       9.92   PEAK FLOW RATE(CFS) =     28.58

****************************************************************************
 FLOW PROCESS FROM NODE       2.00 TO NODE       2.01 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1450.00
 DOWNSTREAM NODE ELEVATION(FEET) =   1300.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00
 "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
 PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
 MAXIMUM DEPTH(FEET) =   5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA       Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "OPEN BRUSH"                D       16.12      0.20      1.000    96
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     51.51
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  27.30
 AVERAGE FLOW DEPTH(FEET) =   0.58   FLOOD WIDTH(FEET) =    6.17
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.37   Tc(MIN.) =  14.56
 SUBAREA AREA(ACRES) =   16.12       SUBAREA RUNOFF(CFS) =   45.90
 EFFECTIVE AREA(ACRES) =   26.04     AREA-AVERAGED Fm(INCH/HR) =   0.21
 AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =     26.04         PEAK FLOW RATE(CFS) =      74.01

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.67   FLOOD WIDTH(FEET) =    7.07
 FLOW VELOCITY(FEET/SEC.) =  29.77   DEPTH*VELOCITY(FT*FT/SEC) =  19.87
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.01 =  1600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE       2.00 TO NODE       2.01 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  14.56
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA       Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
```

```
"OPEN BRUSH"                D       16.50      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   16.50      SUBAREA RUNOFF(CFS) =   46.99
EFFECTIVE AREA(ACRES) =     42.54   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =     42.54       PEAK FLOW RATE(CFS) =     121.00

****************************************************************************
FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  91
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =   1300.00
DOWNSTREAM NODE ELEVATION(FEET) =   1050.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1800.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.230
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       20.95      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    149.56
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  28.12
AVERAGE FLOW DEPTH(FEET) =   0.99   FLOOD WIDTH(FEET) =   10.33
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.07   Tc(MIN.) =  15.62
SUBAREA AREA(ACRES) =   20.95       SUBAREA RUNOFF(CFS) =   57.14
EFFECTIVE AREA(ACRES) =   63.49     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =     63.49         PEAK FLOW RATE(CFS) =     173.02

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.05   FLOOD WIDTH(FEET) =   10.91
FLOW VELOCITY(FEET/SEC.) =  29.16   DEPTH*VELOCITY(FT*FT/SEC) =  30.64
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.02 =  3400.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  15.62
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.230
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       22.44      0.20     1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   22.44      SUBAREA RUNOFF(CFS) =   61.20
```

```
  EFFECTIVE AREA(ACRES) =      85.93   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      85.93       PEAK FLOW RATE(CFS) =     234.22

****************************************************************************
  FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1050.00
  DOWNSTREAM NODE ELEVATION(FEET) =    875.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2030.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.093
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       43.56      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    290.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  27.56
  AVERAGE FLOW DEPTH(FEET) =   1.41   FLOOD WIDTH(FEET) =   14.54
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.23   Tc(MIN.) =  16.85
  SUBAREA AREA(ACRES) =   43.56       SUBAREA RUNOFF(CFS) =  113.41
  EFFECTIVE AREA(ACRES) =  129.49     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    129.49         PEAK FLOW RATE(CFS) =     337.00

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.50   FLOOD WIDTH(FEET) =   15.37
  FLOW VELOCITY(FEET/SEC.) =  28.57   DEPTH*VELOCITY(FT*FT/SEC) =  42.76
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.03 =  5430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  16.85
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.093
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       24.20      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   24.20       SUBAREA RUNOFF(CFS) =   63.01
  EFFECTIVE AREA(ACRES) =    153.69   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    153.69       PEAK FLOW RATE(CFS) =     400.00
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    875.00
  DOWNSTREAM NODE ELEVATION(FEET) =    844.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2200.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.871
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       56.19      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    467.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  15.61
  AVERAGE FLOW DEPTH(FEET) =   2.41   FLOOD WIDTH(FEET) =   24.48
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.35   Tc(MIN.) =  19.20
  SUBAREA AREA(ACRES) =   56.19       SUBAREA RUNOFF(CFS) =  135.05
  EFFECTIVE AREA(ACRES) =  209.88     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    209.88         PEAK FLOW RATE(CFS) =     504.31

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  2.48   FLOOD WIDTH(FEET) =   25.19
  FLOW VELOCITY(FEET/SEC.) =  15.91   DEPTH*VELOCITY(FT*FT/SEC) =  39.43
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.04 =  7630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  19.20
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.871
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       13.26      0.20     1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   13.26       SUBAREA RUNOFF(CFS) =   31.87
  EFFECTIVE AREA(ACRES) =    223.14   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    223.14        PEAK FLOW RATE(CFS) =     536.18

****************************************************************************
  FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  MAINLINE Tc(MIN) =  19.20
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.871
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                 D       11.64      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   11.64      SUBAREA RUNOFF(CFS) =   27.98
  EFFECTIVE AREA(ACRES) =    234.78   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    234.78       PEAK FLOW RATE(CFS) =     564.16

******************************************************************************
  FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  91
------------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    844.00
  DOWNSTREAM NODE ELEVATION(FEET) =    700.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2050.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.775
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                 D       12.71      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    578.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  30.19
  AVERAGE FLOW DEPTH(FEET) =   1.92   FLOOD WIDTH(FEET) =   19.59
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.13   Tc(MIN.) =  20.33
  SUBAREA AREA(ACRES) =   12.71      SUBAREA RUNOFF(CFS) =   29.45
  EFFECTIVE AREA(ACRES) =  247.49     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =    247.49         PEAK FLOW RATE(CFS) =     573.40

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  1.91   FLOOD WIDTH(FEET) =   19.52
  FLOW VELOCITY(FEET/SEC.) =  30.12   DEPTH*VELOCITY(FT*FT/SEC) =  57.59
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.05 =  9680.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN) =  20.33
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.775
  SUBAREA LOSS RATE DATA(AMC III):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       30.19      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   30.19      SUBAREA RUNOFF(CFS) =   69.96
EFFECTIVE AREA(ACRES) =    277.68   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    277.68       PEAK FLOW RATE(CFS) =     643.37

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      1.06 IS CODE =  91
----------------------------------------------------------------------------
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
UPSTREAM NODE ELEVATION(FEET) =    700.00
DOWNSTREAM NODE ELEVATION(FEET) =    595.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00
"V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
MAXIMUM DEPTH(FEET) =   5.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.745
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D        0.01      0.20      1.000    96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    643.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  37.51
AVERAGE FLOW DEPTH(FEET) =   1.81   FLOOD WIDTH(FEET) =   18.53
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.40   Tc(MIN.) =  20.73
SUBAREA AREA(ACRES) =    0.01       SUBAREA RUNOFF(CFS) =    0.02
EFFECTIVE AREA(ACRES) =  277.69     AREA-AVERAGED Fm(INCH/HR) =   0.20
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
TOTAL AREA(ACRES) =    277.69         PEAK FLOW RATE(CFS) =     643.37
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  1.81   FLOOD WIDTH(FEET) =   18.53
FLOW VELOCITY(FEET/SEC.) =  37.51   DEPTH*VELOCITY(FT*FT/SEC) =  68.00
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.06 = 10580.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      2.05 TO NODE      1.06 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  20.73
RAINFALL INTENSITY(INCH/HR) =   2.74
AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20
```

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =   277.69
  TOTAL STREAM AREA(ACRES) =   277.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    643.37

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.01 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1100.00
  ELEVATION DATA: UPSTREAM(FEET) =    910.00  DOWNSTREAM(FEET) =    850.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   20.797
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.739
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       19.40      0.20     1.000    96   20.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     44.34
  TOTAL AREA(ACRES) =     19.40   PEAK FLOW RATE(CFS) =     44.34

****************************************************************************
  FLOW PROCESS FROM NODE      3.01 TO NODE      1.06 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    850.00
  DOWNSTREAM NODE ELEVATION(FEET) =    595.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1100.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.689
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       15.03      0.20     1.000    96
  NATURAL FAIR COVER
  "OPEN BRUSH"                A        1.37      0.40     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.22
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     62.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  27.78
  AVERAGE FLOW DEPTH(FEET) =   0.63   FLOOD WIDTH(FEET) =    6.73
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.66   Tc(MIN.) =  21.46
  SUBAREA AREA(ACRES) =   16.40       SUBAREA RUNOFF(CFS) =   36.49
  EFFECTIVE AREA(ACRES) =   35.80     AREA-AVERAGED Fm(INCH/HR) =   0.21
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     35.80         PEAK FLOW RATE(CFS) =      79.96
```

```
END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  0.70   FLOOD WIDTH(FEET) =    7.40
FLOW VELOCITY(FEET/SEC.) =  29.38   DEPTH*VELOCITY(FT*FT/SEC) =  20.56
LONGEST FLOWPATH FROM NODE      3.00 TO NODE      1.06 =  2200.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.01 TO NODE      1.06 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
TIME OF CONCENTRATION(MIN.) =  21.46
RAINFALL INTENSITY(INCH/HR) =   2.69
AREA-AVERAGED Fm(INCH/HR) =  0.21
AREA-AVERAGED Fp(INCH/HR) =  0.21
AREA-AVERAGED Ap =  1.00
EFFECTIVE STREAM AREA(ACRES) =    35.80
TOTAL STREAM AREA(ACRES) =    35.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =     79.96

** CONFLUENCE DATA **
 STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1    840.69  19.61    2.835  0.20( 0.20) 1.00   354.8       1.00
    2    643.37  20.73    2.745  0.20( 0.20) 1.00   277.7       1.00
    3     79.96  21.46    2.689  0.21( 0.21) 1.00    35.8       3.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  3 STREAMS.

** PEAK FLOW RATE TABLE **
 STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1   1548.09  19.61    2.835  0.20( 0.20) 1.00   650.2       1.00
    2   1534.28  20.73    2.745  0.20( 0.20) 1.00   667.1       1.00
    3   1503.63  21.46    2.689  0.20( 0.20) 1.00   668.3       3.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =   1548.09    Tc(MIN.) =    19.61
EFFECTIVE AREA(ACRES) =   650.18   AREA-AVERAGED Fm(INCH/HR) =  0.20
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    668.30
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      1.06 = 10580.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.06 TO NODE      1.07 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    595.00  DOWNSTREAM(FEET) =    530.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1900.00   CHANNEL SLOPE =  0.0342
CHANNEL FLOW THRU SUBAREA(CFS) =   1548.09
FLOW VELOCITY(FEET/SEC) =  20.93 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
  TRAVEL TIME(MIN.) =    1.51    Tc(MIN.) =  21.12
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE       1.07 = 12480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       1.06 TO NODE       1.07 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1700.00
  ELEVATION DATA: UPSTREAM(FEET) =    595.00  DOWNSTREAM(FEET) =    530.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   26.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.378
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                 D       38.68      0.20     1.000    96   26.58
  NATURAL FAIR COVER
  "OPEN BRUSH"                 C        5.74      0.25     1.000    92   26.58
  NATURAL FAIR COVER
  "OPEN BRUSH"                 A       12.11      0.40     1.000    66   26.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   56.53   INITIAL SUBAREA RUNOFF(CFS) =  108.37

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN) =  21.12
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.715
  SUBAREA AREA(ACRES) =   56.53      SUBAREA RUNOFF(CFS) =  125.51
  EFFECTIVE AREA(ACRES) =    706.71   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    724.83       PEAK FLOW RATE(CFS) =    1596.14

****************************************************************************
  FLOW PROCESS FROM NODE       1.06 TO NODE       1.07 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2400.00
  ELEVATION DATA: UPSTREAM(FEET) =    910.00  DOWNSTREAM(FEET) =    530.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   22.960
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.582
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                 D       14.64      0.20     1.000    96   22.96
  NATURAL FAIR COVER
  "OPEN BRUSH"                 C       29.90      0.25     1.000    92   22.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```

```
SUBAREA AREA(ACRES) =   44.54   INITIAL SUBAREA RUNOFF(CFS) =   94.16

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
MAINLINE Tc(MIN) =  21.12
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.715
SUBAREA AREA(ACRES) =   44.54      SUBAREA RUNOFF(CFS) =   99.46
EFFECTIVE AREA(ACRES) =    751.25   AREA-AVERAGED Fm(INCH/HR) =  0.21
AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    769.37       PEAK FLOW RATE(CFS) =    1695.60

****************************************************************************
FLOW PROCESS FROM NODE      1.06 TO NODE      1.07 IS CODE =  82
----------------------------------------------------------------------------
>>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
>>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =  3300.00
ELEVATION DATA: UPSTREAM(FEET) =   1010.00  DOWNSTREAM(FEET) =    530.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   26.526
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.381
SUBAREA Tc AND LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH"               D       46.83      0.20     1.000    96   26.53
NATURAL FAIR COVER
"OPEN BRUSH"               C       32.60      0.25     1.000    92   26.53
NATURAL FAIR COVER
"OPEN BRUSH"               A        5.11      0.40     1.000    66   26.53
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.23
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA AREA(ACRES) =   84.54   INITIAL SUBAREA RUNOFF(CFS) =  163.53

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
MAINLINE Tc(MIN) =  21.12
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.715
SUBAREA AREA(ACRES) =   84.54      SUBAREA RUNOFF(CFS) =  188.96
EFFECTIVE AREA(ACRES) =    835.79   AREA-AVERAGED Fm(INCH/HR) =  0.21
AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    853.91       PEAK FLOW RATE(CFS) =    1884.56

****************************************************************************
FLOW PROCESS FROM NODE      4.00 TO NODE      4.01 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   770.00
ELEVATION DATA: UPSTREAM(FEET) =    880.00  DOWNSTREAM(FEET) =    845.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   18.702
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.914
SUBAREA Tc AND LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
     LAND USE              GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       10.30      0.20      1.000    96   18.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     25.16
  TOTAL AREA(ACRES) =     10.30   PEAK FLOW RATE(CFS) =     25.16

****************************************************************************
  FLOW PROCESS FROM NODE      4.01 TO NODE      4.02 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    845.00
  DOWNSTREAM NODE ELEVATION(FEET) =    800.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   645.00
  "V" GUTTER WIDTH(FEET) =   1.00   GUTTER HIKE(FEET) =  0.050
  PAVEMENT LIP(FEET) =  0.010   MANNING'S N = .0130
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.20000
  MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.856
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "OPEN BRUSH"                D       15.84      0.20      1.000    96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     44.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  16.14
  AVERAGE FLOW DEPTH(FEET) =   0.70   FLOOD WIDTH(FEET) =    7.41
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =  19.37
  SUBAREA AREA(ACRES) =   15.84       SUBAREA RUNOFF(CFS) =   37.86
  EFFECTIVE AREA(ACRES) =   26.14     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =     26.14         PEAK FLOW RATE(CFS) =      62.48

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOOD WIDTH(FEET) =    8.45
  FLOW VELOCITY(FEET/SEC.) =  17.58   DEPTH*VELOCITY(FT*FT/SEC) =  14.15
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      4.02 =  1415.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =     26.14  TC(MIN.) =     19.37
  EFFECTIVE AREA(ACRES) =     26.14  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)    =     62.48
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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FRB MDP (2005)
UNIT HYDROGRAPH CALCULATIONS

Lag Time

Lag Time = 0.8 T_C

Where:
T_C = Time of Concentration = 21.12 min
Note: T_C is obtained from Rational Method Hydrology study at entrance to basin.

Lag Time = 0.8 (21.12 min) (1 hr / 60 min) = 0.2816 hr

<u>Lag Time = 0.282 hr</u>

Maximum Loss Rate

$F_M = a_P F_P$

Where:
F_M = maximum loss rate
a_p = pervious loss rate (inches / hour) =
F_P = maximum loss rate for pervious area (inches / hour)

a_p = 100% or 1.0 (site is 0% impervious = 100% pervious)

$$F_P = \frac{(A_A F_{pA}) + (A_B F_{pB}) + (A_C F_{pC}) + (A_D F_{pD})}{A_A + A_B + A_C + A_D}$$

$$F_P = \frac{((21.92)(0.40)) + ((0)(0.30)) + ((71.34)(0.25)) + ((744.14)(0.20))}{21.92 + 0 + 71.34 + 744.14}$$

$F_P = 0.209$

$F_M = (1.0)\ (.209) = 0.21$

<u>$F_M = 0.21$</u>

Low Loss Rate

$F^* = Y' * I$

Where:
F* = low loss rate (inches / hour)
Y' = catchment low loss fraction = 1 – Y
Y = catchment 24-hour storm runoff yield fraction
I = rainfall intensity = 2.689 (inch / hour)
Note: I is obtained from Rational Method Hydrology study at entrance to basin.

$Y = Y_j$ for single area sites
Y_j = 24-hour storm runoff yield fraction

$$Y_j = \frac{(P_{24} - I_a)^2}{(P_{24} - I_a + S)P_{24}}$$

Where:
P_{24} = 24-hour storm rainfall = 5.63 inch
I_a = initial abstraction = (0.2) S

$$S = \frac{1000}{CN} - 10$$

$$CN = \frac{(A_A CN_A) + (A_B CN_B) + (A_C CN_C) + (A_D CN_D)}{A_A + A_B + A_C + A_D}$$

$$CN = \frac{((21.92)(66)) + ((0)(N/A)) + ((71.34)(92)) + ((744.14)(96))}{21.92 + 0 + 71.34 + 744.14}$$

CN = 94.87

$$S = \frac{1000}{94.87} - 10 = 0.54$$

I_a = (0.2) (0.54) = .108 = .011

$$Y_j = \frac{(5.63(inch) - 0.11)^2}{(5.63(inch) - 0.11 + 0.56)5.63(inch)}$$

Y_j = 0.89
Y = 0.89
Y' = (1 – Y) = (1 - 0.89) = 0.11

F* = (0.11) (2.69) = 0.296 (inch / hour)

<u>F* = 0.296 (inch / hour)</u>

```
****************************************************************************

              F L O O D   R O U T I N G   A N A L Y S I S
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              Ver. 10.2  Release Date: 01/01/2005  License ID 1211

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* 100 YEAR 24 HOUR RETURN FOR FRB MASTER DEVELOPMENT PLAN                 *
* BCRB ANALYSIS (ASSUMED 39 AF OF SEDIMENT IN BASIN)                      *
* CHM                                                                     *
 ************************************************************************

  FILE NAME: FRBMUH.DAT
  TIME/DATE OF STUDY: 16:33 04/04/2006


****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.01 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      853.900 ACRES
         BASEFLOW =    0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =     0.290 HOURS
         STORM RETURN FREQUENCY =  100-YEAR
         FOOTHILL S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.210
         LOW LOSS FRACTION = 0.296
         *HYDROGRAPH MODEL #7 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.52
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.09
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.45
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.43
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.36
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  5.63

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.962
          30-MINUTE FACTOR = 0.962
           1-HOUR FACTOR = 0.962
           3-HOUR FACTOR = 0.994
           6-HOUR FACTOR = 0.997
          24-HOUR FACTOR = 0.998
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UNIT HYDROGRAPH TIME UNIT = 1.000 MINUTES
UNIT INTERVAL PERCENTAGE OF LAG-TIME = 5.747

RUNOFF HYDROGRAPH LISTING LIMITS:
MODEL TIME(HOURS) FOR BEGINNING OF RESULTS = 14.00
MODEL TIME(HOURS) FOR END OF RESULTS = 18.00

UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	0.374	192.887
2	1.121	385.773
3	1.892	398.185
4	2.896	518.620
5	3.992	565.859
6	5.246	647.662
7	6.788	795.962
8	8.522	895.099
9	10.005	766.100
10	11.895	975.802
11	14.228	1204.603
12	17.046	1455.010
13	19.962	1505.779
14	23.431	1791.189
15	28.040	2379.737
16	33.966	3059.669
17	42.985	4656.968
18	50.222	3736.890
19	54.215	2061.875
20	57.672	1785.005
21	60.594	1508.358
22	63.340	1417.888
23	65.193	957.091
24	67.019	942.875
25	69.049	1048.203
26	70.617	809.515
27	72.212	823.465
28	73.716	776.657
29	75.198	765.426
30	76.571	708.919
31	77.766	616.624
32	78.734	499.841
33	79.778	539.502
34	80.823	539.546
35	81.926	569.067
36	82.936	521.996
37	83.703	395.963
38	84.521	422.282
39	85.372	439.568
40	86.179	416.401
41	86.880	362.009

42	87.577	359.638
43	88.225	334.631
44	88.800	297.081
45	89.375	296.730
46	89.945	294.536
47	90.476	274.358
48	90.999	269.879
49	91.521	269.706
50	92.027	261.197
51	92.462	224.257
52	92.887	219.695
53	93.313	220.050
54	93.738	219.518
55	94.119	196.709
56	94.431	160.735
57	94.741	160.384
58	95.052	160.388
59	95.363	160.384
60	95.673	160.561
61	95.971	153.715
62	96.176	105.638
63	96.361	95.810
64	96.547	95.632
65	96.732	95.810
66	96.917	95.636
67	97.103	95.810
68	97.288	95.632
69	97.474	95.810
70	97.659	95.810
71	97.844	95.636
72	97.996	78.086
73	98.034	20.004
74	98.065	15.616
75	98.094	15.092
76	98.124	15.442
77	98.153	15.265
78	98.183	15.442
79	98.213	15.442
80	98.243	15.265
81	98.272	15.092
82	98.303	15.793
83	98.332	15.092
84	98.362	15.442
85	98.392	15.442
86	98.421	15.088
87	98.451	15.442
88	98.480	15.092
89	98.511	15.793
90	98.539	14.741
91	98.570	15.793
92	98.600	15.438
93	98.629	15.442
94	98.659	15.092
95	98.689	15.442
96	98.718	15.442
97	98.748	15.092
98	98.778	15.442

99	98.808	15.438
100	98.837	15.092
101	98.867	15.793
102	98.897	15.092
103	98.926	15.442
104	98.956	15.092
105	98.986	15.793
106	99.016	15.088
107	99.045	15.088
108	99.074	15.088
109	99.103	15.088
110	99.132	15.088
111	99.162	15.088
112	99.191	15.088
113	99.220	15.088
114	99.249	15.088
115	99.278	15.088
116	99.308	15.088
117	99.337	15.088
118	99.366	15.088
119	99.395	15.088
120	99.425	15.088
121	99.454	15.088
122	99.483	15.088
123	99.512	15.088
124	99.541	15.088
125	99.571	15.088
126	99.600	15.088
127	99.629	15.088
128	99.658	15.088
129	99.688	15.088
130	99.717	15.088
131	99.746	15.088
132	99.775	15.088
133	99.804	15.088
134	99.834	15.088
135	99.863	15.088
136	99.892	15.088
137	99.921	15.088
138	99.951	15.088
139	99.980	15.088
140	100.000	10.435

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 103.4759
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 296.2990

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2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN ONE-MINUTE UNIT INTERVALS(CFS)
(Notes: Time indicated is at END of Each Unit Intervals.
Peak 5-minute rainfall intensity is modeled as
a constant value for entire 5-minute period.)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	550.0	1100.0	1650.0	2200.0
14.000	99.9436	209.61	. Q	. V	.	.	.
14.017	100.2335	210.46	. Q	. V	.	.	.
14.033	100.5246	211.37	. Q	. V	.	.	.
14.050	100.8170	212.29	. Q	. V	.	.	.
14.067	101.1107	213.25	. Q	. V	.	.	.
14.083	101.4058	214.23	. Q	. V	.	.	.
14.100	101.7023	215.25	. Q	. V	.	.	.
14.117	102.0002	216.31	. Q	. V	.	.	.
14.133	102.2997	217.41	. Q	. V	.	.	.
14.150	102.6007	218.49	. Q	. V	.	.	.
14.167	102.9032	219.63	. Q	. V	.	.	.
14.183	103.2074	220.85	. Q	. V	.	.	.
14.200	103.5134	222.14	. Q	. V	.	.	.
14.217	103.8212	223.46	. Q	. V	.	.	.
14.233	104.1309	224.86	. Q	. V	.	.	.
14.250	104.4428	226.44	. Q	. V	.	.	.
14.267	104.7571	228.21	. Q	. V	.	.	.
14.283	105.0745	230.42	. Q	. V	.	.	.
14.300	105.3946	232.39	. Q	. V	.	.	.
14.317	105.7168	233.93	. Q	. V	.	.	.
14.333	106.0411	235.40	. Q	. V	.	.	.
14.350	106.3672	236.80	. Q	. V	.	.	.
14.367	106.6953	238.20	. Q	. V	.	.	.
14.383	107.0252	239.48	. Q	. V	.	.	.
14.400	107.3568	240.77	. Q	. V	.	.	.
14.417	107.6903	242.10	. Q	. V	.	.	.
14.433	108.0255	243.38	. Q	. V	.	.	.
14.450	108.3625	244.68	. Q	. V	.	.	.
14.467	108.7014	245.98	. Q	. V	.	.	.
14.483	109.0420	247.29	. Q	. V	.	.	.
14.500	109.3844	248.60	. Q	. V	.	.	.
14.517	109.7286	249.91	. Q	. V	.	.	.
14.533	110.0746	251.20	. Q	. V	.	.	.
14.550	110.4224	252.51	. Q	. V	.	.	.
14.567	110.7721	253.84	. Q	. V	.	.	.
14.583	111.1236	255.20	. Q	. V	.	.	.
14.600	111.4770	256.56	. Q	. V	.	.	.
14.617	111.8322	257.91	. Q	. V	.	.	.
14.633	112.1894	259.28	. Q	. V	.	.	.
14.650	112.5484	260.67	. Q	. V	.	.	.
14.667	112.9094	262.08	. Q	. V	.	.	.
14.683	113.2723	263.49	. Q	. V	.	.	.
14.700	113.6372	264.92	. Q	. V	.	.	.

14.717	114.0041	266.37	.	Q	.	V	.	.	.
14.733	114.3730	267.83	.	Q	.	V	.	.	.
14.750	114.7440	269.30	.	Q	.	V	.	.	.
14.767	115.1170	270.80	.	Q	.	V	.	.	.
14.783	115.4921	272.32	.	Q	.	V	.	.	.
14.800	115.8693	273.86	.	Q	.	V	.	.	.
14.817	116.2487	275.43	.	Q	.	V	.	.	.
14.833	116.6303	277.02	.	Q	.	V	.	.	.
14.850	117.0140	278.62	.	Q	.	V	.	.	.
14.867	117.4001	280.25	.	Q	.	V	.	.	.
14.883	117.7884	281.91	.	Q	.	V	.	.	.
14.900	118.1790	283.59	.	Q	.	V	.	.	.
14.917	118.5720	285.30	.	Q	.	V	.	.	.
14.933	118.9673	287.03	.	Q	.	V	.	.	.
14.950	119.3651	288.79	.	Q	.	V	.	.	.
14.967	119.7653	290.58	.	Q	.	V	.	.	.
14.983	120.1681	292.40	.	Q	.	V	.	.	.
15.000	120.5734	294.26	.	Q	.	V	.	.	.
15.017	120.9813	296.15	.	Q	.	V	.	.	.
15.033	121.3919	298.06	.	Q	.	V	.	.	.
15.050	121.8051	300.01	.	Q	.	V	.	.	.
15.067	122.2211	301.99	.	Q	.	V	.	.	.
15.083	122.6399	304.02	.	Q	.	V	.	.	.
15.100	123.0615	306.09	.	Q	.	V	.	.	.
15.117	123.4860	308.20	.	Q	.	V	.	.	.
15.133	123.9135	310.35	.	Q	.	V	.	.	.
15.150	124.3440	312.56	.	Q	.	V	.	.	.
15.167	124.7776	314.80	.	Q	.	V	.	.	.
15.183	125.2144	317.10	.	Q	.	V	.	.	.
15.200	125.6544	319.45	.	Q	.	V	.	.	.
15.217	126.0977	321.83	.	Q	.	V	.	.	.
15.233	126.5443	324.26	.	Q	.	V	.	.	.
15.250	126.9944	326.76	.	Q	.	V	.	.	.
15.267	127.4480	329.31	.	Q	.	V	.	.	.
15.283	127.9052	331.93	.	Q	.	V	.	.	.
15.300	128.3661	334.61	.	Q	.	V	.	.	.
15.317	128.8308	337.37	.	Q	.	V	.	.	.
15.333	129.2994	340.19	.	Q	.	V	.	.	.
15.350	129.7716	342.80	.	Q	.	V	.	.	.
15.367	130.2471	345.22	.	Q	.	V	.	.	.
15.383	130.7260	347.70	.	Q	.	V	.	.	.
15.400	131.2082	350.09	.	Q	.	V	.	.	.
15.417	131.6938	352.50	.	Q	.	V	.	.	.
15.433	132.1826	354.88	.	Q	.	V	.	.	.
15.450	132.6745	357.14	.	Q	.	V	.	.	.
15.467	133.1695	359.37	.	Q	.	V	.	.	.
15.483	133.6680	361.89	.	Q	.	V	.	.	.
15.500	134.1696	364.22	.	Q	.	V	.	.	.
15.517	134.6742	366.34	.	Q	.	V	.	.	.
15.533	135.1814	368.22	.	Q	.	V	.	.	.
15.550	135.6913	370.17	.	Q	.	V	.	.	.
15.567	136.2035	371.87	.	Q	.	V	.	.	.
15.583	136.7171	372.89	.	Q	.	V	.	.	.
15.600	137.2311	373.13	.	Q	.	V	.	.	.
15.617	137.7425	371.27	.	Q	.	V	.	.	.
15.633	138.2535	370.97	.	Q	.	V	.	.	.
15.650	138.7677	373.36	.	Q	.	V	.	.	.

15.667	139.2862	376.44	Q . V . . .
15.683	139.8100	380.26	Q . V . . .
15.700	140.3397	384.57	Q . V . . .
15.717	140.8768	389.93	Q . V. . .
15.733	141.4220	395.77	Q . V. . .
15.750	141.9756	401.96	Q . V. . .
15.767	142.5391	409.07	Q . V. . .
15.783	143.1132	416.79	Q . V. . .
15.800	143.6991	425.35	Q . V. . .
15.817	144.2980	434.81	Q . V. . .
15.833	144.9115	445.43	Q . V. . .
15.850	145.5415	457.35	Q . V. . .
15.867	146.1897	470.63	Q . V. . .
15.883	146.8580	485.18	Q . V. . .
15.900	147.5485	501.28	Q. V. . .
15.917	148.2636	519.19	Q. V . .
15.933	149.0066	539.40	Q. V . .
15.950	149.7817	562.70	Q V . .
15.967	150.6087	600.46	Q V . .
15.983	151.5062	651.52	.Q V . .
16.000	152.4782	705.69	. Q V . .
16.017	153.5377	769.21	. Q V . .
16.033	154.6918	837.87	. Q V . .
16.050	155.9334	901.41	. Q .V . .
16.067	157.2591	962.46	. Q .V . .
16.083	158.6754	1028.24	. Q .V . .
16.100	160.1635	1080.30	. Q.V . .
16.117	161.7390	1143.84	. QV . .
16.133	163.4158	1217.37	. . Q . .
16.150	165.2034	1297.77	. . VQ . .
16.167	167.0979	1375.43	. . V Q . .
16.183	169.1379	1481.05	. . V Q . .
16.200	171.3542	1609.08	. . V Q. .
16.217	173.7811	1761.93	. . V . Q .
16.233	176.5090	1980.41	. . V . Q .
16.250	179.4315	2121.75	. . V . Q .
16.267	182.3732	2135.69	. . V . Q .
16.283	185.2474	2086.67	. . V . Q .
16.300	187.9573	1967.37	. . V . Q .
16.317	190.3356	1726.63	. . V .Q .
16.333	192.3996	1498.47	. . V Q . .
16.350	194.2905	1372.83	. . Q V . .
16.367	196.0499	1277.27	. . Q V . .
16.383	197.6889	1189.98	. .Q V . .
16.400	199.2225	1113.39	. Q V . .
16.417	200.6915	1066.49	. Q. V . .
16.433	202.1024	1024.30	. Q . V . .
16.450	203.4449	974.61	. Q . V . .
16.467	204.7337	935.71	. Q . V . .
16.483	205.9619	891.69	. Q . V . .
16.500	207.1398	855.16	. Q . V . .
16.517	208.2710	821.24	. Q . V . .
16.533	209.3650	794.23	. Q . V . .
16.550	210.4272	771.15	. Q . V . .
16.567	211.4602	749.99	. Q . V . .
16.583	212.4663	730.41	. Q . V . .
16.600	213.4490	713.46	. Q . V . .

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16.617    214.4073    695.72  .          . Q       .        V .          .
16.633    215.3391    676.46  .          . Q       .         V.          .
16.650    216.2524    663.09  .          . Q       .         V.          .
16.667    217.1438    647.13  .          .Q        .         V.          .
16.683    218.0087    627.93  .          .Q        .         V.          .
16.700    218.8494    610.32  .          .Q        .         V.          .
16.717    219.6699    595.68  .          Q         .         V.          .
16.733    220.4695    580.55  .          Q         .         V.          .
16.750    221.2509    567.26  .          Q         .         V.          .
16.767    222.0173    556.39  .          Q         .         V.          .
16.783    222.7685    545.38  .         Q.         .          V          .
16.800    223.5020    532.51  .         Q.         .          V          .
16.817    224.2195    520.89  .         Q.         .          V          .
16.833    224.9216    509.74  .         Q.         .          V          .
16.850    225.6082    498.52  .         Q.         .          V          .
16.867    226.2780    486.26  .        Q .         .          V          .
16.883    226.9315    474.46  .        Q .         .          V          .
16.900    227.5697    463.31  .        Q .         .          V          .
16.917    228.1929    452.43  .        Q .         .          V          .
16.933    228.8011    441.59  .        Q .         .          V          .
16.950    229.3963    432.07  .       Q  .         .          V          .
16.967    229.9809    424.48  .       Q  .         .          .V         .
16.983    230.5518    414.41  .       Q  .         .          .V         .
17.000    231.1083    404.04  .       Q  .         .          .V         .
17.017    231.6506    393.73  .       Q  .         .          .V         .
17.033    232.1789    383.53  .      Q   .         .          .V         .
17.050    232.6938    373.80  .      Q   .         .          .V         .
17.067    233.1996    367.23  .      Q   .         .          .V         .
17.083    233.6977    361.62  .      Q   .         .          .V         .
17.100    234.1884    356.28  .      Q   .         .          .V         .
17.117    234.6718    350.92  .      Q   .         .          .V         .
17.133    235.1477    345.51  .      Q   .         .          .V         .
17.150    235.6144    338.87  .      Q   .         .          .V         .
17.167    236.0673    328.77  .    Q     .         .          .V         .
17.183    236.5059    318.42  .    Q     .         .          .V         .
17.200    236.9303    308.10  .    Q     .         .          .V         .
17.217    237.3406    297.91  .    Q     .         .          . V        .
17.233    237.7385    288.87  .    Q     .         .          . V        .
17.250    238.1292    283.62  .    Q     .         .          . V        .
17.267    238.5135    279.00  .    Q     .         .          . V        .
17.283    238.8914    274.36  .   Q      .         .          . V        .
17.300    239.2636    270.24  .   Q      .         .          . V        .
17.317    239.6311    266.84  .   Q      .         .          . V        .
17.333    239.9943    263.65  .   Q      .         .          . V        .
17.350    240.3534    260.71  .   Q      .         .          . V        .
17.367    240.7086    257.86  .   Q      .         .          . V        .
17.383    241.0602    255.24  .   Q      .         .          . V        .
17.400    241.4082    252.71  .   Q      .         .          . V        .
17.417    241.7530    250.27  .   Q      .         .          . V        .
17.433    242.0946    247.99  .   Q      .         .          . V        .
17.450    242.4330    245.74  .   Q      .         .          . V        .
17.467    242.7686    243.64  .   Q      .         .          . V        .
17.483    243.1014    241.56  .   Q      .         .          . V        .
17.500    243.4314    239.57  .   Q      .         .          . V        .
17.517    243.7586    237.60  .   Q      .         .          . V        .
17.533    244.0834    235.76  .   Q      .         .          . V        .
17.550    244.4054    233.82  .   Q      .         .          . V        .
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17.567    244.7249    231.90  .   Q     .         .         .  V     .
17.583    245.0417    230.05  .   Q     .         .         .  V     .
17.600    245.3561    228.26  .   Q     .         .         .  V     .
17.617    245.6681    226.51  .   Q     .         .         .  V     .
17.633    245.9778    224.83  .   Q     .         .         .  V     .
17.650    246.2852    223.15  .   Q     .         .         .  V     .
17.667    246.5903    221.52  .   Q     .         .         .  V     .
17.683    246.8932    219.93  .  Q      .         .         .  V     .
17.700    247.1941    218.44  .  Q      .         .         .  V     .
17.717    247.4929    216.89  .  Q      .         .         .  V     .
17.733    247.7896    215.42  .  Q      .         .         .  V     .
17.750    248.0843    213.95  .  Q      .         .         .  V     .
17.767    248.3770    212.53  .  Q      .         .         .  V     .
17.783    248.6678    211.10  .  Q      .         .         .  V     .
17.800    248.9567    209.73  .  Q      .         .         .  V     .
17.817    249.2437    208.39  .  Q      .         .         .  V     .
17.833    249.5290    207.07  .  Q      .         .         .  V     .
17.850    249.8124    205.79  .  Q      .         .         .  V     .
17.867    250.0941    204.52  .  Q      .         .         .  V     .
17.883    250.3741    203.28  .  Q      .         .         .  V     .
17.900    250.6524    202.05  .  Q      .         .         .  V     .
17.917    250.9291    200.84  .  Q      .         .         .  V     .
17.933    251.2041    199.65  .  Q      .         .         .  V     .
17.950    251.4775    198.48  .  Q      .         .         .  V     .
17.967    251.7493    197.33  .  Q      .         .         .  V     .
17.983    252.0195    196.18  .  Q      .         .         .   V    .
18.000    252.2882    195.05  .  Q      .         .         .   V    .
-------------------------------------------------------------------------------
   TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
   (Note: 100% of Peak Flow Rate estimate assumed to have
   an instantaneous time duration)

   Percentile of Estimated                    Duration
       Peak Flow Rate                         (minutes)
   ======================                     =========
             0%                                7895.0
            10%                                1105.0
            20%                                 345.0
            30%                                 210.0
            40%                                 140.0
            50%                                  95.0
            60%                                  65.0
            70%                                  45.0
            80%                                  35.0
            90%                                  25.0


*******************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE = 3.2
-------------------------------------------------------------------------------
  >>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
===============================================================================

                      INFLOW
                    (STREAM 1)
                         |
                         |
```

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        V                    __effective depth
 -----------                 |   (and volume)
|           |     |     |
|           |     |....V........
| detention |<-->|           outflow
|   basin   |     |.........________
 -----------      |     ^     |  \
     |            |  dead     |   basin outlet
     V            | storage   |
  OUTFLOW          ---------
 (STREAM 1)
```

ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE(AF) = 0.000
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	7.00	67.60	28.000
3	17.00	82.90	97.390
4	26.50	112.48	210.270
5	27.00	137.41	216.210
6	28.00	246.71	232.350

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MODIFIED-PULS BASIN ROUTING MODEL RESULTS(1-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
14.017	0.000	210.46	0.00	10.08	72.3	49.366
14.033	0.000	211.37	0.00	10.11	72.3	49.557
14.050	0.000	212.29	0.00	10.13	72.4	49.750
14.067	0.000	213.25	0.00	10.16	72.4	49.944
14.083	0.000	214.23	0.00	10.19	72.5	50.139
14.100	0.000	215.25	0.00	10.22	72.5	50.336
14.117	0.000	216.31	0.00	10.25	72.5	50.534
14.133	0.000	217.41	0.00	10.28	72.6	50.733
14.150	0.000	218.49	0.00	10.31	72.6	50.934
14.167	0.000	219.63	0.00	10.33	72.7	51.137
14.183	0.000	220.85	0.00	10.36	72.7	51.341
14.200	0.000	222.14	0.00	10.39	72.8	51.546
14.217	0.000	223.46	0.00	10.42	72.8	51.754

14.233	0.000	224.86	0.00	10.45	72.9	51.963
14.250	0.000	226.44	0.00	10.48	72.9	52.175
14.267	0.000	228.21	0.00	10.51	73.0	52.389
14.283	0.000	230.42	0.00	10.55	73.0	52.605
14.300	0.000	232.39	0.00	10.58	73.0	52.825
14.317	0.000	233.93	0.00	10.61	73.1	53.046
14.333	0.000	235.40	0.00	10.64	73.1	53.270
14.350	0.000	236.80	0.00	10.67	73.2	53.495
14.367	0.000	238.20	0.00	10.71	73.2	53.723
14.383	0.000	239.48	0.00	10.74	73.3	53.951
14.400	0.000	240.77	0.00	10.77	73.3	54.182
14.417	0.000	242.10	0.00	10.81	73.4	54.414
14.433	0.000	243.38	0.00	10.84	73.4	54.648
14.450	0.000	244.68	0.00	10.87	73.5	54.884
14.467	0.000	245.98	0.00	10.91	73.6	55.122
14.483	0.000	247.29	0.00	10.94	73.6	55.361
14.500	0.000	248.60	0.00	10.98	73.7	55.602
14.517	0.000	249.91	0.00	11.01	73.7	55.845
14.533	0.000	251.20	0.00	11.05	73.8	56.089
14.550	0.000	252.51	0.00	11.08	73.8	56.335
14.567	0.000	253.84	0.00	11.12	73.9	56.583
14.583	0.000	255.20	0.00	11.16	73.9	56.833
14.600	0.000	256.56	0.00	11.19	74.0	57.084
14.617	0.000	257.91	0.00	11.23	74.0	57.337
14.633	0.000	259.28	0.00	11.26	74.1	57.593
14.650	0.000	260.67	0.00	11.30	74.2	57.849
14.667	0.000	262.08	0.00	11.34	74.2	58.108
14.683	0.000	263.49	0.00	11.38	74.3	58.369
14.700	0.000	264.92	0.00	11.41	74.3	58.631
14.717	0.000	266.37	0.00	11.45	74.4	58.896
14.733	0.000	267.83	0.00	11.49	74.4	59.162
14.750	0.000	269.30	0.00	11.53	74.5	59.431
14.767	0.000	270.80	0.00	11.57	74.6	59.701
14.783	0.000	272.32	0.00	11.61	74.6	59.973
14.800	0.000	273.86	0.00	11.65	74.7	60.248
14.817	0.000	275.43	0.00	11.69	74.7	60.524
14.833	0.000	277.02	0.00	11.73	74.8	60.802
14.850	0.000	278.62	0.00	11.77	74.9	61.083
14.867	0.000	280.25	0.00	11.81	74.9	61.366
14.883	0.000	281.91	0.00	11.85	75.0	61.651
14.900	0.000	283.59	0.00	11.89	75.1	61.938
14.917	0.000	285.30	0.00	11.93	75.1	62.228
14.933	0.000	287.03	0.00	11.97	75.2	62.520
14.950	0.000	288.79	0.00	12.02	75.2	62.814
14.967	0.000	290.58	0.00	12.06	75.3	63.110
14.983	0.000	292.40	0.00	12.10	75.4	63.409
15.000	0.000	294.26	0.00	12.15	75.4	63.711
15.017	0.000	296.15	0.00	12.19	75.5	64.014
15.033	0.000	298.06	0.00	12.23	75.6	64.321
15.050	0.000	300.01	0.00	12.28	75.6	64.630
15.067	0.000	301.99	0.00	12.32	75.7	64.942
15.083	0.000	304.02	0.00	12.37	75.8	65.256
15.100	0.000	306.09	0.00	12.41	75.8	65.573
15.117	0.000	308.20	0.00	12.46	75.9	65.893
15.133	0.000	310.35	0.00	12.51	76.0	66.216
15.150	0.000	312.56	0.00	12.55	76.1	66.542
15.167	0.000	314.80	0.00	12.60	76.1	66.870

15.183	0.000	317.10	0.00	12.65	76.2	67.202
15.200	0.000	319.45	0.00	12.70	76.3	67.537
15.217	0.000	321.83	0.00	12.75	76.4	67.875
15.233	0.000	324.26	0.00	12.80	76.4	68.217
15.250	0.000	326.76	0.00	12.85	76.5	68.561
15.267	0.000	329.31	0.00	12.90	76.6	68.909
15.283	0.000	331.93	0.00	12.95	76.7	69.261
15.300	0.000	334.61	0.00	13.00	76.7	69.616
15.317	0.000	337.37	0.00	13.05	76.8	69.975
15.333	0.000	340.19	0.00	13.10	76.9	70.338
15.350	0.000	342.80	0.00	13.15	77.0	70.704
15.367	0.000	345.22	0.00	13.21	77.1	71.073
15.383	0.000	347.70	0.00	13.26	77.1	71.446
15.400	0.000	350.09	0.00	13.32	77.2	71.822
15.417	0.000	352.50	0.00	13.37	77.3	72.201
15.433	0.000	354.88	0.00	13.43	77.4	72.583
15.450	0.000	357.14	0.00	13.48	77.5	72.968
15.467	0.000	359.37	0.00	13.54	77.6	73.357
15.483	0.000	361.89	0.00	13.59	77.6	73.748
15.500	0.000	364.22	0.00	13.65	77.7	74.143
15.517	0.000	366.34	0.00	13.71	77.8	74.540
15.533	0.000	368.22	0.00	13.76	77.9	74.940
15.550	0.000	370.17	0.00	13.82	78.0	75.342
15.567	0.000	371.87	0.00	13.88	78.1	75.747
15.583	0.000	372.89	0.00	13.94	78.2	76.153
15.600	0.000	373.13	0.00	14.00	78.3	76.559
15.617	0.000	371.27	0.00	14.06	78.4	76.963
15.633	0.000	370.97	0.00	14.11	78.4	77.366
15.650	0.000	373.36	0.00	14.17	78.5	77.772
15.667	0.000	376.44	0.00	14.23	78.6	78.182
15.683	0.000	380.26	0.00	14.29	78.7	78.597
15.700	0.000	384.57	0.00	14.35	78.8	79.018
15.717	0.000	389.93	0.00	14.41	78.9	79.447
15.733	0.000	395.77	0.00	14.48	79.0	79.883
15.750	0.000	401.96	0.00	14.54	79.1	80.328
15.767	0.000	409.07	0.00	14.61	79.2	80.782
15.783	0.000	416.79	0.00	14.67	79.3	81.247
15.800	0.000	425.35	0.00	14.74	79.4	81.724
15.817	0.000	434.81	0.00	14.81	79.5	82.213
15.833	0.000	445.43	0.00	14.89	79.6	82.717
15.850	0.000	457.35	0.00	14.96	79.7	83.237
15.867	0.000	470.63	0.00	15.04	79.8	83.776
15.883	0.000	485.18	0.00	15.12	80.0	84.334
15.900	0.000	501.28	0.00	15.20	80.1	84.914
15.917	0.000	519.19	0.00	15.29	80.2	85.518
15.933	0.000	539.40	0.00	15.38	80.4	86.151
15.950	0.000	562.70	0.00	15.48	80.5	86.815
15.967	0.000	600.46	0.00	15.58	80.6	87.531
15.983	0.000	651.52	0.00	15.69	80.8	88.317
16.000	0.000	705.69	0.00	15.82	81.0	89.178
16.017	0.000	769.21	0.00	15.95	81.2	90.125
16.033	0.000	837.87	0.00	16.10	81.4	91.167
16.050	0.000	901.41	0.00	16.27	81.7	92.296
16.067	0.000	962.46	0.00	16.44	81.9	93.509
16.083	0.000	1028.24	0.00	16.63	82.2	94.812
16.100	0.000	1080.30	0.00	16.83	82.5	96.187
16.117	0.000	1143.84	0.00	17.02	82.8	97.648

16.133	0.000	1217.37	0.00	17.15	83.2	99.210
16.150	0.000	1297.77	0.00	17.29	83.6	100.883
16.167	0.000	1375.43	0.00	17.44	84.0	102.662
16.183	0.000	1481.05	0.00	17.61	84.5	104.585
16.200	0.000	1609.08	0.00	17.78	85.1	106.684
16.217	0.000	1761.93	0.00	17.98	85.6	108.993
16.233	0.000	1980.41	0.00	18.20	86.3	111.602
16.250	0.000	2121.75	0.00	18.43	87.0	114.405
16.267	0.000	2135.69	0.00	18.67	87.7	117.226
16.283	0.000	2086.67	0.00	18.90	88.5	119.978
16.300	0.000	1967.37	0.00	19.12	89.2	122.565
16.317	0.000	1726.63	0.00	19.31	89.8	124.820
16.333	0.000	1498.47	0.00	19.47	90.3	126.760
16.350	0.000	1372.83	0.00	19.62	90.8	128.525
16.367	0.000	1277.27	0.00	19.76	91.3	130.159
16.383	0.000	1189.98	0.00	19.89	91.7	131.672
16.400	0.000	1113.39	0.00	20.00	92.1	133.079
16.417	0.000	1066.49	0.00	20.12	92.4	134.420
16.433	0.000	1024.30	0.00	20.22	92.8	135.703
16.450	0.000	974.61	0.00	20.33	93.1	136.918
16.467	0.000	935.71	0.00	20.42	93.4	138.078
16.483	0.000	891.69	0.00	20.52	93.7	139.177
16.500	0.000	855.16	0.00	20.61	94.0	140.225
16.517	0.000	821.24	0.00	20.69	94.3	141.227
16.533	0.000	794.23	0.00	20.77	94.5	142.190
16.550	0.000	771.15	0.00	20.85	94.8	143.122
16.567	0.000	749.99	0.00	20.92	95.0	144.024
16.583	0.000	730.41	0.00	21.00	95.2	144.899
16.600	0.000	713.46	0.00	21.07	95.5	145.750
16.617	0.000	695.72	0.00	21.14	95.7	146.577
16.633	0.000	676.46	0.00	21.21	95.9	147.377
16.650	0.000	663.09	0.00	21.27	96.1	148.158
16.667	0.000	647.13	0.00	21.34	96.3	148.916
16.683	0.000	627.93	0.00	21.40	96.5	149.648
16.700	0.000	610.32	0.00	21.46	96.7	150.356
16.717	0.000	595.68	0.00	21.52	96.9	151.043
16.733	0.000	580.55	0.00	21.57	97.0	151.709
16.750	0.000	567.26	0.00	21.63	97.2	152.356
16.767	0.000	556.39	0.00	21.68	97.4	152.989
16.783	0.000	545.38	0.00	21.73	97.6	153.605
16.800	0.000	532.51	0.00	21.78	97.7	154.204
16.817	0.000	520.89	0.00	21.83	97.9	154.787
16.833	0.000	509.74	0.00	21.88	98.0	155.354
16.850	0.000	498.52	0.00	21.92	98.2	155.906
16.867	0.000	486.26	0.00	21.97	98.3	156.440
16.883	0.000	474.46	0.00	22.01	98.4	156.958
16.900	0.000	463.31	0.00	22.06	98.6	157.460
16.917	0.000	452.43	0.00	22.10	98.7	157.947
16.933	0.000	441.59	0.00	22.14	98.8	158.420
16.950	0.000	432.07	0.00	22.17	99.0	158.878
16.967	0.000	424.48	0.00	22.21	99.1	159.327
16.983	0.000	414.41	0.00	22.25	99.2	159.761
17.000	0.000	404.04	0.00	22.28	99.3	160.181
17.017	0.000	393.73	0.00	22.32	99.4	160.586
17.033	0.000	383.53	0.00	22.35	99.5	160.977
17.050	0.000	373.80	0.00	22.38	99.6	161.355
17.067	0.000	367.23	0.00	22.41	99.7	161.723

17.083	0.000	361.62	0.00	22.44	99.8	162.084
17.100	0.000	356.28	0.00	22.47	99.9	162.437
17.117	0.000	350.92	0.00	22.50	100.0	162.783
17.133	0.000	345.51	0.00	22.53	100.1	163.121
17.150	0.000	338.87	0.00	22.56	100.2	163.450
17.167	0.000	328.77	0.00	22.59	100.3	163.764
17.183	0.000	318.42	0.00	22.61	100.3	164.065
17.200	0.000	308.10	0.00	22.64	100.4	164.351
17.217	0.000	297.91	0.00	22.66	100.5	164.623
17.233	0.000	288.87	0.00	22.68	100.6	164.882
17.250	0.000	283.62	0.00	22.70	100.6	165.134
17.267	0.000	279.00	0.00	22.72	100.7	165.380
17.283	0.000	274.36	0.00	22.74	100.7	165.619
17.300	0.000	270.24	0.00	22.76	100.8	165.852
17.317	0.000	266.84	0.00	22.78	100.9	166.081
17.333	0.000	263.65	0.00	22.80	100.9	166.305
17.350	0.000	260.71	0.00	22.82	101.0	166.525
17.367	0.000	257.86	0.00	22.84	101.0	166.741
17.383	0.000	255.24	0.00	22.85	101.1	166.953
17.400	0.000	252.71	0.00	22.87	101.2	167.162
17.417	0.000	250.27	0.00	22.89	101.2	167.367
17.433	0.000	247.99	0.00	22.91	101.3	167.570
17.450	0.000	245.74	0.00	22.92	101.3	167.768
17.467	0.000	243.64	0.00	22.94	101.4	167.964
17.483	0.000	241.56	0.00	22.96	101.4	168.157
17.500	0.000	239.57	0.00	22.97	101.5	168.348
17.517	0.000	237.60	0.00	22.99	101.5	168.535
17.533	0.000	235.76	0.00	23.00	101.6	168.720
17.550	0.000	233.82	0.00	23.02	101.6	168.902
17.567	0.000	231.90	0.00	23.03	101.7	169.081
17.583	0.000	230.05	0.00	23.05	101.7	169.258
17.600	0.000	228.26	0.00	23.06	101.8	169.432
17.617	0.000	226.51	0.00	23.08	101.8	169.604
17.633	0.000	224.83	0.00	23.09	101.8	169.774
17.650	0.000	223.15	0.00	23.11	101.9	169.941
17.667	0.000	221.52	0.00	23.12	101.9	170.105
17.683	0.000	219.93	0.00	23.13	102.0	170.268
17.700	0.000	218.44	0.00	23.15	102.0	170.428
17.717	0.000	216.89	0.00	23.16	102.1	170.586
17.733	0.000	215.42	0.00	23.17	102.1	170.742
17.750	0.000	213.95	0.00	23.19	102.1	170.896
17.767	0.000	212.53	0.00	23.20	102.2	171.048
17.783	0.000	211.10	0.00	23.21	102.2	171.198
17.800	0.000	209.73	0.00	23.22	102.3	171.346
17.817	0.000	208.39	0.00	23.24	102.3	171.493
17.833	0.000	207.07	0.00	23.25	102.3	171.637
17.850	0.000	205.79	0.00	23.26	102.4	171.779
17.867	0.000	204.52	0.00	23.27	102.4	171.920
17.883	0.000	203.28	0.00	23.28	102.4	172.059
17.900	0.000	202.05	0.00	23.30	102.5	172.196
17.917	0.000	200.84	0.00	23.31	102.5	172.331
17.933	0.000	199.65	0.00	23.32	102.6	172.465
17.950	0.000	198.48	0.00	23.33	102.6	172.597
17.967	0.000	197.33	0.00	23.34	102.6	172.728
17.983	0.000	196.18	0.00	23.35	102.7	172.856
18.000	0.000	195.05	0.00	23.36	102.7	172.984
18.017	0.000	193.80	0.00	23.37	102.7	173.109

18.033	0.000	192.45	0.00	23.38	102.8	173.233
18.050	0.000	191.10	0.00	23.39	102.8	173.354
18.067	0.000	189.68	0.00	23.40	102.8	173.474
18.083	0.000	188.24	0.00	23.41	102.9	173.592
18.100	0.000	186.75	0.00	23.42	102.9	173.707
18.117	0.000	185.17	0.00	23.43	102.9	173.820
18.133	0.000	183.52	0.00	23.44	102.9	173.931
18.150	0.000	181.96	0.00	23.45	103.0	174.040
18.167	0.000	180.25	0.00	23.46	103.0	174.147
18.183	0.000	178.40	0.00	23.47	103.0	174.250
18.200	0.000	176.38	0.00	23.48	103.1	174.351
18.217	0.000	174.32	0.00	23.49	103.1	174.449
18.233	0.000	172.06	0.00	23.49	103.1	174.544
18.250	0.000	169.39	0.00	23.50	103.1	174.636
18.267	0.000	166.24	0.00	23.51	103.2	174.723
18.283	0.000	161.72	0.00	23.52	103.2	174.803
18.300	0.000	157.17	0.00	23.52	103.2	174.878
18.317	0.000	153.71	0.00	23.53	103.2	174.947
18.333	0.000	150.45	0.00	23.53	103.2	175.012
18.350	0.000	147.37	0.00	23.54	103.2	175.073
18.367	0.000	144.67	0.00	23.54	103.3	175.130
18.383	0.000	142.98	0.00	23.55	103.3	175.185
18.400	0.000	141.40	0.00	23.55	103.3	175.237
18.417	0.000	139.82	0.00	23.56	103.3	175.287
18.433	0.000	138.44	0.00	23.56	103.3	175.336
18.450	0.000	137.10	0.00	23.56	103.3	175.382
18.467	0.000	135.81	0.00	23.57	103.3	175.427
18.483	0.000	134.56	0.00	23.57	103.4	175.470
18.500	0.000	133.37	0.00	23.57	103.4	175.511
18.517	0.000	132.26	0.00	23.58	103.4	175.551
18.533	0.000	131.25	0.00	23.58	103.4	175.589
18.550	0.000	130.22	0.00	23.58	103.4	175.626
18.567	0.000	129.22	0.00	23.59	103.4	175.662
18.583	0.000	128.20	0.00	23.59	103.4	175.696
18.600	0.000	127.23	0.00	23.59	103.4	175.729
18.617	0.000	126.36	0.00	23.60	103.4	175.760
18.633	0.000	125.47	0.00	23.60	103.4	175.791
18.650	0.000	124.59	0.00	23.60	103.4	175.820
18.667	0.000	123.73	0.00	23.60	103.5	175.848
18.683	0.000	122.89	0.00	23.61	103.5	175.875
18.700	0.000	122.06	0.00	23.61	103.5	175.900
18.717	0.000	121.26	0.00	23.61	103.5	175.925
18.733	0.000	120.50	0.00	23.61	103.5	175.948
18.750	0.000	119.74	0.00	23.61	103.5	175.971
18.767	0.000	118.99	0.00	23.62	103.5	175.992
18.783	0.000	118.26	0.00	23.62	103.5	176.012
18.800	0.000	117.54	0.00	23.62	103.5	176.032
18.817	0.000	116.83	0.00	23.62	103.5	176.050
18.833	0.000	116.14	0.00	23.62	103.5	176.067
18.850	0.000	115.47	0.00	23.62	103.5	176.084
18.867	0.000	114.81	0.00	23.62	103.5	176.099
18.883	0.000	114.16	0.00	23.63	103.5	176.114
18.900	0.000	113.52	0.00	23.63	103.5	176.128
18.917	0.000	112.89	0.00	23.63	103.5	176.141
18.933	0.000	112.30	0.00	23.63	103.5	176.153
18.950	0.000	111.71	0.00	23.63	103.5	176.164
18.967	0.000	111.13	0.00	23.63	103.5	176.174

18.983	0.000	110.56	0.00	23.63	103.5	176.184
19.000	0.000	109.99	0.00	23.63	103.5	176.193
19.017	0.000	109.43	0.00	23.63	103.6	176.201
19.033	0.000	108.90	0.00	23.63	103.6	176.208
19.050	0.000	108.39	0.00	23.63	103.6	176.215
19.067	0.000	107.89	0.00	23.63	103.6	176.221
19.083	0.000	107.38	0.00	23.63	103.6	176.226
19.100	0.000	106.89	0.00	23.64	103.6	176.231
19.117	0.000	106.39	0.00	23.64	103.6	176.235
19.133	0.000	105.91	0.00	23.64	103.6	176.238
19.150	0.000	105.42	0.00	23.64	103.6	176.241
19.167	0.000	104.95	0.00	23.64	103.6	176.242
19.183	0.000	104.47	0.00	23.64	103.6	176.244
19.200	0.000	104.01	0.00	23.64	103.6	176.244
19.217	0.000	103.60	0.00	23.64	103.6	176.244
19.233	0.000	103.19	0.00	23.64	103.6	176.244
19.250	0.000	102.78	0.00	23.64	103.6	176.243
19.267	0.000	102.38	0.00	23.64	103.6	176.241
19.283	0.000	101.99	0.00	23.64	103.6	176.239
19.300	0.000	101.59	0.00	23.64	103.6	176.236
19.317	0.000	101.20	0.00	23.64	103.6	176.233
19.333	0.000	100.82	0.00	23.64	103.6	176.229
19.350	0.000	100.44	0.00	23.63	103.6	176.225
19.367	0.000	100.07	0.00	23.63	103.6	176.220
19.383	0.000	99.70	0.00	23.63	103.6	176.215
19.400	0.000	99.33	0.00	23.63	103.6	176.209
19.417	0.000	98.96	0.00	23.63	103.6	176.203
19.433	0.000	98.60	0.00	23.63	103.6	176.196
19.450	0.000	98.25	0.00	23.63	103.5	176.189
19.467	0.000	97.89	0.00	23.63	103.5	176.181
19.483	0.000	97.54	0.00	23.63	103.5	176.173
19.500	0.000	97.20	0.00	23.63	103.5	176.164
19.517	0.000	96.85	0.00	23.63	103.5	176.155
19.533	0.000	96.51	0.00	23.63	103.5	176.145
19.550	0.000	96.17	0.00	23.63	103.5	176.135
19.567	0.000	95.84	0.00	23.63	103.5	176.124
19.583	0.000	95.50	0.00	23.63	103.5	176.113
19.600	0.000	95.17	0.00	23.62	103.5	176.102
19.617	0.000	94.85	0.00	23.62	103.5	176.090
19.633	0.000	94.52	0.00	23.62	103.5	176.077
19.650	0.000	94.20	0.00	23.62	103.5	176.064
19.667	0.000	93.88	0.00	23.62	103.5	176.051
19.683	0.000	93.57	0.00	23.62	103.5	176.037
19.700	0.000	93.26	0.00	23.62	103.5	176.023
19.717	0.000	92.94	0.00	23.62	103.5	176.009
19.733	0.000	92.64	0.00	23.62	103.5	175.994
19.750	0.000	92.33	0.00	23.61	103.5	175.978
19.767	0.000	92.03	0.00	23.61	103.5	175.963
19.783	0.000	91.73	0.00	23.61	103.5	175.946
19.800	0.000	91.43	0.00	23.61	103.5	175.930
19.817	0.000	91.14	0.00	23.61	103.5	175.913
19.833	0.000	90.84	0.00	23.61	103.5	175.895
19.850	0.000	90.55	0.00	23.61	103.5	175.878
19.867	0.000	90.26	0.00	23.60	103.5	175.859
19.883	0.000	89.98	0.00	23.60	103.5	175.841
19.900	0.000	89.70	0.00	23.60	103.5	175.822
19.917	0.000	89.41	0.00	23.60	103.5	175.803

19.933	0.000	89.13	0.00	23.60	103.4	175.783
19.950	0.000	88.86	0.00	23.60	103.4	175.763
19.967	0.000	88.58	0.00	23.59	103.4	175.742
19.983	0.000	88.31	0.00	23.59	103.4	175.722
20.000	0.000	88.04	0.00	23.59	103.4	175.700
20.017	0.000	87.77	0.00	23.59	103.4	175.679
20.033	0.000	87.50	0.00	23.59	103.4	175.657
20.050	0.000	87.24	0.00	23.59	103.4	175.635
20.067	0.000	86.97	0.00	23.58	103.4	175.612
20.083	0.000	86.71	0.00	23.58	103.4	175.589
20.100	0.000	86.45	0.00	23.58	103.4	175.566
20.117	0.000	86.20	0.00	23.58	103.4	175.542
20.133	0.000	85.94	0.00	23.58	103.4	175.518
20.150	0.000	85.69	0.00	23.57	103.4	175.494
20.167	0.000	85.44	0.00	23.57	103.4	175.469
20.183	0.000	85.19	0.00	23.57	103.4	175.444
20.200	0.000	84.94	0.00	23.57	103.4	175.419
20.217	0.000	84.69	0.00	23.56	103.3	175.393
20.233	0.000	84.45	0.00	23.56	103.3	175.367
20.250	0.000	84.20	0.00	23.56	103.3	175.340
20.267	0.000	83.96	0.00	23.56	103.3	175.314
20.283	0.000	83.72	0.00	23.56	103.3	175.287
20.300	0.000	83.49	0.00	23.55	103.3	175.259
20.317	0.000	83.25	0.00	23.55	103.3	175.232
20.333	0.000	83.02	0.00	23.55	103.3	175.204
20.350	0.000	82.79	0.00	23.55	103.3	175.176
20.367	0.000	82.57	0.00	23.54	103.3	175.147
20.383	0.000	82.35	0.00	23.54	103.3	175.118
20.400	0.000	82.14	0.00	23.54	103.3	175.089
20.417	0.000	81.92	0.00	23.54	103.3	175.060
20.433	0.000	81.70	0.00	23.53	103.2	175.030
20.450	0.000	81.49	0.00	23.53	103.2	175.000
20.467	0.000	81.28	0.00	23.53	103.2	174.970
20.483	0.000	81.07	0.00	23.53	103.2	174.939
20.500	0.000	80.86	0.00	23.52	103.2	174.909
20.517	0.000	80.65	0.00	23.52	103.2	174.878
20.533	0.000	80.44	0.00	23.52	103.2	174.846
20.550	0.000	80.24	0.00	23.52	103.2	174.815
20.567	0.000	80.03	0.00	23.51	103.2	174.783
20.583	0.000	79.83	0.00	23.51	103.2	174.751
20.600	0.000	79.63	0.00	23.51	103.2	174.718
20.617	0.000	79.43	0.00	23.51	103.2	174.685
20.633	0.000	79.23	0.00	23.50	103.2	174.652
20.650	0.000	79.03	0.00	23.50	103.1	174.619
20.667	0.000	78.84	0.00	23.50	103.1	174.586
20.683	0.000	78.64	0.00	23.49	103.1	174.552
20.700	0.000	78.45	0.00	23.49	103.1	174.518
20.717	0.000	78.25	0.00	23.49	103.1	174.484
20.733	0.000	78.06	0.00	23.49	103.1	174.449
20.750	0.000	77.87	0.00	23.48	103.1	174.415
20.767	0.000	77.68	0.00	23.48	103.1	174.380
20.783	0.000	77.50	0.00	23.48	103.1	174.344
20.800	0.000	77.31	0.00	23.47	103.1	174.309
20.817	0.000	77.12	0.00	23.47	103.1	174.273
20.833	0.000	76.94	0.00	23.47	103.0	174.237
20.850	0.000	76.76	0.00	23.46	103.0	174.201
20.867	0.000	76.58	0.00	23.46	103.0	174.165

20.883	0.000	76.39	0.00	23.46	103.0	174.128
20.900	0.000	76.22	0.00	23.46	103.0	174.091
20.917	0.000	76.04	0.00	23.45	103.0	174.054
20.933	0.000	75.86	0.00	23.45	103.0	174.017
20.950	0.000	75.68	0.00	23.45	103.0	173.979
20.967	0.000	75.51	0.00	23.44	103.0	173.941
20.983	0.000	75.33	0.00	23.44	103.0	173.903
21.000	0.000	75.16	0.00	23.44	102.9	173.865
21.017	0.000	74.99	0.00	23.43	102.9	173.826
21.033	0.000	74.82	0.00	23.43	102.9	173.788
21.050	0.000	74.65	0.00	23.43	102.9	173.749
21.067	0.000	74.48	0.00	23.42	102.9	173.710
21.083	0.000	74.31	0.00	23.42	102.9	173.670
21.100	0.000	74.14	0.00	23.42	102.9	173.631
21.117	0.000	73.98	0.00	23.41	102.9	173.591
21.133	0.000	73.81	0.00	23.41	102.9	173.551
21.150	0.000	73.65	0.00	23.41	102.9	173.511
21.167	0.000	73.48	0.00	23.40	102.8	173.470
21.183	0.000	73.32	0.00	23.40	102.8	173.429
21.200	0.000	73.16	0.00	23.40	102.8	173.389
21.217	0.000	73.00	0.00	23.39	102.8	173.348
21.233	0.000	72.84	0.00	23.39	102.8	173.306
21.250	0.000	72.68	0.00	23.39	102.8	173.265
21.267	0.000	72.53	0.00	23.38	102.8	173.223
21.283	0.000	72.37	0.00	23.38	102.8	173.181
21.300	0.000	72.21	0.00	23.38	102.8	173.139
21.317	0.000	72.06	0.00	23.37	102.7	173.097
21.333	0.000	71.90	0.00	23.37	102.7	173.054
21.350	0.000	71.75	0.00	23.36	102.7	173.012
21.367	0.000	71.60	0.00	23.36	102.7	172.969
21.383	0.000	71.45	0.00	23.36	102.7	172.926
21.400	0.000	71.30	0.00	23.35	102.7	172.883
21.417	0.000	71.15	0.00	23.35	102.7	172.839
21.433	0.000	71.00	0.00	23.35	102.7	172.796
21.450	0.000	70.85	0.00	23.34	102.7	172.752
21.467	0.000	70.70	0.00	23.34	102.6	172.708
21.483	0.000	70.55	0.00	23.34	102.6	172.664
21.500	0.000	70.41	0.00	23.33	102.6	172.619
21.517	0.000	70.26	0.00	23.33	102.6	172.575
21.533	0.000	70.12	0.00	23.32	102.6	172.530
21.550	0.000	69.98	0.00	23.32	102.6	172.485
21.567	0.000	69.83	0.00	23.32	102.6	172.440
21.583	0.000	69.69	0.00	23.31	102.6	172.395
21.600	0.000	69.55	0.00	23.31	102.5	172.349
21.617	0.000	69.41	0.00	23.30	102.5	172.304
21.633	0.000	69.27	0.00	23.30	102.5	172.258
21.650	0.000	69.13	0.00	23.30	102.5	172.212
21.667	0.000	68.99	0.00	23.29	102.5	172.166
21.683	0.000	68.85	0.00	23.29	102.5	172.119
21.700	0.000	68.72	0.00	23.29	102.5	172.073
21.717	0.000	68.58	0.00	23.28	102.5	172.026
21.733	0.000	68.44	0.00	23.28	102.5	171.979
21.750	0.000	68.31	0.00	23.27	102.4	171.932
21.767	0.000	68.18	0.00	23.27	102.4	171.885
21.783	0.000	68.04	0.00	23.27	102.4	171.838
21.800	0.000	67.91	0.00	23.26	102.4	171.790
21.817	0.000	67.78	0.00	23.26	102.4	171.743

21.833	0.000	67.65	0.00	23.25	102.4	171.695
21.850	0.000	67.51	0.00	23.25	102.4	171.647
21.867	0.000	67.38	0.00	23.25	102.4	171.598
21.883	0.000	67.26	0.00	23.24	102.3	171.550
21.900	0.000	67.13	0.00	23.24	102.3	171.502
21.917	0.000	67.00	0.00	23.23	102.3	171.453
21.933	0.000	66.87	0.00	23.23	102.3	171.404
21.950	0.000	66.74	0.00	23.22	102.3	171.355
21.967	0.000	66.62	0.00	23.22	102.3	171.306
21.983	0.000	66.49	0.00	23.22	102.3	171.257
22.000	0.000	66.37	0.00	23.21	102.3	171.207
22.017	0.000	66.24	0.00	23.21	102.2	171.158
22.033	0.000	66.12	0.00	23.20	102.2	171.108
22.050	0.000	66.00	0.00	23.20	102.2	171.058
22.067	0.000	65.87	0.00	23.20	102.2	171.008
22.083	0.000	65.75	0.00	23.19	102.2	170.958
22.100	0.000	65.63	0.00	23.19	102.2	170.908
22.117	0.000	65.51	0.00	23.18	102.2	170.857
22.133	0.000	65.39	0.00	23.18	102.1	170.807
22.150	0.000	65.27	0.00	23.17	102.1	170.756
22.167	0.000	65.15	0.00	23.17	102.1	170.705
22.183	0.000	65.03	0.00	23.17	102.1	170.654
22.200	0.000	64.91	0.00	23.16	102.1	170.603
22.216	0.000	64.80	0.00	23.16	102.1	170.551
22.233	0.000	64.68	0.00	23.15	102.1	170.500
22.250	0.000	64.56	0.00	23.15	102.1	170.448
22.266	0.000	64.45	0.00	23.14	102.0	170.396
22.283	0.000	64.33	0.00	23.14	102.0	170.344
22.300	0.000	64.22	0.00	23.14	102.0	170.292
22.316	0.000	64.10	0.00	23.13	102.0	170.240
22.333	0.000	63.99	0.00	23.13	102.0	170.188
22.350	0.000	63.88	0.00	23.12	102.0	170.135
22.366	0.000	63.77	0.00	23.12	102.0	170.083
22.383	0.000	63.65	0.00	23.11	101.9	170.030
22.400	0.000	63.54	0.00	23.11	101.9	169.977
22.416	0.000	63.43	0.00	23.10	101.9	169.924
22.433	0.000	63.32	0.00	23.10	101.9	169.871
22.450	0.000	63.21	0.00	23.10	101.9	169.818
22.466	0.000	63.10	0.00	23.09	101.9	169.764
22.483	0.000	62.99	0.00	23.09	101.9	169.711
22.500	0.000	62.88	0.00	23.08	101.8	169.657
22.516	0.000	62.77	0.00	23.08	101.8	169.603
22.533	0.000	62.67	0.00	23.07	101.8	169.549
22.550	0.000	62.56	0.00	23.07	101.8	169.495
22.566	0.000	62.45	0.00	23.06	101.8	169.441
22.583	0.000	62.35	0.00	23.06	101.8	169.387
22.600	0.000	62.24	0.00	23.05	101.8	169.332
22.616	0.000	62.14	0.00	23.05	101.7	169.278
22.633	0.000	62.03	0.00	23.05	101.7	169.223
22.650	0.000	61.93	0.00	23.04	101.7	169.168
22.666	0.000	61.82	0.00	23.04	101.7	169.113
22.683	0.000	61.72	0.00	23.03	101.7	169.058
22.700	0.000	61.62	0.00	23.03	101.7	169.003
22.716	0.000	61.51	0.00	23.02	101.7	168.948
22.733	0.000	61.41	0.00	23.02	101.6	168.892
22.750	0.000	61.31	0.00	23.01	101.6	168.837
22.766	0.000	61.21	0.00	23.01	101.6	168.781

22.783	0.000	61.11	0.00	23.00	101.6	168.725
22.800	0.000	61.01	0.00	23.00	101.6	168.670
22.816	0.000	60.91	0.00	22.99	101.6	168.614
22.833	0.000	60.81	0.00	22.99	101.6	168.557
22.850	0.000	60.71	0.00	22.98	101.5	168.501
22.866	0.000	60.61	0.00	22.98	101.5	168.445
22.883	0.000	60.51	0.00	22.98	101.5	168.388
22.900	0.000	60.42	0.00	22.97	101.5	168.332
22.916	0.000	60.32	0.00	22.97	101.5	168.275
22.933	0.000	60.22	0.00	22.96	101.5	168.218
22.950	0.000	60.12	0.00	22.96	101.5	168.161
22.966	0.000	60.03	0.00	22.95	101.4	168.104
22.983	0.000	59.93	0.00	22.95	101.4	168.047
23.000	0.000	59.84	0.00	22.94	101.4	167.990
23.016	0.000	59.74	0.00	22.94	101.4	167.933
23.033	0.000	59.65	0.00	22.93	101.4	167.875
23.050	0.000	59.55	0.00	22.93	101.4	167.817
23.066	0.000	59.46	0.00	22.92	101.3	167.760
23.083	0.000	59.37	0.00	22.92	101.3	167.702
23.100	0.000	59.27	0.00	22.91	101.3	167.644
23.116	0.000	59.18	0.00	22.91	101.3	167.586
23.133	0.000	59.09	0.00	22.90	101.3	167.528
23.150	0.000	59.00	0.00	22.90	101.3	167.470
23.166	0.000	58.90	0.00	22.89	101.3	167.411
23.183	0.000	58.81	0.00	22.89	101.2	167.353
23.200	0.000	58.72	0.00	22.88	101.2	167.294
23.216	0.000	58.63	0.00	22.88	101.2	167.236
23.233	0.000	58.54	0.00	22.87	101.2	167.177
23.250	0.000	58.45	0.00	22.87	101.2	167.118
23.266	0.000	58.36	0.00	22.86	101.2	167.059
23.283	0.000	58.27	0.00	22.86	101.1	167.000
23.300	0.000	58.19	0.00	22.85	101.1	166.941
23.316	0.000	58.10	0.00	22.85	101.1	166.882
23.333	0.000	58.01	0.00	22.84	101.1	166.822
23.350	0.000	57.92	0.00	22.84	101.1	166.763
23.366	0.000	57.83	0.00	22.83	101.1	166.703
23.383	0.000	57.75	0.00	22.83	101.1	166.644
23.400	0.000	57.66	0.00	22.82	101.0	166.584
23.416	0.000	57.57	0.00	22.82	101.0	166.524
23.433	0.000	57.49	0.00	22.81	101.0	166.464
23.450	0.000	57.40	0.00	22.81	101.0	166.404
23.466	0.000	57.32	0.00	22.80	101.0	166.344
23.483	0.000	57.23	0.00	22.80	101.0	166.284
23.500	0.000	57.15	0.00	22.79	100.9	166.223
23.516	0.000	57.06	0.00	22.79	100.9	166.163
23.533	0.000	56.98	0.00	22.78	100.9	166.102
23.550	0.000	56.89	0.00	22.78	100.9	166.042
23.566	0.000	56.81	0.00	22.77	100.9	165.981
23.583	0.000	56.73	0.00	22.77	100.9	165.920
23.600	0.000	56.65	0.00	22.76	100.9	165.859
23.616	0.000	56.56	0.00	22.76	100.8	165.798
23.633	0.000	56.48	0.00	22.75	100.8	165.737
23.650	0.000	56.40	0.00	22.75	100.8	165.676
23.666	0.000	56.32	0.00	22.74	100.8	165.615
23.683	0.000	56.24	0.00	22.74	100.8	165.553
23.700	0.000	56.16	0.00	22.73	100.8	165.492
23.716	0.000	56.08	0.00	22.73	100.7	165.431

23.733	0.000	55.99	0.00	22.72	100.7	165.369
23.750	0.000	55.92	0.00	22.72	100.7	165.307
23.766	0.000	55.84	0.00	22.71	100.7	165.245
23.783	0.000	55.76	0.00	22.71	100.7	165.184
23.800	0.000	55.68	0.00	22.70	100.7	165.122
23.816	0.000	55.60	0.00	22.70	100.6	165.060
23.833	0.000	55.52	0.00	22.69	100.6	164.997
23.850	0.000	55.44	0.00	22.68	100.6	164.935
23.866	0.000	55.36	0.00	22.68	100.6	164.873
23.883	0.000	55.29	0.00	22.67	100.6	164.811
23.900	0.000	55.21	0.00	22.67	100.6	164.748
23.916	0.000	55.13	0.00	22.66	100.5	164.686
23.933	0.000	55.06	0.00	22.66	100.5	164.623
23.950	0.000	54.98	0.00	22.65	100.5	164.560
23.966	0.000	54.90	0.00	22.65	100.5	164.497
23.983	0.000	54.83	0.00	22.64	100.5	164.435
24.000	0.000	54.75	0.00	22.64	100.5	164.372
24.016	0.000	54.48	0.00	22.63	100.4	164.308
24.033	0.000	54.01	0.00	22.63	100.4	164.244
24.050	0.000	53.53	0.00	22.62	100.4	164.180
24.066	0.000	52.92	0.00	22.62	100.4	164.114
24.083	0.000	52.27	0.00	22.61	100.4	164.048
24.100	0.000	51.53	0.00	22.60	100.4	163.981
24.116	0.000	50.65	0.00	22.60	100.3	163.912
24.133	0.000	49.66	0.00	22.59	100.3	163.843
24.150	0.000	48.81	0.00	22.59	100.3	163.772
24.166	0.000	47.74	0.00	22.58	100.3	163.699
24.183	0.000	46.44	0.00	22.57	100.3	163.625
24.200	0.000	44.89	0.00	22.57	100.2	163.549
24.216	0.000	43.28	0.00	22.56	100.2	163.470
24.233	0.000	41.39	0.00	22.55	100.2	163.389
24.250	0.000	38.89	0.00	22.55	100.2	163.305
24.266	0.000	35.70	0.00	22.54	100.2	163.216
24.283	0.000	30.88	0.00	22.53	100.1	163.121
24.300	0.000	27.01	0.00	22.52	100.1	163.020
24.316	0.000	24.86	0.00	22.51	100.1	162.917
24.333	0.000	22.99	0.00	22.51	100.1	162.810
24.350	0.000	21.42	0.00	22.50	100.0	162.702
24.366	0.000	19.93	0.00	22.49	100.0	162.592
24.383	0.000	18.93	0.00	22.48	100.0	162.480
24.400	0.000	17.93	0.00	22.47	99.9	162.367
24.416	0.000	16.83	0.00	22.46	99.9	162.253
24.433	0.000	15.98	0.00	22.45	99.9	162.137
24.450	0.000	15.12	0.00	22.44	99.9	162.021
24.466	0.000	14.30	0.00	22.43	99.8	161.903
24.483	0.000	13.49	0.00	22.42	99.8	161.784
24.500	0.000	12.75	0.00	22.41	99.8	161.664
24.516	0.000	12.10	0.00	22.40	99.7	161.543
24.533	0.000	11.57	0.00	22.39	99.7	161.422
24.550	0.000	11.00	0.00	22.38	99.7	161.300
24.566	0.000	10.43	0.00	22.37	99.6	161.177
24.583	0.000	9.84	0.00	22.36	99.6	161.053
24.600	0.000	9.29	0.00	22.35	99.6	160.929
24.616	0.000	8.87	0.00	22.34	99.5	160.804
24.633	0.000	8.42	0.00	22.33	99.5	160.679
24.650	0.000	7.96	0.00	22.32	99.5	160.553
24.666	0.000	7.52	0.00	22.31	99.4	160.426

24.683	0.000	7.14	0.00	22.29	99.4	160.299
24.700	0.000	6.76	0.00	22.28	99.4	160.171
24.716	0.000	6.41	0.00	22.27	99.3	160.043
24.733	0.000	6.10	0.00	22.26	99.3	159.915
24.750	0.000	5.79	0.00	22.25	99.3	159.786
24.766	0.000	5.48	0.00	22.24	99.2	159.657
24.783	0.000	5.19	0.00	22.23	99.2	159.528
24.800	0.000	4.90	0.00	22.22	99.2	159.398
24.816	0.000	4.62	0.00	22.21	99.1	159.268
24.833	0.000	4.35	0.00	22.20	99.1	159.137
24.850	0.000	4.11	0.00	22.19	99.1	159.006
24.866	0.000	3.88	0.00	22.17	99.0	158.875
24.883	0.000	3.65	0.00	22.16	99.0	158.744
24.900	0.000	3.42	0.00	22.15	99.0	158.612
24.916	0.000	3.21	0.00	22.14	98.9	158.480
24.933	0.000	3.04	0.00	22.13	98.9	158.348
24.950	0.000	2.88	0.00	22.12	98.9	158.216
24.966	0.000	2.71	0.00	22.11	98.8	158.084
24.983	0.000	2.54	0.00	22.10	98.8	157.951
25.000	0.000	2.37	0.00	22.09	98.8	157.818
25.016	0.000	2.21	0.00	22.07	98.7	157.686
25.033	0.000	2.10	0.00	22.06	98.7	157.552
25.050	0.000	2.00	0.00	22.05	98.6	157.419
25.066	0.000	1.90	0.00	22.04	98.6	157.286
25.083	0.000	1.80	0.00	22.03	98.6	157.153
25.100	0.000	1.69	0.00	22.02	98.5	157.019
25.116	0.000	1.59	0.00	22.01	98.5	156.886
25.133	0.000	1.49	0.00	22.00	98.5	156.752
25.150	0.000	1.39	0.00	21.98	98.4	156.619
25.166	0.000	1.29	0.00	21.97	98.4	156.485
25.183	0.000	1.19	0.00	21.96	98.4	156.351
25.200	0.000	1.11	0.00	21.95	98.3	156.217
25.216	0.000	1.09	0.00	21.94	98.3	156.083
25.233	0.000	1.07	0.00	21.93	98.3	155.949
25.250	0.000	1.06	0.00	21.92	98.2	155.816
25.266	0.000	1.04	0.00	21.91	98.2	155.682
25.283	0.000	1.02	0.00	21.89	98.2	155.548
25.300	0.000	1.00	0.00	21.88	98.1	155.414
25.316	0.000	0.99	0.00	21.87	98.1	155.280
25.333	0.000	0.97	0.00	21.86	98.1	155.147
25.350	0.000	0.95	0.00	21.85	98.0	155.013
25.366	0.000	0.94	0.00	21.84	98.0	154.879
25.383	0.000	0.92	0.00	21.83	97.9	154.746
25.400	0.000	0.90	0.00	21.82	97.9	154.612
25.416	0.000	0.88	0.00	21.80	97.9	154.478
25.433	0.000	0.87	0.00	21.79	97.8	154.345
25.450	0.000	0.85	0.00	21.78	97.8	154.211
25.466	0.000	0.83	0.00	21.77	97.8	154.078
25.483	0.000	0.82	0.00	21.76	97.7	153.944
25.500	0.000	0.80	0.00	21.75	97.7	153.811
25.516	0.000	0.78	0.00	21.74	97.7	153.677
25.533	0.000	0.77	0.00	21.73	97.6	153.544
25.550	0.000	0.75	0.00	21.71	97.6	153.411
25.566	0.000	0.73	0.00	21.70	97.6	153.277
25.583	0.000	0.72	0.00	21.69	97.5	153.144
25.600	0.000	0.70	0.00	21.68	97.5	153.010
25.616	0.000	0.68	0.00	21.67	97.5	152.877

25.633	0.000	0.67	0.00	21.66	97.4	152.744
25.650	0.000	0.65	0.00	21.65	97.4	152.611
25.666	0.000	0.63	0.00	21.64	97.4	152.477
25.683	0.000	0.62	0.00	21.62	97.3	152.344
25.700	0.000	0.60	0.00	21.61	97.3	152.211
25.716	0.000	0.58	0.00	21.60	97.2	152.078
25.733	0.000	0.57	0.00	21.59	97.2	151.945
25.750	0.000	0.55	0.00	21.58	97.2	151.812
25.766	0.000	0.53	0.00	21.57	97.1	151.679
25.783	0.000	0.52	0.00	21.56	97.1	151.546
25.800	0.000	0.50	0.00	21.55	97.1	151.413
25.816	0.000	0.48	0.00	21.54	97.0	151.280
25.833	0.000	0.47	0.00	21.52	97.0	151.147
25.850	0.000	0.45	0.00	21.51	97.0	151.014
25.866	0.000	0.44	0.00	21.50	96.9	150.881
25.883	0.000	0.42	0.00	21.49	96.9	150.748
25.900	0.000	0.40	0.00	21.48	96.9	150.615
25.916	0.000	0.39	0.00	21.47	96.8	150.482
25.933	0.000	0.37	0.00	21.46	96.8	150.349
25.950	0.000	0.36	0.00	21.45	96.8	150.217
25.966	0.000	0.34	0.00	21.43	96.7	150.084
25.983	0.000	0.32	0.00	21.42	96.7	149.951
26.000	0.000	0.31	0.00	21.41	96.7	149.818
26.016	0.000	0.29	0.00	21.40	96.6	149.686
26.033	0.000	0.28	0.00	21.39	96.6	149.553
26.050	0.000	0.26	0.00	21.38	96.6	149.420
26.066	0.000	0.25	0.00	21.37	96.5	149.288
26.083	0.000	0.23	0.00	21.36	96.5	149.155
26.100	0.000	0.21	0.00	21.35	96.4	149.023
26.116	0.000	0.20	0.00	21.33	96.4	148.890
26.133	0.000	0.18	0.00	21.32	96.4	148.758
26.150	0.000	0.17	0.00	21.31	96.3	148.625
26.166	0.000	0.15	0.00	21.30	96.3	148.493
26.183	0.000	0.14	0.00	21.29	96.3	148.360
26.200	0.000	0.12	0.00	21.28	96.2	148.228
26.216	0.000	0.10	0.00	21.27	96.2	148.095
26.233	0.000	0.09	0.00	21.26	96.2	147.963
26.250	0.000	0.07	0.00	21.25	96.1	147.831
26.266	0.000	0.06	0.00	21.23	96.1	147.699
26.283	0.000	0.04	0.00	21.22	96.1	147.566
26.300	0.000	0.03	0.00	21.21	96.0	147.434
26.316	0.000	0.01	0.00	21.20	96.0	147.302
26.333	0.000	0.00	0.00	21.19	96.0	147.170
26.350	0.000	0.00	0.00	21.18	95.9	147.038
26.366	0.000	0.00	0.00	21.17	95.9	146.905
26.383	0.000	0.00	0.00	21.16	95.9	146.773
26.400	0.000	0.00	0.00	21.15	95.8	146.641
26.416	0.000	0.00	0.00	21.13	95.8	146.509
26.433	0.000	0.00	0.00	21.12	95.8	146.378
26.450	0.000	0.00	0.00	21.11	95.7	146.246
26.466	0.000	0.00	0.00	21.10	95.7	146.114
26.483	0.000	0.00	0.00	21.09	95.7	145.982
26.500	0.000	0.00	0.00	21.08	95.6	145.850
26.516	0.000	0.00	0.00	21.07	95.6	145.719
26.533	0.000	0.00	0.00	21.06	95.5	145.587
26.550	0.000	0.00	0.00	21.05	95.5	145.456
26.566	0.000	0.00	0.00	21.03	95.5	145.324

26.583	0.000	0.00	0.00	21.02	95.4	145.193
26.600	0.000	0.00	0.00	21.01	95.4	145.061
26.616	0.000	0.00	0.00	21.00	95.4	144.930
26.633	0.000	0.00	0.00	20.99	95.3	144.799
26.650	0.000	0.00	0.00	20.98	95.3	144.667
26.666	0.000	0.00	0.00	20.97	95.3	144.536
26.683	0.000	0.00	0.00	20.96	95.2	144.405
26.700	0.000	0.00	0.00	20.95	95.2	144.274
26.716	0.000	0.00	0.00	20.93	95.2	144.143
26.733	0.000	0.00	0.00	20.92	95.1	144.012
26.750	0.000	0.00	0.00	20.91	95.1	143.881
26.766	0.000	0.00	0.00	20.90	95.1	143.750
26.783	0.000	0.00	0.00	20.89	95.0	143.619
26.800	0.000	0.00	0.00	20.88	95.0	143.488
26.816	0.000	0.00	0.00	20.87	95.0	143.357
26.833	0.000	0.00	0.00	20.86	94.9	143.226
26.850	0.000	0.00	0.00	20.85	94.9	143.096
26.866	0.000	0.00	0.00	20.84	94.9	142.965
26.883	0.000	0.00	0.00	20.82	94.8	142.834
26.900	0.000	0.00	0.00	20.81	94.8	142.704
26.916	0.000	0.00	0.00	20.80	94.8	142.573
26.933	0.000	0.00	0.00	20.79	94.7	142.443
26.950	0.000	0.00	0.00	20.78	94.7	142.312
26.966	0.000	0.00	0.00	20.77	94.7	142.182
26.983	0.000	0.00	0.00	20.76	94.6	142.052
27.000	0.000	0.00	0.00	20.75	94.6	141.921
27.016	0.000	0.00	0.00	20.74	94.6	141.791
27.033	0.000	0.00	0.00	20.73	94.5	141.661
27.050	0.000	0.00	0.00	20.71	94.5	141.531
27.066	0.000	0.00	0.00	20.70	94.4	141.401
27.083	0.000	0.00	0.00	20.69	94.4	141.271
27.100	0.000	0.00	0.00	20.68	94.4	141.141
27.116	0.000	0.00	0.00	20.67	94.3	141.011
27.133	0.000	0.00	0.00	20.66	94.3	140.881
27.150	0.000	0.00	0.00	20.65	94.3	140.751
27.166	0.000	0.00	0.00	20.64	94.2	140.621
27.183	0.000	0.00	0.00	20.63	94.2	140.491
27.200	0.000	0.00	0.00	20.62	94.2	140.362
27.216	0.000	0.00	0.00	20.61	94.1	140.232
27.233	0.000	0.00	0.00	20.59	94.1	140.102
27.250	0.000	0.00	0.00	20.58	94.1	139.973
27.266	0.000	0.00	0.00	20.57	94.0	139.843
27.283	0.000	0.00	0.00	20.56	94.0	139.714
27.300	0.000	0.00	0.00	20.55	94.0	139.584
27.316	0.000	0.00	0.00	20.54	93.9	139.455
27.333	0.000	0.00	0.00	20.53	93.9	139.326
27.350	0.000	0.00	0.00	20.52	93.9	139.196
27.366	0.000	0.00	0.00	20.51	93.8	139.067
27.383	0.000	0.00	0.00	20.50	93.8	138.938
27.400	0.000	0.00	0.00	20.49	93.8	138.809
27.416	0.000	0.00	0.00	20.47	93.7	138.680
27.433	0.000	0.00	0.00	20.46	93.7	138.550
27.450	0.000	0.00	0.00	20.45	93.7	138.421
27.466	0.000	0.00	0.00	20.44	93.6	138.292
27.483	0.000	0.00	0.00	20.43	93.6	138.164
27.500	0.000	0.00	0.00	20.42	93.6	138.035
27.516	0.000	0.00	0.00	20.41	93.5	137.906

27.533	0.000	0.00	0.00	20.40	93.5	137.777
27.550	0.000	0.00	0.00	20.39	93.5	137.648
27.566	0.000	0.00	0.00	20.38	93.4	137.520
27.583	0.000	0.00	0.00	20.37	93.4	137.391
27.600	0.000	0.00	0.00	20.36	93.4	137.262
27.616	0.000	0.00	0.00	20.34	93.3	137.134
27.633	0.000	0.00	0.00	20.33	93.3	137.005
27.650	0.000	0.00	0.00	20.32	93.3	136.877
27.666	0.000	0.00	0.00	20.31	93.2	136.748
27.683	0.000	0.00	0.00	20.30	93.2	136.620
27.700	0.000	0.00	0.00	20.29	93.2	136.492
27.716	0.000	0.00	0.00	20.28	93.1	136.363
27.733	0.000	0.00	0.00	20.27	93.1	136.235
27.750	0.000	0.00	0.00	20.26	93.1	136.107
27.766	0.000	0.00	0.00	20.25	93.0	135.979
27.783	0.000	0.00	0.00	20.24	93.0	135.851
27.800	0.000	0.00	0.00	20.23	93.0	135.723
27.816	0.000	0.00	0.00	20.22	92.9	135.595
27.833	0.000	0.00	0.00	20.20	92.9	135.467
27.850	0.000	0.00	0.00	20.19	92.9	135.339
27.866	0.000	0.00	0.00	20.18	92.8	135.211
27.883	0.000	0.00	0.00	20.17	92.8	135.083
27.900	0.000	0.00	0.00	20.16	92.8	134.955
27.916	0.000	0.00	0.00	20.15	92.7	134.828
27.933	0.000	0.00	0.00	20.14	92.7	134.700
27.950	0.000	0.00	0.00	20.13	92.7	134.572
27.966	0.000	0.00	0.00	20.12	92.6	134.445
27.983	0.000	0.00	0.00	20.11	92.6	134.317
28.000	0.000	0.00	0.00	20.10	92.6	134.190
28.016	0.000	0.00	0.00	20.09	92.5	134.062
28.033	0.000	0.00	0.00	20.08	92.5	133.935
28.050	0.000	0.00	0.00	20.06	92.5	133.808
28.066	0.000	0.00	0.00	20.05	92.4	133.680
28.083	0.000	0.00	0.00	20.04	92.4	133.553
28.100	0.000	0.00	0.00	20.03	92.4	133.426
28.116	0.000	0.00	0.00	20.02	92.3	133.299
28.133	0.000	0.00	0.00	20.01	92.3	133.172
28.150	0.000	0.00	0.00	20.00	92.3	133.044
28.166	0.000	0.00	0.00	19.99	92.2	132.917
28.183	0.000	0.00	0.00	19.98	92.2	132.790
28.200	0.000	0.00	0.00	19.97	92.2	132.664
28.216	0.000	0.00	0.00	19.96	92.1	132.537
28.233	0.000	0.00	0.00	19.95	92.1	132.410
28.250	0.000	0.00	0.00	19.94	92.1	132.283
28.266	0.000	0.00	0.00	19.93	92.0	132.156
28.283	0.000	0.00	0.00	19.92	92.0	132.030
28.300	0.000	0.00	0.00	19.90	92.0	131.903
28.316	0.000	0.00	0.00	19.89	91.9	131.776
28.333	0.000	0.00	0.00	19.88	91.9	131.650
28.350	0.000	0.00	0.00	19.87	91.9	131.523
28.366	0.000	0.00	0.00	19.86	91.8	131.397
28.383	0.000	0.00	0.00	19.85	91.8	131.270
28.400	0.000	0.00	0.00	19.84	91.8	131.144
28.416	0.000	0.00	0.00	19.83	91.7	131.018
28.433	0.000	0.00	0.00	19.82	91.7	130.891
28.450	0.000	0.00	0.00	19.81	91.7	130.765
28.466	0.000	0.00	0.00	19.80	91.6	130.639

28.483	0.000	0.00	0.00	19.79	91.6	130.513
28.500	0.000	0.00	0.00	19.78	91.6	130.386
28.516	0.000	0.00	0.00	19.77	91.5	130.260
28.533	0.000	0.00	0.00	19.76	91.5	130.134
28.550	0.000	0.00	0.00	19.75	91.5	130.008
28.566	0.000	0.00	0.00	19.73	91.4	129.882
28.583	0.000	0.00	0.00	19.72	91.4	129.757
28.600	0.000	0.00	0.00	19.71	91.4	129.631
28.616	0.000	0.00	0.00	19.70	91.3	129.505
28.633	0.000	0.00	0.00	19.69	91.3	129.379
28.650	0.000	0.00	0.00	19.68	91.3	129.253
28.666	0.000	0.00	0.00	19.67	91.2	129.128
28.683	0.000	0.00	0.00	19.66	91.2	129.002
28.700	0.000	0.00	0.00	19.65	91.2	128.877
28.716	0.000	0.00	0.00	19.64	91.1	128.751
28.733	0.000	0.00	0.00	19.63	91.1	128.626
28.750	0.000	0.00	0.00	19.62	91.1	128.500
28.766	0.000	0.00	0.00	19.61	91.0	128.375
28.783	0.000	0.00	0.00	19.60	91.0	128.249
28.800	0.000	0.00	0.00	19.59	91.0	128.124
28.816	0.000	0.00	0.00	19.58	90.9	127.999
28.833	0.000	0.00	0.00	19.57	90.9	127.874
28.850	0.000	0.00	0.00	19.55	90.9	127.748
28.866	0.000	0.00	0.00	19.54	90.8	127.623
28.883	0.000	0.00	0.00	19.53	90.8	127.498
28.900	0.000	0.00	0.00	19.52	90.8	127.373
28.916	0.000	0.00	0.00	19.51	90.7	127.248
28.933	0.000	0.00	0.00	19.50	90.7	127.123
28.950	0.000	0.00	0.00	19.49	90.7	126.998
28.966	0.000	0.00	0.00	19.48	90.6	126.874
28.983	0.000	0.00	0.00	19.47	90.6	126.749
29.000	0.000	0.00	0.00	19.46	90.6	126.624
29.016	0.000	0.00	0.00	19.45	90.5	126.499
29.033	0.000	0.00	0.00	19.44	90.5	126.375
29.050	0.000	0.00	0.00	19.43	90.5	126.250
29.066	0.000	0.00	0.00	19.42	90.4	126.125
29.083	0.000	0.00	0.00	19.41	90.4	126.001
29.100	0.000	0.00	0.00	19.40	90.4	125.876
29.116	0.000	0.00	0.00	19.39	90.3	125.752
29.133	0.000	0.00	0.00	19.38	90.3	125.628
29.150	0.000	0.00	0.00	19.37	90.3	125.503
29.166	0.000	0.00	0.00	19.36	90.3	125.379
29.183	0.000	0.00	0.00	19.35	90.2	125.255
29.200	0.000	0.00	0.00	19.33	90.2	125.130
29.216	0.000	0.00	0.00	19.32	90.2	125.006
29.233	0.000	0.00	0.00	19.31	90.1	124.882
29.250	0.000	0.00	0.00	19.30	90.1	124.758
29.266	0.000	0.00	0.00	19.29	90.1	124.634
29.283	0.000	0.00	0.00	19.28	90.0	124.510
29.300	0.000	0.00	0.00	19.27	90.0	124.386
29.316	0.000	0.00	0.00	19.26	90.0	124.262
29.333	0.000	0.00	0.00	19.25	89.9	124.138
29.350	0.000	0.00	0.00	19.24	89.9	124.014
29.366	0.000	0.00	0.00	19.23	89.9	123.891
29.383	0.000	0.00	0.00	19.22	89.8	123.767
29.400	0.000	0.00	0.00	19.21	89.8	123.643
29.416	0.000	0.00	0.00	19.20	89.8	123.520

29.433	0.000	0.00	0.00	19.19	89.7	123.396
29.450	0.000	0.00	0.00	19.18	89.7	123.272
29.466	0.000	0.00	0.00	19.17	89.7	123.149
29.483	0.000	0.00	0.00	19.16	89.6	123.025
29.500	0.000	0.00	0.00	19.15	89.6	122.902
29.516	0.000	0.00	0.00	19.14	89.6	122.779
29.533	0.000	0.00	0.00	19.13	89.5	122.655
29.550	0.000	0.00	0.00	19.12	89.5	122.532
29.566	0.000	0.00	0.00	19.11	89.5	122.409
29.583	0.000	0.00	0.00	19.10	89.4	122.286
29.600	0.000	0.00	0.00	19.08	89.4	122.162
29.616	0.000	0.00	0.00	19.07	89.4	122.039
29.633	0.000	0.00	0.00	19.06	89.3	121.916
29.650	0.000	0.00	0.00	19.05	89.3	121.793
29.666	0.000	0.00	0.00	19.04	89.3	121.670
29.683	0.000	0.00	0.00	19.03	89.2	121.547
29.700	0.000	0.00	0.00	19.02	89.2	121.425
29.716	0.000	0.00	0.00	19.01	89.2	121.302
29.733	0.000	0.00	0.00	19.00	89.1	121.179
29.750	0.000	0.00	0.00	18.99	89.1	121.056
29.766	0.000	0.00	0.00	18.98	89.1	120.933
29.783	0.000	0.00	0.00	18.97	89.1	120.811
29.800	0.000	0.00	0.00	18.96	89.0	120.688
29.816	0.000	0.00	0.00	18.95	89.0	120.566
29.833	0.000	0.00	0.00	18.94	89.0	120.443
29.850	0.000	0.00	0.00	18.93	88.9	120.321
29.866	0.000	0.00	0.00	18.92	88.9	120.198
29.883	0.000	0.00	0.00	18.91	88.9	120.076
29.900	0.000	0.00	0.00	18.90	88.8	119.953
29.916	0.000	0.00	0.00	18.89	88.8	119.831
29.933	0.000	0.00	0.00	18.88	88.8	119.709
29.950	0.000	0.00	0.00	18.87	88.7	119.587
29.966	0.000	0.00	0.00	18.86	88.7	119.464
29.983	0.000	0.00	0.00	18.85	88.7	119.342
30.000	0.000	0.00	0.00	18.84	88.6	119.220

PROCESS SUMMARY OF STORAGE:

INFLOW VOLUME = 296.298 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME = 296.297 AF
LOSS VOLUME = 0.000 AF

==========

END OF FLOODSCx ROUTING ANALYSIS

BEE CANYON RETARDING BASIN
CALCULATIONS

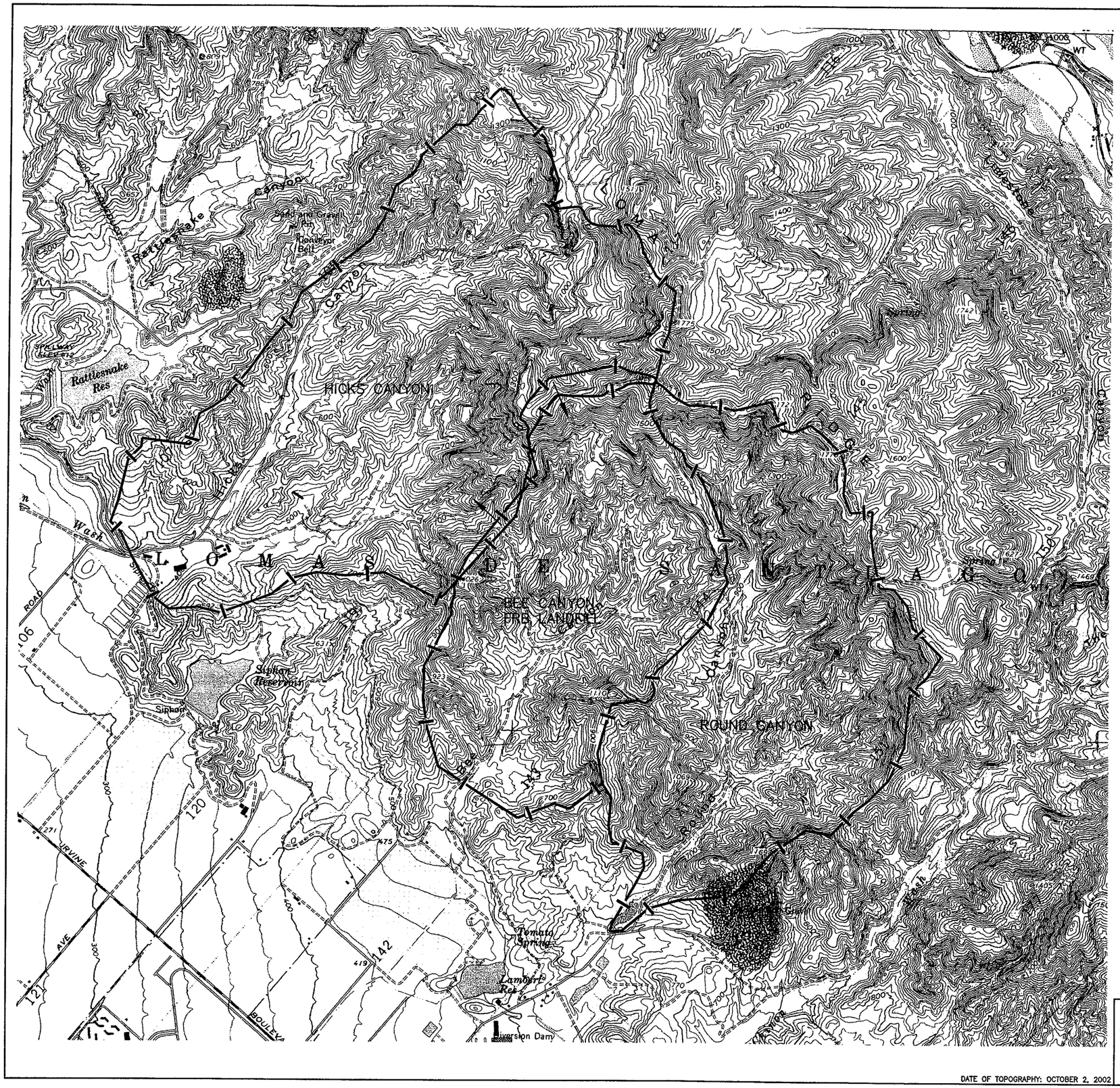
Basin Calculations

DATE	6/17/2005	JOB	2005-0069
CALC BY	CHM	Description	FRB BCRB Calculations
SCALE	100	Checked By	ACR

CONTOUR	AREA sq inch	AVE. AREA sq feet	Cubic Yards Volume	Cumulative CY	VOLUME AF	Depth FT
530	0.13					
532	4.67	24,000	1,778	1,778	1.10	2
534	10.19	74,300	5,504	7,281	4.51	4
536	12.48	113,350	8,396	15,678	9.72	6
538	14.33	134,050	9,930	25,607	15.87	8
540	15.18	147,550	10,930	36,537	22.65	10
550	23.28	192,300	71,222	107,759	66.79	20
560	37.35	303,150	112,278	220,037	136.39	30
570	66.17	517,600	191,704	411,741	255.21	40
572	74.39	702,800	52,059	463,800	287.48	42
574	82.62	785,050	58,152	521,952	323.52	44
576	90.84	867,300	64,244	586,196	363.34	46
578	99.06	949,500	70,333	656,530	406.94	48
580	107.31	1,031,850	76,433	732,963	454.32	50
		Volume	**732,960**			

Per 2005 Aerial Topographic Survey			
EL	Depth	Q	Vol
530.0	0.0	0.00	0.00
532.0	2.0	21.00	1.10
535.0	5.0	33.80	7.12
538.0	8.0	42.80	15.87
540.0	10.0	47.80	22.65
543.0	13.0	55.00	35.89
550.0	20.0	67.60	66.79
560.0	30.0	82.90	136.39
569.5	39.5	112.48	249.27
570.0	40.0	137.41	255.21
571.0	41.0	246.71	271.35
572.0	42.0	413.92	287.48
573.0	43.0	624.90	305.50
574.0	44.0	879.10	323.52
575.0	45.0	1169.69	343.43
576.0	46.0	1484.52	363.34
577.0	47.0	1814.16	385.14
578.0	48.0	2172.54	406.94
579.0	49.0	3014.90	430.63
580.0	50.0	3558.59	454.32
581.0	51.0	4676.59	478.00

BCRB Volume - Assume 39 AF Sediment		
EL	Q	Vol
530.0	0.00	0.00
543.0	0.00	0.00
550.0	67.60	28.00
560.0	82.90	97.39
569.5	112.48	210.27
570.0	137.41	216.21
571.0	246.71	232.35



DATE OF TOPOGRAPHY: OCTOBER 2, 2002

N

GRAPHIC SCALE

1000 500 0 1000 2000

(IN FEET)

LEGEND

DRAINAGE TRIBUTARY AREA

PROPERTY LINE

MARK	DATE	DESCRIPTION

REVISIONS

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER BRYAN A. STIRRAT No. 22631 Exp. 12-31-07 CIVIL STATE OF CALIFORNIA

DATE

BAS
BRYAN A. STIRRAT & ASSOCIATES
CIVIL AND ENVIRONMENTAL ENGINEERS
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA. 91765
(909) 860-7777

COUNTY OF ORANGE
INTEGRATED WASTE MANAGEMENT DEPARTMENT

HICKS CANYON, BEE CANYON, ROUND CANYON

WATERSHED AREAS

DESIGNED T.J.C.			SHEET
DRAWN D.C.R.		CHECKED M.A.C.	1
SCALE	DATE	DRAWING NO.	OF 1
AS SHOWN	03-2006	24215DB.DWG	

ATTACHMENT 3
SEDIMENT AND DEBRIS CALCULATION RESULTS
(John Tettemer & Associates, 1989)
(BAS, 2000)

SEDIMENT AND DEBRIS CALCULATIONS
(John Tettermer & Associates, 1989)

storms and recognizing the Orange County Flood Control District desire to clean the facilities once annually.

Agua Chinon Retarding Basin	40 acre-feet
Round Canyon Retarding Basin	28 acre-feet
Bee Canyon Retarding Basin	39 acre-feet

Please note that the Tatum computations are for drainage areas that have four to five years of recovery from a major fire. The Los Angeles County computations are used for debris basins, not retarding basins, and are for more severe fire circumstances.

As for the particular case of the proposed Bee Canyon Retarding Basin, where most of the watershed is assigned as "Landfill", two cases were considered in this study. In Case I, it was assumed that there would be minor management practices to control erosion of the landfill. The required volume in this case turned out to be so high that it would render the project unfeasible. On the other hand, in Case II, it was assumed that appropriate landfill erosion control measures would be undertaken in accordance with good practice and County regulations, the computed volume of sediment was 39 acre-feet which is consistent with neighboring basins.

Finally, we considered the possibility of mudflow and the effect it would have on the retarding basins. Mudflows usually occur as a result of heavy rain on bare slopes or may originate from landslides where movement of the mass creates the mixing of water and soils necessary for flow to take place. The critical conditions required to develop mudflows are sufficiently rare that they should not, by themselves, be considered in facilities designed to provide 100-year flood

BEE CANYON

Assuming Appropriate Erosion Control of landfill so that erosion potential would not get worse than existing conditions in the watershed.

	D_s < .062	0.62 to 1.0 mm	> 1.0 mm	Total acre ft
o MUSLE for wash load and Karim & Kennedy for bed material load for a 100 yr flood event	6.57	23.77	1.50	31.84
o Tatum's method which considers the case of 100 yr flood event 4 to 5 years after 100% burn				32.8
o Tatum's method plus 20% for maintenance uncertainties (similar to the requirements of San Bernardino County)				39.4
o Los Angeles County Flood Control District's Method which considers the case of a 40-50 yr flood event first year after 100% burn; (average of curves C & B)				43.9
o Other Methods for average annual volumes				
o USLE based on 2 yr-6H rainfall				15.38
o Pacific Southwest Interagency Committee				5.50
o Flaxman's Method				4.85

ATTACHMENT 4

UNIVERSAL SOIL LOSS EQUATION
(BAS, 2000)

UNIVERSAL SOIL LOSS EQUATION (USLE)
FOR AREAS W/O ON-SITE BASINS, TABLE 1-2

JOB NAME FRB LANDFILL
DATE 9/14/00
CALC BY ACR

AVERAGE DENSITY OF SOIL (PCF) = 100

NODE NO.	AREA (ACRES)	R FACTOR	K FACTOR	LS FACTOR	C FACTOR	P FACTOR	TONS PER ACRE	ANNUAL SOIL LOSS (TONS/YEAR)	VOLUME (CY)
1.37-native	24.31	50	0.25	10.0	0.07	1.0	8.8	212.7	157.56
1.37-native	11.86	50	0.25	10.0	0.10	1.0	12.5	148.3	109.81
1.37-waste	30.63	50	0.28	9.0	0.08	0.9	9.1	277.9	205.83
1.37-waste	59.43	50	0.28	9.0	0.08	0.9	9.1	539.1	399.37
1.07	78.02	50	0.25	10.0	0.07	1.0	8.8	682.7	505.69
1.07	34.34	50	0.25	10.0	0.07	1.0	8.8	300.5	222.57
1.05-liner PCL	11.92	50	0.28	10.0	0.5	0.9	63.0	751.0	556.27
1.05-Phase V	75.32	50	0.28	1.0	0.6	0.9	7.6	569.4	421.79
1.05-native	50.51	50	0.25	10.0	0.07	1.0	8.8	442.0	327.38
1.06-waste	19.54	50	0.28	9.0	0.08	0.9	9.1	177.3	131.31
1.06-native	11.38	50	0.25	10.0	0.25	1.0	31.3	355.6	263.43
1.08	62.33	50	0.25	10.0	0.07	1.0	8.8	545.4	403.99
1.09	155.62	50	0.25	10.0	0.07	1.0	8.8	1361.7	1008.65
Note: This study covers all areas of the landfill bypassing on-site desilting basin and into the Bee Canyon Retarding Basin									
TOTAL	*625.2*					*AVERAGE VALUE (tons/acre/year)=*	*10.2*	*6363.4*	*4713.7*

SEDIMENT VOLUME FOR ENTIRE SITE TRIBUTARY TO BCRB

With On-site Basin (CY) -	2,867	(see attached sheet)
No On-site Basin (CY) -	4,714	
TOTAL (CY) -	7,580	

APPENDIX F
TRAFFIC IMPACT STUDY

RELOOC STRATEGIC PLAN
FRANK R. BOWERMAN LANDFILL IMPLEMENTATION
TRAFFIC IMPACT STUDY
ORANGE COUNTY, CALIFORNIA

Prepared for:

County of Orange
Integrated Waste Management Department
320 North Flower Street, Suite 400
Santa Ana, CA 92703

Prepared by:

P&D Consultants
999 Town & Country Road, 4th Floor
Orange, CA 92868

Contact: Lee Wooten, P.E.
Project Engineer
(714) 835-4447

December 30, 2005

TABLE OF CONTENTS

Section **Page**

1.0 INTRODUCTION 1-1

1.1 Project Description 1-1
1.1.1 Project Location 1-1
1.1.2 Proposed Project 1-1
1.1.3 Project Alternatives 1-5
1.2 Scope of Analysis 1-5
1.3 Study Area 1-6
1.4 Review of Previous Reports 1-9

2.0 METHODOLOGY 2-1

2.1 Assumptions 2-1
2.2 Traffic Counts 2-1
2.3 Future Background Traffic Volumes 2-2
2.4 Project Trip Generation 2-3
2.5 Proposed Project Trip Distribution 2-6
2.6 Proposed Project Trip Assignment 2-6
2.7 Level of Service 2-6
2.7.1 Road Segments 2-11
2.7.2 Signalized Intersections 2-12
2.8 Regulatory Framework 2-13
2.8.1 Level of Service Standards 2-13
2.8.2 Thresholds of Significant Adverse Impacts 2-13

3.0 EXISTING CONDITIONS 3-1

3.1 Existing Major Land Uses 3-1
3.2 Existing Circulation Network 3-1
3.3 Existing Vehicular Traffic Volumes 3-5
3.4 Existing Transit Services 3-5
3.5 Existing Bike Lanes 3-5
3.6 Existing Level of Service 3-5
3.6.1 Road Segments 3-5
3.6.2 Signalized Intersections 3-8

4.0 2010 TRAFFIC IMPACT ANALYSIS 4-1

4.1 Traffic Conditions 4-1
4.1.1 Circulation Network 4-1
4.1.2 Traffic Volumes 4-2

TABLE OF CONTENTS (CONT.)

Section **Page**

4.2 Traffic Impact Analysis 4-2
4.2.1 Road Segments 4-6
4.2.2 Signalized Intersections 4-8
4.3 Recommended Mitigation Measures 4-11

5.0 2030 TRAFFIC IMPACT ANALYSIS 5-1

5.1 Traffic Conditions 5-1
5.1.1 Circulation Network 5-1
5.1.2 Traffic Volumes 5-2
5.2 Traffic Impact Analysis 5-2
5.2.1 Road Segments 5-2
5.2.2 Signalized Intersections 5-8
5.3 Recommended Mitigation Measures 5-11

6.0 POST-2030 TRAFFIC IMPACT ANALYSIS 6-1

6.1 Traffic Conditions 6-1
6.1.1 Circulation Network 6-1
6.1.2 Traffic Volumes 6-1
6.2 Traffic Impact Analysis 6-1
6.3 Mitigation Measures 6-3

7.0 PROJECT ALTERNATIVES TRAFFIC IMPACTS 7-1

7.1 Alternative 1 7-1
7.2 Alternative 2 7-1
7.3 Alternative 3 7-2
7.4 Alternative 4 7-2

8.0 OTHER TRAFFIC ISSUES 8-1

8.1 Congestion Management Program Analysis 8-1
8.2 Selected 2025 Traffic Impact Analysis 8-1
8.3 Lake Forest General Plan Amendment Sensitivity Analysis 8-3
8.4 FRB Landfill Hours of Operation Sensitivity Analysis 8-4
8.5 Bicycle Circulation Impacts 8-5

9.0 FINDINGS AND RECOMMENDATIONS 9-1

9.1 Findings and Conclusions 9-1
9.1.1 FRB Landfill 9-1

TABLE OF CONTENTS (CONT.)

Section **Page**

9.1.2 Existing Conditions 9-1
9.1.3 Year 2010 Conditions 9-1
9.1.4 Selected Year 2025 Conditions 9-2
9.1.5 Year 2030 Conditions 9-2
9.1.6 Year Post-2030 Conditions 9-3
9.2 Recommendations 9-4

APPENDICES

A Existing Vehicular Traffic Counts

B Level of Service Computation Reports – Existing Conditions

C Level of Service Computation Reports
C1 2010 without the Project
C2 2010 with the Project

D Level of Service Computation Reports
D1 2030 without the Project
D2 2030 with the Project
D3 2030 with the Project with Mitigation

E Level of Service Computation Report – 2025

F FRB Landfill Daily Truck Data

G OCTAM and ITAM Traffic Forecasting Results

LIST OF TABLES

Table **Page**

1.3-1 Study Road Segments 1-8
1.3-2 Study Intersections 1-8

2.4-1 FRB Landfill Trips at the Maximum Allowable 10,625 Tons per Day of Municipal Solid Waste 2-4
2.4-2 FRB Landfill Trip Generation – 2010 2-5
2.4-3 FRB Landfill Trip Generation – 2030 2-5
2.7-1 Maximum Average Daily Traffic for Arterial Roads – Orange County 2-11
2.7-2 Maximum Average Daily Traffic for Arterial Roads – City of Irvine 2-11
2.7-3 Level of Service Criteria – Signalized Intersections 2-12

3.6-1 Road Segment Daily Levels of Service – Existing Conditions 3-8
3.6-2 Signalized Intersection Levels of Service – Existing Conditions 3-9

4.1-1 Road Segment Planned Improvements – 2010 4-1
4.1-2 Signalized Intersection Planned Improvements – 2010 4-2
4.2-1 Road Segment Levels of Service – 2010 without the Project 4-6
4.2-2 Road Segment Levels of Service – 2010 with the Project 4-7
4.2-3 Road Segment Significant Adverse Impact Summary – 2010 4-8
4.2-4 Signalized Intersection Levels of Service – 2010 without the Project 4-9
4.2-5 Signalized Intersection Levels of Service – 2010 with the Project 4-10
4.2-6 Signalized Intersection Significant Adverse Impact Summary – 2010 4-11

5.1-1 Road Segment Planned Improvements – 2030 5-1
5.1-2 Signalized Intersection Planned Improvements – 2030 5-2
5.2-1 Road Segment Levels of Service – 2030 without the Project 5-6
5.2-2 Road Segment Levels of Service – 2030 with the Project 5-7
5.2-3 Road Segment Significant Adverse Impact Summary – 2030 5-8
5.2-4 Signalized Intersection Levels of Service – 2030 without the Project 5-9
5.2-5 Signalized Intersection Levels of Service – 2030 with the Project 5-10
5.2-6 Signalized Intersection Significant Adverse Impact Summary – 2007 5-11
5.3-1 Signalized Intersection Levels of Service – 2030 with the Project with Mitigation 5-12

6.2-1 Road Segments Operating at Level of Service D, E or F Summary – 2030 with the Project 6-2
6.2-2 Signalized Intersections Operating at Level of Service D, E or F Summary – 2030 with the Project 6-3

8.2-1 Signalized Intersection Levels of Service – 2025 A.M. Peak Hour 8-3
8.2-2 Signalized Intersection Significant Adverse Impact Summary – 2025 8-3
8.2-3 Signalized Intersection Levels of Service – 2025 A.M. Peak Hour with Mitigation 8-3
8.4-1 Peak Hour Transfer Trucks 8-5

LIST OF FIGURES

Figure **Page**

1.1-1 Regional Location Map 1-2
1.1-2 Permitted Landfill Limits 1-3
1.1-3 Proposed Landfill Expansion 1-4
1.3-1 Study Road Segments and Intersections 1-7

2.5-1 Proposed Project Trip Distribution – Waste Hauling Trucks 2-7
2.5-2 Proposed Project Trip Distribution – Employees 2-8
2.6-1 Proposed Project Trip Assignment – 2010 2-9
2.6-2 Proposed Project Trip Assignment – 2030 2-10

3.2-1 Circulation Network – Existing Conditions 3-6
3.3-1 Traffic Volumes – Existing Conditions 3-7

4.1-1 Circulation Network – 2010 4-3
4.1-2 Traffic Volumes – 2010 without Project 4-4
4.1-3 Traffic Volumes – 2010 with Project 4-5

5.1-1 Circulation Network – 2030 5-3
5.1-2 Traffic Volumes – 2030 without Project 5-4
5.1-3 Traffic Volumes – 2030 with Project 5-5
5.3-1 Circulation Network – 2030 with Mitigation 5-13

8.2-1 2025 Traffic Conditions – Select Intersections 8-2

SECTION 1.0
INTRODUCTION

The Frank R. Bowerman (FRB) Landfill Implementation Traffic Impact Study is an analysis of traffic-related impacts associated with implementation of the proposed FRB Landfill Implementation project. This study includes analysis of potential project-related traffic impacts on the surrounding circulation system, along with assumptions, methodology, findings and recommendations.

1.1 PROJECT DESCRIPTION

Strategic planning for municipal solid waste (MSW) needs in Orange County is the responsibility of the Orange County Integrated Waste Management Department (IWMD). The IWMD's mission is to "…to meet the solid waste disposal needs of Orange County through efficient operations, sound environmental practices, strategic planning, innovation and technology." Regional Landfill Options for Orange County (RELOOC) is a long range strategic planning project initiated by IWMD in 1998 to address existing disposal system capabilities and future needs, and to develop viable short and long term solid waste disposal options for the County.

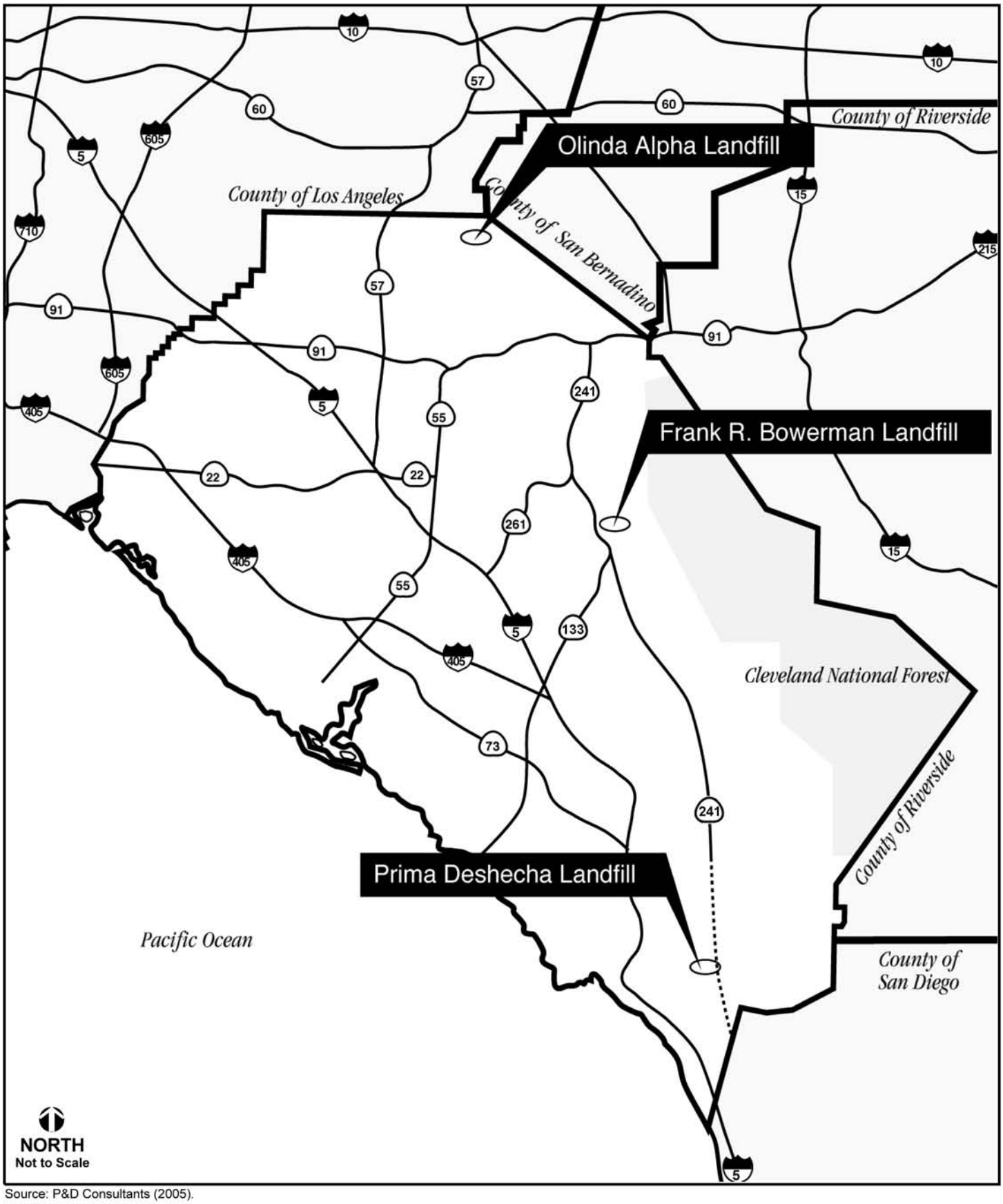
1.1.1 PROJECT LOCATION

The FRB Landfill is located at 11002 Bee Canyon Access Road in unincorporated Orange County near the City of Irvine. 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. Figure 1.1-1 is the regional location map of the three active landfills.

1.1.2 PROPOSED PROJECT

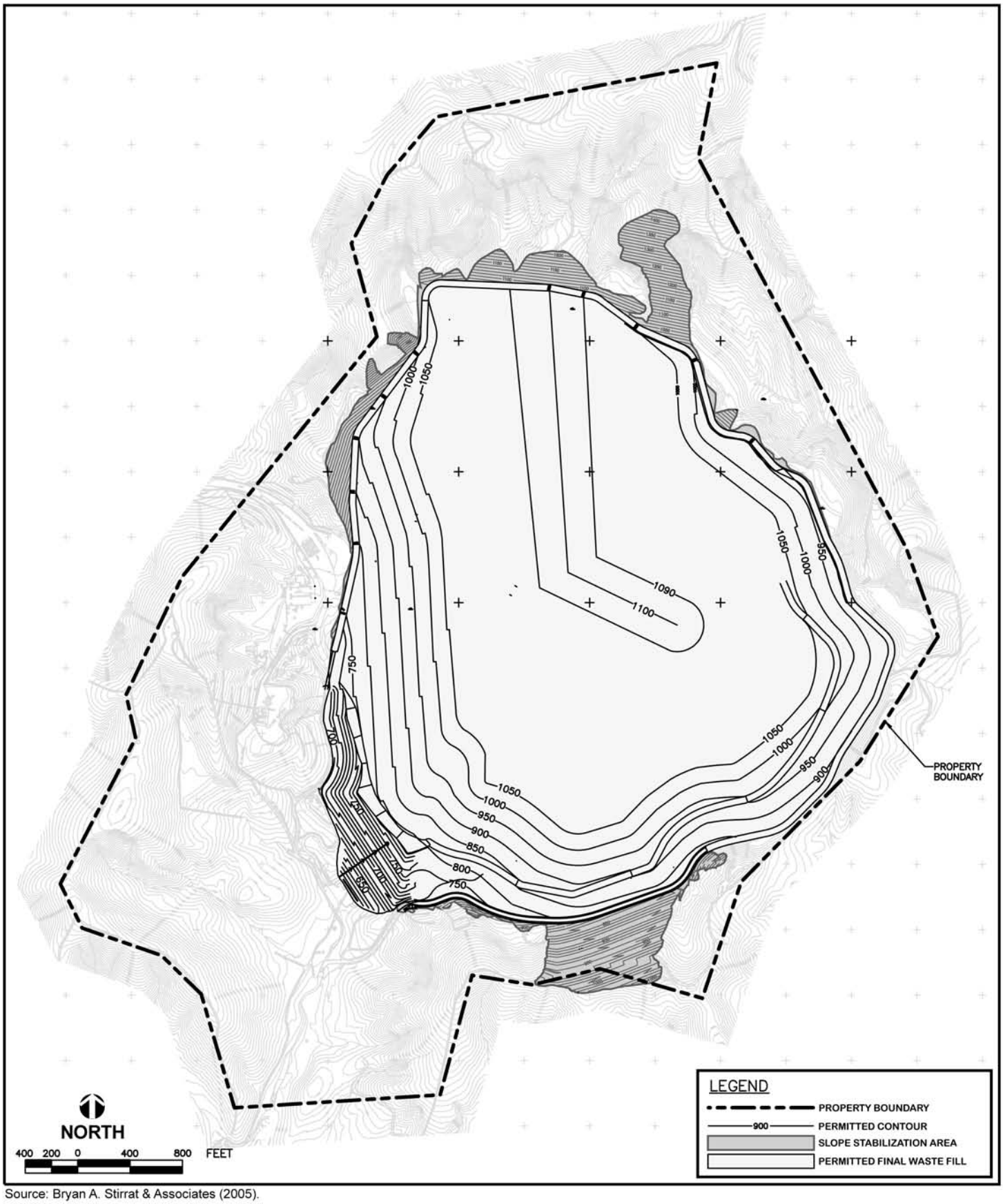
As part of the RELOOC Strategic Plan, the proposed project consists of expanding the FRB Landfill vertically and horizontally. Figure 1.1-2 shows the existing permitted vertical and horizontal limits at the landfill. Figure 1.1-3 shows the grades at the landfill with the proposed vertical and horizontal expansion. Implementation of the proposed project will increase the capacity at the landfill by approximately 130 million cubic yard (mcy) over the permitted capacity and will result in an extension of the life of the landfill from the permitted closure date of 2022 to approximately 2053.

The proposed project also consists of increasing the daily maximum tons per day (TPD) of MSW to 11,500 TPD, while maintaining an annual average of 8,500 TPD. The landfill is currently permitted to accept a daily maximum of 10,625 TPD for 36 floating (not designated) days of the year with an annual average of 8,500 TPD. These 36 high-tonnage-limit days typically occur around a holiday. Any unused high-tonnage-limit days will not roll over to the next year.



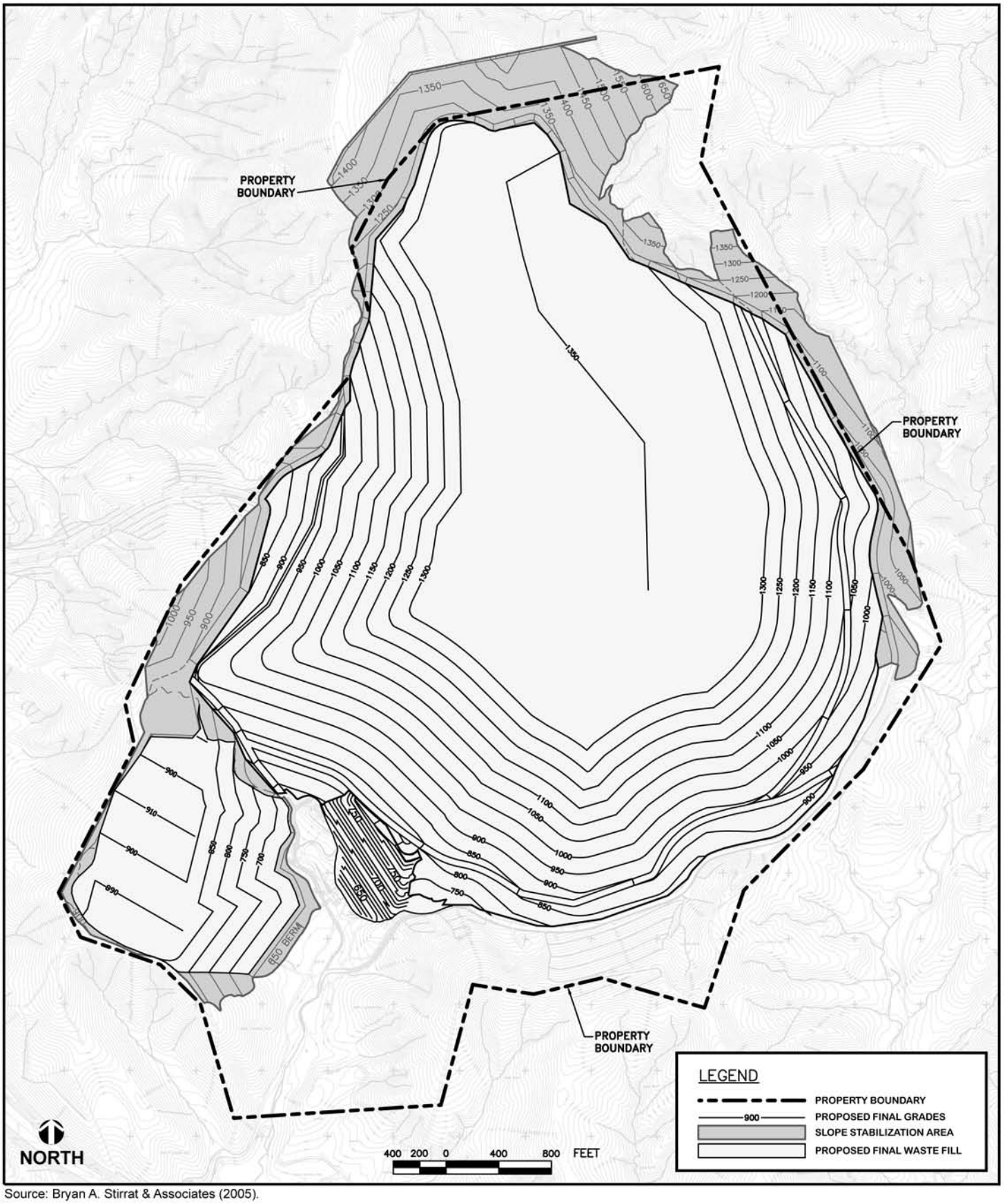
Source: P&D Consultants (2005).

Figure 1.1-1
Regional Location Map



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

Figure 1.1-2
Permitted Landfill Limits



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

Figure 1.1-3
Proposed Landfill Expansion

1.1.3 PROJECT ALTERNATIVES

Alternative 1 – No Project: No FRB Expansion and No Daily Tonnage Increase

The No Project Alternative proposes no changes to the FRB Landfill; neither an increase in capacity (through a vertical or horizontal expansion), nor an increase in daily tonnage. The effective closure date for the landfill will remain 2022. The landfill will continue to accept the permitted annual average of 8,500 TPD and a maximum high-tonnage limit of 10,625 TPD for 36 floating (not designated) days.

Alternative 2 – FRB Expansion: No Daily Tonnage Increase

Alternative 2 proposes a vertical and horizontal expansion for the FRB Landfill and no increase in the maximum daily tonnage. The vertical and horizontal expansion for the landfill is the same as the proposed project, which will effectively extend the closure date to 2053. The landfill will continue to accept the permitted annual average of 8,500 TPD and a maximum high tonnage limit of 10,625 TPD for 36 floating (not designated) days.

Alternative 3 – FRB Expansion: Daily Tonnage (Annual Average) Increase to 11,500 TPD

Alternative 3 proposes a vertical and horizontal expansion for the FRB Landfill and an increase of the permitted annual average from 8,500 TPD to 11,500 TPD. The vertical and horizontal expansion for the landfill is the same as the proposed project, which will effectively extend the closure date to 2044 if the Olinda Alpha Landfill closes in 2013 and extend the closure date to 2047 if the Olinda Alpha Landfill closes in 2021.

Alternative 4 – FRB Expansion: Daily Tonnage Increase at Prima Deshecha Landfill

Alternative 4 proposes a vertical and horizontal expansion for the FRB Landfill, no increase in the maximum daily tonnage and for the Prima Deshecha Landfill, an increase of the permitted annual average from 4,000 TPD to 7,000 TPD. The vertical and horizontal expansion for the FRB Landfill is the same as the proposed project, which will effectively extend the closure date to 2053. The FRB Landfill will continue to accept the permitted annual average of 8,500 TPD and a maximum high tonnage limit for 10,625 TPD for 36 floating (not designated) days. The increase of the permitted annual average at Prima Deshecha Landfill will effectively reduce the closure date from 2067 to 2057 if the Olinda Alpha Landfill closes in 2013 and reduce the closure date from 2067 to 2059 if the Olinda Alpha Landfill closes in 2021.

1.2 SCOPE OF ANALYSIS

This traffic study examines existing traffic conditions, analyzes future conditions and identifies potentially significant adverse traffic impacts associated with the proposed FRB Landfill Implementation project and potential mitigation measures for improving traffic circulation. The future conditions consist of a short-term analysis for the year 2010 and a long-term analysis for the year 2030 as requested by the City of Irvine and Orange County. The year 2030 is considered full buildout of the area. Even though implementation of the proposed project would

occur in year 2006, traffic-related impacts were not analyzed for year 2006 because the traffic conditions would closely resemble existing traffic conditions for year 2005. By year 2010, however, traffic volumes near the landfill will increase significantly because of the new residential and commercial developments occurring near the landfill.

The following scenarios were analyzed quantitatively:

- existing conditions
- 2010 without the project
- 2010 with the project
- 2030 without the project
- 2030 with the project

The following scenarios were analyzed qualitatively:

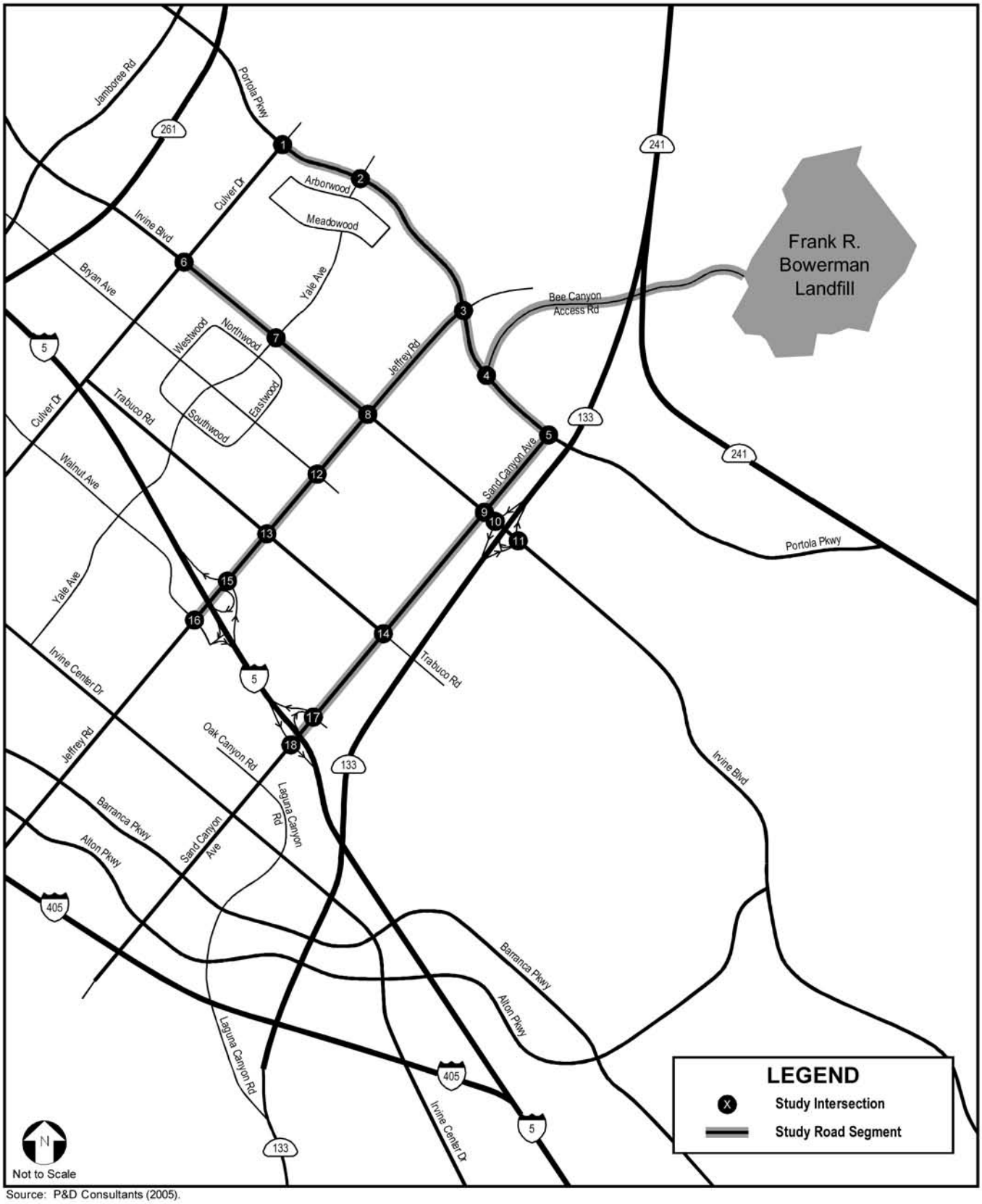
- post 2030 without the project
- post 2030 with the project
- Project Alternative 1
- Project Alternative 2
- Project Alternative 3
- Project Alternative 4

The scope of this study included the following key components:

- field observations to document and field verify existing conditions
- review of previously completed traffic studies for projects in the vicinity
- forecasting of future traffic conditions
- Level of Service (LOS) analysis
- improvement recommendations

1.3 STUDY AREA

Figure 1.3-1 shows the study area for the traffic impact analysis, including the road segments and intersections evaluated in this analysis, which were established in consultation with the City of Irvine and Orange County. All road segments and intersections with waste hauling trucks within a two-mile radius of the intersection of Bee Canyon Access Road at Portola Parkway were included in the study area. Tables 1.3-1 and 1.3-2 list the study road segments and intersections, respectively.



Source: P&D Consultants (2005).

Figure 1.3-1
Study Road Segments and Intersections

TABLE 1.3-1
STUDY ROAD SEGMENTS

Road	Segment Limits
Portola Parkway	Culver Drive to Yale Avenue
Portola Parkway	Yale Avenue to Jeffrey Road
Portola Parkway	Jeffrey Road to Bee Canyon Access Road
Portola Parkway	Bee Canyon Access Road to Sand Canyon Avenue
Irvine Boulevard	Culver Drive to Yale Avenue
Irvine Boulevard	Yale Avenue to Jeffrey Road
Irvine Boulevard	Sand Canyon Avenue to SR 133
Jeffrey Road	Portola Parkway to Irvine Boulevard
Jeffrey Road	Irvine Boulevard to Bryan Avenue
Jeffrey Road	Bryan Avenue to Trabuco Road
Jeffrey Road	Trabuco Road to I-5
Bee Canyon Access Road	FRB Landfill to Bee Canyon Access Road
Sand Canyon Avenue	Portola Parkway to Irvine Boulevard
Sand Canyon Avenue	Irvine Boulevard to Trabuco Road
Sand Canyon Avenue	Trabuco Road to I-5

TABLE 1.3-2
STUDY INTERSECTIONS

Index Code[1]	Intersection
1	Culver Drive at Portola Parkway
2	Yale Avenue at Portola Parkway
3	Jeffrey Road at Portola Parkway
4	Bee Canyon Access Road at Portola Parkway
5	Sand Canyon Avenue at Portola Parkway
6	Culver Drive at Irvine Boulevard
7	Yale Avenue at Irvine Boulevard
8	Jeffrey Road at Irvine Boulevard
9	Sand Canyon Avenue at Irvine Boulevard
10	SR 133 southbound ramps at Irvine Boulevard
11	SR 133 northbound ramps at Irvine Boulevard
12	Jeffrey Road at Bryan Avenue
13	Jeffrey Road at Trabuco Road
14	Sand Canyon Avenue at Trabuco Road
15	Jeffrey Road at I-5 northbound ramps
16	Jeffrey Road at Walnut Avenue
17	Sand Canyon Avenue at I-5 northbound ramps
18	Sand Canyon Avenue at I-5 southbound ramps

[1] The Index Code refers to the numbers used to identify the intersection on the circulation network and is used throughout the analysis in this Traffic Impact Study. These intersection locations are shown in Figure 1.3-1.

1.4 REVIEW OF PREVIOUS REPORTS

As part of this study, the summary of findings, recommendations and mitigations of previously completed traffic studies in the project vicinity were reviewed. These studies include the following reports:

- Austin-Foust Associates, Inc., *City of Irvine Northern Sphere Area Zone Change and General Plan Amendment Traffic Study*, 2001
- Austin-Foust Associates, Inc., *City of Irvine Planning Areas 1 and 9 General Plan Amendment and Zone Change Traffic Study*, 2005
- Stevens Garland Associates, *Traffic Analysis for the Proposed Bee Canyon Landfill*, 1987
- Urban Crossroads, Inc., *Orange County Great Park General Plan Amendment and Zone Change Traffic Impact Analysis*, 2002

SECTION 2.0
METHODOLOGY

This section describes the procedures and methodologies used to forecast project traffic and to analyze potential project impacts on the circulation system in the study area. Topics in this section include traffic forecasting assumptions, traffic counts, trip generation, trip distributions, traffic assignment, and LOS.

2.1 ASSUMPTIONS

It is assumed that future operations at 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.

For year 2010, it is assumed that 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. As discussed in Section 2.8, significant adverse impacts were identified based on each jurisdiction's regulatory framework.

2.2 TRAFFIC COUNTS

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

- Portola Parkway just east of Culver Drive
- Portola Parkway just east of Jeffrey Road
- Portola Parkway just west of Jeffrey Road
- Portola Parkway just west of Sand Canyon Avenue
- Irvine Boulevard just east of Culver Drive
- Irvine Boulevard just east of Jeffrey Road
- Irvine Boulevard just west of Jeffrey Road
- Irvine Boulevard just east of Sand Canyon Avenue
- Culver Drive just south of Portola Parkway
- Jeffrey Road just south of Portola Parkway
- Jeffrey Road just south of Irvine Boulevard
- Jeffrey Road just north of Trabuco Road
- Jeffrey Road just south of Trabuco Road
- Bee Canyon Access Road just north of Portola Parkway
- Sand Canyon Avenue just south of Portola Parkway

- Sand Canyon Avenue just south of Irvine Boulevard
- Sand Canyon Avenue just south of Trabuco Road
- Sand Canyon Avenue just north of Laguna Canyon Road
- Sand Canyon Avenue just north of Irvine Center Drive
- Sand Canyon Avenue just north of Barranca Parkway
- Sand Canyon Avenue just north of Alton Parkway
- Sand Canyon Avenue just south of Alton Parkway

Intersection turning counts were conducted during both the A.M. peak period of 7:00 A.M. to 9:00 A.M. and the second landfill peak period of 9:00 A.M. to 11:00 A.M. on Wednesday, September 14, 2005 for the following intersections:

- Culver Drive at Portola Parkway
- Yale Avenue at Portola Parkway
- Jeffrey Road at Portola Parkway
- Bee Canyon Access Road at Portola Parkway
- Sand Canyon Avenue at Portola Parkway
- Culver Drive at Irvine Boulevard
- Yale Avenue at Irvine Boulevard
- Jeffrey Road at Irvine Boulevard
- Sand Canyon Avenue at Irvine Boulevard
- SR 133 southbound ramps at Irvine Boulevard
- SR 133 northbound ramps at Irvine Boulevard
- Jeffrey Road at Bryan Avenue
- Jeffrey Road at Trabuco Road
- Sand Canyon Avenue at Trabuco Road
- Jeffrey Road at I-5 northbound ramps
- Jeffrey Road at Walnut Avenue
- I-5 southbound ramps at Walnut Avenue
- Sand Canyon Avenue at I-5 northbound ramps
- Sand Canyon Avenue at I-5 southbound ramps
- Sand Canyon Avenue at Laguna Canyon Road
- Sand Canyon Avenue at Irvine Center Drive
- Sand Canyon Avenue at Barranca Parkway
- Sand Canyon Avenue at Alton Parkway
- Sand Canyon Avenue at I-405 northbound ramps
- Sand Canyon Avenue at I-405 southbound ramps

2.3 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 G.

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 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 to the procedures outlined in the National Cooperative Highway Research Program (NCHRP) Report 255.

2.4 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. As discussed in the Section 2.1, 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 2.4-1 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 2.4-1
FRB LANDFILL TRIPS AT THE MAXIMUM ALLOWABLE 10,625 TONS PER DAY OF MUNICIPAL SOLID WASTE

Year	Trip Generator	Trip Generation					
		Daily		A.M. Peak Hour		Landfill Peak Hour	
		Raw	PCE[1]	Raw	PCE[1]	Raw	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. As discussed in the Section 2.1, 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 2.4-2 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 2.4-2
FRB LANDFILL TRIP GENERATION – 2010

Conditions	Trip Generator	Trip Generation					
		Daily		A.M. Peak Hour		Landfill Peak Hour	
		Raw	PCE[1]	Raw	PCE[1]	Raw	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 2.4-3 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 2.4-3
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.

2.5 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 in Section 2.1, 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 B.

Figure 2.5-1 shows the existing trip distribution for the waste hauling trucks based on the traffic counts. 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 on Sand Canyon Avenue 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 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 use alternative routes other than the designated truck route to the landfill.

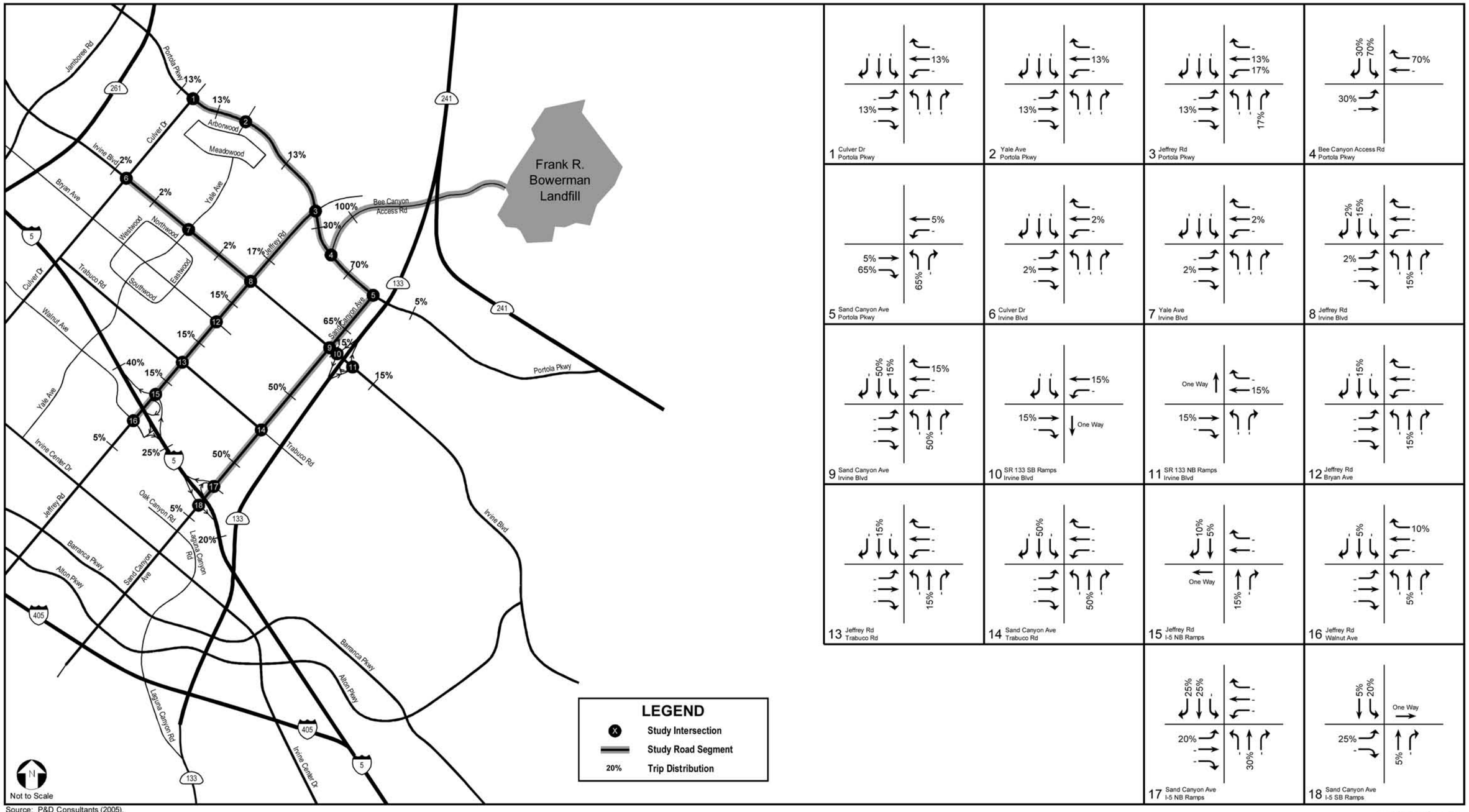
The trip distribution for the employees was determined based on information provided by IWMD. Approximately 70 percent of the employees reside to the north of the landfill, and 30 percent of the employees reside to the south. The major travel routes from the north would include I-5, I-405, Jeffrey Road, Portola Parkway, and Irvine Boulevard. The major travel routes from the south would include I-5, Sand Canyon Avenue, Portola Parkway, and Irvine Boulevard. Figure 2.5-2 shows the trip distribution for the landfill employees.

2.6 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 as determined in Section 2.5. The results of the project trip assignment for year 2010 and 2030 are shown in Figures 2.6-1 and 2.6-2, respectively.

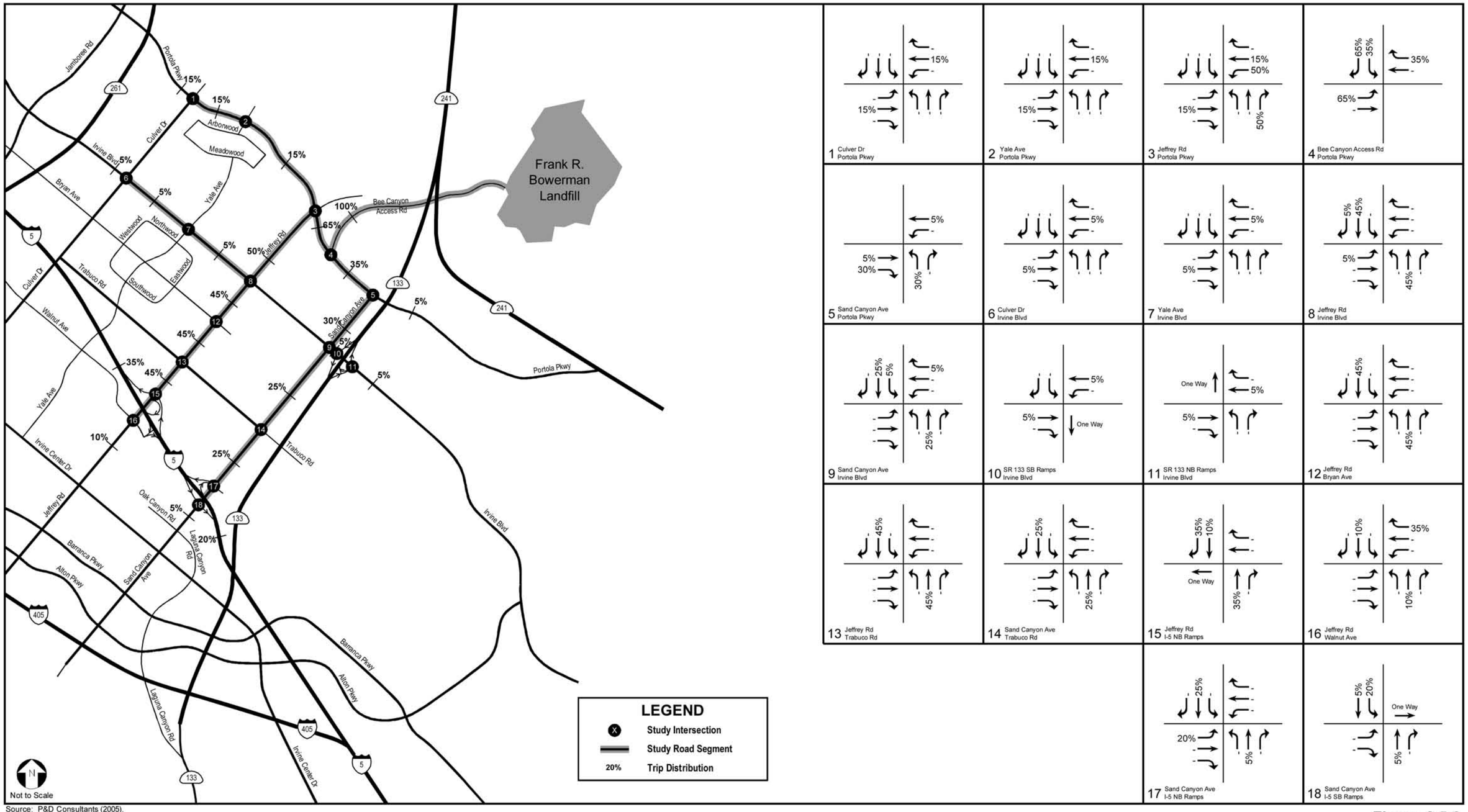
2.7 LEVEL OF SERVICE

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



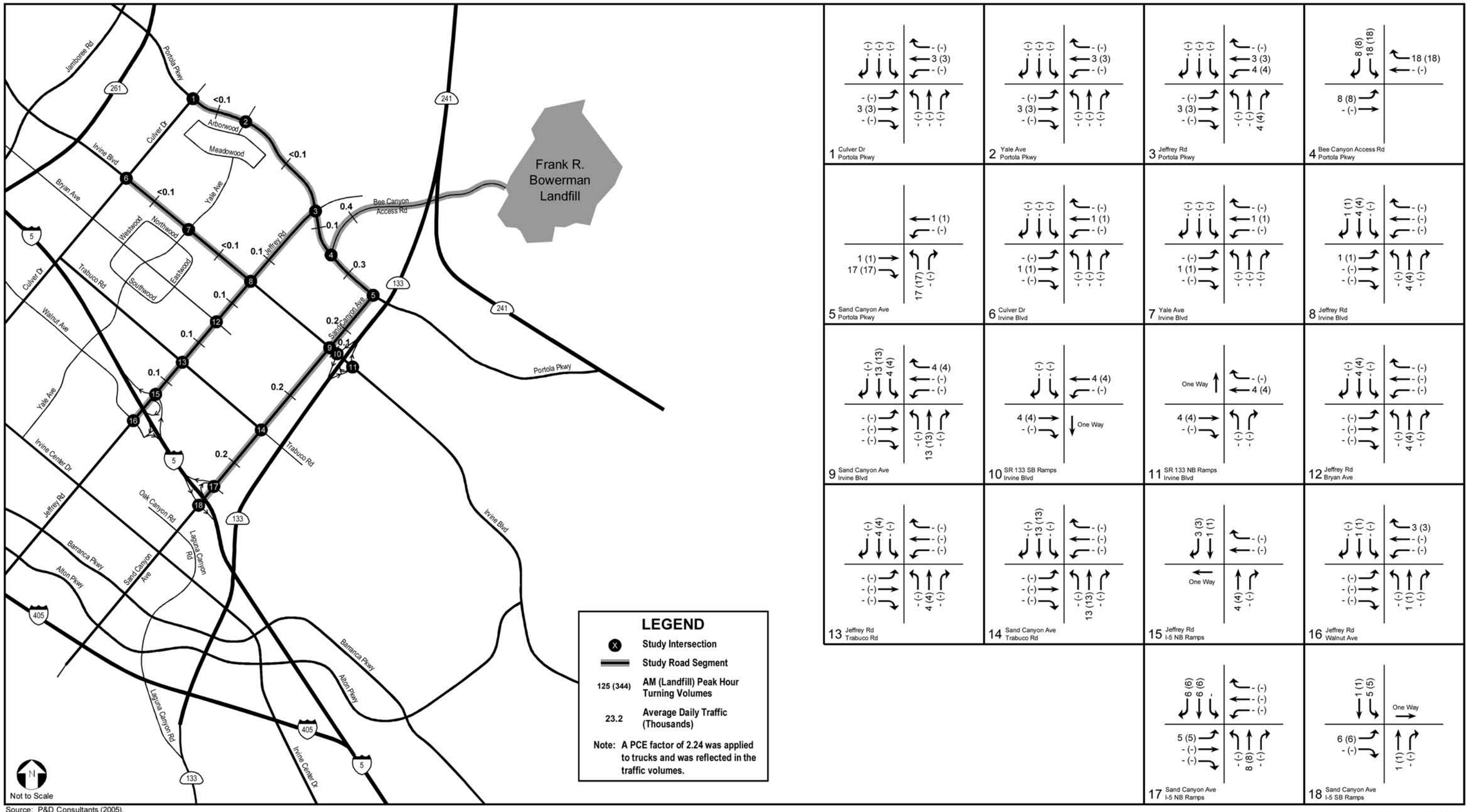
Source: P&D Consultants (2005).

Figure 2.5-1
Proposed Project Trip Distribution
Waste Hauling Trucks



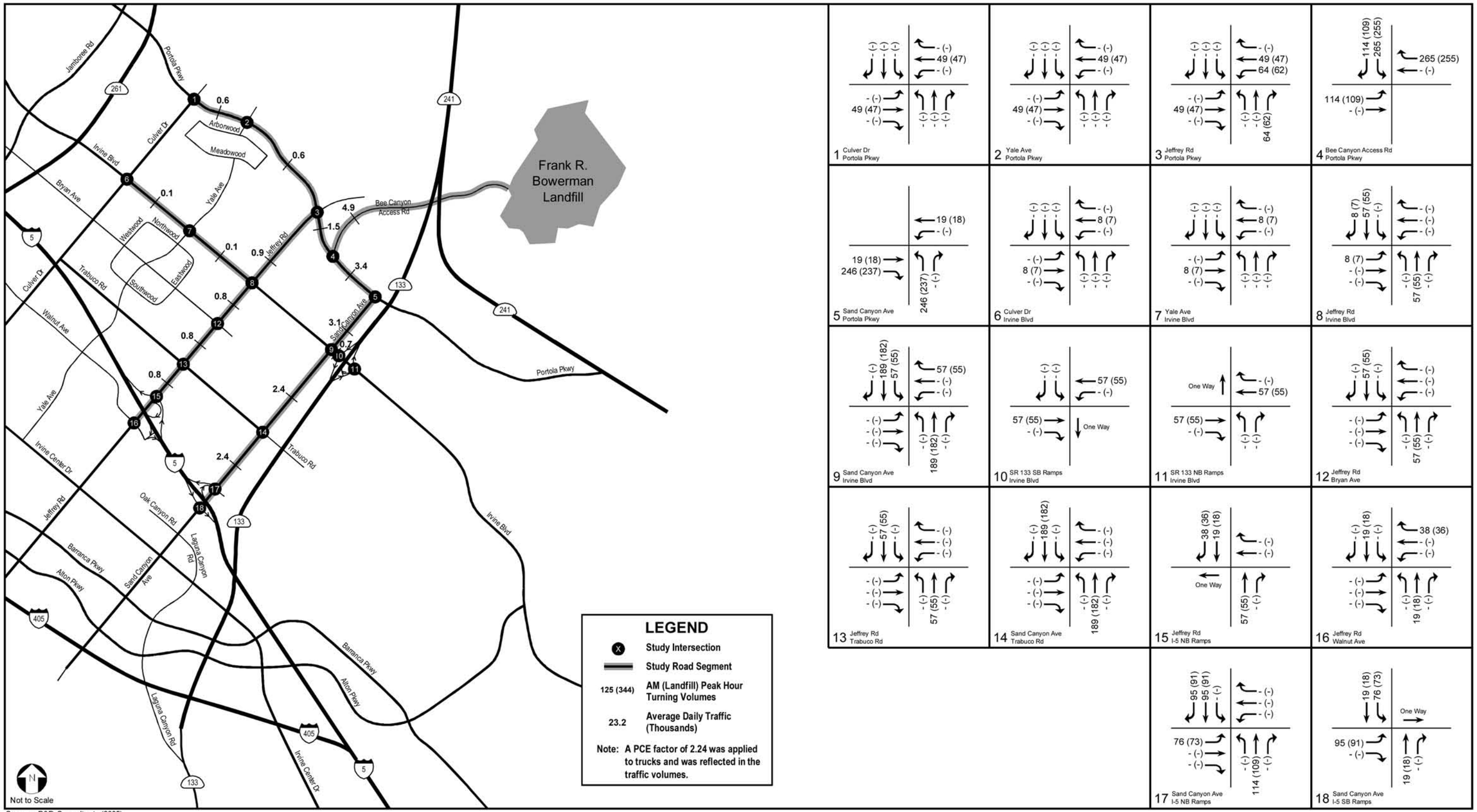
Source: P&D Consultants (2005).

Figure 2.5-2
Proposed Project Trip Distribution
Employees



Source: P&D Consultants (2005).

Figure 2.6-1
Proposed Project Trip Assignment
2010



Source: P&D Consultants (2005).

Figure 2.6-2
Proposed Project Trip Assignment
2030

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.

2.7.1 ROAD SEGMENTS

For planning purposes, 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 2.7-1 and 2.7-2, respectively. In this study, 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.

TABLE 2.7-1
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 2.7-2
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.

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.[1] In this study, 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.

2.7.2 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 2.7-3.

TABLE 2.7-3
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.[2] 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

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

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.

2.8 REGULATORY FRAMEWORK

2.8.1 LEVEL OF SERVICE STANDARDS

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.[3] 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.

2.8.2 THRESHOLDS OF SIGNIFICANT ADVERSE IMPACTS

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.

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

SECTION 3.0
EXISTING CONDITIONS

This section describes the existing conditions in the study area, including major land uses, parking facilities, vehicular volumes, pedestrian volumes, road segments and intersection operational characteristics, and existing LOS.

3.1 EXISTING MAJOR LAND USES

Land uses to the north and east of the FRB Landfill consist of preserved open space for the Limestone Canyon Regional Park. Land uses to the south and west of the landfill consist of agricultural uses.

3.2 EXISTING CIRCULATION NETWORK

The following describes the current road operational characteristics in the study area.

Culver Drive is a six-lane north-south Major Arterial as classified on the 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).

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 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.

The following describes the current intersection lane configurations in the study area.

1. Culver Drive at Portola Parkway is a signalized four-legged intersection. Two exclusive left-turn lanes are provided on the northbound and westbound approaches. One exclusive left-turn lane is provided on the eastbound approach. One exclusive right-turn lane is provided on the northbound, eastbound, and westbound approaches. The southbound approach consists of one shared through/left-/right-turn lane. Marked crosswalks are available on all legs of the intersection.

2. Yale Avenue at Portola Parkway is a signalized four-legged intersection. One exclusive left-turn lane is provided on all approaches. An unstriped right-turn lane is assumed for all legs of the intersection because the distance measured to the outside through lane is 19 feet or greater. Yellow crosswalks exist on all legs of the intersection. Yellow crosswalks are used near schools. A high school is located just north of the intersection.

3. Jeffrey Road at Portola Parkway is a signalized three-legged intersection. Two exclusive left-turn lanes are provided on the northbound and westbound approaches. One exclusive left-turn lane is provided on the southbound and eastbound approaches. One exclusive right-turn lane is provided on all legs of the intersection. The northbound approach consists of a free right-turn. The eastbound right-turn lane has a protected right-turn phase that is

overlapped with the northbound left-turn phase. Marked crosswalks are available on all legs of the intersection.

4. Bee Canyon Access Road at Portola Parkway is a signalized three-legged intersection. The southbound approach consists of one exclusive left-turn lane and one shared left-/right-turn lane. The westbound approach consists of two free right-turns. The eastbound approach consists of one exclusive left-turn lane. No marked crosswalks are available at the intersection.

5. Sand Canyon Access Road at Portola Parkway is a signalized three-legged intersection. Two exclusive left-turn lanes are provided on the northbound and westbound approaches. Two exclusive right-turn lanes are provided on the northbound approach. The northbound right-turn lanes have a protected right-turn phase that is overlapped with the westbound left-turn phase. The eastbound approach consists of one free right-turn lane. Marked crosswalks are available on the south and east legs of the intersection.

6. Culver Drive at Irvine Boulevard is a signalized four-legged intersection. Two exclusive left-turn lanes are provided on all approaches. One exclusive right-turn lane is provided on the northbound approach. The northbound right-turn lane has a protected right-turn phase that is overlapped with the westbound left-turn phase. An unstriped right-turn lane is assumed for the southbound and eastbound approaches because the distance measured to the outside through lane is 19 feet or greater. Marked crosswalks are available on all legs of the intersection.

7. Yale Avenue at Irvine Boulevard is a signalized four-legged intersection. One exclusive left-turn lane is provided on all approaches. An unstriped right-turn lane is assumed for the northbound and southbound approaches because the distance measured to the outside through lane is 19 feet or greater. Marked crosswalks are available on all legs of the intersection.

8. Jeffrey Road at Irvine Boulevard is a signalized four-legged intersection. Two exclusive left-turn lanes and one exclusive right-turn lane are provided on all approaches. The northbound approach consists of a free right-turn. Marked crosswalks are available on all legs of the intersection.

9. Sand Canyon Avenue at Irvine Boulevard is a signalized four-legged intersection. Two exclusive left-turn lanes and one exclusive right-turn lane are provided on all approaches. Marked crosswalks are available on all legs of the intersection.

10. SR 133 southbound ramps at Irvine Boulevard is a signalized four-legged intersection. The south leg of the intersection only provides access to SR 133. One exclusive left-turn lane is provided on the southbound and westbound approaches. Two exclusive right-turn lanes are provided on the southbound approach. One exclusive right-turn lane is provided on the eastbound approach. Marked crosswalks are available on the north and south legs of the intersections.

11. SR 133 northbound ramps at Irvine Boulevard is a signalized four legged-intersection. The north leg of the intersection only provides access to SR 133. One exclusive left-turn lane and one exclusive right-turn lane are provided on the northbound approach. Two exclusive right-turn lanes are available on the eastbound approach. Marked crosswalks are available on the south leg of the intersection.

12. Jeffrey Road at Bryan Avenue is a signalized four-legged intersection. Two exclusive left-turn lanes are provided on the northbound, southbound, and westbound approaches. One exclusive left-turn lane is provided on the eastbound approach. One exclusive right-turn lane is provided on the southbound approach. An unstriped right-turn lane is assumed for the northbound, eastbound, and westbound approaches because the distance measured to the outside through lane is 19 feet or greater. Marked crosswalks are available on all legs of the intersection.

13. Jeffrey Road at Trabuco Road is a signalized four-legged intersection. Two exclusive left-turn lanes are provided on all approaches. One exclusive right-turn lane is provided on the southbound, eastbound, and westbound approaches. The eastbound right-turn lane has a protected right-turn phase that is overlapped with the northbound left-turn phase. An unstriped right-turn lane is assumed for the northbound approach because the distance measured to the outside through lane is 19 feet or greater. Marked crosswalks are available on legs of the intersection.

14. Sand Canyon Avenue at Trabuco Road is a signalized four-legged intersection. One exclusive left-turn lane is provided on all approaches. One exclusive right-turn lane is provided on the northbound and westbound approaches. Marked crosswalks are available on all legs of the intersection.

15. Jeffrey Road at I-5 northbound ramps is a signalized four-legged intersection. The west leg of the intersection only provides access to I-5. One exclusive free right-turn lane is provided on the northbound and southbound approaches. The westbound approach consists of one left-turn lane, one shared left-/right-turn lane and one right-turn lane. Marked crosswalks are available on the east leg of the intersection.

16. Jeffrey Road at Walnut Avenue is a signalized four-legged intersection. Two exclusive left-turn lanes are provided on the northbound, southbound, and westbound approaches. One exclusive left-turn lane is provided on the eastbound approach. One exclusive right-turn lane is provided on the eastbound and westbound approaches. An unstriped right-turn lane is assumed for the northbound approach because the distance measured to the outside through lane is 19 feet or greater. Marked crosswalks are available on all legs of the intersection.

17. Sand Canyon Avenue at I-5 northbound ramps is a signalized four-legged intersection. Two exclusive left-turn lanes are provided on the northbound approach. One exclusive left-turn lane is provided on the southbound and westbound approaches. One exclusive right-turn lane is provided on the southbound approach. An unstriped right-turn lane is assumed for the northbound approach because the distance measured to the outside through lane is 19 feet or greater. The eastbound approach consists one left-turn lane, one shared through/left-turn

lane, and one right-turn lane. Marked crosswalks are available on the east and west legs of the intersection.

18. Sand Canyon Avenue at I-5 southbound ramps is a signalized four-legged intersection. The west leg of the intersection only provides access to I-5. Two exclusive left-turn lanes are provided on the southbound approach. An unstriped right-turn lane is assumed for the northbound approach because the distance measured to the outside through lane is 19 feet or greater. The eastbound approach consists of one left-turn lane, one shared left-/right-turn lane, and one right-turn lane. Marked crosswalks are available on the east and west legs of the intersection.

The existing circulation network is shown in Figure 3.2-1.

3.3 EXISTING VEHICULAR TRAFFIC VOLUMES

The existing traffic counts used in this study were taken in September 2005. Intersection turning movement counts were conducted at the study intersections during the circulation network A.M. 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 A.M. 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 3.3-1.

3.4 EXISTING TRANSIT SERVICES

No transit services exist in the immediate vicinity of the FRB Landfill. The OCTA Route 79 that traverses Irvine Boulevard and Yale Avenue. Route 79 provides service between Tustin and Newport Beach.

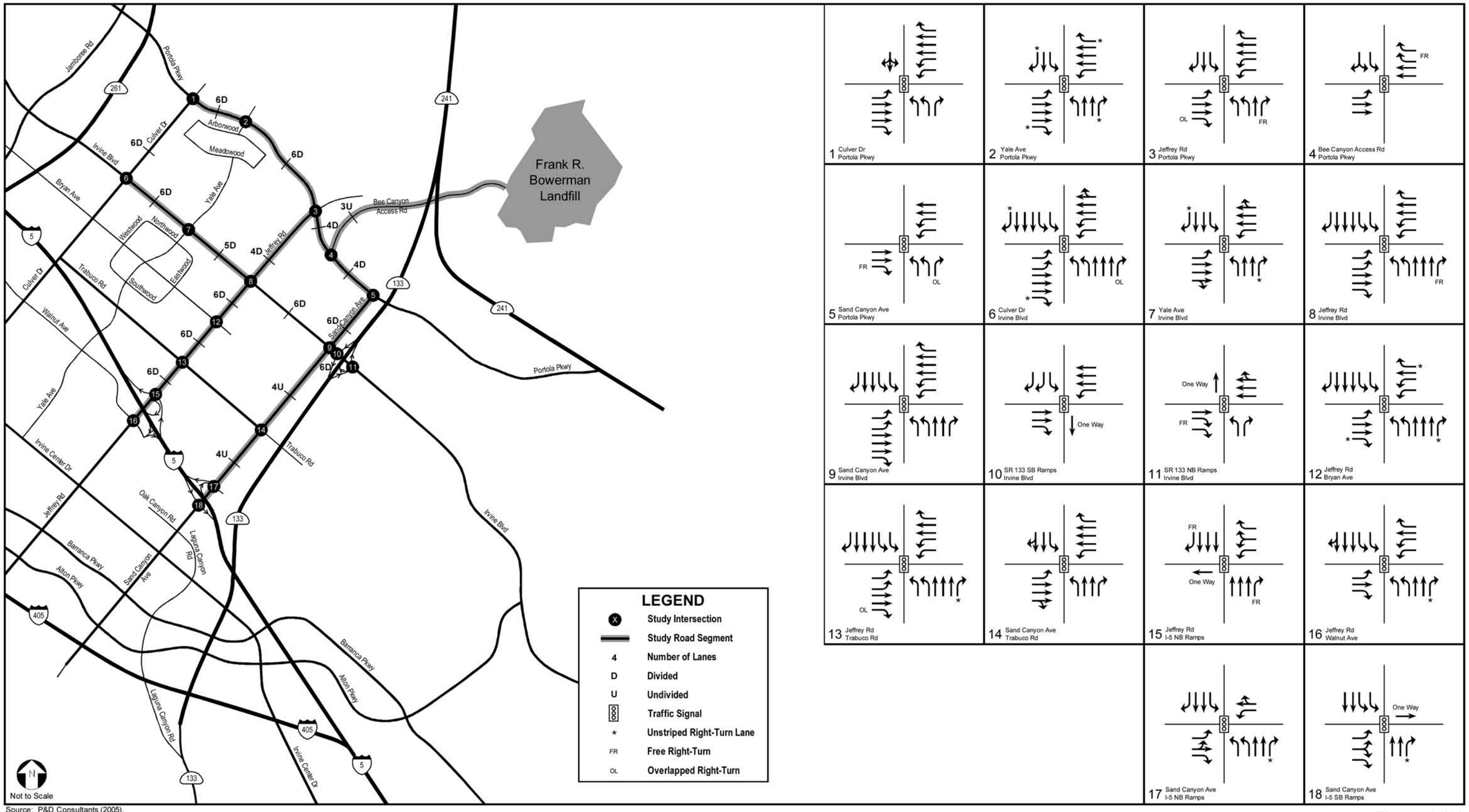
3.5 EXISTING BIKE LANES

Existing bike lanes within the study area are located 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. These bike lanes are classified as Class II Bikeways because the lanes are striped.

3.6 EXISTING LEVEL OF SERVICE

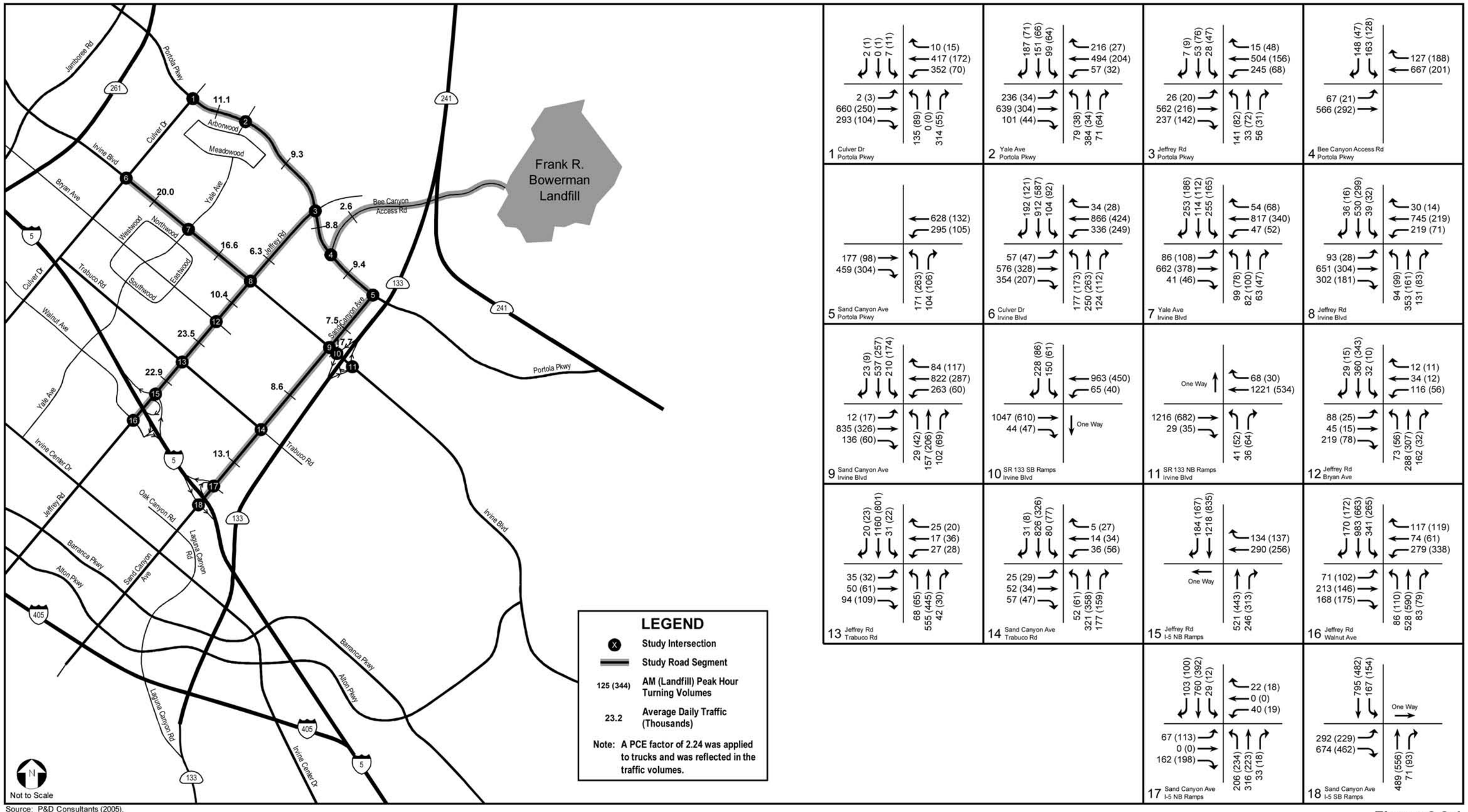
3.6.1 ROAD SEGMENTS

Table 3.6-1 summarizes the existing LOS for the study road segments based on the V/C ratio standards discussed in Section 2.7. As shown in Table 3.6-1, all study road segments are currently operating at LOS A. Sand Canyon Avenue between Trabuco Road and I-5 has the worst V/C ratio of 0.469.



Source: P&D Consultants (2005).

Figure 3.2-1
Circulation Network
Existing Conditions



Source: P&D Consultants (2005).

Figure 3.3-1
Traffic Volumes
Existing Conditions

TABLE 3.6-1
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
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.

3.6.2 SIGNALIZED INTERSECTIONS

Table 3.6-2 shows the existing LOS for the study intersections during the circulation network A.M. peak hour and during the landfill peak hour based on the ICU methodology discussed in Section 2.7. As shown in Table 3.6-2, 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 B.

TABLE 3.6-2
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.

SECTION 4.0
2010 TRAFFIC IMPACT ANALYSIS

This section describes the 2010 traffic impacts of the proposed project. This section includes: an analysis of traffic conditions without and with the project in 2010 by determining the LOS; significant adverse traffic impacts based on a comparison of these conditions; and potential improvements to reduce potentially significant adverse traffic impacts to less than significant levels.

4.1 TRAFFIC CONDITIONS

4.1.1 CIRCULATION NETWORK

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 Improvement Projects (CIP) or mitigation measures to other nearby planned projects. As discussed in Section 2.1, 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 4.1-1 and 4.1-2 summarize the planned improvements to the road segments and intersections, respectively. Figure 4.1-1 shows the circulation network in 2010.

TABLE 4.1-1
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 4.1-2
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.

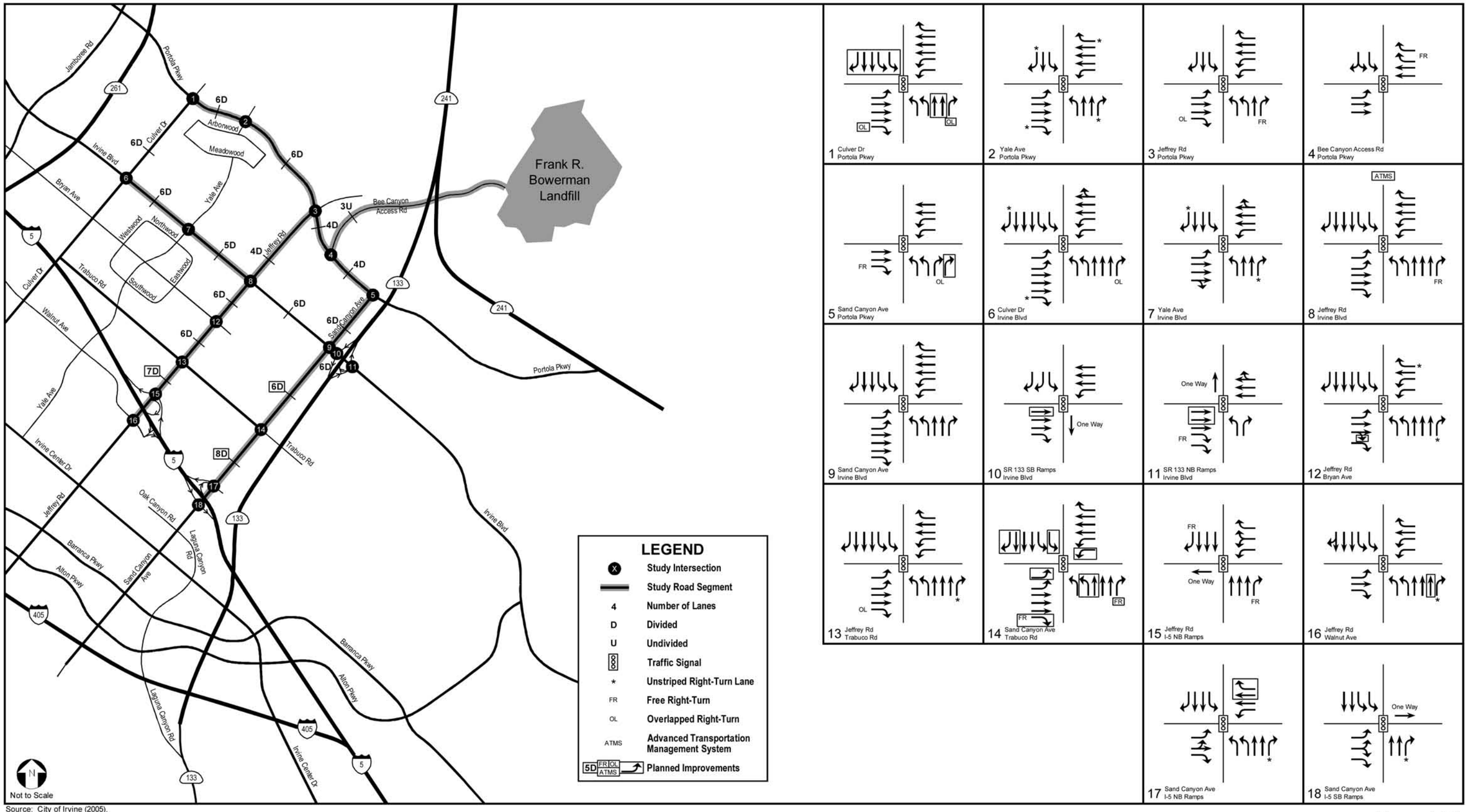
Source: City of Irvine (2005).
[1] The Advanced Transportation Management System (ATMS) strategies apply the latest traffic control systems to improve traffic flow through the intersections. These traffic control systems include the use of interconnect, closed circuit television and communication systems,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

4.1.2 TRAFFIC VOLUMES

As discussed in Section 2.3, 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. As discussed in Section 2.4, 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 4.1-2 and 4.1-3 show the traffic volumes in the study area without and with the project scenarios in 2010, respectively.

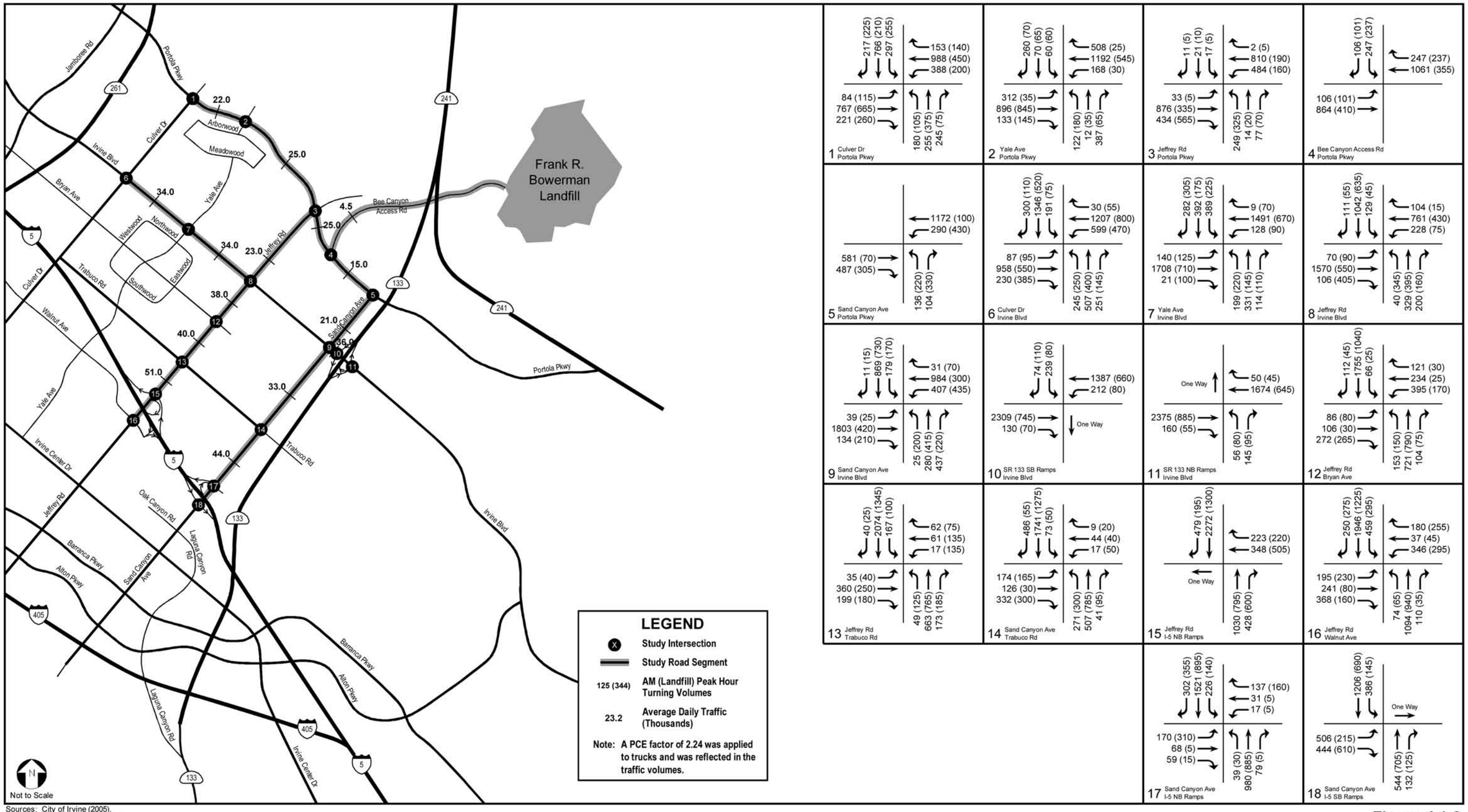
4.2 TRAFFIC IMPACT ANALYSIS

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



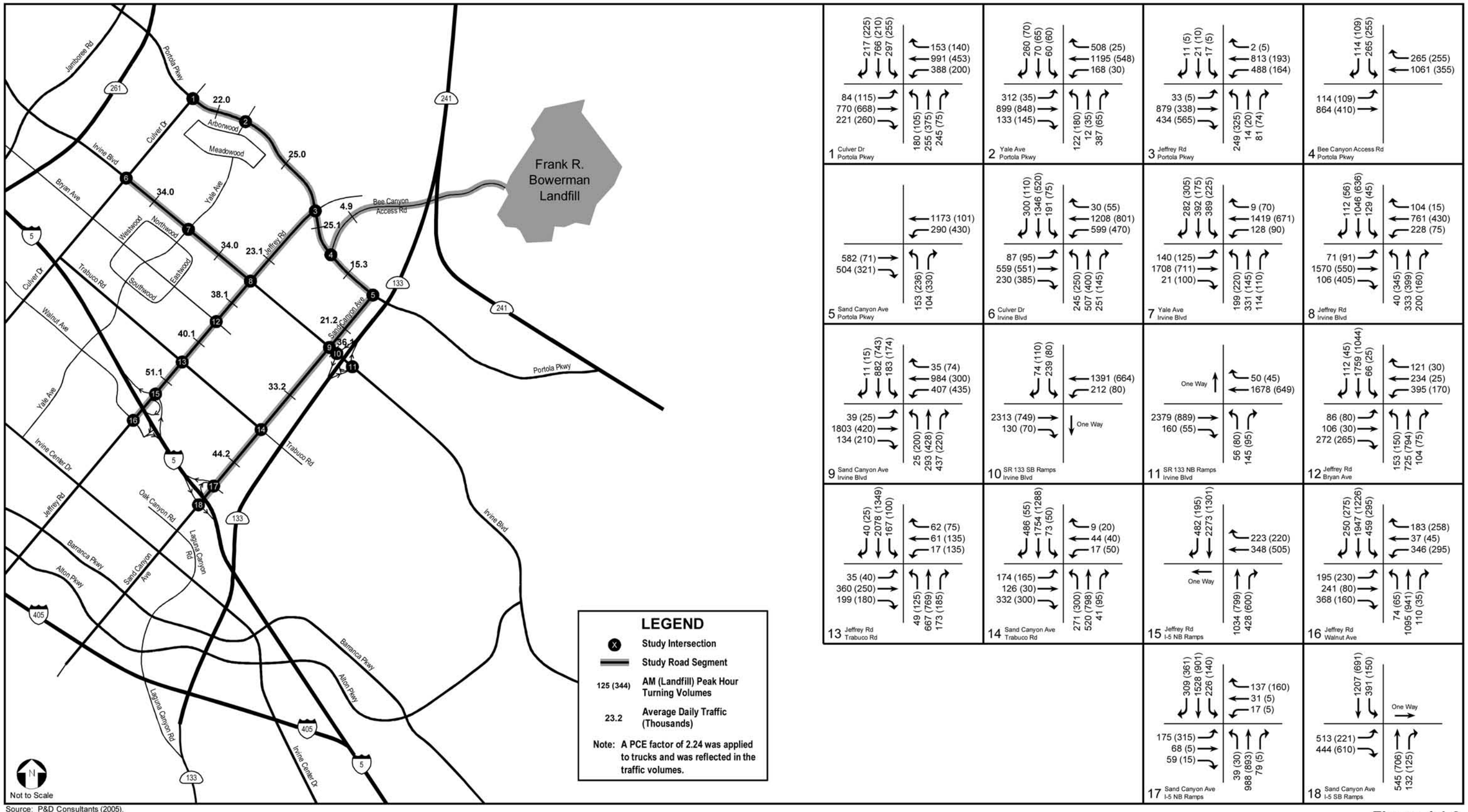
Source: City of Irvine (2005).

Figure 4.1-1
Circulation Network
2010



Sources: City of Irvine (2005).
P&D Consultants (2005).

Figure 4.1-2
Traffic Volumes
2010 without Project



Source: P&D Consultants (2005).

Figure 4.1-3
Traffic Volumes
2010 with Project

the City of Irvine's or Orange County's criteria for significant adverse project impacts previously described in Section 2.8.

4.2.1 ROAD SEGMENTS

Table 4.2-1 summarizes the study road segment LOS in 2010 without the proposed project. As shown in Table 4.2-1, all study road segments will operate at acceptable LOS D or better. 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 4.2-1
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 Trabuco Road	Major Arterial	6 Divided	33,000	54,000	0.611	B
	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.

Table 4.2-2 summarizes the study road segment LOS in 2010 with the proposed project. As shown in Table 4.2-2, all study road segments will operate at acceptable LOS D or better. 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 4.2-2
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.

Table 4.2-3 summarizes the road segment changes in V/C, and identifies if the road segment will be operating at an unacceptable LOS, and if the road segment will be significantly adversely impacted by implementation of the proposed project. As shown in Table 4.2-3, 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 will not be significantly adversely impacted by implementation of the proposed project.

TABLE 4.2-3
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.

4.2.2 SIGNALIZED INTERSECTIONS

Table 4.2-4 summarizes the study intersection LOS in 2010 without the proposed project during the A.M. and second landfill peak hour. As shown in Table 4.2-4, all study intersections will operate at acceptable LOS D or better. 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 C1.

TABLE 4.2-4
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.

Table 4.2-5 summarizes the study intersection LOS in 2010 with the proposed project during the A.M. and second landfill peak hour. As shown in Table 4.2-5, all study intersections will operate at acceptable LOS D or better. 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 C2.

TABLE 4.2-5
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
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.

Table 4.2-6 summarizes the intersection changes in ICU, identifies if the intersection will be operating at an unacceptable LOS, and if the intersection will be significantly adversely impacted by implementation of the proposed project. As shown in Table 4.2-6, all intersections will operate at an acceptable LOS with the proposed project. Therefore, the intersections will not be significantly adversely impacted by implementation of the proposed project.

TABLE 4.2-6
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.

4.3 RECOMMENDED MITIGATION MEASURES

No mitigation measures are required in 2010 because no study road segment or intersection will be significantly adversely impacted by implementation of the proposed project.

SECTION 5.0
2030 TRAFFIC IMPACT ANALYIS

This section describes the 2030 traffic impacts of the proposed project. Year 2030 was assumed to represent full buildout of the area. This section includes an analysis of traffic conditions without and with the project in 2030 by determining the LOS, significant adverse traffic impacts based on a comparison of these conditions, and potential improvements to reduce potentially significant adverse traffic impacts to less than significant levels.

5.1 TRAFFIC CONDITIONS

5.1.1 CIRCULATION NETWORK

Several improvements to the circulation network will occur between 2010 and 2030. 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. As discussed in Section 2.1, it was assumed that study road segments and intersections in unincorporated Orange County will be annexed by the City of Irvine. Tables 5.1-1 and 5.1-2 summarize the planned improvements to the road segments and intersections, respectively. Figure 5.1-1 shows the circulation network in 2030.

TABLE 5.1-1
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 5.1-2
SIGNALIZED INTERSECTION PLANNED IMPROVEMENTS – 2030

Index	Intersection	Planned Improvement
1	Culver Drive at Portola Parkway	- Add one northbound and southbound through lane.
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).

5.1.2 TRAFFIC VOLUMES

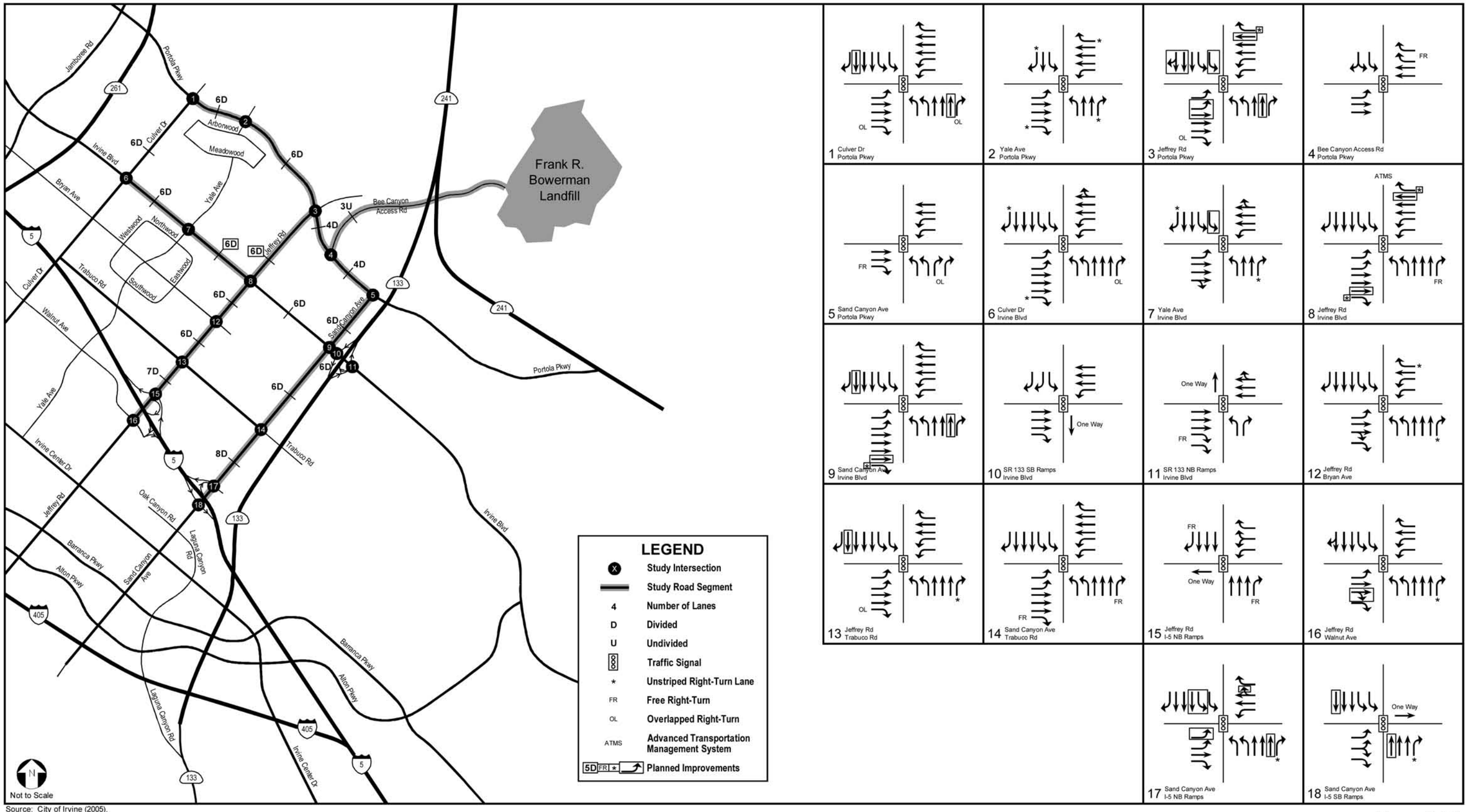
As discussed in Section 2.3, the City of Irvine provided the 2030 daily and the A.M. peak hour intersection turning traffic volumes generated by ITAM. The 2030 daily traffic volumes were post-processed from ITAM according to the procedures outlined in the NCHRP Report 255 to obtain the second landfill peak hour intersection turning volumes. As discussed in Section 2.4, 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 5.1-2 and 5.1-3 show the traffic volumes in the study area without and with the project scenarios in 2030, respectively.

5.2 TRAFFIC IMPACT ANALYSIS

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 previously discussed in Section 2.8.

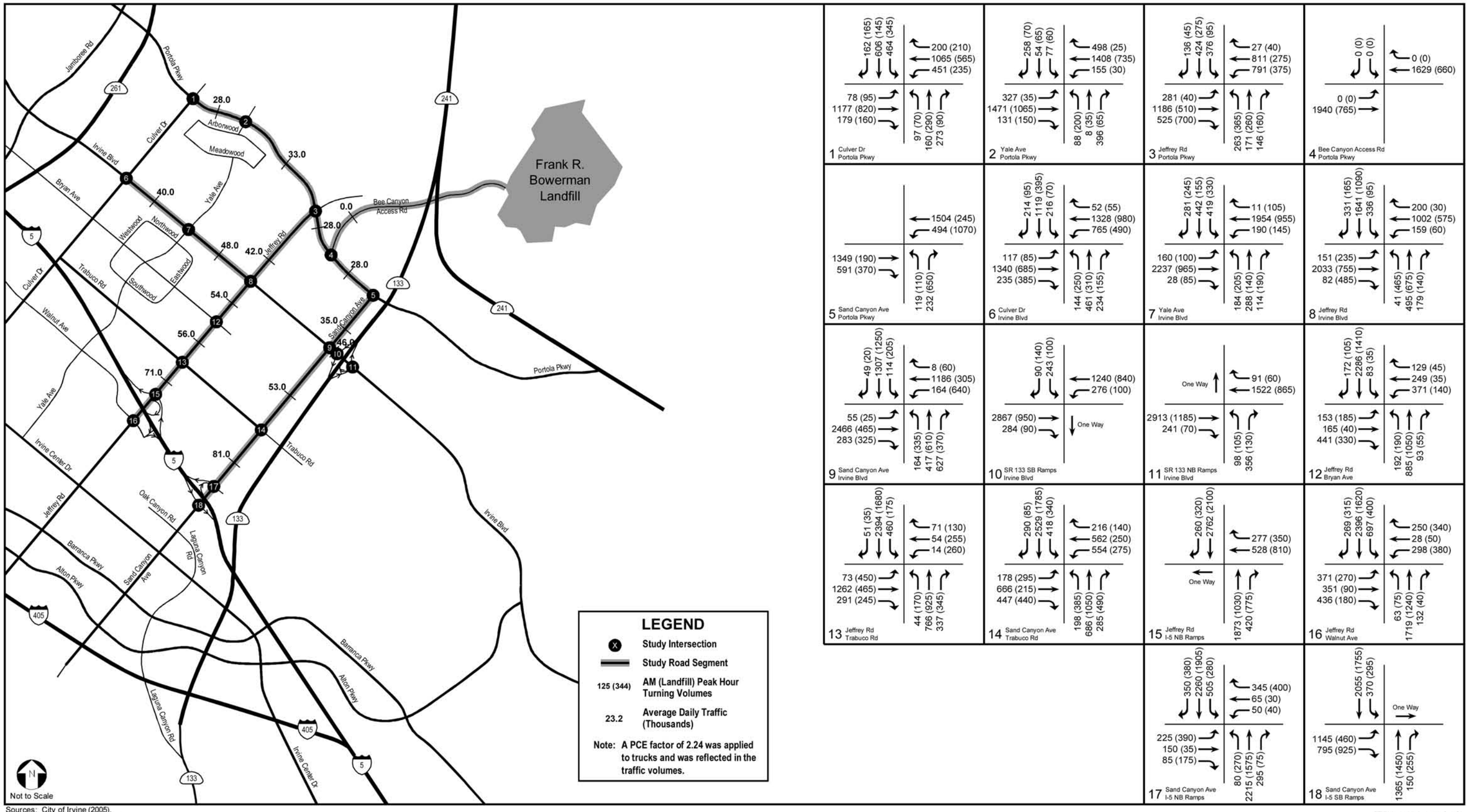
5.2.1 ROAD SEGMENTS

Table 5.2-1 summarizes the study road segment LOS in 2030 without the proposed project. As shown in Table 5.2-1, six study road segments will operate at unacceptable LOS E or F. Jeffrey



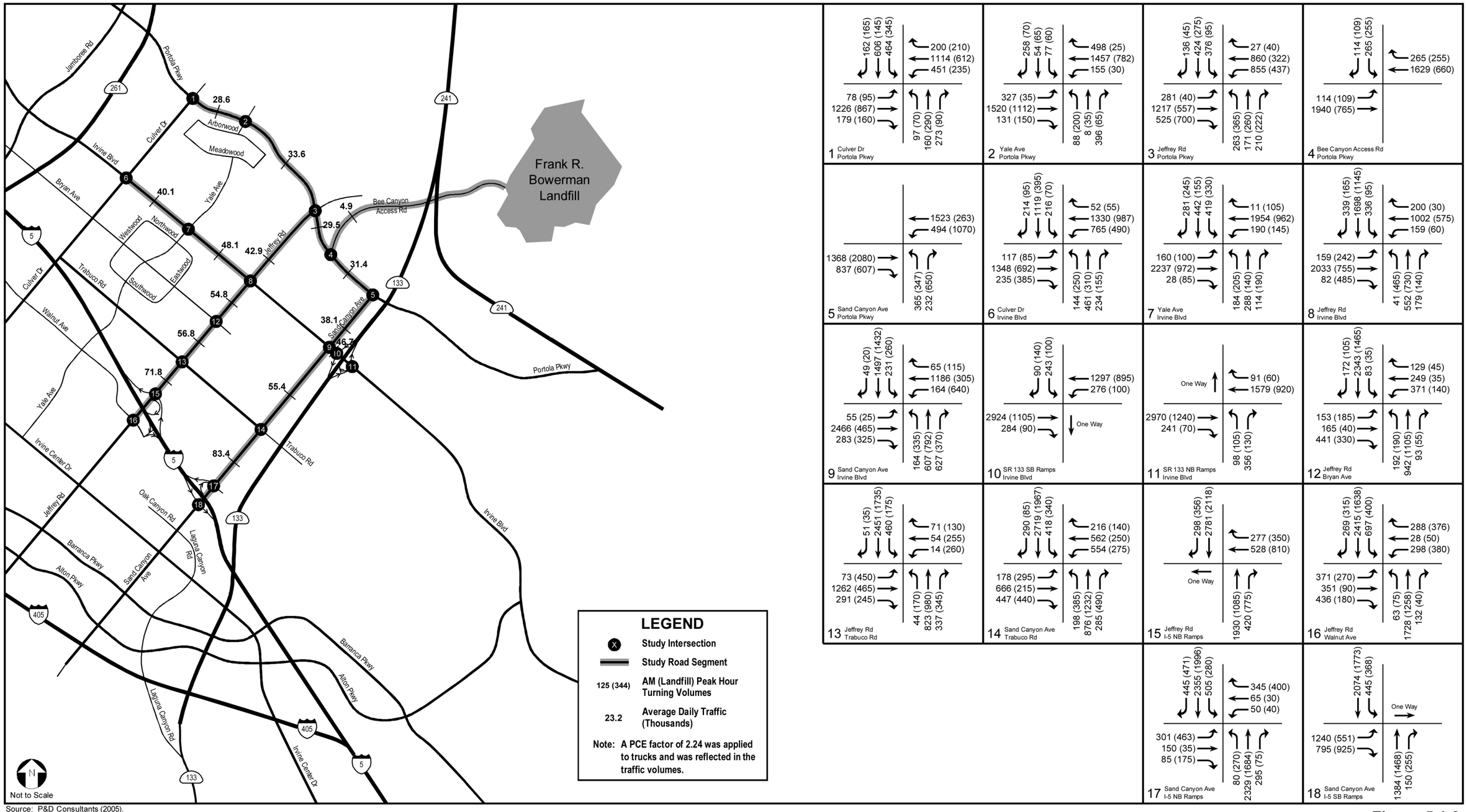
Source: City of Irvine (2005).

Figure 5.1-1
Circulation Network
2030



Sources: City of Irvine (2005).
P&D Consultants (2005).

Figure 5.1-2
Traffic Volumes
2030 without Project



Source: P&D Consultants (2005).

Figure 5.1-3
Traffic Volumes
2030 with Project

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 5.2-1
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**
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.

Table 5.2-2 summarizes the study road segment LOS in 2030 with the proposed project. As shown in Table 5.2-2, 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 5.2-2
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
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.

Table 5.2-3 summarizes the road segment changes in V/C, identifies if the road segment will be operating at an unacceptable LOS, and if the road segment will be significantly adversely impacted by implementation of the proposed project. As shown in Table 5.2-3, 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 by 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 discussed in Sections 2.7 and 2.8. As shown in the Peak Hour column of the Table 5.2-3, the seven remaining road segments would operate at acceptable LOS C or better during the peak hour for these road segments. Therefore, implementation of the proposed project would not result in significant adverse impacts to the road segments.

TABLE 5.2-3
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
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.

5.2.2 SIGNALIZED INTERSECTIONS

Table 5.2-4 summarizes the study intersection LOS in 2030 without the proposed project during the A.M. and second landfill peak hour. As shown in Table 5.2-4, 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 D1.

TABLE 5.2-4
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.

Table 5.2-5 summarizes the study intersection LOS in 2030 with the proposed project during the A.M. and second landfill peak hour. As shown in Table 5.2-5, 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 D2.

TABLE 5.2-5
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.

Table 5.2-6 summarizes the intersection changes in ICU, identifies if the intersection will be operating at an unacceptable LOS and if the intersection would be significantly adversely impacted by implementation of the proposed project. As shown in Table 5.2-6, two study intersections would be significantly adversely impacted by implementation of the proposed project 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. Recommended mitigation measures for these two significantly adversely impacted intersections are discussed in Section 5.3.

TABLE 5.2-6
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.

5.3 RECOMMENDED MITIGATION MEASURES

As discussed in Section 5.2, the intersection of Sand Canyon Avenue at Trabuco Road and the intersection of Jeffrey Road at Walnut Avenue would be significantly adversely impacted by implementation of the proposed project. The mitigation measure for Sand Canyon Avenue at Trabuco Road is to extend the Advanced Transportation Management System (ATMS) strategies. 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. When the ATMS strategies are applied to Sand Canyon Avenue at Trabuco Road, a 0.05 credit is applied to the ICU only during the A.M. peak hour.[1]

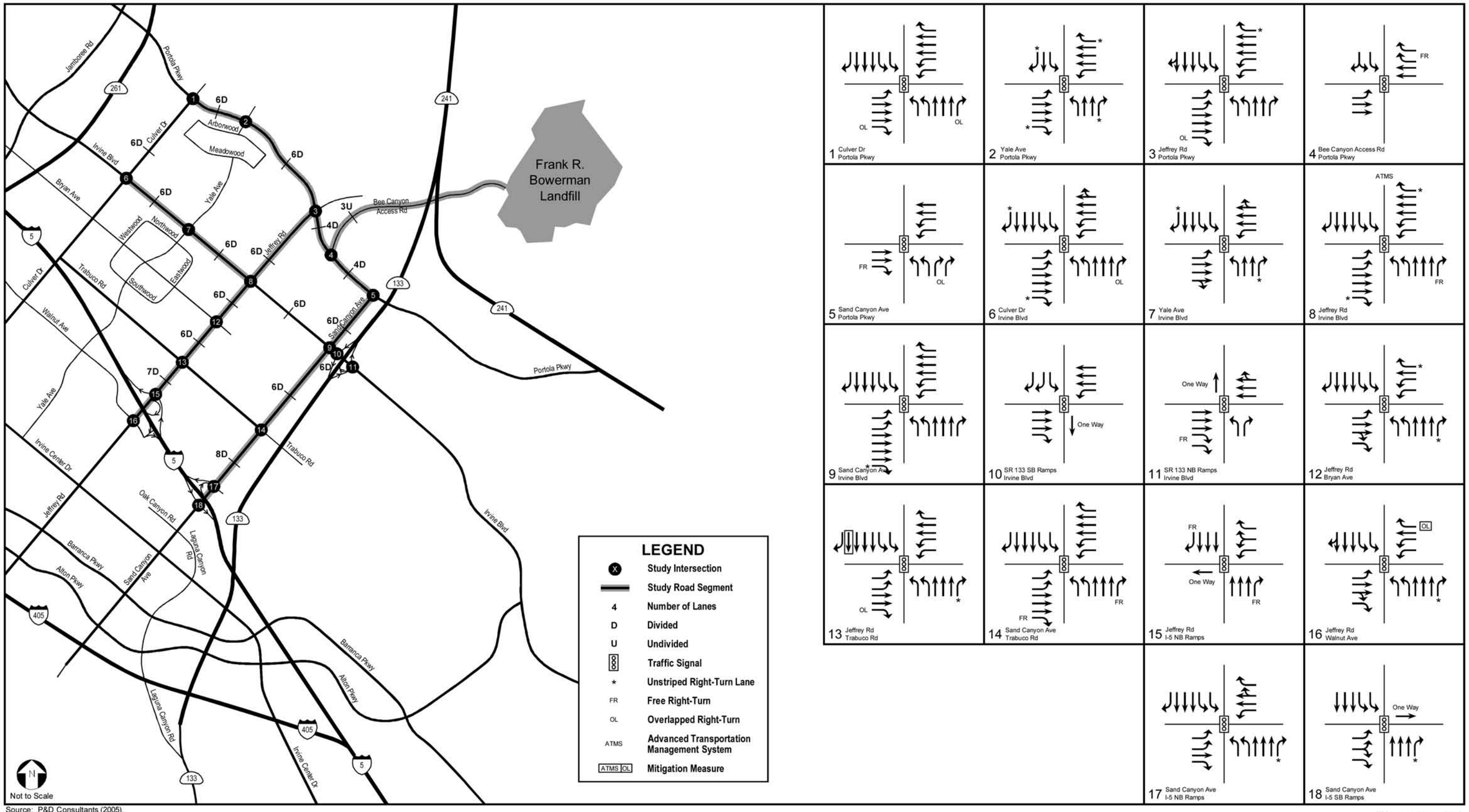
[1] City of Irvine, *Traffic Impact Analysis Guidelines*, 2004.

The mitigation measure for Jeffrey Road at Walnut Avenue is to provide the westbound right-turn lane with a protected right-turn phase that is overlapped with the southbound left-turn phase. As shown in Table 5.3-1, the two significantly adversely impacted intersections would operate at an acceptable LOS with implementation of the recommended mitigation measures. Therefore, these recommended mitigation measures would reduce the significant adverse impacts to below a level of significance. Figure 5.3-1 shows the circulation network in 2030 with the mitigation measures. The detailed LOS calculation worksheets are included in Appendix D3.

TABLE 5.3-1
SIGNALIZED INTERSECTION LEVELS OF SERVICE – 2030 WITH THE PROJECT WITH MITIGATION

Index	Intersection	A.M. Peak Hour		Landfill Peak Hour	
		ICU	LOS	ICU	LOS
14[1]	Sand Canyon Avenue at Trabuco Road	0.841	D	0.799	C
16	Jeffrey Road at Walnut Avenue	0.830	D	0.717	C

Source: P&D Consultants (2005).
[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.



Source: P&D Consultants (2005).

Figure 5.3-1
Circulation Network
2030 with Mitigation

SECTION 6.0
POST-2030 TRAFFIC IMPACT ANALYSIS

This section describes the post-2030 traffic impacts of the proposed project. This section provides a qualitative analysis of traffic conditions with the project post-2030. The section includes a description of LOS at buildout conditions in year 2030; identifies road segments or intersections in the study area that may be significantly impacted post-2030; as a result of implementation of the proposed project and provides direction for future supplemental traffic impact studies as the year 2030 approaches. As year 2030 approaches, the supplemental traffic impact studies will identify the significant adverse traffic impacts and provide recommended mitigation measures to reduce the significant adverse traffic impacts to less than significant levels.

6.1 TRAFFIC CONDITIONS

6.1.1 CIRCULATION NETWORK

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.

6.1.2 TRAFFIC VOLUMES

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.

6.2 TRAFFIC IMPACT ANALYSIS

A qualitative traffic impact analysis for post-2030 was conducted by examining the LOS for road segments and intersections at buildout conditions in year 2030. In addition, direction is provided for future supplemental traffic impact studies when the year 2030 approaches.

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 6.2-1 and 6.2-2 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 6.2-1 and 6.2-2, 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 operate at LOS D during the second landfill peak hour. Therefore, these two intersections shall also be analyzed during the second landfill peak hour in the supplemental traffic impact studies.

TABLE 6.2-1
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 6.2-2
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
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).

6.3 MITIGATION MEASURES

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.

SECTION 7.0
PROJECT ALTERNATIVES TRAFFIC IMPACTS

This section describes the traffic impacts qualitatively for the proposed alternatives to the proposed project. The four proposed project alternatives are described below.

7.1 ALTERNATIVE 1

Alternative 1 is the No Project Alternative. The No Project Alternative proposes no changes to the FRB Landfill; neither an increase in capacity (through a vertical or horizontal expansion) nor an increase in daily tonnage. The permitted closure date for the landfill will remain 2022. The landfill will continue to accept the permitted annual average of 8,500 TPD and a maximum high tonnage limit of 10,625 TPD for 36 floating (not designated) days.

The No Project Alternative would not result in any significant adverse traffic impacts to the circulation network because the 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.

Exportation of waste from Orange County would be required in 2013 when the Olinda Alpha Landfill near Brea, California closes if the Olinda Alpha Landfill expansion is not approved. If the Olinda Alpha Landfill expansion is approved, exportation of waste from Orange County would be required in 2021. Traffic related to the FRB Landfill would be removed from the circulation network after 2022. Traffic originally to the FRB Landfill and the Olinda Alpha Landfill would be relocated to landfills outside of Orange County with the exportation of waste.

7.2 ALTERNATIVE 2

Alternative 2 proposes a vertical and horizontal expansion for the FRB Landfill and no increase in the maximum daily tonnage. The vertical and horizontal expansion for the landfill is the same as the proposed project, which will extend the closure date to 2053. The landfill will continue to accept the permitted annual average MSW of 8,500 TPD and a maximum high tonnage limit of 10,625 for 36 floating (not designated) days.

Alternative 2 would not result in any significant adverse traffic impacts to the road segments in 2030. This is because daily traffic generated by Alternative 2 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 2 would result in significant adverse impacts to two intersections in 2030; Sand Canyon Avenue at Trabuco Road, and Jeffrey Road at Walnut Avenue. Therefore, the same recommended mitigation measures identified in Section 5.3 for the proposed project would also apply to Alternative 2.

Exportation of waste from Orange County would be required in 2013 when the Olinda Alpha Landfill near Brea, California, closes if the Olinda Alpha Landfill expansion is not approved. If the Olinda Alpha Landfill expansion is approved, exportation of waste from Orange County would be required in 2021. Traffic related to the FRB Landfill would be removed from the

circulation network in 2053. Traffic originally to the FRB Landfill and Olinda Alpha Landfill would be relocated to landfills outside of Orange County with the exportation of waste.

7.3 ALTERNATIVE 3

Alternative 3 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 is the same as the proposed project, which will extend the closure date to 2044 if the Olinda Alpha Landfill closes in 2013 and extend the closure date to 2047 if the Olinda Alpha Landfill closes in 2021.

Alternative 3 would not result in any significant adverse traffic impacts to the road segments in 2030. This is because daily traffic generated by Alternative 3 would be the same as the proposed project and the proposed project did not result in any significant adverse traffic impacts to the road segments. Alternative 3 would result in significant adverse impacts to two intersections in 2030; Sand Canyon Avenue at Trabuco Road, and Jeffrey Road at Walnut Avenue. Therefore, the same recommended mitigation measures identified in Section 5.3 for the proposed project would also apply to Alternative 3. However, it is important to note that the severity of impacts for Alternative 3 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.

7.4 ALTERNATIVE 4

Alternative 4 proposes a vertical and horizontal expansion for the FRB Landfill; no increase in the maximum daily tonnage and for the Prima Deshecha Landfill; and an increase of the permitted annual average from 4,000 TPD to 7,000 TPD. The vertical and horizontal expansion for the FRB Landfill under Alternative 4 is the same as the proposed project, which will extend the closure date to 2053. The FRB Landfill will continue to accept the permitted annual average of MSW of 8,500 TPD and a maximum high tonnage limit of 10,625 TPD for 36 floating (not designated) days. The increase of the permitted annual average of MSW at Prima Deshecha Landfill will reduce its closure date from 2067 to 2057 if the Olinda Alpha Landfill closes in 2013 and reduce the closure date from 2067 to 2059 if the Olinda Alpha Landfill closes in 2021.

Alternative 4 would not result in any significant adverse traffic impacts to the road segments in 2030. This is because daily traffic generated by Alternative 4 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 4 would result in significant adverse impacts to two intersections in 2030; Sand Canyon Avenue at Trabuco Road, and Jeffrey Road at Walnut Avenue. Therefore, the same recommended mitigation measures identified in Section 5.3 for the proposed project would also apply to Alternative 4.

Traffic impacts related to the increase of the annual average MSW of 4,000 TPD to 7,000 TPD at Prima Deshecha Landfill was not quantitatively analyzed in this Report. It was anticipated that increase of annual average MSW at Prima Deshecha Landfill would result in 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.[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 under Alternative 4 because the increase of annual average MSW at the Prima Deshecha Landfill would meet the projected disposal needs of Orange County.

[1] Austin-Foust Associates, Inc., *Prima Deshecha General Plan Development EIR Traffic Analysis*, 2000.

SECTION 8.0
OTHER TRAFFIC ISSUES

This section describes other traffic issues related to the proposed project that were not covered in other sections of this report. Other traffic issues described are the Congestion Management Program (CMP) Traffic Analysis, selected 2025 traffic impact analysis, the Lake Forest General Plan Amendment sensitivity analysis, the FRB Landfill hours of operation sensitivity analysis and the impacts of the proposed project related to the bicycle circulation network.

8.1 CONGESTION MANAGEMENT PROGRAM 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. As discussed in Section 2.4, 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.

8.2 SELECTED 2025 TRAFFIC IMPACT ANALYSIS

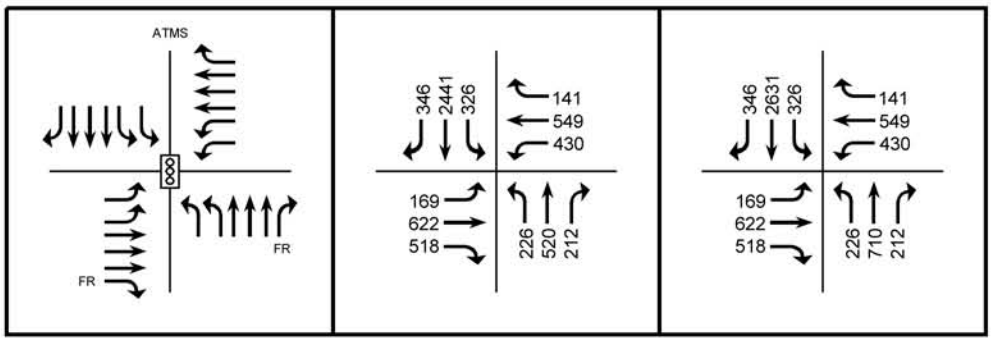
Traffic Impact Studies performed for projects within the City of Irvine require a long-term analysis year prior to analyzing General Plan buildout conditions. The long-term analysis year for the City of Irvine is currently year 2025, which is five years before the General Plan buildout year 2030 used in this Report. Analysis shows that the traffic conditions between 2025 and 2030 were nearly identical, except that the forecasted traffic volumes for 2030 were slightly higher than 2025. Therefore, a complete traffic impact analysis was performed for 2030 and was provided in Section 5.0.

As discussed in Section 5.2, implementation of the proposed project would result in significant adverse impacts at the intersection of Sand Canyon Avenue at Trabuco Road and the intersection of Jeffrey Road at Walnut Avenue in 2030 during the A.M. peak hour. Analysis of these two intersections was performed to determine if the proposed project would result in significant adverse impacts in 2025 during the A.M. peak hour.

Figure 8.2-1 shows the traffic conditions for Sand Canyon Avenue at Trabuco Road and Jeffrey Road at Walnut Avenue in 2025. The 2025 traffic conditions include intersection lane geometry and traffic volumes without and with the proposed project.

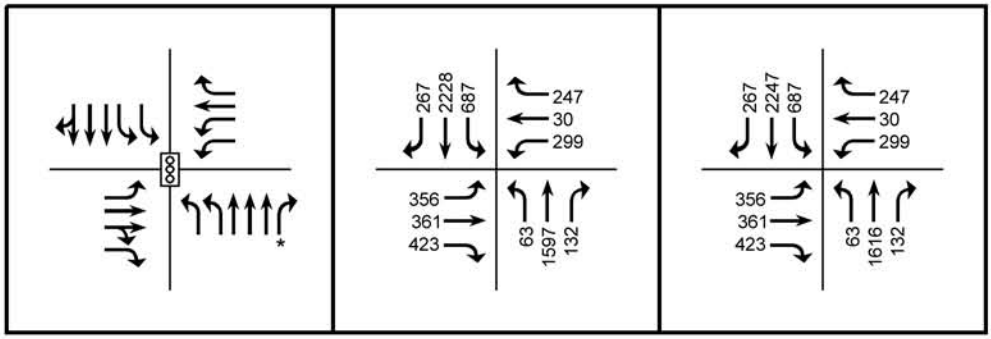
Table 8.2-1 summarizes the LOS at these two intersections without and with the proposed project in 2025 during the A.M. peak hour. As shown in Table 8.2-1, the intersection of Sand Canyon Avenue at Trabuco Road would operate at acceptable LOS D without the proposed project, but the intersection of Jeffrey Road at Walnut Avenue would operate at unacceptable LOS E without and with the proposed project.

14. Sand Canyon Avenue at Trabuco Road



Intersection Geometry | 2025 without Project | 2025 with Project

16. Jeffrey Road at Walnut Avenue



Intersection Geometry | 2025 without Project | 2025 with Project

LEGEND

▣	Traffic Signal
*	Unstriped Right-Turn Lane
FR	Free Right-Turn
ATMS	Advanced Transporation Management System
125	AM Peak Hour Turning Volumes

Note: A PCE factor of 2.24 was applied to trucks and was reflected in the traffic volumes.

Sources: City of Irvine (2005).
P&D Consultants (2005).

Figure 8.2-1
2025 Traffic Conditions
Select Intersections

TABLE 8.2-1
SIGNALIZED INTERSECTION LEVELS OF SERVICE – 2025 A.M. PEAK HOUR

Index	Intersection	Without Project		With Project	
		ICU	LOS	ICU	LOS
14[1]	Sand Canyon Avenue at Trabuco Road	0.794	C	0.831	D
16	Jeffrey Road at Walnut Avenue	**0.920**	**E**	**0.946**	**E**

Source: P&D Consultants (2005). **Bolded** items indicate the 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.

Table 8.2-2 summarizes the intersection changes in ICU, identifies if the intersection would be operating at an unacceptable LOS, and would result in significant adverse impacts to the intersections. As shown in Table 8.2-2, the proposed project would result in significant adverse impacts to the intersection of Jeffrey Road at Walnut Avenue during the A.M. peak hour. This is because the increase in ICU would be greater than 0.02 and the intersection would operate at an unacceptable LOS.

TABLE 8.2-2
SIGNALIZED INTERSECTION SIGNIFICANT ADVERSE IMPACT SUMMARY – 2025 A.M. PEAK HOUR

Index	Intersection	Change in ICU	Unacc. LOS?[1]	Sig. Adv. Imp.?[2]
14	Sand Canyon Avenue at Trabuco Road	0.037	No	No
16	Jeffrey Road at Walnut Avenue	**0.026**	**Yes**	**Yes**

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.

The mitigation measure for Jeffrey Road at Walnut Avenue is to provide the westbound right-turn lane with a protected right-turn phase that is overlapped with the southbound left-turn phase. The mitigation measure is the same as the mitigation measure for year 2030 at this intersection as discussed in Section 5.3. As shown in Table 8.2-3, the intersection of Jeffrey Road at Walnut Avenue would operate at acceptable LOS D with implementation of the mitigation measure.

TABLE 8.2-3
SIGNALIZED INTERSECTION LEVELS OF SERVICE – 2025 A.M. PEAK HOUR WITH MITIGATION

Index	Intersection	ICU	LOS
16	Jeffrey Road at Walnut Avenue	0.811	D

Source: P&D Consultants (2005).

8.3 LAKE FOREST GENERAL PLAN AMENDMENT 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.[1]

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.

8.4 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.

Table 8.4-1 shows number of transfer trucks arriving during the A.M. and the second landfill peak periods on the 85th percentile day based on data supplied by IWMD. Table 8.4-1 also shows the amount of transfer trucks that would arrive during the A.M. and the second landfill peak periods on the 85th percentile day if the landfill was to open one hour earlier at 6:00 A.M. As shown in Table 8.4-1, 29 transfer trucks arrive during the peak hour of the A.M. peak period, 29 transfer trucks arrive during the peak hour of the second landfill peak period and less than 29 transfer trucks per hour arrive after 11:00 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.

[1] City of Lake Forest.

TABLE 8.4-1
PEAK HOUR TRANSFER TRUCKS

Time	Peak Hour Transfer Trucks	
	7:00 A.M. to 5:00 P.M.	**6:00 A.M. to 4:00 P.M.**
6:00 A.M. to 7:00 A.M.	Closed	29
7:00 A.M. to 9:00 A.M.	29	29
9:00 A.M. to 11:00 A.M.	29	≤ 29
11:00 A.M. to 4:00 P.M.	< 29	< 29
4:00 P.M. to 5:00 P.M.	< 29	Closed

Source: P&D Consultants (2005).

8.5 BICYCLE CIRCULATION IMPACTS

As discussed in Section 3.5, 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.

SECTION 9.0
FINDINGS AND RECOMMENDATIONS

This section summarizes the key findings and recommendations for transportation related issues pertaining to the FRB Landfill Implementation project.

9.1 FINDINGS AND CONCLUSIONS

9.1.1 FRB LANDFILL

Current operations at the FRB Landfill indicate that the landfill generates two peak periods. The first landfill peak hour occurs between 7:00 A.M. and 9:00 A.M., which coincides with the circulation network A.M. peak period and the opening of the landfill. The second landfill peak hour occurs between 9:00 A.M. and 11:00 A.M.

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 in 2010 only consisted of the projected traffic increase from the maximum allowable MSW of 10,625 TPD to 11,500 TPD. The proposed project by the year 2010 will generate 162 daily trips with 23 trips during the A.M. peak hour and 22 trips during the second landfill peak hour. After applying a PCE of 2.24 to all waste hauling trucks, the proposed project by the year 2010 will generate 346 daily trips with 52 trips during the A.M. peak hour and 49 trips during the second landfill peak hour.

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 allow MSW of 11,500 TPD. The proposed project in year 2030 will generate 2,300 daily trips with 338 trips during the A.M. peak hour and 325 trips during the second landfill peak hour. After applying a PCE of 2.24 to all waste hauling trucks, the proposed project in year 2030 will generate 4,911 daily trips with 757 trips during the A.M. peak hour and 728 trips during the second landfill peak hour.

9.1.2 EXISTING CONDITIONS

All study road segments currently operate at an acceptable daily LOS. All study intersections currently operate at an acceptable LOS during the A.M. and the second landfill peak hours.

9.1.3 YEAR 2010 CONDITIONS

All study road segments will operate at an acceptable daily LOS in 2010 without and with the proposed project. All study intersections will operate at an acceptable LOS during the A.M. and the second landfill peak hours in 2010 without and with the proposed project.

Implementation of the proposed project will not create a significant adverse impact on the study road segments and study intersections because all the road segments and intersections will operate at an acceptable LOS.

9.1.4 SELECTED YEAR 2025 CONDITIONS

The year 2025 and 2030 traffic conditions were nearly identical, except that the forecasted traffic volumes for 2030 were slightly higher than 2025. Therefore, only selected intersections were analyzed for year 2025. The selected intersections were Sand Canyon Avenue at Trabuco Road and Jeffrey Road at Walnut Avenue. These intersections were selected because implementation of the proposed project would create a significant adverse impact during the A.M. peak hour in 2030.

Sand Canyon Avenue at Trabuco Road will operate at an acceptable LOS in 2025 without and with the proposed project. Jeffrey Road at Walnut Avenue will operate at unacceptable LOS E in 2025 without and with the proposed project.

Implementation of the proposed project will create a significant adverse impact only to the intersection of Jeffrey Road at Walnut Avenue in 2025 because the intersection will operate at an unacceptable LOS with an increase in ICU of greater than 0.02 when rounded to the nearest hundredth.

9.1.5 YEAR 2030 CONDITIONS

Even without implementation of the proposed project in 2030, six road segments will still operate at an unacceptable daily LOS. The road segments are:

- Jeffrey Road between Irvine Boulevard and Bryan Avenue
- Jeffrey Road between Bryan Avenue and Trabuco Road
- Jeffrey Road between Trabuco Road and I-5
- Sand Canyon Avenue between Portola Parkway and Irvine Boulevard
- Sand Canyon Avenue between Irvine Boulevard and Trabuco Road
- Sand Canyon Avenue between Trabuco Road and I-5

With implementation of the proposed project in 2030, eight road segments will operate at an unacceptable LOS. The road segments are:

- Portola Parkway between Jeffrey Road and Bee Canyon Access Road
- Portola Parkway between Bee Canyon Access Road and Sand Canyon Avenue
- Jeffrey Road between Irvine Boulevard and Bryan Avenue
- Jeffrey Road between Bryan Avenue and Trabuco Road
- Jeffrey Road between Trabuco Road and I-5
- Sand Canyon Avenue between Portola Parkway and Irvine Boulevard
- Sand Canyon Avenue between Irvine Boulevard and Trabuco Road
- Sand Canyon Avenue between Trabuco Road and I-5

Even without implementation of the proposed project in 2030, only Jeffrey Road at Walnut Avenue will operate at an unacceptable LOS during the A.M. peak hour. With implementation of the proposed project in 2030, Sand Canyon Avenue at Trabuco Road and Jeffrey Road at Walnut Avenue will operate at an unacceptable LOS during the A.M. peak hour.

Implementation of the proposed project will not create a significant adverse impact on the road segments because all the road segments will operate at an acceptable peak hour LOS. Implementation of the proposed project will create a significant adverse impact on Sand Canyon Avenue at Trabuco Road and Jeffrey Road at Walnut Avenue because these intersections will operate at an unacceptable LOS with an increase in ICU of greater than 0.02 when rounded to the nearest hundredth. Implementation of the proposed project will not create a significant adverse impact on the remaining study intersections.

9.1.6 YEAR POST-2030 CONDITIONS

A complete traffic impact analysis could not be conducted for this report because traffic volumes for post-2030 were not available. Only a qualitative traffic impact analysis for post-2030 was conducted by examining the LOS for road segments and intersections at buildout conditions in year 2030. Road segments and intersections operating at LOS D, E or F in 2030 indicate that the road segment or intersection is approaching its capacity limits. Therefore, these road segments and intersections shall be included in supplemental traffic impact studies. 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.

The following road segments shall be analyzed in future supplemental traffic impact studies:

- Portola Parkway between Jeffrey Road and Bee Canyon Access Road
- Portola Parkway between Bee Canyon Access Road and Sand Canyon Avenue
- Jeffrey Road between Irvine Boulevard and Bryan Avenue
- Jeffrey Road between Bryan Avenue and Trabuco Road
- Jeffrey Road between Trabuco Road and I-5
- Sand Canyon Avenue between Portola Parkway and Irvine Boulevard
- Sand Canyon Avenue between Irvine Boulevard and Trabuco Road
- Sand Canyon Avenue between Trabuco Road and I-5

The following intersections shall be analyzed during the A.M. peak hour in future supplemental traffic impact studies:

- Yale Avenue at Portola Parkway
- Culver Drive at Irvine Boulevard
- Yale Avenue at Irvine Boulevard
- Sand Canyon Avenue at Irvine Boulevard
- SR 133 southbound ramps at Irvine Boulevard
- SR 133 northbound ramps at Irvine Boulevard
- Jeffrey Road at Bryan Avenue
- Sand Canyon Avenue at Trabuco Road
- Jeffrey Road at Walnut Avenue
- Sand Canyon Avenue at I-5 northbound ramps
- Sand Canyon Avenue at I-5 southbound ramps

The following intersections shall be analyzed during the second landfill peak hour in future supplemental traffic impact studies:

- Sand Canyon Avenue at Irvine Boulevard
- Jeffrey Road at Walnut Avenue

9.2 RECOMMENDATIONS

No mitigation measures are required in year 2010, as no significant adverse impacts will occur.

The recommended mitigation measure in year 2025 and 2030 for Jeffrey Road at Walnut Avenue is to provide the westbound right-turn lane with a protected right-turn phase that is overlapped with the southbound left-turn phase. The recommended mitigation measure in year 2025 and 2030 for Jeffery Road at Walnut Avenue will reduce the significant adverse impact to below a level of significance.

The recommended mitigation measure in year 2030 for Sand Canyon Avenue at Trabuco Road is to extend the ATMS strategies. 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 recommended mitigation measure in year 2030 for Sand Canyon Avenue at Trabuco Road will reduce the significant adverse impact to below a level of significance.

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 below a level of significance.

RELOOC STRATEGIC PLAN
FRANK R. BOWERMAN LANDFILL IMPLEMENTATION
TRAFFIC IMPACT STUDY
ORANGE COUNTY, CALIFORNIA

TECHNICAL APPENDICES

Prepared for:

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Integrated Waste Management Department
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Prepared by:

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December 30, 2005

APPENDIX A

Traffic Counts

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-001

Location: Portola Pkwy E/o Culver Dr

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			5		3			12:00			46		95		
00:15			3		3			12:15			54		80		
00:30			7		3			12:30			63		49		
00:45			5	20	2	11	31	12:45			51	214	51	275	489
01:00			2		2			13:00			37		54		
01:15			0		2			13:15			54		39		
01:30			1		1			13:30			50		44		
01:45			2	5	0	5	10	13:45			56	197	52	189	386
02:00			1		1			14:00			91		88		
02:15			3		0			14:15			103		99		
02:30			2		1			14:30			90		103		
02:45			3	9	1	3	12	14:45			56	340	110	400	740
03:00			1		1			15:00			48		117		
03:15			1		0			15:15			55		106		
03:30			4		2			15:30			77		101		
03:45			5	11	3	6	17	15:45			89	269	103	427	696
04:00			4		0			16:00			74		127		
04:15			3		0			16:15			70		136		
04:30			2		1			16:30			79		138		
04:45			6	15	2	3	18	16:45			82	305	148	549	854
05:00			21		4			17:00			84		145		
05:15			17		11			17:15			96		165		
05:30			23		7			17:30			91		177		
05:45			32	93	9	31	124	17:45			99	370	179	666	1036
06:00			46		20			18:00			90		186		
06:15			56		33			18:15			93		143		
06:30			60		41			18:30			97		127		
06:45			88	250	68	162	412	18:45			84	364	105	561	925
07:00			171		90			19:00			86		98		
07:15			129		128			19:15			77		63		
07:30			163		146			19:30			74		72		
07:45			287	750	148	512	1262	19:45			61	298	59	292	590
08:00			291		133			20:00			36		31		
08:15			184		146			20:15			26		36		
08:30			176		120			20:30			17		18		
08:45			177	828	132	531	1359	20:45			18	97	27	112	209
09:00			160		127			21:00			19		25		
09:15			155		115			21:15			14		28		
09:30			95		88			21:30			21		18		
09:45			69	479	72	402	881	21:45			12	66	14	85	151
10:00			57		71			22:00			9		12		
10:15			42		59			22:15			14		21		
10:30			55		40			22:30			14		13		
10:45			44	198	45	215	413	22:45			8	45	13	59	104
11:00			41		56			23:00			9		8		
11:15			44		42			23:15			6		2		
11:30			49		39			23:30			4		3		
11:45			39	173	41	178	351	23:45			4	23	7	20	43
Total Vol.				2831		2059	4890					2588		3635	6223

Daily Totals	NB	SB	EB	WB	Combined
			5419	5694	11113

	AM			PM		
Split %	57.9%	42.1%	44.0%	41.6%	58.4%	56.0%
Peak Hour	07:45	07:30	07:30	17:45	17:15	17:15
Volume	938	573	1498	379	707	1083
P.H.F.	0.81	0.97	0.86	0.96	0.95	0.97

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-002

Location: Portola Pkwy W/o Jeffrey Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			4		3			12:00			42		32		
00:15			2		6			12:15			53		34		
00:30			5		4			12:30			34		46		
00:45			1	12	4	17	29	12:45			30	159	40	152	311
01:00			2		2			13:00			43		35		
01:15			0		2			13:15			39		29		
01:30			0		2			13:30			40		31		
01:45			1	3	0	6	9	13:45			44	166	60	155	321
02:00			1		1			14:00			51		55		
02:15			1		0			14:15			56		67		
02:30			0		1			14:30			46		52		
02:45			3	5	0	2	7	14:45			46	199	39	213	412
03:00			1		0			15:00			44		62		
03:15			0		0			15:15			40		61		
03:30			3		1			15:30			41		108		
03:45			4	8	4	5	13	15:45			66	191	97	328	519
04:00			4		0			16:00			64		133		
04:15			2		0			16:15			59		103		
04:30			2		1			16:30			69		122		
04:45			5	13	1	2	15	16:45			71	263	123	481	744
05:00			17		6			17:00			68		129		
05:15			15		3			17:15			74		151		
05:30			29		3			17:30			64		258		
05:45			45	106	7	19	125	17:45			78	284	191	729	1013
06:00			40		7			18:00			76		174		
06:15			99		21			18:15			69		127		
06:30			110		40			18:30			49		122		
06:45			167	416	91	159	575	18:45			47	241	82	505	746
07:00			135		107			19:00			45		62		
07:15			150		155			19:15			29		70		
07:30			197		153			19:30			42		54		
07:45			201	683	147	562	1245	19:45			13	129	40	226	355
08:00			180		155			20:00			25		35		
08:15			193		150			20:15			23		31		
08:30			188		189			20:30			16		20		
08:45			120	681	131	625	1306	20:45			21	85	28	114	199
09:00			150		75			21:00			13		24		
09:15			73		44			21:15			15		21		
09:30			63		40			21:30			17		24		
09:45			51	337	35	194	531	21:45			11	56	22	91	147
10:00			42		28			22:00			5		12		
10:15			49		43			22:15			8		16		
10:30			32		27			22:30			11		8		
10:45			34	157	28	126	283	22:45			10	34	13	49	83
11:00			37		32			23:00			5		6		
11:15			34		33			23:15			5		5		
11:30			36		31			23:30			3		3		
11:45			39	146	37	133	279	23:45			4	17	6	20	37
Total Vol.				2567		1850	4417					1824		3063	4887

Daily Totals	NB	SB	EB	WB	Combined
			4391	4913	9304

	AM			PM		
Split %	58.1%	41.9%	47.5%	37.3%	62.7%	52.5%
Peak Hour	07:30	07:45	07:45	17:15	17:15	17:15
Volume	771	641	1403	292	774	1066
P.H.F.	0.96	0.85	0.93	0.94	0.75	0.83

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-003

Location: Portola Pkwy E/o Jeffrey Rd

AM Period	NB		SB		EB		WB		PM Period	NB		SB		EB		WB		
00:00	5		4						12:00	42		41						
00:15	6		3						12:15	37		37						
00:30	4		2						12:30	35		40						
00:45	1	16	0	9				25	12:45	36	150	44	162					312
01:00	2		2						13:00	30		49						
01:15	0		3						13:15	29		42						
01:30	1		1						13:30	44		46						
01:45	2	5	1	7				12	13:45	34	137	44	181					318
02:00	0		1						14:00	42		47						
02:15	0		0						14:15	48		46						
02:30	0		0						14:30	54		32						
02:45	1	1	0	1				2	14:45	76	220	32	157					377
03:00	0		1						15:00	72		43						
03:15	0		0						15:15	92		40						
03:30	1		0						15:30	133		36						
03:45	0	1	0	1				2	15:45	132	429	66	185					614
04:00	0		0						16:00	119		69						
04:15	2		1						16:15	136		72						
04:30	3		2						16:30	149		73						
04:45	3	8	13	16				24	16:45	162	566	77	291					857
05:00	4		14						17:00	150		74						
05:15	3		18						17:15	202		113						
05:30	4		38						17:30	201		88						
05:45	14	25	48	118				143	17:45	151	704	95	370					1074
06:00	14		43						18:00	130		83						
06:15	25		67						18:15	101		80						
06:30	30		71						18:30	88		61						
06:45	54	123	99	280				403	18:45	75	394	66	290					684
07:00	89		114						19:00	62		54						
07:15	144		118						19:15	49		42						
07:30	151		133						19:30	38		53						
07:45	172	556	158	523				1079	19:45	26	175	47	196					371
08:00	169		119						20:00	21		26						
08:15	143		120						20:15	17		24						
08:30	110		88						20:30	11		33						
08:45	75	497	129	456				953	20:45	15	64	18	101					165
09:00	57		86						21:00	22		20						
09:15	54		49						21:15	25		23						
09:30	45		57						21:30	29		31						
09:45	51	207	48	240				447	21:45	20	96	21	95					191
10:00	35		38						22:00	20		21						
10:15	45		42						22:15	8		18						
10:30	31		29						22:30	8		17						
10:45	37	148	33	142				290	22:45	6	42	3	59					101
11:00	29		31						23:00	7		5						
11:15	37		35						23:15	10		4						
11:30	37		32						23:30	3		11						
11:45	54	157	34	132				289	23:45	4	24	0	20					44
Total Vol.		1744		1925				3669			3001		2107					5108

Daily Totals

NB	SB	EB	WB	Combined
4745	4032			8777

	AM			PM		
Split %	47.5%	52.5%	41.8%	58.8%	41.2%	58.2%
Peak Hour	07:15	07:30	07:30	16:45	17:15	17:00
Volume	636	530	1165	715	379	1074
P.H.F.	0.92	0.84	0.88	0.89	0.84	0.85

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-004

Location: Portola Pkwy W/o Sand Canyon Ave

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			4		3			12:00			50		64		
00:15			4		9			12:15			60		74		
00:30			2		3			12:30			49		79		
00:45			0	10	1	16	26	12:45			64	223	63	280	503
01:00			2		2			13:00			62		50		
01:15			4		1			13:15			70		49		
01:30			1		0			13:30			70		66		
01:45			1	8	2	5	13	13:45			73	275	55	220	495
02:00			1		0			14:00			68		77		
02:15			0		0			14:15			71		67		
02:30			0		0			14:30			61		77		
02:45			0	1	1	1	2	14:45			48	248	96	317	565
03:00			1		0			15:00			62		91		
03:15			0		0			15:15			77		116		
03:30			0		1			15:30			54		138		
03:45			0	1	0	1	2	15:45			71	264	116	461	725
04:00			0		1			16:00			92		108		
04:15			0		2			16:15			93		124		
04:30			3		3			16:30			84		132		
04:45			9	12	7	13	25	16:45			78	347	150	514	861
05:00			12		9			17:00			92		137		
05:15			20		10			17:15			113		149		
05:30			38		10			17:30			114		128		
05:45			42	112	29	58	170	17:45			112	431	116	530	961
06:00			36		21			18:00			90		125		
06:15			53		34			18:15			83		93		
06:30			63		35			18:30			60		74		
06:45			99	251	65	155	406	18:45			82	315	75	367	682
07:00			100		110			19:00			51		68		
07:15			107		177			19:15			41		62		
07:30			132		180			19:30			71		40		
07:45			120	459	132	599	1058	19:45			37	200	33	203	403
08:00			137		195			20:00			27		20		
08:15			110		140			20:15			26		21		
08:30			99		114			20:30			34		10		
08:45			111	457	62	511	968	20:45			19	106	19	70	176
09:00			78		55			21:00			22		27		
09:15			40		40			21:15			25		30		
09:30			58		34			21:30			30		31		
09:45			41	217	22	151	368	21:45			20	97	25	113	210
10:00			37		23			22:00			26		22		
10:15			35		27			22:15			18		11		
10:30			24		26			22:30			18		11		
10:45			21	117	23	99	216	22:45			3	65	8	52	117
11:00			25		37			23:00			4		7		
11:15			32		33			23:15			5		12		
11:30			58		54			23:30			11		5		
11:45			56	171	95	219	390	23:45			0	20	2	26	46
Total Vol.				1816		1828	3644					2591		3153	5744

			Daily Totals EB	WB	Combined
	NB	SB	4407	4981	9388
	AM		PM		
Split %	49.8%	50.2%	38.8%	45.1%	54.9%	61.2%
Peak Hour	07:30	07:15	07:15	17:00	16:30	16:45
Volume	499	684	1180	431	568	961
P.H.F.	0.91	0.88	0.89	0.95	0.95	0.92

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-005

Location: Irvine Blvd E/o Culver

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			27		20			12:00			129		100		
00:15			16		17			12:15			139		105		
00:30			18		9			12:30			137		100		
00:45			7	68	9	55	123	12:45			120	525	107	412	937
01:00			8		5			13:00			130		91		
01:15			5		8			13:15			134		101		
01:30			4		4			13:30			125		100		
01:45			6	23	7	24	47	13:45			123	512	121	413	925
02:00			4		2			14:00			132		108		
02:15			4		4			14:15			140		100		
02:30			3		3			14:30			132		115		
02:45			6	17	4	13	30	14:45			123	527	116	439	966
03:00			7		5			15:00			148		142		
03:15			5		4			15:15			166		150		
03:30			7		5			15:30			158		136		
03:45			4	23	7	21	44	15:45			146	618	207	635	1253
04:00			8		5			16:00			168		177		
04:15			12		8			16:15			176		214		
04:30			22		13			16:30			175		410		
04:45			19	61	12	38	99	16:45			233	752	261	1062	1814
05:00			27		16			17:00			224		256		
05:15			47		35			17:15			255		291		
05:30			84		36			17:30			242		288		
05:45			52	210	53	140	350	17:45			232	953	229	1064	2017
06:00			65		67			18:00			192		218		
06:15			108		80			18:15			174		245		
06:30			155		109			18:30			156		217		
06:45			178	506	120	376	882	18:45			170	692	181	861	1553
07:00			177		170			19:00			140		116		
07:15			151		241			19:15			107		114		
07:30			165		320			19:30			118		101		
07:45			230	723	257	988	1711	19:45			120	485	72	403	888
08:00			192		379			20:00			125		71		
08:15			189		315			20:15			94		66		
08:30			188		275			20:30			101		73		
08:45			156	725	268	1237	1962	20:45			112	432	49	259	691
09:00			130		211			21:00			104		60		
09:15			126		150			21:15			100		43		
09:30			125		188			21:30			68		40		
09:45			75	456	155	704	1160	21:45			85	357	46	189	546
10:00			82		130			22:00			66		48		
10:15			99		130			22:15			46		36		
10:30			112		145			22:30			43		25		
10:45			85	378	106	511	889	22:45			42	197	17	126	323
11:00			62		88			23:00			39		17		
11:15			58		83			23:15			25		16		
11:30			56		96			23:30			25		16		
11:45			121	297	91	358	655	23:45			25	114	8	57	171
Total Vol.				3487		4465	7952					6164		5920	12084

Daily Totals	NB	SB	EB	WB	Combined
			9651	10385	20036

	AM			PM		
Split %	43.9%	56.1%	39.7%	51.0%	49.0%	60.3%
Peak Hour	07:45	07:30	07:30	16:45	16:30	16:30
Volume	799	1271	2047	954	1218	2105
P.H.F.	0.87	0.84	0.90	0.94	0.74	0.90

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-006

Location: Irvine Blvd W/o Jeffrey Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			4		14			12:00			104		98		
00:15			6		12			12:15			109		84		
00:30			4		9			12:30			107		86		
00:45			5	19	6	41	60	12:45			102	422	61	329	751
01:00			3		3			13:00			105		80		
01:15			1		4			13:15			117		75		
01:30			0		6			13:30			98		72		
01:45			5	9	1	14	23	13:45			113	433	80	307	740
02:00			3		1			14:00			86		96		
02:15			3		1			14:15			93		111		
02:30			1		5			14:30			106		161		
02:45			3	10	2	9	19	14:45			112	397	147	515	912
03:00			5		2			15:00			119		132		
03:15			9		0			15:15			138		180		
03:30			7		1			15:30			89		195		
03:45			2	23	5	8	31	15:45			111	457	187	694	1151
04:00			7		6			16:00			129		178		
04:15			24		4			16:15			132		238		
04:30			16		5			16:30			137		280		
04:45			29	76	2	17	93	16:45			154	552	296	992	1544
05:00			33		10			17:00			176		297		
05:15			78		11			17:15			168		281		
05:30			91		22			17:30			123		193		
05:45			83	285	32	75	360	17:45			148	615	254	1025	1640
06:00			83		30			18:00			125		214		
06:15			106		34			18:15			135		173		
06:30			152		51			18:30			123		121		
06:45			154	495	87	202	697	18:45			88	471	118	626	1097
07:00			169		109			19:00			75		95		
07:15			184		180			19:15			86		71		
07:30			236		205			19:30			65		87		
07:45			329	918	260	754	1672	19:45			54	280	67	320	600
08:00			218		215			20:00			62		53		
08:15			189		181			20:15			47		57		
08:30			294		224			20:30			48		59		
08:45			237	938	239	859	1797	20:45			49	206	60	229	435
09:00			165		100			21:00			52		51		
09:15			138		74			21:15			48		56		
09:30			107		80			21:30			45		50		
09:45			97	507	76	330	837	21:45			29	174	34	191	365
10:00			93		65			22:00			31		29		
10:15			80		88			22:15			24		26		
10:30			84		68			22:30			23		27		
10:45			89	346	60	281	627	22:45			20	98	23	105	203
11:00			65		86			23:00			13		22		
11:15			109		95			23:15			11		12		
11:30			92		118			23:30			15		13		
11:45			103	369	131	430	799	23:45			11	50	13	60	110
Total Vol.				3995		3020	7015					4155		5393	9548

Daily Totals	NB	SB	EB	WB	Combined
			8150	8413	16563

	AM			PM		
Split %	56.9%	43.1%	42.4%	43.5%	56.5%	57.6%
Peak Hour	07:45	07:45	07:45	16:30	16:30	16:30
Volume	1030	880	1910	635	1154	1789
P.H.F.	0.78	0.85	0.81	0.90	0.97	0.95

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-007

Location: Irvine Blvd E/o Jeffrey Rd

AM Period	NB		SB		EB		WB		PM Period	NB		SB		EB		WB		
00:00	7		11						12:00	95		72						
00:15	11		6						12:15	104		84						
00:30	12		4						12:30	83		89						
00:45	4	34	6	27				61	12:45	98	380	95	340					720
01:00	6		6						13:00	59		91						
01:15	1		2						13:15	84		79						
01:30	2		0						13:30	77		82						
01:45	3	12	0	8				20	13:45	107	327	88	340					667
02:00	1		2						14:00	80		81						
02:15	1		2						14:15	100		82						
02:30	0		2						14:30	101		84						
02:45	5	7	2	8				15	14:45	152	433	99	346					779
03:00	1		1						15:00	118		68						
03:15	1		8						15:15	162		92						
03:30	0		10						15:30	175		108						
03:45	1	3	5	24				27	15:45	275	730	95	363					1093
04:00	5		2						16:00	198		89						
04:15	6		5						16:15	244		122						
04:30	2		25						16:30	238		122						
04:45	9	22	10	42				64	16:45	256	936	142	475					1411
05:00	2		29						17:00	278		146						
05:15	17		34						17:15	319		208						
05:30	16		34						17:30	314		159						
05:45	25	60	51	148				208	17:45	256	1167	150	663					1830
06:00	24		39						18:00	210		126						
06:15	26		36						18:15	206		124						
06:30	38		71						18:30	164		102						
06:45	67	155	61	207				362	18:45	112	692	112	464					1156
07:00	79		53						19:00	109		76						
07:15	99		66						19:15	95		58						
07:30	123		93						19:30	72		68						
07:45	160	461	103	315				776	19:45	68	344	62	264					608
08:00	135		74						20:00	48		50						
08:15	131		74						20:15	34		65						
08:30	127		66						20:30	37		54						
08:45	109	502	68	282				784	20:45	34	153	55	224					377
09:00	53		53						21:00	34		45						
09:15	40		44						21:15	25		55						
09:30	54		37						21:30	38		45						
09:45	48	195	29	163				358	21:45	30	127	40	185					312
10:00	48		36						22:00	20		29						
10:15	48		30						22:15	21		30						
10:30	54		27						22:30	15		31						
10:45	67	217	29	122				339	22:45	19	75	38	128					203
11:00	73		36						23:00	16		21						
11:15	76		61						23:15	20		12						
11:30	73		82						23:30	9		14						
11:45	100	322	84	263				585	23:45	12	57	11	58					115
Total Vol.		1990		1609				3599			5421		3850					9271

Daily Totals	NB	SB	EB	WB	Combined
	7411	5459			12870

	AM			PM		
Split %	55.3%	44.7%	28.0%	58.5%	41.5%	72.0%
Peak Hour	07:45	07:30	07:30	16:45	17:00	17:00
Volume	553	344	893	1167	663	1830
P.H.F.	0.86	0.83	0.85	0.92	0.80	0.87

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-008

Location: Irvine Blvd E/o Sand Canyon Ave

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			9		9			12:00			135		108		
00:15			7		12			12:15			128		93		
00:30			4		3			12:30			118		100		
00:45			3	23	7	31	54	12:45			122	503	67	368	871
01:00			2		2			13:00			125		86		
01:15			1		2			13:15			117		73		
01:30			2		3			13:30			131		74		
01:45			2	7	1	8	15	13:45			127	500	89	322	822
02:00			3		2			14:00			121		98		
02:15			2		0			14:15			119		106		
02:30			7		5			14:30			123		161		
02:45			0	12	2	9	21	14:45			125	488	125	490	978
03:00			9		2			15:00			141		153		
03:15			8		1			15:15			165		184		
03:30			8		3			15:30			151		280		
03:45			4	29	5	11	40	15:45			161	618	192	809	1427
04:00			2		9			16:00			151		230		
04:15			22		4			16:15			140		213		
04:30			27		8			16:30			186		266		
04:45			29	80	7	28	108	16:45			158	635	248	957	1592
05:00			49		20			17:00			226		298		
05:15			71		27			17:15			224		294		
05:30			106		41			17:30			195		266		
05:45			94	320	49	137	457	17:45			174	819	201	1059	1878
06:00			115		86			18:00			175		224		
06:15			136		102			18:15			131		165		
06:30			184		166			18:30			139		136		
06:45			118	553	178	532	1085	18:45			106	551	116	641	1192
07:00			176		205			19:00			90		94		
07:15			173		232			19:15			78		78		
07:30			234		312			19:30			88		73		
07:45			186	769	268	1017	1786	19:45			60	316	53	298	614
08:00			209		275			20:00			45		40		
08:15			156		257			20:15			42		36		
08:30			159		260			20:30			54		35		
08:45			142	666	113	905	1571	20:45			49	190	33	144	334
09:00			128		100			21:00			55		31		
09:15			86		106			21:15			65		30		
09:30			96		90			21:30			67		26		
09:45			92	402	84	380	782	21:45			40	227	18	105	332
10:00			80		78			22:00			35		29		
10:15			76		57			22:15			40		16		
10:30			87		80			22:30			29		21		
10:45			88	331	73	288	619	22:45			18	122	16	82	204
11:00			107		85			23:00			17		27		
11:15			124		87			23:15			11		9		
11:30			126		101			23:30			14		10		
11:45			85	442	97	370	812	23:45			10	52	10	56	108
Total Vol.				3634		3716	7350					5021		5331	10352

Daily Totals	NB	SB	EB	WB	Combined
			8655	9047	17702

	AM			PM		
Split %	49.4%	50.6%	41.5%	48.5%	51.5%	58.5%
Peak Hour	07:15	07:30	07:30	17:00	16:30	16:45
Volume	802	1112	1897	819	1106	1909
P.H.F.	0.86	0.89	0.87	0.91	0.93	0.91

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-009

Location: Culver S/o Portola

AM Period	NB		SB		EB		WB		PM Period	NB		SB		EB		WB	
00:00	6		3						12:00	30		53					
00:15	5		3						12:15	28		100					
00:30	1		1						12:30	94		36					
00:45	2	14	6	13				27	12:45	47	199	33	222				421
01:00	4		4						13:00	36		40					
01:15	3		1						13:15	26		26					
01:30	1		1						13:30	37		25					
01:45	0	8	0	6				14	13:45	41	140	29	120				260
02:00	4		2						14:00	60		31					
02:15	1		1						14:15	79		147					
02:30	1		1						14:30	71		113					
02:45	1	7	1	5				12	14:45	54	264	50	341				605
03:00	1		0						15:00	62		51					
03:15	0		0						15:15	61		37					
03:30	1		0						15:30	63		42					
03:45	0	2	1	1				3	15:45	101	287	71	201				488
04:00	0		0						16:00	92		101					
04:15	0		0						16:15	88		58					
04:30	1		1						16:30	70		42					
04:45	2	3	2	3				6	16:45	93	343	53	254				597
05:00	1		1						17:00	94		50					
05:15	2		5						17:15	101		48					
05:30	6		12						17:30	97		51					
05:45	4	13	9	27				40	17:45	94	386	68	217				603
06:00	10		14						18:00	94		51					
06:15	16		13						18:15	93		57					
06:30	38		33						18:30	100		56					
06:45	62	126	38	98				224	18:45	98	385	34	198				583
07:00	42		65						19:00	103		53					
07:15	53		117						19:15	65		56					
07:30	65		94						19:30	68		34					
07:45	69	229	105	381				610	19:45	43	279	25	168				447
08:00	60		96						20:00	50		34					
08:15	109		134						20:15	48		16					
08:30	206		200						20:30	35		23					
08:45	78	453	196	626				1079	20:45	35	168	34	107				275
09:00	41		60						21:00	22		25					
09:15	34		38						21:15	22		15					
09:30	42		39						21:30	28		23					
09:45	33	150	36	173				323	21:45	28	100	15	78				178
10:00	31		24						22:00	22		13					
10:15	41		30						22:15	24		13					
10:30	27		33						22:30	16		8					
10:45	25	124	22	109				233	22:45	13	75	11	45				120
11:00	25		31						23:00	9		10					
11:15	24		29						23:15	4		3					
11:30	20		23						23:30	5		3					
11:45	26	95	24	107				202	23:45	7	25	4	20				45
Total Vol.		1224		1549				2773			2651		1971				4622

Daily Totals	NB	SB	EB	WB	Combined
	3875	3520			7395

	AM			PM		
Split %	44.1%	55.9%	37.5%	57.4%	42.6%	62.5%
Peak Hour	08:00	08:00	08:00	18:15	14:15	14:15
Volume	453	626	1079	394	361	627
P.H.F.	0.55	0.78	0.66	0.97	0.61	0.69

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-010

Location: Jeffrey Rd S/o Portola Pkwy

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			6		3			12:00			73		75		
00:15			3		5			12:15			71		76		
00:30			2		9			12:30			60		61		
00:45			0	11	7	24	35	12:45			68	272	52	264	536
01:00			0		4			13:00			56		50		
01:15			5		0			13:15			60		52		
01:30			3		2			13:30			70		52		
01:45			4	12	7	13	25	13:45			58	244	60	214	458
02:00			2		3			14:00			62		43		
02:15			5		4			14:15			61		69		
02:30			0		4			14:30			70		86		
02:45			2	9	0	11	20	14:45			71	264	70	268	532
03:00			2		3			15:00			56		61		
03:15			1		1			15:15			60		90		
03:30			2		0			15:30			61		48		
03:45			2	7	2	6	13	15:45			46	223	74	273	496
04:00			2		3			16:00			41		40		
04:15			6		3			16:15			33		42		
04:30			8		9			16:30			43		48		
04:45			15	31	11	26	57	16:45			43	160	45	175	335
05:00			40		14			17:00			49		51		
05:15			34		15			17:15			62		50		
05:30			45		17			17:30			53		44		
05:45			49	168	27	73	241	17:45			54	218	43	188	406
06:00			45		36			18:00			39		34		
06:15			32		44			18:15			25		35		
06:30			30		69			18:30			33		28		
06:45			34	141	58	207	348	18:45			33	130	37	134	264
07:00			30		68			19:00			24		24		
07:15			64		70			19:15			21		21		
07:30			80		103			19:30			21		16		
07:45			92	266	112	353	619	19:45			23	89	18	79	168
08:00			36		95			20:00			10		13		
08:15			40		85			20:15			13		13		
08:30			34		69			20:30			11		34		
08:45			33	143	67	316	459	20:45			6	40	23	83	123
09:00			31		53			21:00			19		10		
09:15			32		44			21:15			25		22		
09:30			24		52			21:30			18		13		
09:45			25	112	52	201	313	21:45			11	73	12	57	130
10:00			29		48			22:00			7		9		
10:15			22		40			22:15			3		9		
10:30			16		43			22:30			6		7		
10:45			30	97	34	165	262	22:45			2	18	3	28	46
11:00			40		50			23:00			8		9		
11:15			41		35			23:15			4		4		
11:30			38		43			23:30			5		3		
11:45			39	158	43	171	329	23:45			6	23	10	26	49
Total Vol.				1155		1566	2721					1754		1789	3543

Daily Totals	NB	SB	EB	WB	Combined
			2909	3355	6264

	AM			PM		
Split %	42.4%	57.6%	43.4%	49.5%	50.5%	56.6%
Peak Hour	07:15	07:30	07:15	12:00	14:30	14:30
Volume	272	395	652	272	307	564
P.H.F.	0.74	0.88	0.80	0.93	0.85	0.90

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-011

Location: Jeffrey Rd S/o Irvine Blvd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			7		4			12:00			57		95		
00:15			4		2			12:15			66		68		
00:30			4		15			12:30			71		81		
00:45			3	18	5	26	44	12:45			89	283	109	353	636
01:00			0		5			13:00			70		88		
01:15			5		1			13:15			74		69		
01:30			7		2			13:30			92		80		
01:45			4	16	6	14	30	13:45			79	315	80	317	632
02:00			1		3			14:00			107		100		
02:15			4		4			14:15			84		154		
02:30			0		3			14:30			71		100		
02:45			2	7	2	12	19	14:45			95	357	109	463	820
03:00			3		3			15:00			88		135		
03:15			1		0			15:15			111		91		
03:30			2		0			15:30			99		116		
03:45			1	7	2	5	12	15:45			100	398	125	467	865
04:00			1		3			16:00			125		91		
04:15			4		3			16:15			107		77		
04:30			11		4			16:30			133		89		
04:45			14	30	8	18	48	16:45			129	494	87	344	838
05:00			15		4			17:00			139		79		
05:15			23		10			17:15			185		101		
05:30			52		15			17:30			177		81		
05:45			60	150	18	47	197	17:45			148	649	80	341	990
06:00			76		23			18:00			103		79		
06:15			53		32			18:15			95		89		
06:30			87		57			18:30			87		76		
06:45			61	277	46	158	435	18:45			76	361	64	308	669
07:00			50		71			19:00			84		72		
07:15			68		95			19:15			60		63		
07:30			79		123			19:30			51		42		
07:45			67	264	108	397	661	19:45			54	249	35	212	461
08:00			77		124			20:00			40		30		
08:15			106		134			20:15			33		32		
08:30			124		86			20:30			41		36		
08:45			82	389	130	474	863	20:45			58	172	57	155	327
09:00			54		73			21:00			67		29		
09:15			65		60			21:15			55		38		
09:30			53		63			21:30			31		28		
09:45			73	245	54	250	495	21:45			25	178	18	113	291
10:00			61		33			22:00			12		17		
10:15			39		43			22:15			11		12		
10:30			62		45			22:30			12		8		
10:45			48	210	38	159	369	22:45			9	44	4	41	85
11:00			48		53			23:00			11		12		
11:15			53		58			23:15			5		8		
11:30			55		74			23:30			8		7		
11:45			59	215	93	278	493	23:45			11	35	14	41	76
Total Vol.				1828		1838	3666					3535		3155	6690

Daily Totals	NB	SB	EB	WB	Combined
			5363	4993	10356

	AM			PM		
Split %	49.9%	50.1%	35.4%	52.8%	47.2%	64.6%
Peak Hour	08:00	07:30	08:00	17:00	14:15	17:00
Volume	389	489	863	649	498	990
P.H.F.	0.78	0.91	0.90	0.88	0.81	0.87

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-012

Location: Jeffrey Rd N/o Trabuco Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			17		11			12:00			127		217		
00:15			11		4			12:15			153		172		
00:30			11		20			12:30			163		198		
00:45			13	52	9	44	96	12:45			167	610	186	773	1383
01:00			3		12			13:00			152		198		
01:15			9		6			13:15			177		196		
01:30			13		3			13:30			177		179		
01:45			8	33	10	31	64	13:45			196	702	165	738	1440
02:00			7		5			14:00			184		217		
02:15			8		8			14:15			133		225		
02:30			3		6			14:30			129		240		
02:45			5	23	2	21	44	14:45			145	591	217	899	1490
03:00			5		3			15:00			149		247		
03:15			3		3			15:15			170		249		
03:30			2		3			15:30			164		285		
03:45			2	12	5	14	26	15:45			173	656	204	985	1641
04:00			5		5			16:00			195		173		
04:15			9		7			16:15			189		146		
04:30			18		11			16:30			262		161		
04:45			19	51	17	40	91	16:45			265	911	166	646	1557
05:00			19		22			17:00			240		171		
05:15			45		31			17:15			354		179		
05:30			76		46			17:30			345		133		
05:45			70	210	49	148	358	17:45			354	1293	150	633	1926
06:00			110		56			18:00			231		175		
06:15			128		83			18:15			228		168		
06:30			194		122			18:30			195		193		
06:45			270	702	196	457	1159	18:45			206	860	157	693	1553
07:00			222		225			19:00			170		153		
07:15			142		295			19:15			150		117		
07:30			112		393			19:30			138		108		
07:45			149	625	438	1351	1976	19:45			131	589	98	476	1065
08:00			127		389			20:00			110		68		
08:15			168		418			20:15			94		60		
08:30			159		362			20:30			91		67		
08:45			128	582	360	1529	2111	20:45			87	382	69	264	646
09:00			115		274			21:00			127		53		
09:15			149		214			21:15			113		60		
09:30			100		185			21:30			96		68		
09:45			135	499	195	868	1367	21:45			70	406	43	224	630
10:00			125		128			22:00			54		43		
10:15			131		218			22:15			43		39		
10:30			124		184			22:30			43		26		
10:45			137	517	171	701	1218	22:45			35	175	16	124	299
11:00			117		172			23:00			28		22		
11:15			138		171			23:15			20		18		
11:30			133		178			23:30			21		15		
11:45			132	520	185	706	1226	23:45			23	92	27	82	174
Total Vol.				3826		5910	9736					7267		6537	13804

	AM			PM		
Daily Totals	NB	SB	EB	WB	Combined	
			11093	12447	23540	
Split %	39.3%	60.7%	41.4%	52.6%	47.4%	58.6%
Peak Hour	06:30	07:30	07:45	17:00	14:45	17:00
Volume	828	1638	2210	1293	998	1926
P.H.F.	0.77	0.93	0.94	0.91	0.88	0.90

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-013

Location: Jeffrey Rd S/o Trabuco Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			24		16			12:00			116		205		
00:15			14		5			12:15			161		168		
00:30			14		18			12:30			173		196		
00:45			13	65	11	50	115	12:45			168	618	194	763	1381
01:00			3		12			13:00			160		157		
01:15			9		5			13:15			168		187		
01:30			10		5			13:30			147		155		
01:45			11	33	5	27	60	13:45			177	652	147	646	1298
02:00			6		8			14:00			172		178		
02:15			8		8			14:15			187		196		
02:30			8		4			14:30			153		191		
02:45			4	26	5	25	51	14:45			151	663	224	789	1452
03:00			4		2			15:00			154		249		
03:15			4		4			15:15			163		203		
03:30			4		3			15:30			195		278		
03:45			4	16	4	13	29	15:45			193	705	233	963	1668
04:00			3		3			16:00			193		166		
04:15			5		7			16:15			214		144		
04:30			22		6			16:30			246		149		
04:45			19	49	18	34	83	16:45			278	931	163	622	1553
05:00			21		20			17:00			242		185		
05:15			44		28			17:15			368		171		
05:30			77		31			17:30			367		150		
05:45			67	209	49	128	337	17:45			404	1381	149	655	2036
06:00			124		50			18:00			275		162		
06:15			154		76			18:15			235		144		
06:30			199		109			18:30			194		178		
06:45			280	757	147	382	1139	18:45			202	906	144	628	1534
07:00			258		205			19:00			179		135		
07:15			179		219			19:15			159		117		
07:30			129		274			19:30			147		101		
07:45			150	716	349	1047	1763	19:45			145	630	92	445	1075
08:00			148		307			20:00			112		63		
08:15			167		315			20:15			98		54		
08:30			176		278			20:30			97		68		
08:45			142	633	317	1217	1850	20:45			83	390	56	241	631
09:00			142		231			21:00			119		70		
09:15			130		200			21:15			114		47		
09:30			108		187			21:30			98		82		
09:45			144	524	157	775	1299	21:45			83	414	46	245	659
10:00			135		144			22:00			63		46		
10:15			117		174			22:15			47		38		
10:30			129		197			22:30			50		28		
10:45			156	537	162	677	1214	22:45			36	196	20	132	328
11:00			130		160			23:00			31		18		
11:15			134		169			23:15			21		16		
11:30			143		147			23:30			24		19		
11:45			129	536	181	657	1193	23:45			23	99	18	71	170
Total Vol.				4101		5032	9133					7585		6200	13785

	Daily Totals NB	SB	EB	WB	Combined
			11686	11232	22918

	AM			PM		
Split %	44.9%	55.1%	39.9%	55.0%	45.0%	60.1%
Peak Hour	06:30	07:45	07:45	17:15	15:00	17:15
Volume	916	1249	1890	1414	963	2046
P.H.F.	0.82	0.89	0.95	0.88	0.87	0.92

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-014

Location: Bee Canyon Access Rd N/o Portola Pkwy

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			0		0			12:00			31		37		
00:15			0		0			12:15			33		31		
00:30			0		0			12:30			30		20		
00:45			0	0	0	0		12:45			38	132	25	113	245
01:00			0		0			13:00			34		48		
01:15			0		0			13:15			40		41		
01:30			0		0			13:30			28		27		
01:45			0	0	0	0		13:45			25	127	26	142	269
02:00			0		0			14:00			28		23		
02:15			0		0			14:15			29		29		
02:30			0		0			14:30			29		35		
02:45			0	0	0	0		14:45			30	116	19	106	222
03:00			0		0			15:00			28		27		
03:15			0		0			15:15			36		45		
03:30			0		0			15:30			32		31		
03:45			0	0	0	0		15:45			32	128	33	136	264
04:00			1		0			16:00			20		29		
04:15			1		0			16:15			14		25		
04:30			0		0			16:30			18		32		
04:45			3	5	0	0	5	16:45			5	57	8	94	151
05:00			2		0			17:00			7		14		
05:15			3		0			17:15			3		5		
05:30			6		1			17:30			10		20		
05:45			8	19	1	2	21	17:45			2	22	3	42	64
06:00			10		0			18:00			2		1		
06:15			12		0			18:15			0		0		
06:30			12		0			18:30			0		1		
06:45			21	55	0	0	55	18:45			2	4	3	5	9
07:00			22		1			19:00			0		0		
07:15			40		32			19:15			0		0		
07:30			48		49			19:30			1		2		
07:45			44	154	40	122	276	19:45			0	1	0	2	3
08:00			36		56			20:00			1		1		
08:15			30		34			20:15			1		1		
08:30			22		24			20:30			0		0		
08:45			28	116	14	128	244	20:45			0	2	0	2	4
09:00			37		25			21:00			0		0		
09:15			34		31			21:15			0		0		
09:30			48		45			21:30			0		0		
09:45			38	157	37	138	295	21:45			0	0	0	0	
10:00			29		31			22:00			0		0		
10:15			42		48			22:15			0		0		
10:30			32		23			22:30			0		0		
10:45			26	129	26	128	257	22:45			0	0	0	0	
11:00			24		22			23:00			0		0		
11:15			39		40			23:15			0		0		
11:30			24		24			23:30			0		0		
11:45			32	119	33	119	238	23:45			0	0	0	0	
Total Vol.				754		637	1391					589		642	1231

	AM			PM		
				Daily Totals		
	NB	SB	EB	WB	Combined	
			1343	1279	2622	
Split %	54.2%	45.8%	53.1%	47.8%	52.2%	46.9%
Peak Hour	07:15	07:30	07:15	12:30	13:00	12:45
Volume	168	179	345	142	142	281
P.H.F.	0.88	0.80	0.89	0.89	0.74	0.86

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-015

Location: Sand Canyon Ave S/o Portola Pkwy

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			9		1			12:00			62		51		
00:15			15		2			12:15			61		44		
00:30			2		4			12:30			75		53		
00:45			1	27	0	7	34	12:45			55	253	50	198	451
01:00			1		3			13:00			45		68		
01:15			7		5			13:15			49		51		
01:30			2		0			13:30			54		45		
01:45			4	14	4	12	26	13:45			36	184	42	206	390
02:00			7		0			14:00			62		46		
02:15			10		0			14:15			70		51		
02:30			3		5			14:30			65		56		
02:45			1	21	4	9	30	14:45			63	260	46	199	459
03:00			0		5			15:00			63		38		
03:15			3		2			15:15			87		57		
03:30			1		0			15:30			100		51		
03:45			2	6	2	9	15	15:45			91	341	34	180	521
04:00			0		1			16:00			116		40		
04:15			3		0			16:15			103		31		
04:30			0		4			16:30			130		20		
04:45			6	9	5	10	19	16:45			126	475	21	112	587
05:00			2		12			17:00			168		26		
05:15			11		15			17:15			189		17		
05:30			34		34			17:30			177		27		
05:45			38	85	40	101	186	17:45			144	678	19	89	767
06:00			31		47			18:00			140		15		
06:15			31		68			18:15			101		30		
06:30			29		70			18:30			82		20		
06:45			32	123	112	297	420	18:45			68	391	28	93	484
07:00			37		123			19:00			47		20		
07:15			33		134			19:15			48		13		
07:30			36		179			19:30			31		27		
07:45			26	132	146	582	714	19:45			16	142	24	84	226
08:00			29		134			20:00			16		12		
08:15			24		119			20:15			7		11		
08:30			31		112			20:30			18		10		
08:45			38	122	115	480	602	20:45			20	61	6	39	100
09:00			45		88			21:00			25		6		
09:15			30		80			21:15			15		16		
09:30			39		80			21:30			28		19		
09:45			35	149	62	310	459	21:45			19	87	12	53	140
10:00			22		62			22:00			20		16		
10:15			24		60			22:15			13		12		
10:30			29		43			22:30			10		13		
10:45			26	101	44	209	310	22:45			12	55	2	43	98
11:00			32		48			23:00			15		2		
11:15			39		49			23:15			18		7		
11:30			53		48			23:30			6		9		
11:45			48	172	41	186	358	23:45			2	41	16	34	75
TotalVol.				961		2212	3173					2968		1330	4298

	AM			PM		
				Daily Totals		
	NB	SB	EB	WB	Combined	
			3929	3542	7471	
Split %	30.3%	69.7%	42.5%	69.1%	30.9%	57.5%
Peak Hour	11:45	07:15	07:15	17:00	12:30	17:00
Volume	246	593	717	678	222	767
P.H.F.	0.82	0.83	0.83	0.90	0.82	0.93

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-016

Location: Sand Canyon Ave S/o Irvine Blvd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			3		2			12:00			50		61		
00:15			4		1			12:15			66		54		
00:30			4		5			12:30			65		81		
00:45			1	12	0	8	20	12:45			61	242	75	271	513
01:00			0		6			13:00			47		69		
01:15			2		5			13:15			52		73		
01:30			6		1			13:30			57		52		
01:45			1	9	6	18	27	13:45			52	208	48	242	450
02:00			6		1			14:00			47		70		
02:15			1		0			14:15			63		63		
02:30			4		8			14:30			50		89		
02:45			3	14	6	15	29	14:45			54	214	70	292	506
03:00			0		7			15:00			76		45		
03:15			3		3			15:15			62		59		
03:30			0		2			15:30			83		73		
03:45			7	10	3	15	25	15:45			90	311	61	238	549
04:00			1		2			16:00			94		62		
04:15			4		6			16:15			59		51		
04:30			5		2			16:30			73		63		
04:45			12	22	7	17	39	16:45			87	313	47	223	536
05:00			10		14			17:00			92		48		
05:15			17		20			17:15			112		52		
05:30			42		32			17:30			105		55		
05:45			40	109	38	104	213	17:45			120	429	38	193	622
06:00			51		59			18:00			93		45		
06:15			56		91			18:15			83		59		
06:30			92		97			18:30			80		68		
06:45			51	250	121	368	618	18:45			70	326	57	229	555
07:00			53		135			19:00			49		38		
07:15			55		165			19:15			32		26		
07:30			61		229			19:30			23		35		
07:45			60	229	199	728	957	19:45			29	133	26	125	258
08:00			36		172			20:00			16		16		
08:15			53		145			20:15			7		21		
08:30			42		163			20:30			15		11		
08:45			38	169	150	630	799	20:45			28	66	10	58	124
09:00			68		84			21:00			22		15		
09:15			51		92			21:15			27		18		
09:30			47		103			21:30			25		16		
09:45			43	209	82	361	570	21:45			24	98	14	63	161
10:00			53		61			22:00			16		9		
10:15			40		72			22:15			9		12		
10:30			40		58			22:30			13		24		
10:45			36	169	57	248	417	22:45			8	46	4	49	95
11:00			49		63			23:00			9		4		
11:15			46		52			23:15			8		11		
11:30			66		63			23:30			7		6		
11:45			52	213	65	243	456	23:45			2	26	20	41	67
Total Vol.				1415		2755	4170					2412		2024	4436

	NB	SB	Daily Totals EB	WB	Combined
			3827	4779	8606

	AM			PM		
Split %	33.9%	66.1%	48.5%	54.4%	45.6%	51.5%
Peak Hour	06:15	07:15	07:15	17:15	12:30	17:00
Volume	252	765	977	430	298	622
P.H.F.	0.68	0.84	0.84	0.90	0.92	0.95

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-017

Location: Sand Canyon Ave S/o Trabuco Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			6		10			12:00			104		117		
00:15			9		1			12:15			99		74		
00:30			3		6			12:30			105		122		
00:45			2	20	0	17	37	12:45			110	418	144	457	875
01:00			2		4			13:00			88		107		
01:15			6		2			13:15			76		83		
01:30			5		5			13:30			78		70		
01:45			6	19	1	12	31	13:45			85	327	81	341	668
02:00			6		5			14:00			87		91		
02:15			9		1			14:15			90		112		
02:30			4		7			14:30			90		124		
02:45			4	23	2	15	38	14:45			106	373	91	418	791
03:00			0		12			15:00			106		107		
03:15			5		4			15:15			122		154		
03:30			0		0			15:30			175		132		
03:45			6	11	5	21	32	15:45			164	567	156	549	1116
04:00			0		3			16:00			190		101		
04:15			5		8			16:15			110		89		
04:30			5		2			16:30			142		79		
04:45			14	24	8	21	45	16:45			157	599	62	331	930
05:00			11		11			17:00			170		72		
05:15			25		14			17:15			200		66		
05:30			52		33			17:30			218		76		
05:45			55	143	40	98	241	17:45			176	764	69	283	1047
06:00			80		44			18:00			174		75		
06:15			94		82			18:15			152		88		
06:30			118		83			18:30			157		119		
06:45			123	415	112	321	736	18:45			159	642	119	401	1043
07:00			114		127			19:00			72		57		
07:15			90		145			19:15			58		47		
07:30			96		204			19:30			43		38		
07:45			80	380	216	692	1072	19:45			25	198	45	187	385
08:00			82		189			20:00			21		61		
08:15			98		163			20:15			10		39		
08:30			99		158			20:30			19		34		
08:45			114	393	170	680	1073	20:45			30	80	10	144	224
09:00			103		115			21:00			24		67		
09:15			71		114			21:15			22		79		
09:30			93		92			21:30			19		107		
09:45			107	374	99	420	794	21:45			12	77	97	350	427
10:00			87		66			22:00			24		20		
10:15			89		78			22:15			16		20		
10:30			67		66			22:30			15		18		
10:45			62	305	71	281	586	22:45			16	71	11	69	140
11:00			78		101			23:00			14		4		
11:15			82		101			23:15			11		7		
11:30			86		92			23:30			6		13		
11:45			91	337	97	391	728	23:45			2	33	16	40	73
TotalVol.				2444		2969	5413					4149		3570	7719

Daily Totals	NB	SB	EB	WB	Combined
			6593	6539	13132

	AM			PM		
Split %	45.2%	54.8%	41.2%	53.8%	46.2%	58.8%
Peak Hour	06:15	07:30	07:30	17:15	15:00	15:15
Volume	449	772	1128	768	549	1194
P.H.F.	0.91	0.89	0.94	0.88	0.88	0.93

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-018

Location: Sand Canyon Ave N/o Laguna Canyon Rd

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			33		14			12:00			251		157		
00:15			20		26			12:15			263		194		
00:30			12		13			12:30			226		213		
00:45			8	73	13	66	139	12:45			234	974	224	788	1762
01:00			16		8			13:00			217		222		
01:15			6		8			13:15			190		227		
01:30			7		11			13:30			200		200		
01:45			10	39	4	31	70	13:45			204	811	180	829	1640
02:00			7		3			14:00			225		179		
02:15			6		3			14:15			172		189		
02:30			6		5			14:30			262		153		
02:45			2	21	6	17	38	14:45			206	865	164	685	1550
03:00			9		3			15:00			230		127		
03:15			5		1			15:15			241		130		
03:30			4		5			15:30			328		112		
03:45			2	20	17	26	46	15:45			243	1042	164	533	1575
04:00			8		12			16:00			297		150		
04:15			4		22			16:15			261		165		
04:30			10		22			16:30			303		126		
04:45			10	32	71	127	159	16:45			291	1152	140	581	1733
05:00			10		45			17:00			362		144		
05:15			14		46			17:15			393		154		
05:30			19		65			17:30			350		124		
05:45			21	64	95	251	315	17:45			310	1415	124	546	1961
06:00			55		164			18:00			280		106		
06:15			95		196			18:15			220		111		
06:30			69		179			18:30			230		121		
06:45			75	294	252	791	1085	18:45			275	1005	134	472	1477
07:00			110		256			19:00			187		104		
07:15			126		261			19:15			191		101		
07:30			117		328			19:30			119		62		
07:45			92	445	404	1249	1694	19:45			89	586	60	327	913
08:00			111		341			20:00			94		49		
08:15			119		316			20:15			90		59		
08:30			147		261			20:30			72		39		
08:45			165	542	320	1238	1780	20:45			120	376	40	187	563
09:00			130		281			21:00			122		53		
09:15			135		221			21:15			82		64		
09:30			149		218			21:30			86		68		
09:45			152	566	170	890	1456	21:45			62	352	61	246	598
10:00			153		125			22:00			61		36		
10:15			130		128			22:15			65		52		
10:30			136		126			22:30			42		34		
10:45			154	573	131	510	1083	22:45			41	209	35	157	366
11:00			169		160			23:00			47		12		
11:15			200		151			23:15			25		12		
11:30			230		171			23:30			20		10		
11:45			281	880	181	663	1543	23:45			14	106	18	52	158
Total Vol.				3549		5859	9408					8893		5403	14296

			Daily Totals EB	WB	Combined
	NB	SB	12442	11262	23704

	AM			PM		
Split %	37.7%	62.3%	39.7%	62.2%	37.8%	60.3%
Peak Hour	11:30	07:30	07:30	17:00	12:30	17:00
Volume	1025	1389	1828	1415	886	1961
P.H.F.	0.91	0.86	0.92	0.90	0.98	0.90

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-019

Location: Sand Canyon Ave N/o Irvine Center Dr

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			33		14			12:00			251		157		
00:15			20		26			12:15			263		194		
00:30			12		13			12:30			226		213		
00:45			8	73	13	66	139	12:45			234	974	224	788	1762
01:00			16		8			13:00			217		222		
01:15			6		8			13:15			190		227		
01:30			7		11			13:30			200		200		
01:45			10	39	4	31	70	13:45			204	811	180	829	1640
02:00			7		3			14:00			225		179		
02:15			6		3			14:15			172		189		
02:30			6		5			14:30			262		153		
02:45			2	21	6	17	38	14:45			206	865	164	685	1550
03:00			9		3			15:00			230		127		
03:15			5		1			15:15			241		130		
03:30			4		5			15:30			328		112		
03:45			2	20	17	26	46	15:45			243	1042	164	533	1575
04:00			8		12			16:00			297		150		
04:15			4		22			16:15			261		165		
04:30			10		22			16:30			303		126		
04:45			10	32	71	127	159	16:45			291	1152	140	581	1733
05:00			10		45			17:00			362		144		
05:15			14		46			17:15			393		154		
05:30			19		65			17:30			350		124		
05:45			21	64	80	236	300	17:45			310	1415	124	546	1961
06:00			50		138			18:00			280		106		
06:15			86		164			18:15			220		111		
06:30			62		150			18:30			230		121		
06:45			68	266	211	663	929	18:45			275	1005	134	472	1477
07:00			99		215			19:00			187		104		
07:15			113		218			19:15			191		101		
07:30			105		274			19:30			119		62		
07:45			83	400	338	1045	1445	19:45			89	586	60	327	913
08:00			100		286			20:00			94		49		
08:15			107		264			20:15			90		59		
08:30			132		218			20:30			72		39		
08:45			148	487	268	1036	1523	20:45			120	376	40	187	563
09:00			117		235			21:00			122		53		
09:15			122		185			21:15			82		64		
09:30			134		183			21:30			86		68		
09:45			137	510	143	746	1256	21:45			62	352	61	246	598
10:00			138		104			22:00			61		36		
10:15			117		107			22:15			65		52		
10:30			122		106			22:30			42		34		
10:45			139	516	109	426	942	22:45			41	209	35	157	366
11:00			169		115			23:00			47		12		
11:15			200		151			23:15			25		12		
11:30			218		145			23:30			20		10		
11:45			281	868	181	592	1460	23:45			14	106	18	52	158
Total Vol.				3296		5011	8307					8893		5403	14296

	Daily Totals NB	SB	EB	WB	Combined
			12189	10414	22603

	AM			PM		
Split %	39.7%	60.3%	36.8%	62.2%	37.8%	63.2%
Peak Hour	11:45	07:30	11:45	17:00	12:30	17:00
Volume	1021	1162	1766	1415	886	1961
P.H.F.	0.91	0.86	0.96	0.90	0.98	0.90

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-020

Location: Sand Canyon Ave N/o Barranca Pkwy

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			12		17			12:00			192		173		
00:15			12		19			12:15			222		166		
00:30			5		14			12:30			203		174		
00:45			1	30	15	65	95	12:45			214	831	169	682	1513
01:00			6		8			13:00			201		171		
01:15			4		12			13:15			182		161		
01:30			3		9			13:30			196		152		
01:45			7	20	6	35	55	13:45			198	777	157	641	1418
02:00			1		4			14:00			168		149		
02:15			5		1			14:15			148		185		
02:30			3		5			14:30			175		209		
02:45			4	13	2	12	25	14:45			155	646	187	730	1376
03:00			2		5			15:00			208		163		
03:15			2		0			15:15			233		161		
03:30			2		3			15:30			254		166		
03:45			8	14	3	11	25	15:45			192	887	164	654	1541
04:00			7		2			16:00			193		199		
04:15			4		10			16:15			166		202		
04:30			8		5			16:30			207		168		
04:45			20	39	16	33	72	16:45			163	729	189	758	1487
05:00			16		12			17:00			176		275		
05:15			23		24			17:15			209		212		
05:30			36		37			17:30			180		203		
05:45			56	131	46	119	250	17:45			146	711	184	874	1585
06:00			54		62			18:00			129		158		
06:15			79		110			18:15			130		192		
06:30			70		107			18:30			157		184		
06:45			106	309	112	391	700	18:45			113	529	156	690	1219
07:00			127		142			19:00			99		129		
07:15			154		152			19:15			93		106		
07:30			133		189			19:30			76		115		
07:45			136	550	234	717	1267	19:45			47	315	79	429	744
08:00			141		190			20:00			48		67		
08:15			189		208			20:15			37		77		
08:30			194		158			20:30			54		62		
08:45			175	699	211	767	1466	20:45			48	187	55	261	448
09:00			203		147			21:00			49		64		
09:15			163		154			21:15			35		72		
09:30			125		141			21:30			37		57		
09:45			116	607	157	599	1206	21:45			40	161	60	253	414
10:00			141		144			22:00			32		40		
10:15			119		133			22:15			33		36		
10:30			113		142			22:30			23		31		
10:45			127	500	141	560	1060	22:45			25	113	23	130	243
11:00			145		175			23:00			21		29		
11:15			159		168			23:15			19		15		
11:30			178		176			23:30			17		13		
11:45			184	666	172	691	1357	23:45			9	66	18	75	141
Total Vol.				3578		4000	7578					5952		6177	12129

Daily Totals	NB	SB	EB	WB	Combined
			9530	10177	19707

	AM			PM		
Split %	47.2%	52.8%	38.5%	49.1%	50.9%	61.5%
Peak Hour	11:45	07:30	11:45	15:00	16:45	16:45
Volume	801	821	1486	887	879	1607
P.H.F.	0.90	0.88	0.96	0.87	0.80	0.89

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-021

Location: Sand Canyon Ave N/o Alton Pkwy

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			3		11			12:00			156		154		
00:15			10		13			12:15			147		170		
00:30			5		11			12:30			137		120		
00:45			2	20	19	54	74	12:45			174	614	140	584	1198
01:00			8		7			13:00			178		165		
01:15			4		9			13:15			183		130		
01:30			4		10			13:30			134		123		
01:45			6	22	4	30	52	13:45			180	675	106	524	1199
02:00			0		4			14:00			145		155		
02:15			5		3			14:15			138		144		
02:30			5		2			14:30			155		177		
02:45			7	17	2	11	28	14:45			144	582	153	629	1211
03:00			2		6			15:00			202		166		
03:15			2		1			15:15			177		120		
03:30			5		1			15:30			202		145		
03:45			12	21	1	9	30	15:45			150	731	134	565	1296
04:00			7		3			16:00			125		166		
04:15			9		6			16:15			122		143		
04:30			10		3			16:30			114		156		
04:45			24	50	16	28	78	16:45			119	480	156	621	1101
05:00			28		10			17:00			150		245		
05:15			42		26			17:15			117		184		
05:30			43		32			17:30			130		200		
05:45			63	176	37	105	281	17:45			136	533	163	792	1325
06:00			72		54			18:00			84		171		
06:15			83		68			18:15			111		161		
06:30			115		105			18:30			120		152		
06:45			128	398	111	338	736	18:45			88	403	132	616	1019
07:00			120		98			19:00			69		107		
07:15			103		118			19:15			72		87		
07:30			166		162			19:30			58		97		
07:45			167	556	186	564	1120	19:45			47	246	66	357	603
08:00			173		187			20:00			42		66		
08:15			180		188			20:15			37		81		
08:30			189		117			20:30			51		82		
08:45			186	728	139	631	1359	20:45			53	183	64	293	476
09:00			195		163			21:00			34		71		
09:15			154		123			21:15			29		71		
09:30			100		96			21:30			38		56		
09:45			112	561	102	484	1045	21:45			29	130	56	254	384
10:00			109		129			22:00			18		27		
10:15			113		117			22:15			28		25		
10:30			120		133			22:30			17		23		
10:45			115	457	138	517	974	22:45			14	77	9	84	161
11:00			111		107			23:00			7		20		
11:15			147		154			23:15			9		9		
11:30			147		164			23:30			5		7		
11:45			189	594	164	589	1183	23:45			13	34	9	45	79
Total Vol.				3600		3360	6960					4688		5364	10052

Daily Totals	NB	SB	EB	WB	Combined
			8288	8724	17012

	AM			PM		
Split %	51.7%	48.3%	40.9%	46.6%	53.4%	59.1%
Peak Hour	08:15	07:30	07:30	15:00	17:00	17:00
Volume	750	723	1409	731	792	1325
P.H.F.	0.96	0.96	0.96	0.90	0.81	0.84

Volumes for: Wednesday, September 14, 2005 City: Irvine Project #: 05-1182-022

Location: Sand Canyon Ave S/o Alton Pkwy

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			21		35			12:00			193		306		
00:15			19		37			12:15			234		306		
00:30			9		29			12:30			269		247		
00:45			8	57	35	136	193	12:45			322	1018	279	1138	2156
01:00			9		21			13:00			279		276		
01:15			5		25			13:15			270		202		
01:30			4		19			13:30			259		248		
01:45			10	28	9	74	102	13:45			311	1119	260	986	2105
02:00			6		11			14:00			239		293		
02:15			8		2			14:15			239		310		
02:30			6		15			14:30			237		377		
02:45			4	24	6	34	58	14:45			240	955	350	1330	2285
03:00			3		8			15:00			295		359		
03:15			2		7			15:15			261		287		
03:30			6		8			15:30			249		363		
03:45			14	25	6	29	54	15:45			221	1026	352	1361	2387
04:00			11		10			16:00			188		387		
04:15			15		7			16:15			187		374		
04:30			32		6			16:30			182		413		
04:45			69	127	25	48	175	16:45			180	737	379	1553	2290
05:00			42		18			17:00			174		482		
05:15			68		26			17:15			198		440		
05:30			87		37			17:30			234		444		
05:45			168	365	40	121	486	17:45			240	846	400	1766	2612
06:00			169		50			18:00			150		407		
06:15			213		67			18:15			169		389		
06:30			230		104			18:30			212		309		
06:45			262	874	156	377	1251	18:45			185	716	313	1418	2134
07:00			279		188			19:00			162		335		
07:15			281		239			19:15			126		219		
07:30			317		318			19:30			115		193		
07:45			352	1229	288	1033	2262	19:45			96	499	188	935	1434
08:00			398		354			20:00			78		175		
08:15			398		432			20:15			70		181		
08:30			406		328			20:30			81		139		
08:45			392	1594	363	1477	3071	20:45			83	312	137	632	944
09:00			386		319			21:00			61		148		
09:15			324		225			21:15			61		129		
09:30			254		164			21:30			68		106		
09:45			259	1223	216	924	2147	21:45			57	247	129	512	759
10:00			235		207			22:00			50		97		
10:15			206		185			22:15			54		89		
10:30			193		210			22:30			36		68		
10:45			222	856	220	822	1678	22:45			33	173	48	302	475
11:00			184		262			23:00			27		77		
11:15			201		268			23:15			15		52		
11:30			216		291			23:30			15		28		
11:45			244	845	248	1069	1914	23:45			23	80	28	185	265
Total Vol.				7247		6144	13391					7728		12118	19846

			Daily Totals EB	WB	Combined
	NB	SB	14975	18262	33237

	AM			PM		
Split %	54.1%	45.9%	40.3%	38.9%	61.1%	59.7%
Peak Hour	08:00	08:00	08:00	12:30	17:00	17:00
Volume	1594	1477	3071	1140	1766	2612
P.H.F.	0.98	0.85	0.93	0.89	0.92	0.96

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Culver Dr. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Portola Pkwy. DAY: WEDNESDAY PROJECT# 05-1181-001

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	0	1	0	1	0	1	3	1	2	3	1	
6:00 AM	3	1	5	0	0	0	0	69	12	5	8	0	103
6:15 AM	7	1	7	0	0	0	0	96	10	2	16	0	139
6:30 AM	12	2	22	0	0	0	1	104	20	14	26	1	202
6:45 AM	23	2	37	1	0	0	0	150	33	35	47	0	328
7:00 AM	25	1	17	0	0	0	0	120	37	28	59	2	289
7:15 AM	25	1	26	0	0	0	0	140	81	35	108	0	416
7:30 AM	41	0	24	0	0	0	0	189	62	32	92	2	442
7:45 AM	47	0	21	1	0	0	2	186	53	49	90	1	450
8:00 AM	27	1	30	0	0	0	0	156	62	33	106	0	415
8:15 AM	50	1	54	0	0	0	1	158	74	62	91	0	491
8:30 AM	32	0	174	0	0	2	0	172	82	124	98	0	684
8:45 AM	24	0	52	0	0	0	1	140	73	124	88	1	503
9:00 AM	23	0	16	0	0	0	0	90	30	31	48	0	238
9:15 AM	22	0	11	0	0	0	2	50	24	14	34	0	157
9:30 AM	26	0	14	0	0	0	0	47	26	12	32	1	158
9:45 AM	18	0	14	0	1	1	1	32	24	11	29	1	132
10:00 AM	13	0	17	0	0	0	0	31	15	10	13	0	99
10:15 AM	15	0	30	0	0	0	0	20	11	20	33	0	129
10:30 AM	16	0	10	0	0	0	0	22	15	16	20	0	99
10:45 AM	18	0	5	0	0	0	2	26	15	8	20	1	95
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	467	10	586	2	1	3	10	1998	759	665	1058	10	5569

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	133	2	310	0	0	2	2	626	291	343	383	1	2093
PEAK HR. FACTOR:		0.540			0.250			0.905			0.819		0.765

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Yale Ave DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Portola Pkwy. DAY: WEDNESDAY PROJECT# 05-1181-002

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	1	0	1	3	0	1	3	0	
6:00 AM	1	0	2	0	0	0	1	19	0	0	6	0	29
6:15 AM	4	0	3	0	0	0	2	97	0	1	10	2	119
6:30 AM	2	5	3	1	1	7	12	84	2	0	25	9	151
6:45 AM	5	60	3	15	25	24	31	152	6	4	33	37	395
7:00 AM	5	28	9	19	33	29	33	121	5	7	63	26	378
7:15 AM	3	4	16	1	2	4	13	143	6	14	96	13	315
7:30 AM	6	18	14	7	1	10	26	140	8	13	125	19	387
7:45 AM	2	12	15	6	18	14	20	198	7	14	108	23	437
8:00 AM	7	10	21	6	1	7	8	160	21	19	129	9	398
8:15 AM	22	27	24	12	8	14	24	152	11	8	124	18	444
8:30 AM	16	169	10	30	58	68	103	137	37	17	89	61	795
8:45 AM	34	178	16	51	84	98	101	154	32	9	109	128	994
9:00 AM	16	18	18	52	59	56	14	91	19	11	45	10	409
9:15 AM	9	4	19	4	1	4	4	74	13	3	40	3	178
9:30 AM	8	8	19	3	3	2	8	41	8	11	34	2	147
9:45 AM	5	4	8	3	3	9	8	49	4	7	31	8	139
10:00 AM	4	10	5	4	2	6	12	26	4	2	20	8	103
10:15 AM	2	39	8	6	10	16	20	38	10	5	24	13	191
10:30 AM	8	40	8	5	22	17	16	19	4	2	23	6	170
10:45 AM	2	0	3	4	3	2	7	23	7	5	22	1	79
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 161	NT 634	NR 224	SL 229	ST 334	SR 387	EL 463	ET 1918	ER 204	WL 152	WT 1156	WR 396	TOTAL 6258

AM Peak Hr Begins at: 815 AM

PEAK VOLUMES =	88	392	68	145	209	236	242	534	99	45	367	217	2642
PEAK HR. FACTOR:		0.601			0.633			0.762			0.639		0.664

CONTROL: Signalized;

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Jeffrey Rd. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Portola Pkwy. DAY: WEDNESDAY PROJECT# 05-1181-003

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	1	1	0	1	0	1	3	0	1	3	0	
6:00 AM	2	10	1	0	2	1	9	24	6	2	4	0	61
6:15 AM	4	13	9	4	0	2	29	57	11	6	14	2	151
6:30 AM	9	11	6	3	4	2	14	73	23	7	26	2	180
6:45 AM	41	10	4	5	9	6	16	113	38	14	43	0	299
7:00 AM	24	8	11	10	6	5	5	99	33	25	77	2	305
7:15 AM	26	4	4	8	5	5	2	106	41	49	123	1	374
7:30 AM	31	3	7	4	2	2	2	142	51	44	118	0	406
7:45 AM	30	2	7	0	4	4	7	140	58	59	111	1	423
8:00 AM	30	2	11	0	3	0	5	122	51	43	124	2	393
8:15 AM	46	4	2	2	4	1	1	124	68	43	102	3	400
8:30 AM	97	10	1	0	1	0	3	111	73	37	91	1	425
8:45 AM	81	7	2	1	4	1	6	117	101	14	46	2	382
9:00 AM	39	9	2	2	2	1	1	71	77	15	33	1	253
9:15 AM	13	4	4	0	3	3	2	37	34	9	29	0	138
9:30 AM	19	1	5	2	3	1	1	44	16	5	22	3	122
9:45 AM	11	4	7	3	3	2	5	33	11	10	20	1	110
10:00 AM	18	6	4	1	3	0	1	30	10	2	9	2	86
10:15 AM	19	0	4	1	3	1	1	30	18	6	22	1	106
10:30 AM	7	0	4	0	4	4	4	17	11	5	14	0	70
10:45 AM	5	3	1	1	2	2	0	16	18	8	19	1	76
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 552	NT 111	NR 96	SL 47	ST 67	SR 43	EL 114	ET 1506	ER 749	WL 403	WT 1047	WR 25	TOTAL 4760

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES =	203	18	21	2	12	5	16	497	250	182	428	7	1641
PEAK HR. FACTOR:		0.560			0.594			0.930			0.902		0.965

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Bee Cyn. Acess Rd DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Portola Pkwy. DAY: WEDNESDAY PROJECT# 05-1181-004

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	0	0	1.5	0	0.5	1	2	0	0	2	1	
6:00 AM				0		0	1	17		0	8	2	28
6:15 AM				0		0	6	54		0	19	9	88
6:30 AM				0		0	9	66		0	33	3	111
6:45 AM				0		0	9	103		0	50	4	166
7:00 AM				0		0	15	112		0	77	5	209
7:15 AM				2		2	11	114		0	132	1	262
7:30 AM				0		0	1	107		0	189	0	297
7:45 AM				1		1	1	162		0	152	1	318
8:00 AM				1		0	2	132		0	148	1	284
8:15 AM				0		1	0	136		0	167	2	306
8:30 AM				1		1	3	115		0	114	2	236
8:45 AM				0		0	1	121		1	81	0	204
9:00 AM				2		0	1	92		1	51	1	148
9:15 AM				0		0	0	53		0	37	2	92
9:30 AM				0		0	1	44		0	31	3	79
9:45 AM				1		4	1	45		0	30	1	82
10:00 AM				0		3	0	28		0	19	2	52
10:15 AM				0		0	0	44		0	20	0	64
10:30 AM				1		0	0	20		0	19	2	42
10:45 AM				0		0	0	22		0	27	0	49
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 0	NT 0	NR 0	SL 9	ST 0	SR 12	EL 62	ET 1587	ER 0	WL 2	WT 1404	WR 41	TOTAL 3117

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES =	0	0	0	2	0	2	4	537	0	0	656	4	1205
PEAK HR. FACTOR:		0.000			0.500			0.830			0.873		0.947

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Portola Pkwy. DAY: WEDNESDAY PROJECT# 05-1181-005

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	0	1	0	0	0	0	2	1	2	2	0	
6:00 AM	9		35					11	24	20	12		111
6:15 AM	12		31					23	34	20	20		140
6:30 AM	7		27					16	45	28	30		153
6:45 AM	21		20					23	74	38	46		222
7:00 AM	15		30					32	66	41	96		280
7:15 AM	15		17					31	74	50	158		345
7:30 AM	18		20					39	96	71	160		404
7:45 AM	11		17					42	77	66	119		332
8:00 AM	13		12					45	89	63	180		402
8:15 AM	15		13					37	72	50	130		317
8:30 AM	13		10					29	67	49	99		267
8:45 AM	11		12					32	78	35	50		218
9:00 AM	22		26					11	66	20	35		180
9:15 AM	10		8					11	29	15	31		104
9:30 AM	13		14					25	32	21	19		124
9:45 AM	7		4					22	18	20	13		84
10:00 AM	5		9					14	21	10	17		76
10:15 AM	13		10					16	22	5	12		78
10:30 AM	5		9					12	11	16	21		74
10:45 AM	6		7					10	10	5	17		55
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 241	NT 0	NR 331	SL 0	ST 0	SR 0	EL 0	ET 481	ER 1005	WL 643	WT 1265	WR 0	TOTAL 3966

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =	57	0	66	0	0	0	0	157	336	250	617	0	1483
PEAK HR. FACTOR:		0.809			0.000			0.913			0.892		0.918

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Culver Dr. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Irvine Blvd. DAY: WEDNESDAY PROJECT# 05-1181-006

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	3	1	2	3	0	2	3	0	2	3	0	
6:00 AM	8	9	15	8	32	10	3	42	15	35	28	2	207
6:15 AM	10	12	21	10	55	14	4	75	19	40	36	3	299
6:30 AM	16	16	39	12	97	13	2	101	24	41	63	4	428
6:45 AM	23	35	25	15	113	22	6	137	42	38	85	1	542
7:00 AM	27	30	27	19	107	30	7	130	38	44	109	8	576
7:15 AM	33	46	20	19	176	42	7	110	42	74	153	7	729
7:30 AM	34	45	25	11	219	43	7	126	62	110	211	4	897
7:45 AM	41	76	27	26	234	50	11	176	88	54	202	8	993
8:00 AM	48	61	42	27	194	46	16	125	87	109	260	6	1021
8:15 AM	59	61	26	19	259	52	11	142	80	83	217	12	1021
8:30 AM	29	52	29	32	225	44	19	122	97	90	178	6	923
8:45 AM	46	69	33	20	239	48	18	100	70	91	170	6	910
9:00 AM	48	69	35	22	173	34	10	86	63	77	124	9	750
9:15 AM	42	68	24	32	162	28	14	80	49	60	83	4	646
9:30 AM	35	62	22	25	119	27	14	79	51	69	110	8	621
9:45 AM	48	62	31	13	133	32	9	76	44	43	103	7	601
10:00 AM	37	57	25	17	90	16	14	43	24	45	80	3	451
10:15 AM	44	83	19	16	156	23	6	46	28	42	83	11	557
10:30 AM	32	74	25	12	89	18	16	61	39	47	92	4	509
10:45 AM	55	65	30	16	142	25	16	65	32	25	78	2	551
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 715	NT 1052	NR 540	SL 371	ST 3014	SR 617	EL 210	ET 1922	ER 994	WL 1217	WT 2465	WR 115	TOTAL 13232

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES =	177	250	124	104	912	192	57	565	352	336	857	32	3958
PEAK HR. FACTOR:		0.912			0.915			0.885			0.817		0.969

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Yale Ave DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Irvine Blvd. DAY: WEDNESDAY PROJECT# 05-1181-007

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	0	1	3	0	1	3	0	
6:00 AM	8	5	5	8	6	15	2	84	2	3	23	2	163
6:15 AM	8	2	6	14	6	25	4	118	2	2	36	3	226
6:30 AM	12	1	2	18	7	29	3	139	2	3	47	3	266
6:45 AM	17	12	8	25	14	34	10	164	3	3	70	1	361
7:00 AM	13	16	7	36	21	57	12	122	6	1	104	10	405
7:15 AM	16	15	7	51	27	73	18	134	9	9	124	11	494
7:30 AM	20	11	10	60	25	72	8	114	10	7	158	9	504
7:45 AM	21	20	21	72	29	61	24	215	9	11	218	8	709
8:00 AM	28	17	10	74	38	72	13	142	12	14	199	15	634
8:15 AM	29	20	18	49	23	65	28	162	6	9	221	15	645
8:30 AM	21	25	14	58	24	55	21	136	12	13	170	16	565
8:45 AM	21	22	12	74	31	79	22	118	12	8	134	18	551
9:00 AM	18	32	11	35	26	43	30	101	4	16	100	13	429
9:15 AM	20	19	15	53	29	52	18	102	11	11	81	14	425
9:30 AM	21	21	12	45	30	55	26	90	13	11	76	19	419
9:45 AM	19	28	9	32	27	36	34	76	18	10	76	22	387
10:00 AM	15	36	14	41	32	33	31	74	24	9	70	16	395
10:15 AM	23	27	4	30	23	32	12	50	15	2	68	18	304
10:30 AM	19	27	11	43	38	33	16	56	11	7	76	11	348
10:45 AM	26	34	15	42	21	38	29	73	11	7	60	14	370
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 375	NT 390	NR 211	SL 860	ST 477	SR 959	EL 361	ET 2270	ER 192	WL 156	WT 2111	WR 238	TOTAL 8600

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES =	99	82	63	253	114	253	86	655	39	47	808	54	2553
PEAK HR. FACTOR:		0.910			0.842			0.786			0.928		0.900

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Jeffrey Rd. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Irvine Blvd. DAY: WEDNESDAY PROJECT# 05-1181-008

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	3	1	2	3	1	2	2	1	2	3	1	
6:00 AM	1	58	23	2	11	0	16	62	5	6	29	0	213
6:15 AM	5	42	13	6	14	2	16	65	23	7	26	[illegible]	221
6:30 AM	10	40	18	4	26	2	1	123	26	11	38	2	301
6:45 AM	14	64	24	6	59	2	9	108	36	23	69	2	416
7:00 AM	14	37	20	9	68	10	7	103	56	16	81	9	430
7:15 AM	7	48	26	4	80	13	5	136	45	32	164	3	563
7:30 AM	19	55	33	11	114	9	9	181	50	42	179	5	707
7:45 AM	20	64	39	18	116	5	11	226	108	82	232	4	925
8:00 AM	20	43	29	5	115	15	7	128	81	39	172	3	657
8:15 AM	23	77	39	2	119	7	10	129	54	59	147	4	670
8:30 AM	31	115	22	5	81	7	61	164	59	32	187	8	772
8:45 AM	65	87	33	11	129	4	9	171	55	23	168	2	757
9:00 AM	20	22	22	9	98	6	7	101	56	15	75	2	433
9:15 AM	29	27	18	5	52	4	9	84	43	9	45	[illegible]	326
9:30 AM	24	25	16	5	38	1	6	61	38	10	47	3	274
9:45 AM	26	22	16	0	21	3	4	49	42	15	45	1	244
10:00 AM	23	27	17	6	11	2	1	53	35	10	41	2	228
10:15 AM	30	26	14	7	17	4	6	39	38	16	49	2	248
10:30 AM	29	15	13	2	14	1	2	36	44	7	33	[illegible]	196
10:45 AM	19	20	9	2	21	5	3	54	30	9	34	[illegible]	208
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 429	NT 914	NR 444	SL 119	ST 1204	SR 102	EL 199	ET 2073	ER 924	WL 463	WT 1861	WR 57	TOTAL 8789

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES =	94	299	129	30	431	34	89	647	302	212	738	19	3024
PEAK HR. FACTOR:		0.777			0.890			0.752			0.762		0.817

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Irvine Blvd. DAY: WEDNESDAY PROJECT# 05-1181-009

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	2	1	2	2	1	2	3	1	2	3	1	
6:00 AM	1	32	9	4	14	0	0	41	0	7	20	0	128
6:15 AM	8	36	22	12	38	0	1	88	7	33	56	9	310
6:30 AM	21	35	45	29	61	0	0	193	13	27	70	5	499
6:45 AM	26	43	28	64	98	3	4	127	13	58	130	10	604
7:00 AM	36	39	20	62	101	1	0	132	13	59	127	6	596
7:15 AM	6	23	27	34	118	3	3	108	16	57	145	9	549
7:30 AM	6	11	19	44	120	5	0	186	21	87	170	4	673
7:45 AM	7	21	36	24	171	5	1	279	45	73	250	10	922
8:00 AM	7	19	14	29	67	3	0	162	24	57	217	5	604
8:15 AM	9	16	22	39	114	3	0	197	46	42	174	5	667
8:30 AM	11	22	21	27	56	2	0	132	17	32	95	7	422
8:45 AM	6	20	19	35	42	3	1	106	13	27	72	5	349
9:00 AM	8	15	11	43	35	2	0	78	10	34	61	10	307
9:15 AM	9	16	18	30	27	0	0	95	24	38	73	4	334
9:30 AM	12	19	13	11	45	1	1	94	16	27	84	8	331
9:45 AM	13	10	16	7	40	4	0	52	10	19	51	5	227
10:00 AM	11	10	14	9	22	0	1	79	10	22	53	3	234
10:15 AM	22	14	15	20	22	1	1	59	20	18	74	5	271
10:30 AM	8	7	11	5	27	2	3	61	7	26	37	7	201
10:45 AM	9	13	6	3	16	0	4	55	13	18	47	5	189
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 236	NT 421	NR 386	SL 531	ST 1234	SR 38	EL 20	ET 2324	ER 338	WL 761	WT 2006	WR 122	TOTAL 8417

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES =	29	67	91	136	472	16	1	824	136	259	811	24	2866
PEAK HR. FACTOR:		0.730			0.780			0.739			0.821		0.777

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: SR-133 SB Ramp: DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Irvine Blvd. DAY: WEDNESDAY PROJECT# 05-1181-010

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:				1		1		2	2	3	1		
6:00 AM				8		14		72	3	3	57		157
6:15 AM				21		28		91	3	8	75		226
6:30 AM				31		32		229	10	9	104		415
6:45 AM				36		40		190	12	8	151		437
7:00 AM				32		34		223	9	8	191		497
7:15 AM				19		38		190	11	10	187		455
7:30 AM				29		48		231	8	15	254		585
7:45 AM				42		65		267	11	18	245		648
8:00 AM				38		54		242	13	17	201		565
8:15 AM				41		61		211	12	15	191		531
8:30 AM				31		46		191	9	10	202		489
8:45 AM				25		29		170	12	5	141		382
9:00 AM				15		25		173	13	8	105		339
9:15 AM				18		26		125	7	13	76		265
9:30 AM				12		21		125	15	14	87		274
9:45 AM				16		14		86	12	5	72		205
10:00 AM				15		17		79	7	5	65		188
10:15 AM				13		9		72	7	5	61		167
10:30 AM				5		16		41	6	4	60		132
10:45 AM				5		10		58	7	11	50		141
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 0	NT 0	NR 0	SL 452	ST 0	SR 627	EL 0	ET 3066	ER 187	WL 191	WT 2575	WR 0	TOTAL 7098

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES =	0	0	0	150	0	228	0	951	44	65	891	0	2329
PEAK HR. FACTOR:		0.000			0.883			0.895			0.888		0.899

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: SR-133 NB Ramps DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Irvine Blvd. DAY: WEDNESDAY PROJECT# 05-1181-011

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1		1					3	1		3	1	
6:00 AM	5		8					82	4		68	7	174
6:15 AM	7		9					113	8		92	4	233
6:30 AM	8		10					270	9		126	9	432
6:45 AM	10		7					333	6		177	6	539
7:00 AM	11		6					262	10		225	10	524
7:15 AM	13		8					226	6		282	15	550
7:30 AM	10		10					276	8		321	22	647
7:45 AM	8		6					323	9		300	13	659
8:00 AM	10		12					295	6		246	18	587
8:15 AM	8		8					260	7		238	20	541
8:30 AM	9		10					235	8		251	15	528
8:45 AM	12		7					204	5		160	10	398
9:00 AM	19		29					198	10		144	8	408
9:15 AM	7		12					145	8		96	7	275
9:30 AM	13		12					136	9		102	11	283
9:45 AM	13		11					102	8		82	4	220
10:00 AM	3		5					92	9		77	6	192
10:15 AM	7		9					78	10		72	7	183
10:30 AM	6		6					46	8		70	12	148
10:45 AM	8		4					63	4		54	4	137
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 187	NT 0	NR 189	SL 0	ST 0	SR 0	EL 0	ET 3739	ER 152	WL 0	WT 3183	WR 208	TOTAL 7658

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =	41	0	36	0	0	0	0	1120	29	0	1149	68	2443
PEAK HR. FACTOR:		0.875			0.000			0.865			0.887		0.927

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Jeffrey Rd. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Bryan Ave. DAY: WEDNESDAY PROJECT# 05-1181-012

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	1	1	2	1	2	1	1	2	1	1		
6:00 AM	4	47	17	2	21	2	21	4	7	5	2	1	133
6:15 AM	9	47	42	8	39	2	22	9	17	11	2	[illegible]	208
6:30 AM	6	43	84	12	44	9	30	27	20	10	7	2	294
6:45 AM	11	51	75	18	60	6	33	44	36	12	2	1	349
7:00 AM	14	44	65	14	65	5	17	15	26	11	3	1	280
7:15 AM	17	48	52	10	84	6	19	13	47	20	10	2	328
7:30 AM	17	59	46	9	72	9	21	16	52	31	8	4	344
7:45 AM	19	74	28	6	64	6	23	6	61	36	7	[illegible]	331
8:00 AM	20	62	36	7	62	8	25	10	59	29	9	5	332
8:15 AM	24	36	15	10	68	6	17	4	42	21	8	1	252
8:30 AM	21	51	10	5	67	1	17	5	40	20	6	[illegible]	246
8:45 AM	17	36	16	0	93	3	7	1	45	14	1	2	235
9:00 AM	20	46	6	4	59	3	5	6	30	20	0	[illegible]	201
9:15 AM	12	29	2	3	29	3	8	2	21	22	6	[illegible]	140
9:30 AM	8	44	3	0	38	1	7	3	16	7	5	3	135
9:45 AM	15	61	12	3	59	2	9	6	25	18	5	1	216
10:00 AM	16	51	5	6	57	5	7	5	23	14	2	[illegible]	192
10:15 AM	10	38	8	0	62	1	5	2	10	11	0	[illegible]	151
10:30 AM	15	58	7	1	51	7	4	2	20	13	5	[illegible]	188
10:45 AM	8	56	9	2	50	7	9	6	21	21	10	[illegible]	206
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 283	NT 981	NR 538	SL 120	ST 1144	SR 92	EL 306	ET 186	ER 618	WL 346	WT 98	WR 49	TOTAL 4761

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =	73	243	162	32	282	29	88	45	219	116	34	12	1335
PEAK HR. FACTOR:		0.980			0.858			0.936			0.920		0.970

CONTROL: Signalized, 1

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Jeffrey Rd. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Trabuco Rd. DAY: WEDNESDAY PROJECT# 05-1181-013

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	2.5	0.5	2	2.5	0.5	1	1.5	0.5	1	2	0	
6:00 AM	4	126	18	3	74	1	10	9	4	4	2	2	257
6:15 AM	4	184	20	3	88	4	13	9	6	2	0	4	337
6:30 AM	5	190	24	5	104	0	15	16	9	3	0	3	374
6:45 AM	9	259	28	1	159	0	16	12	11	13	8	3	519
7:00 AM	16	209	11	5	171	0	16	9	18	9	4	4	472
7:15 AM	25	149	8	7	209	0	18	10	29	5	6	3	469
7:30 AM	20	130	8	6	255	3	11	10	22	6	4	5	480
7:45 AM	17	126	10	7	296	7	10	16	25	6	7	8	535
8:00 AM	16	127	11	9	277	5	7	11	25	6	2	5	501
8:15 AM	15	125	13	9	249	5	7	13	20	9	4	7	476
8:30 AM	15	132	10	10	237	7	9	16	26	10	4	2	478
8:45 AM	19	106	7	6	206	4	9	13	25	4	5	5	409
9:00 AM	21	98	7	7	182	4	11	19	28	3	11	6	397
9:15 AM	11	98	8	6	192	7	9	13	32	11	8	5	400
9:30 AM	14	97	9	5	177	4	6	14	26	7	6	5	370
9:45 AM	19	98	6	4	167	4	6	15	23	7	11	4	364
10:00 AM	24	90	2	1	148	3	11	12	19	7	11	4	332
10:15 AM	21	94	6	2	140	3	7	12	11	6	7	3	312
10:30 AM	16	88	4	2	122	2	7	6	16	4	7	5	279
10:45 AM	15	73	2	3	110	2	5	9	11	8	8	6	252
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 306	NT 2599	NR 212	SL 101	ST 3563	SR 65	EL 203	ET 244	ER 386	WL 130	WT 115	WR 89	TOTAL 8013

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES =	68	508	42	31	1077	20	35	50	92	27	17	25	1992
PEAK HR. FACTOR:		0.978			0.910			0.868			0.821		0.931

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Trabuco Rd. DAY: WEDNESDAY PROJECT# 05-1181-014

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	1	1	2	0	1	3	1	1	3	0	
6:00 AM	1	63	5	4	41	2	1	1	3	0	1	1	123
6:15 AM	9	42	5	2	55	3	4	3	8	0	0	5	136
6:30 AM	11	82	5	2	74	6	4	5	15	2	0	3	209
6:45 AM	17	68	10	2	90	1	9	2	6	2	1	1	209
7:00 AM	29	67	7	0	94	4	3	1	8	1	1	1	216
7:15 AM	7	56	13	6	142	7	11	3	14	3	1	(	263
7:30 AM	12	59	20	6	184	11	11	7	16	3	1	1	331
7:45 AM	10	44	11	6	217	12	9	6	22	10	1	3	351
8:00 AM	10	58	33	21	192	9	11	6	13	2	2	3	360
8:15 AM	12	53	51	13	199	4	4	14	14	7	1	1	373
8:30 AM	18	42	36	22	175	9	5	15	14	14	3	0	353
8:45 AM	12	67	57	24	155	9	5	17	16	13	8	1	384
9:00 AM	15	51	38	16	83	3	7	7	14	22	16	7	279
9:15 AM	14	57	25	9	76	0	3	5	8	16	12	7	232
9:30 AM	13	50	36	29	45	4	11	4	13	7	3	7	222
9:45 AM	10	41	60	23	46	1	6	18	8	11	3	6	233
10:00 AM	12	28	14	3	25	4	0	3	6	10	1	4	110
10:15 AM	6	41	15	4	35	4	0	1	13	7	2	7	135
10:30 AM	12	36	17	1	37	3	1	3	5	5	5	6	131
10:45 AM	17	49	13	5	32	3	2	1	11	7	3	1	144
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 247	NT 1054	NR 471	SL 198	ST 1997	SR 99	EL 107	ET 122	ER 227	WL 142	WT 65	WR 65	TOTAL 4794

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	52	220	177	80	721	31	25	52	57	36	14	5	1470
PEAK HR. FACTOR:		0.825			0.937			0.882			0.625		0.957

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Jeffrey Rd. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: I-5 NB Ramp DAY: WEDNESDAY PROJECT# 05-1181-015

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	3	1	0	3	1	0	0	0	1.5	0	1.5	
6:00 AM	0	88	32		36	6		0		12		4	178
6:15 AM	0	142	42		64	20		0		11		9	288
6:30 AM	0	155	49		88	33		0		21		9	355
6:45 AM	3	217	55		128	41		0		25		23	492
7:00 AM	0	249	45		156	38		0		41		21	550
7:15 AM	0	158	95		202	45		0		30		23	553
7:30 AM	0	112	87		215	51		0		77		22	564
7:45 AM	1	113	68		317	37		0		80		29	645
8:00 AM	0	125	68		306	36		0		79		27	641
8:15 AM	0	117	53		277	40		0		69		28	584
8:30 AM	0	119	55		258	40		0		58		34	564
8:45 AM	0	140	98		258	35		0		56		28	615
9:00 AM	0	96	78		254	46		0		85		36	595
9:15 AM	1	98	65		225	32		0		76		19	516
9:30 AM	0	104	76		168	20		0		41		27	436
9:45 AM	0	102	83		159	24		7		52		28	455
10:00 AM	3	124	82		140	44		0		48		27	468
10:15 AM	0	106	75		159	36		0		44		28	448
10:30 AM	0	84	53		140	24		0		42		34	377
10:45 AM	0	107	72		154	31		0		62		26	452
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	8	2556	1331	0	3704	679	0	7	0	1009	0	482	9776

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES =	1	474	244	0	1158	153	0	0	0	286	0	118	2434
PEAK HR. FACTOR:		0.931			0.926			0.000			0.927		0.943

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Jeffrey Rd. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Walnut Ave DAY: WEDNESDAY PROJECT# 05-1181-016

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	2	0	2	2	0	1	1	1	2	2	0	
6:00 AM	8	97	7	34	74	19	13	31	18	31	7	9	348
6:15 AM	7	110	9	41	110	22	19	40	17	34	10	12	431
6:30 AM	10	99	8	57	119	29	21	48	21	29	14	16	471
6:45 AM	15	113	10	61	97	31	17	39	23	42	11	10	469
7:00 AM	12	101	13	50	101	35	8	44	28	54	12	13	471
7:15 AM	14	147	15	71	127	40	15	38	34	48	15	18	582
7:30 AM	19	175	21	76	98	68	25	68	67	53	21	23	714
7:45 AM	25	112	19	81	210	45	19	71	70	66	20	21	759
8:00 AM	21	149	22	87	270	50	16	50	40	63	22	28	818
8:15 AM	21	116	20	90	225	37	15	48	31	69	19	35	726
8:30 AM	19	108	22	81	229	36	21	44	27	81	13	31	712
8:45 AM	24	123	18	62	211	40	22	60	52	77	18	36	743
9:00 AM	25	129	20	59	190	48	27	46	48	89	21	29	731
9:15 AM	28	136	17	63	171	57	29	32	50	102	15	22	722
9:30 AM	31	144	22	72	158	39	25	38	44	86	14	31	704
9:45 AM	26	134	20	67	122	24	21	30	33	61	11	37	586
10:00 AM	30	117	25	61	117	28	28	33	31	65	12	30	577
10:15 AM	36	99	22	56	106	30	35	27	27	54	9	22	523
10:30 AM	35	117	16	55	132	22	27	37	31	72	21	20	585
10:45 AM	29	122	17	49	120	19	21	31	27	67	22	24	548
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 435	NT 2448	NR 343	SL 1273	ST 2987	SR 719	EL 424	ET 855	ER 719	WL 1243	WT 307	WR 467	TOTAL 12220

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES =	86	552	82	334	803	200	75	237	208	251	82	107	3017
PEAK HR. FACTOR:		0.837			0.821			0.813			0.894		0.922

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: I-5 SB Ramps DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Walnut Ave DAY: WEDNESDAY PROJECT# 05-1181-017

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:						2	1					0	
6:00 AM						48	75						123
6:15 AM						58	82						140
6:30 AM						63	89						152
6:45 AM						69	92						161
7:00 AM						78	90						168
7:15 AM						82	108						190
7:30 AM						98	153						251
7:45 AM						110	152						262
8:00 AM						119	156						275
8:15 AM						116	160						276
8:30 AM						124	148						272
8:45 AM						130	138						268
9:00 AM						141	129						270
9:15 AM						136	115						251
9:30 AM						129	135						264
9:45 AM						108	118						226
10:00 AM						110	121						231
10:15 AM						88	108						196
10:30 AM						110	112						222
10:45 AM						115	98						213
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 0	NT 0	NR 0	SL 0	ST 0	SR 2032	EL 2379	ET 0	ER 0	WL 0	WT 0	WR 0	TOTAL 4411

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	0	0	0	0	489	602	0	0	0	0	0	1091
PEAK HR. FACTOR:		0.000			0.940			0.941			0.000		0.988

CONTROL:

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: I-5 NB Ramp DAY: WEDNESDAY PROJECT# 05-1181-018

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	2	1	1	2	1	1.5	0.5	1	1	0	1	
6:00 AM	0	101	49	10	38	0	1		12	1		5	217
6:15 AM	22	117	47	9	94	15	3		1	9		2	319
6:30 AM	31	87	32	12	97	26	11		16	10		10	332
6:45 AM	34	55	17	9	101	29	22		40	20		10	337
7:00 AM	43	53	10	8	141	21	6		12	26		7	327
7:15 AM	26	88	6	2	129	17	9		35	17		8	337
7:30 AM	53	74	8	0	144	24	15		35	22		3	378
7:45 AM	51	57	8	1	207	22	11		53	8		6	424
8:00 AM	60	47	9	7	156	6	12		49	4		5	355
8:15 AM	21	73	8	12	167	8	7		23	6		6	331
8:30 AM	68	70	10	4	129	13	21		55	3		2	375
8:45 AM	51	64	3	6	125	15	14		79	4		3	364
9:00 AM	34	45	5	0	106	12	12		61	8		7	290
9:15 AM	61	36	5	8	83	15	5		70	6		5	294
9:30 AM	46	25	4	4	74	12	7		31	4		3	210
9:45 AM	55	39	4	0	64	9	17		34	1		3	226
10:00 AM	58	43	3	1	38	6	13		44	5		2	213
10:15 AM	42	57	5	0	57	6	12		26	3		7	215
10:30 AM	33	34	2	1	38	0	6		47	3		1	165
10:45 AM	61	29	4	0	54	6	7		58	0		3	222
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 850	NT 1194	NR 239	SL 94	ST 2042	SR 262	EL 211	ET 0	ER 781	WL 160	WT 0	WR 98	TOTAL 5931

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =	190	266	31	10	636	69	47	0	172	51	0	22	1494
PEAK HR. FACTOR:		0.902			0.777			0.855			0.730		0.881

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: I-5 SB Ramps DAY: WEDNESDAY PROJECT# 05-1181-019

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	2	2	0	1.5	0	1.5	0	0	0	
6:00 AM		43	4	3	17		70	0	52				189
6:15 AM		92	8	8	68		91	0	72				339
6:30 AM		69	19	21	62		85	0	99				355
6:45 AM		65	18	17	96		59	0	118				373
7:00 AM		85	17	39	118		38	0	123				420
7:15 AM		91	25	40	117		40	0	116				429
7:30 AM		109	30	37	203		46	1	141				567
7:45 AM		85	26	31	238		45	0	146				571
8:00 AM		98	15	38	205		32	1	155				544
8:15 AM		117	14	34	191		51	15	142				564
8:30 AM		120	20	26	151		71	1	166				555
8:45 AM		116	22	31	239		66	1	146				621
9:00 AM		110	17	21	166		30	0	124				468
9:15 AM		118	29	38	130		38	0	100				453
9:30 AM		139	22	21	88		37	0	116				423
9:45 AM		135	21	22	96		43	0	84				401
10:00 AM		162	18	21	49		27	0	86				363
10:15 AM		140	27	7	59		17	0	69				319
10:30 AM		99	40	14	58		12	2	46				271
10:45 AM		145	33	19	75		13	0	54				339
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 0	NT 2138	NR 425	SL 488	ST 2426	SR 0	EL 911	ET 21	ER 2155	WL 0	WT 0	WR 0	TOTAL 8564

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	451	71	129	786	0	220	18	609	0	0	0	2284
PEAK HR. FACTOR:		0.932			0.847			0.890			0.000		0.919

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Laguna Cyn. Rd. DAY: WEDNESDAY PROJECT# 05-1181-020

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	3	1	1	2	1	2	1	0	2	1	1	
6:00 AM	4	51	1	26	122	10	3	1	0	0	0	2	220
6:15 AM	5	61	4	28	148	18	5	0	2	0	1	2	274
6:30 AM	8	72	3	32	156	22	5	1	3	0	2	1	305
6:45 AM	4	76	1	45	182	21	7	1	0	0	0	2	339
7:00 AM	8	85	1	31	234	32	9	1	4	0	1	3	409
7:15 AM	6	100	1	28	210	30	7	0	1	0	0	6	389
7:30 AM	6	89	2	44	241	31	8	2	0	3	0	4	430
7:45 AM	6	85	5	58	278	32	7	1	0	2	4	6	484
8:00 AM	8	78	1	48	175	18	9	0	2	3	6	5	353
8:15 AM	7	101	7	39	171	19	6	1	1	0	3	5	360
8:30 AM	5	138	1	32	169	18	6	0	2	1	2	8	382
8:45 AM	21	124	5	62	249	24	13	6	3	1	1	3	512
9:00 AM	12	95	1	61	202	28	10	3	5	0	0	10	427
9:15 AM	11	129	2	41	186	22	10	2	3	2	2	7	417
9:30 AM	12	139	1	38	174	19	11	1	2	3	3	10	413
9:45 AM	3	130	2	34	168	16	9	1	1	1	1	11	377
10:00 AM	13	129	1	22	98	16	15	1	3	0	5	6	309
10:15 AM	5	126	5	15	128	18	9	2	8	2	1	7	326
10:30 AM	15	119	3	18	98	16	10	5	7	2	0	13	306
10:45 AM	8	112	3	15	88	14	8	2	4	1	0	8	263
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 167	NT 2039	NR 50	SL 717	ST 3477	SR 424	EL 167	ET 31	ER 51	WL 21	WT 32	WR 119	TOTAL 7295

AM Peak Hr Begins at: 845 AM

PEAK VOLUMES =	56	487	9	202	811	93	44	12	13	6	6	30	1769
PEAK HR. FACTOR:		0.908			0.825			0.784			0.656		0.864

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Irvine Center Dr. DAY: WEDNESDAY PROJECT# 05-1181-021

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	3	1	2	3	1	2	3	1	2	3	1	
6:00 AM	3	36	9	12	51	3	4	42	13	1	26	3	203
6:15 AM	5	54	13	12	64	8	12	65	25	5	40	4	307
6:30 AM	8	42	18	29	86	10	16	103	21	3	17	7	360
6:45 AM	3	43	22	28	122	20	24	118	20	4	37	5	446
7:00 AM	7	74	23	39	115	14	14	86	21	2	27	11	433
7:15 AM	9	77	34	48	123	17	14	97	21	15	55	14	524
7:30 AM	18	65	38	60	156	24	29	94	35	11	75	17	622
7:45 AM	18	64	45	59	179	40	25	173	36	15	107	15	776
8:00 AM	19	78	40	48	180	23	29	159	22	13	61	13	685
8:15 AM	32	95	36	75	202	28	21	122	31	16	47	14	719
8:30 AM	19	74	32	72	193	22	24	119	41	13	78	9	696
8:45 AM	28	103	30	81	188	20	31	114	30	11	64	11	711
9:00 AM	30	99	29	50	115	22	25	109	38	9	67	6	599
9:15 AM	22	80	31	40	97	22	23	86	37	12	63	13	526
9:30 AM	16	94	25	30	94	10	27	67	39	9	72	12	495
9:45 AM	29	84	30	30	87	25	13	81	12	10	74	9	484
10:00 AM	23	86	36	17	102	15	15	54	19	20	35	10	432
10:15 AM	25	97	25	22	97	12	13	35	16	15	30	7	394
10:30 AM	24	77	29	11	84	16	17	41	26	18	32	4	379
10:45 AM	38	111	25	9	90	22	18	77	23	18	55	2	488
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 376	NT 1533	NR 570	SL 772	ST 2425	SR 373	EL 394	ET 1842	ER 526	WL 220	WT 1062	WR 186	TOTAL 10279

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES =	88	311	153	254	754	113	99	573	130	57	293	51	2876
PEAK HR. FACTOR:		0.847			0.919			0.857			0.732		0.927

CONTROL: SIGNALIZED

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Barranca Pkwy. DAY: WEDNESDAY PROJECT# 05-1181-022

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	1	1	2	1	0	1	1	1	1	0	
6:00 AM	10	42	3	3	38	1	1	12	1	3	8	1	123
6:15 AM	7	91	8	7	101	5	12	30	3	3	15	4	286
6:30 AM	18	89	17	3	69	3	6	37	4	12	33	6	297
6:45 AM	5	122	3	7	109	2	9	51	3	9	10	6	336
7:00 AM	21	92	0	4	155	5	5	67	17	6	29	12	413
7:15 AM	23	98	11	25	137	6	8	48	9	19	40	7	431
7:30 AM	50	116	12	17	169	10	4	93	16	19	60	6	572
7:45 AM	30	65	0	5	150	1	5	91	14	17	79	4	461
8:00 AM	30	90	16	11	182	8	12	132	32	14	82	2	611
8:15 AM	23	191	7	23	174	6	19	99	28	18	87	7	682
8:30 AM	54	169	2	25	175	4	22	167	22	20	91	6	757
8:45 AM	17	104	4	8	161	10	16	97	21	20	66	5	529
9:00 AM	52	108	4	7	136	6	18	61	18	12	47	7	476
9:15 AM	24	103	0	11	106	5	21	47	8	3	42	2	372
9:30 AM	20	86	1	8	161	5	6	53	6	12	27	3	388
9:45 AM	19	91	5	18	187	4	11	96	16	14	16	3	480
10:00 AM	29	62	3	5	93	3	29	24	11	13	31	1	304
10:15 AM	43	72	2	5	121	5	26	37	11	5	13	2	342
10:30 AM	20	66	0	7	78	8	15	37	7	7	23	4	272
10:45 AM	16	60	6	6	83	4	10	36	7	7	16	1	252
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 511	NT 1917	NR 104	SL 205	ST 2585	SR 101	EL 255	ET 1315	ER 254	WL 233	WT 815	WR 89	TOTAL 8384

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	124	554	29	67	692	28	69	495	103	72	326	20	2579
PEAK HR. FACTOR:		0.786			0.964			0.790			0.893		0.852

CONTROL: SIGNALIZED

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: Alton Pkwy. DAY: WEDNESDAY PROJECT# 05-1181-023

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	3	1	2	3	1	2	3	1	2	2	1	
6:00 AM	3	68	56	22	21	0	3	11	11	6	11	0	212
6:15 AM	11	103	84	22	27	1	1	27	7	5	16	5	309
6:30 AM	11	110	100	35	51	5	3	39	30	10	26	2	422
6:45 AM	11	145	97	32	58	5	11	70	26	14	42	1	512
7:00 AM	21	119	113	25	92	8	7	69	41	26	43	0	564
7:15 AM	25	192	108	24	122	9	10	81	49	19	112	1	752
7:30 AM	34	146	76	25	126	3	18	86	52	57	153	2	778
7:45 AM	43	212	109	27	130	9	14	226	61	94	212	8	1145
8:00 AM	54	206	121	47	186	6	25	187	44	135	194	3	1208
8:15 AM	39	157	129	44	156	11	31	213	92	113	234	5	1224
8:30 AM	84	160	139	31	150	14	26	157	63	96	219	7	1146
8:45 AM	49	212	149	36	144	11	55	144	61	109	194	5	1169
9:00 AM	53	181	134	33	116	10	39	116	66	70	117	8	943
9:15 AM	35	173	117	27	71	7	22	99	31	49	51	7	689
9:30 AM	28	144	93	24	85	17	22	40	25	50	60	3	591
9:45 AM	27	148	78	32	77	9	16	73	24	47	37	6	574
10:00 AM	46	137	89	45	133	23	17	79	33	92	44	3	741
10:15 AM	24	166	69	21	85	10	16	51	21	60	46	11	580
10:30 AM	37	158	80	21	156	13	20	71	37	62	71	5	731
10:45 AM	35	176	55	19	127	19	32	64	23	67	61	9	687
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 670	NT 3113	NR 1996	SL 592	ST 2113	SR 190	EL 388	ET 1903	ER 797	WL 1181	WT 1943	WR 91	TOTAL 14977

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	226	735	538	158	636	42	137	701	260	453	841	20	4747
PEAK HR. FACTOR:		0.914			0.874			0.817			0.933		0.970

CONTROL: SIGNALIZED

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: I-405 NB Ramps DAY: WEDNESDAY PROJECT# 05-1181-024

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:		2	0		2	1				1		1	
6:00 AM		133	28		15	33				7		40	256
6:15 AM		186	35		32	23				22		50	348
6:30 AM		188	49		42	56				23		51	409
6:45 AM		242	68		76	63				60		49	558
7:00 AM		258	113		84	81				40		37	613
7:15 AM		284	106		79	125				36		21	651
7:30 AM		311	115		98	171				22		29	746
7:45 AM		372	128		107	181				20		23	831
8:00 AM		374	122		148	164				21		38	867
8:15 AM		397	127		196	178				24		35	957
8:30 AM		413	135		146	130				18		26	868
8:45 AM		377	106		114	176				27		55	855
9:00 AM		333	66		116	100				22		43	680
9:15 AM		291	52		119	91				24		44	621
9:30 AM		221	58		75	80				25		52	511
9:45 AM		217	65		84	103				33		67	569
10:00 AM		200	58		94	101				23		44	520
10:15 AM		162	58		70	93				26		53	462
10:30 AM		159	53		91	100				27		45	475
10:45 AM		180	49		106	100				30		55	520
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 0	NT 5298	NR 1591	SL 0	ST 1892	SR 2149	EL 0	ET 0	ER 0	WL 530	WT 0	WR 857	TOTAL 12317

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	1561	490	0	604	648	0	0	0	90	0	154	3547
PEAK HR. FACTOR:		0.936			0.837			0.000			0.744		0.927

CONTROL: Signalized

Intersection Turning Movement

Prepared by: Southland Car Counters

N-S STREET: Sand Canyon Ave. DATE: 9/14/2005 LOCATION: City of Irvine

E-W STREET: I-405 SB Ramp DAY: WEDNESDAY PROJECT# 05-1181-025

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2			2	1	1.5		0.5				
6:00 AM	16	40			33	14	133		29				265
6:15 AM	20	57			38	10	154		31				310
6:30 AM	25	76			48	19	158		91				417
6:45 AM	32	112			82	24	177		76				503
7:00 AM	26	173			96	14	205		114				628
7:15 AM	45	169			86	15	205		84				604
7:30 AM	53	134			64	48	211		84				594
7:45 AM	43	172			68	36	201		73				593
8:00 AM	53	325			127	80	185		61				831
8:15 AM	59	300			161	64	238		74				896
8:30 AM	56	309			132	49	254		53				853
8:45 AM	51	229			96	45	248		43				712
9:00 AM	32	258			85	53	248		43				719
9:15 AM	33	257			78	41	192		45				646
9:30 AM	43	111			68	31	149		57				459
9:45 AM	30	133			72	36	141		34				446
10:00 AM	30	108			79	38	139		37				431
10:15 AM	34	117			62	25	94		37				369
10:30 AM	22	106			73	43	96		38				378
10:45 AM	36	140			102	33	86		29				426
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 739	NT 3326	NR 0	SL 0	ST 1650	SR 718	EL 3514	ET 0	ER 1133	WL 0	WT 0	WR 0	TOTAL 11080

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	219	1163	0	0	516	238	925	0	231	0	0	0	3292
PEAK HR. FACTOR:		0.914			0.838			0.926			0.000		0.919

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-001A

Location: Culver Dr. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	0	1	0	1	0	1	3	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks				1				5	1			
6:15	Trash Trucks								1				2
6:30	Trash Trucks								1				
6:45	Trash Trucks								3			2	
7:00	Trash Trucks								3		1		
7:15	Trash Trucks			1	1				2	1		2	
7:30	Trash Trucks								10			2	
7:45	Trash Trucks			2	1		1		1			5	1

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	3	3	0	1	0	26	2	1	11	3
TOTALS	0	0	3	3	0	1	0	26	2	1	11	3

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	0	3	2	0	1	0	16	1	1	9	1
PEAK HR. FACTOR:		0.375			0.375			0.425			0.458	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-001A

Location: Culver Dr. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	0	1	0	1	0	1	3	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks			1	1				2	1	2	5	
8:15	Trash Trucks				2				3		2	2	1
8:30	Trash Trucks		1						5			2	2
8:45	Trash Trucks								5			6	1
9:00	Trash Trucks				1				5			4	2
9:15	Trash Trucks				3				5		1	5	1
9:30	Trash Trucks				1				3			3	1
9:45	Trash Trucks								1			1	2

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	1	1	8	0	0	0	29	1	5	28	10
TOTALS	0	1	1	8	0	0	0	29	1	5	28	10

PM Peak Hr Begins at: 1630 PM

PEAK VOLUMES =	0	1	0	4	0	0	0	20	0	1	17	6
PEAK HR. FACTOR:		0.250			0.333			1.000			0.857	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-001A

Location: Culver Dr. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	0	1	0	1	0	1	3	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks			4	3	1			1	1		6	
10:15	Trash Trucks								1		1	3	
10:30	Trash Trucks			3					1			1	1
10:45	Trash Trucks	1									1	2	1

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	1	0	7	3	1	0	0	3	1	2	12	2
TOTALS	1	0	7	3	1	0	0	3	1	2	12	2

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	1	0	7	3	1	0	0	3	1	2	12	2
PEAK HR. FACTOR:		0.500			0.250			0.500			0.667	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-002A

Location: Yale Ave. & Portola Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	0	1	1	0	1	3	0	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks								2				
6:15	Trash Trucks								4			2	
6:30	Trash Trucks												
6:45	Trash Trucks								3			2	
7:00	Trash Trucks								4			2	
7:15	Trash Trucks				1				7			2	
7:30	Trash Trucks								6			2	
7:45	Trash Trucks								6			4	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	1	0	0	0	32	0	0	14	0
TOTALS	0	0	0	1	0	0	0	32	0	0	14	0

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	0	0	1	0	0	0	23	0	0	10	0
PEAK HR. FACTOR:		0.000			0.250			0.821			0.625	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-002A

Location: Yale Ave. & Portola Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	0	1	1	0	1	3	0	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks								4		1	5	
8:15	Trash Trucks								4		1	4	
8:30	Trash Trucks								4			3	
8:45	Trash Trucks								4			7	
9:00	Trash Trucks								7			6	
9:15	Trash Trucks								6			7	1
9:30	Trash Trucks				1				6			6	1
9:45	Trash Trucks								3			5	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	1	0	0	0	38	0	2	43	2
TOTALS	0	0	0	1	0	0	0	38	0	2	43	2

PM Peak Hr Begins at: 1645 PM

PEAK VOLUMES =	0	0	0	1	0	0	0	23	0	0	26	2
PEAK HR. FACTOR:		0.000			0.250			0.821			0.875	

CONTROL: Signalized

15 45 Start Time - 15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-002A

Location: Yale Ave. & Portola Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	0	1	1	0	1	3	0	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks								3			2	
10:15	Trash Trucks								4			4	
10:30	Trash Trucks								3			6	
10:45	Trash Trucks								3			3	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	0	0	0	0	13	0	0	15	0
TOTALS	0	0	0	0	0	0	0	13	0	0	15	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	0	0	0	0	0	0	13	0	0	15	0
PEAK HR. FACTOR:		0.000			0.000			0.813			0.625	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-003A

Location: Jeffrey Rd. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	1	1	0	1	0	1	3	0	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks		5	1	4	3		1	1			2	
6:15	Trash Trucks		1	1	1			1	1				
6:30	Trash Trucks	1	4			3							
6:45	Trash Trucks	1	1	2	3	5		2		1		2	
7:00	Trash Trucks		4	2	2	3			4				
7:15	Trash Trucks		1	2	3	9	1	2	4		3	1	
7:30	Trash Trucks		6	7	2	9		2	7	1	5	4	2
7:45	Trash Trucks	1	2	2	3	3		2	6		5	2	2

MOVEMENT TOTALS

Trash Trucks	3	24	17	18	35	1	10	23	2	13	11	4
TOTALS	3	24	17	18	35	1	10	23	2	13	11	4
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	1	13	13	10	24	1	6	21	1	13	7	4
PEAK HR. FACTOR:		0.519			0.673			0.700			0.545	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-003A

Location: Jeffrey Rd. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	1	1	0	1	0	1	3	0	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		1	3	4	4		1	1	3	10	13	
8:15	Trash Trucks	1	1	1	1	2			1		5	3	
8:30	Trash Trucks	1	5		3	2		2	2	1	5	3	2
8:45	Trash Trucks		4	1	9	5	1	2	6		6	4	3
9:00	Trash Trucks		3	2	4	6		3	2	1	2	4	4
9:15	Trash Trucks	1	9	1	6	8		2	4	1	4	5	6
9:30	Trash Trucks		5	2	7	9			4		3	8	4
9:45	Trash Trucks		7	1	1	6	1		4		4	6	5

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	3	35	11	35	42	2	10	24	6	39	46	24
TOTALS	3	35	11	35	42	2	10	24	6	39	46	24

PM Peak Hr Begins at: 1645 PM

PEAK VOLUMES =	1	21	6	26	28	1	7	16	2	15	21	17
PEAK HR. FACTOR:		0.636			0.859			0.781			0.883	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-003A

Location: Jeffrey Rd. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	1	1	0	1	0	1	3	0	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		11		5	4		1	2	1	3	4	7
10:15	Trash Trucks		4		3	7			4	1	6	3	2
10:30	Trash Trucks	1	7		3	5		1	1		4	4	4
10:45	Trash Trucks	1	10	4	6	6	1		2		3	1	5

MOVEMENT TOTALS

Trash Trucks	2	32	4	17	22	1	2	9	2	16	12	18
TOTALS	2	32	4	17	22	1	2	9	2	16	12	18
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	2	32	4	17	22	1	2	9	2	16	12	18
PEAK HR. FACTOR:		0.633			0.769			0.650			0.821	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-004A

Location: Bee Cyn. Acess Rd. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	0	0	1.5	0	0.5	1	2	0	0	2	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks								4			1	2
6:15	Trash Trucks								4			2	7
6:30	Trash Trucks							1	2			0	6
6:45	Trash Trucks							2	0			1	12
7:00	Trash Trucks							4	2			1	19
7:15	Trash Trucks				6		2	12	2			1	13
7:30	Trash Trucks				21		7	12	1			1	20
7:45	Trash Trucks				14		18	10	2			1	13

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	41	0	27	41	17	0	0	8	92
TOTALS	0	0	0	41	0	27	41	17	0	0	8	92

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	0	0	41	0	27	38	7	0	0	4	65
PEAK HR. FACTOR:		0.000			0.531			0.804			0.821	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-004A

Location: Bee Cyn. Acess Rd. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	0	0	1.5	0	0.5	1	2	0	0	2	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks				17		24	5	5			1	14
8:15	Trash Trucks				20		16	1	5			2	8
8:30	Trash Trucks				8		3	1	9			9	10
8:45	Trash Trucks				7		7	4	6			5	22
9:00	Trash Trucks				4		3	1	10			3	19
9:15	Trash Trucks				17		6	1	5			7	17
9:30	Trash Trucks				18		7	4	2			6	14
9:45	Trash Trucks				17		3	2	9			7	31

MOVEMENT TOTALS

Trash Trucks	0	0	0	108	0	69	19	51	0	0	40	135
TOTALS	0	0	0	108	0	69	19	51	0	0	40	135
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	0	0	0	56	0	19	8	26	0	0	23	81
PEAK HR. FACTOR:		0.000			0.750			0.773			0.684	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-004A

Location: Bee Cyn. Acess Rd. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	0	0	1.5	0	0.5	1	2	0	0	2	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks				13		6	1				8	10
10:15	Trash Trucks				16		9	3				2	16
10:30	Trash Trucks				10		3	2				4	12
10:45	Trash Trucks				11		8	7	7			7	18

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	50	0	26	13	7	0	0	21	56
TOTALS	0	0	0	50	0	26	13	7	0	0	21	56

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	0	0	50	0	26	13	7	0	0	21	56
PEAK HR. FACTOR:		0.000			0.760			0.357			0.770	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-005A

Location: Sand Cyn. Ave. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	0	1	0	0	0	0	2	1	2	2	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks	6		3						5	4	1	
6:15	Trash Trucks	7		7					2	2	4		
6:30	Trash Trucks	9		5							6	1	
6:45	Trash Trucks	9		6						2	2	5	
7:00	Trash Trucks	16		7					3	8	8	4	
7:15	Trash Trucks	12		5					4	12	8	1	
7:30	Trash Trucks	15		3					1	11	6		
7:45	Trash Trucks	12		6					2	7	2	2	

MOVEMENT TOTALS

Trash Trucks	86	0	42	0	0	0	0	12	47	40	14	0
TOTALS	86	0	42	0	0	0	0	12	47	40	14	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	55	0	21	0	0	0	0	10	38	24	7	(
PEAK HR. FACTOR:		0.826			0.000			0.750			0.646	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-005A

Location: Sand Cyn. Ave. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	0	1	0	0	0	0	2	1	2	2	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks	12		3					2	25	4	2	
8:15	Trash Trucks	13		1					3	14	4		
8:30	Trash Trucks	22		2					6	11	4		
8:45	Trash Trucks	11		5					5	13	2	3	
9:00	Trash Trucks	30		10					8	23	2	7	
9:15	Trash Trucks	20		5					1	17	6		
9:30	Trash Trucks	21		5					2	25	3	7	
9:45	Trash Trucks	23		4					2	6	2	1	

MOVEMENT TOTALS

Trash Trucks	152	0	35	0	0	0	0	29	134	27	20	0
TOTALS	152	0	35	0	0	0	0	29	134	27	20	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 1645 PM

PEAK VOLUMES =	82	0	25	0	0	0	0	16	78	13	17	0
PEAK HR. FACTOR:		0.669			0.000			0.758			0.750	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-005A

Location: Sand Cyn. Ave. & Portola Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	0	1	0	0	0	0	2	1	2	2	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks	18		8					2	15	4	5	
10:15	Trash Trucks	14		1					3	15	4	2	
10:30	Trash Trucks	19		2						12	3	3	
10:45	Trash Trucks	15		6					4	17	4		

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	66	0	17	0	0	0	0	9	59	15	10	0
TOTALS	66	0	17	0	0	0	0	9	59	15	10	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	66	0	17	0	0	0	0	9	59	15	10	(
PEAK HR. FACTOR:		0.798			0.000			0.810			0.694	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-006A

Location: Culver Dr. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	0	2	3	0	2	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks								2				
6:15	Trash Trucks								2				
6:30	Trash Trucks								2				
6:45	Trash Trucks								3				
7:00	Trash Trucks		1					1	3	1		1	
7:15	Trash Trucks		1			1			3				
7:30	Trash Trucks								1			1	
7:45	Trash Trucks								2			1	

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	2	0	0	1	0	1	18	1	0	3	0
TOTALS	0	2	0	0	1	0	1	18	1	0	3	0

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	2	0	0	1	0	1	11	1	0	3	0
PEAK HR. FACTOR:		0.500			0.250			0.650			0.750	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-006A

Location: Culver Dr. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	0	2	3	0	2	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks								1			1	1
8:15	Trash Trucks								1			1	
8:30	Trash Trucks								1	1		1	
8:45	Trash Trucks								1			1	
9:00	Trash Trucks								2			1	
9:15	Trash Trucks											1	
9:30	Trash Trucks												
9:45	Trash Trucks		1						1				

MOVEMENT TOTALS

Trash Trucks	0	1	0	0	0	0	0	7	1	0	6	1
TOTALS	0	1	0	0	0	0	0	7	1	0	6	1
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 1615 PM

PEAK VOLUMES =	0	0	0	0	0	0	0	5	1	0	4	1
PEAK HR. FACTOR:		0.000			0.000			0.750			1.000	

CONTROL: Signalized

15 45 Start Time - 15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-006A

Location: Culver Dr. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	0	2	3	0	2	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks			1									
10:15	Trash Trucks		1		1	1			1			1	
10:30	Trash Trucks								1			1	
10:45	Trash Trucks	1										1	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	1	1	1	1	1	0	0	2	0	0	3	0
TOTALS	1	1	1	1	1	0	0	2	0	0	3	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	1	1	1	1	1	0	0	2	0	0	3	0
PEAK HR. FACTOR:		0.750			0.250			0.500			0.750	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-007A

Location: Yale Ave. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	0	1	2	0	1	3	0	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks												
6:15	Trash Trucks												
6:30	Trash Trucks								4				
6:45	Trash Trucks								3				
7:00	Trash Trucks							2	1				
7:15	Trash Trucks								1	1		1	
7:30	Trash Trucks							1	1			1	
7:45	Trash Trucks								1	1		1	

MOVEMENT TOTALS

Trash Trucks	0	0	0	0	0	0	3	11	2	0	3	0
TOTALS	0	0	0	0	0	0	3	11	2	0	3	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 730 AM

PEAK VOLUMES =	0	0	0	0	0	0	2	9	1	0	1	0
PEAK HR. FACTOR:		0.000			0.000			0.750			0.250	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-007A

Location: Yale Ave. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	0	1	2	0	1	3	0	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks				1							1	
8:15	Trash Trucks								1			1	
8:30	Trash Trucks								1			1	
8:45	Trash Trucks								2				
9:00	Trash Trucks								1			1	
9:15	Trash Trucks								2		1	1	
9:30	Trash Trucks								1		1	1	
9:45	Trash Trucks												

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	1	0	0	0	8	0	2	6	0
TOTALS	0	0	0	1	0	0	0	8	0	2	6	0

PM Peak Hr Begins at: 1645 PM

PEAK VOLUMES =	0	0	0	0	0	0	0	6	0	2	3	0
PEAK HR. FACTOR:		0.000			0.000			0.750			0.625	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-007A

Location: Yale Ave. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	0	1	2	0	1	3	0	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks					1							
10:15	Trash Trucks								2			1	
10:30	Trash Trucks					1			1		1	1	
10:45	Trash Trucks		1						1		1	1	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	1	0	0	2	0	0	4	0	2	3	0
TOTALS	0	1	0	0	2	0	0	4	0	2	3	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	1	0	0	2	0	0	4	0	2	3	0
PEAK HR. FACTOR:		0.250			0.500			0.500			0.625	

CONTROL: Signalized

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-008A

Location: Jeffrey Rd. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	1	2	2	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks		5			1							
6:15	Trash Trucks		2			2							
6:30	Trash Trucks		5			3		1	3		2		1
6:45	Trash Trucks		5			3			1	2			
7:00	Trash Trucks		4			6		1			3		1
7:15	Trash Trucks		5			6			1				
7:30	Trash Trucks	1	7		1	14			1		2	1	1
7:45	Trash Trucks		9		2	13	1	1			1		1

MOVEMENT TOTALS

Trash Trucks	1	42	0	3	48	1	3	6	2	8	1	4
TOTALS	1	42	0	3	48	1	3	6	2	8	1	4
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	1	25	0	3	39	1	2	2	0	6	1	3
PEAK HR. FACTOR:		0.722			0.672			1.000			0.625	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-008A

Location: Jeffrey Rd. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	1	2	2	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		5		1	16					1	1	
8:15	Trash Trucks		5		1	8			1			1	1
8:30	Trash Trucks		5	1		7		1	1		1	1	3
8:45	Trash Trucks		7		1	7		1			2		
9:00	Trash Trucks		6	2	1	7		1	1		2	1	1
9:15	Trash Trucks		7	1	2	12			2		3	1	
9:30	Trash Trucks		6	1	1	11			1	1	2	1	
9:45	Trash Trucks		10	1	2	10	1				3		2

MOVEMENT TOTALS

Trash Trucks	0	51	6	9	78	1	3	6	1	14	6	7
TOTALS	0	51	6	9	78	1	3	6	1	14	6	7
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	0	29	5	6	40	1	1	4	1	10	3	3
PEAK HR. FACTOR:		0.773			0.839			0.750			0.800	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-008A

Location: Jeffrey Rd. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	1	2	2	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		17	1	4	17		1		2		1	
10:15	Trash Trucks	1	8		1	11			1			1	
10:30	Trash Trucks		8			3			1				1
10:45	Trash Trucks		12			7						3	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	1	45	1	5	38	0	1	2	2	0	5	1
TOTALS	1	45	1	5	38	0	1	2	2	0	5	1

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	1	45	1	5	38	0	1	2	2	0	5	1
PEAK HR. FACTOR:		0.653			0.512			0.417			0.500	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-009A

Location: Sand Canyon Ave. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2	1	2	2	1	2	3	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks		7	1	6	1					1	3	3
6:15	Trash Trucks		9	2	3	4					1	1	3
6:30	Trash Trucks		8	2	1	4					2	1	5
6:45	Trash Trucks		8	1	8	4		2				1	5
7:00	Trash Trucks		10	4	8	3	1				2	1	7
7:15	Trash Trucks		14	2	8	7					2	1	6
7:30	Trash Trucks		10	1	9	6	1	3	2		2	1	5
7:45	Trash Trucks		12	1	10	5			1			1	7

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	78	14	53	34	2	5	3	0	10	10	41
TOTALS	0	78	14	53	34	2	5	3	0	10	10	41

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	46	8	35	21	2	3	3	0	6	4	25
PEAK HR. FACTOR:		0.844			0.906			0.300			0.875	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-009A

Location: Sand Canyon Ave. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2	1	2	2	1	2	3	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		9	1	7	8	1	1	2			2	6
8:15	Trash Trucks		9	2	7	10	1	1				1	9
8:30	Trash Trucks		9	2	8	9		2	2			2	4
8:45	Trash Trucks		17	2	8	9	1	1	1			1	5
9:00	Trash Trucks		15	1	7	15		2	1			3	9
9:15	Trash Trucks		15	1	10	10	1	1	1			2	9
9:30	Trash Trucks		15	1	9	11		2	1		1	1	8
9:45	Trash Trucks		20	2	11	13		2				2	14

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	109	12	67	85	4	12	8	0	1	14	64
TOTALS	0	109	12	67	85	4	12	8	0	1	14	64

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	0	65	5	37	49	1	7	3	0	1	8	40
PEAK HR. FACTOR:		0.795			0.906			0.833			0.766	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-009A

Location: Sand Canyon Ave. & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2	1	2	2	1	2	3	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks	1	14	3	8	12	1	2	1		1	2	8
10:15	Trash Trucks		7	4	7	13			1				10
10:30	Trash Trucks		11	7	11	8		1				2	9
10:45	Trash Trucks		3		1	12		2	1		2	1	14

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	1	35	14	27	45	1	5	3	0	3	5	41
TOTALS	1	35	14	27	45	1	5	3	0	3	5	41

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	1	35	14	27	45	1	5	3	0	3	5	41
PEAK HR. FACTOR:		0.694			0.869			0.667			0.721	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-010A

Location: SR-133 SB Ramps & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	0	0	1	0	1	0	2	2	3	1	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks								7			7	
6:15	Trash Trucks								5			6	
6:30	Trash Trucks								3			7	
6:45	Trash Trucks								9			6	
7:00	Trash Trucks								11			10	
7:15	Trash Trucks								9			9	
7:30	Trash Trucks								13			7	
7:45	Trash Trucks								12			8	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	0	0	0	0	69	0	0	60	0
TOTALS	0	0	0	0	0	0	0	69	0	0	60	0

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	0	0	0	0	0	0	45	0	0	34	0
PEAK HR. FACTOR:		0.000			0.000			0.865			0.850	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-010A

Location: SR-133 SB Ramps & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	0	0	1	0	1	0	2	2	3	1	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks								9			8	
8:15	Trash Trucks								9			9	
8:30	Trash Trucks								12			6	
8:45	Trash Trucks								11			5	
9:00	Trash Trucks								9			12	
9:15	Trash Trucks								12			11	
9:30	Trash Trucks								11			10	
9:45	Trash Trucks								13			16	

MOVEMENT TOTALS

Trash Trucks	0	0	0	0	0	0	0	86	0	0	77	0
TOTALS	0	0	0	0	0	0	0	86	0	0	77	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	0	0	0	0	0	0	0	45	0	0	49	0
PEAK HR. FACTOR:		0.000			0.000			0.865			0.766	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-010A

Location: SR-133 SB Ramps & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	0	0	1	0	1	0	2	2	3	1	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks								12			11	
10:15	Trash Trucks								11			10	
10:30	Trash Trucks								18			11	
10:45	Trash Trucks								2			17	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	0	0	0	0	43	0	0	49	0
TOTALS	0	0	0	0	0	0	0	43	0	0	49	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	0	0	0	0	0	0	43	0	0	49	0
PEAK HR. FACTOR:		0.000			0.000			0.597			0.721	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-011A

Location: SR-133 NB Ramps & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	0	1	0	0	0	0	3	1	0	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks								7			7	
6:15	Trash Trucks								5			6	
6:30	Trash Trucks								3			7	
6:45	Trash Trucks								9			6	
7:00	Trash Trucks								11			10	
7:15	Trash Trucks								9			9	
7:30	Trash Trucks								13			7	
7:45	Trash Trucks								12			8	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	0	0	0	0	69	0	0	60	0
TOTALS	0	0	0	0	0	0	0	69	0	0	60	0

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	0	0	0	0	0	0	45	0	0	34	0
PEAK HR. FACTOR:		0.000			0.000			0.865			0.850	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-011A

Location: SR-133 NB Ramps & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	0	1	0	0	0	0	3	1	0	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks								9			8	
8:15	Trash Trucks								9			9	
8:30	Trash Trucks								12			6	
8:45	Trash Trucks								11			5	
9:00	Trash Trucks								9			12	
9:15	Trash Trucks								12			11	
9:30	Trash Trucks								11			10	
9:45	Trash Trucks								13			16	

MOVEMENT TOTALS

Trash Trucks	0	0	0	0	0	0	0	86	0	0	77	0
TOTALS	0	0	0	0	0	0	0	86	0	0	77	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	0	0	0	0	0	0	0	45	0	0	49	0
PEAK HR. FACTOR:		0.000			0.000			0.865			0.766	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-011A

Location: SR-133 NB Ramps & Irvine Blvd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	0	1	0	0	0	0	3	1	0	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks								12			10	
10:15	Trash Trucks								11			10	
10:30	Trash Trucks								18			11	
10:45	Trash Trucks								3			18	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	0	0	0	0	44	0	0	49	0
TOTALS	0	0	0	0	0	0	0	44	0	0	49	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	0	0	0	0	0	0	44	0	0	49	0
PEAK HR. FACTOR:		0.000			0.000			0.611			0.681	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-012A

Location: Jeffrey Rd. & Bryan Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	1	1	2	1	2	1	1	2	1	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks		4			1							
6:15	Trash Trucks		3			4							
6:30	Trash Trucks		5			2							
6:45	Trash Trucks		4			4							
7:00	Trash Trucks		4			5							
7:15	Trash Trucks		5			6							
7:30	Trash Trucks		6			11							
7:45	Trash Trucks		5			10							

MOVEMENT TOTALS

Trash Trucks	0	36	0	0	43	0	0	0	0	0	0	0
TOTALS	0	36	0	0	43	0	0	0	0	0	0	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	20	0	0	32	0	0	0	0	0	0	0
PEAK HR. FACTOR:		0.833			0.727			0.000			0.000	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-012A

Location: Jeffrey Rd. & Bryan Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	1	1	2	1	2	1	1	2	1	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		4			8							
8:15	Trash Trucks		4			11							
8:30	Trash Trucks		5			10							
8:45	Trash Trucks		4			7							
9:00	Trash Trucks		5			9							
9:15	Trash Trucks		6			11							
9:30	Trash Trucks		8			10							
9:45	Trash Trucks		10			15							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	46	0	0	81	0	0	0	0	0	0	0
TOTALS	0	46	0	0	81	0	0	0	0	0	0	0

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	0	29	0	0	45	0	0	0	0	0	0	0
PEAK HR. FACTOR:		0.725			0.750			0.000			0.000	

CONTROL: Signalized

15 45 Start Time - 15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-012A

Location: Jeffrey Rd. & Bryan Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	1	1	2	1	2	1	1	2	1	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		15			18							
10:15	Trash Trucks		10			12							
10:30	Trash Trucks		9			6							
10:45	Trash Trucks		12			7							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	46	0	0	43	0	0	0	0	0	0	0
TOTALS	0	46	0	0	43	0	0	0	0	0	0	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	46	0	0	43	0	0	0	0	0	0	0
PEAK HR. FACTOR:		0.767			0.597			0.000			0.000	

CONTROL: Signalized

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-013A

Location: Jeffrey Rd. & Trabuco Rd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2.5	0.5	2	2.5	0.5	1	1.5	0.5	1	2	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks		4			1							
6:15	Trash Trucks		3			3							
6:30	Trash Trucks		6			4							
6:45	Trash Trucks		5			3	1						
7:00	Trash Trucks		5			6							
7:15	Trash Trucks		6			7							
7:30	Trash Trucks		7			9							
7:45	Trash Trucks		8			11							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	44	0	0	44	1	0	0	0	0	0	0
TOTALS	0	44	0	0	44	1	0	0	0	0	0	0

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	26	0	0	33	0	0	0	0	0	0	0
PEAK HR. FACTOR:		0.813			0.750			0.000			0.000	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-013A

Location: Jeffrey Rd. & Trabuco Rd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2.5	0.5	2	2.5	0.5	1	1.5	0.5	1	2	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		2			8							
8:15	Trash Trucks		4			9				1			
8:30	Trash Trucks		6			1							
8:45	Trash Trucks		7			8							
9:00	Trash Trucks		5			9	1						
9:15	Trash Trucks		6			11							
9:30	Trash Trucks		6			8							
9:45	Trash Trucks		7			9	1						

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	43	0	0	63	2	0	0	1	0	0	0
TOTALS	0	43	0	0	63	2	0	0	1	0	0	0

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	0	24	0	0	37	2	0	0	0	0	0	0
PEAK HR. FACTOR:		0.857			0.886			0.000			0.000	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-013A

Location: Jeffrey Rd. & Trabuco Rd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2.5	0.5	2	2.5	0.5	1	1.5	0.5	1	2	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		12			15							
10:15	Trash Trucks		15			11							
10:30	Trash Trucks		9			8							
10:45	Trash Trucks		8			7							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	44	0	0	41	0	0	0	0	0	0	0
TOTALS	0	44	0	0	41	0	0	0	0	0	0	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	44	0	0	41	0	0	0	0	0	0	0
PEAK HR. FACTOR:		0.733			0.683			0.000			0.000	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-014A

Location: Sand Canyon Ave. & Trabuco Rd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	1	1	2	0	1	3	1	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks		5			3							
6:15	Trash Trucks		4			4							
6:30	Trash Trucks		14			4							
6:45	Trash Trucks		11			5							
7:00	Trash Trucks	1	16			4							
7:15	Trash Trucks		17			7				1			1
7:30	Trash Trucks		11			6							
7:45	Trash Trucks		13			10							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	1	91	0	0	43	0	0	0	1	0	0	1
TOTALS	1	91	0	0	43	0	0	0	1	0	0	1

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	1	57	0	0	27	0	0	0	1	0	0	1
PEAK HR. FACTOR:		0.853			0.675			0.250			0.250	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-014A

Location: Sand Canyon Ave. & Trabuco Rd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	1	1	2	0	1	3	1	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		13			19							
8:15	Trash Trucks		10			16							
8:30	Trash Trucks		9			8							
8:45	Trash Trucks		13			4							
9:00	Trash Trucks	1	17			5							
9:15	Trash Trucks		19			9				1			
9:30	Trash Trucks		19			9		1		1			
9:45	Trash Trucks	3	16			11							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	4	116	0	0	81	0	1	0	2	0	0	0
TOTALS	4	116	0	0	81	0	1	0	2	0	0	0

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	4	71	0	0	34	0	1	0	2	0	0	0
PEAK HR. FACTOR:		0.987			0.773			0.375			0.000	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-014A

Location: Sand Canyon Ave. & Trabuco Rd. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	1	1	2	0	1	3	1	1	3	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		17			16							
10:15	Trash Trucks		12			9				1			
10:30	Trash Trucks		5			11		1		1			
10:45	Trash Trucks	1	15			12							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	1	49	0	0	48	0	1	0	2	0	0	0
TOTALS	1	49	0	0	48	0	1	0	2	0	0	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	1	49	0	0	48	0	1	0	2	0	0	0
PEAK HR. FACTOR:		0.735			0.750			0.375			0.000	

CONTROL: Signalized

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-015A

Location: Jeffrey Rd. & I-5 NB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	3	1	0	3	1	0	0	0	1.5	0	1.5
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks		2			1	1						
6:15	Trash Trucks		4			2	1						
6:30	Trash Trucks		6			1	4						
6:45	Trash Trucks		6			4	2						1
7:00	Trash Trucks		8	1		2	2						
7:15	Trash Trucks		6			3	5				1		1
7:30	Trash Trucks		2			4	3						3
7:45	Trash Trucks		6			9	1				1		1

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	40	1	0	26	19	0	0	0	2	0	6
TOTALS	0	40	1	0	26	19	0	0	0	2	0	6

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	22	1	0	18	11	0	0	0	2	0	5
PEAK HR. FACTOR:		0.639			0.725			0.000			0.583	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-015A

Location: Jeffrey Rd. & I-5 NB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	3	1	0	3	1	0	0	0	1.5	0	1.5
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		5			6	1						5
8:15	Trash Trucks		6	1		8	7				1		1
8:30	Trash Trucks		4			4	5						
8:45	Trash Trucks		4			2	6						1
9:00	Trash Trucks		5	1			6				1		2
9:15	Trash Trucks		5			1	5						3
9:30	Trash Trucks		5	3		6	3						4
9:45	Trash Trucks		4	1		6	6						3

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	38	6	0	33	39	0	0	0	2	0	19
TOTALS	0	38	6	0	33	39	0	0	0	2	0	19

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	0	19	5	0	13	20	0	0	0	1	0	12
PEAK HR. FACTOR:		0.750			0.688			0.000			0.813	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-015A

Location: Jeffrey Rd. & I-5 NB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	3	1	0	3	1	0	0	0	1.5	0	1.5
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		4			3	6						6
10:15	Trash Trucks		5	2		5	5				1		3
10:30	Trash Trucks		3			2	10						6
10:45	Trash Trucks		14			4	6						3

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	26	2	0	14	27	0	0	0	1	0	18
TOTALS	0	26	2	0	14	27	0	0	0	1	0	18

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	26	2	0	14	27	0	0	0	1	0	18
PEAK HR. FACTOR:		0.500			0.854			0.000			0.792	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-016A

Location: Jeffrey Rd. & Walnut Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2	0	2	2	0	1	1	1	2	2	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks		2			1							
6:15	Trash Trucks		3			2							
6:30	Trash Trucks		5			1							
6:45	Trash Trucks		6			2		1					1
7:00	Trash Trucks		7			3							
7:15	Trash Trucks		6			3							
7:30	Trash Trucks		2			2		1					
7:45	Trash Trucks		3		1	4	1						1

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	34	0	1	18	1	2	0	0	0	0	2
TOTALS	0	34	0	1	18	1	2	0	0	0	0	2

PM Peak Hr Begins at: 730 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
PEAK VOLUMES =	0	24	0	0	9	0	1	0	0	0	0	1
PEAK HR. FACTOR:		0.857			0.750			0.250			0.250	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-016A

Location: Jeffrey Rd. & Walnut Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2	0	2	2	0	1	1	1	2	2	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		5			6							
8:15	Trash Trucks		6			8							
8:30	Trash Trucks		5			4							
8:45	Trash Trucks		4		1	2							
9:00	Trash Trucks		5			1							
9:15	Trash Trucks		6		2		1						
9:30	Trash Trucks		6			3	1						
9:45	Trash Trucks		4			6							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	41	0	3	30	2	0	0	0	0	0	0
TOTALS	0	41	0	3	30	2	0	0	0	0	0	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	20	0	1	20	0	0	0	0	0	0	0
PEAK HR. FACTOR:		0.833			0.656			0.000			0.000	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-016A

Location: Jeffrey Rd. & Walnut Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2	0	2	2	0	1	1	1	2	2	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		6			3							
10:15	Trash Trucks		5			4							
10:30	Trash Trucks		4			5							
10:45	Trash Trucks		10			3							2

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	25	0	0	15	0	0	0	0	0	0	2
TOTALS	0	25	0	0	15	0	0	0	0	0	0	2

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	25	0	0	15	0	0	0	0	0	0	2
PEAK HR. FACTOR:		0.625			0.750			0.000			0.250	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-017A

Location: I-5 SB Ramps & Walnut Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	0	0	0	0	2	1	0	0	0	0	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks												
6:15	Trash Trucks												
6:30	Trash Trucks												
6:45	Trash Trucks						1						
7:00	Trash Trucks												
7:15	Trash Trucks												
7:30	Trash Trucks												
7:45	Trash Trucks						1	1					

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	0	0	2	1	0	0	0	0	0
TOTALS	0	0	0	0	0	2	1	0	0	0	0	0

PM Peak Hr Begins at: 845 AM

PEAK VOLUMES =	0	0	0	0	0	1	1	0	0	0	0	0
PEAK HR. FACTOR:		0.000			0.250			0.250			0.000	

CONTROL:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-017A

Location: I-5 SB Ramps & Walnut Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	0	0	0	0	2	1	0	0	0	0	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks												
8:15	Trash Trucks												
8:30	Trash Trucks												
8:45	Trash Trucks							1					
9:00	Trash Trucks												
9:15	Trash Trucks							1					
9:30	Trash Trucks							1					
9:45	Trash Trucks												

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	0	0	0	3	0	0	0	0	0
TOTALS	0	0	0	0	0	0	3	0	0	0	0	0

PM Peak Hr Begins at: 1645 PM

PEAK VOLUMES =	0	0	0	0	0	0	3	0	0	0	0	0
PEAK HR. FACTOR:		0.000			0.000			0.750			0.000	

CONTROL:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-017A

Location: I-5 SB Ramps & Walnut Ave. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	0	0	0	0	2	1	0	0	0	0	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	W L	W T	W R
10:00	Trash Trucks												
10:15	Trash Trucks												
10:30	Trash Trucks												
10:45	Trash Trucks						2						

MOVEMENT TOTALS

Trash Trucks	0	0	0	0	0	2	0	0	0	0	0	0
TOTALS	0	0	0	0	0	2	0	0	0	0	0	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	W L	W T	W R

PM Peak Hr Begins at: 1645 PM

PEAK VOLUMES =	0	0	0	0	0	2	0	0	0	0	0	0
PEAK HR. FACTOR:		0.000			0.250			0.000			0.000	

CONTROL:

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-018A

Location: Sand Canyon Ave. & I-5 NB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2	1	1	2	1	1.5	0.5	1	1	0	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks		10										1
6:15	Trash Trucks		4	1			3	1					4
6:30	Trash Trucks		7			1	2	3					1
6:45	Trash Trucks		9				3	5					
7:00	Trash Trucks	3	15	1	1	3	5	2					
7:15	Trash Trucks	7	10			1	2	3					1
7:30	Trash Trucks	2	8		3	8	5	4		1			1
7:45	Trash Trucks		8			4	3	2					

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	12	71	2	4	17	23	20	0	1	0	0	8
TOTALS	12	71	2	4	17	23	20	0	1	0	0	8

PM Peak Hr Begins at: 800 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
PEAK VOLUMES =	24	42	1	4	16	15	14	0	1	0	0	2
PEAK HR. FACTOR:		0.724			0.547			0.750			0.500	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-018A

Location: Sand Canyon Ave. & I-5 NB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2	1	1	2	1	1.5	0.5	1	1	0	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks	1	7			4	4	1					
8:15	Trash Trucks	6	6		1	9	7	3					
8:30	Trash Trucks	5	10			1	2	3					
8:45	Trash Trucks	6	14		1	2	6	5					
9:00	Trash Trucks	1	15			7	4	10					
9:15	Trash Trucks	1	3			6	5	8					
9:30	Trash Trucks	8	10			8	6	7					
9:45	Trash Trucks	7	7			8	8	7		1			

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	35	72	0	2	45	42	44	0	1	0	0	0
TOTALS	35	72	0	2	45	42	44	0	1	0	0	0

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	17	35	0	0	29	23	32	0	1	0	0	0
PEAK HR. FACTOR:		0.722			0.813			0.825			0.000	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-018A

Location: Sand Canyon Ave. & I-5 NB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	2	1	1	2	1	1.5	0.5	1	1	0	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		10	1		4	6	1					
10:15	Trash Trucks	4	10		1	6	8	3					
10:30	Trash Trucks	6	10	1		7	6	4					2
10:45	Trash Trucks	5	8			10	2	1					

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	15	38	2	1	27	22	9	0	0	0	0	2
TOTALS	15	38	2	1	27	22	9	0	0	0	0	2

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	15	38	2	1	27	22	9	0	0	0	0	2
PEAK HR. FACTOR:		0.809			0.833			0.563			0.250	

CONTROL: Signali:

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-019A

Location: Sand Canyon Ave. & I-5 SB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	2	0	2	2	0	1.5	0	1.5	0	0	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks			1				8		2			
6:15	Trash Trucks		1	1				6					
6:30	Trash Trucks		2			1		6					
6:45	Trash Trucks		1		1			5		1			
7:00	Trash Trucks		8			2		13		1			
7:15	Trash Trucks		9		2			9		1			
7:30	Trash Trucks		3		5	2		6					
7:45	Trash Trucks				4	1		7					

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	24	2	12	6	0	60	0	5	0	0	0
TOTALS	0	24	2	12	6	0	60	0	5	0	0	0

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	20	0	11	5	0	35	0	2	0	0	0
PEAK HR. FACTOR:		0.556			0.571			0.661			0.000	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-019A

Location: Sand Canyon Ave. & I-5 SB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	2	0	2	2	0	1.5	0	1.5	0	0	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		1		4	1		7		3			
8:15	Trash Trucks		6		7	2		9		4			
8:30	Trash Trucks		6		3			6		8			
8:45	Trash Trucks		4		3	1		6		10			
9:00	Trash Trucks		6		2			8		6			
9:15	Trash Trucks		6		6			8		5			
9:30	Trash Trucks		6	1	8			12		6			
9:45	Trash Trucks		6	1	7	1		8					

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	41	2	40	5	0	64	0	42	0	0	0
TOTALS	0	41	2	40	5	0	64	0	42	0	0	0

PM Peak Hr Begins at: 1645 PM

PEAK VOLUMES =	0	22	1	19	1	0	34	0	27	0	0	(
PEAK HR. FACTOR:		0.821			0.625			0.847			0.000	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-019A

Location: Sand Canyon Ave. & I-5 SB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	2	0	2	2	0	1.5	0	1.5	0	0	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		5		3			8		2			
10:15	Trash Trucks		11		6	1		6		2			
10:30	Trash Trucks		7		5	2		5		4			
10:45	Trash Trucks		7	2	8	1		6		1			

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	30	2	22	4	0	25	0	9	0	0	0
TOTALS	0	30	2	22	4	0	25	0	9	0	0	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	30	2	22	4	0	25	0	9	0	0	0
PEAK HR. FACTOR:		0.727			0.722			0.850			0.000	

CONTROL: Signali:

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-020A

Location: Sand Canyon Ave. & Laguna Cyn. Rd City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	3	1	1	2	1	2	1	0	2	1	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks		3										
6:15	Trash Trucks				1								1
6:30	Trash Trucks		3	1									
6:45	Trash Trucks										2		1
7:00	Trash Trucks		1	2	1						1		3
7:15	Trash Trucks		2	1	1	3							5
7:30	Trash Trucks		1		2	2				1			2
7:45	Trash Trucks				1								2

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	10	4	6	5	0	0	0	1	3	0	14
TOTALS	0	10	4	6	5	0	0	0	1	3	0	14

PM Peak Hr Begins at: 800 AM

PEAK VOLUMES =	0	4	3	5	5	0	0	0	1	3	0	12
PEAK HR. FACTOR:		0.583			0.625			0.250			0.700	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-020A

Location: Sand Canyon Ave. & Laguna Cyn. Rd City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	3	1	1	2	1	2	1	0	2	1	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		1	1	3						2		2
8:15	Trash Trucks		2		3	2							3
8:30	Trash Trucks		2		4								4
8:45	Trash Trucks		1		7								6
9:00	Trash Trucks		1		5	1							6
9:15	Trash Trucks		3		5	1							1
9:30	Trash Trucks		1		6	1							1
9:45	Trash Trucks		1		7	1							6

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	12	1	40	6	0	0	0	0	2	0	29
TOTALS	0	12	1	40	6	0	0	0	0	2	0	29

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	0	7	0	23	4	0	0	0	0	0	0	19
PEAK HR. FACTOR:		0.750			0.844			0.000			0.792	

CONTROL: Signali:

15 45 Start Time - 15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-020A

Location: Sand Canyon Ave. & Laguna Cyn. Rd City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	3	1	1	2	1	2	1	0	2	1	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		2		1	1							
10:15	Trash Trucks		1		3	1							8
10:30	Trash Trucks		2		2	2							
10:45	Trash Trucks				2	1							7

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	5	0	8	5	0	0	0	0	0	0	15
TOTALS	0	5	0	8	5	0	0	0	0	0	0	15

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	5	0	8	5	0	0	0	0	0	0	15
PEAK HR. FACTOR:		0.625			0.813			0.000			0.469	

CONTROL: Signali:

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-021A

Location: Sand Canyon Ave. & Irvine Center Dr. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	1	2	3	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks												
6:15	Trash Trucks		1		2					2			
6:30	Trash Trucks		1			1							
6:45	Trash Trucks		2		2								
7:00	Trash Trucks	1	2		1	1							
7:15	Trash Trucks		2										1
7:30	Trash Trucks		2			1							1
7:45	Trash Trucks		1			1		1					

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	1	11	0	5	4	0	1	0	2	0	0	2
TOTALS	1	11	0	5	4	0	1	0	2	0	0	2

PM Peak Hr Begins at: 745 AM

PEAK VOLUMES =	2	8	0	5	2	0	0	0	2	0	0	2
PEAK HR. FACTOR:		0.750			0.875			0.250			0.500	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-021A

Location: Sand Canyon Ave. & Irvine Center Dr. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	1	2	3	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		3			1							
8:15	Trash Trucks		2			2						1	
8:30	Trash Trucks		2										
8:45	Trash Trucks		1			2							
9:00	Trash Trucks		1			1							
9:15	Trash Trucks		1			1							
9:30	Trash Trucks		1			1							
9:45	Trash Trucks		1			1							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	12	0	0	9	0	0	0	0	0	1	0
TOTALS	0	12	0	0	9	0	0	0	0	0	1	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	8	0	0	5	0	0	0	0	0	1	0
PEAK HR. FACTOR:		0.667			0.625			0.000			0.250	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-021A

Location: Sand Canyon Ave. & Irvine Center Dr. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	1	2	3	1	2	3	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		3			1							
10:15	Trash Trucks		1	1		1							
10:30	Trash Trucks		1			2							
10:45	Trash Trucks					1							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	5	1	0	5	0	0	0	0	0	0	0
TOTALS	0	5	1	0	5	0	0	0	0	0	0	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	5	1	0	5	0	0	0	0	0	0	0
PEAK HR. FACTOR:		0.500			0.625			0.000			0.000	

CONTROL: Signali:

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project# 05-1181-022A

Location: Sand Cyn. & Barranca Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	1	1	2	1	0	1	1	1	1	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks	1											
6:15	Trash Trucks		2				1					3	
6:30	Trash Trucks		3			2				1	1		
6:45	Trash Trucks					1						1	
7:00	Trash Trucks	1	1	2		1						2	
7:15	Trash Trucks	1		1		2						2	
7:30	Trash Trucks		2						1	1	1	1	
7:45	Trash Trucks					1							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	3	8	3	0	7	1	0	1	2	2	9	0
TOTALS	3	8	3	0	7	1	0	1	2	2	9	0

PM Peak Hr Begins at: 730 AM

PEAK VOLUMES =	3	6	3	0	6	1	0	0	1	1	6	0
PEAK HR. FACTOR:		0.563			0.750			0.250			0.750	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-022A

Location: Sand Cyn. & Barranca Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	1	1	2	1	0	1	1	1	1	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks	1				2	1		1		1	1	
8:15	Trash Trucks					1		1	1			1	1
8:30	Trash Trucks	1	1			1			1				1
8:45	Trash Trucks		2			1			2	1		1	
9:00	Trash Trucks		1		1	1		1	2				1
9:15	Trash Trucks		2	1		1	1		1		1	1	1
9:30	Trash Trucks	1	1	1		1	1		2	1		1	
9:45	Trash Trucks	1	1	1					1			2	1

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	4	8	3	1	8	3	2	11	2	2	7	5
TOTALS	4	8	3	1	8	3	2	11	2	2	7	5

PM Peak Hr Begins at: 1700 PM

PEAK VOLUMES =	3	6	3	1	4	2	1	7	2	1	4	3
PEAK HR. FACTOR:		0.833			0.875			0.833			0.667	

CONTROL: Signalized

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-022A

Location: Sand Cyn. & Barranca Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	1	1	2	1	0	1	1	1	1	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		1	1	1	1	1	1	1	1	1	2	
10:15	Trash Trucks		1			1			1			1	1
10:30	Trash Trucks		1	1	1	1		2	1				
10:45	Trash Trucks		1	1	1				1		1	2	

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	4	3	3	3	1	3	4	1	2	5	1
TOTALS	0	4	3	3	3	1	3	4	1	2	5	1

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	4	3	3	3	1	3	4	1	2	5	1
PEAK HR. FACTOR:		0.875			0.583			0.667			0.667	

CONTROL: Signalized

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-023A

Location: Sand Canyon Ave. & Alton Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	1	2	3	1	2	2	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks				1	1			1			1	
6:15	Trash Trucks		2		2								
6:30	Trash Trucks		2										
6:45	Trash Trucks				3								1
7:00	Trash Trucks					1							1
7:15	Trash Trucks				1								
7:30	Trash Trucks		2		1						1		
7:45	Trash Trucks		1										1

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	7	0	8	2	0	0	1	0	1	1	3
TOTALS	0	7	0	8	2	0	0	1	0	1	1	3

PM Peak Hr Begins at: 700 AM

PEAK VOLUMES =	0	4	0	6	1	0	0	1	0	0	1	1
PEAK HR. FACTOR:		0.500			0.583			0.250			0.500	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-023A

Location: Sand Canyon Ave. & Alton Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	1	2	3	1	2	2	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks		1			1							
8:15	Trash Trucks		1			1							
8:30	Trash Trucks		1	1		1	1						
8:45	Trash Trucks		1				1						
9:00	Trash Trucks		2				1						
9:15	Trash Trucks		1		1			1					
9:30	Trash Trucks				1								
9:45	Trash Trucks		1				2						

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	8	1	2	3	5	1	0	0	0	0	0
TOTALS	0	8	1	2	3	5	1	0	0	0	0	0

PM Peak Hr Begins at: 1630 PM

PEAK VOLUMES =	0	5	1	1	1	3	1	0	0	0	0	0
PEAK HR. FACTOR:		0.750			0.625			0.250			0.000	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-023A

Location: Sand Canyon Ave. & Alton Pkwy. City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	2	3	1	2	3	1	2	3	1	2	2	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks		2		2								
10:15	Trash Trucks					1							
10:30	Trash Trucks		1			1							
10:45	Trash Trucks		1			1							

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	4	0	2	3	0	0	0	0	0	0	0
TOTALS	0	4	0	2	3	0	0	0	0	0	0	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	4	0	2	3	0	0	0	0	0	0	0
PEAK HR. FACTOR:		0.500			0.625			0.000			0.000	

CONTROL: Signali:

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-024A

Location: Sand Canyon Ave. & I-405 NB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	2	0	0	2	1	0	0	0	1	0	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
6:00	Trash Trucks				1								
6:15	Trash Trucks												
6:30	Trash Trucks							2					
6:45	Trash Trucks		1										
7:00	Trash Trucks		1		1								
7:15	Trash Trucks		2										
7:30	Trash Trucks												
7:45	Trash Trucks												

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	4	0	2	0	0	2	0	0	0	0	0
TOTALS	0	4	0	2	0	0	2	0	0	0	0	0

PM Peak Hr Begins at: 730 AM

PEAK VOLUMES =	0	4	0	1	0	0	2	0	0	0	0	0
PEAK HR. FACTOR:		0.500			0.250			0.250			0.000	

CONTROL: Signali:

15 45 Start Time - 15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-024A

Location: Sand Canyon Ave. & I-405 NB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	2	0	0	2	1	0	0	0	1	0	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks				1			1					
8:15	Trash Trucks				1								
8:30	Trash Trucks							2					
8:45	Trash Trucks							1					
9:00	Trash Trucks							1					
9:15	Trash Trucks												
9:30	Trash Trucks												
9:45	Trash Trucks												

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	2	0	0	5	0	0	0	0	0
TOTALS	0	0	0	2	0	0	5	0	0	0	0	0

PM Peak Hr Begins at: 1600 PM

PEAK VOLUMES =	0	0	0	2	0	0	4	0	0	0	0	0
PEAK HR. FACTOR:		0.000			0.500			0.500			0.000	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-024A

Location: Sand Canyon Ave. & I-405 NB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	0	2	0	0	2	1	0	0	0	1	0	1
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks												
10:15	Trash Trucks		1	1			1						
10:30	Trash Trucks						1						
10:45	Trash Trucks						1	2					

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	1	1	0	0	3	2	0	0	0	0	0
TOTALS	0	1	1	0	0	3	2	0	0	0	0	0

PM Peak Hr Begins at: 1615 PM

PEAK VOLUMES =	0	1	1	0	0	3	2	0	0	0	0	0
PEAK HR. FACTOR:		0.250			0.750			0.250			0.000	

CONTROL: Signali:

6 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-025A

Location: Sand Canyon Ave. & I-405 SB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	0	0	2	1	1.5	0	0.5	0	0	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	W L	W T	W R
6:00	Trash Trucks												
6:15	Trash Trucks												
6:30	Trash Trucks												
6:45	Trash Trucks							1					
7:00	Trash Trucks							1	1				
7:15	Trash Trucks							2					
7:30	Trash Trucks												
7:45	Trash Trucks												

MOVEMENT TOTALS

Trash Trucks	0	0	0	0	0	0	4	1	0	0	0	0
TOTALS	0	0	0	0	0	0	4	1	0	0	0	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	W L	W T	W R

PM Peak Hr Begins at: 745 AM

PEAK VOLUMES =	0	0	0	0	0	0	4	1	0	0	0	0
PEAK HR. FACTOR:		0.000			0.000			0.625			0.000	

CONTROL: Signali:

15 45 Start Time -15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-025A

Location: Sand Canyon Ave. & I-405 SB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	0	0	2	1	1.5	0	0.5	0	0	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
8:00	Trash Trucks												
8:15	Trash Trucks												
8:30	Trash Trucks												
8:45	Trash Trucks												
9:00	Trash Trucks												
9:15	Trash Trucks												
9:30	Trash Trucks												
9:45	Trash Trucks												

MOVEMENT TOTALS

Trash Trucks	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR

PM Peak Hr Begins at: 0 AM

PEAK VOLUMES =	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR. FACTOR:		0.000			0.000			0.000			0.000	

CONTROL: Signali:

15 45 Start Time - 15 MINUTES

SOUTHLAND CAR COUNTERS

Trash Trucks Count

Project # 05-1181-025A

Location: Sand Canyon Ave. & I-405 SB Ramps City: Irvine Date: 09/14/05 Day: WEDNESDAY

	LANES:	1	2	0	0	2	1	1.5	0	0.5	0	0	0
		NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
10:00	Trash Trucks												
10:15	Trash Trucks							2					
10:30	Trash Trucks												
10:45	Trash Trucks												

MOVEMENT TOTALS

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR
Trash Trucks	0	0	0	0	0	0	2	0	0	0	0	0
TOTALS	0	0	0	0	0	0	2	0	0	0	0	0

PM Peak Hr Begins at: 1615 PM

PEAK VOLUMES =	0	0	0	0	0	0	2	0	0	0	0	0
PEAK HR. FACTOR:		0.000			0.000			0.250			0.000	

CONTROL: Signali:

APPENDIX B

LOS Computation Reports
Existing Conditions

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #1 Culver Drive at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.516
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 24 Level Of Service: A

Street Name:	Culver Drive						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 0 0 1			0 0 1! 0 0			1 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	135	0	314	7	0	2	2	660	293	352	417	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	135	0	314	7	0	2	2	660	293	352	417	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	135	0	314	7	0	2	2	660	293	352	417	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	135	0	314	7	0	2	2	660	293	352	417	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	135	0	314	7	0	2	2	660	293	352	417	10
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.78	0.00	0.22	1.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	0	1700	1322	0	378	1700	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.18	0.01	0.00	0.01	0.00	0.13	0.17	0.10	0.08	0.01
Crit Moves:			****	****					****	****		

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #1 Culver Drive at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.172
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 15 Level Of Service: A

Street Name:	Culver Drive						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 0 0 1			0 0 1! 0 0			1 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	89	0	55	11	1	1	3	250	104	70	172	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	89	0	55	11	1	1	3	250	104	70	172	15
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	89	0	55	11	1	1	3	250	104	70	172	15
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	89	0	55	11	1	1	3	250	104	70	172	15
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	89	0	55	11	1	1	3	250	104	70	172	15
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.84	0.08	0.08	1.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	0	1700	1438	131	131	1700	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.03	0.01	0.01	0.01	0.00	0.05	0.06	0.02	0.03	0.01
Crit Moves:			****		****				****	****		

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #2 Yale Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.487
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 23 Level Of Service: A

Street Name:	Yale Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 1 0 1			1 0 3 0 1			1 0 3 0 1		
Volume Module:												
Base Vol:	79	384	71	99	151	187	236	639	101	57	494	216
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	79	384	71	99	151	187	236	639	101	57	494	216
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	79	384	71	99	151	187	236	639	101	57	494	216
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	79	384	71	99	151	187	236	639	101	57	494	216
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	79	384	71	99	151	187	236	639	101	57	494	216
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	1700	1700	1700	5100	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.11	0.04	0.06	0.09	0.11	0.14	0.13	0.06	0.03	0.10	0.13
Crit Moves:		****		****			****					****

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

****

Intersection #2 Yale Avenue at Portola Parkway

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.204
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 15 Level Of Service: A

****

Street Name:	Yale Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 1 0 1			1 0 3 0 1			1 0 3 0 1		
Volume Module:												
Base Vol:	38	34	64	64	66	71	34	304	44	32	204	27
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	38	34	64	64	66	71	34	304	44	32	204	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	38	34	64	64	66	71	34	304	44	32	204	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	38	34	64	64	66	71	34	304	44	32	204	27
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	38	34	64	64	66	71	34	304	44	32	204	27
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	1700	1700	1700	5100	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.01	0.04	0.04	0.04	0.04	0.02	0.06	0.03	0.02	0.04	0.02
Crit Moves:			****	****				****		****		

****

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

****

Intersection #3 Jeffrey Road at Portola Parkway

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.360
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 19 Level Of Service: A

****

Street Name:	Jeffrey Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 1	0 1		1 0 1	0 1		1 0 2	0 1		2 0 2	0 1	
Volume Module:												
Base Vol:	141	33	56	28	53	7	26	562	237	245	504	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	141	33	56	28	53	7	26	562	237	245	504	15
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	141	33	0	28	53	7	26	562	237	245	504	15
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	141	33	0	28	53	7	26	562	237	245	504	15
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	141	33	0	28	53	7	26	562	237	245	504	15
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	1700	1700	1700	1700	1700	1700	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.02	0.00	0.02	0.03	0.00	0.02	0.17	0.14	0.07	0.15	0.01
Crit Moves:	****				****			****		****		

****

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

****

Intersection #3 Jeffrey Road at Portola Parkway

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.204
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 15 Level Of Service: A

****

Street Name:	Jeffrey Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 1	0 1		1 0 1	0 1		1 0 2	0 1		2 0 2	0 1	
Volume Module:												
Base Vol:	84	72	31	47	76	9	20	216	142	68	156	48
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	84	72	31	47	76	9	20	216	142	68	156	48
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	84	72	0	47	76	9	20	216	142	68	156	48
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	84	72	0	47	76	9	20	216	142	68	156	48
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	84	72	0	47	76	9	20	216	142	68	156	48
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	1700	1700	1700	1700	1700	1700	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.04	0.00	0.03	0.04	0.01	0.01	0.06	0.08	0.02	0.05	0.03
Crit Moves:		****		****				****		****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #4 Bee Canyon Access Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.377
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 19 Level Of Service: A

Street Name:	Bee Canyon Access Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 1! 0 0			1 0 2 0 0			0 0 2 0 2		
Volume Module:												
Base Vol:	0	0	0	163	0	148	67	566	0	0	667	127
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	163	0	148	67	566	0	0	667	127
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	163	0	148	67	566	0	0	667	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	163	0	148	67	566	0	0	667	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	0	0	0	163	0	148	67	566	0	0	667	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.05	0.00	0.95	1.00	2.00	0.00	0.00	2.00	2.00
Final Sat.:	0	0	0	1782	0	1618	1700	3400	0	0	3400	3400
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.09	0.00	0.09	0.04	0.17	0.00	0.00	0.20	0.00
Crit Moves:				****			****				****	

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

****

Intersection #4 Bee Canyon Access Road at Portola Parkway

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.187
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 15 Level Of Service: A

****

Street Name:	Bee Canyon Access Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 1! 0 0			1 0 2 0 0			0 0 2 0 2		
Volume Module:												
Base Vol:	0	0	0	128	0	47	21	292	0	0	201	188
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	128	0	47	21	292	0	0	201	188
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	128	0	47	21	292	0	0	201	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	128	0	47	21	292	0	0	201	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	0	0	0	128	0	47	21	292	0	0	201	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.46	0.00	0.54	1.00	2.00	0.00	0.00	2.00	2.00
Final Sat.:	0	0	0	2487	0	913	1700	3400	0	0	3400	3400
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.05	0.00	0.05	0.01	0.09	0.00	0.00	0.06	0.00
Crit Moves:				****				****		****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

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Intersection #5 Sand Canyon Avenue at Portola Parkway

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.285
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 17 Level Of Service: A

****

Street Name:	Sand Canyon Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 0 0 1			0 0 0 0 0			0 0 2 0 1			2 0 2 0 0		
Volume Module:												
Base Vol:	171	0	104	0	0	0	0	177	459	295	628	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	171	0	104	0	0	0	0	177	459	295	628	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	171	0	104	0	0	0	0	177	0	295	628	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	171	0	104	0	0	0	0	177	0	295	628	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	171	0	104	0	0	0	0	177	0	295	628	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	1.00	2.00	2.00	0.00
Final Sat.:	3400	0	1700	0	0	0	0	3400	1700	3400	3400	0
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.06	0.00	0.00	0.00	0.00	0.05	0.00	0.09	0.18	0.00
Crit Moves:	****						****				****	

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

****

Intersection #5 Sand Canyon Avenue at Portola Parkway

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.187
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 15 Level Of Service: A

****

Street Name:	Sand Canyon Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 0 0 1			0 0 0 0 0			0 0 2 0 1			2 0 2 0 0		
Volume Module:												
Base Vol:	263	0	106	0	0	0	0	98	304	105	132	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	263	0	106	0	0	0	0	98	304	105	132	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	263	0	106	0	0	0	0	98	0	105	132	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	263	0	106	0	0	0	0	98	0	105	132	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	263	0	106	0	0	0	0	98	0	105	132	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	1.00	2.00	2.00	0.00
Final Sat.:	3400	0	1700	0	0	0	0	3400	1700	3400	3400	0
Capacity Analysis Module:												
Vol/Sat:	0.08	0.00	0.06	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.04	0.00
Crit Moves:	****							****		****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #6 Culver Drive at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.588
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Culver Drive						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 2 1 0		
Volume Module:												
Base Vol:	177	250	124	104	912	192	57	576	354	336	866	34
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	177	250	124	104	912	192	57	576	354	336	866	34
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	177	250	124	104	912	192	57	576	354	336	866	34
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	177	250	124	104	912	192	57	576	354	336	866	34
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	177	250	124	104	912	192	57	576	354	336	866	34
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.89	0.11
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	4907	193
Capacity Analysis Module:												
Vol/Sat:	0.05	0.05	0.07	0.03	0.18	0.11	0.02	0.11	0.21	0.10	0.18	0.18
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #6 Culver Drive at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.411
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 20 Level Of Service: A

Street Name:	Culver Drive						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 2 1 0		
Volume Module:												
Base Vol:	173	263	112	92	587	121	47	328	207	249	424	28
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	173	263	112	92	587	121	47	328	207	249	424	28
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	173	263	112	92	587	121	47	328	207	249	424	28
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	173	263	112	92	587	121	47	328	207	249	424	28
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	173	263	112	92	587	121	47	328	207	249	424	28
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.81	0.19
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	4784	316
Capacity Analysis Module:												
Vol/Sat:	0.05	0.05	0.07	0.03	0.12	0.07	0.01	0.06	0.12	0.07	0.09	0.09
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #7 Yale Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.478
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 23 Level Of Service: A

Street Name:	Yale Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 2 0 1			1 0 2 1 0			1 0 2 1 0		
Volume Module:												
Base Vol:	99	82	63	255	114	253	86	662	41	47	817	54
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	99	82	63	255	114	253	86	662	41	47	817	54
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	99	82	63	255	114	253	86	662	41	47	817	54
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	99	82	63	255	114	253	86	662	41	47	817	54
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	99	82	63	255	114	253	86	662	41	47	817	54
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.83	0.17	1.00	2.81	0.19
Final Sat.:	1700	3400	1700	1700	3400	1700	1700	4803	297	1700	4784	316
Capacity Analysis Module:												
Vol/Sat:	0.06	0.02	0.04	0.15	0.03	0.15	0.05	0.14	0.14	0.03	0.17	0.17
Crit Moves:	****					****	****				****	

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #7 Yale Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.349
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 19 Level Of Service: A

Street Name:	Yale Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 2 0 1			1 0 2 1 0			1 0 2 1 0		
Volume Module:												
Base Vol:	78	100	47	165	112	186	108	378	46	52	340	68
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	78	100	47	165	112	186	108	378	46	52	340	68
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	78	100	47	165	112	186	108	378	46	52	340	68
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	78	100	47	165	112	186	108	378	46	52	340	68
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	78	100	47	165	112	186	108	378	46	52	340	68
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.67	0.33	1.00	2.50	0.50
Final Sat.:	1700	3400	1700	1700	3400	1700	1700	4547	553	1700	4250	850
Capacity Analysis Module:												
Vol/Sat:	0.05	0.03	0.03	0.10	0.03	0.11	0.06	0.08	0.08	0.03	0.08	0.08
Crit Moves:	****					****	****				****	

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #8 Jeffrey Road at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.437
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Jeffrey Road						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	94	353	131	39	530	36	93	651	302	219	745	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	94	353	131	39	530	36	93	651	302	219	745	30
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	94	353	0	39	530	36	93	651	302	219	745	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	94	353	0	39	530	36	93	651	302	219	745	30
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	94	353	0	39	530	36	93	651	302	219	745	30
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.07	0.00	0.01	0.10	0.02	0.03	0.19	0.18	0.06	0.22	0.02
Crit Moves:	****				****			****			****	

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

****

Intersection #8 Jeffrey Road at Irvine Boulevard

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.265
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 17 Level Of Service: A

****

Street Name:	Jeffrey Road						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	99	161	83	32	299	16	28	304	181	71	219	14
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	99	161	83	32	299	16	28	304	181	71	219	14
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	99	161	0	32	299	16	28	304	181	71	219	14
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	99	161	0	32	299	16	28	304	181	71	219	14
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	99	161	0	32	299	16	28	304	181	71	219	14
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.03	0.00	0.01	0.06	0.01	0.01	0.09	0.11	0.02	0.06	0.01
Crit Moves:	****				****				****	****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

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Intersection #9 Sand Canyon Avenue at Irvine Boulevard

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.458
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

****

Street Name:	Sand Canyon Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	29	157	102	210	537	23	12	835	136	263	822	84
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	29	157	102	210	537	23	12	835	136	263	822	84
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	29	157	102	210	537	23	12	835	136	263	822	84
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	29	157	102	210	537	23	12	835	136	263	822	84
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	29	157	102	210	537	23	12	835	136	263	822	84
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3400	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.05	0.06	0.06	0.16	0.01	0.00	0.16	0.08	0.08	0.16	0.05
Crit Moves:	****				****			****		****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

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Intersection #9 Sand Canyon Avenue at Irvine Boulevard

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.261
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 16 Level Of Service: A

****

Street Name:	Sand Canyon Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	42	206	69	174	257	9	17	326	60	120	287	117
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	42	206	69	174	257	9	17	326	60	120	287	117
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	42	206	69	174	257	9	17	326	60	120	287	117
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	42	206	69	174	257	9	17	326	60	120	287	117
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	42	206	69	174	257	9	17	326	60	120	287	117
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3400	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.06	0.04	0.05	0.08	0.01	0.01	0.06	0.04	0.04	0.06	0.07
Crit Moves:		****		****				****		****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

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Intersection #10 SR 133 Southbound Ramps at Irvine Boulevard

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.530
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 25 Level Of Service: A

****

Street Name:	SR 133 Southbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			2 0 0 0 1			0 0 2 0 1			1 0 3 0 0		
Volume Module:												
Base Vol:	0	0	0	150	0	228	0	1047	44	65	963	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	150	0	228	0	1047	44	65	963	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	150	0	228	0	1047	44	65	963	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	150	0	228	0	1047	44	65	963	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	150	0	228	0	1047	44	65	963	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	2.00	1.00	1.00	3.00	0.00
Final Sat.:	0	0	0	3400	0	1700	0	3400	1700	1700	5100	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.04	0.00	0.13	0.00	0.31	0.03	0.04	0.19	0.00
Crit Moves:						****		****		****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

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Intersection #10 SR 133 Southbound Ramps at Irvine Boulevard

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.304
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 17 Level Of Service: A

****

Street Name:	SR 133 Southbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			2 0 0 0 1			0 0 2 0 1			1 0 3 0 0		
Volume Module:												
Base Vol:	0	0	0	61	0	86	0	610	47	40	450	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	61	0	86	0	610	47	40	450	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	61	0	86	0	610	47	40	450	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	61	0	86	0	610	47	40	450	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	61	0	86	0	610	47	40	450	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	2.00	1.00	1.00	3.00	0.00
Final Sat.:	0	0	0	3400	0	1700	0	3400	1700	1700	5100	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.02	0.00	0.05	0.00	0.18	0.03	0.02	0.09	0.00
Crit Moves:						****		****		****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

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Intersection #11 SR 133 Northbound Ramps at Irvine Boulevard

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.789
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 50 Level Of Service: C

****

Street Name:	SR 133 Northbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 1 0 2			0 0 2 1 0		
Volume Module:												
Base Vol:	41	0	36	0	0	0	0	1216	29	0	1221	68
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	41	0	36	0	0	0	0	1216	29	0	1221	68
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	41	0	36	0	0	0	0	1216	0	0	1221	68
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	41	0	36	0	0	0	0	1216	0	0	1221	68
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	41	0	36	0	0	0	0	1216	0	0	1221	68
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	2.00	0.00	2.84	0.16
Final Sat.:	1700	0	1700	0	0	0	0	1700	3400	0	4831	269
Capacity Analysis Module:												
Vol/Sat:	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.25	0.25
Crit Moves:	****							****		****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #11 SR 133 Northbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.489
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 23 Level Of Service: A

Street Name:	SR 133 Northbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 1 0 2			0 0 2 1 0		
Volume Module:												
Base Vol:	52	0	64	0	0	0	0	682	35	0	534	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	52	0	64	0	0	0	0	682	35	0	534	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	52	0	64	0	0	0	0	682	0	0	534	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	52	0	64	0	0	0	0	682	0	0	534	30
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	52	0	64	0	0	0	0	682	0	0	534	30
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	2.00	0.00	2.84	0.16
Final Sat.:	1700	0	1700	0	0	0	0	1700	3400	0	4829	271
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.04	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.11	0.11
Crit Moves:			****					****		****		

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #12 Jeffrey Road at Bryan Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.318
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 18 Level Of Service: A

Street Name:	Jeffrey Road						Bryan Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			1 0 2 0 1			2 0 1 0 1		
Volume Module:												
Base Vol:	73	288	162	32	360	29	88	45	219	116	34	12
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	73	288	162	32	360	29	88	45	219	116	34	12
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	73	288	162	32	360	29	88	45	219	116	34	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	73	288	162	32	360	29	88	45	219	116	34	12
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	73	288	162	32	360	29	88	45	219	116	34	12
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	1.00	2.00	1.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	1700	3400	1700	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.06	0.10	0.01	0.07	0.02	0.05	0.01	0.13	0.03	0.02	0.01
Crit Moves:			****	****					****	****		

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #12 Jeffrey Road at Bryan Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.196
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 15 Level Of Service: A

Street Name:	Jeffrey Road						Bryan Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			1 0 2 0 1			2 0 1 0 1		
Volume Module:												
Base Vol:	56	307	32	10	343	15	25	15	78	56	12	11
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	56	307	32	10	343	15	25	15	78	56	12	11
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	56	307	32	10	343	15	25	15	78	56	12	11
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	56	307	32	10	343	15	25	15	78	56	12	11
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	56	307	32	10	343	15	25	15	78	56	12	11
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	1.00	2.00	1.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	1700	3400	1700	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.06	0.02	0.00	0.07	0.01	0.01	0.00	0.05	0.02	0.01	0.01
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

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Intersection #13 Jeffrey Road at Trabuco Road

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Cycle (sec): 100 Critical Vol./Cap. (X): 0.341
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 18 Level Of Service: A

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Street Name:	Jeffrey Road						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	68	555	42	31	1160	20	35	50	94	27	17	25
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	68	555	42	31	1160	20	35	50	94	27	17	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	68	555	42	31	1160	20	35	50	94	27	17	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	68	555	42	31	1160	20	35	50	94	27	17	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	68	555	42	31	1160	20	35	50	94	27	17	25
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.11	0.02	0.01	0.23	0.01	0.01	0.01	0.06	0.01	0.01	0.01
Crit Moves:	****				****				****	****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #13 Jeffrey Road at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.279
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 17 Level Of Service: A

Street Name:	Jeffrey Road						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	65	445	30	22	801	23	32	61	109	28	36	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	65	445	30	22	801	23	32	61	109	28	36	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	65	445	30	22	801	23	32	61	109	28	36	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	65	445	30	22	801	23	32	61	109	28	36	20
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	65	445	30	22	801	23	32	61	109	28	36	20
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.09	0.02	0.01	0.16	0.01	0.01	0.02	0.06	0.01	0.01	0.01
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

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Intersection #14 Sand Canyon Avenue at Trabuco Road

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Cycle (sec): 100 Critical Vol./Cap. (X): 0.387
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 20 Level Of Service: A

****

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 1 1 0			1 0 2 1 0			1 0 3 0 1		
Volume Module:												
Base Vol:	52	321	177	80	826	31	25	52	57	36	14	5
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	52	321	177	80	826	31	25	52	57	36	14	5
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	52	321	177	80	826	31	25	52	57	36	14	5
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	52	321	177	80	826	31	25	52	57	36	14	5
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	52	321	177	80	826	31	25	52	57	36	14	5
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.93	0.07	1.00	2.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	3277	123	1700	3400	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.09	0.10	0.05	0.25	0.25	0.01	0.02	0.03	0.02	0.00	0.00
Crit Moves:	****				****				****	****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

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Intersection #14 Sand Canyon Avenue at Trabuco Road

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Cycle (sec): 100 Critical Vol./Cap. (X): 0.261
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 16 Level Of Service: A

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Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 1 1 0			1 0 2 1 0			1 0 3 0 1		
Volume Module:												
Base Vol:	61	358	159	77	326	8	29	34	47	56	34	27
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	61	358	159	77	326	8	29	34	47	56	34	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	61	358	159	77	326	8	29	34	47	56	34	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	61	358	159	77	326	8	29	34	47	56	34	27
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	61	358	159	77	326	8	29	34	47	56	34	27
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.95	0.05	1.00	2.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	3319	81	1700	3400	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.11	0.09	0.05	0.10	0.10	0.02	0.01	0.03	0.03	0.01	0.02
Crit Moves:		****		****					****	****		

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Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

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Intersection #15 Jeffrey Road at I-5 Northbound Ramps

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Cycle (sec): 100 Critical Vol./Cap. (X): 0.374
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 19 Level Of Service: A

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Street Name:	Jeffrey Road						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0	1	0 0 3	0	1	0 0 0	0	0	1 0 1!	0	1
Volume Module:												
Base Vol:	0	521	246	0	1218	184	0	0	0	290	0	134
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	521	246	0	1218	184	0	0	0	290	0	134
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	521	0	0	1218	0	0	0	0	290	0	134
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	521	0	0	1218	0	0	0	0	290	0	134
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	521	0	0	1218	0	0	0	0	290	0	134
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	0.00	3.00	1.00	0.00	0.00	0.00	2.00	0.00	1.00
Final Sat.:	0	5100	1700	0	5100	1700	0	0	0	3400	0	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.10	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.09	0.00	0.08
Crit Moves:	****				****					****		

****

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

****

Intersection #15 Jeffrey Road at I-5 Northbound Ramps

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.291
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 17 Level Of Service: A

****

Street Name:	Jeffrey Road						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0	1	0 0 3	0	1	0 0 0	0	0	1 0 1!	0	1
Volume Module:												
Base Vol:	0	443	313	0	835	167	0	0	0	256	0	137
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	443	313	0	835	167	0	0	0	256	0	137
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	443	0	0	835	0	0	0	0	256	0	137
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	443	0	0	835	0	0	0	0	256	0	137
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	443	0	0	835	0	0	0	0	256	0	137
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	0.00	3.00	1.00	0.00	0.00	0.00	1.95	0.00	1.05
Final Sat.:	0	5100	1700	0	5100	1700	0	0	0	3322	0	1778
Capacity Analysis Module:												
Vol/Sat:	0.00	0.09	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.08	0.00	0.08
Crit Moves:	****				****					****		

****

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.513
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 24 Level Of Service: A

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 1 0			1 0 1 0 1			2 0 1 0 1		
Volume Module:												
Base Vol:	86	528	83	341	983	170	71	213	168	279	74	117
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	86	528	83	341	983	170	71	213	168	279	74	117
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	86	528	83	341	983	170	71	213	168	279	74	117
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	86	528	83	341	983	170	71	213	168	279	74	117
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	86	528	83	341	983	170	71	213	168	279	74	117
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.56	0.44	1.00	1.00	1.00	2.00	1.00	1.00
Final Sat.:	3400	3400	1700	3400	4348	752	1700	1700	1700	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.16	0.05	0.10	0.23	0.23	0.04	0.13	0.10	0.08	0.04	0.07
Crit Moves:		****		****				****		****		

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.504
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 24 Level Of Service: A

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2	0 1		2 0 2	1 0		1 0 1	0 1		2 0 1	0 1	
Volume Module:												
Base Vol:	110	590	79	265	663	172	102	146	175	338	61	119
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	110	590	79	265	663	172	102	146	175	338	61	119
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	110	590	79	265	663	172	102	146	175	338	61	119
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	110	590	79	265	663	172	102	146	175	338	61	119
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	110	590	79	265	663	172	102	146	175	338	61	119
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.38	0.62	1.00	1.00	1.00	2.00	1.00	1.00
Final Sat.:	3400	3400	1700	3400	4049	1051	1700	1700	1700	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.17	0.05	0.08	0.16	0.16	0.06	0.09	0.10	0.10	0.04	0.07
Crit Moves:		****		****					****	****		

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

****

Intersection #17 Sand Canyon Avenue at I-5 Northbound Ramps

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.444
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

****

Street Name:	Sand Canyon Avenue						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			1 0 2 0 1			1 1 0 0 1			1 0 0 1 0		
Volume Module:												
Base Vol:	206	316	33	29	730	103	67	0	162	40	0	22
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	206	316	33	29	730	103	67	0	162	40	0	22
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	206	316	33	29	730	103	67	0	162	40	0	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	206	316	33	29	730	103	67	0	162	40	0	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	206	316	33	29	730	103	67	0	162	40	0	22
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	2.00	1.00	2.00	0.00	1.00	1.00	0.00	1.00
Final Sat.:	3400	3400	1700	1700	3400	1700	3400	0	1700	1700	0	1700
Capacity Analysis Module:												
Vol/Sat:	0.06	0.09	0.02	0.02	0.21	0.06	0.02	0.00	0.10	0.02	0.00	0.01
Crit Moves:	****				****				****	****		

****

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

****

Intersection #17 Sand Canyon Avenue at I-5 Northbound Ramps

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.362
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 19 Level Of Service: A

****

Street Name:	Sand Canyon Avenue						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			1 0 2 0 1			1 1 0 0 1			1 0 0 1 0		
Volume Module:												
Base Vol:	234	223	18	12	392	100	113	0	198	19	0	18
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	234	223	18	12	392	100	113	0	198	19	0	18
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	234	223	18	12	392	100	113	0	198	19	0	18
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	234	223	18	12	392	100	113	0	198	19	0	18
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	234	223	18	12	392	100	113	0	198	19	0	18
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	2.00	1.00	2.00	0.00	1.00	1.00	0.00	1.00
Final Sat.:	3400	3400	1700	1700	3400	1700	3400	0	1700	1700	0	1700
Capacity Analysis Module:												
Vol/Sat:	0.07	0.07	0.01	0.01	0.12	0.06	0.03	0.00	0.12	0.01	0.00	0.01
Crit Moves:	****				****				****	****		

****

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #18 Sand Canyon Avenue at I-5 Southbound Ramps

Cycle (sec):	100	Critical Vol./Cap. (X):	0.482
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	23	Level Of Service:	A

Street Name:	Sand Canyon Avenue						I-5 Southbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 2	0 1		2 0 2	0 0		1 0 1!	0 1		0 0 0	0 0	
Volume Module:												
Base Vol:	0	489	71	167	795	0	292	0	674	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	489	71	167	795	0	292	0	674	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	489	71	167	795	0	292	0	674	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	489	71	167	795	0	292	0	674	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	489	71	167	795	0	292	0	674	0	0	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.00	1.00	2.00	2.00	0.00	1.00	0.00	2.00	0.00	0.00	0.00
Final Sat.:	0	3400	1700	3400	3400	0	1700	0	3400	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.14	0.04	0.05	0.23	0.00	0.17	0.00	0.20	0.00	0.00	0.00
Crit Moves:	****				****				****			

Frank R. Bowerman Landfill Implementation Project
Existing Conditions
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #18 Sand Canyon Avenue at I-5 Southbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.395
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 20 Level Of Service: A

Street Name:	Sand Canyon Avenue						I-5 Southbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 2	0 1		2 0 2	0 0		1 0 1!	0 1		0 0 0	0 0	
Volume Module:												
Base Vol:	0	556	93	154	482	0	229	0	462	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	556	93	154	482	0	229	0	462	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	556	93	154	482	0	229	0	462	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	556	93	154	482	0	229	0	462	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	556	93	154	482	0	229	0	462	0	0	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.00	1.00	2.00	2.00	0.00	1.00	0.00	2.00	0.00	0.00	0.00
Final Sat.:	0	3400	1700	3400	3400	0	1700	0	3400	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.16	0.05	0.05	0.14	0.00	0.13	0.00	0.14	0.00	0.00	0.00
Crit Moves:		****		****					****			

APPENDIX C

LOS Computation Reports
2006

APPENDIX C1

LOS Computation Reports
2010 without the Project

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #1 Culver Drive at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.593
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Culver Drive						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 0 1			1 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	180	255	245	297	766	217	84	767	221	388	988	153
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	180	255	245	297	766	217	84	767	221	388	988	153
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	180	255	245	297	766	217	84	767	221	388	988	153
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	180	255	245	297	766	217	84	767	221	388	988	153
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	180	255	245	297	766	217	84	767	221	388	988	153
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3400	1700	1700	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.08	0.14	0.09	0.23	0.13	0.05	0.15	0.13	0.11	0.19	0.09
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #1 Culver Drive at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.425
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Culver Drive						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 0 1			1 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	105	375	75	255	210	225	115	665	260	200	450	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	105	375	75	255	210	225	115	665	260	200	450	140
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	105	375	75	255	210	225	115	665	260	200	450	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	105	375	75	255	210	225	115	665	260	200	450	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	105	375	75	255	210	225	115	665	260	200	450	140
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3400	1700	1700	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.11	0.04	0.08	0.06	0.13	0.07	0.13	0.15	0.06	0.09	0.08
Crit Moves:		****		****				****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #2 Yale Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.795
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 51 Level Of Service: C

Street Name:	Yale Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 1 0 1			1 0 3 0 1			1 0 3 0 1		
Volume Module:												
Base Vol:	122	12	387	60	70	260	312	896	133	168	1192	508
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	122	12	387	60	70	260	312	896	133	168	1192	508
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	122	12	387	60	70	260	312	896	133	168	1192	508
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	122	12	387	60	70	260	312	896	133	168	1192	508
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	122	12	387	60	70	260	312	896	133	168	1192	508
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	1700	1700	1700	5100	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.07	0.00	0.23	0.04	0.04	0.15	0.18	0.18	0.08	0.10	0.23	0.30
Crit Moves:			****	****			****					****

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #2 Yale Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.377
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 19 Level Of Service: A

Street Name:	Yale Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 1 0 1			1 0 3 0 1			1 0 3 0 1		
Volume Module:												
Base Vol:	180	35	65	60	65	70	35	845	145	30	545	25
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	180	35	65	60	65	70	35	845	145	30	545	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	180	35	65	60	65	70	35	845	145	30	545	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	180	35	65	60	65	70	35	845	145	30	545	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	180	35	65	60	65	70	35	845	145	30	545	25
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	1700	1700	1700	5100	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.11	0.01	0.04	0.04	0.04	0.04	0.02	0.17	0.09	0.02	0.11	0.01
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #3 Jeffrey Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.536
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 25 Level Of Service: A

Street Name:	Jeffrey Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 1	0 1		1 0 1	0 1		1 0 2	0 1		2 0 2	0 1	
Volume Module:												
Base Vol:	249	14	77	17	21	11	33	876	434	484	810	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	249	14	77	17	21	11	33	876	434	484	810	2
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	249	14	0	17	21	11	33	876	434	484	810	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	249	14	0	17	21	11	33	876	434	484	810	2
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	249	14	0	17	21	11	33	876	434	484	810	2
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	1700	1700	1700	1700	1700	1700	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.07	0.01	0.00	0.01	0.01	0.01	0.02	0.26	0.26	0.14	0.24	0.00
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #3 Jeffrey Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.435
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Jeffrey Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 1	0 1		1 0 1	0 1		1 0 2	0 1		2 0 2	0 1	
Volume Module:												
Base Vol:	325	20	70	5	10	5	5	335	565	160	190	5
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	325	20	70	5	10	5	5	335	565	160	190	5
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	325	20	0	5	10	5	5	335	565	160	190	5
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	325	20	0	5	10	5	5	335	565	160	190	5
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	325	20	0	5	10	5	5	335	565	160	190	5
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	1700	1700	1700	1700	1700	1700	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.10	0.01	0.00	0.00	0.01	0.00	0.00	0.10	0.33	0.05	0.06	0.00
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #4 Bee Canyon Access Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.528
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 25 Level Of Service: A

Street Name:	Bee Canyon Access Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 1! 0 0			1 0 2 0 0			0 0 2 0 2		
Volume Module:												
Base Vol:	0	0	0	247	0	106	106	864	0	0	1061	247
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	247	0	106	106	864	0	0	1061	247
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	247	0	106	106	864	0	0	1061	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	247	0	106	106	864	0	0	1061	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	0	0	0	247	0	106	106	864	0	0	1061	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.40	0.00	0.60	1.00	2.00	0.00	0.00	2.00	2.00
Final Sat.:	0	0	0	2379	0	1021	1700	3400	0	0	3400	3400
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.10	0.00	0.10	0.06	0.25	0.00	0.00	0.31	0.00
Crit Moves:				****			****				****	

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #4 Bee Canyon Access Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.313
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 18 Level Of Service: A

Street Name:	Bee Canyon Access Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 1! 0 0			1 0 2 0 0			0 0 2 0 2		
Volume Module:												
Base Vol:	0	0	0	237	0	101	101	410	0	0	355	237
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	237	0	101	101	410	0	0	355	237
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	237	0	101	101	410	0	0	355	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	237	0	101	101	410	0	0	355	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	0	0	0	237	0	101	101	410	0	0	355	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.40	0.00	0.60	1.00	2.00	0.00	0.00	2.00	2.00
Final Sat.:	0	0	0	2384	0	1016	1700	3400	0	0	3400	3400
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.10	0.00	0.10	0.06	0.12	0.00	0.00	0.10	0.00
Crit Moves:				****			****				****	

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #5 Sand Canyon Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.435
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Sand Canyon Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 0 0 2			0 0 0 0 0			0 0 2 0 1			2 0 2 0 0		
Volume Module:												
Base Vol:	136	0	104	0	0	0	0	581	487	290	1172	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	136	0	104	0	0	0	0	581	487	290	1172	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	136	0	104	0	0	0	0	581	0	290	1172	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	136	0	104	0	0	0	0	581	0	290	1172	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	136	0	104	0	0	0	0	581	0	290	1172	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	2.00	0.00	0.00	0.00	0.00	2.00	1.00	2.00	2.00	0.00
Final Sat.:	3400	0	3400	0	0	0	0	3400	1700	3400	3400	0
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.03	0.00	0.00	0.00	0.00	0.17	0.00	0.09	0.34	0.00
Crit Moves:	****						****				****	

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #5 Sand Canyon Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.262
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 16 Level Of Service: A

Street Name:	Sand Canyon Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 0 0 2			0 0 0 0 0			0 0 2 0 1			2 0 2 0 0		
Volume Module:												
Base Vol:	220	0	330	0	0	0	0	70	305	430	100	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	220	0	330	0	0	0	0	70	305	430	100	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	220	0	330	0	0	0	0	70	0	430	100	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	220	0	330	0	0	0	0	70	0	430	100	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	220	0	330	0	0	0	0	70	0	430	100	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	2.00	0.00	0.00	0.00	0.00	2.00	1.00	2.00	2.00	0.00
Final Sat.:	3400	0	3400	0	0	0	0	3400	1700	3400	3400	0
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.10	0.00	0.00	0.00	0.00	0.02	0.00	0.13	0.03	0.00
Crit Moves:	****							****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #6 Culver Drive at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.750
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 43 Level Of Service: C

Street Name:	Culver Drive						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 2 1 0		
Volume Module:												
Base Vol:	245	507	251	191	1346	300	87	958	230	599	1207	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	245	507	251	191	1346	300	87	958	230	599	1207	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	245	507	251	191	1346	300	87	958	230	599	1207	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	245	507	251	191	1346	300	87	958	230	599	1207	30
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	245	507	251	191	1346	300	87	958	230	599	1207	30
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.93	0.07
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	4976	124
Capacity Analysis Module:												
Vol/Sat:	0.07	0.10	0.15	0.06	0.26	0.18	0.03	0.19	0.14	0.18	0.24	0.24
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #6 Culver Drive at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.590
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Culver Drive						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 2 1 0		
Volume Module:												
Base Vol:	250	400	145	75	520	110	95	550	385	470	800	55
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	250	400	145	75	520	110	95	550	385	470	800	55
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	250	400	145	75	520	110	95	550	385	470	800	55
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	250	400	145	75	520	110	95	550	385	470	800	55
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	250	400	145	75	520	110	95	550	385	470	800	55
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.81	0.19
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	4772	328
Capacity Analysis Module:												
Vol/Sat:	0.07	0.08	0.09	0.02	0.10	0.06	0.03	0.11	0.23	0.14	0.17	0.17
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #7 Yale Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.790
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 50 Level Of Service: C

Street Name:	Yale Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 2 0 1			1 0 2 1 0			1 0 2 1 0		
Volume Module:												
Base Vol:	199	331	114	389	392	282	140	1707	21	128	1490	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	199	331	114	389	392	282	140	1707	21	128	1490	9
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	199	331	114	389	392	282	140	1707	21	128	1490	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	199	331	114	389	392	282	140	1707	21	128	1490	9
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	199	331	114	389	392	282	140	1707	21	128	1490	9
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.96	0.04	1.00	2.98	0.02
Final Sat.:	1700	3400	1700	1700	3400	1700	1700	5038	62	1700	5069	31
Capacity Analysis Module:												
Vol/Sat:	0.12	0.10	0.07	0.23	0.12	0.17	0.08	0.34	0.34	0.08	0.29	0.29
Crit Moves:		****		****				****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #7 Yale Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.577
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Yale Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 2 0 1			1 0 2 1 0			1 0 2 1 0		
Volume Module:												
Base Vol:	220	145	110	225	175	305	125	710	100	90	670	70
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	220	145	110	225	175	305	125	710	100	90	670	70
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	220	145	110	225	175	305	125	710	100	90	670	70
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	220	145	110	225	175	305	125	710	100	90	670	70
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	220	145	110	225	175	305	125	710	100	90	670	70
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.63	0.37	1.00	2.72	0.28
Final Sat.:	1700	3400	1700	1700	3400	1700	1700	4470	630	1700	4618	482
Capacity Analysis Module:												
Vol/Sat:	0.13	0.04	0.06	0.13	0.05	0.18	0.07	0.16	0.16	0.05	0.15	0.15
Crit Moves:	****					****	****				****	

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #8 Jeffrey Road at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.795
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 51 Level Of Service: C

Street Name:	Jeffrey Road						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	40	329	200	129	1042	111	70	1570	106	228	761	104
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	40	329	200	129	1042	111	70	1570	106	228	761	104
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	40	329	0	129	1042	111	70	1570	106	228	761	104
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	40	329	0	129	1042	111	70	1570	106	228	761	104
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	40	329	0	129	1042	111	70	1570	106	228	761	104
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.06	0.00	0.04	0.20	0.07	0.02	0.46	0.06	0.07	0.22	0.06
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #8 Jeffrey Road at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.536
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 25 Level Of Service: A

Street Name:	Jeffrey Road						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	345	395	160	45	635	55	90	550	405	75	430	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	345	395	160	45	635	55	90	550	405	75	430	15
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	345	395	0	45	635	55	90	550	405	75	430	15
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	345	395	0	45	635	55	90	550	405	75	430	15
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	345	395	0	45	635	55	90	550	405	75	430	15
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.10	0.08	0.00	0.01	0.12	0.03	0.03	0.16	0.24	0.02	0.13	0.01
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #9 Sand Canyon Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.833
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 60 Level Of Service: D

Street Name:	Sand Canyon Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	25	280	437	179	869	11	39	1803	134	407	984	31
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	280	437	179	869	11	39	1803	134	407	984	31
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	280	437	179	869	11	39	1803	134	407	984	31
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	25	280	437	179	869	11	39	1803	134	407	984	31
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	25	280	437	179	869	11	39	1803	134	407	984	31
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3400	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.08	0.26	0.05	0.26	0.01	0.01	0.35	0.08	0.12	0.19	0.02
Crit Moves:			****	****				****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #9 Sand Canyon Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.575
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 27 Level Of Service: A

Street Name:	Sand Canyon Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2	0 1		2 0 2	0 1		2 0 3	0 1		2 0 3	0 1	
Volume Module:												
Base Vol:	200	415	220	170	730	15	25	420	210	435	300	70
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	200	415	220	170	730	15	25	420	210	435	300	70
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	200	415	220	170	730	15	25	420	210	435	300	70
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	200	415	220	170	730	15	25	420	210	435	300	70
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	200	415	220	170	730	15	25	420	210	435	300	70
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3400	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.06	0.12	0.13	0.05	0.21	0.01	0.01	0.08	0.12	0.13	0.06	0.04
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #10 SR 133 Southbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.698
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 37 Level Of Service: B

Street Name:	SR 133 Southbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			2 0 0 0 1			0 0 3 0 1			1 0 3 0 0		
Volume Module:												
Base Vol:	0	0	0	239	0	74	0	2309	130	212	1387	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	239	0	74	0	2309	130	212	1387	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	239	0	74	0	2309	130	212	1387	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	239	0	74	0	2309	130	212	1387	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	239	0	74	0	2309	130	212	1387	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	0	0	0	3400	0	1700	0	5100	1700	1700	5100	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.07	0.00	0.04	0.00	0.45	0.08	0.12	0.27	0.00
Crit Moves:				****				****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #10 SR 133 Southbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.308
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 18 Level Of Service: A

Street Name:	SR 133 Southbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			2 0 0 0 1			0 0 3 0 1			1 0 3 0 0		
Volume Module:												
Base Vol:	0	0	0	80	0	110	0	745	70	80	660	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	80	0	110	0	745	70	80	660	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	80	0	110	0	745	70	80	660	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	80	0	110	0	745	70	80	660	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	80	0	110	0	745	70	80	660	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	0	0	0	3400	0	1700	0	5100	1700	1700	5100	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.02	0.00	0.06	0.00	0.15	0.04	0.05	0.13	0.00
Crit Moves:						****		****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #11 SR 133 Northbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.601
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 29 Level Of Service: B

Street Name:	SR 133 Northbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 3 0 2			0 0 2 1 0		
Volume Module:												
Base Vol:	56	0	145	0	0	0	0	2375	160	0	1674	50
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	56	0	145	0	0	0	0	2375	160	0	1674	50
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	56	0	145	0	0	0	0	2375	0	0	1674	50
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	56	0	145	0	0	0	0	2375	0	0	1674	50
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	56	0	145	0	0	0	0	2375	0	0	1674	50
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	2.00	0.00	2.91	0.09
Final Sat.:	1700	0	1700	0	0	0	0	5100	3400	0	4952	148
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.09	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.34	0.34
Crit Moves:			****					****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #11 SR 133 Northbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.279
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 17 Level Of Service: A

Street Name:	SR 133 Northbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 3 0 2			0 0 2 1 0		
Volume Module:												
Base Vol:	80	0	95	0	0	0	0	885	55	0	645	45
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	80	0	95	0	0	0	0	885	55	0	645	45
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	80	0	95	0	0	0	0	885	0	0	645	45
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	80	0	95	0	0	0	0	885	0	0	645	45
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	80	0	95	0	0	0	0	885	0	0	645	45
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	2.00	0.00	2.80	0.20
Final Sat.:	1700	0	1700	0	0	0	0	5100	3400	0	4767	333
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.06	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.14	0.14
Crit Moves:			****					****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #12 Jeffrey Road at Bryan Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.635
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 31 Level Of Service: B

Street Name:	Jeffrey Road						Bryan Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	153	721	104	66	1755	112	86	106	272	395	234	121
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	153	721	104	66	1755	112	86	106	272	395	234	121
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	153	721	104	66	1755	112	86	106	272	395	234	121
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	153	721	104	66	1755	112	86	106	272	395	234	121
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	153	721	104	66	1755	112	86	106	272	395	234	121
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	1700	1700	3400	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.14	0.06	0.02	0.34	0.07	0.05	0.06	0.08	0.12	0.14	0.07
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #12 Jeffrey Road at Bryan Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.426
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Jeffrey Road						Bryan Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	150	790	75	25	1040	45	80	30	265	170	25	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	150	790	75	25	1040	45	80	30	265	170	25	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	150	790	75	25	1040	45	80	30	265	170	25	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	150	790	75	25	1040	45	80	30	265	170	25	30
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	150	790	75	25	1040	45	80	30	265	170	25	30
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	1700	1700	3400	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.15	0.04	0.01	0.20	0.03	0.05	0.02	0.08	0.05	0.01	0.02
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #13 Jeffrey Road at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.582
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Jeffrey Road						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	49	663	173	167	2074	40	35	360	199	17	61	62
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	49	663	173	167	2074	40	35	360	199	17	61	62
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	49	663	173	167	2074	40	35	360	199	17	61	62
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	49	663	173	167	2074	40	35	360	199	17	61	62
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	49	663	173	167	2074	40	35	360	199	17	61	62
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.13	0.10	0.05	0.41	0.02	0.01	0.11	0.12	0.01	0.02	0.04
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #13 Jeffrey Road at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.464
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

Street Name:	Jeffrey Road						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	125	765	185	100	1345	25	40	250	180	135	135	75
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	125	765	185	100	1345	25	40	250	180	135	135	75
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	125	765	185	100	1345	25	40	250	180	135	135	75
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	125	765	185	100	1345	25	40	250	180	135	135	75
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	125	765	185	100	1345	25	40	250	180	135	135	75
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.15	0.11	0.03	0.26	0.01	0.01	0.07	0.11	0.04	0.04	0.04
Crit Moves:	****				****			****			****	

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #14 Sand Canyon Avenue at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.531
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 25 Level Of Service: A

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	271	507	41	73	1741	486	174	126	332	17	44	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	271	507	41	73	1741	486	174	126	332	17	44	9
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	271	507	0	73	1741	486	174	126	0	17	44	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	271	507	0	73	1741	486	174	126	0	17	44	9
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	271	507	0	73	1741	486	174	126	0	17	44	9
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.08	0.10	0.00	0.02	0.34	0.29	0.05	0.02	0.00	0.01	0.01	0.01
Crit Moves:	****				****		****				****	

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #14 Sand Canyon Avenue at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.445
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	300	785	95	50	1275	55	165	30	300	50	40	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	300	785	95	50	1275	55	165	30	300	50	40	20
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	300	785	0	50	1275	55	165	30	0	50	40	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	300	785	0	50	1275	55	165	30	0	50	40	20
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	300	785	0	50	1275	55	165	30	0	50	40	20
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.09	0.15	0.00	0.01	0.25	0.03	0.05	0.01	0.00	0.01	0.01	0.01
Crit Moves:	****				****		****				****	

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #15 Jeffrey Road at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.607
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 29 Level Of Service: B

Street Name:	Jeffrey Road						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0	1	0 0 3	0	1	0 0 0	0	0	1 0 1!	0	1
Volume Module:												
Base Vol:	0	1030	428	0	2272	479	0	0	0	348	0	223
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1030	428	0	2272	479	0	0	0	348	0	223
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1030	0	0	2272	0	0	0	0	348	0	223
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1030	0	0	2272	0	0	0	0	348	0	223
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1030	0	0	2272	0	0	0	0	348	0	223
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	0.00	3.00	1.00	0.00	0.00	0.00	1.82	0.01	1.17
Final Sat.:	0	5100	1700	0	5100	1700	0	0	0	3108	0	1992
Capacity Analysis Module:												
Vol/Sat:	0.00	0.20	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.11	0.00	0.11
Crit Moves:	****				****					****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #15 Jeffrey Road at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.453
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

Street Name:	Jeffrey Road							I-5 Northbound Ramps					
Approach:	North Bound			South Bound				East Bound			West Bound		
Movement:	L	T	R	L	T	R		L	T	R	L	T	R
Control:	Protected			Protected				Protected			Protected		
Rights:	Ignore			Ignore				Include			Include		
Min. Green:	0	0	0	0	0	0		0	0	0	0	0	0
Lanes:	0 0 3	0	1	0 0 3	0	1		0 0 0	0	0	1 0 1!	0	1
Volume Module:													
Base Vol:	0	795	600	0	1300	195		0	0	0	505	0	220
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	795	600	0	1300	195		0	0	0	505	0	220
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	795	0	0	1300	0		0	0	0	505	0	220
Reduct Vol:	0	0	0	0	0	0		0	0	0	0	0	0
Reduced Vol:	0	795	0	0	1300	0		0	0	0	505	0	220
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	795	0	0	1300	0		0	0	0	505	0	220
Saturation Flow Module:													
Sat/Lane:	1700	1700	1700	1700	1700	1700		1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	0.00	3.00	1.00		0.00	0.00	0.00	2.00	0.00	1.00
Final Sat.:	0	5100	1700	0	5100	1700		0	0	0	3400	0	1700
Capacity Analysis Module:													
Vol/Sat:	0.00	0.16	0.00	0.00	0.25	0.00		0.00	0.00	0.00	0.15	0.00	0.13
Crit Moves:	****				****						****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.821
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 57 Level Of Service: D

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 0 1			2 0 1 0 1		
Volume Module:												
Base Vol:	74	1094	110	459	1946	250	195	241	368	346	37	180
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	74	1094	110	459	1946	250	195	241	368	346	37	180
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	74	1094	110	459	1946	250	195	241	368	346	37	180
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	74	1094	110	459	1946	250	195	241	368	346	37	180
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	74	1094	110	459	1946	250	195	241	368	346	37	180
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.66	0.34	1.00	1.00	1.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4519	581	1700	1700	1700	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.21	0.06	0.14	0.43	0.43	0.11	0.14	0.22	0.10	0.02	0.11
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.649
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 32 Level Of Service: B

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 0 1			2 0 1 0 1		
Volume Module:												
Base Vol:	65	940	35	295	1225	275	230	80	160	295	45	255
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	65	940	35	295	1225	275	230	80	160	295	45	255
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	65	940	35	295	1225	275	230	80	160	295	45	255
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	65	940	35	295	1225	275	230	80	160	295	45	255
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	65	940	35	295	1225	275	230	80	160	295	45	255
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.45	0.55	1.00	1.00	1.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4165	935	1700	1700	1700	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.18	0.02	0.09	0.29	0.29	0.14	0.05	0.09	0.09	0.03	0.15
Crit Moves:	****				****		****					****

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #17 Sand Canyon Avenue at I-5 Northbound Ramps

Cycle (sec):	100	Critical Vol./Cap. (X):	0.659
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	33	Level Of Service:	B

Street Name:	Sand Canyon Avenue						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			1 0 2 0 1			1 1 0 0 1			1 0 2 0 1		
Volume Module:												
Base Vol:	39	980	79	226	1521	302	170	68	59	17	31	137
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	39	980	79	226	1521	302	170	68	59	17	31	137
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	39	980	79	226	1521	302	170	68	59	17	31	137
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	39	980	79	226	1521	302	170	68	59	17	31	137
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	39	980	79	226	1521	302	170	68	59	17	31	137
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	2.00	1.00	1.43	0.57	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3400	1700	2429	971	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.29	0.05	0.13	0.45	0.18	0.07	0.07	0.03	0.01	0.01	0.08
Crit Moves:	****				****			****				****

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #17 Sand Canyon Avenue at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.579
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Sand Canyon Avenue						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			1 0 2 0 1			1 1 0 0 1			1 0 2 0 1		
Volume Module:												
Base Vol:	30	885	5	140	895	355	310	5	15	5	5	160
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	30	885	5	140	895	355	310	5	15	5	5	160
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	30	885	5	140	895	355	310	5	15	5	5	160
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	30	885	5	140	895	355	310	5	15	5	5	160
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	30	885	5	140	895	355	310	5	15	5	5	160
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	2.00	1.00	1.97	0.03	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3400	1700	3346	54	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.26	0.00	0.08	0.26	0.21	0.09	0.09	0.01	0.00	0.00	0.09
Crit Moves:		****		****				****				****

Frank R. Bowerman Landfill Implementation Project
2010 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #18 Sand Canyon Avenue at I-5 Southbound Ramps

Cycle (sec):	100	Critical Vol./Cap. (X):	0.591
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	28	Level Of Service:	A

Street Name:	Sand Canyon Avenue									I-5 Southbound Ramps												
Approach:	North Bound					South Bound					East Bound					West Bound						
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R		
Control:	Protected					Protected					Protected					Protected						
Rights:	Include					Include					Include					Include						
Min. Green:	0	0	0			0	0	0			0	0	0			0	0	0				
Lanes:	0	0	2	0	1	2	0	2	0	0	1	0	1!	0	1	0	0	0	0	0		
Volume Module:																						
Base Vol:	0	544	132			386	1206				0	506	2			444	0	0				
Growth Adj:	1.00	1.00	1.00			1.00	1.00				1.00	1.00	1.00			1.00	1.00	1.00				
Initial Bse:	0	544	132			386	1206				0	506	2			444	0	0				
User Adj:	1.00	1.00	1.00			1.00	1.00				1.00	1.00	1.00			1.00	1.00	1.00				
PHF Adj:	1.00	1.00	1.00			1.00	1.00				1.00	1.00	1.00			1.00	1.00	1.00				
PHF Volume:	0	544	132			386	1206				0	506	2			444	0	0				
Reduct Vol:	0	0	0			0	0				0	0	0			0	0	0				
Reduced Vol:	0	544	132			386	1206				0	506	2			444	0	0				
PCE Adj:	1.00	1.00	1.00			1.00	1.00				1.00	1.00	1.00			1.00	1.00	1.00				
MLF Adj:	1.00	1.00	1.00			1.00	1.00				1.00	1.00	1.00			1.00	1.00	1.00				
Final Vol.:	0	544	132			386	1206				0	506	2			444	0	0				
Saturation Flow Module:																						
Sat/Lane:	1700	1700	1700			1700	1700				1700	1700	1700			1700	1700	1700				
Adjustment:	1.00	1.00	1.00			1.00	1.00				1.00	1.00	1.00			1.00	1.00	1.00				
Lanes:	0.00	2.00	1.00			2.00	2.00				0.00	1.59	0.01			1.40	0.00	0.00				
Final Sat.:	0	3400	1700			3400	3400				0	2711	11			2379	0	0				
Capacity Analysis Module:																						
Vol/Sat:	0.00	0.16	0.08			0.11	0.35				0.00	0.19	0.19			0.19	0.00	0.00				
Crit Moves:	****						****					****										

Frank R. Bowerman Landfill Implementation Project
2010 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #18 Sand Canyon Avenue at I-5 Southbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.479
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 23 Level Of Service: A

Street Name:	Sand Canyon Avenue						I-5 Southbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 2	0 1		2 0 2	0 0		1 0 1!	0 1		0 0 0	0 0	
Volume Module:												
Base Vol:	0	705	125	145	690	0	215	0	610	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	705	125	145	690	0	215	0	610	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	705	125	145	690	0	215	0	610	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	705	125	145	690	0	215	0	610	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	705	125	145	690	0	215	0	610	0	0	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.00	1.00	2.00	2.00	0.00	1.00	0.00	2.00	0.00	0.00	0.00
Final Sat.:	0	3400	1700	3400	3400	0	1700	0	3400	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.21	0.07	0.04	0.20	0.00	0.13	0.00	0.18	0.00	0.00	0.00
Crit Moves:		****		****					****			

APPENDIX C2

LOS Computation Reports
2010 with the Project

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Culver Drive at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.593
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Culver Drive						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 0 1			1 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	180	255	245	297	766	217	84	767	221	388	988	153
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	180	255	245	297	766	217	84	767	221	388	988	153
Added Vol:	0	0	0	0	0	0	0	3	0	0	3	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	180	255	245	297	766	217	84	770	221	388	991	153
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	180	255	245	297	766	217	84	770	221	388	991	153
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	180	255	245	297	766	217	84	770	221	388	991	153
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	180	255	245	297	766	217	84	770	221	388	991	153
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3400	1700	1700	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.08	0.14	0.09	0.23	0.13	0.05	0.15	0.13	0.11	0.19	0.09
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Culver Drive at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.425
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Culver Drive						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 0 1			1 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	105	375	75	255	210	225	115	665	260	200	450	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	105	375	75	255	210	225	115	665	260	200	450	140
Added Vol:	0	0	0	0	0	0	0	3	0	0	3	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	105	375	75	255	210	225	115	668	260	200	453	140
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	105	375	75	255	210	225	115	668	260	200	453	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	105	375	75	255	210	225	115	668	260	200	453	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	105	375	75	255	210	225	115	668	260	200	453	140
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3400	1700	1700	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.11	0.04	0.08	0.06	0.13	0.07	0.13	0.15	0.06	0.09	0.08
Crit Moves:		****		****				****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Yale Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.795
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 51 Level Of Service: C

Street Name:	Yale Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 1 0 1			1 0 3 0 1			1 0 3 0 1		
Volume Module:												
Base Vol:	122	12	387	60	70	260	312	896	133	168	1192	508
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	122	12	387	60	70	260	312	896	133	168	1192	508
Added Vol:	0	0	0	0	0	0	0	3	0	0	3	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	122	12	387	60	70	260	312	899	133	168	1195	508
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	122	12	387	60	70	260	312	899	133	168	1195	508
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	122	12	387	60	70	260	312	899	133	168	1195	508
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	122	12	387	60	70	260	312	899	133	168	1195	508
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	1700	1700	1700	5100	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.07	0.00	0.23	0.04	0.04	0.15	0.18	0.18	0.08	0.10	0.23	0.30
Crit Moves:			****	****			****					****

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Yale Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.378
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 19 Level Of Service: A

Street Name:	Yale Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 1 0 1			1 0 3 0 1			1 0 3 0 1		
Volume Module:												
Base Vol:	180	35	65	60	65	70	35	845	145	30	545	25
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	180	35	65	60	65	70	35	845	145	30	545	25
Added Vol:	0	0	0	0	0	0	0	3	0	0	3	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	180	35	65	60	65	70	35	848	145	30	548	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	180	35	65	60	65	70	35	848	145	30	548	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	180	35	65	60	65	70	35	848	145	30	548	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	180	35	65	60	65	70	35	848	145	30	548	25
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	1700	1700	1700	5100	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.11	0.01	0.04	0.04	0.04	0.04	0.02	0.17	0.09	0.02	0.11	0.01
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Jeffrey Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.538
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 25 Level Of Service: A

Street Name:	Jeffrey Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 1	0 1		1 0 1	0 1		1 0 2	0 1		2 0 2	0 1	
Volume Module:												
Base Vol:	249	14	77	17	21	11	33	876	434	484	810	2
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	249	14	77	17	21	11	33	876	434	484	810	2
Added Vol:	0	0	4	0	0	0	0	3	0	4	3	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	249	14	81	17	21	11	33	879	434	488	813	2
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	249	14	0	17	21	11	33	879	434	488	813	2
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	249	14	0	17	21	11	33	879	434	488	813	2
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	249	14	0	17	21	11	33	879	434	488	813	2
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	1700	1700	1700	1700	1700	1700	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.07	0.01	0.00	0.01	0.01	0.01	0.02	0.26	0.26	0.14	0.24	0.00
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

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Intersection #3 Jeffrey Road at Portola Parkway

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Cycle (sec): 100 Critical Vol./Cap. (X): 0.436
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

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Street Name:	Jeffrey Road									Portola Parkway							
Approach:	North Bound				South Bound				East Bound				West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Ignore					Include					Ovl					Include				
Min. Green:	0	0	0			0	0	0			0	0	0			0	0	0		
Lanes:	2	0	1	0	1	1	0	1	0	1	1	0	2	0	1	2	0	2	0	1
Volume Module:																				
Base Vol:	325	20	70			5	10	5			5	335	565			160	190	5		
Growth Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Initial Bse:	325	20	70			5	10	5			5	335	565			160	190	5		
Added Vol:	0	0	4			0	0	0			0	3	0			4	3	0		
PasserByVol:	0	0	0			0	0	0			0	0	0			0	0	0		
Initial Fut:	325	20	74			5	10	5			5	338	565			164	193	5		
User Adj:	1.00	1.00	0.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Adj:	1.00	1.00	0.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Volume:	325	20	0			5	10	5			5	338	565			164	193	5		
Reduct Vol:	0	0	0			0	0	0			0	0	0			0	0	0		
Reduced Vol:	325	20	0			5	10	5			5	338	565			164	193	5		
PCE Adj:	1.00	1.00	0.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
MLF Adj:	1.00	1.00	0.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Final Vol.:	325	20	0			5	10	5			5	338	565			164	193	5		
Saturation Flow Module:																				
Sat/Lane:	1700	1700	1700			1700	1700	1700			1700	1700	1700			1700	1700	1700		
Adjustment:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Lanes:	2.00	1.00	1.00			1.00	1.00	1.00			1.00	2.00	1.00			2.00	2.00	1.00		
Final Sat.:	3400	1700	1700			1700	1700	1700			1700	3400	1700			3400	3400	1700		
Capacity Analysis Module:																				
Vol/Sat:	0.10	0.01	0.00			0.00	0.01	0.00			0.00	0.10	0.33			0.05	0.06	0.00		
Crit Moves:	****						****						****			****	****			

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Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Bee Canyon Access Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.541
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 26 Level Of Service: A

Street Name:	Bee Canyon Access Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 1! 0 0			1 0 2 0 0			0 0 2 0 2		
Volume Module:												
Base Vol:	0	0	0	247	0	106	106	864	0	0	1061	247
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	247	0	106	106	864	0	0	1061	247
Added Vol:	0	0	0	18	0	8	8	0	0	0	0	18
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	265	0	114	114	864	0	0	1061	265
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	265	0	114	114	864	0	0	1061	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	265	0	114	114	864	0	0	1061	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	0	0	0	265	0	114	114	864	0	0	1061	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.40	0.00	0.60	1.00	2.00	0.00	0.00	2.00	2.00
Final Sat.:	0	0	0	2377	0	1023	1700	3400	0	0	3400	3400
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.11	0.00	0.11	0.07	0.25	0.00	0.00	0.31	0.00
Crit Moves:				****			****				****	

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Bee Canyon Access Road at Portola Parkway

Cycle (sec):	100	Critical Vol./Cap. (X):	0.326
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	18	Level Of Service:	A

Street Name:	Bee Canyon Access Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 1! 0 0			1 0 2 0 0			0 0 2 0 2		
Volume Module:												
Base Vol:	0	0	0	237	0	101	101	410	0	0	355	237
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	237	0	101	101	410	0	0	355	237
Added Vol:	0	0	0	18	0	8	8	0	0	0	0	18
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	255	0	109	109	410	0	0	355	255
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	255	0	109	109	410	0	0	355	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	255	0	109	109	410	0	0	355	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	0	0	0	255	0	109	109	410	0	0	355	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.40	0.00	0.60	1.00	2.00	0.00	0.00	2.00	2.00
Final Sat.:	0	0	0	2382	0	1018	1700	3400	0	0	3400	3400
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.11	0.00	0.11	0.06	0.12	0.00	0.00	0.10	0.00
Crit Moves:				****			****				****	

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Sand Canyon Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.440
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Sand Canyon Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 0 0 2			0 0 0 0 0			0 0 2 0 1			2 0 2 0 0		
Volume Module:												
Base Vol:	136	0	104	0	0	0	0	581	487	290	1172	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	136	0	104	0	0	0	0	581	487	290	1172	0
Added Vol:	17	0	0	0	0	0	0	1	17	0	1	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	153	0	104	0	0	0	0	582	504	290	1173	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	153	0	104	0	0	0	0	582	0	290	1173	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	153	0	104	0	0	0	0	582	0	290	1173	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	153	0	104	0	0	0	0	582	0	290	1173	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	2.00	0.00	0.00	0.00	0.00	2.00	1.00	2.00	2.00	0.00
Final Sat.:	3400	0	3400	0	0	0	0	3400	1700	3400	3400	0
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.03	0.00	0.00	0.00	0.00	0.17	0.00	0.09	0.34	0.00
Crit Moves:	****						****				****	

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

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Intersection #5 Sand Canyon Avenue at Portola Parkway

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Cycle (sec): 100 Critical Vol./Cap. (X): 0.267
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 17 Level Of Service: A

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Street Name:	Sand Canyon Avenue									Portola Parkway							
Approach:	North Bound				South Bound				East Bound				West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Ovl					Include					Ignore					Include				
Min. Green:	0	0	0			0	0	0			0	0	0			0	0	0		
Lanes:	2	0	0	0	2	0	0	0	0	0	0	0	2	0	1	2	0	2	0	0
Volume Module:																				
Base Vol:	220	0	330			0	0	0			0	70	305			430	100	0		
Growth Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Initial Bse:	220	0	330			0	0	0			0	70	305			430	100	0		
Added Vol:	16	0	0			0	0	0			0	1	16			0	1	0		
PasserByVol:	0	0	0			0	0	0			0	0	0			0	0	0		
Initial Fut:	236	0	330			0	0	0			0	71	321			430	101	0		
User Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	0.00			1.00	1.00	1.00		
PHF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	0.00			1.00	1.00	1.00		
PHF Volume:	236	0	330			0	0	0			0	71	0			430	101	0		
Reduct Vol:	0	0	0			0	0	0			0	0	0			0	0	0		
Reduced Vol:	236	0	330			0	0	0			0	71	0			430	101	0		
PCE Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	0.00			1.00	1.00	1.00		
MLF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	0.00			1.00	1.00	1.00		
Final Vol.:	236	0	330			0	0	0			0	71	0			430	101	0		
Saturation Flow Module:																				
Sat/Lane:	1700	1700	1700			1700	1700	1700			1700	1700	1700			1700	1700	1700		
Adjustment:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Lanes:	2.00	0.00	2.00			0.00	0.00	0.00			0.00	2.00	1.00			2.00	2.00	0.00		
Final Sat.:	3400	0	3400			0	0	0			0	3400	1700			3400	3400	0		
Capacity Analysis Module:																				
Vol/Sat:	0.07	0.00	0.10			0.00	0.00	0.00			0.00	0.02	0.00			0.13	0.03	0.00		
Crit Moves:	****											****				****				

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Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Culver Drive at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.750
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 43 Level Of Service: C

Street Name:	Culver Drive						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 2 1 0		
Volume Module:												
Base Vol:	245	507	251	191	1346	300	87	958	230	599	1207	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	245	507	251	191	1346	300	87	958	230	599	1207	30
Added Vol:	0	0	0	0	0	0	0	1	0	0	1	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	245	507	251	191	1346	300	87	959	230	599	1208	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	245	507	251	191	1346	300	87	959	230	599	1208	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	245	507	251	191	1346	300	87	959	230	599	1208	30
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	245	507	251	191	1346	300	87	959	230	599	1208	30
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.93	0.07
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	4976	124
Capacity Analysis Module:												
Vol/Sat:	0.07	0.10	0.15	0.06	0.26	0.18	0.03	0.19	0.14	0.18	0.24	0.24
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Culver Drive at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.590
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Culver Drive						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 2 1 0		
Volume Module:												
Base Vol:	250	400	145	75	520	110	95	550	385	470	800	55
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	250	400	145	75	520	110	95	550	385	470	800	55
Added Vol:	0	0	0	0	0	0	0	1	0	0	1	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	250	400	145	75	520	110	95	551	385	470	801	55
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	250	400	145	75	520	110	95	551	385	470	801	55
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	250	400	145	75	520	110	95	551	385	470	801	55
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	250	400	145	75	520	110	95	551	385	470	801	55
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.81	0.19
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	4772	328
Capacity Analysis Module:												
Vol/Sat:	0.07	0.08	0.09	0.02	0.10	0.06	0.03	0.11	0.23	0.14	0.17	0.17
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Yale Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.790
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 50 Level Of Service: C

Street Name:	Yale Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 2 0 1			1 0 2 1 0			1 0 2 1 0		
Volume Module:												
Base Vol:	199	331	114	389	392	282	140	1707	21	128	1490	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	199	331	114	389	392	282	140	1707	21	128	1490	9
Added Vol:	0	0	0	0	0	0	0	1	0	0	1	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	199	331	114	389	392	282	140	1708	21	128	1491	9
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	199	331	114	389	392	282	140	1708	21	128	1491	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	199	331	114	389	392	282	140	1708	21	128	1491	9
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	199	331	114	389	392	282	140	1708	21	128	1491	9
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.96	0.04	1.00	2.98	0.02
Final Sat.:	1700	3400	1700	1700	3400	1700	1700	5038	62	1700	5069	31
Capacity Analysis Module:												
Vol/Sat:	0.12	0.10	0.07	0.23	0.12	0.17	0.08	0.34	0.34	0.08	0.29	0.29
Crit Moves:		****		****				****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

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Intersection #7 Yale Avenue at Irvine Boulevard

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.578
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

****

Street Name:	Yale Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 2 0 1			1 0 2 1 0			1 0 2 1 0		
Volume Module:												
Base Vol:	220	145	110	225	175	305	125	710	100	90	670	70
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	220	145	110	225	175	305	125	710	100	90	670	70
Added Vol:	0	0	0	0	0	0	0	1	0	0	1	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	220	145	110	225	175	305	125	711	100	90	671	70
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	220	145	110	225	175	305	125	711	100	90	671	70
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	220	145	110	225	175	305	125	711	100	90	671	70
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	220	145	110	225	175	305	125	711	100	90	671	70
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.63	0.37	1.00	2.72	0.28
Final Sat.:	1700	3400	1700	1700	3400	1700	1700	4471	629	1700	4618	482
Capacity Analysis Module:												
Vol/Sat:	0.13	0.04	0.06	0.13	0.05	0.18	0.07	0.16	0.16	0.05	0.15	0.15
Crit Moves:	****					****	****				****	

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Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Jeffrey Road at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.796
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 51 Level Of Service: C

Street Name:	Jeffrey Road						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	40	329	200	129	1042	111	70	1570	106	228	761	104
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	40	329	200	129	1042	111	70	1570	106	228	761	104
Added Vol:	0	4	0	0	4	1	1	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	40	333	200	129	1046	112	71	1570	106	228	761	104
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	40	333	0	129	1046	112	71	1570	106	228	761	104
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	40	333	0	129	1046	112	71	1570	106	228	761	104
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	40	333	0	129	1046	112	71	1570	106	228	761	104
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.07	0.00	0.04	0.21	0.07	0.02	0.46	0.06	0.07	0.22	0.06
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

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Intersection #8 Jeffrey Road at Irvine Boulevard

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.537
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 25 Level Of Service: A

****

Street Name:	Jeffrey Road									Irvine Boulevard								
Approach:	North Bound				South Bound				East Bound				West Bound					
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Ignore					Include					Include					Include				
Min. Green:	0	0	0			0	0	0			0	0	0			0	0	0		
Lanes:	2	0	3	0	1	2	0	3	0	1	2	0	2	0	1	2	0	2	0	1
Volume Module:																				
Base Vol:	345	395	160			45	635	55			90	550	405			75	430	15		
Growth Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Initial Bse:	345	395	160			45	635	55			90	550	405			75	430	15		
Added Vol:	0	4	0			0	4	1			1	0	0			0	0	0		
PasserByVol:	0	0	0			0	0	0			0	0	0			0	0	0		
Initial Fut:	345	399	160			45	639	56			91	550	405			75	430	15		
User Adj:	1.00	1.00	0.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Adj:	1.00	1.00	0.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Volume:	345	399	0			45	639	56			91	550	405			75	430	15		
Reduct Vol:	0	0	0			0	0	0			0	0	0			0	0	0		
Reduced Vol:	345	399	0			45	639	56			91	550	405			75	430	15		
PCE Adj:	1.00	1.00	0.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
MLF Adj:	1.00	1.00	0.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Final Vol.:	345	399	0			45	639	56			91	550	405			75	430	15		
Saturation Flow Module:																				
Sat/Lane:	1700	1700	1700			1700	1700	1700			1700	1700	1700			1700	1700	1700		
Adjustment:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Lanes:	2.00	3.00	1.00			2.00	3.00	1.00			2.00	2.00	1.00			2.00	2.00	1.00		
Final Sat.:	3400	5100	1700			3400	5100	1700			3400	3400	1700			3400	3400	1700		
Capacity Analysis Module:																				
Vol/Sat:	0.10	0.08	0.00			0.01	0.13	0.03			0.03	0.16	0.24			0.02	0.13	0.01		
Crit Moves:	****						****						****			****	****			

****

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Sand Canyon Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.834
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 60 Level Of Service: D

Street Name:	Sand Canyon Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	25	280	437	179	869	11	39	1803	134	407	984	31
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	280	437	179	869	11	39	1803	134	407	984	31
Added Vol:	0	13	0	4	13	0	0	0	0	0	0	4
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	25	293	437	183	882	11	39	1803	134	407	984	35
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	293	437	183	882	11	39	1803	134	407	984	35
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	25	293	437	183	882	11	39	1803	134	407	984	35
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	25	293	437	183	882	11	39	1803	134	407	984	35
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3400	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.09	0.26	0.05	0.26	0.01	0.01	0.35	0.08	0.12	0.19	0.02
Crit Moves:			****	****				****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

****

Intersection #9 Sand Canyon Avenue at Irvine Boulevard

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.579
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

****

Street Name:	Sand Canyon Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	200	415	220	170	730	15	25	420	210	435	300	70
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	200	415	220	170	730	15	25	420	210	435	300	70
Added Vol:	0	13	0	4	13	0	0	0	0	0	0	4
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	200	428	220	174	743	15	25	420	210	435	300	74
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	200	428	220	174	743	15	25	420	210	435	300	74
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	200	428	220	174	743	15	25	420	210	435	300	74
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	200	428	220	174	743	15	25	420	210	435	300	74
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3400	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.06	0.13	0.13	0.05	0.22	0.01	0.01	0.08	0.12	0.13	0.06	0.04
Crit Moves:	****				****				****	****		

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Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 SR 133 Southbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.699
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 37 Level Of Service: B

Street Name:	SR 133 Southbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			2 0 0 0 1			0 0 3 0 1			1 0 3 0 0		
Volume Module:												
Base Vol:	0	0	0	239	0	74	0	2309	130	212	1387	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	239	0	74	0	2309	130	212	1387	0
Added Vol:	0	0	0	0	0	0	0	4	0	0	4	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	239	0	74	0	2313	130	212	1391	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	239	0	74	0	2313	130	212	1391	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	239	0	74	0	2313	130	212	1391	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	239	0	74	0	2313	130	212	1391	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	0	0	0	3400	0	1700	0	5100	1700	1700	5100	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.07	0.00	0.04	0.00	0.45	0.08	0.12	0.27	0.00
Crit Moves:				****				****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 SR 133 Southbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.309
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 18 Level Of Service: A

Street Name:	SR 133 Southbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			2 0 0 0 1			0 0 3 0 1			1 0 3 0 0		
Volume Module:												
Base Vol:	0	0	0	80	0	110	0	745	70	80	660	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	80	0	110	0	745	70	80	660	0
Added Vol:	0	0	0	0	0	0	0	4	0	0	4	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	80	0	110	0	749	70	80	664	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	80	0	110	0	749	70	80	664	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	80	0	110	0	749	70	80	664	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	80	0	110	0	749	70	80	664	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	0	0	0	3400	0	1700	0	5100	1700	1700	5100	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.02	0.00	0.06	0.00	0.15	0.04	0.05	0.13	0.00
Crit Moves:						****		****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 SR 133 Northbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.602
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 29 Level Of Service: B

Street Name:	SR 133 Northbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 3 0 2			0 0 2 1 0		
Volume Module:												
Base Vol:	56	0	145	0	0	0	0	2375	160	0	1674	50
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	56	0	145	0	0	0	0	2375	160	0	1674	50
Added Vol:	0	0	0	0	0	0	0	4	0	0	4	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	56	0	145	0	0	0	0	2379	160	0	1678	50
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	56	0	145	0	0	0	0	2379	0	0	1678	50
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	56	0	145	0	0	0	0	2379	0	0	1678	50
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	56	0	145	0	0	0	0	2379	0	0	1678	50
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	2.00	0.00	2.91	0.09
Final Sat.:	1700	0	1700	0	0	0	0	5100	3400	0	4952	148
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.09	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.34	0.34
Crit Moves:			****					****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 SR 133 Northbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.280
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 17 Level Of Service: A

Street Name:	SR 133 Northbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 3 0 2			0 0 2 1 0		
Volume Module:												
Base Vol:	80	0	95	0	0	0	0	885	55	0	645	45
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	80	0	95	0	0	0	0	885	55	0	645	45
Added Vol:	0	0	0	0	0	0	0	4	0	0	4	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	80	0	95	0	0	0	0	889	55	0	649	45
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	80	0	95	0	0	0	0	889	0	0	649	45
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	80	0	95	0	0	0	0	889	0	0	649	45
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	80	0	95	0	0	0	0	889	0	0	649	45
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	2.00	0.00	2.81	0.19
Final Sat.:	1700	0	1700	0	0	0	0	5100	3400	0	4769	331
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.06	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.14	0.14
Crit Moves:			****					****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #12 Jeffrey Road at Bryan Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.636
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 31 Level Of Service: B

Street Name:	Jeffrey Road						Bryan Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	153	721	104	66	1755	112	86	106	272	395	234	121
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	153	721	104	66	1755	112	86	106	272	395	234	121
Added Vol:	0	4	0	0	4	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	153	725	104	66	1759	112	86	106	272	395	234	121
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	153	725	104	66	1759	112	86	106	272	395	234	121
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	153	725	104	66	1759	112	86	106	272	395	234	121
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	153	725	104	66	1759	112	86	106	272	395	234	121
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	1700	1700	3400	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.14	0.06	0.02	0.34	0.07	0.05	0.06	0.08	0.12	0.14	0.07
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #12 Jeffrey Road at Bryan Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.427
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Jeffrey Road						Bryan Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	150	790	75	25	1040	45	80	30	265	170	25	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	150	790	75	25	1040	45	80	30	265	170	25	30
Added Vol:	0	4	0	0	4	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	150	794	75	25	1044	45	80	30	265	170	25	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	150	794	75	25	1044	45	80	30	265	170	25	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	150	794	75	25	1044	45	80	30	265	170	25	30
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	150	794	75	25	1044	45	80	30	265	170	25	30
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	1700	1700	3400	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.16	0.04	0.01	0.20	0.03	0.05	0.02	0.08	0.05	0.01	0.02
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Jeffrey Road at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.583
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Jeffrey Road						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	49	663	173	167	2074	40	35	360	199	17	61	62
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	49	663	173	167	2074	40	35	360	199	17	61	62
Added Vol:	0	4	0	0	4	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	49	667	173	167	2078	40	35	360	199	17	61	62
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	49	667	173	167	2078	40	35	360	199	17	61	62
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	49	667	173	167	2078	40	35	360	199	17	61	62
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	49	667	173	167	2078	40	35	360	199	17	61	62
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.13	0.10	0.05	0.41	0.02	0.01	0.11	0.12	0.01	0.02	0.04
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Jeffrey Road at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.465
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

Street Name:	Jeffrey Road						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	125	765	185	100	1345	25	40	250	180	135	135	75
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	125	765	185	100	1345	25	40	250	180	135	135	75
Added Vol:	0	4	0	0	4	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	125	769	185	100	1349	25	40	250	180	135	135	75
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	125	769	185	100	1349	25	40	250	180	135	135	75
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	125	769	185	100	1349	25	40	250	180	135	135	75
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	125	769	185	100	1349	25	40	250	180	135	135	75
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.15	0.11	0.03	0.26	0.01	0.01	0.07	0.11	0.04	0.04	0.04
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Sand Canyon Avenue at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.533
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 25 Level Of Service: A

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	271	507	41	73	1741	486	174	126	332	17	44	9
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	271	507	41	73	1741	486	174	126	332	17	44	9
Added Vol:	0	13	0	0	13	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	271	520	41	73	1754	486	174	126	332	17	44	9
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	271	520	0	73	1754	486	174	126	0	17	44	9
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	271	520	0	73	1754	486	174	126	0	17	44	9
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	271	520	0	73	1754	486	174	126	0	17	44	9
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.08	0.10	0.00	0.02	0.34	0.29	0.05	0.02	0.00	0.01	0.01	0.01
Crit Moves:	****				****		****				****	

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Sand Canyon Avenue at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.447
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	300	785	95	50	1275	55	165	30	300	50	40	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	300	785	95	50	1275	55	165	30	300	50	40	20
Added Vol:	0	13	0	0	13	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	300	798	95	50	1288	55	165	30	300	50	40	20
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	300	798	0	50	1288	55	165	30	0	50	40	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	300	798	0	50	1288	55	165	30	0	50	40	20
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	300	798	0	50	1288	55	165	30	0	50	40	20
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.09	0.16	0.00	0.01	0.25	0.03	0.05	0.01	0.00	0.01	0.01	0.01
Crit Moves:	****				****		****				****	

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Jeffrey Road at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.608
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 29 Level Of Service: B

Street Name:	Jeffrey Road						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0	1	0 0 3	0	1	0 0 0	0	0	1 0 1!	0	1
Volume Module:												
Base Vol:	0	1030	428	0	2272	479	0	0	0	348	0	223
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1030	428	0	2272	479	0	0	0	348	0	223
Added Vol:	0	4	0	0	1	3	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1034	428	0	2273	482	0	0	0	348	0	223
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1034	0	0	2273	0	0	0	0	348	0	223
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1034	0	0	2273	0	0	0	0	348	0	223
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1034	0	0	2273	0	0	0	0	348	0	223
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	0.00	3.00	1.00	0.00	0.00	0.00	1.82	0.01	1.17
Final Sat.:	0	5100	1700	0	5100	1700	0	0	0	3108	0	1992
Capacity Analysis Module:												
Vol/Sat:	0.00	0.20	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.11	0.00	0.11
Crit Moves:	****				****					****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Jeffrey Road at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.454
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

Street Name:	Jeffrey Road						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0 1		0 0 3	0 1		0 0 0	0 0		1 0 1!	0 1	
Volume Module:												
Base Vol:	0	795	600	0	1300	195	0	0	0	505	0	220
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	795	600	0	1300	195	0	0	0	505	0	220
Added Vol:	0	4	0	0	1	3	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	799	600	0	1301	198	0	0	0	505	0	220
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	799	0	0	1301	0	0	0	0	505	0	220
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	799	0	0	1301	0	0	0	0	505	0	220
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	799	0	0	1301	0	0	0	0	505	0	220
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	0.00	3.00	1.00	0.00	0.00	0.00	2.00	0.00	1.00
Final Sat.:	0	5100	1700	0	5100	1700	0	0	0	3400	0	1700
Capacity Analysis Module:												
Vol/Sat:	0.00	0.16	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.15	0.00	0.13
Crit Moves:	****				****					****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.821
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 57 Level Of Service: D

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 0 1			2 0 1 0 1		
Volume Module:												
Base Vol:	74	1094	110	459	1946	250	195	241	368	346	37	180
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	74	1094	110	459	1946	250	195	241	368	346	37	180
Added Vol:	0	1	0	0	1	0	0	0	0	0	0	3
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	74	1095	110	459	1947	250	195	241	368	346	37	183
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	74	1095	110	459	1947	250	195	241	368	346	37	183
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	74	1095	110	459	1947	250	195	241	368	346	37	183
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	74	1095	110	459	1947	250	195	241	368	346	37	183
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.66	0.34	1.00	1.00	1.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4520	580	1700	1700	1700	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.21	0.06	0.14	0.43	0.43	0.11	0.14	0.22	0.10	0.02	0.11
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.650
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 33 Level Of Service: B

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 0 1			2 0 1 0 1		
Volume Module:												
Base Vol:	65	940	35	295	1225	275	230	80	160	295	45	255
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	65	940	35	295	1225	275	230	80	160	295	45	255
Added Vol:	0	1	0	0	1	0	0	0	0	0	0	3
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	65	941	35	295	1226	275	230	80	160	295	45	258
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	65	941	35	295	1226	275	230	80	160	295	45	258
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	65	941	35	295	1226	275	230	80	160	295	45	258
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	65	941	35	295	1226	275	230	80	160	295	45	258
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.45	0.55	1.00	1.00	1.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4166	934	1700	1700	1700	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.18	0.02	0.09	0.29	0.29	0.14	0.05	0.09	0.09	0.03	0.15
Crit Moves:	****				****		****					****

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Sand Canyon Avenue at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.663
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 34 Level Of Service: B

Street Name:	Sand Canyon Avenue						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			1 0 2 0 1			1 1 0 0 1			1 0 2 0 1		
Volume Module:												
Base Vol:	39	980	79	226	1521	302	170	68	59	17	31	137
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	39	980	79	226	1521	302	170	68	59	17	31	137
Added Vol:	0	8	0	0	7	7	5	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	39	988	79	226	1528	309	175	68	59	17	31	137
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	39	988	79	226	1528	309	175	68	59	17	31	137
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	39	988	79	226	1528	309	175	68	59	17	31	137
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	39	988	79	226	1528	309	175	68	59	17	31	137
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	2.00	1.00	1.44	0.56	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3400	1700	2449	951	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.29	0.05	0.13	0.45	0.18	0.07	0.07	0.03	0.01	0.01	0.08
Crit Moves:	****				****		****					****

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Sand Canyon Avenue at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.583
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Sand Canyon Avenue						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			1 0 2 0 1			1 1 0 0 1			1 0 2 0 1		
Volume Module:												
Base Vol:	30	885	5	140	895	355	310	5	15	5	5	160
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	30	885	5	140	895	355	310	5	15	5	5	160
Added Vol:	0	8	0	0	6	6	5	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	30	893	5	140	901	361	315	5	15	5	5	160
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	30	893	5	140	901	361	315	5	15	5	5	160
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	30	893	5	140	901	361	315	5	15	5	5	160
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	30	893	5	140	901	361	315	5	15	5	5	160
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	1.00	2.00	1.00	1.97	0.03	1.00	1.00	2.00	1.00
Final Sat.:	3400	3400	1700	1700	3400	1700	3347	53	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.26	0.00	0.08	0.27	0.21	0.09	0.09	0.01	0.00	0.00	0.09
Crit Moves:		****		****				****				****

Frank R. Bowerman Landfill Implementation Project
2010 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #18 Sand Canyon Avenue at I-5 Southbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.593
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Sand Canyon Avenue						I-5 Southbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 2	0 1		2 0 2	0 0		1 0 1!	0 1		0 0 0	0 0	
Volume Module:												
Base Vol:	0	544	132	386	1206	0	506	2	444	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	544	132	386	1206	0	506	2	444	0	0	0
Added Vol:	0	1	0	5	1	0	7	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	545	132	391	1207	0	513	2	444	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	545	132	391	1207	0	513	2	444	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	545	132	391	1207	0	513	2	444	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	545	132	391	1207	0	513	2	444	0	0	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.00	1.00	2.00	2.00	0.00	1.60	0.01	1.39	0.00	0.00	0.00
Final Sat.:	0	3400	1700	3400	3400	0	2728	11	2361	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.16	0.08	0.12	0.36	0.00	0.19	0.19	0.19	0.00	0.00	0.00
Crit Moves:	****				****		****					

Frank R. Bowerman Landfill Implementation Project
2010 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

****

Intersection #18 Sand Canyon Avenue at I-5 Southbound Ramps

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.481
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 23 Level Of Service: A

****

Street Name:	Sand Canyon Avenue						I-5 Southbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 2	0 1		2 0 2	0 0		1 0 1!	0 1		0 0 0	0 0	
Volume Module:												
Base Vol:	0	705	125	145	690	0	215	0	610	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	705	125	145	690	0	215	0	610	0	0	0
Added Vol:	0	1	0	5	1	0	6	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	706	125	150	691	0	221	0	610	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	706	125	150	691	0	221	0	610	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	706	125	150	691	0	221	0	610	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	706	125	150	691	0	221	0	610	0	0	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	2.00	1.00	2.00	2.00	0.00	1.00	0.00	2.00	0.00	0.00	0.00
Final Sat.:	0	3400	1700	3400	3400	0	1700	0	3400	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.21	0.07	0.04	0.20	0.00	0.13	0.00	0.18	0.00	0.00	0.00
Crit Moves:		****		****					****			

****

APPENDIX D

LOS Computation Reports
2030

APPENDIX D1

LOS Computation Reports
2030 without the Project

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #1 Culver Drive at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.581
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Culver Drive						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	97	160	273	464	606	162	78	1177	179	451	1065	200
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	97	160	273	464	606	162	78	1177	179	451	1065	200
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	97	160	273	464	606	162	78	1177	179	451	1065	200
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	97	160	273	464	606	162	78	1177	179	451	1065	200
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	97	160	273	464	606	162	78	1177	179	451	1065	200
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.03	0.16	0.14	0.12	0.10	0.02	0.23	0.11	0.13	0.21	0.12
Crit Moves:	****			****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #1 Culver Drive at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.438
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Culver Drive						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	70	290	90	345	145	165	95	820	160	235	565	210
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	70	290	90	345	145	165	95	820	160	235	565	210
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	70	290	90	345	145	165	95	820	160	235	565	210
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	70	290	90	345	145	165	95	820	160	235	565	210
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	70	290	90	345	145	165	95	820	160	235	565	210
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.06	0.05	0.10	0.03	0.10	0.03	0.16	0.09	0.07	0.11	0.12
Crit Moves:		****		****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #2 Yale Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.814
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 55 Level Of Service: D

Street Name:	Yale Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 1 0 1			1 0 3 0 1			1 0 3 0 1		
Volume Module:												
Base Vol:	88	8	396	77	54	258	327	1471	131	155	1408	498
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	88	8	396	77	54	258	327	1471	131	155	1408	498
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	88	8	396	77	54	258	327	1471	131	155	1408	498
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	88	8	396	77	54	258	327	1471	131	155	1408	498
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	88	8	396	77	54	258	327	1471	131	155	1408	498
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	1700	1700	1700	5100	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.23	0.05	0.03	0.15	0.19	0.29	0.08	0.09	0.28	0.29
Crit Moves:			****	****			****					****

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #2 Yale Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.432
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Yale Avenue									Portola Parkway							
Approach:	North Bound				South Bound				East Bound				West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Include					Include					Include					Include				
Min. Green:	0	0	0			0	0	0			0	0	0			0	0	0		
Lanes:	1	0	2	0	1	1	0	1	0	1	1	0	3	0	1	1	0	3	0	1
Volume Module:																				
Base Vol:	200		35		65	60		65		70	35		1065		150	30		735		25
Growth Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Initial Bse:	200		35		65	60		65		70	35		1065		150	30		735		25
User Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Volume:	200		35		65	60		65		70	35		1065		150	30		735		25
Reduct Vol:	0		0		0	0		0		0	0		0		0	0		0		0
Reduced Vol:	200		35		65	60		65		70	35		1065		150	30		735		25
PCE Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
MLF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Final Vol.:	200		35		65	60		65		70	35		1065		150	30		735		25
Saturation Flow Module:																				
Sat/Lane:	1700	1700	1700			1700	1700	1700			1700	1700	1700			1700	1700	1700		
Adjustment:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Lanes:	1.00	2.00	1.00			1.00	1.00	1.00			1.00	1.00	3.00			1.00	1.00	3.00		
Final Sat.:	1700	3400	1700			1700	1700	1700			1700	1700	5100			1700	1700	5100		
Capacity Analysis Module:																				
Vol/Sat:	0.12	0.01	0.04			0.04	0.04	0.04			0.02	0.21	0.09			0.02	0.14	0.01		
Crit Moves:	****					****					****					****				

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #3 Jeffrey Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.708
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 38 Level Of Service: C

Street Name:	Jeffrey Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2	0 1		2 0 2	1 0		2 0 3	0 1		2 0 3	0 1	
Volume Module:												
Base Vol:	263	171	146	376	424	136	281	1168	525	791	811	27
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	263	171	146	376	424	136	281	1168	525	791	811	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	263	171	146	376	424	136	281	1168	525	791	811	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	263	171	146	376	424	136	281	1168	525	791	811	27
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	263	171	146	376	424	136	281	1168	525	791	811	27
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.27	0.73	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3861	1239	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.08	0.05	0.09	0.11	0.11	0.11	0.08	0.23	0.31	0.23	0.16	0.02
Crit Moves:			****	****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #3 Jeffrey Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.635
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 31 Level Of Service: B

Street Name:	Jeffrey Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2	0 1		2 0 2	1 0		2 0 3	0 1		2 0 3	0 1	
Volume Module:												
Base Vol:	365	260	160	95	275	45	40	510	700	375	275	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	365	260	160	95	275	45	40	510	700	375	275	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	365	260	160	95	275	45	40	510	700	375	275	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	365	260	160	95	275	45	40	510	700	375	275	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	365	260	160	95	275	45	40	510	700	375	275	40
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.58	0.42	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	4383	717	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.11	0.08	0.09	0.03	0.06	0.06	0.01	0.10	0.41	0.11	0.05	0.02
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #4 Bee Canyon Access Road at Portola Parkway

Cycle (sec):	100	Critical Vol./Cap. (X):	0.621
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	30	Level Of Service:	B

Street Name:	Bee Canyon Access Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 1! 0 0			1 0 2 0 0			0 0 2 0 2		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	1940	0	0	1629	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	1940	0	0	1629	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	0	1940	0	0	1629	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	0	1940	0	0	1629	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	0	0	0	0	0	0	0	1940	0	0	1629	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	1.00	0.00	1.00	2.00	0.00	0.00	2.00	2.00
Final Sat.:	0	0	0	1700	1700	0	1700	3400	0	0	3400	3400
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.48	0.00
Crit Moves:								****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #4 Bee Canyon Access Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.275
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 17 Level Of Service: A

Street Name:	Bee Canyon Access Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 1! 0 0			1 0 2 0 0			0 0 2 0 2		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	765	0	0	660	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	765	0	0	660	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	0	0	0	0	765	0	0	660	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	0	0	0	765	0	0	660	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	0	0	0	0	0	0	0	765	0	0	660	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	1.00	0.00	1.00	2.00	0.00	0.00	2.00	2.00
Final Sat.:	0	0	0	1700	1700	0	1700	3400	0	0	3400	3400
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.19	0.00
Crit Moves:								****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #5 Sand Canyon Avenue at Portola Parkway

Cycle (sec):	100	Critical Vol./Cap. (X):	0.627
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	31	Level Of Service:	B

Street Name:	Sand Canyon Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 0 0 2			0 0 0 0 0			0 0 2 0 1			2 0 2 0 0		
Volume Module:												
Base Vol:	119	0	232	0	0	0	0	1349	591	494	1504	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	119	0	232	0	0	0	0	1349	591	494	1504	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	119	0	232	0	0	0	0	1349	0	494	1504	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	119	0	232	0	0	0	0	1349	0	494	1504	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	119	0	232	0	0	0	0	1349	0	494	1504	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	2.00	0.00	0.00	0.00	0.00	2.00	1.00	2.00	2.00	0.00
Final Sat.:	3400	0	3400	0	0	0	0	3400	1700	3400	3400	0
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.07	0.00	0.00	0.00	0.00	0.40	0.00	0.15	0.44	0.00
Crit Moves:	****							****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #5 Sand Canyon Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.453
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 22 Level Of Service: A

Street Name:	Sand Canyon Avenue									Portola Parkway							
Approach:	North Bound				South Bound				East Bound				West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Ovl					Include					Ignore					Include				
Min. Green:	0	0	0			0	0	0			0	0	0			0	0	0		
Lanes:	2	0	0	0	2	0	0	0	0	0	0	0	2	0	1	2	0	2	0	0
Volume Module:																				
Base Vol:	110		0		650	0		0		0	0		190		370	1070		245		0
Growth Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Initial Bse:	110		0		650	0		0		0	0		190		370	1070		245		0
User Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		0.00	1.00	1.00	1.00		
PHF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		0.00	1.00	1.00	1.00		
PHF Volume:	110		0		650	0		0		0	0		190		0	1070		245		0
Reduct Vol:	0		0		0	0		0		0	0		0		0	0		0		0
Reduced Vol:	110		0		650	0		0		0	0		190		0	1070		245		0
PCE Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		0.00	1.00	1.00	1.00		
MLF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		0.00	1.00	1.00	1.00		
Final Vol.:	110		0		650	0		0		0	0		190		0	1070		245		0
Saturation Flow Module:																				
Sat/Lane:	1700	1700	1700			1700	1700	1700			1700	1700	1700		1700	1700	1700	1700		
Adjustment:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		1.00	1.00	1.00	1.00		
Lanes:	2.00	0.00	2.00			0.00	0.00	0.00			0.00	2.00	1.00		2.00	2.00	2.00	0.00		
Final Sat.:	3400		0		3400	0		0		0	0		3400		1700	3400		3400		0
Capacity Analysis Module:																				
Vol/Sat:	0.03	0.00	0.19			0.00	0.00	0.00			0.00	0.06			0.00	0.31		0.07		0.00
Crit Moves:	****											****				****				

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #6 Culver Drive at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.800
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 52 Level Of Service: C

Street Name:	Culver Drive						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 2 1 0		
Volume Module:												
Base Vol:	144	461	234	216	1119	214	117	1340	235	765	1322	52
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	144	461	234	216	1119	214	117	1340	235	765	1322	52
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	144	461	234	216	1119	214	117	1340	235	765	1322	52
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	144	461	234	216	1119	214	117	1340	235	765	1322	52
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	144	461	234	216	1119	214	117	1340	235	765	1322	52
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.89	0.11
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	4907	193
Capacity Analysis Module:												
Vol/Sat:	0.04	0.09	0.14	0.06	0.22	0.13	0.03	0.26	0.14	0.23	0.27	0.27
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #6 Culver Drive at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.572
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 27 Level Of Service: A

Street Name:	Culver Drive						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 2 1 0		
Volume Module:												
Base Vol:	250	310	155	70	395	95	85	685	385	490	980	55
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	250	310	155	70	395	95	85	685	385	490	980	55
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	250	310	155	70	395	95	85	685	385	490	980	55
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	250	310	155	70	395	95	85	685	385	490	980	55
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	250	310	155	70	395	95	85	685	385	490	980	55
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.84	0.16
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	4829	271
Capacity Analysis Module:												
Vol/Sat:	0.07	0.06	0.09	0.02	0.08	0.06	0.03	0.13	0.23	0.14	0.20	0.20
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #7 Yale Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.879
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 76 Level Of Service: D

Street Name:	Yale Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			2 0 2 0 1			1 0 2 1 0			1 0 2 1 0		
Volume Module:												
Base Vol:	184	288	114	419	442	281	160	2237	28	190	1954	11
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	184	288	114	419	442	281	160	2237	28	190	1954	11
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	184	288	114	419	442	281	160	2237	28	190	1954	11
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	184	288	114	419	442	281	160	2237	28	190	1954	11
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	184	288	114	419	442	281	160	2237	28	190	1954	11
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	2.00	2.00	1.00	1.00	2.96	0.04	1.00	2.98	0.02
Final Sat.:	1700	3400	1700	3400	3400	1700	1700	5037	63	1700	5071	29
Capacity Analysis Module:												
Vol/Sat:	0.11	0.08	0.07	0.12	0.13	0.17	0.09	0.44	0.44	0.11	0.39	0.39
Crit Moves:	****					****		****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #7 Yale Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.606
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 29 Level Of Service: B

Street Name:	Yale Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			2 0 2 0 1			1 0 2 1 0			1 0 2 1 0		
Volume Module:												
Base Vol:	205	140	190	330	155	245	100	965	85	145	955	105
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	205	140	190	330	155	245	100	965	85	145	955	105
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	205	140	190	330	155	245	100	965	85	145	955	105
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	205	140	190	330	155	245	100	965	85	145	955	105
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	205	140	190	330	155	245	100	965	85	145	955	105
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	2.00	2.00	1.00	1.00	2.76	0.24	1.00	2.70	0.30
Final Sat.:	1700	3400	1700	3400	3400	1700	1700	4687	413	1700	4595	505
Capacity Analysis Module:												
Vol/Sat:	0.12	0.04	0.11	0.10	0.05	0.14	0.06	0.21	0.21	0.09	0.21	0.21
Crit Moves:	****					****		****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #8 Jeffrey Road at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.829
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 59 Level Of Service: D

Street Name:	Jeffrey Road						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	41	495	179	336	1641	331	151	2033	82	159	1002	200
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	41	495	179	336	1641	331	151	2033	82	159	1002	200
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	41	495	0	336	1641	331	151	2033	82	159	1002	200
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	41	495	0	336	1641	331	151	2033	82	159	1002	200
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	41	495	0	336	1641	331	151	2033	82	159	1002	200
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.10	0.00	0.10	0.32	0.19	0.04	0.40	0.05	0.05	0.20	0.12
Crit Moves:	****				****			****			****	

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #8 Jeffrey Road at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.703
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 38 Level Of Service: C

Street Name:	Jeffrey Road						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	465	675	140	95	1090	165	235	755	485	60	575	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	465	675	140	95	1090	165	235	755	485	60	575	30
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	465	675	0	95	1090	165	235	755	485	60	575	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	465	675	0	95	1090	165	235	755	485	60	575	30
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	465	675	0	95	1090	165	235	755	485	60	575	30
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.14	0.13	0.00	0.03	0.21	0.10	0.07	0.15	0.29	0.02	0.11	0.02
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #9 Sand Canyon Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.881
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 77 Level Of Service: D

Street Name:	Sand Canyon Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 4 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	164	417	627	174	1307	49	55	2466	283	164	1186	8
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	164	417	627	174	1307	49	55	2466	283	164	1186	8
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	164	417	627	174	1307	49	55	2466	283	164	1186	8
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	164	417	627	174	1307	49	55	2466	283	164	1186	8
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	164	417	627	174	1307	49	55	2466	283	164	1186	8
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	4.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	6800	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.08	0.37	0.05	0.26	0.03	0.02	0.36	0.17	0.05	0.23	0.00
Crit Moves:			****	****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #9 Sand Canyon Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.773
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 47 Level Of Service: C

Street Name:	Sand Canyon Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 4 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	335	610	370	205	1250	20	25	465	325	640	305	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	335	610	370	205	1250	20	25	465	325	640	305	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	335	610	370	205	1250	20	25	465	325	640	305	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	335	610	370	205	1250	20	25	465	325	640	305	60
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	335	610	370	205	1250	20	25	465	325	640	305	60
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	4.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	6800	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.10	0.12	0.22	0.06	0.25	0.01	0.01	0.07	0.19	0.19	0.06	0.04
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #10 SR 133 Southbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.846
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 64 Level Of Service: D

Street Name:	SR 133 Southbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			2 0 0 0 1			0 0 3 0 1			1 0 3 0 0		
Volume Module:												
Base Vol:	0	0	0	243	0	90	0	2867	284	276	1240	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	243	0	90	0	2867	284	276	1240	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	243	0	90	0	2867	284	276	1240	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	243	0	90	0	2867	284	276	1240	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	243	0	90	0	2867	284	276	1240	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	0	0	0	3400	0	1700	0	5100	1700	1700	5100	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.07	0.00	0.05	0.00	0.56	0.17	0.16	0.24	0.00
Crit Moves:				****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #10 SR 133 Southbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.377
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 19 Level Of Service: A

Street Name:	SR 133 Southbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			2 0 0 0 1			0 0 3 0 1			1 0 3 0 0		
Volume Module:												
Base Vol:	0	0	0	100	0	140	0	950	90	100	840	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	100	0	140	0	950	90	100	840	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	100	0	140	0	950	90	100	840	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	100	0	140	0	950	90	100	840	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	100	0	140	0	950	90	100	840	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	0	0	0	3400	0	1700	0	5100	1700	1700	5100	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.03	0.00	0.08	0.00	0.19	0.05	0.06	0.16	0.00
Crit Moves:						****		****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #11 SR 133 Northbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.831
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 59 Level Of Service: D

Street Name:	SR 133 Northbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 3 0 2			0 0 2 1 0		
Volume Module:												
Base Vol:	98	0	356	0	0	0	0	2913	241	0	1522	91
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	98	0	356	0	0	0	0	2913	241	0	1522	91
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	98	0	356	0	0	0	0	2913	0	0	1522	91
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	98	0	356	0	0	0	0	2913	0	0	1522	91
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	98	0	356	0	0	0	0	2913	0	0	1522	91
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	2.00	0.00	2.83	0.17
Final Sat.:	1700	0	1700	0	0	0	0	5100	3400	0	4812	288
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.21	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.32	0.32
Crit Moves:			****					****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #11 SR 133 Northbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.359
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 19 Level Of Service: A

Street Name:	SR 133 Northbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 3 0 2			0 0 2 1 0		
Volume Module:												
Base Vol:	105	0	130	0	0	0	0	1185	70	0	865	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	105	0	130	0	0	0	0	1185	70	0	865	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	105	0	130	0	0	0	0	1185	0	0	865	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	105	0	130	0	0	0	0	1185	0	0	865	60
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	105	0	130	0	0	0	0	1185	0	0	865	60
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	2.00	0.00	2.81	0.19
Final Sat.:	1700	0	1700	0	0	0	0	5100	3400	0	4769	331
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.08	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.18	0.18
Crit Moves:			****					****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #12 Jeffrey Road at Bryan Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.794
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 51 Level Of Service: C

Street Name:	Jeffrey Road									Bryan Avenue							
Approach:	North Bound				South Bound				East Bound				West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Include					Include					Include					Include				
Min. Green:	0	0	0			0	0	0			0	0	0			0	0	0		
Lanes:	2	0	3	0	1	2	0	3	0	1	1	0	1	1	1	2	0	1	0	1
Volume Module:																				
Base Vol:	192	885	93			83	2286	172			153	156	441			371	249	129		
Growth Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Initial Bse:	192	885	93			83	2286	172			153	156	441			371	249	129		
User Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
PHF Volume:	192	885	93			83	2286	172			153	156	441			371	249	129		
Reduct Vol:	0	0	0			0	0	0			0	0	0			0	0	0		
Reduced Vol:	192	885	93			83	2286	172			153	156	441			371	249	129		
PCE Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
MLF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Final Vol.:	192	885	93			83	2286	172			153	156	441			371	249	129		
Saturation Flow Module:																				
Sat/Lane:	1700	1700	1700			1700	1700	1700			1700	1700	1700			1700	1700	1700		
Adjustment:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Lanes:	2.00	3.00	1.00			2.00	3.00	1.00			1.00	1.00	2.00			2.00	1.00	1.00		
Final Sat.:	3400	5100	1700			3400	5100	1700			1700	1700	3400			3400	1700	1700		
Capacity Analysis Module:																				
Vol/Sat:	0.06	0.17	0.05			0.02	0.45	0.10			0.09	0.09	0.13			0.11	0.15	0.08		
Crit Moves:	****						****						****			****				

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #12 Jeffrey Road at Bryan Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.518
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 24 Level Of Service: A

Street Name:	Jeffrey Road									Bryan Avenue							
Approach:	North Bound				South Bound				East Bound				West Bound				
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R		
Control:	Protected				Protected				Protected				Protected				
Rights:	Include				Include				Include				Include				
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0		
Lanes:	2	0	3	0	1	2	0	3	0	1	1	0	1	1	1	2	0	1	0	1
Volume Module:																	
Base Vol:	190	1050	55		35	1410	105		185	40	330		140	35	45		
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		
Initial Bse:	190	1050	55		35	1410	105		185	40	330		140	35	45		
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		
PHF Volume:	190	1050	55		35	1410	105		185	40	330		140	35	45		
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0		
Reduced Vol:	190	1050	55		35	1410	105		185	40	330		140	35	45		
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		
Final Vol.:	190	1050	55		35	1410	105		185	40	330		140	35	45		
Saturation Flow Module:																	
Sat/Lane:	1700	1700	1700		1700	1700	1700		1700	1700	1700		1700	1700	1700		
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		
Lanes:	2.00	3.00	1.00		2.00	3.00	1.00		1.00	1.00	2.00		2.00	1.00	1.00		
Final Sat.:	3400	5100	1700		3400	5100	1700		1700	1700	3400		3400	1700	1700		
Capacity Analysis Module:																	
Vol/Sat:	0.06	0.21	0.03		0.01	0.28	0.06		0.11	0.02	0.10		0.04	0.02	0.03		
Crit Moves:	****					****			****						****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #13 Jeffrey Road at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.790
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 50 Level Of Service: C

Street Name:	Jeffrey Road						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 4 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	44	766	337	460	2394	51	73	1262	291	14	54	71
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	44	766	337	460	2394	51	73	1262	291	14	54	71
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	44	766	337	460	2394	51	73	1262	291	14	54	71
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	44	766	337	460	2394	51	73	1262	291	14	54	71
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	44	766	337	460	2394	51	73	1262	291	14	54	71
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	4.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	6800	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.15	0.20	0.14	0.35	0.03	0.02	0.37	0.17	0.00	0.02	0.04
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #13 Jeffrey Road at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.560
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 27 Level Of Service: A

Street Name:	Jeffrey Road						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 4 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	170	925	345	175	1680	35	450	465	245	260	255	130
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	170	925	345	175	1680	35	450	465	245	260	255	130
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	170	925	345	175	1680	35	450	465	245	260	255	130
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	170	925	345	175	1680	35	450	465	245	260	255	130
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	170	925	345	175	1680	35	450	465	245	260	255	130
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	4.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	6800	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.18	0.20	0.05	0.25	0.02	0.13	0.14	0.14	0.08	0.08	0.08
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #14 Sand Canyon Avenue at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.895
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 84 Level Of Service: D

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	198	686	285	418	2529	290	178	666	447	544	562	216
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	198	686	285	418	2529	290	178	666	447	544	562	216
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	198	686	0	418	2529	290	178	666	0	544	562	216
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	198	686	0	418	2529	290	178	666	0	544	562	216
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	198	686	0	418	2529	290	178	666	0	544	562	216
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.06	0.13	0.00	0.12	0.50	0.17	0.05	0.13	0.00	0.16	0.11	0.13
Crit Moves:	****				****			****			****	

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #14 Sand Canyon Avenue at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.682
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 35 Level Of Service: B

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	385	1050	490	340	1785	85	295	215	440	275	250	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	385	1050	490	340	1785	85	295	215	440	275	250	140
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	385	1050	0	340	1785	85	295	215	0	275	250	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	385	1050	0	340	1785	85	295	215	0	275	250	140
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	385	1050	0	340	1785	85	295	215	0	275	250	140
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.11	0.21	0.00	0.10	0.35	0.05	0.09	0.04	0.00	0.08	0.05	0.08
Crit Moves:	****				****		****					****

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #15 Jeffrey Road at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.749
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 43 Level Of Service: C

Street Name:	Jeffrey Road						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0	1	0 0 3	0	1	0 0 0	0	0	1 0 1!	0	1
Volume Module:												
Base Vol:	0	1873	420	0	2762	260	0	0	0	528	0	277
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1873	420	0	2762	260	0	0	0	528	0	277
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1873	0	0	2762	0	0	0	0	528	0	277
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1873	0	0	2762	0	0	0	0	528	0	277
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1873	0	0	2762	0	0	0	0	528	0	277
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	0.00	3.00	1.00	0.00	0.00	0.00	1.97	xxxx	1.03
Final Sat.:	0	5100	1700	0	5100	1700	0	0	0	3345	0	1755
Capacity Analysis Module:												
Vol/Sat:	0.00	0.37	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Crit Moves:	****				****					****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #15 Jeffrey Road at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.700
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 37 Level Of Service: B

Street Name:	Jeffrey Road							I-5 Northbound Ramps					
Approach:	North Bound			South Bound				East Bound			West Bound		
Movement:	L	T	R	L	T	R		L	T	R	L	T	R
Control:	Protected			Protected				Protected			Protected		
Rights:	Ignore			Ignore				Include			Include		
Min. Green:	0	0	0	0	0	0		0	0	0	0	0	0
Lanes:	0 0 3	0	1	0 0 3	0	1		0 0 0	0	0	1 0 1!	0	1
Volume Module:													
Base Vol:	0	1030	775	0	2100	320		0	0	0	810	0	350
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1030	775	0	2100	320		0	0	0	810	0	350
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1030	0	0	2100	0		0	0	0	810	0	350
Reduct Vol:	0	0	0	0	0	0		0	0	0	0	0	0
Reduced Vol:	0	1030	0	0	2100	0		0	0	0	810	0	350
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1030	0	0	2100	0		0	0	0	810	0	350
Saturation Flow Module:													
Sat/Lane:	1700	1700	1700	1700	1700	1700		1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	0.00	3.00	1.00		0.00	0.00	0.00	2.00	0.00	1.00
Final Sat.:	0	5100	1700	0	5100	1700		0	0	0	3400	0	1700
Capacity Analysis Module:													
Vol/Sat:	0.00	0.20	0.00	0.00	0.41	0.00		0.00	0.00	0.00	0.24	0.00	0.21
Crit Moves:	****				****						****		

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.957
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 140 Level Of Service: E

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	63	1719	132	697	2396	269	371	351	436	298	28	250
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	63	1719	132	697	2396	269	371	351	436	298	28	250
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	63	1719	132	697	2396	269	371	351	436	298	28	250
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	63	1719	132	697	2396	269	371	351	436	298	28	250
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	63	1719	132	697	2396	269	371	351	436	298	28	250
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.70	0.30	1.00	1.34	1.66	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4585	515	1700	2275	2825	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.34	0.08	0.21	0.52	0.52	0.22	0.15	0.15	0.09	0.02	0.15
Crit Moves:		****		****			****					****

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.810
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 54 Level Of Service: D

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	75	1240	40	400	1620	315	270	90	180	380	50	340
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	75	1240	40	400	1620	315	270	90	180	380	50	340
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	75	1240	40	400	1620	315	270	90	180	380	50	340
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	75	1240	40	400	1620	315	270	90	180	380	50	340
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	75	1240	40	400	1620	315	270	90	180	380	50	340
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.51	0.49	1.00	1.00	2.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4270	830	1700	1700	3400	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.24	0.02	0.12	0.38	0.38	0.16	0.05	0.05	0.11	0.03	0.20
Crit Moves:	****				****		****					****

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #17 Sand Canyon Avenue at I-5 Northbound Ramps

Cycle (sec):	100	Critical Vol./Cap. (X):	0.801
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	52	Level Of Service:	D

Street Name:	Sand Canyon Avenue						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 1 0 1			1 0 1 1 1		
Volume Module:												
Base Vol:	78	2213	297	507	2261	350	227	151	86	48	66	345
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	78	2213	297	507	2261	350	227	151	86	48	66	345
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	78	2213	297	507	2261	350	227	151	86	48	66	345
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	78	2213	297	507	2261	350	227	151	86	48	66	345
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	78	2213	297	507	2261	350	227	151	86	48	66	345
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	1.00	1.00	1.00	1.00	2.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	1700	1700	1700	1700	3400
Capacity Analysis Module:												
Vol/Sat:	0.02	0.43	0.17	0.15	0.44	0.21	0.07	0.09	0.05	0.03	0.04	0.10
Crit Moves:		****		****			****					****

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #17 Sand Canyon Avenue at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.735
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 41 Level Of Service: C

Street Name:	Sand Canyon Avenue						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 1 0 1			1 0 1 1 1		
Volume Module:												
Base Vol:	271	1573	73	278	1903	379	391	35	175	39	28	398
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	271	1573	73	278	1903	379	391	35	175	39	28	398
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	271	1573	73	278	1903	379	391	35	175	39	28	398
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	271	1573	73	278	1903	379	391	35	175	39	28	398
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	271	1573	73	278	1903	379	391	35	175	39	28	398
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	1.00	1.00	1.00	1.00	2.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	1700	1700	1700	1700	3400
Capacity Analysis Module:												
Vol/Sat:	0.08	0.31	0.04	0.08	0.37	0.22	0.12	0.02	0.10	0.02	0.02	0.12
Crit Moves:	****				****		****					****

Frank R. Bowerman Landfill Implementation Project
2030 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #18 Sand Canyon Avenue at I-5 Southbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.834
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 60 Level Of Service: D

Street Name:	Sand Canyon Avenue						I-5 Southbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0 1		2 0 3	0 0		1 0 1!	0 1		0 0 0	0 0	
Volume Module:												
Base Vol:	0	1366	148	370	2056	0	1144	2	794	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1366	148	370	2056	0	1144	2	794	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1366	148	370	2056	0	1144	2	794	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1366	148	370	2056	0	1144	2	794	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1366	148	370	2056	0	1144	2	794	0	0	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	2.00	3.00	0.00	1.77	0.01	1.22	0.00	0.00	0.00
Final Sat.:	0	5100	1700	3400	5100	0	3007	5	2087	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.27	0.09	0.11	0.40	0.00	0.38	0.38	0.38	0.00	0.00	0.00
Crit Moves:	****				****		****					

Frank R. Bowerman Landfill Implementation Project
2030 without Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #18 Sand Canyon Avenue at I-5 Southbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.691
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 36 Level Of Service: B

Street Name:	Sand Canyon Avenue						I-5 Southbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0 1		2 0 3	0 0		1 0 1!	0 1		0 0 0	0 0	
Volume Module:												
Base Vol:	0	1452	257	294	1757	0	459	0	926	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1452	257	294	1757	0	459	0	926	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1452	257	294	1757	0	459	0	926	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1452	257	294	1757	0	459	0	926	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1452	257	294	1757	0	459	0	926	0	0	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	2.00	3.00	0.00	1.00	0.00	2.00	0.00	0.00	0.00
Final Sat.:	0	5100	1700	3400	5100	0	1700	0	3400	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.28	0.15	0.09	0.34	0.00	0.27	0.00	0.27	0.00	0.00	0.00
Crit Moves:		****		****			****					

APPENDIX D2

LOS Computation Reports
2030 with the Project

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Culver Drive at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.591
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 28 Level Of Service: A

Street Name:	Culver Drive						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	97	160	273	464	606	162	78	1177	179	451	1065	200
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	97	160	273	464	606	162	78	1177	179	451	1065	200
Added Vol:	0	0	0	0	0	0	0	49	0	0	49	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	97	160	273	464	606	162	78	1226	179	451	1114	200
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	97	160	273	464	606	162	78	1226	179	451	1114	200
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	97	160	273	464	606	162	78	1226	179	451	1114	200
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	97	160	273	464	606	162	78	1226	179	451	1114	200
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.03	0.03	0.16	0.14	0.12	0.10	0.02	0.24	0.11	0.13	0.22	0.12
Crit Moves:		****		****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #1 Culver Drive at Portola Parkway

Cycle (sec):	100	Critical Vol./Cap. (X):	0.447
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	22	Level Of Service:	A

Street Name:	Culver Drive						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		fo
Rights:	Ovl			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	70	290	90	345	145	165	95	820	160	235	565	210
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	70	290	90	345	145	165	95	820	160	235	565	210
Added Vol:	0	0	0	0	0	0	0	47	0	0	47	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	70	290	90	345	145	165	95	867	160	235	612	210
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	70	290	90	345	145	165	95	867	160	235	612	210
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	70	290	90	345	145	165	95	867	160	235	612	210
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	70	290	90	345	145	165	95	867	160	235	612	210
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.06	0.05	0.10	0.03	0.10	0.03	0.17	0.09	0.07	0.12	0.12
Crit Moves:		****		****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Yale Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.806
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 53 Level Of Service: D

Street Name:	Yale Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2	0 1		1 0 1	0 1		1 0 3	0 1		1 0 3	0 1	
Volume Module:												
Base Vol:	88	8	396	77	54	258	327	1471	131	155	1408	498
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	88	8	396	77	54	258	327	1471	131	155	1408	498
Added Vol:	0	0	0	0	0	0	0	49	0	0	49	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	88	8	396	77	54	258	327	1520	131	155	1457	498
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	88	8	396	77	54	258	327	1520	131	155	1457	498
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	88	8	396	77	54	258	327	1520	131	155	1457	498
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	88	8	396	77	54	258	327	1520	131	155	1457	498
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	1700	1700	1700	5100	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.23	0.05	0.03	0.15	0.19	0.30	0.08	0.09	0.29	0.29
Crit Moves:			****	****			****				****	

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #2 Yale Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.442
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 21 Level Of Service: A

Street Name:	Yale Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			1 0 1 0 1			1 0 3 0 1			1 0 3 0 1		
Volume Module:												
Base Vol:	200	35	65	60	65	70	35	1065	150	30	735	25
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	200	35	65	60	65	70	35	1065	150	30	735	25
Added Vol:	0	0	0	0	0	0	0	47	0	0	47	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	200	35	65	60	65	70	35	1112	150	30	782	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	200	35	65	60	65	70	35	1112	150	30	782	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	200	35	65	60	65	70	35	1112	150	30	782	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	200	35	65	60	65	70	35	1112	150	30	782	25
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00	1.00
Final Sat.:	1700	3400	1700	1700	1700	1700	1700	5100	1700	1700	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.12	0.01	0.04	0.04	0.04	0.04	0.02	0.22	0.09	0.02	0.15	0.01
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Jeffrey Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.774
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 47 Level Of Service: C

Street Name:	Jeffrey Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2 0 1			2 0 2 1 0			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	263	171	146	376	424	136	281	1168	525	791	811	27
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	263	171	146	376	424	136	281	1168	525	791	811	27
Added Vol:	0	0	64	0	0	0	0	49	0	64	49	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	263	171	210	376	424	136	281	1217	525	855	860	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	263	171	210	376	424	136	281	1217	525	855	860	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	263	171	210	376	424	136	281	1217	525	855	860	27
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	263	171	210	376	424	136	281	1217	525	855	860	27
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.27	0.73	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	3861	1239	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.08	0.05	0.12	0.11	0.11	0.11	0.08	0.24	0.31	0.25	0.17	0.02
Crit Moves:			****	****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #3 Jeffrey Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.653
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 33 Level Of Service: B

Street Name:	Jeffrey Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 2	0 1		2 0 2	1 0		2 0 3	0 1		2 0 3	0 1	
Volume Module:												
Base Vol:	365	260	160	95	275	45	40	510	700	375	275	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	365	260	160	95	275	45	40	510	700	375	275	40
Added Vol:	0	0	62	0	0	0	0	47	0	62	47	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	365	260	222	95	275	45	40	557	700	437	322	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	365	260	222	95	275	45	40	557	700	437	322	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	365	260	222	95	275	45	40	557	700	437	322	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	365	260	222	95	275	45	40	557	700	437	322	40
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.58	0.42	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	3400	1700	3400	4383	717	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.11	0.08	0.13	0.03	0.06	0.06	0.01	0.11	0.41	0.13	0.06	0.02
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Bee Canyon Access Road at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.732
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 41 Level Of Service: C

Street Name:	Bee Canyon Access Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 1! 0 0			1 0 2 0 0			0 0 2 0 2		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	1940	0	0	1629	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	1940	0	0	1629	0
Added Vol:	0	0	0	265	0	114	114	0	0	0	0	265
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	265	0	114	114	1940	0	0	1629	265
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	265	0	114	114	1940	0	0	1629	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	265	0	114	114	1940	0	0	1629	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	0	0	0	265	0	114	114	1940	0	0	1629	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.40	0.00	0.60	1.00	2.00	0.00	0.00	2.00	2.00
Final Sat.:	0	0	0	2377	0	1023	1700	3400	0	0	3400	3400
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.11	0.00	0.11	0.07	0.57	0.00	0.00	0.48	0.00
Crit Moves:				****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Bee Canyon Access Road at Portola Parkway

Cycle (sec):	100	Critical Vol./Cap. (X):	0.415
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	20	Level Of Service:	A

Street Name:	Bee Canyon Access Road						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			1 0 1! 0 0			1 0 2 0 0			0 0 2 0 2		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	765	0	0	660	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	765	0	0	660	0
Added Vol:	0	0	0	255	0	109	109	0	0	0	0	255
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	255	0	109	109	765	0	0	660	255
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
PHF Volume:	0	0	0	255	0	109	109	765	0	0	660	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	255	0	109	109	765	0	0	660	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	0	0	0	255	0	109	109	765	0	0	660	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.40	0.00	0.60	1.00	2.00	0.00	0.00	2.00	2.00
Final Sat.:	0	0	0	2382	0	1018	1700	3400	0	0	3400	3400
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.11	0.00	0.11	0.06	0.23	0.00	0.00	0.19	0.00
Crit Moves:				****			****				****	

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Sand Canyon Avenue at Portola Parkway

Cycle (sec):	100	Critical Vol./Cap. (X):	0.705
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	38	Level Of Service:	C

Street Name:	Sand Canyon Avenue						Portola Parkway					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 0 0 2			0 0 0 0 0			0 0 2 0 1			2 0 2 0 0		
Volume Module:												
Base Vol:	119	0	232	0	0	0	0	1349	591	494	1504	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	119	0	232	0	0	0	0	1349	591	494	1504	0
Added Vol:	246	0	0	0	0	0	0	19	246	0	19	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	365	0	232	0	0	0	0	1368	837	494	1523	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	365	0	232	0	0	0	0	1368	0	494	1523	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	365	0	232	0	0	0	0	1368	0	494	1523	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	365	0	232	0	0	0	0	1368	0	494	1523	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	2.00	0.00	0.00	0.00	0.00	2.00	1.00	2.00	2.00	0.00
Final Sat.:	3400	0	3400	0	0	0	0	3400	1700	3400	3400	0
Capacity Analysis Module:												
Vol/Sat:	0.11	0.00	0.07	0.00	0.00	0.00	0.00	0.40	0.00	0.15	0.45	0.00
Crit Moves:	****							****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #5 Sand Canyon Avenue at Portola Parkway

Cycle (sec): 100 Critical Vol./Cap. (X): 0.528
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 25 Level Of Service: A

Street Name:	Sand Canyon Avenue									Portola Parkway							
Approach:	North Bound				South Bound				East Bound				West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected					Protected					Protected					Protected				
Rights:	Ovl					Include					Ignore					Include				
Min. Green:	0	0	0			0	0	0			0	0	0			0	0	0		
Lanes:	2	0	0	0	2	0	0	0	0	0	0	0	2	0	1	2	0	2	0	0
Volume Module:																				
Base Vol:	110	0	650			0	0	0			0	190	370			1070	245	0		
Growth Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Initial Bse:	110	0	650			0	0	0			0	190	370			1070	245	0		
Added Vol:	237	0	0			0	0	0			0	18	237			0	18	0		
PasserByVol:	0	0	0			0	0	0			0	0	0			0	0	0		
Initial Fut:	347	0	650			0	0	0			0	208	607			1070	263	0		
User Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	0.00			1.00	1.00	1.00		
PHF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	0.00			1.00	1.00	1.00		
PHF Volume:	347	0	650			0	0	0			0	208	0			1070	263	0		
Reduct Vol:	0	0	0			0	0	0			0	0	0			0	0	0		
Reduced Vol:	347	0	650			0	0	0			0	208	0			1070	263	0		
PCE Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	0.00			1.00	1.00	1.00		
MLF Adj:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	0.00			1.00	1.00	1.00		
Final Vol.:	347	0	650			0	0	0			0	208	0			1070	263	0		
Saturation Flow Module:																				
Sat/Lane:	1700	1700	1700			1700	1700	1700			1700	1700	1700			1700	1700	1700		
Adjustment:	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00		
Lanes:	2.00	0.00	2.00			0.00	0.00	0.00			0.00	2.00	1.00			2.00	2.00	0.00		
Final Sat.:	3400	0	3400			0	0	0			0	3400	1700			3400	3400	0		
Capacity Analysis Module:																				
Vol/Sat:	0.10	0.00	0.19			0.00	0.00	0.00			0.00	0.06	0.00			0.31	0.08	0.00		
Crit Moves:	****											****				****				

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Culver Drive at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.801
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 52 Level Of Service: D

Street Name:	Culver Drive						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 2 1 0		
Volume Module:												
Base Vol:	144	461	234	216	1119	214	117	1340	235	765	1322	52
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	144	461	234	216	1119	214	117	1340	235	765	1322	52
Added Vol:	0	0	0	0	0	0	0	8	0	0	8	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	144	461	234	216	1119	214	117	1348	235	765	1330	52
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	144	461	234	216	1119	214	117	1348	235	765	1330	52
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	144	461	234	216	1119	214	117	1348	235	765	1330	52
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	144	461	234	216	1119	214	117	1348	235	765	1330	52
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.89	0.11
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	4908	192
Capacity Analysis Module:												
Vol/Sat:	0.04	0.09	0.14	0.06	0.22	0.13	0.03	0.26	0.14	0.23	0.27	0.27
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #6 Culver Drive at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.572
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 27 Level Of Service: A

Street Name:	Culver Drive						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 2 1 0		
Volume Module:												
Base Vol:	250	310	155	70	395	95	85	685	385	490	980	55
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	250	310	155	70	395	95	85	685	385	490	980	55
Added Vol:	0	0	0	0	0	0	0	7	0	0	7	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	250	310	155	70	395	95	85	692	385	490	987	55
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	250	310	155	70	395	95	85	692	385	490	987	55
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	250	310	155	70	395	95	85	692	385	490	987	55
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	250	310	155	70	395	95	85	692	385	490	987	55
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.84	0.16
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	4831	269
Capacity Analysis Module:												
Vol/Sat:	0.07	0.06	0.09	0.02	0.08	0.06	0.03	0.14	0.23	0.14	0.20	0.20
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Yale Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.881
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 77 Level Of Service: D

Street Name:	Yale Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			2 0 2 0 1			1 0 2 1 0			1 0 2 1 0		
Volume Module:												
Base Vol:	184	288	114	419	442	281	160	2237	28	190	1954	11
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	184	288	114	419	442	281	160	2237	28	190	1954	11
Added Vol:	0	0	0	0	0	0	0	8	0	0	8	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	184	288	114	419	442	281	160	2245	28	190	1962	11
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	184	288	114	419	442	281	160	2245	28	190	1962	11
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	184	288	114	419	442	281	160	2245	28	190	1962	11
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	184	288	114	419	442	281	160	2245	28	190	1962	11
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	2.00	2.00	1.00	1.00	2.96	0.04	1.00	2.98	0.02
Final Sat.:	1700	3400	1700	3400	3400	1700	1700	5037	63	1700	5072	28
Capacity Analysis Module:												
Vol/Sat:	0.11	0.08	0.07	0.12	0.13	0.17	0.09	0.45	0.45	0.11	0.39	0.39
Crit Moves:	****					****		****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #7 Yale Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.607
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 29 Level Of Service: B

Street Name:	Yale Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2 0 1			2 0 2 0 1			1 0 2 1 0			1 0 2 1 0		
Volume Module:												
Base Vol:	205	140	190	330	155	245	100	965	85	145	955	105
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	205	140	190	330	155	245	100	965	85	145	955	105
Added Vol:	0	0	0	0	0	0	0	7	0	0	7	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	205	140	190	330	155	245	100	972	85	145	962	105
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	205	140	190	330	155	245	100	972	85	145	962	105
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	205	140	190	330	155	245	100	972	85	145	962	105
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	205	140	190	330	155	245	100	972	85	145	962	105
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	2.00	2.00	1.00	1.00	2.76	0.24	1.00	2.70	0.30
Final Sat.:	1700	3400	1700	3400	3400	1700	1700	4690	410	1700	4598	502
Capacity Analysis Module:												
Vol/Sat:	0.12	0.04	0.11	0.10	0.05	0.14	0.06	0.21	0.21	0.09	0.21	0.21
Crit Moves:	****					****		****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Jeffrey Road at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.840
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 62 Level Of Service: D

Street Name:	Jeffrey Road						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	41	495	179	336	1641	331	151	2033	82	159	1002	200
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	41	495	179	336	1641	331	151	2033	82	159	1002	200
Added Vol:	0	57	0	0	57	8	8	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	41	552	179	336	1698	339	159	2033	82	159	1002	200
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	41	552	0	336	1698	339	159	2033	82	159	1002	200
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	41	552	0	336	1698	339	159	2033	82	159	1002	200
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	41	552	0	336	1698	339	159	2033	82	159	1002	200
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.11	0.00	0.10	0.33	0.20	0.05	0.40	0.05	0.05	0.20	0.12
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #8 Jeffrey Road at Irvine Boulevard

Cycle (sec):	100	Critical Vol./Cap. (X):	0.714
Loss Time (sec):	5 (Y+R = 4 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	39	Level Of Service:	C

Street Name:	Jeffrey Road						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	465	675	140	95	1090	165	235	755	485	60	575	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	465	675	140	95	1090	165	235	755	485	60	575	30
Added Vol:	0	55	0	0	55	7	7	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	465	730	140	95	1145	172	242	755	485	60	575	30
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	465	730	0	95	1145	172	242	755	485	60	575	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	465	730	0	95	1145	172	242	755	485	60	575	30
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	465	730	0	95	1145	172	242	755	485	60	575	30
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.14	0.14	0.00	0.03	0.22	0.10	0.07	0.15	0.29	0.02	0.11	0.02
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Sand Canyon Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.898
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 85 Level Of Service: D

Street Name:	Sand Canyon Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 4 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	164	417	627	174	1307	49	55	2466	283	164	1186	8
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	164	417	627	174	1307	49	55	2466	283	164	1186	8
Added Vol:	0	190	0	57	190	0	0	0	0	0	0	57
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	164	607	627	231	1497	49	55	2466	283	164	1186	65
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	164	607	627	231	1497	49	55	2466	283	164	1186	65
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	164	607	627	231	1497	49	55	2466	283	164	1186	65
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	164	607	627	231	1497	49	55	2466	283	164	1186	65
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	4.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	6800	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.12	0.37	0.07	0.29	0.03	0.02	0.36	0.17	0.05	0.23	0.04
Crit Moves:			****	****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #9 Sand Canyon Avenue at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.809
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 54 Level Of Service: D

Street Name:	Sand Canyon Avenue						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 4 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	335	610	370	205	1250	20	25	465	325	640	305	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	335	610	370	205	1250	20	25	465	325	640	305	60
Added Vol:	0	182	0	55	182	0	0	0	0	0	0	55
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	335	792	370	260	1432	20	25	465	325	640	305	115
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	335	792	370	260	1432	20	25	465	325	640	305	115
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	335	792	370	260	1432	20	25	465	325	640	305	115
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	335	792	370	260	1432	20	25	465	325	640	305	115
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	4.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	6800	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.10	0.16	0.22	0.08	0.28	0.01	0.01	0.07	0.19	0.19	0.06	0.07
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 SR 133 Southbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.857
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 67 Level Of Service: D

Street Name:	SR 133 Southbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			2 0 0 0 1			0 0 3 0 1			1 0 3 0 0		
Volume Module:												
Base Vol:	0	0	0	243	0	90	0	2867	284	276	1240	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	243	0	90	0	2867	284	276	1240	0
Added Vol:	0	0	0	0	0	0	0	57	0	0	57	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	243	0	90	0	2924	284	276	1297	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	243	0	90	0	2924	284	276	1297	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	243	0	90	0	2924	284	276	1297	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	243	0	90	0	2924	284	276	1297	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	0	0	0	3400	0	1700	0	5100	1700	1700	5100	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.07	0.00	0.05	0.00	0.57	0.17	0.16	0.25	0.00
Crit Moves:				****				****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #10 SR 133 Southbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.388
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 20 Level Of Service: A

Street Name:	SR 133 Southbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 0 0 0			2 0 0 0 1			0 0 3 0 1			1 0 3 0 0		
Volume Module:												
Base Vol:	0	0	0	100	0	140	0	950	90	100	840	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	100	0	140	0	950	90	100	840	0
Added Vol:	0	0	0	0	0	0	0	55	0	0	55	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	100	0	140	0	1005	90	100	895	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	100	0	140	0	1005	90	100	895	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	100	0	140	0	1005	90	100	895	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	100	0	140	0	1005	90	100	895	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	0	0	0	3400	0	1700	0	5100	1700	1700	5100	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.03	0.00	0.08	0.00	0.20	0.05	0.06	0.18	0.00
Crit Moves:						****		****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 SR 133 Northbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.842
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 62 Level Of Service: D

Street Name:	SR 133 Northbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 3 0 2			0 0 2 1 0		
Volume Module:												
Base Vol:	98	0	356	0	0	0	0	2913	241	0	1522	91
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	98	0	356	0	0	0	0	2913	241	0	1522	91
Added Vol:	0	0	0	0	0	0	0	57	0	0	57	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	98	0	356	0	0	0	0	2970	241	0	1579	91
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	98	0	356	0	0	0	0	2970	0	0	1579	91
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	98	0	356	0	0	0	0	2970	0	0	1579	91
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	98	0	356	0	0	0	0	2970	0	0	1579	91
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	2.00	0.00	2.84	0.16
Final Sat.:	1700	0	1700	0	0	0	0	5100	3400	0	4822	278
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.21	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.33	0.33
Crit Moves:			****					****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #11 SR 133 Northbound Ramps at Irvine Boulevard

Cycle (sec): 100 Critical Vol./Cap. (X): 0.370
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 19 Level Of Service: A

Street Name:	SR 133 Northbound Ramps						Irvine Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 0 0 1			0 0 0 0 0			0 0 3 0 2			0 0 2 1 0		
Volume Module:												
Base Vol:	105	0	130	0	0	0	0	1185	70	0	865	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	105	0	130	0	0	0	0	1185	70	0	865	60
Added Vol:	0	0	0	0	0	0	0	55	0	0	55	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	105	0	130	0	0	0	0	1240	70	0	920	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	105	0	130	0	0	0	0	1240	0	0	920	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	105	0	130	0	0	0	0	1240	0	0	920	60
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	105	0	130	0	0	0	0	1240	0	0	920	60
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	2.00	0.00	2.82	0.18
Final Sat.:	1700	0	1700	0	0	0	0	5100	3400	0	4788	312
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.08	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.19	0.19
Crit Moves:			****					****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #12 Jeffrey Road at Bryan Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.805
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 53 Level Of Service: D

Street Name:	Jeffrey Road						Bryan Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	192	885	93	83	2286	172	153	156	441	371	249	129
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	192	885	93	83	2286	172	153	156	441	371	249	129
Added Vol:	0	57	0	0	57	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	192	942	93	83	2343	172	153	156	441	371	249	129
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	192	942	93	83	2343	172	153	156	441	371	249	129
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	192	942	93	83	2343	172	153	156	441	371	249	129
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	192	942	93	83	2343	172	153	156	441	371	249	129
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	1700	1700	3400	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.06	0.18	0.05	0.02	0.46	0.10	0.09	0.09	0.13	0.11	0.15	0.08
Crit Moves:	****				****				****	****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #12 Jeffrey Road at Bryan Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.528
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 25 Level Of Service: A

Street Name:	Jeffrey Road						Bryan Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	190	1050	55	35	1410	105	185	40	330	140	35	45
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	190	1050	55	35	1410	105	185	40	330	140	35	45
Added Vol:	0	55	0	0	55	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	190	1105	55	35	1465	105	185	40	330	140	35	45
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	190	1105	55	35	1465	105	185	40	330	140	35	45
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	190	1105	55	35	1465	105	185	40	330	140	35	45
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	190	1105	55	35	1465	105	185	40	330	140	35	45
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	1700	1700	3400	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.06	0.22	0.03	0.01	0.29	0.06	0.11	0.02	0.10	0.04	0.02	0.03
Crit Moves:	****				****		****					****

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Jeffrey Road at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.799
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 52 Level Of Service: C

Street Name:	Jeffrey Road						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 4 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	44	766	337	460	2394	51	73	1262	291	14	54	71
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	44	766	337	460	2394	51	73	1262	291	14	54	71
Added Vol:	0	57	0	0	57	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	44	823	337	460	2451	51	73	1262	291	14	54	71
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	44	823	337	460	2451	51	73	1262	291	14	54	71
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	44	823	337	460	2451	51	73	1262	291	14	54	71
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	44	823	337	460	2451	51	73	1262	291	14	54	71
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	4.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	6800	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.01	0.16	0.20	0.14	0.36	0.03	0.02	0.37	0.17	0.00	0.02	0.04
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #13 Jeffrey Road at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.568
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 27 Level Of Service: A

Street Name:	Jeffrey Road						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 4 0 1			2 0 2 0 1			2 0 2 0 1		
Volume Module:												
Base Vol:	170	925	345	175	1680	35	450	465	245	260	255	130
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	170	925	345	175	1680	35	450	465	245	260	255	130
Added Vol:	0	55	0	0	55	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	170	980	345	175	1735	35	450	465	245	260	255	130
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	170	980	345	175	1735	35	450	465	245	260	255	130
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	170	980	345	175	1735	35	450	465	245	260	255	130
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	170	980	345	175	1735	35	450	465	245	260	255	130
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	4.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3400	5100	1700	3400	6800	1700	3400	3400	1700	3400	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.05	0.19	0.20	0.05	0.26	0.02	0.13	0.14	0.14	0.08	0.08	0.08
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Sand Canyon Avenue at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.932
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 110 Level Of Service: E

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	198	686	285	418	2529	290	178	666	447	544	562	216
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	198	686	285	418	2529	290	178	666	447	544	562	216
Added Vol:	0	190	0	0	190	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	198	876	285	418	2719	290	178	666	447	544	562	216
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	198	876	0	418	2719	290	178	666	0	544	562	216
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	198	876	0	418	2719	290	178	666	0	544	562	216
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	198	876	0	418	2719	290	178	666	0	544	562	216
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.06	0.17	0.00	0.12	0.53	0.17	0.05	0.13	0.00	0.16	0.11	0.13
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Sand Canyon Avenue at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.718
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 39 Level Of Service: C

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	385	1050	490	340	1785	85	295	215	440	275	250	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	385	1050	490	340	1785	85	295	215	440	275	250	140
Added Vol:	0	182	0	0	182	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	385	1232	490	340	1967	85	295	215	440	275	250	140
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	385	1232	0	340	1967	85	295	215	0	275	250	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	385	1232	0	340	1967	85	295	215	0	275	250	140
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	385	1232	0	340	1967	85	295	215	0	275	250	140
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.11	0.24	0.00	0.10	0.39	0.05	0.09	0.04	0.00	0.08	0.05	0.08
Crit Moves:	****				****		****					****

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Jeffrey Road at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.753
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 44 Level Of Service: C

Street Name:	Jeffrey Road						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Ignore			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0	1	0 0 3	0	1	0 0 0	0	0	1 0 1!	0	1
Volume Module:												
Base Vol:	0	1873	420	0	2762	260	0	0	0	528	0	277
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1873	420	0	2762	260	0	0	0	528	0	277
Added Vol:	0	57	0	0	19	38	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1930	420	0	2781	298	0	0	0	528	0	277
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1930	0	0	2781	0	0	0	0	528	0	277
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1930	0	0	2781	0	0	0	0	528	0	277
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1930	0	0	2781	0	0	0	0	528	0	277
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	0.00	3.00	1.00	0.00	0.00	0.00	1.97	xxxx	1.03
Final Sat.:	0	5100	1700	0	5100	1700	0	0	0	3345	0	1755
Capacity Analysis Module:												
Vol/Sat:	0.00	0.38	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Crit Moves:	****				****					****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #15 Jeffrey Road at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.704
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 38 Level Of Service: C

Street Name:	Jeffrey Road							I-5 Northbound Ramps					
Approach:	North Bound			South Bound				East Bound			West Bound		
Movement:	L	T	R	L	T	R		L	T	R	L	T	R
Control:	Protected			Protected				Protected			Protected		
Rights:	Ignore			Ignore				Include			Include		
Min. Green:	0	0	0	0	0	0		0	0	0	0	0	0
Lanes:	0 0 3	0	1	0 0 3	0	1		0 0 0	0	0	1 0 1!	0	1
Volume Module:													
Base Vol:	0	1030	775	0	2100	320		0	0	0	810	0	350
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1030	775	0	2100	320		0	0	0	810	0	350
Added Vol:	0	55	0	0	18	36		0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0		0	0	0	0	0	0
Initial Fut:	0	1085	775	0	2118	356		0	0	0	810	0	350
User Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1085	0	0	2118	0		0	0	0	810	0	350
Reduct Vol:	0	0	0	0	0	0		0	0	0	0	0	0
Reduced Vol:	0	1085	0	0	2118	0		0	0	0	810	0	350
PCE Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	0.00		1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1085	0	0	2118	0		0	0	0	810	0	350
Saturation Flow Module:													
Sat/Lane:	1700	1700	1700	1700	1700	1700		1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	0.00	3.00	1.00		0.00	0.00	0.00	2.00	0.00	1.00
Final Sat.:	0	5100	1700	0	5100	1700		0	0	0	3400	0	1700
Capacity Analysis Module:													
Vol/Sat:	0.00	0.21	0.00	0.00	0.42	0.00		0.00	0.00	0.00	0.24	0.00	0.21
Crit Moves:	****				****						****		

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.982
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 180 Level Of Service: E

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	63	1719	132	697	2396	269	371	351	436	298	28	250
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	63	1719	132	697	2396	269	371	351	436	298	28	250
Added Vol:	0	19	0	0	19	0	0	0	0	0	0	38
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	63	1738	132	697	2415	269	371	351	436	298	28	288
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	63	1738	132	697	2415	269	371	351	436	298	28	288
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	63	1738	132	697	2415	269	371	351	436	298	28	288
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	63	1738	132	697	2415	269	371	351	436	298	28	288
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.70	0.30	1.00	1.34	1.66	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4589	511	1700	2275	2825	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.34	0.08	0.21	0.53	0.53	0.22	0.15	0.15	0.09	0.02	0.17
Crit Moves:	****				****		****					****

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.835
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 60 Level Of Service: D

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	75	1240	40	400	1620	315	270	90	180	380	50	340
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	75	1240	40	400	1620	315	270	90	180	380	50	340
Added Vol:	0	18	0	0	18	0	0	0	0	0	0	36
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	75	1258	40	400	1638	315	270	90	180	380	50	376
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	75	1258	40	400	1638	315	270	90	180	380	50	376
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	75	1258	40	400	1638	315	270	90	180	380	50	376
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	75	1258	40	400	1638	315	270	90	180	380	50	376
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.52	0.48	1.00	1.00	2.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4277	823	1700	1700	3400	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.25	0.02	0.12	0.38	0.38	0.16	0.05	0.05	0.11	0.03	0.22
Crit Moves:	****				****		****					****

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #17 Sand Canyon Avenue at I-5 Northbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.846
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 64 Level Of Service: D

Street Name:	Sand Canyon Avenue						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 1 0 1			1 0 1 1 1		
Volume Module:												
Base Vol:	78	2213	297	507	2261	350	227	151	86	48	66	345
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	78	2213	297	507	2261	350	227	151	86	48	66	345
Added Vol:	0	114	0	0	95	95	76	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	78	2327	297	507	2356	445	303	151	86	48	66	345
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	78	2327	297	507	2356	445	303	151	86	48	66	345
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	78	2327	297	507	2356	445	303	151	86	48	66	345
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	78	2327	297	507	2356	445	303	151	86	48	66	345
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	1.00	1.00	1.00	1.00	2.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	1700	1700	1700	1700	3400
Capacity Analysis Module:												
Vol/Sat:	0.02	0.46	0.17	0.15	0.46	0.26	0.09	0.09	0.05	0.03	0.04	0.10
Crit Moves:		****		****			****					****

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

****

Intersection #17 Sand Canyon Avenue at I-5 Northbound Ramps

****

Cycle (sec): 100 Critical Vol./Cap. (X): 0.774
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 47 Level Of Service: C

****

Street Name:	Sand Canyon Avenue						I-5 Northbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 1 0 1			1 0 1 1 1		
Volume Module:												
Base Vol:	271	1573	73	278	1903	379	391	35	175	39	28	398
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	271	1573	73	278	1903	379	391	35	175	39	28	398
Added Vol:	0	109	0	0	91	91	73	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	271	1682	73	278	1994	470	464	35	175	39	28	398
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	271	1682	73	278	1994	470	464	35	175	39	28	398
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	271	1682	73	278	1994	470	464	35	175	39	28	398
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	271	1682	73	278	1994	470	464	35	175	39	28	398
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	1.00	1.00	1.00	1.00	2.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	1700	1700	1700	1700	3400
Capacity Analysis Module:												
Vol/Sat:	0.08	0.33	0.04	0.08	0.39	0.28	0.14	0.02	0.10	0.02	0.02	0.12
Crit Moves:	****				****		****					****

****

Frank R. Bowerman Landfill Implementation Project
2030 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #18 Sand Canyon Avenue at I-5 Southbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.856
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 67 Level Of Service: D

Street Name:	Sand Canyon Avenue						I-5 Southbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0 1		2 0 3	0 0		1 0 1!	0 1		0 0 0	0 0	
Volume Module:												
Base Vol:	0	1366	148	370	2056	0	1144	2	794	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1366	148	370	2056	0	1144	2	794	0	0	0
Added Vol:	0	19	0	76	19	0	95	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1385	148	446	2075	0	1239	2	794	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1385	148	446	2075	0	1239	2	794	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1385	148	446	2075	0	1239	2	794	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1385	148	446	2075	0	1239	2	794	0	0	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	2.00	3.00	0.00	1.82	0.01	1.17	0.00	0.00	0.00
Final Sat.:	0	5100	1700	3400	5100	0	3105	5	1990	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.27	0.09	0.13	0.41	0.00	0.40	0.40	0.40	0.00	0.00	0.00
Crit Moves:	****				****		****					

Frank R. Bowerman Landfill Implementation Project
2030 with Project
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #18 Sand Canyon Avenue at I-5 Southbound Ramps

Cycle (sec): 100 Critical Vol./Cap. (X): 0.736
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 41 Level Of Service: C

Street Name:	Sand Canyon Avenue						I-5 Southbound Ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0 3	0 1		2 0 3	0 0		1 0 1!	0 1		0 0 0	0 0	
Volume Module:												
Base Vol:	0	1452	257	294	1757	0	459	0	926	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1452	257	294	1757	0	459	0	926	0	0	0
Added Vol:	0	18	0	73	18	0	91	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1470	257	367	1775	0	550	0	926	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1470	257	367	1775	0	550	0	926	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	1470	257	367	1775	0	550	0	926	0	0	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	1470	257	367	1775	0	550	0	926	0	0	0
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	2.00	3.00	0.00	1.12	0.00	1.88	0.00	0.00	0.00
Final Sat.:	0	5100	1700	3400	5100	0	1900	0	3200	0	0	0
Capacity Analysis Module:												
Vol/Sat:	0.00	0.29	0.15	0.11	0.35	0.00	0.29	0.00	0.29	0.00	0.00	0.00
Crit Moves:		****		****			****					

APPENDIX D3

LOS Computation Reports
2030 with the Project with Mitigation

Frank R. Bowerman Landfill Implementation Project
2030 with Project with Mitigation
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.830
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 59 Level Of Service: D

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	63	1719	132	697	2396	269	371	351	436	298	28	250
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	63	1719	132	697	2396	269	371	351	436	298	28	250
Added Vol:	0	19	0	0	19	0	0	0	0	0	0	38
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	63	1738	132	697	2415	269	371	351	436	298	28	288
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	63	1738	132	697	2415	269	371	351	436	298	28	288
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	63	1738	132	697	2415	269	371	351	436	298	28	288
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	63	1738	132	697	2415	269	371	351	436	298	28	288
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.70	0.30	1.00	1.34	1.66	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4589	511	1700	2275	2825	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.34	0.08	0.21	0.53	0.53	0.22	0.15	0.15	0.09	0.02	0.17
Crit Moves:	****				****		****				****	

Frank R. Bowerman Landfill Implementation Project
2030 with Project with Mitigation
Landfill Peak Hour (9-11 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.717
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 39 Level Of Service: C

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	75	1240	40	400	1620	315	270	90	180	380	50	340
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	75	1240	40	400	1620	315	270	90	180	380	50	340
Added Vol:	0	18	0	0	18	0	0	0	0	0	0	36
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	75	1258	40	400	1638	315	270	90	180	380	50	376
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	75	1258	40	400	1638	315	270	90	180	380	50	376
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	75	1258	40	400	1638	315	270	90	180	380	50	376
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	75	1258	40	400	1638	315	270	90	180	380	50	376
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.52	0.48	1.00	1.00	2.00	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4277	823	1700	1700	3400	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.25	0.02	0.12	0.38	0.38	0.16	0.05	0.05	0.11	0.03	0.22
Crit Moves:	****				****		****					****

APPENDIX E

LOS Computation Reports
2025 with the Project

Frank R. Bowerman Landfill Implementation Project
2025 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #14 Sand Canyon Avenue at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.844
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 63 Level Of Service: D

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	226	520	212	326	2441	346	169	622	518	430	549	141
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	226	520	212	326	2441	346	169	622	518	430	549	141
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	226	520	0	326	2441	346	169	622	0	430	549	141
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	226	520	0	326	2441	346	169	622	0	430	549	141
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	226	520	0	326	2441	346	169	622	0	430	549	141
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.07	0.10	0.00	0.10	0.48	0.20	0.05	0.12	0.00	0.13	0.11	0.08
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2025 without Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.920
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 100 Level Of Service: E

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	63	1597	132	687	2228	267	356	361	423	299	30	247
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	63	1597	132	687	2228	267	356	361	423	299	30	247
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	63	1597	132	687	2228	267	356	361	423	299	30	247
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	63	1597	132	687	2228	267	356	361	423	299	30	247
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	63	1597	132	687	2228	267	356	361	423	299	30	247
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.68	0.32	1.00	1.38	1.62	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4554	546	1700	2348	2752	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.31	0.08	0.20	0.49	0.49	0.21	0.15	0.15	0.09	0.02	0.15
Crit Moves:		****		****			****					****

Frank R. Bowerman Landfill Implementation Project
2025 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #14 Sand Canyon Avenue at Trabuco Road

Cycle (sec): 100 Critical Vol./Cap. (X): 0.881
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 77 Level Of Service: D

Street Name:	Sand Canyon Avenue						Trabuco Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Ignore			Include			Ignore			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 3 0 1			2 0 3 0 1			2 0 3 0 1		
Volume Module:												
Base Vol:	226	520	212	326	2441	346	169	622	518	430	549	141
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	226	520	212	326	2441	346	169	622	518	430	549	141
Added Vol:	0	190	0	0	190	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	226	710	212	326	2631	346	169	622	518	430	549	141
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	226	710	0	326	2631	346	169	622	0	430	549	141
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	226	710	0	326	2631	346	169	622	0	430	549	141
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Final Vol.:	226	710	0	326	2631	346	169	622	0	430	549	141
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3400	5100	1700	3400	5100	1700	3400	5100	1700	3400	5100	1700
Capacity Analysis Module:												
Vol/Sat:	0.07	0.14	0.00	0.10	0.52	0.20	0.05	0.12	0.00	0.13	0.11	0.08
Crit Moves:	****				****			****		****		

Frank R. Bowerman Landfill Implementation Project
2025 with Project
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.946
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 125 Level Of Service: E

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	63	1597	132	687	2228	267	356	361	423	299	30	247
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	63	1597	132	687	2228	267	356	361	423	299	30	247
Added Vol:	0	19	0	0	19	0	0	0	0	0	0	38
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	63	1616	132	687	2247	267	356	361	423	299	30	285
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	63	1616	132	687	2247	267	356	361	423	299	30	285
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	63	1616	132	687	2247	267	356	361	423	299	30	285
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	63	1616	132	687	2247	267	356	361	423	299	30	285
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.68	0.32	1.00	1.38	1.62	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4558	542	1700	2348	2752	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.32	0.08	0.20	0.49	0.49	0.21	0.15	0.15	0.09	0.02	0.17
Crit Moves:		****		****			****					****

Frank R. Bowerman Landfill Implementation Project
2025 with Project with Mitigation
AM Peak Hour (7-9 AM)

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #16 Jeffrey Road at Walnut Avenue

Cycle (sec): 100 Critical Vol./Cap. (X): 0.811
Loss Time (sec): 5 (Y+R = 4 sec) Average Delay (sec/veh): xxxxxx
Optimal Cycle: 54 Level Of Service: D

Street Name:	Jeffrey Road						Walnut Avenue					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2 0 3 0 1			2 0 2 1 0			1 0 1 1 1			2 0 1 0 1		
Volume Module:												
Base Vol:	63	1597	132	687	2228	267	356	361	423	299	30	247
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	63	1597	132	687	2228	267	356	361	423	299	30	247
Added Vol:	0	19	0	0	19	0	0	0	0	0	0	38
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	63	1616	132	687	2247	267	356	361	423	299	30	285
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	63	1616	132	687	2247	267	356	361	423	299	30	285
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	63	1616	132	687	2247	267	356	361	423	299	30	285
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	63	1616	132	687	2247	267	356	361	423	299	30	285
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	2.68	0.32	1.00	1.38	1.62	2.00	1.00	1.00
Final Sat.:	3400	5100	1700	3400	4558	542	1700	2348	2752	3400	1700	1700
Capacity Analysis Module:												
Vol/Sat:	0.02	0.32	0.08	0.20	0.49	0.49	0.21	0.15	0.15	0.09	0.02	0.17
Crit Moves:		****		****				****		****		

APPENDIX F

FRB Landfill Daily Truck Data

FRB Landfill Traffic Count - 2004

MSW

Day	Date	Trucks	
Wednesday	8/11/2004	135	
Thursday	8/12/2004	134	
Thursday	7/29/2004	129	
Thursday	11/18/2004	123	
Wednesday	7/28/2004	116	
Wednesday	9/15/2004	116	
Monday	6/21/2004	114	
Wednesday	11/17/2004	112	
Friday	11/19/2004	112	
Monday	4/26/2004	109	
Monday	9/13/2004	109	
Wednesday	5/26/2004	108	
Thursday	6/17/2004	108	
Tuesday	9/14/2004	106	
Monday	7/12/2004	104	
Friday	10/1/2004	100	
Wednesday	7/21/2004	97	
Monday	9/20/2004	95	
Monday	9/27/2004	93	
Monday	8/9/2004	92	
Thursday	9/23/2004	92	
Monday	10/25/2004	92	
Thursday	4/29/2004	90	
Friday	6/18/2004	90	
Thursday	7/8/2004	90	
Monday	12/20/2004	90	
Friday	7/2/2004	87	
Tuesday	3/2/2004	86	
Thursday	5/20/2004	86	
Tuesday	7/20/2004	86	
Thursday	9/16/2004	85	
Tuesday	7/13/2004	84	
Wednesday	3/10/2004	83	
Wednesday	3/17/2004	83	
Friday	8/13/2004	82	
Friday	6/25/2004	81	
Wednesday	4/14/2004	80	
Wednesday	5/19/2004	80	
Thursday	10/7/2004	80	
Thursday	12/2/2004	80	
Friday	5/14/2004	79	
Monday	7/19/2004	79	
Tuesday	10/5/2004	79	
Monday	11/8/2004	78	
Saturday	12/11/2004	78	
Wednesday	5/5/2004	76	85th Percentile Day
Monday	6/28/2004	76	
Wednesday	9/22/2004	76	
Wednesday	12/22/2004	76	
Thursday	9/2/2004	75	
Wednesday	3/3/2004	74	
Friday	4/9/2004	74	
Tuesday	4/13/2004	74	

Non-MSW

Day	Date	Trucks
Thursday	7/1/2004	786
Friday	7/2/2004	757
Thursday	7/8/2004	744
Tuesday	5/25/2004	709
Thursday	6/3/2004	708
Wednesday	7/28/2004	707
Monday	10/25/2004	707
Wednesday	5/19/2004	706
Monday	6/7/2004	700
Wednesday	8/4/2004	699
Monday	9/13/2004	697
Wednesday	4/28/2004	694
Monday	6/28/2004	694
Tuesday	5/4/2004	693
Friday	7/16/2004	692
Tuesday	7/20/2004	692
Monday	11/15/2004	692
Tuesday	1/20/2004	690
Monday	6/21/2004	690
Tuesday	7/27/2004	689
Wednesday	3/31/2004	688
Wednesday	5/12/2004	687
Friday	6/4/2004	687
Wednesday	7/14/2004	687
Tuesday	8/24/2004	687
Tuesday	10/26/2004	685
Wednesday	7/21/2004	684
Tuesday	4/20/2004	683
Monday	5/17/2004	683
Tuesday	6/1/2004	683
Thursday	6/17/2004	683
Thursday	5/6/2004	681
Tuesday	5/18/2004	681
Monday	9/20/2004	681
Friday	7/9/2004	679
Wednesday	8/18/2004	678
Thursday	9/23/2004	678
Friday	10/15/2004	677
Wednesday	1/7/2004	676
Tuesday	7/6/2004	676
Monday	7/19/2004	676
Tuesday	8/3/2004	676
Monday	11/22/2004	675
Friday	4/23/2004	674
Friday	9/24/2004	674
Wednesday	4/7/2004	673
Wednesday	6/30/2004	673
Tuesday	5/11/2004	671
Tuesday	6/29/2004	670
Thursday	9/9/2004	669
Wednesday	2/11/2004	667
Wednesday	3/24/2004	667
Tuesday	6/22/2004	667

FRB Landfill Traffic Count - 2004

MSW

Day	Date	Trucks
Tuesday	5/18/2004	74
Wednesday	10/6/2004	74
Friday	7/9/2004	73
Monday	8/2/2004	73
Thursday	9/30/2004	73
Thursday	4/15/2004	72
Monday	7/26/2004	72
Thursday	7/1/2004	71
Tuesday	7/27/2004	71
Monday	3/1/2004	70
Tuesday	3/30/2004	70
Monday	4/12/2004	70
Monday	6/7/2004	70
Thursday	12/9/2004	70
Monday	3/15/2004	69
Wednesday	4/28/2004	69
Monday	5/17/2004	69
Friday	6/11/2004	68
Thursday	7/22/2004	68
Monday	10/11/2004	68
Monday	11/22/2004	68
Tuesday	3/16/2004	67
Tuesday	6/22/2004	66
Friday	10/15/2004	66
Monday	10/18/2004	65
Tuesday	11/30/2004	65
Wednesday	12/15/2004	65
Saturday	6/5/2004	64
Friday	7/23/2004	64
Tuesday	8/10/2004	64
Wednesday	10/13/2004	64
Monday	1/5/2004	63
Tuesday	3/9/2004	63
Monday	5/24/2004	63
Wednesday	7/14/2004	63
Friday	8/20/2004	63
Monday	8/23/2004	63
Wednesday	12/1/2004	63
Tuesday	4/20/2004	62
Saturday	7/24/2004	62
Saturday	4/3/2004	61
Thursday	5/13/2004	61
Tuesday	6/15/2004	61
Friday	3/5/2004	60
Thursday	4/22/2004	60
Saturday	6/19/2004	60
Friday	7/30/2004	60
Tuesday	5/4/2004	59
Tuesday	6/1/2004	59
Wednesday	6/9/2004	59
Saturday	6/26/2004	59
Tuesday	7/6/2004	59
Wednesday	7/7/2004	59

Non-MSW

Day	Date	Trucks
Saturday	11/29/2004	666
Thursday	3/11/2004	665
Tuesday	6/15/2004	665
Thursday	9/2/2004	665
Friday	10/1/2004	665
Wednesday	6/23/2004	664
Thursday	1/8/2004	663
Thursday	8/19/2004	663
Wednesday	9/8/2004	663
Wednesday	1/28/2004	662
Monday	8/30/2004	662
Friday	10/22/2004	662
Wednesday	11/24/2004	662
Wednesday	1/14/2004	660
Wednesday	3/17/2004	660
Tuesday	3/30/2004	660
Friday	8/27/2004	660
Wednesday	5/26/2004	659
Monday	8/23/2004	659
Thursday	8/26/2004	659
Tuesday	1/6/2004	658
Friday	2/6/2004	658
Wednesday	3/10/2004	658
Wednesday	6/2/2004	658
Friday	10/8/2004	658
Monday	1/12/2004	657
Friday	5/14/2004	657
Thursday	6/24/2004	656
Friday	6/25/2004	656
Monday	11/8/2004	656
Wednesday	12/2/2004	656
Wednesday	1/21/2004	655
Monday	7/12/2004	655
Thursday	7/22/2004	655
Monday	9/27/2004	654
Tuesday	3/23/2004	653
Tuesday	4/27/2004	653
Thursday	9/30/2004	653
Friday	11/5/2004	653
Monday	7/26/2004	652
Friday	9/3/2004	652
Sun	12/20/2004	651
Monday	1/26/2004	650
Monday	3/22/2004	650
Friday	5/28/2004	650
Monday	6/14/2004	650
Tuesday	7/13/2004	650
Monday	10/11/2004	650
Thursday	2/5/2004	649
Monday	5/24/2004	649
Wednesday	8/25/2004	649
Tuesday	11/16/2004	649
Tuesday	1/13/2004	648

FRB Landfill Traffic Count - 2004

MSW

Day	Date	Trucks
Monday	3/29/2004	58
Monday	5/10/2004	58
Thursday	6/24/2004	58
Thursday	8/19/2004	58
Friday	10/8/2004	57
Tuesday	10/12/2004	57
Tuesday	11/16/2004	57
Friday	2/13/2004	56
Thursday	6/3/2004	56
Monday	3/8/2004	55
Wednesday	4/21/2004	55
Wednesday	6/30/2004	55
Tuesday	8/3/2004	55
Wednesday	6/16/2004	54
Wednesday	9/29/2004	54
Monday	11/15/2004	54
Monday	11/29/2004	54
Friday	2/27/2004	53
Friday	4/23/2004	53
Monday	5/3/2004	53
Thursday	5/6/2004	53
Saturday	5/15/2004	53
Tuesday	6/8/2004	53
Thursday	8/26/2004	53
Tuesday	8/31/2004	53
Friday	12/3/2004	53
Monday	3/22/2004	52
Friday	5/28/2004	52
Tuesday	6/29/2004	52
Friday	9/3/2004	52
Tuesday	9/21/2004	52
Saturday	3/6/2004	51
Wednesday	3/31/2004	51
Wednesday	5/12/2004	51
Friday	5/21/2004	51
Thursday	8/5/2004	51
Friday	9/24/2004	51
Tuesday	9/28/2004	51
Wednesday	11/3/2004	51
Thursday	3/4/2004	50
Friday	12/10/2004	50
Monday	1/26/2004	49
Friday	7/16/2004	49
Monday	8/30/2004	49
Friday	9/17/2004	49
Tuesday	1/6/2004	48
Tuesday	1/20/2004	48
Friday	4/30/2004	48
Thursday	5/27/2004	48
Thursday	6/10/2004	48
Thursday	10/14/2004	48
Wednesday	1/7/2004	47
Monday	1/19/2004	47

Non-MSW

Day	Date	Trucks
Thursday	5/13/2004	648
Wednesday	6/9/2004	648
Thursday	7/15/2004	648
Friday	8/20/2004	648
Thursday	10/7/2004	648
Thursday	11/18/2004	648
Tuesday	11/23/2004	648
Thursday	3/25/2004	647
Friday	5/21/2004	647
Tuesday	10/5/2004	646
Tuesday	3/9/2004	645
Wednesday	7/7/2004	645
Tuesday	3/2/2004	644
Monday	8/9/2004	644
Monday	10/4/2004	644
Wednesday	6/16/2004	643
Tuesday	8/17/2004	643
Tuesday	12/1/2004	642
Thursday	4/1/2004	639
Wednesday	4/14/2004	639
Thursday	5/20/2004	639
Monday	1/19/2004	638
Tuesday	4/6/2004	638
Wednesday	9/15/2004	638
Thursday	9/16/2004	638
Wednesday	5/5/2004	637
Friday	7/23/2004	637
Thursday	8/5/2004	637
Thursday	6/10/2004	636
Tuesday	11/2/2004	636
Tuesday	11/9/2004	636
Friday	4/30/2004	635
Thursday	11/4/2004	635
Friday	11/19/2004	635
Friday	3/12/2004	634
Friday	3/26/2004	634
Tuesday	8/10/2004	634
Wednesday	8/11/2004	634
Tuesday	9/28/2004	634
Wednesday	10/6/2004	634
Friday	9/17/2004	633
Monday	10/18/2004	633
Tuesday	10/12/2004	632
Wednesday	11/3/2004	632
Tuesday	1/27/2004	631
Thursday	4/22/2004	630
Thursday	4/29/2004	630
Thursday	5/27/2004	630
Thursday	10/14/2004	630
Monday	2/2/2004	629
Thursday	4/8/2004	629
Friday	5/7/2004	628
Monday	8/16/2004	628

FRB Landfill Traffic Count - 2004

MSW

Day	Date	Trucks
Tuesday	2/10/2004	47
Monday	2/16/2004	47
Friday	3/12/2004	47
Friday	4/16/2004	47
Saturday	6/12/2004	47
Saturday	7/10/2004	47
Wednesday	8/18/2004	47
Saturday	9/4/2004	47
Friday	9/10/2004	47
Thursday	1/8/2004	46
Friday	5/7/2004	46
Tuesday	5/25/2004	46
Wednesday	6/23/2004	46
Monday	8/16/2004	46
Friday	8/27/2004	46
Thursday	9/9/2004	46
Thursday	3/18/2004	45
Saturday	7/3/2004	45
Friday	8/6/2004	45
Monday	10/4/2004	45
Saturday	10/9/2004	45
Tuesday	12/14/2004	45
Friday	12/17/2004	45
Friday	1/30/2004	44
Monday	2/9/2004	44
Thursday	2/12/2004	44
Tuesday	4/27/2004	44
Saturday	5/22/2004	44
Saturday	5/29/2004	44
Friday	6/4/2004	44
Friday	11/12/2004	44
Tuesday	12/21/2004	44
Tuesday	1/27/2004	43
Thursday	3/11/2004	43
Thursday	4/1/2004	43
Friday	4/2/2004	43
Thursday	7/15/2004	43
Saturday	7/17/2004	43
Saturday	7/31/2004	43
Monday	11/1/2004	43
Thursday	11/11/2004	43
Thursday	12/16/2004	43
Wednesday	2/4/2004	42
Wednesday	2/11/2004	42
Tuesday	3/23/2004	42
Friday	3/26/2004	42
Monday	4/5/2004	42
Wednesday	8/25/2004	42
Saturday	9/18/2004	42
Saturday	12/4/2004	42
Wednesday	1/28/2004	41
Tuesday	2/3/2004	41
Thursday	2/5/2004	41

Non-MSW

Day	Date	Trucks
Thursday	1/22/2004	627
Tuesday	3/16/2004	627
Monday	4/5/2004	626
Wednesday	9/1/2004	626
Tuesday	9/14/2004	626
Thursday	12/10/2004	625
Monday	1/5/2004	624
Friday	6/18/2004	624
Thursday	7/29/2004	624
Wednesday	11/17/2004	624
Thursday	12/3/2004	624
Monday	4/12/2004	623
Tuesday	8/31/2004	623
Monday	3/8/2004	622
Friday	7/30/2004	622
Tuesday	12/15/2004	622
Friday	10/29/2004	620
Friday	2/13/2004	619
Thursday	11/26/2004	619
Thursday	1/15/2004	618
Wednesday	2/4/2004	618
Friday	8/6/2004	618
Friday	6/11/2004	617
Monday	4/26/2004	616
Monday	12/21/2004	616
Friday	8/13/2004	615
Wednesday	11/10/2004	614
Tuesday	12/22/2004	614
Tuesday	6/8/2004	613
Monday	3/1/2004	612
Tuesday	4/13/2004	612
Monday	8/2/2004	612
Tuesday	9/21/2004	612
Friday	3/19/2004	611
Wednesday	4/21/2004	611
Tuesday	9/7/2004	611
Friday	1/16/2004	610
Friday	4/2/2004	610
Friday	4/9/2004	610
Friday	4/16/2004	610
Monday	5/3/2004	610
Wednesday	9/29/2004	610
Wednesday	9/22/2004	609
Friday	1/30/2004	608
Tuesday	2/10/2004	608
Sun	12/13/2004	608
Friday	3/5/2004	607
Wednesday	2/25/2004	605
Sun	12/6/2004	605
Monday	3/15/2004	604
Thursday	3/18/2004	603
Monday	3/29/2004	603
Wednesday	12/16/2004	603

FRB Landfill Traffic Count - 2004

MSW

Day	Date	Trucks
Saturday	3/20/2004	41
Tuesday	5/11/2004	41
Saturday	8/14/2004	41
Saturday	9/25/2004	41
Saturday	1/17/2004	40
Thursday	1/22/2004	40
Friday	1/23/2004	40
Monday	2/2/2004	40
Tuesday	2/17/2004	40
Thursday	2/19/2004	40
Monday	6/14/2004	40
Saturday	8/7/2004	40
Tuesday	8/17/2004	40
Saturday	10/2/2004	40
Tuesday	11/9/2004	40
Friday	1/16/2004	39
Saturday	3/13/2004	39
Tuesday	9/7/2004	39
Friday	2/6/2004	38
Friday	2/20/2004	38
Friday	3/19/2004	38
Monday	4/19/2004	38
Saturday	11/13/2004	38
Monday	1/12/2004	37
Wednesday	6/2/2004	37
Saturday	9/11/2004	37
Saturday	10/16/2004	37
Wednesday	3/24/2004	36
Thursday	3/25/2004	36
Tuesday	4/6/2004	36
Wednesday	4/7/2004	36
Saturday	5/1/2004	36
Saturday	5/8/2004	36
Tuesday	10/26/2004	36
Saturday	1/10/2004	35
Tuesday	1/13/2004	35
Wednesday	1/21/2004	35
Wednesday	8/4/2004	35
Wednesday	9/1/2004	35
Saturday	1/31/2004	34
Saturday	4/10/2004	34
Saturday	4/17/2004	34
Saturday	8/28/2004	34
Wednesday	9/8/2004	34
Thursday	10/28/2004	34
Saturday	10/30/2004	34
Wednesday	1/14/2004	33
Saturday	1/24/2004	33
Wednesday	2/18/2004	33
Wednesday	2/25/2004	33
Saturday	4/24/2004	33
Tuesday	8/24/2004	33
Thursday	11/4/2004	33

Non-MSW

Day	Date	Trucks
Tuesday	2/17/2004	602
Monday	2/9/2004	601
Wednesday	3/3/2004	601
Friday	1/9/2004	600
Wednesday	12/9/2004	600
Wednesday	10/13/2004	598
Monday	4/19/2004	597
Monday	5/10/2004	597
Friday	1/23/2004	596
Monday	12/7/2004	593
Monday	12/14/2004	591
Thursday	2/19/2004	590
Thursday	10/21/2004	590
Thursday	2/12/2004	589
Tuesday	10/19/2004	589
Wednesday	10/27/2004	589
Thursday	4/15/2004	588
Friday	1/2/2004	586
Friday	11/12/2004	586
Monday	11/30/2004	584
Sun	12/27/2004	584
Thursday	1/29/2004	583
Wednesday	2/18/2004	583
Thursday	12/17/2004	583
Wednesday	12/23/2004	583
Friday	9/10/2004	582
Thursday	11/11/2004	576
Monday	2/16/2004	575
Thursday	3/4/2004	575
Tuesday	2/3/2004	573
Thursday	8/12/2004	562
Tuesday	12/8/2004	562
Monday	11/1/2004	560
Saturday	9/11/2004	559
Friday	2/20/2004	558
Monday	2/23/2004	556
Friday	2/27/2004	556
Tuesday	2/24/2004	554
Saturday	1/10/2004	544
Thursday	10/28/2004	544
Thursday	12/24/2004	534
Wednesday	12/30/2004	525
Wednesday	10/20/2004	505
Tuesday	12/29/2004	505
Thursday	2/26/2004	503
Saturday	7/10/2004	502
Saturday	6/5/2004	500
Saturday	6/19/2004	497
Monday	12/28/2004	494
Friday	11/27/2004	493
Saturday	5/29/2004	476
Saturday	1/3/2004	462
Saturday	8/14/2004	460

FRB Landfill Traffic Count - 2004

MSW

Day	Date	Trucks
Monday	12/6/2004	33
Monday	12/27/2004	33
Thursday	1/15/2004	32
Saturday	2/21/2004	32
Tuesday	2/24/2004	32
Saturday	2/28/2004	32
Thursday	4/8/2004	32
Friday	1/2/2004	31
Thursday	1/29/2004	31
Saturday	11/20/2004	31
Monday	12/13/2004	31
Saturday	2/14/2004	30
Thursday	12/23/2004	30
Tuesday	11/2/2004	29
Tuesday	12/7/2004	29
Wednesday	12/8/2004	29
Friday	1/9/2004	28
Thursday	10/21/2004	28
Tuesday	11/23/2004	28
Saturday	12/18/2004	28
Monday	2/23/2004	26
Saturday	3/27/2004	26
Saturday	10/23/2004	25
Friday	11/5/2004	25
Saturday	2/7/2004	24
Saturday	8/21/2004	24
Friday	10/22/2004	24
Wednesday	11/10/2004	24
Saturday	11/27/2004	24
Wednesday	11/24/2004	23
Friday	11/26/2004	23
Tuesday	10/19/2004	22
Thursday	12/30/2004	22
Saturday	11/6/2004	21
Friday	12/24/2004	21
Friday	10/29/2004	20
Saturday	1/3/2004	17
Thursday	2/26/2004	17
Wednesday	12/29/2004	14
Friday	12/31/2004	14
Wednesday	10/20/2004	13
Tuesday	12/28/2004	13
Monday	7/5/2004	12
Wednesday	10/27/2004	5

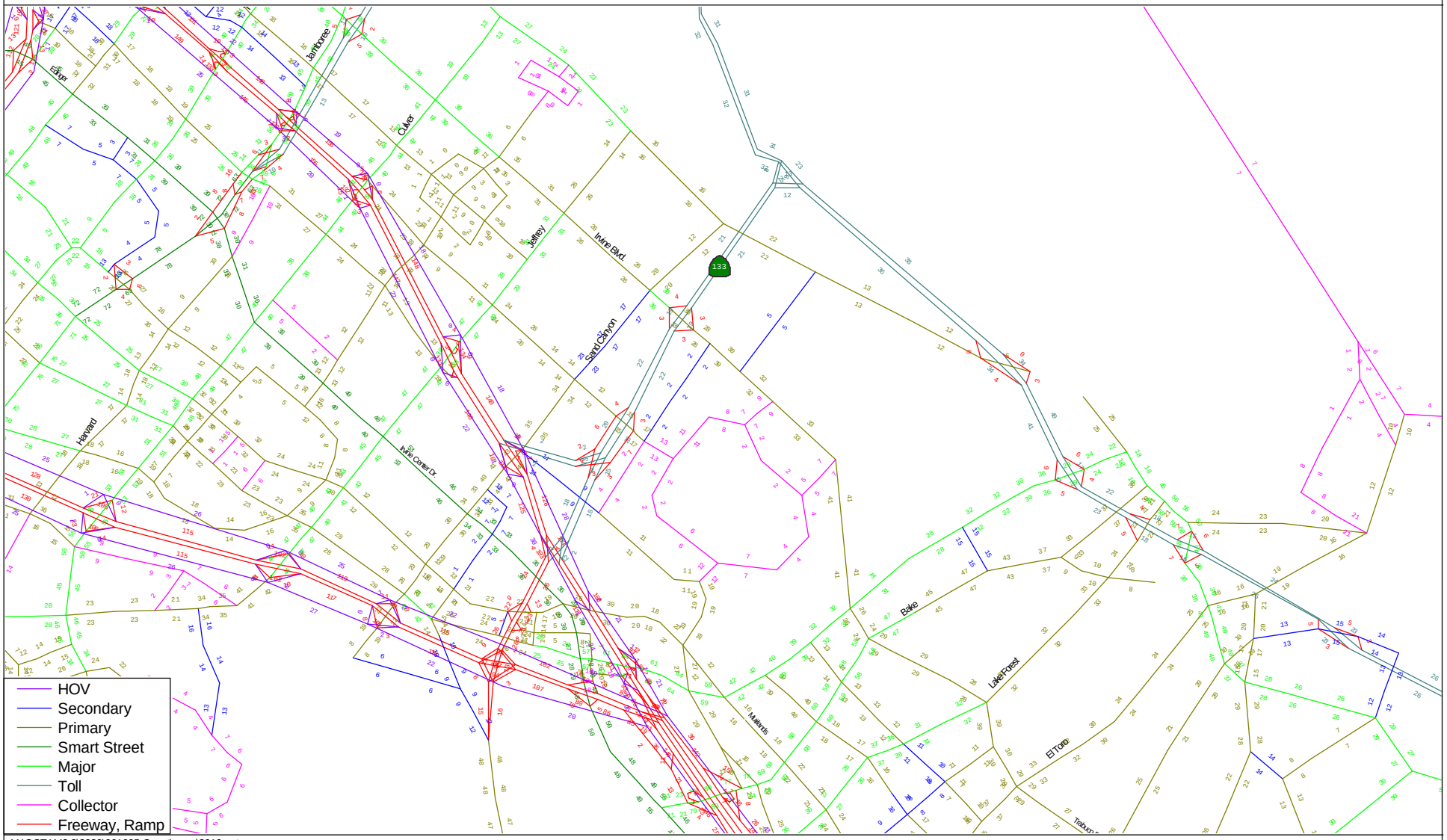
Non-MSW

Day	Date	Trucks
Saturday	6/26/2004	457
Saturday	4/3/2004	454
Saturday	5/15/2004	454
Saturday	8/7/2004	452
Saturday	7/3/2004	451
Saturday	3/20/2004	449
Thursday	12/31/2004	446
Saturday	2/7/2004	442
Saturday	5/22/2004	438
Saturday	6/12/2004	437
Saturday	7/24/2004	436
Saturday	8/28/2004	432
Saturday	3/6/2004	431
Saturday	8/21/2004	431
Saturday	7/31/2004	430
Saturday	10/30/2004	430
Saturday	3/13/2004	428
Saturday	9/4/2004	423
Saturday	1/17/2004	421
Saturday	10/23/2004	420
Saturday	5/1/2004	415
Saturday	9/25/2004	414
Saturday	5/8/2004	413
Saturday	3/27/2004	412
Saturday	7/17/2004	409
Saturday	4/10/2004	407
Saturday	1/31/2004	401
Saturday	9/18/2004	401
Saturday	4/24/2004	399
Saturday	1/24/2004	396
Saturday	10/2/2004	393
Saturday	2/14/2004	391
Saturday	4/17/2004	384
Saturday	11/6/2004	381
Saturday	2/28/2004	379
Saturday	10/9/2004	377
Saturday	11/20/2004	377
Saturday	10/16/2004	371
Friday	12/11/2004	370
Friday	12/4/2004	366
Friday	12/18/2004	358
Saturday	2/21/2004	355
Monday	7/5/2004	352
Saturday	11/13/2004	340

APPENDIX G

OCTAM and ITAM Traffic Forecasting Results

OCTAM3.2 YEAR 2010 ADT - FRB STUDY AREA
VOLUME IN THOUSANDS



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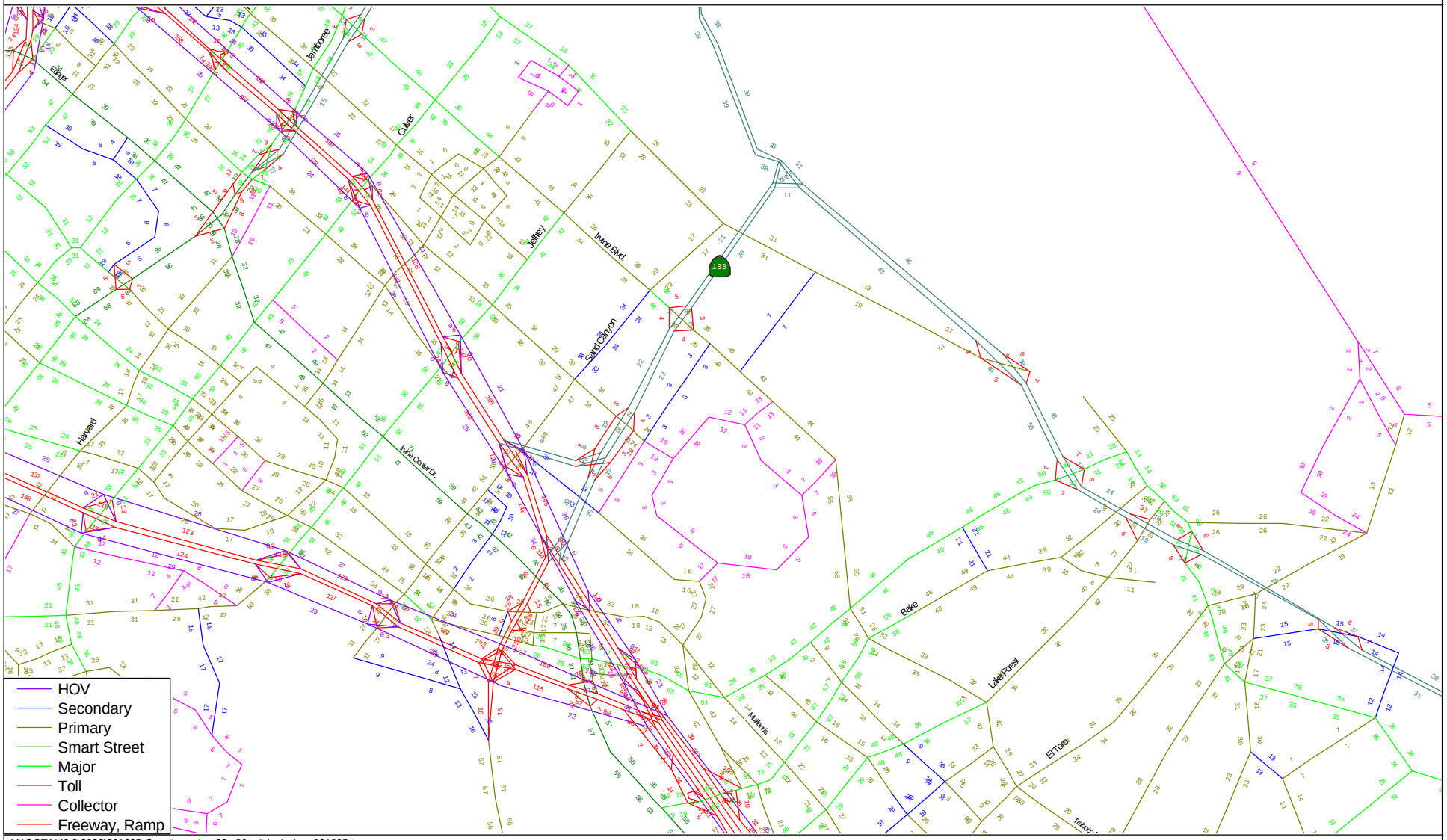
9/21/2005

viper

Licensed to Orange County Transportation Authority

OCTAM3.2 YEAR 2030 ADT - FRB STUDY AREA
VOLUME IN THOUSANDS



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9/21/2005

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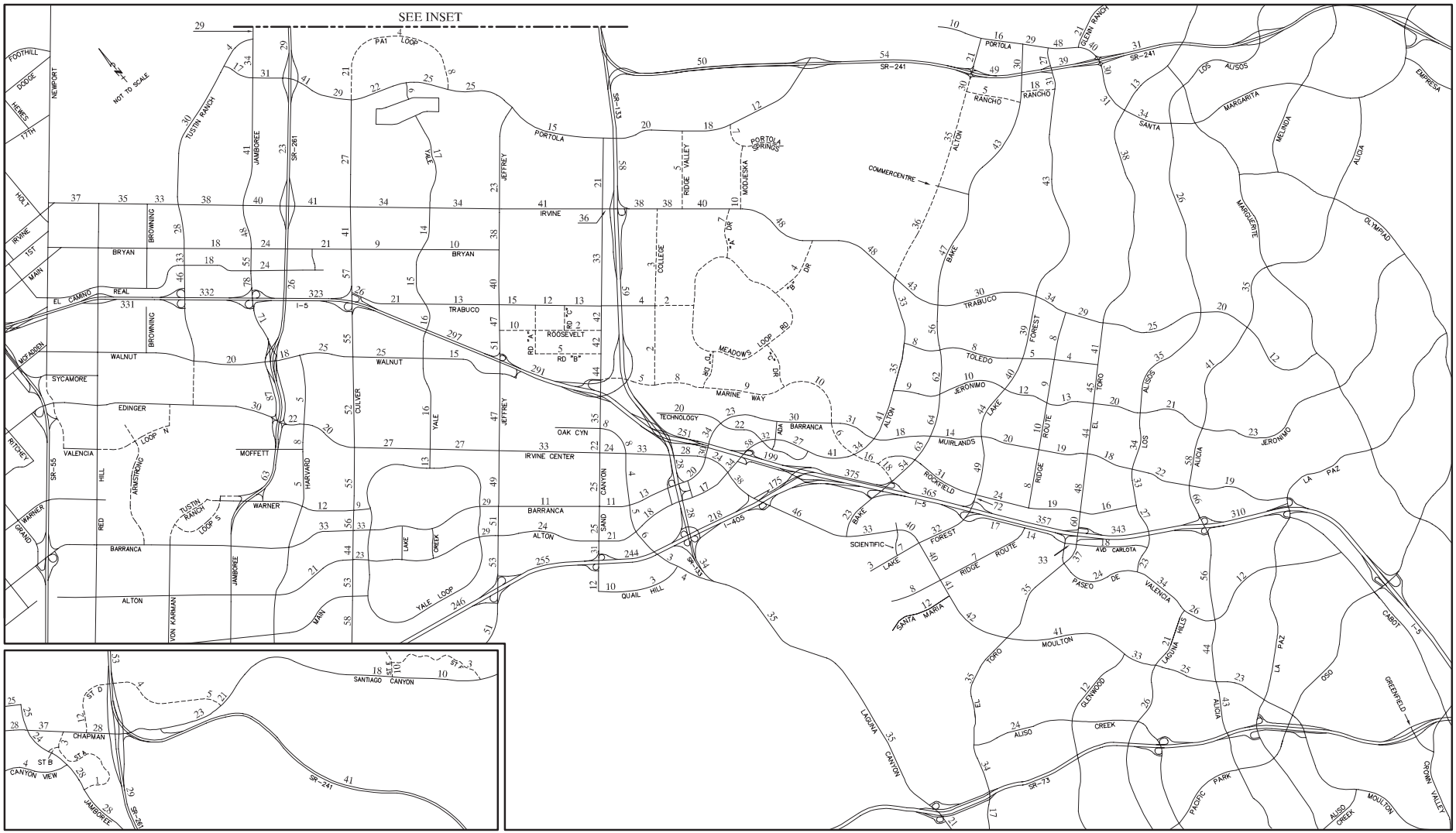


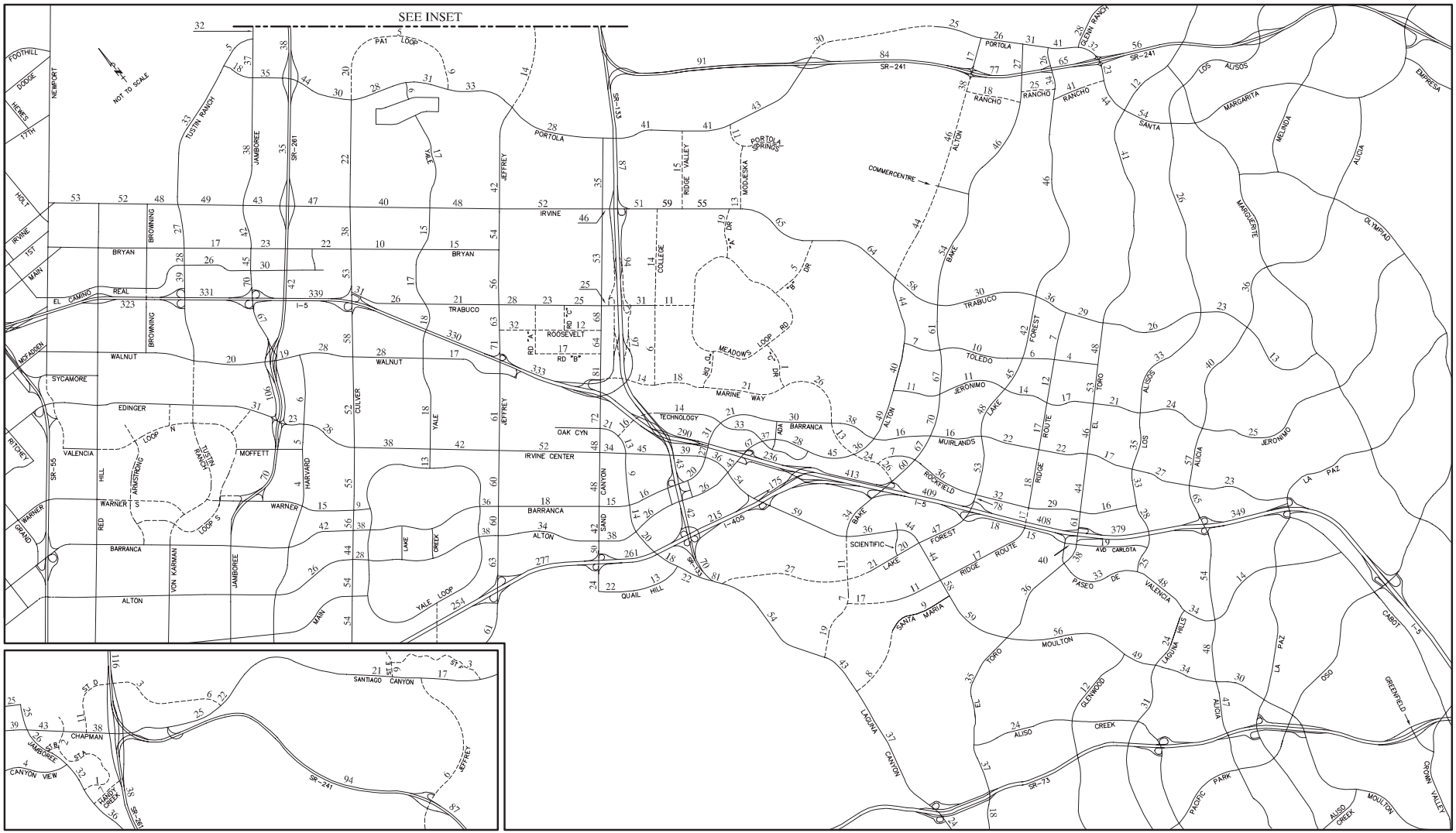
Legend

------ Future roadway

ITAM - YEAR 2010

Figure 5-3

2010 ADT VOLUMES (000s)
- WITH-PROJECT (DESIGN OPTION B)



Legend

------ Future roadway

ITAM - YEAR 2030

Figure 7-3

POST-2025 ADT VOLUMES (000s)
- WITH-PROJECT (DESIGN OPTION B)

APPENDIX G
AIR QUALITY ANALYSIS

AIR QUALITY ANALYSIS

REGIONAL LANDFILL OPTIONS FOR ORANGE COUNTY

FRANK R. BOWERMAN LANDFILL EXPANSION

Prepared for

County of Orange, Integrated Waste Management Department
Office of Public Affairs
320 North Flower Street, Suite 400
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May 1, 2006

URS

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TABLE OF CONTENTS

SECTION PAGE

1.0 INTRODUCTION 1-6
1.1 Overview 1-6
1.2 Frank R. Bowerman Landfill 1-6

2.0 DESCRIPTIONS OF THE PROPOSED PROJECT AND ALTERNATIVES 2-1
2.1 Proposed Project 2-1
2.1.1 Project Location 2-1
2.1.2 Project Description 2-1
2.1.3 Proposed Modifications – Increased Landfill Tonnage and Expansion 2-2
2.1.4 Proposed Slope Stabilization Activities 2-4
2.1.5 Phasing of the FRB Landfill Expansions 2-4
2.1.6 Waste Composition at FRB Landfill 2-4
2.1.7 Access to/from Landfill 2-5
2.1.8 Other Project Features 2-5
2.2 Project Alternatives 2-5
2.2.1 Alternatives 1a and 1b - No Project: No FRB Expansion and No Daily Tonnage Increase 2-5
2.2.2 Alternatives 2a and 2b - FRB Expansion: No Daily Tonnage Increase 2-7
2.2.3 Alternatives 3a and 3b - FRB Expansion: Daily Tonnage (Annual Average) Increase to 11,500 TPD 2-9
2.2.4 Alternatives 4a and 4b - FRB Expansion: Daily Tonnage Increase at Prima Deshecha 2-10

3.0 EXISTING CONDITIONS 3-1
3.1 Climate/Meteorology 3-1
3.2 Air Quality Standards and Attainment Status of the Project Area 3-3
3.2.1 Federal Air Quality Standards 3-3
3.2.2 State Air Quality Standards 3-4
3.2.3 Attainment Planning 3-4
3.3 Local Air Quality-Recent Ambient Air Pollutant Concentrations 3-9
3.4 Regional Air Quality Planning Framework 3-14

4.0 IMPACT ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA 4-1
4.1 Criteria for Evaluating Significance of Impacts 4-1
4.2 Impact Assessment Methodology 4-1
4.2.1 Construction Impacts Assessment Methodology 4-3
4.2.2 Operations Impacts Assessment Methodology 4-3

5.0 CRITERIA POLLUTANT IMPACTS OF THE PROPOSED PROJECT 5-1
5.1 Construction Emissions 5-1
5.2 Operational Landfill Emissions 5-4

5.2.1 Criteria Pollutant Emissions 5-4
5.2.2 CO Hotspots Modeling Analysis 5-7
5.3 Potential Odor Impacts 5-9
5.4 Summary of Predicted Criteria Pollutant Impacts 5-10

6.0 HEALTH RISK IMPACTS OF THE PROPOSED PROJECT 6-1

7.0 IMPACTS OF PROJECT ALTERNATIVES 7-1

7.1 Impacts of alternatives 1a and 1b - No Project: No FRB Expansion and No Daily Tonnage Increase 7-1
7.2 Impacts of Alternatives 2a and 2b - FRB Expansion: No Daily Tonnage Increase 7-1
7.3 Impacts of Alternatives 3a and 3b - FRB Expansion: Daily Tonnage (Annual Average) Increase to 11,500 Tons Per Day 7-1
7.4 Impacts of Alternatives 4a and 4b - FRB Landfill Expansion: Daily Tonnage Increase at Prima Deshecha 7-2

8.0 MITIGATION MEASURES 8-1

8.1 Standard Conditions and Mitigation Measures 8-1
8.1.1 Standard Conditions 8-1
8.1.2 Additional Feasible Control Measures 8-2

9.0 CUMULATIVE IMPACTS 9-1

10.0 REFERENCES AND PERSONAL COMMUNICATIONS 10-1

11.0 LIST OF PREPARERS 11-1

11.1 URS Corporation 11-1

LIST OF FIGURES

FIGURE 1-1. FRB LANDFILL PROPERTY AND BOUNDARY 1-7
FIGURE 2-1. PROPOSED PHASED VERTICAL AND HORIZONTAL EXPANSIONS OF THE FRB REFUSE FOOTPRINT 2-3
FIGURE 2-2. LOCATIONS OF EXISTING ORANGE COUNTY LANDFILLS 2-6
FIGURE 4-1. WIND ROSE FOR EL TORO MONITORING STATION – CALENDAR YEAR 1981 4-11
FIGURE 6-1. SOURCES AND RECEPTORS INCLUDED IN THE HRA FOR THE FRB LANDFILL EXPANSION PROJECT 6-2
FIGURE 6-2. HRA RESULTS 6-4
FIGURE 6-3. CANCER RISK ASSESSMENT 6-5

LIST OF TABLES

TABLE 3-1. AVERAGE TEMPERATURES AND PRECIPITATION IN ORANGE COUNTY TUSTIN IRVINE RANCH (1927-2003) 3-2
TABLE 3-2. AMBIENT AIR QUALITY STANDARDS 3-6
TABLE 3-3. PRIMARY SOURCES AND EFFECTS OF CRITERIA POLLUTANTS 3-7
TABLE 3-4. CRITERIA POLLUTANTS ATTAINMENT STATUS IN THE SOUTH COAST AIR BASIN 3-8
TABLE 3-5. OZONE LEVELS AT MISSION VIEJO (PPM) 3-10
TABLE 3-6. NITROGEN DIOXIDE LEVELS AT ANAHEIM (PPM) 3-10
TABLE 3-7. CARBON MONOXIDE LEVELS AT MISSION VIEJO (PPM) 3-12
TABLE 3-8. SULFUR DIOXIDE LEVELS AT COSTA MESA (PPM) 3-12
TABLE 3-9. PARTICULATE MATTER (PM_{10}) LEVELS AT MISSION VIEJO ($\mu G/M^3$) 3-12
TABLE 3-10.PARTICULATE MATTER ($PM_{2.5}$) LEVELS AT MISSION VIEJO ($\mu G/M^3$) 3-13
TABLE 4-1. SCAQMD AIR QUALITY SIGNIFICANCE THRESHOLDS 4-2
TABLE 4-2. TACS INCLUDED IN THE FRB LANDFILL EXPANSION HRA 4-8
TABLE 4-3. SENSITIVE RECEPTORS WITHIN 5 MILES FROM THE FRB LANDFILL USED IN HRA MODELING 4-10
TABLE 5-1. CONSTRUCTION PHASE EMISSIONS SOURCES AND ESTIMATION METHODS 5-2
TABLE 5-2. SUMMARY OF MAXIMUM ESTIMATED CONSTRUCTION PHASE EMISSIONS 5-3
TABLE 5-3. OPERATIONAL PHASE EMISSIONS SOURCES AND ESTIMATION METHODS (1 OF 2) 5-5
TABLE 5-4. SUMMARY OF MAXIMUM ESTIMATED OPERATIONAL EMISSIONS 5-6
TABLE 5-5. CARBON MONOXIDE CONCENTRATIONS (PPM*) PREDICTED USING CALINE4 FOR FUTURE (YEAR 2030) CONDITIONS WITH AND WITHOUT THE PROPOSED PROJECT** 5-8
TABLE 6-1. SUMMARY OF MAXIMUM PREDICTED HEALTH RISK IMPACTS DUE TO THE PROPOSED FRB LANDFILL EXPANSION PROJECT 6-3

List of Acronyms

AB	Assembly Bill
AQA	Air Quality Analysis
AQMP	Air Quality Management Plan
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQA	California Air Quality Act
CIWMB	California Integrated Waste Management Board
CO	carbon monoxide
cy	cubic yards
DPM	diesel particulate matter
EIR	Environmental Impact Report
EMFAC	EMission FACtors
EPA	U.S. Environmental Protection Agency
FRB	Frank R. Bowerman
HARP	Hotspots Analysis and Reporting Program
HI	hazard index
HOV	High Occupancy Vehicle
HQ	hazard quotient
HRA	Health Risk Assessment
IOD	Irrevocable Offer of Dedication
IWMD	Integrated Waste Management Department
lbs/day	pounds per day
LFG	landfill gas
LOS	level of service
MCY	million cubic yards
MEI	maximally exposed individual
MEIR	maximally exposed individual resident
MICR	maximum individual cancer risk
µg/m3	micrograms per cubic meter
mph	miles per hour
MPO	Metropolitan Planning Organization
MSL	mean sea level
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
NCCP	Natural Communities Conservation Plan
NO	nitric oxide
NO_2	nitrogen dioxide
NOCLATS	North Orange County Landfill and Alternatives Technology
NO_X	oxides of nitrogen
OEHHA	Office of Environmental Health Hazard Assessment

O_3	ozone
Pb	lead
$PM_{2.5}$	particulate matter with aerodynamic diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with aerodynamic diameter less than or equal to 10 microns
PMI	point of maximum impact
ppm	parts per million
REL	reference exposure level
RELOOC	Regional Landfill Options for Orange County
RWQCB	Regional Water Quality Control Board
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
SMP	Soil Management Plan
SO_2	sulfur dioxide
SO_x	oxides of sulfur
SWFP	Solid Waste Facility Permit
TAC	toxic air contaminant
T-BACT	Toxics Best Available Control Technology
TPD	tons per day
TSP	total suspended particulate
VOC	volatile organic compound

1.0 INTRODUCTION

1.1 OVERVIEW

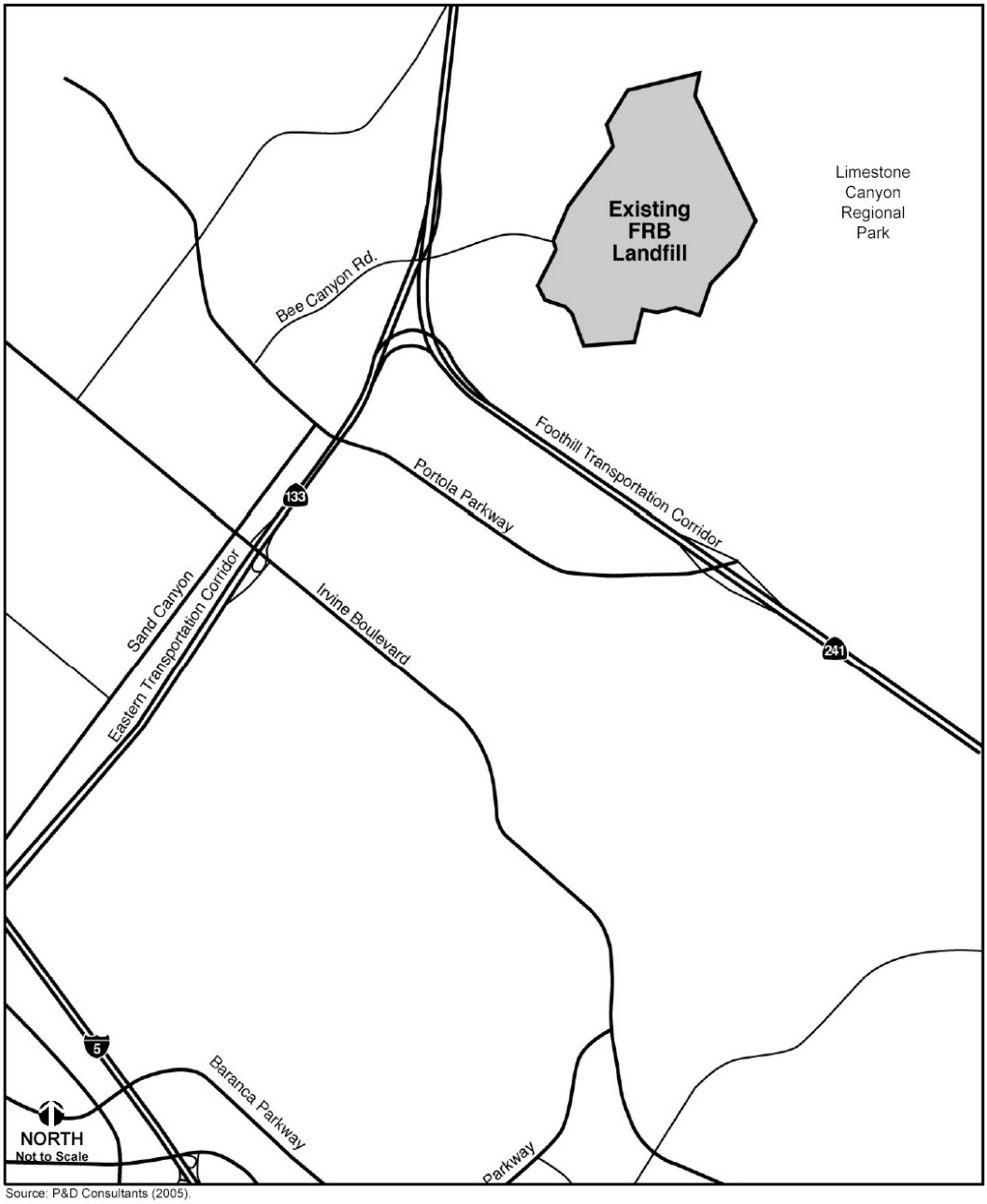
The Regional Landfill Options for Orange County (RELOOC) effort is a long-range strategic planning program initiated by the County of Orange's (County's) Integrated Waste Management Department (IWMD) for the three existing landfills located in Orange County, California. The objectives of the RELOOC program are 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 that endeavor, the County is considering a variety of short-term improvements to enhance existing operations at these municipal solid waste (MSW) landfills operated by the County's IWMD. Although the RELOOC program addresses the potential improvements at all three landfills, this Air Quality Analysis (AQA) focuses on air quality impacts associated with the proposed expansion of the Frank R. Bowerman (FRB) Landfill. The proposed improvements consist of expanding the vertical and horizontal dimensions so that the FRB Landfill could accept a higher volume of waste and extend the operation of the facility for several decades beyond the current closure date of 2022. Considering that the operations at all three landfills complement each others' needs and goals, which is to help the County meet its long-term MSW disposal needs, the improvements proposed at the FRB Landfill have been selected in consideration of the potential improvements or lack of improvements at the other two landfills, Olinda Alpha and Prima Deshecha.

This AQA analyzes the potential air quality impacts associated with the increase in operation at the facility as if the proposed expansion and extended operation of the FRB Landfill were approved, i.e., from the original closure year of 2022 to the proposed closure year of 2053.

1.2 FRANK R. BOWERMAN LANDFILL

The FRB Landfill was opened in 1990 and is located in an unincorporated part of Orange County at 11002 Bee Canyon Access Road. The project site is also within the Sphere of Influence for the City of Irvine. The major cross streets in the general vicinity of the landfill are Sand Canyon Avenue and Portola Parkway, with access from Bee Canyon Access Road (see Figure 1-1). The landfill is open Monday through Saturday from 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 vehicles operating under commercial status is accepted at this landfill. Hazardous materials such as asbestos, batteries, chemicals, paints, medical/biohazard, poisons/pesticides, radioactive material, contaminated soil, or chemically treated wood wastes and other substances considered hazardous are not accepted at this landfill. The current closure date for the landfill is planned for 2022.

Under a Settlement Agreement with the City of Irvine, FRB Landfill is currently allowed to accept an annual average of 7,921 tons per day (TPD) (as of December 2004), and can increase this average daily rate by 1.75% per year until it reaches a daily maximum of 8,500 TPD, which would occur in approximately December 2010 at the maximum growth allowed. The current Solid Waste Facility Permit (SWFP) for the FRB Landfill allows a maximum daily refuse inflow of 8,500 TPD and allows this limit to be exceeded for 36 "high-tonnage" days during the year for which the limit is set at 10,625 TPD.



Source: P&D Consultants (2005).

Figure 1-1
Frank R. Bowerman Landfill

RELOOC Strategic Plan – Frank R. Bowerman Landfill Implementation

Figure 1-1. FRB Landfill Property and Boundary

These high tonnage days can be used anytime during the calendar year and are not carried over from one year to the next. The high-tonnage days are designed to accommodate the increase in MSW that typically occurs immediately preceding or following a holiday.

The FRB Landfill property encompasses approximately 725 acres with 341 acres permitted for refuse disposal. A landfill system capacity and closure date are calculated using various parameters, such as total air space, refuse volume, liner volume, and refuse-to-soil ratio. The permitted airspace for waste disposal at the FRB Landfill is 127 million cubic yards (MCY), which translates to a closure date in year 2022. However, due to a major landslide at the site in 2002, the available airspace was reduced by over 40 MCY, which resulted in a premature closure date of 2014. Hence, to meet the needs of refuse disposal by the County, IWMD re-evaluated and redesigned the FRB Landfill's Master Plan to accommodate future waste disposal needs. The new Master Plan includes slope stabilization for the remediation of this landslide and would include activities that would physically affect terrain within and immediately outside the landfill property boundary. The new Master Plan for the expansion of the landfill, including increased capacity and extension of operations until 2053, is the basis for the current EIR and this AQA. Upon closure, the project site would be converted to a passive regional park.

The landfill is required to comply with numerous federal, state, and local landfill regulations. The landfill is also subject to regular inspections from the California Integrated Waste Management Board (CIWMB), the Board's Local Enforcement Agency, the Regional Water Quality Control Board (RWQCB), and the South Coast Air Quality Management District (SCAQMD) to assure compliance with applicable regulations.

2.0 DESCRIPTIONS OF THE PROPOSED PROJECT AND ALTERNATIVES

The RELOOC Strategic Plan is a long-range strategic plan prepared by the County of Orange IWMD to maximize operational efficiency at the three existing Orange County landfills (i.e. FRB, Olinda Alpha, and Prima Deshecha). The purpose of RELOOC was 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 the Strategic Plan, the County identified a number of potential improvements to the three existing Orange County landfills operated by IWMD. It should be noted that the viability and implementation of certain proposed improvements at FRB Landfill is dependent on the existing and any potential increase in daily capacity at the other two landfills, in addition to operating according to the adopted RELOOC Strategic Plan goals and objectives, which are:

- Ensure that 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; and
- Minimize adverse environmental impacts.

To extend the life of the FRB Landfill operation, IWMD must adhere to the objectives of the Soil Management Plan (SMP) and the Natural Communities Conservation Plan (NCCP). The objective of the SMP is preserving the canyons adjacent to the project site; therefore, all stockpiling of soils must occur within the property boundary. The NCCP requires that plant and animal habitats on the landfill property continue to be planned for and protected such that there is no net loss of sub-regional habitat value. Accordingly, the 2002 landslide at the site requires IWMD to:

- Remediate and stabilize landslide areas to minimize the risk of future slope failures in the area and to protect and provide for future landfilling capacity on those parts of the landfill property; and
- Provide for soil management needs on site to avoid impacts on adjacent canyons.

2.1 PROPOSED PROJECT

2.1.1 Project Location

The FRB Landfill is located in an unincorporated area of Orange County, at 11002 Bee Canyon Access Road, within the Sphere of Influence for the City of Irvine. Figure 1-1 shows the location of the landfill.

2.1.2 Project Description

Landfill system capacity is based on various factors such as total air space, refuse volume, liner volume, refuse-to-soil ratio and other factors, which can be used to estimate a facility closure date. As of June 30,

2005, the current permitted remaining refuse capacity for the FRB Landfill is 44.6 million tons, with a permitted total of 127 MCY of total airspace. On this basis, the facility is estimated to cease operation in 2022. Due to the landslide in 2002, over 40 MCY of airspace was lost, moving the expected closure date up to 2014. Accordingly, IWMD has reevaluated and redesigned the FRB Master Plan to accommodate the future development of this site that is the subject of this AQA. The improvements proposed for the FRB Landfill that are addressed in the current Environmental Impact Report (EIR) and this AQA are the following:

- Phased vertical and horizontal expansions of the FRB refuse footprint within the existing property boundary, as shown on Figure 2-1. These phased expansions would result in increased capacity (approximately 130 MCY of additional capacity over the currently permitted capacity) at this landfill and would result in an extension of the life of this landfill from the current effective closure date in 2022 to approximately 2053.
- An annual average of 8,500 TPD of MSW, with an increase in the daily maximum TPD to 11, 500 TPD.
- Temporary disturbance outside the property boundary to remediate on-site landslides through slope stabilization.

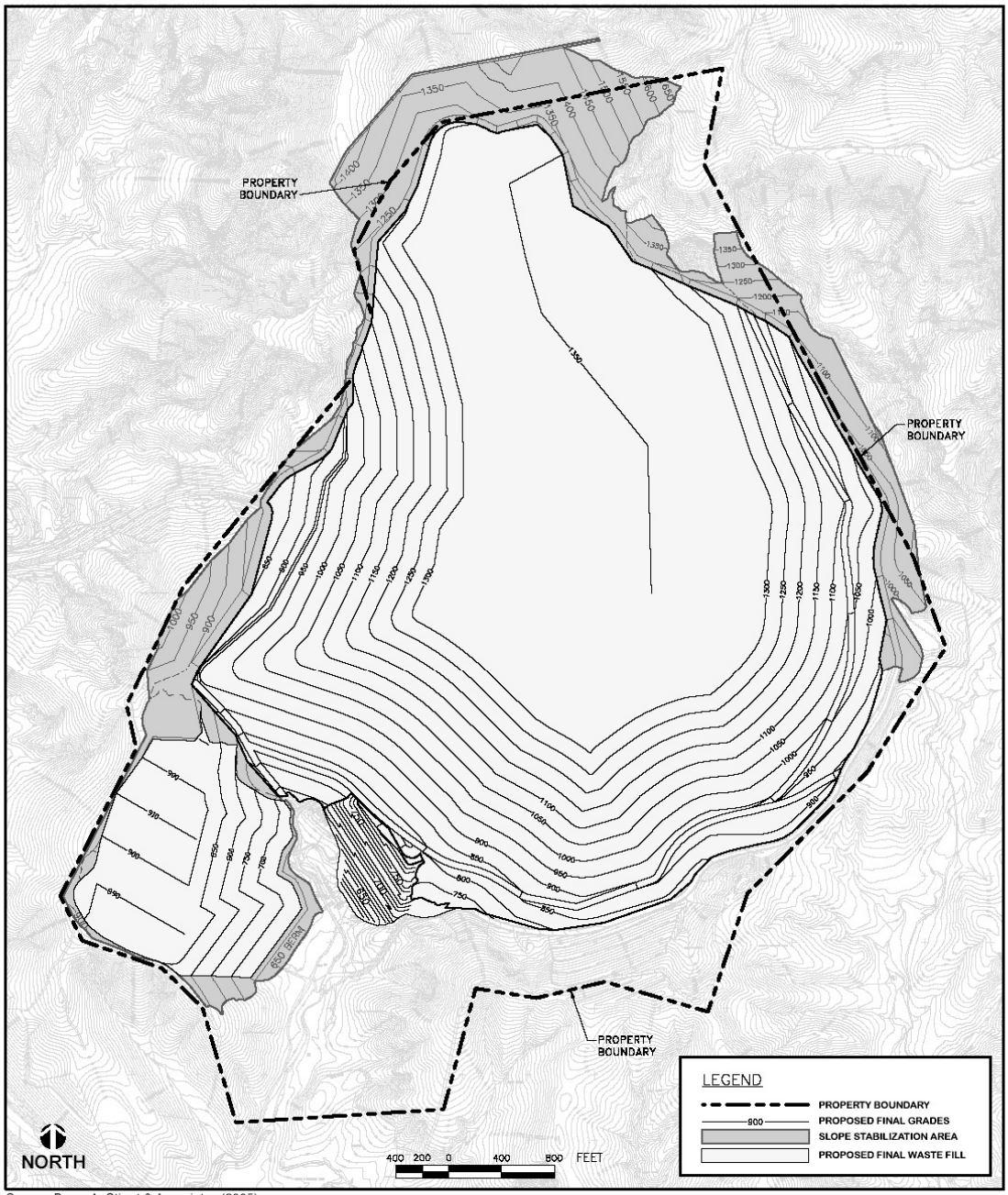
The draft EIR for the proposed project analyzes the potential environmental impacts associated with these project components and with continued operation of FRB Landfill from 2022 to the estimated horizon or closure year of 2053. This AQA evaluates potential air quality impacts from the implementation of the proposed project. The following subsections describe aspects of the project that are relevant to this evaluation.

2.1.3 Proposed Modifications – Increased Landfill Tonnage and Expansion

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 and this AQA 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 current operating permits for the FRB Landfill place an 8,500 TPD limit on operations with the exception of 36 days allowed for high tonnage. A Mitigated Negative Declaration for the Maximum High Tonnage Days project that was approved for this landfill in 2004 identified the need to accommodate higher volumes of waste disposal due to holidays, large demolition projects (like the removal of military structures and aviation facilities at the decommissioned Marine Corps Air Station El Toro), and other similar events with the potential to generate a significant amount of waste. The adopted high tonnage project assumes a maximum daily high tonnage at the FRB Landfill of 10,625 TPD (a 25% increase over 8,500 TPD) for 36 days per year, which would include a moderate increase in on-site equipment, operations, and staff to accommodate the higher tonnage on those days. The increase in daily tonnage to a maximum 11,500 TPD under the proposed project would be analyzed as a worst-case daily maximum rate while still maintaining an 8,500 TPD annual average inflow rate.

Figure 2-1. Proposed Phased Vertical and Horizontal Expansions of the FRB Refuse Footprint



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

Figure 2-1
Proposed Landfill Expansion

RELOOC Strategic Plan – Frank R. Bowerman Landfill Implementation

The expansion of FRB Landfill would provide an additional MSW capacity of 130 MCY of airspace over the current effective capacity after the landslide, which is approximately 87 MCY and would extend the life of the landfill from its current effective closure date of 2014 to approximately 2053, based on an annual average refuse inflow rate at the currently permitted limit of 8,500 TPD by 2010 in accordance with the existing City of Irvine Settlement Agreement for the landfill. The continuation of 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 the Olinda Alpha Landfill is closes.

As proposed, the height of FRB Landfill would be increased from its current permitted level of 1,100 feet above mean sea level (MSL) to about 1,350 above MSL or a net vertical increase of approximately 250 feet. The horizontal expansion would include landform modifications to provide for an additional approximate 193 acres of refuse footprint area (total proposed project refuse footprint approximately 534 acres), over the currently permitted refuse footprint of 341 acres. Expansion of the refuse footprint would be contained within the existing 725 acre landfill property. A total of 130 additional acres (total proposed project disturbance area approximately 655 acres) is proposed to be disturbed beyond the currently permitted disturbance area of 525 acres. Figure 2-1 shows the proposed limits of the vertical and horizontal expansions at the landfill under the proposed project.

2.1.4 Proposed Slope Stabilization Activities

Slope stabilization is required in the northern and eastern parts of the landfill site to provide a stable sub-grade designated for the landfill within areas underlain by landslides. Approximately 34 acres outside the landfill property boundary would be included within the disturbance limits for slope stabilization. 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 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 on that area prior to project disturbance. The IOD places other permit conditions on the remedial grading for erosion control and drainage.

2.1.5 Phasing of the FRB Landfill Expansions

The vertical and horizontal expansions of FRB Landfill would be implemented in phases and would only disturb small portions of the landfill at any one time. These phased areas of development are described in the project EIR. Preliminary grading plans indicate that approximately 37 MCY of soil would be excavated throughout the life of the proposed expansion for the FRB Landfill.

2.1.6 Waste Composition at FRB Landfill

The waste composition at 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.

2.1.7 Access to/from Landfill

Access to FRB Landfill would remain unchanged, with local access provided via Bee Canyon Access Road, Sand Canyon Avenue, Portola Parkway and regional access via I-5 and I-405.

2.1.8 Other Project Features

The project may require that additional buildings and structures be constructed at FRB Landfill and will require relocation of existing entrance facilities, scales/scale house, landfill gas (LFG) control facilities and other landfill support facilities in a later phase of development (Phase X). The number of employees at the landfill will not change substantially as a result of the proposed project. Employees would continue to perform landfill operations including administration, landfill cover operations, and other landfill-related operations. The number and types of equipment used at FRB Landfill would not change substantially. The operating hours, days, and schedule at FRB Landfill are expected to remain the same as a result of the implementation of the proposed project. However, it should be noted that there has been discussion of changing the current operating hours of 7 a.m. – 5 p.m. to 6 a.m. – 4 p.m. The change in operating hours would create negligible or no changes in air pollutants emitted; therefore, air quality impacts would be the same for both operating conditions.

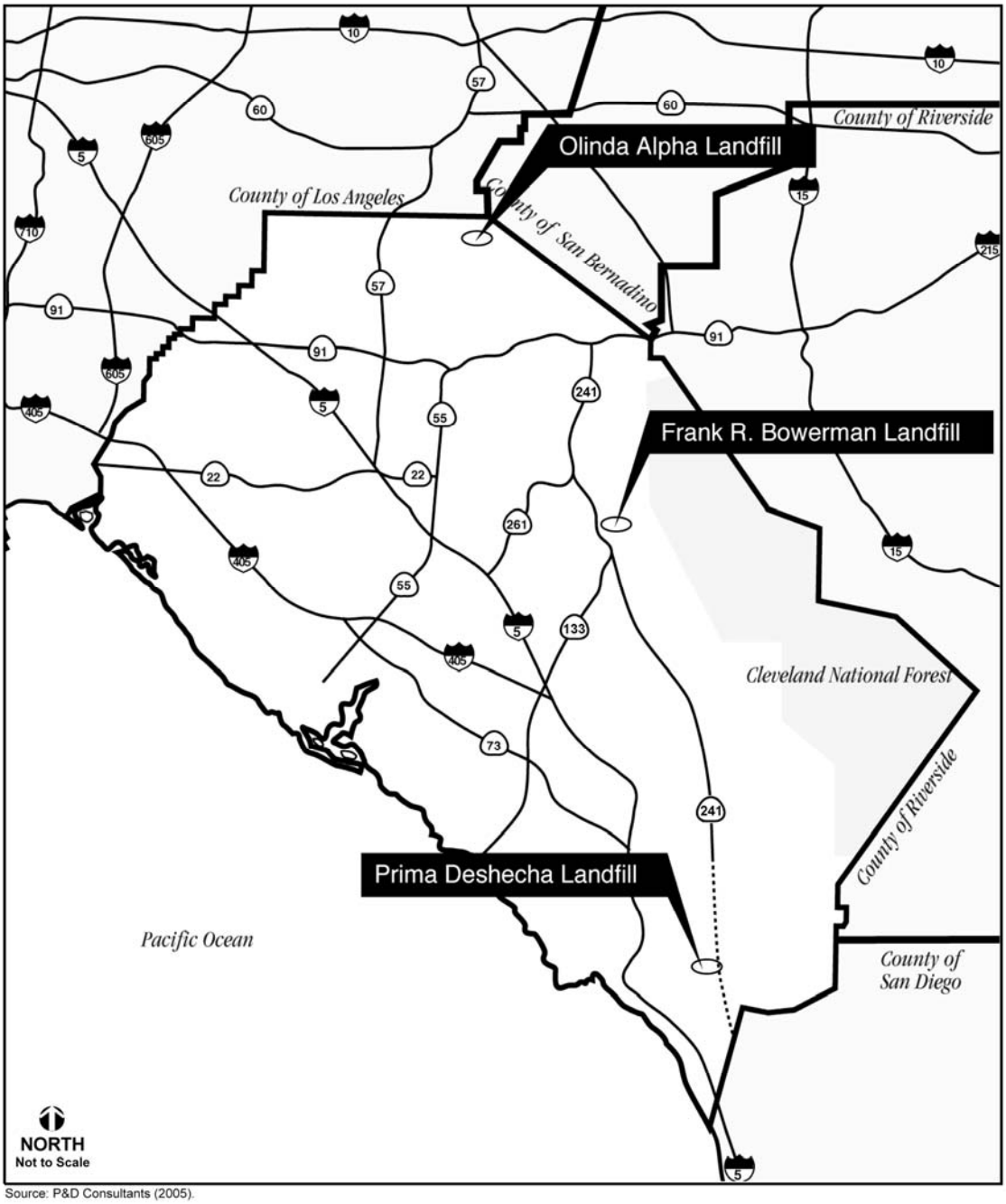
2.2 PROJECT ALTERNATIVES

The alternatives to the proposed project at FRB Landfill include the No Project Alternative and three Build alternatives, as described in the following sections. Because the alternatives are dependent on other local landfills, the locations of the other landfills are illustrated on Figure 2-2. The Build alternatives were developed to meet most or all of the defined project objectives.

2.2.1 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.

Figure 2-2. Locations of Existing Orange County Landfills



Source: P&D Consultants (2005).

Figure 2-2
Locations of Existing Orange County Landfills

RELOOC Strategic Plan – Frank R. Bowerman Landfill Implementation

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

- No vertical and horizontal expansions at FRB Landfill.
- No extension in the life of 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.
- No change in the County's existing Settlement Agreement with the City of Irvine and existing permits with the CIWMB and other regulatory agencies with jurisdictional oversight for FRB Landfill.

No Project Alternatives 1a and 1b assumes 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. Under this Alternative, none of the proposed project components at FRB Landfill would occur. Accordingly, under this Alternative, 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 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 County would occur commencing 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 County, and may include El Sobrante Landfill in Riverside County and/or the Mid-Valley Landfill in San Bernardino County.

2.2.2 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 FRB Landfill:

- The same vertical and horizontal expansions at FRB Landfill as under the proposed project.
- Extension of the life of FRB Landfill to 2053.
- The same slope remediation for on site landslides as under the proposed project.
- The same SMP 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 FRB Landfill.
- No change in on site equipment, operations and staff at this landfill.
- No change in the number of daily truck trips to FRB Landfill.
- Amendments to the County's existing Settlement Agreement with the City of Irvine and existing permits with the CIWMB and other regulatory agencies with jurisdictional oversight for FRB Landfill.

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 FRB Landfill, except an increase in TPD, would occur. Under Alternatives 2a and 2b, 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 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 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.

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

Alternative 3a/3b proposes an increase in the permitted annual average refuse inflow rate of 8,500 TPD at the FRB Landfill 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 FRB Landfill:

- The same vertical and horizontal expansions at FRB Landfill as under the proposed project.
- Extension of the life of FRB Landfill to 2044 under Alternative 3a.
- Extension of the life of FRB Landfill to 2047 under Alternative 3b.
- The same slope remediation for on site landslides as under the proposed project.
- The same SMP 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. The 11,500 TPD annual average would not be reached until 2014 under Alternative 3a and not until 2022 under Alternative 3b.
- No change in the existing access to/from FRB Landfill.
- Increase in on-site equipment, operations, and staff at this landfill.
- Increase in the number of daily truck trips to FRB Landfill.
- Amendments to the County's existing Settlement Agreement with the City of Irvine and existing permits with the CIWMB and other regulatory agencies with jurisdictional oversight for FRB Landfill.

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 for the FRB Landfill. Under this Alternative, all the proposed project components at FRB Landfill would occur. In addition, this Alternative, unlike the proposed project, would increase the Annual Average TPD at FRB Landfill from 8,500 to 11,500 TPD. There would also be an increase in the long-term physical capacity at FRB Landfill based on the vertical and horizontal expansions.

Under Alternatives 3a and 3b, importation of waste into the 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).

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

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 to 7,000 when the Olinda Alpha Landfill closes which meets the RELOOC demand projection of 15,500 by 2039 (with the FRB Landfill maintaining its permitted annual average waste inflow rate of 8,500). 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 FRB Landfill:

- The same vertical and horizontal expansions at 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 SMP 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 except for 36 high tonnage daily per year in which 10,625 is allowed.
- No change in the existing access to/from FRB Landfill.
- No increase in on-site equipment, operations and staff at this landfill.
- No increase in the number of daily truck trips to FRB Landfill.
- Amendments to the County's existing Settlement Agreement with the City of Irvine and existing permits with the CIWMB and other regulatory agencies with jurisdictional oversight for FRB Landfill.

Alternatives 4a and 4b assume an increase in the TPD at Prima Deshecha Landfill from the existing permitted 4,000 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 with close in 2021.

Alternatives 4a and 4b would require action by the County for the FRB and Prima Deshecha Landfills. Under this Alternative, all the proposed project components at 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 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 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).

3.0 EXISTING CONDITIONS

3.1 CLIMATE/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 from the nearest station, Tustin Irvine Ranch, were obtained from the Western Regional Climate Center and summarized in Table 3-1 for the period from 1927 to 2003. 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 during the months between November and April. 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 3-1. Average Temperatures and Precipitation in 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 Riverside and San Bernardino counties. In the winter, the greatest pollution problem is accumulation of carbon monoxide (CO) and oxides of nitrogen (NO_x) 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.

3.2 Air Quality Standards and Attainment Status of the Project Area

3.2.1 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.

3.2.2 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.

3.2.3 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), carbon monoxide (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 3-2 presents the federal and California

ambient standards for regulated criteria pollutants, and Table 3-3 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.

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 ($\mu g/m^3$), based on the three-year average of annual arithmetic means from single or multiple monitors (as available); and a standard of 65 $\mu g/m^3$, based on the three-year average of the 98th percentile of 24-hour average concentrations at each monitor within an area. In addition, California Air Resources Board (CARB) has amended the particulate matter air quality standards by lowering the annual average PM_{10} level to 20 $\mu g/m^3$ (currently 30 $\mu g/m^3$), and establishing an annual average $PM_{2.5}$ standard of 12 $\mu g/m^3$.

Table 3-4 presents information on the current attainment status of the SCAB with respect to the California and federal ambient air quality standards.

Table 3-2. 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]	---

[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

Source: CARB Air Quality Standards website (http://www.arb.ca.gov/aqs/aqs.htm)

Table 3-3. 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 ores Industrial processes	Plant injury Reduced visibility Deterioration of metals, textiles, leather, finishes, coatings, and so on 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, and so on Irritation of eyes Reduced lung infection 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

Table 3-4. Criteria Pollutants Attainment Status in the South Coast Air Basin

	State	Federal
O3 (one-hour)	Nonattainment	Extreme Nonattainment
O3 (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.

3.3 LOCAL AIR QUALITY-RECENT AMBIENT AIR POLLUTANT CONCENTRATIONS

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.

Ozone. 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 3-5 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.

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 3-6 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.

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 3-5. 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)

Table 3-6. 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)

Table 3-7 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.

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 3-8 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 3-9 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 3-7. 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)

Table 3-8. 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 3-9. 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 3-10 show that the federal 24-hour average NAAQS of 65 µg/m^3 has not been exceeded in the past three years. The maximum 24-hour $PM_{2.5}$ background concentration of 58.5 µg/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 µg/m^3 in 2002 and state standards of 12 µg/m^3 each of those years with a maximum concentration of 15.5 µg/m^3 in 2002. SCAB is designated as being in nonattainment for $PM_{2.5}$.

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 looks at a quarterly average, while CAAQS looks at 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.

Table 3-10.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)

3.4 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 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 are expected to be implemented between 1997 and 2005. Long-term measures rely on the advancement of technologies and control methods that can 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.

4.0 IMPACT ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

4.1 CRITERIA FOR EVALUATING SIGNIFICANCE OF IMPACTS

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; or
- 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 4-1. Revisions to parts of the Handbook have been posted on SCAQMD's website, and these changes are reflected in Table 4-1 as well.

4.2 IMPACT ASSESSMENT 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 4.1, 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.

Specific categories of air quality and health risk impacts addressed in this report are summarized in the following subsections.

Table 4-1. 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 $\mu g/m^3$ (recommended for construction) B 2.5 $\mu g/m^3$ (operation) 1.0 $\mu g/m^3$ 20 $\mu g/m^3$	
Sulfate 24-hour average	 1 $\mu g/m^3$	
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.

KEY: lbs/day = pounds per day ppm = parts per million $\mu g/m^3$ = microgram per cubic meter ≥ greater than or equal to

4.2.1 Construction Impacts Assessment Methodology

Construction emission sources include equipment exhaust and fugitive dust generation associated with excavation of future waste cells and installation of liners, stockpiling of excavated materials and remediation of landslide areas, as well as vehicle exhaust and fugitive dust from the on- and off-site portions of construction worker commute trips and material delivery truck trips. Annual emissions from the combined construction and landslide remediation activities have been estimated based on average daily movement of 20,000 cubic yards (cy) of earth, while the maximum daily emissions are based on the movement of 40,000 cubic yards. Both figures are considered to represent worst-case conditions and, in all likelihood, most years will see a lower annual average value and very few days with such a high daily total of earth movement. Note that as a worst-case scenario, annual emissions associated with landfill operations account for the extra construction equipment that is required on peak days (i.e., 11,500 TPD) would operate 154 days per year and typical equipment for the remainder of the year. Thus, the construction impacts on air quality compares the worst-case daily emissions with the SCAQMD significance criteria pollutant thresholds established for construction activities.

4.2.2 Operations Impacts Assessment Methodology

The important source categories associated with ongoing landfill operations include:

- 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;
- 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; and
- Fugitive leakage of LFG not captured by the site collection system.

4.2.2.1 General Criteria Pollutant Impacts

Evaluation of the proposed project's potential impacts to local criteria pollutant levels consists primarily of 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. The one exception is the impact of CO emissions from vehicles serving the landfill, which is discussed later in this section.

As described more fully in Section 5.2, the concept of incremental project emissions is somewhat difficult for an operating landfill, since closure of such facilities will cause some, but not all, of its emissions to cease. LFG flaring and fugitive leaks of LFG from the landfill surface will continue for as long as the decomposition of the deposited waste occurs. On the other hand, emissions directly related to the transport, placement, and covering of waste will drop to zero immediately upon facility closure. Thus, while the magnitude of the daily and annual emissions from the operational landfill will be generally

similar to those already occurring due to 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 landfilling emissions that would otherwise have occurred beginning in 2022. In this sense, the entirety of these emissions after 2022, unlike those from LFG generation, must be considered to be the incremental impact of the expansion project. This approach, which has been adopted based on guidance from SCAQMD CEQA specialists, leads to higher predicted impacts than would be the case if the incremental change in emissions was measured from the existing levels.

4.2.2.2 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. An important component of this analysis was the traffic study conducted by P&D Consultants to examine potential effects of the project on existing traffic levels at 18 intersections in the vicinity of the landfill.

According to the P&D traffic report, two nearby intersections will be degraded to an unacceptable level-of-service (LOS). These two intersections, Sand Canyon Avenue at Trabuco Road and Jeffrey Road at Walnut Avenue, were selected for the hot spots analysis. A third intersection, Sand Canyon Avenue at Irvine Boulevard, was also selected because it had the second highest traffic counts of all intersections in the P&D analysis (Sand Canyon Avenue at Trabuco Road had the highest traffic volumes). Thus, these intersections would be considered worst-case scenario because the intersections with the worst LOS and highest vehicle volume would generate the most amount of pollutants.

The vehicle volume and geometrics from the P&D report for the year 2030 traffic scenarios "with Project" and "without Project" were used in the hot spot analysis. A review of the traffic report indicates the morning volumes are greater than the afternoon volumes. Therefore, the morning traffic volumes from the P&D report were used in the hot spots analysis

The EMission FACtors (EMFAC) model was developed by the CARB to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways, and local roads in California. In the EMFAC model, the emission rates for various vehicle categories are multiplied with vehicle activity data provided by regional transportation agencies to calculate statewide or regional emission inventories. The model can also be used to evaluate emissions for individual roadways and intersections, as in this hot spots analysis.

The 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 model default parameters for Orange County in the year 2030 was run to generate vehicle emission factors for the CO hot spot model, CALINE4.

CALINE4 (Caltrans, 1989) is a simple line source Gaussian plume dispersion model that predicts CO pollutant impacts near roads and intersections. Its purpose is to help planners protect public health from the adverse effects of excessive CO exposure. The Caltrans publication, *Transportation Project-Level Carbon Monoxide Protocol* (CO Protocol) (Garza et al., 1997), recommends the use of CALINE4 for a

detailed CO analysis. The CALINE user defines the roadway geometries, worst-case meteorological parameters, anticipated traffic volumes, and receptor positions for each intersection to be modeled. The user must also define CO emission factors for each roadway link near the intersection.

The following CALINE4 model inputs were used in the CO hotspots analysis for the proposed landfill expansion project:

- 1.8 meters receptor height;
- Receptors were placed at street corners and along the roadway;
- The road links were selected as at grade;
- Traffic links for through and turning traffic were used for each intersection;
- The projected ambient 1-hour and 8-hour CO concentrations of 5.9 ppm and 3.9 ppm, respectively, for the Anaheim monitoring station in year 2020 was derived from the SCAQMD web site; and
- 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°,

Results of the CO hotspots analysis are described in Section 5.2.2.

4.2.2.3 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). Specifically, the guidance contained in the following documents was used:

- The SCAQMD's Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (Assembly Bill [AB]2588), July 2005;
- The SCAQMD's Risk Assessment Procedures for Rules 1401 and 212, Version 7.0, July 2005; and
- OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines – The Air Toxics Hot spots Program Guidance Manual for Preparation of Health Risk Assessments, August 2003.

The four principal steps of an HRA, such as that conducted for the FRB Landfill expansion project, include the following:

- 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; and
- 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; and
- 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 (see tables in Appendix B for details of the emissions calculations).

Toxic constituents contained in fugitive and flared LFG that were evaluated in the HRA include the compounds listed in Attachment A, Table 1 (Carcinogenic and Toxic Air Contaminants [Core Group] of SCAQMD Rule 1150.1. These are the same TACs that SCAQMD requires the FRB Landfill to monitor on a routine basis, and are thus the substances that the District has determined to be potentially significant for this site.. 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. Tables showing the calculation of fugitive LFG and flare emissions are included in Appendix B. A full list of the TACs included in this HRA is provided in Table 4-2.

A number of assumptions regarding the representation of emission sources in this HRA ensure that its results provide a conservative estimate of health risks resulting from the proposed landfill expansion 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.
- 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 <u>all</u> 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 <u>entire fleet</u> 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 <u>maximum predicted difference</u> 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.

Table 4-2. 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	

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"; and
- Chronic non-cancer risk was evaluated at all receptors using the "Derived (OEHHA) Method".

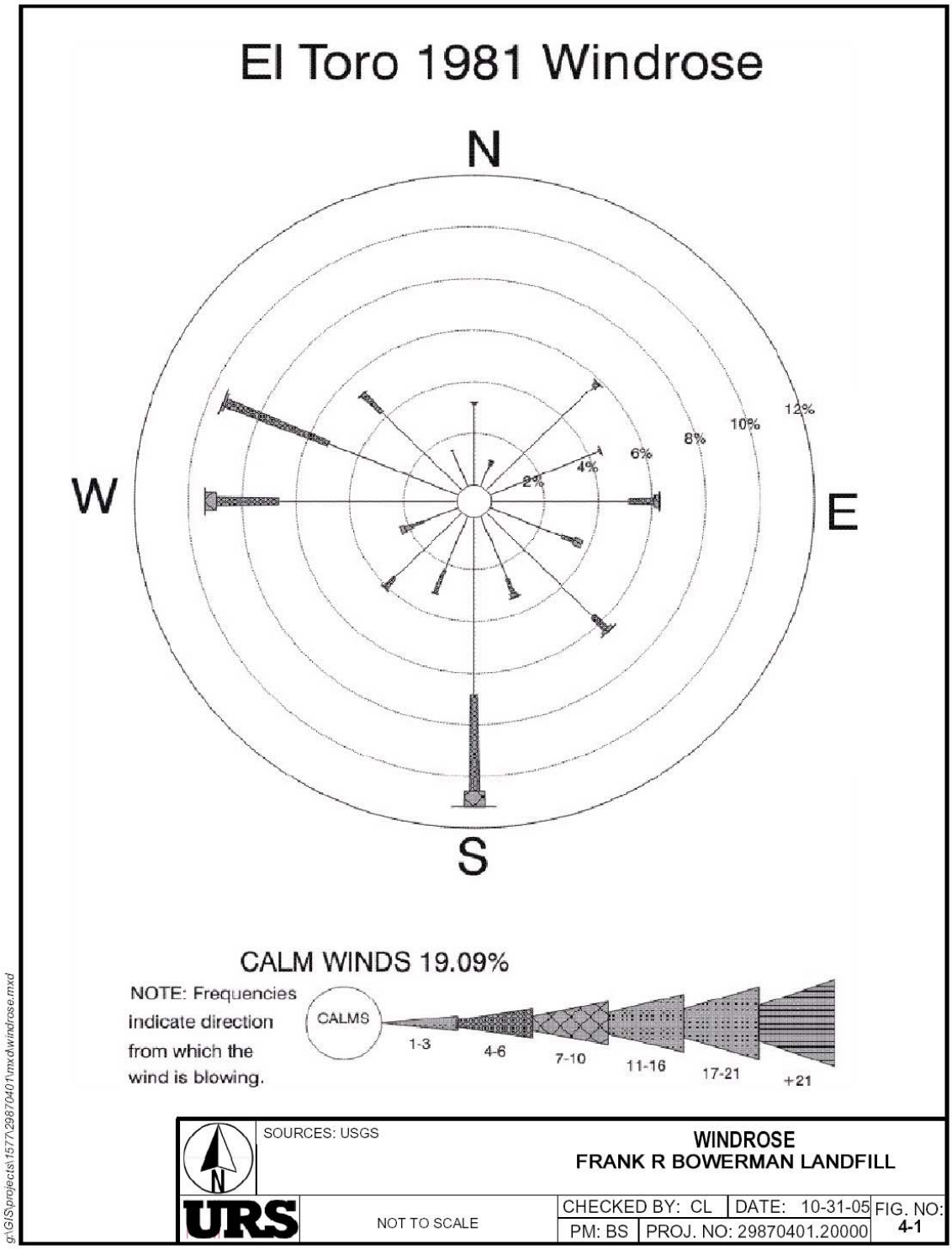
An exhaustive determination of sensitive receptors within 10 kilometers of the landfill was conducted to ensure that the effects of incremental TAC emissions would be evaluated at the areas most susceptible to health impacts. A total of 285 sensitive receptors, including schools, daycare centers, hospitals, convalescent homes, residences, and playgrounds and athletic areas were identified (Table 4-3, some sites have more than one receptor to ensure maximum risk is evaluated). 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 4-1. Urban dispersion coefficients and the "no calms processing" were selected for this application.

Table 4-3. Sensitive Receptors Within 5 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'Bbey (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		

Figure 4-1. Wind Rose for El Toro Monitoring Station – Calendar Year 1981



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 Section 6.0 of this report. 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 (1.0×10^{-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 (1.0×10^{-5}) at any receptor location, if the project is constructed with T-BACT; and

(C) a cancer burden greater than 0.5.

- Chronic Non-Cancer Hazard Index (HI)

The cumulative increase in total chronic 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.

- Acute Non-Cancer HI

The cumulative increase in total acute 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.

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 (1.0×10^{-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.

5.0 CRITERIA POLLUTANT IMPACTS OF THE PROPOSED PROJECT

Evaluation of the air quality impacts associated with the proposed landfill expansion project requires the best available information on air pollutant emissions data for all phases and components of the project. This section describes the development of these emissions data. The activities that are included in the estimation of construction emissions are: (1) remediation of the landslide area on the north portion of the site to increase the area available for waste placement; and (2) preparation of new landfill cells, including excavation and liner installation. Operational emissions include those arising from employee commute trips to and from the site, transport of waste to the landfill, placement of waste and daily cover in the active areas of the site and the LFG generated by waste decomposition, both the fraction that is captured by the gas collection system and burned in flares and the smaller fraction that is not collected and is assumed to leak from the landfill into the atmosphere.

5.1 CONSTRUCTION EMISSIONS

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, 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 5-1 shows the assumptions and emissions estimation techniques used in developing emissions information for each source category of the construction effort. Table 5-2 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 A of the AQ Technical Study.

The emissions calculations represented in Table 5-2 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. Mitigation measures to reduce these emissions are addressed in Section 8.0.

Table 5-1. 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

Table 5-2. 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

5.2 OPERATIONAL LANDFILL EMISSIONS

5.2.1 Criteria Pollutant Emissions

A variety of source types will be responsible for the proposed project's operational emissions, including on-site emissions associated with daily landfilling activities and off-site emissions due to trash hauling vehicles visiting the site and employees commuting to and from work. The specific emission source categories for landfill operations will include:

- Exhaust from diesel equipment used for on-site waste disposal and placement of daily cover material;
- Fugitive dust associated with on-site equipment movement on unpaved surfaces;
- Exhaust and fugitive dust generated by trash hauling trucks while on the site;
- Exhaust and fugitive dust generated by trash hauling trucks outside the site;
- Fugitive LFG emissions;
- LFG flaring combustion emissions; and
- Exhaust and fugitive dust from employee vehicle trips to and from the site.

Table 5-3 summarizes the methods and assumptions used in the development of emissions estimates for each source category of the operational facility. The resulting maximum daily and annual emissions data are listed in Table 5-4, and detailed documentation of the associated calculations is provided in Appendix B of the AQ Technical Study.

The data in Table 5-4 show 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.

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.

Table 5-3. Operational Phase Emissions Sources and Estimation Methods (1 of 2)

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
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

Table 5-4. 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

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).

5.2.2 CO Hotspots Modeling Analysis

Section 4.2.2.2 presents information on the methodology and input data used to conduct a CO hotspots analysis to estimate the effects of landfill traffic on CO levels at the intersections expected to be most impacted by the proposed project.

The EMFAC2002 model was run for calendar year 2030, using the input data described in Section 4.2.2.2 and traffic data from the project traffic report produced by P&D Consultants with the following results:

- CO emission factor for approaching vehicles was calculated as 1.43 grams/mile; and
- CO emission factor for departuring vehicles was calculated as 1.38 grams/mile.

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. Table 5-5 presents the results of the CO hot spots modeling analysis. Detailed model input files corresponding to the simulations described in this section are provided in Appendix C.

The CO hot spots analysis indicates 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 state and federal ambient standards for CO.

Table 5-5. Carbon Monoxide Concentrations (ppm*) Predicted using CALINE4 for Future (Year 2030) Conditions With and Without the Proposed Project**

Intersection	Locations of Receptors with Highest Concentrations	Without Project CO Concentrations 1-hour/ 8-hour	With Project CO Concentration 1-hour/8-hour	Change in CO Concentration 1-hour/8-hour
Sand Canyon Avenue & Trabuco Road	SE	6.2/4.1	6.2/4.1	0.0/0.0
	NW	6.3/4.2	6.3/4.2	0.0/0.0
	SW	6.3/4.2	6.3/4.2	0.0/0.0
	NE	6.2/4.1	6.2/4.1	0.0/0.0
Jeffrey Road & Walnut Avenue	SE	6.2/4.1	6.2/4.1	0.0/0.0
	NW	6.2/4.1	6.2/4.1	0.0/0.0
	SW	6.3/4.2	6.3/4.2	0.0/0.0
	NE	6.2/4.1	6.2/4.1	0.0/0.0
Sand Canyon Avenue & Irvine Boulevard	SE	6.3/4.2	6.3/4.2	0.0/0.0
	NW	6.2/4.1	6.2/4.1	0.0/0.0
	SW	6.3/4.2	6.3/4.2	0.0/0.0
	NE	6.2/4.1	6.2/4.1	0.0/0.0

Source: URS Corporation

Notes:

CAAQS – 1-hour = 20 ppm; 8-hour = 9.0 ppm

* ppm = parts per million

** Estimated CO concentrations 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

CO concentrations shown includes projected 1-hour and 8-hour ambient background concentrations at the SCAQMD Anaheim monitoring station in year 2020.

5.3 POTENTIAL ODOR IMPACTS

Currently, complaints are not being received from the public regarding objectionable odors from the FRB landfill and 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. This section describes the measures that will need to be applied to ensure that the current successful odor management program continues to provide adequate protection for expanded operations at the FRB facility.

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 alternative daily covers. 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 odorour 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, there are strong reasons to expect that a continuation of 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 the concurrent development of 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 measures to minimize odor generation and plan for the eventuality of increased odor impacts in the future. The control measures that are considered feasible for future implementation would consist of:

(1) 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;

(2) Discontinue the use of green waste as an alternate cover and for erosion control on slopes adjacent to major nearby roadways;

(3) Use screening berms on top of each new landfill lift and between the waste disposal area and major nearby roadways;

(4) Apply odor masking chemicals at the landfill working face to reduce/eliminate offsite detection of unpleasant odors.

(5) 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.

Rigorous implementation of the existing FRB odor control measures the addition of other measures like those listed above on an as-needed basis is expected to prevent offsite odor impacts from increasing to a level of significance.

5.4 Summary of Predicted Criteria Pollutant Impacts

The foregoing 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. Note that these results reflect the conservative impact evaluation approach described previously, whereby <u>all</u> 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. In reality, the annual operational emissions of the

landfill will continue at levels near those that presently occur for the existing landfill, although the construction activities associated with the proposed expansion will represent an actual 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.

A CO hot spots analysis was conducted for the intersections that would potentially be most affected by the project in terms of additional traffic associated from the FRB Landfill. It is noted that the project's effects on traffic will actually be increased only slightly from current levels. Average daily waste receipts will remain at the currently permitted level of 8,500 tons, although some additional worker trips associated with the planned construction activities will add to the existing waste hauling truck trips and worker commuting trips. This analysis showed that the effects of this additional traffic on CO air quality will be below a level of significance. The proposed expansion project's impacts on odor levels in the surrounding community were also determined to be below a level of significance.

Mitigation measures to lessen the projected air quality impacts of the proposed landfill expansion project are summarized in Section 8.0. However, the project emissions of NOx, VOC and PM_{10} for both construction and operational activities constitute unavoidable significant impacts to air quality based on the SCAQMD significance thresholds.

6.0 HEALTH RISK IMPACTS OF THE PROPOSED PROJECT

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 emissions, receptors, and analysis procedures incorporated in the HRA were presented in Section 4.2.2.3 and are not repeated here. However, in order to facilitate the informed interpretation of the HRA results, it is important to reiterate the somewhat complex conventions that have been used to represent the incremental changes in emissions due to the proposed landfill expansion project and the associated effects on human health. 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 fleets of trucks and equipment that would operate in service to the FRB facility after 2022, because without the expansion project these emissions would cease to occur upon the closure of the facility in that year.
- 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, because these emissions 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.

Figure 6-1 shows the locations of the emission sources and receptors included in the HRA modeling analysis. The sources represented on this figure include fugitive LFG escaping the landfill and flaring of collected gas, as well emissions of DPM from operation of the diesel fueled equipment used at the landfill site and diesel trucks delivering waste to the FRB facility. The receptors include sensitive locations, census receptors in populated locations, and general receptors to complete the receptor coverage of all areas within 10 kilometers from the FRB Landfill.

The principal results of the HRA are summarized in Table 6-1 and on Figures 6-2 and 6-3. Figure 6-2 shows the receptors where the highest cancer and non-cancer health risk impacts of the proposed project are predicted to occur at the PMI and the MEIR. Figure 6-3 is an isopleth contour plot showing the geographic distribution of the predicted cancer risks. 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 well away from the FRB site on the Santa Ana Freeway (Interstate 5), and are attributable almost entirely to the emissions of waste hauling trucks traveling along this roadway, rather than the TAC constituents associated with fugitive LFG or flaring at the landfill. This result highlights the very stringent health risk criteria that have been developed for DPM .in the state of California. DPM has not been designated as a TAC for acute risks, while some of the constituents of landfill gas (most notable xylenes and toluene), have been assigned acute RELS. This explains why the maximum acute health risk is predicted to occur just within the buffer zone adjacent to the southwest corner of 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 all well below the corresponding significance levels.

Figure 6-1. Sources and Receptors Included in the HRA for the FRB Landfill Expansion Project

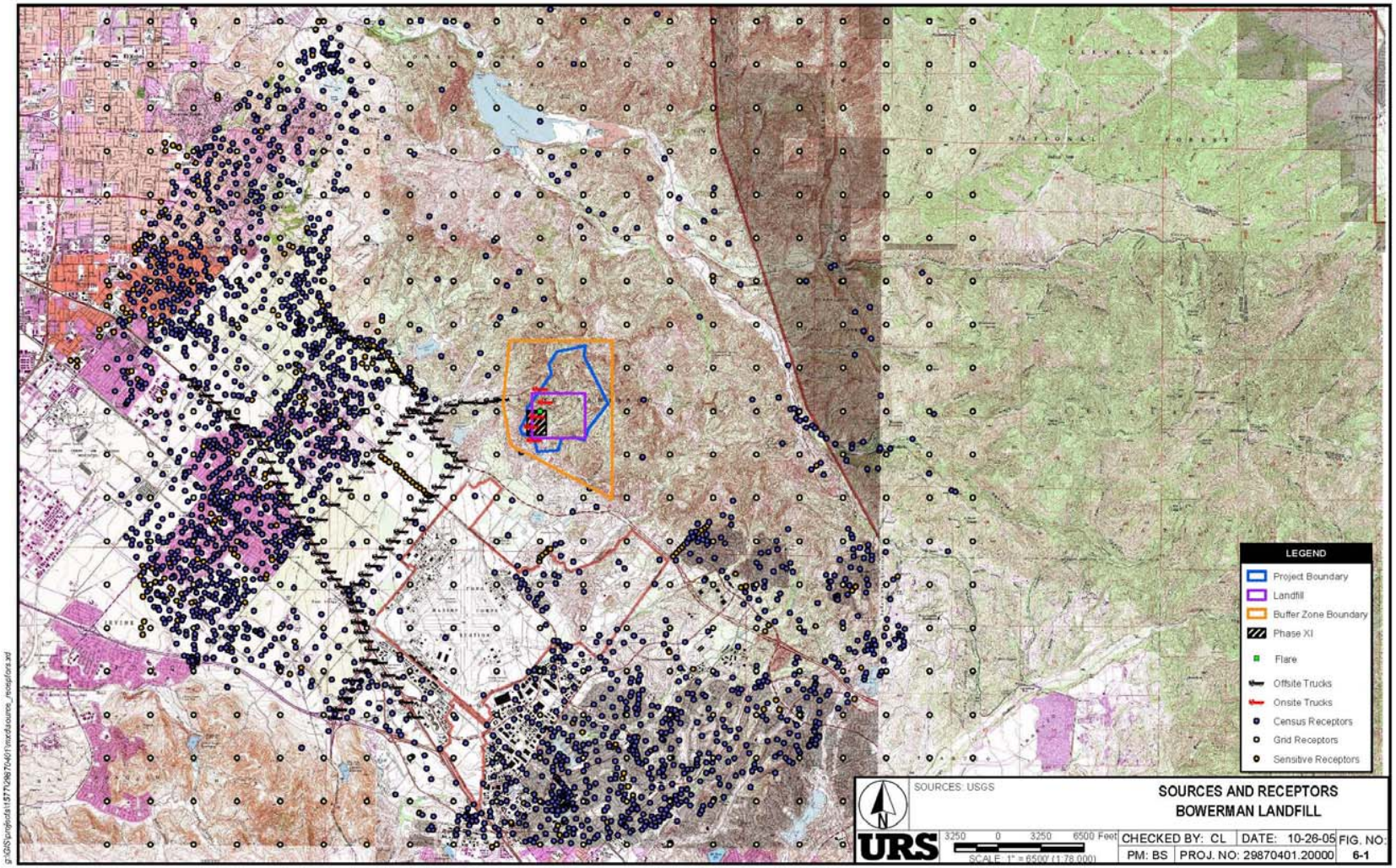


Table 6-1. Summary of Maximum Predicted Health Risk Impacts due to the Proposed FRB Landfill Expansion Project

Receptor	Risk Type	Receptor Type	Maximum Risk Value	Pollutant(s) that Contribute the Most to Risk	Source that Contribute the Most to Maximum Risk	Targeted Organs
PMI	Cancer	Boundary of landfill buffer	9.0 in a million	DPM	Off-site Waste-Hauling Truck Exhaust	Inhalation
PMI	Chronic Non-Cancer	Boundary of landfill	0.0057	DPM	Off-site Waste-Hauling Truck Exhaust	Respiration
PMI	Acute Non-Cancer	Boundary	0.0002	Benzene & Toluene	Off-site Waste-Hauling Truck Exhaust	Development & Reproductive
MEIR	Cancer	SW resident 1	8.4 in a million	DPM	Off-site Waste-Hauling Truck Exhaust	Inhalation
MEIR	Chronic Non-Cancer	SW resident 1	0.0054	DPM	Off-site Waste-Hauling Truck Exhaust	Respiration
MEIR	Acute Non-Cancer	SW resident 3	0.0001	Benzene & Toluene	Landfill Gas Fugitive Emissions	Development & Reproduction

PMI = Point of Maximum Impact
Note: The Maximum Exposed Individual Resident (MEIR) & the sensitive receptor with the maximum risk are the same in this analysis.

Figure 6-2. HRA Results

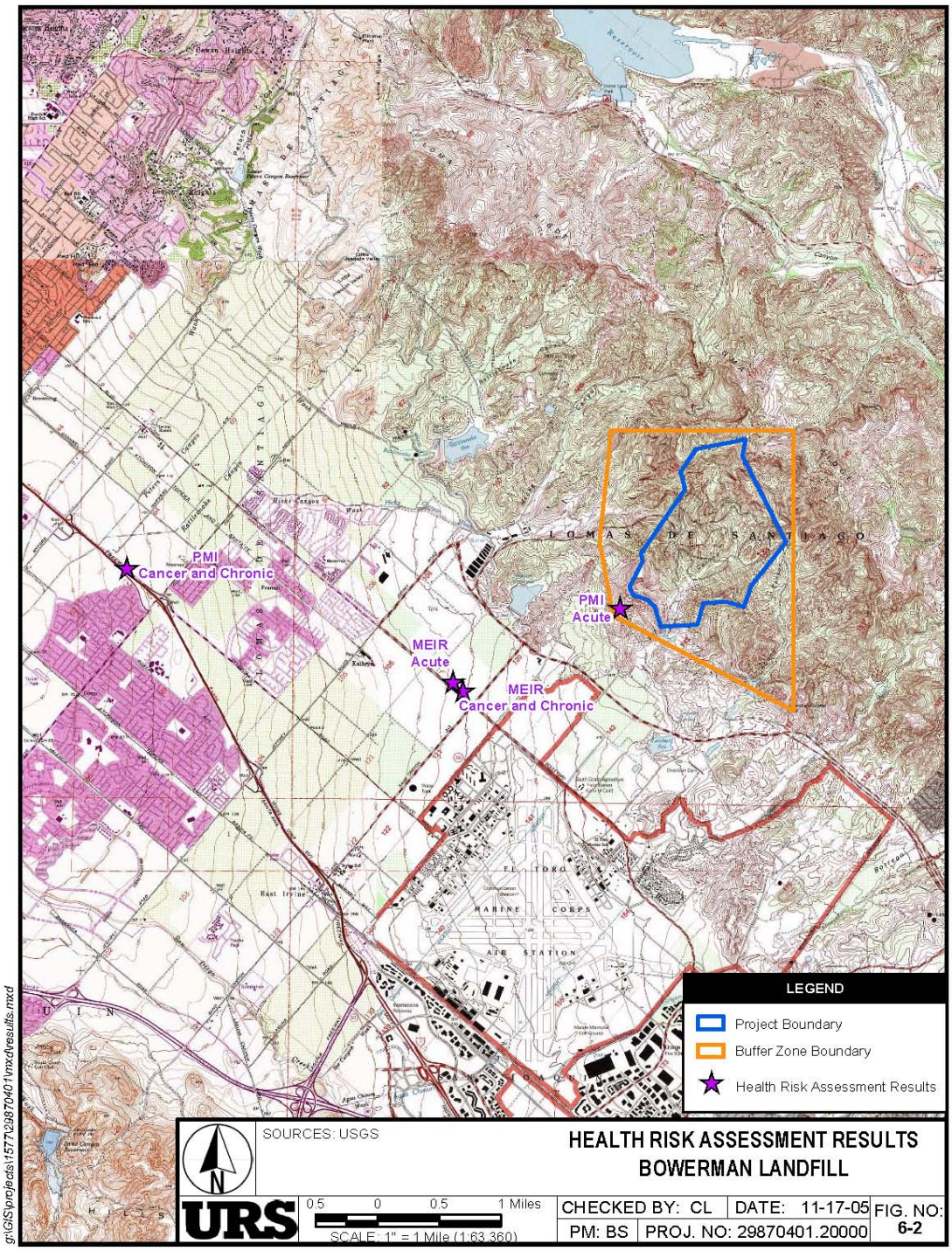
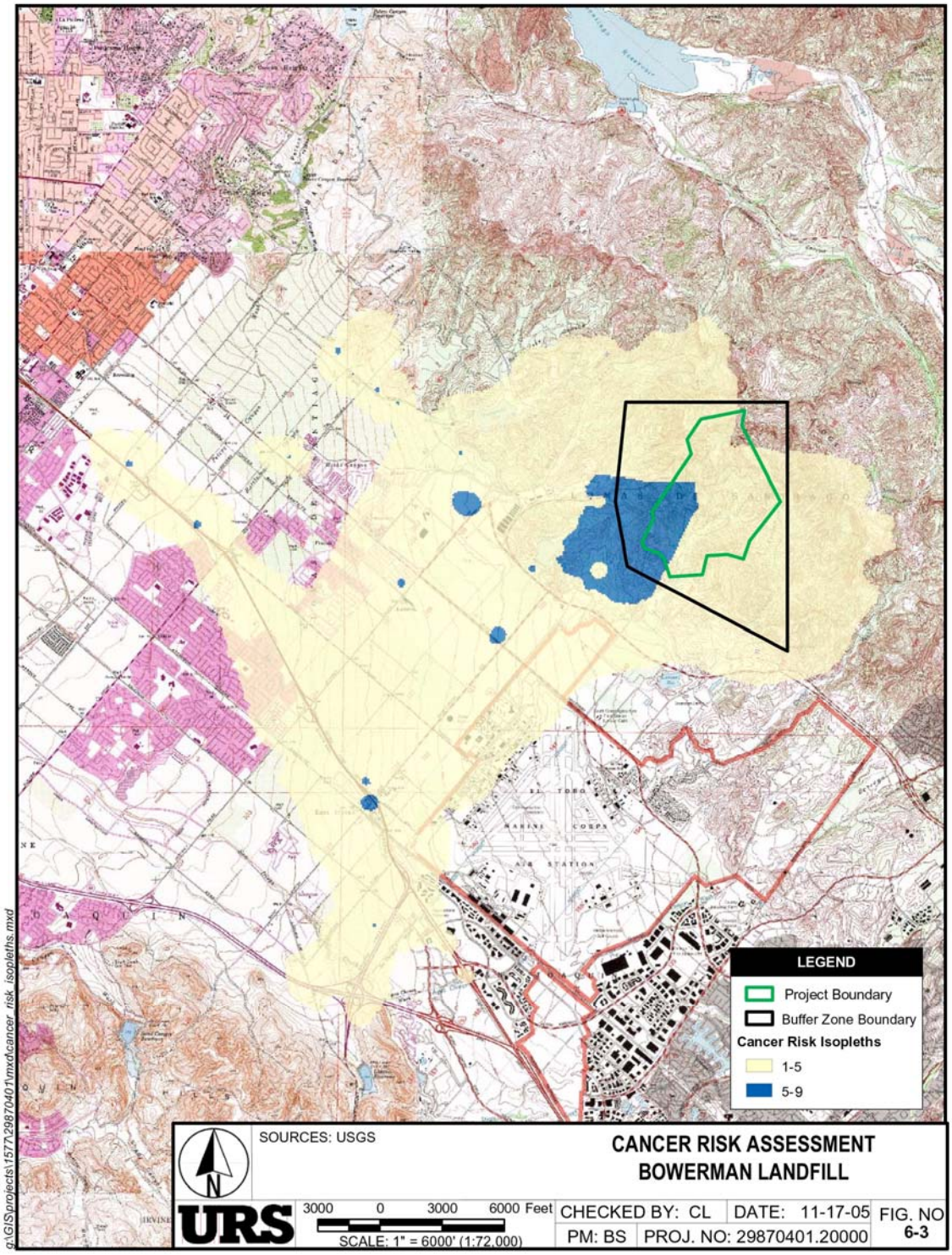


Figure 6-3. Cancer Risk Assessment



Additional model results regarding the proposed project's 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; and
- 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 usually considers a cancer burden value less than 0.5 to be below a level of significance.

As indicated in Table 6-1, the highest predicted acute and chronic non-cancer risks, as represented by the respective HIs, are far below the significance threshold of 1.0. The maximum acute risks at any receptor and at a 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.

The HARP model input file associated with this HRA is provided in Appendix D of the AQ Technical Study.

The findings of this HRA are as follows:

- The maximum predicted cancer risk due to the proposed project is less than SCAQMD's threshold of 10 in one million). The estimated maximum risk of 9.0 in one million is due primarily to waste hauling truck emissions passing close to receptors along the roadways to and from the landfill.
- The calculated hazard indices corresponding to the maximum predicted off-site chronic and acute non-cancer health risks are far below the significance threshold of 1.0 at all receptors.
- The predicted cancer burden, the number of predicted excess cancer cases in the exposed population, is well below the significance threshold of 0.5.
- Therefore, the proposed project is not expected to have a significant adverse effect on human health.

7.0 IMPACTS OF PROJECT ALTERNATIVES

Air quality and health risk impacts of the proposed project were quantified and discussed in Sections 5.0 and 6.0. This section provides a comparison of those impacts with the impacts that would result from implementing each of the various alternative project designs that were identified in Section 2.2.

7.1 IMPACTS OF ALTERNATIVES 1A AND 1B - NO PROJECT: NO FRB EXPANSION AND NO DAILY TONNAGE INCREASE

Construction No construction would occur at the FRB Landfill under these alternatives. Accordingly, the construction emissions associated with the proposed expansion project (see Section 5.2) would not occur at this site, although it is likely that at least a portion of these emissions would be generated in the preparation of one or more alternate waste disposal sites if the proposed FRB expansion is implemented.

Operations These project alternatives would result in the need to divert future waste hauling trucks to other more distant landfills within or outside of Orange County, most likely increasing the total daily vehicle miles traveled by these trucks and resulting in higher waste transport emissions. In addition, emissions directly related to landfill operations would occur at approximately the same levels elsewhere in the region to accommodate the County's projected waste generation quantities. Therefore, while localized impacts on air quality and health risks very close to the FRB Landfill would be improved under these alternatives relative to the proposed project, regional long-term air quality impacts for the proposed project would be worse than those described in Sections 5.0 and 6.0 of this report.

7.2 IMPACTS OF ALTERNATIVES 2A AND 2B - FRB EXPANSION: NO DAILY TONNAGE INCREASE

Construction Construction activities and their associated air pollutant emissions and impacts under these alternatives would be the same as for the proposed project.

Operations Annual waste receipts under these project alternatives 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 these alternatives. 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.

7.3 IMPACTS OF ALTERNATIVES 3A AND 3B - FRB EXPANSION: DAILY TONNAGE (ANNUAL AVERAGE) INCREASE TO 11,500 TONS PER DAY

Construction Construction activities and their associated air pollutant emissions and impacts under these alternatives would be the same as for the proposed project.

Operations Under these project alternatives, the allowable daily and annual tonnages of wastes received at the FRB Landfill would be allowed to increase, resulting in higher short and long-term emissions of criteria pollutants and TAC 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 LFG generation and flaring. The air quality and health risk impacts associated with the landfill expansion would thus be worse in all respects from those anticipated for the proposed project.

7.4 IMPACTS OF ALTERNATIVES 4A AND 4B - FRB LANDFILL EXPANSION: DAILY TONNAGE INCREASE AT PRIMA DESHECHA

Construction Construction activities and their associated air pollutant emissions and impacts under these alternatives would be the same as for the proposed project.

Operations Under these project alternatives, 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 the FRB Landfill. Thus, the air quality and health risk impacts in the vicinity of the 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 Landfill.

8.0 MITIGATION MEASURES

8.1 STANDARD CONDITIONS AND MITIGATION MEASURES

8.1.1 Standard Conditions

The project will be required to comply with regional rules that assist in reducing short-term air pollutant emissions. SCAQMD Rule 403 requires that fugitive dust during project construction and operational be controlled with best available control measures, so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 402 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site.

AQ-1 Applicable dust suppression techniques from Rule 403 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 the fugitive dust generation (and thus the PM_{10} component). Compliance with these rules would reduce impacts on nearby sensitive receptors.

Applicable Rule 403 Measures:

- Apply surfactants 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.

Additional SCAQMD *CEQA Air Quality Handbook* Dust Control Measures:

- 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); and
- 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 following the dust control measures listed below:

- 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 or maintain six inches of freeboard from the point of origin.

AQ-3 Implementation of the following measures will help reduction NO_x and PM_{10} emissions during operational activities:

- The IWMD shall purchase four, single engine, articulating dump trucks in fiscal year 2006/2007 to replace four, twin engine scrapers. The trucks will meet United States EPA Tier 3 emissions standards. In addition, IWMD will purchase one excavator.

- The IWMD shall routinely train employees in efficient scheduling and load management to eliminate unnecessary queue and idling of trucks with the landfill.

- Continue to be proactive in notifying truck drivers of the designated truck route.

- Make sure signage at the exit of the landfill indicating the turn direction to follow the designated truck route to the freeway is visible to all truck drivers.

- Continue to monitor wind speed and direction through the landfill's on-site weather station.

8.1.2 Additional Feasible Control Measures

No significant impacts are predicted for odors or litter generated by the expanded landfill. However, the actual potential significance for these types of nuisance impacts is difficult to foresee and it considered prudent to plan for the future eventuality when such issues may become important. Accordingly, the following additional control measures are postulated for consideration should they be needed.

Litter Control Measures

If fugitive litter migrating off-site is identified as a problem in the future due to continuing FRB landfill development and buildout of the nearby residential community, IWMD will consider implementing the following measures:

(1) Periodically send litter control crews through the areas adjacent to the landfill to remove such litter;

(2) Continue the use of litter containment barriers around the active working face of the landfill

(3) Increase surveillance of landfilling activities within the site to improve the retrieval of litter before it leaves the site.

Odor Control Measures

If fugitive odors migrating off-site are identified as a problem in the future due to continuing FRB landfill development and buildout of the nearby residential community, IWMD will consider implementing the following measures:

(1) 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;

(2) Discontinue the use of green waste as an alternate cover and for erosion control on slopes adjacent to major nearby roadways;

(3) Use of screening berms on top of each new landfill lift and between the waste disposal area and major nearby roadways;

(4) Apply odor masking chemicals at the landfill working face to reduce/eliminate offsite detection of unpleasant odors.

(5) 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.

Level of Significance After Mitigation

Implementation of Measures AQ-1, AQ-2, and AQ-3 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 emission threshold. Therefore, construction and operation of the project would have a significant unavoidable adverse impact on regional air quality.

9.0 CUMULATIVE IMPACTS

The proposed project would have the following cumulative air quality impacts:

The proposed project would result in emissions from construction equipment and excavation and grading activities. These emissions, together with emissions from other construction activities in the project vicinity and in the SCAB, would add to the SCAB's daily emissions and contribute to the existing exceedance of air quality standards. This is a significant cumulative air quality impact that would occur over a number of years.

The proposed project would result in the continued operations at FRB Landfill until year 2053. The emissions generated by the project operation in the years after its currently permitted closure date would exceed the SCAQMD's significance thresholds. Therefore, the project would contribute cumulatively to local and regional air quality degradation.

Predicted health risk levels predicted to result from the proposed project are below the significance criteria used by SCAQMD. There are no known plans to introduce other new sources of TACs in the same vicinity. Under these circumstances, the cumulative health risk effects of the proposed FRB Landfill expansion are not considered to be significant.

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APPENDIX A

CONSTRUCTION EMISSIONS CALCULATIONS

Average Annual Equipment Needs

Frank R. Bowerman Landfill
Construction Emissions
Average Annual Equipment Needs

		Daily Emissions (lb/day)					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	9.38	25.63	40.92	634.30	1.50	1.44	3.93	6.28	97.36	0.23
Construction Equipment	Fugitive dust	239.34	-	-	-	-	36.66	-	-	-	-
Commuter Vehicles	Combustion exhaust	0.13	2.22	0.16	0.17	0.02	0.02	0.34	0.02	0.03	0.003
Commuter Vehicles	Fugitive dust	5.20	-	-	-	-	0.80	-	-	-	-
Total Construction Emissions		**254.0**	**27.8**	**41.1**	**634.5**	**1.5**	**38.9**	**4.3**	**6.3**	**97.4**	**0.2**
CEQA significance threshold for construction		**150**	**550**	**75**	**100**	**150**					

Source: URS Corporation / CEQA Guidelines

Frank R. Bowerman Landfill
Construction Diesel Fired Equipment
Average Annual Equipment Needs

Operation	Equipment	Manufacturer & Model	Qty.	Power (hp)	Load (%)	Hours/ Day	Days/ Year	Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
								PM_{10}	CO	VOC	NO_x	SO_x	PM_{10}	CO	VOC	NO_x	SO_x
Mass Excavation	Scrapers	Caterpillar 657E	17	1,045	66.0	10	307	8.82	21.1	34.42	620.8	1.26	1.35	3.24	5.28	95.29	0.19
Rip Cut	Dozers	Caterpillar D10	2	580	57.5	10	307	0.17	1.33	1.96	4.07	0.07	0.03	0.20	0.30	0.63	0.01
Trim Slopes	Dozers	Caterpillar D9	1	410	57.5	10	307	0.06	0.47	0.69	1.44	0.03	0.01	0.07	0.11	0.22	0.00
Maintain Haul Roads/Fill	Dozers	Caterpillar 824H	1	354	59.0	10	307	0.05	0.42	0.61	1.28	0.02	0.01	0.06	0.09	0.20	0.00
Knock Down Fill/Compaction	Dozers	Caterpillar 834H	1	498	59.0	10	307	0.07	0.59	0.86	1.79	0.03	0.01	0.09	0.13	0.28	0.00
Compaction	Dozers	Caterpillar 824H	1	354	59.0	10	307	0.05	0.42	0.61	1.28	0.02	0.01	0.06	0.09	0.20	0.00
Minor trim	Dozers	Caterpillar D6	1	185	57.5	10	307	0.03	0.19	0.31	0.65	0.01	0.00	0.03	0.05	0.10	0.00
Maintain Haul Roads/Finish Grade	Motorgrader	Caterpillar 16H	1	265	57.5	10	307	0.04	0.27	0.45	0.93	0.02	0.01	0.04	0.07	0.14	0.00
Miscellaneous	Loaders	Caterpillar 980H WHA	1	318	46.5	10	307	0.04	0.29	0.43	0.90	0.02	0.01	0.05	0.07	0.14	0.00
Dust Control, Maintain Fill	Water Truck	Mack MR600S	1	300	50.0	10	307	0.04	0.30	0.44	0.92	0.02	0.01	0.05	0.07	0.14	0.00
Miscellaneous	Backhoe	Caterpillar 438	1	89	46.5	10	307	0.01	0.23	0.12	0.25	0.00	0.00	0.04	0.02	0.04	0.00
							Total -	**9.38**	**25.6**	**40.9**	**634.3**	**1.5**	**1.44**	**3.93**	**6.28**	**97.36**	**0.23**

Source: URS Corporation

Notes:

Equipment list & quantity from "Equip Est for Air Quality.xls" Oct7-05

hp rating from Caterpillar & other vendors

load factors from SCAQMD CEQA Handbook Table A9-8-D

Emission factors from “Exhaust and Crankcase Emission Factors for Nonroad engine Modeling – Compression- Ignition”, EPA 2004.

assumed all equipment operates 10 hours per day

Annual equipment needs based on the movement of 20,000 yd3 of earth/day - provided by Christine Arbogast

Frank R Bowerman Landfill
Fugitive Dust Emissions from Construction Equipment, Earthmoving & Vehicle Travel
Average Annual Equipment Needs
General Construction

Dirt Pushing or Bulldozing

$E = .45 * 2.2046 * G^{1.5} / H^{1.4}$ PM_{10} Emissions from dirt pushing (lb/hr)

SCAQMD Table A9-9-F

7.5G = Silt content (%) (from Table A9-9-F-1 for overburden)

15H = Moisture content of surface material (%) (from Table A9-9-F-2 for moist dirt)

0.4598lb/hr of PM_{10}

Equipment	Manufacturer & Model	Qnty	Hours/ Day	Days/ year	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Scrapers	Caterpillar 657E	17	10	307	50%	3.909	39.09	6.00
Dozers	Caterpillar D10	2	10	307	50%	0.460	4.60	0.71
Dozers	Caterpillar D9	1	10	307	50%	0.230	2.30	0.35
Dozers	Caterpillar 824H	1	10	307	50%	0.230	2.30	0.35
Dozers	Caterpillar 834H	1	10	307	50%	0.230	2.30	0.35
Dozers	Caterpillar 824H	1	10	307	50%	0.230	2.30	0.35
Dozers	Caterpillar D6	1	10	307	50%	0.230	2.30	0.35
Backhoe	Caterpillar 438	1	10	307	50%	0.230	2.30	0.35
					Total	**5.748**	**57.48**	**8.82**

Assumed the scrapers moved all the earth to the cover storage areas (it is not loaded into trucks for transport)

Grading

$E = p* .051 * (S)^{2.0}$

0.6p = particle size multiplier = 0.60 for PM_{10}

7.1S = avg speed of vehicle (mph) (from AP-42 Table 11.9-3)

PM_{10}	1.54lb/VMT	EPA AP-42 Table 11.9-1	EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES

Equipment	Qnty	Hours/ Day	Days/ year	Miles traveled per hour	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Motor Grader	1	10	307	7.1	50%	5.476	54.760	8.41

Travel on unpaved road

$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$ SCAQMD Table A9-9-D

Emission factor for vehicle travel on unpaved roads (lb/VMT)

4G = Surface silt loading (%) (from Table A9-9-D-1 for gravel road)

15H = Mean vehicle speed (mph)

10I = Mean number of wheels on vehicle (from Table A9-9-D-3)

13J = Mean vehicle weight (ton) (from Table A9-9-D-3)

K = Mean number of days per with at least 0.01 inches of precipitation (from Table A9-9-D-4 average year 34for SCAB)

1.401PM_{10} lb/VMT

Equipment	Qnty	Hours/ Day	Days/ year	Miles traveled per hour	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Water Truck	1	10	307	15	50%	10.505	105.053	16.13

Assumed maximum travel speed is 15 mph

Frank R. Bowerman Landfill
Fugitive Dust Emissions from Construction Equipment, Earthmoving & Vehicle Travel
Average Annual Equipment Needs
General Construction

Truck filling or storage pile emptying

PM_{10} emissions per ton of material handled (SCAQMD Table A9-9)

0.02205lb/ton

Equipment	Qnty	Hours/Day	Days/year	Material Handled (ton/day)	Material Handled (ton/yr)	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Loader	1	10	307	2000	599,850	50%	2.204	22.044	3.31

Assume the loader moves 3000 yd3/day or 900,000 yd3/yr (same as during normal operations)

3000yd3/day 2000ton/day 1333density of cover (lb/yd3) provide by IWMD

900,000yd3/yr 599,850ton/yr

fugitive dust from storage piles is accounted for in normal operations

Commuter travel

OFF SITE

Passenger vehicle travel on paved roads

0.0064PM10 lb/VMT (from Table A9-9-B-1 for major streets) SCAQMD Table A9-9-B

Equipment	Number of Employees	Hours/Day	Days/year	Miles traveled per trip	Total miles traveled per year	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
All Employee Vehicles	35	10	307	23.2	249284	0.51968	5.1968	0.798

Assumed average distance traveled off site for all employees commuting will be 11.6 miles
per SCAQMD Table A9-5-D Orange County average home to work trip length in 2010
times 2 for return trip 23.2miles

Source: URS Corporation 2005.

Frank R. Bowerman Landfill
Emissions from Employees Commuting during Construction
Average Annual Equipment Needs

						Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
Equipment	**Number of Employees**	**Hours/ Day**	**Days/ Year**	**Miles traveled per trip**	**Total miles traveled per year**	**PM_{10}**	**CO**	**VOC**	**NO_x**	**SO_x**	**PM_{10}**	**CO**	**VOC**	**NO_x**	**SO_x**
All Employee Vehicles	35	10	307	23.2	249284	0.132	2.220	0.156	0.168	0.020	0.02	0.34	0.02	0.03	0.003

Source: URS Corporation 2005

EMFAC2002 Model used to obtain emission factors
Assumed average distance traveled off site for all employees commuting will be 11.6 miles
per SCAQMD Table A9-5-D Orange County average home to work trip length in 2010
times 2 for return trip 23.2miles

Maximum Daily Equipment Needs

Frank R Bowerman Landfill
Construction Emissions
Maximum Daily Equipment Needs

		Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
Operation	**Emission source**	**PM10**	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**CO**	**VOC**	**NOx**	**SOx**
Construction Equipment	Combustion exhaust	17.93	47.53	76.29	1224.75	2.79	2.75	7.30	11.71	188.00	0.43
Construction Equipment	Fugitive dust	388.08	-	-	-	-	59.49	-	-	-	-
Commuter Vehicles	Combustion exhaust	0.22	3.61	0.25	0.27	0.03	0.03	0.55	0.04	0.04	0.005
Commuter Vehicles	Fugitive dust	8.46	-	-	-	-	1.30	-	-	-	-
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				
Total Construction Emissions		**426.7**	**51.4**	**76.6**	**1225.2**	**2.8**	**65.4**	**7.9**	**11.8**	**188.1**	**0.4**
CEQA significance threshold for construction		**150**	**550**	**75**	**100**	**150**					

Source: URS Corporation / CEQA Guidelines

Frank R. Bowerman Landfill
Construction Diesel Fired Equipment
Maximum Daily Equipment Needs

Operation	Equipment	Manufacturer & Model	Qnty	Power (hp)	Load (%)	Hours/ Day	Days/ Year	Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
								PM_{10}	CO	VOC	NO_x	SO_x	PM_{10}	CO	VOC	NO_x	SO_x
Mass Excavation	Scrapers	Caterpillar 657E	33	1,045	66.0	10	307	17.12	41.0	66.82	1205.0	2.45	2.63	6.30	10.26	184.97	0.38
Rip Cut	Dozers	Caterpillar D10	3	580	57.5	10	307	0.25	1.99	2.94	6.11	0.11	0.04	0.31	0.45	0.94	0.02
Trim Slopes	Dozers	Caterpillar D9	2	410	57.5	10	307	0.12	0.94	1.38	2.88	0.05	0.02	0.14	0.21	0.44	0.01
Maintain Haul Roads/Fill	Dozers	Caterpillar 824H	1	354	59.0	10	307	0.05	0.42	0.61	1.28	0.02	0.01	0.06	0.09	0.20	0.00
Knock Down Fill/Compaction	Dozers	Caterpillar 834H	2	498	59.0	10	307	0.15	1.17	1.73	3.59	0.06	0.02	0.18	0.26	0.55	0.01
Compaction	Dozers	Caterpillar 824H	1	354	59.0	10	307	0.05	0.42	0.61	1.28	0.02	0.01	0.06	0.09	0.20	0.00
Minor trim	Dozers	Caterpillar D6	1	185	57.5	10	307	0.03	0.19	0.31	0.65	0.01	0.00	0.03	0.05	0.10	0.00
Maintain Haul Roads/Finish Grade	Motorgrader	Caterpillar 16H	1	265	57.5	10	307	0.04	0.27	0.45	0.93	0.02	0.01	0.04	0.07	0.14	0.00
Miscellaneous	Loaders	Caterpillar 980H WHA	1	318	46.5	10	307	0.04	0.29	0.43	0.90	0.02	0.01	0.05	0.07	0.14	0.00
Dust Control, Maintain Fill	Water Truck	Mack MR600S	2	300	50.0	10	307	0.08	0.60	0.88	1.83	0.03	0.01	0.09	0.14	0.28	0.00
Miscellaneous	Backhoe	Caterpillar 438	1	89	46.5	10	307	0.01	0.23	0.12	0.25	0.00	0.00	0.04	0.02	0.04	0.00
							Total -	**17.93**	**47.5**	**76.29**	**1224.7**	**2.79**	**2.75**	**7.30**	**11.71**	**188.00**	**0.43**

Notes:

Equipment list & quantity from "Equip Est for Air Quality.xls" Oct7-05
hp rating from Caterpillar & other vendors
load factors from SCAQMD CEQA Handbook Table A9-8-D
Emission factors from “Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling-Compression Ignition, EPA 2004
assumed all equipment operates 10 hours per day
Maximum daily equipment needs based on the movement of 40,000 yd3 of earth/day – provided by Christine Arbogast

Source: URS Corporation 2005

Frank R Bowerman Landfill

Fugitive Dust Emissions from Construction Equipment, Earthmoving & Vehicle Travel
Maximum Daily Equipment Needs

General Construction

Dirt Pushing or Bulldozing

$E = .45 * 2.2046 * G^{1.5} / H^{1.4}$ PM_{10} Emissions from dirt pushing (lb/hr)

SCAQMD Table A9-9-F

7.5G = Silt content (%) (from Table A9-9-F-1 for overburden)

15H = Moisture content of surface material (%) (from Table A9-9-F-2 for moist dirt)

0.4598lb/hr of PM10

Equipment	Manufacturer & Model	Qnty	Hours/Day	Days/year	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Scrapers	Caterpillar 657E	33	10	307	50%	7.587	75.87	11.65
Dozers	Caterpillar D10	3	10	307	50%	0.690	6.90	1.06
Dozers	Caterpillar D9	2	10	307	50%	0.460	4.60	0.71
Dozers	Caterpillar 824H	1	10	307	50%	0.230	2.30	0.35
Dozers	Caterpillar 834H	2	10	307	50%	0.460	4.60	0.71
Dozers	Caterpillar 824H	1	10	307	50%	0.230	2.30	0.35
Dozers	Caterpillar D6	1	10	307	50%	0.230	2.30	0.35
Backhoe	Caterpillar 438	1	10	307	50%	0.230	2.30	0.35
					Total	**10.116**	**101.16**	**15.53**

Assumed the scrapers moved all the earth to the cover storage areas (it is not loaded into trucks for transport)

Grading

$E = p* .051 * (S)^{2.0}$

0.6p = particle size multiplier = 0.60 for PM_{10}

7.1S = avg speed of vehicle (mph) (from AP-42 Table 11.9-3)

PM_{10} 1.54lb/VMT EPA AP-42 Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES

Frank R Bowerman Landfill

Fugitive Dust Emissions from Construction Equipment, Earthmoving & Vehicle Travel
Maximum Daily Equipment Needs

Equipment	Qnty	Hours/Day	Days/year	Miles traveled per hour	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Motor Grader	1	10	307	7.1	50%	5.476	54.760	8.41

Travel on unpaved road

$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$ SCAQMD Table A9-9-D

Emission factor for vehicle travel on unpaved roads (lb/VMT)

4G = Surface silt loading (%) (from Table A9-9-D-1 for gravel road)

15H = Mean vehicle speed (mph)

10I = Mean number of wheels on vehicle (from Table A9-9-D-3)

13J = Mean vehicle weight (ton) (from Table A9-9-D-3)

34K = Mean number of days per with at least 0.01 inches of precipitation (from Table A9-9-D-4 average year for SCAB)

1.401PM10 lb/VMT

Equipment	Qnty	Hours/Day	Days/year	Miles traveled per hour	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Water Truck	2	10	307	15	50%	21.011	210.107	32.25

Assumed maximum travel speed is 15 mph

Frank R Bowerman Landfill

Fugitive Dust Emissions from Construction Equipment, Earthmoving & Vehicle Travel
Maximum Daily Equipment Needs

Truck filling or storage pile emptying
PM_{10} emissions per ton of material handledSCAQMD Table A9-9
0.02205lb/ton

Equipment	Qnty	Hours/Day	Days/year	Material Handled (ton/day)	Material Handled (ton/yr)	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Loader	1	10	307	2000	599,850	50%	2.204	22.044	3.31

Assume the loader moves 3000 yd3/day or 900,000 yd3/yr (same as during normal operations)
3000yd3/day 2000ton/day 1333density of cover (lb/yd3) provide by IWMD
900,000yd3/yr 599,850ton/yr

fugitive dust from storage piles is accounted for in normal operations

Commuter travel
OFF SITE
Passenger vehicle travel on paved roads
0.0064PM10 lb/VMT (from Table A9-9-B-1 for major streets) SCAQMD Table A9-9-B

Equipment	Number of Employees	Hours/Day	Days/year	Miles traveled per trip	Total miles traveled per year	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
All Employee Vehicles	57	10	307	23.2	405976.8	0.846336	8.46336	1.299

Assumed average distance traveled off site for all employees commuting will be 11.6 miles
per SCAQMD Table A9-5-D Orange County average home to work trip length in 2010
times 2 for return trip 23.2miles

Frank R Bowerman Landfill

Emissions from Employees Commuting during Construction
Maximum Daily Equipment Needs

						Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
Equipment	**Number of Employees**	**Hours/ Day**	**Days/ Year**	**Miles traveled per trip**	**Total miles traveled per year**	**PM_{10}**	**CO**	**VOC**	**NO_x**	**SO_x**	**PM_{10}**	**CO**	**VOC**	**NO_x**	**SO_x**
All Employee Vehicles	57	10	307	23.2	405976.8	0.216	3.615	0.253	0.274	0.032	0.03	0.55	0.04	0.04	0.005

EMFAC2002 Model used to obtain emission factors
Assumed average distance traveled off site for all employees commuting will be 11.6 miles
per SCAQMD Table A9-5-D Orange County average home to work trip length in 12010
times 2 for return trip 23.2miles

Source: URS Corporation 2005

ON SITE Material Delivery Trucks – Fugitive Dust on Unpaved and Paved Roads

Truck Travel on unpaved roads

$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$ SCAQMD Table A9-9-D

Emission factor for vehicle travel on unpaved roads (lb/VMT)

4	G = Surface silt loading (%) (from SCAQMD Table A9-9-D-1 for gravel road (per IWMD and site visit))
15	H = Mean vehicle speed (mph)
see table below	I = Mean number of wheels on vehicle (from SCAQMD Table A9-9-D-3)
see table below	J = Mean vehicle weight (ton) (from SCAQMD Table A9-9-D-3)
34	K = Mean number of days per with at least 0.01 inches of precipitation (from Table A9-9-D-4 average year for SCAB)

Equipment	Max Annual Trips	Mean Vehicle Weight (J) (ton)	Mean Number of Wheels (I)	Trips per day	Days/year	Miles traveled per trip	Total miles traveled per year	PM10 Emission Factor (lb/VMT)	Watering Control Efficiency	PM10 Emissions (lb/day)	PM10 Emissions (tons/yr)
Heavy Heavy Duty Trucks	921	23.25	18	3	307	0.73	672.4	2.823	50%	3.09	0.47
									Total	**3.09**	**0.47**

max distance traveled on site for material delivery trucks assumed to be the
distance of 1175 meters from the main entrance off Bee Canyon Rd to the Phase XI site area
times 2 for return trip 1175 m 0.73 miles
max speed traveled will be 15 mph

OFF SITE

Truck travel on paved roads

$F = 0.77 * (G*0.35)^{0.3}$ SCAQMD Table A9-9-C

0.012	G = Surface silt loading (ounces/square yards) (from Table A9-9-C-1 for major streets)
0.1491	PM10 lb/VMT

Equipment	Total Annual Trips	Trips per day	Days/year	Miles traveled per trip	Total miles traveled per year	PM10 Emissions (lb/day)	PM10 Emissions (tons/yr)
Heavy Heavy Duty Trucks	921	3	307	20.0	18420	8.95	1.37

Assumed average distance traveled off site for all garbage delivery trucks will be 10 miles
times 2 for return trip 20 miles

Total Onsite +Offsite Delivery Truck Dust Emissions = 12.04 lb/ PM10 day

ON SITE

EMFAC Class	Maximum Annual Quantity	Weight Range (tons)	Hours/ Day	Days/ year	Miles traveled per trip	Total miles traveled per year	EMFAC Maximum Emission Factors (grams/mile)					Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
							PM10	CO	ROG	NOx	SOx	PM10	CO	VOC	NOx	SOx	PM10	CO	VOC	NOx	SOx
Heavy Heavy Duty Trucks	921	16.5 – 30.0	10	307	0.73	672	0.089	2.112	0.2	1.182	0.021	4E-04	0.01	1E-03	0.006	1E-04	7E-05	0.002	1E-04	9E-04	2E-05
											Total	**4E-04**	**0.01**	**1E-03**	**0.006**	**1E-04**	**7E-05**	**0.002**	**1E-04**	**9E-04**	**2E-05**

EMFAC2002 Model used to obtain emission factors
Weight range from the EMFAC2002 model

Assume 3 deliveries using heavy heavy duty trucks per construction day

max distance traveled on-site is 1175 meters from the main entrance off Bee Canyon Rd times 2 for return trip 1175 m 0.73 miles

OFF SITE

EMFAC Class	Maximum Annual Quantity	Weight Range (tons)	Hours/ Day	Days/ year	Miles traveled per trip	Total miles traveled per year	EMFAC Maximum Emission Factors (grams/mile)					Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
							PM10	CO	ROG	NOx	SOx	PM10	CO	VOC	NOx	SOx	PM10	CO	VOC	NOx	SOx
Heavy Heavy Duty Trucks	921	16.5 – 30.0	10	307	20.00	18420	0.089	2.112	0.2	1.182	0.021	0.012	0.279	0.026	0.156	0.003	0.002	0.043	0.004	0.024	4E-04
											Total	**0.012**	**0.279**	**0.026**	**0.156**	**0.003**	**0.002**	**0.043**	**0.004**	**0.024**	**4E-04**

EMFAC2002 Model used to obtain emission factors

Weight range from the EMFAC2002 model

Assumed average distance traveled off site for all delivery trucks will be 10 miles times 2 for return trip 20 miles

APPENDIX B

OPERATIONAL EMISSIONS CALCULATIONS

Frank R Bowerman Landfill
Operations Emissions
Maximum Annual Emissions

		Daily Emissions (lb/day)					Annual Emissions (ton/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	-	-	-	-
Garbage Delivery 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
Garbage Delivery Trucks - On site	Fugitive dust	512.4	-	-	-	-	78.66	-	-	-	-
Garbage Delivery 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
Garbage Delivery 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
Commuter Vehicles	Fugitive dust	14.40	-	-	-	-	2.21	-	-	-	-
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**	**-**	**-**	**-**	**-**	**-**

Source: URS Corporation

FRANK R. BOWERMAN LANDFILL

Flare Stack Parameters for ISCST3
Flare Calculations

										ISCST3 Stack Parameters				Hourly Emissions (lb/hr)				
Flare	**Q (scf/yr)**	**Heat Input rate 10^6 Btu/hr**	**H = Total Heat release rate (cal/s)**	**HHV (Btu/scf)**	**Fb = Buoyancy flux**	**Q_H = sensible heat release rate**	**d = effective stack diameter (m)**	**Hs = Stack height (m)**	**He = Effective stack height (m) as calculated in SCREEN3**	**H**	**T**	**v**	**d**	**PM10**	**CO**	**VOC**	**NOx**	**SOx**
All flares - Max Annual	4.73E+09	217.92	1.37E+07	404	2.28E+02	6.18E+06	2.456	9.144	20.914	20.91	1273	20	2.456	4.909	10.24	0.617	13.075	4.332

H = Heat Release Rate (MMBtu/hr) * 0.9 * 70,000 cal/sec

Fb = 1.66 x 10-5 x H

Q_H = 0.45 x H

d_{eff} = 0.000988 * Q_H^0.5

He = Hs + 4.56E-03 * H**0.478

For ISCST3 model purposes, assumed emissions from all flares are emitted from 1 combined flare that is 30 feet tall.
Flare Stack Parameters estimated using SCREEN3 methods
Emissions of PM10, CO & NOx calculated from permit to operate conditions for flares
LFG Heat content (HHV) from stack testing of FRB flares
VOC emissions calculated according to AP-42, section 2.4.4.1 (Uncontrolled Emissions), as total NMOC as hexane for MSW landfills with no co-disposal
Emissions of SOx based on the SDAPCD Emission Calculation Procedures for Landfills (SDAPCD 1999).

Source: URS Corporation

FRANK R. BOWERMAN LANDFILL

ESTIMATION OF LANDFILL GAS GENERATION RATE

	Baseline - Without Expansion Project						With Expansion Project							
Year	Disposal Rate (R) (tons/yr)	Cumulative Tonnage (tons)	c (yr)	t (yr)	Total LFG Generation as methane (10^6 scf/yr)	LFG Generation as methane (scfm)	Disposal Rate (R) (tons/yr)	Cumulative Tonnage (tons)	c (yr)	t (yr)	Total LFG Generation as methane (10^6 scf/yr)	LFG Generation as methane (scfm)	Increase in LFG (as CH_4) due to Project (scfm)	Remarks
1990	847,846	847,846	0	1	92	176	847,846	847,846	0	1	92	176	0	landfill gas generated by the end of 1990
1991	982,044	1,829,890	0	2	197	374	982,044	1,829,890	0	2	197	374	0	
1992	1,129,081	2,958,971	0	3	314	598	1,129,081	2,958,971	0	3	314	598	0	
1993	1,329,090	4,288,061	0	4	450	856	1,329,090	4,288,061	0	4	450	856	0	
1994	1,308,020	5,596,081	0	5	580	1,104	1,308,020	5,596,081	0	5	580	1,104	0	
1995	1,197,877	6,793,958	0	6	696	1,324	1,197,877	6,793,958	0	6	696	1,324	0	
1996	1,475,874	8,269,832	0	7	837	1,592	1,475,874	8,269,832	0	7	837	1,592	0	
1997	1,739,440	10,009,272	0	8	1,000	1,903	1,739,440	10,009,272	0	8	1,000	1,903	0	
1998	1,953,232	11,962,504	0	9	1,181	2,248	1,953,232	11,962,504	0	9	1,181	2,248	0	
1999	1,955,577	13,918,081	0	10	1,358	2,584	1,955,577	13,918,081	0	10	1,358	2,584	0	Annual Report
2000	2,094,978	16,013,059	0	11	1,544	2,937	2,094,978	16,013,059	0	11	1,544	2,937	0	Annual Report
2001	2,097,393	18,110,452	0	12	1,725	3,283	2,097,393	18,110,452	0	12	1,725	3,283	0	Annual Report
2002	2,117,668	20,228,120	0	13	1,904	3,623	2,117,668	20,228,120	0	13	1,904	3,623	0	Annual Report
2003	2,333,555	22,561,675	0	14	2,099	3,994	2,333,555	22,561,675	0	14	2,099	3,994	0	
2004	2,374,425	24,936,100	0	15	2,293	4,363	2,374,425	24,936,100	0	15	2,293	4,363	0	
2005	2,415,905	27,352,005	0	16	2,486	4,730	2,415,905	27,352,005	0	16	2,486	4,730	0	
2006	2,458,183	29,810,188	0	17	2,678	5,095	2,458,183	29,810,188	0	17	2,678	5,095	0	
2007	2,501,201	32,311,389	0	18	2,869	5,459	2,501,201	32,311,389	0	18	2,869	5,459	0	
2008	2,544,972	34,856,361	0	19	3,060	5,821	2,544,972	34,856,361	0	19	3,060	5,821	0	
2009	2,589,510	37,445,871	0	20	3,250	6,183	2,589,510	37,445,871	0	20	3,250	6,183	0	
2010	2,609,500	40,055,371	0	21	3,436	6,538	2,609,500	40,055,371	0	21	3,436	6,538	0	
2011	2,609,500	42,664,871	0	22	3,619	6,885	2,609,500	42,664,871	0	22	3,619	6,885	0	
2012	2,609,500	45,274,371	0	23	3,797	7,224	2,609,500	45,274,371	0	23	3,797	7,224	0	

Year	Disposal Rate (R) (tons/yr)	Cumulative Tonnage (tons)	c (yr)	t (yr)	Total LFG Generation as methane (10^6 scf/yr)	LFG Generation as methane (scfm)	Disposal Rate (R) (tons/yr)	Cumulative Tonnage (tons)	c (yr)	t (yr)	Total LFG Generation as methane (10^6 scf/yr)	LFG Generation as methane (scfm)	Increase in LFG (as CH_4) due to Project (scfm)	Remarks
2013	2,609,500	47,883,871	0	24	3,971	7,555	2,609,500	47,883,871	0	24	3,971	7,555	0	
2014	2,609,500	50,493,371	0	25	4,140	7,877	2,609,500	50,493,371	0	25	4,140	7,877	0	
2015	2,609,500	53,102,871	0	26	4,306	8,192	2,609,500	53,102,871	0	26	4,306	8,192	0	
2016	2,609,500	55,712,371	0	27	4,468	8,500	2,609,500	55,712,371	0	27	4,468	8,500	0	
2017	2,609,500	58,321,871	0	28	4,625	8,800	2,609,500	58,321,871	0	28	4,625	8,800	0	
2018	2,609,500	60,931,371	0	29	4,779	9,093	2,609,500	60,931,371	0	29	4,779	9,093	0	
2019	2,609,500	63,540,871	0	30	4,929	9,379	2,609,500	63,540,871	0	30	4,929	9,379	0	
2020	2,609,500	66,150,371	0	31	5,076	9,658	2,609,500	66,150,371	0	31	5,076	9,658	0	
2021	2,609,500	68,759,871	0	32	5,219	9,930	2,609,500	68,759,871	0	32	5,219	9,930	0	
2022	2,609,500	71,369,371	0	33	5,359	10,196	2,609,500	71,369,371	0	33	5,359	10,196	0	
2023	0	71,369,371	1	34	5,227	9,944	2,609,500	73,978,871	0	34	5,495	10,456	511	
2024	0	71,369,371	2	35	5,098	9,699	2,609,500	76,588,371	0	35	5,629	10,709	1,010	
2025	0	71,369,371	3	36	4,972	9,459	2,609,500	79,197,871	0	36	5,759	10,956	1,497	
2026	0	71,369,371	4	37	4,849	9,226	2,609,500	81,807,371	0	37	5,885	11,198	1,972	
2027	0	71,369,371	5	38	4,729	8,998	2,609,500	84,416,871	0	38	6,009	11,433	2,435	
2028	0	71,369,371	6	39	4,613	8,776	2,609,500	87,026,371	0	39	6,130	11,663	2,887	
2029	0	71,369,371	7	40	4,499	8,559	2,609,500	89,635,871	0	40	6,248	11,888	3,329	
2030	0	71,369,371	8	41	4,388	8,348	2,609,500	92,245,371	0	41	6,363	12,107	3,759	
2031	0	71,369,371	9	42	4,279	8,142	2,609,500	94,854,871	0	42	6,476	12,321	4,179	
2032	0	71,369,371	10	43	4,174	7,941	2,609,500	97,464,371	0	43	6,586	12,530	4,589	
2033	0	71,369,371	11	44	4,071	7,745	2,609,500	100,073,871	0	44	6,693	12,734	4,989	
2034	0	71,369,371	12	45	3,970	7,553	2,609,500	102,683,371	0	45	6,798	12,933	5,379	
2035	0	71,369,371	13	46	3,872	7,367	2,609,500	105,292,871	0	46	6,900	13,127	5,760	
2036	0	71,369,371	14	47	3,776	7,185	2,609,500	107,902,371	0	47	6,999	13,317	6,132	
2037	0	71,369,371	15	48	3,683	7,008	2,609,500	110,511,871	0	48	7,097	13,502	6,495	
2038	0	71,369,371	16	49	3,592	6,835	2,609,500	113,121,371	0	49	7,192	13,683	6,848	
2039	0	71,369,371	17	50	3,504	6,666	2,609,500	115,730,871	0	50	7,285	13,860	7,194	
	Baseline - Without Expansion Project						**With Expansion Project**							

Year	Disposal Rate (R) (tons/yr)	Cumulative Tonnage (tons)	c (yr)	t (yr)	Total LFG Generation as methane (10^6 scf/yr)	LFG Generation as methane (scfm)	Disposal Rate (R) (tons/yr)	Cumulative Tonnage (tons)	c (yr)	t (yr)	Total LFG Generation as methane (10^6 scf/yr)	LFG Generation as methane (scfm)	Increase in LFG (as CH_4) due to Project (scfm)	Remarks
2040	0	71,369,371	18	51	3,417	6,501	2,609,500	118,340,371	0	51	7,375	14,032	7,531	
2041	0	71,369,371	19	52	3,333	6,341	2,609,500	120,949,871	0	52	7,464	14,200	7,860	
2042	0	71,369,371	20	53	3,250	6,184	2,609,500	123,559,371	0	53	7,550	14,365	8,180	
2043	0	71,369,371	21	54	3,170	6,032	2,609,500	126,168,871	0	54	7,634	14,525	8,493	
2044	0	71,369,371	22	55	3,092	5,883	2,609,500	128,778,371	0	55	7,717	14,682	8,799	
2045	0	71,369,371	23	56	3,016	5,737	2,609,500	131,387,871	0	56	7,797	14,835	9,097	
2046	0	71,369,371	24	57	2,941	5,596	2,609,500	133,997,371	0	57	7,876	14,984	9,388	
2047	0	71,369,371	25	58	2,869	5,458	2,609,500	136,606,871	0	58	7,952	15,130	9,672	
2048	0	71,369,371	26	59	2,798	5,323	2,609,500	139,216,371	0	59	8,027	15,272	9,949	
2049	0	71,369,371	27	60	2,729	5,191	2,609,500	141,825,871	0	60	8,100	15,411	10,220	
2050	0	71,369,371	28	61	2,661	5,063	2,609,500	144,435,371	0	61	8,171	15,547	10,484	
2051	0	71,369,371	29	62	2,596	4,938	2,609,500	147,044,871	0	62	8,241	15,679	10,741	
2052	0	71,369,371	30	63	2,531	4,816	2,609,500	149,654,371	0	63	8,309	15,809	10,993	
2053	0	71,369,371	31	64	2,469	4,697	2,609,500	152,263,871	0	64	8,376	15,935	11,238	

Notes:

6,504 average emission increase 2023-2053

1. Use EPA Landfill Air Emissions Estimation model equation: 11,238 maximum emission increase (2053)

$Q_{CH4} = Lo * R * [e^{-kc} - e^{-kt}]$

Q_{CH4} = Methane (LFG) generation rate at time t (scf/yr)

Lo = methane generation potential (scf CH4/ton refuse) = 4411 scf of CH4/ton of refuse provided by IWMD

R = average annual refuse acceptance rate during active life (ton/yr)

k = methane generation rate constant (1/yr) = 0.025 provided by IWMD

c = time since landfill closure, yr (= 0 for active landfills)

t = time since initial refuse placement, yr

scfm = standard cubic ft per minute

from AP-42 Section 2.4 Municipal Solid Waste Landfills

Source: URS Corporation

FRANK R. BOWERMAN LANDFILL

ESTIMATION OF LANDFILL GAS FUGITIVE EMISSIONS AND FLARE EMISSIONS

Maximum Annual Incremental Emissions (2053)

Operating Time: 24 hours per day, and 365 days per year.

COMPOUNDS	Molecular Weight (g/g-mol)	Concentration of TACs in LFG (ppmv) (2)	Maximum Annual Incremental Emissions of LFG to Flares (tons/yr) (3)	Flare Destruction Efficiency (4)	Maximum Annual Incremental Emissions of LFG from Landfill - Fugitives (tons/yr) (3)	(lb/day)	Maximum Annual Incremental Emissions of LFG from Flares (tons/yr) (3)	(lb/day)
TACs (1)								
Benzene	78.11	2.215	1.139	99.89%	2.85E-01	1.56E+00	1.25E-03	6.87E-03
Chlorobenzene	112.56	0.064	0.047	96.22%	1.19E-02	6.50E-02	1.79E-03	9.83E-03
Dichlorobenzene (1,4-Dichlorobenzene)	147.00	0.716	0.693	97.80%	1.73E-01	9.49E-01	1.52E-02	8.36E-02
1,1-Dichloroethane (ethylidene dichloride)	98.97	1.140	0.743	99.80%	1.86E-01	1.02E+00	1.49E-03	8.14E-03
1,2-Dichloroethane (ethylene dichloride)	98.96	0.128	0.083	97.96%	2.09E-02	1.14E-01	1.70E-03	9.32E-03
1,1-Dichloroethylene (vinylidene chloride)	96.94	0.093	0.059	96.14%	1.48E-02	8.13E-02	2.29E-03	1.26E-02
Dichloromethane (Methylene Chloride)	84.94	8.230	4.603	99.37%	1.15E+00	6.31E+00	2.90E-02	1.59E-01
Perchloroethylene (tetrachloroethylene)	165.83	2.780	3.036	99.96%	7.59E-01	4.16E+00	1.21E-03	6.65E-03
Toluene	92.13	29.250	17.746	99.98%	4.44E+00	2.43E+01	3.55E-03	1.94E-02
1,1,1-Trichloroethane (methyl chloroform)	133.41	0.073	0.064	98.23%	1.60E-02	8.79E-02	1.14E-03	6.22E-03
Trichloroethylene (trichloroethene)	131.40	0.959	0.830	99.87%	2.07E-01	1.14E+00	1.08E-03	5.91E-03
Vinyl chloride	62.50	0.266	0.109	98.68%	2.74E-02	1.50E-01	1.45E-03	7.92E-03
m,p-Xylene	106.16	10.850	7.585	100.00%	1.90E+00	1.04E+01	0.00E+00	0.00E+00
o-Xylene	106.16	3.360	2.349	99.80%	5.87E-01	3.22E+00	4.70E-03	2.57E-02
Totals: HAPs								
Criteria Air Pollutants and Combustion By Products								
VOC (NMOC as Hexane) (5)	86.18	595	337.671	99.20%	8.44E+01	4.63E+02	2.70E+00	1.48E+01

COMPOUNDS				Emission Factor	Emission Factor	LFG Heat content	Maximum Annual Incremental Emissions of LFG from Flares	
				(lb/MMscf)	(lb/MMBtu)	(Btu/ft3) (6)	(tons/yr)	(lb/day)
Nitrogen Oxides (NOx) (7)					0.060	404	57.270	313.810
Carbon Monoxide (CO) (7)					0.047	404	44.862	245.818
Particulates (PM_{10}) (7)				9.1	0.023	404	21.500	117.808
Sulfur Oxide (SOx) (8)				8.03	0.020	404	18.972	103.956

Source: URS Corporation

Notes:

(1) List of TACs are from source testing of flares as required by SCAQMD

(2) Concentrations of the TACs in LFG are based on maximum flare source test inlet concentrations

(3) The calculations are presented below under example calculations.

(4) The destruction efficiencies for TACs are from flare source test

(5) According to AP-42, section 2.4.4.1 (Uncontrolled Emissions), a total NMOC value of 595 ppmv as hexane should be used for MSW landfills with no co-disposal and unknown NMOCS concentrations.

(6) LFG Heat content from stack testing of FRB flares

(7) Emission factors for NOx, CO & PM10 from permit to operate for flares

(8) Emission factor for SOx based on the permit to operate for flares lb/hr / total scfm of all flares

Benzyl Chloride, 1,2-dibromomethane, carbon tetrachloride & chloroform not measure above the detection limit

Variables:

MODEL INPUT VARIABLES:	Maximum Annual Incremental LFG (2053)		
Maximum LFG generation rate	11,238	scfm	
Capture efficiency of LFG	80.0%		per SCAQMD guidance (Charlie Tupac)
Total captured LFG to Flare	8,990	scfm	
LFG not captured	2,248	scfm	
Fugitive LFG Escape Rate	100.0%		
LFG to landfill surface	2,247.6	scfm	

EXAMPLE CALCULATIONS

(TACs)

Emissions in LFG to landfill surface = (Molecular Weight of Compound [g/g-mol])*(Concentration of Compound[ppm]/1,000,000)*(LFG to Landfill Surface [scfm])

(525,600 min/yr)(1ton/2000lb)*(1lb/453.6g)*(1gmol/22.4L)*(28.32L/1cf)

Emissions in LFG to flare = (Molecular Weight of Compound[g/g-mol])*(Concentration of Compound[ppmv]/1,000,000)*(LFG to Flare [scfm])

(525,600 min/yr)(1ton/2000lb)*(1lb/453.6g)*(1mol/22.4L)*(28.32L/1cf)

Emissions in LFG from flare = (LFG Emissions To Flare [tons/yr])*(1 - Destruction Efficiency of Flare)

<u>(NO_x, SO_x, ROG, PM, CO, & Formaldehyde)</u>
Total Combustion Emissions from the Flare = (LFG to Flare scfm)*(Emission Factor lb/MMBtu) * (MMBtu/10^6 Btu) * (Heat content Btu/scf) *(1ton/2000lb)*(5256000 min/yr)

HCL Emissions from the Flare = 1.03 * (Molecular Weight of Compound[g/g-mol])*(Concentration of Total Chloride [ppm]/1000000)*(LFG to Landfill Surface [scfm])

(525,600 min/yr)(1ton/2000lb)*(1lb/453.6g)*(1mol/22.4L)*(28.32L/1cf)

Frank R Bowerman Landfill
Normal Operations Diesel Fired Equipment

Equipment	Manufacturer & Model	Qnty	Power (hp)	Load (%)	Hours/ Day	Days/ Year	Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
							PM_{10}	CO	VOC	NO_x	SO_x	PM_{10}	CO	VOC	NO_x	SO_x
Trash Tractor	Caterpillar D10	4	580	57.5	10	307	0.33	2.66	3.92	8.15	0.14	0.05	0.41	0.60	1.25	0.02
Dirt Tractor	Caterpillar D10	1	580	57.5	10	307	0.08	0.66	0.98	2.04	0.04	0.01	0.10	0.15	0.31	0.01
Scrapers	Caterpillar 657E	2	1,045	66.0	5	307	0.52	1.24	2.02	36.52	0.07	0.08	0.19	0.31	5.61	0.01
Cat 824 w/BG Dozer	Caterpillar 824H	1	354	59.0	10	307	0.05	0.42	0.61	1.28	0.02	0.01	0.06	0.09	0.20	0.00
Water Truck	Mack MR600S	2	300	50.0	10	307	0.08	0.60	0.88	1.83	0.03	0.01	0.09	0.14	0.28	0.00
Trash compactor	Caterpillar 836H	2	468	46.5	10	307	0.11	0.87	1.28	2.66	0.05	0.02	0.13	0.20	0.41	0.01
Motor Grader	Caterpillar 140H	1	165	57.5	1	307	0.00	0.02	0.03	0.06	0.00	0.00	0.00	0.00	0.01	0.00
Backhoe	Caterpillar 430D	1	97	46.5	1	307	0.00	0.03	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Loader	Caterpillar 962G	1	210	46.5	1	307	0.00	0.02	0.03	0.06	0.00	0.00	0.00	0.00	0.01	0.00
Light Plant	MultiQuip MLT-DA7	1	13.9	74.0	1	307	0.01	0.05	0.01	0.10	0.00	0.00	0.01	0.00	0.02	0.00
Cover Dump trucks	Caterpillar 777D	2	938	38.0	10	307	0.54	1.28	2.09	37.74	0.08	0.08	0.20	0.32	5.79	0.01
Additional equipment for high tonnage days																
Trash Tractor	Caterpillar D10	1	580	57.5	10	154	0.08	0.66	0.98	2.04	0.04	0.01	0.05	0.08	0.16	0.00
Scrapers	Caterpillar 657E	1	1,045	66.0	5	154	0.26	0.62	1.01	18.26	0.04	0.02	0.05	0.08	1.40	0.00
Trash compactor	Caterpillar 836H	1	468	46.5	10	154	0.05	0.43	0.64	1.33	0.02	0.00	0.03	0.05	0.10	0.00
							2.1	**9.6**	**14.5**	**112.1**	**0.5**	**0.30**	**1.34**	**2.02**	**15.55**	**0.07**

590.3lb/yr

Notes:

Equipment list, quantity & hours of operation from "FRB Energy KW to BTU Calculations TW corrections.xls"
load factors from SCAQMD CEQA Handbook Table A9-8-D
Emission factors from “Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling-Compression
Ignition,” EPA 2004
Assumed by URS that 50% of the operational days would be high tonnage days
assumed by URS each cover dump truck carries 100 tons (like the Caterpillar 777D)
assumed by URS 2 cover trucks are needed – each truck can haul 1 load per hour

Source: URS Corporation

Frank R Bowerman Landfill

Fugitive Dust Emissions from Storage Piles, Earthmoving & Truck Travel on site

General Operations

Dirt Pushing or Bulldozing

$E = .45 * 2.2046 * G^{1.5} / H^{1.4}$ PM_{10} Emissions from dirt pushing (lb/hr)

SCAQMD Table A9-9-F

7.5G = Silt content (%) (from Table A9-9-F-1 for overburden)

15H = Moisture content of surface material (%) (from Table A9-9-F-2 for moist dirt)

0.4598lb/hr of PM_{10}

Equipment	Qnty	Hours/Day	Days/year	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Trash Tractor	4	10	307	50%	0.920	9.20	1.41
Dirt Tractor	1	10	307	50%	0.230	2.30	0.35
Scrapers	2	5	307	50%	0.460	2.30	0.35
Cat 824 w/BG Dozer	1	10	307	50%	0.230	2.30	0.35
Trash compactor	2	10	307	50%	0.460	4.60	0.71
Backhoe	1	1	307	50%	0.230	0.23	0.04
Additional equipment for high tonnage days							
Trash Tractor	1	10	154	50%	0.230	2.30	0.18
Scrapers	1	5	154	50%	0.230	1.15	0.09
Trash compactor	1	10	154	50%	0.230	2.30	0.18
				Total	**3.219**	**26.67**	**3.65**

Assumed by URS that 50% of the operational days would be high tonnage days

Grading

$E = p* .051 * (S)^{2.0}$

0.6p = particle size multiplier = 0.60 for PM_{10}

7.1S = avg speed of vehicle (mph) (from AP-42 Table 11.9-3)

PM_{10} 1.54lb/VMT EPA AP-42 Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES

Frank R Bowerman Landfill

Fugitive Dust Emissions from Storage Piles, Earthmoving & Truck Travel on site

General Operations

Equipment	Qnty	Hours/Day	Days/year	Miles traveled per hour	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Motor Grader	1	1	307	7.1	50%	5.476	5.476	0.84

Travel on unpaved road

$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$ SCAQMD Table A9-9-D

Emission factor for vehicle travel on unpaved roads (lb/VMT)

4G = Surface silt loading (%) (from Table A9-9-D-1 for gravel road)

15H = Mean vehicle speed (mph)

10I = Mean number of wheels on vehicle (from Table A9-9-D-3)

13J = Mean vehicle weight (ton) (from Table A9-9-D-3)

34K = Mean number of days per with at least 0.01 inches of precipitation (from Table A9-9-D-4 average year for SCAB)

1.401PM10 lb/VMT

Equipment	Qnty	Hours/Day	Days/year	Miles traveled per hour	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Water Truck	2	10	307	15	50%	21.011	210.107	32.25

Assumed maximum travel speed is 15 mph

Cover Movement

Truck filling or storage pile emptying

PM_{10} emissions per ton of material handled (SCAQMD Table A9-9)

0.02205lb/ton

Truck dumping

PM_{10} emissions per ton of material handled (SCAQMD Table A9-9)

0.009075lb/ton

Frank R Bowerman Landfill
Fugitive Dust Emissions from Storage Piles, Earthmoving & Truck Travel on site
General Operations

Equipment	Qnty	Hours/Day	Days/year	Material Handled (ton/day)	Material Handled (ton/yr)	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Loader	1	1	307	2000	599,850	50%	22.044	22.044	3.31
Cover Dump trucks	2	10	307	2000	599,850	50%	0.907	9.073	1.36

need 3000 yd3/day or 900,000 yd3/yr of cover soil

3000yd3/day 2000ton/day 20.0trucks/day 2.0trucks/hr

900,000yd3/yr 599,850ton/yr 1333density of cover (lb/yd3) provide by IWMD

assumed by URS each dump truck carries 100 tons (like the Caterpillar 777D)

assumed by URS 2 trucks are needed - each truck can haul 1 load per hour

Travel on unpaved road

$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$ SCAQMD Table A9-9-D

Emission factor for vehicle travel on unpaved roads (lb/VMT)

4G = Surface silt loading (%) (from Table A9-9-D-1 for gravel road)

15H = Mean vehicle speed (mph)

8I = Mean number of wheels on vehicle (from Table A9-9-D-3)

9J = Mean vehicle weight (ton) (from Table A9-9-D-3)

34K = Mean number of days per with at least 0.01 inches of precipitation (from Table A9-9-D-4 average year for SCAB)

0.969PM10 lb/VMT

Equipment	Qnty	Hours/Day	Days/year	Miles traveled per hour	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	$PM1_0$ Emissions (tons/yr)
Cover Dump trucks	2	10	307	1.89	50%	1.827	18.271	2.80

max distance traveled on site per cover truck after 2022 will be from the stockpile area 5D to the Phase XI area

which is a distance of 1518 meters

times 2 for return trip 3036m 1.89miles

Cover Storage Pile

SCAQMD Table A9-9-E

$E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J$

PM_{10} Emission factor from wind erosion of storage piles per day per acre

7.5G = Silt content (%) (from Table A9-9-E-1 for overburden)

34H = Number of days with >= 0.01 inches of precipitation per year (from Table A9-9-E-2 average year for SCAB)

0.33I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height

(from the 1981 meteorological data for El Toro provided by SCAQMD)

0.5J = Fraction of TSP that is PM10 = 0.5 (default) 0.132lb/acre/day

Frank R Bowerman Landfill
Fugitive Dust Emissions from Storage Piles, Earthmoving & Truck Travel on site

General Operations

Source	Qnty	Size of Pile (acre)	Hours/Day	Days/year	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Cover Storage Pile	1	5	24	365	50%	0.014	0.329	0.06

Cover stock piles will be stored in area 5D

URS assumed the active storage pile size & that it will be watered to control dust

Garbage Truck travel

ON SITE

Travel on unpaved roads

$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$ SCAQMD Table A9-9-D

Emission factor for vehicle travel on unpaved roads (lb/VMT)

4G = Surface silt loading (%) (from Table A9-9-D-1 for gravel road (per IWMD and site visit))

15H = Mean vehicle speed (mph)

see table belowI = Mean number of wheels on vehicle (from Table A9-9-D-3)

see table belowJ = Mean vehicle weight (ton) (from Table A9-9-D-3)

34K = Mean number of days per with at least 0.01 inches of precipitation (from Table A9-9-D-4 average year for SCAB)

Equipment	Max Annual Qnty	Mean Vehicle Weight (J) (ton)	Mean Number of Wheels (I)	Hours/Day	Days/year	Miles traveled per trip	Total miles traveled per year	PM_{10} Emission Factor (lb/VMT)	Watering Control Efficiency	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
Light Duty Trucks	5,906	2.375	4	10	307	0.73	4312.0	0.270	50%	0.189	1.89	0.29
Medium Duty Trucks	4,541	3.5625	4	10	307	0.73	3315.4	0.358	50%	0.193	1.93	0.30
Light Heavy Duty Trucks 1	3,952	4.625	6	10	307	0.73	2885.4	0.526	50%	0.247	2.47	0.38
Light Heavy Duty Trucks 2	5,792	6	8	10	307	0.73	4228.8	0.729	50%	0.502	5.02	0.77
Medium Heavy Duty Trucks	69,827	11.75	10	10	307	0.73	50981.5	1.305	50%	10.836	108.36	16.63
Heavy Heavy Duty Trucks	117,003	23.25	18	10	307	0.73	85425.2	2.823	50%	39.277	392.77	60.29
									Total	**51.245**	**512.45**	**78.66**

max distance traveled on site for garbage delivery trucks after 2022 will be to the Phase XI area

which is a distance of 1175 meters from the main entrance off Bee Canyon Rd

times 2 for return trip 1175m 0.73miles

max speed traveled will be 15 mph

Frank R Bowerman Landfill

Fugitive Dust Emissions from Storage Piles, Earthmoving & Truck Travel on site

General Operations

OFF SITE

Truck travel on paved roads

$F = 0.77 * (G*0.35)^{0.3}$ SCAQMD Table A9-9-C

0.012G = Surface silt loading (ounces/square yards) (from Table A9-9-C-1 for major streets)

0.1491PM10 lb/VMT

Equipment	Total Annual Qnty	Hours/Day	Days/year	Miles traveled per trip	Total miles traveled per year	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
All Garbage Delivery Trucks	207,021	10	307	20.0	4140420	201.08	2010.81	308.66

Assumed average distance traveled off site for all garbage delivery trucks will be 10 miles

times 2 for return trip 20miles

Passenger vehicle travel on paved roads

0.0064PM10 lb/VMT (from Table A9-9-B-1 for major streets) SCAQMD Table A9-9-B

Equipment	Number of Employees	Hours/Day	Days/year	Miles traveled per trip	Total miles traveled per year	PM_{10} Emissions (lb/hr)	PM_{10} Emissions (lb/day)	PM_{10} Emissions (tons/yr)
All Employee Vehicles	97	10	307	23.2	690872.8	1.440256	14.40256	2.211

Source: URS Corporation

Assumed average distance traveled off site for all employees commuting will be 11.6 miles

per SCAQMD Table A9-5-D Orange County average home to work trip length in 2010

times 2 for return trip 23.2miles

Frank R Bowerman Landfill
Diesel Emissions from Garbage Delivery Trucks

ON SITE

EMFAC Class	Maximum Annual Quantity	Weight Range (tons)	Hours/Day	Days/year	Miles traveled per trip	Total miles traveled per year	Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
							PM_{10}	CO	VOC	NO_x	SO_x	PM_{10}	CO	VOC	NO_x	SO_x
Light Duty Trucks	5,906	1.875 – 2.875	10	307	0.73	4312	5E-04	0.032	0.003	0.003	4E-04	8E-05	0.005	4E-04	4E-04	7E-05
Medium Duty Trucks	4,541	2.875 – 4.25	10	307	0.73	3315	4E-04	0.031	0.002	0.002	5E-04	6E-05	0.005	4E-04	3E-04	7E-05
Light Heavy Duty Trucks 1	3,952	4.25 – 5.0	10	307	0.73	2885	2E-04	0.011	0.002	0.004	4E-04	3E-05	0.002	3E-04	7E-04	7E-05
Light Heavy Duty Trucks 2	5,792	5.0 – 7.0	10	307	0.73	4229	4E-04	0.019	0.003	0.011	5E-04	6E-05	0.003	5E-04	0.002	7E-05
Medium Heavy Duty Trucks	69,827	7.0 – 16.5	10	307	0.73	50981	0.029	0.417	0.041	0.289	0.006	0.004	0.064	0.006	0.044	9E-04
Heavy Heavy Duty Trucks	117,003	16.5 – 30.0	10	307	0.73	85425	0.055	1.294	0.123	0.724	0.013	0.008	0.199	0.019	0.111	0.002
							0.085	**1.805**	**0.174**	**1.034**	**0.021**	**0.013**	**0.277**	**0.027**	**0.159**	**0.003**

EMFAC2002 Model used to obtain emission factors
Weight range from the EMFAC2002 model
Maximum number of trucks scaled from the 2004 fleet mix
which is a distance of 1175 meters from the main entrance off Bee Canyon Rd
times 2 for return trip 1175m 0.73miles

OFF SITE

EMFAC Class	Maximum Annual Quantity	Weight Range (tons)	Hours/Day	Days/year	Miles traveled per trip	Total miles traveled per year	Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
							PM_{10}	CO	VOC	NO_x	SO_x	PM_{10}	CO	VOC	NO_x	SO_x
Light Duty Trucks	5,906	1.875 – 2.875	10	307	20.00	118120	0.014	0.867	0.071	0.069	0.012	0.002	0.133	0.011	0.011	0.002
Medium Duty Trucks	4,541	2.875 – 4.25	10	307	20.00	90820	0.01	0.861	0.063	0.056	0.012	0.002	0.132	0.01	0.009	0.002
Light Heavy Duty Trucks 1	3,952	4.25 – 5.0	10	307	20.00	79040	0.005	0.315	0.05	0.12	0.012	8E-04	0.048	0.008	0.018	0.002
Light Heavy Duty Trucks 2	5,792	5.0 – 7.0	10	307	20.00	115840	0.011	0.533	0.086	0.31	0.013	0.002	0.082	0.013	0.048	0.002
Medium Heavy Duty Trucks	69,827	7.0 – 16.5	10	307	20.00	1396540	0.802	11.41	1.132	7.926	0.16	0.123	1.752	0.174	1.217	0.025
Heavy Heavy Duty Trucks	117,003	16.5 – 30.0	10	307	20.00	2340060	1.494	35.46	3.358	19.84	0.353	0.229	5.443	0.515	3.046	0.054
							2.336	49.45	4.76	28.33	0.562	0.359	7.59	0.731	4.348	0.086

Source: URS Corporation

EMFAC2002 Model used to obtain emission factors
Weight range from the EMFAC2002 model
Maximum number of trucks scaled from the 2004 fleet mix
Assumed average distance traveled off site for all garbage delivery trucks will be 10 miles
times 2 for return trip 20miles

Frank R. Bowerman Landfill
Emissions from Employees Commuting

						Daily Emissions (lb/day)					Annual Emissions (ton/yr)				
Equipment	**Number of Employees**	**Hours/ Day**	**Days/ Year**	**Miles traveled per trip**	**Total miles traveled per year**	**PM_{10}**	**CO**	**VOC**	**NO_x**	**SO_x**	**PM_{10}**	**CO**	**VOC**	**NO_x**	**SO_x**
All Employee Vehicles	97	10	307	23.2	690872.8	0.367	6.151	0.431	0.466	0.055	0.06	0.94	0.07	0.07	0.008

Source: URS Corporation
EMFAC2002 Model used to obtain emission factors
Assumed average distance traveled off site for all employees commuting will be 11.6 miles
per SCAQMD Table A9-5-D Orange County average home to work trip length in 2010
times 2 for return trip 23.2miles

APPENDIX C

CALINE 4 MODEL OUTPUT FILES

NO BUILD

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Sand Canyon/Irvine Blvd W/O Project #9
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 250. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 20. DEGREES TEMP= 8.9 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. SNCYN N APP	15	-150	15	0	AG	1044	1.4	.0	17.6
B. SN CYN N LT	9	-150	0	0	AG	164	1.4	.0	17.6
C. SNCYN N DEP	15	0	15	150	AG	480	1.4	.0	14.0
D. SN CYN S APP	-15	150	-15	0	AG	1356	1.4	.0	17.6
E. SN CYN S LT	-9	150	0	0	AG	174	1.4	.0	17.6
F. SNCYN S DEP	-15	0	-15	-150	AG	1754	1.4	.0	14.0
G. IRV E APP	-150	-17	0	-17	AG	2749	1.4	.0	21.3
H. IRV E LT	-150	-9	0	0	AG	55	1.4	.0	21.3
I. IRV E DEP	0	-17	150	-17	AG	3267	1.4	.0	17.6
J. IRV W APP	150	15	0	15	AG	1194	1.4	.0	17.6
K. IRV W LT	150	9	0	0	AG	164	1.4	.0	17.6
L. IRV W DEP	0	15	-150	15	AG	1399	1.4	.0	14.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. SE	25	-27	1.8
2. NW	-25	23	1.8
3. SW	-23	-29	1.8
4. NE	23	25	1.8
5. SE 100	25	-100	1.8
6. NW 100	-25	100	1.8
7. SW 100	-23	-100	1.8
8. NE 100	23	100	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Sand Canyon/Irvine Blvd W/O Project #9
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	295.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	153.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	70.	.4	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	205.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. SE 100	338.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. NW 100	162.	.2	.0	.0	.0	.1	.0	.0	.0	.0
7. SW 100	20.	.2	.0	.0	.0	.0	.0	.1	.0	.0
8. NE 100	199.	.2	.0	.0	.0	.0	.0	.0	.0	.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L
1. SE	.2	.0	.0	.0
2. NW	.0	.0	.0	.0
3. SW	.1	.0	.0	.0
4. NE	.0	.0	.0	.0
5. SE 100	.0	.0	.0	.0
6. NW 100	.0	.0	.0	.0
7. SW 100	.0	.0	.0	.0
8. NE 100	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Sand Canyon/Trabuco W/O Project #14
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 250. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 20. DEGREES TEMP= 8.9 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. SNCYN N APP	15	-150	15	0	AG	971	1.4	.0	17.6
B. SN CYN N LT	9	-150	0	0	AG	198	1.4	.0	17.6
C. SNCYN N DEP	15	0	15	150	AG	1080	1.4	.0	14.0
D. SN CYN S APP	-15	150	-15	0	AG	2819	1.4	.0	17.6
E. SN CYN S LT	-9	150	0	0	AG	418	1.4	.0	17.6
F. SNCYN S DEP	-15	0	-15	-150	AG	3520	1.4	.0	14.0
G. TRAB E APP	-150	-15	0	-15	AG	1113	1.4	.0	17.6
H. TRAB E LT	-150	-9	0	0	AG	178	1.4	.0	17.6
I. TRAB E DEP	0	-15	150	-15	AG	1369	1.4	.0	14.0
J. TRAB W APP	150	15	0	15	AG	778	1.4	.0	17.6
K. TRAB W LT	150	9	0	0	AG	544	1.4	.0	17.6
L. TRAB W DEP	0	15	-150	15	AG	1050	1.4	.0	14.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. SE	25	-23	1.8
2. NW	-25	23	1.8
3. SW	-23	-25	1.8
4. NE	23	25	1.8
5. SE 100	25	-100	1.8
6. NW 100	-25	100	1.8
7. SW 100	-23	-100	1.8
8. NE 100	23	100	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Sand Canyon/Trabuco W/O Project #14
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	332.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	156.	.4	.0	.0	.0	.1	.0	.1	.0	.0
3. SW	25.	.4	.0	.0	.0	.0	.0	.2	.0	.0
4. NE	215.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. SE 100	338.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. NW 100	161.	.3	.0	.0	.0	.2	.0	.0	.0	.0
7. SW 100	19.	.4	.0	.0	.0	.0	.0	.3	.0	.0
8. NE 100	203.	.2	.0	.0	.0	.0	.0	.0	.0	.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L
1. SE	.0	.0	.0	.0
2. NW	.0	.0	.0	.0
3. SW	.0	.0	.0	.0
4. NE	.0	.0	.0	.0
5. SE 100	.0	.0	.0	.0
6. NW 100	.0	.0	.0	.0
7. SW 100	.0	.0	.0	.0
8. NE 100	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jeffrey/Walnut W/O Project #16
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 250. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 20. DEGREES TEMP= 8.9 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. JEFRY N APP	15	-150	15	0	AG	1851	1.4	.0	17.6
B. JEFRY N LT	9	-150	0	0	AG	63	1.4	.0	17.6
C. JEFRY N DEP	15	0	15	150	AG	2340	1.4	.0	14.0
D. JEFRY S APP	-13	150	-13	0	AG	2665	1.4	.0	14.0
E. JEFRY S LT	-9	150	0	0	AG	697	1.4	.0	14.0
F. JEFRY S DEP	-13	0	-13	-150	AG	3130	1.4	.0	12.1
G. WLNT E APP	-150	-9	0	-9	AG	787	1.4	.0	14.0
H. WLNT E LT	-150	-6	0	0	AG	371	1.4	.0	14.0
I. WLNT E DEP	0	-9	150	-9	AG	1180	1.4	.0	10.0
J. WLNT W APP	150	11	0	11	AG	278	1.4	.0	10.3
K. WLNT W LT	150	9	0	0	AG	298	1.4	.0	10.3
L. WLNT W DEP	0	11	-150	11	AG	360	1.4	.0	10.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. SE	25	-16	1.8
2. NW	-21	18	1.8
3. SW	-20	-18	1.8
4. NE	23	18	1.8
5. SE 100	25	-100	1.8
6. NW 100	-21	100	1.8
7. SW 100	-20	-100	1.8
8. NE 100	23	100	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Jeffrey/Walnut W/O Project #16
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	334.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	156.	.3	.0	.0	.0	.1	.0	.1	.0	.0
3. SW	25.	.4	.0	.0	.0	.0	.0	.1	.0	.0
4. NE	208.	.3	.0	.0	.1	.0	.0	.0	.0	.0
5. SE 100	340.	.3	.1	.0	.0	.0	.0	.0	.0	.0
6. NW 100	159.	.3	.0	.0	.0	.2	.0	.0	.0	.0
7. SW 100	18.	.4	.0	.0	.0	.0	.0	.2	.0	.0
8. NE 100	201.	.3	.0	.0	.2	.0	.0	.0	.0	.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L
1. SE	.0	.0	.0	.0
2. NW	.0	.0	.0	.0
3. SW	.0	.0	.0	.0
4. NE	.0	.0	.0	.0
5. SE 100	.0	.0	.0	.0
6. NW 100	.0	.0	.0	.0
7. SW 100	.0	.0	.0	.0
8. NE 100	.0	.0	.0	.0

BUILD

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Sand Canyon/Irvine Blvd W/ Project #9
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 250. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 20. DEGREES TEMP= 8.9 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. SNCYN N APP	15	-150	15	0	AG	1234	1.4	.0	17.6
B. SN CYN N LT	9	-150	0	0	AG	164	1.4	.0	17.6
C. SNCYN N DEP	15	0	15	150	AG	727	1.4	.0	14.0
D. SN CYN S APP	-15	150	-15	0	AG	1546	1.4	.0	17.6
E. SN CYN S LT	-9	150	0	0	AG	231	1.4	.0	17.6
F. SNCYN S DEP	-15	0	-15	-150	AG	1944	1.4	.0	14.0
G. IRV E APP	-150	-17	0	-17	AG	2749	1.4	.0	21.3
H. IRV E LT	-150	-9	0	0	AG	55	1.4	.0	21.3
I. IRV E DEP	0	-17	150	-17	AG	3324	1.4	.0	17.6
J. IRV W APP	150	15	0	15	AG	1251	1.4	.0	17.6
K. IRV W LT	150	9	0	0	AG	164	1.4	.0	17.6
L. IRV W DEP	0	15	-150	15	AG	1399	1.4	.0	14.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. SE	25	-27	1.8
2. NW	-25	23	1.8
3. SW	-23	-29	1.8
4. NE	23	25	1.8
5. SE 100	25	-100	1.8
6. NW 100	-25	100	1.8
7. SW 100	-23	-100	1.8
8. NE 100	23	100	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Sand Canyon/Irvine Blvd W/ Project #9
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	295.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	153.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	70.	.4	.0	.0	.0	.0	.0	.1	.0	.0
4. NE	205.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. SE 100	338.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. NW 100	161.	.2	.0	.0	.0	.1	.0	.0	.0	.0
7. SW 100	20.	.3	.0	.0	.0	.0	.0	.2	.0	.0
8. NE 100	199.	.2	.0	.0	.0	.0	.0	.0	.0	.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L
1. SE	.2	.0	.0	.0
2. NW	.0	.0	.0	.0
3. SW	.1	.0	.0	.0
4. NE	.0	.0	.0	.0
5. SE 100	.0	.0	.0	.0
6. NW 100	.0	.0	.0	.0
7. SW 100	.0	.0	.0	.0
8. NE 100	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Sand Canyon/Trabuco W Project #14
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 250. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 20. DEGREES TEMP= 8.9 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. SNCYN N APP	15	-150	15	0	AG	1161	1.4	.0	17.6
B. SN CYN N LT	9	-150	0	0	AG	198	1.4	.0	17.6
C. SNCYN N DEP	15	0	15	150	AG	1270	1.4	.0	14.0
D. SN CYN S APP	-15	150	-15	0	AG	3009	1.4	.0	17.6
E. SN CYN S LT	-9	150	0	0	AG	418	1.4	.0	17.6
F. SNCYN S DEP	-15	0	-15	-150	AG	3710	1.4	.0	14.0
G. TRAB E APP	-150	-15	0	-15	AG	1113	1.4	.0	17.6
H. TRAB E LT	-150	-9	0	0	AG	178	1.4	.0	17.6
I. TRAB E DEP	0	-15	150	-15	AG	1369	1.4	.0	14.0
J. TRAB W APP	150	15	0	15	AG	778	1.4	.0	17.6
K. TRAB W LT	150	9	0	0	AG	544	1.4	.0	17.6
L. TRAB W DEP	0	15	-150	15	AG	1050	1.4	.0	14.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. SE	25	-23	1.8
2. NW	-25	23	1.8
3. SW	-23	-25	1.8
4. NE	23	25	1.8
5. SE 100	25	-100	1.8
6. NW 100	-25	100	1.8
7. SW 100	-23	-100	1.8
8. NE 100	23	100	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Sand Canyon/Trabuco W Project #14
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	332.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	156.	.4	.0	.0	.0	.1	.0	.1	.0	.0
3. SW	25.	.4	.0	.0	.0	.0	.0	.2	.0	.0
4. NE	215.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. SE 100	338.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. NW 100	160.	.3	.0	.0	.0	.2	.0	.0	.0	.0
7. SW 100	19.	.4	.0	.0	.0	.0	.0	.3	.0	.0
8. NE 100	203.	.2	.0	.0	.1	.0	.0	.0	.0	.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L
1. SE	.0	.0	.0	.0
2. NW	.0	.0	.0	.0
3. SW	.0	.0	.0	.0
4. NE	.0	.0	.0	.0
5. SE 100	.0	.0	.0	.0
6. NW 100	.0	.0	.0	.0
7. SW 100	.0	.0	.0	.0
8. NE 100	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: Jeffrey/Walnut W/ Project #16
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= 1.0 M/S Z0= 100. CM ALT= 250. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 20. DEGREES TEMP= 8.9 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. JEFRY N APP	15	-150	15	0	AG	1870	1.4	.0	17.6
B. JEFRY N LT	9	-150	0	0	AG	63	1.4	.0	17.6
C. JEFRY N DEP	15	0	15	150	AG	2397	1.4	.0	14.0
D. JEFRY S APP	-13	150	-13	0	AG	2684	1.4	.0	14.0
E. JEFRY S LT	-9	150	0	0	AG	697	1.4	.0	14.0
F. JEFRY S DEP	-13	0	-13	-150	AG	3149	1.4	.0	12.1
G. WLNT E APP	-150	-9	0	-9	AG	787	1.4	.0	14.0
H. WLNT E LT	-150	-6	0	0	AG	371	1.4	.0	14.0
I. WLNT E DEP	0	-9	150	-9	AG	1180	1.4	.0	10.0
J. WLNT W APP	150	11	0	11	AG	316	1.4	.0	10.3
K. WLNT W LT	150	9	0	0	AG	298	1.4	.0	10.3
L. WLNT W DEP	0	11	-150	11	AG	360	1.4	.0	10.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. SE	25	-16	1.8
2. NW	-21	18	1.8
3. SW	-20	-18	1.8
4. NE	23	18	1.8
5. SE 100	25	-100	1.8
6. NW 100	-21	100	1.8
7. SW 100	-20	-100	1.8
8. NE 100	23	100	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: Jeffrey/Walnut W/ Project #16
RUN: Hour 1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	334.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	156.	.3	.0	.0	.0	.1	.0	.1	.0	.0
3. SW	25.	.4	.0	.0	.0	.0	.0	.1	.0	.0
4. NE	208.	.3	.0	.0	.1	.0	.0	.0	.0	.0
5. SE 100	340.	.3	.1	.0	.0	.0	.0	.0	.0	.0
6. NW 100	159.	.3	.0	.0	.0	.2	.0	.0	.0	.0
7. SW 100	18.	.4	.0	.0	.0	.0	.0	.2	.0	.0
8. NE 100	201.	.3	.0	.0	.2	.0	.0	.0	.0	.0

RECEPTOR	CONC/LINK (PPM) I	J	K	L
1. SE	.0	.0	.0	.0
2. NW	.0	.0	.0	.0
3. SW	.0	.0	.0	.0
4. NE	.0	.0	.0	.0
5. SE 100	.0	.0	.0	.0
6. NW 100	.0	.0	.0	.0
7. SW 100	.0	.0	.0	.0
8. NE 100	.0	.0	.0	.0

APPENDIX D

HARP MODEL INPUT FILES

"CEIDARS25","HARP/CEIDARS 2.5 transaction file generated 4/13/2006 6:21:55 PM"

"FAC",30,16,"SC","SC","A","FRANK R BOWERMAN LANDFILL","","","","","",,,4953,"562212",,"","","","CA","","","","",,"","U11","NAD83","GRS80",434.157,3730.867,"","","","","",,"","20051023","ptn",20060413

"DEV",30,16,"SC","SC","A",1,"FLARE","",,,"",,,"",,,"",,"","","",,"","20051023","ptn",20060413

"DEV",30,16,"SC","SC","A",2,"LANDFILL","",,,"",,,"",,,"",,"","","",,"","20051023","ptn",20060413

"DEV",30,16,"SC","SC","A",3,"OPERATIONS EQUIPMENT","",,,"",,,"",,,"",,"","","",,"","20051023","ptn",20060413

"DEV",30,16,"SC","SC","A",4,"ONSITE GARBAGE TRUCKS","",,,"",,,"",,,"",,"","","",,"","20051023","ptn",20060413

"DEV",30,16,"SC","SC","A",5,"OFFSITE GARBAGE TRUCKS","",,,"",,,"",,,"",,"","","",,"","20051023","ptn",20060413

"PRO",30,16,"SC","SC","A",1,1,"FLARE",50200601,4953,"",4725,,0,0.539,0.539,404,,,2,,1,24,7,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","20051023",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",2,2,"LANDFILL - FUGITIVES",50200602,4953,"",,,0,,,404,,,,,2,24,7,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",3,3,"OPERATIONS EQUIPMENT - PHASE XI",50410004,4953,"",,,0,,,,,,,,3,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

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"PRO",30,16,"SC","SC","A",4,5,"ONSITE GARBAGE TRUCKS",50100401,4953,"",,,0,,,,,,,,5,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",4,6,"ONSITE GARBAGE TRUCKS",50100401,4953,"",,,0,,,,,,,,6,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",4,7,"ONSITE GARBAGE TRUCKS",50100401,4953,"",,,0,,,,,,,,7,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",4,8,"ONSITE GARBAGE TRUCKS",50100401,4953,"",,,0,,,,,,,,8,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

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"PRO",30,16,"SC","SC","A",5,10,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,10,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

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"PRO",30,16,"SC","SC","A",5,14,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,14,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,15,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,15,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,16,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,16,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,17,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,17,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,18,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,18,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,19,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,19,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,20,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,20,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,37,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,37,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,38,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,38,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,39,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,39,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,40,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,40,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,41,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,41,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,42,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,42,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,43,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,43,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,44,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,44,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,45,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,45,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,46,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,46,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,47,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,47,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,48,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,48,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,49,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,49,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,50,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,50,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,51,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,51,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,52,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,52,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,69,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,69,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,70,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,70,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,71,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,71,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,72,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,72,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,73,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,73,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,74,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,74,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,75,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,75,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,76,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,76,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,77,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,77,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,78,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,78,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,79,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,79,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,80,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,80,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,81,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,81,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,82,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,82,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,83,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,83,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,84,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,84,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,21,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,21,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,22,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,22,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,23,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,23,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,24,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,24,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,25,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,25,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,26,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,26,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,27,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,27,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,28,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,28,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,29,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,29,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,30,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,30,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,31,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,31,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,32,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,32,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,33,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,33,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,34,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,34,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,35,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,35,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,36,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,36,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,53,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,53,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,54,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,54,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,55,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,55,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,56,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,56,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,57,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,57,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,58,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,58,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,59,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,59,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,60,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,60,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,61,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,61,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,62,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,62,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,63,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,63,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,64,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,64,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,65,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,65,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,66,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,66,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

"PRO",30,16,"SC","SC","A",5,67,"OFFSITE GARBAGE TRUCKS",30501039,4953,"",,,0,,,,,,,,67,10,6,52,,"","","","",8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,8.3,"","","",,,"","","ptn",20060413

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"EMS",30,16,"SC","SC","A",5,68,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,69,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,70,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,71,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,72,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,73,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,74,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,75,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,76,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,77,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,78,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"EMS",30,16,"SC","SC","A",5,79,9901,,,,,,,,0,3.984,0.001298,,,,,,"","20051025","","","ptn",20060413

"STK",30,16,"SC","SC","A",1,"FLARE",67.8,8.056,1832,18656,3938,"U11","NAD83","GRS80",434.157,3730.867,"",0,"POINT",0,0,0,0,0,0,"","","20060410","ptn",20060413

"STK",30,16,"SC","SC","A",2,"LANDFILL - FUGITIVES",0,,,,,"U11","NAD83","GRS80",433.975,3730.25,"001",0,"AREA",0,0,4003,3363,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",55,"TRUCK OFFSITE 47",4.92,,,,,"U11","NAD83","GRS80",429.762,3724.452,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",56,"TRUCK OFFSITE 48",4.92,,,,,"U11","NAD83","GRS80",429.653,3724.253,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",57,"TRUCK OFFSITE 49",4.92,,,,,"U11","NAD83","GRS80",429.526,3723.999,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",58,"TRUCK OFFSITE 50",4.92,,,,,"U11","NAD83","GRS80",429.932,3726.887,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",59,"TRUCK OFFSITE 51",4.92,,,,,"U11","NAD83","GRS80",430.123,3727.113,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",60,"TRUCK OFFSITE 52",4.92,,,,,"U11","NAD83","GRS80",430.287,3727.302,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",61,"TRUCK OFFSITE 53",4.92,,,,,"U11","NAD83","GRS80",430.456,3727.517,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",62,"TRUCK OFFSITE 54",4.92,,,,,"U11","NAD83","GRS80",430.604,3727.705,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",63,"TRUCK OFFSITE 55",4.92,,,,,"U11","NAD83","GRS80",430.773,3727.888,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",64,"TRUCK OFFSITE 56",4.92,,,,,"U11","NAD83","GRS80",430.948,3728.098,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",65,"TRUCK OFFSITE 57",4.92,,,,,"U11","NAD83","GRS80",431.166,3728.367,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",66,"TRUCK OFFSITE 58",4.92,,,,,"U11","NAD83","GRS80",431.374,3728.609,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",67,"TRUCK OFFSITE 59",4.92,,,,,"U11","NAD83","GRS80",431.532,3728.798,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",68,"TRUCK OFFSITE 60",4.92,,,,,"U11","NAD83","GRS80",431.827,3729.137,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",69,"TRUCK OFFSITE 61",4.92,,,,,"U11","NAD83","GRS80",432.007,3729.363,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",70,"TRUCK OFFSITE 62",4.92,,,,,"U11","NAD83","GRS80",432.198,3729.583,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",71,"TRUCK OFFSITE 63",4.92,,,,,"U11","NAD83","GRS80",431.285,3723.824,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051026","ptn",20060413

"STK",30,16,"SC","SC","A",72,"TRUCK OFFSITE 64",4.92,,,,,"U11","NAD83","GRS80",432.087,3729.928,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051026","ptn",20060413

"STK",30,16,"SC","SC","A",73,"TRUCK OFFSITE 65",4.92,,,,,"U11","NAD83","GRS80",431.926,3730.084,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051026","ptn",20060413

"STK",30,16,"SC","SC","A",74,"TRUCK OFFSITE 66",4.92,,,,,"U11","NAD83","GRS80",431.781,3730.242,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051026","ptn",20060413

"STK",30,16,"SC","SC","A",75,"TRUCK OFFSITE 67",4.92,,,,,"U11","NAD83","GRS80",431.62,3730.421,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",76,"TRUCK OFFSITE 68",4.92,,,,,"U11","NAD83","GRS80",431.523,3730.601,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",77,"TRUCK OFFSITE 69",4.92,,,,,"U11","NAD83","GRS80",431.476,3730.828,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",78,"TRUCK OFFSITE 70",4.92,,,,,"U11","NAD83","GRS80",431.757,3730.669,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",79,"TRUCK OFFSITE 71",4.92,,,,,"U11","NAD83","GRS80",431.888,3730.842,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",80,"TRUCK OFFSITE 72",4.92,,,,,"U11","NAD83","GRS80",432.111,3731.008,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",81,"TRUCK OFFSITE 73",4.92,,,,,"U11","NAD83","GRS80",432.431,3731.076,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",82,"TRUCK OFFSITE 74",4.92,,,,,"U11","NAD83","GRS80",432.777,3731.063,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",83,"TRUCK OFFSITE 75",4.92,,,,,"U11","NAD83","GRS80",433.037,3731.11,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",84,"TRUCK OFFSITE 76",4.92,,,,,"U11","NAD83","GRS80",431.228,3730.906,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",85,"TRUCK OFFSITE 77",4.92,,,,,"U11","NAD83","GRS80",431.091,3730.755,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",86,"TRUCK OFFSITE 78",4.92,,,,,"U11","NAD83","GRS80",430.939,3730.567,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",87,"TRUCK OFFSITE 79",4.92,,,,,"U11","NAD83","GRS80",430.775,3730.384,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",88,"TRUCK OFFSITE 80",4.92,,,,,"U11","NAD83","GRS80",430.584,3730.153,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",89,"TRUCK OFFSITE 81",4.92,,,,,"U11","NAD83","GRS80",431.355,3731.262,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",90,"TRUCK OFFSITE 82",4.92,,,,,"U11","NAD83","GRS80",431.086,3731.53,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",91,"TRUCK OFFSITE 83",4.92,,,,,"U11","NAD83","GRS80",430.753,3731.803,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",92,"TRUCK OFFSITE 84",4.92,,,,,"U11","NAD83","GRS80",430.134,3732.344,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051026","ptn",20060413

"STK",30,16,"SC","SC","A",93,"TRUCK OFFSITE 85",4.92,,,,,"U11","NAD83","GRS80",429.876,3732.545,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",94,"TRUCK OFFSITE 86",4.92,,,,,"U11","NAD83","GRS80",429.3,3733.037,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",95,"TRUCK OFFSITE 87",4.92,,,,,"U11","NAD83","GRS80",430.458,3725.081,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",96,"TRUCK OFFSITE 88",4.92,,,,,"U11","NAD83","GRS80",430.653,3724.798,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",97,"TRUCK OFFSITE 89",4.92,,,,,"U11","NAD83","GRS80",430.835,3724.515,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",98,"TRUCK OFFSITE 90",4.92,,,,,"U11","NAD83","GRS80",431.068,3724.164,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",3,"OPERATIONS EQUIPMENT - ACROSS LANDFILL",9.84,,,,,"U11","NAD83","GRS80",433.975,3730.25,"",0,"AREA",0,4.58,4003,3363,0,0,"","","20051116","ptn",20060413

"STK",30,16,"SC","SC","A",4,"TRUCK ONSITE 1",4.92,,,,,"U11","NAD83","GRS80",434.151,3731.384,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",5,"TRUCK ONSITE 2",4.92,,,,,"U11","NAD83","GRS80",434.283,3731.076,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",6,"TRUCK ONSITE 3",4.92,,,,,"U11","NAD83","GRS80",434.093,3730.743,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",7,"TRUCK ONSITE 4",4.92,,,,,"U11","NAD83","GRS80",433.96,3730.528,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",8,"TRUCK ONSITE 5",4.92,,,,,"U11","NAD83","GRS80",434.025,3730.214,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",9,"TRUCK OFFSITE 1",4.92,,,,,"U11","NAD83","GRS80",429.575,3732.731,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",10,"TRUCK OFFSITE 2",4.92,,,,,"U11","NAD83","GRS80",431.447,3731.043,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",11,"TRUCK OFFSITE 3",4.92,,,,,"U11","NAD83","GRS80",432.316,3729.741,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",12,"TRUCK OFFSITE 4",4.92,,,,,"U11","NAD83","GRS80",428.569,3731.543,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051025","ptn",20060413

"STK",30,16,"SC","SC","A",13,"TRUCK OFFSITE 5",4.92,,,,,"U11","NAD83","GRS80",430.416,3729.974,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",14,"TRUCK OFFSITE 6",4.92,,,,,"U11","NAD83","GRS80",431.652,3728.938,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051025","ptn",20060413

"STK",30,16,"SC","SC","A",15,"TRUCK OFFSITE 7",4.92,,,,,"U11","NAD83","GRS80",428.782,3728.04,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",29,"TRUCK OFFSITE 21",4.92,,,,,"U11","NAD83","GRS80",426.446,3731.234,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",30,"TRUCK OFFSITE 22",4.92,,,,,"U11","NAD83","GRS80",426.188,3731.458,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051026","ptn",20060413

"STK",30,16,"SC","SC","A",31,"TRUCK OFFSITE 23",4.92,,,,,"U11","NAD83","GRS80",425.999,3731.616,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",32,"TRUCK OFFSITE 24",4.92,,,,,"U11","NAD83","GRS80",427.735,3730.006,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",33,"TRUCK OFFSITE 25",4.92,,,,,"U11","NAD83","GRS80",427.885,3729.723,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",34,"TRUCK OFFSITE 26",4.92,,,,,"U11","NAD83","GRS80",428.024,3729.462,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",35,"TRUCK OFFSITE 27",4.92,,,,,"U11","NAD83","GRS80",428.162,3729.212,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",36,"TRUCK OFFSITE 28",4.92,,,,,"U11","NAD83","GRS80",428.285,3728.962,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",37,"TRUCK OFFSITE 29",4.92,,,,,"U11","NAD83","GRS80",428.429,3728.718,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",38,"TRUCK OFFSITE 30",4.92,,,,,"U11","NAD83","GRS80",428.563,3728.446,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",39,"TRUCK OFFSITE 31",4.92,,,,,"U11","NAD83","GRS80",428.686,3728.218,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",40,"TRUCK OFFSITE 32",4.92,,,,,"U11","NAD83","GRS80",428.905,3727.821,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",41,"TRUCK OFFSITE 33",4.92,,,,,"U11","NAD83","GRS80",429.027,3727.598,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",16,"TRUCK OFFSITE 8",4.92,,,,,"U11","NAD83","GRS80",429.721,3726.689,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",17,"TRUCK OFFSITE 9",4.92,,,,,"U11","NAD83","GRS80",429.423,3723.797,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",18,"TRUCK OFFSITE 10",4.92,,,,,"U11","NAD83","GRS80",433.253,3731.145,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",19,"TRUCK OFFSITE 11",4.92,,,,,"U11","NAD83","GRS80",430.18,3729.685,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",20,"TRUCK OFFSITE 12",4.92,,,,,"U11","NAD83","GRS80",429.901,3729.345,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",21,"TRUCK OFFSITE 13",4.92,,,,,"U11","NAD83","GRS80",429.661,3729.06,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",22,"TRUCK OFFSITE 14",4.92,,,,,"U11","NAD83","GRS80",429.372,3728.727,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",23,"TRUCK OFFSITE 15",4.92,,,,,"U11","NAD83","GRS80",429.077,3728.372,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",24,"TRUCK OFFSITE 16",4.92,,,,,"U11","NAD83","GRS80",427.548,3730.294,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",25,"TRUCK OFFSITE 17",4.92,,,,,"U11","NAD83","GRS80",427.259,3730.552,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051116","ptn",20060413

"STK",30,16,"SC","SC","A",26,"TRUCK OFFSITE 18",4.92,,,,,"U11","NAD83","GRS80",427.053,3730.715,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",27,"TRUCK OFFSITE 19",4.92,,,,,"U11","NAD83","GRS80",426.854,3730.879,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",28,"TRUCK OFFSITE 20",4.92,,,,,"U11","NAD83","GRS80",426.634,3731.075,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",42,"TRUCK OFFSITE 34",4.92,,,,,"U11","NAD83","GRS80",429.134,3727.391,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

"STK",30,16,"SC","SC","A",43,"TRUCK OFFSITE 35",4.92,,,,,"U11","NAD83","GRS80",429.273,3727.174,"",0,"VOLUME",4.58,4.58,0,0,0,0,"","","20051023","ptn",20060413

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APPENDIX H
NOISE AND VIBRATION STUDY

Frank R. Bowerman Landfill
Noise and Vibration Study

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October 26, 2005

TABLE OF CONTENTS

SECTION PAGE

1.0 INTRODUCTION 1-1

2.0 BACKGROUND 2-1

2.1 Noise Terminology 2-1
2.2 Vibration Terminology 2-5
2.3 Noise Regulations 2-5

3.0 EXISTING CONDITIONS 3-1

3.1 Ambient Noise Survey 3-1
3.2 Ambient Vibration Survey 3-6

4.0 SIGNIFICANCE CRITERIA 4-1

4.1 Thresholds of Significance 4-1

5.0 IMPACT ASSESSMENT METHODOLOGY 5-1

5.1 Construction Noise 5-1
5.2 Operational Noise 5-2
5.3 Off-Site Project-Related Traffic Noise 5-2
5.3.1 6AM To 7 AM Hour Traffic Noise Levels 5-5
5.3.2 Vibration 5-8

6.0 MITIGATION MEASURES 6-1

7.0 PROJECT ALTERNATIVES 7-1

7.1 Alternative 1 7-1
7.2 Alternative 2 7-1
7.3 Alternative 3 7-2
7.4 Alternative 4 7-2

8.0 CUMULATIVE IMPACTS 8-1

9.0 LIMITATIONS 9-1

10.0 KEY PERSONNEL 10-1

11.0 REFERENCES 11-1

List of Tables

1 Sound Levels of Typical Noise Sources and Noise Environments (dBA)
2 City of Irvine Exterior Noise Standards
3 Long-Term Noise Measurements Data
4 Short-Term Noise Measurement Data
5 Short-Term Vibration Measurement Data
6 Predicted Exterior Noise Levels Assuming No Soundwalls
7 Predicted Exterior Noise Levels Assuming 7-Foot High Soundwalls
8 Predicted Exterior Noise Levels (6 to 7 AM Hour) Assuming No Soundwalls
9 Predicted Exterior Noise Levels (6 to 7 AM Hour) Assuming 7-Foot High Soundwalls
10 Criteria for Impact for Human Annoyance and Interference with Use of Vibration-Sensitive Equipment

List of Figures

1 Project Location and Noise/Vibration Measurement and Modeling Locations
2 LT-1 Hourly Noise Levels (Sand Canyon Avenue)
3 LT-2 Hourly Noise Levels (Bee Canyon Access Road)

List of Appendices

A List of Field Instrumentation and Calibration Records
B Noise Measurement Data
C Vibration Measurement Data
D Site Photographs

1.0 INTRODUCTION

This analysis assesses whether expansion of refuse disposal capacity of the Frank R. Bowerman Landfill (proposed project) will result in significant noise and vibration impacts on sensitive receptors in the vicinity of the landfill. The determination of "significant" environmental impact is based on whether 1) the sum of project-related noise and existing noise levels would exceed regulatory noise guidelines, and/or 2) the project would contribute substantial additional incremental noise above existing noise levels. Additionally, potential effects from project-related vibration will be addressed in this analysis by comparing vibration from the project to existing levels and regulatory guidelines.

2.0 BACKGROUND

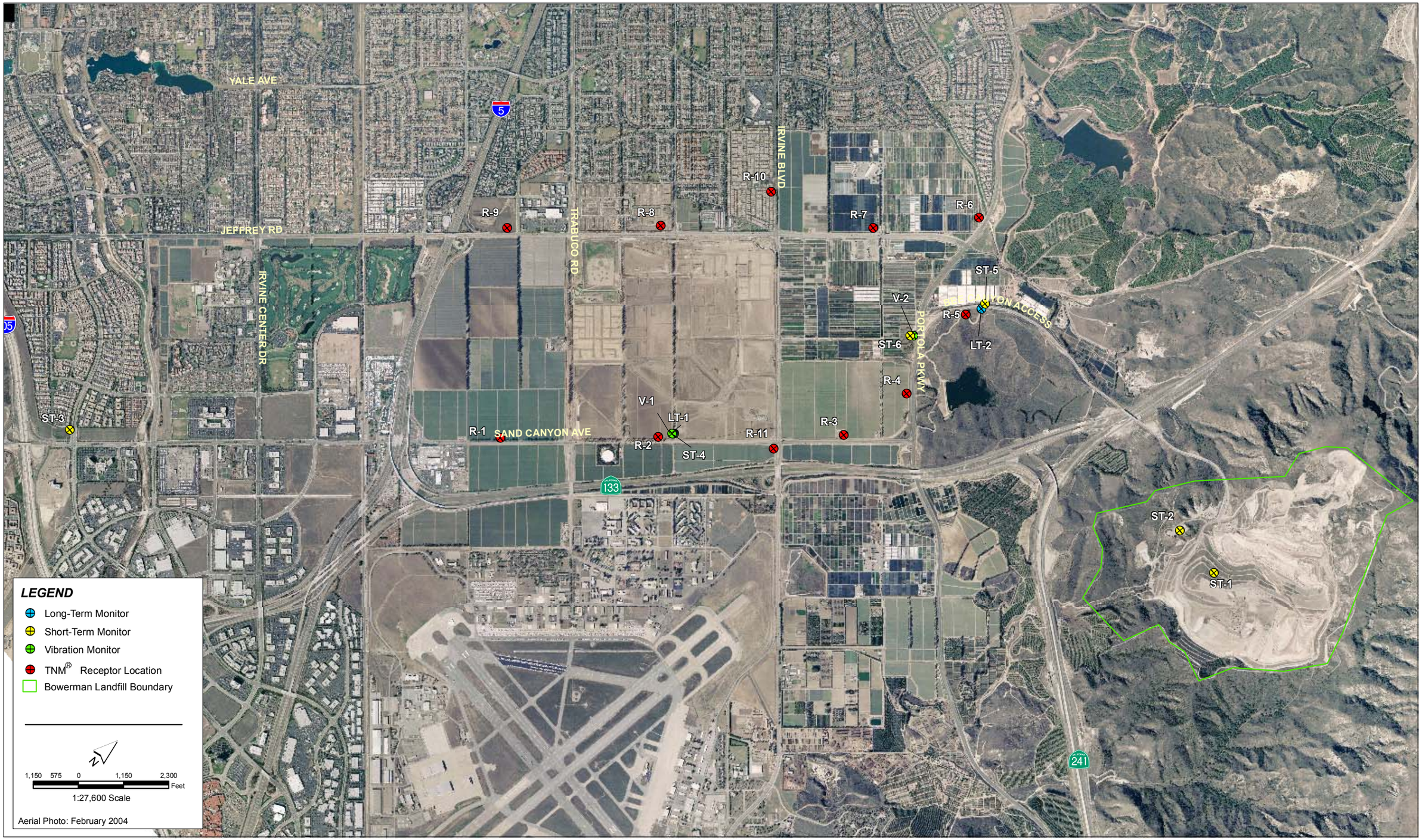
The Frank R. Bowerman Landfill (FRB Landfill) is a Class III non-hazardous municipal waste disposal site operated by the County of Orange Integrated Waste Management Department. The landfill is located at 11002 Bee Canyon Access Road, in an unincorporated portion of Orange County, north of the City of Irvine, as shown in Figure 1. FRB Landfill has been operating since 1990. The operating or "activity" level of a landfill is typically described by its daily capacity to accept refuse, quantified in tons-per-day (TPD). This project is proposed to increase the permitted daily tonnage of 8,500 TPD to a maximum of 11,500 TPD while maintaining the current 8,500 TPD limit as an annual average.

Integral to the operation of a large municipal waste disposal site is the use of diesel-powered heavy equipment on-site and heavy transport trucks operating both on and off-site. The FRB Landfill also has an on-site flare facility where collected landfill gas is combusted. Vehicles and machinery operating at FRB Landfill generate noise and may produce vibration. The on-site noise from trucks and large mobile equipment is equivalent to noise produced during the excavation and grading phase of a large construction project. The flare facility noise is similar to industrial noise from a fixed location. FRB Landfill also will construct a LNG facility located on a 3-acre site adjacent to the existing flare station. This facility was approved administratively by IWMD on August 10, 2004. This analysis will utilize noise data from the Mitigated Negative Declaration prepared for the LNG facility to analyze LNG noise.

2.1 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 ear.



Aerial Date: February 2004

URS

Figure 1

Project Location and Monitoring/Modeling Locations

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 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 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: Compiled by URS Corporation

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. Remember however, that 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 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 often desirable to also know the range of acoustic levels of the noise source being measured. This is accomplished through the 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 (DNL or 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.

2.2 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).

2.3 NOISE REGULATIONS

As previously stated, FRB Landfill is located within unincorporated Orange County. Currently no noise/vibration-sensitive receptors are located within the unincorporated area near 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 FRB Landfill the jurisdictional regulations applicable to this project are the City's. 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 2.

Table 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 2.

3.0 EXISTING CONDITIONS

Baseline noise and vibration measurements were conducted on-site and along the primary refuse hauling route to the FRB Landfill. These measurements were conducted to characterize existing ambient noise/vibration conditions at sensitive land uses, as well as to obtain reference noise measurements for on-site activities such as truck tipping, refuse spreading/compacting, gas flares, etc.

3.1 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 1. During the measurement survey, traffic noise was found to be the primary source of noise within 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 FRB Landfill. Two of the measurements were unattended, long-term (25+ hours duration, long-term (LT)). The other nine short-term (10 to 15 minutes duration, short-term (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.

The 24 hour noise data from LT-1 and LT-2 and the calculated CNEL value is shown below in Table 3. The hourly noise levels (in dBA L_{eq}) for LT-1 and LT-2 are presented in Figures 2 and 3, respectively.

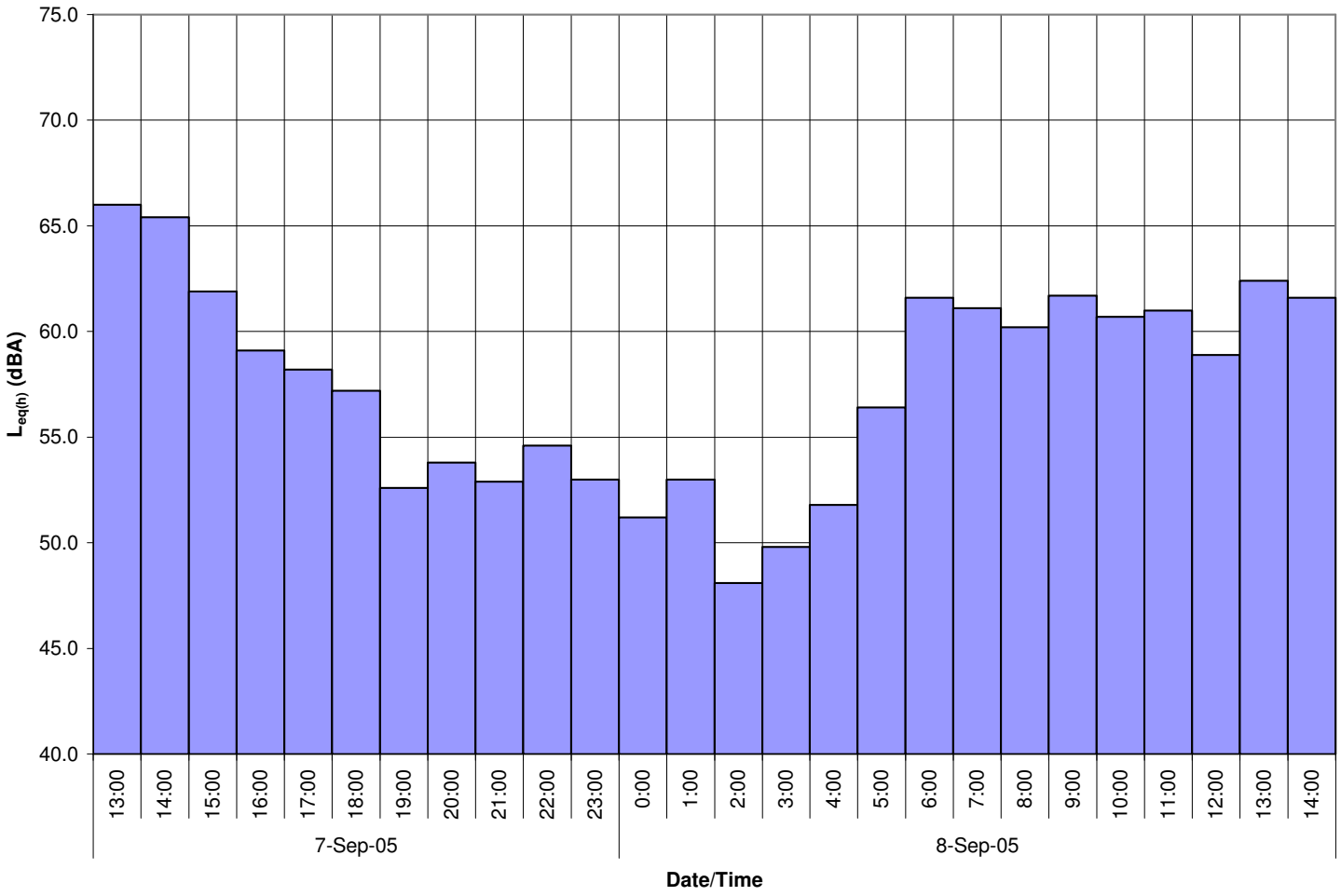
Table 3. Long-Term Noise Measurement Data

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

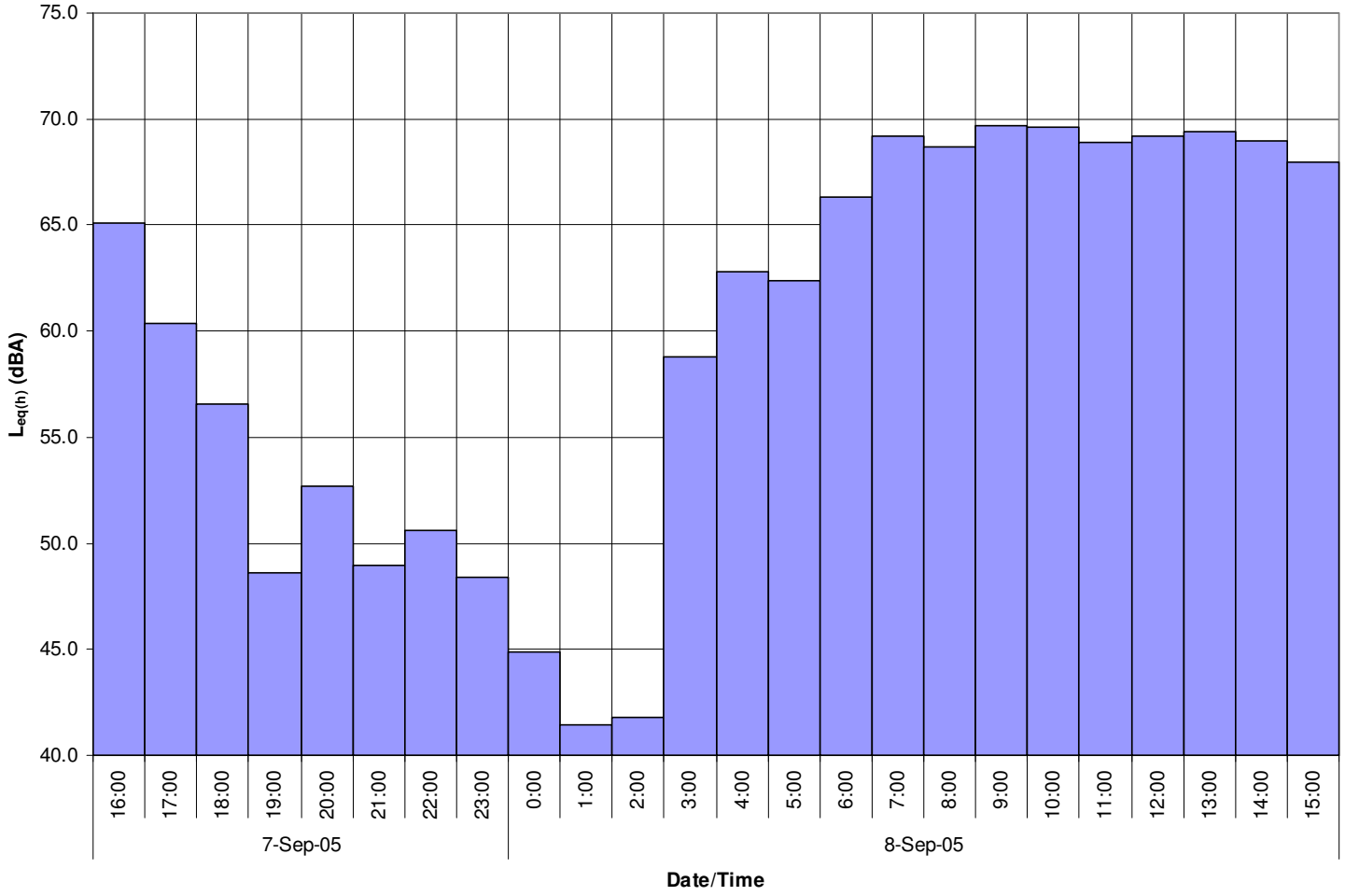
Based on observation, many of the heavy trucks using Sand Canyon were associated with FRB Landfill activity. However, numerous other heavy trucks and all other vehicles (e.g., autos, pick-up's, SUV's, busses) and local construction equipment were not associated with FRB Landfill. Conversely, all traffic on Bee Canyon Access Road was associated with FRB Landfill activities.

Figure 2: LT-1 Hourly Noise Levels (Sand Canyon Avenue)



Source: URS Corporation

Figure 3: LT-2 Hourly Noise Levels (Bee Canyon Access Road)



Source: URS Corporation

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 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.

Table 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 Nursury	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

3.2 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 FRB Landfill. The vibration measurement sites were chosen to represent potentially vibration-sensitive land uses. The measurement locations are shown on Figure 1 and are described in Table 5. Measurements were made during periods of normal traffic volumes (including numerous heavy trucks) in order to collect typical background vibration data.

Because local jurisdictions have not developed methods for measuring and evaluating ground vibration and its effects, the methodology promulgated by the Federal Transit Administration was used in this study. The Federal Transit Administration (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 area 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 contains the vibration spectra and Table 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:

$$V_{rms} = 10^{-6} \times 10^{\frac{L_v}{20}} \qquad PPV \cong 4V_{rms}$$

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.

Table 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

4.0 SIGNIFICANCE CRITERIA

4.1 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 criterion 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 Federal Transit Administration (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:

- 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).

5.0 IMPACT ASSESSMENT 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 landfill 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 level 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 station 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.

5.1 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 4 as ST-1. Large earth movers, wheeled tractor scrapers, tracked spreader-compactors, large bulldozers, along with 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 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 adverse environmental impact. To be conservative this noise analysis did not take credit where intervening terrain between the

[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.

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 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.

5.2 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 landfill gas flaring station. Based on the ST-2 measurements, the overall noise from the flare 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.

A liquefied natural gas (LNG) facility was previously analyzed and approved for construction at FRB Landfill. After incorporation of noise reducing features the noise level produced will be 50 dBA L_{50}, or 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 an adverse environmental impact.

5.3 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 – 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 for this study were provided by the traffic study completed for the project (P&D Consultants, 2005). 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 6 and 7. Table 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 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 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 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 the Year 2030, noise levels in the Future without Project scenario are predicted to range from 74 dBA CNEL at Receptor #4 (Portola Parkway from Sand Canyon Avenue to Bee Canyon Access Road) to 78 dBA CNEL at Receptor # 1 (Sand Canyon Avenue between I-5 and Trabuco Road). Noise levels in Year 2030 would increase 1 to 9 decibels either with or without the proposed project. The project itself would not perceptibly increase noise levels.

As shown in Table 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 the Year 2030, noise levels with the project are predicted to range from 66 dBA CNEL at Receptor # 4 to 70 dBA CNEL at Receptor # 1. Noise levels in Year 2030 would increase 1 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 noise impact from off-site traffic operations.

Table 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	N/A[3]	70	1	N/A[3]
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

Source: URS Corporation

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.*

3 *Not Applicable. Under Future(Year 2030) without Project conditions, there would be no traffic along Bee Canyon Access Road because the landfill would be closed.*

Table 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	N/A[3]	63	1	N/A[3]
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

Source: URS Corporation

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.*
3 *Not Applicable. Under Future(Year 2030) without Project conditions, there would be no traffic along Bee Canyon Access Road because the landfill would be closed.*

5.3.1 6AM To 7 AM Hour Traffic Noise Levels

Traffic noise levels were also calculated for the period from 6 AM to 7 AM, because the project proponents are considering beginning operations of transfer trucks during the 6 to 7 AM hour. Currently, transfer truck operations do not commence until after 7 AM. During the 6 to 7 AM hour, transfer trucks would travel along the designated truck route (i.e., Sand Canyon and Portola Parkway). Using traffic data supplied by the P&D Consultants, TNM® was used to predict noise levels during the 6 to 7 AM hour. The resultant levels are shown in Tables 8 and 9. Table 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 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 8, existing noise levels during the 6 to 7 AM 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 the Year 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 Year 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 9, existing noise levels during the 6 to 7 AM 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 to 7 AM 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 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[2]	67	0	N/A[2]
11	Irvine Boulevard / Sand Cyn toSR-133	70	74	74	4	0

Source: URS Corporation

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 Not Applicable. Under Future(Year 2030) without Project conditions, there would be no traffic along Bee Canyon Access Road because the landfill would be closed.

Table 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[2]	60	0	N/A[2]
11	Irvine Boulevard / Sand Cyn toSR-133	61	65	65	4	0

Source: URS Corporation

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 Not Applicable. Under Future(Year 2030) without Project conditions, there would be no traffic along Bee Canyon Access Road because the landfill would be closed.

5.3.2 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) 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 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 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

6.0 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. Thus, 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. Thus, 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. (see also discussion on Cumulative Impact)

No impact would result from traffic vibration associated with the proposed project and no mitigation measures are required.

7.0 PROJECT ALTERNATIVES

This section describes the noise and vibration impacts qualitatively for the proposed project alternatives. The four proposed project alternatives are described below.

7.1 ALTERNATIVE 1

Alternative 1 is the No Project Alternative. The No Project Alternative proposes no changes to the FRB Landfill; neither an increase in capacity (through a vertical or horizontal expansion) nor an increase in daily tonnage would occur. The effective closure date for the landfill would remain 2022. The landfill would continue to accept the permitted annual average of 8,500 TPD and a maximum high tonnage limit of 10,625 TPD for 36 floating (not designated) days.

Alternative 1 would not result in significant adverse noise or vibration impacts within the project area because the 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. No additional noise or vibration above existing levels would be created as a result of implementation of Alternative 1.

Exportation of waste from Orange County would be required in the event that the Olinda Alpha Landfill (OAL) Expansion Project is not approved, resulting in the closure of OAL in or around 2013. If OAL expansion is approved, exportation of waste from Orange County would be required 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.

7.2 ALTERNATIVE 2

Alternative 2 proposes a vertical and horizontal expansion for the FRB Landfill and no increase in the maximum daily tonnage. The vertical and horizontal expansion for the landfill would be the same as the proposed project, which would effectively extend the closure date to 2053. The landfill would continue to accept the permitted annual average MSW of 8,500 TPD and a maximum high tonnage limit of 10,625 for 36 floating (not designated) days.

Alternative 2 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 by Alternative 2 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 in the event that the OAL Expansion Project is not approved, resulting in the closure of OAL in or around 2013. If OAL expansion is approved, exportation of waste from Orange County would be required 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.

7.3 ALTERNATIVE 3

Alternative 3 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, which would effectively extend the closure date to 2044 if the OAL closes in 2013 and extend the closure date to 2047 if the OAL closes in 2021.

Alternative 3 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 3 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.

7.4 ALTERNATIVE 4

Alternative 4 proposes a vertical and horizontal expansion for the FRB Landfill; no increase in the maximum daily tonnage; and for Prima Deshecha Landfill; an increase of the permitted annual average from 4,000 TPD to 7,000 TPD. The vertical and horizontal expansion for the FRB Landfill under Alternative 4 is the same as the proposed project, which would effectively extend the closure date to 2053. The FRB Landfill would continue to accept the permitted annual average MSW of 8,500 TPD and a maximum high tonnage limit of 10,625 TPD for 36 floating (not designated) days. The increase of the permitted annual average MSW at Prima Deshecha Landfill would effectively reduce its closure date from 2067 to 2057 if the OAL closes in 2013 and reduce the closure date from 2067 to 2059 if the OAL closes in 2021.

Alternative 4 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 4 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 were not analyzed in this Report. However, assuming 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 Deschecha 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. An increase in noise levels associated with the landfill could, however result in the exceedance of a local noise standard.

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.

8.0 CUMULATIVE IMPACTS

There are several development plans approved for the incorporated area generally southwesterly and southerly of FRB Landfill. These developments 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. This interface of sensitive use and increased truck traffic may result in adverse noise impact exceeding local noise standards. 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.

9.0 LIMITATIONS

The opinions and recommendations presented herein are based in part upon field measurements and observations of what is believed to be typical and representative conditions of normal landfill and community activity and URS' understanding of the project as presented in this report. The noise measurements and analyses were conducted using the professional standard of care as practiced in the industry and are representative of the activity being measured during the environmental conditions existing during the measurement periods. Because of the variability of factors not within the control of the investigators, no warranty can be made that the exact noise, traffic, or activity levels would be obtained by subsequent field measurements. However, for similar climatic and seasonal conditions, and intensity of landfill and community activity, the noise levels measured would be similar to those reported herein.

10.0 KEY PERSONNEL

This Technical Noise Study and Report was prepared under the supervision of Rob Greene, who directed the technical activities of the project team. Mr. Greene is URS Vice President for Noise and Vibration. He is Board Certified by the Institute of Noise Control Engineering of the United States (#84004), and is certified as an Acoustical Consultant by the County of Orange (#200516). Mr. Mike Greene, INCE Board Certified (#97008) Senior Project Engineer, was the lead technical analyst for this project. Mr. Bob Rusby, AICP, Senior Project Planner, was the administrative Project Manager. Additional technical personnel included Ms. Rachel Romond and Mr. Grant Limberg, who served as assistant field and technical staff.

11.0 REFERENCES

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Appendix A

List of Field Instrumentation and Calibration Records

List of Field Instrumentation

Sound Level Meter (for short-term noise measurements)

- Brüel & Kjær Type 2231 Precision (Type 1) Integrating Sound Level Meter, Serial Number 1413404

Community Noise Analyzers (for long-term noise measurements)

- Larson Davis Model 820 Type 1 Integrating Sound Level Meter, Serial Number 0775
- Metrosonics Model dB308, serial numbers 2881.

Acoustical Calibrators

- Brüel & Kjær Type 4231 Acoustical Calibrator, Serial Number 1850301
- Larson Davis Model Cal 200 (94 dBA SPL @ 1000 Hz). Serial Number 2794.

Vibration Analyzer & Accelerometer

- Larson-Davis System 824 Type 1 Precision Sound Level Meter & Real Time Analyzer with FFT Module, Serial Number A0427
- PCB Piezotronics Model 393A03 ICP Accelerometer, Serial Number 9995
- 10 kg machined steel seismic mass with threaded steel stud mount, leveling feet, and spirit level

Meteorology Instrumentation

- Mannix Model CMM 880 Digital Hygrometer/Thermometer, Serial Number 8821784
- Sims Model DIC Digital Anemometer, Serial Number 95022

Other Equipment

- Surveyor tape measures
- Nikon Laser Rangefinder

Figure A-1. Brüel & Kjær Type 2231 SLM Calibration Certificate

CERTIFICATE OF CONFORMANCE
#12262-1
FOR BRÜEL & KJAER INTEGRATING SOUND LEVEL METER

Model **2231**

Serial No. **1413404**
ID No. **N/A**
P.O.# **Letter**

Customer: **URS Corporation**
Santa Ana, CA 92705

was tested and met factory specifications
according to the Referenced Test Procedure

on **19 March, 2004** BY **HAROLD LYNCH**
Service Manager

As received condition: Within Specification.
Re-calibration due **19 March, 2005**

Certified References*

Mfg.	Type	Serial No.	Date Due
B&K	2636	1324114	14 JUL 2004
HP	34401A	MY41031678	01 JUL 2004
HP	3458A	2823A07179	02 JUL 2004
HP	34970A	CRN001301	29 JAN 2005
B&K	4226	1774068	04 APR 2004
B&K	4231	1770857	31 JUL 2004

Performed in Compliance with ANSI, NCSL Z-540-1 (which also covers MIL STD 45662A)
*References are traceable to NIST (National Institute of Standards and Technology).

Note: For calibration data see enclosed pages.
The data represent both "as found" and "as left."

Reference Test Procedure: **ACCT Procedure 2231 Ver. 1.0**

Brüel & Kjær Factory Service Instructions**: 2231** Rev. Apr. 1985

Temperature	Relative Humidity	Barometric Pressure
23°C	**42**%	**990.94** hPa

Note: This calibration report shall not be reproduced, except in full, without written consent by Odin Metrology, Inc.

Signed:

ODIN METROLOGY, INC.

CALIBRATION OF BRÜEL & KJÆR INSTRUMENTS
3533 OLD CONEJO ROAD; SUITE 125 THOUSAND OAKS CA 91320
PHONE: (805) 375-0830 FAX: (805) 375-0405

Figure A-2. Larson Davis 820 SLM, S/N 0775 Calibration Certificate

Certificate of Calibration and Conformance

Certificate Number 2004-63864

Instrument Model 820, Serial Number 0775, was calibrated on 11-09-2004. The instrument meets factory specifications per Procedure D0001.8160, ANSI S1.4 1983, IEC 651-Type 1 1979, and IEC 804-Type 1 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 11-09-2004
Calibration due: 11-09-2006

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0589 / 0103	12 Months	12/04/2004	2003-54896
Larson Davis	PRM828	1302	12 Months	02/03/2005	2004-56474

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 25 ° Centigrade

Relative Humidity: 32 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Corporate Headquarters. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.

Signed: Keith Driskill
Technician: Keith Driskill

Larson Davis A PCB GROUP CO.

Larson Davis, Inc. is an ISO 9001-2000 Registered Company

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Figure A-3. Metrosonics Model dB308, S/N 2881 Calibration Certificate

CERTIFICATE OF CONFORMANCE
9442-4
FOR METROSONICS SOUND ANALYZER

Model **dB-308** — Serial No. **2881**
Id No. **N/A**

Tested with Microphone Model **MK-308** — Serial No. **N/A**

Customer: **URS Greiner – Woodward – Clyde**
Santa Ana, CA 92705

P.O. # **Verbal**

was tested and met specifications per
Metrosonics product specifications.

on **14 Mar, 2001** BY **HAROLD LYNCH**
Service Manager

As received condition: Within Specifications.
Re-calibration due on: **14 Mar, 2002**

Certified References*

Mfg.	Type	Serial No.	Date Due
B&K	9545	390093	13 AUG 2001
HP	3458A	2823A07179	31 JUL 2001
B&K	4226	1774068	22 DEC 2001

Performed in Compliance with ANSI, NCSL Z-540-1 (which also covers MIL STD 45662A)
*References are traceable to NIST (National Institute of Standards and Technology).

Reference Test Procedure: **Odin Metrology Procedure for Metrosonics dB-308**
Uncertainty of Reference 4226 in Pressure:
31.5 Hz-4kHz: ± .20dB. 4kHz-8kHz: ±.25dB
Uncertainty of ANSI Type 2 S.L.M.: 31.5Hz-2kHz: ±2dB
2kHz-4kHz: ±2.5dB. 4kHz-5kHz: ±3.0dB. 5kHz-6.3kHz: ±3.5dB. 6.3kHz-8kHz: ±4.5dB
Uncertainty ratio: >4:1

Temperature	Relative Humidity	Barometric Pressure
23° C	**42** %	**992.71** hPa

Note: This calibration report shall not be reproduced, except in full, without written consent by Odin Metrology, Inc..

Signed: Harold Lynch

ODIN METROLOGY, INC.

CALIBRATION OF BRÜEL & KJÆR INSTRUMENTS
3533 OLD CONEJO ROAD; SUITE 125 THOUSAND OAKS CA 91320
PHONE: (805) 375-0830 FAX: (805) 375-0405

Figure A-4. Brüel & Kjær 4231 Acoustical Calibrator Calibration Certificate

CERTIFICATE OF CALIBRATION FOR BRÜEL & KJÆR

Sound Level Calibrator Type 4231

The Sound Pressure Level has been measured by comparison with Standard Reference Pistonphone.

Type 4220 serial No. **1048473** and
Type 4220 serial No. **1048795**

Calibrated by: **TS** (BRÜEL & KJÆR)
Date of calibration: **02 AUG 2004**
Re-calibration due : **02 AUG 2005**

The calibrator type **4231**

Serial number **1850301**
ID number **N/A**

has been found to be **within** the specifications listed below.
Sound Pressure Level produced in the coupler terminated by a loading volume of 1.333 cm^3:
94.0 dB ± 0.2 dB
Level step: SPL increase of: **20 dB ± 0.1 dB**
Frequency: **1000 Hz ± 0.1 %**
Distortion: **< 1%**

For: **URS Corporation**
Santa Ana, CA 92705

Certificate: **13097-1** PO #: **Letter**

CONDITION OF TEST

Ambient Pressure:	**993.37**	hPa
Temperature	**23°**	C
Relative Humidity	**44**	%
Date of Calibration	**07 MAR 2005**	
Re-calibration due on	**07 MAR 2006**	

Calibration procedure: Brüel & Kjær 4231, Rev. 15 DEC 2004

PERFORMANCE AS RECEIVED:

Frequency	**999.8**	Hz
SPL	**93.97**	dB
SPL + 20 dB	**114.04**	dB
Distortion (at 94 dB)	**+0.3**	%
Battery voltage	**1.4**	**Volt**

Was frequency and SPL adjusted for improvement? **No!**
Was battery replaced with new alkaline type? **Yes!**

UNCERTAINTY OF MEASUREMENT:

A: Estimated Uncertainty of comparison:+/-0.09 dB at 99 % Confidence Level
B: Estimated Uncertainty of Ref. 4220: +/-0.09 dB at 99 % Confidence Level
C: Total Uncertainty : 0.13 dB (calculated as the Square root of the summed squares of a and b) at 99 % Confidence Level

FINAL PERFORMANCE:

Frequency	**999.8**	Hz
SPL	**93.97**	dB
SPL + 20 dB	**114.04**	dB
Distortion (at 94 dB)	**+0.3**	%

Note: This calibrator was **within** Mfg. Specifications as received.

Performed on a test system which operates in compliance with ANSI/ NCSL Z540-1(also covering MIL STD 45662A), ISO 17025, and ISO 9001:2000 Certification NQA No. 11252. Reference standards pistonphones calibrated traceable to NIST with, NIST test no **822/268655-03, D1192**

ODIN METROLOGY, INC.
CALIBRATION OF BRÜEL & KJÆR INSTRUMENTS
3533 OLD CONEJO ROAD, SUITE # 125
THOUSAND OAKS, CA 91320
PHONE: (805) 375-0830 FAX: (805) 375-0405

Calibration performed by: Harold Lynch
Harold Lynch, Service Manager

Note: This calibration report shall not be reproduced, except in full, without written consent by Odin Metrology, Inc.

Figure A-5. Larson Davis Cal 200 S/N XXXX Calibration Certificate

Certificate of Calibration and Conformance

Certificate Number 2004-63323

Instrument Model CAL200, Serial Number 2794, was calibrated on 11-03-2004. The instrument meets factory specifications per Procedure D0001.8190.

Instrument found to be in calibration as received: YES
Date Calibrated: 11-03-2004
Calibration due: 11-03-2005

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2559	2506	12 Months	11/11/2004	11920-1
Hewlett Packard	34401A	US36033460	16 Months	01/25/2005	261441
Schaevitz	P3061-15PSIA	4987	12 Months	02/14/2005	266108
Larson Davis	2900	0661	12 Months	04/05/2005	2004-58183
Hewlett Packard	34401A	3146A10352	12 Months	06/22/2005	269758
Larson Davis	PRM915	0112	12 Months	09/14/2005	2004-61841
Larson Davis	PRM902	0480	12 Months	09/14/2005	2004-61840
Larson Davis	MTS1000/2201	0111	12 Months	09/16/2005	09161-2004

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as shown on calibration report.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Corporate Headquarters. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

Before: 113.90 dB, 93.90 dB, 1000.1 Hz @ 1013 mbar.
After: Refer to Certificate of Measured Output.

Signed: Scott Montgomery
Technician: Scott Montgomery

Larson Davis A PCB GROUP CO.

Larson Davis, Inc. is an ISO 9001-2000 Registered Company

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Figure A-6. Larson Davis System 824 S/N A0427 Calibration Certificate

Certificate of Calibration and Conformance

Certificate Number 2005-70816

Instrument Model 824, Serial Number 0427, was calibrated on 01AUG2005. The instrument meets factory specifications per Procedure D0001.8046, IEC 61672-1:2002 Class 1; IEC 60651-2001, 60804-2000 and ANSI S1.4-1983 Type 1 1/3, 1/1 Oct. Filters; S1.11-1986 Type 1C; IEC61260-am1-2001 Class 1 .

Instrument found to be in calibration as received: YES
Date Calibrated: 01AUG2005
Calibration due: 01AUG2006

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0653 / 0113	12 Months	03NOV2005	2004-63328

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 25 ° Centigrade

Relative Humidity: 36 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Corporate Headquarters. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"As received" data is the same as shipped data.
Tested with PRM902 S/N 0765

Signed: _____
Technician: Sean Childs

Larson Davis A PCB GROUP CO.

Larson Davis, Inc. is an ISO 9001-2000 Registered Company

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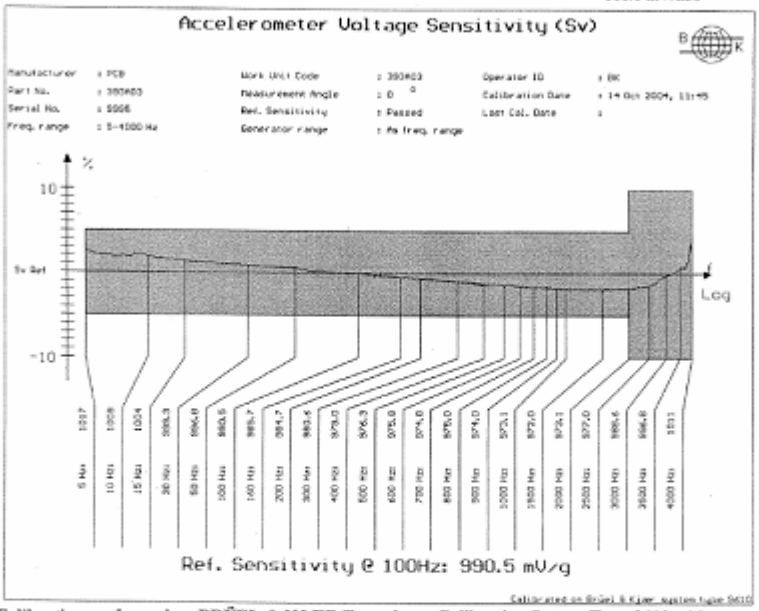
Figure A-7. PCB Piezotronics Model 393A03 ICP Accelerometer S/N 9995 Calibration Certificate

CERTIFICATE OF CALIBRATION for

PCB ACCELEROMETER — TYPE **393A03** — SERIAL# **9995**
CERTIFICATE # **12755-1** — PO # **Letter** — ID # **N/A**
FOR: **URS Corporation Santa Ana, CA 92705**
REFERENCE SENSITIVITY AT **100 HZ** WITH AN EXCITATION LEVEL OF 2 g: RMS: **990.5 mV/g**
= 101.0 mV/m/s²



Calibration performed on BRÜEL & KJÆR Transducer Calibration System Type 9610 with
Brüel & Kjær Calibration Software WT 9301 Version 1.12.04, 20010625.
Calibration System operates in conformance to ANSI/ NCSL Z540-1 (also covering MIL STD 45662A) and ISO 17025.
ISO 9001:2000 Certification NQA No. 11252
Note: The Sensitivity at 100 Hz is **WITHIN** Mfg. Specifications.
Note: The Frequency Response is **WITHIN** Mfg. Specifications which are indicated in the shaded area of the graph.
Note: **"AS FOUND"** Data is also the **"AS FINAL"** Data.
Reference Standard: Brüel & Kjær Type 8305/WH2335
Serial # 1435168
Calibration Due Date **20 AUG 2006**
NIST traceable # 822/269414-04

The Calibration was performed by: Harold Lynch
Service Manager

UNCERTAINTY OF MEASUREMENT (At 100 Hz)
A: Estimated uncertainty of comparison:
0.86% at 99 % Confidence level
B: Estimated uncertainty of Ref. Accelerometer.
0.6 % at 99 % Confidence level.
C: Total Uncertainty: : Equal to the square root of the summed squares of A and B which is
1.12 % at 99 % Confidence level.
Date of Calibration: **14 OCT 2004**
Re-calibration due on: **14 OCT 2005**

ODIN METROLOGY, INC.
CALIBRATION OF BRÜEL & KJÆR INSTRUMENTS
3533 OLD CONEJO ROAD, SUITE 125
THOUSAND OAKS, CA. 91320
PHONE: (805) 375-0830 FAX: (805) 375 0405

Environmental Conditions:
Temperature: 23°C
Relative Humidity: 39 %
Ambient Pressure: 988.16 hPa

Note: This calibration report shall not be reproduced, except in full, without written consent by Odin Metrology, Inc.

Appendix B
Noise Measurement Data

Figure B-1. ST-1 Noise Field Measurement Data Sheet

FIELD NOISE MEASUREMENT DATA

URS Project: F.R. Bowerman Landfill Job # 29870401.10000

SITE IDENTIFICATION: ST-1 **OBSERVER(s):** R. Romond, R. Greene
START DATE & TIME: 9:30 9/7/05 **END DATE & TIME:** 9/7/05
ADDRESS: dumping/compacting area E. of flare site

ID

TEMP: 68 °F HUMIDITY: 59 % R.H. WIND: CALM **LIGHT** MODERATE VARIABLE
WINDSPEED: 1-2 MPH DIR: N NE E SE **S** SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY **CLEAR** **SUNNY** FOG RAIN Other: _____

Weather

INSTRUMENT: B+K 2231 **TYPE:** **1** 2 **SERIAL #:**
CALIBRATOR: B+K 4231 **SERIAL #:**
CALIBRATION CHECK: **PRE-TEST** 93.9 **dBA SPL** **POST-TEST** _____ **dBA SPL** **WINDSCREEN** X
SETTINGS: **A-WEIGHTED** **SLOW** FAST FRONTAL **RANDOM** **ANSI** OTHER: _____

Rec #	Start	End								
/	9:35	9:50	L_{eq} 75.0	L_{max} 82.7	L_{min} 68.3	L_{90} 72.0	L_{50} 74.5	L_{10} 77.0	15:19
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	SEL 104.6
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	/	/	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	

COMMENTS: approx 250' to ctr of compacting area
500 yds E of flare station, 9500
approx 6 dg x-fer trucks, 6 spreader-compactors, 2-3 sm trash trucks
6-7

Acoustic Measurements

PRIMARY SOURCE: **TRAFFIC** **AIRCRAFT** **RAIL** **INDUSTRIAL** **AMBIENT** **OTHER:** landfill
ROADWAY TYPE:

COUNT DURATION: _____ -MINUTE	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

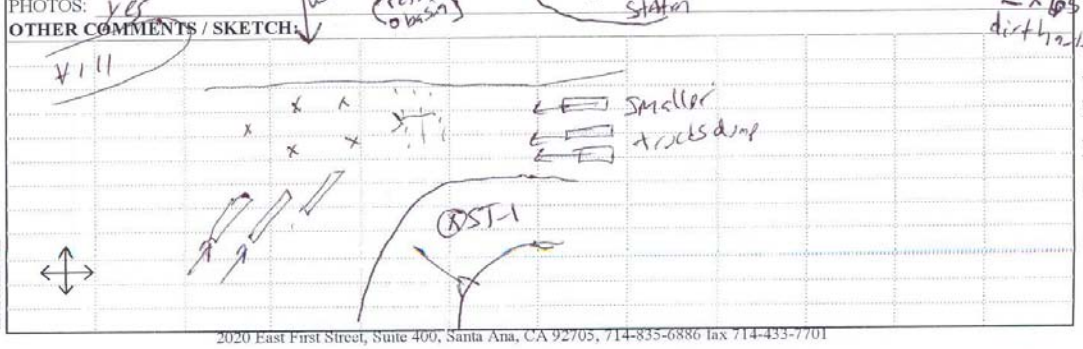
SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: back up alarms + diesel engine noise, tread clanking

CAT equip #s 836G, 836 sp/comp spreader
1x D10R
1x D9L
1x D9R
1x D9N
Occasionally 2x657E dirt haulers

Source Info and Traffic Counts

TERRAIN: HARD **SOFT** MIXED FLAT OTHER:
PHOTOS: yes
OTHER COMMENTS / SKETCH:



Description / Sketch

meas form3.xls

2020 East First Street, Suite 400, Santa Ana, CA 92705, 714-835-6886 fax 714-433-7701

Figure B-2. ST-2 Noise Field Measurement Data Sheet

FIELD NOISE MEASUREMENT DATA

URS Project: F.R. Bowerman Landfill Job # 29870401.10000

ID

SITE IDENTIFICATION: ST-2 OBSERVER(s): P. Romond, R. Greene
START DATE & TIME: 9/7/05 10:15 END DATE & TIME: 9/7/05 10:40
ADDRESS: Flare station

Weather

TEMP: 80 °F HUMIDITY: 41 % R.H. WIND: CALM [LIGHT] MODERATE VARIABLE
WINDSPEED: 2-3 MPH DIR: N NE E [SE] S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY [CLEAR] [SUNNY] FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B+K 2231 TYPE: [1] 2 SERIAL #:
CALIBRATOR: B+K 4231 SERIAL #:
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST dBA SPL WINDSCREEN X
SETTINGS: [A-WEIGHTED] [SLOW] FAST FRONTAL [RANDOM] [ANSI] OTHER:

Rec #	Start / End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
/	10:30 / 10:40	63.2	66.2	61.6	62.5	63.0	64.0
/	/						
/	/						
/	/						

COMMENTS: ~~MS~~ mostly pump noise
~~background~~ subtract 1dB b/c of bkgd noise (compactors, bus stops)

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL [INDUSTRIAL] AMBIENT OTHER: Flares & pumps
ROADWAY TYPE:

COUNT DURATION: -MINUTE

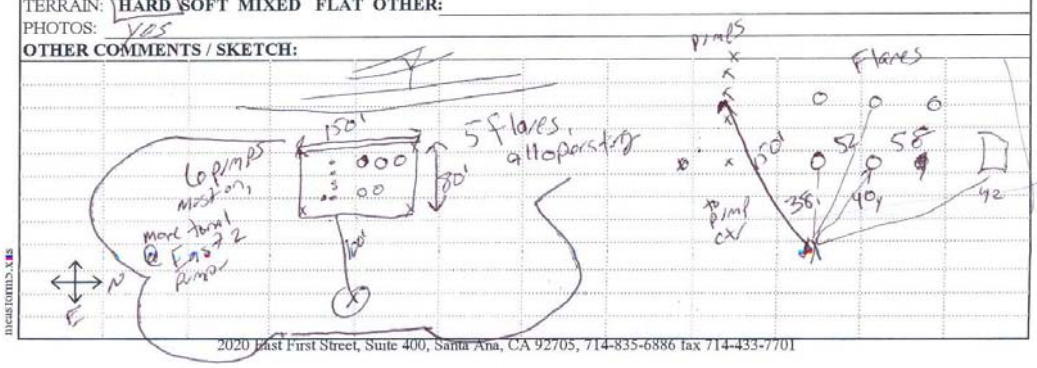
	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Description / Sketch

TERRAIN: [HARD] SOFT MIXED FLAT OTHER:
PHOTOS: YES
OTHER COMMENTS / SKETCH:



noisforms.xls

Figure B-3. ST-3 Noise Field Measurement Data Sheet

FIELD NOISE MEASUREMENT DATA

URS Project: F.R. Bowerman Landfill Job # 29870401.10000

ID

SITE IDENTIFICATION: ST-3 OBSERVER(s): KR + KG
START DATE & TIME: 11:15 9/4/05 END DATE & TIME: 11:35
ADDRESS: SW cnr Sand cyn + Alton

Weather

TEMP: 80 °F HUMIDITY: 37 % R.H. WIND: CALM [LIGHT] MODERATE [VARIABLE]
WINDSPEED: 3 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY [CLEAR] [SUNNY] FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B+K 2231 TYPE: [1] 2 SERIAL #:
CALIBRATOR: B+K 4231 SERIAL #:
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST ____ dBA SPL WINDSCREEN X
SETTINGS: [A-WEIGHTED] [SLOW] FAST FRONTAL [RANDOM] [ANSI] OTHER:

Rec #	Start / End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
/	11:20 / 11:30	62.6	71.9	54.5	57.0	60.5	66.5
/	/						
/	/						
/	/						

COMMENTS: Const. of hospital SE cnr Sand cyn → Alton
traffic on Alton more audible than traffic on Sand cyn

Source Info and Traffic Counts

PRIMARY SOURCE: [TRAFFIC] AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: CONSTRUCTION
ROADWAY TYPE:

COUNT DURATION: ____-MINUTE	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	1 /	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS
distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: dist. const (cutting tree?)

Description / Sketch

TERRAIN: HARD [SOFT] MIXED FLAT OTHER:
PHOTOS: yes
OTHER COMMENTS / SKETCH:

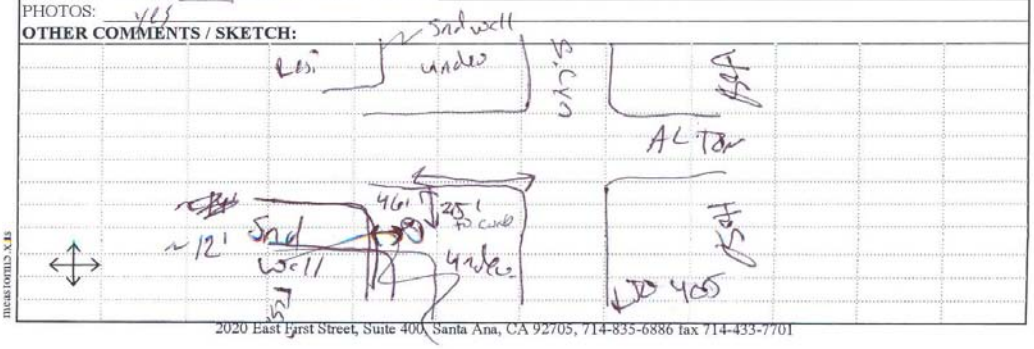


Figure B-4. ST-4 Noise Field Measurement Data Sheet

FIELD NOISE MEASUREMENT DATA

URS

Project: F.R. Bowerman Landfill Job # 29870401.10000

ID

SITE IDENTIFICATION: ST-4 OBSERVER(s): R. Greene R. Romoad
START DATE & TIME: 9-7-05 1330 END DATE & TIME: 9-7-05 1430
ADDRESS: S/W corner area Sand Cyn & Towngate
Same as LT-1

Weather

TEMP: 82 °F HUMIDITY: 38 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 6-10 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 2 SERIAL #: 1413454
CALIBRATOR: B&K 4230 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 94.0 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start	End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
1	1345	1400	62.6	77.2	49.9	52.0	56.5	65.5
2	1400	1415	62.3	75.5	48.6	51.5	60.5	65.0
/	/	/						
/	/	/						

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: Heavy Construction Equipment
ROADWAY TYPE: 4 lane arterial
COUNT DURATION: -MINUTE

	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	103 /	/	/	/
MED. TRUCKS:	1 /	/	/	/
HVY TRUCKS:	66 / 7 const veh	/	/	/
BUSES:	X /	/	/	/
MOTORCYCLES:	X /	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER: portable generator @100' for 5 minutes

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS: ✓
OTHER COMMENTS / SKETCH:

Same as LT-1

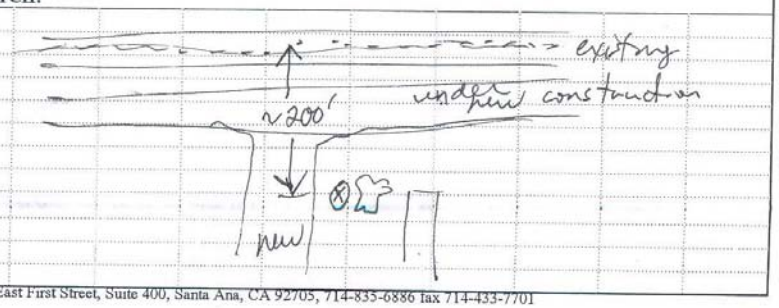


Figure B-5. ST-5 Noise Field Measurement Data Sheet

FIELD NOISE MEASUREMENT DATA

URS

Project: F.R. Bowerman Landfill Job # 29870401.10000

ID

SITE IDENTIFICATION: ST-5 OBSERVER(s): R. Greene & R. Remond
START DATE & TIME: 9-7-05 1430 END DATE & TIME:
ADDRESS: Bee Canyon Access Road N/o Portola 1st Driveway

Weather

TEMP: 80 °F HUMIDITY: 39 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 1-3 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: 1 2 SERIAL #:
CALIBRATOR: 4231 SERIAL #:
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 94.0 dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start	End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
1	1450	1455	74.3	86.1	44.4	47.0	60.0	79.5	
2	1455	1510	75.3	94.9	41.7	45.0	60.0	80.0	
/	/	/							
/	/	/							

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER:
ROADWAY TYPE:

COUNT DURATION: 15 -MINUTE

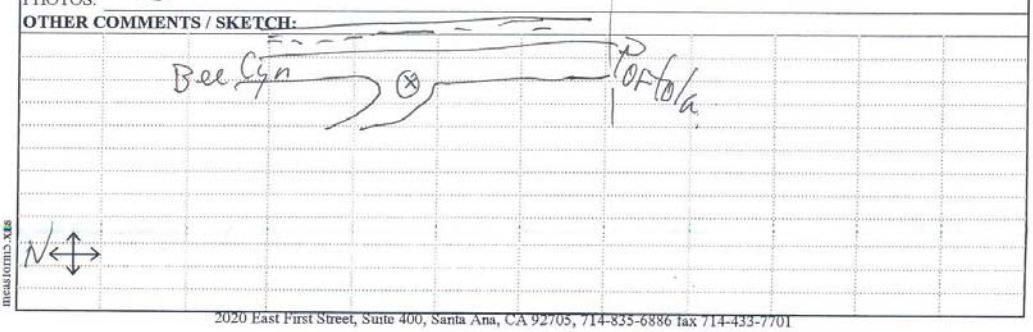
	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	10 /	/	/	/
MED. TRUCKS:	X /	/	/	/
HVY TRUCKS:	48 /	/	/	/
BUSES:	X /	/	/	/
MOTORCYCLES:	X /	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



measforms.xls

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Figure B-6. ST-6 Noise Field Measurement Data Sheet

FIELD NOISE MEASUREMENT DATA

URS Project: F.R. Bowerman Landfill Job # 29870401.10000

ID

SITE IDENTIFICATION: ST-6 OBSERVER(s): R. Greene & R. Romond
START DATE & TIME: 9-8-05 1500 END DATE & TIME: 1605
ADDRESS: on ~~Heinz~~ Hines Nursery

Weather

TEMP: 85 °F HUMIDITY: 44 % R.H. WIND: CALM (LIGHT) MODERATE VARIABLE
WINDSPEED: 1-4 MPH DIR: N NE E SE (S) SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY (CLEAR) (SUNNY) FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: B&K 2231 TYPE: (1) 2 SERIAL #: 1413404
CALIBRATOR: B&K 4231 SERIAL #: 1850301
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST 93.9 dBA SPL WINDSCREEN X
SETTINGS: (A-WEIGHTED) (SLOW) FAST FRONTAL (RANDOM) (ANSI) OTHER:

Rec #	Start / End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}
1	1535 / 1540	49.5	57.7	44.0	45.5	48.0	52.5
2	1540 / 1555	52.6	67.1	44.0	45.5	47.5	54.5
/	/						
/	/						

COMMENTS:

Source Info and Traffic Counts

PRIMARY SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: irrigation / birds (distant)
ROADWAY TYPE: 4 lane arterial

COUNT DURATION: ____-MINUTE

	NB / EB	SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB	SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	62	Not visible				45 est
MED. TRUCKS:						
HVY TRUCKS:	10	7				35 est.
BUSES:	X	X				
MOTORCYCLES:	X	X				

SPEED ESTIMATED BY: RADAR / DRIVING / (OBSERVER)

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS

OTHER:

Description / Sketch

TERRAIN: HARD (SOFT) MIXED (FLAT) OTHER: w/ elevated roadway 15'-20'
PHOTOS:
OTHER COMMENTS / SKETCH:

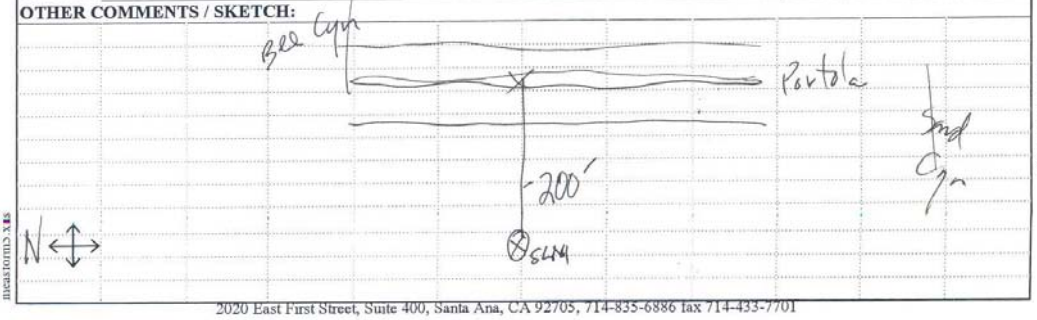

Figure B-7: LT-1 Noise Field Measurement Data Sheet

FIELD NOISE MEASUREMENT DATA

URS Project: F.R. Bowerman Landfill Job # 29870401.10000

ID

SITE IDENTIFICATION: LT-1 OBSERVER(s): R. Greene - R. Romond
START DATE & TIME: 9-7-05 1300 END DATE & TIME: 9/8/05 1500
ADDRESS: S/W corner of Sand Canyon & Towngate

Weather

TEMP: 82 °F HUMIDITY: 38 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 6-10 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: dB 308 TYPE: 1 2 SERIAL #: 2881 WCC2
CALIBRATOR: SERIAL #:
CALIBRATION CHECK: PRE-TEST 102.0 dBA SPL POST-TEST 101.8 dBA SPL WINDSCREEN ___
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start	End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	
/	1330	1455	59.8	87.8					
/									
/									
/									

COMMENTS: disregard 13:15 to 13:30 25hrs 36min 37sec

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: CONSTRUCTION Heavy vehicles
ROADWAY TYPE: 2 lane arterial

COUNT DURATION: ____-MINUTE

	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS
OTHER:

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH: mounted on large old eucalyptus tree

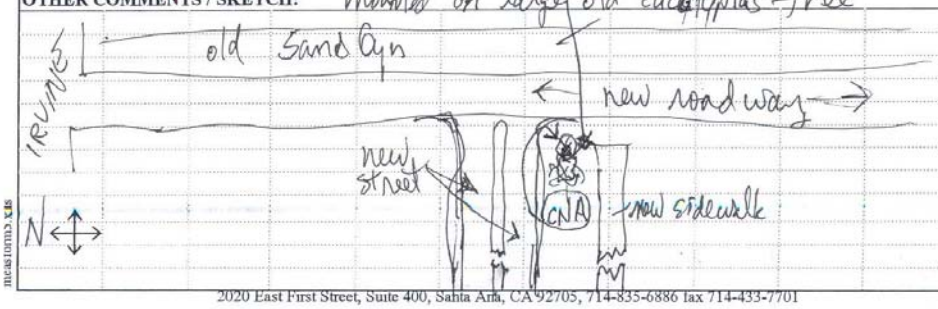

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Figure B-8: LT-2 Noise Field Measurement Data Sheet

FIELD NOISE MEASUREMENT DATA

URS Project: F.R. Bowerman Landfill Job # 29870401.10000

ID

SITE IDENTIFICATION: LT-2 OBSERVER(s): L. Romanul, R. Greene
START DATE & TIME: 9/7/05 14:45 END DATE & TIME: 9-8-05 16:15
ADDRESS: Bee Cyn Rd, W side of @ 1st turnout

Weather

TEMP: 80 °F HUMIDITY: 39 % R.H. WIND: CALM LIGHT MODERATE VARIABLE
WINDSPEED: 1-3 MPH DIR: N NE E SE S SW W NW STEADY GUSTY
SKY: OVRCST PARTLY CLOUDY CLEAR SUNNY FOG RAIN Other:

Acoustic Measurements

INSTRUMENT: LD 820 TYPE: 1 2 SERIAL #:
CALIBRATOR: LD CAL 200 SERIAL #:
CALIBRATION CHECK: PRE-TEST 93.9 dBA SPL POST-TEST dBA SPL WINDSCREEN X
SETTINGS: A-WEIGHTED SLOW FAST FRONTAL RANDOM ANSI OTHER:

Rec #	Start	End	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	L_{25}
	15:00	1620	65.8	88.9	32.3	40.3	47.3	69.2	54.1

COMMENTS: disregard 1st 15 min
25hrs 17min 55sec

Source Info and Traffic Counts

PRIMARY SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL AMBIENT OTHER: trash x-fer trucks
ROADWAY TYPE: 3-lane Idn hill, 2 up grade ~ 4%

COUNT DURATION: -MINUTE

	NB / EB / SB / WB	SPEED (mph) NB EB / SB WB	#2 COUNT: NB / EB / SB / WB	SPEED (mph) NB EB / SB WB
AUTOS:	/	/	/	/
MED. TRUCKS:	/	/	/	/
HVY TRUCKS:	/	/	/	/
BUSES:	/	/	/	/
MOTORCYCLES:	/	/	/	/

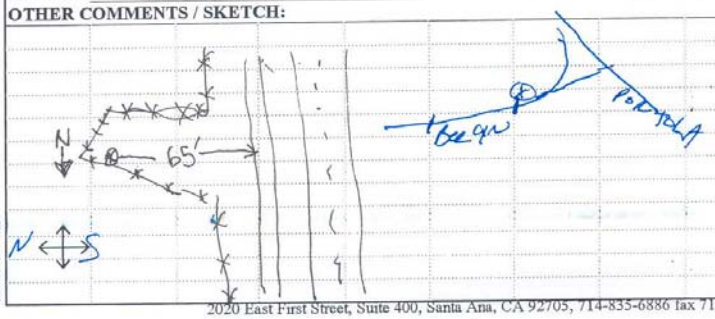
SPEED ESTIMATED BY: RADAR / DRIVING / OBSERVER

OTHER NOISE SOURCES: distant AIRCRAFT overhead / RUSTLING LEAVES / distant BARKING DOGS / BIRDS distant CHILDREN PLAYING / distant TRAFFIC / distant LANDSCAPING / distant TRAINS

OTHER:

Description / Sketch

TERRAIN: HARD SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



measureform.xls

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Appendix C
Vibration Measurement Data

Figure C-1: V-1a – V-1b Vibration Field Measurement Data Sheet

FIELD VIBRATION MEASUREMENT DATA

URS

Project: F.R. Bowerman Landfill Job #: 29870401.10000

Measurement ID

SITE IDENTIFICATION: V-1 OBSERVER(s): R. Romond
START DATE & TIME: 9/8/05 13:20 END DATE & TIME: 9/8/05 13:50
ADDRESS: SW corner of Sand Canyon + Towngate
(S. of Irvine Blvd, N. of Trabuco)
GPS:

INSTRUMENT: Larson Davis System 824 SERIAL #: A0427
TRANSDUCER: PCB 393A03 accelerometer SERIAL #: 9995
MOUNTING METHOD: [STUD & SEISMIC MASS] MAGNETIC ADHESIVE OTHER:
CALIBRATION: w/ CAL 200 @ 94 Cal Level: 94.30 Cal Offset Check: -46.90
SETUP: FFT vib HT Gain: +20 BW: 200 Avgs: 600 Win: Han Lin Units: g Lin Scale: +0.08
MODE: FFT, direct x-ducer, scale factor = 990.5999 mV/unit, unit = g

PRM 902 #1640
mi L2560 #3137,
Xducer = "direct"

Vibration Measurements

ID	824 File	Start	End Time	Comments (incl. gain & # avgs if different than above)	
V-1a	1	13:33	13:38	in line w/ ST-4 + LT-1; 7 Heavy Trucks, 1 med truck	47.
				on existing Sand Cyn; CAT 330C excavator +	
				CAT front-end loader across Townhome, ~250'	
				"bump" @ ~65 Hz from truck traffic	
V-1b	2	13:40	13:45	7 Heavy, 1 med, spike @ ~66.5 Hz	47.1
				lo-freq (0-30 Hz) from const?	

Source Info

PRIMARY SOURCE: [TRAFFIC] RAIL CONSTRUCTION INDUSTRIAL AMBIENT OTHER
OTHER/DESC: on existing Sand Canyon
OTHER VIB SOURCES: distant TRAFFIC / distant RAIL / distant [CONSTRUCTION]
OTHER: N. of Towngate, ~250' away

Description / Sketch

SURFACE: FLAT ROLLING DIRT [CONCRETE] ASPHALT OTHER:
SUBSURFACE: UNKNOWN [SOIL] ROCK OTHER: SOIL TYPE:
OTHER COMMENTS / SKETCH: See ST-4, LT-1 PHOTOS: [Y] N

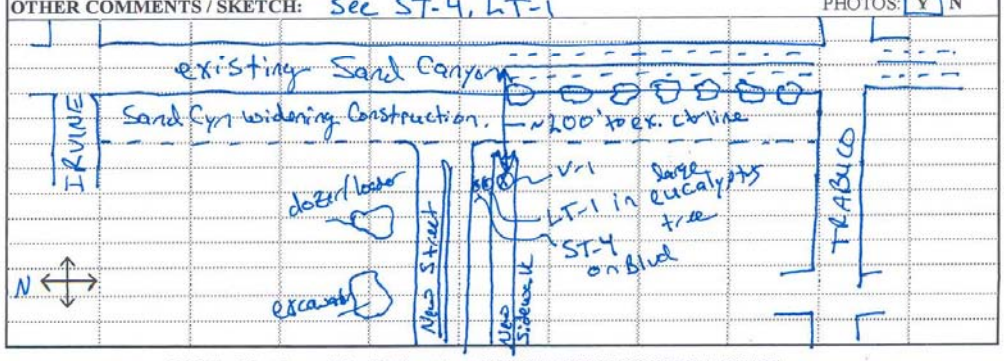

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Figure C-2: V-2d – V-1f Vibration Field Measurement Data Sheet

FIELD VIBRATION MEASUREMENT DATA

URS

Project: F.R. Bowerman Landfill Job #: 29870401.10000

Measurement ID

SITE IDENTIFICATION: V-2 OBSERVER(s): R. Romond
START DATE & TIME: 15:25 9/8/05 END DATE & TIME: 16:05 9/8/05
ADDRESS: Hines Nursery, SE of Portola Pkwy / Bee Canyon intersection
GPS:

INSTRUMENT: Larson Davis System 824 SERIAL #: A0427
TRANSDUCER: PCB 393A03 accelerometer SERIAL #: 9995
MOUNTING METHOD: **STUD & SEISMIC MASS** MAGNETIC ADHESIVE OTHER:
CALIBRATION: w/ CAL 200 @ 94 Cal Level: 94.30 Cal Offset Check: -46.90
SETUP: FFTvib HI Gain: +20 BW: 200 Avgs: 600 Win: Han Lin Units: g Lin Scale: +0.08
MODE: FFT, direct xducer, Scale Factor = 990.5999 mV/g

PRM902 #1640
mic 2560 #3137

Vibration Measurements

ID	824 File	Start	End Time	Comments (incl. gain & # avgs if different than above)	
V-2a	3	15:34	15:39	on Portola: ~3 Hwy, 7 med	45.7
V-2b	4	15:41	15:46	" ~2 Hwy, 5 med, none visible in EB lanes	47.1
V-2c	5	15:49	15:54	" ~3 Hwy, 4 med; 2 Hwy, 2 med in close lane	50.6
V-2d	6	15:55	16:00	"Some Hwy, med in close lane; tractor driving on path	47.3

Source Info

PRIMARY SOURCE: **TRAFFIC** RAIL CONSTRUCTION INDUSTRIAL AMBIENT OTHER
OTHER/DESC: on Portola Pkwy
OTHER VIB SOURCES: distant **TRAFFIC** / distant **RAIL** / distant **CONSTRUCTION**
OTHER:

Description / Sketch

SURFACE: FLAT ROLLING **DIRT** CONCRETE ASPHALT OTHER packed dirt + gravel truck path
SUBSURFACE: UNKNOWN **SOIL** ROCK OTHER: SOIL TYPE:
OTHER COMMENTS / SKETCH: PHOTOS: Y N

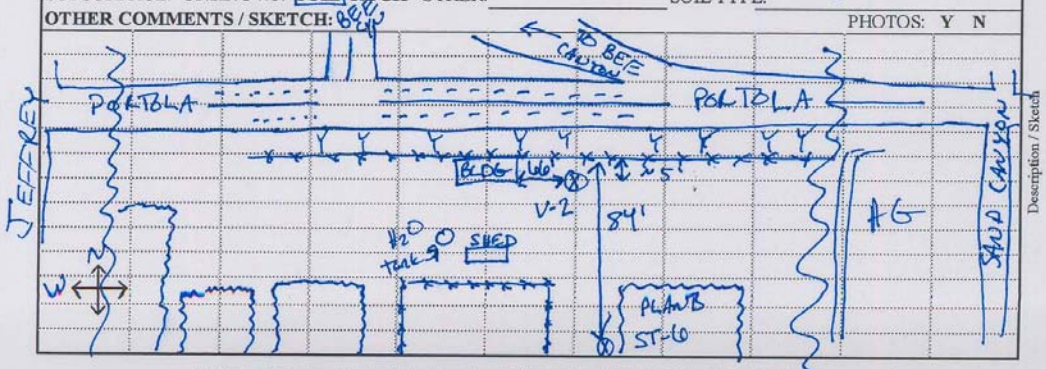

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Figure C-3. Vibration Spectrum V-1a

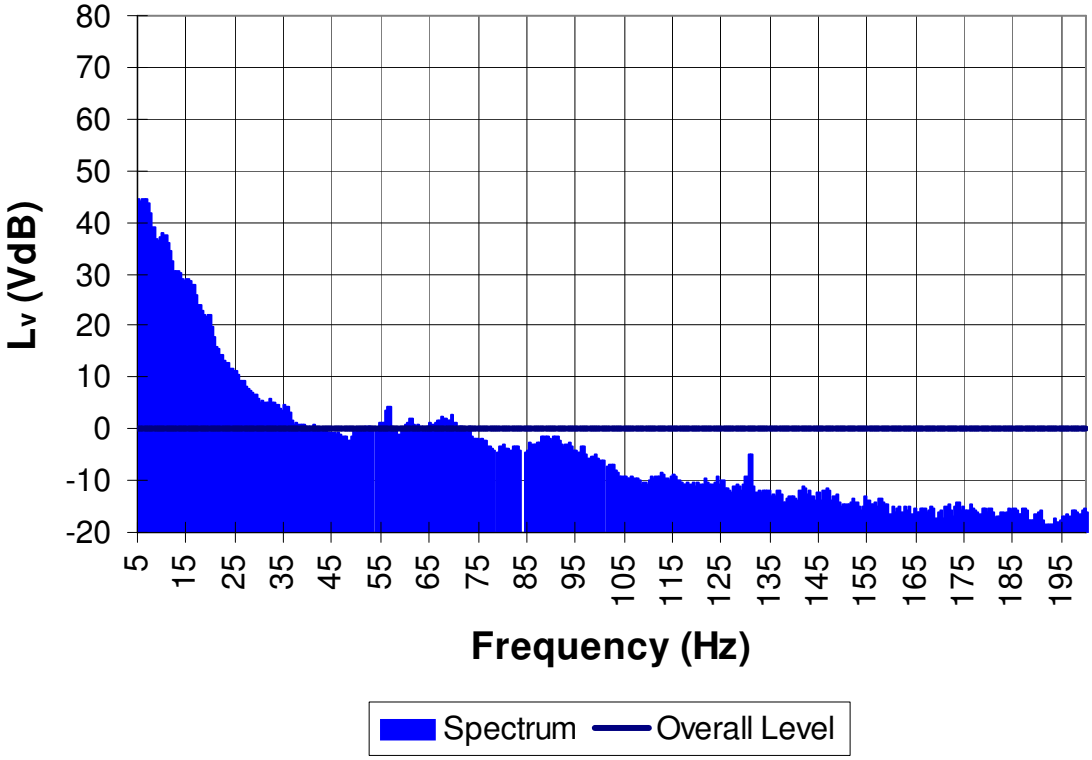


Figure C-4. Vibration Spectrum V-1b

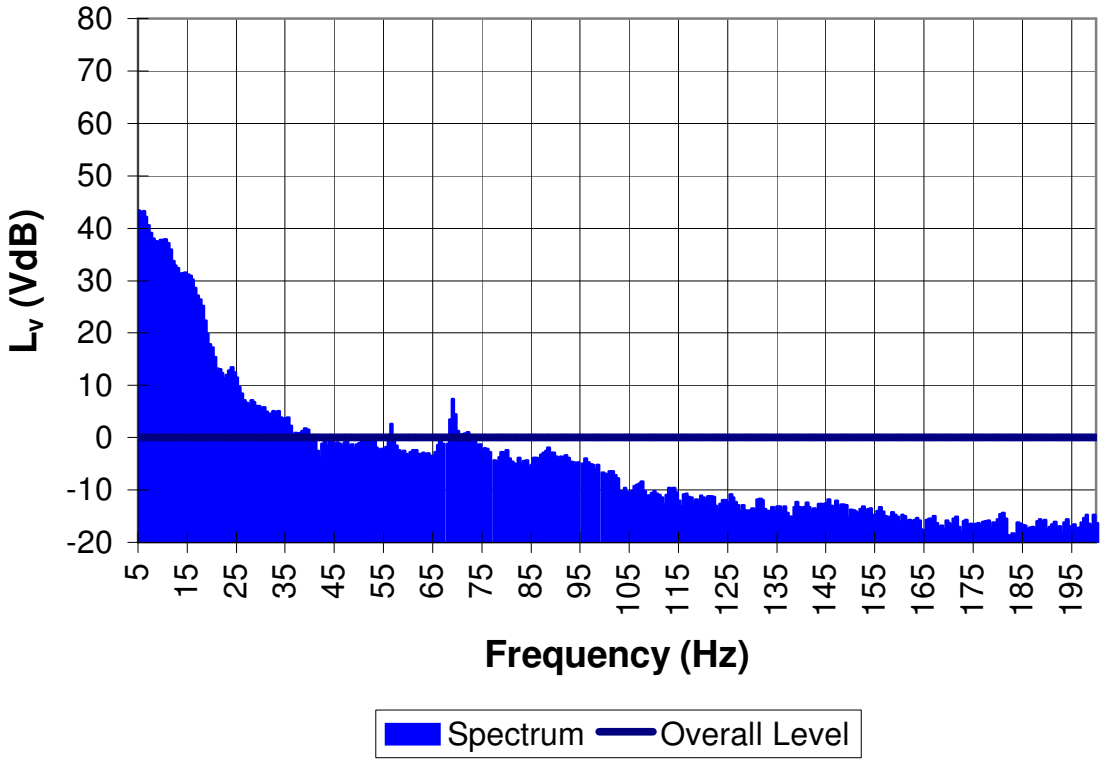


Figure C-5: Vibration Spectrum V-2a

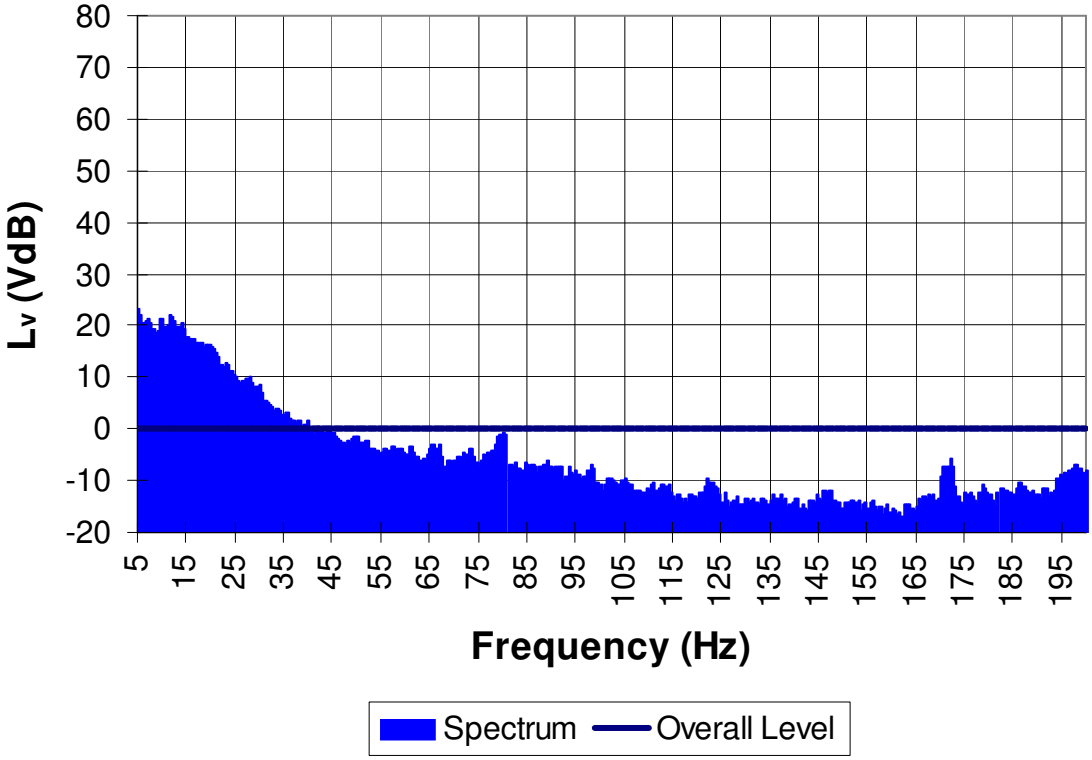


Figure C-6. Vibration Spectrum V-2b

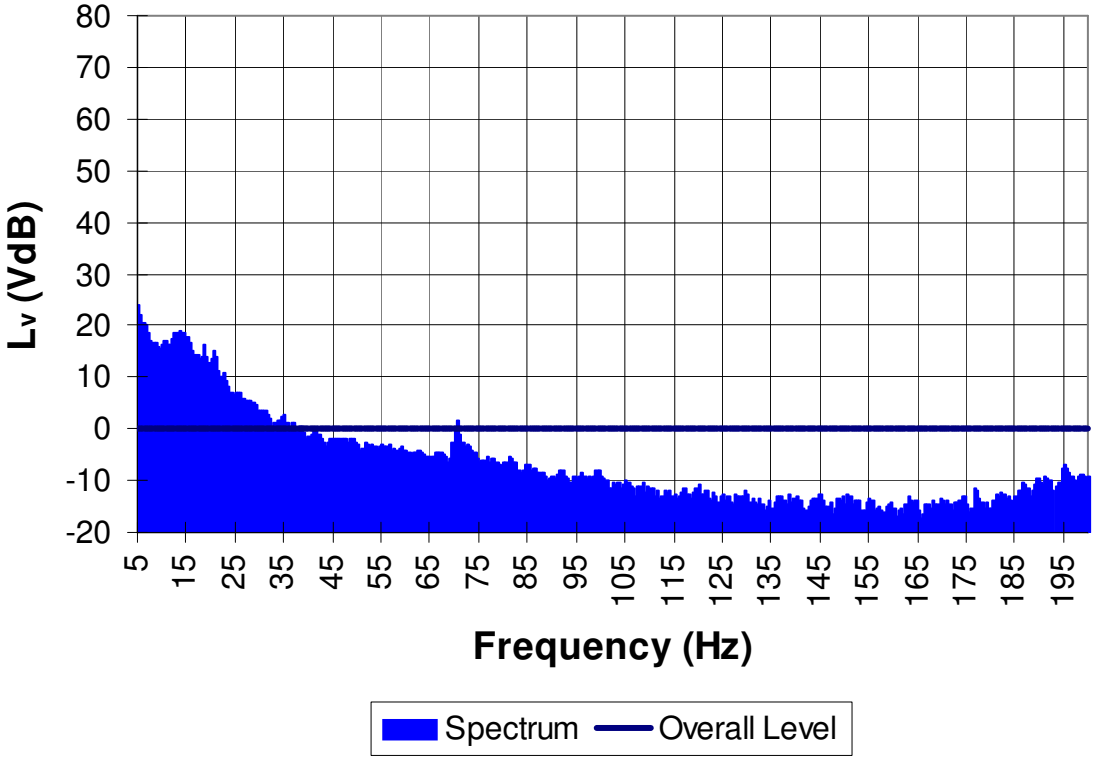


Figure C-7. Vibration Spectrum V-2c

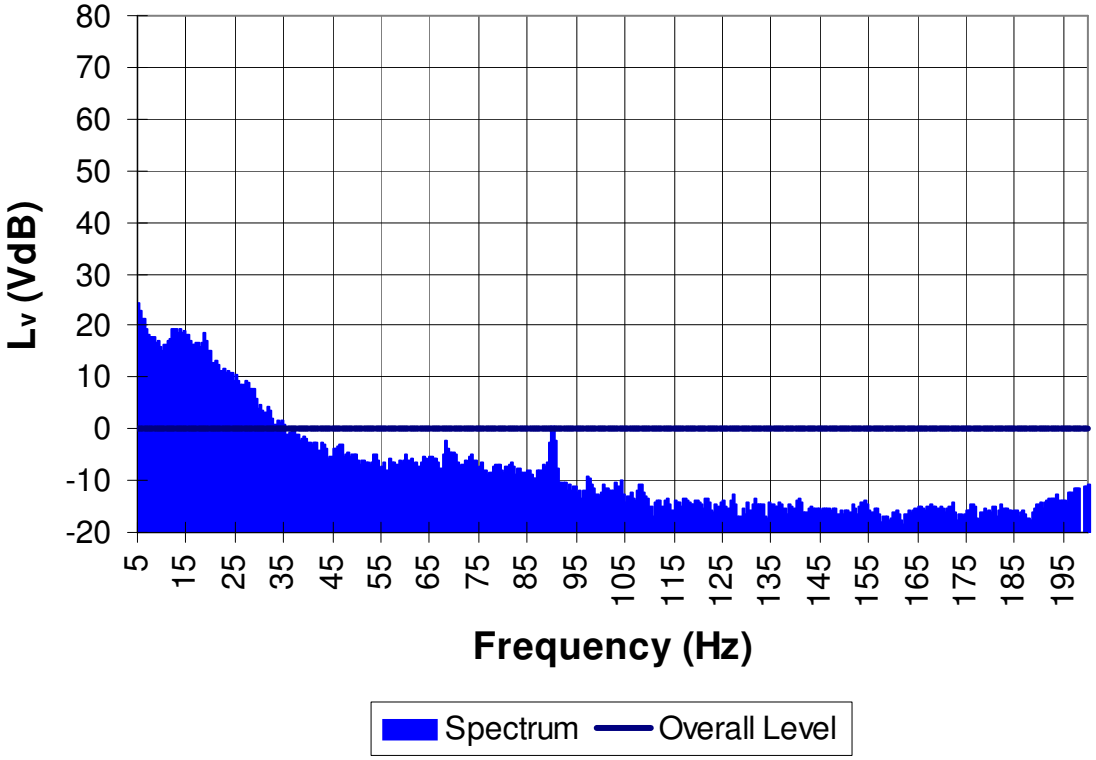
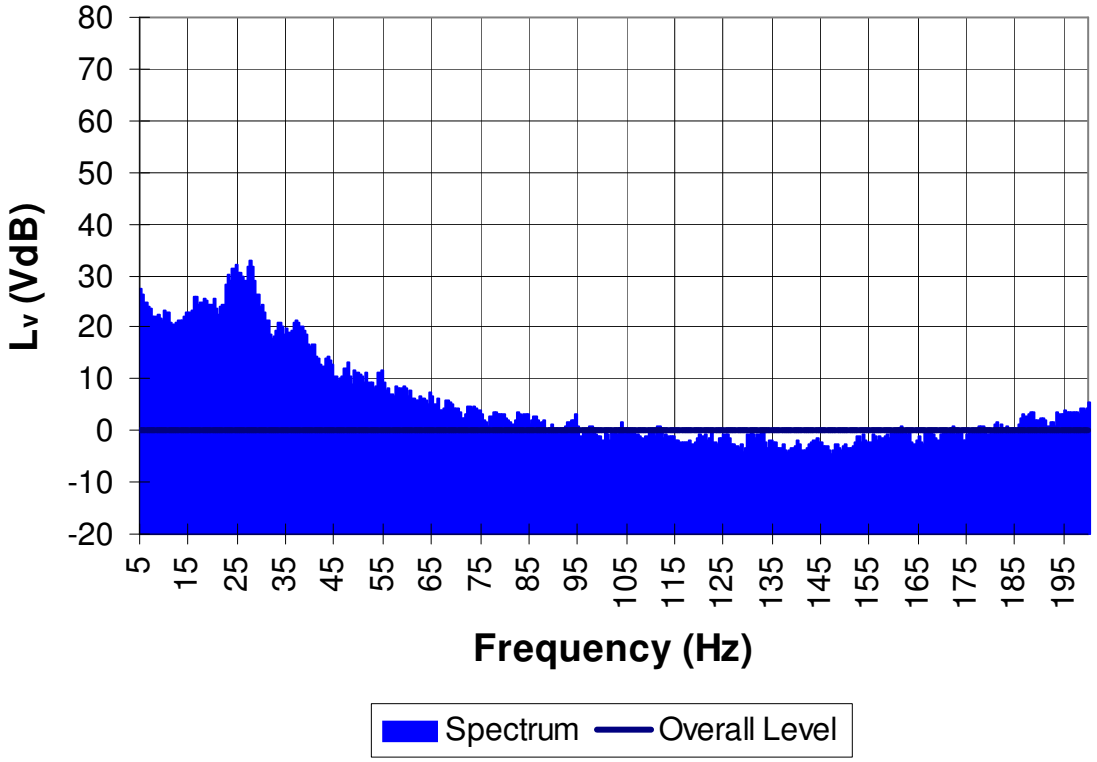


Figure C8. Vibration Spectrum V-2d



Appendix D
Site Photographs

LT-1

LT-2
.

ST-1

ST-1

ST-2

ST-3
.

ST-4

ST-5

.

ST-6 & V-2

V-1
.

V-2
.

APPENDIX I
BIOLOGICAL RESOURCES

FRANK R. BOWERMAN LANDFILL
MASTER DEVELOPMENT PLAN
BIOLOGICAL RESOURCES TECHNICAL REPORT

PREPARED FOR:

County of Orange
Integrated Waste Management Department
320 North Flower Street, Suite 400
Santa Ana, California 92703

&

Bryan A. Stirrat & Associates
1360 Valley Vista Drive
Diamond Bar, California 91765

PREPARED BY:

P&D Consultants
999 Town and Country Road, 4th Floor
Orange, CA 92868

Contact Person: Michael Benner

JANUARY 2005

TABLE OF CONTENTS

1.0 INTRODUCTION....1
1.1 Overview....1

2.0 MASTER DEVELOPMENT PLAN....7

3.0 EXISTING CONDITIONS....9
3.1 Plant Communities and Wildlife Habitats....9
3.1.1 Venturan-Diegan Transitional Coastal Sage Scrub....9
3.1.1.1 Sagebrush-California Buckwheat Scrub....12
3.1.1.2 Sagebrush Scrub....13
3.1.1.3 Sagebrush-Black Sage Scrub....14
3.1.1.4 Bush Mallow Sage Scrub....14
3.1.2 Toyon-Sumac Chaparral....14
3.1.3 Southern Cactus Scrub....15
3.1.4 Ruderal Grassland Community....15
3.1.5 Southern Sycamore Riparian Woodland....16
3.1.6 Southern Willow Scrub....17
3.1.7 Coast Live Oak Woodland....17
3.1.8 Orchard....18
3.1.9 Revegetation Area....18
3.2 Orange County Central and Coastal Subregion Natural Community Conservation Plan .19
3.2.1 Overview of the NCCP....19
3.2.1.1 Reserve System....22
3.2.1.2 Special Linkage Area....22
3.2.1.3 Take Authorization....24
3.2.1.4 Limestone Canyon Wilderness Park....24
3.3 Sensitive Biological Resources....25
3.3.1 Plants....30
3.3.1.1 Thread-Leaved Brodiaea (*Brodiaea filifolia*)....30
3.3.1.2 Intermediate (Foothill) Mariposa Lily (*Calochortus weedii* var. *intermedius*)....31
3.3.1.3 Catalina Mariposa Lily (*Calochortus catalinae*)....31
3.3.1.4 Many-Stemmed Dudleya (*Dudleya multicaulis*)....32
3.3.1.5 Vernal Barley (*Hordeum intercedens*)....32
3.3.1.6 Chaparral Beargrass (*Nolina cismontane*)....34
3.3.1.7 Coulter's Matilija Poppy (*Romneya coulteri*)....34
3.3.2 Plant Communities....34
3.3.2.1 Venturan-Diegan Transitional Coastal Sage Scrub....34
3.3.2.2 Southern Cactus Scrub....35
3.3.2.3 Southern Sycamore Riparian Woodland....35
3.3.2.4 Southern Willow Scrub....35
3.3.2.5 Coast Live Oak Woodland....36
3.3.3 Amphibians....36
3.3.3.1 Western Spadefoot Toad (*Scaphiopus hammondii*)....36

3.3.4 Reptiles 36
3.3.4.1 Orange-Throated Whiptail (*Aspidoscelis hyperythrus*) 36
3.3.4.2 San Diego Horned Lizard (*Phrynosoma coronatum blainvillei*) 37
3.3.4.3 Red Diamond Rattlesnake (*Crotalus rubber*) 37
3.3.5 Birds 38
3.3.5.1 Coastal California Gnatcatcher (*Polioptila californica californica*) 38
3.3.5.2 Least Bell's Vireo (*Vireo bellii pusillus*) 40
3.3.5.3 Coastal Cactus Wren (*Campylorhynchus brunneicapillus*) 40
3.3.5.4 Cooper's Hawk (*Accipiter cooperi*) 41
3.3.5.5 Sharp-shinned Hawk (*Accipiter striatus*) 41
3.3.5.6 Northern Harrier (*Circus cyaneus*) 41
3.3.5.7 Golden Eagle (*Aquila chrysaetos*) 42
3.3.5.8 Peregrine Falcon (*Falco peregrinus*) 42
3.3.5.9 Prairie Falcon (*Falco mexicanus*) 43
3.3.5.10 Loggerhead Shrike (*Lanius ludovicianus*) 43
3.3.5.11 Yellow Warbler (*Dendroica petechia brewsteri*) 43
3.3.5.12 Yellow-breasted Chat (*Icteria virens*) 44
3.3.5.13 Rufous-crowned sparrow (*Aimophila ruficeps canescens*) 44
3.3.5.14 Bell's Sage Sparrow (*Amphisipiza belli belli*) 45
3.3.5.15 Southwestern Willow Flycatcher (*Empidonax traillii extimus*) 45
3.3.6 Mammals 46
3.3.6.1 San Diego Desert Woodrat (*Neotoma lepisa intermedia*) 46
3.4 Wildlife Dispersal 46
3.5 Wetlands and Waters of the United States and California 47
3.5.1 Wetland and Jurisdictional Waters Regulation 48
3.5.1.1 United States Army Corps of Engineers 48
3.5.1.2 Regional Water Quality Control Board 48
3.5.1.3 California Department of Fish and Game 48
3.5.2 Jurisdictional Drainages 49

4.0 METHODOLOGY 52
4.1 Sensitive Species Determinations 52
4.2 Listed Species 53
4.3 Orange County Central and Coastal Subregion NCCP 53
4.4 Sensitive Species Surveys 54
4.5 Plant Community Mapping 55

5.0 THRESHOLDS OF SIGNIFICANCE 57
5.1 CEQA Thresholds of Significance 57
5.2 Orange County Central and Coastal Subregion NCCP 58

6.0 BIOLOGICAL IMPACTS 59
6.1 Introduction 59
6.2 Plant Communities/Wildlife Habitat 60
6.2.1 Short Term Impacts 60
6.2.2 Long Term Impacts 60

6.3 Sensitive Biological Resources 62
6.3.1 Short Term Impacts 62
6.3.2 Long Term Impacts 64
6.3.2.1 Intermediate Mariposa Lily 65
6.3.2.2 Catalina Mariposa Lily 65
6.3.2.3 Many-stemmed dudleya 65
6.3.2.4 Coastal Sage Scrub 67
6.3.2.5 California Gnatcatcher, Cactus Wren and Orange-throated Whiptail 67
6.3.2.6 Other Sensitive Wildlife 68
6.4 Wildlife Dispersal 69
6.4.1 Short Term Impacts 69
6.4.2 Long Term Impacts 69
6.5 Summary of Jurisdictional Determination 70

7.0 MITIGATION MEASURES 73

8.0 REFERENCES AND PERSONAL COMMUNICATIONS 81

9.0 LIST OF PREPARERS 83

APPENDICES

A Floral Compendia
B Faunal Compendia
C Results of Surveys for Rare Plants at the Frank R. Bowerman Landfill
D Results of Surveys for Coastal California Gnatcatcher at the Frank R. Bowerman Landfill
E Results of Surveys for Least Bell's Vireo and Southwestern Willow Flycatcher at the Frank R. Bowerman Landfill

LIST OF FIGURES

1 Vicinity Map 2
2 Topographic Map Showing the Location of FRB Landfill.....3
3 FRB Master Development Plan Phase Summary 6
4 Vegetation Communities 10
5 Vegetation Communities - Detailed.....11
6 NCCP Special Linkage and Reserve System Encroachment Areas 23
7 Sensitive Plants 33
8 Coastal California Gnatcatcher and Cactus Wren Locations.....39
9 ACOE Jurisdiction.....50
10 CDFG Jurisdiction 51
11 FRB Master Development Plan Phase Summary and Detailed Vegetation Communities.....63
12 FRB Master Development Plan Phase Summary and Sensitive Biological Resources.....66
13 FRB Master Development Plan Phase Summary and Jurisdictional Waters.....72

LIST OF TABLES

1 Target, Identified and Conditionally Covered Species Receiving Regulatory Coverage under the Central/Coastal NCCP 21
2 Sensitive Plant Species That Occur or are Known to Occur Within the Survey Are and/or Immediate Vicinity 26
3 Sensitive Animal Species That Occur or are Known to Occur Within the Survey Area and/or Immediate Vicinity 27
4 Frank R. Bowerman Master Development Plan Incremental Coastal Sage Scrub Take by Phase 61
5 Impacts to ACOE Jurisdiction 71
6 Impacts to CDFG Jurisdiction 71

GLOSSARY

ACOE	Army Corps of Engineers
AHMP	Adaptive Habitat Management Plan
amsl	above mean sea level
BAS	Bryan A. Stirrat and Associates
BRMP	Biological Resources Management Plan
CACW	coastal cactus wren
CAGN	California gnatcathcer
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CSC	California Species of Special Concern
CSS	coastal sage scrub
CWA	Clean Water Act
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ESA	Environmentally Sensitive Areas
FESA	Federal Endangered Species
FRB	Frank R. Bowerman
HBPD	Harbors, Beaches and Parks Department
HCP	Habitat Conservation Plan
IA	Implementation Agreement
IML	intermediate mariposa lily
IWMD	Integrated Waste Management Department
LBV	least Bell's vireo
LCWP	Laguna Coast Wilderness Park
MCAS	Marine Corps Air Station
MCY	million cubic yards
MDP	Master Development Plan
NCCP	Natural Community Conservation Plan
NROC	Nature Reserve of Orange County
OCHCS	Orange County Habitat Classification System

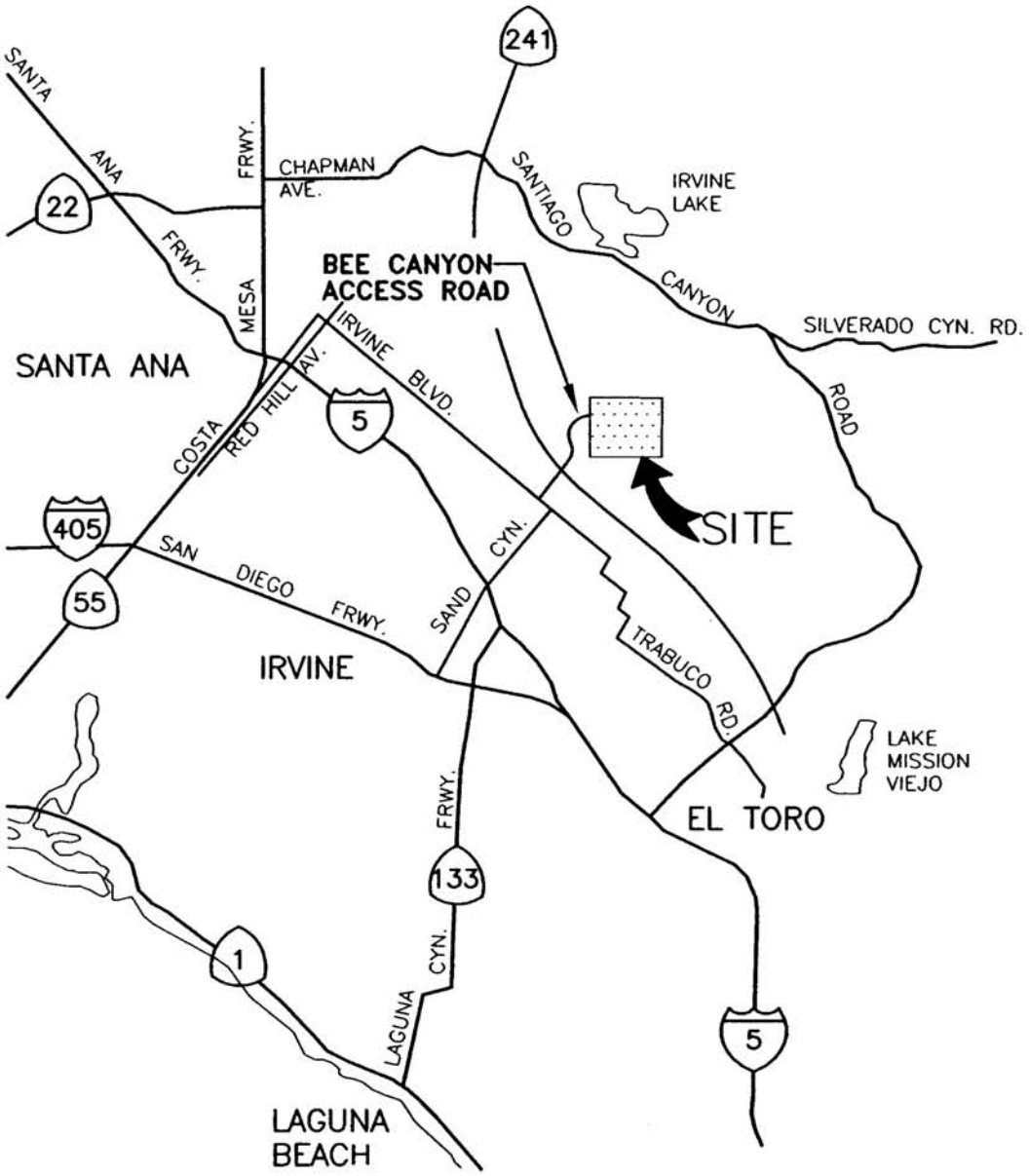
OTW	orange-throated whiptail
P&D	P&D Consultants, Inc.
RDMD	Resources Development Management Department
RELOOC	Regional Landfill Options for Orange County
RWQCB	Regional Water Quality Control Board
SWFP	Solid Waste Facility Permit
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

SECTION 1.0
INTRODUCTION

1.1 OVERVIEW

The Frank R. Bowerman (FRB) Landfill is located at 11002 Bee Canyon Access Road in unincorporated Orange County, California, immediately north of the City of Irvine, as shown in Figure 1. Specifically, the Landfill is located within Township 5 South, Range 8 West, and parts of Sections 143, 144 and 118 of the United States Geological Survey (USGS) 7.5-minute El Toro Quadrangle, as depicted in Figure 2. The Landfill is owned by the County of Orange and operated by its Integrated Waste Management Department (IWMD). The Landfill property is approximately 725 acres with 341 acres permitted for refuse disposal. The Landfill opened in 1990 and its current permits project closure in approximately 2022.

The IWMD has initiated preparation of a new Master Development Plan (MDP) for FRB Landfill. The purpose of the MDP is to maximize the available landfill capacity of the site and to remediate a recent major on-site landslide that occurred in 2002. The remediation of the landslide is necessary to ensure the safety of landfill employees and maintain operation of the facility. In addition, the MDP presents a landfill operations plan that addresses continuous landfill operations needs while allowing for the safe removal of landslide material. The new MDP proposes future development of the FRB Landfill in nine remaining phases. In addition, it also identifies the locations of soil stockpile areas necessary during removal of the landslide and needed for daily cover of active landfill areas. The primary stockpile area for the MDP is located between a previously filled refuse area (Phase V-D Stockpile) and an adjacent cut slope, a portion of which is outside the property boundary which required a permit from the adjacent property owner, The Irvine Company. The MDP proposes a landslide remediation design which includes removal and stabilization with a buttress fill. In order to implement the landslide remediation/stabilization measures, a total of 50 acres of land in two areas outside the existing landfill boundary will be required. These north and east areas are outside, and adjacent to, the north part of the Landfill boundary and are part of the Irrevocable Officer of Dedication to the County of Orange by the property owner, The Irvine Company.



NORTH
Not to Scale

Source: Bryan A. Stirrat and Associates, 2004.

Figure 1
Vicinity Map

Source: El Toro Quadrangle (USGS, 1997); FRB Property Boundary (based on DWG files by BAS, 2004).

Figure 2
Topographic Map Showing the Location of FRB Landfill

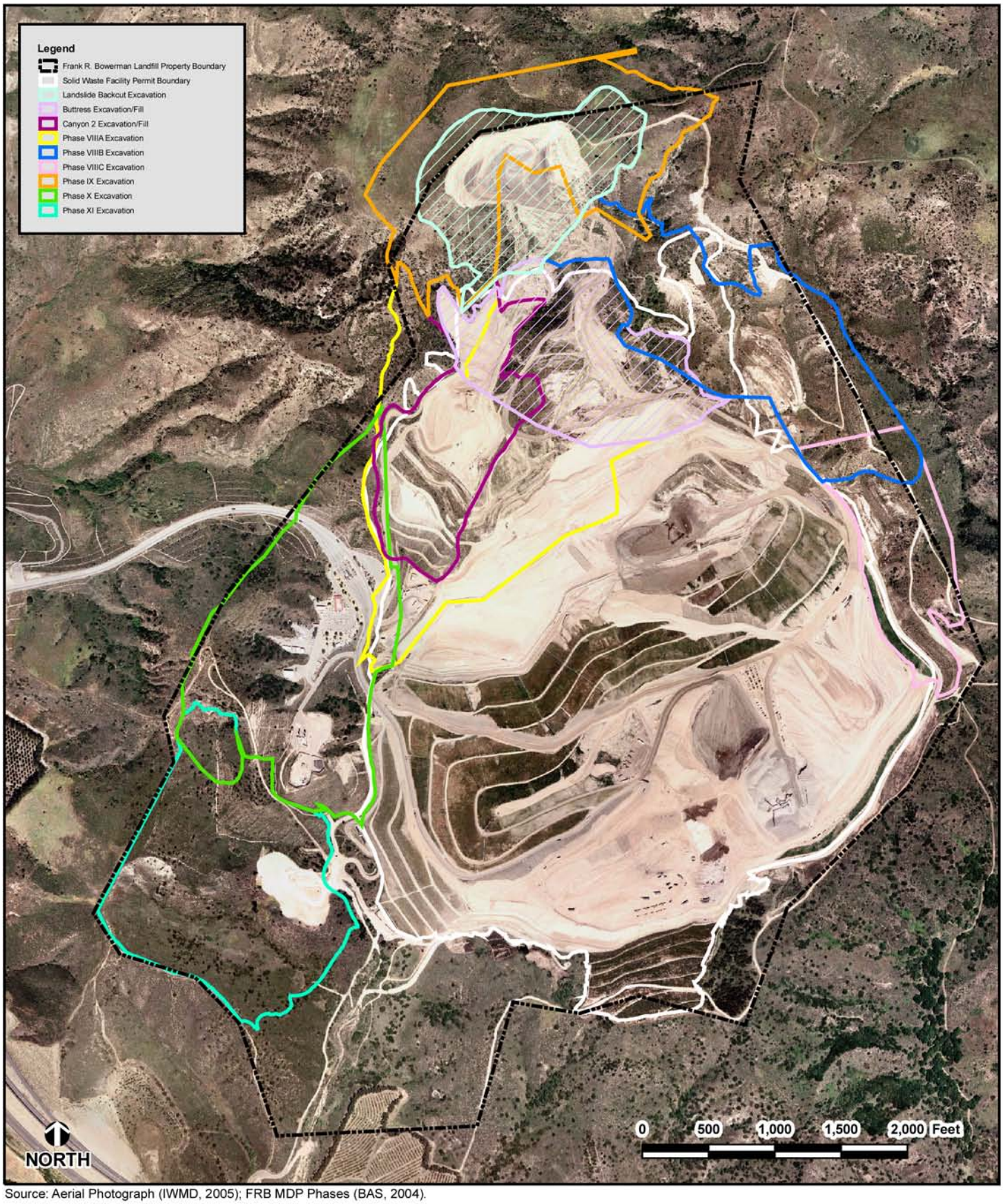
The two off-site areas are located within a part of the future Limestone Canyon Wilderness Park (LCWP) proposed by the County of Orange's Harbors, Beaches and Parks Department (HBPD).

The ultimate implementation of the MDP will require substantial earthwork and is estimated to include excavation of approximately 37 million cubic yards (MCY) of soil for landslide remediation and phasing excavation. The planning horizon of the MDP covers approximately 47 years (from 2006 to 2053) and is intended to provide the IWMD with an operational framework to address landslide remediation and long-term operational needs at the FRB Landfill.

Implementation of the MDP will involve grading and construction activities to implement the planned phases. These phases are located throughout the landfill and include areas previously permitted under the existing FRB Landfill Solid Waste Facility Permit (SWFP). The defined study area for this report includes additional acreage that extends from the SWFP boundary to the FRB Landfill property boundary, and in the cases of the two off-site areas for landslide remediation, beyond the existing landfill boundary. These areas, discussed in the FRB Landfill MDP (November 2004, Bryan A. Stirrat & Associates (BAS)), are off-site areas necessary for remediation of on-site landslides, to ensure the safe operation of the Landfill. Approval of the MDP will require compliance with the California Environmental Quality Act (CEQA) and other applicable state and federal regulations. Environmental impacts associated with the proposed FRB MDP will be analyzed as part of the Environmental Impact Report (EIR) planned for preparation as part of the MDP approval. The EIR is to be prepared consistent with the goals and objectives of the Regional Landfill Options for Orange County (RELOOC) program which proposes an expansion of the FRB Landfill. This Biological Resource Technical Report is intended to support the CEQA EIR for the proposed MDP.

P&D Consultants, Inc. (P&D) prepared this technical report to provide baseline information regarding biological resources on the Landfill site, to support the preparation of the EIR in compliance with CEQA and to support the anticipated discretionary actions required for implementation of the MDP. As part of that effort, the following biological evaluations were conducted: plant community mapping, rare plant surveys, coastal California gnatcatcher (*Polioptila californica californica*, CAGN) southwestern willow flycatcher (*Empidonax traillii extimus*) and least Bell's vireo (*vireo bellii pusillus*) protocol surveys and consideration of

wildlife movement. In addition, jurisdictional areas regulated by the United States Army Corps of Engineers (ACOE) and California Department of Fish and Game (CDFG) are also identified in this report and potential impacts from implementation of the MDP on those jurisdictions are discussed. The survey area for assessing these biological resources and potential impacts included the entire FRB Landfill property boundary, including an off-site area comprising the existing Phase V-D Stockpile area, as well as the two off-site areas located to the north and northeast and shown in Figure 3. For the purposes of this report, a 100-foot buffer around the 50 acres of land required to implement the landslide remediation/stabilization measures were surveyed. The total acreage surveyed was 63.4 acres, however, only 33.9 acres of this land will be directly impacted by the implementation of the landslide remediation/stabilization measures. Each of these biological resource issues were addressed within the study area, consistent with MDP phasing plans provided by BAS.



Source: Aerial Photograph (IWMD, 2005); FRB MDP Phases (BAS, 2004).

Figure 3
FRB Master Development Plan Phase Summary

SECTION 2.0
MASTER DEVELOPMENT PLAN

The existing MDP for the FRB Landfill was developed in 1991 but was never permitted to its ultimate elevation of 1,350 feet above mean sea level (amsl). The current permitted final elevation for the FRB Landfill is 1,100 feet amsl. An EIR initiated by IWMD in September, 2002 for the RELOOC project included a vertical expansion of the FRB Landfill from its permitted 1,100 foot amsl final elevation to the 1,350 foot amsl final elevation reflected in the site's 1991 MDP. A landslide, which occurred in the northern portion of the site in February 2002, has resulted in the need for a new MDP and new EIR which addresses landslide remediation and revised design and operational requirements for the site.

In November 2002, BAS developed the "*Conceptual Master Development Plan for Geotechnical Investigation and Determination of Property and Permitting Requirements*" to serve as a guideline for determination of property and permitting requirements, continued geotechnical investigation and biological resources mapping for multiple conceptual excavation and fill alternatives developed for the new MDP. The basis for development of the conceptual phasing plans was to provide increased refuse volume in anticipation of the reduction in airspace volume resulting from the February 2002 landslide at the site and associated remediation efforts. These conceptual excavation and fill areas were refined and incorporated into a *"Report of Findings and Recommendations"*, dated January 2004 based on geotechnical analyses and biological resource surveys and evaluations performed up to that time. The *"Report of Findings and Recommendations"* was finalized in June, 2004 based on comments received from IWMD and a *"Draft Master Development Plan" (Draft MDP)* was subsequently prepared in July 2004 and later updated and finalized in November 2004 which serves as the basis for this Biological Resources Technical Report.

The MDP, including geotechnical investigation and analysis and engineering design, focuses on remediation of the major landslide in the northern portion of the site and maximizing air space, particularly important with the air space loss anticipated with the landslide remediation. Because the landslide remediation project requires significant earth work involving large amounts of soil

handling, the proposed landfill development phasing presented in the MDP report is intended to optimize existing landfill areas to allow IWMD to operate as long as possible while landslide material is being excavated in a cost-effective manner. Development phases beyond the landslide remediation were conceptually designed to provide time for operations personnel to perform a majority of the excavation with their own forces to reduce capital costs.

All design plans for the MDP have been prepared at a planning level of design and include the landslide backcut excavation, buttress excavation/fill, Canyon 2 excavation/fill, Phases VIII-A, B and C Excavation; Phase IX Excavation; Phase X Excavation and Phase XI Excavation plans. Additional engineering design details, geotechnical evaluations and biological surveys will be needed for development of construction level plans for future implementation of the MDP.

Prior to placing liner in Phase VIII-A Excavation for refuse filling, the landslide remediation needs to occur which consists of three proposed construction phases: landslide backcut excavation; buttress excavation/fill; and Canyon 2 excavation/fill. Phase IX Excavation completes development of the MDP in the northern portion of the site and Phase X Excavation is a development area proposed to the east over the existing scales/entrance road facilities. Phase X Excavation will require relocation of several operational support facilities (scales/scalehouse, office buildings and flare station). Phase XI Excavation is in the southwest portion of the site in a new area. Phase XI Excavation is included in the new MDP as a final phase of operation.

The MDP (BAS, November 2004) presents the conceptual excavation, fill and soil management plans for each proposed phase of development at the FRB Landfill (see Figure 3) as well as the master storm drain, subdrain and leachate collection plans and liner design. The study area for this Biological Resources Technical Report is based on this MDP (BAS, November 2004).

SECTION 3.0
EXISTING CONDITIONS

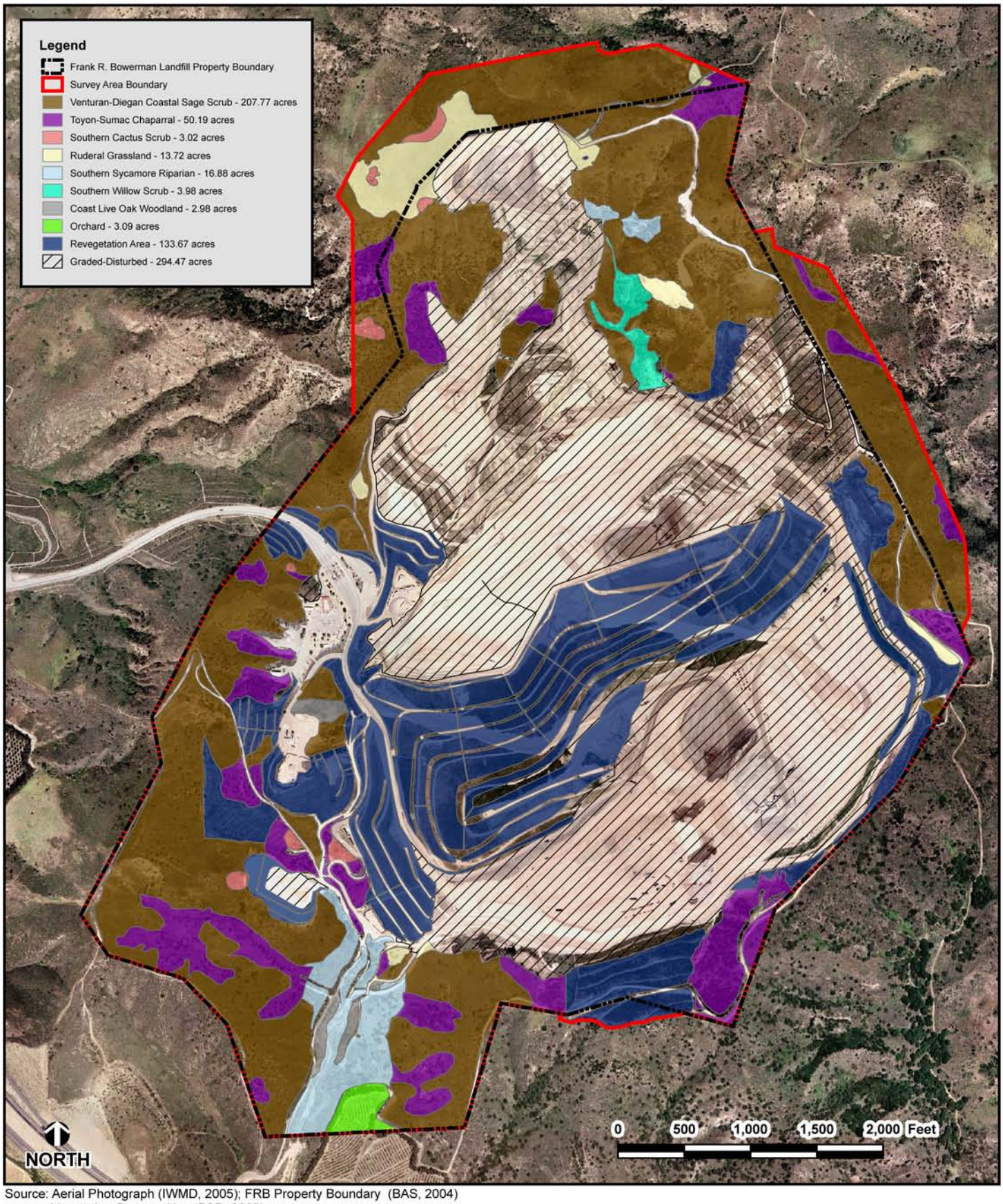
This section describes existing biological conditions and identifies jurisdictional drainages located within the survey area. The information provided below is based upon field reconnaissance and focused surveys for sensitive biological resources conducted within the survey area from 2002 through 2005. Section 4.0 Methodology contains a detailed description of survey methodology, sensitive species status criteria and other resources utilized to document on- and off-site biological resources. In addition, Appendices C, D and E contain survey dates for the rare plant, coastal California gnatcatcher, and least Bell's vireo and southwestern willow flycatcher, respectively, conducted within the survey area.

3.1 PLANT COMMUNITIES AND WILDLIFE HABITATS

The survey area (previously discussed) includes the FRB Landfill property boundary as well as the areas located off-site to the north and northeast. Nine plant communities were identified and mapped within the FRB Landfill survey area. These plant communities are shown in Figures 4 and 5. An in-depth description of each of these plant communities and their acreage totals in the survey area are provided in the following sections.

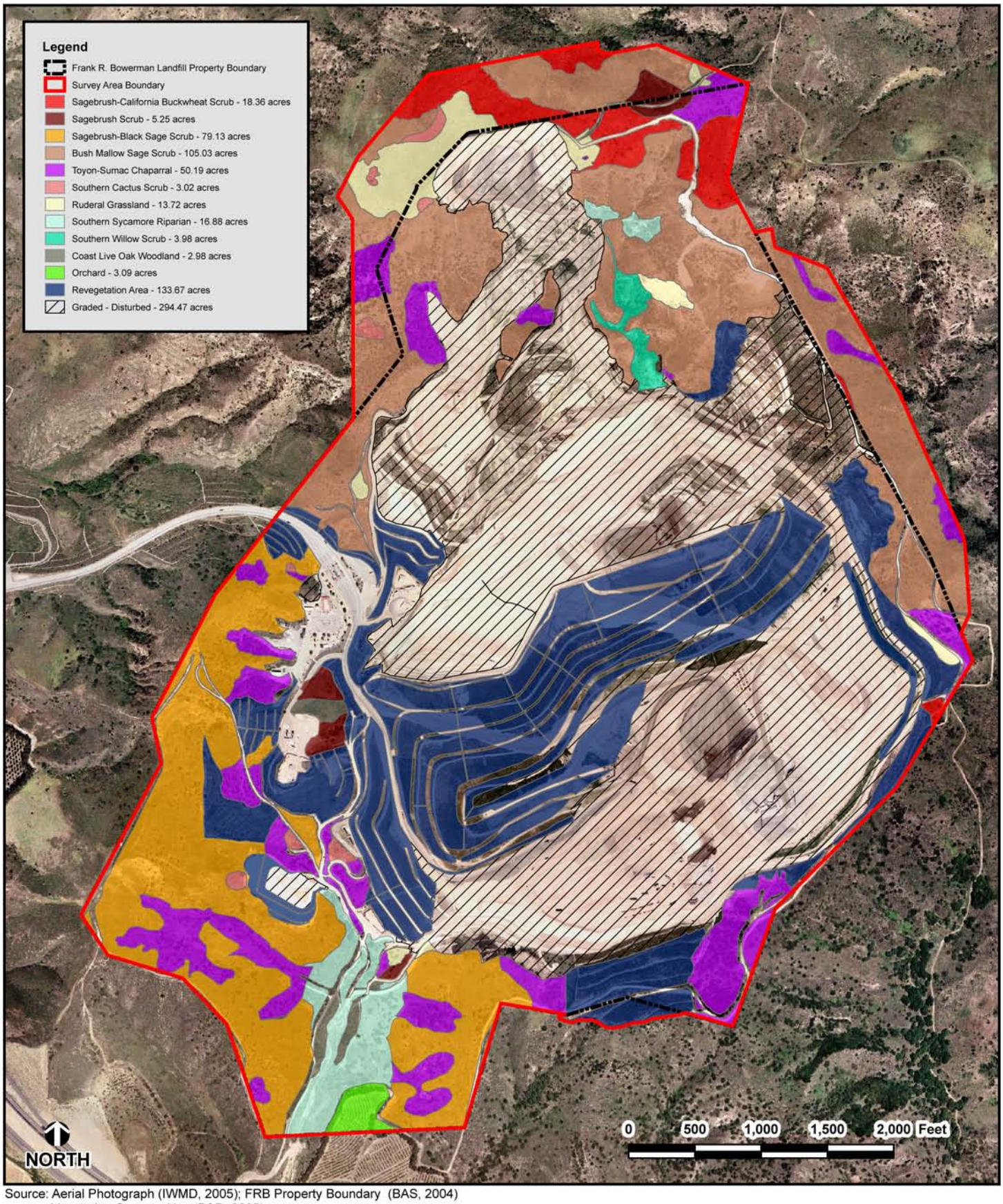
3.1.1 VENTURAN-DIEGAN TRANSITIONAL COASTAL SAGE SCRUB

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. In addition to the subassociations, this association often integrates with grassland and chaparral communities.



Source: Aerial Photograph (IWMD, 2005); FRB Property Boundary (BAS, 2004)
Vegetation Communities (P&D, 2005).

Figure 4
Vegetation Communities



Source: Aerial Photograph (IWMD, 2005); FRB Property Boundary (BAS, 2004)
Vegetation Communities (P&D, 2005).

Figure 5
Vegetation Communities - Detailed

The CSS plant community provides habitat for many special status animal and plant species. In particular, the 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 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*).

3.1.1.1 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 described for the Venturan-Diegan transitional coastal sage scrub association in Section 3.1.1.

3.1.1.2 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 described for the Venturan-Diegan transitional coastal sage scrub association in Section 3.1.1.

3.1.1.3 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 described for the Venturan-Diegan transitional coastal sage scrub association in Section 3.1.1.

3.1.1.4 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 described for the Venturan-Diegan transitional coastal sage scrub association in Section 3.1.1.

3.1.2 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*).

3.1.3 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 as those 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*).

3.1.4 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*).

3.1.5 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*).

3.1.6 SOUTHERN WILLOW SCRUB

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*).

3.1.7 COAST LIVE OAK WOODLAND

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 (2004).

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*).

3.1.8 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.

3.1.9 REVEGETATION AREA

A total of 133.67acres 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 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 described for the Venturan-Diegan transitional coastal sage scrub association in Section 3.1.1.

3.2 ORANGE COUNTY CENTRAL AND COASTAL SUBREGION NATURAL COMMUNITY CONSERVATION PLAN

3.2.1 OVERVIEW OF THE NCCP

The Natural Community Conservation Plan (NCCP) program is a cooperative effort undertaken by local, state and federal agencies to protect habitats and species throughout California. The program, which began in 1991 under the State's Natural Community Conservation Planning Act, is broader in its orientation and objectives than the California and Federal Endangered Species Acts (CESA and FESA). Those laws are designed to identify and protect individual species that have already declined substantially in number. The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale while accommodating compatible land uses.

The Orange County Central and Coastal NCCP Subregional Plan approved in July 1996 established a 37,380 acre reserve system that includes substantial areas of 12 major habitat types and covers 39 sensitive plant and animal species. The County of Orange is one of 11 participating landowners under the NCCP and has contributed substantial land and/or funding toward implementation of the NCCP Reserve System and the adaptive management program.

Under the terms and conditions of the NCCP/Habitat Conservation Plan (HCP) Implementation Agreement (IA), development activities and uses that are addressed by the NCCP/HCP are considered fully mitigated under the NCCP Act and the CESA and FESA for impacts to habitat occupied by listed and other identified species. The County of Orange is a signatory to the IA.

In 1996, the Central and Coastal Subregion NCCP/HCP was approved by the United States Fish and Wildlife Service (USFWS), the CDFG and participating landowners including the County of Orange. The primary goal of the NCCP/HCP is to protect and manage habitat supporting a broad range of plant and animal populations within the Central and Coastal Subregion in Orange County. The Central and Coastal Subregion NCCP/HCP provides regulatory coverage for a total of 39 Target and Identified species. These species include three Target species, six federally listed species and 30 other Identified species not listed under the CESA and FESA, but found within habitats covered by the NCCP/HCP. These species are shown in Table 1.

The NCCP also identified a number of Covered Habitats which receive protection under the program. The Covered Habitats are oak woodlands, Tecate cypress forest, cliff and rock, and chaparral (within the Coastal Subarea only).

To protect and manage these species, the NCCP/HCP created a subregional habitat Reserve System and implemented a coordinated program to manage biological resources within the habitat reserve. Creating the Reserve System was intended to provide assurances to the public and to affected landowners with respect to the location of future development and open space within the subregion.

The FRB Landfill is located within the Central Subregion NCCP/HCP. The NCCP designates the FRB Landfill as an “Existing Use” that is permitted to continue functioning within the current property boundaries.

TABLE 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 mariposa lily	

Source: Orange County Central and Coastal Subregion NCCP/HCP (1996).

The County of Orange is a participating landowner under the terms and agreements of the NCCP/HCP, and is, therefore, entitled to certain rights and responsibilities under the program. As a participating landowner and contributor to the NCCP/HCP, the County of Orange is authorized incidental take of the protected species under the following three categories:

- Incidental Take related to permitted uses within the Reserve System;
- Incidental Take on lands located within Special Linkage areas; and
- Incidental Take resulting from activities outside the Reserve System and Special Linkage areas.

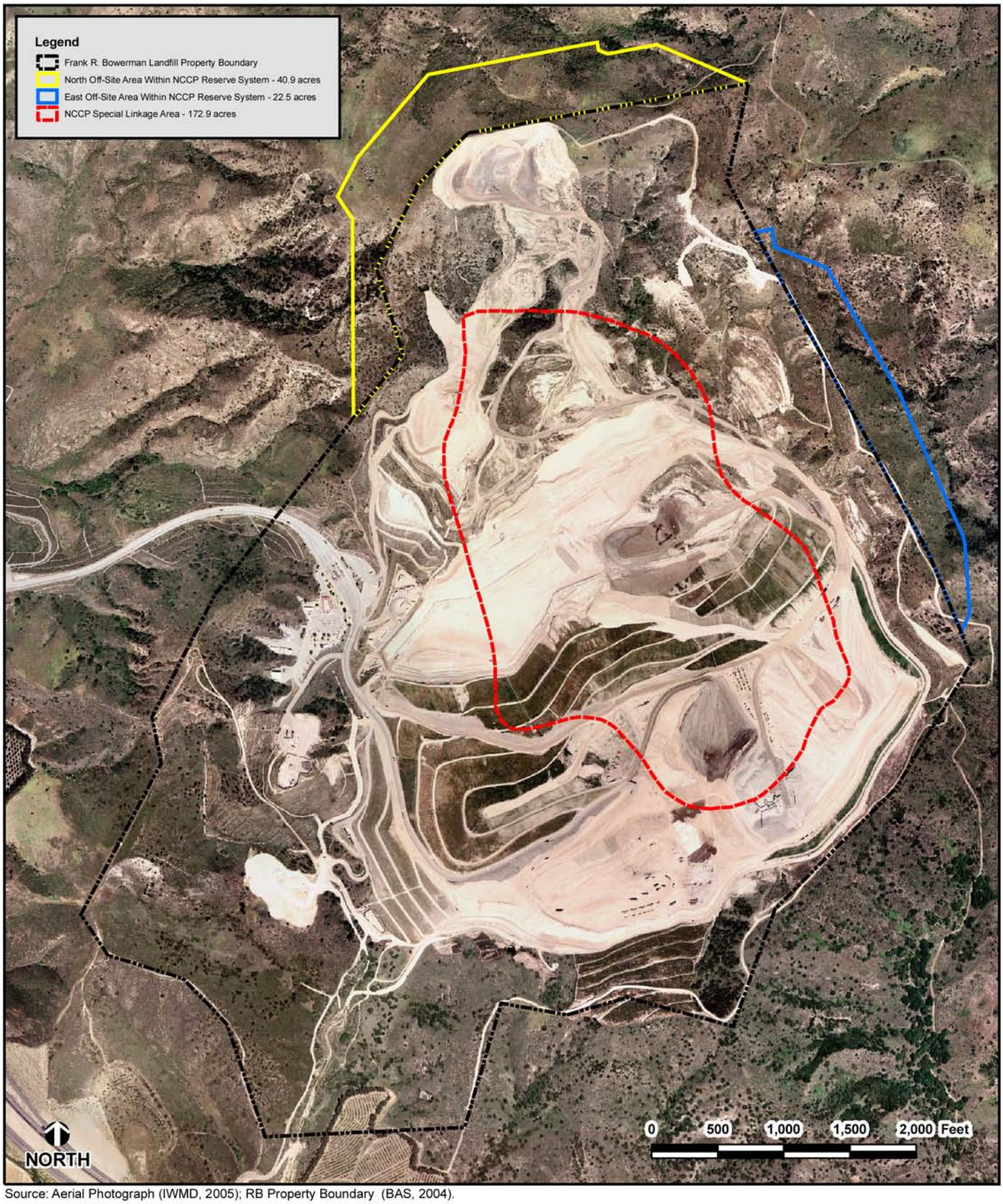
These categories are explained below. Figure 6 shows the location of the Reserve System and Special Linkage Area relative to the FRB Landfill.

3.2.1.1 Reserve System

Under the terms and agreements of the NCCP/HCP, the IWMD is authorized to take species identified in Table 1, although certain restrictions and requirements apply for specific species. In addition, the total number of acres of CSS removed by IWMD is strictly monitored through an accounting system maintained and overseen by the Nature Reserve of Orange County (NROC). The amount of CSS available to the IWMD for take in 1996 for the FRB Landfill was 30 acres. The County of Orange is responsible for tracking take (e.g., removal, disturbance, etc.) by each County department, including IWMD, and prepares an annual summary for submittal to the NROC.

3.2.1.2 Special Linkage Area

The NCCP/HCP identifies significant natural lands for inclusion within the subregional conservation strategy. These areas are designated as "supplemental non-reserve habitat areas" consisting of Special Linkages owned by participating landowners (e.g. County of Orange) and "Existing Use Areas" owned by non-participating landowners. The purpose of these supplemental non-reserve areas is to maintain connectivity between core CSS habitat areas within the subregion, to improve biological linkages between the Central and Coastal Subregion and adjacent NCCP subregions, and to provide for other Target Species habitat located outside the Reserve System. Criteria were established to determine those instances when designated lands constituted "Special Linkage" or "Existing Use Areas." Part of the FRB Landfill property, a 173-acre area located in the north-central part of the property, is designated as a "Special Linkage" by the NCCP/HCP as shown on Figure 6. On termination of landfilling and closure of the Landfill, the remaining 550 acres of the Landfill property that surrounds this existing Special Linkage area will become part of the Reserve System and will be managed in accordance with the provisions of the IA and applicable landfill closure agreements. Policies governing the Special Linkage and Existing Use Areas are defined in the NCCP/HCP and include minimization



Source: Aerial Photograph (IWMD, 2005); RB Property Boundary (BAS, 2004).

Figure 6
NCCP Special Linkage and Reserve System Encroachment Areas

and mitigation requirements for the approved end-use and design and oversight of activities proposed in these areas. A total of 36 acres of CSS take are permitted within the FRB Landfill Special Linkage area under the NCCP/HCP.

3.2.1.3 Take Authorization

As noted previously, take authorization for participating landowners is fully authorized under the Central & Coastal NCCP, provided certain conditions identified above are met. However, if additional facilities and/or activities are proposed that exceed authorized incidental take, an amendment to the Central & Coastal Subregion NCCP/HCP is required in accordance with the IA. The IA identifies circumstances under which an amendment may be permitted. Amendments are classified under the NCCP as either Minor or Major and require approval by the NROC, CDFG and USFWS. A Minor Amendment includes, but is not limited to, combinations of adding and removing land from the Reserve System which results in no net loss of Reserve System acreage and no long-term net loss of subregional habitat value. A Major Amendment requires amending the IA and Section 10 (a) Permits as well as other procedural requirements. A Major Amendment is largely limited to changes involving boundary modifications resulting in a net loss of Reserve System acreage and removal of a species from the list of Identified Species or addition of a new Identified Species.

3.2.1.4 Limestone Canyon Wilderness Park (LCWP)

The County of Orange Harbors Beaches and Parks Department (HBPD) operates regional recreational facilities and manages historical and natural resources in the County. This covers a total of 37,000 acres of parkland and open space including regional and wilderness parks, nature preserves, recreational trails, historic sites, harbors and beaches. Existing and future park facilities located within the NCCP are subject to public access and recreation policies as identified in the NCCP. Planned park facilities relevant to the MDP and located within the NCCP include part of the future LCWP, in part, within Round Canyon, along the Landfill's northern and eastern boundary. As noted previously, grading and infrastructure improvements in

two off-site areas within the LCWP limits would be necessary during remediation of landslides on the FRB Landfill property.

3.3 SENSITIVE BIOLOGICAL RESOURCES

The California Natural Diversity Data Base (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, wildlife corridors and wetlands that are known or that may potentially occur in the survey area are discussed below.

Of the 39 plant and animal species identified for coverage by the Central and Coastal Subregion NCCP/HCP, 19 species are not evaluated in this report. This is because they are either recognized as relatively common species by the regulatory agencies (i.e.,. coyote, gray fox, coastal western whiptail, San Bernardino king ring-neck snake and rosy boa); species for which no suitable habitat is considered present within the survey area (i.e., Riverside fairy shrimp, San Diego fairy shrimp, black-bellied salamander, arboreal salamander and southwestern arroyo toad) or species that would not be expected to be present within the survey area due to the known range of these species occurring outside the general area of the survey area (i.e., Laguna Beach dudleya, Santa Monica Mountains dudleya, Nuttall's scrub oak, small-flowered mountain mahogany, heart-leaved pitcher sage, Tecate cypress, Quino checkerspot butterfly, Coronado skink, rough-legged hawk and Pacific pocket mouse). Table 2 identifies eight (8) sensitive plant species which occur or potentially occur within the survey area and/or immediate vicinity. Table 3 identifies twenty (20) sensitive animals which occur or potentially occur within the survey area and/or immediate vicinity. Appendix A – FRB Landfill Floral Compendia contains a list of all vascular plants observed within the survey area.

TABLE 2
SENSITIVE PLANT SPECIES THAT OCCUR
OR ARE KNOWN TO OCCUR WITHIN THE SURVEY AREA AND/OR IMMEDIATE VICINITY

	Status				
Species	**CNPS**	**USFWS**	**CDFG**	**Likelihood for Occurrence**	**Impacts**
Thread-Leaved Brodiaea (*Brodiaea filifolia*)	1B	FT	SE	This species has not been recorded within the FRB survey area, although suitable habitat conditions exist.	If present, this species may potentially be impacted by the direct loss of habitat associated with the FRB MDP.
Intermediate (Foothill) Mariposa Lily (*Calochortus weedii* var. *intermedius*)	1B	–	–	This species has been recorded within the FRB survey area. It is a Conditionally Covered species under the central and coastal NCCP.	This species will be impacted by the direct loss of habitat associated with the FRB MDP.
Catalina Mariposa Lily (*Calochortus catalinae*)	4	–	–	This species has been recorded within the FRB survey area. It is an Identified species under the central and coastal NCCP.	This species will be impacted by the direct loss of habitat associated with the FRB MDP.
Many-stemmed Dudleya (*Dudleya multicaulis*)	1B	–	–	This species has been recorded within the FRB survey area, but outside of the MDP.	A population of 1,839 plants will be directly impacted by the FRB MDP. A population of 300 plants may be indirectly impacted with the FRB MDP.
Vernal Barley (*Hordeum intercedens*)	3	–	–	This species has not been recorded within the FRB survey area, although suitable habitat conditions exist.	If present, this species will be impacted by the direct loss of habitat associated with the FRB MDP.
Chaparral Beargrass (*Nolina cismontana*)	1B	–	–	This species has not been recorded within the FRB survey area, although suitable habitat conditions exist.	If present, this species will be impacted by the direct loss of habitat associated with the FRB MDP.
Coulter's Matilija Poppy (*Romneya coulteri*)	4	–	–	This species has not been recorded within the FRB survey area, although suitable habitat conditions exist. Because this plant is quite distinctive in appearance lack of detection indicates a low presence potential.	If present, this species will be impacted by the direct loss of habitat associated with the FRB MDP.

LEGEND

Federal (USFWS)
FT Threatened

State (CDFG)
SE Endangered

California Native Plant Society (CNPS):
1B considered rare, threatened or endangered in California and elsewhere
3 more information is needed to determine its sensitivity status
4 limited distribution in California, but susceptibility to threat appears low at this time

TABLE 3
SENSITIVE ANIMAL SPECIES THAT OCCUR
OR ARE KNOWN TO OCCUR WITHIN THE SURVEY AREA AND/OR IMMEDIATE VICINITY

	Status				
Species	**NCCP**	**USFWS**	**CDFG**	**Likelihood for Occurrence**	**Impacts**
Amphibians					
Western Spadefoot Toad (*Scaphiopus hammondii*)	I	_	CSC	This species has not been recorded within the FRB survey area, although limited areas of marginal habitat may be present in more mesic areas.	If present, impacts would potentially be limited to mesic areas of the FRB survey area, which include the southern willow scrub plant community. These impacts are not considered significant.
Reptiles					
Orange-throated Whiptail (*Aspidoscelis hyperythrus*)	T	_	CSC	This species has been recorded within the FRB survey area.	This species will be impacted by the direct loss of habitat associated with the FRB MDP. Impacts covered by the NCCP are not considered significant.
San Diego Horned Lizard (*Phrynosoma coronatum blainvillei*)	I	_	CSC	This species has been recorded within the FRB survey area.	This species will be impacted by the direct loss of habitat associated with the FRB MDP. Impacts covered by the NCCP are not considered significant.
Red Diamond Rattlesnake (*Crotalus ruber*)	I	_	CSC	This species has not been recorded within the FRB survey area, although suitable habitat is present.	If present, this species will be potentially impacted by the direct loss of habitat associated with the FRB MDP. Impacts covered by the NCCP are not considered significant.
Birds					
Coastal California Gnatcatcher (*Polioptila californica californica*)	T	FT	CSC	This species has been recorded within the FRB survey area.	This species will be directly impacted by the direct loss of habitat associated with the FRB MDP. This species is fully covered by the NCCP.
Least Bell's vireo (*Vireo bellii pusillus*)	CC	FE	SE	This species has not been recorded within the FRB survey area, although limited areas of marginal habitat are present in the southern scrub plant community.	This species does not occur on-site due to limited acreage, isolation, and marginal habitat value. Potential impacts would be limited to direct loss of habitat within the southern willow scrub plant community.

TABLE 3
SENSITIVE ANIMAL SPECIES THAT OCCUR
OR ARE KNOWN TO OCCUR WITHIN THE SURVEY AREA AND/OR IMMEDIATE VICINITY

	Status				
Species	**NCCP**	**USFWS**	**CDFG**	**Likelihood for Occurrence**	**Impacts**
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	CC	FE	SE	This species has not been recorded within the FRB survey area, although limited areas of marginal habitat are present in the southern scrub plant community.	This species does not occur on-site due to limited acreage, isolation, and marginal habitat value. Potential impacts would be limited to direct loss of habitat within the southern willow scrub plant community.
Coastal Cactus Wren (*Campylorhynchus brunneicapillus*)	T	_	CSC	This species has been recorded within the FRB survey area.	This species will be impacted by the direct loss of habitat associated with the FRB MDP. Impacts covered by the NCCP are not considered significant.
Cooper's Hawk (*Accipiter cooperi*)	_	_	CSC	This species has been recorded within the FRB survey area, and may breed where trees are present.	This species will be impacted by the direct loss of habitat associated with the FRB MDP. These impacts are not considered significant.
Sharp-shinned Hawk (*Accipiter striatus*)	I	_	CSC	Although this species has not been documented within the FRB survey area, it undoubtedly occurs as an occasional winter visitor.	If present, this species will be impacted by the direct loss of foraging habitat associated with the FRB MDP. These impacts are not considered significant.
Northern Harrier (*Circus cyaneus*)	I	_	CSC	Although this species has been documented within the FRB survey area, the probability of suitable breeding habitat is considered low.	This species will be impacted by the direct loss of foraging habitat associated with the FRB MDP. These impacts are not considered significant.
Golden Eagle (*Aquila chrysaetos*)	CC	_	CSC	This species has not been documented within the survey area. It is not expected to breed within the survey area, although individuals may rarely forage over the site.	If present, this species will be impacted by the direct loss of foraging habitat associated with the FRB MDP. Impacts not significant with conditions implemented under the NCCP.

TABLE 3
SENSITIVE ANIMAL SPECIES THAT OCCUR
OR ARE KNOWN TO OCCUR WITHIN THE SURVEY AREA AND/OR IMMEDIATE VICINITY

	Status				
Species	**NCCP**	**USFWS**	**CDFG**	**Likelihood for Occurrence**	**Impacts**
Peregrine Falcon (*Falco peregrinus*)	I	_	SE	This species has not been documented within the FRB survey area. Due to the location of the FRB Landfill, and the lack of typical habitat, it is expected to be a very infrequent, non-breeding visitor.	If present, this species will be impacted by the direct loss of foraging habitat associated with the FRB MDP. Impacts covered by the NCCP are not considered significant.
Prairie Falcon (*Falco mexicanus*)	CC	_	CSC	This species has not been documented within the FRB survey area. It would not be expected to breed at the FRB Landfill, although individuals may occasionally forage over the site during the non-breeding season.	If present, this species will be impacted by the direct loss of foraging habitat associated with the FRB MDP. Impacts not significant with conditions implemented under the NCCP.
Loggerhead Shrike (*Lanius ludovicianus*)	_	_	CSC	This species has been recorded within the FRB survey area, confirming that suitable foraging and potential breeding habitat is present.	This species will be impacted by the direct loss of habitat associated with the FRB MDP. These impacts are not considered significant.
Yellow Warbler (*Dendroica petechia brewsteri*)	–	–	CSC	This species has not been documented within the FRB survey area. Suitable breeding and foraging habitat is present in limited quantities.	If present, impacts would be limited to direct loss of habitat within the southern willow scrub plant community. These impacts are not considered significant.
Yellow-breasted Chat (*Icteria virens*)	_	_	CSC	This species has not been documented within the FRB survey area. Suitable breeding and foraging habitat is present in limited quantities.	If present, impacts would be limited to direct loss of habitat within the southern willow scrub plant community. These impacts are not considered significant.

TABLE 3
SENSITIVE ANIMAL SPECIES THAT OCCUR
OR ARE KNOWN TO OCCUR WITHIN THE SURVEY AREA AND/OR IMMEDIATE VICINITY

	Status				
Species	**NCCP**	**USFWS**	**CDFG**	**Likelihood for Occurrence**	**Impacts**
Rufous-crowned Sparrow (*Aimophila ruficeps canescens*)	I	–	CSC	This species has been recorded within the FRB survey area, confirming that suitable foraging and breeding habitat is present.	This species will be impacted by the direct loss of habitat associated with the FRB MDP. These impacts are not considered significant.
Bell's Sage Sparrow (*Amphispiza belli belli*)	–	–	CSC	Although this species has not been documented within the FRB survey area, suitable habitat characteristics are present.	If present this species may be impacted by the direct loss of habitat associated with the FRB MDP. These impacts are not considered significant.
Mammals					
San Diego Desert Woodrat (*Neotoma lepida intermedia*	I	–	CSC	This species was documented within the FRB survey area during the 2005 survey season, suitable habitat is present.	This species will be impacted by the direct loss of habitat associated with the FRB MDP. Impacts not significant with conditions implemented under the NCCP.

LEGEND

Federal (USFWS)	State (CDFG)	NCCP
FE Endangered	SE Endangered	T Target Species
FT Threatened	ST Threatened	I Identified Species
SOC Species of Concern	CSC Species of Special Concern	CC Conditionally Covered Species

Appendix B – FRB Landfill Faunal Compendia contains a list of all animals observed (e.g., direct observation, heard and/or by sign) within the survey area.

3.3.1 PLANTS

3.3.1.1 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.

3.3.1.2 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 NCCP/HCP. 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 7.

3.3.1.3 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. 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

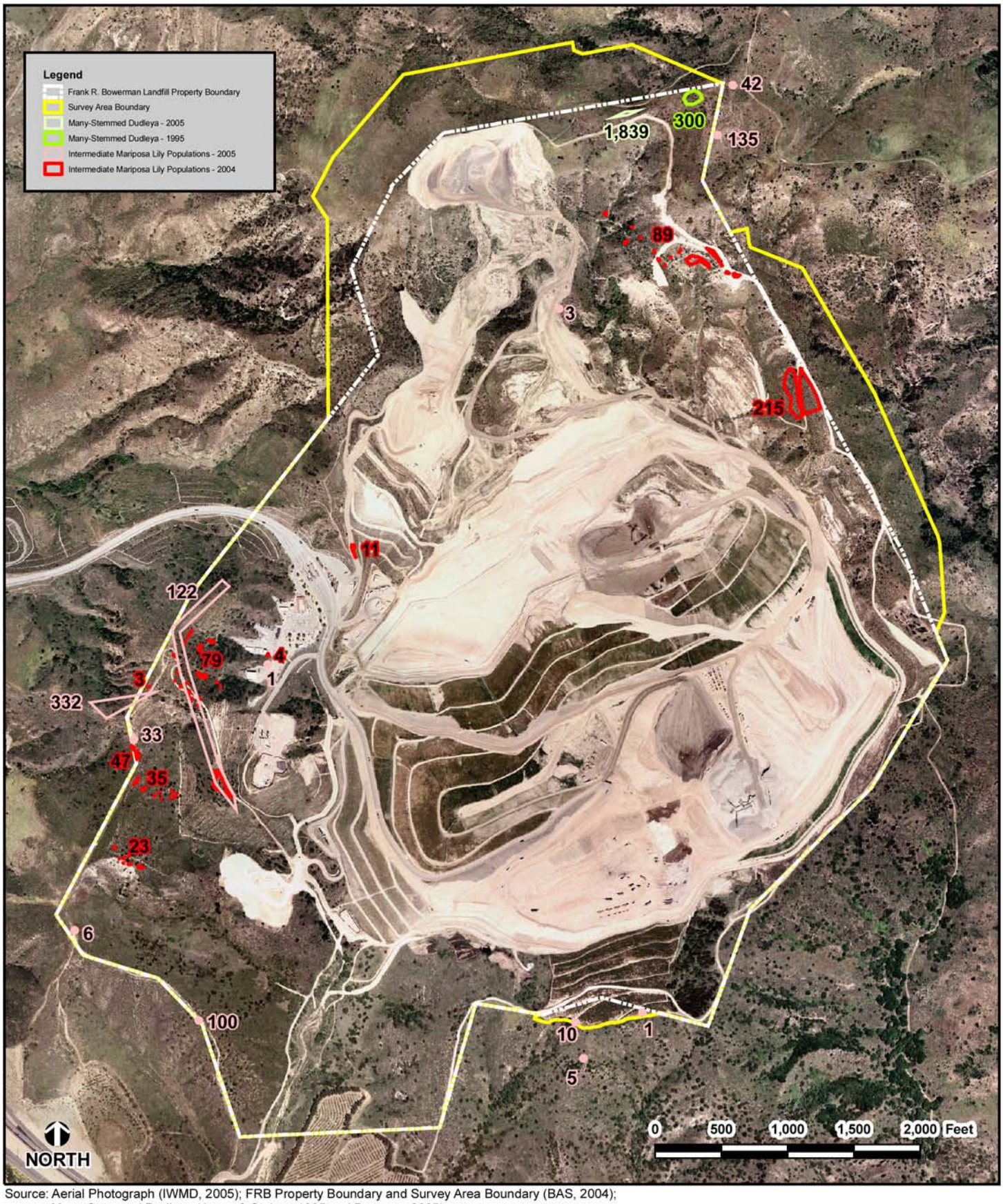
Jones and Stokes Associates in 1995, found ten plants in the northern section of the landfill property. This area was subsequently eliminated by a landslide. No plants were recorded during the 2003 through 2004 survey seasons.

3.3.1.4 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 7. Another population of many-stemmed dudleya, that contained 1,839 plants, was located in 2005. This location is also shown on Figure 7. During the 2002 through 2005 rare plant surveys, no individuals of this species were located.

3.3.1.5 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.



Source: Aerial Photograph (IWMD, 2005); FRB Property Boundary and Survey Area Boundary (BAS, 2004); Many-Stemmed Dudleya (Jones & Stokes, 1995 and Bonterra, 2005); Intermediate Mariposa Lily (P&D, 2003 and Bonterra, 2005).

Figure 7
Sensitive Plants

3.3.1.6 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 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.

3.3.1.7 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.

3.3.2 PLANT COMMUNITIES

3.3.2.1 Venturan-Diegan Transitional Coastal Sage Scrub

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 on Figures 4 and 5. A total of 207.77 acres (includes subassociation acreages noted previously) of this plant community occurs within the survey area.

3.3.2.2 Southern Cactus Scrub

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 Figures 4 and 5). A total of 3.02 acres of this CSS subassociation occurs within the survey area.

3.3.2.3 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 Figures 4 and 5). 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.

3.3.2.4 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; refer to Section 3.5.2 of this report). Because this community is considered riparian habitat, it is regarded as sensitive (see Figures 4 and 5). A total of 3.98 acres of this plant community occurs within the survey area.

3.3.2.5 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 Figures 4 and 5). 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.

3.3.3 AMPHIBIANS

3.3.3.1 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. 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.

3.3.4 REPTILES

3.3.4.1 Orange-Throated Whiptail (*Aspidoscelis hyperythrus*)

The orange-throated whiptail is a CSC and a Target Species in the Central and Coastal Subregion NCCP/HCP. 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.

3.3.4.2 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. 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.

3.3.4.3 Red Diamond Rattlesnake (*Crotalus rubber*)

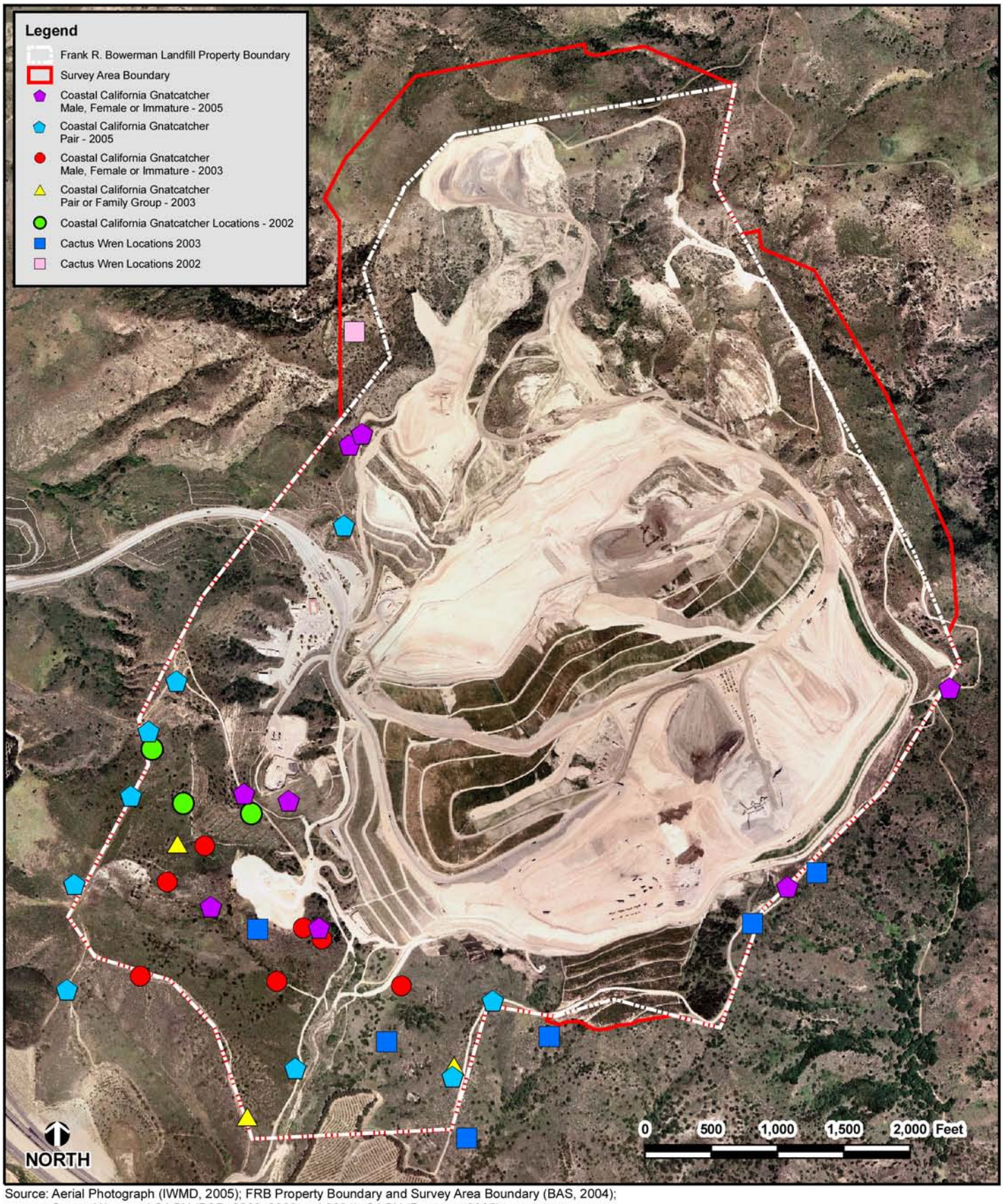
The red diamond rattlesnake is a CSC and an Identified Species under the Central and Coastal Subregion NCCP/HCP. It inhabits open scrub, chaparral and grassland communities. This species ranges from southern San Bernardino County to Baja California, and from sea level to about 5,000 feet above mean sea 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.

3.3.5 BIRDS

3.3.5.1 Coastal California Gnatcatcher (*Polioptila californica californica*)

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. 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 8. 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 8. 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 8. 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.



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 8
Coastal California Gnatcatcher and Cactus Wren Locations

3.3.5.2 Least Bell's Vireo (*Vireo bellii pusillus*)

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. 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 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.

3.3.5.3 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. 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 8. CACW was also recorded within the survey area during 2005 surveys by Bonterra Consulting. These locations were not mapped.

3.3.5.4 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.

3.3.5.5 Sharp-shinned Hawk (*Accipiter striatus*)

The sharp-shinned hawk is a CSC and an Identified Species under the Central and Coastal Subregion NCCP/HCP. 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.

3.3.5.6 Northern Harrier (*Circus cyaneus*)

The northern harrier is a CSC and an Identified Species under the Central and Coastal Subregion NCCP/HCP. 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.

3.3.5.7 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. 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 and Varanus Biological Services.

3.3.5.8 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.

3.3.5.9 Prairie Falcon (*Falco mexicanus*)

The prairie falcon is a CSC and a Conditionally Covered Species under the Central and Coastal Subregion NCCP/HCP. 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.

3.3.5.10 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).

3.3.5.11 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.

3.3.5.12 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 and Varanus Biological Services and P&D.

3.3.5.13 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. 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 P&D in the survey area in 2002 and 2003 at numerous locations, as well as during previous surveys by Jones and Stokes and Varanus Biological Services. This species was also detected by Bonterra Consulting in 2005.

3.3.5.14 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.

3.3.5.15 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. 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.

3.3.6 MAMMALS

3.3.6.1 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. 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.

3.4 WILDLIFE DISPERSAL

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 in those areas due to the lack of vegetative cover. However, non-active landfilling areas of the survey area support sufficient vegetative cover that dispersal is more prevalent, particularly to mammalian carnivores. Mammalian carnivores are not typically constrained 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.

3.5 WETLANDS AND WATERS OF THE UNITED STATES AND CALIFORNIA

The survey area contains a number of drainages that are subject to state and federal regulatory requirements. This section 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).

3.5.1 WETLAND AND JURISDICTIONAL WATERS REGULATION

3.5.1.1 United States Army Corps of Engineers

The ACOE has regulatory authority over the discharge of dredged or fill material into waters of the United States (U.S.) (including wetlands) under Section 404 of the Clean Water Act (CWA). Federal jurisdiction is dependant on a demonstrated nexus between the subject water feature and navigable waters or interstate commerce. The ACOE and United States Environmental Protection Agency (EPA) define wetlands as "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions." In order to be considered a jurisdictional wetland under Section 404 of the CWA, an area must possess three wetland characteristics: hydrophytic vegetation, hydric soils and wetland hydrology.

3.5.1.2 Regional Water Quality Control Board

The Regional Water Quality Control Board (RWQCB) is the primary agency responsible for protecting water quality in California. The RWQCB regulates discharges to surface waters under the Federal CWA (Section 401) and the California Porter-Cologne Water Quality Control Act. The RWQCB's jurisdiction extends to all waters of the State and to all waters of the U.S., including wetlands.

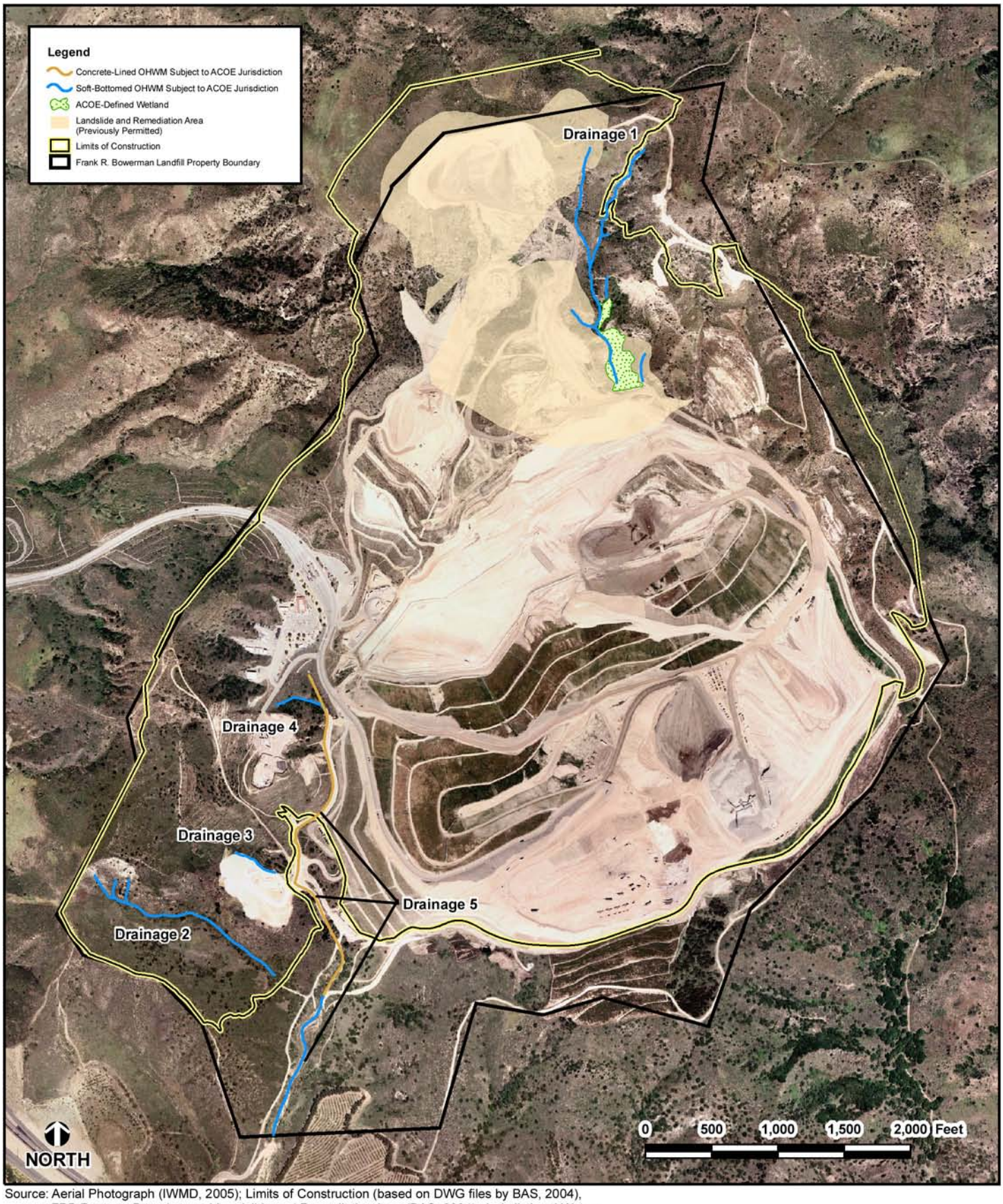
3.5.1.3 California Department of Fish and Game

The State of California regulates activities in rivers, streams and lakes pursuant to Sections 1600-1603 of the California Fish and Game Code. These Sections discuss the process by which an individual, government agency or public utility must notify CDFG prior to any activity that would "…substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream, or lake…" Streams (and rivers) are defined by the presence of a channel bed and banks, and at least an intermittent flow of water. CDFG exerts jurisdiction

over all waters of the State (measured from bank to bank) and any "riparian" vegetation associated with the waters. The term "riparian" vegetation refers to vegetation which occurs in and/or adjacent to a watercourse. Typical "riparian" vegetation includes willows, mulefat, sycamores, cottonwoods, cattails and other vegetation found in moist areas. CDFG regulates wetland areas only to the extent that those wetlands are part of a river, stream or lake as defined by CDFG. Following such notification, the CDFG must inform the individual, agency or utility of the existence of any fish and wildlife resources that may be substantially adversely affected by the activity. The CDFG must also include a proposal for measures to protect fish and wildlife resources. The proposal is called a Streambed Alteration Agreement (1602 Agreement for public agencies and utilities, and a 1603 Agreement for private party activities).

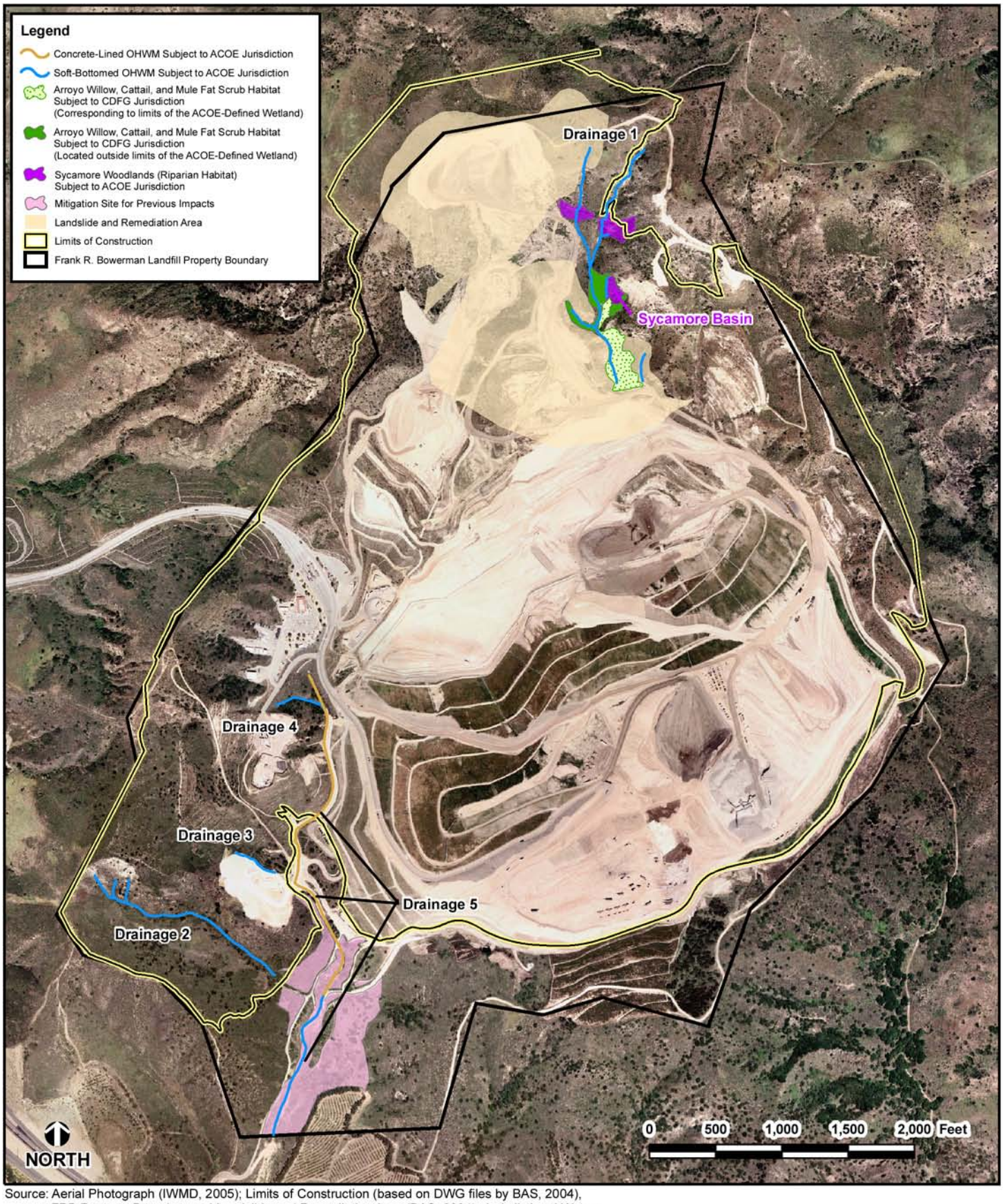
3.5.2 JURISDICTIONAL DRAINAGES

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 ACOE and CDFG jurisdiction, which are shown in Figures 9 and 10, respectively. 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 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, per CDFG jurisdiction. A summary of the on-site ACOE and CDFG jurisdictional drainages and wetlands identified for the FRB Landfill is presented in Section 6.5.



Source: Aerial Photograph (IWMD, 2005); Limits of Construction (based on DWG files by BAS, 2004), FRB Property Boundary and Landslide and Remediation Area (BAS, 2004), Jurisdictional Waters and Wetlands (P&D, 2004 and URS, 2005).

Figure 9
ACOE Jurisdiction



Source: Aerial Photograph (IWMD, 2005); Limits of Construction (based on DWG files by BAS, 2004), FRB Property Boundary and Landslide and Remediation Area (BAS, 2004), Jurisdictional Waters and Wetlands (P&D, 2004 and URS, 2005).

Figure 10
CDFG Jurisdiction

SECTION 4.0
METHODOLOGY

4.1 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.

Sensitive plant communities are vegetation assemblages, associations or subassociations that support concentrations of sensitive plant or wildlife species, are of relatively limited distribution or are of particular value to wildlife. Although sensitive habitats are not afforded specific legal protection unless they support protected species, potential impacts to them are important as they provide diversity and must be considered in the context of CEQA reporting requirements.

The CNDDB provides an inventory of plant communities that are considered sensitive by state and federal resource agencies, academic institutions and conservation groups such as the CNPS. Determination of the level of sensitivity is based on the Nature Conservancy Heritage Program Status Ranks that rank both species and plant communities on a global and statewide basis according to the number and size of remaining occurrences as well as recognized threats such as proposed development, habitat degradation, and invasion by non-native species.

CSC is an informal designation used by the CDFG for some declining wildlife species that are not considered threatened or endangered. This designation does not provide legal protection, but signifies that these species are recognized as sensitive by the CDFG.

The CNPS is a state-wide resource conservation organization that has developed an inventory of California's sensitive plant species. This inventory is the summary of information on the distribution, rarity, and endangerment of California's vascular plants. This rare plant inventory is comprised of a series of list that rank rarity of plant species found in California. List 1B plants are considered rare, threatened or endangered throughout their range.

4.2 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.

4.3 ORANGE COUNTY CENTRAL AND COASTAL SUBREGION NCCP

As noted previously, 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.

4.4 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 to determine the presence or potential presence of sensitive plant species and suitable habitats. The surveys included all rare plants covered by the NCCP with the exception of those species which were identified previously in Section 3.3. The surveys also covered species on the CNPS' 1B list and/or those included on the CESA and FESA. All surveys were conducted in accordance with standard botanical survey guidelines developed by the USFWS, CDFG and CNPS. Appendix C contains correspondence concerning the results of the 2002 and 2003, and 2005 rare plant surveys conducted for the FRB Landfill.

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 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. Appendix D contains correspondence concerning the results of the CAGN surveys conducted in 2003 and 2004 by P&D, and the results of the 2005 CAGN survey by Bonterra, for the FRB Landfill.

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. Appendix E contains the results of the 2005 LBV and SWF survey conducted by Bonterra for the FRB Landfill.

4.5 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. 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.

SECTION 5.0
THRESHOLDS OF SIGNIFICANCE

The location of FRB Landfill in the Orange County Central and Coastal NCCP/HCP requires that actions undertaken by the County of Orange be evaluated to ensure that existing and planned uses do not affect long term habitat value of the Reserve System or result in activities that would exceed take authorization. In addition, because the MDP will be evaluated in the context of the CEQA through the preparation of an EIR, both thresholds identified by CEQA and the NCCP would apply. Implementation of the FRB MDP was determined to result in a significant adverse impact if it resulted in exceedances of the CEQA and NCCP thresholds defined below.

5.1 CEQA THRESHOLDS OF SIGNIFICANCE

- 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 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 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 HCP, NCCP or other approved local, regional or state HCP.

5.2 ORANGE COUNTY CENTRAL AND COASTAL SUBREGION NCCP

- 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.

SECTION 6.0
BIOLOGICAL IMPACTS

6.1 INTRODUCTION

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.

6.2 PLANT COMMUNITIES/WILDLIFE HABITAT

6.2.1 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.

6.2.2 Long Term Impacts

The new FRB MDP implementation is proposed to occur over a 47 year period (2005 to 2053) and will be implemented in phases (see Section 2.0). During each of these phases, the on-site plant communities and the associated wildlife habitat will be incrementally impacted by MDP activities. Table 4 contains the FRB MDP phasing scenario and incremental CSS take totals. 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.

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:

TABLE 4
FRANK R. BOWERMAN MASTER DEVELOPMENT PLAN
INCREMENTAL COASTAL SAGE SCRUB TAKE BY PHASE

MASTER DEVELOPMENT PLAN PHASE	CONSTRUCTION PERIOD	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.

- 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:

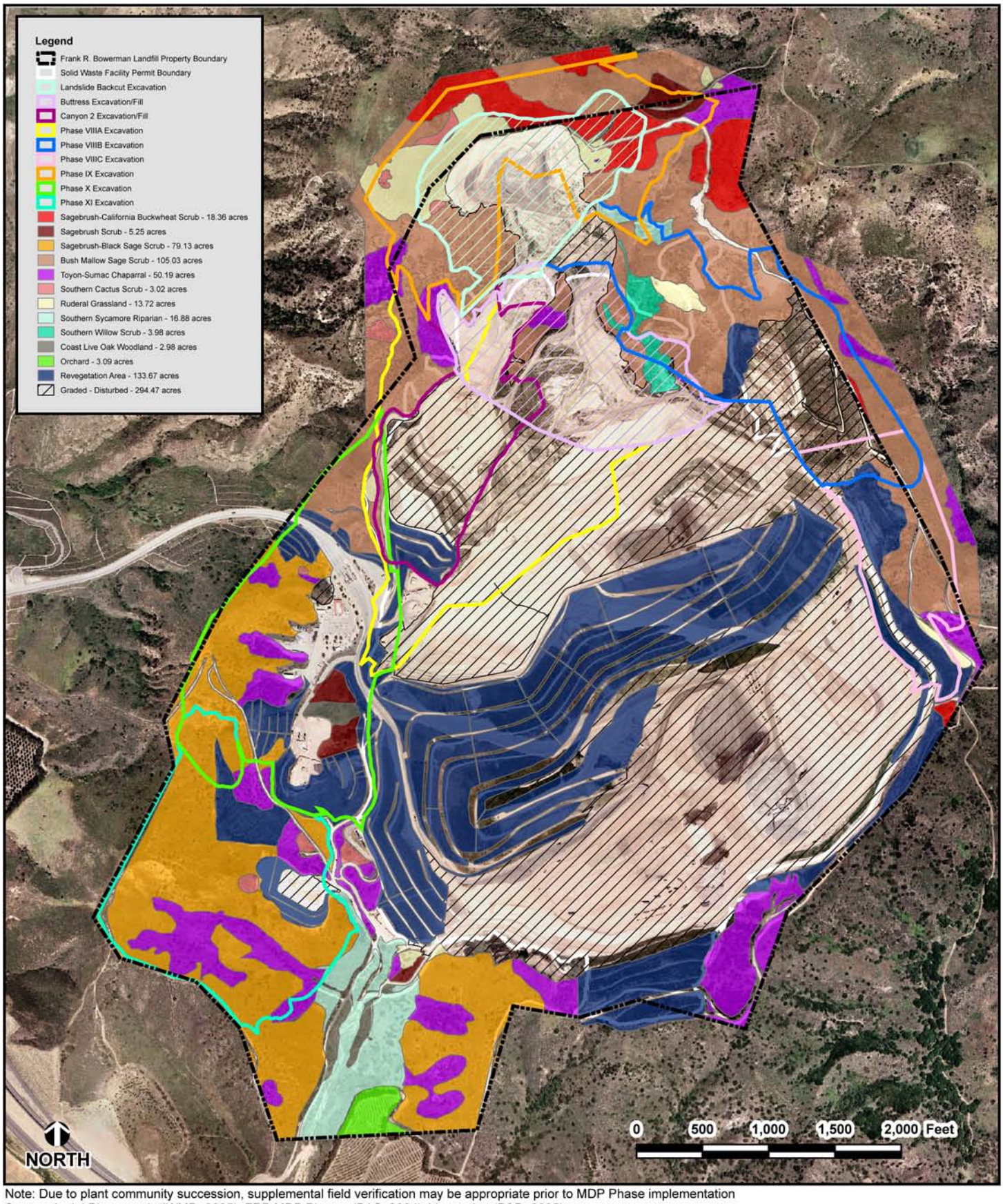
- 136.45 acres of Venturan-Diegan coastal sage scrub
- 1.89 acres of southern cactus scrub
- 1.58 acres of southern sycamore riparian
- 1.17 acres of coast live oak woodland
- 3.98 acres of southern willow scrub.

As noted previously, the MDP will occur in phases over a 47 year period (2004 to 2051) 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. 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 11 shows the location of plant communities/wildlife habitat affected by the FRB MDP.

6.3 SENSITIVE BIOLOGICAL RESOURCES

6.3.1 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, temporary indirect impacts to sensitive plant communities and plant species would include fugitive dust. Additional



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 11

FRB Master Development Plan Phase Summary and Detailed Vegetation Communities

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.

6.3.2 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 listed in Tables 2 and 3. 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. Figure 12 shows the location of sensitive biological resources affected by the FRB MDP.

6.3.2.1 Intermediate Mariposa Lily

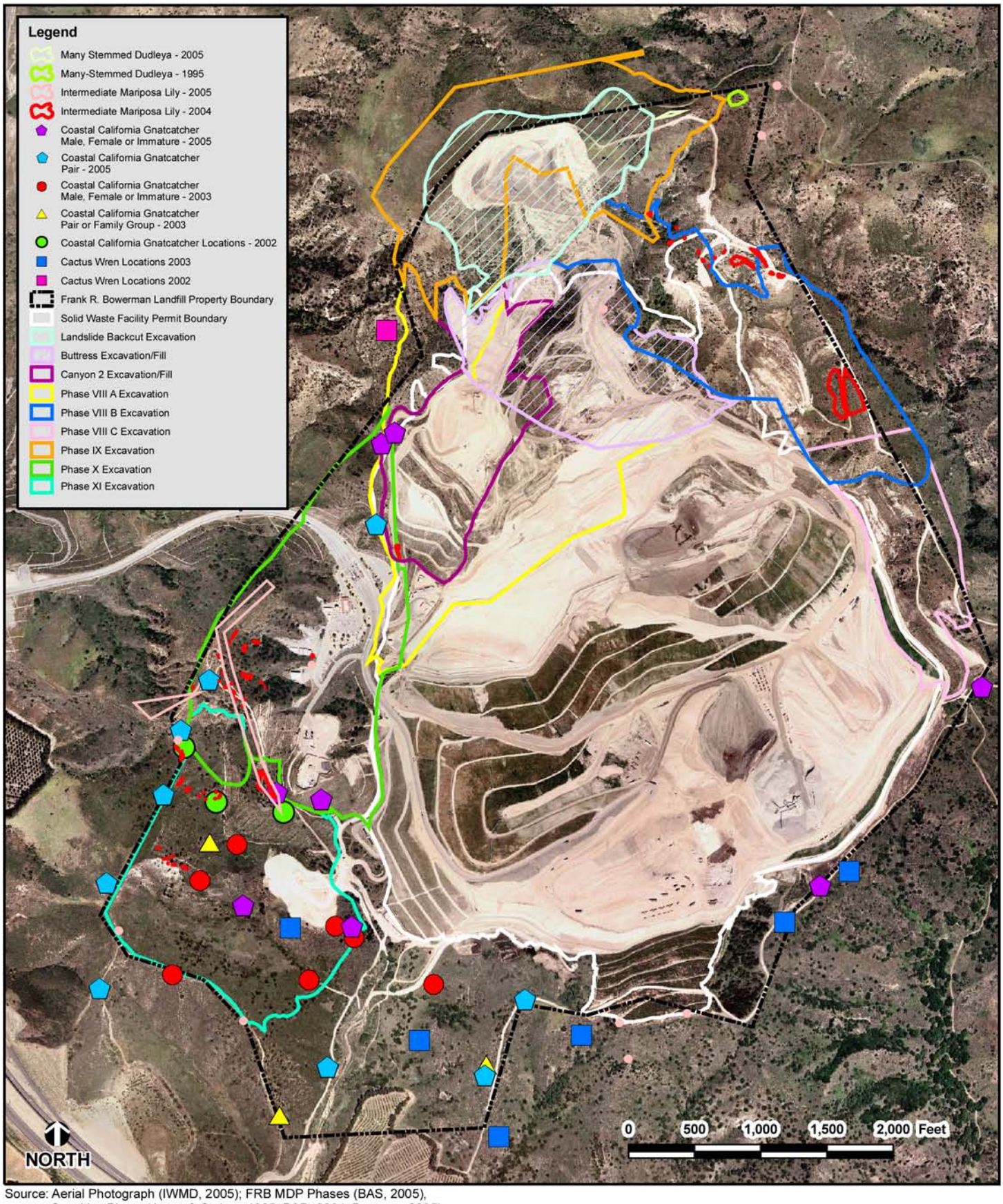
The NCCP indicates that impacts of less than 20 individual IML plants do not require mitigation beyond that already accommodated in the NCCP. Impacts to greater than 20 to 100 plants require implementation of a mitigation plan and are considered to be a significant adverse impact. Based on the 2004 and 2005 data, the FRB MDP would directly impact approximately 963 individual IML plants. Additional surveys were conducted in 2005. Figure 12 shows the IML populations affected relative to their location within the MDP, for both 2004 and 2005.

6.3.2.2 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.

6.3.2.3 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



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 12

FRB Master Development Plan Phase Summary and Sensitive Biological Resources

MDP to many-stemmed dudleya are considered adverse but not significant. Figure 12 shows the many-stemmed dudleya populations.

6.3.2.4 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 Figure 4).

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.

6.3.2.5 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 12 shows the location of these species in relation to the MDP. The orange-throated whiptail (OTW) is present in small to moderate numbers throughout the survey area. Impacts to CAGN associated with the FRB MDP would be considered adverse. However, impacts to CAGN, CACW and OTW are covered as part of the Central and Coastal Subregional NCCP/HCP, and are considered fully covered. Construction-related minimization measures exist for these species, which are addressed in the mitigation section (see Section 7.0). Consequently, impacts to CAGN, CACW, and OTW within the FRB Landfill are considered covered by the NCCP, and as such, these impacts are considered less than significant. However, it is important to recognize, these species occur in CSS and the additional take of 138.34 acres includes the presence of these species.

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.

6.3.2.6 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 are described in Table 3 and 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 least Bell's vireo and southwestern willow flycatcher is not expected to occur on-site due to limited acreage, isolation, and marginal habitat value.

Impacts to the species in Table 3 would be similar to those previously described and would generally include loss of foraging, nesting and/or cover sites. Table 3 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 3 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.

6.4 WILDLIFE DISPERSAL

6.4.1 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 have used adjacent areas normally. These indirect impacts are not considered to be significant.

6.4.2 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.

6.5 SUMMARY OF JURISDICTIONAL DETERMINATION

The impact area contains 2.81acres 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 and 6 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 and 6. As noted in the Delineation Report, 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 13 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.

TABLE 5
IMPACTS TO ACOE JURISDICTION

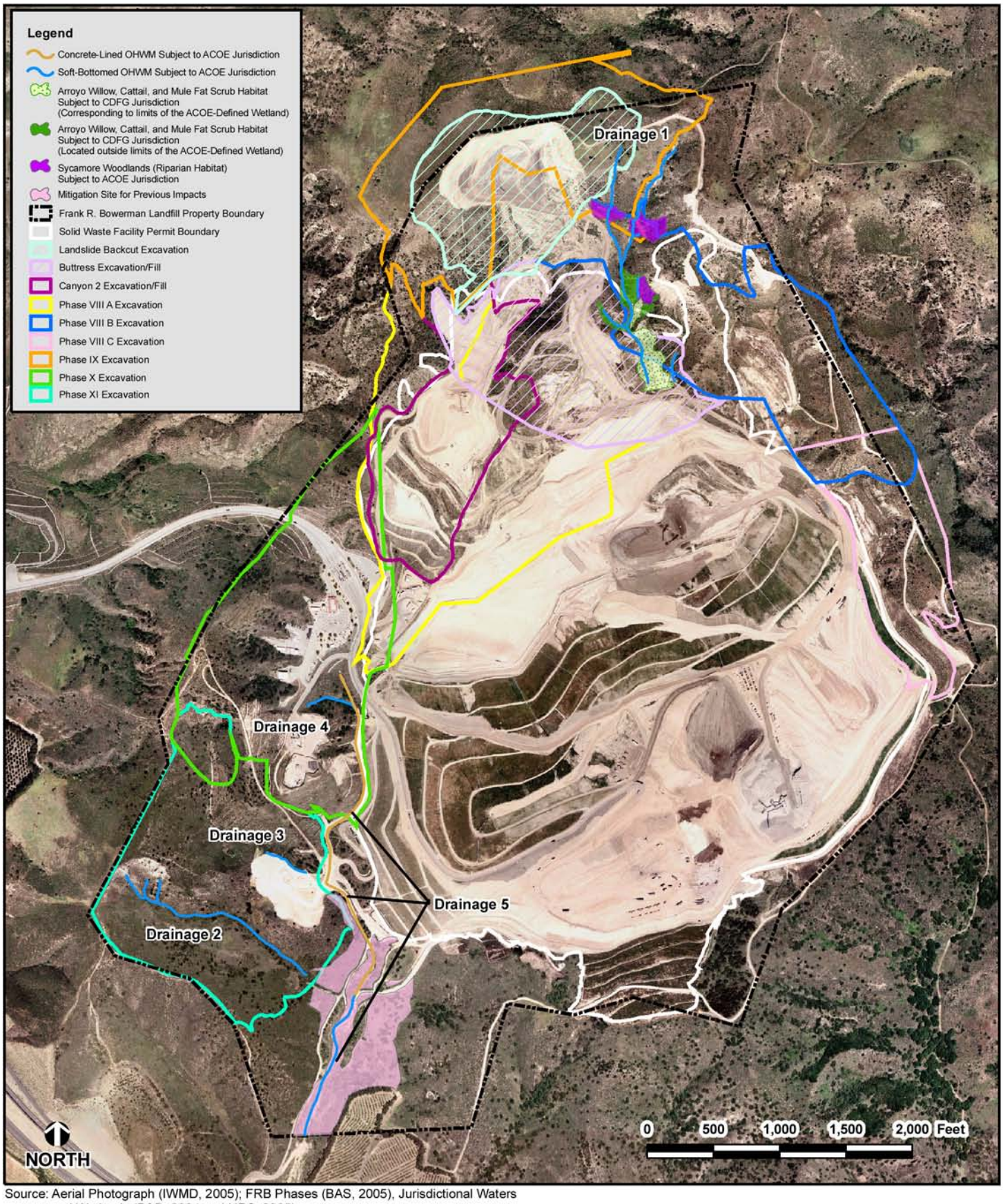
Drainage Name	Other Waters (Acres)	ACOE-Defined Wetlands (Acres)	Total ACOE Jurisdiction (Acres)
1	0.11	2.06	2.17
2	0.29	None	0.29
3	0.06	None	0.06
4	0.04	None	0.04
5	0.25	None	0.25
Total	0.75	2.06	2.81

Source: P&D/URS, 2005.

TABLE 6
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.



Source: Aerial Photograph (IWMD, 2005); FRB Phases (BAS, 2005), Jurisdictional Waters and Wetlands (P&D, 2004 and URS, 2005).

Figure 13
FRB Master Development Plan Phase Summary and Jurisdictional Waters

SECTION 7.0
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 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. The IWMD will mitigate for impacts to southern willow scrub and southern sycamore riparian

woodland and jurisdictional areas.

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 and approve final design and specifications for projects impacting resources or those within 500 feet of sensitive habitats.

- 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.*

SECTION 8.0
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SECTION 9.0
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APPENDIX A
FLORAL COMPENDIA

FRANK R. BOWERMAN LANDFILL

Floral Compendia

Ferns and Fern Allies.

Dryopteridaceae

Dryopteris arguta Coastal wood fern

Equisetaceae

Equisetum laevigatum Smooth scouring rush

Polypodiaceae

Polypodium californicum California polypody

Pteridaceae

Adiantum jordanii California maidenhair fern

Pellaea andromedifolia Coffee fern

Pellaea mucronata var. mucronata. Bird's-foot fern

Selaginellaceae

Selaginella bigelovii Bigelow’spikemoss

Dicotyledons

Amaranthaceae

Amaranthus albus Tumbling pigweed

Anacardiaceae

Malosma laurina Laurel sumac

Rhus integrifolia Lemonadeberry

Rhus trilobata Skunkbrush, squaw bush

Schinus molle Peruvian pepper tree

Toxicodendron diversilobum Poison oak

Apiaceae

Apium graveolens Celery

Daucus pusillus American wild carrot/Rattlesnake weed

Conium maculatum Poison hemlock

Foeniculum vulgare Fennel

Lomatium dasycarpum Woolly-fruited lomatium

Lomatium utriculatum Common lomatium

Apocynaceae

Apocynum cannabinum Indian hemp, dogbane

Vinca major Periwinkle

Asclepiadaceae

Asclepias californica California milkweed

Asclepias eriocarpa Milkweed, Indian milkweed

Asclepias fascicularis Narrow-leaf milkweed

Sarcostemma cynanchoides ssp. *hartwegii* Climbing milkweed

Asteraceae

Achillea millefilium Common yarrow

Acourtia millefolium Sacapellote

Ambrosia acanthicarpa Annual bursage

Ambrosia chamissonis Beach-bur

Ambrosia psilostachya Western ragweed

Anthemis cotula Mayweed, stinkweed

Artemisia californica California sagebrush

Artemisia douglasiana Mugwort

Artemisia dracunculus Tarragon

Baccharis pilularis Coyote brush

Baccharis salicifolia Mule fat

Bidens pilosa Beggar-ticks

Brickellia californica California brickellbush

Carduus pycnocephalus Indian thistle

Centaurea melitensis Tocalote

Centaurea solstitialis Yellow starthistle

Chaenactis artemisiifolia White pincushion

Chaenactis glabriuscula Yellow pincushion

Chamomilla suaveolens Pineapple weed

Chrysanthemum coronarium Garland daisy

Cirsium occidentale var. *californicum* California thistle

Cirsium occidentale var. *occidentale*. Cobwebby thistle

Cirsium vulgare Bull thistle

Conyza bonariensis Flax-leaved horseweed

Conzya canadensis Horseweed

Cynara cardunculus Cardoon, artichoke thistle

Encelia californica California bush sunflower

Encelia farinose Brittlebush

Ericameria pinifolia Pinebush

Erigeron foliosus Leafy daisy

Eriophyllum confertiflorum Golden-yarrow

Euthamia occidentalis Western goldenrod

Filago californica California fluffweed

Filago gallica Narrow-leaved filago

Gazania linearis Gazania

Gnaphalium bicolor Bicolored cudweed

Gnaphalium californicum California everlasting

Gnaphalium canescens ssp. *microcephalum* Fragrant everlasting

Gnaphalium luteo-album White cudweed

Gnaphalium palustre Lowland cudweed

Grindelia camporum var. *bracteosum* Gumplant

Gutierrezia californica California matchweed

Gutierrezia sarothrae San Joaquin matchweed

Hazardia squarrosa Saw-toothed goldenbush

Hedypnois cretica Crete hedypnois

Helianthus annuus Common sunflower

Helianthus gracilentus Slender sunflower

Hemizonia fasciculata Fascicled tarweed

Heterotheca grandiflora Telegraph weed

Heterotheca sessiliflora Bristly golden aster

Hypochaeris glabra Smooth cat's-ear

Hypochaeris radicata Hairy cat's-ear

Isocoma menziesii Coastal goldenbush

Lactuca serriola L. Prickly lettuce

Lasthenia californica Coast goldfields

Layia platyglossa Tidy-tips

Lessingia filaginifolia var. *filaginifolia* California aster

Madia elegans Lindley ssp. *elegans*. Common madia

Malacothrix saxatilis Cliff malacothrix

Osmadenia tella Osmadenia

Picris echioides Bristly ox-tongue

Rafinesquia californica California chicory

Senecio californicus California butterweed

Senecio flaccidus var. *douglasii* Sand-wash groundsel

Senecio vulgaris Common groundsel

Silybum marianum Milk thistle

Solidago californica California goldenrod

Sonchus asper Prickly sow thistle

Sonchus oleraceus Common sow thistle

Stephanomeria virgata Twiggy wreathplant

Stephanomeria exigua Wreath plant

Stylocline gnaphaloides Everlasting nest straw

Tragopogon porrifolius Salsify

Uropappus lindleyi Silver puffs

Xanthium spinosum Spiny cocklebur

Xanthium strumarium Cocklebur

Boraginaceae

Amsinckia menziesii var. *intermedia* Common fiddleneck

Cryptantha intermedia Common forget-me-not

Cryptantha micromeres Minute-flowered cryptantha

Heliotropium curassavicum Salt heliptrope

Pectocarya linearis ssp. *ferocula* Slender pectocarya

Plagiobothrys nothofulvus Rusty popcornflower

Brassicaceae

Brassica nigra Black mustard

Brassica rapa field mustard

Capsella bursa-pastoris Shepherd's purse

Cardamine californica Toothwort

Hirschfeldia incana Short-podded mustard

Lepidium lasiocarpum var. *lasiocarpum*

Lepidium latipes Dwarf peppergrass

Lepidium nitidum Shining peppergrass

Lobularia maritima Sweet alyssum

Raphanus sativus Radish

Rorippa nasturtium-aquaticum Water cress

Sisymbrium irio London rocket

Sisymbrium officinale Hedge mustard

Sisymbrium orientale Oriental mustard

Cactaceae

Opuntia littoralis Coastal prickly pear

Caprifoliaceae

Sambucus mexicana Blue elderberry

Caryophyllaceae

Cardionema ramosissimum Sand mat

Silene gallica Common catchfly

Stellaria media Common chickweed

Spergularia sp. Sand spurrey

Chenopodiaceae

Atriplex californica California saltbush

Atriplex lentiformis Quail brush

Atriplex semibaccata Australian saltbush

Chenopodium album Lamb's quarters

Chenopodium ambrosioides Mexican tea

Chenopodium californicum California goosefoot

Chenopodium multifidum Cut -leaved goosefoot

Salsola tragus Russian thistle, tumbleweed

Convolvulaceae

Calystegia macrostegia Western bindweed

Convolvulus arvensis Bindweed

Crassulaceae

Crassula connata Pygmy weed

Dudleya lanceolata Lance-leaved dudleya

Dudleya multicaulis Many-stemmed dudleya

Dudleya pulverulenta Chalk dudleya

Cucurbitaceae

Cucurbita foetidissima Calabazilla

Marah macrocarpus Man-root

Cuscutaceae

Cuscuta californica California dodder

Datiscaceae

Datisca glomerata Durango root

Euphorbiaceae

Chamaesyce albomarginata Rattlesnake weed

Chamaesyce maculata Spotted spurge

Chamaesyce melanadenia (Torrey) Millsp.

Chamaesyce serpyllifolia Thyme leaved spurge

Croton californicus California croton

Eremocarpus setigerus Doveweed

Euphorbia peplus Petty spurge

Ricinus communis Castor bean

Fabaceae

Amorpha californica var. *californica* False indigo

Astragalus didymocarpus Two-seeded milkvetch

Astragalus gambelianus Gambell's dwarf locoweed

Hoita macrostachya Leather root

Lotus argophyllus Silver leaf lotus

Lotus purshianus Spanish clover

Lotus scoparius California broom

Lotus strigosus Strigose lotus*Lupinus bicolor* Miniature lupine

Lupinus concinnus Bajada lupine

Lupinus excubitus Grape soda lupine*Lupinus hirsutissimus* Stinging lupine

Lupinus succulentus Arroyo lupine

Medicago polymorpha California burclover

Melilotus alba White sweetclover

Melilotus indica Sour clover

Trifolium willdenovii Tomcat clover

Vicia villosa Winter vetch

Fagaceae

Quercus agrifolia Coast live oak

Quercus berberidifolia Scrub oak

Gentianaceae

Centaurium venustum Canchalagua

Geraniaceae

Erodium botrys Long-beaked filaree

Erodium cicutarium Red-stemmed filaree

Erodium moschatum White-stemmed filaree

Geranium carolinianum Carolina geranium

Glossulariaceae

Ribes malvaceum Chaparral currant

Ribes speciosum Fuchsia-flowered gooseberry

Hydrophyllaceae

Eriodictyon crassifolium Thick-leaved yerba santa

Eucrypta chrysanthemifolia Common eucrypta

Nemophila menziesii Baby blue-eyes

Phacelia cicutaria Caterpillar phacelia

Phacelia distans Wild heliotrope

Phacelia minor Wild Canterbury-bell

Phacelia ramosissima Branching phacelia

Pholistoma auritum Fiesta flower

Lamiaceae

Marrubium vulgare Horehound

Salvia apiana White sage

Salvia columbariae Chia

Salvia leucophylla Purple sage

Salvia mellifera Black sage

Trichostema lanceolatum Vinegar weed

Malvaceae

Malacothamnus densiflorus Many-flowered bushmallow

Malacothamnus fasciculatus Chaparral mallow

Malva parviflora Cheeseweed

Nyctaginaceae

Mirabilis californica Wishbone bush

Onagraceae

Camissonia bistorta California sun cup

Camissonia californica Mustard-like evening primrose

Clarkia bottae Punchbowl godetia

Clarkia purpurea Winecup clarkia

Epilobium canum California fuchsia

Oxalidaceae

Oxalis pes-caprae Bermuda buttercup

Paeoniaceae

Paeonia californica California peony

Papaveraceae

Eschscholzia californica California poppy

Platystemon californicus Cream cups

Plantaginaceae

Plantago erecta Western plantain

Plantago lanceolata English plantain

Plantago major Common plantain

Platanaceae

Platanus racemosa California sycamore

Polemoniaceae

Eriastrum sapphirinum Sapphire eriastrum

Gilia capitata ssp. *abrotanifolia* Ball gilia

Leptodactylon californicum Prickly phlox

Linanthus dianthiflorus Ground pink

Linanthus liniflorus Flax flowered linanthus

Polygonaceae

Chorizanthe staticoides Turkish rugging

Eriogonum fasciculatum California buckwheat

Rumex crispus Curly dock

Portulacaceae

Calandrinia ciliata Red maids

Claytonia perfoliata Miner's lettuce

Portulaca oleracea Common purslane

Primulaceae

Anagallis arvensis Scarlet pimpernel, poor-man's weatherglass

Dodecatheon clevelandii Padres’ shooting star

Ranunculaceae

Delphinium cardinale Scarlet larkspur

Delphinium parryi Parry’s larkspur

Ranunculus californicus California buttercup

Rhamnaceae

Ceanothus megacarpus Big-podded ceanothus

Rhamnus ilicifolia Holly-leaved redberry

Rosaceae

Adenostoma fasciculatum Chamise

Heteromeles arbutifolia Toyon

Rubiaceae

Galium angustifolium Narrow-leaved bedstraw

Galium aparine Goosegrass

Galium nuttallii ssp. nuttallii San Diego bedstraw

Salicaceae

Populus fremontii Fremont cottonwood

Salix exigua Narrow-leaved willow

Salix lasiolepis Arroyo willow

Scrophulariaceae

Antirrhinum coulterianum White snapdragon

Castilleja affinis Coast paintbrush

Castilleja exserta Purple owl's-clover

Collinsia heterophylla Chinese houses

Cordylanthus rigidus Dark-tipped bird's-beak

Keckiella cordifolia Heart-leaved penstemon

Mimulus aurantiacus Orange bush monkey flower

Mimulus brevipes Wide throated monkey flower

Mimulus guttatus Common monkey flower

Scrophularia californica California figwort

Veronica peregrine Purslane speedwell

Solanaceae

Datura stramonium Jimson weed

Datura wrightii Jimson weed

Nicotiana galuca Cleveland's tree tobacco

Nicotiana glauca Tree tobacco

Solanum douglasii Douglas' nightshade

Solanum xanti Chaparral nightshade

Tamaricaceae

Tamarix ramosissima Tamarisk, saltcedar

Urticaceae

Hesperocnide tenella Western nettle

Violaceae

Viola pedunculata Johnny jump-up, wild pansy

Monocotyledons

Arecaceae

Phoenix canariensis Canary Island date palm

Iridaceae

Sisyrinchium bellum Blue-eyed-grass

Liliaceae

Bloomeria crocea Common goldenstar

Chlorogalum pomeridianum Soap plant

Dichelostemma pulchellum Blue dicks

Calochortus catalinae Catalina mariposa lily

Calochortus splendens Lilac mariposa lily

Calochortus weedii var. *intermedius* Foothill (intermediate) mariposa lily

Chlorogalum pomeridianum Wavy-leaved soap plant*Yucca whipplei* Spanish bayonet

Poaceae

Achnatherum coronatum Giant needlegrass

Arundo donax L. Giant reed, reed cane

Avena barbata Slender wild oat

Avena fatua Wild oat

Brachypoduim distachyon Purple false brome

Bromus carinatus California brome grass

Bromus diandrus Ripgut grass

Bromus hordaceus soft chess

Bromus madritensis ssp. *rubens* Foxtail chess

Cortaderia selloana Pampus grass

Cynodon dactylon Bermuda grass

Hordeum murinum var. *lepidorinum* Foxtail barley

Lamarckia aurea Goldentop

Leymus condensatus Giant wild rye

Lolium multiflorum Italian ryegrass

Lolium perenne Perennial ryegrass

Melica imperecta Small flowered melic grass

Nassella lepida Foothill needlegrass

Nassella pulchra Purple needlegrass

Pennisetum setaceum African fountain grass

Schismus barbatus Mediterranean schismus

Vulpia myuros var. *myuros* Rattail fescue

Typhaceae

Typha domingensis Slender cattail

Typha latifolia Broad-leaved cattail

APPENDIX B
FAUNAL COMPENDIA

FRANK R. BOWERMAN LANDFILL
Faunal Compendia

AMPHIBIANS	
Garden Slender Salamander *Batrachoseps major* Western Toad *Bufo boreas*	Pacific Treefrog *Hyla regila*
REPTILES	
Orange-throated Whiptail *Aspidoscelis hyperythrus* Southern Alligator Lizard *Elgaria multicarinata* Coast Horned Lizard *Phrynosoma coronatum* Gilbert's Skink *Eumeces gilberti* Southern Alligator Lizard *Elgaria multicarinata*	Western Fence Lizard *Sceloporus occidentalis* Side-blotched Lizard *Uta stansburiana* Gopher Snake *Pituophis melanoleucus* Western Whiptail *Cnemidophorus tigris* Striped Racer *Masticophus lateralis*
BIRDS	
Turkey Vulture *Cathartes aura* Cooper's Hawk *Accipiter cooperii* Northern Harrier *Circus cyaneus* Red-shouldered Hawk *Buteo lineatus* Red-tailed Hawk *Buteo jamaicensis* American Kestrel *Falco sparverius* California Quail *Callipepla californica* Killdeer *Charadrius vociferous*Mourning Dove *Zenaida macroura* Common Ground-Dove *Columbia livia* Greater Roadrunner *Geococcyx californianus* White-throated Swift *Aeronautes saxatalis* Rufous/Allen's Hummingbird *Selasphorus* sp. Anna's Hummingbird *Calypte anna* Costa's Hummingbird *Calypte costae*	Cactus Wren *Campylorhynchus brunneicapillus* Rock Wren *Salpinctes obsoletus* Bewick's Wren *Thryomanes bewickii* House Wren *Troglodytes aedon* California Gnatcatcher *Polioptila californica* Hermit Thrush *Catharus guttatus* Wrentit *Chamaea fasciata* Northern Mockingbird *Mimus polyglottos* California Thrasher *Toxostoma redivivum* European Starling *Sturnus vulgaris* American Pipit *Anthus rufescens* Phainopepla *Phainopepla nitens* Orange-crowned Warbler *Vermivora celata* Yellow-rumped Warbler *Dendroica coronata* Common Yellowthroat

Northern Flicker *Colaptes auritus* Acorn Woodpecker *Melanerpes formicivorus* Nuttall's Woodpecker *Picoides nuttallii* Willow Flycatcher *Empidonax traillii* Pacific-slope Flycatcher *Empidonax difficilis* Black Phoebe *Sayornis nigricans* Say's Phoebe *Sayornis saya* Ash-throated Flycatcher *Myiarchus cinerascens* Cassin's Kingbird *Tyrannus vociferans* Western Kingbird *Tyrannus verticalis* Loggerhead Shrike *Lanius ludovicianus* American Crow *Corvus brachyrhynchos* Common Raven *Corvus corax* Horned Lark *Eremophila alpestris* Western Scrub-Jay *Aphelocoma californica* Violet-green Swallow *Tachycineta thalassina* Northern Rough-winged Swallow *Stelgidopteryx serripennis* Cliff Swallow *Petrochelidon pyrrhonota* Oak Titmouse *Baeolophus inornatus* Bushtit *Psaltriparus minimus*	*Geothlypis trichas* Yellow-breasted Chat *Icteria virens* Spotted Towhee *Pipilo maculatus* California Towhee *Pipilo crissalis* Rufous-crowned Sparrow *Aimophila ruficeps* Black-chinned Sparrow *Spizella atrogularis* Lark Sparrow *Chondestes grammacus* White-crowned Sparrow *Zonotrichia leucophrys* Song Sparrow *Melospiza melodia* White-crowned Sparrow *Zonotrichia leucophrys* Golden-crowned Sparrow *Zonotrichia atricapilla* Black-headed Grosbeak *Pheucticus melanocephalus* Blue Grosbeak *Guiraca caerulea* Lazuli Bunting *Passerina amoena* Bullock's Oriole *Icterus bullockii* Hooded Oriole *Icterus cuculattus* Lesser Goldfinch *Carduelis psaltria* American Goldfinch *Carduelis tristis* Lawrence's Goldfinch *Carduelis lawrencei* House Finch *Carpodacus mexicanus*
MAMMALS	
Opossum *Didelphis virginiana* Audubon's Cottontail *Sylvilagus audubonii* Black-tailed Jackrabbit *Lepus californicus* California Ground Squirrel *Spermophilus beecheyi* Botta's Pocket Gopher *Thomomys bottae*	San Diego Desert Woodrat *Neotoma lepida intermedia* Bobcat *Lynx rufus* Coyote *Canis latrans* Raccoon *Procyon lotor* Mule Deer *Odocoiles hemionus*

Dusky-footed Woodrat *Neotoma fuscipes*	

APPENDIX C
RESULTS OF SURVEYS FOR RARE PLANTS AT THE FRANK R. BOWERMAN LANDFILL

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December 2, 2003

Christine Arbogast
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1360 Valley Vista Drive
Diamond Bar, California 91765

RE: RESULTS OF SURVEYS FOR RARE PLANTS AT THE FRANK R. BOWERMAN LANDFILL (2003)

Dear Christine:

Provided below are the results of the rare plant surveys performed at the Frank R. Bowerman (FRB) Landfill, Orange County, California during April, May and June 2003 by P&D Environmental. Background information on the survey locations and dates, methodology and findings are provided below. As you will note, only one of the rare plants identified in our scope, foothill mariposa lily (FML), was found on the FRB Landfill property. No rare plants were observed within the proposed north or east off-site encroachment areas. P&D surveys conducted during 2002 had indicated potential habitat for the FML and other rare plants and therefore were recommended during 2003 due to low rainfall in 2002. Rainfall for 2003 was slightly greater than the average annual rainfall for Orange County, therefore rare plants identified for surveys would likely have germinated. As such, the absence of these species during 2003 is likely an indicator of their general absence on-site.

METHODS

Standard botanical survey methods were employed during the rare plant surveys conducted on April 18, May 9, 13, June 9, 20, 21, 24, 2003 by surveying botanist J. Crain. This included conducting inventories of the target species during the appropriate time of year within all potential habitat areas of the survey boundary. A review of target species was also conducted through the use of reference materials. Monitoring of rainfall was also performed to identify optimum observation periods. Flowering periods for rare plants (noted below) and other species occurring within these habitats were also monitored within both Southern California and Orange County. Reference populations within the Laguna Coast Wilderness Park were used for all target species to determine their development and flowering status. Site visits to this reference population were conducted on April 15 and June 8. The site visits indicated that FML and many-stemmed dudleya were in bloom. The rare plant surveys were conducted on foot throughout the FRB Landfill property and the encroachment areas to the north and east (i.e., survey boundary) of the existing property boundary.

The rare plant survey was conducted for the following target plant species:

- Intermediate (foothill) mariposa lily (*Calochortus weedii* var. *intermedius*)
- Thread-leaved brodiaea (*Brodiaea filifolia*)
- Many-stemmed dudleya (*Dudleya multicaulis*)
- Vernal barley (*Hordeum intercedens*)

- Chaparral beargrass (*Nolina cismontana*)

HABITAT SUITABILITY

An assessment of both rare and sensitive plant species occurrence within the FRB Landfill boundary and proposed encroachment areas is provided below. The habitat types, flowering period and occurrence information for all target species identified for surveys potentially occurring within the FRB Landfill is provided in Table 1.

Table 1

Rare Plant Species Potentially Occurring within the Frank R. Bowerman Landfill Master Development Plan Survey Area.

Species	Common Name	Status[1]	Life Form	Flowering Period	Habitat	Occurrence
Dudleya multicaulis	Many-stemmed dudleya	CNPS 1B	perennial herb	April through July	chaparral, coastal scrub, grassland /often on clay soils	not observed; suitable habitat present
Calochortus weedii var. *intermedius*	Intermediate mariposa lily	CNPS 1B	perennial herb (bulbiferous)	May through July	chaparral, coastal scrub, grassland /rocky substrate	556 individuals observed during 2003 surveys
Brodiaea filifolia	thread-leaved brodiaea	FT, SE, CNPS 1B	perennial herb (bulbiferous)	March through June	Chaparral (openings), cismontane woodland, coastal scrub, playas, grassland, vernal pools /often on clay soils	not observed; suitable habitat present
Nolina cismontana	Chaparral beardgrass	CNPS 1B	shrub (evergreen)	May through July	chaparral, coastal scrub /sandstone or gabbro substrate	not observed; suitable habitat present
Hordeum intercedens	vernal barley	CNPS 3	annual herb	March through June	coastal dunes, coastal scrub, grassland (saline flats and depressions), vernal pools	not observed; suitable habitat present

[1]**Notes:** California Native Plant Society (CNPS)
Federally Threatened (FT)
State Endangered (SE)

Intermediate (Foothill) Mariposa Lily

This rare plant species was observed during the 2003 surveys. The species was observed in both black sage scrub and bush mallow scrub habitats. Species co-occurring with FML included our Lord's candle (*Yucca whipplei*), black sage (*Salvia mellifera*), deerweed (*Lotus scoparius*), California sagebrush (*Artemisia californica*), laurel sumac (*Malosma laurina*), flat-top buckwheat (*Eriogonum fasciculate*) and purple needlegrass (*Nassella pulchra*).

Thread-leaved Brodiaea

No individuals of this species were observed during the 2003 surveys, although suitable habitat was present within the survey area. Surveys were conducted during the flowering period of this species.

Many-stemmed Dudleya

No individuals of this species were observed during the 2003 surveys, although suitable habitat was present within the survey area. Surveys were conducted during the flowering period of this species.

Vernal Barley

No individuals of this species were observed during the 2003 surveys, although suitable habitat was present within the survey area. Surveys were conducted during the flowering period of this species.

Chaparral beargrass

No individuals of this species were observed during the 2003 surveys, although suitable habitat was present within the survey area. Surveys were conducted during the flowering period of this species.

RESULTS

Of the five target plant species identified for surveys, only foothill mariposa lily was observed within the survey area during the 2003 FRB rare plant surveys. Surveys were conducted in all suitable habitat for each species during the appropriate flowering period. Rainfall for 2003 was above the normal average for Orange County, therefore if these target species were present on site, germination would have been expected.

Foothill Mariposa Lily

A total of 556 foothill mariposa lily (lily) individuals in 53 distinct polygons were observed during the 2003 FRB rare plant surveys. Figure 1 illustrates the location of each of these polygons within the survey areas. Figure 2 contains field photographs of individual plants and typical habitat setting. Individual polygons varied in size from 1 to 134 individuals. Due to the sporadic distribution of this species, individual populations consisted of several polygons in close proximity.

A majority of the individuals were found concentrated in two areas, in the southwest and northeast portions of the landfill property boundary (see Figure 1). As noted above, no FML populations were identified in the north or northeast encroachment areas. The largest populations of FML were observed in the northeast portion of the landfill, including populations of 81 and 134 individual plants. A brief comparison of occurrence characteristics between the southwest and northeast populations indicates that relatively sparse shrub canopy cover found within the northeast populations is likely favoring this species. This area was subject to fire within the last five years resulting in more open space between shrubs for the lily to occupy, which may explain the larger number of individuals compared to the populations found in the southwest area. As the shrub canopy recovers, fewer individuals may be observed flowering.

Our review of the Phase VII A/B disturbance limits indicates that the Phase VII B component is likely to affect a portion of the northeast populations. As you are aware, the Orange County Central and Coastal Subregion Natural Community Conservation Plan (NCCP)/Habitat Conservation Plan (HCP) indicates that impacts by "participating landowners" to one to 20 individual plants is fully mitigated under the NCCP/HCP. Planned projects affecting populations greater than 20 individual plants require the preparation of a mitigation plan and approval by the Nature Reserve of Orange County, California Department of Fish and Game and the United States Fish and Wildlife Service. The recommended period for transplantation of the FML is August to early October.

Should you have any questions, please contact me at (714) 835-4447. Thank you.

Respectfully,

Michael A. Benner

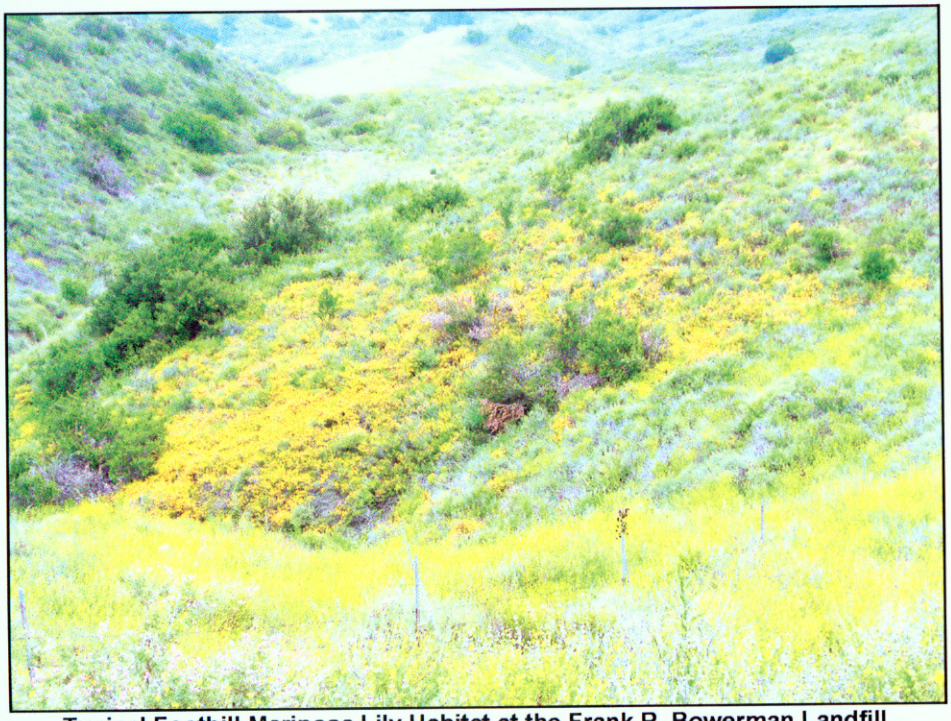
Michael A. Benner
Vice President

F:\PROJ-ENV\FRB Master Plan\Sensitive Species Surveys (2003)\2003 rare plant surveys.doc

0 250 500 1,000 1,500 2,000 Feet

Source: Aerial photograph, Eagle Aerial, 2002.

Figure 1
Foothill Mariposa Lily Populations



Typical Foothill Mariposa Lily Habitat at the Frank R. Bowerman Landfill

Foothill Mariposa Lily

Figure 2
Foothill Mariposa Lily Habitat

BonTerra
CONSULTING
An Environmental Planning/Resource Management Corporation

October 7, 2005

Mr. Tarik Hadj-Hamou
GeoSyntec Consultants
2100 Main Street, Suite 150
Huntington Beach, CA 92648

VIA FACSIMILE AND MAIL
(714) 969-0820

Subject: Results of Special Status Plant Surveys for the Frank R. Bowerman Landfill in Unincorporated Orange County, California

Dear Mr. Hadj-Hamou:

This report presents the findings of special status plant surveys conducted on the Frank R. Bowerman Landfill (hereafter referred to as the project site). The purpose of this survey was to identify special status plant species on the project site. The format and level of detail provided by this report complies with documentation guidelines and requirements specified by the California Native Plant Society's (CNPS) Botanical Survey Guidelines.

SITE LOCATION

The project site totals 904 acres and is located on the U.S. Geological Survey's El Toro, 7.5-minute California Quadrangle at Township 5S, Range 8W, and includes portions of Sections 143, 144, and 118. The project site is located at the northern terminus of Bee Canyon Access Road in Orange County, north of the City of Irvine. The regional location of the project site is shown on Exhibit 1 and the study area boundary is shown on Exhibit 2.

Topography on the project site is mountainous, with elevations ranging from approximately 700 to 1500 feet above mean sea level. The surrounding area is primarily Nature Conservancy land with Limestone Canyon Regional Park to the north and east of the project site. To the west and south of the project site are the Eastern Transportation Corridor and the Foothill Transportation Corridor, respectively.

The study area consists of approximately 494 acres of vegetation surrounding approximately 410 acres of active landfill.

METHODS

Prior to survey performance, a literature review was conducted to identify special status plants or vegetation types known to occur within the project site and vicinity. This literature review included a review of the El Toro, Santiago Peak, and Tustin USGS 7.5-minute quadrangles in the California Natural Diversity Data Base (CNDDB) (CDFG 2003a); the California Native Plant Society's (CNPS) *Electronic Inventory* (2005); and the compendium of special status species published by the

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U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) (USFWS 1994, CDFG 2003b).

Special status plant surveys were conducted on April 5, 19, May 19, 31, and June 7 and 23, 2005, by BonTerra Consulting biologists Sandra Leatherman, Amber Oneal, Jennifer Pareti, Andrea Warniment, and Allison Rudalevige. All areas of the project site containing native habitats potentially suitable for special status plant species (approximately 494 acres) were surveyed using meandering transects. Ms. Leatherman visited known populations of thread-leaved brodiaea (*Brodiaea filifolia*), many-stemmed dudleya (*Dudleya multicaulis*), and intermediate mariposa lily (*Calochortus weedii* var. *intermedius*) prior to site surveys to ensure they were blooming at the time of survey performance.

All observed plant species were recorded in field notes. Plant species were identified in the field or collected for subsequent identification. Plants were identified using keys in Hickman (1993) and Munz (1974). Taxonomy follows Hickman (1993) and current scientific data (e.g., scientific journals) for scientific and common names. Nomenclature for vegetation types generally follows that of *The Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the CNDDB* (CDFG 2003).

SITE DESCRIPTION

Vegetation on the project site consists of 15 types: black sagebrush scrub, buckwheat sagebrush scrub, bush mallow scrub, coast live oak woodland, graded-disturbed, lemonadeberry sumac chaparral, orchard, revegetation area, ruderal, sagebrush scrub, southern cactus scrub, southern mixed riparian, sycamore woodland, toyon lemonadeberry chaparral, and toyon sumac chaparral (P&D Environmental 2004). The distribution of these vegetation types are shown in Exhibit 3.

Twelve soil types occur on the project site (Exhibit 4). These include Alo clay (with 15-30 percent slopes), Anaheim clay loam (with 15-30 and 30-50 percent slopes), Balcom clay loam (with 30-50 percent slopes), Bosanko clay (with 15-30 and 30-50 percent slopes), Calleguas clay loam (50-75 percent slopes, eroded), Capistrano sandy loam (with 2-9 percent and 9-15 percent slopes), Cieneba sandy loam (with 15-30 percent slopes and 30-75 percent slopes, eroded), Corralitos loamy sand, Myford sandy loam (with 9-15 percent slopes, and 9-30 percent slopes, eroded), Riverwash, Soper gravelly loam (with 30-50 percent slopes), and Soper cobbly loam (with 15-50 percent slopes).

Table 1 lists the special status plants known to occur within the vicinity of the project site. The results column indicates if the species was observed during these surveys.

SURVEY RESULTS

Catalina mariposa lily (*Calochortus catalinae*), intermediate mariposa lily (*Calochortus weedii* var. *intermedius*), and many-stemmed dudleya (*Dudleya multicaulis*) were the three special status plant species observed during the surveys. The results of these observations are discussed below. Photographs were taken of species in lieu of collecting a voucher specimen as these were known locations which had been previously vouchered. A list of all plants observed during the survey can be found in Appendix A.

TABLE 1
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE PROJECT VICINITY

Species	Status			Results
	Federal	State	CNPS	
Atriplex coulteri Coulter's saltbush	–	–	1B	Not observed during surveys. Not expected to occur; lack of suitable habitat
Atriplex serenana var. *davidsonii* Davidson's saltscale	–	–	1B	Not observed during surveys. Not expected to occur; lack of suitable habitat
Brodiaea filifolia thread-leaved brodiaea	FT	SE	1B	Not observed during surveys. Not expected to occur; limited suitable habitat
Calochortus catalinae Catalina mariposa lily	–	–	4	Present; observed during surveys
Calochortus weedii var. *intermedius* intermediate mariposa lily	–	–	1B	Present; observed during surveys
Camissonia lewisii Lewis's evening-primrose	–	–	3	Not observed during surveys. Not expected to occur; lack of suitable habitat
Centromadia parryi ssp. *australis* southern tarplant	–	–	1B	Not observed during surveys. Limited suitable habitat
Chorizanthe parri var. *fernandina* San Fernando Valley spineflower	FC	SE	1B	Not observed during surveys. Not expected to occur; lack of suitable habitat
Cupressus forbesii tecate cypress	–	–	1B	Not observed during surveys. Not expected to occur; lack of suitable habitat
Dodecahema leptoceras slender-horned spineflower	–	–	1B	Not observed during surveys. Not expected to occur; lack of suitable habitat
Dudleya cymosa ssp. *ovatifolia* Santa Monica Mountains dudleya	FT	–	1B	Not observed during surveys. Not expected to occur; lack of suitable habitat
Dudleya multicaulis many-stemmed dudleya	–	–	1B	Present; observed during surveys
Helianthus nuttallii ssp. *parishii* Los Angeles sunflower	–	–	1A	Not observed during surveys. Not expected to occur; lack of suitable habitat
Hordeum intercedens vernal barley	–	–	3	Not observed during surveys. Limited suitable habitat
Lepechinia cardiophylla heart-leaved pitcher sage	–	–	1B	Not observed during surveys. Not expected to occur; lack of suitable habitat
Lepidium virginicum var. *robinsonii* Robinson's pepper-grass	–	–	1B	Not observed during surveys. Limited suitable habitat
Monardella hypoleuca ssp. *lanata* felt-leaved monardella	–	–	1B	Not observed during surveys. Not expected to occur; lack of suitable habitat
Monardella macrantha ssp. *hallii* Hall's monardella	–	–	1B	Not observed during surveys. Not expected to occur; lack of suitable habitat
Nama stenocarpum mud nama	–	–	2	Not observed during surveys. Not expected to occur; lack of suitable habitat
Nolina cismontane chaparral nolina	–	–	1B	Not observed during surveys. Limited suitable habitat
Phacelia suaveolens ssp. *keckii* Santiago Peak phaceilia	–	–	1B	Not observed during surveys. Not expected to occur; lack of suitable habitat
Sidalcea neomexicana Salt Spring checkerbloom	–	–	2	Not observed during surveys. Not expected to occur; lack of suitable habitat

LEGEND

Federal (USFWS)
FE Endangered
FT Threatened
PE Proposed Endangered
PT Proposed Threatened
FC Federal Candidate for Listing

State (CDFG)
SE Endangered
ST Threatened
PE Proposed Endangered
PT Proposed Threatened

California Native Plant Society (CNPS)
1A Plants Presumed Extinct in California
1B Plants Rare, Threatened, or Endangered in California and Elsewhere
2 Plants Rare, Threatened, or Endangered in California But More Common Elsewhere
3 Plants About Which We Need More Information – A Review List
4 Plants of Limited Distribution – A Watch List

Catalina Mariposa Lily (*Calochortus catalinae*)

Catalina mariposa lily is a CNPS List 4 species. This lily is a bulbous perennial herb found in chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland. It typically blooms from February to May. It is know to occur in Los Angeles, Orange, Santa Barbara, San Diego, San Luis Obispo, and Ventura counties, and Santa Rosa, Santa Catalina, and Santa Cruz islands (CNPS 2005). This species is known throughout Orange County. Catalina mariposa lily was observed scattered throughout the project site. Locations were not mapped due to the status of the species and its relative abundance throughout its range.

Intermediate Mariposa Lily (Calochortus weedii var. intermedius)

Intermediate mariposa lily is a CNPS List 1B species. It typically blooms between May and June. This lily is a bulbous perennial herb found in chaparral, coastal sage scrub, valley and foothill grassland vegetation types, as well as rocky outcrops. This species occurs in Los Angeles, Riverside, and Orange counties and is threatened by development, road construction, and fuel modification (CNPS 2005). This species is known to occur in Aliso Viejo, Laguna Beach, San Joaquin Hills, Trabuco Canyon, Gypsum Canyon, Rancho Mission Viejo, and Starr Ranch in Orange County (CDFG 2002). This species has also been previously documented on the project site. A total of 790 individuals were counted on the project site on May 19, 31, and June 7, 2005. Exhibit 5 shows the locations of the individuals observed within portions of the project site. Specific population locations are described below.

<u>Intermediate Mariposa Lily Location #1</u>

Location #1 supported ten lily plants. Three plants were in flower, five were in flower and bud, and two were in fruit. These plants were located on Calleguas clay loam soil, on a southwest facing slope (Exhibit 5). Associated species include San Joaquin matchweed (*Gutierrezia sarothrae*), our Lord's candle (*Yucca whipplei*), ripgut grass (*Bromus diandrus*), California buckwheat (*Eriogonum fasiculatum*), California sagebrush (*Artemisia californica*), black sage (*Salvia mellifera*), and lemonadeberry (*Rhus integrifolia*).

<u>Intermediate Mariposa Lily Location #2</u>

Location #2 supported five lily plants, all in flower. These plants were located on Calleguas clay loam soil, on a southwest facing slope (Exhibit 5). Associated species include California sagebrush, deerweed (*Lotus scoparius*), narrow-leaved bedstraw (*Galium angustifolium*), and foothill needlegrass (*Nassella lepida*).

<u>Intermediate Mariposa Lily Location #3</u>

Location #3 supported one lily plant in flower. This plant was located on Calleguas clay loam soil, along the ridgeline in the southeast portion of the project site. Associated species include ripgut grass, foxtail barley (*Hordeum murinum* var. *leporinum*), black mustard (*Brassica nigra*), fascicled tarweed (*Hemizonia fasciculata*), and deerweed.

<u>Intermediate Mariposa Lily Location #4</u>

Location #4 supported three lily plants. Two plants were in flower and the third was in fruit. These plants were located on Cieneba sandy loam soil, in disturbed coastal sage scrub, and north of the active landfill area. Associated species include California buckwheat, California

sagebrush, fascicled tarweed, foothill needle grass, foxtail chess (*Bromus madritensis* ssp. *rubens*), and soft chess (*Bromus hordeaceus*).

Intermediate Mariposa Lily Location #5

Location #5 supported 135 lily plants. Two plants were vegetative, 92 were in flower, and 41 were in fruit. These plants were located in soper cobbly loam soil, in the northeast portion of the project site. Associated species include Our Lord's candle, California sagebrush, black sage, foothill needlegrass, white sage (*Salvia apiana*), fascicled tarweed, osmadenia (*Osmadenia tenella*), black mustard, morning-glory (*Calystegia macrostegia*), giant needlegrass (*Achnatherum coronatum*), smooth cat's ear (*Hypochaeris glabra*), and slender wild oat (*Avena barbata*).

Intermediate Mariposa Lily Location #6

Location #6 supported 42 lily plants. Fifteen plants were vegetative, 25 were in flower, and two were in fruit. These plants were located in soper cobbly loam soil, in the northeast portion of the project site. Associated species include Our Lord's candle, California sagebrush, black sage, foothill needle grass, white sage, fascicled tarweed, osmadenia, black mustard, morning-glory, giant needlegrass, smooth cat's ear, and slender wild oat.

Intermediate Mariposa Lily Location #7

Location #7 supported one lily plant in flower. This plant was located in Calleguas clay loam soil, in the western portion of the project site near the landfill area along an east-southeast facing slope. Associated species include Our Lord's candle, California buckwheat, California sagebrush, black sage, foxtail chess, and goldenbush (*Isocoma menziesii*).

Intermediate Mariposa Lily Location #8

Location #8 supported 122 lily plants. Twenty-eight plants were vegetative, 93 were in flower, and one was in fruit. These plants were located in Calleguas clay loam soil, in the western portion of the project site. The highest concentration of the plants was located on a south facing slope, primarily within black sage scrub along the edge of the road (less vegetated areas). Associated species include black sage, Our Lord's candle, California buckwheat, California sagebrush, foothill needlegrass, and lemonadeberry. Plants located along the road were associated with tocalote (*Centaurea melitensis*), and deerweed.

Intermediate Mariposa Lily Location #9

Location #9 supported 332 lily plants. Ten plants were vegetative, 307 were in flower, and 15 were in fruit. These plants were located in Calleguas clay loam soil, in the western portion of the project site in sage scrub-grassland ecotone habitat. Associated species include Our Lord's candle, California buckwheat, California sagebrush, tocalote, and foxtail chess. A concentrated area within Location #9 was located along the side of the road on a north facing slope in sage-California buckwheat scrub. Associated species include California buckwheat, California sagebrush, white sage, foothill needle grass, Los Angeles phlox (*Gilia angelensis*), Indian paintbrush (*Castilleja affins*), and deerweed.

Intermediate Mariposa Lily Location #10

Location #10 supported 33 lily plants. One plant was vegetative and 32 were in flower. These plants were located in Calleguas clay loam soil, in the western portion of the project site on a west facing slope. Associated species include California buckwheat, California sagebrush, foothill needle grass, deerweed, and fascicled tarweed.

Intermediate Mariposa Lily Location #11

Location #11 supported six lily plants, all of which were in flower. These plants were located in Calleguas clay loam soil, in the southwest portion of the project site in California sage scrub-grassland ecotone habitat. Associated species include California sagebrush, black sage, California brome grass (*Bromus carinatus*), fascicled tarweed, tocalote, slender wild oat (*Avena barbata*), and shortpod mustard (*Hirschfeldia incana*).

Intermediate Mariposa Lily Location #12

Location #12 supported 100 lily plants. Seven plants were vegetative, 69 were in flower, and 24 were in fruit. These plants were located in Cieneba sandy loam soil, on the southwest portion of the project site along a south facing slope. Associated species include California buckwheat, California sagebrush, black sage, San Joaquin matchweed, deerweed, and tocalote.

Many-stemmed Dudleya (*Dudleya multicaulis*)

Many-stemmed dudleya is a CNPS List 1B species. It typically blooms between May and July. The many-stemmed dudleya is a perennial herb with an underground stem that grows in chaparral, coastal sage scrub, and valley and foothill vegetation types, often associated with clay soils. This species is known to occur in Los Angeles, Orange, Riverside, San Diego, and San Bernardino counties. The largest populations occur in Orange County. A total of 1,839 individuals were observed on the project site on June 7, 2005. Exhibit 5 shows the location of the individuals observed on the project site.

Many-Stemmed Dudleya Location #1

Location #1 supported 1,839 dudleya plants in flower. These plants were located in Calleguas clay loam soil, in the northern portion of the project site, on the north facing hillside adjacent to the northernmost road. Associated species include California sagebrush, splendid mariposa lily (*Calochortus splendens*), osmadenia, California buckwheat, California aster (*Lessingia filaginifolia*), white sage, and morning-glory.

CONCLUSIONS

In conclusion, this report presents findings of special status plant surveys conducted at FRB in 2005. If any of the special status plant locations should be impacted, mitigation will be required and will be consistent with guidelines outlined in the NCCP and described in detail in the EIR currently being prepared by P&D Consultants. This mitigation will include one or more of the following: 1) avoidance, 2) salvage, and 3) restoration or enhancement.

BonTerra Consulting has appreciated the opportunity to assist on this project. If you have any comments or questions, please call Sandy Leatherman at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING

Melissa A. Howe
Associate Principal
Restoration Services

Sandra J. Leatherman
Project Manager/Senior Botanist

Enclosure: Exhibits 1 to 5 and Appendix A

cc: Gary Medeiros, BonTerra Consulting

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Regional Location

Exhibit 1

Special Status Plant Surveys, Frank R. Bowerman Landfill

N W E S

10 5 0 10 Miles

BonTerra CONSULTING

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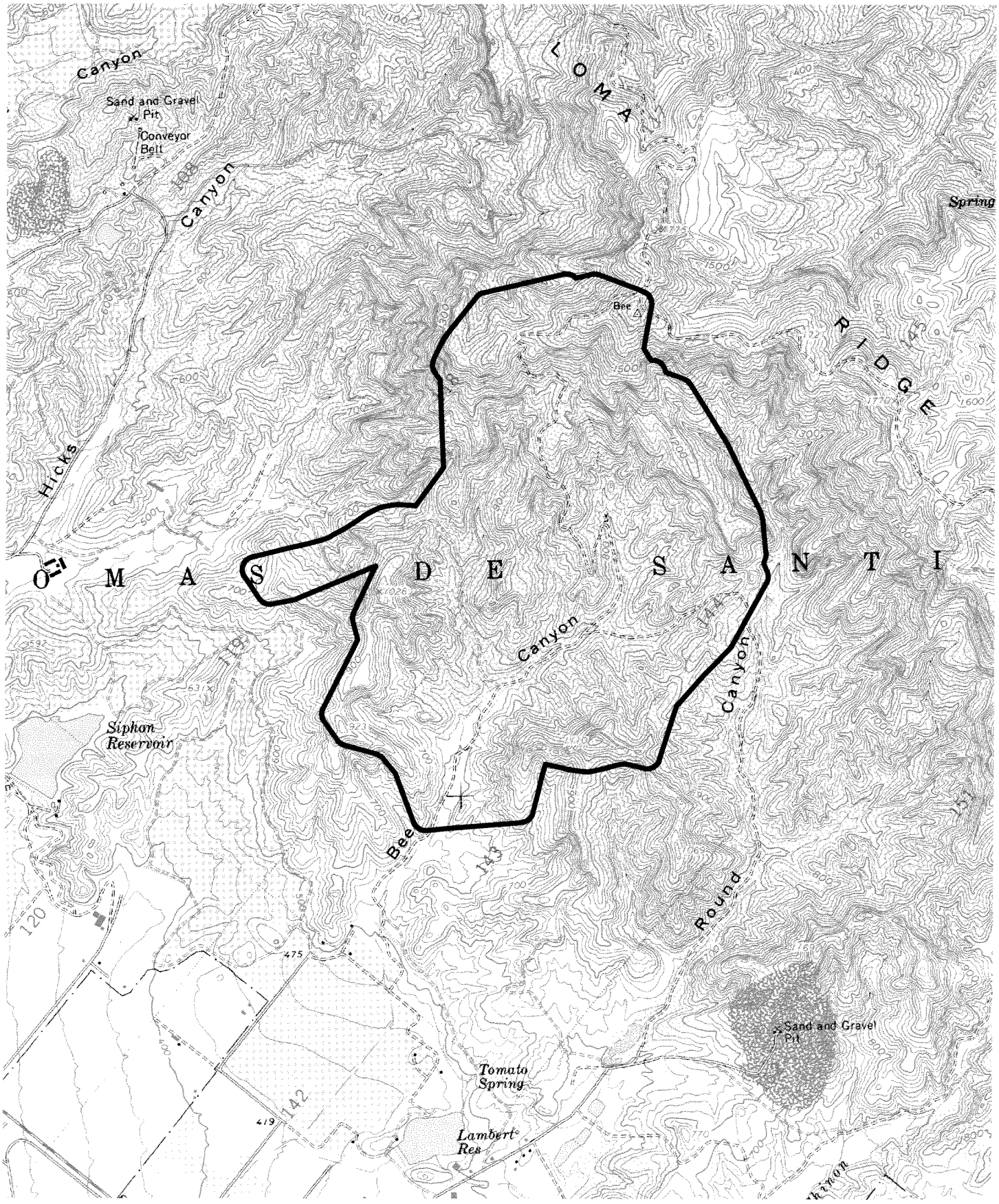

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Study Area and Local Vicinity

Exhibit 2

Special Status Plant Surveys, Frank R. Bowerman Landfill

N W E S

2,000 1,000 0 2,000 Feet

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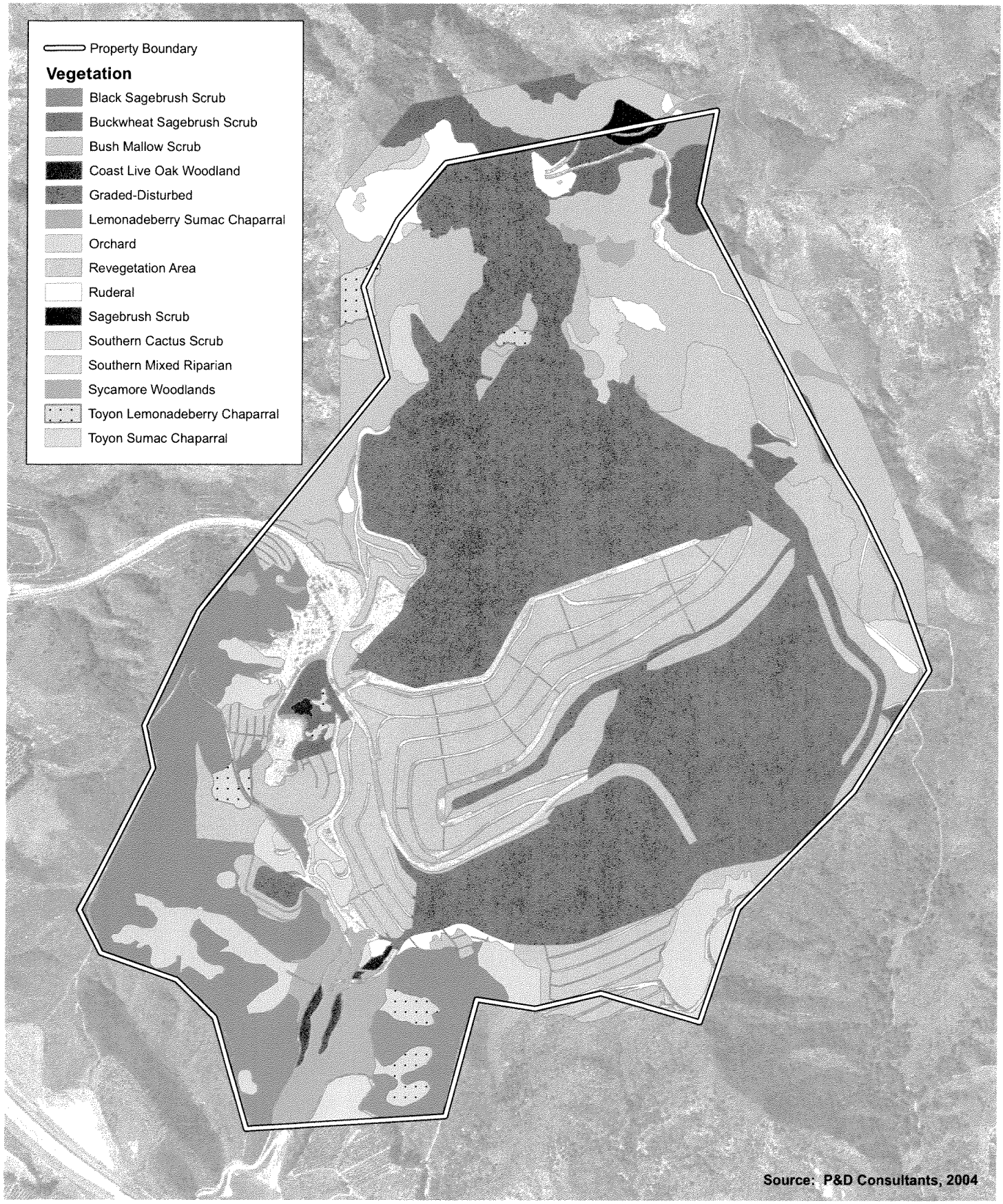

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Vegetation Types

Exhibit 3

Special Status Plant Surveys, Frank R. Bowerman Landfill

N W E S

1,000 500 0 1,000 Feet

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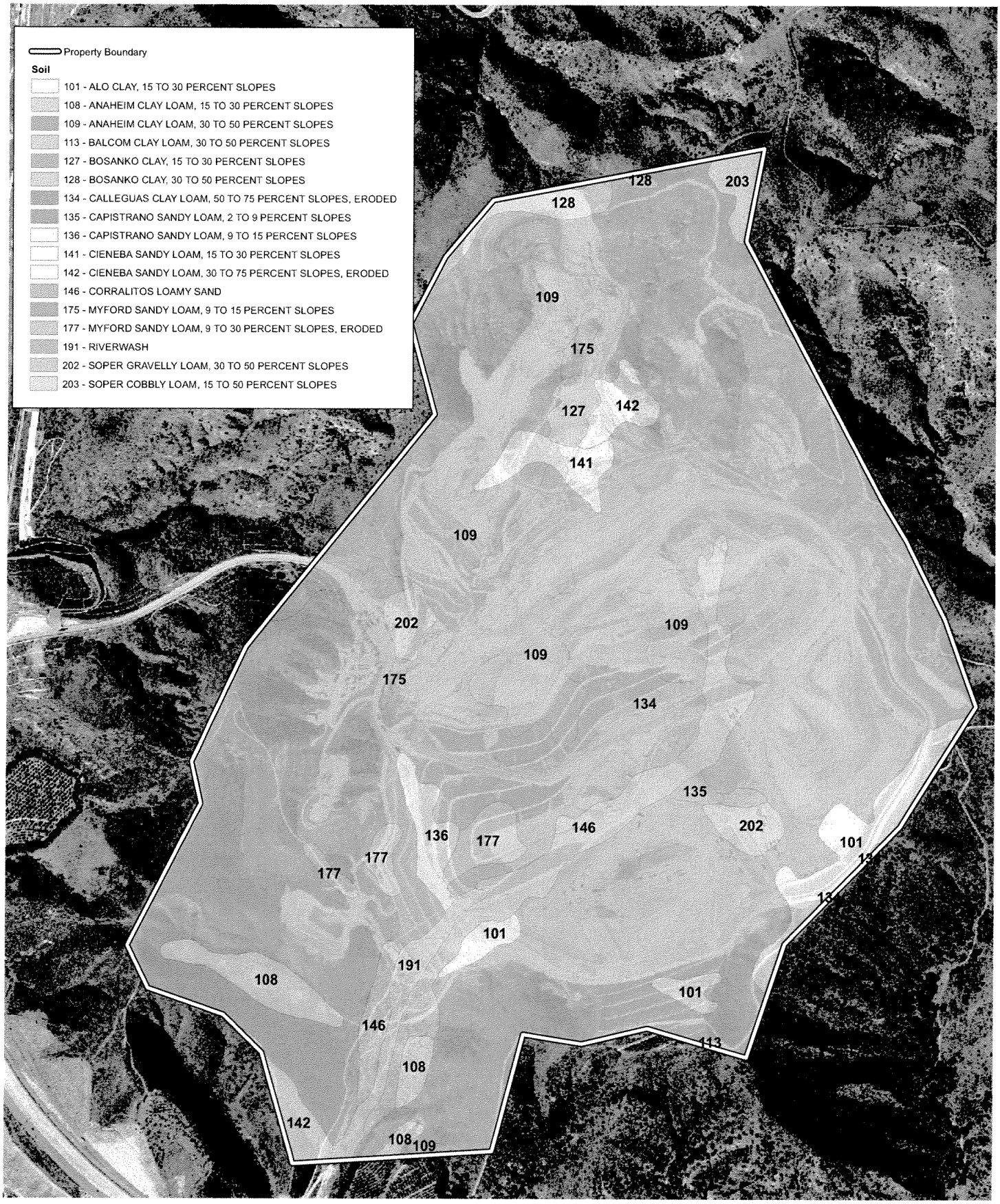

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Soils

Exhibit 4

Special Status Plant Surveys, Frank R. Bowerman Landfill

N W E S

1,000 500 0 1,000 Feet

BonTerra CONSULTING

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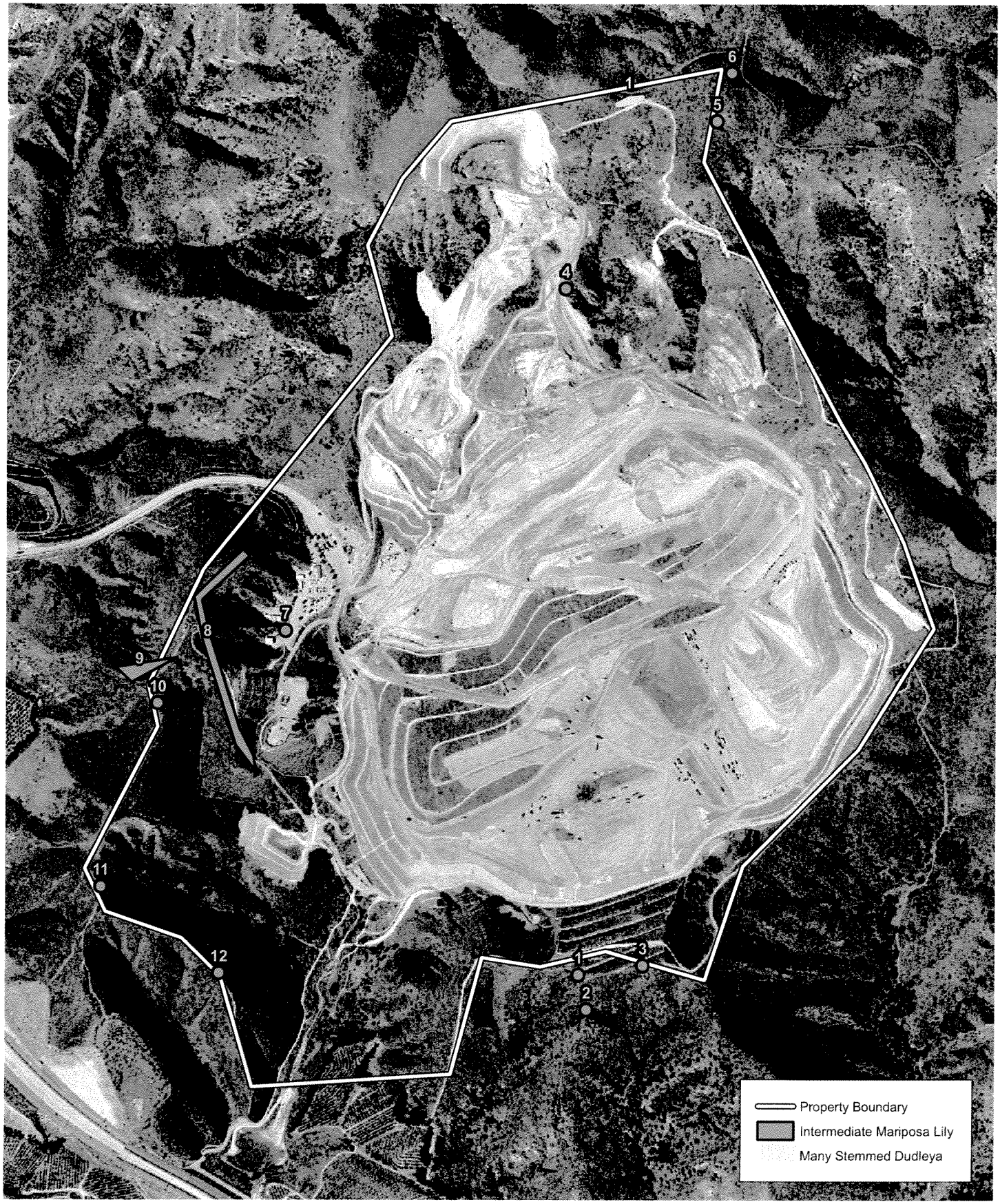

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Special Status Plant Species Locations

Exhibit 5

Special Status Plant Surveys, Frank R. Bowerman Landfill

N W E S

1,000 500 0 1,000 Feet

BonTerra CONSULTING

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APPENDIX A

FERNS AND ALLIES
POLYPODIACEAE - POLYPODY FAMILY
Polypodium californicum California polypody
FLOWERING PLANTS
CLASS DICOTYLEDONES (DICOTS)
ANACARDIACEAE - SUMAC FAMILY
Malosma laurina laurel sumac
Rhus integrifolia lemonadeberry
Rhus ovata sugar bush
Toxicodendron diversilobum western poison oak
APIACEAE (UMBELLIFERAE) - CARROT FAMILY
Daucus pusillus rattlesnake weed
Foeniculum vulgare sweet fennel
Lomatium sp. lomatium
ASCLEPIADACEAE - MILKWEED FAMILY
Sarcostemma cynanchoides ssp. *hartwegii* climbing milkweed
ASTERACEAE (COMPOSITAE) - SUNFLOWER FAMILY
Achillea millefolium common yarrow
Acourtia microcephala sacapellote
Ambrosia acanthicarpa annual bursage
Ambrosia psilostachya western ragweed
Anthemis cotula mayweed
Artemisia californica California sagebrush
Artemisia douglasiana mugwort
Baccharis pilularis coyote brush
Baccharis salicifolia mule fat
Brickellia californica California brickellbush
Carduus pycnocephalus Italian thistle
Centaurea melitensis tocalote
Chaenactis artemisiifolia artemisia-leaved pincushion
Cirsium occidentale cobweb thistle

APPENDIX A
(Continued)

Cynara cardunculus cardoon/globe artichoke
Encelia californica *bush sunflower*
Encelia farinosa brittlebush
Eriophyllum confertiflorum golden yarrow
Filago californica fluffweed
Filago gallica narrow-leaved filago
Gazania linearis gazania
Gnaphalium californicum California everlasting
Gnaphalium canescens
Grindelia sp. gumplant
Gutierrezia californica California matchweed
Gutierrezia sarothrae San Joaquin matchweed
Hedypnois cretica Crete hedypnois
Helianthus annuus western sunflower
Hemizonia fasciculata fascicled tarweed
Heterotheca grandiflora telegraph weed
Hypochaeris glabra smooth cat's ear
Isocoma menziesii goldenbush
Lactuca serriola prickly lettuce
Lasthenia californica California goldfields
Lessingia filaginifolia California aster
Malacothrix saxatilis cliff malacothrix
Osmadenia tenella osmadenia
Senecio vulgaris common groundsel
Silybum marianum milk thistle
Sonchus asper prickly sow-thistle
Sonchus oleraceus common sow-thistle
Stephanomeria exigua wreath plant

APPENDIX A
(Continued)

Uropappus lindleyi *silver puffs*
BORAGINACEAE - BORAGE FAMILY
Amsinckia menziesii rancher's fiddleneck
Cryptantha sp. cryptantha
Pectocarya sp. pectocarya
Plagiobothrys sp. popcorn flower
BRASSICACEAE (CRUCIFERAE) - MUSTARD FAMILY
Brassica nigra black mustard
Hirschfeldia incana shortpod mustard
Sisymbrium irio London rocket
CACTACEAE - CACTUS FAMILY
Opuntia littoralis coastal prickly pear
CAPRIFOLIACEAE - HONEYSUCKLE FAMILY
Sambucus mexicana blue elderberry
CARYOPHYLLACEAE - PINK FAMILY
Cardionema ramosissimum sand mat
Silene gallica windmill pink/common catchfly
Spergularia sp. sand spurrey
CHENOPODIACEAE - GOOSEFOOT FAMILY
Atriplex semibaccata Australian saltbush
Chenopodium album lamb's quarters
Salsola tragus Russian thistle
CONVOLVULACEAE - MORNING-GLORY FAMILY
Calystegia macrostegia morning-glory
CRASSULACEAE - STONECROP FAMILY
Crassula connata pigmy-weed
Dudleya lanceolata lance-leaved dudleya/lanceleaf/ coastal dudleya/coastal live-forever
Dudleya multicaulis many-stemmed dudleya
Dudleya pulverulenta chalk dudleya/chalky live-forever
CUCURBITACEAE - GOURD FAMILY
Cucurbita foetidissima coyote melon/calabazilla

APPENDIX A
(Continued)

Marah macrocarpus wild cucumber/cucamonga manroot
CUSCUTACEAE - DODDER FAMILY
Cuscuta californica California dodder
EUPHORBIACEAE -SPURGE FAMILY
Chamaesyce albomarginata rattlesnake weed
FABACEAE (LEGUMINOSAE) - LEGUME FAMILY
Lotus scoparius deerweed/California broom
Lotus strigosus strigose lotus
Lupinus bicolor miniature lupine
Luinus excubitus grape soda lupine
Lupinus succulentus arroyo lupine
Medicago polymorpha California burclover
Melilotus alba white sweet-clover
Melilotus indica sourclover
Trifolium sp. clover
FAGACEAE - OAK/BEECH FAMILY
Quercus agrifolia coast live oak
Quercus berberidifolia scrub oak/California scrub oak
GERANIACEAE - GERANIUM FAMILY
Erodium cicutarium red-stemmed filaree
Geranium carolinianum Carolina geranium
GROSSULARIACEAE - GOOSEBERRY FAMILY
Ribes speciosum fuchsia-flowered gooseberry
HYDROPHYLLACEAE - WATERLEAF FAMILY
Eucrypta chrysanthemifolia common eucrypta
Phacelia ramosissima branching phacelia
Phacelia cicutaria caterpillar phacelia
Phacelia minor wild canterbury-bell
LAMIACEAE (LABIATAE) - MINT FAMILY
Marrubium vulgare common horehound
Salvia apiana white sage

APPENDIX A
(Continued)

Salvia mellifera black sage
MALVACEAE - MALLOW FAMILY
Malacothamnus densiflorus many-flowered bushmallow
Malacothamnus fasciculatus chaparral bushmallow
Malva parviflora cheeseweed
NYCTAGINACEAE - FOUR-O'CLOCK FAMILY
Mirabilis californica wishbone bush/California wishbone bush
ONAGRACEAE - EVENING PRIMROSE FAMILY
Camissonia sp. suncup
Camissonia californica mustard-like evening primrose
Clarkia purpurea ssp. *quadrivulnera* four-spot clarkia
PAPAVERACEAE - POPPY FAMILY
Eschscholzia californica California poppy
PLANTAGINACEAE - PLANTAIN FAMILY
Plantago erecta dwarf plantain/California plantain
POLEMONIACEAE - PHLOX FAMILY
Gilia angelensis Los Angeles phlox/Los Angeles gilia
Leptodactylon californicum prickly phlox
Linanthus dianthiflorus ground pink
POLYGONACEAE - BUCKWHEAT FAMILY
Chorizanthe staticoides Turkish rugging
Eriogonum fasciculatum California buckwheat
PORTULACACEAE - PURSLANE FAMILY
Claytonia perfoliata common miner's-lettuce
PRIMULACEAE - PRIMROSE FAMILY
Anagallis arvensis scarlet pimpernel
RANUNCULACEAE - CROWFOOT FAMILY
Ranunculus californicus California buttercup
RHAMNACEAE - BUCKTHORN FAMILY
Rhamnus ilicifolia holly-leaf redberry
ROSACEAE - ROSE FAMILY
Heteromeles arbutifolia toyon/Christmas berry
RUBIACEAE - MADDER FAMILY
Galium angustifolium narrow-leaved bedstraw

APPENDIX A
(Continued)

Galium aparine goosegrass
Galium nuttallii ssp. *nuttallii* San Diego bedstraw
SCROPHULARIACEAE - FIGWORT FAMILY
Antirrhinum coulterianum white snapdragon
Castilleja affinis ssp. *affinis* coastal/Indian paintbrush
Keckiella cordifolia heart-leaved bush-penstemon
Mimulus aurantiacus bush monkeyflower
Mimulus brevipes slope semaphore
Scrophularia californica California figwort
SOLANACEAE - NIGHTSHADE FAMILY
Nicotiana clevelandii Cleveland's tobacco
Nicotiana glauca tree tobacco
Solanum douglasii Douglas' nightshade
CLASS MONOCOTYLEDONES (MONOCOTS)
ARECACEAE (PALMAE) - PALM FAMILY
Phoenix canariensis Canary Island date palm
IRIDACEAE - IRIS FAMILY
Sisyrinchium bellum blue-eyed grass
LILIACEAE - LILY FAMILY
Bloomeria crocea common goldenstar
Calochortus catalinae Catalina mariposa lily
Calochortus splendens splendid mariposa lily
Calochortus weedii var. *intermedius* intermediate mariposa lily
Chlorogalum pomeridianum wavy-leaved soap plant
Dichelostemma capitatum blue dicks
Yucca whipplei Our Lord's candle
POACEAE [GRAMINEAE] - GRASS FAMILY
Achnatherum coronatum giant needlegrass
Avena barbata slender wild oat
Brachypodium distachyon purple false brome
Bromus carinatus California brome grass

APPENDIX A
(Continued)

Bromus diandrus ripgut grass
Bromus hordeaceus soft chess
Bromus madritensis ssp. *rubens* foxtail chess
Hordeum murinum var. *leporinum* foxtail barley
Lamarckia aurea goldentop grass
Leymus condensatus giant wild rye
Lolium multiflorum Italian ryegrass
Lolium perenne perennial ryegrass
Melica imperfecta small-flowered melic grass
Nassella lepida foothill needlegrass
Nassella pulchra purple needlegrass
Pennisetum setaceum African fountain grass
Schismus barbatus Mediterranean schismus
Vulpia myuros var. *myuros* rattail fescue

APPENDIX D
RESULTS OF SURVEYS FOR COASTAL CALIFORNIA GNATCATCHER AT THE FRANK R. BOWERMAN LANDFILL

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December 2, 2003

Christine Arbogast
Bryan A. Stirrat & Associates
1360 Valley Vista Drive
Diamond Bar, California 91765

SUBJECT: RESULTS OF FOCUSED COASTAL CALIFORNIA GNATCATCHER SURVEYS AT THE FRANK R. BOWERMAN LANDFILL (2003)

Dear Christine:

This report documents the results of protocol-level surveys for the coastal California gnatcatcher (*Polioptila californica californica*; CAGN), which were conducted at the Frank R. Bowerman (FRB) Landfill by P&D Environmental (P&D) in 2003. Background information on the survey locations and dates, methodology and findings are provided below. As you will note below, a total of seven (7) male, female and/or juveniles and a total of three (3) pairs and/or family groups were identified during the surveys. A total of six (6) coastal cactus wren (*Campylorhynchus brunneicapillus* - CCW) were also identified during the surveys. Both the CAGN and CCW were concentrated within the southern portion of the FRB Landfill. A copy of the findings has been sent to the United States Fish and Wildlife Service (USFWS), per the Special Terms and Conditions of the recovery permit holder's survey requirements.

BACKGROUND

The CAGN is listed as a federally threatened species and is a California Department of Fish and Game Species of Special Concern. The CAGN is a species with restricted habitat requirements, being an obligate resident of coastal sage scrub habitats that are dominated by coastal sagebrush and generally occur below 750 feet elevation in coastal regions and below 1,500 feet inland. It ranges from Ventura County south to San Diego County and northern Baja California, Mexico. It is less common in coastal sage scrub with a high percentage of tall shrubs such as laurel sumac (*Malosma laurina*), preferring habitat with more low growing vegetation. CAGN breed between mid-February and August, with the peak of activity occurring from mid-March to mid-June. Population declines are primarily attributed to loss of coastal sage scrub habitat due to development.

LOCATION AND EXISTING CONDITIONS

P&D conducted focused surveys in June and July 2003 for CAGN within the southern portion of the Frank R. Bowerman Landfill property boundary (see Figure 1). Focused surveys for the remaining landfill boundary (including proposed north and east encroachment areas – See Figure

1) were conducted in 2002[1]. The southern portion of the survey area is characterized as Diegan coastal sage scrub. Diegan coastal sage scrub vegetation is typically composed of facultative drought-deciduous subshrubs that are adapted to xeric, exposed sites that possess shallow soils. This habitat is characterized by a relatively open canopy with a well-developed understory/herb layer. The Diegan phase is one of four floristic sage scrub associations recognized in California, and occurs from Orange County to northwestern coastal Baja California, Mexico.[2] The sub-shrubs that comprise this vegetation community have shallow, fibrous root systems that have adapted to maximize the brief availability of surface water, particularly in fine-grained, clay soils, where runoff is rapid and percolation is minimal. The plant species that comprise this community are variable, depending upon soil type, slope, and aspect; however, typical members of a Diegan coastal sage scrub community include such species as California sagebrush (*Artemisia californica*), flat-top buckwheat (*Eriogonum fasciculatum*), California encelia (*Encelia californica*), laurel sumac, black sage (*Salvia mellifera*), and lemonadeberry (*Rhus integrifolia*). The dominant species found within the southwestern area include flat-top buckwheat, California sagebrush and black sage.

METHODS

The USFWS's focused protocol presence/absence surveys for the CAGN were conducted on June 5, 6, 12 and 20 and on July 10, 14, 22 and 24, 2003. Biologists conducting the surveys included Tito Alejandro Marchant (USFWS Permit PRT No. TE007581-0), Gilberto Ruiz (USFWS Permit PRT No. TE 840036-2) and Douglas Willick (USFWS Permit PRT No. TE821404-3). All on-site surveys were performed according to USFWS survey protocols.

The study area was surveyed on foot by walking along survey routes determined by vegetation and topography, which included all stands of coastal sage scrub. Taped coastal CAGN vocalizations were played at approximate five-minute intervals to elicit responses from birds. The remaining time on site was spent listening for calls and looking for CAGN individuals or pairs. Depending on vegetation characteristics and topography, calling points along the route were located at intervals of 50 to 200 feet. All pairs, single individuals, and fledglings observed were noted, as well as any CAGN vocalizations that were not confirmed through visual observation.

Weather conditions during the surveys were conducive to moderate to high levels of bird activity. Throughout the survey period temperatures were mild to warm, ranging from approximately 60 to 82 degrees Fahrenheit. Wind speeds were usually low during the survey period, averaging 0 to 4 miles per hour.

---

[1] P&D conducted focused surveys in June and July 2002 for CAGN and CCW within the Frank R. Bowerman Landfill in association with areas identified for inclusion in the County of Orange's Integrated Waste Management Department Phase VIII and FRB Master Development Plan (MDP) areas. The results of these surveys were sent to the USFWS's Carlsbad Field Office in February 2002.

[2] O'Leary 1990

SURVEY RESULTS

A total of seven (7) male, female and/or juvenile CAGNs and a total of three (3) presumed breeding pairs and/or family groups were identified during the surveys within the southern portion of the FRB Landfill. The location of the seven individuals and three pairs are shown in Figure 1. A total of six (6) CCW were also identified during the surveys and were primarily concentrated within the southern and southeastern portion of the FRB Landfill (see Figure 1). It is likely that the seven individual CAGNs identified during the surveys were not occupying breeding territories but may instead represent dispersing juveniles and/or unmated adults. Due to the time of year, and the plumage and behavioral characteristics of the observed individuals, it is presumed that the majority of these were dispersing juveniles. However, the three pairs and/or family groups noted during the surveys were assumed to be occupying breeding territories. This assumption is based on the frequency and locality of sightings during the surveys, the presence of obvious adults or family groups, and the mean territory size (i.e., 5.68 acres)[3] requirements for the CAGN within the coastal portion of its range.

After several drought years, the 2003 survey followed above average rainfall totals within this portion of Orange County. Abundant insect populations and the availability of other resources (e.g., improved habitat conditions, etc.) likely contributed to increased reproductive success (including the potential for multiple broods) among the pairs observed within the FRB Landfill property boundary. This presumably is directly linked to the relatively high numbers of individuals detected in the survey area. The number of CAGNs located during the 2003 surveys may actually represent a more typical population size for this area during periods of more favorable habitat and climatic conditions.

Should you have any questions, please feel free to contact me directly, or Doug Willick, at (714) 835-4447. Thank you.

Respectfully,
P&D ENVIRONMENTAL

Michael A. Benner
Vice President

cc: Jonathan Snyder, USFWS
Daniel Marquez, USFWS

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[3] Information derived from *The Birds of North America*, No. 574, 2001, Jonathan L. Atwood and David R. Bontrager.

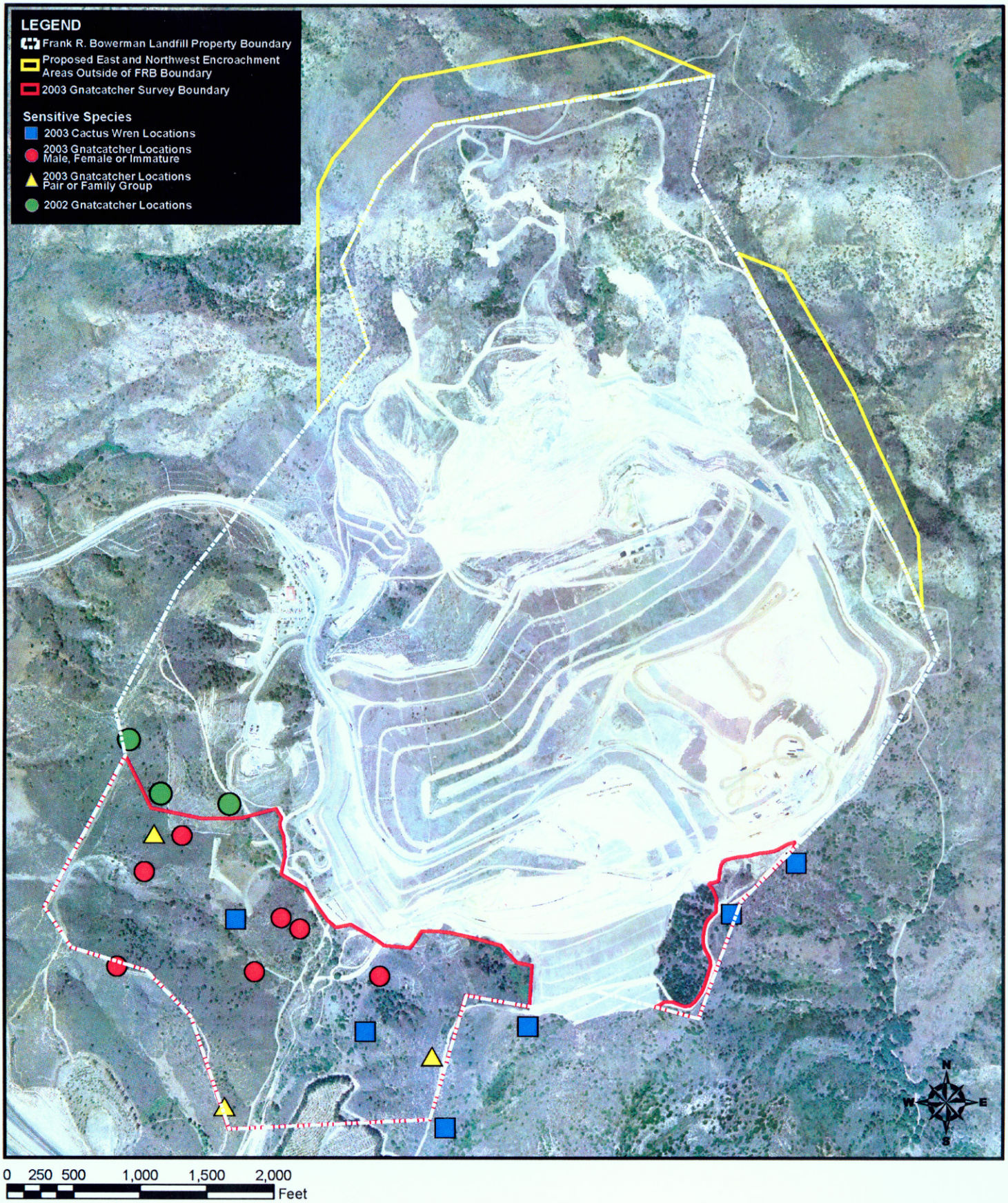

Figure 1
Coastal California Gnatcatcher and Cactus Wren Locations (2003)

P&D Environmental
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February 12, 2004

Mr. Daniel Marquez
United States Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92009

SUBJECT: RESULTS OF FOCUSED COASTAL CALIFORNIA GNATCATCHER SURVEYS AT THE FRANK R. BOWERMAN LANDFILL, ORANGE COUNTY, CA

Dear Mr. Marquez:

This report documents the results of protocol-level surveys for the coastal California gnatcatcher (*Polioptila californica californica*; CAGN), which were conducted at the Frank R. Bowerman (FRB) Landfill[1], Orange County, California by P&D Environmental (P&D) in 2003. Background information on the survey locations and dates, methodology and findings are provided below. As you will note below, a total of seven (7) male, female and/or juveniles and a total of three (3) pairs and/or family groups were identified during the surveys. A total of six (6) coastal cactus wren (*Campylorhynchus brunneicapillus* - CCW) were also identified during the surveys. Both the CAGN and CCW were concentrated within the southern portion of the FRB Landfill.

BACKGROUND

The CAGN is listed as a federally threatened species and is a California Department of Fish and Game Species of Special Concern. The CAGN is a species with restricted habitat requirements, being an obligate resident of coastal sage scrub habitats that are dominated by coastal sagebrush and generally occur below 750 feet elevation in coastal regions and below 1,500 feet inland. It ranges from Ventura County south to San Diego County and northern Baja California, Mexico. It is less common in coastal sage scrub with a high percentage of tall shrubs such as laurel sumac (*Malosma laurina*), preferring habitat with more low growing vegetation. CAGN breed between mid-February and August, with the peak of activity occurring from mid-March to mid-June. Population declines are primarily attributed to loss of coastal sage scrub habitat due to development.

The FRB Landfill is located within the Central Sub-region of the Orange County Central & Coastal Sub-region Natural Community Conservation Plan (NCCP)/Habitat Conservation Plan (HCP). The County of Orange is a participating landowner in the Central & Coastal Sub-region NCCP/HCP program.

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[1] The FRB Landfill is owned by the County of Orange and operated by the Integrated Waste Management Department.

LOCATION AND EXISTING CONDITIONS

P&D conducted focused surveys in June and July 2003 for CAGN within the southern portion of the Frank R. Bowerman Landfill property boundary (see Figure 1). Focused surveys for the remaining landfill boundary (including proposed north and east encroachment areas – See Figure 1) were conducted in 2002[2]. The southern portion of the survey area is characterized as Diegan coastal sage scrub. Diegan coastal sage scrub vegetation is typically composed of facultative drought-deciduous subshrubs that are adapted to xeric, exposed sites that possess shallow soils. This habitat is characterized by a relatively open canopy with a well-developed understory/herb layer. The Diegan phase is one of four floristic sage scrub associations recognized in California, and occurs from Orange County to northwestern coastal Baja California, Mexico.[3] The sub-shrubs that comprise this vegetation community have shallow, fibrous root systems that have adapted to maximize the brief availability of surface water, particularly in fine-grained, clay soils, where runoff is rapid and percolation is minimal. The plant species that comprise this community are variable, depending upon soil type, slope, and aspect; however, typical members of a Diegan coastal sage scrub community include such species as California sagebrush (*Artemisia californica*), flat-top buckwheat (*Eriogonum fasciculatum*), California encelia (*Encelia californica*), laurel sumac, black sage (*Salvia mellifera*), and lemonadeberry (*Rhus integrifolia*). The dominant species found within the southwestern area include flat-top buckwheat, California sagebrush and black sage.

METHODS

The USFWS's focused protocol presence/absence surveys for the CAGN were conducted on June 5, 6, 12 and 20 and on July 10, 14, 22 and 24, 2003. Biologists conducting the surveys included Tito Alejandro Marchant (USFWS Permit PRT No. TE007581-0), Gilberto Ruiz (USFWS Permit PRT No. TE 840036-2) and Douglas Willick (USFWS Permit PRT No. TE821404-3). All on-site surveys were performed according to USFWS survey protocols.

The study area was surveyed on foot by walking along survey routes determined by vegetation and topography, which included all stands of coastal sage scrub. Taped coastal CAGN vocalizations were played at approximate five-minute intervals to elicit responses from birds. The remaining time on site was spent listening for calls and looking for CAGN individuals or pairs. Depending on vegetation characteristics and topography, calling points along the route were located at intervals of 50 to 200 feet. All pairs, single individuals, and fledglings observed were noted, as well as any CAGN vocalizations that were not confirmed through visual observation.

Weather conditions during the surveys were conducive to moderate to high levels of bird activity. Throughout the survey period temperatures were mild to warm, ranging from

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[2] P&D conducted focused surveys in June and July 2002 for CAGN and CCW within the Frank R. Bowerman Landfill in association with areas identified for inclusion in the County of Orange's Integrated Waste Management Department Phase VIII and FRB Master Development Plan (MDP) areas. The results of these surveys were sent to the USFWS's Carlsbad Field Office in February 2002.

[3] O'Leary 1990

approximately 60 to 82 degrees Fahrenheit. Wind speeds were usually low during the survey period, averaging 0 to 4 miles per hour.

SURVEY RESULTS

A total of seven (7) male, female and/or juvenile CAGNs and a total of three (3) presumed breeding pairs and/or family groups were identified during the surveys within the southern portion of the FRB Landfill. The location of the seven individuals and three pairs are shown in Figure 1. A total of six (6) CCW were also identified during the surveys and were primarily concentrated within the southern and southeastern portion of the FRB Landfill (see Figure 1). It is likely that the seven individual CAGNs identified during the surveys were not occupying breeding territories but may instead represent dispersing juveniles and/or unmated adults. Due to the time of year, and the plumage and behavioral characteristics of the observed individuals, it is presumed that the majority of these were dispersing juveniles. However, the three pairs and/or family groups noted during the surveys were assumed to be occupying breeding territories. This assumption is based on the frequency and locality of sightings during the surveys, the presence of obvious adults or family groups, and the mean territory size (i.e., 5.68 acres)[4] requirements for the CAGN within the coastal portion of its range.

After several drought years, the 2003 survey followed above average rainfall totals within this portion of Orange County. Abundant insect populations and the availability of other resources (e.g., improved habitat conditions, etc.) likely contributed to increased reproductive success (including the potential for multiple broods) among the pairs observed within the FRB Landfill property boundary. This presumably is directly linked to the relatively high numbers of individuals detected in the survey area. The number of CAGNs located during the 2003 surveys may actually represent a more typical population size for this area during periods of more favorable habitat and climatic conditions.

Should you have any questions, please feel free to contact me directly, or Doug Willick, at (714) 835-4447. Thank you.

Respectfully,
P&D ENVIRONMENTAL

Michael A. Benner

Michael A. Benner
Vice President

cc: Jonathan Snyder, USFWS
Suzanne McClanahan, IWMD
Mike Giancola, IWMD
Ray Douglass, IWMD
Jim Pfaff, IWMD
Christine Arbogast, BAS

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[4] Information derived from *The Birds of North America*, No. 574, 2001, Jonathan L. Atwood and David R. Bontrager.

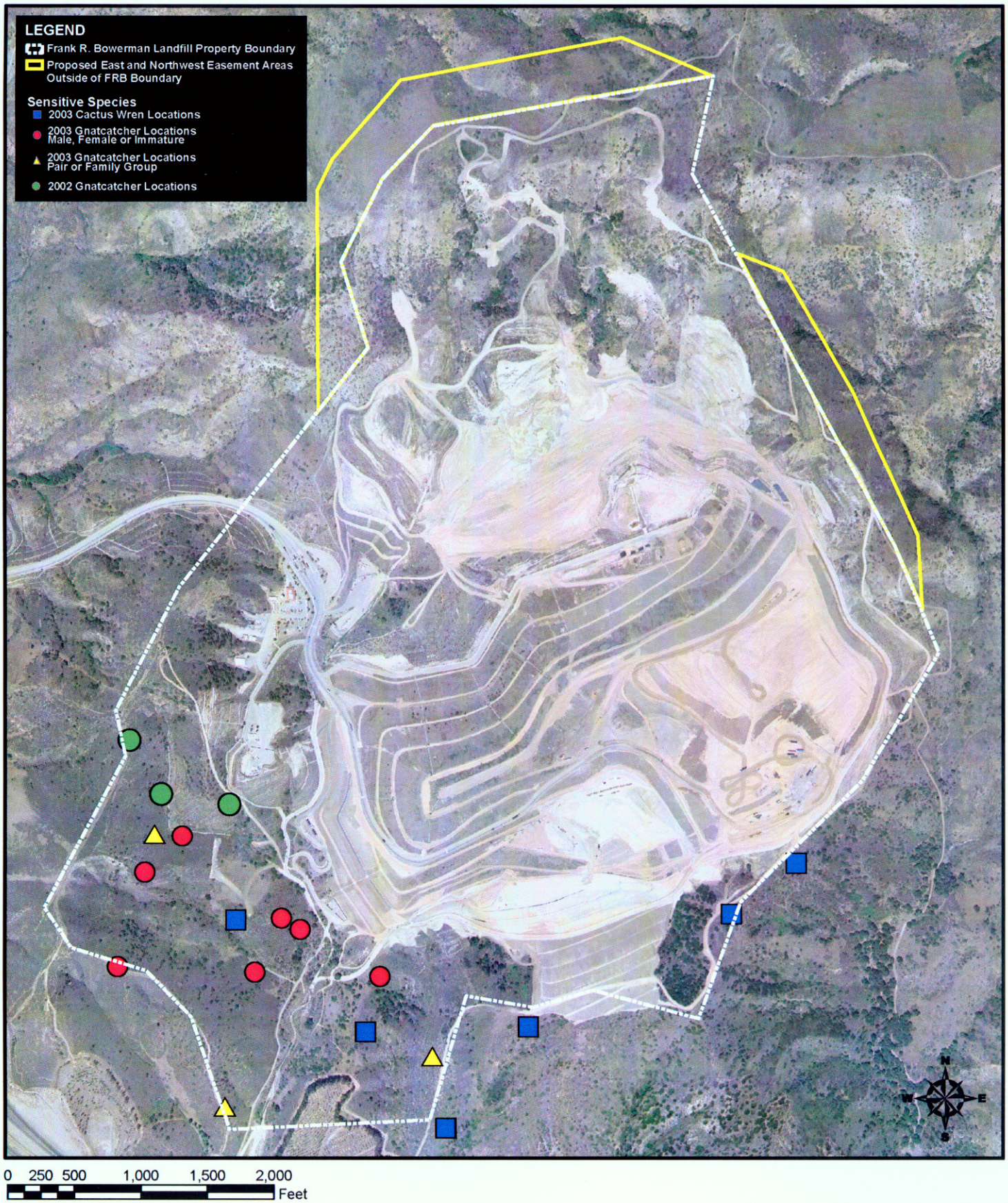

Figure 1
Coastal California Gnatcatcher and Cactus Wren Locations (2003)

P&D Consultants

Frank R. Bowerman Landfill

BonTerra
CONSULTING
An Environmental Planning/Resource Management Corporation

October 12, 2005

Mr. Daniel Marquez
Southern California Field Office
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92009

VIA FACSIMILE AND MAIL
(760) 431-9624

Subject: Results of Focused Surveys for the Coastal California Gnatcatcher for the Frank R. Bowerman Landfill Project Site, Orange County, California

Dear Mr. Marquez:

This letter reports the results of focused surveys to evaluate the presence or absence of the federally Threatened coastal California gnatcatcher (*Polioptila californica californica*) on the Frank R. Bowerman Landfill (FRB). The landfill is located in central Orange County along the coastal side of the Lomas de Santiago foothills, east of the City of Irvine (Exhibits 1 and 2). Specifically, the landfill is east of the Foothill (SR-241) and Eastern (SR-133) Transportation Corridor interchange at the terminus of Bee Canyon Access Road. The study area included the landfill property and a buffer area of approximately 300 feet around the entire property, excluding Bee Canyon Access Road.

BACKGROUND

The California gnatcatcher is a resident (non-migratory) songbird that nests and forages in coastal sage scrub vegetation in southern California year-around. Territory size varies with season and locale. Territory size may increase by as much as 80 percent during the non-breeding season as pairs and individuals tend to wander more widely. Inland populations tend to have larger home ranges than coastal populations, as noted above. The breeding season generally occurs from March through July. Juvenile dispersal distances average less than 1.2 miles from natal territories, but have been documented up to nearly six miles.

The coastal California gnatcatcher was listed by the U.S. Fish and Wildlife Service (USFWS) as a Threatened species in 1993 (USFWS 1993). Historically this species occurred in California from the Santa Clara River Valley and northern San Fernando Valley, south through the coastal foothills of San Diego County (Garrett and Dunn 1981). Habitat loss and fragmentation from expanding development and agriculture have been major factors in the decline of this species in southern California (Atwood 1993).

The USFWS originally designated critical habitat for the California gnatcatcher in 2000 (USFWS 2000); however, a proposal to revise the critical habitat was published in 2003 (USFWS 2003). The original critical habitat designation remains in effect until a final rule on the revised critical habitat designation is published. The study area is within Orange County's Central-Coastal Subregion of the Natural Communities

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Conservation Program (NCCP). The NCCP serves as a recovery plan for the gnatcatcher; therefore, the USFWS did not designate critical habitat within the NCCP area except in areas designated as "Existing Use" by the NCCP.

The California gnatcatcher inhabits moderately dense stands of coastal sage scrub occurring on arid hillsides, mesas, and washes. Coastal sage scrub vegetation types dominated by California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), and white sage (*Salvia apiana*) seem to be preferred by this species, but shrub composition in occupied areas across the species' range varies, as does shrub community structure (height, density, etc.). Chaparral, riparian, and ruderal habitats may be used occasionally for dispersal and foraging, especially when these habitats are adjacent to occupied stands of coastal sage scrub. California gnatcatcher populations in inland areas usually occur in lower densities rather than in coastal sites, and generally occur in more open scrub habitats; as such, inland populations tend to have larger home ranges than coastal populations. California gnatcatcher elevational limit is as high as 2,640 feet above mean sea level (msl), but most occurrences are well below that, with populations generally below 1,800 feet above msl in inland areas and below 1,350 feet above msl in coastal habitats (Atwood and Bontrager 2001).

EXISTING HABITAT

Extensive patches of coastal sage scrub occur within and adjacent to the study area, and is composed of several vegetation types based on a classification system developed for the County of Orange by Gray and Bramlet (1990) and mapped by P&D Consultants (2004). Approximately 240 acres of coastal sage scrub occur within the boundaries of the landfill. These vegetation types include: black sagebrush scrub, buckwheat sagebrush scrub, bush mallow scrub, sagebrush scrub, and southern cactus scrub (Exhibit 3). Several vegetation types that are not generally used by the California gnatcatcher (for nesting) also occur within the study area. These include coast live oak woodland, graded-disturbed, lemonadeberry sumac chaparral, orchard, revegetation areas, ruderal, southern mixed riparian, sycamore woodlands, toyon lemonadeberry chaparral, and toyon sumac chaparral. Detailed descriptions of these vegetation types are available in previous documentation prepared for the study area (P&D Environmental 2004, BonTerra Consulting 2005).

METHODS

Prior to conducting the focused survey, a search was conducted of the most recent version of the California Natural Diversity Data Base (CNDDB) (CDFG 2005, El Toro USGS 7.5 minute quadrangle), and other relevant available documents to determine the extent of California gnatcatcher presence in the study area and vicinity.

All focused surveys were conducted by Brian Leatherman (USFWS permit # TE 827493-4; CDFG MOU), a wildlife biologist with over 12 years field experience in southern California. Survey methods followed the guidelines developed by the USFWS, as described below. Observations of listed species were mapped in the field using a 1 inch = 300 feet aerial photograph of the study area, and waypoints using Global Positioning System (GPS) technology (Garmin Etrex Venture, NAD83 UTM) were used to record location data. The focus of the surveys was on the detection and identification of the California gnatcatcher, but all wildlife incidentally observed or detected in the study area was documented. Identifications were made with the aid of 8 X 42 power Bosch & Lomb Elite binoculars. A list of the species observed during the surveys is included in Attachment A.

As the study area is within Orange County's Central-Coastal Subregion of the NCCP, surveys for the California gnatcatcher followed the presence/absence protocol (USFWS 1997) for jurisdictions within an approved or interim NCCP area. The protocol requires that three surveys be conducted in all suitable habitat at least seven days apart between March 15 and June 30. Surveys are to be conducted between dawn and noon under suitable weather conditions. The protocol allows coverage of 100 acres of suitable habitat per survey day, or a maximum rate of approximately 17 acres per hour. Based on this protocol, three visits were necessary to cover all suitable habitat during one survey. As noted above, the study area consisted of an estimated 240 acres of coastal sage scrub on the landfill property as well as sage scrub located in the adjacent buffer zone. Surveys were conducted by walking slowly within and along the perimeter of coastal sage scrub stands while watching and listening for California gnatcatcher activity. Taped vocalizations were used conservatively to solicit a response from any gnatcatchers potentially present. The frequency of taped playback use varied with site conditions such as habitat patch size, topography, and ambient noise levels. Survey dates, times, and weather data for the focused California gnatcatcher surveys are shown in Table 1.

RESULTS

The California gnatcatcher is known to occur in the study area vicinity. Fourteen records for California gnatcatcher were listed by the CNDDB for the USGS El Toro quadrangle (CDFG 2005). All of these records were located at the base of the hills in the vicinity of the study area, including the Marine Corps Air Station (MCAS) El Toro NCCP Reserve located immediately south of the study area. This area at one time had (and may still have) one of the highest densities of California gnatcatcher in Orange County (Sweetwater Environmental Biologists 1994).

TABLE 1
DATES, TIMES AND WEATHER CONDITIONS FOR FOCUSED CALIFORNIA GNATCATCHER SURVEYS

Date	Time	Weather Conditions
April 8, 2005	0700-1200	Temperature = 56 → 66 °F; 1-2.5 mph average winds; 10% → 30% cloud cover
April 19, 2005	0645-1200	Temperature = 53 → 64 °F; 1.5-2.2 mph average winds; 100% overcast with brief periods of sun
May 16, 2005	0700-1200	Temperature = 53 → 65 °F; 1.0 → 3.5 mph average winds; 100% overcast
May 17, 2005	0700-1200	Temperature = 59 → 73 °F; 1-2.5 mph average winds; 100% overcast → 70% cloud cover
May 25, 2005	0645-1145	Temperature = 60 → 75 °F; 1-2.1 mph average winds; 100% overcast → clear but hazy
May 31, 2005	0645-1200	Temperature = 64 → 74 °F; 1-2.8 mph average winds; 100% overcast → clear but hazy
June 7, 2005	0700-nr	Temperature = 60 → nr °F; 1.2 mph average winds; Clear but hazy → clear skies
June 17, 2005	0700-1200	Temperature = 64 → 75 °F; 1.5 mph average winds; 100% → 40% cloud cover
June 20, 2005	0700-1200	Temperature = 57 → 75 °F; 1.0 → 4.8 mph average winds; clear skies
June 27, 2005	0700-1200	Temperature = 59 → 75 °F; 1.5 → 3.9 mph average winds; 100% → 25% cloud cover

Time rounded to nearest quarter hour
→ indicates a unidirectional change during survey period
- indicates a range of fluctuation during survey period
Temperature and winds measured with Kestrel 2000 (wind 6 ft. above ground, temperature 4 ft. above ground in shade)
nr = not recorded

Several focused surveys for California gnatcatcher have been conducted on the FRB property over the past several years. The results of those surveys, in terms of the number of California gnatcatcher pairs, juveniles, family groups, and individual sightings, and the relative locations of these birds, have varied over the years. Specifically, three coastal California gnatcatcher locations were mapped during 2002 surveys and ten California gnatcatcher locations were mapped during 2003 surveys. The 2003 survey locations included three family groups, and seven sightings of individuals.

In 2005 the number of pairs appears to have increased from previous years and, based on the number of juveniles observed, most pairs fledged at least one brood. At least nine, and as many as twelve, California gnatcatcher territories occur within the study area or at least partially within the study area (Exhibit 4). Six nesting pairs were documented within the landfill property, and an additional three nesting pairs were documented within the buffer area. These offsite pairs likely include at least a small portion of the landfill property within their home range; however, most of their home ranges are likely beyond the limits of the landfill property. Two territorial males were also observed but whether or not they were paired was never determined. Two independent observations of a female (that may or may not have been the same bird) in the vicinity of the lone males suggest that at least one of those territorial males was paired. Four juveniles were observed during the latter surveys in areas where no California gnatcatchers had yet been observed. Two of the juveniles, which were foraging together, were likely dispersing from the pair just north of Bee Canyon Access Road. The other two juveniles, which were not observed together, likely represent dispersing young from a pair (possibly two) beyond the limits of the study area to the southeast.

Critical habitat for the California gnatcatcher was proposed by the USFWS in 2003 (USFWS 2003). The landfill is within critical habitat Unit 7, which includes the Central-Coastal NCCP planning area.

No brown-headed cowbirds (*Molothrus ater*) were observed during any of the surveys. The Transportation Corridor Agencies have been conducting trapping programs for the last decade in the vicinity of the nearby toll roads to reduce nest parasitism on federally-listed bird species in the area. The success of that program is likely responsible for the apparently low number of cowbirds in the area during the breeding season.

If you have any comments or questions, please call Gary Medeiros or Amber Oneal at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING

Gary A. Medeiros
Associate Principal, Regulatory Services

Amber S. Oneal
Project Manager/Ecologist

I certify that the information in this survey report and enclosed exhibits fully and accurately present my work.

Brian Leatherman
Consulting Biologist (permit # TE 827493-4)

Enclosures: Exhibits 1, 2, 3, and 4
Attachment A

cc: Brian Leatherman, White-Leatherman BioServices
Bob Fleming, OCIWMD
Tarik Hadj-Hamou, GeoSyntec Consultants
Melissa Howe, BonTerra Consulting

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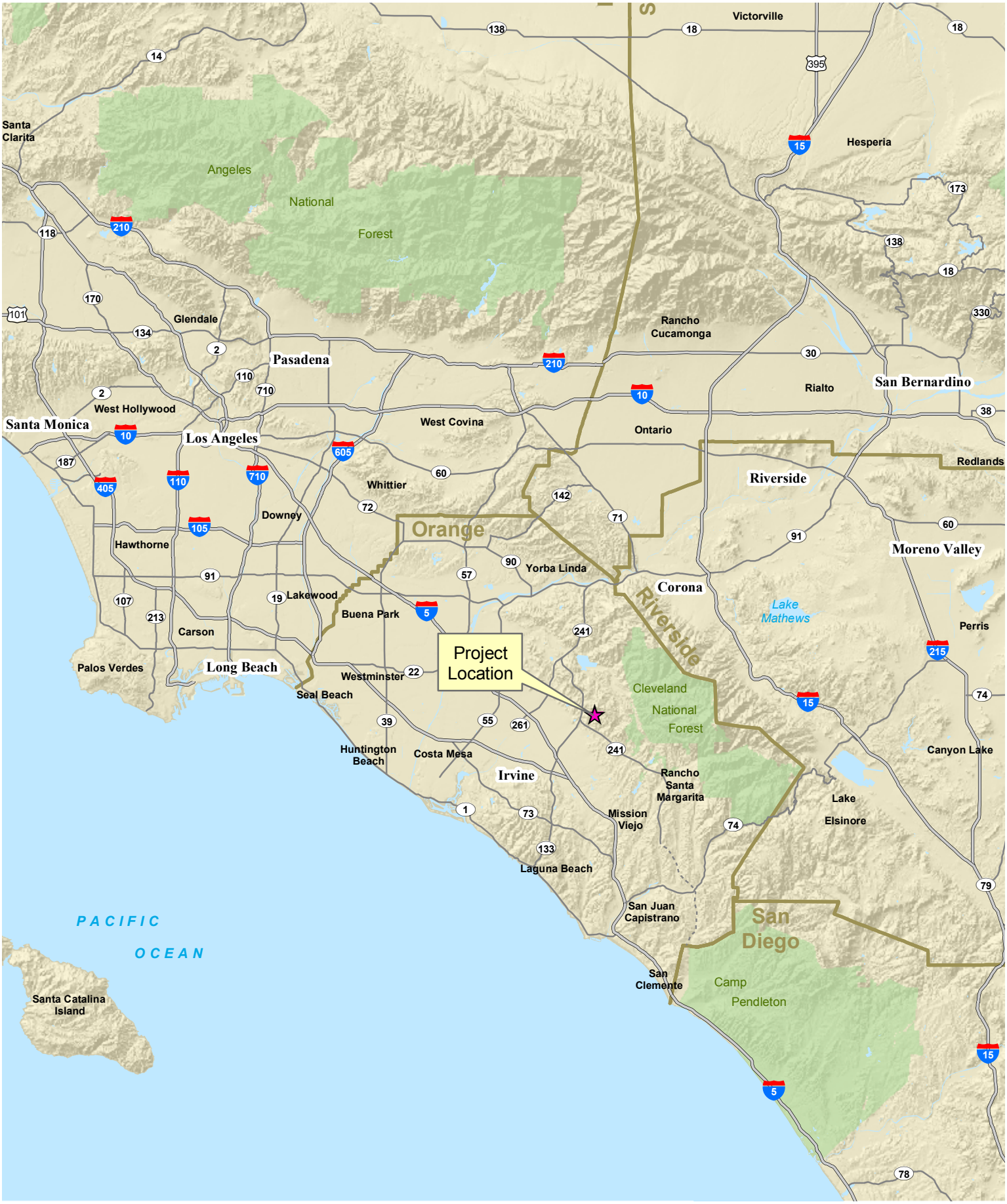

Regional Location

Exhibit 1

Frank R. Bowerman Landfill

N W E S

10 5 0 10 Miles

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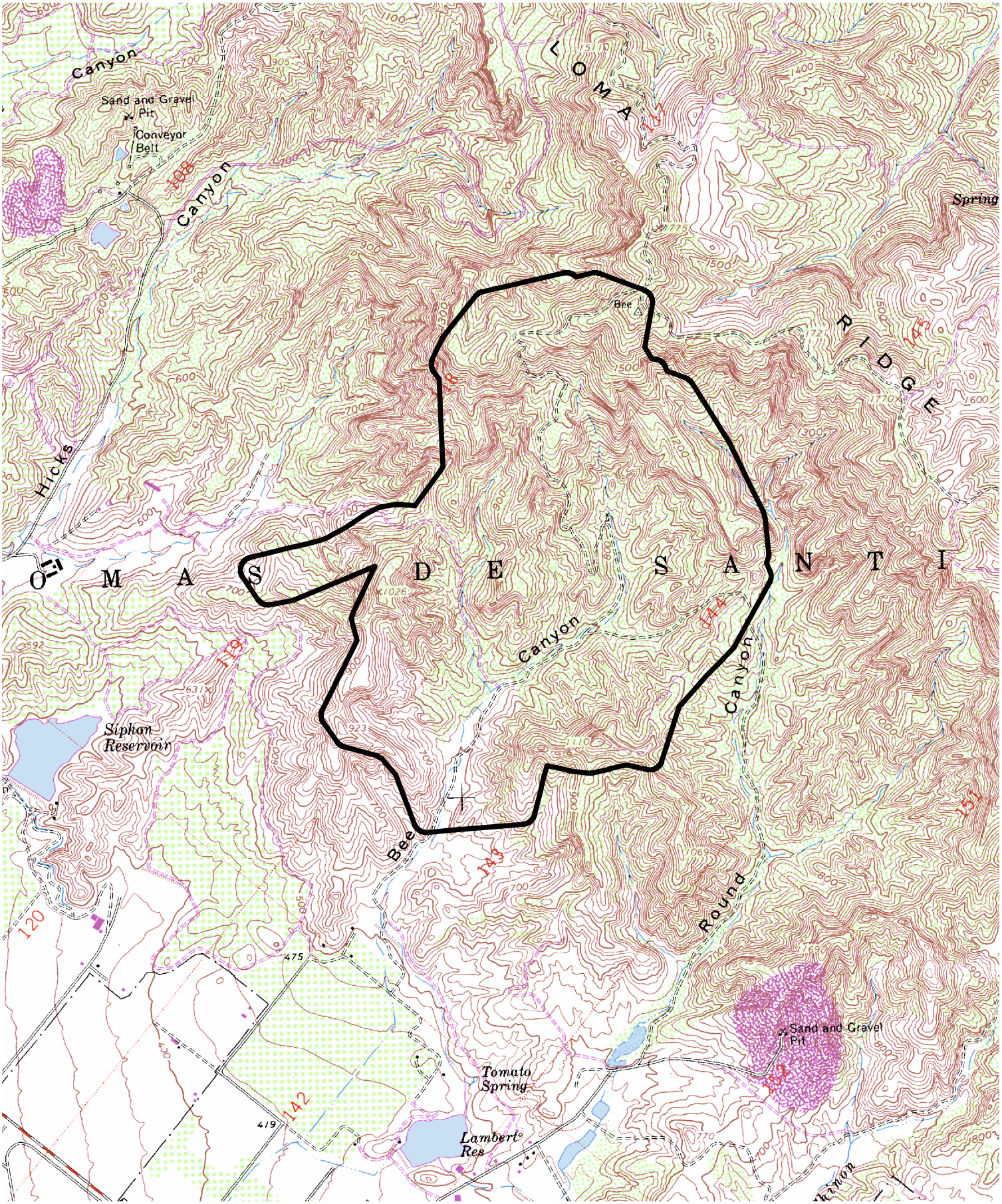

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Study Area and Local Vicinity

Exhibit 2

Frank R. Bowerman Landfill

N W E S

2,000 1,000 0 2,000

Feet

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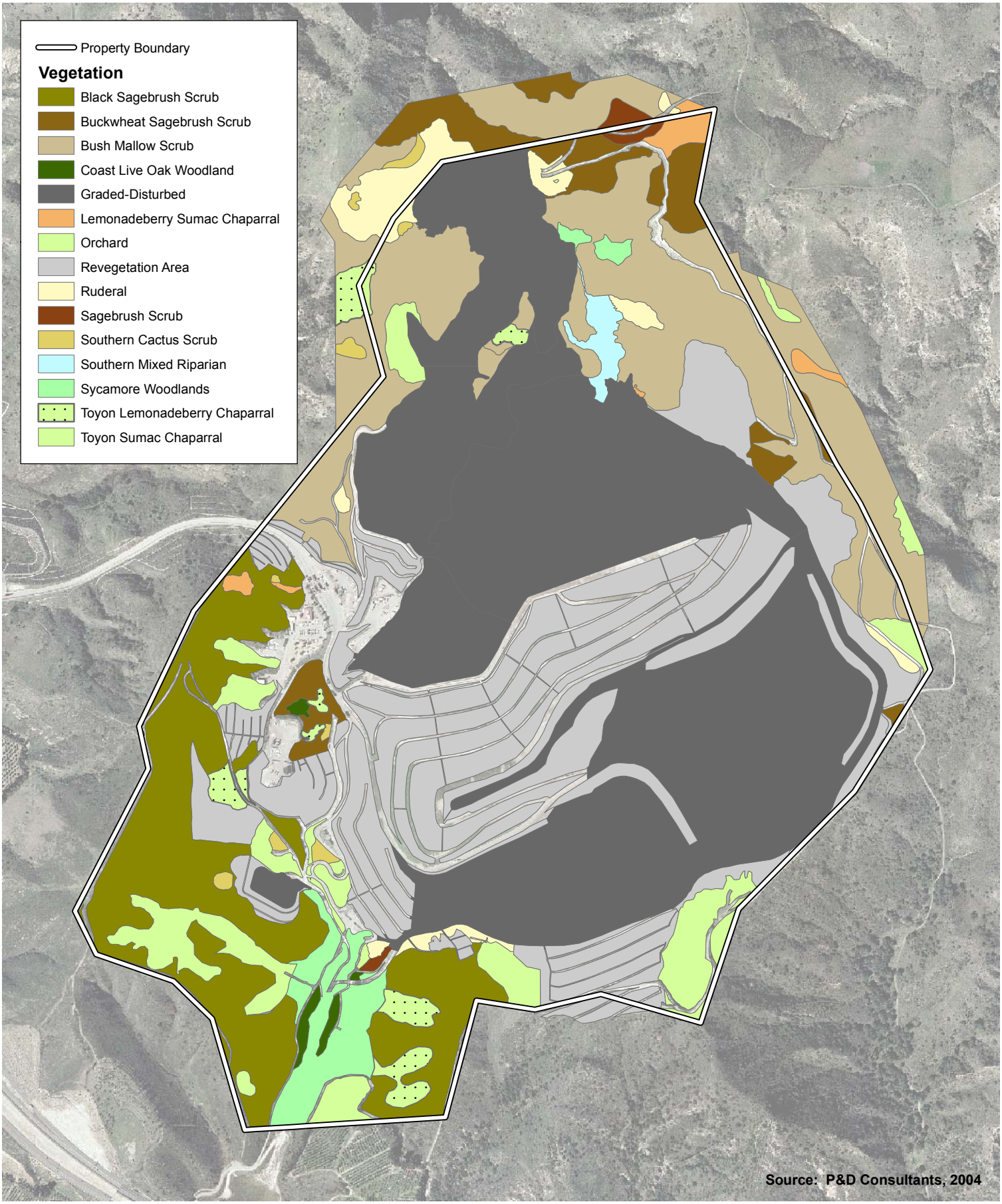

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Vegetation Types

Exhibit 3

Frank R. Bowerman Landfill

N W E S

1,000 500 0 1,000 Feet

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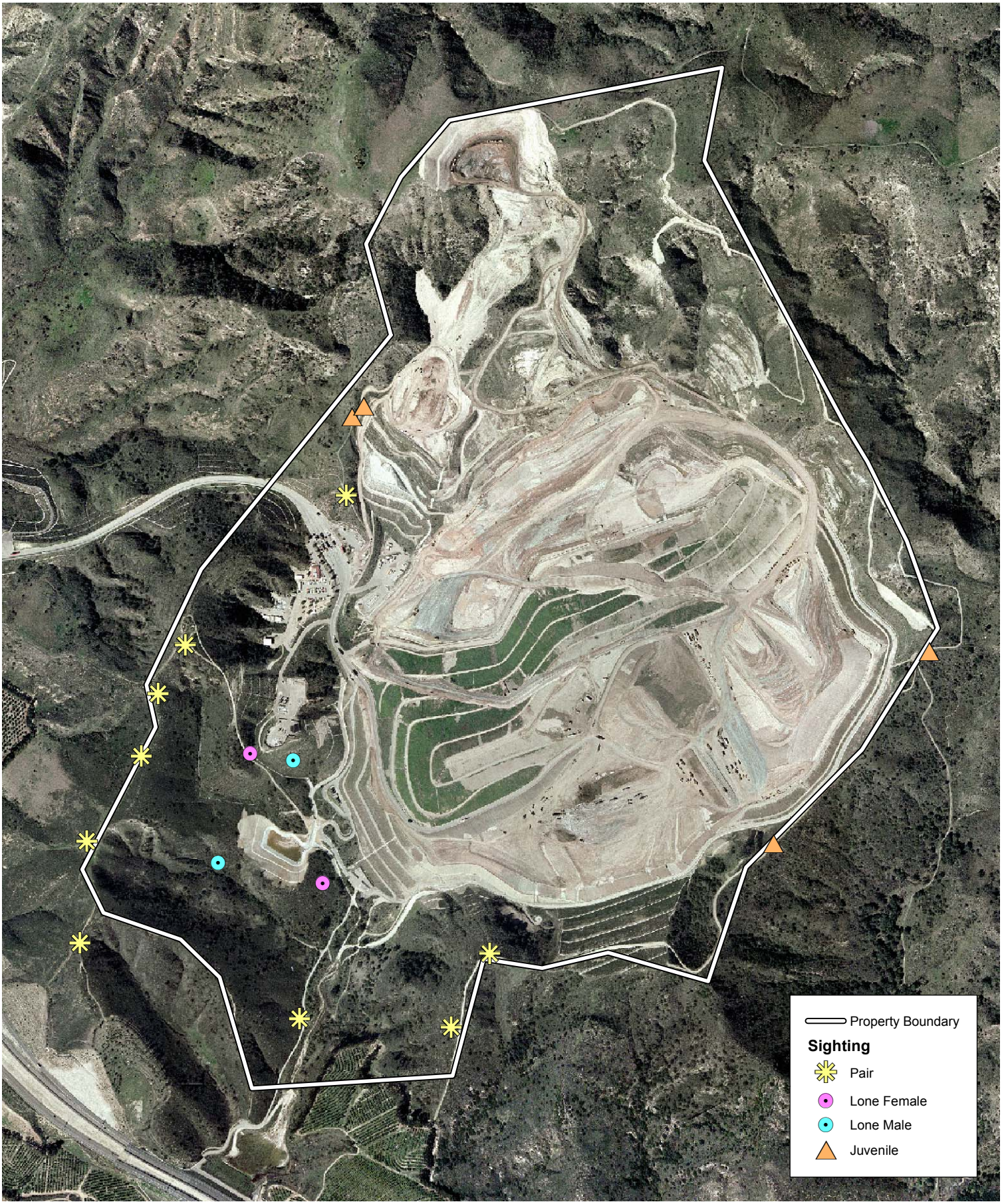

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Coastal California Gnatcatcher Locations

Exhibit 4

Frank R. Bowerman Landfill

N
W E
S

1,000 500 0 1,000
Feet

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APPENDIX A
WILDLIFE COMPENDIUM

The following is a list of species observed or detected on the project site. Non-native species are indicated by an asterisk. Species on CDFG's Special Animals list are indicated by two asterisks. Other species may have been overlooked or inactive/absent because of the season (amphibians are active during rains, reptiles during summer, some birds (and bats) migrate out of the area for summer or winter, some mammals hibernate etc.). Taxonomy and nomenclature generally follow NABA (2002) for butterflies, Stebbins (2003) for amphibians and reptiles, AOU (1998) for birds, and Jones et al. (1992) for mammals.

p

SCIENTIFIC NAME	COMMON NAME
LEPIDOPTERA	**BUTTERFLIES**
Papilionidae	**Swallowtails**
Papilio eurymedon	Pale Swallowtail
Pieridae	**Whites and Sulfures**
Pontia protodice	Checkered White
Pieris rapae	Cabbage Butterfly
Anthocharis sara	Sara's Orangetip
Colias eurytheme	Orange Sulfur
Nathalis iole	Dainty Sulfur
Lycaenidae	**Gossomer-winged Butterflies**
Callophrys augustinus	Brown Elfin
Leptotes marina	Marine Blue
Hemiargus isola	Reakirt's Blue
Euphilotes battoides	Square-spotted Blue
Riodinidae	**Metalmarks**
Apodemia mormo virgulti	Mormon (Behr's) Metalmark
Nymphalidae	**Brush-footed Butterflies**
Vanessa cardui	Painted Lady
Vanessa annabella	West Coast Lady
Junonia coenia	Common Buckeye
Coenonympha tullia california	Common Ringlet
Hesperidae	**Skippers**
Erynnis funeralis	Funereal Duskywing
Heliopetes ericetorum	Northern White Skipper
REPTILIA	**Reptiles**
Phrynosomatidae	**Phrynosomatids**
Sceloporus occidentalis biseriatus	Western fence lizard
Uta stansburiana	Side-blotched lizard
Scincidae	**Skinks**
Eumeces gilberti	Gilbert's skink
Teiidae	**Whiptail lizards**
** *Cnemidophorus hyperythrus beldingi*	Orange-throated whiptail
** *Cnemidophorus tigris*	Western whiptail
Anguidae	**Alligator lizards**
Elgaria multicarinata webbii	Southern alligator lizard
Colubridae	**Colubrids**
Masticophus lateralis	Striped racer
Pituophis catenifer	Gopher snake

APPENDIX A
WILDLIFE COMPENDIUM

AVES	**Birds**
Cathartidae	**Vultures**
Cathartes aura	Turkey vulture
Accipitridae	**Raptors**
Buteo jamaicensis	Red-tailed hawk
Falconidae	**Falcons**
Falco sparverius	American kestrel
Odontophoridae	**Quail**
Callipepla californica	California quail
Charadriidae	**Plovers**
Charadrius vociferus	Killdeer
Columbidae	**Pidgeons and doves**
Zenaida macroura	Mourning dove
Cuculidae	**Cuckoos and roadrunners**
Geococcyx californianus	Greater roadrunner
Apodidae	**Swifts**
Aeronautes saxatalis	White-throated swift
Trochilidae	**Hummingbirds**
Calypte anna	Anna's hummingbird
Calypte costae	Costa's hummingbird
Selasphorus sasin	Allen's hummingbird
Picidae	**Woodpeckers**
Melanerpes formicivorus	Acorn woodpecker
Picoides nuttallii	Nuttall's woodpecker
Colaptes auratus	Northern flicker
Tyrannidae	**Tyrant flycatchers**
** *Empidonax traillii*	Willow flycatcher
Empidonax difficilis	Pacific-slope flycatcher
Sayornis nigricans	Black phoebe
Myiarchus cinerascens	Ash-throated flycatcher
Tyrannus vociferans	Cassin's kingbird
Tyrannus verticalis	Western kingbird
Corvidae	**Jays and crows**
Aphelocoma californica	Western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
Alaudidae	**Larks**
** *Eremophila alpestris*	Horned lark
Hirundinidae	**Swallows**
Tachycineta thalassina	Violet-green swallow
Stelgidopteryx serripennis	Northern rough-winged swallow
Petrochelidon pyrrhonota	Cliff swallow
Paridae	**Titmice and chickadees**
Baeolophus inornatus	Oak (Plain) titmouse
Aegithalidae	**Bushtits**
Psaltriparus minimus	Bushtit
Troglodytidae	**Wrens**
** *Campylorhynchus brunneicapillus*	Cactus wren
Salpinctes obsoletus	Rock wren
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	House wren

APPENDIX A
WILDLIFE COMPENDIUM

Silviidae	**Gnatcatchers**
** *Polioptila californica*	California gnatcatcher
Timaliidae	**Wrentits**
Chamaea fasciata	Wrentit
Mimidae	**Mockingbirds and thrashers**
Mimus polyglottis	Northern mockingbird
Toxostoma redivivum	California thrasher
Sturnidae	**Starlings**
* *Sturnus vulgaris*	European starling
Ptilogonatidae	**Silky flycatchers**
Phainopepla nitens	Phainopepla
Parulidae	**Wood warblers**
Vermivora celata	Orange-crowned warbler
Geothlypis trichas	Common yellowthroat
** *Icteria virens*	Yellow-breasted chat
Emberizidae	**Towhees and sparrows**
Pipilo maculatus	Spotted towhee
Pipilo crissalis	California towhee
** *Aimophila ruficeps*	Rufous-crowned sparrow
** *Spizella atrogularis*	Black-chinned sparrow
Chondestes grammacus	Lark sparrow
Melospiza melodia	Song sparrow
Zonotrichia leucophrys	White-crowned sparrow
Zonotrichia atricapilla	Golden-crowned sparrow
Cardinalidae	**Grosbeaks and buntings**
Pheucticus melanocephalus	Black-headed grosbeak
Guiraca caerulea	Blue grosbeak
Passerina amoena	Lazuli bunting
Icteridae	**Blackbirds and orioles**
Icterus cucullatus	Hooded oriole
Icterus bullockii	Bullock's oriole
Fringillidae	**Finches**
Carpodacus mexicanus	House finch
Carduelis psaltria	Lesser goldfinch
Carduelis tristis	American goldfinch
MAMMALIA	**Mammals**
Leporidae	**Hares and rabbits**
Sylvilagus audubonii	Desert cottontail
** *Lepus californicus*	Black-tailed jackrabbit
Sciuridae	**Squirrels**
Spermophilus beecheyi	California ground squirrel
Geomyidae	**Pocket gophers**
Thomomys bottae	Botta's pocket gopher (burrows)
Muridae	**Old world rats and mice**
Neotoma fuscipes	Dusky-footed woodrat (nest)
** *Neotoma lepida intermedia*	San Diego desert woodrat
Canidae	**Dogs/wolves/foxes**
Canis latrans	Coyote (scat, tracks)
Procyonidae	**Raccoons**
Procyon lotor	Common raccoon (tracks)
Cervidae	**Deer**
Odocoileus hemionus	Mule deer

APPENDIX E
RESULTS OF SURVEYS FOR LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER AT THE FRANK R. BOWERMAN LANDFILL

BonTerra
CONSULTING
An Environmental Planning/Resource Management Corporation

October 12, 2005

Mr. Daniel Marquez
Southern California Field Office
U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92011

VIA FACSIMILE AND MAIL
(760) 431-9624

Subject: Results of Focused Surveys for the Southwestern Willow Flycatcher and Least Bell's Vireo for the Frank R. Bowerman Landfill Project, Orange County, California

Dear Mr. Marquez:

This letter report presents the results of focused surveys performed to evaluate the presence or absence of the southwestern willow flycatcher (*Empidonax traillii extimus*) and least Bell's vireo (*Vireo bellii pusillus*) on the Frank R. Bowerman (FRB) Landfill project site (hereafter referred to as the project site). The surveys were conducted according to guidelines established by the U.S. Fish and Wildlife Service (USFWS).

Project Location and Study Area Description

The project site is located in central Orange County along the coastal side of the Lomas de Santiago foothills, and east of the City of Irvine (Exhibits 1 and 2). Specifically, the project site is located east of the Foothill (SR-241) and Eastern (SR-133) Transportation Corridor interchange at the terminus of Bee Canyon Access Road.

The study area included the project site, a 300-foot-wide buffer area around the entire project site property, and a portion of Bee Canyon Access Road (Exhibit 2). Surveys for least Bell's vireo and southwestern willow flycatcher were performed within all potentially suitable habitat for these species; this included sycamore woodland located within the BioMitigation Area in the southern portion of the project site, and sycamore woodland and southern mixed riparian habitat located above the active landfill area in the northeastern portion of the project site. These and other vegetation types found at FRB are based on a classification system developed for the County of Orange by Gray and Bramlet (1992) and mapped by P&D Consultants (2004) and are shown on Exhibit 3. Detailed descriptions of all project site vegetation types are available in previous documentation prepared for the study area (P&D Environmental 2004). A description of habitat areas that are potentially suitable for both least Bell's vireo and southwestern willow flycatcher is provided below.

Sycamore woodland located within the southern portion of the project site occurs along a streambed within the Riparian BioMitigation Area. This streambed terminates in a detention basin in the southern portion of the project site. Storm

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flows are collected by the detention basin and conveyed under the toll road to Bee Canyon Channel via a drainage structure. Western sycamore (*Platanus racemosa*) trees are the dominant tree species along the length of the streambed, with mule fat (*Baccharis salicifolia*) occurring in the understory. Willow trees (*Salix* spp.) are present primarily in the lower portions of the streambed and in an adjacent side channel that extends alongside an offsite citrus orchard. Dominant willow species in this area included black willow (*Salix gooddingii*) and arroyo willow (*Salix lasiolepis*).

Southern mixed riparian habitat and sycamore woodland located in the northeastern portion of the landfill occurs at the top of, and along side a drainage located on a slope above the active landfill area and directly adjacent to the area of the ancient landslide in Phase VIII. This drainage consists of a small stream (less than three feet wide) that was flowing for the duration of the surveys. Sycamore woodland is located on a plateau area at the top of this drainage and includes western sycamore trees and an understory of willow species. Southern mixed riparian habitat was located along the drainage below the plateau and consisted of mule fat and willow species established along the length of the drainage and small groups of cattails (*Typha* sp.) and mule fat within the drainage at the bottom of the slope.

Background

Southwestern Willow Flycatcher

Southwestern willow flycatcher (*Empidonax traillii extimus*) is a neotropical migrant that breeds in the west from northern Baja California, Mexico to central British Colombia and generally east through the northern half of the United States to the Atlantic coast (A.O.U. 1998). Depending on the authority, there are four or five recognized subspecies of willow flycatcher (Sedgwick 2000). The breeding range of the southwestern willow flycatcher includes southern California, Arizona, New Mexico, western Texas, and extreme southern parts of Nevada and Utah (USFWS 1993). In California, the southwestern willow flycatcher breeds along the coast south of the San Fernando Valley and north in the interior to Independence, Inyo County (Unitt 1987). The largest breeding populations of southwestern willow flycatcher in California are located at the South Fork of the Kern River, Kern County, and on the Santa Margarita River in Camp Pendleton, San Diego County (Unitt 1987). The range-wide population of southwestern willow flycatcher is estimated at between 300 and 500 pairs (USFWS 1997a). The population of southwestern willow flycatcher in California is estimated to be about 70 pairs (USFWS 1993).

The southwestern willow flycatcher breeds in willow-dominated riparian habitats that are similar to least Bell's vireo nesting habitats. The southwestern willow flycatcher differs from least Bell's vireo in that it shows a stronger dependency on willow thickets for all its requirements (Grinnell and Miller 1944). In addition, the southwestern willow flycatcher appears to have a preference for sites with surface water in the vicinity, such as stream banks and adjacent areas, the margins of a pond or lake, and wet mountain meadows (Grinnell and Miller 1944, Flett and Sanders 1987, Harris *et al.* 1987), and in Arizona the southwestern willow flycatcher invariably nests near surface water (Phillips *et al.* 1964). Recently, the southwestern willow flycatcher has adapted to introduced vegetation present in riparian communities, such as tamarisk (*Tamarix* sp.) and Russian olive (*Elaeagnus angustifolia*) (USFWS 1993).

The southwestern willow flycatcher is a common migrant in the interior of California and a rare to uncommon migrant along the coastal slope, with most birds during the spring season moving through southern California between May 15 and June 20 (Garrett and Dunn 1981, Unitt 1987). The spring migration of southwestern willow flycatcher is earlier than that of the northern subspecies (Unitt 1984, USFWS 1993). As a result, surveys for nesting southwestern willow

flycatcher are complicated by the presence of more abundant subspecies migrating through the range of southwestern willow flycatcher during its breeding season.

On July 22, 1997, the USFWS published a final critical habitat for this species. Approximately 100 river miles in Kern, Riverside, San Bernardino, and San Diego counties were designated for the southwestern willow flycatcher. Following the designation of critical habitat, a lawsuit challenging various aspects of the designation was filed. In response to these lawsuits, the critical habitat designation was vacated and the USFWS was instructed by the court to re-evaluate its previous position. A new proposed critical habitat designation was published on October 12, 2004, covering 376,095 acres including 1,556 stream miles. The study area is not located in the designated critical habitat area for this species.

Least Bell's Vireo

Least Bell's vireo is a neotropical migrant that breeds in central and southwestern North America from northern Mexico to southern California, Nevada, and Utah, and east to Louisiana; and in the Central United States north to North Dakota, Wisconsin, and Indiana (A.O.U. 1998). The winter range of this species, although not well known, is believed to be the west coast of Central America from southern Sonora south to northwest Nicaragua, including the cape region of Baja California, Mexico (Brown 1993). Of the four Bell's vireo subspecies, only two breed in California; the least Bell's vireo and the Arizona Bell's vireo (*V. b. arizonae*), which occurs in the Colorado River valley (Garrett and Dunn 1981, Rosenberg et al. 1991). The least Bell's vireo formerly was considered a common breeder in riparian habitats throughout the Central Valley and other low elevation riverine systems in California and Baja California, Mexico (Franzreb 1989). Presently, the least Bell's vireo has been eliminated from much of its historical range (Franzreb 1989, Brown 1993).

Breeding habitat of least Bell's vireo consists of primarily riparian habitats dominated by willows with dense understory vegetation. Shrubs such as mule fat and California rose (*Rosa californica*) are often a component of the understory (Goldwasser 1981). The least Bell's vireo is often found in areas that include trees such as willow, sycamore, or cottonwood (*Populus* spp.), particularly where the canopy is within or immediately adjacent to an understory layer of vegetation (Salata 1983). The least Bell's vireo generally nests in early successional stages of riparian habitats, with vireo nest sites frequently located in willows that are between four and ten years of age (RECON 1988, Franzreb 1989). The most critical factor in habitat structure is the presence of a dense understory shrub layer from approximately two feet to ten feet above ground (Goldwasser 1981, Salata 1983, Franzreb 1989).

The least Bell's vireo was formerly a more common and widespread summer resident of southern California's lowland riparian woodlands (Grinnell and Miller 1944, Garrett and Dunn 1981). The substantial population declines of this avian species over the latter half of the twentieth century is attributable to the loss and degradation of riparian habitats and, perhaps more importantly, brood parasitism by the brown-headed cowbird (*Molothrus ater*). As a result, the least Bell's vireo was listed by the California Department of Fish and Game (CDFG) as Endangered on October 2, 1980, and by the USFWS as Endangered on May 2, 1986.

On February 2, 1994, the USFWS issued their final determination of critical habitat for the least Bell's vireo. Approximately 37,560 acres were identified as critical habitat in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties. The project site/study area is not located within any of the areas designated as critical habitat for the least Bell's vireo.

Survey Methods

Prior to conducting the focused survey, a search was conducted of the most recent version of the California Natural Diversity Data Base (CNDDB) (CDFG 2005, El Toro USGS 7.5 minute quadrangle), and other relevant available documents to determine the extent of southwestern willow flycatcher and least Bell's vireo presence in the study area and vicinity.

A total of ten surveys for the southwestern willow flycatcher and least Bell's vireo were conducted on April 14, 26, May 10, 20, 25, June 1, July 1, 8, 14, and 27, 2005. All surveys followed the recommended USFWS guidelines for both species, including the July 11, 2000, revision to the survey protocol for southwestern willow flycatcher (USFWS 1997b, USFSWS 2000). Per this protocol revision, instead of the previously required minimum of three surveys, a total of five surveys must now be performed for all project related surveys. Surveys are still to be conducted in three specified time periods at least five days apart. The first survey must be conducted between May 15 and May 31, with the second survey occurring between June 1 and June 21. The remaining three surveys (Surveys 3 to 5) are to be conducted between June 22 and July 17, with survey No. 3 occurring between June 22 and June 30.

Updated guidelines for least Bell's vireo surveys were issued on April 8, 1999, and require that at least eight surveys be conducted from April 10 to July 31 with a ten-day interval between each survey/site visit. Surveys for southwestern willow flycatcher and least Bell's vireo can be performed simultaneously because of their similar habitat requirements.

Senior Biologist, Marc Blain (Permit # TE-001075-1) conducted all of the surveys for southwestern willow flycatcher (May 25 to July 14, 2005) and used taped vocalizations on May 25, June 1, July 1, 8, and 14, 2005. Surveys for the least Bell's vireo were conducted by Amber Oneal on April 14, 26, May 10, and 20, 2005, and by Marc Blain on June 1, July 1, 14, and 27, 2005. All suitable habitat was thoroughly surveyed during each site visit. Survey dates, survey- biologists, and survey types are summarized in Table 1 below.

TABLE 1
SUMMARY OF SURVEYS

Survey Date	Biologist	Species Surveyed
April 14, 2005	Amber Oneal	least Bell's vireo
April 26, 2005	Amber Oneal	least Bell's vireo
May 10, 2005	Amber Oneal	least Bell's vireo
May 20, 2005	Amber Oneal	least Bell's vireo
May 25, 2005	Marc Blain/Amber Oneal	southwestern willow flycatcher
June 1, 2005	Marc Blain	least Bell's vireo/southwestern willow flycatcher
July 1, 2005	Marc Blain	least Bell's vireo/southwestern willow flycatcher
July 8, 2005	Marc Blain	southwestern willow flycatcher
July 14, 2005	Marc Blain	least Bell's vireo/southwestern willow flycatcher
July 27, 2005	Marc Blain	least Bell's vireo

The riparian habitats were systematically surveyed by walking slowly and methodically along their margins. Taped vocalizations of southwestern willow flycatcher were used to elicit a response from any potentially territorial southwestern willow flycatcher. If no southwestern willow flycatchers were detected after the initial tape playing, the recording was usually replayed at least once, but often multiple times. Taped vocalizations of least Bell's vireo were not used. All observations of willow flycatchers, including migrating subspecies and their behavior were

recorded and their locations noted. All surveys were conducted under optimal weather conditions and during early morning hours when bird activity is at a peak. All bird species observed were recorded in field notes and are listed in Appendix A. Notable observations and any special status species and other birds, such as the brown-headed cowbird, were documented.

Survey Results

No southwestern willow flycatchers or least Bell's vireo were observed in the study area during the 2005 focused surveys. No migrant willow flycatchers were observed in the study area.

A red-tailed hawk (*Buteo jamaicensis*) was observed nesting in a sycamore tree on the plateau above the southern mixed riparian.

No brown-headed cowbirds were observed during any of the surveys. The Transportation Corridor Agencies have been conducting trapping programs for the last decade in the vicinity of the nearby toll roads to reduce nest parasitism on federally-listed bird species in the area. The success of that program is likely responsible for the apparently low number of cowbirds in the area during the breeding season.

If you have any comments or questions, please call Gary Medeiros or Amber Oneal at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING

Gary A. Medeiros
Associate Principal, Regulatory Services

Amber S. Oneal
Project Manager/Ecologist

I certify that the information in this survey report and enclosed exhibits fully and accurately present my work.

Amber S. Oneal
Project Manager/Ecologist (no permit)

Marc Blain
Biological Resources Manager
(Permit #TE-001075-1)

Enclosures: Exhibits 1, 2, and 3
Compendium

cc: Bob Fleming, OCIWMD
Tarik Hadj-Hamou, GeoSyntec
Melissa Howe, BonTerra Consulting

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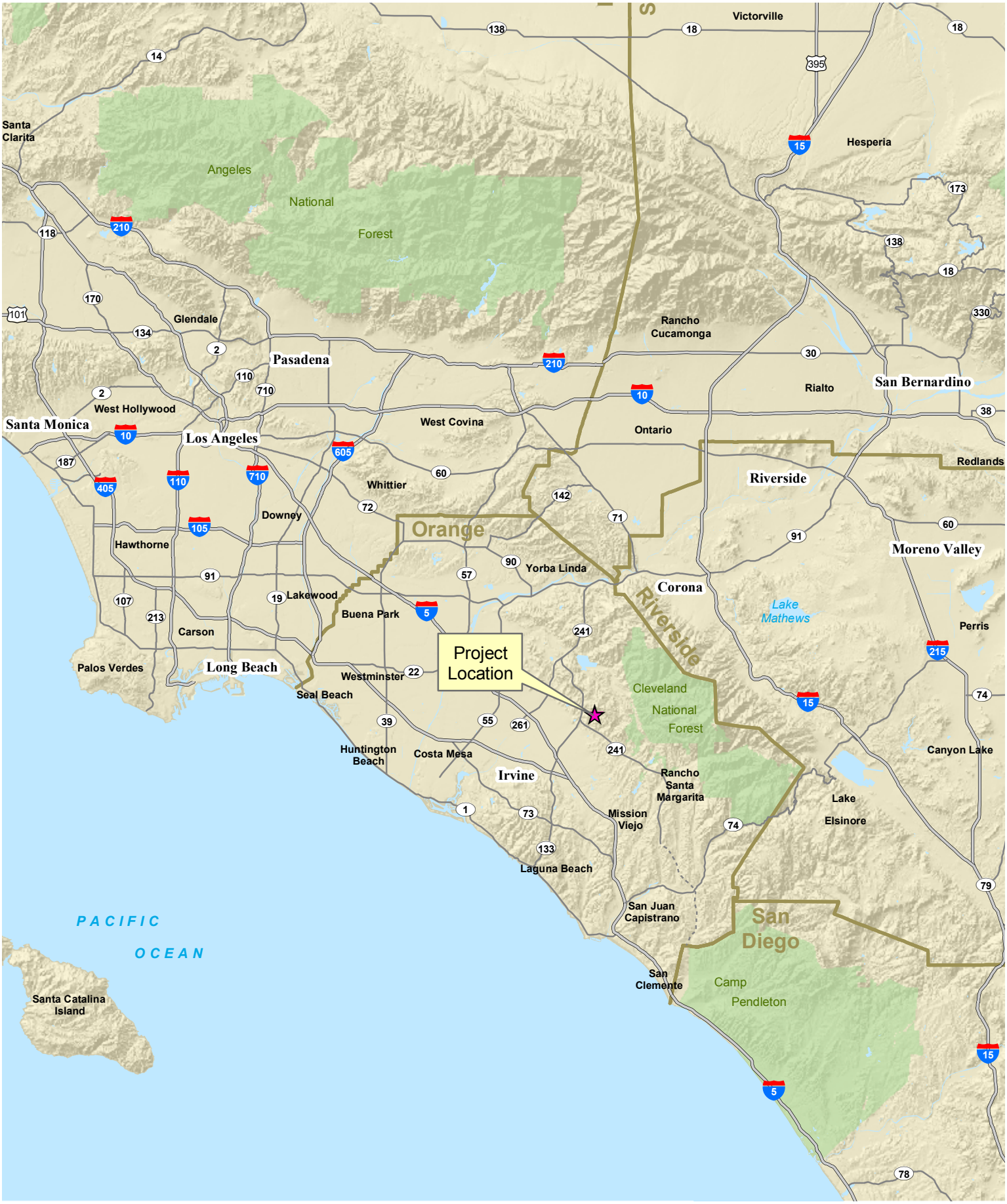

Regional Location

Exhibit 1

Frank R. Bowerman Landfill

N W E S

10 5 0 10 Miles

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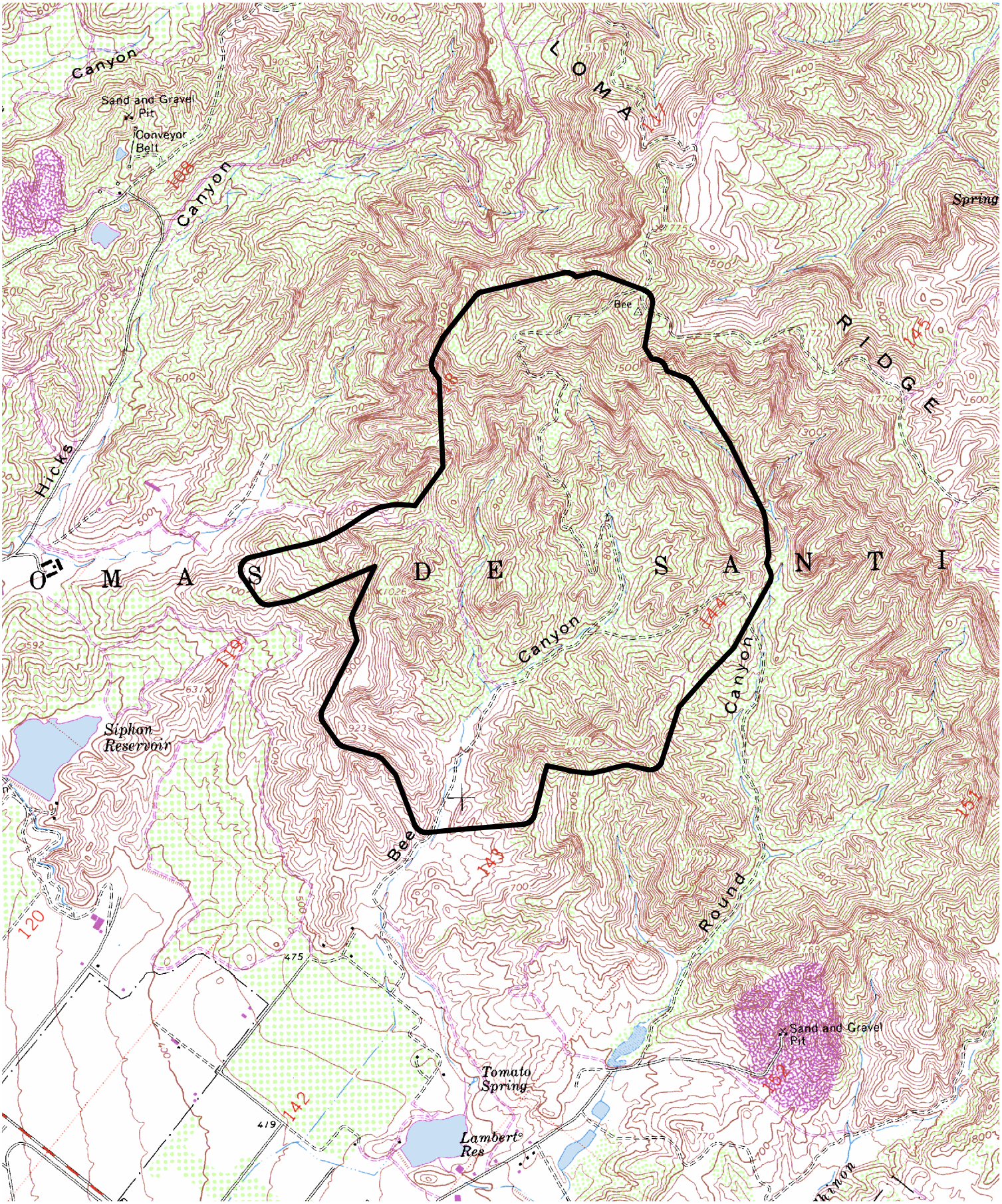

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Study Area and Local Vicinity

Exhibit 2

Frank R. Bowerman Landfill

N W E S

2,000 1,000 0 2,000

Feet

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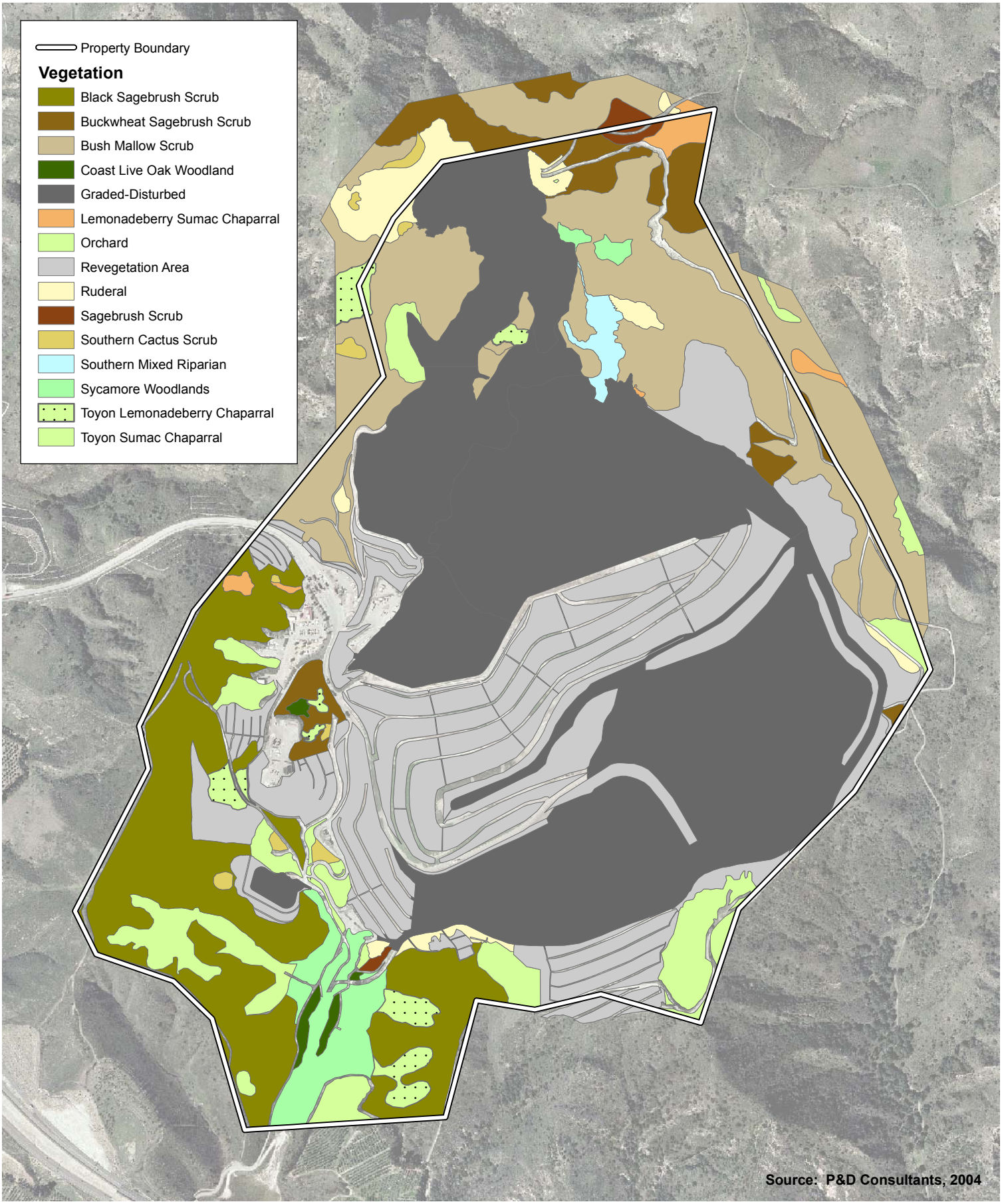

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Vegetation Types

Exhibit 3

Frank R. Bowerman Landfill

N W E S

1,000 500 0 1,000 Feet

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WILDLIFE COMPENDIUM

AMPHIBIANS
BUFONIDAE - TRUE TOADS
Bufo boreas California toad
REPTILES
PHRYNOSOMATIDAE - ZEBRA-TAILED, FRINGE-TOED, ZPINY, TREE, SIDE-BLOTCHED, AND HORNED LIZARDS
Sceloporus occidentalis western fence lizard
Uta stansburiana side-blotched lizard
COLUBRIDAE - COLUBRID SNAKES
Masticophis taeniatus striped whipsnake
VIPERIDAE - VIPERS
Crotalus atrox western diamond-backed rattlesnake
BIRDS
Anas platyrhynchos mallard
ODONTOPHORIDAE - QUAILS
Callipepla californica California quail
CATHARTIDAE - NEW WORLD VULTURES
Cathartes aura turkey vulture
ACCIPITRIDAE - HAWKS
Accipiter striatus sharp-shinned hawk
Buteo lineatus red-shouldered hawk
Buteo jamaicensis red-tailed hawk
CHARADRIIDAE - PLOVERS
Charadrius vociferus killdeer
COLUMBIDAE - PIGEONS & DOVES
Zenaida macroura mourning dove
CUCULIDAE - CUCKOOS & ROADRUNNERS
Geococcyx californianus greater roadrunner
APODIDAE - SWIFTS
Aeronautes saxatalis white-throated swift

WILDLIFE COMPENDIUM
(Continued)

TROCHILIDAE - HUMMINGBIRDS
Archilochus alexandri black-chinned hummingbird
Calypte anna Anna's hummingbird
Calypte costae Costa's hummingbird
Selasphorus sasin Allen's hummingbird
PICIDAE - WOODPECKERS
Melanerpes formicivorus acorn woodpecker
Picoides nuttallii Nuttall's woodpecker
Colaptes auratus northern flicker
TYRANNIDAE - TYRANT FLYCATCHERS
Empidonax difficilis Pacific-slope flycatcher
Sayornis nigricans black phoebe
Myiarchus cinerascens ash-thoated flycatcher
Tyrannus vociferans Cassin's kingbird
Tyrannus verticalis western kingbird
CORVIDAE - JAYS & CROWS
Aphelocoma californica western scrub-jay
Corvus brachyrhynchos American crow
Corvus corax common raven
HIRUNDINIDAE - SWALLOWS
Stelgidopteryx serripennis northern rough-winged swallow
Petrochelidon pyrrhonota cliff swallow
PARIDAE - TITMICE
Baeolophus inornatus oak titmouse
AEGITHALIDAE - BUSHTITS
Psaltriparus minimus bushtit

WILDLIFE COMPENDIUM
(Continued)

TROGLODYTIDAE - WRENS
Campylorhynchus brunneicapillus cactus wren
Salpinctes obsoletus rock wren
Thryomanes bewickii Bewick's wren
Troglodytes aedon house wren
SYLVIIDAE - GNATCATCHERS
Polioptila californica California gnatcatcher
TURIDIDAE - THRUSHES & ROBINS
Catharus guttatus hermit thrush
TIMALIIDAE - WRENTITS
Chamaea fasciata wrentit
MIMIDAE - THRASHERS
Mimus polyglottos northern mockingbird
Toxostoma redivivum California thrasher
STURNIDAE - STARLINGS
Sturnus vulgaris European starling *
PTILOGONATIDAE - SILKY-FLYCATCHERS
Phainopepla nitens phainopepla
PARULIDAE - WARBLERS
Vermivora celata orange-crowned warbler
Vermivora ruficapilla Nashville warbler
Dendroica petechia yellow warbler
Dendroica nigrescens black-throated gray warbler
Geothlypis trichas common yellowthroat
Wilsonia pusilla Wilson's warbler
EMBERIZIDAE - SPARROWS & JUNCOS
Pipilo maculatus spotted towhee
Pipilo crissalis California towhee

WILDLIFE COMPENDIUM
(Continued)

Aimophila ruficeps rufous-crowned sparrow
Melospiza melodia song sparrow
Zonotrichia leucophrys white-crowned sparrow
CARDINALIDAE - GROSBEAKS & BUNTINGS
Pheuticus melanocephalus black-headed grosbeak
Passerina caerulea blue grosbeak
Passerina amoena lazuli bunting
ICTERIDAE - BLACKBIRDS
Icterus bullockii Bullock's oriole
FRINGILLIDAE - FINCHES
Carpodacus mexicanus house finch
Carduelis psaltria lesser goldfinch
Carduelis tristis American goldfinch
MAMMALS
LEPORIDAE - HARES & RABBITS
Sylvilagus audubonii desert cottontail
SCIURIDAE - SQUIRRELS
Spermophilus beecheyi California ground squirrel
CANIDAE - WOLVES & FOXES
Canis latrans coyote
FELIDAE - CATS
Lynx rufus bobcat
CERVIDAE - DEERS
Odocoileus hemionus mule deer

APPENDIX J
CULTURAL RESOURCE ASSESSMENT

INTEGRATED WASTE MANAGEMENT DEPARTMENT
320 N. FLOWER STREET, SUITE 400
SANTA ANA, CALIFORNIA 92703

DATE: May 17, 2006

TO: Interested Parties

FROM: Cymantha Atkinson, Project Manager

SUBJECT: Cultural Resource Assessment and Paleontological Resource Assessment Report for the Frank R. Bowerman Landfill Master Development Plan

PROJECT TITLE: Regional Landfill Options for Orange County (RELOOC) Strategic Plan-Frank R. Bowerman (FRB) Landfill Implementation

CONTACT PERSON: Linda Hagthrop, Public Information Officer

Phone: (714) 834-4176
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E-Mail: FRBEIR@iwmd.ocgov.com

Since these reports contain sensitive information about the locations of cultural and paleontological resources, these reports are not available for public review and are not included in Volume II. Copies of the Cultural Resource Assessment for the Frank R. Bowerman Landfill Master Development Plan (URS, 2005) and the Paleontological Resource Assessment Report for the Frank R. Bowerman Landfill Master Development Plan (Conkling and Smith, 2006) can be reviewed by qualified archaeologists and paleontologists at the FRB Landfill office. If you wish to review these technical reports please contact the public information officer above.

Respectfully submitted:

Cymantha Atkinson, Project Manager