REDWOOD LANDFILL FINAL ENVIRONMENTAL IMPACT REPORT

Response to Comments Amendment SCH No. 1991033042

Prepared for: County of Marin March 2008

ESA

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CHAPTER 1 Introduction: Purpose and Use of the FEIR Response to Comments Amendment

This document is an Amendment to the Final Environmental Impact Report (FEIR) for the Redwood Landfill Solid Waste Facilities Permit Revision (SCH No. 1991033042) published in July 2005. Pursuant to Marin County's environmental review procedures, the FEIR, which includes revisions to the Draft Environmental Impact Report (DEIR), published in July 2003, as well as comments on the DEIR and responses to those comments, circulated for a comment period of 74 days following its release to allow additional review and comment on the adequacy of the earlier responses to comments on the DEIR. During this FEIR review period, public and agency reviewers had the opportunity to submit written comments on the FEIR document. Following publication of the FEIR Response to Comments, new information and data were generated by the applicant and peer reviewed by the EIR consultants prior to the completion of this Response to Comments Amendment, to clarify, correct, and refine information regarding the landfill provided in the FEIR. In some instances, this information was the result of additional site monitoring and management data requested by State regulatory agencies and/or the LEA to be compiled by the landfill operators. Compilation and review of this new information resulted in considerable delay in completing this FEIR Response to Comments Amendment since circulation in 2005 of the FEIR Response to Comments. New information is summarized below and discussed in detail in the Master Responses presented in Chapter 2.

This FEIR Response to Comments Amendment is intended to aid the public, the Lead Agency (the Marin County Environmental Health Services Division acting as Local Enforcement Agency [LEA] for the California Integrated Waste Management Board), responsible agencies, and interested organizations and individuals in understanding the project, its potential environmental effects and alternatives to the project, and particularly to address additional comments on the adequacy of the earlier responses to comments presented in the FEIR. Marin County's environmental review procedures provide for circulation of a FEIR response to comments, focusing on the adequacy of earlier responses in the FEIR. With compilation of this Response to Comments Amendment to the FEIR, the process for public review and comment on the FEIR is concluded and no further review for comment and response is provided. The FEIR Response to Comments Amendment is distributed publicly prior to County Planning Commission action to consider recommendation to certify the FEIR as adequate and complete. In view of the delay between completion of the FEIR and the FEIR Amendment, a short distribution period prior to certification action is being provided. This is not a comment period on the FEIR Response to Comments Amendment and no further responses are being provided in the FEIR. The document will serve as a basis for a recommendation by the Marin County Planning Commission on

certification of the document by the LEA, as Lead Agency, and for the LEA and Responsible Agencies' decisions to approve or disapprove the project.

This FEIR Response to Comments Amendment has two specific purposes: First and foremost, to respond to comments received on the FEIR. Responses to comments are included in both Chapter 2 and Chapter 3. Chapter 2 contains "Master Responses," which are responses to comments grouped by similarity of topic. Chapter 3 contains individual responses, as well as the comment letters received. Where comments substantially repeat comments on the DEIR that were responded to in the FEIR, the FEIR responses are referred to in the current set of responses.

A second use of the FEIR is to provide updated and new information on the project, mitigation measures specified in the FEIR, and project alternatives. These are discussed in the responses to comments, and the appendices. Changes to the text of the FEIR are compiled in Chapter 4.

This document will be distributed to interested parties prior to the Marin County Planning Commission's consideration of its recommendation to the Local Enforcement Agency (LEA) on certification of the FEIR as adequate and complete pursuant to CEQA. Prior to adopting a recommendation, the Planning Commission will hold a Public Hearing to take comments on the document. The LEA will subsequently hold a public meeting to consider certification of the EIR followed by a public hearing for action on the project Solid Waste Facility Permit (SWFP).

New Information

Since publication of the FEIR, several events have occurred which constitute new information that generally bears upon the project. This is not "significant new information" pursuant to CEQA *Guidelines* § 15088.5 that would trigger recirculation of the Draft EIR, since this new information does not change the EIR in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. In all instances where new information was submitted by the applicant, it was peer reviewed independently by appropriate ESA technical experts before incorporation into the FEIR. New information discussed in the FEIR is either included in the FEIR Amendment or is on file in the Redwood Landfill Project File at the County of Marin Environmental Health Services office, 3501 Civic Center Drive, San Rafael, CA, and may be obtained for review or copy at that location.

New information includes the following:

1. The project sponsor, Redwood Landfill, committed by letter dated June 15, 2006 (see Appendix A) to implementing a project redesign based on the Mitigated Alternative in the FEIR. A revised project SWFP application is expected to be submitted by Redwood after the FEIR has been certified. The applicant has also provided detailed information on the design and engineering properties of the Mitigated Alternative, which is summarized and reviewed in Master Response 104, with additional analysis in Master Responses 108 and 112 in Chapter 2.

- 2. The landfill plans to seek certification under the International Organization of Standardization (ISO) 14001 program as part of the landfill's environmental management system. This is further described in Master Response 111 in Chapter 2.
- 3. In December, 2006, there was a failure of a section of the landfill's levee separating the site from San Antonio Creek. This is further described and analyzed in Master Response 106 in Chapter 2.
- 4. The landfill access road overpass was completed in June, 2006. The overpass is not a part of the project analyzed in this EIR, but its completion was anticipated in the EIR.
- 5. The California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) are proposing to improve US 101 between Novato and Petaluma in order to reduce traffic congestion and address physical deficiencies of the roadway. Pursuant to the CEQA and the National Environmental Policy Act (NEPA), Caltrans has prepared a Draft Environmental Impact Report/Environmental Impact Statement (DEIR/S) to assess the environmental impacts of the proposed Marin-Sonoma Narrows Project. The DEIR/S was published in October, 2007; comments were accepted through December 14, 2007. See response to Comment V-14 in Chapter 3 for more information.
- 6. Marin County has adopted an updated Countywide Plan. In November 2007 the Marin County Board of Supervisors adopted the new Countywide Plan. (FEIR response to comment V-4 provides information on relevant interim guiding principles the Board of Supervisors had adopted to guide the development of the new plan.) Table 1.1 presents a summary comparison of goals, policies and programs from the 1994 Countywide Plan that are referenced in the FEIR and the comparable goals, policies and programs of the recently adopted 2007 Countywide Plan. With respect to waste management plans, the FEIR cites the relevant goals, policies and programs of the County's Integrated Waste Management Plan elements, including the Multi-Jurisdictional Source Reduction and Recycling Element for Marin County and its Cities, the Marin County Regional Summary Plan, and the Marin County 1995 Siting Element. Table 1.2 presents a summary comparison of goals, policies and programs of the adopted 2007 County's waste management plans that are referenced in the FEIR and the comparable goals, policies and programs of goals, policies and programs of the County Regional Summary Plan, and the Marin County 1995 Siting Element. Table 1.2 presents a summary comparison of goals, policies and programs of the County's waste management plans that are referenced in the FEIR and the comparable goals, policies and programs contained in the Public Facilities and Services Chapter of the adopted 2007 Countywide Plan.
- 7. Updated information on the origin of vehicles arriving at the landfill, as of July 2005, is discussed in Master Response 101 in Chapter 2.
- 8. Clapper rail habitat evaluation from the applicant is reviewed and analyzed in Master Response 102 in Chapter 2.

- 9. Leachate monitoring and management information, including monitoring data for the perimeter hydraulic gradient, as well as analysis of leachate storage, water balance, and the adequacy of the design of the leachate collection system, are discussed in Master Response 105 in Chapter 2.
- 10. Revised site life and landfill volume tables based on 2006 information from the applicant are presented in Master Response 107 in Chapter 2.
- 11. Lifecycle Greenhouse Gas emissions from the Landfill, and impacts on Global Climate Change, are discussed in Master Response 112.

EIR Topic Area	1994 Countywide Plan	November 2007 Countywide Plan
General	Environmental Corridors	Change – Added a 4th Baylands Corridor in 2007 CWP.
	EQ-1.1 Land Use of the City-Centered Corridor	(Goal CD-1 Environmental Corridor Land Use
	EQ-1.2 Land Use of the Inland Rural Corridor	Framework)
	EQ-1.3 Land Use of the Coastal Recreation Corridor	
3.1 Aesthetics	EQ-2.72 Viewshed Protection EQ-2.73 View Corridor Identification and Enhancement EQ-2.74 Design for Waterfront Development EQ-3.11 Visual Quality and Views	Minor changes.Viewshed protection from the94 Plan has been expanded from viewprotection of Bayfront vistas and distinctshorelines to more broadly addressprotection of views of the naturalenvironment, key public views, impacts ofpublic facilities, mass and scale of structures,and views of ridgelines through policies andprograms pertaining to Ridge and UplandGreenbelt Areas in the Community DesignSection of the 2007 CWP.Relevant goals/polices/programs:GOAL DES-4 Protection of Scenic ResourcesDES-4.1 Preserve Visual QualityDES-4.a Protect Key Public ViewsDES-4.b Minimize Impacts of Public FacilitiesDES-4.c Regulate Mass and ScaleDES-4.d Protect Views of Ridgelines
	EQ-3 The Built Environment	DES-4.e Protect Views of RUG Areas The 2007 CWP has been reorganized to ensure that goals are evaluated for environment, economy, and equity benefits. The concept of managing the built environment within the context of the natural environment has been expanded by directing land uses to appropriate areas to protect environmentally sensitive lands (Community Development Section). In addition, residential densities and commercial FAR are calculated at the low end of the density range on sites with sensitive habitat, or within the RUG, Baylands Corridor, or properties lacking public water or sewer systems. <i>Relevant goals/polices/programs:</i> CD-1.2 Direct Land uses to Appropriate Areas CD-1.3 Reduce Potential Impacts CD-1.b Preserve Resources in the Baylands corridor CD-1.c Reduce Potential Impacts

TABLE 1.1COMPARISON OF RELEVANT GENERAL PLAN POLICES: 1994 COUNTYWIDE PLAN AND
2007 ADOPTED COUNTYWIDE PLAN UPDATE

EIR Topic Area 1994 Countywide Plan November 2007 Countywide Plan 3.6 Land Use EQ-3.26 Rural Character and Lighting Rural Character - No changes **GOAL DES-1** Preservation of Community Character DES-.1.2 Protect Rural character DES-1.c Regulate Urban and Rural Design Concept has been expanded by additional policies in Transportation section Relevant goals/polices/programs: TR-1.6 Keep Rural Characters in West Marin TR-1.0 Keep West Marin Rural Lighting - Changes Lighting guidelines have been expanded to address rural signs, efficiency, and reasonableness of intensity, directional control, signage, night lighting, education, incentives, and enforcement. Relevant goals/polices/programs: **DES-1.h Lighting Design Guidelines** DES-1.f Rural sign Regulation EQ-2.43 Development and Access **Baylands Protection - Minor changes** Limitations in Bayfront Conservation Areas The 1994 Bayfront Conservation Zone has been elevated to a new 4th environmental corridor (Baylands Corridor) in the 2007 CWP. Most of the regulations in these BFC areas have not changed except: GOAL BIO-5 and BIO-5.1 Increased stream and wetland setbacks for parcels over 2 acres Additional setbacks to preserve upland buffers for parcels over 2 acres Additional site assessment may be required for SCA and WCA setbacks in the Baylands Corridor. Also see CD-1.c Reduce Potential Impacts, new requirement for the low end of the density range for large properties (>2 acres) within the Baylands Corridor. Relevant goals/polices/programs: BIO-5.i Conduct mapping and analysis New program to analyze small parcels not currently in the Baylands Corridor to determine whether they should be added to or omitted from the Corridor.

TABLE 1.1 (continued) COMPARISON OF RELEVANT GENERAL PLAN POLICES: 1994 COUNTYWIDE PLAN AND 2007 ADOPTED COUNTYWIDE PLAN UPDATE

TABLE 1.1 (continued)
COMPARISON OF RELEVANT GENERAL PLAN POLICES: 1994 COUNTYWIDE PLAN AND
2007 ADOPTED COUNTYWIDE PLAN UPDATE

EIR Topic Area	1994 Countywide Plan	November 2007 Countywide Plan
	EQ-2.45 Diked Historic Marshlands Subzone	No change. See BIO-5.e, Enforce Diked Bay Marshland Requirements
	EQ-2.53 Siting of Industrial Facilities	No specific equivalent, but no change. See BIO-5.c, Update Development Code, for general comparison.
	EQ-2.56 Waste Discharge	Expanded regulations to protect water resources in the 2007 CWP. Waste discharge is addressed in Water Resources Section– See WR-2.1 Reduce Toxic Runoff; WR-2.3, Avoid Erosion and Sedimentation; WR-2.4, Design County Facilities to Minimize Pollutant Input; and WR-2.c, Research and Implement Safe and Effective Alternative Waste Options.
	EQ-2.58 Protection of Existing agricultural lands	<u>Minor change</u> . The Agriculture and Food section addresses protecting agricultural lands; however, there is not a specific policy to protect ag lands in the Baylands. Instead BIO-5.9, Allow Limited Agricultural Use, encourages only those ag uses that are compatible with the protection of wetlands and other sensitive resources to remain in baylands.
	EQ-2.66 Use of Shoreline Areas	Minor change. Public access is still encouraged in the 2007 CWP, but there are stricter policies for minimizing the environmental impacts of public access.
		See BIO-5.7, Limit Access to Wetlands, which doesn't just encourage public access but ensures that public access is designed to avoid disturbance to wetlands or buffer areas. And BIO-5.f, Control Public Access, requires public use areas to be designed to minimize conflicts between public and private uses, to provide continuous walkways, to be setback from any proposed structure, and to be buffered from wetlands.
	EQ-2.67 Ensuring Public Access to Shoreline Areas	No specific equivalent but generally covered by policies noted above.
	CD-1.2 Land use in the Inland Rural Corridor	No change. See CD-1.d, Maintain Agriculture in the Inland Rural Corridor.
	CD-8.2 Land Use Categories	No change. See CD-8.2, Establish Land Use Categories
	A-1.10. Non-Agricultural Land Uses	<u>Changes</u> . Similar regulations with new restrictions on agricultural home sizes and new clustering requirements. See Ag-1.6 Limit Non-Agricultural Development and AG- 1.7, Limit Ancillary Non-Agricultural Land Uses, and AG-1.a, Residential Building Sizes in Agricultural Areas.

TABLE 1.1 (continued)
COMPARISON OF RELEVANT GENERAL PLAN POLICES: 1994 COUNTYWIDE PLAN AND
2007 ADOPTED COUNTYWIDE PLAN UPDATE

EIR Topic Area	1994 Countywide Plan	November 2007 Countywide Plan
3.7 Noise	N-2: Prevent Significant Noise Impacts From New Development in Existing Developed Areas.	This objective has been revised to Goal NO- 1: Ensure that new land uses, transportation activities, and construction do not create noise levels that impair human health or quality of life, and Policy NO-1.1 Limit Noise from New Development.
		No significant change.
	N-2.1: Use Noise Level Guidelines-Existing Development.	This policy has been incorporated into Program NO1.a Enforce Allowable Noise Levels. No significant change.
	N-2.la: Use the CEQA Process and Discretionary Review to Protect Existing Land Uses From Significant Noise Impacts Due to New Development.	This program has been incorporated into Program NO1.a Enforce Allowable Noise Levels. No significant change.
	N-2.Ib: Noise Guidelines to Protect Existing Land Uses from Transportation-Generated Noise Due to New Development. Table N-2 shall be used as a guide to establish allowable noise levels.	This program has been modified and incorporated into Program NO1.a Enforce Allowable Noise Levels. The references to the acceptable ranges has been deleted.
	N-2.1c: Noise Guidelines to Protect Existing Land Uses from Stationary Source Noise Generated by New Development. Table N-3 shall be used as a guide to establish allowable noise levels.	This program has been modified and incorporated into Program NO1.a Enforce Allowable Noise Levels.
	N-2.4: Minimize Impacts From Excessive Noise Levels	This policy has been incorporated into Policy NO-1.3 Regulate Noise Generating Activities. In addition to neighboring properties, require measures to minimize noise exposure to open space and wildlife habitat from construction-related activities, yard maintenance equipment, and other noise sources, such as amplified music.
	N-2.4a: Limit Construction Hours.	This program has been incorporated into Program NO-1.i Regulate Noise Sources. The program has been modified to require as a condition of permit approval for projects generating significant construction noise impacts during the construction phase, a construction noise reduction plan as well as designating a disturbance coordinator at the construction site to implement the provisions of the plan.
3.9 Public Services and Energy	CD-4.1. Energy Conservation and Commercial Development.	The concept of this policy has been incorporated into Policy DES-2.1 Enhance Transit Nodes to concentrate commercial and medium and high density residential development near activity centers that can be served efficiently by public transit and alternative transportation modes.

EIR Topic Area	1994 Countywide Plan	November 2007 Countywide Plan
	CD-4.2. Opportunities for Energy Savings.	The concept of this policy has been generally incorporated into Policies EN-1.2 Offer Effective Incentives and EN-3.2 Offer Effective Incentives to encourage green building practices and energy efficient technology and practices. Yes, these both have the same policy name
	CD-4.2b. Incorporate Energy Efficiency into Project Review.	This program has been modified and incorporated into Program EN-1.a Establish a Permanent Sustainable Energy Planning Process, EN-1.b Adopt Energy Efficiency Standards for New and Remodeled Buildings and EN-1.c Implement the Single-Family Dwelling Energy Efficiency Ordinance. These are three new programs that expand and refine the old program.
	CD-4.3. Upgrade Energy Efficiency of Existing Structures.	This policy is incorporated into Program EN- 1.d Explore Energy Efficiency Standards for Existing Buildings. New language says to explore, if appropriate, energy efficiency standards for existing residential and commercial buildings upon substantial remodel, and to consider requiring energy efficiency inspections, disclosure, and retrofits at change of ownership based on cost-effective and commercially available energy efficiency measures.
	CD-4.4. Increase the Energy Efficiency of New Structures.	This policy has been revised and incorporated into Policy EN-1.2 Offer Effective Incentives and Program EN-1.b Adopt Energy Efficiency Standards for new and Remodeled Buildings.
	CD-4.5. Use of Renewable Energy.	This policy has been revised and incorporated into Program EN-2.c Protect Solar Access, which calls for the continuation of requiring the protection of passive and active solar design elements and systems from shading by neighboring structures and trees.
	CD-4.6. Water Conservation	This policy has been revised and incorporated into Policy PFS-2.1 Conserve Water and Utilize Sustainable Resources. This policy promotes conservation to increase the responsible use and reliability of water supplies, and to reduce waste. See also WR-3.1 Conserve Water and Develop New Sustainable Sources, which calls for reducing the waste of potable water through efficient technologies, conservation efforts, and design management practices, and by better matching the source and quality of water to the user's needs.

TABLE 1.1 (continued) COMPARISON OF RELEVANT GENERAL PLAN POLICES: 1994 COUNTYWIDE PLAN AND 2007 ADOPTED COUNTYWIDE PLAN UPDATE

EIR Topic Area	Marin County Waste Management Plans	November 2007 Countywide Plan - Public Facilities and Services Chapter				
3.9 Public Services and Energy	<u>Multi-Jurisdictional Source Reduction and</u> <u>Recycling Element (SRRE) for Marin County</u> and its Cities (July 1996)	GOAL PFS-4. Efficient Processing and Reduced Landfill Disposal of Solid Waste. Minimize, treat, and safely process solid				
	SRRE Goal 1: Maximize Diversion from All Source Reduction and Recycling Element Program Areas	waste materials in a manner that protects natural resources from pollution while planning for the eventual reuse or recycling of discarded material to achieve zero waste.				
	SRRE Goal 2: Maintain Public/Private Partnership.	Policies				
	Medium-Term Planning Period objective: Work with haulers, landfills, and recovery centers to promote the continuation and development of local activities and industries that contribute to the attainment of the diversion targets for Marin County and its	PFS-4.1 Reduce the Solid Waste Stream. Promote the highest and best use of discarded materials through redesign, reuse, composting, and shared producer responsibility. Emphasize a closed-loop system of production and consumption.				
	Cities.	PFS-4.2 Protect Environmental Health. Require the use of waste processing and				
	SRRE Goal 3: Build on Existing Programs.	disposal techniques that prevent the				
	Medium-Term Planning Period objective: Promote the continuation and development of	contamination or other impairment of natural resources.				
	local activities and industries that contribute to the attainment of the diversion targets for Marin County and its Cities.	PFS-4.3 Plan for Waste Transformation or Disposal. Plan for the transformation or elimination of waste materials that cannot be				
	SRRE Goal 4: Maximize Cost-Effectiveness.	reduced, recycled, or composted.				
	SRRE Goal 6: Maximize Source Reduction.	PFS 4.4 Promote Regulatory Efforts. Support State legislative or regulatory efforts that will				
	Medium-Term Planning Period objective:	aid in achieving zero waste.				
	Reduce waste generation by two percent through source reduction activities.	Implementing Programs				
	SRRE Goal 9: Maximize the Use of Incentives that will Promote Diversion Programs.	PFS-4.b Divert Construction Waste. Continue to implement the construction and demolition recycling waste ordinance to divert construction waste from landfills.				
	Objective (among others): Develop tip fee differential rates based on materials or jurisdiction of origin.)	PFS-4.c Reduce Waste at Landfill. Continue to pursue aggressive recycling, resource recovery, and composting strategies to reduce the amount of waste diverted to landfill.				

TABLE 1.2COMPARISON OF POLICIES OF COUNTY WASTE MANAGEMENT PLANS CITED IN THE FEIR AND
2007 ADOPTED COUNTYWIDE PLAN UPDATE

EIR Topic Area	Marin County Waste Management Plans	November 2007 Countywide Plan - Public Facilities and Services Chapter					
	Marin County Regional Summary Plan	PFS-4.d Offer Waste Materials Recycling					
	Summary Plan Goal 12. To insure that all residents of Marin County have access to a program that safely and effectively manages household hazardous wastes.	Education. Enact educational programs to inform residents about reuse, recycling, composting, waste to energy, and zero was programs.					
	Summary Plan Goal 13. To allow Marin County to maintain adequate landfill disposal capacity for those wastes which will need to be landfilled after maximizing source reduction, recycling, and composting through the year 2010.	PFS-4.f Best Management Practices at Landfill. Employ best management practices at the landfill facility, and incorporate effective new practices as they become available. PFS-4.g Coordinate with Water Providers. Encourage sanitation districts to partner with					
	Summary Plan Policy 13. To target yard waste in the commercial and self-haul waste streams, facility operators are to develop separate drop-off locations at all Marin County waste recovery and disposal facilities.	water districts to reduce the volume of wastewater that must be treated, and to employ biological methods to treat solid waste. PFS-4.h Prepare a Siting Element. The Mar					
	Summary Plan Policy 14. Marin County, its cities, and/or the Regional Agency will develop an effective program for managing household hazardous waste generated in the county.	Hazardous and Solid Waste Joint Powers Authority should prepare a Countywide Sitir Element that provides a description of the areas to be used for development of adequate transformation or disposal capaci concurrent and consistent with the					
	Summary Plan Objective 4. Marin regionwide composting of yard wastes will be diverted at 8 percent in the short term, and 11 percent in medium term. Summary Plan Objective 5. To encourage the source reduction and recycling of special	development and implementation of the Source Reduction and Recycling Elements. PFS-4.i Promote Product Redesign. Pursue and support upstream redesign strategies to reduce the volume and toxicity of discarded products and materials, including biodegradable plastic bags, fast food					
	wastes, where appropriate, develop alternative management methods for non- hazardous sewage and industrial sludge, and to continue safe handling and disposal practices for ash, asbestos, auto bodies, auto shredder waste, white goods, bulky wastes, used tires, and agricultural waste.	containers, and utensils. PFS-4.j Stimulate Waste-Reuse Economic Activities. Foster and support use of discarded products and waste materials to stimulate and drive local economic and workforce development.					
	Summary Plan Objective 10. Maintain and monitor existing load checking activities which promote proper handling of household hazardous waste and to update, if necessary	PFS-4.k Phase In Highest and Best Use of Products. Improve downstream reuse/recycling of end-of-life products and materials to ensure their highest and best					
	Summary Plan Objective 13. To ensure there are opportunities for residents to recycle waste oil, latex paint, and lead-acid batteries	use. PFS-4.I Food Waste Collection Program. Th County should actively promote a curbside					
	Marin County 1995 Siting Element	food waste collection program by integrating this measure into bid specifications.					
	Siting Element Goal 1 (essentially repeats Summary Plan Goal 13): Assure 15 Years Disposal Capacity for Marin County.						
	Siting Element Goal 2: Ensure Regulatory Compliance.						

TABLE 1.2 (continued) COMPARISON OF POLICIES OF COUNTY WASTE MANAGEMENT PLANS CITED IN THE FEIR AND 2007 ADOPTED COUNTYWIDE PLAN UPDATE

CHAPTER 2 Master Responses

101. Waste Imports and Traffic Analysis

This Master Response deals with comments on changes, since publication of the DSEIR, in the origins of waste coming to the landfill and on potential significant impacts on roads other than Highway 101 (e.g., Highway 37 and Atherton Avenue).

Trip Origins

Comments E-28, I-6, N-38, R-9, Z-3, DD-2, EE-2, KK-9 and OO-8 suggest that the DEIR's expectation regarding directional split of trip origins under project conditions is no longer valid because of an increase in municipal waste coming from Sonoma County. These commenters also assert that the DEIR is deficient because it did not analyze project impacts to roads other than U.S. 101 (e.g., State Route 37 and Atherton Road).

As described in the DSEIR, trip origins of waste transported to the landfill were determined from data in the Traffic Report: Source Origination from July 2001 provided by Redwood Landfill, Inc. At that time, the great majority (about 85 to 90 percent) of the traffic originates south of the site. More recent trip origin data (July 2005) was reviewed, and the directional split has in fact shifted somewhat from July 2001 conditions, with a somewhat higher percentage of trips from the north now (about 75 to 80 percent originates south of the site).¹ That shift is due predominantly to reductions in truck trips from the Davis Street Transfer Station (in San Leandro) and increases in truck trips from Sonoma County.² However, the effect of the shift on conclusions about traffic impacts reported in the DSEIR and FSEIR is minimal (i.e., conclusions reached in those documents about less-than-significant project impacts to levels of service on the Highway 101 mainline, at the Highway 101 / Sanitary Landfill Road intersection, and at the Highway 101 ramp junction areas of the interim access road, would not change). The table on the following page (a modified Table 3.10-5 from the DSEIR and FSEIR) shows the relative traffic volumes associated with the project as proposed at the time of the DSEIR, as revised at the time of the FSEIR, and if the July 2005 trip origin data were applied to the FSEIR-revised project.

Source Origination Reports for other months were also reviewed, and variations in trip origins were found. About 80 to 85 percent of trips originating south of the site in February 2006, and about 70 percent originating south of the site in April 2006. However, the July 2005 data is being used for this response (to compare to data for the same month in 2001) in order to eliminate possible seasonal variations.

² In 2005, Redwood Landfill entered into a five-year disposal contract with Sonoma County.

Roadway / Turning Movement		Number of Vehicles					
	Direction	DSEIR ^a	FSEIR ^b	Now ^c			
Northbound Highway 101 (south of Access Road) – Right Turn from Highway 101	Inbound	58	26	23			
Southbound Highway 101 (north of Access Road) – Diverge from Highway 101 to Access Road Overcrossing	Inbound	8	4	7			
Southbound Highway 101 (south of Access Road) – Merge from Access Road Overcrossing to Highway 101	Outbound	55	25	22			
 Northbound Highway (north of Access Road) Right Turn onto Highway 101 	Outbound	8	3	6			

TABLE 3.10-5 (modified) PROJECT VEHICLE TRIP DISTRIBUTION – AM PEAK HOUR

^a Based on a directional split 88%/12% south and north of the site, and an inbound/outbound split of 66/63 project trips.
 ^b Based on a directional split 88%/12% south and north of the site, and an inbound/outbound split of 30/28 project trips.

^c Based on a directional split of 30/22% south and north of the site, and an inbound/outbound split of 30/28 project trips.

SOURCE: Environmental Science Associates, using data provided by Waste Management (G. Roycroft)

Review of the trip origins data from both July 2001 and July 2005 indicates that about 3 percent and 6 percent of the total trips used Highway 37 in those two months, respectively.³ Applying those percentages to estimated project trip generation, the proposed project would add about one or two vehicles to the peak-direction (westbound) Highway 37 traffic flow during the a.m. peak hour, which would represent an increase of less than 0.1 percent in peak-hour peak-direction traffic volumes. On the basis of traffic volume data published by Caltrans, the level of service (LOS) for westbound Highway 37 is LOS C during the a.m. peak hour.⁴ Based on a review of existing contracts and a general understanding of the local disposal market, traffic on Highway 37 would not be expected to increase under the proposed project; Redwood Landfill foresees limited potential to increase tonnage receipts from market areas served by Highway 37.

There is no reason to believe that Atherton Avenue (between Highway 37 and Highway 101) would be used to any substantial degree as an alternate route (i.e., instead of staying on Highway 37 and Highway 101). The travel times for these two possible routes are both about six minutes (based on an average travel speed of 35 mph on the 3.2-mile Atherton Avenue route between Highways 37 and 101, and 55 mph on the 5.7-mile freeway route. Because westbound Highway 37 and northbound Highway 101 operate at good level of service (LOS C or better) during the a.m. peak hour, it is reasonable to expect that only in case of an accident that closes one lane on these freeways might drivers choose to use Atherton Avenue as an alternate route.

³ The percentage of trips using Highway 37 is conservatively estimated because trips from Napa and St. Helena, which could be made on Highways 121 and 116 to southbound Highway 101 as well as on Highway 121 to Highway 37, are included.

⁴ Level of service conditions on westbound Highway 37 during the a.m. peak hour were determined using the same methodology used for the 2005 Marin Congestion Management Program, which reported LOS C conditions in the eastbound peak-direction during the p.m. peak hour.

102. Petaluma Marsh Biological Resources

This Master Response deals with comments on sensitive biological resources of the Petaluma Marsh under five general categories: cumulative effects; the intrinsic value of and project impacts on the marsh system; impacts of noise and lights on wildlife, especially clapper rail; and invasive species.

Cumulative Effects

Comments GG-6, N-34, and N-35 suggest that a study be done to determine what effects the landfill has had on wildlife up to the present time, alleging that these would be "cumulative" with respect to impacts analyzed in the EIR. As much as previous development may have affected the marsh, the landfill's effects began accruing in 1958, when the landfill began operations, and it would be speculative to try to establish an historical baseline against which to measure the degradation that may have occurred prior to the present EIR analysis. It is for this reason, among others, that CEQA only requires assessing the effects of a project on conditions extant at the time of the analysis. However, the importance of these habitats regionally and their precarious condition does have a cumulative impact aspect which is worth acknowledging in the FEIR. According to the San Francisco Estuary Project, prior to widespread disturbance of the Bay and its watershed, there were 190,000 acres of tidal marsh with 6,000 miles of channels; at present there are 40,000 acres of marsh with about 1,000 miles of channels. Any degradation of the Petaluma Marsh would therefore be significant.

Mitigation measures contained in the FEIR are designed to reduce to a less-than-significant level potential impacts on the marsh. The FEIR concludes (page 4-8) that the project, with mitigation measures in place, "...would not have a considerable contribution to regional impacts on biological resources." Therefore, the project effects are not cumulatively considerable.

Value of the Marsh System

The EIR acknowledges the importance of the marsh in several ways, perhaps none so clearly as its presentation of sensitive wildlife and vegetation. The EIR describes:

- Five threatened or endangered species reported from the Novato and Petaluma River quadrangles;
- Potential for California red-legged frog as well as four salmonids;
- Site proximity to previously designated Critical Habitat for the red-legged frog;
- The three salt marsh plant species with federal status known to occur within the general region of the project site; and
- Coastal Brackish Marsh as a "plant community of concern" between San Antonio Creek and the Petaluma River.

CEQA guidelines require clarity and the use of best available, but not exhaustive information, and the EIR more than meets this standard.

Impacts of Noise and Lights on Wildlife

There may be increases in noise from bird-deterrence operations with the proposed expansion. Although the environmental baseline against which the landfill expansion must be assessed includes this kind of noise as part of the existing environment, several commenters asked for a more robust discussion and analysis.

The principle sensitive wildlife receptor is the California clapper rail. No surveys have been conducted for California clapper rail in the vicinity of the landfill, a fact mentioned by several commenters. The species is, however, presumed present. An evaluation of potential California clapper rail habitat in the vicinity of the landfill commissioned by the applicant and conducted by Bumgardner Biological Consulting (Bumgardner, 2006) confirms the findings of the FEIR regarding potential presence of the species.

Concerns about the clapper rail are most fully presented in the letter from Avocet Research Associates (Comment Letter H). Clapper rails breed at Arrowhead Marsh near Oakland Airport, and have been observed at Moffet Field and other areas with substantial ambient disturbance. Most rails currently breeding in the Bay Area are in close proximity to urban and industrial development, and noise *per se* is not frequently cited as a cause for population declines – as opposed to habitat fragmentation and predation, for example (see http://www.abag.ca.gov/ bayarea/sfep/reports/Species.pdf) The preponderance of information supports a conclusion that in the presence of suitable habitat, most animals, including clapper rails, adapt to the prevalent acoustic conditions.

Nonetheless, disturbance at breeding sites is a cause for concern and Comment H-1 correctly cites USFWS guidelines stipulating a 700-foot buffer between potential nests and construction activity. The EIR mitigation (3.3.4) stated a 500-foot buffer, because reconstruction work at any one location along the levee would be temporary. However, on review a 700-foot buffer makes the measure more defensible, especially since formal consultation with the U.S. Fish and Wildlife Service – which might allow a smaller buffer under these circumstances – is not anticipated. The Bumgardner Biological Consulting evaluation also suggests revising this mitigation measure to extend the buffer to 700 feet, and suggests several other suggestions for increasing protection for the species, which have been incorporated into revised mitigation measures, presented below.

The Mitigated Alternative, as described in Master Response 104 in the current document, includes a 200-foot minimum horizontal setback from San Antonio Creek for future operations, which would add additional protection to marsh wildlife. The setback would be maintained all year (i.e., not just during nesting season).

Lastly, Comment Letter H expresses concern about night-lighting. The response to Comment N-22 in volume 2 of the FEIR states that Mitigation Measure 3.6.2, which addressed the possibility of increased use of night lighting at the landfill, was intended to reduce potential

conflicts with flight operations at Gnoss Field, and would also reduce the potential effects of night lighting on wildlife in Petaluma Marsh.

To add further protection for California clapper rail and ensure that Impacts 3.3.4 and 3.3.5 are mitigated to less than significant levels, the following mitigation measures are revised:

Mitigation Measure 3.3.4a: Levee reconstruction work during the California clapper rail nesting season (February 1 – August 31) shall be avoided, unless surveys by a qualified biologist with a current federal scientific take permit for California clapper rail indicate that black or California clapper rails are not nesting within 500 700 feet of the work area. The surveys should be conducted consistent with the current U.S. Fish and Wildlife Service survey protocol for California clapper rail. Furthermore, the surveys should be conducted to determine the pair status of any observed individuals, local habitat use, and location of nests (if any) to within at least 30 feet. If nesting California clapper rails are found or highly suspected, one of the following measures should be implemented:

- (a) No construction activities should be conducted within 700 feet of a known or suspected California clapper rail nest; or
- (b) Construction activities that must occur within 700 feet of a known or suspected California clapper rail nest should not be conducted until between September 1 and January 31.

Proper precautions shall be taken to confine the necessary disturbances to the smallest area possible. Although salt marsh harvest mice were absent from the landfill in 1992, they should be considered potentially present during high tides, when mice may use the outer levee slope as a refuge. Care should be taken to avoid construction that disturbs the outer levee bank during spring tides.

Mitigation Measure 3.3.4b: Levee reconstruction work throughout the year (regardless of time) should be conducted consistent with the following provisions to address potential impacts to California clapper rail and salt marsh harvest mouse:

- (a) No construction activities should be conducted any earlier than 1.5 hours after sunrise and any later than 1.5 hours prior to sunset (to address the crepuscular activity peaks of this taxon):
- (b) No construction activities should be conducted 1.5 hours prior to or 1.5 hours after high tides that are of sufficient elevation to flood the adjacent middle intertidal marsh (when clapper rails and salt marsh harvest mice may need to seek refuge in high intertidal marsh or upland from rising tidal waters); and
- (c) Upon completion of the construction activities all disturbed soils in marsh habitat shall be winter stabilized to prevent erosion and allow for passive restoration of brackish marsh vegetation.

Mitigation Measure 3.3.5a: <u>Bird deterrent practices and C</u>compost machinery, including tubgrinders, trammel screens, and windrow turners, and other composting equipment capable of generating high noise levels shall be <u>positioned operated</u> to assure that noise levels do not exceed 76 dBA at the marsh boundary east of the levee during <u>the California</u> clapper rail nesting season (February 1 – August 31). Furthermore, the existing screening

between the composting area and the marsh shall be maintained in place to minimize lineof-sight views of composting activities from the adjacent low intertidal marsh. See also Mitigation Measure 3.7-3.

Mitigation Measure 3.3.5b: If landfill activities, including but not limited to bird deterrent practices, are to take place in Areas A or B during the California clapper rail nesting season (February 1 – August 31), they must be preceded by either (1) a biological survey to determine presence or absence of California clapper rail nests in the marsh area adjacent to the landfill (consistent with Mitigation Measure 3.3.4) or (2) a noise study to determine noise levels from landfill operations at the marsh boundary. Landfill activities may proceed in these areas during the nesting season only if it is determined that nests are not present, or that sound levels at the marsh boundary are below 76 dBA. Furthermore, if landfill activities are to take place in these areas during the nesting season, and surveys do not support a finding of absence of California clapper rail in the intertidal marsh adjacent to the landfill, visual screening shall be implemented at the top-of-slope of the active fill area (i.e., at the edge of the fill plateau) to minimize line-of-sight views from the adjacent intertidal marsh. It should be noted that this fence will need to be continually moved to the new edge of the fill plateau as the active fill area increases in height.

Invasive Species

Comment GG-7 refers to a Mitigation Measure (3.4.4b), proposed by the applicant as part of the project, which proposes using yard waste and grass seed as a slope stabilization technique. The applicant has already used these materials for erosion control and slope stabilization for approximately 10 years. While not explicitly allowed in the SWFP, this is a customary practice at many landfills in California, and is accepted by the RWQCB as an erosion control measure. However, the concern raised by the commenter, that this practice could result in the establishment and spread of noxious weed species to areas adjacent to Redwood Landfill, including Petaluma Marsh, is justified. To ensure that this does not occur with respect to the proposed project, the following Mitigation Measure is added:

Mitigation Measure 3.4.4e: To ensure that raw yardwaste used for erosion control on landfill side slopes does not become a source for the spread of invasive weed species into the adjoining marsh, Redwood Landfill shall undertake an invasive weed monitoring and control program. At the least, this program will consist of the following:

- 1. Conduct a baseline survey of areas of the landfill where yardwaste has been applied for erosion control, and of the perimeter of the landfill, to determine the presence and extent of invasive weed species already established, if any;
- 2. Remove invasive weeds that become established on the landfill property and monitor annually for removal;
- 3. If after monitoring it is determined that use of raw yardwaste for erosion control at the site is not a source of invasive weed species, the frequency of monitoring may be reduced and/or the control program discontinued.
- 4. Alternatively, Redwood Landfill could substitute composted or heat-sterilized yardwaste that does not contain viable weed seeds for raw yardwaste.

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103. Status of Land Use Permit

A number of commenters have raised concerns about the facility's Conditional Use Permit (CUP). Questions include whether it continues to be valid in light of its brevity and when it was issued (1958), whether it covers current operations at the site, and whether circumstances associated with current operations allow or impel the County to review the permit with consideration toward revising or revoking it. This Master Response responds to all or part of the following comments: C-17, I-8, J-6, N-3, N-43, N-44, R-11, T-2, U-2, AA-1, KK-11, OO-9, VV-3. This response draws on, and is intended to be consistent with, a memo prepared by the Marin County Counsel (Marin County, 2005) for the Board of Supervisors regarding issues raised in a letter received by the Board about Redwood Landfill's CUP.

Overview

The proposed project principally concerns the revision of Redwood Landfill's existing solid waste facilities permit (SWFP). The CUP, issued by the County, is required for operation of a landfill under the zoning code and is one of the required permits under which the landfill operates (see FEIR Table 2.1 for a list of current permits).

Conditional Use Permits

The power and authority of counties to grant CUPs is a valid exercise of the constitutionally provided police power and is specifically granted by state statute (Government Code Section 65901). Typically, a county zoning ordinance provides for basic uses (uses that are allowed by right) and for additional (conditional) uses that may be permitted after approval by an administrative agency upon making a finding of public convenience and necessity and that the use will not be contrary to the public health and welfare. The property owner may only conduct the use consistent with the conditions identified in the CUP. Once a CUP has been issued, the power to revoke it is limited, and, where a property owner incurs material expense in reliance on a CUP, the property owner acquires a vested property right. To revoke a vested CUP, a county must show a compelling public necessity warranting the revocation; this could occur if the business constitutes a public nuisance (Marin County, 2005, p. 2). While the Board of Supervisors has the authority to revoke or suspend a CUP (subject to due process requirements), per County Code Section 120.030, there is no authority to "initiate a review hearing" (Marin County, 2005 [p. 1, footnote 1]).

The Redwood Landfill site is located in an area zoned agriculture, in which landfills are allowed as a conditional use upon issuance of a CUP.⁵ The CUP under which RLI operates was approved by the Board of Supervisors and granted in 1958. The permit, allowed under provisions of

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⁵ In California, a jurisdiction's zoning ordinance is required to be consistent with its general plan. The recently adopted Marin Countywide Plan (adopted November 6, 2007) designates the area within which the site is located as AG1 (Agricultural, 1 unit/31-60 acres) and Baylands Corridor, as compared to the site's designation in the 1994 Countywide Plan as AG1 (Agricultural, 1 housing unit per 31-60 acres) and Bayfront Conservation Zone. According to the new plan (p. 2-40) "For parcels of all sizes, existing lawful uses are grandfathered. ...Creation of the Baylands Corridor will not subject currently allowed activities to additional County regulation (Marin County, 2007)."

Section 20 of Ordinance No. 254 (the county Zoning Ordinance), authorized Jordan Smith, et al., to "permit the establishment of a sanitary land fill garbage and rubbish dump" on a 600-acre parcel of land known as the "Burdell Ranch," located between the Northwestern Pacific Railroad right-of-way and San Antonio Creek (Marin County, 1958).

Solid Waste Facility Permits

As described in the FEIR introduction, the process for obtaining a Solid Waste Facilities Permit (SWFP) is different from that for a CUP. The SWFP is not issued pursuant to the police power of the local jurisdiction, but is issued by the Local Enforcement Agency (LEA), whose designation is approved by the California Integrated Waste Management Board (CIWMB). The power and authority to require SWFPs is specifically granted by state law (Public Resources Code [PRC] Section 44001; 44004) (Marin County, 2005). The SWFP regulates the design and operation of the solid waste facility, including waste storage, handling, and disposal. A significant change in the solid waste facility's design or operation that is not authorized in the existing SWFP may not be undertaken unless the change conforms with state laws and regulations established by the CIWMB, and the terms and conditions of the SWFP are revised to reflect the change (PRC Section 44004). The CIWMB must concur in the issuance of the SWFP issued by the LEA. In Marin County, the LEA is the Environmental Health Services Division.

Comments Concerning the CUP

Many of the use permit comments recommend that the County Planning Commission and/or Board of Supervisors take the opportunity to review the adequacy of the 1958 CUP. Some state that a review of the facility's CUP is justified because today a use permit would not be granted for a similar use at this site.

Although the Board of Supervisors has broad authority over regulation of land use within its jurisdiction, that authority is not unlimited (Marin County, 2005). As noted above once a CUP is issued, the power to revoke it is limited. The Board of Supervisors has the authority, pursuant to County Code Section 120.030, to revoke or suspend a CUP (subject to due process requirements), but there is no authority to "initiate a review hearing" on a CUP (Marin County, 2005 [p. 1, footnote 1]). Because a vested right is involved, any discussion of current requirements for granting a new CUP for a proposed new landfill or waste facility is irrelevant (Marin County, 2005).

Some comments state that a review of the CUP, or a revocation or suspension proceeding, is justified because current or proposed operations and activities at the site are more extensive or more industrial than was contemplated when the permit was issued. Some comments state that the permit was issued to a local farmer for a local dump, whereas now the site is owned by a multinational corporation. Several comments contend that the record of proceedings when the permit was issued indicate that a "local dump" (or, in one comment, a "small local dump") was expected, and that, in contrast, Waste Management intends to operate a regional facility; several comments say the permit hearing record indicates that a commitment was made at the hearing to keep the landfill a certain distance away from San Antonio Creek.

As noted in the FEIR Introduction (p. vii) and clarified with verbatim text from the CUP above, the CUP is broadly written. The CUP does not contain any conditions limiting use of the entire 600-acre site or limiting the regional scope of the area that might be served by the landfill. The current and proposed land use is consistent with the permitted land use as a sanitary landfill garbage and rubbish dump. Therefore, the provisions of the CUP itself do not appear to support contentions that current and proposed land uses are beyond the scope expected under the current use permit.

This view is supported by the County Counsel's review of RLI's CUP. In its review, the County Counsel noted that the CUP "is remarkably devoid of any conditions" except to comply with all applicable laws and ordinances (Marin County, 2005 [p. 3]). In addition, because there is a vested right associated with the use permit, County Counsel stated that any suspension or revocation of such rights must meet constitutional muster. It is unlikely, in the County Counsel's view, "that a statement made at a hearing or the 'contemplation' of decision makers would form a constitutionally acceptable basis to revoke or suspend a vested right particularly where neither the statement nor the 'contemplation'" is reflected as a condition on the CUP (Marin County, 2005). County Counsel also noted that, because a CUP runs with the land, a transfer of ownership cannot form the basis to "initiate a review"⁶ or revoke the CUP (Marin County, 2005). The County Counsel review noted that the proposed project pertains to the design and operation of the facility, not a change in land use. Since the CUP does not contain operating restrictions, the RLI's application for a revised SWFP does not seek an expansion of existing land use conditions. The application also does not propose an increase in the CUP footprint, but rather a solid waste facility permit change in existing waste operations and environmental controls (Marin County, 2005).

Some comments indicate that violations of applicable laws, regulations, and permits under which RLI operates provide the opportunity and/or necessity for the County to review the existing CUP.

As indicated above, current and proposed landfill operations and activities are permitted under the site's CUP. As discussed in FEIR Master Response 18, the current EIR process is part of a lengthy process on the part of the Marin County LEA to review the landfill's existing SWFP and ensure the facility operates in compliance with its permits. Other agencies that have permitting authority over RLI operations have procedures unrelated to the CUP to enforce their permit conditions and requirements.

In its review of the Redwood Landfill CUP, the Marin County Counsel states that alleged violations of law related to noncompliance with conditions of the SWFP may be enforced through the [SWFP] process (Marin County, 2005 [p. 4]), rather than the use permit. If the County can demonstrate a compelling public necessity by presenting evidence that the landfill is a public nuisance, such evidence could form the basis to revoke the use permit (Marin County, 2005). However, to do so the County would need to present evidence showing that the landfill operations is detrimental to health, safety and welfare of people residing or working in the area. According

⁶ As previously noted, this has been requested in comments, although there is no authority provided the County to initiate a review of a CUP.

to the County Counsel, "[g]iven the fact that the landfill must meet the regulatory approval and operating standards of numerous State agencies ..., it would be a difficult evidentiary burden to pursue closure for operational air or water quality issues that meet the approval of State agencies" (Marin County, 2005 [p. 5]).

Some comments point to the CUP under which the Altamont Landfill and Resource Recovery Facility (ALRRF) operates as an example of use permit that Marin County should refer to or follow in revising RLI's CUP.

The circumstances under which ALRRF's CUP was revised are different from those existing in the case of Redwood Landfill. Among other factors, the ALRRF CUP includes tonnage limits, and the landfill operator applied to Alameda County for a new CUP in order to expand operations beyond the limits contained in its existing CUP. ALRRF's current CUP emerged from the settlement of protracted litigation related to the approval of the CUP application. As discussed above, the proposed revisions to RLI's SWFP are consistent with the land use allowed under its CUP, and RLI has not proposed a revision to its CUP. In response to a comparison between RLI's CUP and that of ALRRF, the Marin County Counsel stated that the two cases are "procedurally and factually" different, and that it is factually incorrect that the ALRRF matter supports the proposition that the County may "initiate CUP a review proceeding" (Marin County, 2005).

104. Refinement of the Mitigated Alternative

This Master Response responds to comments from numerous commenters on the Mitigated Alternative, which is discussed in Chapter 5 of Volume 1 of the FEIR, and also in Master Response 20 in Volume 2 of the FEIR. This Master Response provides further refinements to the Mitigated Alternative and to the process for consideration of its approval in substitution for the project proposed by the applicant.

Review and discussion of the Mitigated Alternative has become an iterative process, with input from commenters and the applicant being used to refine, correct, and elaborate on this alternative. The applicant, in a letter to the LEA dated June 15, 2006, and included in this document as Appendix A, has agreed to pursue implementation of the Mitigated Alternative in lieu of their proposed project, opening the door to consideration of a project with considerably lesser environmental impacts that the EIR identified as the environmentally superior alternative. The County expects that the process for approval of the Mitigated Alternative would include submittal by RLI of a revised application following certification of the FEIR. This process is further discussed in the last part of this Master Response.

This Master Response covers the following issues in relation to the Mitigated Alternative:

- 1. further specificity of allowed material types and tonnage limits;
- 2. corrections to traffic limits;
- 3. refinement of the air quality analysis;
- 4. detail on site design and development of facilities;
- 5. site life projections under the Mitigated Alternative;

- 6. incorporation of all mitigation measures stated in the FEIR;
- 7. process for consideration of approval of the Mitigated Alternative.

The fundamental basis for the Mitigated Alternative is stated in the description of this alternative on page 5-31 of the FEIR:

[Under the Mitigated Alternative,] Redwood Landfill would shift its emphasis from waste disposal to material and energy recovery. Instead of placing emphasis on increasing waste disposal capacity, Redwood Landfill would develop processes and methods aimed at increasing diversion of materials from landfill, and increasing energy production at the site. This would result in several benefits, including preservation of landfill capacity; increasing diversion and reducing landfilling of wastes in this environmentally sensitive location; reducing the need for certain project mitigation measures described in the analysis; providing justification for Overriding Considerations for significant unavoidable impacts of the project; helping to counterbalance or avoid altogether the significant unavoidable effects of the proposed project; maximizing consistency with County Integrated Waste Management Plan policies and County energy policies; and providing long-term protection of the environment in accordance with California Public Resources Code (PRC) § 44012⁷.

1. Refinement of Allowed Material Types and Tonnage Limits

Several changes have been made since publication of the FEIR in the type and volume of allowable material types under the Mitigated Alternative. These are summarized in Table MR104-1, which compares maximum daily volume of various material types for disposal, recycling, composting, and daily cover with currently permitted volumes and the applicant's revised proposal, as presented in the FEIR. The differences between material types and limits in this table and in Table MR20-1 in the FEIR are as follows:

- 500 tons per day, average and peak, of petroleum contaminated (PC) soils meeting RWQCB acceptance criteria for use as ADC has been eliminated.
- 300 tons per day, average and peak, of green/yard/wood waste for use as ADC and for erosion control and slope stabilization, has been added. See discussion of control of invasive weeds from use of this material in Master Response 102. As this quantity reflects a substantial reduction from the amount proposed to be used as ADC under the project evaluated in this EIR, no further analysis of this aspect of the Mitigated Alternative is required.
- The description of clean soil material to be used for cover is modified to read, "clean soil/non-hazardous minimally contaminated soil." This is to allow explicitly the use of soil with background levels of contamination typical of soils from urban areas. Such soils often contain low levels of heavy metals and petroleum products, but do not exceed Regional Water Quality Control Board, Bay Area Air Quality Management District, and state Department of Toxic Substances Control regulatory thresholds for special handling and disposal.

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PRC § 44012 states that "When issuing or revising any solid waste facilities permit, the enforcement agency shall ensure that primary consideration is given to protecting public health and safety and preventing environmental damage, and that the long-term protection of the environment is the guiding criterion...."

		Currently nitted	Mitigated	Alternative	Applicant's Rev Proposal		
Material Type	Average	Peak Day	Average	Peak Day	Average	Peak Day	
Landfilled							
Non-hazardous Class III waste	N/S	1,270	1,270	1,270	1,350	1,350	
"Class III waste to replace previous Class II waste proposal"	N/S	N/S	N/S	N/S	500	500	
Subtotal: Non-Hazardous Class III Waste	N/S	1,270	1,270	1,270	1,850	1,850	
Non-hazardous sludge (Class B biosolids) for direct disposal or to main impoundment (for current permit, see below)	N/S	N/S	100	100	100	100	
Class II Petroleum contaminated soil (not meeting RWQCB criteria)	N/S	N/S	0	0	0	0	
Other designated wastes (including PC soil meeting RWQCB waste acceptance criteria) /1/	N/S	20	20	20	200	200	
Total Landfilled Waste	N/S	1,290	1,390	1,390	2,150	2,150	
Recyclable. Reusable, Compostable							
Non-hazardous separated or commingled materials (not including green/yard/wood waste, non-hazardous minimally contaminated soils and clean soils) for Recycling only	10	10	400	400	10	10	
Compostable							
Green/yard/wood waste	42	238	60	60	400	400	
Biosolids (Class B) (for composting)	84	307	80	80	82	82	
Food Waste	-	-	30	30	32	32	
Subtotal: Compostable	126	545	170	170	514	514	
Materials used for interim, daily, and alternative daily cove	er						
Green/yard/wood waste (includes erosion control and slope stabilization)	N/S	N/S	300	300		ed under postable	
Petroleum Contaminated (PC) soil meeting RWQCB criteria (for ADC)	N/S	N/S	0	0	640	800	
Biosolids (Class B) (for ADC)	424	455	50	50	50	50	
Clean soil/non-hazardous minimally- contaminated soil (for cover) /2/	0	0	Not Counted in Tonnage		500	800	
Subtotal Cover Materials	424	455	350	350	1,190	1,650	
Total Recyclable, Reusable, Compostable, and Cover Material	560	1,010	920	920	1,714	2,174	
TOTAL	N/A	2,300	2,310	2,310	3,864	4,324	
Total biosolids (Class B) for all purposes – Full and Registration Tier SWFPs /3/	550	1,000	230	230	232	232	

TABLE MR104-1 MITIGATED ALTERNATIVE: UPDATED DETAILS (tons per day)

Key: N/A: Not applicable; N/S: Not specified in permits

Note: Some totals may not sum due to rounding.

1

2

Types of designated waste are the same as in the current SWFP. Must have approvals and adhere to guidelines of RWQCB, BAAQMD, and DTSC. Due to changes in composting regulations, in order to continue co-composting of biosolids after October 5, 2008, Redwood Landfill must obtain a Compostable Materials Handling Facility Permit (i.e., SWFP) by that date, in accordance with 14 CCR Section 17855.4. Alternatively, this activity may be included in the revised SWFP for the entire facility that is being sought, and will be applied for, subsequent to certification of the FEIR. 3

2. Corrections to Traffic Limits

There are errors in the FSEIR regarding the number of vehicles that would be allowed to enter and exit the facility under the Mitigated Alternative. The discussion of the maximum number of vehicles that would be allowed under the Mitigated Alternative in Master Response 20 in volume 2 of the FSEIR states a maximum of 612 waste-carrying vehicles per day, plus 50 other vehicles, which would total 662 vehicles per day. The total number of vehicles entering the facility is given as 712, due to a math error. The figure that <u>should</u> have been used– and that was used in the air quality analysis for the Mitigated Alternative (see Appendix D-2 of the FSEIR, including tables MD-1 and MD-3), is 562 vehicles per day (1,124 vehicle trips per day). This figure includes 100 trips (50 vehicles) for non-waste deliveries and employees, and 512 vehicles carrying waste to the site or recovered materials off the site.

Compounding this error, construction vehicles were inadvertently excluded from the vehicle count in the description of Mitigated Alternative traffic. The applicant has stated that up to 100 construction-related vehicles (200 vehicle trips) per day will be required for necessary construction activities at the site, including raising the height of the perimeter levee. Construction vehicles were not included in the air quality analysis for the Mitigated Alternative presented in the FEIR.

Table MR104-2 shows the correct number of vehicles that would be allowed under the Mitigated Alternative; a revised air quality analysis incorporating these corrections has been conducted and is discussed below.

_	Daily Totals			
Vehicle Type	Vehicles	Vehicle Trip		
Mitigated Alternative				
Vehicles Carrying Waste	512	1,024		
Other Vehicles (Employees, Visitors and Deliveries)	50	100		
Subtotal	562	1,124		
Construction Traffic (seasonal)	100	200		
Total Proposed Traffic	662	1,324		
Existing				
All Vehicles (Carrying Waste, Employees, Visitors and Deliveries)	415	830		
Construction Traffic (expired 2002)	0	0		
Total Existing Traffic	415	830		
Net New				
Landfill and Recycling Operations	147	294		
Construction Traffic (seasonal)	100	200		
Total	247	494		

TABLE MR104-2 MITIGATED ALTERNATIVE TRIP GENERATION

SOURCE: ESA, Marin County

3. Refinement of the Air Quality Analysis

The air quality analysis for the Mitigated Alternative has been repeated to account for the corrected traffic figures presented in Table MR104-2. The assumptions and calculations used in this analysis appear in Appendix D in this document, and the results are summarized in Table MR104-3. Regarding greenhouse gas (GHG) emissions, see Master Response 112.

As shown in the righthand set of columns in Table MR104-3, the Mitigated Alternative would substantially reduce air emissions relative to the applicant's proposed project, but would not reduce all project impacts identified in the FEIR as significant and unavoidable to less-thansignificant (compare with project emissions in revised Table 3.2-6 in response to Comment 0-12 in chapter 3 of this document). This is consistent with the intent of the Mitigated Alternative, as stated in the FEIR (Volume 1, pp. 5-30 through 5-34). Corrections to the Mitigated Alternative truck trip generation presented in the RTC Amendment (and the elimination of air drying of sludge) result in changes to the air emissions calculations, resulting in different conclusions than those presented in FEIR Master Response 20: ROG emissions are reduced to less than significant (assuming elimination of air drying of sludge), but NOx and PM-10 emissions, while substantially reduced compared to the applicant's proposed project, still exceed threshold values. As stated in the FEIR (Volume 1, page 5-31), greater consistency with County Integrated Waste Management Plan and energy policies provides justification for Overriding Considerations for significant unavoidable impacts of the Mitigated Alternative.

4. Detail on Site Design and Development of Facilities

The applicant has prepared a final grading plan and site plan for the Mitigated Alternative, which appear here as Figures MR104-1. and MR104-2. The site plan includes the following features:

- A set back of a minimum of 200 feet from San Antonio Creek for all future operations. The setback would be measured from a surveyed line that corresponds with the bankfull elevation⁸ of San Antonio Creek;
- Placement of bins for cardboard and other paper grades, glass, metal, plastic containers, and other basic recycled commodities in an area accessible prior to entering the scale house for self-haul public customers, to provide an economic incentive to recycle;
- Addition of construction and demolition (C&D) debris recycling activities. The processing facility would likely be located adjacent to (north of) the existing administration building and south of the landfill footprint in a currently undeveloped area of the landfill property, in one of the former sludge holding ponds (see FEIR, Figure 2-7). This facility would be adjacent to the future planned scalehouse/landfill entrance so that recyclable wastes could be redirected prior to entering the disposal area. Tipping areas would be included for clean recyclable materials, such as rock, concrete and other inert materials; mattresses, other bulky items and carpet; and building materials, such as salvaged lumber and roofing materials. The facility would also include a sorting operation to separate recyclable and reusable materials from mixed loads. Non-recoverable residues from this facility would be

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⁸ Bankfull elevation refers to the elevation of the creek at bankfull stage, which is the stage at which water fills the channel completely, and its surface is level with the flood plain (Dunne and Leopold, 1978).

	Existing 2006 Emissions (pounds per day)				Mitigated Alternative 2010 Emissions (pounds per day)			Net Increase Emissions (pounds per day)							
Emission Source	CO	ROG	NOx	PM-10	eCO ₂ ²	СО	ROG	NOx	PM-10	eCO2 ²	CO	ROG	NOx	PM-10	eCO2 ²
Construction Activities				NQ					NQ					NQ	
On-Road Vehicles	88	8	110	19	18,120	129	16	236	40	47,348	41	8	126	21	29,228
Off-Road Equipment	35	11	110	4	11,939	43	13	136	5	15,158	8	2	26	1	3,219
Fugitive Dust from LF Operations	-	-	-	817					1,082					265	
Fugitive Landfill Gas ¹	-	243	-	-	952,582		247			968,077		4			15,495
Flare Emissions ³	128	9	37	11	31,209	152	10	45	13	31,716	24	1	8	2	508
Composting/Co-Composting	-	171	-	-			213					42			
Sludge as ADC and Disposed	-	38	-	-			21					(18)			
Sludge Air Drying	-	24	-	-			102					78			
Designated waste disposal in Area G		NQ	NQ	NQ			NQ	NQ	NQ			NQ	NQ	NQ	
TOTAL QUANTIFIED EMISSIONS	251	505	257	851	1,013,849	324	621	417	1,140	1,062,299	73	117	160	289	48,450
BAAQMD Significance Criteria											550	80	80	80	n.a.
Countywide Total											246,400	44,420	37,400	15,740	
Quantified Project Emissions as a percent of Countywide Emissions											0.03%	0.26%	0.43%	1.84%	

TABLE MR104-3 MITIGATED ALTERNATIVE AIR EMISSIONS

Fugitive landfill gas and flare emissions compare 2010 under existing permit and under the Mitigated Alternative.
 eCO₂ (CO2 equivalent) includes CO₂ plus CO₂ equivalent of methane for on-road and off-road, and CO2 equivalent of methane for fugitive landfill gas and flare emissions.
 Flare emissions other that eCO2 based on Table O-12 in response to Comment O-12 in Chapter 3 of this document and reflect estimated peak emissions during life of landfill.

disposed in the landfill and would count against the landfill's maximum daily disposed tonnage, providing an incentive to the landfill to maximize recovery efforts. Consistent with Countywide Plan Update program AIR-4.a (Reduce Greenhouse Gas Emissions Resulting from Energy Use in Buildings), new buildings will be designed to reduce energy consumption and to incorporate and/or use renewable energy to the extent feasible;

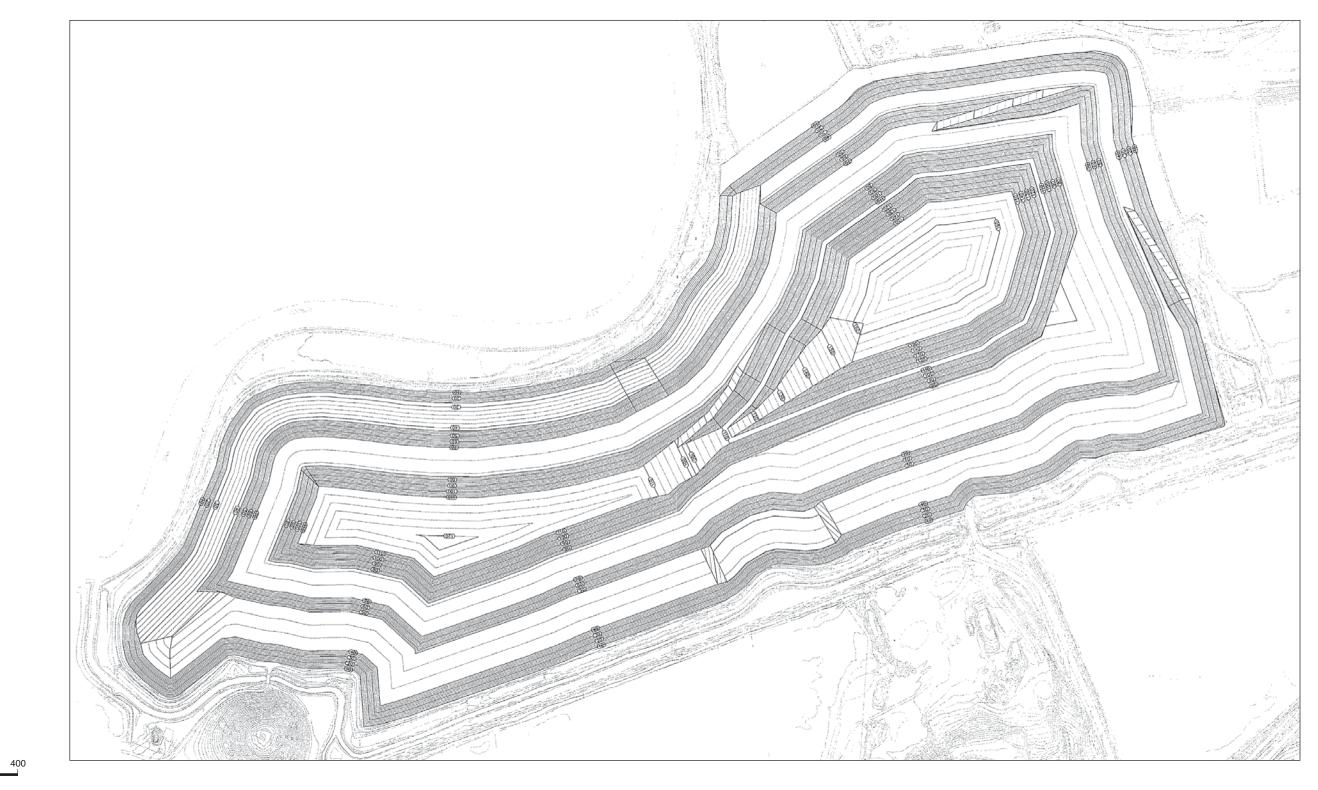
- A co-composting facility accepting green/yard/wood waste, biosolids, and food waste (see Table MR104-1 for allowed quantities of these feedstocks) and producing finished compost products for use on site or sale off-site;
- Development of power production facilities, including landfill gas-fired turbines and • photovoltaic power. Windpower would not be developed at the site, due to concerns regarding impacts on birds. It is anticipated that development of photovoltaic power at the site would not require permits, other than building permits, and would not, therefore, require additional environmental review. Sufficient power generation capacity would be developed to utilize all captured landfill gas for this purpose. Under the Mitigated Alternative, power generation potential is expected to peak at about 18 megawatts in 2025, and to average about 12.5 megawatts over a 30-year period (see Master Response 112 in this document). Additional power generation equipment may be installed as landfill gas production increases in order to maximize power production. Authority to Construct (ATC) permits from the BAAQMD would be required for construction of the landfill gas-fired turbines. The BAAQMD would require the landfill gas-fired turbines to comply with applicable BAAQMD, State, and federal rules and regulations, including implementation of best available control technology, emission offsets, and prevention of significant deterioration requirements. Permits to Operate (PTOs) from the BAAQMD would be required for operation of the landfill-gas fired turbines;
- Preparation of a Greenhouse Gas Reduction Plan within two years of project approval that demonstrates how the landfill will reduce annual greenhouse gas emissions to a level 15 percent below 1990 levels by the year 2020. This aspect of the Mitigated Alternative is further discussed in Master Response 112 in this document.

5. Site Life Projection for the Mitigated Alternative

Site life projections for the Mitigated Alternative appear in Table MR104-4. The projections are based on a landfill design with a total above-grade capacity (airspace) of approximately 26 million cubic yards (see Figure MR104-1). This capacity figure represents the total capacity for waste, daily cover, intermediate cover, and final cover. Based on an assumption that the landfill would receive the maximum daily volume permitted for disposal each operating day and other assumptions stated in the table, the landfill's remaining life would be about 18 years from October 2006, and the earliest closure date for the facility would be 2024. See Master Response 107 for further discussion of the site life calculations contained in the table.

6. Incorporation of All Mitigation Measures Stated in the FEIR

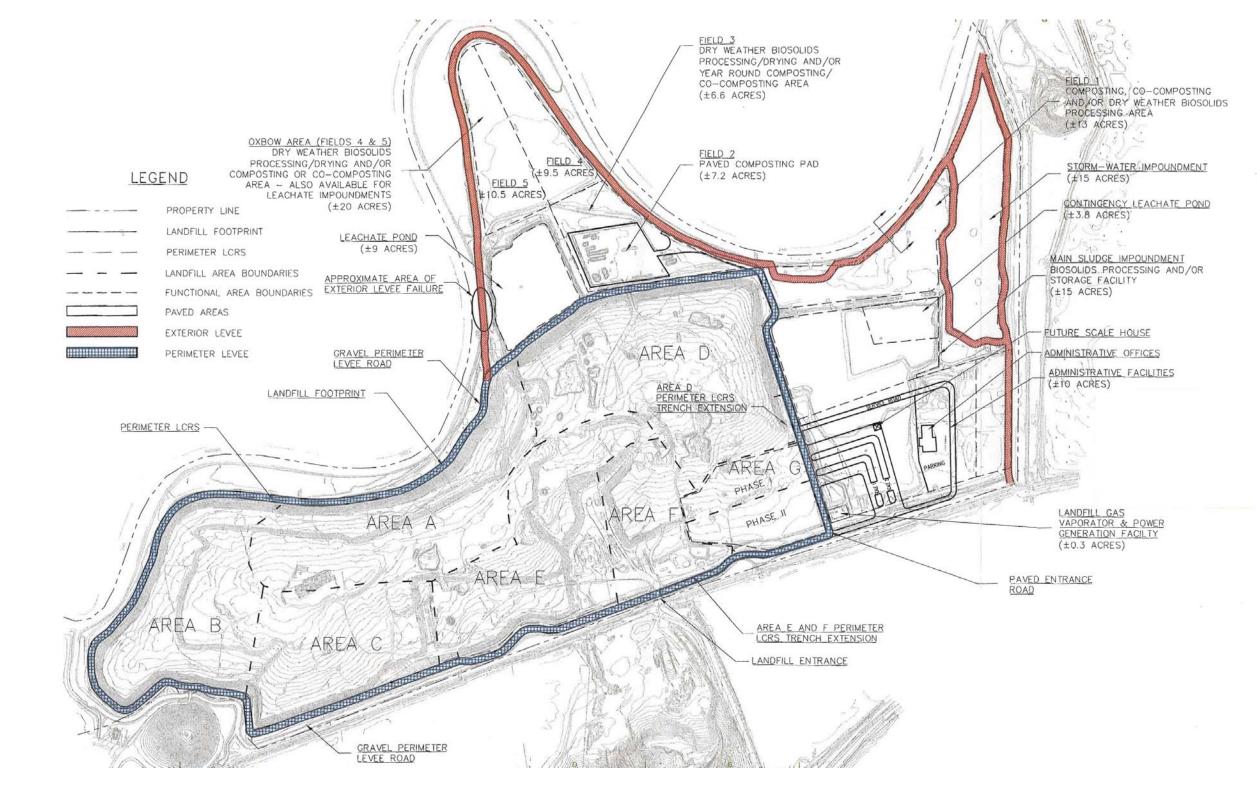
The Mitigated Alternative, as described in the FEIR, includes all of the mitigation measures specified in Chapters 3 and 4 of the FEIR. Several additional mitigation measures or alterations to mitigation measures appear in this FEIR Amendment (see Chapter 4 in this document). An ordinance to institute a waste import mitigation fee (Mitigation Measure 3.6.4b) is currently under consideration by the Marin County Board of Supervisors.





Feet

- Redwood Landfill Solid Waste Facilities Permit Revision EIR / 200238 ■ Figure MR104-1 Mitigated Alternative Final Grading Plan



SOURCE: GeoSyntec Consultants, 2007

Feet

600

Redwood Landfill Solid Waste Facilities Permit Revision EIR / 200238 ■ Figure MR104-2 Mitigated Alternative Site Plan

TABLE MR104-4
SITE LIFE CALCULATIONS FOR THE MITIGATED ALTERNATIVE

	Permitted	Applicant's Proposal (revised)	Mitigated Alternative
Area of landfill footprint in acres	210.0	222.5	222.5
Area of landfill footprint in square feet	9,147,600	9,692,100	9,692,100
Depth of final cover	4	3	3
Volume of final cover - cubic feet (assumes planar surface)	36,590,400	29,076,300	29,076,300
In cubic yards	1,355,200	1,076,900	1,076,900
Net Airspace (waste plus daily cover without final cover)	19,100,000	33,697,100	25,000,000
Total Airspace (includes final cover)	20,455,200	34,774,000	26,076,900
In-place Volume as of Oct 06(1)	15,300,000	15,300,000	15,300,000
Total Remaining Airspace (incl. final cover)	5,155,200	19,474,000	10,776,900
Net Remaining Airspace (waste plus daily cover)	3,800,000	18,397,100	9,700,000
Airspace (ft3) gained by future consolidation of Bay Mud @ 3.25 ft(2)	29,729,700	31,499,325	31,499,325
In cubic yards	1,101,100	1,166,642	1,166,642
Airspace gained by 9% settlement of net volume (yds3)	1,719,000	3,032,739	2,250,000
Total airspace gained by settlement	2,820,100	4,199,381	3,416,642
Effective Net Airspace of Landfill	21,920,100	37,896,481	28,416,642
Effective Remaining Net Airspace of Landfill	6,620,100	22,596,481	13,116,642
Tons of waste per cubic yard	0.59	0.59	0.59
In pounds per cubic yard	1,180	1,180	1,180
In pounds per cubic foot	44	44	44
Effective Remaining Net Airspace tons	3,905,859	13,331,924	7,738,819
Maximum tons waste per day(4)	1,290	2,150	1,390
Maximum tons waste per year (311 operating days)	401,190	668,650	432,290
Minimum remaining site life (years) from October, 2006	9.7	19.9	17.9
Earliest Projected Closure Date	2016	2026	2024

¹ Information on current site volume provided by GeoSyntec, 2007a, based on aerial topographic survey by Walker Assoc, Oct. 2006 Amount of consolidation corrected from EEID to account for actionment already realized (60% of total)

Amount of consolidation corrected from FEIR to account for settlement already realized (50% of total) Generates 2007a estimates 8 10%

Geosyntec, 2007a estimates 8-10%
 Daily Toppage Figures based on Table MR

⁴ Daily Tonnage Figures based on Table MR104-1

SOURCE: GeoSyntec, 2007a; Roycroft, 2007; ESA

7. Additional Considerations: Post-Closure Maintenance of Environmental Control Systems

Based on additional analysis of greenhouse gas (GHG) emissions associated with the Mitigated Alternative and the facility as currently permitted (see Master Response 112) and further consideration of the effectiveness of the leachate collection and recovery system (see Master Response 105), the Mitigated Alternative is further refined to include a requirement for the applicant to maintain the landfill gas collection system (including power production engines or turbines), the LCRS, and associated groundwater, surface water, and air emission monitoring and reporting programs for an indefinite period after landfill closure, unless it can be conclusively demonstrated to the relevant regulatory agencies that the landfill no longer poses a threat to the environment. Prior to issuance of a revised solid waste facility permit, the applicant shall provide cost estimates and financial assurances for indefinite post-closure maintenance as part of a revised Preliminary Post-Closure Maintenance Plan.

8. Process for Consideration of Approval of the Mitigated Alternative

One of the fundamental purposes of CEQA is to reduce potential environmental impacts of a project. This may be accomplished by the adoption of feasible mitigation measures or feasible alternatives to a proposed project that would substantially lessen a project's environmental effects (PRC § 21002). A lead agency, after considering the final EIR, and in conjunction with making findings regarding any significant environmental effects of a project, may then decide whether or how to approve a project (CEQA *Guidelines* § 15092 (a)). For a project that has been found to have the potential for significant environmental effects, the lead agency shall not approve the project unless the agency has either:

- (A) Eliminated or substantially lessened all significant effects on the environment where feasible... and
- (B) Determined that any remaining significant effects on the environment found to be unavoidable... are acceptable due to overriding concerns....

(CEQA Guidelines § 15092 (b))

The process for certification of this EIR and for action on the project is described in the Introduction to the FEIR, on page vii:

The County will circulate this FEIR Response to Comments Amendment to Responsible and Trustee Agencies that commented on the DSEIR and all interested parties.... Upon the conclusion of the review, the County Planning Commission will consider whether to recommend certification of the EIR.

The Marin County Environmental Health Services Division (EHS) is certified by the California Integrated Waste Management Board (CIWMB) as the Local Enforcement Agency (LEA). The LEA has the authority to draft a proposed Solid Waste Facilities Permit (SWFP) for CIWMB concurrence. The CIWMB is the hearing body for the permit and the approval authority. The LEA issues the permit locally on behalf of the CIWMB. The LEA is also the CEQA Lead Agency and will make the determination of whether or not to certify the Final EIR. The LEA will conduct a separate and distinct meeting subsequent to EIR certification regarding the proposed permit, prior to submittal of the proposed permit to the CIWMB for concurrence. The meeting will not be for approval or disapproval of the permit. The purpose of the meeting will be to allow interested parties to provide comments regarding the proposed permit to be submitted to the CIWMB, for consideration prior to action on the permit. The LEA will conduct a public hearing and take action on the SWFP. If the CIWMB concurs in the issuance of the SWFP, the LEA will issue the permit to the applicant.

In certifying the EIR, the LEA would be affirming that the EIR is adequate and complete pursuant to CEQA and the County Environmental Review Guidelines. In conjunction with a decision on the project, the LEA would also find that it reviewed and considered the information contained in the FEIR prior to taking action on the project (CEQA Guidelines §15090). No action can be taken to approve the proposed project until the FEIR has been

certified. However, certification of the EIR does not require or ensure approval of the project evaluated in the EIR.

The Mitigated Alternative was crafted and has been refined to ensure its feasibility. The applicant has concurred in the feasibility of the Mitigated Alternative (see Appendix A). Following Planning Commission consideration of the FEIR and its recommendation to the LEA on certification of the FEIR, the LEA will consider whether to certify the FEIR. After consideration of the FEIR, the LEA may then consider the following actions:

Whether to:

- 1. Approve the project as proposed by the applicant and with mitigation measures specified in the FEIR,
- 2. Approve an alternative to the project analyzed in the FEIR, or
- 3. Disapprove the project.

If, after certifying the FEIR, the LEA acts to approve the Mitigated Alternative or another alternative to the project, there is a possibility that further environmental review may be required for some aspects of the alternative not fully analyzed in the FEIR. If, however, the application describes a project that is consistent with the Mitigated Alternative as it is described and analyzed in this EIR (including the FEIR and this document), it is likely that this EIR will provide adequate environmental review, since the FEIR has evaluated the Mitigated Alternative in detail and includes substantial additional analysis of impacts of this alternative and its ability to reduce impacts in comparison to the project.

105. Leachate Management

Introduction

A number of comments concerned the effectiveness of the Leachate Collection and Removal System (LCRS) and the mitigation measures stated in the FEIR, including the requirement to update the facility's leachate management plan and to include a water balance model to demonstrate the adequacy of LCRS collection and storage components. FEIR Impacts 3.4.7 and 3.4.8 address the adequacy of the LCRS to prevent the offsite discharge of leachate and the capacity to contain and manage leachate collected in the LCRS, respectively. The LCRS is further discussed in FEIR Master Responses 1 and 13, and FEIR Master Response 14 describes the leachate detection monitoring program. Regarding the LCRS as an engineered alternative design, see FEIR Master Response 1 and the responses to comments E-22 and N-18 in this document.

Mitigation Measure 3.4.8c of the FEIR requires RLI to update the facility's Leachate Management Plan. The updated plan must include the most current leachate flow rates, based on the most recent and comprehensive leachate generation studies. Furthermore, the plan must demonstrate through use of an empirically-based water balance model that the LCRS components and impoundment(s) provide adequate capacity as required under Title 27 CCR Section 20340. Mitigation Measure 3.4.7e requires RLI to initiate a pumping program to extract leachate from the interior of the landfill and specifies performance criteria to verify the reduction of leachate volume in the landfill, the adequacy of the interior leachate pumping system, and achievement of sustainable leachate levels.

Since publication of the FEIR, RLI and the RWQCB have made significant advances in implementation of these mitigation measures. This Master Response describes changes in leachate monitoring and management that have been implemented at the site and describes the progress the applicant has made to date in the development of a water balance model. Information presented in this response is based primarily on Redwood Landfill's latest Leachate Management and Monitoring Annual Reports (annual reports) (GeoSyntec Consultants, 2005a; 2006a; 2007b) and memoranda from RLI and its consultant GeoSyntec to the Regional Waster Quality Control Board (RWQCB), to the County, and to ESA, the County's EIR consultant. The annual reports describe management practices and the results of monitoring activities, and include water balance assessments of the leachate system. The reports are based on the "water year" (the 12-month period from October through September⁹) rather than the calendar year.

Leachate Monitoring and Management Program

Leachate in the Landfill Interior

In February 2004 RLI initiated a program of quarterly monitoring of leachate fluid levels using landfill gas wells in the interior of the landfill. The purpose of this monitoring program is to "observe and monitor location of fluid within waste" and provide long-term, quantified information on the distribution of leachate (GeoSyntec, 2006a [p.11]). The monitoring program will provide information on the reduction or accumulation of leachate volume over time and will help refine water balance calculations for the site. According to the two annual reports prepared since the program began, the results of monitoring indicate a difference in leachate distribution along horizontal and vertical axes within the waste, described as "a downward 'stair-stepping' distribution of leachate from one low permeability horizon to the next." Hydraulic conductivity along horizontal axes is greater than along vertical axes. This difference in hydraulic conductivity is consistent with, and assumed to result from, the waste filling process and placement of relatively lower permeability daily and intermediate cover (GeoSyntec, 2006a; 2007b [Section 3.1.2, p.12]).

As requested by the RWQCB and consistent with the aforementioned FEIR mitigation measures, in 2006 RLI initiated a pilot study to extract leachate from 13 landfill gas extraction wells in the landfill's interior. Each well was pumped for a minimum period of 24 hours to estimate the preliminary pumping rate for the individual wells. The combined pumping rate for the 13 wells, based on short term equilibrium extraction rates measured at each well, was 9.8 gpm. The results of the pilot study were then used to develop a full-scale implementation plan, which was scheduled to commence in the final quarter of 2006.

⁹ A water year is designated by the calendar year in which it ends; e.g., the period October 2004 through September 2005 is water year 2005.

Monitoring of the Perimeter Hydraulic Gradient

As described in the FEIR, a critical aspect of the LCRS is maintenance of a hydraulic gradient toward the perimeter LCRS collection trench, or toward the interior leachate extraction wells. In order to monitor the hydraulic gradients in the vicinity of the perimeter trench, RLI constructed a system of six piezometer¹⁰ clusters, or transects, around the landfill perimeter. Three of the six transects were constructed during the reporting period for the 2004 annual report (GeoSyntec, 2005a) and three were constructed in November 2005 and their measurements were first reported in the 2005 annual report (GeoSyntec, 2006a). Each cluster consists of a transect across the LCRS trench, with one piezometer constructed in waste, one in the extraction trench (i.e., the perimeter LCRS trench), and one in native Bay Mud on the outboard side of the extraction trench. Water levels within the piezometers are measured to verify that a gradient is maintained toward the perimeter LCRS trench. Monitoring reported in the 2004 annual report indicated a gradient toward the LCRS trench in the three clusters installed at the time (GeoSyntec, 2005a). Monitoring reported in the 2005 annual report indicated a gradient toward the trench in four clusters; however, in two of the three more recently constructed clusters monitoring indicated the gradient between Bay Mud and the trench was away from the trench. The two clusters indicating potential gradient away from the trench were in Area B (piezometers LW-10, LW-11, and LW-12) and Area D (piezometers LW-16, LW-17, and LW-18).

RLI and its consultant GeoSyntec considered several possible causes for the gradient away from the trench at Area B, including tidal influence and the influence of positive air pressure within the piezometer casing at the Area B cluster. Pressure transducers were installed in April 2006 and set to record fluid levels every 15 minutes. Data downloaded from the transducers showed little change in the difference in water level elevations for the first week or so of monitoring, followed by a gradual increase in the difference between the water level in the outboard (Bay Mud) piezometer and trench piezometer, reflecting declining water levels in the respective areas, and increasing gradient toward the trench. RLI and GeoSyntec eventually concluded that infiltration of surface water into the LCRS trench as result of recent rains and saturated conditions was likely responsible for the piezometer measurements indicating the outward gradient at Area B. RLI subsequently re-graded the area to improve surface drainage and limit infiltration (GeoSyntec, 2006b, Redwood Landfill, 2006; RLI and GeoSyntec, 2006).

Follow-up investigations at the Area D piezometers showed that the trench and outboard piezometers (LW-16 and LW-18) consistently had less than 1 foot of fluid in the bottom of the casings (as was the case with the initial measurement showing the apparent outward gradient). In practice, piezometers with less than a foot of measurable liquid are considered effectively dry and not representative of actual groundwater conditions. Therefore, the water level measured in piezometers LW-16 and LW-18 is not reliable for use in determining hydraulic gradient¹¹ (GeoSyntec, 2006a).

 $^{^{10}}$ A piezometer is a small diameter well used to measure the hydraulic head in an aquifer or water-bearing zone.

¹¹ According to GeoSyntec, "[d]ue to the potential collection of condensate and lack of draining from the bottom of the piezometer casing, fluid levels of less that 1 foot are considered unreliable and not indicative of formation fluid levels" (GeoSyntec, 2006b).

Subsequent quarterly monitoring reported in the 2006 annual report (GeoSyntec, 2007b) and monthly monitoring in the 2007 water year (GeoSyntec, 2007c) indicate an inward gradient at all piezometer clusters except that of the Area D extension (location of the LW-16-LW-18 piezometer cluster), which continues to be reported as dry.

Sand Deposits Within the Bay Mud

As discussed in FEIR Section 3.4 and Master Response 109 in this document, sand deposits within the Bay Mud have been identified at the landfill site. Variously referred to as sand stringers, lenses, or channel deposits in background documents, these areas have been found to have somewhat greater permeability than the normally low-permeability Bay Mud. As such, since the inception of the detection monitoring program,¹² detection monitoring wells have been located within the known channel deposits on the site perimeter. As discussed in the FEIR and Master Response 109, geotechnical investigations indicate that these deposits are relatively thin and laterally discontinuous. Nevertheless, the effectiveness of the LCRS trench in maintaining the hydraulic gradient toward the trench in areas near to or intersecting such deposits is particularly critical, due to the greater permeability within these deposits (relative to Bay Mud in general). Although none of the transects described above to monitor hydraulic gradient were located within the sand deposits, RLI has proposed adding four of the existing monitoring points in the detection monitoring system (three wells and one piezometer) to the hydraulic gradient monitoring program (RLI and GeoSyntec, 2006). The wells and piezometer would continue to be part of the detection monitoring program and, for the hydraulic gradient monitoring program, also would be measured on a monthly basis along with the transect piezometers. RLI has proposed adding these wells and piezometer to the hydraulic monitoring program to provide supplementary information on groundwater levels farther outboard than the outboard transect locations. RLI notes that care would be needed to ensure that detection sampling activities not distort the results of hydraulic gradient monitoring at these locations (RLI and GeoSyntec, 2006).

Given that hydraulic gradient monitoring reported in the 2005 annual report indicated the potential existence of an outward gradient, the dynamic nature of the tidal environment surrounding the landfill, the increased permeability of sand channel deposits that occur at the site, the critical role played by the perimeter LCRS in preventing the offsite discharge of leachate, and the lack of redundancy in the LCRS system, additional data are needed to understand the dynamics of the site's hydrology and to confirm the consistent effectiveness of the LCRS system. Data from monthly monitoring of the existing transects needs to be supplemented by more than the addition of four detection monitoring system wells (proposed to be monitored on a monthly basis for some period of time) in order to document the consistent effectiveness of the LCRS trench. After such consistency has been documented by more frequent monitoring (as described in Mitigation Measure 3.4.7g, below), less frequent monitoring may be adequate. In addition, because the LCRS trench sections associated with each area of the landfill are effectively independent of one another (that is, withdrawal of fluid from one trench section has little or no effect on fluid elevation in other trench sections) (Jones, 2007), an additional piezometer transect

¹² The detection monitoring program is described in FEIR Master Response 14, and monitoring wells are shown in Figure MR 14-1.

is needed in order to monitor the hydraulic gradient at Area F, which currently does not include a piezometer transect.¹³ That is, each section of the landfill utilizing the vertical perimeter trench design to maintain a gradient toward the trench should have a minimum of one piezometer transect with which to monitor the effectiveness of the trench in that area.

Therefore, to develop a clearer understanding of the dynamics of site hydrology and the functioning of the perimeter trench system, to document the effectiveness of the LCRS, and to address further any potential occurrence of an outward gradient, **Mitigation Measure 3.4.7** is refined to include the following.

Mitigation Measure 3.4.7g: To more clearly demonstrate the effectiveness of the LCRS perimeter trench, RLI shall implement a continuous hydraulic gradient monitoring program, through at least one above-average wet season, or until a gradient toward the trench is consistently demonstrated (whichever occurs later), through the use of automatic devices to measure and record water level (water level loggers) as described herein. All such devices will be set to record a measurement at least every 15 minutes:

- <u>Water level loggers shall be installed and maintained at each of the transects</u> <u>currently established to monitor hydraulic gradient.</u>
- <u>A piezometer transect consisting of one piezometer located within the landfill</u> (inboard of the trench), one piezometer within the perimeter trench, and one piezometer outboard of the trench shall be constructed in landfill Area F, which currently does not have such a piezometer cluster. Water level loggers shall be installed and maintained in the newly constructed piezometers and set for continuous monitoring.
- Water level loggers shall be installed and maintained in sand channel monitoring wells G-18, MWH-24, MWH-9 and piezometer P-2R.
- Water level loggers (or stage recorders) shall be installed and maintained in San Antonio Creek and one of the sloughs adjacent to the landfill footprint.

<u>RLI shall compile data recorded by the water level loggers and notify the LEA and</u> <u>RWQCB within 14 days in the event that monitoring indicates a gradient away from the</u> trench. If monitoring indicates a consistent gradient toward the trench, monitoring results shall be reported as part of the facility's annual Leachate Management and Monitoring <u>Report.</u>

If monitoring reveals evidence of a gradient away from the trench, RLI shall evaluate the potential cause(s) of the reversed gradient and implement measures to remediate the problem and provide a consistent gradient toward the LCRS trench. RLI and its geotechnical consultant, GeoSyntec, have proposed the following remedial measures if monitoring indicates a gradient away from the trench (RLI and GeoSyntec, 2006). Remediation measures may include, but would not be limited to, the following:

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¹³ Piezometer transects would not be needed at Area G, which was constructed recently and has a liner that meets Subtitle D and Title 27 requirements, as well as a different LCRS design, or at Area A, where the perimeter trench includes a cut off wall as originally proposed and approved in 1994.

- <u>Grading and surface water control features shall be observed to assess the possibility</u> <u>that surface water infiltration has occurred. RLI shall implement additional grading,</u> <u>piping, or other surface water control features if deemed necessary.</u>
- <u>Pump inlets shall be lowered at the two nearest sump locations to increase the gradient and associated discharge within the trench.</u>
- If the two preceding measures do not result in resumption of a demonstrated inward gradient (toward the LCRS trench), RLI shall install and connect to the existing system an additional trench sump and discharge system.
- If none of the above measures result in a resumption of demonstrated inward gradient toward the LCRS trench, RLI shall seek approval from the RWQCB to address the situation through an engineered solution such as deepening the extraction trench or constructing a subsurface cut-off wall.

In addition, if an outward gradient is detected, RLI shall seek direction from the RWQCB to determine whether additional water quality or water level monitoring locations or methods are required.

Power Supply Availability

As described by GeoSyntec and noted in the FEIR (p. 3.4-30), the sumps are fitted with automatic level control pumping systems that pump the leachate to the on-site leachate impoundment (GeoSyntec, 1998). In addition, the recent Leachate Management and Monitoring Annual Reports (GeoSyntec, 2006a; GeoSyntec, 2007b) note that each sump is equipped with an alarm to alert site personnel in the event of pump malfunction, apart from a site-wide power failure. Pacific Gas and Electric (PG&E) provides electricity to the site (as described in FEIR Section 3.9, Public Services and Energy) to power the onsite pumping facilities, as well as other site facilities, including offices, electric gates, and automated scales. According to the facility's 1998 Joint Technical Document (JTD), a six-cylinder diesel-powered generator, which would activate automatically if a power outage occurred, was kept at the site. Fuel for the generator was stored in a 100-gallon above-ground tank mounted beneath the generator (GeoSyntec, 1998). An automatic back-up power system such as this would ensure that power was available to operate the LCRS sump pumps as needed, in the event of a power outage.

More recently, RLI has stated that based on existing trench and pumping monitoring data, it does not believe that the LCRS trench would fill quickly enough, in the absence of pumping, to represent a critical situation. RLI has stated that if a power outage lasted more than 12 hours -- and RLI deemed the action to be an appropriate use of resources depending on the cause and extent of the power outage -- then landfill staff would use a truck/tank to manually pump leachate from sump manholes and would secure a generator to provide power to the leachate pump stations (RLI and GeoSyntec, 2006).

Given the central roll that the LCRS plays in preventing the offsite discharge of leachate, the central roll the sump pumps play in the design and overall function of the LCRS, and RLI's obligation under existing laws, regulations, and permit conditions, to prevent the offsite discharge

of leachate, an on-site generator that engages automatically in the event of a power outage and would be available to power the LCRS pumping system (and other site facilities if needed) should be maintained at the landfill site, consistent with what was described in the JTD. Therefore, to ensure that backup power would be ready and available *at the site* if needed in the event of a power outage, consistent with the description in the JTD, Mitigation Measure 3.4.7 is refined as follows:

Mitigation Measure 3.4.7h: A backup power generator capable of powering the LCRS sump pumps and other basic facilities needed to ensure the continuing effectiveness of the landfill's environmental controls, shall be maintained at the landfill site. Adequate fuel to power the generator shall be maintained consistent with all applicable regulations and permit requirements.

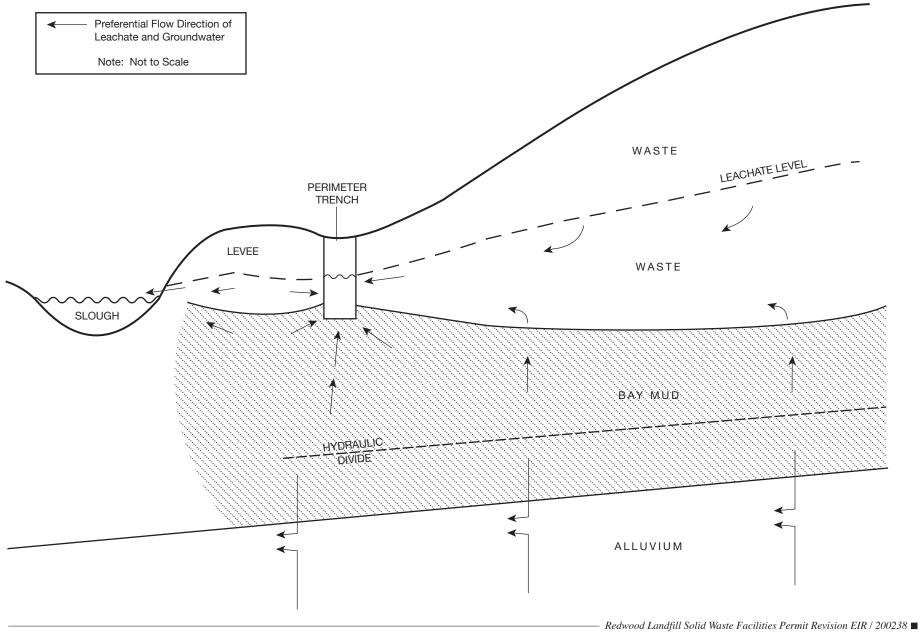
Consideration of Hypothetical Failure Scenarios

In considering the effectiveness of the LCRS to protect ground and surface water quality, ESA considered several hypothetical scenarios that incorporate different aspects of the known and postulated geology, hydrogeology, development history, and engineering of the landfill. These scenarios are illustrated in figures MR105-2 and MR105-4 through MR105-6 (which are presented with the respective scenarios below), and may be compared with the idealized model for LCRS function illustrated in figure MR105-1. As discussed below, with the refinement of mitigation measures specified in the FEIR, these hypothetical failure scenarios can be prevented or remediated, to the extent that they would not pose the potential for a significant impact.

Idealized Model

Figure MR105-01 depicts the idealized model for design and function of the LCRS trench in the context of typical site conditions. The figure shows the generalized direction of flow of groundwater and leachate within the three strata: waste, Bay Mud, and Pleistocene alluvium. The perimeter levee, which consists of engineered sections of known composition, as well as other sections of unknown and varied composition and material characteristics, is shown as well. Just inboard of the levee is the perimeter LCRS trench, with fluid level indicated. (For simplicity, interior leachate extraction wells are not shown, but these do not affect the basis for the trench design and function.) Beyond the levee is a slough or creek channel. Note that the interface between waste and Bay Mud is lower toward the middle of the landfill and shallower toward the perimeter, due to consolidation of the Bay Mud under the weight of the overlying waste.

Leachate within the interior of the landfill is mounded within the waste, and is maintained at a relatively low level within the perimeter trench. Because the leachate level within the trench is lower than that within the waste and within the levee, the preferential flow gradient and direction is from the waste toward the trench, and from the levee toward the trench. The perimeter LCRS trench is shown extending into the Bay Mud (per the design basis for the LCRS, though some sections of the trench do not extend into the Bay Mud). The preferential flow gradient and direction is established because fluid elevation is maintained at a relatively low level within the trench. Because fluid elevation within the trench is relatively low, it represents a low "hydraulic head" or "zone of depression" of the water surface, toward which water tends to flow from all



directions, including upward from below (just as groundwater flows upward toward a pumping well), as illustrated. In this idealized model, the LCRS trench establishes a hydraulic barrier that prevents off-site migration of leachate.

Within the Bay Mud unit beneath the interior of the landfill, the Bay Mud is undergoing consolidation due to the weight of the overlying waste. As it consolidates, pore water is squeezed out of the interstices between the solid mud particles, creating elevated water pressure within the Bay Mud. This pressure is exerted in all directions. Pore water drains from the Bay Mud into any adjoining medium that is more permeable, and where the water pressure (also referred to as hydrostatic pressure) is equal to or less than that within the mud. Some pore water drains upward into the more permeable waste (overcoming the downward pressure, or "hydraulic head" caused by mounded leachate within the waste) and some drains downward into the more permeable Pleistocene Alluvium. This pattern of upward drainage from higher in the Bay Mud unit and downward drainage in the lower Bay Mud unit is known as "dual drainage;" the plane that divides the area of upward drainage from the area of downward drainage pressure of the Bay Mud, it is physically impossible for leachate to cross the hydraulic divide.

In order to drain downward, pore water pressure must exceed the water pressure (potentiometric head¹⁴) of the Pleistocene Alluvium (referred to henceforth as "the alluvium"). The alluvium is confined by the overlying Bay Mud, and conveys water pressure originating from higher elevations to the west to produce artesian pressure; the alluvium exhibits potentiometric head of 5-6 feet above mean sea level (msl). Figure MR105-1 depicts an idealized model of groundwater within the alluvium, as well as pore water draining from the Bay Mud, flowing through the alluvium just below the interface of the alluvium with the Bay Mud. Because only pore water from the lower part of the Bay Mud is draining downward, there is no chance for leachate to contaminate groundwater within the alluvium, or to leave the site by this path.

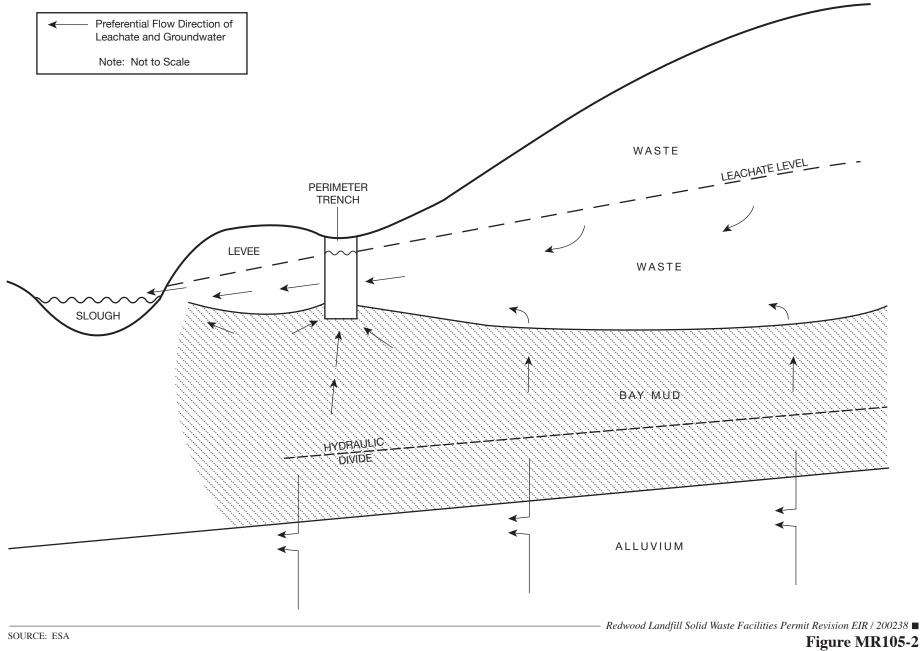
Hypothetical Failure Scenarios

Figure MR105-1 depicts an idealized, simplified version of conditions and processes known to exist at the site. Figures MR105-2 and MR105-4 through MR105-6 introduce variations to the idealized model that present hypothetical means for leachate to escape from the site through subsurface flow. It should be emphasized that the landfill maintains a "detection monitoring program" in compliance with State regulations (CCR Title 27 §20380) and the Waste Discharge Requirements issued by the RWQCB (Order 95-110), and that no actual escape of leachate from the site has been verified. Groundwater and surface water monitoring are discussed in detail in Master Response 14 in the FEIR.

Hypothetical Failure Scenario 1: Outward Gradient through the Levee

Figure MR105-2 depicts a hypothetical situation in which fluid elevation within the perimeter trench is insufficient to maintain an inward gradient from the levee toward the trench, and

¹⁴ Potentiometric head refers to the water pressure of a water bearing zone and is defined by the levels to which groundwater would rise in tightly cased wells.



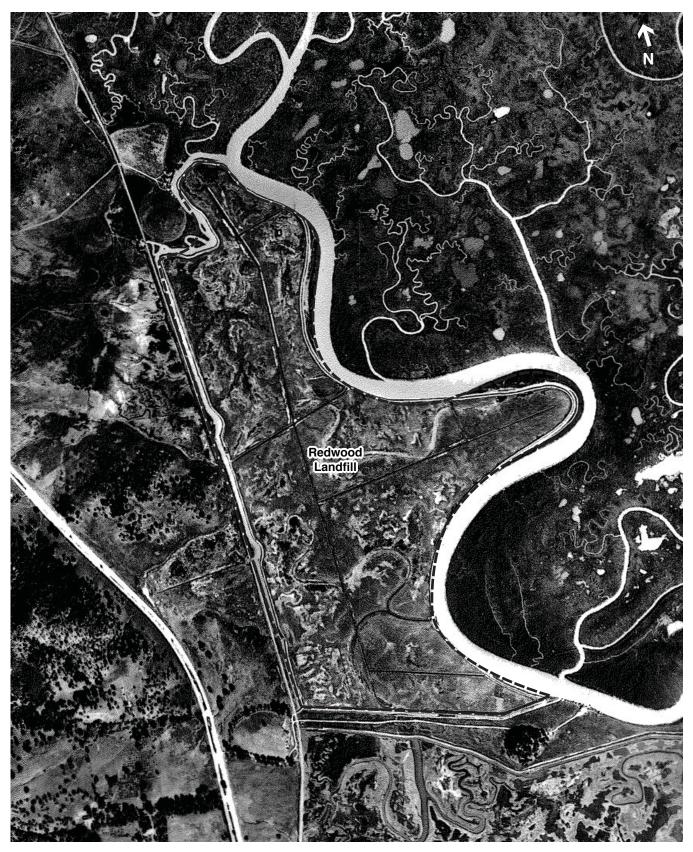
Hypothetical LCRS Failure Scenario 1 Outward Gradient through Levee leachate seeps toward a slough channel from within or beneath the trench, or from waste that had been placed outboard of the trench. Mitigation Measures 3.4.7g and 3.5.7h would ensure that this scenario would not occur.

Hypothetical Failure Scenario 2: Migration of Leachate into the Alluvium through an Old Trench Fill

Early in the history of the use of the site as a landfill, the operator used a landfilling method known as "trench fill." A trench would be dug, filled with waste, and then covered over. Little information is available on trench filling practices or the exact location of trench fills at Redwood Landfill, though examination of a 1970 air photo reveals three features that could be trench fills (Figure MR105-3b). The facility's JTD (GeoSyntec, 1998) reports, based on interviews with long-time site employees, that "…trenches (measuring 5-10 feet deep, 20 feet wide, and several hundred feet long) were excavated in the Bay Mud and then backfilled with refuse. The trenching method, which was discontinued by 1970, was only used in Areas A and D" (GeoSyntec, 1998, p. 4-3). However, the same section of the JTD notes that "the elevation of the bottom of the refuse ranges from -2 to -20 feet MSL. Areas where the bottom of the refuse is approximately - 10 ft MSL or lower, are believed to have been trenched." Therefore, it is possible that the trenches may have been deeper than 10 feet.

Figure MR109-2 (see Master Response 109 in this document) indicates that the Bay Mud in areas A and D where the trench fills were located ranges from about 10 feet thick to about 40 feet thick, with most of these areas between 15 and 25 feet thick (for location of the landfill areas, see Figure MR104-2 in Master Response 104). It is therefore possible that some of the old trench fills may have been excavated all the way through the Bay Mud unit into the alluvium. If this were the case, the artesian pressure from the alluvium would tend to retard any downward flow of leachate from waste placed within the trench or above it. However, pore water draining from the Bay Mud surrounding the trench laterally would create elevated water pressure within the more permeable waste in the trench, and could create dual drainage: higher in the trench, leachate and pore water would tend to drain upward into the underlying alluvium, as shown in Figure MR 105-4. In this scenario, leachate would contaminate groundwater in the alluvium, and may also contaminate surface water beyond the landfill where groundwater emerges within slough and stream channels or San Pablo Bay, as in the figure, where groundwater is shown migrating upward under artesian pressure through sandy deposits beneath a slough channel.

Also visible on air photos from 1970 and from 1958 when the landfill first opened (Figure MR105-3a and b) are linear features that are probably ditches constructed to drain the diked wetlands and convert it to dry land. One large feature extends nearly the entire north-south length of the site, and intersects with several more extending both east and west. No information could be found on these features in the facility's background documents. While their fate is unknown, it is likely that they were filled with waste or other materials as landfilling proceeded. It is, however, unlikely that they were excavated all the way through the Bay Mud, and so are unlikely to provide a conduit for leachate to enter the underlying alluvium. Neither is it clear how these ditches – if such they were – drained off-site, but this was probably accomplished either



SOURCE: Pacific Aerial Surveys

- Redwood Landfill Solid Waste Facilities Permit Revision EIR / 200238 ■ Figure MR 105-3a Aerial Photograph, March 1, 1958



SOURCE: Pacific Aerial Surveys

Redwood Landfill Solid Waste Facilities Permit Revision EIR / 200238 ■ Figure MR 105-3b Aerial Photograph, July 2, 1970

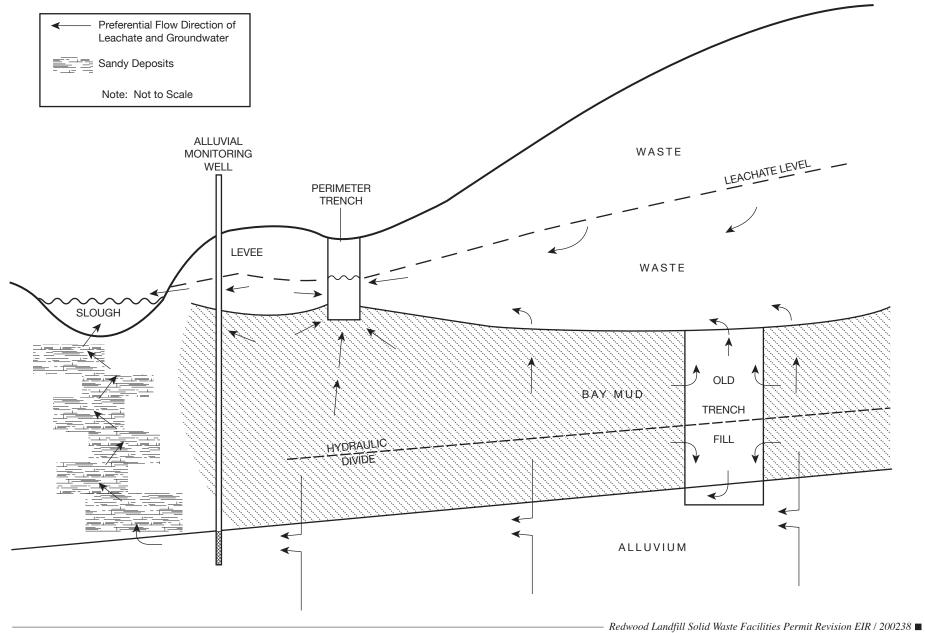


Figure MR105-4

Hypothetical LCRS Failure Scenario 2 Old Trench Fill

SOURCE: ESA

through flap gates on culverts at the perimeter levee or by pumping over the levee. In either case, it is likely that the remnants of these ditches now intersect with the perimeter LCRS trench and may convey leachate to the LCRS trench; in the opinion of the EIR preparers, these features do not exhibit potential for conveying leachate off-site.

To address the potential for leachate to migrate through the old trench fills and contaminate ground and surface water, Mitigation Measure 3.4.7 is refined to include the following provisions:

Mitigation Measure 3.4.7-i: The applicant shall, through historical research and site investigations, map the location and dimensions (including depth) of all trench fills located at the site. The applicant shall undertake any necessary subsurface investigations to ascertain whether any trench fills were excavated into the Pleistocene Alluvium underlying the Bay Mud. If not, no further action is required. If so, the applicant shall develop and implement a plan to correct this condition. The plan shall be reviewed and approved by the RWQCB. The plan may entail: a. installation of leachate extraction wells at sufficient frequency and depth within the old trenches to prevent downward migration of leachate into the underlying alluvium; b. excavation of all waste from the trench and replacement with a liner that meets current regulatory standards; or c. another engineered solution.

Mitigation Measure 3.4.7-j: The applicant shall implement an improved program to monitor groundwater within the Pleistocene Alluvium that underlies the Bay Mud. In consultation with the RWOCB, the applicant shall locate and install additional wells, screened in the alluvium, to augment the existing wells (currently there are 4 wells in the alluvium: P-10, P-6B, P-5B, MWH-25R). Since the gradient within the alluvium is tidally influenced, the network will include both wells that are in locations that are at least at times down-gradient of the landfill, as well as reference wells that are never down gradient of the landfill, but which otherwise exhibit similar hydrogeologic characteristics and water chemistry. A sufficient number of wells shall be installed to ensure that localized inconsistencies in the hydrogeologic system are considered, and that monitoring data characterize the quality of groundwater under both reference conditions and that which could be contaminated by leachate from the landfill. A sampling and analysis plan, including schedule, shall be developed in consultation with the RWQCB, and monitoring results will be added to the facility's semi-annual and annual monitoring reports to the RWQCB. If monitoring reveals that contamination is occurring in the alluvium, the applicant shall develop a remediation plan. The remediation plan shall be reviewed and approved by the RWOCB. Remediation may entail pump and treat methods, treat-in-place methods, or other methods approved by the RWOCB. Treatment shall continue as long as contamination is present or until a water quality objective established by the RWOCB is met.

Hypothetical Failure Scenario 3a and 3b: Sandy Channel Deposits and Sand Lenses

Under Hypothetical Failure Scenario 3a (Figure MR 105-5), leachate would migrate laterally offsite through a sand/silty-sand deposit within one of the old slough channels located beneath the landfill. This might occur if Bay Mud or some other low-permeability material provided a barrier preventing or retarding flow from the channel deposits into the LCRS trench where the channel intersects laterally with the LCRS trench; in other words, the channel deposits would pass beneath, but not be influenced by, the LCRS trench. Leachate could then work its way through

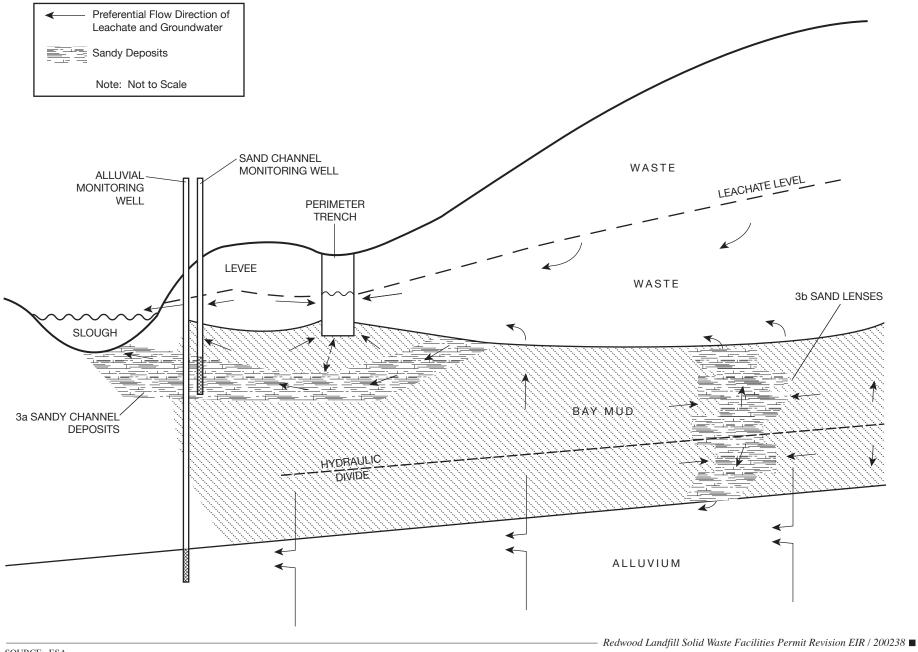


Figure MR105-5 Hypothetical LCRS Failure Scenario 3 Sandy Channel Deposits and Lenses

SOURCE: ESA

the more permeable channel deposits and emerge in a slough channel outboard of the perimeter levee. The landfill's monitoring program, however, includes monitoring wells placed within each known sand channel deposit, outboard of the landfill. Therefore, were this scenario to occur, contamination would be detected, reported, and remediated; no further mitigation is necessary.

Another scenario involving deposits of coarser (i.e., more permeable) materials is labeled "3b" in Figure MR105-5. In this scenario, laterally discontinuous sand lenses are shown to provide vertical continuity between the waste and the alluvium. If such a situation occurs on the site (none such has been discovered or reported), drainage of pore water from consolidating Bay Mud to the surrounding the sand lenses would pressurize water within the sand lenses. This pressurized groundwater within shallower lenses would tend to flow upward into the waste, while groundwater within deeper lenses would tend to flow downward into the alluvium, consistent with "dual drainage" described above. The upward pressure of pore water above the hydraulic divide would prevent the downward migration of leachate, so contamination would not occur, and no mitigation is necessary.

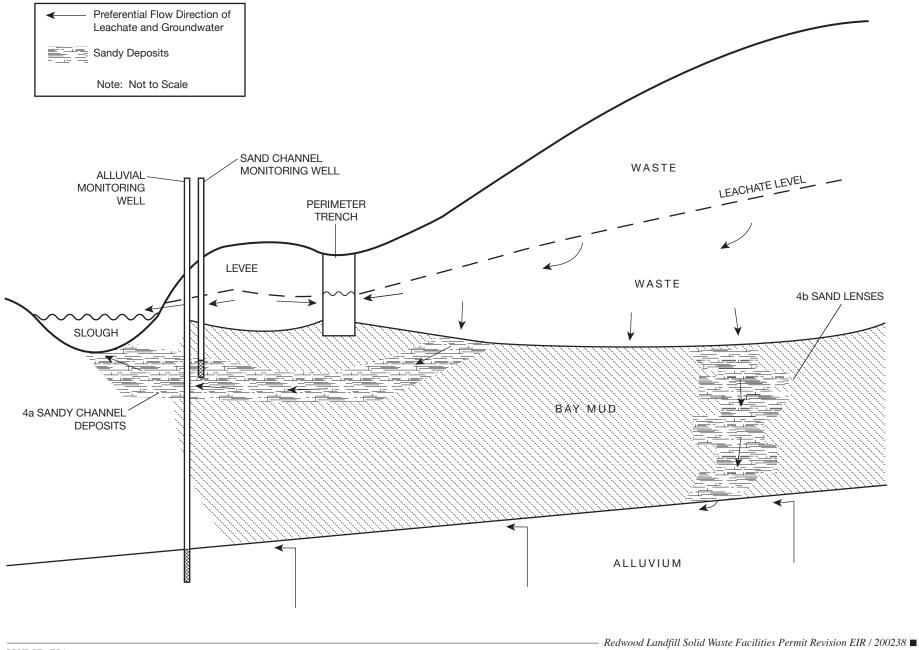
Hypothetical Failure Scenario 4: After Bay Mud Consolidation

Figure MR 105-6 presents a schematic diagram of hydrogeologic conditions at the site following cessation of Bay Mud consolidation. This condition would be reached several decades following placement of final cover on the landfill (since the cover material itself would add weight to the structure and further compress the Bay Mud). This scenario assumes that the LCRS is still in operation. As shown in the figure, there is no longer dual drainage from the Bay Mud unit, as pore water is no longer draining from the Bay Mud. Artesian pressure continues to be exerted upward from within the alluvium to the overlying Bay Mud, and any leachate within the waste exerts downward pressure on the Bay Mud.

Two factors would prevent the downward migration of leachate through the Bay Mud: first, as the Bay Mud consolidates it becomes even less permeable. Second, the artesian pressure within the alluvium would tend to retard or prevent migration of leachate downward into the alluvium, even if it reached the bottom of the Bay Mud unit.

As shown in the part of the diagram labeled 4a, the potential would still exist for leachate to migrate off-site through sandy channel deposits, if these do not intersect the LCRS trench. This is not considered a likely condition, but is possible, and points to the need to maintain the sand channel monitoring well network following closure of the landfill, as long as leachate poses a threat to water quality.

The part of the diagram labeled 4b postulates conditions within vertically continuous sand lenses extending from the waste to the alluvium. Leachate could only flow downward into the alluvium if the hydraulic head of the leachate were to exceed the artesian pressure of the alluvium. Since the groundwater within the alluvium has a potentiometric surface of +5-6 feet MSL, leachate mounded higher than this elevation – and therefore with greater head – could cause downward migration into the alluvium and contaminate groundwater. This points to the need to maintain leachate levels at an elevation lower than the piezometric potential of the alluvium.



Mitigation Measure 3.4.7e in the FEIR requires achievement and verification of at least one of the following three LCRS performance criteria:

- 1) Demonstrate that the piezometric (potentiometric) head in the basal (laterally continuous) leachate is no greater than 1 ft MSL;
- 2) Demonstrate that the extracted leachate is chemically indistinguishable from the groundwater in the vicinity of the landfill; or
- 3) Demonstrate that an inward gradient has been achieved such that leachate flows from the perimeter of the landfill towards the center of the landfill.

While either of the first two criteria would prevent groundwater contamination in the event of conditions similar to those depicted in 4b, the third would not, if leachate were mounded higher than +5-6 feet MSL. In addition, the JTD specifies only a 30-year post-closure maintenance period for the landfill. Therefore, the addition of Mitigation Measure 3.4.7k is necessary.

Mitigation Measure 3.4.7k: Following closure of the landfill, the applicant shall continue to operate and maintain the LCRS, including extraction of fluid from the LCRS trench and from interior wells. To demonstrate the effectiveness of the LCRS post-closure, the applicant shall verify that one of the following conditions is met:

- 1) Demonstrate that the piezometric head in the basal (laterally continuous) leachate is no greater than 1 ft MSL;
- 2) Demonstrate that the extracted leachate is chemically indistinguishable from the groundwater in the vicinity of the landfill.

Until it can be demonstrated that condition 2 is met consistently over a 3-year period, the applicant shall continue to operate and maintain the LCRS, and to maintain and monitor the sand channel and Pleistocene Alluvium monitoring wells at the site. Because it may be necessary to continue to operate and maintain the LCRS and to monitor wells beyond the 30-year post-closure period specified in the JTD, the applicant shall prepare a revised Preliminary Post-Closure Maintenance Plan that plans for and provides financial assurances for perpetual maintenance of these environmental control and monitoring systems.

Leachate Storage Capacity

As discussed in the FEIR, leachate management includes providing sufficient storage capacity to contain the leachate collected from the perimeter trench in order to prevent its offsite discharge. State regulations classify leachate impoundments as Class II waste units and specify minimum standards for the unit construction. Redwood landfill's Class II leachate impoundment (or leachate pond) is located in the oxbow area of the site.

The applicant has provided different and conflicting figures for the size and capacity of the leachate pond. The applicant's Joint Technical Document (JTD) described the leachate pond as 11 acres (GeoSyntec, 1998). This figure was also reported in the FEIR. The JTD stated that pond capacity was about 18 million gallons. More recent documents provided by RLI have stated that the pond area is 10 acres. Although the three most recent LCRS annual monitoring reports

(GeoSyntec, 2005a; 2006a; 2007b) consistently refer to the area of the pond as 10 acres, the depth of the pond has changed from an assumed "maximum design depth" of 5 feet, stated in the 2004 annual report, to a "design depth" of 5.5 feet stated in the 2005 annual report, to a "design depth" of 5.9 feet at the deepest" in the 2006 annual report. Based on a comparison of Table 3, Leachate Pond Storage, included in each annual report, the total assumed capacity of the pond has increased each year, from 50.50 acre-feet (equivalent to about 16.5 million gallons) in the 2004 annual report, to 55.57 acre-feet (approximately 18.1 million gallons) in the 2005 annual report, and 59.6 acre-feet (approximately 19.4 million gallons) in the 2006 annual report. Given the inconsistent estimates of capacity in recent monitoring reports, until a survey is undertaken to provide a more definitive estimate, this analysis assumes that pond capacity is approximately 18 million gallons, or approximately 55 acre-feet, as reported in the JTD. The 2006 annual report survey of the pond at its lowest level in order to better define changes in pond area with respect to depth."

Available pond capacity is fundamentally a function of inflow to and outflow from the pond (see discussion below under Water Balance Model). Inflow to the pond includes leachate collected from the LCRS trench, which is pumped to the pond, and precipitation falling directly on the pond. Outflow includes loss through evaporation and leachate pumped from the pond for use for dust control. Until recently RLI used a "vaporator" for destruction of leachate through evaporation, but this system has been decommissioned. The annual monitoring reports include information on a monthly basis as well as annual totals for the inputs and outputs. Since rainfall, leachate collection, evaporation rates, and the need for dust control vary considerably from month to month, depending on the weather, the annual totals for these components are less relevant to determining available pond capacity than are the monthly figures. According to the annual reports, the leachate pond (taking into account the use of leachate for dust control and the other factors) provided adequate capacity to contain the leachate collected at the site in water years 2004 and 2005. The minimum available storage for any month in water year 2004 was 7.05 acrefeet, in March 2004, and the minimum available storage for any month in water year 2005 was 2.42 acre feet, in April 2005. However, in April 2006 (water year 2006), approximately 4.4 acrefeet of leachate needed to be pumped from the leachate pond to a basin formerly used as a sludge impoundment to prevent overflow. The annual report refers to this basin as a "contingency" lagoon."

While the contingency lagoon/sludge impoundment provided emergency storage which prevented the overtopping of the leachate pond and prevented the offsite discharge of leachate, the sludge impoundment is not permitted as a Class II leachate impoundment. FEIR Mitigation Measure 3.4.7f(2) requires RLI to explain why the additional leachate storage/evaporation pond that had been planned according to the 1995 Leachate Spill Contingency Plan was no longer planned or needed. In a recent memorandum to ESA, the County's EIR consultant, RLI has stated that within a year of project approval RLI would undertake a feasibility study to evaluate alternatives for increasing capacity to store or treat leachate during the wet season, should they ever be required (RLI and GeoSyntec, 2006). However, the recent need to use the sludge impoundment shows that current leachate capacity at the site is insufficient (Elias, 2006).

In addition, two changes in leachate management at the site that have occurred since publication of the FEIR increase the likelihood that additional storage capacity will be needed at the site during the wet season:

- The leachate vaporator is no longer in operation and in RLI's November 2004 application to the BAAQMD, RLI requested that it be taken out of the facility's air permits (Sullivan, 2006).
- The RWQCB has modified the circumstances under which leachate may be used for dust control. According to RWQCB staff, dust control using leachate is confined to areas that drain to the working face or to areas that will be covered with clean soil prior to the next rain (Elias, 2006). Although this restriction apparently did not affect the quantity of leachate used for dust control in 2006 (which was greater than in 2005), it could limit the use of leachate for dust control in the future, and certainly would limit the expansion of such use of leachate.

Therefore, to ensure that adequate leachate capacity is available in the near term, in the event of another high rainfall month such as occurred in April 2006, Mitigation Measure 3.4.7 is refined as follows:

Mitigation Measure 3.4.7f: RLI shall update its Leachate Facilities Leak or Spill Contingency Plan to accommodate proposed project changes. At a minimum, the revised plan shall address the following issues:

- (1) Areas in the Oxbow shown in the existing plan (RLI, 1995b) as the location of the contingent leachate pond (Fields 2 and 3 and the narrow strip between the eastern edge of the existing leachate pond and Field 5) are proposed under the project to be used for composting and co-composting, and Fields 3, 4, and 5 are proposed under the project to be used for composting, co-composting, and are "also available for Class II leachate impoundments." The revised leachate contingency plan shall identify which area or areas will be used for contingent leachate storage or, alternatively, explain/clarify how composting operations and emergency leachate storage will be accommodated in the same area. The updated leachate contingency plan shall demonstrate that the compost operation shall be isolated from and not affected by use of any area as a contingency/emergency leachate impoundment. (Refer to Mitigation Measures 3.5.3a, 3.5.3b, and 3.5.3d regarding leachate potentially generated at these new composting areas.)
- (2) Because an additional leachate storage/evaporation pond that, according to the 1995 Leachate Facilities Leak and Spill Contingency Plan (RLI, 1995b), was to have been constructed in the summer of 1996 to provide additional pond storage capacity, has not been constructed, yet additional capacity has been shown to be needed to prevent overflow during especially wet months, the revised plan shall <u>indicate also include</u> the reason(s) that the RLI's plans to provide additional leachate storage capacity. evaporation pond is no longer planned or needed, especially in the event of a leak at the existing 11 acre leachate pond or malfunction of the leachate vaporator. To address revisions to the estimates of the depth and capacity of the existing pond reflected in each of the last three annual monitoring reports, the plan shall also include an updated calculation of the capacity of the existing pond based on a survey of the pond area and depth, conducted by a licensed surveyor.

(3) With regard to potential overtopping of the leachate pond during periods of extreme rainfall, the 1995 plan indicated that pumping directly into San Antonio Creek, if leachate water was confirmed to be clean, was the most effective contingency measure to quickly evacuate the leachate pond. The updated leachate contingency plans shall not rely solely on such a measure for leak or spill contingencies, but shall include other contingency measures as discussed under item (1), above (i.e., identification of the location of on-site contingent impoundments), that prevent the off-site release of leachate. Any such on-site impoundment(s) designated to receive leachate shall be constructed to meet applicable state standards for leachate impoundments.

The updated Leachate Facilities Leak or Spill Contingency Plan shall be submitted to the LEA and the RWQCB prior to project approval. Approval of use of Oxbow areas for composting, other than Field 2, where the Applicant commenced composting on a new pad in 2005, shall be conditioned upon approval of the updated leachate contingency plan, in addition to other relevant approvals required as mitigations in this report.

Water Balance Model

As noted in the introduction, FEIR Mitigation Measure 3.4.8c specifies that RLI's updated Leachate Management Plan demonstrate, through the use of an empirically-based water balance model, that the LCRS components and impoundments provide adequate capacity. RLI's recent annual monitoring reports have included a water balance model as well as measurements of the components that can be directly measured (e.g., perimeter trench extraction volumes and pond elevations). This section describes the water balance model RLI has presented in the 2004, 2005 and 2006 annual reports (GeoSyntec, 2005a, 2006a, 2007b). The water balance developed for the landfill consists of three components, a precipitation/infiltration balance, a subsurface balance, and a leachate pond balance.

Precipitation/Infiltration Balance

The precipitation/infiltration balance estimates the amount of precipitation falling on the landfill that infiltrates and is expressed in the equation,

Infiltration = Precipitation – Runoff – Evaporation.

RLI collected data on the hydraulic properties of the intermediate cover at the landfill (which influences the infiltration rate) and used the Hydrologic Evaluation of Landfill Performance (HELP) model to perform the quantitative analysis of the precipitation/infiltration balance. The analysis showed a net average annual HELP infiltration rate of 0.90 inches¹⁵ per year. The 2004 and 2005 annual reports applying this rate to the 208.5-acre landfill (the footprint minus Area G) for an estimated infiltration quantity of 15.6 acre-feet per year (or a rate of 9.6 gallons per minute [gpm]) (GeoSyntec, 2005a; GeoSyntec, 2006a). The 2006 annual report continues to cite the basic rate of 0.90 inches and applies it to the entire landfill area of 222.5 acres (including Area G) for an estimated infiltration quantity of 16.6 acre-feet per year (or 10.3 gpm) (see Table MR105-1).

¹⁵ Although unit area for the 0.90 inches estimate is not specifically stated, the extrapolation provided for the landfill as whole indicates this rate is per acre.

TABLE MR105-1 LEACHATE COLLECTION AND REMOVAL SYSTEM WATER BALANCE COMPONENT ESTIMATES FOR 2004, 2005, 2006 (acre-feet per year)

Water Year ^a	Infiltration Volume to Landfill	Upflow to landfill from Bay Mud consolidation	Water consumed in waste degradation	Water vapor removed by landfill gas system	Net to landfill subsurface	Leachate Component of Fluid Extracted from trench ^d	Groundwater Component of fluid extracted from trench ^d	Total -fluid extracted from trench to pond	Net climatic input to Pond (precipitation - evaporation)	Dust control	Leachate from Pond to Contingency Lagoon	Net Change in Pond Storage (calculated)
2004	15.6 ^b	3.76	4.63	0.85	13.9	40	13.3	50.5	-22.2	31.8	-	-3.5
2005	15.6 ^b	3.76	4.63	0.85	13.9	40	13.3	53.4	-3.8	41.9	_	7.8
2006	16.6 ^c	3.76	6.66	1.23	12.5	53	15	67.7	0.87	50.9	4.4	13.8

Note: Numbers may not sum due to rounding.

^a The water years extends from October 1 through the following September, and is named for the year in which it ends.

Assumes an infiltration rate of 0.90 inches per year per acre and a landfill area of 208.5 acres (i.e., not including Area G).

^c Assumes an infiltration rate of 0.90 inches per year per acre and a landfill area of 222.5 acres (i.e., including Area G).

Proportion of groundwater and leachate within the trench is based on water quality analyses of collected fluid compared with background groundwater quality.

SOURCE: GeoSyntec Consultants, 2005a; 2006a; 2007b

Subsurface Balance

The components of the subsurface balance are inflow from above (infiltration) and below (upflow from Bay Mud consolidation) and outflow via perimeter trench extraction, extraction of water vapor by the landfill gas collection system, and the consumption of water as a result of biochemical processes of waste decomposition. The subsurface balance is expressed in the equation,

(Infiltration) + (Flow from Bay Mud consolidation) – (Perimeter trench extraction) – (Water vapor extraction via landfill gas system) – (Water consumption during waste decomposition) = (Change in subsurface storage)

The infiltration estimate is described in the precipitation/infiltration balance above. The estimate of flow from Bay Mud consolidation involves a number of assumptions that will require verification through regular monitoring and may be adjusted as needed based on the monitoring results. The estimate of Bay Mud inflow in the current model assumes, based on previous consolidation calculations prepared by GeoSyntec (2003), that the average total Bay Mud settlement that would occur throughout the site with implementation of the proposed final grading plan is 6.75 feet. It was assumed that 5 feet of this total has already occurred and that the remaining 1.75 feet will occur over the next 50 years.

As the Bay Mud consolidates, pore water held within it is expelled. RLI's model of Bay Mud consolidation assumes "dual drainage" from the unit, with consolidation water flowing equally to the overlying landfill and to the underlying Pleistocene alluvium unit (GeoSyntec, 2005a, 2006a, 2007a).

Taking these assumptions together, the subsurface balance estimates that the total future change in volume of Bay Mud would be 608,751 cubic yards and, with half of the resulting flow of pore water moving upward into the landfill, the resulting inflow would be 188-acre feet over 50 years. This translates to an average annual inflow to the landfill of 3.76 acre-feet per year or 2.3 gpm.

A total of approximately 51 acre-feet was pumped from the perimeter trench system in water year 2004; 53 acre-feet was pumped from the trench system in 2005, and 68 acre-feet was pumped in 2006. These totals include a component of the groundwater that is drawn from outside the trench as well as leachate from the landfill. The proportion of groundwater flow into the trench is expected to be low because of the low permeability of the Bay Mud. Based on a comparison of water quality from fluid in sections of the trench system to the groundwater found in Bay Mud outside the trench, RLI estimates that, on average, 75 percent of the total extraction volume was leachate and 25 percent was groundwater.

Using the amount of landfill gas generated each year to estimate the rate of waste degradation that was occurring within the landfill, RLI used published data to estimate the amount of water that would be consumed in the process of waste degradation and the amount of water vapor removed via the landfill gas collection system. RLI estimated that 4.63 acre-feet per year, or 2.86 gpm, of water was consumed in the waste degradation process in 2004 and 2005 (based on the landfill gas extraction rate of 2,000 standard cubic feet per minute (scfm) and that 6.66 acre-feet, or 4.13 gpm, of water was consumed in 2006 (based on the landfill gas extraction rate of 2,900 scfm). An estimated 0.86 acre-feet of water vapor was lost in the process of landfill gas extraction in 2004 and 2005, and 1.23 acre-feet of water vapor was lost in 2006.

As shown in Table MR105-1, each year more fluid has been extracted from the perimeter trench than was generated that year based on the water balance model. According to the 2004 and 2005 annual reports the net reduction in leachate was equivalent to approximately 0.12 foot of leachate over the area of the landfill (GeoSyntec Consultants, 2005a; 2006a). According to the 2006 annual report, the net reduction in leachate that year was approximately 0.18 feet of leachate over the area of the landfill (GeoSyntec Consultants, 2007b).

Leachate Pond Balance

The water balance for the leachate pond component is expressed by the equation:

Pond Inflow – Pond Outflow = Change in Pond Storage.

Leachate pond balance is discussed above, under Leachate Storage Capacity.

Based on the reports reviewed above and the experience in 2006 of needing to pump water from the leachate pond to a former sludge impoundment (which is not permitted as a Class II impoundment) to prevent overflow, the RWQCB has determined that leachate containment capacity is insufficient to contain the volume of leachate that may be produced in an above-average wet year. Consequently, the RWQCB is working with RLI on increasing the facility's leachate containment capacity. The RWQCB also has requested additional information on the pond berm material and liner of the leachate impoundment, because a construction quality assurance report is not available for it. RLI is reported to be conducting investigations on this (Elias, 2006). Continued monitoring will allow RLI to confirm or adjust assumptions used in the water balance model.

106. Levees

This Master Response addresses comments on the integrity and adequacy of the levee system at the project site and presents and analyzes new information regarding a levee failure that occurred at the site in December, 2006, after publication of the FEIR.

The landfill's levee system¹⁶ previously served four functions: 1) buttressing the landfill against slope failure; 2) preventing leachate from flowing into the adjacent creek and sloughs; 3) preventing flooding; and, 4) serving as a perimeter roadway. Based on the results of slope stability analyses performed by GeoSyntec (1997a), fill sequencing eliminates the need to reconstruct the levee (as previously proposed and evaluated in the 1994 FEIR) to provide additional buttressing force. The levee still plays a reduced function in preventing off-site migration of leachate in portions of the landfill (see FEIR Master Responses 1 and 13 and Master Response 105 in this document), and still serves as a perimeter roadway. The principle function served by the levee system is, however, the prevention of flooding of the site. To increase flood protection, RLI has for several years planned to raise the entire length of the levee surrounding the site to 9 feet above mean sea level (+ 9 feet msl). These plans were evaluated in the 1994 FEIR for the current project.

The FEIR evaluated levee functions (the stability of the landfill without further buttressing force; LCRS function, and flood protection) and found that the design of the levee, and of the landfill itself, provide adequate stability, protection of ground and surface water quality, and flood protection. Landfill stability for the Mitigated Alternative is further discussed in Master Response 108. Further consideration of the effectiveness of the LCRS is discussed in Master Response 105.

¹⁶ As discussed in the FEIR (Impact 3.5.6, p. 3.5-14) different sections of the JTD refer both to the levee that encompasses the approximately 380-acre landfill site (i.e., the portion of the landfill site that lies within levees) and the levee that surrounds the landfill itself (i.e., the permitted landfill footprint) as the "perimeter levee." Other background documents also do not distinguish between these levees (essentially "inner" and "outer" levees, which in fact converge where the perimeter of the landfill and site boundaries coincide). Since publication of the FEIR, however, RLI has distinguished between the two by referring to the levee that encircles the landfill footprint as the "perimeter" levee and the levee that encircles the 380-acre landfill site as the "exterior" levee. See Figure MR104-2 in Master Response 104. As specified in FEIR 3.5.6, levee improvements that would elevate the levee to 9 feet above sea level, which were considered in the 1994 FEIR, refer to the levee that surrounds the entire 380-acre site (i.e., the levee RLI now refers to as the "exterior" levee).

As discussed in the FEIR, the previously approved (following certification of the 1994 FEIR) integrated levee-LCRS design was constructed only at Area A. According to the applicant, levee improvements also were implemented in conjunction with construction of the perimeter trench LCRS, and the levee around the landfill footprint has been constructed to an elevation of +9 feet msl except for a 450-foot section in the southeast corner of the landfill at Area D, which is currently about +5 msl. Completion of this section is planned (Meserve, 2006a, Meserve 2006b). Levee construction or reconstruction is not identified as a project element in the JTD (alone or in conjunction with the redesigned LCRS) and the landfill slope stability analysis presented in the applicant's Revised Fill Sequencing Plan (GeoSyntec, 1997a) does not address new levee construction or reconstruction. However, during DSEIR preparation the County's geotechnical engineering consultants, Treadwell and Rollo, raised concerns about the absence of a new levee in the revised fill sequencing plan (Treadwell and Rollo, 2001a). In response, the applicant's geotechnical engineers indicated that the revised fill sequencing plan did not recommend a change to permit conditions requiring a nine-foot levee or elimination of the levee (GeoSyntec Consultants, 2001a). Among the technical reports reviewed by Treadwell and Rollo included the construction quality assurance report for Areas B and C by Golder Associates (1996) entitled Construction Quality Assurance of Leachate Collection and Removal System and Levee Construction at Areas B and C (Treadwell and Rollo, 2002).

The site has been engineered to meet federal, state, and local codes, and RLI is responsible for its maintenance. However, engineering for applicable codes does not cover all conceivable scenarios. Certainly a catastrophic flood of the Petaluma River and San Antonio Creek could result in overtopping of the levees; however, the design elevation of the levee, +9 feet msl, is sufficient for protection against the design flood, which in this case is the 100-year flood. The landfill need not be designed for larger floods. Sea level rise is considered below in this Master Response.

Regarding the potential consequences in the event of a catastrophic failure of the landfill's perimeter levee: even if such a failure were to occur, it would not result in a catastrophe similar to that seen recently in Louisiana and Mississippi caused by Hurricane Katrina, as was suggested or implied in a number of comments. A break, failure, or overtopping of the levee will not result in a extensive inundation of the landfill since the majority of the landfill itself is at the same or greater elevation as the surrounding levee system. The inundation caused by Hurricane Katrina in New Orleans and elsewhere occurred because these cities were below sea level. Inundation would not occur or would be only localized in the low-lying areas around the toe of the landfill slope, in the Oxbow area, or in other low-lying areas. Inundation, could, however, result in unauthorized discharge of leachate or other contaminants to surrounding surface water, erosion of portions of the landfill cover or waste, and disruption or damage to the LCRS as well as other environmental control systems and site facilities. The potential for the site to flood is considered a significant impact in the FEIR (Impact 3.5.6).

Levee Failure, December 2006

In the spring of 2006 RLI initiated an improvement project for a section of the levee on the north side of the oxbow area. This project included placement of engineered fill to raise the levee to a design elevation of +9.5 feet msl and provision of an access road. The design of the reconstructed levee was evaluated in the 1994 FEIR, and the levee reconstruction is considered a part of that project, not the current one. Construction on the levee began in early October 2006 and was completed in mid-November 2006. Between Saturday, December 16, and Monday, December 18, 2006, a portion of the newly upgraded levee located east of the landfill footprint and immediately north of the leachate impoundment failed (see figure MR104-2 in Master Response 104 for the location of the levee failure). The failed section was approximately 350 feet long and exhibited a rotational movement toward San Antonio Creek. Immediately after the levee failure RLI commenced construction of an emergency repair of the levee, consisting of installation of interlocking sheetpiles, 35-40 feet long, driven along the exterior edge of where the levee had been, and extending beyond the area of the failure to tie the structure into the remaining intact portions of the levee. This has afforded temporary flood protection, since the height of the sheetpile wall is about +7.5 feet msl. The levee failure did not affect the landfill or the leachate impoundment, and the failure is not known to have resulted in any unauthorized discharges to San Antonio Creek; nor did the levee failure lead to flooding of the site.

Subsequent to completion of the temporary repair, Miller Pacific Engineering Group, the firm that designed the levee upgrade project, began work on a "remedial action plan" consisting of a design for a permanent repair of the failed section of the levee. The plan is being reviewed by the Marin County Department of Public Works, which must approve levee design and construction (Balderama, 2007). In addition, GeoSyntec, on behalf of RLI, conducted an analysis of the failure as well as a peer review of the remedial action plan (GeoSyntec, 2007d). Treadwell and Rollo, under contract with ESA and acting on behalf of Marin County, then reviewed GeoSyntec's evaluation and conducted their own peer review of the remedial action plan for the purpose of completing this FEIR Amendment (see Appendix F). Treadwell and Rollo also examined implications of the failure for future levee improvements, as well as stability of the landfill (see Appendix F and Master Response 108).

For their evaluation of the levee failure, GeoSyntec compiled existing information regarding the levee and creek geometry, creek water levels, and geotechnical material properties, and performed slope stability analyses. They also compiled Bay Mud strength data in the failure area, and back-calculated the Bay Mud strength. They concluded that the subsurface conditions, the levee and creekside geometry, and the low-tide elevation of the creek resulted in a factor of safety of close to one, and that the failure was caused by insufficient shear strength of the underlying Bay Mud to support the newly-constructed levee improvements under static, short-term, undrained conditions (the Bay Mud gains strength as it drains and consolidates under a static load). In simple terms, the weight of the reconstructed levee was more than the underlying Bay Mud could support at that location. GeoSyntec recommended that slope stability analyses be performed for levee improvements to check that the levees are designed to achieve adequate static

factors of safety and seismic performance in accordance with applicable standards for engineered levee structures, and that these analyses be reviewed by a Registered Geotechnical Engineer.

Miller Pacific Engineering Group has proposed three phases for the remedial action plan for the permanent repair: 1. installation of sheet piles with the tops at elevation +7.5 feet msl (this has already been completed); 2. installation of sheet pile deadmen set back from the existing sheet pile wall, with tierods connecting the two, and placement of "stepped" fill on the landside of the wall to elevation +6 feet msl; and 3. placement of additional fill on the landside of the wall to elevation 9.5 feet. The purpose of the tie rod and deadman system is to improve lateral stability and prevent outward rotation of the sheet pile wall, as fill is placed to rebuild the levee and reestablish the design height for flood protection.

Treadwell and Rollo's peer review of the remedial action plan identified several instances of use of improper or inappropriate factors or methods in the design of the levee repair (Appendix F). Treadwell and Rollo recommends recalculating the strength and stability of the structure using the correct, established factors and methods. This could lead to a conclusion that the design is not adequately stable, and that the design height of 9.5 feet cannot be achieved with placement of fill. Therefore, the following mitigation measures are necessary to ensure that the levee repair, and future upgrade of the levee, are adequately designed and constructed.

Mitigation Measure 3.5.6b: The applicant shall conduct slope stability analyses of the recently completed levee upgrades to determine whether the factor of safety is adequate for static and dynamic stability. The slope stability analyses shall utilize the methods and factors recommended by GeoSyntec (2007d), and shall take into account site-specific differences in surface and subsurface conditions. The same analyses shall be applied to designs for future levee upgrades. All analyses shall be independently peer reviewed by a Registered Geotechnical Engineer at the applicant's expense and subject to approval by the LEA or, if subsequent work requires a Grading Permit, by the Marin County Department of Public Works, or, if a building permit is required, by the Community Development Agency Building and Safety Division. If analysis of the recently-completed levee sections reveals that they do not meet minimum static factor of safety and seismic performance standards, the applicant shall develop a remedial action plan for further levee improvements. Any such plan shall be independently peer reviewed by a Registered Geotechnical Engineer at the applicant's expense and subject to approval by the LEA or the Marin County Department of Public Works or Community Development Agency Building and Safety Division.

Mitigation Measure 3.5.6c: The applicant shall re-analyze the stability analysis contained in the remedial action plan for the failed levee segment, per the recommendations of Treadwell and Rollo's peer review (Appendix F). All analyses shall be independently peer reviewed by a Registered Geotechnical Engineer at the applicant's expense and subject to approval by the LEA, or, if a Grading Permit or a Building Permit is required, by the Marin County Department of Public Works or Community Development Agency Building and Safety Division, respectively. If the new analysis reveals that the design contained in the remedial action plan does not achieve an acceptable static factor of safety and seismic performance standard, the applicant shall develop a new design for the levee repair. This may require, for example, use of higher sheet piles as a parapet wall along the creek to provide flood protection, with the earthen fill and roadway placed at a lower elevation to reduce the static load on the Bay Mud. Any new design shall be independently peer reviewed by a Registered Geotechnical Engineer and subject to approval by the Marin County Department of Public Works.

Global Climate Change and Rising Sea Level

Several commenters questioned the ability of the levee system to provide adequate flood protection for the landfill in the face of rising sea level expected to occur as a consequence of Global Climate Change. The latest Assessment Report from the Intergovernmental Panel on Climate Change (IPCC) provides a best-estimate for global sea level rise of between .28 -.43 meters (.9-1.4 feet) by the end of the 21st century, depending on the efficacy of efforts to limit greenhouse gas emissions affecting climate change (Nicholls et al., 2007). The IPCC also predicts that there will be regional differences in the amount of sea level rise (due to differential rates of thermal expansion) and coastal effects (Nicholls et al., 2007). Long-term, that is, beyond the 21st century, sea level could rise much more, and at an accelerated rate – up to 10 meters (32.8 feet) – if global warming causes an irreversible melting of the Greenland and West Antarctic ice sheets (Nicholls et al., 2007).

Climate Driver (Trend)	Main Physical and Ecosystem Effects on Coastal Systems
CO ₂ concentration (↑) physical and ecosystem effects on coastal systems	Increased CO ₂ fertilization; decreased seawater pH (or 'ocean acidification') negatively impacting coral reefs and other pH sensitive organisms.
Sea surface temperature (↑, R)	Increased stratification/changed circulation; reduced incidence of sea ice at higher latitudes; increased coral bleaching and mortality; pole-ward species migration; increased algal blooms.
Sea level (↑, R)	Inundation, flood and storm damage; erosion; saltwater intrusion; rising water tables/impeded drainage; wetland loss (and change).
Storm intensity (↑, R)	Increased extreme water levels and wave heights; increased episodic erosion, storm damage, risk of flooding and defense failure.
Storm frequency (?, R) Storm track (?, R)	Altered surges and storm waves and hence risk of storm damage and flooding.
Wave climate (?, R)	Altered wave conditions, including swell; altered patterns of erosion and accretion; re-orientation of beach plan form.
Run-off (R)	Altered flood risk in coastal lowlands; altered water quality/salinity; altered fluvial sediment supply; altered circulation and nutrient supply.
KEY (Trend): ↑ increase ? uncertain R regional variability	

TABLE MR 106-1 MAIN CLIMATE DRIVERS FOR GLOBAL COASTAL SYSTEMS, THEIR TRENDS DUE TO CLIMATE CHANGE, AND THEIR MAIN PHYSICAL AND ECOSYSTEM EFFECTS

R regional variability

SOURCE: Nicholls et al., 2007, Table 6.2

Coastal areas are vulnerable to several effects of a rising, warming, acidifying (due to absorption of atmospheric CO_2 by the ocean) sea, including inundation, ecosystem change, changes in runoff and flood regimes, and the potential for increased damage due to storms and storm surges (Table MR106-1). The recently-adopted Marin Countywide Plan Update recognizes the risks to low-lying coastal areas associated with Global Climate Change, and establishes one goal, three policies, and several relevant implementing programs to address this risk (Table MR 106-2).

The current design elevation for the upgraded levees at Redwood Landfill (+9 ft msl) is intended to provide flood protection for the 100-year flood. As sea level rises, however, and if Global Climate Change also causes an increase in the intensity and frequency of severe storms and flooding, the +9 ft msl elevation may be inadequate to protect the site from flooding and from damage to essential environmental control systems. Presumably, as sea level rises and as the climate changes, FEMA (or its successor agency) will revise its flood maps to indicate the current elevation of the 100-year flood, and facilities required by statute or regulation to maintain protection from the 100-year flood, including Redwood Landfill, will need to raise their levees or otherwise establish flood protection.

The recent failure of a levee section at Redwood Landfill (see above) demonstrates, however, the difficulty of constructing heavy, elevated, earthen structures on the Bay Mud; the deficiencies pointed out by Treadwell and Rollo in their peer review of Miller Pacific Engineering Group's Remedial Action Plan demonstrate with stark and disturbing urgency the difficulties in designing, engineering, and constructing such facilities. Since Bay Mud gains strength with time after a static load has been applied to it, any future increase in the height – and the mass – of the landfill's levees may require fill sequencing over a relatively long time horizon or other specialized construction methods to achieve and maintain an adequate factor of safety and standard for seismic performance. Therefore, Mitigation Measure 3.5.6 is refined to include the following provision, which the applicant has agreed to implement:

Mitigation Measure 3.5.6d: Within 2 years of project approval, the applicant shall prepare and submit to the LEA and the San Francisco Bay Regional Water Quality Control Board a plan for long-term flood protection of the site. The plan will include a consideration of feasible options for achieving protection from the 100-year flood in the face of rising sea level and increased flood frequency and intensity. The plan shall include selection of the preferred method or methods for achieving flood protection, and both a schedule and financial assurances for their implementation. The engineering basis for the plan shall be independently peer reviewed by a Registered Geotechnical Engineer prior to submittal for approval. The plan will be drafted and then updated every 5 years during the remaining operational life of the landfill and the post-closure maintenance period to ensure that it is current with the most recent and broadly-accepted predictions for flood levels, following consultation with the U.S. Geological Survey, the San Francisco Bay Conservation and Development Commission, and other monitoring agencies that track bay and ocean levels and that may provide estimates of mean sea level rise and areas subject to future inundation.

TABLE MR106-2 COUNTYWIDE PLAN UPDATE GOALS, POLICIES, AND IMPLEMENTING PROGRAM

Goals, Policies, and Programs	Project Consistency ^a
Goal	
Goal EH-3: Safety from Flooding and Inundation. Protect people and property from risks associated with flooding and inundation. (Also see the Public Facilities and Water Resources sections.)	Consistent with incorporation of mitigation measures contained in the FEIR and in this Amendment.
Policies	
Policy EH-3.1: Follow a Regulatory Approach. Utilize regulations instead of flood control projects whenever possible to minimize losses in areas where flooding is inevitable.	Consistent. The policy applies to new development, not existing infrastructure facilities.
Policy EH-3.2: Retain Natural Conditions. Ensure that flow capacity is maintained in stream channels and floodplains, and achieve flood control using biotechnical techniques instead of storm drains, culverts, riprap, and other forms of structural stabilization.	Consistent. The policy applies to new development, not existing infrastructure facilities.
Policy EH-3.3: Monitor Environmental Change. Consider cumulative impacts to hydrological conditions, including alterations in drainage patterns and the potential for a rise in sea level, when processing development applications in watersheds with flooding or inundation potential.	Consistent with incorporation of Mitigation Measure 3.5.6d (see this Master Response)
Implementing Programs	
Program EH-3.a Regulate Development in Flood and Inundation Areas. Continue to require all improvements in Bayfront, Floodplain, Tidelands, and Coastal High Hazard Zones to be designed to be more resistant to damage from flooding, tsunamis, seiches, and related water- borne debris, and to be located so that buildings and features such as docks, decking, floats, and vessels would be more resistant to damage.	Consistent with incorporation of Mitigation Measures (Mitigation Measu 3.5.6 in the FEIR and Mitigation Measures 3.5.6b, 3.5.6c, and 3.5.6d in this Master Response).
Program EH-3.k Anticipate Sea Level Rise. Work with the U.S. Geological Survey, the San Francisco Bay Conservation and Development Commission, and other monitoring agencies to track bay and ocean levels; utilize estimates for mean sea level rise to map potential areas subject to future inundation (including by updating information about watershed channel conditions and levee elevations); and amend the Development Code to incorporate construction standards consistent with the policies of BCDC's Bay Plan for any areas subject to increased flooding from a rise in sea level.	Consistent with incorporation of Mitigation Measure 3.5.6d (see this Master Response).
Program EH-3.n Plan for Sea Level Rise. Consider sea level rise in future countywide and community plan efforts. Consider revising Marin County Development Code standards for new construction and substantial remodels to limit building or require elevated buildings and infrastructure or other applicable mitigations in areas that may be threatened by future sea level rise as shown on maps released by the San Francisco Bay Conservation and Development Commission in February 2007.	Consistent with incorporation of Mitigation Measure 3.5.6d (see this Master Response).

^a The determinations of policy consistency represent County staff interpretation of policies. However, this EIR does not determine policy consistency. The County decision-makers make the formal policy consistency determinations. Even where policy inconsistencies are identified, these may not necessarily indicate significant environmental effects. Section 15358(b) of the CEQA *Guidelines* states that "effects analyzed under CEQA must be related to a physical change in the environment." Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environmental are considered significant impacts pursuant to CEQA. The discussion below points out where such policy-related impacts are addressed.

SOURCE: Marin County, 2007; ESA.

Effectiveness of Refined Mitigation Measures

Addition of Mitigation Measure 3.5.6b and 3.5.6c (related to the current plans for levee upgrade), and Mitigation Measure 3.5.6d (related to predicted sea level rise and increased flood elevation), which have been agreed to by the applicant, will ensure that Impact 3.5.6 is reduced to a less-than-significant level.

107. Existing and Proposed Landfill Volume, Footprint, and Site Life

The currently permitted landfill volume and footprint are discussed in FEIR Master Response 12 and site life estimates for both the currently permitted and proposed project are presented in FEIR Master Response 21. Updated site life projections for the Mitigated Alternative are presented in Master Response 104 in the current document. As stated, the landfill's Solid Waste Facility Permit states that the permitted footprint area is 210 acres and the permitted capacity is 19.1 million cubic yards (mcy). The landfill is permitted to a maximum height of 166 feet. This Master Response reviews information related to landfill size and capacity in response to comments on the FEIR.

Site Life

Site life calculations for the currently permitted landfill and proposed project were presented in Table MR21-1 of the FEIR. Revised site life calculations are presented in Table MR104-4 in this document; this table also presents site life calculations for the Mitigated Alternative. The revisions in Table MR104-4 are based on new information received from the applicant since publication of the FEIR. This includes a measure of in-place volume based on an October, 2006 aerial topographical survey; changes to the factors used for consolidation of the underlying Bay Mud and settlement of waste-in-place; and the rate at which landfill airspace is consumed. This final revision is the most important. The applicant previously stated that .87 tons of waste (in addition to cover material) is placed in each cubic yard of landfill airspace. The new estimate, which is based on calculation of airspace consumed and tons of waste landfilled, is .59 tons per cubic yard of airspace. As shown in Table MR104-4, these revised factors result in a substantially shortened lifespan for the facility: earliest closure is now estimated to be 2016 under current permit conditions, and 2024 under the Mitigated Alternative.

The shorter minimum life expectancy of the facility under current permit conditions means that Marin County now has less than 15 years of permitted landfill capacity. This triggers the requirement, contained in the Countywide Integrated Waste Management Plan, Siting Element, to initiate a process to site a new landfill.

Footprint

The change in the landfill footprint is addressed in responses to comments D-1 and D-3 in the FEIR. As discussed in the FEIR, the new footprint covers only areas of the site where waste was already in place. Thus this change did not constitute a lateral expansion according to federal Subtitle D regulations, nor did it involve encroachment upon wetlands.

As discussed in the response to Comment D-3 in the FEIR, the technical review and initial study prepared by the County on the proposed physical and operational modifications at Redwood Landfill concluded that the reference to a 222.5-acre landfill footprint for the current project, instead of a 210-acre footprint, was a minor technical modification and should be incorporated into a revised Solid Waste Facility Permit, but did not warrant further environmental review. During the course of evaluating all aspects of the project components described in FEIR Chapter 2, Project Description, the EIR preparers found no evidence to dispute the findings of the technical review and initial study. Had there been, the project description and subsequent EIR analysis would have been revised accordingly. As discussed, the LEA also concurs that the footprint for purposes of the permit revision application currently under environmental review is 222.5 acres (Barnard, 2004), and a result of the change in the LCRS that was implemented subsequent to the previous EIR evaluation. (The LCRS change is evaluated in this EIR.) As previously discussed, the LEA also determined that the 222.5-acre area is "within the 'Subtitle D Footprint,' that is, within the limit of waste placement as of the effective date of Subtitle D" (Barnard, 2004).

The response to comment D-3 in the FEIR also addressed the references to different acreages that appear in some background documents for the landfill, including the facility's Report of Disposal Site Information (RDSI) (HLA, 1994). In September 2004 the LEA clarified the three different acreages referenced in the 1994 RDSI (195, 210, and 220), explaining that the acreage figures in the RDSI "represent the approximations at the time of the existing and [then-] proposed conditions of the site, based upon the design of the LCRS and perimeter levee accepted and permitted by the LEA in its 1995 SWFP. The 195 acre figure is the footprint without Area G (Area G was evaluated as a lateral expansion in the 1994 FEIR), the 210 acre number was the footprint including Area G, and the 220-acre figure represents the footprint with Area G and the area containing waste outside the footprint boundary which was originally proposed to be excavated and deposited into the landfill. As the response to D-3 concludes, the appropriate disposal footprint considered in the current EIR and for the proposed SWFP revision is 222.5 acres.

Permitted and Current Volume

Comments from the applicant have raised the issue of whether the permitted volume of 19.1 mcy written into the current SWFP is for waste only or is the volume for waste and daily cover material. As discussed in FEIR Master Response 12, based on documents prepared at the time the current SWFP was issued – the 1994 FEIR and 1995 Report of Disposal Site Information – the 19.1 million cubic yard volume includes waste and daily cover, but not the final cover. This has been the LEA's understanding since it issued the permit and as noted is supported by key documents prepared at the time. In communications to the County during the current permit revision process the applicant has stated their position that the quantity written into the permit is for waste only and that currently permitted capacity including waste and daily cover is approximately 25 million cubic yards (GeoSyntec Consultants, 2003), as also stated by the applicant in Comment G-1 in this document. Based on the evidence cited above, the LEA maintains its position that the current permitted capacity of 19.1 million cubic yards is for waste and daily cover.

As to current landfill size, Master Response 12 also discusses the fact that landfill operators periodically take measurements of actual (in-place) landfill volume, typically every two years. An aerial survey of landfill volume taken in October 2006, as reported by the applicant in a table provided to the County and ESA in 2007 (RLI, 2007a), (and referenced in GeoSyntec 2007a [p. 5-1]) states that the volume of waste in place in the landfill as of October 2006 was 15.3 mcy; the height of the landfill, which was indicated in a letter dated October 18, 2004 reporting the results of a May 2004 survey, was 70.9 feet. Such landfill surveys are standard and the LEA has no reason to question the accuracy of this relatively recent measurement; it is neither inconsistent with previous measurements taken at the site, nor with the permitted rate of waste acceptance, nor with the results of previous surveys reported to the LEA.

108. Dynamic (Seismic) Stability of the Landfill

This Master Response addresses concerns raised by several commenters regarding calculations used by the applicant in determining the ability of the proposed landfill to remain stable during an earthquake. The issue of seismic stability is examined in the FEIR in Impact 3.4.1, and in FEIR Master Response 22. The concerns raised in comments on the FEIR are most fully developed in a letter from Craig Herzog, principal engineer for Herzog Geotechnical Consulting Engineers, which appears in this document as a part of Comment Letter N (Comments N-45 through N-53). The majority of this Master Response addresses those comments

Since publication of the FEIR, the applicant has prepared and submitted a design for the Mitigated Alternative, which includes landfill geometry, fill sequencing, and analyses of static and dynamic slope stability (GeoSyntec, 2007a). The County's geotechnical engineering subconsultant, Treadwell and Rollo (T&R) conducted a peer review of the Mitigated Alternative design, which is included in this document as Appendix G. The peer review raised several questions regarding the seismic slope stability analyses conducted for the Mitigated Alternative. Through a series of questions from T&R and responses from the applicant's geotechnical consultant, GeoSyntec Consultants, Inc.(GeoSyntec), the issues raised by T&R were ultimately addressed to their satisfaction, and T&R conclude that the applicant's design for the Mitigated Alternative appears to comply with the seismic stability requirements contained in state and federal regulations (California Code of Regulations Title 27 [Title 27] and Code of Federal Regulations Part 258). Therefore, with respect to seismic slope stability, no new or more severe impacts are identified for the Mitigated Alternative.

The remainder of this Master Response addresses comments raised in the Herzog letter and other comments on the FEIR, which address seismic stability issues associated with the project as originally proposed.

Background

Many of the concerns raised in the Herzog letter regarding the seismic stability calculations used by the applicant for the project as proposed were previously raised during the DSEIR preparation process by T&R. During preparation of the DSEIR, T&R reviewed the following documents regarding the proposed landfill modifications:

- GeoSyntec Consultants, *Joint Technical Document, Redwood Landfill, Marin County, California*, March 27, 1998
- GeoSyntec Consultants, *Revised Fill Sequencing Plan, Redwood Landfill, Novato, California*, October 1997a
- GeoSyntec Consultants, *Report of Waste Discharge for Area G Expansion, Redwood Landfill, Marin County, California*, March 25, 1997b.

T&R raised questions and concerns regarding the geotechnical engineering aspects of the proposed landfill modification and presented the results of their review in the following memoranda:

- Treadwell & Rollo, *Modified Landfill Geometry, EIR-Redwood Landfill, Marin County, California, Project No. 3029.01*, dated 19 June 2001, to Dan Sicular, ESA
- Treadwell & Rollo, *Report of Waste Discharge for Area G Expansion, EIR-Redwood Landfill, Marin County, California, Project No. 3029.01*, dated 13 July 2001, to Dan Sicular, ESA
- Treadwell & Rollo, *Final Cover Design, EIR-Redwood Landfill, Marin County, California, Project No. 3029.01*, dated 13 July 2001, to Dan Sicular, ESA.

GeoSyntec, the applicant's geotechnical design and engineering consulting firm, reviewed these memoranda and provided responses to T&R's concerns in the following memoranda and a conference call:

- GeoSyntec Consultants, *Response to Treadwell & Rollo Comments of 13 July 2001, Report of Waste Discharge for Area G Expansion*, dated 18 October 2001 (GeoSyntec 2001a)
- GeoSyntec Consultants, *Response to Treadwell & Rollo Comments of 13 July 2001, Final Cover Design*, dated 18 October 2001. (GeoSyntec 2001b)
- GeoSyntec Consultants, *Response to Treadwell & Rollo Comments of 19 June 2001, Redwood Landfill Revised Fill Sequencing Plan*, dated 18 October 2001. (GeoSyntec 2001c)
- Conference call meeting, 8 March 2002 (involving representatives of Waste Management, Inc., GeoSyntec Consultants, Inc., Treadwell & Rollo, and Environmental Science Associates); minutes prepared by Environmental Science Associates and confirmed by meeting participants (GeoSyntec et al., 2002).

Following review of the above reports and the phone conference consultation, Treadwell & Rollo prepared a final memorandum on the geotechnical aspects of the project:

• Treadwell & Rollo, *Technical Memorandum, Redwood Landfill EIR, Marin County, California, Project No. 3029.01*, dated 5 December 2002, to Dan Sicular, ESA

The results of the analysis of geotechnical aspects of the project documents and follow-up technical memoranda cited above that pertain to dynamic (seismic) and static slope stability are

reflected in FEIR Section 3.4 and in FEIR Master Responses 7 and 22. Section 3.4 and these master responses also address many of the geotechnical aspects of the project raised in comments on the FEIR.

Following closure of the FEIR comment period the County provided Waste Management the comments on geotechnical issues made by Mr. Herzog (included as part of Comment Letter N) to allow their geotechnical engineers the opportunity to respond. Additional details and clarifications to previous project reports and technical memoranda are contained in the following letter report, which is included in Appendix B in this document:

• GeoSyntec Consultants, *Response to 7 September 2005 Letter from Craig Herzog regarding Geotechnical Review of Final Environmental Impact Report, Novato, California, letter report to Mr. Glen Roycroft, Waste Management March 23, 2006.*

All the above documents are available at the Marin County Environmental Health Services Division for review.¹⁷ This Master Response is based on the documents listed above. This Master Response was prepared by Craig Hall, P.E., formerly of Treadwell & Rollo; Linda Liang, P.E., Hadi Yap, P.E., and Ramin Golesorkhi, Ph.D., G.E., of Treadwell & Rollo; and Peter Hudson, C.E.G., Chris Mueller, and Dan Sicular of ESA.

Seismic Analyses

This section of this Master Response responds primarily to Comment N-46.

In preparation of this Master Response, T&R reviewed both Comment N-46 and GeoSyntec's letter dated 23 March 2006 (Appendix B in this document). In their study of seismic stability of the design of the project as originally proposed, GeoSyntec evaluated stability of the interim (short-term) conditions of landfill development subject to seismic loading. GeoSyntec used a "semi-probabilistic" approach using the time period of 15 years to account for partial consolidation of Bay Mud deposits at the time of an earthquake. The values of peak horizontal ground acceleration (PHGA) selected for the interim condition were established based upon back-calculation from earthquake magnitudes likely to occur in a 15-year interval (0.25g versus 0.58g for the near-field event; 0.20g versus 0.33g for the far-field event).

Title 27 requires that Class III landfills be evaluated for seismic slope stability for the maximum probable earthquake (MPE) which is defined as "...*the maximum earthquake that is likely to occur during a 100 year interval. The term describes a probable occurrence, rather than an assured event that will occur at a specific time..."* Seismic slope stability, as defined in Title 27, does not distinguish a time frame for the stability evaluation with respect to the MPE. The seismic slope stability evaluation performed by GeoSyntec for the interim conditions of landfill development is not consistent with the current interpretation of the seismic requirements of Title 27, since the "semi-probabilistic" approach taken by GeoSyntec that established PHGAs of 0.20 to 0.25g for

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¹⁷ The two other technical memoranda prepared for the County by Treadwell & Rollo during preparation of the DSEIR, which also are available for public review at County offices, are *Leachate Collection and Removal System*, *EIR-Redwood Landfill, Marin County, California, Project No. 3029.01*, 13 June 2001, and *Technical Memorandum, Redwood Landfill EIR, Marin County, California, Project No. 3029.01*, 5 December 2002.

interim conditions is not consistent with the definition of the MPE, and there is a potential for an MPE to occur at the site during the interim conditions. Therefore, the seismic slope stability of the interim conditions should be evaluated using the MPE for Bay Mud strengths at various stages of consolidation, including the least consolidated, most vulnerable condition.

In order to ensure that the project as proposed would result in adequate seismic slope stability of the landfill during the interim (short-term) condition, and to ensure that Impact 3.4.1 is adequately mitigated, Mitigation Measure 3.4.1d is added as follows:

Mitigation Measure 3.4.1d: Prior to issuance of a Solid Waste Facility Permit for the project as proposed, the applicant shall perform additional seismic slope stability analyses to determine if the design of the landfill is adequate to withstand the Maximum Probable Earthquake during interim (short-term) conditions, in accordance with California Code of Regulations Title 27. The selection of the Maximum Probable Earthquake and the analyses themselves shall be subject to peer review by a Registered Geotechnical Engineer. If the results of the analyses indicate an insufficient factor of safety or an excessive degree of seismically-induced deformation, the applicant shall prepare and submit a revised design for the landfill and demonstrate that the design meets the seismic stability requirements of Title 27. The revised design shall be subject to peer review by a Registered Geotechnical Engineer.

Use of Off-Site versus On-Site Materials Information

This section of this Master Response responds primarily to Comment N-47.

According to information provided by the applicant's geotechnical engineers, GeoSyntec Consultants (GeoSyntec et al., 2002, GeoSyntec, 1998; see also Appendix B in this document) and reviewed by T&R, the finite element analysis was performed, not as a comprehensive model, but as a tool to determine monitoring of landfill performance. An observational approach to monitor the stability of the waste fill at the site consists of two criteria: 1) rate of excess pore pressure generation and 2) ratio of vertical and lateral deformation. See Mitigation Measure 3.4.2a in the FEIR.

Use of Existing Site Monitoring Data to Compare with Results of the Finite Element Analysis

This section of this Master Response responds primarily to Comment N-48.

For a comparison of onsite monitoring to finite element analyses see Master Response 7 in the FEIR. An observational approach is being proposed to verify the assumptions used to determine the strength, strength gain, and rate of consolidation, and will allow for modifications of the fill rate if the assumptions do not bear out. If assumptions are not borne out, the monitoring results will be used to provide the basis of a reduced rate of fill. The applicant has provided additional detail for this response in Appendix B of this document, including a suggestion to add an additional mitigation measure for Impact 3.4.2. The suggested mitigation measure is added as follows:

Mitigation Measure 3.4.2e: The geotechnical monitoring program shall include monitoring the rate of Bay Mud consolidation due to the weight of the overlying waste by the following method. The elevation of the bottom of LCRS riser LS1 located in Area G shall be recorded immediately before, and then periodically after, each lift of waste is placed in Area G. The observed rate of settlement will be compared with the predicted rate of settlement. The supervision, reporting, and remedial action elements of Mitigation Measures 3.4.2b through 3.4.2d shall also apply to this consolidation monitoring.

Refuse Sheer Strength

This section of this Master Response responds primarily to Comment N-49.

RLI's geotechnical engineering consultants, GeoSyntec, responded to questions concerning refuse strength data in a memorandum to T&R (GeoSyntec 2001a). GeoSyntec stated that "the strength parameters used for this site have been approved by the California Department of Water Resources in their reviews of landfill stability analyses for various RWQCBs and are now considered by GeoSyntec to be the standard of practice of solid waste landfills."

Because the overlying refuse has higher strength than the underlying Bay Mud, slope stability is controlled by the relatively low strength of the Bay Mud and any reduction in Bay Mud strength is not typical performed for slope stability analyses. See additional discussion of this issue in Appendix G.

Vertical Permeability

This section of this Master Response responds primarily to Comment N-50.

As discussed above, the assumptions used in the analyses will be assessed during the observational/monitoring program during refuse fill placement. The rate of filling will ultimately be dictated by the results of the monitoring program, not by the results of the finite element analyses. See also Appendix B in this document for additional information provided by the applicant in response to this comment.

Seismically-Induced Slope Deformation

This section of this Master Response responds primarily to Comment N-51.

Please refer to Master Response 22 in the FEIR. GeoSyntec (2001a) provided their rationale for the discrepancies between the two sets of calculations. GeoSyntec stated that HLA (1992) and GeoSyntec (1997) seismic site response and deformation analyses do not follow the same approach and employed significantly different material properties, hence different resulting deformations. GeoSyntec stated that the HLA seismic site response and deformation analyses are based on an "equivalent-linear total-stress approach," whereas GeoSyntec used a "more advanced non-linear effective stress analysis with ground motion parameters developed based on site-specific evaluations and solid waste material parameters." See also Appendix B in this document for additional information provided by the applicant in response to this comment.

Interface sheer strength required for landfill cover

This section of this Master Response responds primarily to Comment N-52.

As stated in FEIR response to Comment N-32, materials that meet the specified criteria for cohesion and adhesion are currently available. As also discussed, the landfill operator will be responsible for ensuring that the material used meets the specified criteria, and that required quality assurance/quality control standards for final cover are met. Bay Mud Sheer Strength

This section of this Master Response responds primarily to Comment N-53.

The basis of GeoSyntec's approach is to verify assumptions through monitoring, as discussed above. See also additional information provided in Appendix B of this document.

Conclusion

Based on responses to comments provided by the applicant's Geotechnical Engineer (see Appendix B) and reviewed by T&R and ESA, the project as proposed (with incorporation of the additional mitigation measures specified in this Master Response), would not result in new or more severe seismic stability impacts than identified in the FEIR.

109. Subsurface Conditions

A number of commenters asked about or commented on subsurface conditions at the site. Comments and questions focus on the adequacy of subsurface materials to contain and prevent the off-site release of leachate and on whether current information on subsurface conditions is adequate to make reasonable judgments about containment. This Master Response summarizes information previously provided on subsurface conditions and includes supplementary information on past investigations at the site.

FEIR Section 3.4 provides information on site geology, and Master Responses 1, 7, and 13 in the FEIR provide additional information on the subsurface conditions, the permeability of Bay Mud, and the function of the LCRS, which takes into account physical properties of materials underlying the landfill. FEIR Section 3.4 presents information on site geology and describes the geologic units underlying the site; these include Franciscan Bedrock, Pleistocene-age alluvium, and Bay Mud. As described in the FEIR the bedrock is the oldest unit and Bay Mud the youngest; as such, generally the bedrock is overlain by the alluvium which in turn is overlain by the Bay Mud. Exceptions to this occur in areas where bedrock ridges and knolls extend through one or both of the overlying units. In such areas bedrock may be exposed at the surface or overlain directly by Bay Mud. The alluvium unit ranges from 0 (i.e., where bedrock extends through it to the Bay Mud or ground surface) to 200 feet thick and consists of very stiff to hard sandy clay/clayey sand that contains laterally discontinuous lenses of coarse-grained sand and gravel. In the landfill vicinity the top and base of the alluvium consist of very stiff sandy clay or clayey sand.

Bay Mud overlies the alluvium unit. Subsurface investigations at the site (described below) have found that, in general, the Bay Mud deposits thicken eastward, and range from a thickness of 5 feet along the western perimeter to 56 feet in the Oxbow area. Bay Mud ranges from 7 to 48 feet thick within the active landfill footprint. The FEIR description of the Bay Mud geologic unit noted that a previous site investigation encountered no Bay Mud in the area of the former four-acre pond. This description of the underlying geology at the site was intended to describe the naturally occurring units found at the site. The area of the former pond previously had been bedrock, which had been quarried to a depth of approximately -30 feet msl, and subsequently (for a time) used as a pond. Prior to the placement of refuse in this area, the quarried former pond area was lined with compacted Bay Mud to elevations of +8 to -14 feet msl (GeoSyntec, 1998), as stated in FEIR Master Response 7 (p.6.3-24).

As described in the FEIR, Bay Mud is a fine-grained sedimentary deposit consisting of highly plastic clays and silt containing varying amounts of organic material, sand, and shells. Although Bay Mud has low-permeability, it contains sand lenses and stringers of organic material that are more permeable; therefore an understanding of the location and extent of these areas is important to the appropriate management of the site and the development of effective environmental controls to prevent the offsite release of leachate.

The applicant and former owners and operators of the landfill have conducted various geotechnical investigations at the site that contribute to the understanding of its subsurface physical characteristics. Of particular note is the geotechnical investigation conducted by HLA in 1992, which is summarized below. The 1992 HLA report also summarized earlier studies conducted at the site, as follows:

- Cooper, Clark and Associates and John T. O'Rourke and Associates conducted geotechnical investigations of the site prior to 1988. Work included several borings and collection of field and laboratory data and analysis. The HLA study did not use results of this investigation because of the method of sample collection and accuracy of tests were deemed insufficient for use in a detailed stability analysis.
- EMCON Associates conducted detailed geologic, hydrogeologic, and geotechnical investigations at the landfill between 1988 and 1989. The EMCON studies included 13 borings, 29 cone penetration test soundings, seismic refraction and seismic downhole sheer wave surveys, and geotechnical laboratory testing. Based on the geotechnical analyses, EMCON developed a fill sequencing plan that relied on the concept of staged construction to achieve the proposed final landfill height of 170 feet (msl). (The proposed landfill footprint and final height have been revised since the EMCON study.)

During this time, in December 1988, an old perimeter levee in the southern portion of the landfill, by Area A, failed. The levee moved up to several feet, both horizontally and vertically, during a period of extreme tides. EMCON installed five inclinometers and six piezometers within the area of the failure, and retained William Cotton and Associates to help evaluate levee stability.

• William Cotton and Associates investigated the stability of the existing perimeter levee bordering areas A, B, and C, and evaluated a plan for reconstructing the levee. The plan consisted of a levee configuration (also referred to as a cutoff wall) 40 feet wide at the top, supporting an access road around the landfill and a leachate collection and removal system. This investigation, which involved borings from a pontoon rig in the creek and sloughs bordering the site, borings on or immediately inboard of the old levee, and cone penetration test soundings, provided information on the actual thickness of refuse in areas adjacent to the old levee and additional information on levee stability.

- Between 1989 and the 1992 investigation, HLA provided a range of geotechnical services at the site, including geotechnical monitoring, designing and installing a geotechnical monitoring system within area A, abandoning the EMCON inclinometers and piezometers according to accepted procedures, and conducting 20 field vane soundings in Area A, to better characterize the current strength of the Bay Mud and provide a baseline from which to measure increases in Bay Mud sheer strength over time.
- HLA also provided geotechnical observation and testing during construction of the new perimeter levee at Area A. During construction of the perimeter levee at Area A, a temporary fill slope constructed directly on Bay Mud failed. The failure movement was toward the center of the landfill, and did not cause a breach of the levee or discharge of waste, but ultimately provided substantial information on the strength of Bay Mud. Borings and field vane soundings were taken inside and outside the failure area. Results of the collected data indicated the failure was due to a localized low strength zone within the Bay Mud. These data were included in the discussion of results of HLA's 1992 investigation.
- In 1990 HLA conducted a hydrogeologic investigation for development of a perimeter groundwater monitoring well network. The investigation included testing of samples taken from 25 continuously-sampled borings. HLA also installed nine more multi-staged pneumatic piezometers at Areas A, B, and C and four inclinometers at Area A. Logs of the borings to install these instruments provided additional subsurface data that were presented in the 1992 report.

1992 Geotechnical Field Investigation

The 1992 HLA geotechnical investigation, Part 3 of the Revised Site Development Plan (HLA, 1992) was undertaken to fulfill geotechnical requirements contained in CCR Title 23, which at the time were the State Water Resources Control Board regulations governing discharges of waste to land (now Title 27, CCR). Findings of the 1992 HLA investigation were taken into account in the previous permit revision EIR (1994) and thus were not a central focus of this EIR. However, information developed from that investigation continues to be relevant to current and proposed management of the landfill and the current EIR analysis.

To explore subsurface conditions at the landfill site, HLA excavated 12 test pits, drilled 38 borings, and conducted 65 field vane soundings at the landfill site. The investigation also surveyed the bottom of San Antonio Creek in three places. Five borings were drilled on land and 25 hydrogeologic borings were drilled adjacent to the perimeter levee. In addition, five hand auger borings were drilled in the mud flats bordering the landfill perimeter, and three offshore borings were drilled using a pontoon rig from within San Antonio Creek. The locations of the field data points within and near the landfill footprint are shown in Figure MR109-1. During the

drilling a field engineer or geologist logged all the borings and obtained soil samples. The strength of the soft soils also was measured during sampling. Soil samples were reexamined at

HLA's laboratory to confirm field classifications and select representative samples for geotechnical testing.

The 65 field vane soundings were conducted to characterize the undrained shear strength of the soft soils underlying the site. The 12 test pits were excavated within the refuse to evaluate the material's unit weight. Data from 6 of the 12 test pits were not included in the report, however, because the sample sizes at these 6 were considered too limited to provide reliable data.

The investigation found that (as described in the FEIR and above) the site is underlain by three main geologic units: Bay Mud, alluvium, and bedrock. These naturally occurring materials are overlain throughout the site by manmade fill consisting of old levees, new levees, refuse, and compacted clay liners. The report describes the material content and engineering properties of the old and new levees. The investigation found that approximately 220 acres of the site contain refuse, and that two methods had been used since refuse placement began in 1958. One method involved placement of waste directly over existing grades and one involved excavation of trenches 5 to 10 feet deep in which waste was placed. (HLA obtained the information on the trenching practice from interviews with RLI employees.) It is believed that trenching was only used in Areas A and D; this method was discontinued in 1970.

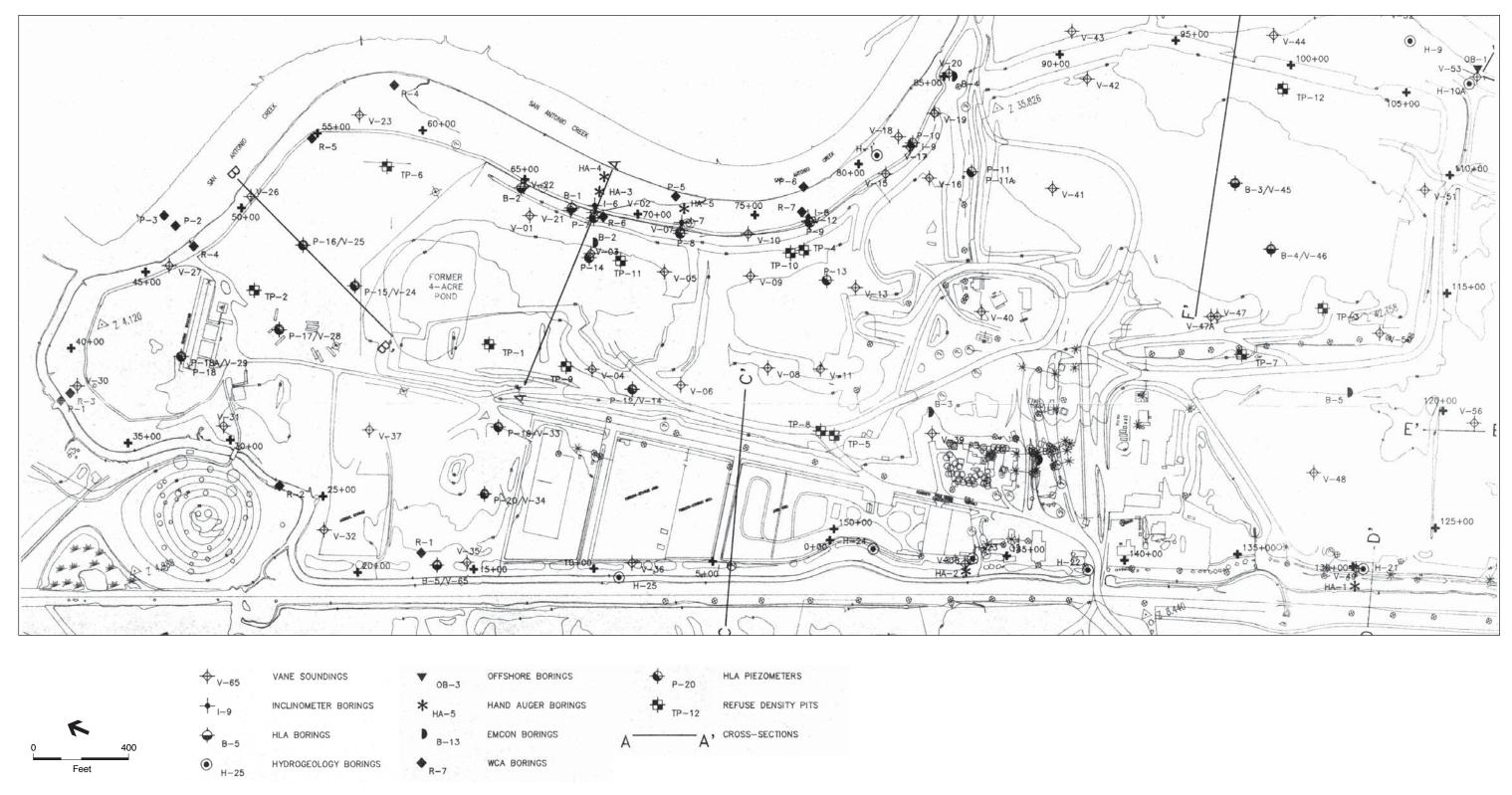
Laboratory tests on the Bay Mud from the site investigations found that 60 to 70 percent of the Bay Mud contains less than 5 percent organic materials (by weight; the boring logs also include estimated percentages by volume) and 30 to 40 percent of the Bay Mud contains 5 to 35 percent organic material by weight. The organic materials generally consist of fibrous matter resembling slightly decomposed marsh grasses, surrounded in a matrix of Bay Mud. Zones of more organic material are generally 5 to 10 feet thick and appear to be discontinuous.¹⁸ The investigation also found some discontinuous sandy zones. These areas were generally less than a few feet thick and consisted of sand surrounded by a matrix of approximately 20 to 60 percent Bay Mud by weight.

The HLA report stated that the alluvium unit that underlies the Bay Mud (except in the area of the former four-acre pond) consists of silts and clays with varying amounts of sand and gravel. In most cases the sands and gravels contain at least 15 percent clays and silts by weight. The silts and clays are generally stiff to very stiff. The silty and clayey sands and gravels are loose to very dense. HLA reported that, much less frequently, the EMCON borings encountered clean discontinuous sand or gravel layers.

Based on the information presented in several of the applicant's geotechnical engineering reports, particularly HLA (1992), there appears to be sufficient geotechnical field data points (borings, cone penetration tests, vane shear tests) to create the resulting Bay Mud thickness contour map presented by HLA (1992) (see Figure MR109-2).

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¹⁸ The report states that other researchers had described encountering peat (defined as pure organic material) or peaty material; however, HLA did not observe any zones that were entirely organic material.

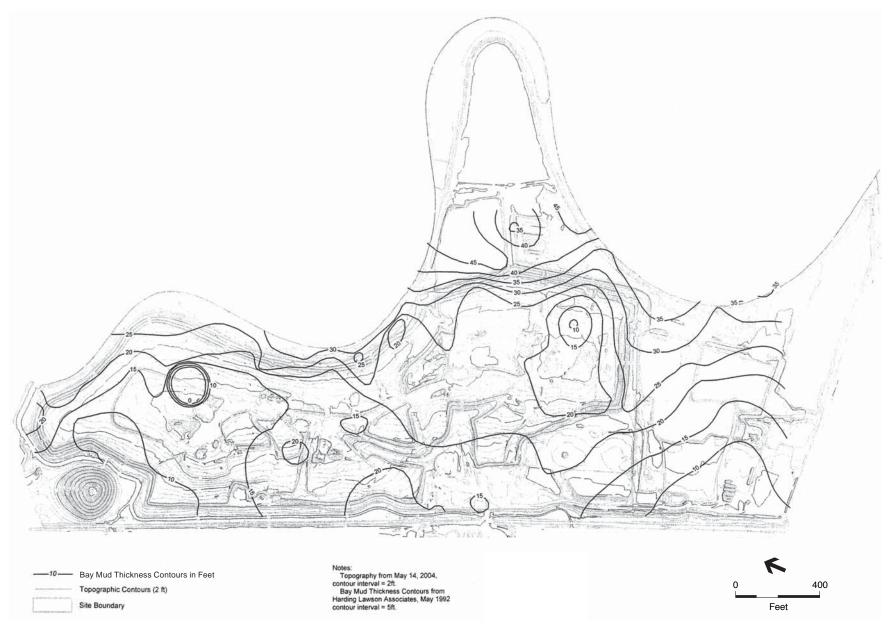


SOURCE: Harding Lawson Associates, 1992, Plate 3-2

Redwood Landfill Solid Waste Facilities Permit Revision FEIR Supplement / 200238 ■ Figure MR 109-1 Geotechnical Data Points Locations

2. Master Responses

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SOURCE: GeoSyntec Consultants, 2005, Figure 5. Bay Mud Contours from Harding Lawson Associates, 1992. Legend based on Harding Lawson Associates, 1992. Redwood Landfill Solid Waste Facilities Permit Revision FEIR Supplement / 200238 ■ Figure MR 109-2 Bay Mud Thickness Contour Map

Subsequent Studies

As reported in the JTD (and FEIR Section 3.4) RLI has conducted a subsequent investigation to identify the location and extent of sand channel deposits within the Bay Mud. RLI has indicated that these deposits were found to be discontinuous. Monitoring wells of the detection monitoring program (described in FEIR Master Response 14) are located within the known channel deposits on the site perimeter. The piezometer clusters that monitor hydraulic gradient (described in Master Response 105) are located in proximity to the channel deposits to confirm that hydraulic gradient toward the LCRS trench is maintained in these areas. As discussed in Master Response 105 a mitigation measure has been added to ensure that hydraulic gradient toward the trench is maintained in these areas

Conclusion

Investigations of subsurface conditions at Redwood Landfill have provided sufficient understanding to support the conclusions reached in the FEIR regarding protection of ground and surface water and also regarding the stability of the landfill itself. Continued monitoring of site conditions will help refine this understanding and will serve as a basis for adjustments to operation of the site, including fill sequencing and the development of the LCRS.

110. Aesthetic Impacts: View from the East

A number of commenters stated that the analysis was inadequate because it did not consider impacts on views from the east of the landfill, in particular the impact on views of people on the Petaluma River or San Antonio Creek.

The FEIR evaluates the potential impact of the proposed project on visual quality in Section 3.1. The analysis discusses potential aesthetic impacts of the project and includes photos of the existing landfill and photo simulations of the permitted and proposed final landfill contours from representative public viewpoints along Highway 101 and Olompali State Park. As discussed in the FEIR no change in the maximum permitted height of the landfill (166 feet msl) is proposed but landfill slopes, currently permitted at 4:1 (horizontal to vertical) are proposed to be increased to 3:1 (horizontal to vertical).

The FEIR appropriately focuses the analysis on the areas where there is a greatest potential for adverse visual impacts. The EIR preparers found that the landfill was too far for the proposed change in slope or changes in site operations to adversely affect views from the nearest public roadway east of the site, the Lakeville Highway. The ridgeline with Mount Burdell predominates views from this distance and direction. Similarly, due to the distance of the Petaluma River from the site, the effect of the proposed changes in landfill contours and permitted operations from this distance would be insignificant, if discernable. For example, the nearest point along the Petaluma River to the landfill itself, from the curve in the river near Hog Island, is about the same distance as vantage point 3 is from the west side of the landfill. Plainly, the change in slope, taking into account the slower pace of travel on the Petaluma River (and correspondingly longer time the landfill would be within view) compared to Highway 101, is minor and would not have a

significant impact on visual quality in this area. It is also important to note that as one approaches closer to the landfill from the east, e.g. by kayak along San Antonio Creek or one of the sloughs, although the focus may be sharper, the view of the landfill itself would increasingly be obstructed by the perimeter levee, which currently ranges from six to nine feet above mean sea level and is planned to be raised to nine feet msl along the entire perimeter in the near future.

In conclusion, the FEIR analysis of aesthetic impacts adequately and thoroughly characterizes the visual character of the site and the potential for aesthetic impacts of the project.

111. Third Party Monitoring

A number of commenters have requested that third party monitoring be established at the site. Groundwater and surface water monitoring at the landfill are discussed in Master Response 14 in the FEIR. Geotechnical monitoring is discussed in Master Response 7 in the FEIR.

A range of FEIR mitigation measures, as well as ongoing landfill operations, involve monitoring by the landfill operator and submittal of data within specified reporting periods to regulatory authorities. The Marin County Environmental Health Services Division, the CIWMB-designated Local Enforcement Agency (LEA) for the County, regularly monitors site activities through unannounced monthly site inspections. The purpose of the site inspections is to ensure compliance with applicable statutes, regulations, and SWFP conditions. The CIWMB provides guidance to LEAs on procedures for conducting inspections, including interpretation and application of statutes and regulations governing landfills. LEA inspections are considered a key part of the enforcement of solid waste regulations and serve to provide information to the site operator about violations of applicable requirements and serve as notice to take actions to correct those violations (CWIMB, 1998). Facility records also are retained on site and reviewed by LEA inspection staff. The LEA is only one part of regulatory oversight of the landfill; CIWMB staff also conduct periodic inspections at the site, and RWQCB and BAAQMD provide oversight pertaining to water and air quality issues, respectively.

As discussed in FEIR Master Response 7, self monitoring activities are common and accepted practice under state and federal regulations at most California landfills. Although several commenters pointed to the applicant's record of compliance as a reason that independent monitoring is warranted, past compliance issues were not related to the manner in which monitoring and the submission of monitoring data was conducted, as indicated by the discussion of the applicant's record of compliance in FEIR Master Response 18. In addition, as noted above, the LEA staff already monitors the landfill on a regular basis as part of their regular duties, and other regulatory agencies also conduct periodic inspections.

Because the FEIR does not identify a significant impact related to the landfill's existing monitoring program, there is no legal basis under CEQA to impose a third party monitoring program on the project as mitigation (CEQA Guidelines § 15126.4(a)(4)). However, the LEA, as the lead agency for the project, may at its discretion require such a program as a condition of

approval of a revised Solid Waste Facilities Permit, if it finds there is a legitimate public interest to do so. The remainder of this Master Response is intended to inform such a decision.

Potential Function of a Third Party Monitor

Monitoring that involves third party experts where appropriate could strengthen the current monitoring program, enhance the credibility of reported results, and provide greater assurance to the public that the landfill is in compliance with environmental regulations and the conditions of its permits.

Reference to Monitoring at Altamont Landfill

Regarding a comparison to Altamont Landfill raised in one comment, it should be noted that the circumstances under which a third party monitoring program was established at Altamont are fundamentally different from the current CEQA process at Redwood Landfill. Third party monitoring was a component of a negotiated settlement agreement at Altamont, and not a mitigation measure specified in the EIR for the project.

ISO 14001: Environmental Management System

Since the FEIR was produced, RLI has indicated its intention to implement the International Organization of Standardization (ISO)¹⁹ 14001 standard with program auditing by an independent third party as part of the landfill's environmental management system (Meserve, 2006; Redwood Landfill and Recycling Center, 2007). RLI has suggested implementing ISO 14001 and making the independent third party audit results public as an appropriate response to community concerns about monitoring at the landfill (RLI, 2007b).

The ISO 14000 series concerns standards in the environmental field, and ISO 14001 is the environmental management system (EMS) standard. ISO 14001 is not a technical standard, and does not in any way replace technical requirements contained in laws or regulations. The ISO 14001 standard requires implementation of practices and procedures which, taken together, constitute an EMS. The ISO 14001 standard requires the following (USEPA, 2006a):

- A policy statement committing the organization to the prevention of pollution, continual improvement of the EMS leading to improvements to overall environmental performance, and compliance with all applicable statutory and regulatory requirements.
- Identification of all aspects of the organization's activities, products and services that could have a significant impact on the environment;

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¹⁹ The ISO is a non-governmental organization consisting of a network of the national standards institutes of 157 countries; a central secretariat located in Geneva, Switzerland, coordinates the system. The American National Standards Institute (ANSI) is the member organization representing the United States (ISO, 2007a). ISO promotes the development and implementation of voluntary international standards, both for particular products and for environmental management issues (USEPA, 2006).

- Setting performance objectives and targets for the management system that link back to the three key policies of pollution prevention, continual EMS improvement, and compliance with applicable statutes and regulations;
- Establishing a program to periodically audit the operation of the EMS;
- Checking and taking corrective and preventive actions when deviations from the EMS occur; and
- Undertaking periodic reviews of the EMS by top management to ensure its continual performance and making adjustments to it as necessary.

According to the ISO, certification is not a requirement of any of ISO's management system standards. However, there is a process by which an EMS program may be certified through an independent auditing process. The ISO defines "certification," in the context of ISO 14001:2004,²⁰ as the issuance of written assurance (the certificate) by an independent external body that it has audited a management system and verified that it conforms to the requirements specified in the standard. The auditing body then records the certification in its client register, referred to as "registration," such that the organization's management system is both certified and registered (ISO, 2007b). (ISO considers the difference between the two terms to be insignificant in the context of ISO 14001:2004 and both are acceptable for general use.)

RLI provided the County and its EIR preparers, ESA, with information on ISO 14001 certification by the firm LRQA (Meserve, 2006c), and has proposed to the County that implementing ISO 14001 and making public the results of the independent third party audit would be an effective means to address community concerns about monitoring at the site. RLI proposes making a commitment to the County -- to implement ISO 14001 and provide the LEA copies of three-year certification audits -- separately from the EIR process, because "verification of Redwood's compliance status does not relate to any particular environmental impact" (RLI, 2007).

112. Greenhouse Gas Emissions and Global Climate Change

Since publication of the FEIR in July, 2005, the issue of global climate change resulting from human activities has gained prominence and urgency as the scientific basis for measuring and predicting climate change has strengthened, the potentially dire consequences for humanity and for life on earth have become better understood, and as efforts have increased to reverse climate change through reduction of greenhouse gas (GHG) emissions (IPCC, 2007a). The passage of Assembly Bill 32 in 2006 established California's goal of reducing greenhouse gas emissions to 1990 levels by 2020; the Governor also established as state policy reducing GHG emissions 80 percent below 1990 levels by 2050.

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²⁰ ISO 14001 was initially adopted in 1996 and revised in 2004; the summary on EMS certification at the ISO website refers to the revised standard as "ISO 14001:2004" (ISO, 2007c).

The Marin County Greenhouse Gas Reduction Plan, adopted by the Board of Supervisors in October 2006, sets out policies to help achieve the County's GHG emissions targets. The target has been set to reduce GHG emissions by 15 to 20 percent below 1990 levels by the year 2020 for internal government operations and 15 percent Countywide. It is the overall policy of the 2007 Countywide Plan Update to apply the GHG Reduction Plan policies to all land use planning and development projects in Marin, as appropriate. For several years, the Intergovernmental Panel on Climate Change (IPCC), the USEPA, and the California Energy Commission have conducted inventories of greenhouse gasses (GHGs) at the global, national, and state level (IPCC, 2007b, USEPA, 2006b, California Energy Commission, 2006). Several local governments, including Marin County, have also conducted their own inventories or are currently engaged in this process. These inventories indicate that municipal solid waste landfills are a major source of GHGs, predominantly from fugitive landfill gas emissions, but also from emissions from fossil-fuel powered equipment and vehicles.

Landfill Gas

As organic material decomposes in a landfill, it is initially digested by aerobic bacteria, which live in the presence of oxygen. Aerobic bacteria consume oxygen and produce carbon dioxide (CO_2) , a greenhouse gas. Inventories of GHG emissions consider CO_2 from decomposition of organic material to be "biogenic" – a component of the natural cycling of carbon in the biosphere and the atmosphere – and therefore these emissions are not "counted." As oxygen in a landfill is depleted, however, anaerobic bacteria take over the task of decomposing the waste. Through a series of biochemical processes, anaerobic decomposition results in the production of methane gas (CH₄), which, according to the IPCC's Fourth Assessment Report, has a global warming potential 25 times that of CO_2 (Forster et al, 2007).²¹ While anaerobic decomposition is a natural process, such emissions are included in local, state, national, and global GHG inventories. Landfill gas emissions are roughly half methane and half CO_2 , with a small fraction consisting of so-called "non-methane organic compounds" or NMOCs.²²

Measuring the amount of landfill gas actually generated in a particular period in a facility's lifespan, and over the entire lifespan of a facility, is difficult at best. Several mathematical models exist for estimating the amount of landfill gas generated. The USEPA uses the LandGEM model, which, like the approach recommended as "good practice" by the IPCC, is based on the "First Order Decay" method.²³ The model uses as inputs the amount of waste placed in the landfill annually; a factor (Lo) for the *potential methane generation capacity*, which depends on the type and composition of waste placed in the landfill; and a factor (k) for the *methane generation rate*, which determines the rate of methane generation for the mass of waste in the landfill, and which is related to environmental conditions within the landfill – primarily the amount of moisture. The output of LandGEM is the total predicted annual generation of gases, including CO₂, methane, and NMOCs. The LandGEM output for Redwood Landfill for the landfill as currently permitted,

²¹ Global Warming Potential, or GWP, is a measure of the relative radiative effect of a given substance compared to CO_2 , integrated over a chosen time horizon. The stated GWP for methane is over a 100-year time horizon.

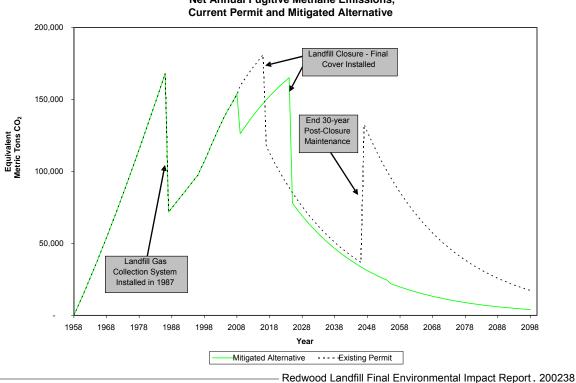
²² NMOCs include several toxic air contaminants (TACs); health risks from exposure to these substances are considered in the FEIR in Impact 3.2.8.

²³ For a full description of the First Order Decay method, see IPCC, 2006, Chapter 3 and Annex 3A.1

and for the landfill as originally proposed, appeared in Appendix D of the FEIR. ESA again ran LandGEM for Redwood Landfill in November, 2007, using the most recent version (version 3.02, May, 2005), current site life estimates for the landfill as currently permitted and under the Mitigated Alternative (see Master Response 104) and refined and updated values for the amount of waste placed in the landfill since it opened in 1958. These runs used default values for k and Lo. The LandGEM report appears in Appendix E in this document.

Of greater concern than the overall rate of methane generation from landfilled waste is the amount of methane that escapes to the atmosphere as so-called "fugitive" emissions. At Redwood Landfill, which has a landfill gas collection system, fugitive methane emissions come from two sources: gases that are not captured by the collection system, and gases that are captured but that are not destroyed by the landfill's flare system (or in the future under the Mitigated Alternative, should it be approved, by the power generation engines that are specified in FEIR Mitigation Measure 3.2.5c as replacements for the flare).

Predicted emissions of methane for Redwood Landfill, from 2008 through 2098, under both the existing permit conditions and under the Mitigated Alternative, are shown in Table MR112-1; emissions for the entire lifecycle of the landfill, from its opening in 1958 through 2098 and under both scenarios, are represented in Figure MR112-1. The complete tables (showing calculations for each year of the landfill's life and post-closure period) are included in Appendix E. The basis for Table MR112-1 and Figure MR112-1 are discussed at some length below.



Net Annual Fugitive Methane Emissions,

SOURCE: Environmental Science Associates

Figure MR112-1 Site Life GHG Emissions

		Unit	Existing Permit	Mitigated Alternative	Increase or (Decrease)	Percent Increase or (Decrease)
Α.	Waste in Place	Short Tons	16,560,382	20,775,054	4,214,672	25.5%
В.	LFG Generation	m3	1,924,392,558	2,658,511,468	734,118,911	38.1%
C1.	LFG Capture ^a	m3	1,072,899,301	1,837,863,324	764,964,023	71.3%
C2	LFG Capture	Mg	715,783	1,226,128	510,345	71.3%
D.	LFG Capture Rate	Percent	56%	69%	13%	
Ε.	Methane Captured	Mg	357,892	613,064	255,172	71.3%
F.	Methane not Captured	Mg	284,036	273,747	(10,289)	-3.6%
G.	Methane Oxidized Through Cover	Mg	28,404	27,375	(1,029)	-3.6%
H.	Net Fugitive Methane From Landfill	Mg	255,633	246,372	(9,260)	-3.6%
I.	Fugitive Methane From Flare/Engines	Mg	7,059	11,079	4,020	56.9%
J.	Total Fugitive Methane – Flare/Engines and Landfill (H+I)	Mg	262,692	257,451	(5,241)	-2.0%
K.	GWP of Fugitive Methane Emissions (J * 25)	Mg eCO2	6,567,289	6,436,272	(131,017)	-2.0%
L.	Power Production Potential of Captured LFG ^b	kWH	_	5,641,926,696	5,641,926,696	_
M.	Electricity Generation Emission Offset – CO2 equivalent	Mg eCO2	-	(2,062,179)	(2,062,179)	_
N.	Global Warming Potential – Net Emissions less Offset	Mg eCO2	6,567,289	4,374,093	(2,193,196)	-33.4%

TABLE MR112-1 GREENHOUSE GAS EMISSIONS FROM LANDFILL GAS, 2008 THROUGH 2098

a Landfill gas system capture based on Redwood Landfill reports to BAAQMD for 2002-2006, and estimated for 2007 and future years.
 Power production potential derived by multiplying: landfill gas captured x energy content of landfill gas x thermal efficiency of power production equipment

<i>Key:</i> Mg m3 eCO2 GWP Short ton	Million grams (1 million grams = 1 metric ton) cubic meter carbon dioxide equivalent Global Warming Potential U.S. ton (2,000 pounds)	Bt M C0	VH MBtu O2 H4	Kilowatt Hour British Thermal Unit Million Btu Carbon dioxide Methane	
	d in Calculations:	Fastar	0		
Description	1	Factor	Sour	ce	
LFG Syste	m Destruction Efficiency: Flare	99%	See	text	
	m Destruction Efficiency: Gas-Fired Engines	98%	See text		
LFG Syste	60%	Average of 2002-2006 reported capture divided by modeled generation			
LFG Syste	75%	See text			
closure per					
CH4 Oxida	10%	See	text		
CH4 Globa	25	Fors	ter et al, 2007		
Energy cor	502.5	From	n CA Climate Action Registry, 2005		
kWH per B	0.000293071	onlin	econversion.com		
kWH per N	1MBtu	293.071	calcu	Ilated	
Mg eCO2 emissions per kWH electricity generation		0.00036551	For California, calculated from factors in CA Climate Action Registry, 2007		
Thermal efficiency for natural gas-fired turbine		60%	On-li	ne literature survey, assumes combined cycle guration	
minutes pe	er vear	525.600		ulated	
ft3 per m3		35.31466672		econversion.com	
Methane d	0.000667148	Calculated from LandGEM output			
lbs/Mg	2,204.62	onlineconversion.com			
5					

SOURCE: ESA, Others

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Landfill Gas Capture and Destruction

Redwood Landfill monitors the amount and composition of landfill gas captured through its landfill gas collection system and reports this to the Bay Area Air Quality Management District as a condition of their permit. The results of monitoring from 2002-2006 appear in Table MR112-2, and indicate that the amount of landfill gas captured through the system has approximately doubled since 2002.

Year	Average Flow Rate ^a (scfm)	Annual LFG Flow (scf)	Annual Methane Captured (scf)	Annual Methane Captured ^b (Mg)	Annual Methane Generated ^c (Mg)	Methane Capture Rate (percent)
2002	1,302	684,331,200	342,165,600	6,464	13,833	47%
2003	1,585	833,275,378	416,637,689	7,871	14,347	55%
2004	1,457	766,017,324	383,008,662	7,236	14,863	49%
2005	2,009	1,055,969,032	527,984,516	9,974	15,347	65%
2006	2,623	1,378,597,672	689,298,836	13,022	15,754	83%
Average, 2002–2006	1,795	943,638,121	471,819,060	8,913	14,829	60%

TABLE MR112-2 LANDFILL GAS COLLECTION SYSTEM MONITORING RESULTS

^a Measured flow rate refers to landfill gas flow through the collection system, and has been corrected to 50% methane content for comparative purposes.

^b See factors in notes in Table MR112-1 for conversion from volume to weight for methane.

^c Based on LandGEM model results scfm: standard cubic feet per minute

scf: standard cubic feet

Mg: metric ton (million grams)

SOURCE: Redwood Landfill, ESA

The concentration of methane in the captured gas is also measured, and varied over the monitoring period, but the total volumes shown in the table have been corrected to 50 percent methane content for consistency. Dividing the amount of landfill gas or methane captured by the amount generated (as predicted by LandGEM) provides a "capture rate." For the monitoring period, the average capture rate derived in this manner is 60 percent: that is, 60 percent of the landfill gas (and methane) apparently generated is captured by the system. To estimate the lifecycle capture rate, the 60 percent figure was used from the time the landfill gas collection system was installed in 1987 through the predicted closure date of the landfill; for the 30-year post-closure maintenance period specified in the Joint Technical Document for the landfill (GeoSyntec, 1998), a figure of 75 percent was used, which reflects the greater efficacy of landfill gas collection systems after an impermeable final cover is installed on a closed landfill.²⁴ For the

²⁴ These figures are consistent with guidelines contained in a recent solid waste industry white paper (Solid Waste Industry for Climate Solutions, 2007a). Page 10 of the report recommends using a capture rate of "50-85% (mid-range default = 68%) for a landfill or portions of a landfill that are under daily cover with an active LFG collection system installed but [that] does not have a Resource Conservation and Recovery Act (RCRA) Subtitle D equivalent liner;" (Redwood Landfill does not have a Subtitle D equivalent liner, except in Area G), and that, "The low end [of the stated range] would be for... systems that were retroactively installed well after the landfill's operating life had begun." (Redwood Landfill began operations in 1958, and the landfill gas collection system was installed beginning in 1987).

emissions estimate under current permit conditions, it is assumed that from the end of the 30-year post-closure maintenance period through 2098 that no landfill gas collection system will be in place, and that the capture rate will be 0 percent. Under the Mitigated Alternative, it is assumed that the gas-fired engines will be in place through 2098 (see Master Response 104 in this document, and Mitigation Measure 3.2-5g, below in this Master Response).

Table MR112-1, line D shows the lifecycle capture rate for the landfill under current permit conditions and under the Mitigated Alternative; line E shows the amount of methane projected to be captured by the system.

When methane is combusted, it produces carbon dioxide and water vapor. Flare and power generation systems do not, however, combust all of the methane input to the system. The "destruction efficiency" of the flares at Redwood Landfill has been measured at over 99 percent; typically, small gas-fired power generation engines have a slightly lower destruction efficiency, of about 98 percent. Thus, 1-2 percent of captured methane can be expected to escape to the atmosphere.²⁵

Table MR112-1, line I, and Figure MR112-1 show the lifecycle emissions of un-combusted methane. The Mitigated Alternative calculations assume that the flares will be replaced by gas-fired engines in 2009 that would continue to operate as long as the landfill is producing methane; under the existing permit, no engines would be installed.

Fugitive Landfill Gas

The amount of methane that is not captured by the landfill gas collection system (fugitive landfill gas) is derived by subtracting the projected amount of captured methane from the amount modeled as generated by LandGEM.²⁶ The results of this calculation are shown in Table MR112-1, line F. Not all of the methane that escapes capture by the landfill gas collection system reaches the atmosphere, as some portion is oxidized (and is transformed to water vapor and CO₂) as it passes through the earthen landfill cover material and is consumed by microorganisms. There is evidence that the cover can be quite effective in oxidizing methane (Solid Waste Industry for Climate Solutions, 2007a), but in the absence of site-specific measurements, a conservative figure of 10 percent (which is used in national and global GHG inventories) is used here. The amount of methane predicted to be oxidized through the cover is shown in Table MR112-1, line G; net fugitive methane emissions, that is, the amount not captured by the LFG collection system, less the amount oxidized, is shown in line H.

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²⁵ These figures are more conservative than those recommended in another recent solid waste industry white paper (Solid Waste Industry for Climate Solutions, 2007b), which recommends use of the following destruction rates: 99.96% for flares

^{98.34%} for engines

^{99.97 %} for turbines

The use of 99% for Redwood Landfill's flares and 98% for engines may over-predict methane emissions, but is considered conservative and appropriate for the purposes of this analysis.

²⁶ While several methodologies exist for direct measurement of fugitive gas from landfills (see Jacobs and Scharff, 2005; Huitric et al, 2007), no direct measurements have been taken at Redwood Landfill; neither would a short-term effort to take such measurements provide useful data, as the amount of gas generated (and the amount that escapes as fugitive gas) varies considerably, as indicated by the monitoring data cited above.

Global Warming Potential of Landfill Gas Methane Emissions

The sum of the methane that is predicted to escape from the flare/power generation engines plus that which will escape through the landfill cover is shown in Table MR112-1, line J. As previously noted, methane has a global warming potential that is 25 times more powerful than carbon dioxide (Forster et al., 2007). The global warming potential of future fugitive methane emissions from the landfill under both the existing permit and under the Mitigated Alternative is shown in Table MR112-1, line K, expressed as metric tons of carbon dioxide equivalent (Mg eCO₂). The future global warming potential of fugitive methane emissions from the landfill under the disting permit is estimated to be about 6.57 million Mg eCO₂; the estimated fugitive emissions for the Mitigated Alternative are slightly less: about 6.44 million Mg eCO₂, or a decrease of about 0.13 million Mg eCO₂. The reason for the decrease is the maintenance of the landfill gas collection system for the entire post-closure period included in this analysis.

Offset: Power Production from Landfill Gas

The power produced from the landfill gas-fired engines can be seen as substituting for electricity generated from other sources. From this viewpoint, power generation at Redwood Landfill under the Mitigated Alternative will offset GHG emissions associated with power production elsewhere. The lifecycle GHG emission offset calculated for this analysis is shown in Table MR112-1, line M. Factors used in this calculation include the heat content of methane, the thermal efficiency of the gas-fired engines, and a GHG emission factor for electrical generation in California. As shown in Table MR112-1, line L, the power production potential over the life of the landfill (from 2009 through the end of the model run in 2098 is considerable: about 5.64 billion kilowatt hours (kWH) under the Mitigated Alternative. The average emission rate of GHGs from electrical power production in California is currently about 0.8 pounds (0.00036551 metric tons) of eCO₂ per kWH (California Climate Action Registry, 2007). The offset from power generation from landfill gas, as shown in Line M, is over 2 million Mg eCO₂ for the Mitigated Alternative.²⁷

The calculations in Appendix E indicate that the annual amount of captured LFG under the Mitigated Alternative will peak at about 17,000 metric tons in 2025. For the period 2008-2038 (which includes several years after landfill closure) the average annual volume of captured methane will be about 12,500 metric tons. 17,000 metric tons of methane has an electrical

²⁷ Not considered here is the amount of carbon that is "sequestered" in the landfill in the form of wood and wood products that decompose very slowly or not at all in an anaerobic environment. GHG inventories typically reduce the volume of GHG emissions from deforestation and harvest of forest products, since some portion of these products remains intact in landfills (EPA, 2006, Table 7-7). The role of Redwood Landfill as a carbon "sink" is not considered here, however, for the following reasons:

^{1.} The rate of decomposition vs. sequestration is poorly understood and has recently been revised, with current estimates showing a much greater rate of decomposition of these materials than previously thought (EPA, 2006, p. 7-13);

^{2.} Much of the carbon that is sequestered in landfills would also be sequestered if the wood and wood products remained in use, or were recycled; or would substitute for fossil fuels if used for power production;

^{3.} Reused or recycled wood products have the additional advantage of substituting for virgin wood products to some extent, and therefore have the added advantage of resulting in more standing forests, which sequester more carbon as they grow;

^{4.} There is a basic error in logic associated with regarding landfills as part of the solution to global climate change because of their carbon sequestration potential, since this leads to a conclusion that the world would benefit from cutting down forests and landfilling the trees.

generation potential of about 160 million kilowatt hours. This is equivalent to continuous generation at the rate of about 18 megawatts for one year. 12,500 metric tons of methane is sufficient to produce about 117 million kilowatt hours of electricity, or a continuous rate of production of about 13 megawatts for one year. The applicant's current proposal is for installation of 4-5 megawatts of power production, well below the landfill's potential. As discussed in Master Response 104, the Mitigated Alternative includes development of sufficient power generation capacity to utilize all captured methane.

Net GHG Emissions from Landfill Gas

Net GHG emissions for the future lifecycle of the landfill (through 2098), under both existing permit conditions and under the Mitigated Alternative, are shown in Table MR112-1, line N. The total predicted amount of GHG emissions from this source is about 6.57 million Mg eCO₂ for the existing permit, and about 4.37 million Mg eCO₂ for the Mitigated Alternative. The Mitigated Alternative would therefore result in a decrease of nearly 2.2 million Mg eCO₂, about a 33 percent decrease compared with the existing permit.

GHG Emissions from Vehicles and Equipment

In addition to the inventory of GHG emissions related to landfill gas, ESA also conducted a future lifecycle analysis of GHG emissions related to equipment and vehicle usage at Redwood Landfill under both the current permit conditions and the Mitigated Alternative. The daily volume of GHG emissions from these sources (in addition to fugitive landfill gas) is shown in Table MR104-3, in Master Response 104. These emissions were estimated using the type, size, number, and use (hours or miles) of equipment and vehicles that would be used under each scenario, and emission factors published by the USEPA. The complete spreadsheets are included in Appendix D. The results of this aspect of the GHG emissions inventory are shown, along with fugitive landfill gas emissions, in Table MR112-3. Table MR112-3 shows the daily, annual (for the year 2010) and future lifecycle (2008-2098) GHG emissions, expressed as metric tons of carbon dioxide equivalent (Mg eCO₂). The substantially higher lifecycle values for vehicle and equipment-related emissions for the Mitigated Alternative, compared to existing permit conditions, are due to the longer operational life of the facility under the Mitigated Alternative (see Master Response 107 and Table MR104-4). As the table indicates, GHG emissions from the facility are dominated by fugitive landfill gas emissions.

Other Considerations

Several other considerations will affect net GHG emissions from Redwood Landfill, both under existing permit conditions and under the Mitigated Alternative. These include the following:

- The applicant has stated their intent to convert to less-polluting liquid fuels (including biodiesel),
- ongoing and planned composting operations will directly and indirectly reduce GHG emissions that contribute to global climate change, since composting produces primarily biogenic CO₂; and some compost products are applied to the soil, which improves soil

	Existing Permit	Mitigated Alternative	Increase/ (Decrease)
Daily			
Emission Source	lbs eCO ₂ b	lbs eCO ₂ b	lbs eCO ₂ b
On-Road Vehicles	18,120	47,348	29,228
Off-Road Equipment	11,939	15,158	3,219
Fugitive Landfill Gas ^a	952,582	968,077	15,495
Flare Emissions ^a	31,209	31,716	508
Total Quantified Daily Emissions	1,013,849	1,062,299	48,450
Annual (2010)			
Emission Source	Mg/Year eCO ₂	Mg/Year eCO ₂	Mg/Year eCO2
On-Road Vehicles	3,000	7,839	4,839
Off-Road Equipment	1,977	2,510	533
Fugitive Landfill Gas ^a	157,711	160,276	2,565
Flare Emissions ^a	5,167	5,251	84
Off-set from Power Production	-	35,908	(35,908)
Total Quantified Annual Emissions	167,854	139,968	(27,887)
Lifecycle ^{c,d}			
Emission Source	Mg eCO ₂	Mg eCO ₂	Mg eCO ₂
On-Road Vehicles	27,000	133,263	106,263
Off-Road Equipment	17,790	42,663	24,873
Fugitive Landfill Gas and Flare Emissions ^e	6,567,289	4,374,093	(2,193,196)
Total Quantified Lifecycle Emissions	6,612,078	4,550,019	(2,062,060)

TABLE MR 112-3 GREENHOUSE GAS EMISSION SUMMARY

^a Fugitive landfill gas and flare emissions compare 2010 under existing permit and under the Mitigated Alternative.

² eCO₂ (CO2 equivalent) includes CO₂ plus CO₂ equivalent of methane for on-road and off-road, and CO2 equivalent of methane for fugitive landfill gas and flare emissions.

^c Lifecycle based on closure date of 2016 for existing permit (9 years of operations) and 2024 for Mitigated Alternative (17 years of operations) ^d Lifecycle analysis does not include emissions related to closure activities.

^e Includes off-sets from power production.

fertility and tilth, reducing the need for other fertilizers and water. Of particular importance in this regard is the inclusion in both the Mitigated Alternative and in the applicant's proposal, for use of food waste as a feedstock, since food waste has a high methane generation potential when landfilled;

- Ongoing recycling operations and new recycling operations specified in the Mitigated Alternative will reduce greenhouse gas emissions (recycled and reused goods are generally less energy-intensive than goods produced from virgin materials). However, there is insufficient information to predict the amounts and types of materials that will be recycled, and therefore it is impossible to estimate GHG reductions from recycling;
- The Mitigated Alternative includes renewable energy production, such as photovoltaic, at the site, which will offset more polluting energy generation; however, the scale of this operation is not yet specified.

It is difficult or premature to attempt to inventory both the emissions related to these activities, and the potential reduction in emissions that they may provide.

Uncertainties in the GHG Emission Analysis

The forgoing analysis of GHG emissions is based on several assumptions and predictions, which add to the uncertainty of the accuracy of the results. The analysis is deemed adequate and appropriate for the purpose of this EIR, however, since it is used primarily to compare GHG emissions from the Mitigated Alternative to the facility under current permit conditions, and since the same method was used for both scenarios. The following potentially affect the accuracy of the calculations:

- The calculation of fugitive landfill gas emissions depends on modeling of methane generation, not actual measurement; thus estimates of fugitive emissions are derived, not based on empirical evidence. Several of the inputs to the LandGEM model are themselves based on assumptions that have uncertainties. These include the amount of waste placed in the landfill each year prior to the initiation of the state's disposal reporting system in 1995 and the total mass of waste placed in the landfill prior to that time (as opposed to volume, which is measured); the value used for decomposition rate (k), which is related to environmental conditions in the landfill, and for methane generation potential (Lo), which is related to the composition of landfilled waste. Default values for U.S. landfills were used for these factors.
- LFG capture rates used in the analysis are based on monitoring over a 5-year period (there was complete data for three years, and partial data for two years which was then extrapolated); the average rate from this period is then applied to all future years during the operational life of the landfill; thereafter, a higher rate, consistent with industry claims for closed landfills, is used.
- The thermal conversion efficiency (from the heat value of landfill gas to the amount of power produced by gas-fired engines) is derived from a literature survey, not from site-specific or equipment-specific information.
- Landfill gas production peaks about a year after the landfill closes, then declines. The closure date thus affects the lifecycle analysis, but the actual closure date and the rate of future waste placement are estimated.
- The length of time after landfill closure that the landfill gas collection system will remain in operation is uncertain. The facility's Joint Technical Document (GeoSyntec, 1998) specifies a 30-year post-closure maintenance period, and this was used in the analysis for the current permit. Operation of the LFG collection system for a longer period, which would occur under the Mitigated Alternative, would substantially reduce emissions.

GHG Emissions in 1990 and 2020

Table MR112-4 compares projected GHG emissions in 2020 under the Mitigated Alternative and the project as proposed by the applicant with estimated GHG emissions from the landfill in 1990. Table MR112-4 indicates that, under the conditions of the Mitigated Alternative, the landfill will emit about twice the amount of GHGs in 2020 as it did in 1990; under the project as proposed, year 2020 GHG emissions would be about three times the amount in 1990. In order to reduce

Year/Scenario	Methane Generation (Mg/Year)	LFG Capture Rate (Percent)	Total Fugitive Methane – Flare and Landfill (Mg/Year)	Global Warming Potential of Fugitive Methane Emissions (Mg/yr eCO2)	Electricity Generation Emission Offset – CO2 equivalent (Mg/yr eCO2)	Net LFG Emissions – CO2 Equivalent (Mg/yr eCO2)	GHG Emissions from Equipment and Vehicles (Mg/yr eCO2)	Total GHG Emissions (Mg/yr eCO2)
1990 ^a	8,682	60%	3,210	80,241	_	80,241	2,986	83,227
2020: Project as Proposed ^b	26,760	60%	9,634	240,840	12,807	228,033	17,310	245,343
2020: Mitigated Alternative	21,342	60%	8,017	200,429	43,479	156,949	10,349	167,298
Increase: Project vs. 1990	18,078	_	6,424	160,599	12,807	147,792	14,324	162,116
Increase: Mitigated Alternative vs. 1990	12,660		4,808	120,188	43,479	76,709	7,363	84,071

TABLE MR112-4 COMPARISON: 1990 EMISSIONS AND 2020 EMISSIONS WITH THE MITIGATED ALTERNATIVE

^a Equipment and vehicle emissions in 1990 assumed to be 60% rate of current estimated emissions.
 ^b Based on LandGEM model run in Appendix D of the DEIR, assumption of 4 megawatt power generation, and vehicle and equipment emissions 1.67 times those of the Mitigated Alternative.

SOURCE: ESA

total emissions to a level that is at least 15 percent below 1990 levels, in conformance with the Marin County Greenhouse Gas Reduction Plan, Mitigation Measures 3.2.5g and 3.2.5f are added. Addition of these mitigation measures will ensure that neither the project as proposed nor the Mitigated Alternative would contribute in a considerable manner to global climate change; and will also ensure consistency with Countywide Plan Update goals, policies, and programs regarding greenhouse gas emissions.

Mitigation Measure 3.2.5f: Within two years of project approval, the applicant will develop a Greenhouse Gas Reduction plan that demonstrates how the landfill will achieve by 2020 a reduction in annual GHG emissions such that emissions are no greater than 15 percent below 1990 levels. This will include but is not limited to development of additional landfill gas-to-energy production capacity; use of alternative fuels in on-site equipment and in truck fleets, increased diversion of organic material from landfill disposal and use as landfill cover material, increased recycling, development of other on-site renewable energy generation capacity, and carbon offsets. The plan will include cost estimates for GHG reduction measures and identify funding sources, including but not limited to tip fee increases. The plan will include an implementation schedule that demonstrates substantial GHG emission reductions prior to the 2020 deadline, including implementation of "early action" measures that may be implemented within two years of plan approval. The plan will include an updated inventory of projected GHG emissions and an updated estimate of GHG emissions in 1990. The plan will be subject to review and approval by Marin County Community Development Agency and the Bay Area Air Quality Management District.

Mitigation Measure 3.2.5g: Following closure of the landfill, the applicant shall continue to operate, maintain, and monitor the landfill gas collection and treatment system as long as the landfill continues to produce landfill gas, or until it is determined by the BAAQMD that emissions no longer constitute a considerable contribution to greenhouse gas emissions, whichever comes first. Because the landfill will continue to produce substantial quantities of landfill gas well beyond the 30-year post-closure maintenance period specified in the JTD, the applicant shall prepare a revised Preliminary Post-Closure Maintenance Plan that plans for and provides financial assurances for operation, maintenance, and monitoring of the landfill gas collection and treatment system for an indefinite period.

Countywide Plan Update Polices and Programs

The newly-adopted Countywide Plan Update (Marin County, 2007) includes polices and programs aimed at reducing greenhouse gas emissions and reducing the impacts of global climate change. Apparent consistency of the Mitigated Alternative with these policies and programs is discussed in Table MR-112-5. The determinations of policy consistency represent County staff interpretation of policies. However, this EIR does not determine policy consistency. The County decision-makers make the formal policy consistency determinations.

Even where policy inconsistencies are identified, these may not necessarily indicate significant environmental effects. Section 15358(b) of the CEQA *Guidelines* states that "effects analyzed under CEQA must be related to a physical change in the environment." Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environmental are considered significant impacts pursuant to CEQA. The discussion below points out where such policy-related impacts are addressed.

Conclusion

The Mitigated Alternative, as further refined in Master Response 104 in this chapter, includes the requirements to install power production capacity and to maintain the landfill gas collection system for an extended post-closure maintenance period. Therefore, the Mitigated Alternative would result in substantially reduced lifecycle GHG emissions, compared with the landfill as currently permitted. Furthermore, other aspects of the Mitigated Alternative, including installation of alternative energy systems at the site and composting of foodwaste, as well as implementation of State-wide regulations for GHG emission reduction, will result in further reduction of GHG emissions, or additional GHG emission off-sets.

As shown in Table MR112-5, both the project as proposed (and further mitigated as discussed above) and the Mitigated Alternative are consistent with goals, policies, and programs contained in the recently-adopted Countywide Plan Update regarding greenhouse gas mitigation.

TABLE MR 112-5 CONSISTENCY OF THE MITIGATED ALTERNATIVE WITH COUNTYWIDE PLAN UPDATE GOALS, POLICIES, AND PROGRAMS PERTINENT TO GLOBAL CLIMATE CHANGE

Goals, Policies, and Programs	Project Consistency
Goals	
Goal AIR-4. Minimization of Contributions to Greenhouse Gases. Prepare policies that promote efficient management and use of resources in order to minimize greenhouse gas emissions. Incorporate sea level rise and more extreme weather information into the planning process.	Consistent. Provisions in the FEIR and in this FEIR Amendment seek to reduce Greenhouse Gas Emissions and to plan for sea level rise. These apply to both the project as proposed by the applicant and to the Mitigated Alternative.
Policies	
AIR-4.1 Reduce Greenhouse Gas Emissions. Adopt practices that promote improved efficiency and energy management technologies; shift to low-carbon and renewable fuels and zero emission technologies.	Consistent with incorporation of mitigation measures. Mitigation measures 3.2.5f and 3.2.5g (described in Master Response 112) would reduce greenhouse gas emissions from the project as proposed to below 1990 levels. As discussed in the text of Master Response 112, the Mitigated Alternative will also result in reduced greenhouse gas emissions, compared with the current permit conditions. The Mitigated Alternative also includes provisions for electrical generation from landfill gas and solar power beyond those of the project as proposed. It is anticipated that state-wide requirements for low-carbon fuels, once they are developed, will apply to the landfill operations and related transport. The applicant has expressed a commitment to an early conversion to low- carbon fuels.
AIR-4.2 Foster the Absorption of Greenhouse Gases. Foster and restore forests and other terrestrial ecosystems that offer significant carbon mitigation potential.	Consistent. Neither the project as proposed nor the Mitigated Alternative does not propose any lateral expansion or removal of existing forests or other terrestrial ecosystems that offer carbon mitigation potential. Wetlands adjacent to the site can be expected to sequester significant volumes of carbon, though this is not part of the project nor the Mitigated Alternative.

TABLE MR 112-5 (continued) CONSISTENCY OF THE MITIGATED ALTERNATIVE WITH COUNTYWIDE PLAN UPDATE GOALS, POLICIES, AND PROGRAMS PERTINENT TO GLOBAL CLIMATE CHANGE

Goals, Policies, and Programs Project Consistency Implementing Programs AIR-4.a Reduce Greenhouse Gas Emissions Resulting Consistent. The Mitigated Alternative would be consistent from Energy Use in Buildings. Implement energy with this program, as it includes a requirement to develop efficiency programs and use of renewable energy. (Also new buildings and facilities at the site to incorporate see EN-1, EN-2, PFS-2, and TR-4.) energy efficiency and use of renewable energy. AIR-4.b Reduce Greenhouse Gas Emissions Resulting Consistent. Equipment and vehicles are expected to be from Transportation. Increase clean-fuel use, promote subject to future requirements for clean-fuel and lowtransit-oriented development and alternative modes of carbon fuel standards, and the applicant has made a transportation, and reduce travel demand. (Also see TR-4, commitment to early conversion to clean, low-carbon AIR-3, DES-2, HS-2, HS-3, CD-2, CD-3, and EC-1.) fuels. AIR-4.c Reduce Methane Emissions Released from Consistent. Both the project as proposed and the Waste Disposal. Encourage recycling, decrease waste Mitigated Alternative add recycling functions to the sent to landfills, require landfill methane recovery, and landfill, add food waste as a composting feedstock, promote methane recovery for energy production from thereby diverting this high-methane potential material other sources. (See PFS-3.) from landfilling, and require methane recovery for energy production. The landfill already has a landfill gas collection and destruction system in place. The Mitigated Alternative requires the applicant to commit to maintenance of the LFG collection system beyond the minimum 30-year post closure maintenance period, thus ensuring continued capture and destruction of methane from decomposing waste placed in the landfill. AIR-4.f Establish a Climate Change Planning Process. Consistent. See Mitigation Measure 3.2.5f, which is Continue implementation of the approved Marin County added in Master Response 112. Greenhouse Gas Reduction Plan. Integrate this plan into long-range and current planning functions of other related agencies. Establish and maintain a process to implement. measure, evaluate, and modify implementing programs, using the Cities for Climate Protection Campaign as a model (see the sidebar). AIR-4.h Evaluate the Carbon Emissions Impacts of Consistent. This FEIR Amendment evaluates carbon Proposed Developments. Incorporate a carbon emissions emissions from the project. assessment into land use plans and the environmental impact report for proposed projects. AIR-4.k Encourage the Planting of Trees. Adopt urban Consistent. Tree planting is not allowed by regulation on forestry practices that encourage re-forestation as a landfills. Other areas of the site may be suitable for tree means of storing carbon dioxide. (Also see BIO-1, planting, however. It is anticipated that the County may DES-3.) work with the applicant to encourage tree planting on appropriate areas of the site. AIR-4 o Implement Proposed State Programs to Reduce Consistent. It is anticipated that the landfill will become Greenhouse Gas Emissions. Implement proposed State subject to State rules and regulations aimed at reducing programs to reduce greenhouse gas emissions, including greenhouse gas emissions. the Renewable Portfolio Standards, California Fuel Efficiency (CAFE) standards, and carbon cap and trade programs. SOURCE: Marin County, 2007; ESA.

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CHAPTER 3

Comments on the FEIR and Responses to Comments



BAY AREA AIR QUALITY MANAGEMENT DISTRICT



ALAMEDA COUNTY Roberta Cooper Scott Haggerty Nate Miley Shelia Young

CONTRA COSTA COUNTY Mark DeSaulnier Mark Ross (Secretary) Michael Shimansky Gayle B. Uilkema (Vice-Chairperson)

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SANTA CLARA COUNTY Erin Garner Liz Kniss Patrick Kwok Julia Miller

SOLANO COUNTY John F. Silva

SONOMA COUNTY Tim Smith Pamela Torliatt

Jack P. Broadbent XECUTIVE OFFICER/APCO September 26, 2005 Mr. Tim Haddad Environmental Coordinator Marin County Environmental Health Services 3501 Civic Center Drive, Room 308 San Rafael, CA 94903-4157

Subject: Redwood Sanitary Landfill Solid Waste Facilities Permit Revision

RECEIVED

Dear Mr. Haddad:

Bay Area Air Quality Management District (District) staff have reviewed the Final Environmental Impact Report (FEIR) and Response to Comments for the Redwood Sanitary Landfill Solid Waste Facilities Permit Revision Project (project). On October 16, 2003, we submitted a comment letter to your agency in response to the Draft Environmental Impact Report (DEIR), and we have the following additional comments.

District staff have concluded that the FEIR's response to the District's comment letter (Items B-1 through B-4 on Page 6.4-3 of Volume II of the July 2005 Response to Comments) adequately addresses the District's original comments on the DEIR for the proposed project. However, implementation of mitigation measure 3.2.5c requires that the applicant apply for District permits for landfill gas fueled engines to produce 4 to 5 megawatts of power. District staff note that landfill gas fueled engines have higher emissions of NOx, CO, VOC, PM10, and secondary toxic air contaminants per cubic foot of landfill gas burned than the corresponding emissions from enclosed landfill gas flares. Any proposed landfill gas fueled engines must comply with all applicable District, State, and federal rules and regulations before a District Authority to Construct permit would be issued. This includes implementing best available control technology, emission offsets, and prevention of significant deterioration requirements.

The DEIR and its appendices include numerous emission factors and assumptions that are used to calculate the projected air emissions for the project. Project emission rates, emission factors, assumptions, and throughput limits will be established during the District's evaluation of the permit application for the landfill expansion project. Compliance with applicable District, State, and federal requirements may require emission limits that are lower than the rates discussed in the FEIR. In any case, the project must comply with all applicable rules and regulations before we can issue an Authority to Construct permit.

District staff commend the incorporation of mitigation measures 3.2.2a-d that will reduce the operational emissions from trucks and equipment. We recommend adding a mitigation measure that would limit the idling of equipment to 3 minutes whenever feasible. This will lower the amount of both NOx and diesel emissions, which was our concern in comment B-1 from our previous letter.

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If you have any questions regarding these comments, please contact Barry G. Young, Supervising Air Quality Engineer, at (415) 749-4721 or at <u>byoung@baaqmd.gov</u>, or Carol S. Allen, Senior Air Quality Engineer, at (415) 749-4702 or at <u>callen@baaqmd.gov</u>.

Sincerely,

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Deputy Air Pollution Control Officer

JR:DK

cc: BAAQMD Director Harold Brown Jr.

Comment Letter A: Bay Area Air Quality Management District

- A-1. This is a statement acknowledging that the County of Marin adequately responded to the BAAQMD's comments on the Draft EIR. See Comment Letter B and responses in Volume II of the FEIR.
- A-2. The County acknowledges that in order to obtain BAAQMD Authority to Construct (ATC) permits for landfill gas (LFG) fueled engines, the engines must comply with applicable District, State, and federal rules and regulations, including the implementation of Best Available Control Technology (BACT), emission offsets, and Prevention of Significant Deterioration (PSD) requirements.
- A-3. The County acknowledges the BAAQMD explanation that compliance with applicable District, State, and federal requirements may require emission limits that are lower than those discussed in the FEIR and that the project must comply with all applicable rules and regulations before an ATC Permit will be issued for the project.
- A-4. Mitigation Measure 3.2.2e has been added to the FEIR, page 3.2-31, with the BAAQMD recommended requirements for diesel engine idling (additions shown as <u>underlined</u>; deletions as <u>strikeout</u>):

Mitigation Measure 3.2.2e: The project applicant shall require all diesel trucks and equipment on-site to limit engine idling to three minutes or less.



THE CITY OF NOVATO CALIFORNIA

75 Rowland Way #200 Novato, CA 94945-5054 415/899-8900 FAX 415/899-8213 WTML.ci.uofato.ca.us

Mayor Bernard II. Meyers Mayor Pro Tem Carole Dillon-Knutson Councilmembers Judy Arnold Pat Eklund Jeanne MacLeamy

City Manager Daniel E. Keen August 16, 2005

Marin County Planning Commission 3501 Civic Center Drive San Rafael, CA 94903-4157

Re: Redwood Landfill Solid Waste Facilities Permit Revision Final EIR

Dear Commissioners,

Thank you for the opportunity to comment on the completeness and adequacy of the Final EIR for Redwood Landfill Solid Waste Facilities Permit Revision.

As you know, the proposed project is directly north of the City of Novato and could have a significant effect on the City. The proposed increase in intensity of use and revision of waste materials to be accepted at the facility have generated substantial City Council and community interest. The Final EIR was released during the summer season when many City residents and decision makers are on vacation. In addition, the City Council will not be holding another meeting until September 13, 2005. In order to have adequate time to solicit community comment and conduct a City Council meeting, the City of Novato hereby requests that the time period for written comment on the Final EIR be extended for 30 days.

The City of Novato appreciates the Commission's consideration of this request as the proposed project will potentially affect our City more than any other community.

Sincerely,

Daniel E. Keen City Manager

CC:

Marin County Board of Supervisors Novato City Council

Comment Letter B: City of Novato, August 16, 2005

B-1. The period for comments on the FEIR was extended from the initial 60-day period to 74 days.

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CITY COUNCIL OF THE CITY OF NOVATO

RESOLUTION NO. 109-05

RESOLUTION COMMENTING ON THE PROPOSED REDWOOD LANDFILL SOLID WASTE FACILITIES PERMIT REVISION AND FINAL EIR

WHEREAS, on September 13, 2005 and September 27, 2005, the City Council conducted public hearings on the proposed permit revisions and Final EIR for the Redwood Landfill Solid Waste Facilities located in Marin County north of the Novato City boundary; and

WHEREAS, a representative of the Landfill spoke in favor of the proposal and two persons spoke representing opponents of the project; and,

WHEREAS, the landfill representative stated that the project proposal is going to be revised again reducing the proposed maximum size of the facility from 34.7 million cubic yards to 31 million; limiting all landfill activities to an area at least 200 feet from the existing boundaries of fill; reducing the proposed average daily tonnage accepted from 1,850 to 1,500; limiting the amount of composting; and, eliminating the air-drying of sludge; and,

WHEREAS, testimony from opponents of the permit revision expressed opposition to expansion of the facility because of its environmentally sensitive location adjoining wetlands, and expressed concerns about the completeness and adequacy of the analysis of the potential impacts of the proposal in the FEIR; and,

WHEREAS, the group No Wetlands Fill Expansion and the Law Offices of Brent J. Newell submitted to the City Council at the hearing copies of two separate letters addressed to Marin County and dated September 12, 2005 which are incorporated herein by reference; the letters further detail concerns about the FIER analysis and the potential impacts of the proposal; and,

WHEREAS, a County use permit for the facility was issued in 1958 and according to the Final EIR the use permit does not need to be updated, however, opponents of the proposal contend that a new or updated use permit is required prior to approval of any expansion of capacity or activities; and,

WHEREAS, a revised Solid Waste Facilities Permit issued by Marin County Environmental Health Services Division is required for the proposal; and,

WHEREAS, Novato is the closest city to the Redwood Landfill facility and has the greatest potential to experience impacts from the proposed expansion of activities, and therefore the City wishes to comment on the proposal.

NOW, THEREFORE, BE IT RESOLVED that the City Council does hereby provide the following comments on the FEIR and the proposed solid waste facilities permit revision to revise and expand the operations of the Redwood Landfill Solid Waste Facility:

- The existing facility is located on diked and drained bay wetlands. In addition, the site is nearly surrounded by natural and manmade sloughs. The City questions whether it is appropriate and wise to expand waste disposal capacity and daily operations in such an environmentally sensitive area. There are numerous potential environmental impacts from such an expansion that would directly and negatively impact the sensitive habitat. In addition, any catastrophic failure of the facility or mitigation measures (e.g. seismic event or leachate leakage) may not be mitigable because the sloughs and wetlands are so close to the site. Such a catastrophic event could have significant impacts on San Francisco bay.
- 2. Substantial questions have been raised about the adequacy of analysis in the Final EIR, as indicated in testimony to the City Council and letters to the County of Marin **3** copied to the City Council at the hearing on September 13, 2005. Concerns about the adequacy of the analysis of impacts include among others: air quality impacts from numerous sources associated with landfill operations; landfill instability in the event 4 of seismic activity exacerbated by the proposed increased volume and steeper landfill slopes; potential catastrophic slope failure due to an inadequate design similar to the 5 Contra Costa landfill which had slope failure; the capacity of the bay mud to adequately separate the landfill from the ground water below without the normal 6 barrier required by the State; impacts of the height and weight of the landfill compacting and possibly breaching the bay mud barrier; the adequacy of 17 containment/drainage provisions to protect the surrounding area; biologic resources 18 impacts; adequacy and accuracy of the data/benchmarks used for the 100 year storm; 19/10 and aesthetic impacts of the 160 foot height of the landfill, especially since the profile of the landfill has been steepened from the existing conditions as a result of the latest revisions to the proposal (prohibiting fill within 200 feet of the existing boundaries 11 of the facility). The City believes that all of these questions and concerns regarding impacts and mitigation measures need to be fully addressed prior to certification of the Fianl EIR on the proposed expansion of the facility as complete and adequate.
- 3. The proposed expansion will increase negative air quality impacts due to on-site operations and traffic accessing the site. Air quality impacts are a substantial concern to the City of Novato because these impacts can "migrate" off-site and impact Novato residents and, according to the Final EIR, cannot be mitigated to a level of insignificance. The pollutants include toxic emissions and odors which impact neighboring residents. Since the proposed project has at best limited benefits for Novato and for Marin County, the City does not believe there is a basis for making findings of overriding considerations.

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4. The analysis of off-site project alternatives in the Final EIR is inadequate. The City believes there should be further discussion of: alternatives outside Marin County; **13**

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better definition of alternatives within the County (e.g. potential locations); and, **13** discussion of "zero" waste alternatives and efforts to achieve same.

- Public testimony and discussions in the Final EIR raise concerns that the facility operator and its parent company have an apparent poor record of complying with permit restrictions and operational requirements. This apparent record casts doubt on future compliance with mitigation measures or with any permit restrictions that may be placed on operation of the landfill without a stronger County enforcement program. This concern is reinforced by the environmentally sensitive nature of the area.
- 6. According to the Final EIR, there is currently adequate daily capacity (amount of material accepted per day) to serve the waste disposal needs of Marin County. The proposed increase in daily capacity would shift the character of the facility to that of a more regional waste disposal facility. Therefore, much of the requested additional daily capacity would enable the facility to accept more waste from other jurisdictions in the Bay Area and potentially beyond. There is limited, if any, benefit to Marin County and the City of Novato in an expansion of daily capacity, as that will ultimately shorten the life of the facility and cause it to reach capacity far earlier than it would without the increased rate of dumping. The City supports limiting any increases in daily capacity and adoption of an out-of-county waste disposal fee ordinance and diversion programs identified in FEIR Mitigation measure 3.6.4b. Funds collected through such a fee should be utilized to assist in meeting Marin County's future waste disposal and recycling needs and to fund independent monitoring.
- 7. The City of Novato encourages Marin County to fully investigate and consider imposing flow control measures if necessary to insure that the Marin County waste flow to the Redwood Landfill facility is adequate to support limitations on waste disposal from outside the County, thereby extending the life of the landfill facilities for Marin County's needs
- 8. There is public controversy over whether the existing County use permit covers all existing and proposed activities and whether violations of the use permit have occurred, thereby necessitating review of the existing approval.
- 9. The City acknowledges the positive changes to the project proposal presented by the applicant at the September 13th City Council hearing including reductions in the increase in the overall and daily capacity. The City believes that any changes to the project proposal should be submitted in writing as part of the permit application. Should a permit revision be approved by the Marin County Environmental Health Services Division, the City requests that approval be granted only if there are further reductions to daily and ultimate capacity increases, and the City supports better mitigation of potential impacts of the proposal.

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I HEREBY CERTIFY that the foregoing resolution was duly and regularly adopted by the City Council of the City of Novato, Marin County, California, at a meeting hereof, held on the 27th day of September, 2005, by the following vote, to wit:

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AYES:	Councilmembers	Arnold, Dillon-Knutson,	Eklund, MacLeamy, Meyers
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NOES: Councilmembers None

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ABSTAIN: Councilmembers None

ABSENT: Councilmembers None

City Clerk of the City of Novato

Comment Letter C: Novato City Council Resolution No. 109-05

- C-1. Comment 1 is preamble to the following comments, and does not directly or specifically address the FEIR. Note, however, that the reference to the applicant's testimony in a public hearing regarding their intent to again modify the proposed project by reducing total fill volume, increasing the setback of future fill activities from San Antonio Creek, and reducing the maximum daily volume of waste accepted at the landfill, does not constitute a formal modification of the FEIR; the applicant has not informed the LEA, as Lead Agency, of their intent to modify the proposed project as stated in the City's resolution, nor has the applicant submitted a revised application for a solid waste facilities permit (which is the subject of the FEIR). The landfill has indicated their willingness to implement the Mitigated Alternative in a letter dated June 15, 2006. (Refer to Appendix A in this document, and to Master Response 104 regarding the Mitigated Alternative.) As suggested in this comment, comment letters from the No Wetlands Landfill Expansion group and from their attorney, Mr. Brent Newell, were received by Marin County, and are included here as Comment Letters L, M, and O.
- C-2. Master Responses 7, 10, 13, 14, and 22 in the FEIR address some of the concerns raised in this comment. Additional response is provided in this document, in Master Responses 102, 105, 106, and 108.
- C-3. Air quality issues are addressed in Master Response 16 in the FEIR and Master Response 112 in this document. See also the discussion of criteria air pollutant emissions related to the Mitigated Alternative in Master Response 104.
- C-4. Concerns regarding seismic stability of the landfill are addressed in Master Response 22 in the FEIR and Master Response 108 in this document.
- C-5. Slope failure at the Acme Landfill in Contra Costa County, apparently erroneously referred to here and elsewhere as the Contra Costa Landfill, is discussed and compared to the project in Master Response 4 in the FEIR.
- C-6. Concerns regarding the adequacy of the Bay Mud in protecting groundwater beneath the landfill from contamination are addressed at length in Master Response 1 in the FEIR. See also Master Response 105 in this document.
- C-7. Concerns regarding Bay Mud strength and settlement are addressed in Master Response 7 in the FEIR.
- C-8. Concerns regarding the landfill's Leachate Collection and Recovery System (LCRS) are discussed in Master Response 13 in the FEIR and in Master Response 105 in this document.

- C-9. The proposed project's potential impacts on biological resources are analyzed in Section 3.3 of the FEIR. See also Master Response 102 in this document.
- C-10. Mitigation Measure 3.5.6 in the FEIR requires the applicant to increase the height of the perimeter levee to +9 feet above mean sea level (msl), which is 2-3 feet above the predicted level of the 100 year flood. It should be noted that in February, 1998, a large flood, did not overtop the levee, though portions were below +9 feet msl. Please see also the response to Comment KK-12 on page 6.4-110 of Volume II of the FEIR, and Master Response 106 in this document.
- C-11. Potential aesthetic impacts of the proposed project are analyzed in Section 3.1 of the FEIR. See also Master Response 110 in this document. As noted in the response to Comment C-1, the applicant has not formally modified their proposal since publication of the FEIR.
- C-12. The comment reiterates the findings of the FEIR regarding air quality impacts of the project. Findings regarding overriding considerations would need to be made by the Lead Agency after FEIR certification and prior to project approval.
- C-13. CEQA requires consideration of a "range of reasonable alternatives" to the project. (CEQA *Guidelines*, Section 15126.6). The off-site alternative presented in the FEIR provides a general comparison of the effects of expanding the Redwood Landfill with the development of a new landfill in Marin County, and thereby helps inform the public and decision makers of the relative severity of project impacts, when compared with development of a new landfill.

The term "zero waste" was not in popular use when the DSEIR for this project was drafted. The recently-adopted Marin Countywide Plan Update includes the concept of zero waste in Goal PFS-4, and in several policies and implementing programs:

GOAL PFS-4: Efficient Processing and Reduced Landfill Disposal of Solid Waste. Minimize, treat, and safely process solid waste materials in a manner that protects natural resources from pollution while planning for the eventual reuse or recycling of discarded material to achieve zero waste.

Policies

PFS-4.1 Reduce the Solid Waste Stream. Promote the highest and best use of discarded materials through redesign, reuse, composting, and shared producer responsibility. Emphasize a closed-loop system of production and consumption.

PFS-4.2 Protect Environmental Health. Require the use of waste processing and disposal techniques that prevent the contamination or other impairment of natural resources.

PFS-4.3 Plan for Waste Transformation or Disposal. Plan for the transformation or elimination of waste materials that cannot be reduced, recycled, or composted.

PFS 4.4 Promote Regulatory Efforts. Support State legislative or regulatory efforts that will aid in achieving zero waste.

Implementing Programs

PFS-4.b Divert Construction Waste. Continue to implement the construction and demolition recycling waste ordinance to divert construction waste from landfills.

PFS-4.c Reduce Waste at Landfill. Continue to pursue aggressive recycling, resource recovery, and composting strategies to reduce the amount of waste diverted to landfill.

PFS-4.d Offer Waste Materials Recycling Education. Enact educational programs to inform residents about reuse, recycling, composting, waste to energy, and zero waste programs.

PFS-4.f Best Management Practices at Landfill. Employ best management practices at the landfill facility, and incorporate effective new practices as they become available.

PFS-4.g Coordinate with Water Providers. Encourage sanitation districts to partner with water districts to reduce the volume of wastewater that must be treated, and to employ

biological methods to treat solid waste.

PFS-4.h Prepare a Siting Element. The Marin Hazardous and Solid Waste Joint Powers Authority should prepare a Countywide Siting Element that provides a description of the areas to be used for development of adequate transformation or disposal capacity concurrent and consistent with the development and implementation of the Source Reduction and Recycling Elements.

PFS-4.i Promote Product Redesign. Pursue and support upstream redesign strategies to reduce the volume and toxicity of discarded products and materials, including biodegradable plastic bags, fast food containers, and utensils.

PFS-4.j Stimulate Waste-Reuse Economic Activities. Foster and support use of discarded products and waste materials to stimulate and drive local economic and workforce development.

PFS-4.k Phase In Highest and Best Use of Products. Improve downstream reuse/recycling of end-of-life products and materials to ensure their highest and best use.

PFS-4.1 Food Waste Collection Program. The County should actively promote a curbside food waste collection program by integrating this measure into bid specifications.

The Mitigated Alternative, substantially redefines the future development of the landfill, and would shift emphasis at the facility from landfill disposal to recovery of materials and energy from wastes, consistent with the Countywide Plan Update goals, policies and programs listed above.¹ The project as proposed is evaluated in the FEIR regarding its consistency with goals and policies contained in the Countywide Integrated Waste Management Plan (see Section 3.6 of the FEIR) which are largely consistent with the Countywide Plan Update goals, policies, and programs listed above.

- C-14. Concerns regarding the applicant's record of compliance are addressed in Master Response 18 in the FEIR.
- C-15. The issues raised in this comment are addressed in Master Responses 8 and 9 in the FEIR.
- C-16. Mitigation Measure 3.6.4b in the FEIR requires the Marin County Board of Supervisors to consider enactment of an ordinance that would impose a mitigation fee on waste imported to Redwood Landfill from areas of California outside Marin County. While not strictly flow control, this measure would create an economic disincentive to waste importation from outside the County. As stated in Master Response 8 in the FEIR, the Marin County Counsel has determined that imposition of such a fee is within the County's police powers.
- C-17. Please refer to Master Response 103 in this document.
- C-18. Please refer to the response to Comment C-1.

¹ The determinations of policy consistency represent County staff interpretation of policies. However, this EIR does not determine policy consistency. The County decision-makers make the formal policy consistency determinations. Even where policy inconsistencies are identified, these may not necessarily indicate significant environmental effects. Section 15358(b) of the CEQA *Guidelines* states that "effects analyzed under CEQA must be related to a physical change in the environment." Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environmental are considered significant impacts pursuant to CEQA.

MARIN COUNTY HAZARDOUS AND SOLID WASTE **MANAGEMENT JOINT POWERS AUTHORITY**

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MARIN COUNTY

COMMUNITY DEVELOPMENT

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Belvedere:

Corte Madera: Jay Tashiro

County of Marin: Mathew Hymel

September 9, 2005

Environmental Coordinator Community Development Agency 3501 Civic Center Drive, Room 308 San Rafael, CA 94903

Adequacy of Redwood Landfill's Final Environmental Impact Report Re: (FEIR)

Dear Tim:

The Marin Hazardous and Solid Waste Joint Powers Authority (JPA) appreciates this opportunity to submit comments on the adequacy of Redwood Landfill's Final Environmental Impact Report (FEIR) and also voice concerns with Redwood Landfill's proposed Solid Waste Facility Permit revision.

The JPA is responsible for compliance with the Integrated Waste Management Act which includes administration, planning, implementation and monitoring of Marin's Regional Integrated Waste Management Plan (RIWMP). Our responsibilities also include an obligation to work with, and on behalf of, member agencies to plan for future disposal capacity for Marin County.

This project, as proposed by the applicant, enables the importation of substantial quantities of solid waste from areas of California outside of Marin County. This project would result in a more rapid consumption of landfill capacity and would reduce capacity levels available for solid waste generated in Marin County. If permitted, the cost of this practice would eventually be borne by the citizens of Marin through a distinct loss of their future local disposal capacity and is of enormous concern to the JPA. Another concern is that the proposed project does not provide sufficient new diversion measures. Additional recycling and diversion measures are needed to be consistent with the RIWMP's goals, objectives and policies.

The FEIR report concludes the project, as proposed, conflicts with Goals 1, 6, and 9 of the JPA's RIWMP Source Reduction and Recycling Element. To mitigate these impacts the FEIR (Mitigation Measure 3.6.4b) requires Redwood Landfill, as a condition of a revised Solid Waste Facilities Permit, to implement diversion programs identified under the FEIR's Mitigated Alternative; and for the County of Marin to consider the enactment of an ordinance to impose a mitigation fee on waste imported from areas outside of Marin County within California.

Marin County Department of Public Works, P.O. Box 4186, San Rafael, CA 94913 Phone: 415/499-6647 - FAX 415/446-7373

Tim Haddad

Fairfax:

Larkspur: Jean Bonander

Mill Valley: **Don Hunter**

Novato: **Daniel Keen**

Ross: Gary Broad

San Anselmo: **Debbie Stutsman**

San Rafael: **Rod Gould**

Sausalito: **Dana Whitson**

Tiburon: Alex McIntyre September 9, 2005 Tim Haddad Page 2 of 2

The JPA supports adoption of an out-of-county waste disposal fee ordinance and diversion programs identified in FEIR's Mitigation Measure 3.6.4b. Funds collected through this fee should be utilized to meet Marin's future waste disposal needs. It is within the County of Marin's and JPA's interest that the impacts caused by Redwood Landfill's waste importation operations are addressed prior to approval of Redwood Landfill's proposed project.

Further, FEIR Section 1.8.2 "Issues to be Resolved" (Page 1-16) identifies outstanding issues derived from the analysis in the Environmental Impact Report that remain to be resolved. The JPA recognizes the Marin County Community Development Agency as the California Integrated Waste Management Board's Local Enforcement Agency for review of Redwood Landfill's proposal. However, in "Issues to be Resolved" (1) the impact of the project enabling regionalization of Redwood Landfill and (2) the project conflicting with the JPA's RIWMP have an impact on the JPA and are of concern to our agency. Therefore, we appreciate the opportunity to participate in your agency's efforts to resolve these issues with Redwood Landfill.

Thank you for the opportunity to comment on this project. Please contact me at 499-3725 to discuss or clarify any comments or concerns affirmed in this letter.

Sincerely,

Michael Frost U Waste Management Specialist

C: JPA Board Members Farhad Mansourian Bob Beaumont Jeff Rawles Alex Hinds

MF:pacF:\Waste\Mfrost\JPA\082505 redwood EIR.doc

Comment Letter D: Marin County Hazardous & Solid Waste Management Joint Powers Authority

- D-1. The issues of increased rate of landfilling and reduced site life are analyzed in Impact 3.6.7 in the FEIR. See also Master Responses 104 and 107 in this document.
- D-2. The proposed project's inconsistency with County diversion goals is addressed in Impact 3.6.4, and Mitigation Measure 3.6.4b, which requires additional diversion (as the commenter notes in Comment D-3). In addition, the Mitigated Alternative, which is identified in the FEIR as the Environmentally Superior Alternative, would involve substantial additional recovery of materials and energy from wastes. See also the response to Comment C-13
- D-3. Additional discussion of an import mitigation fee, and additional detail on the Mitigated Alternative, are included in the FEIR; see Master Responses 8 and 20. See also Master Response 104 in this document.
- D-4. Regionalization of the landfill is discussed in Master Response 19. Conflicts with Regional Integrated Waste Management Plan (RIWMP) goals and policies are analyzed in the FEIR: see Impacts 3.6.4 through 3.6.7.

WADE B. HOLLAND

POST OFFICE BOX 87 INVERNESS, CA 94937 USA (415) 669-1631 • FAX (415) 669-1460 • wade@svn.net

> MARIN COUNTY PLANNING COMMISSIONER FOURTH DISTRICT

> > 2005

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September 12, 2005

Tim Haddad, Environmental Coordinator Marin County Community Development Agency 3501 Civic Center Drive, Room 308 San Rafael, CA 94903

Re: Comments on FEIR for Redwood Landfill SWF Permit Revision

Dear Tim:

It is my pleasure to enclose my comments on the Final Environmental Impact Report for the Redwood Landfill Solid Waste Facilities Permit Revision project.

I look forward to our hearing on this matter at the Planning Commission next month.

*Q***ordially**,

Wade B. Holland Planning Commissioner

FEIR FOR REDWOOD LANDFILL SWF PERMIT REVISION

(Final Environmental Impact Report, SCH 1991033042, July 2005)

Comments by Marin County Planning Commissioner Wade B. Holland

- 1. General: A well-written, well-prepared report, notable especially for careful crafting of mitigations and astute insights into the interrelationships between mitigations.
- 2. p. xvii: "Quench water" needs to be added to the Glossary.
- 3. p. 1-9: With respect to the list of Significant Unavoidable Impacts, see my comment below for p. 3.4-29.
- 4. p. 1-40: With respect to MM 3.3.7, I urge strongly that fn 7 on p. 3.3.25 also be included (or at least referenced) here in Table 1-2 (so that its important requirement does not get overlooked by someone working exclusively from the table and ignoring the details in Chapter 3).
- 5. pp. 2-15 & 2-16: It looks to me in comparing Figures 2-5 and 2-6 that the finished final height is proposed to be increased from the permitted 160 ft to 180 ft. Figure 2-6 only labels the contours through 160 ft, but graphically depicts two more 10-ft-increment contours. If this is the case, it should be noted as a change in the first paragraph of Sec. 2.5.1 on p. 2-10 (and elsewhere as appropriate).
- 6. p. 2-12: In the first paragraph, proposed total capacity is rendered first as "34.7<u>7</u>4" million cu yds, then in two places subsequently as "34.7<u>4</u>4" million cu yds (typo error).
- 7. p. 2-12: The graphic on the left side of the fold-out sheet that includes p. 2-12 appears to be half of Figure 2-4; the other half of this figure is missing (reproduction and bindery problem).
- 8. p. 2-13: This page is entirely missing from my copy of the FEIR (reproduction and bindery problem).
- 9. p. 2-17: The graphic on the left side of the fold-out sheet that includes p. 2-17 appears to be half of Figure 2-7; the other half of this figure is missing (reproduction and bindery problem).
- 10. p. 2-39: With respect to RLI's altered final cover design, does the proposed geomembrane replace both the 1-ft barrier/drainage layer and the flexible membrane liner, or just the barrier/drainage layer? The text is not clear as to whether or not the flexible membrane is retained.
- 11. p. 3.2-31 (also p. 1-24): The new sentence at the end of MM 3.2.2c doesn't really make a great deal of sense; obviously, a purchase of <u>new</u> equipment is going to be limited by market availability. I'm not quite sure what your intent here was, but perhaps you meant, "The purchase of any replacement or additional equipment shall be limited to new equipment which is available on the market at the time of purchase" (in other words, don't buy old, polluting used equipment?).
- 12. p. 3.2-33: For MM 3.2.4, I think a definition of "dry days" is imperative. Is it <u>any</u> day on which there is no rain? I doubt the Landfill would adopt that criterion if the definition is left up to them; they will likely use some sort of loose humidity index to minimize what qualifies as a "dry day." It's not even clear to me if you actually intend "dry day" to mean "any day on which there is no recordable rainfall," which would be the literal interpretation.
- 13. p. 3.2-34: In the first line of the discussion for Impact 3.2.5, verify if the correct value is "34.744" or "34.774" (see comment above for p. 2-12).
- p. 3.2-46: MM 3.2.8c <u>assumes</u> that these new Federal standards will remain in effect, and MM 3.2.8d <u>assumes</u> that these new Federal standards will actually come into effect. In the current regulatory environment in Washington, these are not necessarily safe assumptions. It's difficult to have much confidence in mitigations that rely on the continued existence of Federal standards such as these. This

Comments on Redwood Landfill FEIR

is particularly important because emissions impact 3.2.11 remains a "significant unavoidable impact";
 it will only become a more severe impact if the administration guts proposed and incoming diesel emissions regulations.

- p. 3.2-47: In the 2nd of the bulleted items, "effecting" and "effect" should be "affecting" and "affect" (typo errors). (OK, you might make a case that "effecting" was intended, but inasmuch as you can't justify "effect," it's fairly clear that both are mistakes.)
- 16. p. 3.2-49: I am not at all supportive of MM 3.2.10c, which provides for purchase of emissions credits. I don't like the idea of increasing pollution in my neighborhood just because other folks did a better job of reducing emissions in their neighborhood.
- p. 3.2-52: On the 5th line of the new paragraph at the top of the page, the word "for" is missing; should be "...significant air quality procedures <u>for</u> incinerator ash" (also, do you really want a colon after "ash"?).
- 18. p. 3.2-53 (also p. 1-35): In MM 3.2.14, it needs to be made explicit that no PC soils are to be accepted for use as ADC on a day before a non-working day at the landfill (such as on Saturdays and days before holidays). See, for example, the wording in MM 3.5.10b on p. 3.5-17.
- 19. p. 3.3-9: In fn 2, 2nd line, there is an extraneous close quote mark (typo).
- 20. pp. 3.3-26 3.3-28: An explicit mitigation measure is needed that states that before RLI ships compost out of the Sudden Oak Death quarantine zone, <u>they</u> must first obtain a Compliance Agreement from the County Agricultural Commissioner (the way it's written now, it's almost as if it's up to the Ag Commissioner to ensure that RLI has asked for the Compliance Agreement).
- 21. 3.4-22: Throughout my reading of much of the technical material, I've wondered if studies and reports were peer reviewed, especially material that appears to have been based largely on data provided by the applicants. Near the bottom of p. 3.4-22, the text suggests that the 2002 Treadwell & Rollo technical memorandum was provided as a result of peer review. I think it would strengthen the FEIR if there was a brief discussion at an appropriate spot of the peer review procedures and the material that was subjected to peer review.

The integrity of Master Response 1 would also be strengthened helpfully if the reader was given clear information on your use of peer review to validate the many studies that are cited, especially with respect to leachate. The somewhat snippy Response J-14 disposes of the peer review question by citing Treadwell & Rollo's "technical review," which doesn't quite settle the question of whether or not full-fledged peer review was performed.

22. p. 3.4-29: Notwithstanding Master Response 1, I feel quite uneasy about MM 3.4.6 (responding to the lack of a 5-foot separation between the landfill base and the groundwater level). I've read closely the information on the studies that appear to validate RLI's proposed LCRS, and I am comforted to learn that RWQCB will have the final say in the matter. In the meantime, I wonder if we are really sufficiently confident in the adequacy of the engineered alternative to label this impact as having been reduced to a less-than-significant level? You conclude that the mitigation measure "should prevent the migration of leachate...," but I wonder if it wouldn't have been better to use the wording "may prevent the migration." I'm leaning towards the view that impact 3.4.6 remains a significant unavoidable impact, unless and until RWQCB determines otherwise.

23. p. 3.5-16 (also p. 1-75): On the 4th line of MM 3.5.9, "1,00-year" needs to be corrected to "100-year".

24. p. 3.6-3: On the penultimate line in the 1st paragraph under "Agriculture Element," "...the County would enter into..."; should be corrected to "..the County could enter into..."; entering into a Williamson Act contract is strictly voluntary on the part of each eligible property owner in the Zone.

- 25. p. 3.6-16: The amount of noise from bird control activities could increase as a result of MM 3.6.2d. Moreover, MM 3.6.2a refers to use of "noise," "bang or whistle," "sound of the propellant," and "a loud blast." Thus, it is possible that as a result of the 3.6.2 mitigation measures, the level of significance of impacts of the bird control program could actually increase. Oddly, none of this <u>daily</u> noise is referred to at all in Section 3.7 on Noise! This is a troubling omission from the FEIR, exacerbated by the inadequate responses to Comments P-4 and Z3 (Comment Z-3 is particularly explicit with respect to the adverse impacts on marshland wildlife from the noise of the bird control program, but the response to Z-3 is simply a referral to Response P-4, which largely sidesteps the issue of bird control program noise impacts).
- 26. p. 3.8-14 (also p. 1-81): MM 3.8.1b refers (importantly) to "Mitigation Measure 3.2.10b"; however, this is an incorrect reference (probably the intended reference is to "3.4.10b"). On the 2nd line of 3.8.1b, the first instance of the word "currently" is not appropriate and should be deleted (the parenthetical expression should read "(limit acceptance of designated wastes currently-accepted at the landfill to the currently permitted level of 20 TPD)").
- 27. p. 3.10-3: In the paragraph beginning, "For purposes of this EIR,..." there are Track Changes problems with the newly added sentence beginning on the 4th line of the paragraph. At the beginning of the sentence, the space between the preceding (existing) sentence and this new sentence has been deleted (inadvertently, no doubt). At the end of the sentence there is the sequence: close-paren, space, period, space, period. Also note that although fn 3 was deleted, the subsequent footnote numbers did not decrement.
- 28. pp. 3-10.9 3.10-10: I suspect it may no longer be valid to state that there will be no change in the directional split of the traffic on Hwy 101, now that a significant portion of Sonoma County municipal waste is coming into the Redwood Landfill. There may be other traffic (as well as other) implications for the FEIR as a result of this new development.
- 29. p. 3.10-12: The discussion of Impact 3.10.4 needs to be updated from the DEIR version to reflect that the grade-separated access to the landfill from Hwy 101 has been approved and the work is underway. Additionally, the reference to "footnote 3, page 3.10-2" on the 5th line from the end of the 1st paragraph is not valid (the page number is for the DEIR and the footnote was deleted from the FEIR).
- 30. p. 5-25: Correct "ALRTERNATIVES" (typo) in title of Table 5-2. Also, the cell in the "Mitigated Alternative" column for Program Objective 3 is blank.
- 31. p. 6.3-3: In the 4th paragraph, should the reference to "(pg. 2-31) of the DSEIR" be updated to the correct reference in the FEIR (in the FEIR, the section is on p. 2-33)?
- 32. p. A-1: This page is out of order in my copy of the FEIR (precedes the "APPENDICES" page).

Comment Letter E: Planning Commissioner Wade B. Holland

- E-1. Comment noted and appreciated.
- E-2. Please note that, while editorial comments of this kind are appreciated, the County does not intend to produce a full revision of the FEIR. Only those portions of the FEIR that required substantive revision are presented in Chapter 4 of this document. "Quench water" is water used to increase the moisture content of compost piles to optimize the composting process.
- E-3. Please refer to the response to Comment E-22.
- E-4. Please see response to Comment E-2.
- E-5. As the text in the FEIR indicates, no change in the maximum permitted height is proposed. The landfill is permitted to a maximum height of 166 feet above mean sea level according to the current Solid Waste Facility Permit. Drawings and figures in background documents indicate that both currently permitted landfill contours and proposed landfill contours go to 166 feet. The top two contour lines shown in Figure 2-6 (where the landfill flattens at the top) represent 3-foot contour intervals and should have been so labeled, since they diverge from the 10-foot contour intervals shown for the rest of the landfill. In any event, as stated in the Projection Description, no change in the permitted maximum height was proposed or evaluated as part of the project evaluated in this EIR.
- E-6. The correct figure is 34.774 million cubic yards. Please see Table MR21-1 on page 6.3-86 of Volume II of the FEIR.
- E-7. The EIR preparers apologize for reproduction and bindery errata. The complete document is available from the Marin County Community Development Agency.
- E-8. Please see response to previous comment.
- E-9. Please see response to Comment E-7.
- E-10. Figure 2-11 on page 2-40 of Volume I of the FEIR indicates that the flexible geomembrane (the 40 mil. geomembrane barrier layer) is included, overlain by the geosynthetic drainage layer, between the foundation layer and the vegetative layer.
- E-11. This statement means that the applicant must purchase equipment that meets the thencurrent pollution control and emissions standards. Mitigation Measure 3.2.2c on page 3.2-31 of the FEIR has been revised to clarify this point as follows (additions shown as <u>underlined</u>; deletions as strikeout):

Mitigation Measure 3.2.2c: As off-road equipment ages and requires replacement, the project applicant can be expected to purchase new equipment that incorporates technology that meets more stringent emission standards mandated by CARB. Alternatively, the project applicant may purchase electrically-powered equipment, or equipment fueled by an alternative, less-emitting fuel (e.g., liquefied natural gas [LNG] or compressed natural gas [CNG]). Use of alternative fuel engines can be expected to achieve a reduction in NO_x emissions of at least 37 percent. <u>At the time of replacement</u>, Tthe applicant shall purchase of new equipment that meets then-current emission and pollution control standards.shall be limited to that which is available on the market at the time of replacement.

- E-12. Dry days in this context does mean days when there is no measurable precipitation. Note also that Redwood Landfill's current Title V permit issued by the BAAQMD, which is available for review at the BAAQMD website, includes dust control requirements for dry operating days. Permit condition #19867, Part 11 specifies dust control requirements as follows: "particulate emissions from any operation of the landfill shall be abated by A-18 Water Sprays in such a manner that visible dust emissions shall not exceed Ringelmann 1.0 or result in fallout on adjacent property in such quantities as to cause a public nuisance per Regulation 1-301" and also lists minimum watering requirements to be met by the Permit Holder.
- E-13. Please see the response to Comment E-6.
- E-14. The County is unaware of any proposed changes to the federal standards for emissions reductions from off-road diesel equipment. Any future changes are therefore speculative and beyond the scope of this FEIR.
- E-15. Please see the response to Comment E-2.
- E-16. Comment noted. The commenter is concerned and not supportive of the purchase of emission credits as described in Mitigation Measure 3.2.10c. The mitigation addresses an impact of regional concern within the affected air basin. The primary concern about controlling VOC (ROG) emissions is due to their role as precursors in the formation of ozone. Given that ozone generally requires about three hours to form and often forms in locations away from the source, as noted in the FEIR (page 3.2-13), regional control of precursors (i.e., emission offsets) will benefit the region.
- E-17. Please see the response to Comment E-2.
- E-18. The mitigation measure appears to be clearly enough worded to establish operational standards, which would be incorporated into the facility's operating permits.
- E-19. Please see the response to Comment E-2.
- E-20. As the agency responsible for control of Sudden Oak Death within the County, the County Agricultural Commissioner is responsible for enforcing the quarantine. This

includes imposition of restrictions on operations and activities that may pose a risk for the spread of Sudden Oak Death disease, including a requirement for the applicant for this project to enter into a Compliance Agreement, as stated in the mitigation measure.

- E-21. The County engaged geotechnical engineering consultants Treadwell & Rollo to conduct reviews of several geotechnical issues raised by the applicant's proposal. These reviews are referenced in several places in the FEIR. Copies of the memoranda containing the reviews are available through the County Environmental Health Services Division.
- E-22. Master Response 1 in the FEIR goes to some length in describing the hydrogeologic conditions at the site, which form the basis for the conclusion reached in the FEIR that with mitigation, including the approval by the RWQCB of the final design of the LCRS, groundwater and surface water quality will be sufficiently protected to deem this impact less-than-significant. In February 2006 the Regional Water Quality Control Board (RWQCB) approved Redwood Landfill's engineered alternative to the requirement to maintain five feet of separation between waste and groundwater (Seward, 2006). See also Master Response 105 in this document.
- E-23. Please see the response to Comment E-2.
- E-24. Please see the response to Comment E-2. This does not affect the analysis contained in the FEIR.
- E-25. Please refer to Master Response 102 in this document.
- E-26. The correct reference is to Mitigation Measure 3.4.10b, not 3.2.10b, as suggested by the commenter. The text following the reference in Mitigation Measure 3.8.1b correctly describes the mitigation measures, though the reference is incorrect.
- E-27. Please see the response to Comment E-2.
- E-28. Please see Master Response 101 in this document.
- E-29. While the commenter is correct in stating that the discussion is now out-of-date, this does not affect the conclusion of the analysis.
- E-30. The blank cell in Table 5-2 should read "Partly."
- E-31. The reference to the section number is correct, but the page reference is incorrect, as noted by the commenter.
- E-32. Please see response to Comment E-7.

TO: Tim Haddad

FM: Randy Greenberg

DATE: 9/28/05

RE: Redwood Landfill EIR questions

I have the following questions/comments about the Redwood Landfill SEIR which I will raise at the public hearing. I submit them for your information, and ask that they be appropriately distributed.

I have two major serious concerns which I believe the EIR does not fully address and mitigate. The significance of these lapses is magnified because of the environmental sensitivity of the site. These are:

- Past, and apparently present, unpermitted practices, including: construction of the perimeter LCRS without integrated levee constructions; air drying of sludge, abandonment of the N-Viron process for sludge processing, exceeding permitted capacity, unpermitted leachate vaporator system, not constructing an approved additional leachate storage/evaporation pond (3.4-34) and constructing 3:1 slopes.
- The speculative or experimental nature of some aspects of the project, such as permeability of Bay Mud with the increased landfill capacity, the idea that future height increases in the perimeter levee will offset impacts of rising sea levels, and the impact of earthquakes, especially on the Hayward fault, which has the greatest likelihood of a major quake during the life of the landfill.

1. The following comments apply to many of the mitigations offered:

- In view of past lack of compliance, various mitigations that require monitoring should be reviewed to assess which require independent, as opposed to applicant, monitoring. While usual practice may be self-monitoring, this sensitive site, adjacent to wetlands, requires a more rigorous standard.
- In view of past lack of compliance, it is essential that self-monitoring, an integral part of many of the mitigations, be done in an organized, comprehensive fashion. Taken together, the monitoring task is multilayered and complex. I believe that there should be a mitigation requiring fees from the applicant to pay for independent monitoring management to be sure that each and every monitoring task is done in a timely fashion, with the results forwarded to the appropriate oversight authority.
- In view of past lack of compliance, a new mitigation should be added to make explicit that any changes to procedures or practices in the approved project must be reported to and approved (with conditions of approval, as appropriate) by the appropriate oversight agency, Waste Management's propensity for doing what it considers okay, such as constructing slopes at a 3:1 ratio, without necessary approvals, supports the appropriateness of such a mitigation

R. Greenberg Redwood Landfill FSEIR comments

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• A systemic and serious problem with the mitigations is the requirement for "periodic" inspections". This is a requirement in over 50 mitigations. In order for there to be a way to measure compliance, there needs to be specificity as to the time interval for inspections. In cases where circumstances, rather than time periods, drive inspections, these must be spelled out so that the trigger for inspection is clear. Without this specificity, these mitigations are meaningless and unenforceable. In addition, the difference between "periodic inspections" and "continuing periodic inspections" is unclear and should be defined.

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 Vagueness in language or procedures makes it difficult to require or assess compliance. Where this occurs, definitions that allow for assessment of compliance must be provided for the mitigations to have value. Some examples follow:

(a) Mit. 3.3.4. The last sentence should be changed from "*care should be taken* to avoid construction that disturbs the outer levee bank during spring tides", to "*prohibit* construction that disturbs the outer levee bank during spring tides".

(b) Mit. 3.6.4b. The time frame here is "as soon as possible". This should be changed to "as soon as possible, but not longer than X months".

(c) Mit. 3.8.2c. "Refrain from on *windy* days". A definition of "windy" should be given to allow compliance assessment.

(d) Mit. 3.9.3b. "...commence operation of these engines <u>as soon as possible</u>." Again, the language should be amended to "<u>as soon as possible, but no longer</u> <u>than X period after permit approval.</u>"

- 2. Air pollution. RE mitigations in 3.2.2: On its website, Waste Management states that "with 389 vehicles now converted from diesel fuel to clean-burning natural gas, the company operates one of the nation's largest fleets of heavy-duty trucks powered exclusively by natural gas." Can this technology be applied to onsite equipment? If "yes", this should at least be one of the options offered, if not required, in 3.2.2.
- 3. The impacts of levee construction on the adjacent wetland/marsh areas are unclear. Since much if this levee is already constructed, if impacts have occurred, they should be called out and mitigated.
- 4. In regard to the estimated life of the landfill: Are the "average" volumes, upon which the new estimates (2024 and 2037) are based, the *current* averages? Has regional growth over time been factored in? It can be assumed that population will grow during the life of the landfill, and the "average" waste received on a daily basis will increase over time, shortening the estimated life of the landfill.
- 5. Apparently, the air quality monitoring station is 15 miles away from the Landfill. Given that thousands of people live closer to the facility, why isn't there a mitigation requiring a station closer to the landfill to more adequately assess air quality?

- 6. Mitigation 3.2.10c. If this mitigation is adopted, it should be amended to allow the **purchase of emissions credits** only when there have been no odor complaints for a specified period of time. Additionally, the use of such credits must be stopped if odor complaints are received during a period in which there is increased sludge processing under the purchased credits.
- 7. Settlement around the perimeter of the landfill is expected to be about 9 feet. Height of the perimeter levee is proposed to be increased to a minimum of 9 feet above the mean sea level around the entire landfill. What will be the settlement of this levee, and will its expected final height be sufficient to accomplish its objectives?
- 8. Mitigation 3.4.4b. Controlling erosion with vegetation is desirable. However, there should be a requirement for removal of invasive species on at least an annual basis. In the area above the outer levee, I noted considerable growth of invasive thistle.
- **9.** Multiple agencies are listed as responsible for verifying compliance with many of the mitigations. Where more than one agency is listed, must they all sign off? If "yes", how is this coordinated and how are the agencies informed when one agency identifies a problem? This kind of communication is vital to a successful mitigation program and the process should be explicit, not taken for granted.
- **10.** How does the reduction in daily receipts of sludge (from current 550 to 232 tons/day) affect Marin's disposal of sludge? Can restricting a percentage of such intake to Marin be a mitigation supporting findings of overriding considerations?

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Comment Letter F: Planning Commissioner Randy Greenberg

- F-1. Comment 1 is preamble to the two following comments, and does not address the FEIR specifically enough to respond here.
- F-2. Master Response 18 of the FEIR addresses the applicant's record of compliance. In addition, specific analysis sections of the FEIR (e.g., Sections 3.3, Air Quality, and 3.4, Geology, Soils, and Seismicity) address impacts associated with changes in operations from those currently permitted. Mitigation Measure 3.4.8c requires Redwood Landfill to update its leachate management plan to address the issue of leachate storage capacity. Please also see to Master Response 105 in this document for additional information on leachate management. In December 2004 the LEA issued a letter to RLI regarding the agency's observation of a section of landfill slopes constructed consistent with proposed (3:1) slopes rather than the currently permitted profile of 4:1 (horizontal to vertical) slopes with bench intervals at 15 feet. The LEA subsequently noted on the LEA Inspection Report for that month (12-22-04) that landfill operations staff has suspended placing waste according to the proposed fill plan.
- F-3. Concerns regarding the adequacy of Bay Mud in protecting groundwater beneath the landfill from contamination are addressed at length in Master Response 1 in the FEIR. Master Response 7, Bay Mud Strength and Settlement, also addresses the permeability of Bay Mud and the geotechnical monitoring program in considerable detail. See also Master Responses 105 and 109 in this document.
- F-4. Please refer to Master Response 106.
- F-5. Potential seismic impacts are addressed in section 3.4, Geology and Seismicity, of the FEIR. The seismic stability of the landfill is further addressed in Master Response 22 of the FEIR. See also Master Response 108 in this document.
- F-6. Please see Master Response 111.
- F-7. Redwood Landfill is legally compelled to comply with the terms of its permits, and to report any planned changes in operations that might deviate from permit requirements, and to apply for permit modifications if planned operations will deviate from permit requirements. The permitting agencies have oversight authority of the facility, regularly inspect the facility, and have procedural recourse, including imposition of civil penalties, if the facility violates the terms of its permits. However, the commenter's point is evidenced in past landfill practices leading to past issuance by the LEA of a notice of violation and order to comply. To address the commenter's concerns, Mitigation Measure 3.1.6 is refined to include the following provision, which also applies to all other mitigation measures and conditions of approval:

<u>Mitigation Measure 3.1.6e:</u> Any changes to procedures or practices in the approved project must be reported to and approved (with conditions of approval, as appropriate) by the appropriate oversight agency.

- F-8. The agencies responsible for permitting and overseeing landfill operations under state, federal, and regional regulations conduct periodic inspections to ensure compliance with permit conditions and requirements. In general, state regulations and the agencies conducting the inspections (e.g., the LEA, CIWMB, BAAQMD, and RWQCB) dictate the period for inspections. For example, the LEA conducts inspections at least monthly, as required by state regulations for a disposal facility of this size. Agencies may also conduct inspections in response to complaints or information received regarding potential violations of permit terms. Most inspections are unscheduled to ensure independence and objectivity of the periodic review and factual accuracy of actual conditions encountered.
- F-9. (a) See Master Response 102 for revisions to Mitigation Measure 3.3.4.

(b) The timeline for 3.6.4b in the MMRP is so worded in recognition of the uncertainty involved in permitting and development of some components of this measure.

(c) The wording in Measure 3.8.2c is consistent with CIWMB guidance to LEAs on the topic (CIWMB, 1993); this provision in combination with other provisions of Measures 3.8.2, as well as dust control measures required by BAAQMD permits, reduce potential impacts from exposure to aspirgillus and endotoxins to less than significant levels.

(d) The timeline in Mitigation Measure 3.9.3b is so worded in recognition of the uncertainty involved in permitting and development of some components of this measure.

F-10. The use of natural gas-fueled onsite equipment is described in Mitigation Measure 3.2.2c as an option to replace aging equipment: "the project applicant may purchase electrically-powered equipment, or equipment fueled by an alternative, less-emitting fuel (e.g., liquefied natural gas [LNG] or compressed natural gas [CNG])."

Although this option is already included in the FEIR, the applicant, has expressed concern regarding the feasibility of using natural gas-powered onsite equipment, since "natural gas must be super cooled and maintained in a vacuum tank on board and there are significant design problems with placing a tank like that on a large piece of equipment that is subject to damage, such as landfill equipment".

- F-11. Construction of the existing levee is not the subject of this EIR. Potential impacts of levee construction under the project are addressed in Impacts 3.5.8, 3.3.2, 3.3.3, and 3.3.4 and their associated mitigation measures. See also Master Response 106 in this document.
- F-12. Assumptions used in the site life estimates are shown in Table MR17-1 in the FEIR. For additional information on site life, see Master Response 107 in this document.

- F-13. The location of California Air Resource Board (CARB) and BAAQMD air quality monitoring stations is addressed in FEIR Master Response 16; these stations are regional, not site-specific.
- F-14. Potential odor impacts of sludge processing are addressed in Mitigation Measure 3.2.10a. In addition, measures identified under Impact 3.2-9 address nuisance odor impacts; the purchase of emissions credits is not proposed as an alternative to addressing odor impacts.
- F-15. The settlement around the perimeter of the landfill refers to the settlement beneath the areas where refuse is placed. Although the levee will experience ongoing settlement due to the consolidation of the underlying Bay mud from the added weight of the levee material and influence of the refuse loads nearby, the actual settlement of the levee is anticipated to be significantly less than the 6 to 9 feet presented for the "perimeter of the landfill." According to the applicant's Joint Technical Document (GeoSyntec, 1998), the perimeter levees need to be designed for the 100-year flood elevation of +6.3 feet, msl. As discussed in the EIR, the height of the perimeter levee will be increased to +9 feet, msl, around the entire landfill. Periodically, limited additional fill will need to be added to the levee as part of ongoing levee maintenance to retain required flood protection levels. See also Master Response 106 in this document.
- F-16. Please refer to Master Response 102 in this document.
- F-17. When more than one agency is listed the agency with permitting authority over the respective area (e.g., the RWQCB for water quality issues) takes the lead, and other agencies that conduct monitoring at the site provide supplementary oversight. (The order of agency listing generally reflects the agency with lead oversight responsibility for the particular topic.).
- F-18. Historically, the majority of sludge received at Redwood Landfill has originated outside the County. The County's own generation of sludge is small compared to the permitted and proposed daily limits for sludge acceptance. Wastewater treatment plants have a number of options for disposal of sludge, other than landfilling the material at Redwood Landfill, and the market for sludge handling and disposal is dynamic. The economics of transporting this material favor disposal options close to the point of generation. For these reasons, a set-aside of daily capacity for sludge from Marin County, as suggested in the comment, is unnecessary.

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September 12, 2005

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VIA FASCIMILE AND U.S. MAIL

Tim Haddad Environmental Coordinator Marin County Community Development Agency 3501 Civic Center Drive San Rafael, CA 94903

Re: Comments on Final Subsequent Environmental Impact Report

Dear Mr. Haddad:

This firm represents the Redwood Landfill and Recycling Center ("Redwood"). This letter includes Redwood's comments on the Final Subsequent Environmental Impact Report ("FSEIR") relating to issuance of a revised Solid Waste Facility ("SWF") permit. Redwood appreciates the willingness of the County to accept into the record the following clarifications as we near what appears to be the final phase of this lengthy permitting process.

A. <u>Clarification of Project Description and Mitigation Measures</u>

In recent communications, certain clarifications to the project description and the feasibility of certain mitigation measures have been discussed. As a result of discussions with County staff, Redwood submits the following information. Mr. Tim Haddad September 12, 2005 Page 2

1. Permitted Landfill Capacity

Redwood's engineers, outside consultants, and the County's EIR consultants have all calculated total available airspace volume for both the existing permit fill plan and for the proposed full site expansion contained within our permit application (the 1997 fill plan).¹ It is not disputed that the 1 total available airspace volume, measured from an elevation of minus 5 msl (-5 msl) to the limit of the currently approved final fill contours, is on the order of 25 million cubic yards. Further, for the 1997 fill plan, it is not disputed that the total available airspace volume, measured in a similar manner, is on the order of 35 million cubic yards. The FSEIR addresses the issue of 2 airspace capacity, cover use estimates, settlement, and site life based on assumptions of waste inflow. Redwood notes that even the Mitigated Alternative includes an expansion of approximately 6 million cubic yards. It 3 is expected that during the development of the SWF permit, exact airspace volume to be permitted will be defined.

2. Household Hazardous Waste

The DSEIR and FSEIR discuss the potential for the proposed project to conflict with Summary Plan Goal 12, which is to insure that all residents have access to a program that safely and effectively manages household hazardous waste ("HHW") and Summary Plan Policy 14, to develop an effective program for managing HHW generated in the county. (See FSEIR, at p. 3.6-18.) Redwood currently offers recycling of used motor oil and automotive batteries to its customers. The FSEIR states that Redwood must provide expanded HHW services in order to be consistent with Summary Plan Goal 12 and Summary Plan Policy 14. (Mitigation Measure 3.6.5, FSEIR, at p. 3.6-18.)

County staff has now indicated that additional HHW recycling opportunities, in addition to the two existing HHW facilities in Marin County, are in fact not needed at this time. Therefore, the proposed project is

¹/ For a complete analysis regarding Redwood's understanding of current permitted volume, see my letter of July 2, 2004, at pp. 16-17 and Exhibit N.

Mr. Tim Haddad September 12, 2005 Page 3

consistent with the Summary Plan Goals and no mitigation is required. Redwood also notes that Mitigation Measure 3.6.5b is also legally infeasible at this time because Redwood would have to apply for the necessary entitlements and conduct appropriate environmental review before it could implement the activities described in Mitigation Measure 3.6.5b. (See CEQA Guidelines, §§ 15364, 15126.4, subd. (a)(1)(D).)

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3. Construction and Demolition Debris

The Revised Subsequent Draft Environmental Impact Report ("DSEIR") and the FSEIR state that the proposed project is inconsistent with Goals 1, 6 and 9 of the County's Source Reduction and Recycling Element for Marin County and its Cities ("SRRE").

<u>SRRE Goal 1: Maximize Diversion from All Source Reduction</u> <u>and Recycling Element Program Areas</u>. To meet source reduction, recycling, and composting diversion requirements of Section 40051 of the Public Resources Code.

<u>SRRE Goal 6: Maximize Source Reduction</u>. To recognize that source reduction is the preferred management tool for implementing AB 939 regulations since, if waste is not generated, downstream management efforts can be reduced.

<u>SRRE Goal 9: Maximize the Use of Incentives that will Promote</u> <u>Diversion Programs</u>. To assist the implementation of source reduction, recycling, and composting programs through financial or other incentives that will encourage participation.

According to the FSEIR, to mitigate the potentially significant impact created by the proposed project's "inconsistency" with SRRE Goals 1, 6 and 9, Redwood must implement:

- increased composting; and
- additional diversion programs, such as construction and demolition ("C & D") debris recovery, recovery of materials from self-haul and

Mr. Tim Haddad September 12, 2005 Page 4

> debris box loads, salvage of building materials and other reusable items, increased opportunity for drop-off of source-separated materials and other measures as detailed in the Mitigated Alternative. (Mitigation Measures 3.6.4a and 3.6.4b, FSEIR, at p. 3.6-17.)

First, the proposed project is in fact consistent with SRRE Goals 1, 6 and 9. Under the proposed project, Redwood would continue to implement extensive diversion activities. Roughly one-third of all recycling in Marin County occurs at Redwood. The proposed project would also continue to provide disposal capacity for Marin-generated waste streams for the foreseeable future. The increased daily tonnages of non-hazardous Class III waste ("solid waste") accepted under the proposed project do not affect the continuing source reduction efforts underway in Marin County and elsewhere. Even with source reduction, there is a need to provide safe land disposal for waste that cannot feasibly be reduced at their source. Finally, as mentioned in the FSEIR, Redwood does offer reduced tipping fees for recoverable materials such as clean dirt, concrete, asphalt, and mud. Because the proposed project is consistent with these goals, no mitigation is required.

Second, even if the proposed project did not implement every single SRRE goal, it is not necessarily inconsistent with the SRRE. Redwood is part of an overall system for managing solid waste and other materials in the County. While the proposed project primarily increases solid waste disposal activities, Redwood continues to be integral to meeting the County's source reduction, recycling, and composting diversion requirements under section 40051 of the Public Resources Code.

Third, the C & D recovery activities proposed in the DSEIR and FSEIR cannot feasibly be implemented at this time. Specifically, the environmental impacts that could result from implementation of the additional diversion programs generally described in Mitigation Measure 3.6.4b (and in the Mitigated Alternative) have not been analyzed under CEQA. (See CEQA Guidelines, § 15126.4, subd. (a)(1)(D).) Without such analysis in the current EIR, it is not legally feasible to require implementation of Mitigation

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Mr. Tim Haddad September 12, 2005 Page 5

Measure 3.4.6b as a condition of Redwood's SWF permit. Redwood continues to have great interest in increasing C & D recovery rates and plans to separately submit an application to the LEA to undertake those activities.

B. <u>Alternatives to Proposed Project</u>

Redwood has the following additional information for the County's consideration regarding the description and feasibility of the alternatives to the proposed project.

1. Description of Mitigated Alternative

For the reasons discussed above (in sections A(2) and A(3)), the mitigation measures relating to HHW and C & D recycling are infeasible and should not be required as part of the Mitigated Alternative.

2. Feasibility of Alternatives

CEQA defines "feasible" as capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social and technological factors." (Pub. Resources Code, § 21061.1.) The CEQA Guidelines add another factor: "legal" considerations. (CEQA Guidelines, § 15364; see also *Citizens of Goleta Valley* v. Board of Supervisors (1990) 52 Cal.3d 553, 565 (Goleta II).) The concept of "feasibility" also encompasses the question of whether a particular alternative or mitigation measure promotes the underlying goals and objectives of a project. (*City of Del Mar v. City of San Diego* (1982) 133 Cal.App.3d 410, 417.) ""[F]easibility' under CEQA also encompasses 'desirability' to the extent that desirability is based on a reasonable balancing of the relevant economic, environmental, social, and technological factors." (*Ibid.*)

a. Ability of Mitigated Alternative To Meet Project Objectives

Table 5-2 on FSEIR page 5-25 states that the Mitigated Alternative meets Project Objective 1, and does not state whether the Mitigated

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Mr. Tim Haddad September 12, 2005 Page 6

Alternative is consistent with Project Objective 3. As described in the FSEIR, the Mitigated Alternative would be inconsistent with Project Objectives 1 and 3.

Project Objective 1 is: "To respond to changing physical conditions, changes in regulations, increases in recycling efforts, and necessary responsiveness to changes in waste markets." (FSEIR, at p. 5-25.) Under the Mitigated Alternative, there would be no increase in daily receipts of solid waste. Compared to other landfills in the region, the tonnages of solid waste received at Redwood are relatively small, both because of the size of Marin County's population and because Redwood's remote location can result in relatively high transportation costs. Historically, Redwood had relied on receipt of sludge to supplement its solid waste revenues. These revenues were used to comply with increasingly strict environmental regulations, to implement recycling, and to finance infrastructure projects. Redwood's proposed project seeks to increase daily solid waste tonnage to respond to changes in municipal regulations, which provided less expensive alternatives, thereby reducing its ability to effectively compete for that waste. The request for additional solid waste tonnages would offset lost municipal sludge revenue that was a primary project component for the existing SWF permit. The Mitigated Alternative would not meet Project Objective 1.

Project Objective 3 is: "To stabilize overall site revenue, in turn helping to stabilize in-county waste disposal fees, by phasing in increased permitted receipts of non-hazardous solid waste to offset revenue reductions from planned reductions in sludge receipts." (FSEIR, at p. 5-25.) Despite a major reduction in sludge receipts under the Mitigated Alternative, there would be no increase in solid waste receipts. (See FSEIR, Table MR-1, at p. 6.3-80.) Redwood's proposed permit modifications are based, in large part, on a commitment to the County and the local community to significantly reduce sludge receipts and associated processing. Under the Mitigated Alternative, Redwood's potential to generate revenues from tipping fees would be reduced, while at the same time an extensive array of additional mitigation measures would be required. Redwood would expect a reduction in the rate of return on its investment. Therefore, the Mitigated Alternative would not stabilize site revenue by phasing in increased permitted receipts of solid waste to

Comment Letter G

Mr. Tim Haddad September 12, 2005 Page 7

offset revenue reductions from planned reductions in sludge receipts as described in Project Objective 3.

b. Economic Feasibility of Mitigated Alternative

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As described above in relation to the project objectives, the Mitigated Alternative would reduce the potential of Redwood to generate tipping fees while increasing capital and operating costs. Redwood has retained the services of an economic expert to analyze the economic impact of implementing the new mitigation measures included in the FSEIR. Mr. Ross Wilson's findings are attached as Exhibit A to this letter. The data supporting Mr. Wilson's analysis is proprietary, and thus, Redwood has provided a summary of the detailed analysis undertaken by Mr. Wilson. (See, e.g., Evid. Code, § 1060; Gov. Code, § 6254, subd. (k).)

Mr. Wilson's analysis concludes that the new mitigation measures increase capital and operational costs at Redwood substantially. (Exhibit A, at p.3.) As Redwood understands the Mitigated Alternative, there would be no increase in receipts of solid waste. As explained above (in section A(3)), C & D recovery cannot be implemented as part of this permit process. Though Redwood has interest in eventually implementing C & D recovery, no increased revenues are expected in the near term from such additional activities. Moreover, sludge receipts under the Mitigated Alternative would be reduced substantially, removing one of Redwood's potential revenue sources. Under the Mitigated Alternative, therefore, there would be no increased revenues and significant increased capital and operating costs.

Obviously, Redwood would not pursue the current permit application without the potential to at least balance revenues and costs. As indicated by Mr. Wilson's report, implementation of a project that does not allow Redwood to offset additional mitigation costs with increased revenue potential would lead to a reduction to the current rate of returns at Redwood. A project that is less profitable than current operations is not feasible from an economic standpoint. In order to offset the additional mitigation costs required in the FSEIR, Redwood would need to increase solid waste receipts. Additional costs and lost profitability under the Mitigated Alternative "are sufficiently Mr. Tim Haddad September 12, 2005 Page 8

severe to render it impractical to proceed with the project." (*Citizens of Goleta Valley v. Board of Supervisors* (1988) 197 Cal.App.3d 1167, 1181.) Thus, the Mitigated Alternative, as described in the FSEIR, is not economically feasible and is not required to be adopted. (See Pub. Resources Code, §§ 21002, 21002.1, subds. (b), (c), 21081.)

* * *

Redwood appreciates the opportunity to provide these comments and looks forward to a continued cooperative working relationship with the County. Please contact me if you have any questions about the materials presented in this letter.

Very truly yours,

Osha R. Meserve

ORM:cnh Enclosure

cc: Nancy Grisham Cynthia Barnard Doug Diemer

Comment Letter G

EXHIBIT A

AA /4 A /AAAP 3037 48 44 FMW /MW 101 11-1- 1 10-1

Comment Letter G

WILSON CONSULTING

FINANCIAL MANAGEMENT * OPERATIONS MANAGEMENT 8260 SW 154th Avenue * Beaverton, Oregon 97007 Telephone: 503.644.6201 * Facsimile: 509.267.8334

September 9, 2005

Mr. Doug Diemer Redwood Landfill, Inc. 8950 Redwood Hwy Novato, California 94947

RE: Economic Analysis of Proposed Mitigation Measures

Dear Mr. Diemer:

Thank you for the opportunity to provide professional services to Redwood Landfill, Inc. ("Redwood"). You asked Wilson Consulting to conduct an economic assessment of the proposed mitigation measures, as included in the Redwood Landfill Solid Waste Facilities Permit Revision, Final Environmental Impact Report and Response to Comments, July 2005 ("EIR"). This letter is our response to your request, and contains the procedures, findings, and conclusion.

Redwood EIR

The Redwood EIR lists a number of mitigation measures that if required, will have a negative economical impact upon Redwood.

Procedures Conducted

In order for Wilson Consulting to assess the economical impact of the mitigation measures, we conducted the following procedures.

- * Reviewed EIR. We reviewed the EIR, paying particular attention to section one.
- Determined which measures that have an economic impact on Redwood. For purposes of this report, a negative economic impact is defined as an additional operating cost or capital expenditure that is required that would not be incurred without the specific mitigation measure being required.
- Obtained revenue and cost information for landfill operations. We received the balance sheet as well as current and historical profit and loss statements to determine the current level of investment and to gain an understanding of the cost of current operations.

redwood landfill economic impact of miligation measures, doc

Mr. Doug Diemer Redwood Landfill, Inc. Page 2

- Interviewed operations manager and landfill manager. Interviewed operations manager and landfill manager to determine the measures that are different from what is currently being done. We relied upon the Summary of Impact and Mitigation Measures (Table 1-2 of the EIR) as a guide to determine the differences from current operations.
- Prepared analyses. We determined the cost of implementing the additional mitigation measures.
- **Confirmed results of analysis.** We discussed with the operations and landfill managers, and facility controllers, our draft analysis to confirm our understanding of the magnitude of the operational impact of the new mitigation measures, and validate the analysis.

Findings

Redwood currently implements many environmental mitigation measures. However, the EIR increases the scope of some of the current mitigation measures introduces additional mitigation measures. Our analysis shows that the following mitigation measures would require substantial addition work and follow up beyond what Redwood is currently required to provide, or are new measures requiring investigation, additional studies and analysis that would have a negative financial impact on the operations of the landfill:

- 3.2.4 Operational Dust Mitigation Plan
- 3.2.6b Emissions Monitoring Plan
- 3.2.6c Compost Methods Feasibility Study
- 3.2.9b Odor Impact Minimization Plan
- 3.3.6 Red-legged Frog and Pond Turtle Survey
- 3.4.x Update various plans
- ♦ 3.5.2 Additional Dual Leachate/Gas Collection Welis
- ✤ 3.5.6 10 Foot Perimeter Levee
- 3.5.9 Precipitation and Drainage Control Capacity
- 3.8.2c Compost Dust Spray

Comment Letter G

Mr. Doug Diemer Redwood Landfill, Inc. Page 3

The measures listed above will require Redwood to expend additional capital and/or will increase Redwood's annual cost of operations. Specifically, the measures require Redwood to build new facilities, invest in additional equipment, increase labor costs, increase equipment operational costs, increase equipment fixed costs, increase outside monitoring costs, increase depreciation, increase professional fees, and increase interest expenses.

In addition to the cost of the above measures, there will likely be secondary costs that Redwood may be required to incur in the future. For example, if some of the plans are later implemented, there will be additional operational effects. We have not included these secondary costs within our analysis. The following mitigation measures may have an economic impact, but were not included in our analysis.

- * 3.2.5c Landfill Gas to Energy (see also 3.9.3a)
- 3.6.5b Household Hazardous Waste
- 3.6.4b C&D Recycling

Conclusion

We have completed the procedures described above and determined that implementation of these new mitigation measures will require a capital investment of approximately \$1,900,000 and will cause Redwood to incur approximately \$600,000 in additional operating expenses annually.

Redwood has already invested a very substantial amount of capital in developing the landfill. The additional mitigation measures will require Redwood to invest more capital into the landfill. Given the competitive nature of the disposal industry and the high cost of landfill operations at Redwood, it is currently marginally profitable. If all of the above mitigation measures are imposed and Redwood is not permitted to accept additional MSW tonnages, Redwood's return on investment will be negatively impacted.

In order to make it practical from an economic standpoint for Redwood to invest more, it will need the opportunity to increase its net revenues by an amount greater than the cost of implementing the additional mitigation measures. Revenues could be increased by allowing Redwood to accept additional solid waste tons. For example, if Redwood were able to receive an additional 60,000 tons on an annual basis over its currently permitted level of daily receipts, it may have the opportunity to earn a return on the additional capital and offset the additional annual operating expenses. Without the potential for increasing revenues to offset the additional annual operating expenses, it would be impractical for Redwood to proceed with the project.

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Comment Letter G

Mr. Doug Diemer Redwood Landfill, Inc. Page 4

We have prepared our findings in letter form, and trust that this will meet your needs. If you have any questions regarding the work procedures or findings, please call my office at (503) 644-6201.

Yours truly,

on Wilson Z

Ross E. Wilson, CPA CMC Wilson Consulting

Qualifications of Mr. Ross E. Wilson, CPA CMA

Related Waste Management Experience

Mr. Wilson has been providing financial and operational management consulting to the waste industry for over ten years. He has served a variety of clients offering diverse services, including cost allocation studies, rate case support, contract compliance reviews, performance audits, economic damage assessments, management reviews, profitability analysis, rate benchmarks, profitability benchmark assessments and comparisons, cost of service allocations, rate applications, franchise negotiations, and litigation support. Mr. Wilson has provided services for the entire waste stream, including waste reduction, collection, transportation, recycling, transfer, and disposal and landfill operations.

Prior Related Experience

Prior to starting Wilson Consulting, Mr. Wilson was Director of the Solutions Management Consulting practice for the Portland office of Deloitte & Touche LLP. While at Deloitte, he was involved in and led the utility consulting practice, which is recognized as one of three world wide centers of expertise for the utility industry, providing operational, systems and management consulting. Mr. Wilson was in charge of directing the business process improvement, activity based accounting, financial analysis, systems implementations, strategic cost management, management reviews, benchmarking, and litigation support for utility and manufacturing clients.

Education

Mr. Wilson earned his Master of Accountancy degree from Brigham Young University. His Bachelor of Science degree, with majors in accounting and economics, was also received from Brigham Young University.

Licenses

Mr. Wilson is a licensed in the State of Oregon as a Certified Pubic Accountant (#6508) and is a Certified Management Consultant.

Professional Organizations

Mr. Wilson is a member of the following professional and industry organizations:

- Oregon Refuse and Recycling Association
- Solid Waste Association of North America
- American Institute of Certified Public Accountants
- * Oregon Society of Certified Public Accountants
- Association of Certified Fraud Examiners

Comment Letter G: Osha Meserve, Attorney for Redwood Landfill and Recycling Center

- G-1. Please refer to Master Response 107.
- G-2. Please refer to Master Response 107.
- G-3. Please refer to Master Responses 104 and 107.
- G-4. Comment noted.
- G-5. The comment disagrees with conclusions reached in the DSEIR and reaffirmed in the FEIR, and is argumentative. Furthermore, the applicant has agreed to accept the Mitigated Alternative (see Master Response 104), which includes the mitigation measures questioned in this comment.
- G-6. Please refer to Master Response 104.
- G-7. Please refer to Master Response 104. The applicant has agreed to accept the Mitigated Alternative, which includes the mitigation measures questioned in this comment. The comment regarding the legal definition of "feasibility" under CEQA is noted.
- G-8. Please refer to Master Response 104.
- G-9. Please refer to Master Response 104.



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Avocet Research Associates wildlife biology

Mr. Tim Haddad Marin County Community Development Agency 3501 Civic Center Drive San Rafael, CA 94956

September 9, 2005

RE: Redwood Landfill Solid Waste Facilities Permit Revision: Draft EIR, SCH No. 1991033042

Dear Mr. Haddad:

Please accept this letter of concern regarding the Redwood Landfill DEIR into the public record.

I have been conducting population studies of the federally-endangered California Clapper Rail (*Rallus longirostris obsoletus*) in the San Francisco Bay estuary for 25 years under permit with the U.S. Fish and Wildlife Service (#TE86728-2). The impacts of this project on the rail population in the Petaluma River tidal marshes, adjacent to the landfill site, is the subject of my concerns.

In section 3.3.4 the DEIR requires "Levee reconstruction to be avoided during the clapper rail nesting season unless surveys by a qualified biologist indicate that black or clapper rails are not nesting within 500 feet of the work area." This condition is not sufficient to protect potentially occurring rails in these adjacent marshes.

In earlier surveys we have detected both black and clapper rails along the main stem of San Antonio Creek, immediately adjacent to the landfill. Whether or not they nest is moot, however it is established that they occur in those marshlands, as well as in other marshlands downstream from the site. (Indeed, the lower Petaluma River is a population center in San Pablo Bay.)

The DEIR fails to account for the following factors affecting, or potentially affecting, rail populations:

65 Third St., Suite 25, Point Reyes Station, California 94956-0839 phone 415/663-1148 • fax 415/663-9235 • email jevens@svn.net

Comment Letter H

• Ongoing activities at the landfill (noise, lighting, etc.) are already limiting the habitat value of the adjacent marshland and probably reducing the likelihood that rails are able to establish territories and breed.

• The USFWS protocols require that construction activity potentially disruptive to clapper rail reproductive success be restricted within "700-feet" of the center of a rail territory. A 500-foot radius is not sufficient to provide this buffer.

• Adjacent habitat is appropriate and potentially colonizing rails may be excluded by ongoing activities. The impacts from these ongoing activities are likely much wider than 500-feet.

• The statement "proper precautions shall be taken to confine the necessary disturbances to the smallest possible area" is not specific enough to actually protect rails if they are present (nesting or otherwise). Types of disturbances should be specified (decibel levels, night-lighting, etc.) and seasonally controlled whether rails are nesting or not.

• Contamination of the substrate, or migration of pollutants from the landfill footprint should be evaluated to determine potential impacts to San Antonio Creek and associated marshlands as well as the downstream tidal marshes associated with the Petaluma mouth.

The DEIR should be redrafted to address these impacts to rail populations and to provide remedies that would avoid impacts to these species.

Thank you for your attention to this issue.

Sincerely,

Jules Evens Principal.

65 Third St., Suite 25, Point Reyes Station, California 94956-0839 phone 415/663-1148 • fax 415/663-9235 • email jevens@svn.net

Comment Letter H: Avocet Research Associates

H-1. Please refer to Master Response 102 in this document.

Comment Letter I

Bahia Homeowners Association c/o Steward Property Services 720 South Point Blvd., Suite 210 ELETVED Petaluma, CA 94954

2005 SEP 12 P 4: 07 September 9, 2005

MARIN COUNTY

COMMENTY DEVELOPMENT

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

The Board of Directors of the Bahia Homeowners Association wants to bring to your attention a serious and potentially grave situation in our neighborhood and community. We live in the Bahia area, about two miles south of the Redwood Landfill, and have serious concerns about Waste Management Inc.'s plans to expand substantially the landfill on Rt. 101.

As we understand it, after expansion, 75% of the garbage will come from outside of Marin. To create this regional dump, Waste Management Inc. wants to add over 15 million cubic yards of waste, increase daily average intake of waste by almost 100%, and increase the number of daily truck trips in and out of the landfill by 550 per day. Given our close proximity, all of the residents in Bahia could be impacted by the increased risks to ground water and of air contaminants presented by the expansion project. All of us would be impacted by the increase in truck traffic going by or near our neighborhood, which is off of Atherton Ave.

Air Quality: The prevailing wind direction from the landfill is south, the wind is often strong as measured at Gnoss Field, and as we live due south, we question the sufficiency of the EIR analysis. While the EIR recognizes that Rush Creek and Bahia as nearby sensitive receptors that could be impacted by these risks (3.2-24), no direct analysis was included on the potential impacts to our safety and health.

Bahia has been affected by strong odors from the landfill in the past. Frequent complaints were filed by residents of Bahia, including by the current President of the Board, to the Bay Area Air Quality Management District, which verified the source of the odors as the Redwood Landfill, which was then cited and fined. The EIR states (3.2-47) that "the applicant does not propose to modify any of the odor control mechanisms that are currently in place". The EIR acknowledged that "the increase in waste quantities and changes in activities at the landfill could have an adverse effect on odors and could generate additional odor complaints from nearby sensitive receptors. This would be a potentially significant impact of the project. It is uncertain whether the current odor management practices would sufficiently mitigate potential odor impacts." The EIR does not adequately address what new odor reduction measures will be taken.

The EIR also fails to contain enough analysis regarding ultra-fine particulate matter or the emissions from the dump's current and proposed flares used to burn gas produced by decomposing waste.

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Marin County Development Agency

September 9, 2005

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Protection of Groundwater: The EIR proposes that Waste Management Inc. be excused from complying with the state law requirements that a landfill maintain at least 5 feet separation from groundwater and maintain a bed liner to keep landfill waste and contaminated water from the ground water. We object to this. The EIR fails to make the case that Waste Management Inc. has met its burden of showing an engineered alternative would be equally protective of the environment. The main component of the "engineered alternative" is simply a trench dug around the dump that goes no deeper than 5.5 feet below sea level, coupled with extraction pumps. But the EIR also states that there will be a permanent pool of contaminated water under the landfill at a depth of 9.5 feet below sea level. This is a potential unaddressed danger.

Incomplete Traffic Impact Analysis: The EIR concludes that the impact on traffic from the additional 550 truck trips per day will be less than significant. However, there is little or no analysis of where the new truck traffic from out-of-county haulers will come from and what roads they will likely traverse, other than Rt. 101. For example, Atherton Road, unfortunately, is a major truck route for haulers from the east taking a short-cut between Rt. 37 and Rt. 101. Any increased traffic would directly impact our neighborhood. The EIR is deficient because it does not address fully these traffic issues.

Questionable Need and Benefits of Expansion: If there were some considerable benefit to Marin County, we might understand accepting some risks and allowing Waste Management Inc. to have its way, but there is no benefit. The EIR makes clear that the expanded capacity is not needed to meet Marin County's own needs. It will only enable other counties to export their trash here.

Land Use Permit Should be Reviewed: We understand that the dump is subject to a one-page 1958 land use permit granted to a local owner who wanted to establish a small local "rubbish dump." The size of the landfill has changed in 47 years, but the land use permit has not. It is past time to review that permit to see if additional conditions are appropriately consistent with 21st century land use planning.

The Marin County Planning Commission and the Board of Supervisors should review the scope of activities at the Redwood Landfill today and under its expansion plan to see if they go beyond what was contemplated in 1958. They should also review Waste Management Inc.'s violations of applicable laws or operational permit requirements - many are listed in the EIR. New or expanded activities, or legal violations, would enable the County to begin a proceeding to suspend or revoke the land use permit as a means to impose conditions appropriate for a major industrial operation. It is the responsible thing to do. This review should take place before finalizing the EIR for the solid waste facility permit.

We appreciate this opportunity to comment on the EIR, and ask that our concerns be fully addressed before the EIR is certified as complete.

Very truly yours,

Enni

Lýnn Emrich President

Steve Page

Vice President

imberlv Secretar

John Troia

Treasurer

Comment Letter I: Bahia Homeowners Association (c/o Steward Property Services)

- I-1. Development of the landfill as a regional facility is addressed in Master Response 19 of the FEIR. Groundwater and air quality impacts are addressed in Sections 3.4 and 3.2, respectively, of the FEIR. Groundwater issues are further addressed in Master Responses 1, 13, and 14 of the FEIR and air emissions are addressed in Section 3.2 and Master Response 16 of the FEIR. See also Master Responses 101, 105, and 112 of this document, and the discussion of the Mitigated Alternative in Master Response 104 of this document.
- I-2. The potential health risks of the project are evaluated in Impact 3.2.8 in Section 3.2 (Air Quality) of the FEIR assuming that the nearest sensitive receptor is the Buck Center, which is about 1.5 miles from the landfill; the health risk assessment is further described in FEIR Master Response 11 and individual responses to comments on the DSEIR (see, in particular, the response to Comment HH-20). The screening analysis methodology assumes the worst possible wind conditions for the nearest receptor. Because toxic air contaminants, like odors, tend to disperse and dilute with increasing distance from their source, the potential health risks for the Bahia neighborhood, which is farther from the landfill than the Buck Center, would be less than at the Buck Center. Since the FEIR finds that the health risks at the Buck Center can be reduced to a less-than-significant level with the identified mitigation measures, the health risks for the Bahia neighborhood would also be mitigated to a less-than-significant level.
- I-3. The commenter does not indicate when in the past the referenced odor impacts occurred or any specifics of why the identified mitigation measures included in the EIR are considered inadequate. The EIR text cited in this comment describes the impact prior to mitigation. Section 3.2 of the FEIR describes the odor complaint history of the facility, and Impacts 3.2.9 and 3.2.10 of the FEIR address odor impacts of the proposed project. Master Response 15 of the FEIR further discusses the issue of odors at the site, including changes in sludge handling operations that have occurred, the DSEIR analysis of potential odors from the project, and the BAAQMD's regulations governing odor emissions and procedures for responding to odor complaints. The FEIR analysis indicates that, considering the reduction in permitted sewage sludge proposed to be received under the project and the absence of confirmed complaints under current odor management practices, the measures included in the FEIR would be adequate to reduce odor-related impacts to less than significant levels. See also the discussion of the Mitigated Alternative in Master Response 104 of this document.
- I-4. Please see response to Comment O-12 regarding emissions from LFG flaring. BAAQMD permits for LFG flares do not consider ultra-fine particulates, which are less than 0.1-micrometer aerodynamic diameter and are a subset of PM-2.5 and PM-10. Any discussion of ultra-fine PM impacts in this FEIR document would be speculative since there are no criteria available and the ultra-fine particulates are not regulated

independently of PM2.5 or PM10. Additional information regarding ultra-fine PM can be found on the CARB website (www.arb.ca.gov/ research/pmr/pmr.htm).

- I-5. FEIR Section 3.4 cites the state regulation requiring a five-five foot separation between waste and groundwater (California Code of Regulations Title 27, Section 20240) and the provision of an exemption to this requirement (Section 20080(b)). Section 20080(b) provides that an alternative to the prescriptive standard may be approved only where the landfill operator demonstrates that construction of the prescriptive standard is not feasible and the specific engineered alternative is both consistent with performance goals addressed by the 5-foot separation standard and provides equivalent protection against water quality impairment. Master Response 1 of the FEIR describes at some length the hydrogeologic conditions at the site, which form the basis for the FEIR's conclusion that, with mitigation – including the approval by the RWOCB of the final design of the LCRS - groundwater and surface water quality will be sufficiently protected to deem this impact less-than-significant. In February 2006 the Regional Water Quality Control Board (RWQCB) approved Redwood Landfill's engineered alternative to the requirement to maintain five feet of separation between waste and groundwater (Seward, 2006). Please see also Master Response 105 in this document.
- I-6. Please refer to Master Response 101 in this document.
- I-7. This comment expresses an opinion on the need and benefit of project, not on its environmental effects or the EIR's evaluation thereof. Development of the site as a regional landfill is addressed in Master Response 19 of the FEIR.
- I-8. Please refer to Master Response 103 of this document

Comment Letter J

Haddad, Timothy

From:	Diane Hichwa [dhichwa@earthlink.net]
Sent:	Monday, September 12, 2005 12:58 PM
To:	Haddad, Timothy
Subject:	Redwood Landfill Permit and EIR
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Madrone Audubon Society P.O. Box 1911 Santa Rosa, CA 95402

September 9,

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Marin County Planning Commission 3501 Civic Center Drive, Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Marin County Supervisors

Marin County Community Development Agency Alex Hinds Director 3501 Civic Center Drive Room 308 San Rafael, CA 94903 Email: ahinds@co.marin.ca.us

Dear Commissioners, Supervisors; and Mr. Haddad:

I am writing on behalf of Madrone Audubon Society in Sonoma County with nearly 2000 members. We have serious concerns about plans to expand the Redwood Landfill on Highway 101 by Waste Management, Inc.

As stated by Marin Audubon Society "...the entire property is surrounded by tidal marsh. ... Potential impacts to the adjacent slough and marshes would include water quality degradation, which would also impact vegetation and sediment quality, as well as possible collapse of the levee sides into the adjacent sloughs and Petaluma and fringe marshes."

The impacts to the Petaluma River Estuary would be significant in an earthquake event, a flood event, or a failure of the construction (levees, bedliner, etc). This area is used for recreational and nature observation. Plus increased risks to groundwater would impact many people downstream.

IF the project is allowed to proceed there should be NO relaxation of state law or environmental requirements. Landfill waste and contaminated water should be contained in the most stringent means possible because the stakes of failure in the extreme sensitivity of this environment are phenomenal.

This is a marginal site by current environmental standards. It is high time that the land use permit be carefully reviewed. In 1958 when the permit was issued this was not a major industrial operation of the scale and scope of activity it has today.

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We do not believe that expansion AT THIS SITE is at all appropriate

Diane Hichwa Conservation Chair of Madrone Audubon Society

Santa Rosa: 707-579-1182 Email: dhichwa@earthlink.net

Comment Letter J: Madrone Audubon Society (Diane Hichwa)

- J-1. Potential surface water quality impacts of the project are addressed in Sections 3.5 of the FEIR and in Master Responses 13 and 14 of the FEIR. Please also refer to Master Response 105 in this document.
- J-2. Regarding the integrity of the perimeter levee system, please refer to Master Response 106 of this document.
- J-3. Potential impacts related to earthquake and flooding are addressed in FEIR Sections 3.4 and 3.5, respectively, of the FEIR. See also Master Responses 106 and 108 of this document.
- J-4. The setting of the landfill is described in Chapter 2, Project Description of the FEIR and in greater detail in the individual impact sections of Chapter 3. Potential impacts on nearby land uses related to aesthetics and litter, air quality, noise, and traffic, are addressed in Sections 3.1, 3.2, 3.7, and 3.10, respectively, of the FEIR. Potential impacts on groundwater are addressed in Section 3.4 and in Master Responses 1, 13, and 14 of the FEIR.
- J-5. This comment apparently refers to the proposed leachate collection and removal system (LCRS) as an engineered alternative to the prescriptive standard of 5 feet of separation between wastes and groundwater. State landfill regulations (CCR Title 27 Section 20080(b)) provide for such an engineered alternative. Please also refer to the response to Comment I-5, and to Master Response 105.
- J-6. Please refer to Master Response 103.
- J-7. This comment opposing expansion of the landfill at its current site is noted. Chapter 5 of the FEIR, Alternatives to the Project, considers construction of a landfill at another location in Marin County (the "Off-Site Alternative"). The comparison of expanding Redwood Landfill with this alternative indicates that impacts resulting from development of a new landfill would likely be more severe than those of the proposed project.

Comment Letter K

Marin Audubon Society

Box 599 Mill Valley, California 94942-0599 September 9, 2005

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Tim Haddad Marin County Community Development Agency 3801 Civic Center Drive

RE: COMMENTS ON FINAL EIR FOR REDWOOD LANDFILL EXPANSION

Dear Mr. Haddad:

San Rafael, CA 94903

Thank you for the opportunity to comment on the EIR for Redwood Landfill Expansion Project. As discussed below, the Marin Audubon generally supports the Mitigated Alternative as described in the DEIR. We have additional questions about the information in the DEIR and these also are presented below.

The Marin Audubon Society finds the Mitigated Alternative to be environmentally superior to the proposed project. Implementation of recommended mitigation measures, including increase in onsite energy (methane) production and use, odor controls, and increase in green waste and construction/demolition debris recycling s stem, will combine to reduce the potential environmental impacts, extend the life of the landfill, and avoid new environmental impacts by allowing the existing landfill facility to continue operations.

One of our main concerns has been the geotechnical issue of stability of the landfill. As stated in the EIR, the main geotechnical issue is the stability of the landfill, which is controlled by the strength of the underlying soft bay mud. The safest choice is to fill slowly, and achieve the benefit of allowing the bay mud to gain strength over time. Another concern is that the limits on imported material be flexible enough to ensure sufficient material for daily cover so that soil from the adjacent hill would not need to be removed.

The use of windmills for renewable energy production should proceed with caution, and only after specific additional environmental review, in view of the sensitive location of the landfill adjacent to extensive grassland/savannah and wetland habitats that are habitat for raptor and other species.

Charging an import mitigation fee will also help both fund mitigation, and slow down growth by introducing a market factor to reduce imports. Perhaps, Redwood Landfill should also charge more for imports to help provide the stability of revenue that they seek. Redwood Landfill should not be a low cost, high growth regional al' mative given its sensitive location and need to extend the life of the landfill.

A Chapter of National Audubon Society

Comment Letter K

We would appreciate answers to the following questions regarding responses to our comments:

The response to our comment N–16 (and 33) requesting a more accurate description of the project setting adjacent to the 2,000 acre historic Petaluma Marsh to is not adequate. We are referred to response Z-14, which acknowledges the value of the Petaluma Marsh. This is not an adequate response. The value of that historic marsh should be described for the reader to understand.

Response to comment N -17 indicates that Redwood Landfill plans to extend a perimeter levee around the entire landfill site but that "...the applicant already plans (not as part of the project) to raise and widen portions of the levee so that the entire levee will be at least 9 feet in elevation and 10 feet wide. The elevation and widening of the perimeter levee is a separate issue from the applicants revised sequencing plan." What is the purpose of the levee if it is not to contribute to the stability of the landfill? What standards will be used and what environmental review and permitting process will occur to evaluate its adequacy? Will there be separate requirements for that structure?

Response to comments N–22 acknowledges that the project may result in increased night time activity. While we have observed and heard the bird control program (noise device) on numerous occasions and find that it is not loud enough to impact species using adjacent Petaluma Marsh, the impact of night time activity is not so clear. Mitigation Measure 3.6-2c focuses on Gnoss Field impacts and the characteristics of the lights themselves. For the potential impact of these lights to be evaluated, it is essential that the extent of night time lighting use be described. How much night time activity takes place and what is the extent and nature of the lighting that is used? Will the landfills permit cover this issue?

N-36 The response to this comment is mi...nformed. While trucking in bay mud for cover would necessitate excavating this material, the intent of the question was to use material that is already being or has been excavated for other purposes, such as for marsh restoration projects, thereby reducing the need for excavating material specifically for Redwood Landfill. Excavation of bay mud occurs at many locations around the Bay to restore tidal marshes so that there is often a need for locations to reuse the excavated bay mud.

Mitigation 3.5.10b It is unclear why ADC or a geopsynthetic blanket cannot be used on any day preceding closed days.

N-41 - What would be the anticipated length of time needed for siting of a new landfill within the county?

We have the following additional questions:

In view of the public interest in, and concern about, material coming to Redwood Landfill from other Bay Area landfills, we think it is relevant and important to provide a comprehensive description of the fate of refuse from Marin County. Master Response 19 indicates that 78% of Marin County's solid waste is deposited at Redwood. That appears to indicate that 22% is disposed of out of county. Is that correct? Where does each Marin County discharger take its

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Comment Letter K

waste? How much Redwood Landfill material is generated from out of county?	14
If windmills are considered for installation, they should be subject to separate environmental review because of the sensitive location of the landfill adjacent to grasslands and marsh. Raptors, including golden eagles, and other species would be at risk.	15
Has Redwood ever had an event where leachate overflowed from the leachate impoundment? Has stormwater from the stormwater impoundment ever flowed into the adjacent San Antonio Creek or slough? Is it possible that a Leachate Management Plan that would ensure no overflows, in all rainfall conditions, would be infeasible?	·.
We agree that Redwood Landfill should review and revise its Leachate Management Plan annually, but there does not seem to be a timeline for initial preparation of this Plan. The EIR should recommend a deadline for the landfill to update its Leachate Management Plan to ensure that leachate is adequately contained and does not impact adjacent tidal waters. Preparation of this plan should not be allowed to drag on.	16
It is our recollection that Marin County did consider alternative sites for a landfill some years ago. Hicks Valley was one of the sites considered at that time. It would be useful information for the history of that investigation to be outlined, particularly the conclusions that were reached.	17
We are concerned that the use of green yard waste to promote vegetative cover on the slopes might actually promote highly-invasive plants, such as scotch broom and eucalyptus. We recommend that the Preliminary Closure Plan in the Redwood Landfill Joint Technical Document (GeoSyntec, 1998), include only native plit mix for final cover. According to the discussion on page 3.1-10, the specific vegetation seed mix for the final cover is yet to be established and will be covered in the facility's Final Closure Plan."	18
What measures can be established to better ensure that upon closure the site remains as open space to be restored to upland habitat that would compliment the adjacent Petaluma Marsh. While it is generally accepted that no development can occur on closed landfills, we cite the development of a Home Depot store, and possible other stores to expand the shopping center, along the Bay on the closed San Rafael Landfill. Current restrictions depend completely on land use controls (which can be changed) and the good will of the owner (which may change also).	19

Thank you for responding to our concerns.

Sincerely,

Barbara Salzman, Co-chair Conservation Committee

teron

Phil Peterson, Co-chair Conservation Committee

Comment Letter K. Marin Audubon Society (Barbara Salzman and Phil Peterson)

- K-1. The FEIR identifies the Mitigated Alternative, "generally support[ed]" in this comment, as the Environmentally Superior Alternative. Please refer to Master Response 104.
- K-2. This comment is a preamble to specific questions and comments that follow.
- K-3. The commenters' finding that the Mitigated Alternative is environmentally superior to other alternatives is noted; the FEIR identifies the Mitigated Alternative as the Environmentally Superior Alternative. Please refer also to Master Response 104 in this document.
- K-4. The time-dependent nature of strength gain of the Bay Mud is an integral factor in the applicant's proposed fill sequencing plan. The need for properly phased landfill construction and geotechnical monitoring is discussed in Section 3.4 and Master Response 7 of the FEIR.
- K-5. Neither the proposed project nor the alternatives considered in the EIR preclude the receipt of materials such as green waste that may be used, consistent with applicable regulations and permit conditions, as alternative daily cover. Regarding use of alternative daily cover materials under the Mitigated Alternative, please refer to Master Response 104 in this document.
- K-6. Wind power would not be developed at the site under the Mitigated Alternative, due to concerns about impacts on birds. See Master Response 104.
- K-7. The issue of an import mitigation fee is addressed in Master Response 8 of the FEIR. The commenter's suggestion to the landfill operators regarding the economic stability of the facility is noted.
- K-8. Please refer to Master Response102 in this document.
- K-9. Please refer to Master Response 106 in this document.
- K-10. Nighttime operations are currently permitted at Redwood Landfill (landfill operations, from 8 p.m. [prior day] to 4:30 p.m.; receipt of waste from commercial haulers, from midnight until 3 p.m., and receipt of sludge, 24 hours per day); no change in hours of operations or in the type or number of lights is proposed. However, because the level of nighttime activity could increase, the impact of light and glare from such increased activity on the rural character of the area is evaluated in Impact 3.1.5 of the FEIR, where the portable lighting that is used is described. As the comment notes, the potential impacts on nearby Gnoss Field are evaluated in Impact 3.6.2 of the FEIR. Although

Mitigation Measure 3.6.2c focuses on potential impacts on Gnoss Field, the requirement to shield lights and direct them downward would reduce impacts on other adjacent uses as well. Please refer also to Master Response 102 in this document.

K-11. The County appreciates the clarification of DSEIR Comment N-36. As stated in the response to Comment N-36 in the FEIR, RLI has a Quarry Permit for soil borrow operations on the hillside referenced in this comment. The permit allows RLI to remove the entire hillside. However, as also noted, RLI has avoided removing the remaining portion of the hillside to date and has stated they continually seek off-site soils and alternative daily cover material in order to preserve it. Title 27 CCR Section 20690 requires landfill operators to use earthen material over the entire working face at the end of any operating day preceding a period of time greater than 24 hours when the facility is closed, unless procedures as required by the enforcement agency are in place to ensure that [other Title 27 requirements] are met. Use of soil on the day before the landfill is closed is consistent with RWQCB approval of the use of biolsolids (alone or mixed with greenwaste) as alternative daily cover, which states, "The ADC will be covered at a minimum of once a week with compacted soil to provide a stable internal refuse barriers (sic)" (McMurty, 1995). As such, except as shown, the original DEIR text of Mitigation Measure 3.5.10b is retained, rather than the FEIR text change for this Measure 3.5.10b, as follows:

Mitigation Measure 3.5.10b: <u>The operator shall not use ADC, or shall cover it</u> with a geosynthetic blanket after application at the working face. Dirt shall continue to be used as the cover material Dirt.<u>Soil</u> shall continue to be used as the cover material <u>Dirt.Soil</u> shall continue to be used as the cover material on <u>any day preceding closed days (e.g., Saturdays</u>); ADC may continue to be used as the daily cover the rest of the week (i.e., Monday through Friday; the landfill is closed on Sunday).

To be used as cover material, as suggested by the commenter, Bay Mud must meet acceptance standards for cover soils consistent with CIWMB policies and anticipated permit conditions articulated in the April 13, 2006 letter from Cynthia Barnard, Marin County EHS (LEA) to Jessica Jones, Site Manager, Redwood Landfill, Inc., "[p]rovid[ing] clarification of the LEA's position on the use and receipt of minimally contaminated (non-hazardous) soil for landfill cover." As stated in this letter, RLI is required to gain approval and adhere to guidelines provided by the RWQCB, the BAAQMD, and the Department of Toxic Substance Control (DTSC) regarding the receipt of contaminated soil (Barnard, 2006).

K-12. CCR Title 27 Section 20690 requires that earthen material be placed over the working face at the end of any operating day preceding a period of time greater than 24 hours when the facility is closed, unless the LEA has procedures in place to ensure the adequacy of the ADC as provided in the section. The applicant has not proposed a change to this aspect of landfill operations and therefore it is not part of the project evaluated in the EIR.

- K-13. The FEIR response to Comment N-41 outlined some of the processes involved and issues to be addressed in siting a new landfill. Considering the factors involved and high probability of controversy and contentiousness, a precise estimate of the time required would be speculative. As discussed under Impact 3.6.7 of the DSEIR, both County solid waste management plans and State statute require the County to maintain at least 15 years of landfill capacity; this may be viewed as recognition of the planning period required to ensure adequate landfill capacity to meet the County's needs. Please note that the applicant's latest estimate of remaining capacity and site life indicates that, under the current permit, the landfill could reach capacity as early as 2016. Please see Master Response 107.
- K-14. Figure MR 9-2, Destination of Waste Generated in Marin County, 2002 of Master Response 9 shows the percentage of Marin County waste sent to other counties that year. The figure presented in Figure MR9-2 is from the California Integrated Waste Management Board's website, which now has comparable information posted for 2003 (at http://www.ciwmb.ca.gov/LGCentral/Summaries/21/2003/Outflow.htm). In 2003 approximately 82 percent of the county's waste was deposited within Marin, and most of the rest was sent to Contra Costa (12 percent) and Solano (6 percent) counties; 8 other counties received less than 1 percent of the waste generated in Marin in 2003. Figure MR 9-1, Origin of Wastes Disposed at Redwood Landfill, 2002, shows the percentage of material generated in other counties that was deposited at Redwood Landfill.
- K-15. Please refer to the response to Comment K-6.
- K-16. Exceedance of the leachate pond that occurred in 1998 is discussed under Impact 3.4.8 of the FEIR. By design, water is discharged from the 18-acre stormwater pond to off-site surface waters, as described under Impact 3.5.3. Currently only non-contact water is directed to the stormwater pond, and implementation of mitigation measure 3.5.3d would ensure that leachate (contact water) is not conveyed to this pond. Preventing the off-site discharge of leachate is a fundamental requirement of landfill management under state regulations. As indicated in Mitigation Measure 3.4.8c, adequate capacity to contain leachate generated by the proposed project is required prior to project approval. See also Master Response 105.
- K-17. Results of the previously conducted siting study are summarized in Section 5.1.1 of Chapter 5, Alternatives, of the FEIR. As discussed, these sites were rejected from further analysis because they do not appear to have the ability to substantially lessen or avoid the project's impacts.
- K-18. Regarding use of greenwaste for erosion control, please refer to Master Response 102.
- K-19. The applicant is not proposing a change in the currently planned post-closure land use, non-irrigated open space. The applicant may propose to revise the post-closure use of the facility at a later date, for example when preparing the Final Post-Closure Maintenance Plan. That proposal would, however, be subject to environmental review under CEQA.

Comment Letter L



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MARIN CONSERVATION LEAGUE

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MARIN COUNTY STATISTY DEVELOPMENT

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e-mail: mcl@marinconservationleague.org • website: www.marinconservationleague.org 38

September 12, 2005

Mr. Tim Haddad, Environmental Coordinator 3501 Civic Center Drive, Room 308 San Rafael, CA 94903

Re: Redwood Landfill Final Subsequent Environmental Impact Report

Dear Mr. Haddad:

 ω_{∞} The Marin Conservation League(MCL) has reviewed the Final Subsequent Environmental Impact Report (FSEIR) on the Redwood Landfill Revised Solid Waste Facilities Permit. We appreciate the format of master responses, the corrections and responses in the FSEIR. There are, however, some issues on which we would like to comment.

The project as described in the SEIR, without the Class II in area G, is still inconsistent with the county goals. We continue to urge a project similar to the Mitigated Alternative to reduce the impacts of the project, to increase the recycle and reuse of some of the waste stream, to increase energy conservation and yet extend the life of the landfill for the Marin community.

After witnessing the impact of a natural disaster in New Orleans, the concern about an earthquake, a 100+ year flood and/or rising sea level are naturally heightened. These issues are addressed to meet state criteria, but are still of concern because of the location of the facility on bay mud adjacent to a marsh. The updated Post Earthquake Inspection and Corrective Action Plan should be developed as soon as possible, including contingencies. Does the perimeter levee at 2 ft. above a 100 year flood event provide adequate protection when also considering rising sea levels or possible simultaneous high tides?

The completion of the perimeter levee is important in protecting the landfill operations from inundation from high tides or flood events. It will also be critical that the leachate collection and treatment system have a revised Leachate Management Plan to unify and clarify the operating model for the monitoring agencies. Management of the leachate is one of the major concerns about the landfill at its location.

The FSEIR states that efforts must be made to keep noise levels in the oxbow area below 76dBA during clapper rail nesting season, however there is no mention of the impact of the gull-deterring blasts and noises. The FSEIR states the bird deterrent practices are ongoing and not being reevaluated as part of the

Marin County's Environmental Watchdog

A nonprofit corporation founded in 1934 to preserve, protect and enhance the natural assets of Marin County

Comment Letter L

MARIN CONSERVATION LEAGUE

project. The point in the MCL letter was that these practices should be reevaluated. Are there any new technologies for deterring the gulls, since the FSEIR acknowledges that noise does disturb nesting clapper rails? What good does it do to suppress landfill operational noises when periodic blasts are emitted to deter gulls?

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An MCL letter, as well as letters submitted by others, stated that "buying emission credits" would not be an acceptable response to the landfill's emissions. It may be a legally allowable way for the landfill to deal with odorous emissions, but it is not an acceptable way to deal with impacts on a neighboring community. We would certainly discourage any enforcing agency from accepting that as a "solution" to the landfill's emissions. The FSEIR response to these comments totally missed the point.

We support the revised mitigations (3.2.2) that require reductions in diesel NO_x and particulate emissions. As technology improves and alternatives/or additives to diesel fuels are available that reduce the harmful emissions, the scenario as depicted on Table 3.2-6 should improve.

We appreciate the opportunity to comment on the FSEIR and look forward to an opportunity to comment on the merits of the project.

Yours truly,

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Jana Haehl President

cc: Marin County Environmental Health Services City of Petaluma City of Novato

Comment Letter L: Marin Conservation League

- L-1. The consistency of the project with County waste management goals is summarized in Table 3.6-2 and evaluated under impacts 3.6.4, 3.6.5 and 3.6.7 in section 3.6, Land Use, of the FEIR. Mitigation measures identified for impacts 3.6.4 and 3.6.5 would reduce them to a less-than significant level. Impact 3.6.7 is less than significant and does not require mitigation. EIR Chapter 5, Alternatives, identifies the Mitigated Alternative as the Environmentally Superior Alternative. Please see also the response to Comment C-13.
- L-2. Please see Master Response 106.
- L-3. The comment reiterates the findings of the FEIR regarding the Leachate Management Plan. Aspects of leachate management at the landfill are evaluated in Sections 3.4, Geology, Soils, and Seismicity, and 3.5, Hydrology and Water Quality, of the FEIR and elaborated upon in Master Responses 1, 13, and 14 of the FEIR. See also Master Response 105 in this document.
- L-4. Please refer to Master Response 102.
- L-5. Mitigation measures regarding odors identified under Impact 3.2.9 would apply to any odor sources at the landfill; purchase of emissions credits is not proposed as an alternative to addressing odor impacts. Mitigation Measure 3.2.10c is an alternative to mitigate impacts of VOCs from the proposed air drying of sludge.
- L-6. The comment, concurring with mitigations identified under Impact 3.2.2, is noted.

Comment Letter M

August 24, 2005

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NARIN COUNTY COMMUNICY DEVELOPMENT

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3501 Civic Center Drive San Rafael, CA 94903-4157

Marin County Planning Commission

Re: Redwood Landfill Solid Waste Facilities Permit Revision Final EIR

Dear Commissioners:

We are writing to request a 30-day extension of the period to comment on the completeness and adequacy of the Final EIR for the Redwood Landfill Solid Waste Facilities Permit Revision. We understand that the Novato City Manager, Daniel Keen, has requested this extension to enable the Novato City Council an opportunity to meet and discuss its position on the Final EIR.

As the elected body of the closest population center to the landfill, it is imperative that the Novato City Council have sufficient time to comment. As the city's comment letter states:

[T]he proposed project is directly north of the City of Novato and could have a significant effect on the City. The proposed increase in intensity of use and revision of waste materials to be accepted at the facility have generated substantial City Council and community interest. The Final EIR was released during the summer season when many City residents and decision makers are on vacation. In addition, the City Council will not be holding another meeting until September 13, 2005.

Our organization also needs the additional 30 days to file a complete comment letter. The EIR is two volumes, several inches thick, and hundreds of pages in length covering detailed and highly technical matters. We have retained several experts to assist with our comment letter, and they believe that it is not possible to review the analysis and conclusions in the EIR without substantial reliance on documents and source materials not included in the EIR. We have had to spend hours and hundreds of dollars to locate and copy those necessary documents. This has taken much more time than allowed by the original 60 day comment period. Finally, the EIR was not mailed to and received by many members of the public until July 18 or 19, so despite the announced comment period of 60 days, the actual time afforded for review was less.

Comment Letter M

It took Marin County and its consultants about 20 months to respond to comments on the draft EIR from the public and other agencies. As a result of that process, substantial changes were made to the EIR. Allowing the public an additional 30 days to comment on the final EIR is a matter of fairness and should be required as one of the pre-conditions to any finding or certification that the EIR is complete.

We respectfully request a 30-day extension, and ask that you act upon this request within the next week to provide affected parties sufficient notice.

Very truly yours,

cc:

(415) 207-9616

Christopher Gilkerson Chair No Wetlands Landfill Expansion 220 Saddlewood Dr. Novato, CA 94945

> Marin County Board of Supervisors Tim Haddad, Environmental Coordinator

Comment Letter M: No Wetlands Landfill Expansion

M-1. The period for comments on the FEIR was extended from the initial 60-day period to 74 days.

Comment Letter N



ANDELL EXPANSIO

September 12, 2005

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

No Wetlands Landfill Expansion¹ appreciates this opportunity to comment on the Final Environmental Impact Report (FEIR). After an introductory section below that places Waste Management Inc.'s expansion proposal in proper context – including the need to reexamine the underlying Marin County Land Use Permit - this comment letter highlights major deficiencies with the environmental impact analysis in the FEIR. The relevant standards under CEQA have not been met and, therefore, the Planning Commission should not recommend certification of the FEIR as complete and the Environmental Health Services Division should not certify the FEIR as complete.²

As a preliminary note, the FEIR consists of hundreds of pages of technical text and analysis. It took Waste Management Inc. and the county staff almost two years to make changes in response to comments on the preliminary FEIR. Allowing the public only 60 days to comment is unfair. For example, our review has shown that key underlying data and documents on which the environmental analysis is based are not included in the FEIR. We have had to request documents from Marin County Environmental Health Services, the Regional Water Quality Control Board, and the Regional Air Quality Control Board. For this reason, by separate letter dated August 24, 2005 we requested that the deadline to file written comments be extended by 30 days. This would enable our technical experts additional time to locate the necessary documents and to analyze in more detail certain sections of the FEIR, including the section on groundwater and hydrology. We are disappointed that the County has not acted on our reasonable request.

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MACIN COUNTY COMMUNITY DEVELOPMENT

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¹ NWLE is a grassroots environmental group dedicated to educational and other activities to protect the Petaluma Marsh and River Estuary. A primary objective is to assure that Waste Management Inc.'s operation of the Redwood Landfill does not result in negative health and environmental impacts from air, water, odor, and noise pollution. We believe that Marin County's approach to regulating and overseeing the Redwood Landfill should be to consider it a local resource to conserve to meet the county's integrated waste management needs consistent with the Countywide Plan in conjunction with policies to promote sustainability strategies focused on attaining the goal of "zero waste" so that stockpiling garbage in our environment will become obsolete at some point in the future.

 $^{^{2}}$ A lawyer for No Wetlands Landfill Expansion, Brent Newell, is also filing a comment letter on our behalf that addresses certain aspects of the FEIR not addressed in this letter.

Introduction: The Proposed Expansion, Redwood Landfill's 1958 Land Use Permit, and "Dump Economics"

<u>Brief History and Economics</u>. In 1958 the Board of Supervisors granted a onepage permit to a local farmer to create a local "rubbish dump" for local needs. It was one of numerous if not dozens of small dump operations in the county at the time. Today the Redwood Landfill is the only dump in Marin County and covers 222.5 acres. Instead of local ownership and control, it is owned by a multi-national conglomerate that considers the landfill to be one asset in its regional waste facility system which in turn is one asset among hundreds of holdings in its garbage empire. As a recent New York Times article stated, despite a national glut in landfill capacity, Waste Management Inc. continues to apply to expand its landfills. The article offered a logical explanation: due to accounting rules, the more capacity that remains, the less depreciation Waste Management Inc. must account for, resulting in pretax profits. (See "Rumors of a Shortage of Dump Space Were Greatly Exaggerated," <u>NY Times</u> (Aug. 12, 2005) at C1.) The expansion proposal first and foremost appears to be about corporate profit-taking.

Waste Management Inc. bought the local dump in the early 1990s. It was an attractive acquisition because it could operate the site at a lower cost than other landfills. This is because the old dump has no liner and no modern leachate collection system (so-called Subtitle D compliant) due to its age. (See 6.3-77.)³ It is also because, other than a general condition to abide by other laws and regulations, its 1958 land use permit requires nothing else. Without this expensive overhead, it has been able to undercut the "tipping fees" charged at other Bay Area facilities. (See Master Response 19.) This has converted Marin County into an importer of garbage, stockpiled on the edge of San Antonio Creek and the wetlands gateway to the Petaluma River and San Pablo Bay. As the California Integrated Waste Management Board summed it up in its comment letter on the draft FEIR:

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If proposed today as a new facility in California, Redwood Sanitary Landfill would not have been located in such an environmentally sensitive wetland as it is now situated. The unfortunate location of the facility has resulted in serious concerns in the areas of traffic, air quality, plant and animal habitat, and impacts to subsurface and surface water. Despite mitigation measures proposed to offset potential impacts as a result of the proposed increases in traffic, waste, and landfill capacity, further serious impacts may still occur if the proposed project is implemented in full. (Comment Letter C.)

Any lateral expansion would require compliance with more contemporary standards to protect the public and the environment. So instead of lateral expansion, Waste Management's strategy is to grow-up. Literally, to create a mountain of garbage as high as it can (160 feet), as large as it can (35.4 million cubic yards), and as steep as it can (3:1 angle), creating a most unnatural pyramidal man-made feature as a permanent

³ Unless otherwise indicated, all citations are to sections or page numbers in the final FEIR.

Comment Letter N

scar on the edge of otherwise pristine wetlands, in an otherwise beautiful river valley, along an estuary that is one-of-a-kind. Right here in Marin County. Not to serve Marin's needs but, as its current project proposal makes clear, to become a regional destination for other counties' garbage. It wants to do so because Marin County has not yet taken a stand against it in the form of responsible 21st century land use regulation.

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<u>Summary of the Project</u>. Waste Management Inc. has asked for its expansion to be approved under its solid waste facility permit overseen by the state with Marin's Environmental Health Services Division acting as the state's "local enforcement agency" or LEA. This is distinct from the underlying land use permit directly overseen by the County.

Key aspects of the proposed project under the solid waste facility permit include:

- Approval of its de facto lateral expansion of the permitted landfill footprint from 210 to 222.5 acres. (6.3-85.)
- Increase the volume of the landfill from 19.1 million cubic yards to 34.774 million cubic yards, 82% more than the currently permitted amount. (2-12.)
- Increase daily average intake of waste by approximately 100% to 3,864 tons (see 2-23).
- Increase peak daily intake of waste by 64%, from 2300 tons to 4,324 tons (2-23).
- Increase the number of daily truck trips in and out of the landfill by 66%, from 830 trips per day to 1380, many of them "large trucks hauling waste and other materials from outside Marin County" (2-32), resulting in the spewing of toxic diesel pollution throughout the County on the way to the dump.
- Increase the solid waste coming from outside Marin County to approximately 75%. (Calculation based on Waste Management Inc.'s draft permit application on file with Marin County Environmental Health Services.)
- Increase the daily tonnage of specially designated waste, which due to additional risks require special handling procedures, from 20 tons per day to 200 tons per day. These would include up to 1000 tons a day of petroleum contaminated soils, not allowed under the current solid waste facility permit. (See 2-23, 6.3-19.)

The project, if approved, would also relieve Waste Management Inc. from prior material conditions of its Solid Waste Facility Permit that it has ignored, including the removal of waste dumped without permit in an 11.5 acre part of the site, and the reconstruction of the old levee that is intended to separate and protect the wetlands from landfill spillage that could occur from a major flood. (See 2-33, 2-39.) It would also relieve Waste Management Inc. from its failure "to meet state prescriptive standards . . . in terms of liner design and separation of waste from groundwater." (6.3-20.)

<u>Pre-existing Land Use Permit – Imperative to Review Adequacy</u>. The FEIR indicates that the proposed project and the FEIR analysis is premised on a current and valid land use permit issued by Marin County. However, that land use permit is woefully inadequate and has not been reviewed or updated in 47 years to bring it into compliance with contemporary methods of responsible land use regulation for an industrial facility.

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Attachment 1 to this letter (and incorporated by reference into this letter) sets forth sufficient grounds to initiate such a review as part of a suspension or revocation proceeding based on (1) current and proposed operations exceeding the scope of the 1958 land use permit, and (2) Waste Management Inc.'s violations of law and permit requirements.

This land use permit review should be performed before FEIR certification takes place, as any proceeding to review the land use permit could impose additional conditions with which the project would be required to comply.

Baseline, Fundamental Flaws in Project Description and Analysis

There are baseline, fundamental flaws with the project description and analysis.

• <u>Current volume</u>. Virtually every calculation relating to the design and stability of the landfill project and many resulting impacts and proposed mitigation measures are premised on an accurate current volume calculation. The current volume calculation also impacts the analyses regarding remaining capacity, waste density, waste settlement, and Bay Mud settlement. The FEIR, however, fails to contain a reliable volume calculation.

At the August 18, 2003 Planning Commission meeting, Mr. Glen Roycroft, engineer for Waste Management Inc., stated that by his measurement the then present size was 25 million cubic yards. In a startling revisionist stroke, the final FEIR now claims that Mr. Roycroft was talking about the permitted volume of the landfill. (Master Response 12, at 6.3-39.) That is not what a tape of the meeting would reveal. An engineer for the landfill asked to speak before a government agency at a public meeting must be presumed to know the permitted volume (19.1 million cubic yards) and the actual volume, and to understand the difference between the two.

The FEIR relies on a subsequent letter from the applicant dated October 18, 2004 that now alleges the volume of waste-in-place is only 13.9 million cubic yards. Given the huge discrepancy in the record, and the imperative of assuring an accurate measure of current landfill volume, the FEIR's reliance on the landfill's calculation is unfounded. Moreover, the final FEIR is silent on the measured volume at the time of the 1995 permit request and project, and whether the additional volume over the last 10 years is consistent with reports relating to volume that Waste Management Inc. has kept or filed since then. The FEIR also fails to explain why, if the landfill volume is only 13.9 million cubic yards, expansion to 34.774 million cubic yards is necessary, other than to increase profits for Waste Management Inc.

<u>Permitted footprint</u>. The 1995 RDSI and 1995 SWFP state that the area – the permitted area – of the landfill is 210 acres. The de facto footprint, however,

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is 222.5 acres. As a result, permission to increase the footprint by 12.5 acres is part of the project. (Master Response 12.)

In the past Waste Management Inc. stated that this unpermitted expansion "reflect(s) an evolving landfill footprint and active waste placement on at least 222.5 acres." (See Response to comment D-3.) However, the final FEIR now assumes – without any real analysis - that lateral expansion has occurred as the result of the redesigned perimeter LCRS and levee. (Response to comments D-1, D-3, D-4.) If that is the case, the lateral expansion by definition has either illegally encroached upon wetlands or in the very least has reached its edge. The FEIR is incomplete for failure to analyze the potential impacts this lateral expansion may have caused or what mitigation measures are necessary.

<u>Projected site life under the project</u>. As part of its last expansion plan approved in 1995, Waste Management Inc.'s site life calculation was the year 2039. Just eight years later in 2003, Waste Management Inc. was back with another expansion plan based in large part on a new claim that without another significant expansion approval the site life would extend only until 2016. The FEIR does not explain how this happened. This is a highly relevant question when considering the accuracy and trustworthiness of the data provided by Waste Management Inc. that is the basis of the revised site life calculation.

The draft FEIR, using Waste Management Inc.'s numbers, stated that site life expectancy was 2016. Upon independent review, however, the final FEIR revises that estimate to be the year 2024. (Master Response 21.) This is significant in two respects. First, there is no imperative stemming from the general goal and policy of the Siting Element and Summary Plan for Marin County that the county assure 15 years of disposal capacity. Under the current permit conditions, site life is another 19 years. Second, relying on critical calculations and data provided by Waste Management Inc. in the draft FEIR has shown to be misplaced. This casts doubt on the dozens of other calculations in the final FEIR which rely on Waste Management Inc.'s (or its hired consultants') data rather than independent data collection and calculation.

In terms of the project's proposed revised site life calculation itself, there is an insubstantial basis for a number of assumptions, including in-place volume (see above) and Bay Mud settlement. (Page 6.3-85.)

3.4 - Geology, Soils and Seismicity

<u>Seismicity, Slope Stability, and the Revised Fill-Sequencing Plan</u>. The FEIR states that in the event of a 7.0 earthquake "considerable structural damage would likely occur" to the landfill. (3.4-11.) Because the landfill is built on artificial bay fill,

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liquefaction potential is high. (3.4-12.) To protect the public from the effects from hazards caused by earthquakes, under state law "a geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into the project design" <u>before</u> a permit may be granted for a site within a seismic hazard zone. (3-4-13.) This required analysis was not performed at the site and, therefore, the FEIR is deficient.

No Wetlands Landfill Expansion hired a geotechnical consultant to review the FEIR section on seismicity. The FEIR itself lacks enough detail and background documentation to enable public or expert review. As a result, No Wetlands Landfill Expansion was required to file Public Records Act requests, search government file rooms, and pay for copies to exercise the public's right to comment on the FEIR. The failure of the FEIR to contain sufficient data and information to enable public comment violates CEQA standards.

As shown by the Herzog Geotechnical Consulting Engineers Report, Attachment 2 to this letter (and which is incorporated into this letter by reference), the FEIR's evaluation of the significance risks posed by earthquakes is grossly insufficient. In essence, the FEIR underestimates the horizontal force that would impact the landfill slope in the event of an earthquake ("accelerations"), and also underestimates the resistance of the landfill to withstand that force ("shear strength").

Many of the critical calculations and assumptions in the FEIR are not based on best available data or are not based on data that could and should be obtained from the site. Chief among these deficiencies was the failure to use the correct Maximum Probable Earthquake (MPE) ground motions in evaluating stability of the massive landfill's proposed 3:1 slope. The accelerations used in the FEIR are *contrary to those required by state law*, having "greater than 90 and 70 percent chance of being exceeded over the next 50 years, respectively. Inadequate seismic design could result in failure of the landfill and levee slopes, and damage to the LCRS." (Attachment 2 to this letter.)

The result in the event of a major earthquake could be mass movement of fill waste or contaminated leachate into the surrounding wetlands due to slope failure and/or failure of the levee and LCRS. As the expert opinion in Attachment 2 indicates, because of the deficiencies in the FEIR's analysis, Mitigation Measures under 3.4.1, 3.4.2, and 3.4.9 do not reduce the risks of an earthquake or slope instability, displacement, and settlement to less than a significant level. The FEIR's stability analyses are flawed, and the proposed fill sequencing plan is contrary to state law and must be revised.

Moreover, the deficient analysis reflected in the FEIR violates Marin County policies in the Environmental Hazards Element, including but not limited to Policies EH-5.2, EH-6.1, and EH-7.1. (See 3.4-16.)⁴

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⁴ As a general note, the analysis in the FEIR is based on the 1994 Countywide Plan, which is out of date. There is little or no analysis of the project's consistency with Marin County Interim Sustainability Principles or the updated Countywide Plan (August 2005 Revised Public Review Draft).

With respect to Mitigation Measure 3.4.1c, unless and until Waste Management Inc. prepares an updated Post Earthquake Inspection and Corrective Action Plan that can be considered part of the project and hence subject to public review, the FEIR should not be certified as complete. Considering a plan to deal with the aftermath of a catastrophic earthquake is a weak mitigation measure at best which, alone or in combination with other measures, does not reduce the impact to less than significant.

<u>Failure to Reconstruct the Perimeter Levee</u>. As part of its 1995 expansion, a material condition for Waste Management Inc.'s SWF permit approval was a requirement to reconstruct the perimeter levee. Waste Management Inc. failed to meet that condition. (See 3.4-18.) Now it asks as part of its current "project" that it be excused from doing so. If in 1995 it was imperative to reconstruct the levee to safeguard the surrounding creek and wetlands from landfill and leachate movement cause by flooding, then it is even more of an imperative for the proposed expansion that would increase the mass of the landfill by 75%.

As the FEIR states, "[m]odification of the landfill geometry and construction of a LCRS without reconstructing the perimeter levee could increase the potential for landfill or levee slope failure, damage to the LCRS, and/or damage to the Area G liner, as a result of an earthquake on one of the faults in the project vicinity." (3.4-18.) Further, in a key paragraph, the FEIR admits:

Proposed changes to the landfill geometry (increasing the steepness of side slopes, decreasing bench widths, and increasing the length of intervals between benches) and construction of the LCRS trench without reconstruction of the perimeter levee could increase the potential for landfill or levee slope displacement as a result of static forces. Slope displacement in conjunction with a breach of the perimeter levee could allow refuse and/or leachate to reach and potentially contaminate surrounding surface waters, block an adjacent drainage, or disturb surrounding wetlands. (3-4-21.)

The FEIR fails to provide an adequate explanation as to why reconstructing the perimeter levee should not be required as a condition for continued operation of the landfill, let alone as a condition for the proposed expansion. As recent tragic events in Louisiana have shown, old levees are subject to breakage under stress, and reconstructing the levee to make it stronger, taller, and broader must be required. This is especially necessary given the onset of global warming and the resulting rise in sea-level. The impact of global warming on the perimeter levee and LCRS design and the hydrology of the landfill is glaringly absent from the FEIR.

Surface Drainage. Impact 3.4.5 states that the diversion and drainage system must be sufficient to withstand the fury of a 100-year 24-hour duration storm. It does not appear that the project includes upgrading or re-enforcing the current on-site system despite the plan to radically change the geometry of the landfill and increase its capacity by 75%. Nor does the FEIR analyze Waste Management Inc.'s current system in light of the proposed expansion plan. This is a material deficiency of the FEIR. Moreover,

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Mitigation Measure 3.4.5 does not mitigate the potential significant impact at all; it merely requires Waste Management Inc. to produce and present a report to RWQCB for approval demonstrating sufficiency of the precipitation and drainage control facilities. Unless and until Waste Management Inc. prepares the updated report on precipitation and drainage control facilities that can be considered part of the project and hence subject to public review, the FEIR should not be certified as complete.

<u>Five-Foot Separation Between Base of Landfill and Underlying Groundwater</u>. The landfill is operating in violation of state law, which requires landfills to have a minimum separation of five feet between groundwater and the base of the landfill. Also in violation of state law, the landfill does not have a liner to prevent seepage into groundwater. (See 3.4-28.) The only exception under state law is if Waste Management Inc. can demonstrate that an "engineered alternative" "would be equally protective of the environment." (Master Response 6.3.) The proposed project and the FEIR fail on many grounds to meet this requirement. As a result, the landfill will continue to operate in violation of state law.

Waste Management Inc. has averred that "the cost to meet the five-foot separation requirement would be too great." (3.4-29.) The FEIR is flawed because it contains no information to substantiate that claim. The only statement of support in the FEIR for Waste Management Inc.'s position is that the low elevation of the base of the landfill – below sea level – and the high water table in the area make it prohibitively expensive to install a liner. (6.3-3.) The reason Waste Management Inc. cites as to why it cannot meet the requirements of California law "due to economic reasons" is the very same reason why its site is wholly inappropriate for a landfill, let alone one to expand by 75% and upon which to build a mountain of garbage 160 feet tall at a 3:1 angle.

The proposed alternative – a perimeter leachate collection system coupled with a reliance on the Bay Mud underlying the site – by definition is not an "engineered alternative" to five foot separation and a liner. In fact, the RWQCB has stated that the LCRS is a "corrective action" – one which is long overdue – required in the 1992 Leachate Management Plan. (6.3-3.) It is not an "engineered alternative" for two additional reasons. First, Bay Mud is not an "engineered" solution at all; it is a natural occurrence. Second, the LCRS is necessary to meet a different requirement. Calling it part of the engineered alternative to satisfy an exemption from a critical California state law intended to protect groundwater is boot-strapping at its worst.

The FEIR's conclusion about the analysis of the "engineered alternative" seems simply to be that the LCRS "trench would provide a barrier to <u>lateral</u> leachate migration." (6.3-3.) Would it be a partial barrier? A total barrier? A fool-proof barrier? A barrier to downward migration? A barrier that is equally protective of the environment, as the legal standard requires? The analysis is inconclusive at best.

The FEIR presumes that the Bay Mud under the landfill has "<u>relatively low</u> permeability" and is from 7 to 45 feet thick. (6.3-5.) But Bay Mud is not impermeable like a modern liner would be. As the FEIR indicates, the Bay Mud under the landfill

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"contains intermittent lenses of sand and silty sand channel deposits. These discontinuous sand and silty zones have much higher hydraulic conductivity than the Bay Mud." (Id.)

The FEIR cites a 1990 field investigation program conducted by Harding Lawson Associates (HLA), for the weak conclusion that "all the significant channel deposits at the landfill <u>are believed to have been identified</u>." (Id.) How supportable is that belief? No map or data is provided that shows where borings and measurements were made or what the goal and scope of the 15 year-old investigate program were. They most certainly were not to substantiate the newly proposed LCRS design as an engineered alternative. Moreover, there is no map that shows the confluence of the following critical elements:

- where the landfill has less than five feet separation from groundwater,
- where the Bay Mud is only 7 feet thick,
- with the predicted rate and direction of Bay Mud settlement,
- and where the borings and measurements were made that were part of the HLA analysis.

This is a major flaw of the analysis. What is the appropriate geotechnical standard for manner and number of borings for a site as large as the footprint? The FEIR is silent.

The FEIR's dismissal of the landfill slope failure that occurred at the Acme Landfill in Contra Costa County is disturbing. The Acme Landfill, like the current proposal for the Redwood Landfill, had a 3:1 slope angle and was located on Bay fill. Its slope failure resulted in the spillage of sewage into Pacheco Slough and the emission of gases and foul odors. (Master Response 4.) According to Master Response 4, the cause of the failure at Acme was due to some of the landfill resting on peat instead of Bay Mud. Presumably, the compaction and settlement analysis and the fill sequencing plan assumed it was Bay Mud. Alarmingly, critical documents regarding the analysis of the Acme Landfill situation, both before and after the slope failure, appear to be missing or else the drafters of the present FEIR could not find them. How do we know that peat does not underlie some of the Redwood Landfill? How do we know some of the same flaws in the analysis at Acme were not replicated for the Redwood Landfill? The FEIR gives no assurances and offers little discussion of these critical points.

The FEIR also fails to note that last year high ammonia levels were detected in the site detection wells, 13 of which contained 10 feet or more of leachate at the bottom. (See letter dated October 7, 2004 from Waste Management Inc. to David Elias, RWQCB.) What caused the unusually high ammonia levels? Was it caused by on-site or off-site sources? Is it an indicator of groundwater contact? Because Waste Management Inc. is asking for a critical exemption from the state law standard, these questions must be addressed before the FEIR may be certified as complete. 19

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In terms of the effectiveness of the LCRS, the FEIR states "it is likely" that "there will be a permanent 'pool' of leachate, up to 9.5 feet deep, above the Bay Mud/refuse interface, and below the elevation of the LCRS trench." (6.3-6.) The FEIR fails to provide data and scientifically reasonable analysis why the LCRS trench only extending to -5.5 feet mean sea level is a reasonable measure to capture leachate migration. Why shouldn't the trench be deeper? What are the most reliable and effective materials to line the trench, and are those materials part of the plan and design? What is the plan to maintain and upgrade the LCRS trench system over time? After closure, won't the system need to continue to be maintained, and if so, what is the provision for doing so? In terms of pumping technology, what are the alternatives and which alternative was selected and for what reasons? What are the performance criteria (i.e., the "water balance model") that will be used to measure the LCRS effectiveness? The FEIR is silent on these critical questions, deferring "final determination of the adequacy of the applicant's design as an engineered alternative" until "after the applicant submits a complete design packet." (3.4-29.) Moreover, the FEIR's analysis of the effectiveness of the LCRS fails to address the probable impact of global warming and the rise in sea-level that will occur and the impacts on ground water under the landfill.

The purpose of the proposed leachate pumping program, which initially would use the existing 13 landfill gas wells, is to compensate for the inadequately designed perimeter trench. (See 3.4-33.) This method of reducing pressure from leachate build-up is entirely experimental and speculative in nature without empirical basis. The FEIR is devoid of proven or accepted performance criteria of such a system and cites no model to follow.

Under CEQA the public has a right to review, consider, and comment on the material elements of a project that might impact the environment. Unless and until Waste Management Inc. prepares a complete LCRS design proposal that can be considered part of the project and hence subject to public review, the FEIR should not be certified as complete. The FEIR is devoid of essential information that would be necessary to support any valid conclusion that Waste Management Inc. has met its burden of demonstrating that an engineered alternative exists that would be equally protective of the environment as five foot separation and a liner.

Independent Third Party Monitoring and Oversight. With respect to the mitigation measures that require ongoing monitoring and a monitoring plan, they should be conducted and prepared by a supervising engineer who was not involved in the faulty calculations in the FEIR and who does not work for Waste Management Inc. and who makes his or her reports available to the County and the public at the same time. As Master Response 7 states: "Arranging for third party oversight of the monitoring to eliminate a perceived influence of the monitoring results by the applicant's consultants should only be required if the data collection methods and analyses are suspect." Based on the points raised above, and based on the list of past Waste Management Inc. infractions (see Attachment 1), the standard for independent oversight and monitoring has been met and it should be required.

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3.5 - Hydrology and Water Quality

Due to time constraints and the necessity to locate and retain technical experts in these fields, and the need to locate additional documentation not included in the FEIR, we are unable to comment on this section at this time. As noted on page 1, we requested 30 additional days to submit written comments on the FEIR. As an initial matter we note that there is inadequate mitigation for fact that landfill sits in the 100 year floodplain, and that the equivalent of such flooding occurred recently in 1998 resulting in spillage of leachate into San Antonio Creek. (See correspondence between RLI and RWQCB on file with RWQCB.) The FEIR section on hydrology and water quality is also deficient because it does not take into account the impact of global warming over the next 20 – 100 years and the almost certain rise of the water level surrounding the landfill.

3.2 – Air Quality and 4.2 Cumulative Impacts

Please refer to the separate letter filed by our lawyer, Brent Newell.

3.1 – Aesthetics

The findings of consistency with the Countywide Plan are unsupported by facts or analysis – they are simply subjective opinions.

- Objective EQ-2: The permitted landfill footprint is the figure contained in the 1994 FEIR and SWFP 210 acres. The footprint, however, is actually 222.5 acres. (See comments above regarding footprint; see also footnote 2 on p. 2-10.) Any revised SWF permit for the project must include approval of this expansion of the footprint. Therefore, the conclusion that "the project does not propose expansion of the landfill footprint" is erroneous. (P. 3.1-7)
- Policies EQ-2.72, .73, .74: The conclusion that the project would not block visual access to the bayfront and scenic vistas of water compared to the currently permitted final contours is not supported by fact. The "permitted final contours" do not exist and could not exist but for approval of the project's volume expansion. There is no calculation in the FEIR that demonstrates that the permitted height of 166 feet can even be reached with the currently permitted volume (approx. 19 million cubic tons). It is likely that the permitted height can only be reached with the proposed volume expansion (to approx. 35 million cubic tons). The permitted height with the project's requested volume will impede visual access to bayfront lands, will distract from shoreline and marsh landscapes, and impede optimal views for public enjoyment of the bayfront. Therefore, the project is inconsistent with Policies EQ-2.72, EQ-2.73, and EQ-2.74.
- Moreover, the FEIR is deficient because it fails to address the impact on the scenic vistas to the east, northeast, and southeast of the landfill. San Antonio

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Creek, the adjacent sloughs and marsh, and the Petaluma River are accessible for recreational and nature enjoyment activities. There is no analysis regarding these vista points and the landfill expansion's impact on these activities.

3.3 – Biological Resources

The analysis regarding impacts is insufficient because there was no recent study performed or cited regarding the location or prevalence of special status species such as the Clapper Rail and Black Rail within the vicinity of the landfill. There is little or no information on other species known to live in the area.

The mitigation measures for impacts 3.3.4 (project activities may have a deleterious effect on special status bird and mammal species) and 3.3.5 (high noise levels from certain operations may disturb California clapper rail nesting) are insufficient, as they would only require curtailment of activities during nesting season if at some unspecified point in time a biological survey uncovers their presence.

California Clapper Rails (*Rallus longisostris obsoletus*) were detected along San Antonio Creek near the Oxbow during a synoptic survey of San Francisco Bay tidal wetlands in the early 1990s (US Geological Survey). The continued presence of this species at Black John Slough, Bahia Channel, and contiguous wetlands downstream suggest continued presence in the San Antonio Creek drainage. A new survey should be required before the FEIR can be certified as complete.

The FEIR is flawed because it does not consider the cumulative impacts on surrounding wildlife of the bird control program which uses various loud noise and pyrotechnic devises, and the artificial lights used for nighttime operations. (3.6-15 to - 16.) There is no baseline analysis whether the bird control program and artificial lights at night have increased in intensity since last approved in 1995, or whether there has been a negative impact on the types of numbers of wildlife in the immediate vicinity of the landfill. The statement in the FEIR that "the impacts of siting and operating a new landfill elsewhere in the County (the off-site alternative) would <u>probably</u> result in more impacts on biological resources than the proposed project at its current location" is pure speculation.

3.6 – Land Use and Planning

For analysis of the land use permit, please see Attachment 1 to this letter.

In addition to failing to be consistent with five different source reduction and recycling element goals and one summary plan policy under the Marin County Integrated Waste Management Plan (3.6-11), the project also fails to meet 3 siting elements of the Marin Countywide Plan with respect to new or expanded landfills:

E2 (can't be located in a 100-year flood plain).

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- E3 (can't be located in a manner that does not meet a minimum of 5 feet above the highest anticipated elevation of underlying ground water).
- E7 (be at all times in compliance with applicable federal, state, and local statutes, permits, minimal operating standards and monitoring requirements).

The FEIR's summary conclusion that the above 3 siting criteria are met is erroneous. For E2, the FEIR itself states that part of the landfill site is within the 100year flood plain (Figure 3.5-2), including the Oxbow area where major new operations are planned. For E3, as set forth above, the LCRS fails to meet the "engineered alternative" requirement to waive the 5 foot separation from groundwater requirement under state law. Moreover, there does not appear to be such an exception to the 5 foot separation requirement under the Countywide Plan. For E7, Waste Management Inc. has committed a slew of violations and, therefore does not have the clean hands required under the Countywide Plan to request expansion. Some of these violations are listed in Attachment 1 to this letter.

In terms of Impact 3.6.3, the summary analysis is deficient because it fails to consider the impact on the adjoining land owner of the Mira Monte parcel, including future potential uses of that site such as an Open Space Park to enable public access to the wetlands and river estuary for educational and recreational purposes. Impacts on other potential future nearby land uses are also not discussed in adequate detail, including further development at Gnoss Field.

3.10 - Traffic

The FEIR states that most of the out-of-county traffic will originate to the south of Marin County (3.10-9), although there is evidence much comes from the east as well. (See Master Response 9.) There is no analysis of where the new truck traffic with expansion would originate from. The traffic analysis fails to estimate or account for increased traffic on Rt. 580, Rt. 37, and Atherton Road (which links Rt. 101 and Rt. 37) that would result from the project. The recent decision of Sonoma County to ship a substantial portion of its solid waste to the Redwood Landfill is also not analyzed. The FEIR is incomplete without considering these potential impacts.

5.1 and 5.2 Alternatives to the Project

The cursory analysis of alternative sites fails to meet the CEOA standard.⁵

The FEIR also fails to consider an alternative under which the Marin Countywide Plan would change its goal of requiring 15 years site life in-county to the state standard of having a plan to deal with county waste for the next 15 years. A number of equally environmentally sensitive counties in northern California (e.g., Mendocino and Del Norte) have adopted more aggressive "zero waste" policies while assuring the availability of fill capacity outside of the county in less environmentally sensitive locations.

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⁵ Please see the separate comment letter filed on behalf of No Wetlands Landfill Expansion by Brent Newell, which discusses the alternatives analysis in greater detail.

Moreover, forward-looking sustainability strategies, such as those focused on achieving zero waste through residential and commercial incentives and requirements, are also not considered. Other locales, such as Palo Alto, are considering and adopting such plans in an effort to reduce dramatically the reliance on landfills. The FEIR fails to consider the possibility of an aggressive zero waste strategy, coupled with a serious review of alternative locations to send Marin County's waste 15 years from now. For example, a recent newspaper article indicated that Sonoma County is beginning to explore the future feasibility of shipping waste by rail to the arid desert in Nevada, a more ecologically safe location for waste than a wetlands and river estuary feeding into San Pablo Bay.

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In terms of the "reduced scale alternative" and the "no project alternative," the FEIR notes that each would not result in the unmitigated significant impact on air quality that the "mitigated alternative" would have. Unless the mitigated alternative is changed to reduce the impact on air quality below the significant level (see 6.3-81), the mitigated alternative would seem not to be the "environmentally superior alternative" in all respects.

CONCLUSION

For the reasons stated in this letter, the FEIR for the Redwood Landfill Solid Waste Facilities Permit Revision violates CEQA. Many of the critical analyses in the FEIR are flawed and are not based on best data or appropriate assumptions. We urge the County to refrain from certifying the FEIR as complete. Instead, the County should review the 47 year old land use permit to bring it up to contemporary standards, while the FEIR is being revised and re-circulated for further review. The expansion proposal as presented poses numerous risks to our environment and community that cannot be mitigated to less than significant levels. There is no overriding interest that would warrant approval. For these reasons, No Wetlands Landfill Expansion continues to oppose Waste Management Inc.'s expansion plan. We respectfully request that any notice regarding this proceeding be sent to us at the address below.

Very truly yours,

Mouh &

Christopher Gilkerson Chairperson No Wetlands Landfill Expansion c/o 220 Saddlewood Dr. Novato, CA 94945

Attachment 1 – Land Use Permit

In 1958 the Board of Supervisors granted a one-page land use permit pursuant to Ordinance 264, predecessor to today's Marin County Code provision cited above. The permit was granted to a local owner and operator, Jordan Smith to "permit the establishment of a sanitary land fill garbage and rubbish dump." (Use Permit dated March 4, 1958.)

The hearing record before the Planning Commission shows concern regarding permitting a dump near San Antonio Creek and the wetlands. Surrounding land owners (Silvera and Mira Monte) opposed the permit application. At the time, Mr. Smith and his representatives requested the permit based on several assurances, including:

Operation would begin "about one mile from the nearest San Antonio Creek Boundary." Depending on years of operation, "It might go up to within a couple of hundred feet of San Antonio Creek in future years if it is still in operation." (Hearing before the Planning Commission, Feb. 27, 1958 at 12.)

The Use Permit itself contains the following condition:

"The use permitted herby shall be conducted and shall conform in all particulars to all provisions of all applicable laws and ordinances. Failure to comply with all the aforementioned provisions and conditions will be cause for the cancellation of this permit by the County Planning Commission."

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"All applicable laws" includes compliance with any operating permits.

It also appears from the limited record that a number of conditions were submitted and appended on the date of issuance, March 4, 1958, including:

- A limitation on the number of months for which the permit would be granted, subject to renewal "upon proper application being made."
- "This permit shall terminate at such time as the County determines upon and puts into operation an alternative system of garbage and refuse disposal."
- "Maximum level of trenches or other depressions shall be at least two feet above ground water. There shall be no contamination of underground or percolating water."

Over the last 47 years, much has changed in terms of land use policy especially as relates to wetlands. However, there is no indication that the County has reviewed the continued sufficiency of the Redwood Landfill's one-page permit since 1958. This is the case even though ownership of the land transferred to multi-national waste corporation in the early 1990s, and thereafter Waste Management Inc. greatly expanded the nature and scope of activities on the site. Waste Management Inc. has now proposed its second expansion plan since it took over ownership and began converting the once local "rubbish dump" into a regional waste filling and processing facility.

As summarized below, there are ample grounds for reviewing the 1958 land use permit.

<u>Process</u>: The Board of Supervisors has broad discretionary power to revoke or suspend a use permit if the permit holder violates the terms of the land use code "or any other law or ordinances, or conducts or carries on the use in such manner as to materially affect adversely the health, welfare or safety" of others. (County Code Section 22.88.040 interim). If there is any ground for finding that the permit holder has violated a condition of the permit or violated any provision of law, the Board of Supervisors may direct the Planning Commission to initiate a revocation or suspension proceeding. After notice and a hearing, the Planning Commission may revoke, suspend, and/or impose appropriate conditions, and the Planning Commission's action is subject to review by the Board of Supervisors. (See County Code Section 22.88.045 interim.)

A permit review process could take the form of a "revocation or suspension proceeding" as stated under the Marin County Code, making clear that the intent is to review the landfill's current operations and compliance to determine whether additional conditions are necessary and appropriate considering "the public interest, health, safety, convenience, or welfare of the County." As a policy if not legal matter, that review must take place prior to certification of the FEIR or the initiation of the solid waste facility permit expansion proceeding. This is because the solid waste facility permit is premised on the existence of a current, sufficient, and viable land use permit.

Grounds:

1. Current and Proposed Operations Go Beyond the Scope of the 1958 Permit.

• At the time of the 1958 permit, filling operations were anticipated to stay two hundred feet from San Antonio Creek. (See above.) Today the dump in some places is only 10 feet away from the creek, which leads to the Petaluma River and the San Pablo Bay.

- At the time of the 1958 permit, there was no contemplation of operating a regional dump on the site. Waste Management Inc.'s proposal is to greatly increase its waste operations to accept 3,864 tons of waste per day with a total permitted volume of about 35 million cubic tons (about a 75% increase). (See FEIR at 2-12; 2-23.)
- The Landfill's current operations include some limited greenwaste and wood waste composting and sludge or biosolids processing. (See FEIR at 1-3.) Even if as a policy matter composting is preferable to filling, these processing operations extend well beyond the "land fill and garbage dump" approved under the 1958 permit.
- Waste Management Inc.'s proposal is to expand significantly these operations that were not contemplated under the original 1958 permit to turn the site into a "regional composting facility" accepting 514 tons per day, an amount that

"greatly exceeds the required processing capacity for Marin's compostable greenwaste, food waste, and sewage sludge biosolids." (FEIR at 1-13; 2-30.) Waste Management Inc. recently constructed a compost pad in the environmentally sensitive Oxbow area surrounded on three sides by San Antonio Creek (FEIR at 1-56; 2-31), which has never been approved for such land use.

- In terms of Waste Management Inc.'s proposed project, it wants to relocate administrative and other facilities. (FEIR at 1-2; 2-41.) This is an appropriate matter for the land use permit to address.
- The proposed project would include many elements not contemplated by the 1958 land use permit, including but not limited to an elaborate trench, levees to protect from flooding risks, and various pumping operations.
- It also raises questions concerning compatibility with the Marin Countywide Plan and current and potential future land uses, such as the Gnoss Field airport. These matters are most appropriately addressed by the Planning Commission and the Board of Supervisors, not under a Solid Waste Facility permit proceeding.

2. Violations of Law and Operating Permits (Not Exhaustive).

- Waste was dumped in 11.5 acres outside of the solid waste facility footprint in violation of past and current permits. (FEIR at 2-39)
- The solid waste facility-permitted footprint of the dump is 210 acres, but "the most recent measurements of the landfill footprint indicate that it is 222.5 acres." (FEIR at 2-10.) This lateral expansion was never approved.
- Waste Management Inc. is operating in violation of California Code of Regulations Title 27, Chapter 3 Section 20240(c), which for water protection concerns requires a five-foot separation between waste and the highest anticipated elevation of underlying groundwater. Waste Management Inc. has not met its burden of demonstrating that there is a "specific engineered alternative" that "affords equivalent protection against water quality impairment," the only exception allowed under this important state law requirement. It has also failed to operate with the liner required under state law.
- Over the past two years Waste Management Inc. has regularly exceeded its daily tonnage limits under its solid waste facility permit. (EHS files, self-monitoring reports.)
- At the end of 2004 Waste Management Inc. began making slope changes inconsistent with its current solid waste facility permit, anticipating approval of the proposed project. (EHS files, December 8, 2004 letter from EHS to Redwood Landfill.)
- The dump's methane gas flare came out of compliance with its air quality permit, requiring Waste Management Inc. to request a variance while it replaced it. (Noted in EHS files.)
- Waste Management Inc. is in violation of its 1995 solid waste facility permit because it has never reconstructed or finished the perimeter levee to guard

sufficiently against the risk of flooding, failed to implement the N-Viro process for handling sewage sludge, and failed to excavate fill from 11.5 unpermitted acres on the site. These are breaches of fundamental requirements on which the 1995 revised permit was issued. (See 1995 Solid Waste Facility Permit file.)

- In 1998 there were a number of instances of un-permitted discharges into San Antonio Creek. (Correspondence on file with the Regional Water Quality Control Board; see also attachments to Comment Letter II.)
- Master Response 18 (Applicant's Record of Compliance) refers to other violations Waste Management Inc. has committed.
- The 1999 Stipulated Notice and Order reflects the failure of Waste Management Inc. to comply with other provisions of its 1995 SWF permit.

3. Determination of Consistency with Marin Countywide Plan.

- As with the operation of any large industrial enterprise in our county, the Board of Supervisors must evaluate whether the landfill's current and proposed operation is consistent with the Marin Countywide Plan and related policies. The FEIR for Waste Management Inc.'s proposed dump expansion recognizes this, stating that policy consistency "must ultimately be determined by the Marin County Board of Supervisors and not in this FEIR." (FEIR at 1-8.)
- The dump is located within the "Inland Rural Corridor" as well as the Bayfront Conservation Area. The FEIR for Waste Management Inc.'s proposed project only briefly analyzes consistency with the 1994 Countywide Plan, and not the updated Countywide Plan. (FEIR at 3.1-5.)
- A land use permit hearing would be an appropriate way for the Board of Supervisors (or Planning Commission) to determine whether the dump's current and future operations are consistent with the countywide plan.

Attachment 2



HERZOG GEOTECHNICAL CONSULTING ENGINEERS

September 7, 2005 Project Number 1718-01-05

No Wetlands Landfill Expansion c/o Christopher Gilkerson 220 Sandlewood Drive Novato, California 94945

RE: Geotechnical Review Final Environmental Impact Report Redwood Landfill Novato, California

Dear Mr. Gilkerson:

This presents the results of our geotechnical review of the July 2005 *Final Environmental Impact Report* (FEIR) for the proposed expansion at Redwood Landfill in Novato, California. Our scope of services consisted of reviewing the FEIR and related material, performing engineering analyses, and submitting this report summarizing the results of our review.

The geotechnical section and appendices of the FEIR did not include sufficient background data for us to conduct our review, and we had to obtain numerous documents from Marin County Department of Environmental Health Services to derive information regarding the geotechnical data and analysis methods used in static and seismic analysis of the landfill. Our review indicates that several of the methods utilized in the static and seismic analysis of the proposed landfill slopes are unconservative, and that strength parameters utilized in the analyses are largely based on assumptions and/or off-site data instead of on-site test data. These factors may result in the underestimation of the risk of future instability, and to the failure of Mitigation Measures 3.4.1, 3.4.2 and 3.4.9 to reduce slope stability impacts to a less than significant level. The results of our review are summarized below:

1. The landfill is situated within an area of high seismicity, and current geotechnical standards of practice and Section 20370 of Title 27 of the California Code of Regulations (CCR) require that the seismic stability of structures and significant embankments be evaluated utilizing Maximum Probable Earthquake (MPE) earthquake ground motions with a probability of exceedance of 10 percent in 50 years. The stability analyses for the FEIR do not appear to conform to these requirements. Although MPE ground motions appear to have been used to evaluate final closure stability, the motions utilized to evaluate stability during the approximately 30+ year operational life of the landfill are much lower and less conservative. Although the calculated MPE bedrock acceleration at the site is

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September 7, 2005 Redwood Landfill, Novato Project Number 1646-01-05

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0.58g, less than half this value (0.20g and 0.25g) was used in the FEIR analyses. The accelerations used have greater than 90 and 70 percent chance of being exceeded over the next 50 years, respectively. Inadequate seismic design could result in failure of the landfill and levee slopes, and damage to the LCRS. Accordingly, the fill sequencing plan should be revised to incorporate the MPE ground motions specified in CCR Title 27.

Although there is abundant site-specific consolidation and shear strength data available to perform an accurate analysis of the stability of the fill sequence using well-established conventional methods, a large portion of the evaluation presented in the FEIR was performed using more complex finite element methods. The results derived from the finite element methods used in the FEIR are highly sensitive to a wide array of input parameters. Many of the parameters used in the FEIR analyses were not developed by site specific testing, but instead were derived based on assumptions, generalized correlations, or calibration to limited testing of material from a different site. In addition, several of the parameters used are inconsistent with previous on-site testing and with published ranges of typical values for Bay Mud (Bonaparte and Mitchell, 1979). Parameters should be determined based on the testing of on-site materials. The parameters should be incorporated into revised stability analyses to evaluate whether Mitigation Measures 3.4.1 and 3.4.2 will reduce impacts to a less than significant level.

3. The results of the finite element analyses do not appear to have been compared to the extensive monitoring data prepared at the site, or to conventionally calculated consolidation behavior. Since the static and seismic stability of the proposed fill sequencing is highly dependent upon the finite element analyses, these comparisons should be performed and provided for review.

4. Previous stability analyses by Harding Lawson Associates (1995) at the site utilized refuse shear strengths corresponding to a cohesion of 300 pounds per square foot (psf) and a friction angle of 20 degrees. The stability analyses in the FEIR utilized a refuse cohesion of 900 psf and a friction angle of 31 degrees. These strengths are substantially higher than typical published values. We understand that these values were derived from test results at a landfill in Monterey, and have not been verified by site-specific testing or back-calculation. Accurate strength characterization is necessary to avoid static or seismic slope instability. As such, strength parameters should be derived from laboratory testing and/or back-calculation of material from the Redwood Landfill site. As with the Harding Lawson Associates analyses, refuse strengths should be reduced as necessary to account for strain incompatibility between the refuse and underlying Bay Mud (i.e. the potential for the Bay Mud to fail prior to the refuse deforming enough to obtain its design strength). Revised analyses should be performed to evaluate whether the use of on-site parameters will



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September 7, 2005 Redwood Landfill, Novato Project Number 1646-01-05

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Page 3

result in Mitigation Measures 3.4.1 and 3.4.2 reducing stability impacts to less than significant levels.	49
The vertical permeability utilized in the finite element analyses was reportedly obtained from testing at an adjacent site, and is significantly higher than the values previously measured at Redwood Landfill. Permeability dictates the rate of increase in Bay Mud strength due to consolidation, and analyses should be performed using values developed based on on-site testing.	∍ 50
The seismically induced slope deformations calculated by GeoSyntec Consultants $(2-1/2 \text{ to } 12 \text{ inches})$ are substantially less than those calculated by HLA, 1992 $(1-1/2 \text{ to } 6 \text{ feet})$. The seismic deformations should have increased since steeper slopes are proposed than those evaluated by HLA. An evaluation of the adequacy of Mitigation Measure 3.4.1 will necessitate that the cause(s) for this discrepancy be addressed.	51

The required interface shear strengths presented in Table 3.4-5 of the FEIR are very high, and clarification should be provided as to the types of available material which would satisfy the shear strength requirements.

8. For verification purposes, the relationship utilized by GeoSyntec Consultants to characterize the undrained shear strength of normally consolidated Bay Mud as a function of effective overburden stress should be plotted along side the values of Bay Mud strengths previously measured at the Redwood Landfill site. This is necessary to evaluate the appropriateness of the strength parameters used in the stability analyses.

Services performed by Herzog Geotechnical have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession practicing in the same locality under similar conditions at the time the services were provided. No other representation, expressed or implied, and no warranty or guarantee is included or intended in this report or in any opinion, documented or otherwise.

We trust this provides the information required at this time. If you should have further questions, please do not hesitate to call.

Sincerely, HERZOG GEOTECHNICAL

Craig Herzog, G.E. Principal Engineer





Comment Letter N: No Wetlands Landfill Expansion

- N-1. The comment is a general preamble to comments that follow and does not address the FEIR specifically enough to allow for a specific response.
- N-2. As provided in CEQA *Guidelines* Section 15089 California Code of Regulations (CCR), a lead agency may, but is not required to, provide an opportunity for review of the FEIR by the public or commenting agencies before approving the project. As noted in the response to Comment M-1, the County extended the original 60-day comment period to 74 days for public review of the FEIR. It is also noted that the public was provided 90 days to comment on the DSEIR and provide input from technical experts if desired. The comment does not specify which documents were not available for review; noise analysis calculations, air quality calculations, and health risk assessment model runs were included as appendices in the FEIR. The comment incorrectly implies that Waste Management Inc., the parent company of the applicant, Redwood Landfill Inc, somehow participated in the response to comments on the DSEIR (erroneously referred to as the "preliminary FEIR"). Other than providing requested information to the County and the County's EIR consultant, the applicant was not involved in the response to comments on the DSEIR.
- N-3. Please refer to Master Response 103 regarding the facility's land use permit. The CIWMB comment on the DSEIR cited in this comment is consistent with the impact analysis presented in the EIR which identifies impacts, including significant unavoidable impacts that would result from full implementation of the proposed project, even with mitigation measures specified in the FEIR. FEIR Master Response 9 describes the origin of recent waste receipts at the landfill and Master Response 19 addresses the development of Redwood Landfill as a regional landfill.
- N-4. This comment primarily summarizes information presented in Chapter 2, Project Description, of the FEIR. Regarding the increase in the landfill footprint refer to individual responses to Comments D-1 and D-3 in Section 6.4 of the FEIR. See also Master Response 106 of this FEIR Response to Comments Amendment.
- N-5. Please refer to Master Response 103.
- N-6. Please refer to Master Response 107.
- N-7. Please refer to Master Response 107.
- N-8. Please refer to Master Response 107.
- N-9. This comment reiterates some and misstates other information pertaining to seismic hazards at the site and the analysis required by applicable regulations presented in the setting section of FEIR Section 3.4. The setting section outlines the seismic hazards that are present in the seismically active Bay Area and the factors relevant to the evaluation of

the seismic stability of the proposed project. As stated, high groundwater and alluvial deposits are important factors in considering liquefaction potential. The site response and deformation analyses were performed using measured and estimated geotechnical properties of the foundation soils at the site (as well as the geotechnical properties of waste and the perimeter levee), as discussed under Impact 3.4.1. FEIR responses to Comments D-12 and Q-7 address comments about liquefaction potential at the site. The geotechnical investigations and analyses conducted at the site are cited and discussed, primarily under Impacts 3.4.1 and 3.4.2. See also FEIR Master Responses 7 and 22 and Master Response 108 in this document.

- N-10. CEQA does not contemplate that all background documents used in an EIR analysis will be included in the published document, nor would this be practical. The County's procedures for allowing inspection and reproduction of background documents is customary and proper.
- N-11. Please refer to Master Response 108
- N-12. The applicant has prepared extensive geotechnical site evaluations, in accordance with the County policies cited by the commenter. See Master Response 108. Regarding the Countywide Plan Update, please refer to Chapter 1, Introduction of this document, as well as Master Responses 106 and 112, and the response to Comment C-13.
- N-13. As stated in Mitigation Measure 3.4.1c, the existing Post Earthquake Inspection and Corrective Action Plan needs to be updated. Based on the information provided by the applicant, the landfill has been engineered for the design earthquake and should perform in accordance to their design. See also Master Response 108. The Post Earthquake Inspection Plan is necessary, as an added precaution, to verify the landfill's performance and provides requirements for the applicant to follow in the unlikely case the landfill does not perform as analyzed.
- N-14. This comment reiterates the statements of potential impacts evaluated under Impacts 3.4.1 and 3.4.2 (impacts related to seismic and static stability, respectively) of the FEIR. In each case the cited passage outlines the potential impact under consideration, prior to mitigation. Please see Master Response 106 in this document.
- N-15. Surface Drainage: As stated in Mitigation Measures 3.4.5 and 3.5.9 in the FEIR, the applicant is required to provide a report demonstrating that the drainage control facilities meet Title 27 requirements before project approval.
- N-16. Please see the response to Comment E-22 in this document.
- N-17. Economic analysis is beyond the scope of an EIR. Note, however, that construction of a liner beneath the currently unlined sections of the landfill would entail the removal and replacement of more than 14 million cubic yards of waste and cover material already in place, as discussed in FEIR Master Response 1. Such an exercise would not only be

enormously expensive and logistically challenging, but would no doubt result in potentially significant environmental impacts, including release of odor, dust, methane and other gasses, and consumption of large amounts of energy (fuel) and consequent vehicle and equipment emissions.

- N-18. FEIR Section 3.4, Impact 3.4.6, and FEIR Master Response 1 discuss the provision in state landfill regulations (Title 27 California Code of Regulations [CCR]) for an engineered alternative to the prescriptive standard and summarize the conditions under which an engineered alternative may be allowed. Regarding the allowance of engineered alternatives, CCR Title 27, § 20080 states:
 - (b) Engineered Alternatives Allowed—Unless otherwise specified, alternatives to construction or prescriptive standards contained in the SWRCB-promulgated regulations of this subdivision may be considered. Alternatives shall only be approved where the discharger demonstrates that:
 - (1) the construction or prescriptive standard is not feasible as provided in (c); and
 - (2) there is a specific engineered alternative that:
 - (A) is consistent with the performance goal addressed by the particular construction or prescriptive standard; and
 - (B) affords equivalent protection against water quality impairment.
 - (c) Demonstration [for (b)]—To establish that compliance with prescriptive standards in this subdivision is not feasible for the purposes of (b), the discharger shall demonstrate that compliance with a prescriptive standard either:
 - (1) is unreasonably and unnecessarily burdensome and will cost substantially more than alternatives which meet the criteria in (b); or
 - (2) is impractical and will not promote attainment of applicable performance standards.

The RWQCB shall consider all relevant technical and economic factors including, but not limited to, present and projected costs of compliance, potential costs for remedial action in the event that waste or leachate is released to the environment, and the extent to which ground water resources could be affected.

As stated in the response to Comment E-22 in this document, the RWQCB approved Redwood Landfill's engineered alternative to the requirement to maintain five feet of separation between waste and groundwater (Seward, 2006).

For additional information on the leachate management system, please refer to Master Response 105. Regarding subsurface conditions, see Master Response 109.

N-19. Please refer to Master Response 109.

- N-20. Although documentation for the engineering design of Acme Landfill could not be located and obtained by the EIR preparers, the engineering design for Redwood Landfill is available. The proposed landfill has been designed to meet the requirements of Title 27 of the California Code of Regulations, Title 40 of the Federal Code of Regulations (Subtitle D) and the California Regional Water Quality Control Board San Francisco Bay Region (CRWQCB Order No. 95-110, dated 24 May 1995) (GeoSyntec 1998). Subsurface conditions of the site are known from the borings, cone penetration tests, and in-situ vane shear tests that have been performed throughout the site. See Master Response 109.
- N-21. A responsive report prepared by GeoChem Applications (2004a) explained that the source of the high ammonia levels was most likely naturally occurring ammonia in Bay Mud, and did not indicate any groundwater contamination. FEIR Master Response 14 discusses the natural occurrence in the environment around Redwood Landfill of various constituents used in leachate monitoring, and the challenge this creates in identifying appropriate monitoring parameters to detect a leachate release. One such naturally occurring constituent is ammonia (which is included in the measurement of total Kjeldahl nitrogen [TKN] for purposes of the statistical analysis conducted as part of the monitoring program). As discussed in Master Response 14 alternative parameters (the ratio of cations and anions), the presence of which were shown to differ sufficiently between leachate and background levels, have been proposed as a parameter to augment the current monitoring program and troubleshoot false positives (GeoChem Applications, 2004b).
- N-22. The applicant's LCRS design and operation are discussed extensively in Master Response 13 in the FEIR. See also updated information and additional analysis in Master Response 105 in the current document.
- N-23. Please see Master Response 105 in this document.
- N-24. The effectiveness of the proposed LCRS in preventing the offsite discharge of leachate is discussed in FEIR Sections 3.4 and 3.5, and in greater detail in Master Responses 1, 13, and 14 of the FEIR. Since publication of the FEIR, the applicant has provided additional information on leachate management at the site. This information is reviewed in Master Response 105. Relevant background documents are available for review by interested members of the public at the offices of the Marin County Environmental Health Services Division.
- N-25. Please refer to Master Response 111 in this document.
- N-26. The period for comments on the FEIR was extended from the initial 60-day period to 74 days.
- N-27. Please refer to Impact 3.5.6 and Mitigation Measure 3.5.6 in the FEIR.

Redwood Landfill Final Environmental Impact Report Response to Comments Amendment

- N-28. Please see response to Comment KK-12 on page 6-4-110 of volume 2 of the FEIR, and Master Response 106 in the current document.
- N-29. Mr. Newell's letter is included in this document as Comment Letter O.
- N-30. Table 3.1.1 in the FEIR provides analysis of each conclusion reached regarding the consistency of the project with the 1992 Countywide Plan policies. Regarding the recently-adopted Countywide Plan Update, please refer to Chapter 1, Introduction of this document, as well as Master Responses 106 and 112, and the response to Comment C-13.
- N-31. The change of footprint is addressed in responses to comments D-1 and D-3 in the FEIR and does not change the conclusions of the analysis presented in FEIR Section 3.1. Note also that simulations are presented in Section 3.1 of the permitted and proposed landfill at buildout. Please refer to Master Response 107 regarding the landfill's footprint.
- N-32. The visual impacts of the proposed project are analyzed in Impacts 3.1.1 through 3.1.4 in the FEIR. See also Master Response 110 in this document.
- N-33. Please refer to Master Response 110 in this document.
- N-34. Please refer to Master Response 102 in this document.
- N-35. Please refer to Master Response 102 in this document.
- N-36. Regarding location of the landfill within the 100-year floodplain, please refer to Impact 3.5.6 and Mitigation Measure 3.5.6 in the FEIR, and to Master Response 106 in this document. Regarding the engineered alternative to the 5-foot separation requirement, please refer to the response to Comment E-22 in this document. Regarding Waste Management's record of compliance, please refer to Master Response 18 in the FEIR.
- N-37. Impact 3.6.3 refers to potential conflicts with agricultural uses and so does not apply to the Mira Monte Marina. Regarding potential noise impacts on the Mira Monte Marina, please see Impact 3.7.1 in the FEIR. The County has received no application for a change in land use at the Mira Monte Marina parcel, and any such change is therefore speculative and outside the scope of this EIR.
- N-38. Please refer to Master Response 101.
- N-39. The alternatives analysis in the FEIR (Chapter 5) is consistent with the CEQA statute, *Guidelines*, case law, and current standards of practice.
- N-40. CEQA requires a "range of reasonable alternatives" (CEQA *Guidelines*, §15126.1(a)) The suggested alternative was not considered, was not raised during the public scoping meeting for the EIR, was not brought up in comments on the DSEIR, and does not need to be considered in order to meet the requirements of CEQA. See also the response to Comment C-13 from the city of Novato.

- N-41. Please refer to the discussion of Zero Waste in the response to Comment C-13.
- N-42. The rationale for the conclusion that the Mitigated Alternative is the Environmentally Superior Alternative may be found on page 5-37 of the FEIR.
- N-43. The FEIR is consistent with the CEQA statute, *Guidelines*, case law, and current standards of practice, and was prepared by competent, qualified analysts using the best and most complete data available. Assumptions used in the analysis are stated, are supported, and are reasonable. Recirculation is not required (CEQA *Guidelines* §15088.5). Regarding the facility's land use permit, please see Master Response 103 in this document. The remainder of this comment goes to the merits of the project, not the environmental analysis.
- N-44. Please refer to Master Response 103.
- N-45. This comment is a preamble to specific questions and comments that follow.
- N-46. Please refer to Master Response 108.
- N-47. Please refer to Master Response 108.
- N-48. Please refer to Master Response 108.
- N-49. Please refer to Master Response 108.
- N-50. Please refer to Master Response 108.
- N-51. Please refer to Master Response 108.
- N-52. Please refer to Master Response 108.
- N-53. Please refer to Master Response 108.

LAW OFFICES OF BRENT J. NEWELL

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September 12, 2005

Via Hand Delivery

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Tim Haddad Environmental Coordinator Marin County Community Development Agency 3501 Civic Center Dr., Room 308 San Rafael, CA 94903

Re: Comments on Final Environmental Impact Report and Responses to Comments; Redwood Landfill Solid Waste Facilities Permit Revision; SCH No. 1991033042

Dear Mr. Haddad:

These comments are submitted on behalf of No Wetland Landfill Expansion ("NWLE"), an unincorporated association of Marin and Sonoma County residents. NWLE objects to the approval of the Solid Waste Facilities Permit and the certification of the Environmental Impact Report for Waste Management, Incorporated's Redwood Landfill. NWLE respectfully requests that the Marin County Environmental Health Services Division ("County"), as the Lead Enforcement Agency and Lead Agency under the California Environmental Quality Act, deny the application for the Solid Waste Facility Permit and deny certification of this woefully inadequate Environmental Impact Report. NWLE, and several of its members, have submitted separate comments in addition to this letter.

NWLE's organizational purpose is to (1) oppose the expansion of the Redwood Landfill and assure the enforcement and appropriate oversight of the landfill's current operations; (2) assure the protection of citizens, wildlife, and the river estuary from the negative health and environmental effects from air, water, odor, and noise pollution arising from operation of the Redwood Landfill; (3) redirect local government's approach to the landfill as a local conservation resource to benefit local residents instead of allowing the landfill to become a regional dump; (4) petition our local government decision-makers to include solid waste management as a fundamental element of county and local planning, including contingency planning, closure and abatement planning, and studying and considering alternative technologies and site locations; and (5) preserve and protect the Petaluma River Estuary and Marsh as a public educational and environmental resource because of its natural beauty and its critical role in our local and Bay ecosystems.

The Final Environmental Impact Report ("FEIR") violates the California Environmental Quality Act, Pub. Res. Code §§ 21000, *et seq*. The FEIR (1) fails to analyze the aesthetic impact of

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Mr. Tim Haddad NWLE Comments on the Redwood Landfill FEIR September 12, 2005

landfill expansion on the public uses of San Antonio Creek, the Petaluma River, and the Petaluma Marsh; (2) fails to adequately analyze the impact on air quality and require feasible mitigation measures; (3) fails to analyze the impact of leachate seepage on ground and surface water quality from the unlined landfill bottom; (4) illegally limits the scope of the cumulative air and water quality analysis and fails to consider related projects' cumulative effects; (5) fails to identify the offsite alternative location and illegally limits the consideration of off-site alternatives to Marin County; and (6) fails to consider landfill liner differences in the rejection of the off-site alternative.

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For these reasons, the FEIR violates the fundamental requirements of CEQA and the underlying purpose of an Environmental Impact Report: informed public participation and decision-making.

The California Legislature enacted CEQA to protect the environment of California, Pub. Res. Code § 21000(a), to protect the environmental health of Californians, Pub. Res. Code §§ 21000(b), 21000(d), 21000(g), to prevent the elimination of plant and animal species due to man's activities, Pub. Res. Code § 21001(b), to create and maintain ecological and economic sustainability, Pub. Res. Code § 21001(e), and to "take all action necessary to protect, rehabilitate, and enhance the environmental quality of the State." Pub. Res. Code § 21001(a).

The purpose of an Environmental Impact Report (EIR), to meet the objectives of CEQA, is "to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided," Pub. Res. Code § 21002.1(a). The use of EIRs by each "public agency *shall* mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so." Pub. Res. Code § 21002.1(b) (emphasis added). Moreover, the "purpose of an environmental impact report is to provide public agencies and the public in general with *detailed information about the effect which a proposed project is likely to have on the environment*. Pub. Res. Code § 21061 (emphasis added).

Absent outright denial of the Solid Waste Facility Permit, the County should mandate revision and recirculation of the EIR. A lead agency shall recirculate an EIR when significant new information, including additional data, is added to the EIR in a way that deprives the public of a meaningful opportunity to comment upon a project's substantial adverse environmental effects. CEQA Guidelines § 15088.5. CEQA requires recirculation when the addition of new information to an EIR changes the EIR in such "a way that deprives the public of a meaningful opportunity to comment adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect." *Laurel Heights Improvement Association v. Regents of the University of California* (1993) 6 Cal.4th 1112, 1129-1130 ("*Laurel Heights II*"). An EIR which does not address potentially substantial effects should be recirculated. *See Sierra Club v. Gilrov*

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Mr. Tim Haddad NWLE Comments on the Redwood Landfill FEIR September 12, 2005

City Council (1990) 222 Cal.App.3d 30. Given the gross omissions of data and analysis, this FEIR should be revised and recirculated.

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I. THE EIR FAILS TO ANALYZE THE AESTHETIC IMPACT ON USES OF THE PETALUMA RIVER, SAN ANTONIO CREEK, AND THE PETALUMA MARSH

The FEIR fails to analyze the aesthetic impact on public uses of the Petaluma Marsh and the Petaluma River and its tributaries, including San Antonio Creek. San Antonio Creek and the Petaluma River are navigable surface waters with recreational beneficial uses identified in the Basin Plan as adopted by the Regional Water Quality Control Board, San Francisco Region.¹ The Basin Plan identifies the beneficial uses of these surface waters to include cold freshwater habitat, marine habitat, fish migration, navigation, preservation of rare and endangered species, water contact recreation (e.g. swimming), non-water contact recreation (e.g. boating, aesthetic recreation), fish spawning, warm freshwater habitat, and wildlife habitat.²

The Basin Plan identifies the beneficial uses of Petaluma Marsh as estuarine habitat, fish migration, fishing, preservation of rare and endangered species, water contact recreation, non-water contact recreation, fish spawning, salt water habitat, and wildlife habitat.³

Despite the irrefutable public use of the Petaluma River, San Antonio Creek, and the Petaluma Marsh, the FEIR ignores the aesthetic impact of the Redwood Landfill expansion on those uses. San Antonio Creek and the Petaluma Marsh are directly adjacent to the Redwood Landfill, and closer to the Redwood Landfill than any of the other vantage points in the FEIR.⁴ The Petaluma River parallels the length of the dump profile and comes within 3/4 of a mile, closer than vantage points 3 and 4.

¹ See San Francisco Bay Basin Plan, Chapter 2: Beneficial Uses, available at <u>http://www.waterboards.ca.gov/sanfranciscobay/basinplan.htm</u>, attached as Appendix A ("Basin Plan"); Basin Plan Table 2-6, Basin 6 – San Pablo Basin (identifying existing and potential beneficial uses of the Petaluma River and San Antonio Creek), attached as Appendix B.

 $^{2}Id.$

³See Basin Plan; Table 2-10, Beneficial Uses of Wetland Areas, attached as Appendix C; Basin Plan Figure 2-11, General Locations of Wetland Areas, attached as Appendix D.

⁴See FEIR, Figure 3.1.1.

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The FEIR states that "except for views from the nearby highway, public areas with relatively unobstructed views of the landfill are located at considerable distances from the site."⁵ The FEIR wholly ignores the aesthetic impact on the most important public areas that lie directly adjacent to the Redwood Landfill: the Petaluma River, San Antonio Creek, and the Petaluma Marsh. This failure precludes informed public participation by those individuals and groups use these areas and who express concern about Redwood Landfill's aesthetic impact. Likewise, the FEIR precludes informed decision-making because the aesthetic impact on public uses of these important ecosystems has been swept under the rug.

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The aesthetic impact of the landfill expansion on a *public area* held in the public trust, absolutely must be considered, analyzed and subject to the duty CEQA imposes on the County to mitigate or impose project alternatives to reduce significant environmental effects. Absent that analysis, the approval and certification of the EIR will violate CEQA.

II. THE EIR FAILS TO ADEQUATELY ANALYZE THE IMPACT ON AIR QUALITY AND REQUIRE FEASIBLE MITIGATION

The FEIR found Air Quality impacts to be significant and unavoidable based on equipment and truck emissions (impact 3.2-2), fugitive dust emissions from landfill operations (impact 3.2-4), fugitive landfill gas and emissions from landfill gas combustion or "flaring" (impact 3.2.5), and combined emissions of Reactive Organic Gas ("ROG"), oxides of nitrogen ("NOx"), and PM-10 emissions (impact 3.2.11).

The FEIR inadequately analyzes the impacts on air quality. An EIR's "purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, the EIR 'protects not only the environment but also informed selfgovernment." *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 392 (*"Laurel Heights"*) (internal citations omitted). *"A legally adequate EIR must* contain sufficient detail to help ensure the integrity of the process of decision making by precluding stubborn problems or serious criticism from being swept under the rug." *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 733 (*"Kings County Farm Bureau"*).

The FEIR fails to provide a setting that identifies applicable ambient air quality standards and health effects, fails to identify and quantify several air pollutants emitted by the project, and fails to correlate the project's significant air pollution with public health effects. These failures violate CEQA.

⁵FEIR at 3.1-8.

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A. The FEIR Inadequately Discusses the Air Quality Setting.

1. The FEIR fails to provide a discussion of currently applicable Federal and State Ambient Air Quality Standards.

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The FEIR fails to describe currently applicable Federal and State ambient air quality standards and fails to set forth the current attainment status with respect to those standards. The FEIR declines to include a discussion of the new federal 8-hour and PM2.5 National Ambient Air Quality Standards ("NAAQS") because "sufficient air quality monitoring data are not available to determine attainment status."⁶

EPA promulgated the attainment designations for the 8-hour ozone NAAQS seventeen months ago, designating the San Francisco Bay Area Air Basin as marginal nonattainment for the new, health-based federal standard. 69 Fed. Reg. 23858, 23887-23888 (April 20, 2004); 40 C.F.R. § 81.305 (Table labeled "California – Ozone (8-Hour Standard)"). Air quality monitoring data for this standard from 2002, 2003, and 2004 is available from the San Rafael, Vallejo, and Santa Rosa monitoring stations on the California Air Resources Board website.⁷

EPA promulgated the attainment designations for the PM2.5 NAAQS eight months ago, designating the San Francisco Bay Area Air Basin as attainment with the new, federal PM2.5 NAAQS. 70 Fed. Reg. 944, 958-959 (January 5, 2005); 40 C.F.R. § 81.305 (Table labeled "California – PM2.5"). Air quality monitoring data for this standard from 2002, 2003, and 2004 is available from the San Rafael and Vallejo monitoring stations on the California Air Resources Board website.⁸

On February 27, 2001 the U.S. Supreme Court upheld the U.S. Environmental Protection Agency's authority to promulgate the 8-hour and PM2.5 NAAQS. *See Whitman v. American Trucking Associations*, 531 U.S.457 (2001). The Supreme Court upheld the validity of these standards prior to the Notice of Preparation. EPA promulgated the attainment status of these two standards prior to the revision of the Draft EIR and the publication of the FEIR.

⁶FEIR at 3.2-4.

⁷See Top 4 Eight-Hour Ozone Averages for San Francisco Bay Area Air Basin, San Rafael, Vallejo – Tuolumne Street, and Santa Rosa – 5th Street, attached as Appendix E.

⁸See Top 4 PM2.5 Measurements for Vallejo – Tuolumne Street and Santa Rosa – 5th Street, attached as Appendix F.

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One commentor provided a comment on the issue of the new federal PM-2.5 standard and the Responses to Comments failed to provide a good faith response. Instead of updating the setting and analysis of air quality impacts to reflect the attainment status of the PM-2.5 standard, the Responses to Comments updated Table 3.2-1 to reflect the 2002 adoption of the *State* PM2.5 annual average standard and failed to respond to the comment with respect to attainment status of the federal standard.⁹

The FEIR ignores the fact that EPA designated the San Francisco Bay Area Air Basin as nonattainment for the federal 8-hour ozone NAAQS and that the Air Resources Board designated the San Francisco Bay Area Air Basin as nonattainment for the state PM2.5 annual average standard in June 2002.¹⁰

Besides failing to provide the public and decision-makers with a description of the air quality setting as required by CEQA, the FEIR compounds this error by failing to provide any subsequent analysis of the effect of the Redwood Landfill expansion on public health, efforts to attain the federal 8-hour ozone NAAQS and the state PM2.5 air quality standard, or analyze the effect of maintaining attainment with the federal PM2.5 NAAQS. *See* Section II.K, *infra*.

The FEIR violates CEQA because its failure to provide a description of the air quality setting is a failure to proceed in a manner required by law.

2. The FEIR fails to provide a discussion of the New Source Review regulatory requirement.

The Regulatory setting fails to inform the public and decision makers that the expansion of the Redwood Landfill requires compliance with the "New Source Review" preconstruction permit program for major stationary sources under the Clean Air Act. Currently pending before the Bay Area Air Quality Management District ("District") is Waste Management, Incorporated's

¹⁰See BAAQMD – Ambient Air Quality Standards and Bay Area Attainment Status, attached as Appendix G.

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⁹The lead agency must evaluate and respond to all the comments it received during the public review period. *See* Pub. Res. Code § 21091(d)(2)(A). "There must be good faith, reasoned analysis in response. Conclusory statements unsupported by factual information will not suffice." CEQA Guidelines § 15088(b). The lead agency must also respond to comments in a level of detail commensurate to that of the comment. *See* Discussion following CEQA Guideline § 15088.

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application for an "Authority to Construct" permit for an increase in the permitted incineration of landfill gas.¹¹ The FEIR's failure to disclose the necessity for New Source Review under the Clean Air Act and the basis for triggering that requirement precludes the public and decision-makers from participating effectively in this process at the District as well as being informed that another permit and public process has begun with respect to the expansion of the Redwood Landfill. The failure to adequately describe the setting of the Redwood Landfill expansion with respect to applicable legal requirements violates CEQA.

3. The FEIR fails to meaningfully describe the health effects of ozone, particulate matter, and hydrogen sulfide.

The EIR identifies emissions of particulate matter (PM-10), ozone-forming Reactive Organic Gas ("ROG"),¹² and ozone-forming oxides of nitrogen ("NOx") as significant and unavoidable consequences. Despite this conclusion of significance, the FEIR devotes *one sentence* to the health effects of ozone and PM-10 pollution, respectively. The public and decision-makers are poorly served by an EIR that identifies an impact as significant and unavoidable, yet provides a cursory description of the general health effects of the pollutants. A complete and detailed description of health effects is especially important because EIR certification and project approval can only occur if the County adopts a statement of overriding considerations that trumps these impacts. The public and decision-makers' ability to participate in, and be informed of, the competing values at stake by adopting the Statement of Overriding Considerations is compromised when the EIR devotes two, meager sentences to the health effects associated with ozone and PM-10 pollution.

A document prepared jointly by the California Air Resources Board ("CARB") and the American Lung Association describes ozone as

a powerful oxidant that can damage the respiratory tract, causing inflammation and irritation, and induces symptoms such as coughing, chest tightness, shortness

¹¹The permit application is *not* for the three proposed landfill gas fired engines described in the FEIR. *See* Authority to Construct Permit Application #11371; Letter from Patrick Sullivan, Vice President, SCS Engineers, to Carol Allen, dated November 29, 2004 at 1, attached as Appendix H. Waste Management has not sought an Authority to Construct permit for the three gas fired engines.

¹²The terms Reactive Organic Gas and Volatile Organic Compounds ("VOC") refer to ozone precursors and are often used interchangeably by regulators and the FEIR.

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of breath, and worsening of asthma symptoms. Ozone in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. The greatest risk is to those who are more active outdoors during smoggy periods, such as children, athletes, and outdoor workers. Exposure to levels of ozone above the current ambient air quality standard leads to lung inflammation and lung tissue damage, and a reduction in the amount of air inhaled into the lungs. Recent evidence has, for the first time, linked the onset of asthma to exposure of elevated ozone levels in exercising children (McConnell 2002). These levels of ozone also reduce crop and timber yields, damage native plants, and damage materials such as rubber, paints, fabric, and plastics.¹³

The same document describes the health effects of particulate matter pollution in no uncertain terms.

Premature deaths linked to particulate matter or "PM" are now at levels comparable to deaths from traffic accidents and second-hand smoke (CARB 2002a). One of the most dangerous pollutants, fine particulate matter (e.g., from diesel exhaust and fireplace soot) not only bypasses the body's defense mechanisms and becomes embedded in the deepest recesses of the lung, but also can disrupt cellular processes. Population-based studies in hundreds of cities in the U.S. and around the world have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks. Groundbreaking long-term studies of children's health conducted in California have demonstrated that particle pollution may significantly reduce lung function growth in children (Peters et al. 1999, Avol et al. 2001, Gauderman et al. 2002).¹⁴

One public interest organization, the Environmental Working Group, published California data produced by the Air Resources Board ("ARB") and the Office of Environmental Health Hazard Assessment ("OEHHA"). Environmental Working Group's publication of the data shows that in Marin County, 55 people die from long-term exposure to 2001 levels of PM2.5 while 16 people die from short-term exposure to 2001 levels of PM-10. According to ARB and OEHHA, PM-10 levels

¹³CARB and American Lung Association of California, RECENT RESEARCH FINDINGS: HEALTH EFFECTS OF PARTICULATE MATTER AND OZONE AIR POLLUTION, January 2004 at 2, attached as Appendix I.

 $^{14}Id.$

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cause 2,217 asthma attacks and 23,452 lost work days in Marin County.¹⁵

The FEIR's *only* discussion of health effects from ozone and particulate matter pollution preclude informed public participation and decision-making. The FEIR states that "Ozone causes eye and respiratory irritation, reduces resistance to lung infection, and may aggravate pulmonary conditions in persons with lung disease."¹⁶ The FEIR describes PM-10 and PM2.5 as "particulate matter, which can be inhaled deeply into the lungs and cause adverse health effects" and "very small particles of certain substances (e.g. sulfates and nitrates) can cause lung damage directly, or can contain absorbed gases (e.g. chlorides or ammonium) that may be injurious to health."¹⁷

The health effects of ozone and PM2. 5 pollution are well documented in the scientific literature.¹⁸ The FEIR violates CEQA because the description of the health effects of the significant and unavoidable impacts identified by the FEIR itself are fundamentally inadequate and conclusory in nature and thus violate CEQA by omitting key data from the public and decision-makers.

4. The FEIR neither discusses the attainment status of hydrogen sulfide nor its health effects.

The FEIR omits entirely *any* discussion of the attainment status *or* health effects of hydrogen sulfide, even though the landfill gas flare and fugitive landfill gas account for substantial hydrogen sulfide emissions. California has a state ambient air quality standard for hydrogen sulfide

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¹⁵Environmental Working Group, FINE PARTICLE CIVICS: HOW CLEANER AIR IN CALIFORNIA WILL SAVE LIVES & SAVE MONEY at Table 5, attached as Appendix J.

¹⁶FEIR at 3.2-13.

¹⁷FEIR at 3.2-14.

¹⁸American Lung Association, STATE OF THE AIR 2005: PROTECT THE AIR YOU BREATHE, Attached at Appendix K; American Lung Association, ANNOTATED BIBLIOGRAPHY OF RECENT STUDIES OF THE HEALTH EFFECTS OF OZONE AIR POLLUTION 1997-2001 (2001), attached as Appendix L; American Lung Association, SELECTED KEY STUDIES ON PARTICULATE MATTER AND HEALTH 1997-2001 (2001), attached at Appendix M; American Lung Association, ANNOTATED BIBLIOGRAPHY OF RECENT STUDIES ON THE HEALTH EFFECTS OF AIR POLLUTION (2002), attached as Appendix N. Mr. Tim Haddad NWLE Comments on the Redwood Landfill FEIR September 12, 2005

(.03 ppm averaged over a 1-hour period), an extremely potent Toxic Air Contaminant.¹⁹ In addition to the state ambient air quality standard, Rule 2 of Regulation 9 of the District specifies that ambient ground level hydrogen sulfide concentrations may not exceed 60 ppb averaged over 3 consecutive minutes.

B. Inadequate Analysis of Impact 3.2.5: the FEIR Fails to Analyze Emissions from Landfill Gas Combustion (Flaring).

The FEIR fails to conduct *any* analysis of the emissions from landfill gas combustion at the flare device. The FEIR provides no project baseline for NOx, sulfur oxides ("SOx"), PM-10 and hydrogen sulfide emissions from the flaring of landfill gas and provides no analysis of the increase in these emissions.

Landfill gas collected by the Landfill Gas Collection ("LGC") system will increase from 4,744 cubic feet per minute ("cfm") to 5,662.²⁰ As part of the expansion plans, Redwood Landfill applied for an Authority to Construct ("ATC") Permit with the District on November 29, 2004, seeking to install a second flare with a permitted capacity of 3,000 cfm.²¹ This new flare will be located in the "oxbow" area on the east side of the facility.²² Under the ATC permit application, Redwood Landfill proposed to reduce the permitted capacity of the existing flare to 1,200 cfm.²³ However, in "the next few years, Redwood will make arrangements to replace the existing flare."²⁴

¹⁹See California Air Resources Board, Ambient Air Quality Standards (5/6/05), attached as Appendix O; James Collins, Ph.D. and David Lewis, Ph.D. Air Toxicology and Epidemiology Section, California Office of Environmental Health Hazard Assessment, Hydrogen Sulfide: EVALUATION OF CURRENT CALIFORNIA AMBIENT AIR QUALITY STANDARDS WITH RESPECT TO PROTECTION OF CHILDREN (2000), attached as Appendix P; California Air Resources Board, LISTS OF TOXIC AIR CONTAMINANTS, August 31, 2005, attached as Appendix Q.

²⁰FEIR at 3.2-35, 36.

²¹See Letter from Patrick Sullivan, Vice President, SCS Engineers, to Carol Allen, dated November 29, 2004 at 1, attached as Appendix H.

 22 Id. at Attachment 1 (final page of Attachment 1).

 23 *Id*.

 24 *Id.* at 2.

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The two flares operating at the full *proposed permitted* capacity will, according to the ATC permit application, emit 33.1 tons/year of NOx, 113 tons/year of CO, 7.7 tons/year of ROG, 9.4 tons/year of PM-10, 78.1 tons/year of SOx, and 0.829 tons/year of hydrogen sulfide (H2S). Emissions from the combustion of the 1,462 cfm of landfill gas projected by the FEIR that exceeds the permitted capacity in the ATC permit application is not provided, but simple algebra yields an estimate.

The maximum permitted emissions identified by Waste Management, Incorporated's consultant results from the combustion of 74.2% of the projected landfill gas collection rate. Using the amounts of NOx, CO, ROG, PM-10, SOx, and H2S Waste Management provided in the ATC application, divided by .742, results in the following maximum emission rates from the flaring of 5,662 cfm of landfill gas:

Pollutant	Tons/year		
NOx	44.6		
СО	152.3		
ROG	10.3		
PM-10	12.7		
SOx	105.3		
H2S	1.1		

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Even though Waste Management, Incorporated and its consultant SCS Engineers submitted the application for the flares to the District in late 2004, both the FEIR and the Responses to Comments fail to disclose *any* estimate for, or analysis of, these emissions. The FEIR states that

[Waste Management] has not provided sufficient background information to establish baseline or predicted emissions of other criteria air pollutants associated with combustion of landfill gas. Incomplete information provided by the applicant (Geosyntec Consultants, 1998, Table 6-3) suggests that the project may result in substantial increases in emissions of CO, NOx, SOx, and PM10. Increases in any of the emission of any of these pollutants above the thresholds established by the BAAQMD would be a significant impact. There exists, therefore, the potential for a

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significant impact related to increase in emission of CO, NOx, SOx, and PM-10 from operation fo the landfill gas combustion system.²⁵

Waste Management's comments on the DEIR included a letter written by SCS Engineers, the same consultant who filed the ATC permit application, which recommended that "a detailed calculation of LFG combustion emissions be conducted . . . using appropriate mitigation measures." NWLE remains mystified that Waste Management did not provide the EIR consultant with data on which to base an analysis of emission from landfill gas combustion, that SCS Engineers provided emissions estimates to the District in the fall of 2004, and that SCS Engineers in a 2003 comment letter observed that the DEIR lacked data or mitigation for emissions from landfill gas combustion.

In order to complete the required analysis, the lead agency is to "attempt in good faith to fulfill its obligation under CEQA to provide sufficient meaningful information regarding the types of activity and environmental effects that are reasonably foreseeable." *Stanislaus Natural Heritage Project v. County of Stanislaus* (1996) 48 Cal.App.4th 182, 206. In *Stanislaus*, the disputed EIR stated that there would be a "significant unavoidable impact," but did not include the facts describing that impact, citing the lack of studies and lack of determination of the exact source of water for a housing development. The court stated that this kind of conclusory statement with no facts to assist in the decision-making process defeated the purpose of CEQA. *Id.* at 195.

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The FEIR violates CEQA here because the FEIR fails to discover, disclose, and analyze the impact from landfill gas combustion emissions. FEIR Table 3.2-4 (baseline emissions) only discloses ROG emissions from landfill gas combustion. FEIR Table 3.2-6 does not bother to quantify the emissions of CO, Nox, PM-10, and SOx. Simply calling the impact "significant" does not discharge the duty to *analyze* that impact. The failure to do so precludes the public and decision-makers from meaningfully considering the project's effects on air quality, rendering the EIR inadequate.

C. The FEIR Underestimates ROG Emissions from Composting/CO-Composting.

The FEIR revised ROG emissions from the DEIR to reflect green/wood waste ROG emissions based on a California Integrated Waste Management Board emission factor. FEIR at 6.3-66. Using the South Coast Air Quality Management District's 2002 emission factor for composting green waste and composting biosolids (co-composting), the increase in throughput of composting materials from the FEIR's claimed baseline would emit the following amounts of VOC and

²⁵FEIR at 3.2-37.

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Ammonia (NH3):²⁶

Table 2

Туре	Throughput Increase	Emission Factor	VOC Emissions (tons/year)	NH3 Emissions (tons/year)
Composting	128,920	3.84 lbs VOC/ton 0.85 lbs NH3/ton	247.5	54.8
Co-Composting	(7,908)	1.78 lbs VOC/ton 2.93 lbs NH3/ton	(7)	(11.6)

Total Emission from Composting/Co-Composting would be 240.5 tons/year of VOC (ROG) and 43.2 tons/year of ammonia. The FEIR estimates ROG emissions from Composting/Co-Composting to be 105 pounds per day or 19.1 tons per year,²⁷ or 7.9% of the amount based on the 2002 South Coast Air Quality Management District's methods. The FEIR thus minimizes the amount of ROG emissions from the facility. The County should consult with both the District and the South Coast AQMD for a reliable method to estimate ROG and ammonia emissions from composting/co-composting.

D. The FEIR fails to require feasible mitigation for ammonia and ROG emissions from Composting/Co-Composting.

On January 10, 2003, the South Coast Air Quality Management District adopted Rule 1133.2: Emission Reductions from Co-Composting Operations.²⁸ The rule requires significant ROG and ammonia controls (70% reductions from existing operations) yet exempts co-composting operations below 1,000 tons of throughput per year or co-composting operations with less than 35,000 tons of throughput per year containing less than 20% biosolids by volume. The County

²⁷FEIR at 6.3-67.

²⁸Rule 1133, 1133.1, and 1133.2 are attached as Appendices S, T, and U, respectively.

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²⁶The emissions are calculated using the increase in throughput described by Table D-6 in the DEIR and the emission factors used by the South Coast Air Quality Management District. *See* Technology Assessment for Proposed Rule 1133: Emission Reductions from Composting and Related Operations, March 22, 2002 at 2-8, attached as Appendix R.

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should adopt the control requirements in Rule 1133.2 for the co-composting component of the project as a feasible mitigation measure because the throughput of co-compost is 24,663 tons per year that contains 50% biosolids by volume, a co-composting operation that would trigger Rule 1133.2.²⁹ The failure to adopt this feasible mitigation measure, available in the public record prior to the release of the Draft EIR, violates CEQA.³⁰

Aerated Static Piles (ASP) and biofilters are feasible mitigation for the ROG impact from co-composting because the technology has been achieved in practice.³¹ Because the project's total ROG emissions are significant impacts,³² the County has the duty to adopt feasible mitigation measures to reduce the impact of the project's ROG emissions. Pub. Res. Code § 21002.

The "mitigation measure" proposed to address this impact is a sham. Mitigation Measure 3.2.6c only requires a 25% reduction of ROG emissions from composting/co-composting operations. The mitigation measure does not address ammonia emissions, nor does it equal the control efficiency required by Rule 1133.2, which mandates a 70% reduction of ROG *and* ammonia from existing co-composting operations. Feasible mitigation exists and is used in practice at other composting facilities. If the County fails to require mitigation of co-composting ROG and ammonia emissions equal to or greater than 70%, then approval of the project and certification of the FEIR without this feasible mitigation will violate CEQA. Pub. Res. Code § 21002; CEQA Guidelines § 15091(a)(3).

²⁹Compare Rule 1133.2(j)(1) with DEIR Table D-6 (explaining that DEIR assumes that the volume of biosolids to greenwaste in the co-composting operation is at a 1:1 ratio or, in other words, biosolids account for 50% of the throughput by volume).

³⁰In fact, the FEIR shows that the EIR consultant apparently reviewed Rule 1133. See FEIR at 3.2-39 n.13.

³¹In addition to the Adoption of Rule 1133.2 requirements as evidence of feasibility, NWLE attaches lists of ASP and biofilter co-composting facilities in operation. *See* List of Operational ASP Co-Composting Facilities in the U.S., Appendix A to the Technology Assessment for Proposed Rule 1133, attached as Appendix V; Biofilters in Operation at Composting Facilities in the United States, Appendix C to the Technology Assessment for Proposed Rule 1133, attached as Appendix W.

³²FEIR at 3.2-49.

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E. The FEIR Fails to Estimate Hydrogen Sulfide Emissions from Fugitive Releases of Landfill Gas.

The FEIR fails to estimate hydrogen sulfide emissions from fugitive landfill gas releases. Fugitive landfill gas will increase from 1,551 cfm to 1,887 cfm as a result of the expansion.³³ The *current* hydrogen sulfide emission rate from the facility's fugitive landfill gas emissions, as calculated by the District, totals 4,186 pounds of hydrogen sulfide per year, or 2.1 tons/year.³⁴ The FEIR fails to disclose emissions data on hydrogen sulfide, a Toxic Air Contaminant, from fugitive landfill gas. The failure to quantify hydrogen sulfide emissions as part of the TAC analysis renders the FEIR inadequate as an informational document, precluding the public and decision-makers from critically analyzing and questioning the project's air quality effects.

F. The FEIR Fails to Analyze Ammonia, NOx, ROG, VOC, and SOx Emissions as PM-10 and PM-2.5 Precursors.

Ammonia, NOx, and SOx are particulate matter precursor emissions. So-called "secondary" particulate matter is "formed in the atmosphere from reactions involving precursor pollutants such as oxides of nitrogen, sulfur oxides, volatile organic compounds (NOx, SOx, and VOC), and ammonia. Secondary PM and combustion soot tend to be fine particles (PM-2.5)."³⁵ The FEIR states that "ammonia is a precursor of PM-10, particularly aerosol ammonium nitrate and ammonium sulfides."³⁶

As set forth in these comments, the Redwood Landfill expansion will emit significant amounts of NOx, ROG, SOx, VOC, and ammonia, all of which act as precursors to fine particulate matter (PM2.5). The FEIR has made no effort to analyze or estimate the quantity and health effect of secondary particulate matter formed as a result of the project's emissions.

³³FEIR at 3.2-35, 36.

³⁴See Bay Area Air Quality Management District, Permit Evaluation and Statement of Basis for Major Facility Review Permit Significant Revision, Redwood Landfill, Inc. Plant # 1179, Applications #10873 and #10874, attached as Appendix X.

³⁵Bay Area Air Quality Management District, Particulate Matter Fact Sheet, attached as Appendix Y.

³⁶FEIR at 3.2-18

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G. The FEIR Fails to Estimate or Analyze VOC Emissions from Petroleum Contaminated Soil.

The FEIR admits that Redwood Landfill will accept an average of 640 tons per day of petroleum contaminated waste for use as alternative daily cover, an increase from the currently permitted amount of 20 tons per day.³⁷ The FEIR further admits that petroleum contaminated waste emits VOC, yet does not estimate those emissions either before or after implementation of mitigation measure 3.2.14. Without *any* analysis, the FEIR concludes that limiting petroleum contaminated soil's exposure to the atmosphere to no more than 24 hours somehow reduces the undisclosed VOC emissions by an undisclosed amount to the point that emissions are below 80 pounds per day. The failure to provide an analysis of VOC emissions from the project's additional 620 tons/day of petroleum contaminated soil used as alternative daily cover, or the effectiveness of the proposed mitigation measure, precludes informed public participation and informed decision-making. The public and decision-makers have no basis on which to evaluate and provide comment on the effect of this proposed activity or the effectiveness of the proposed mitigation measure.

H. The FEIR violates EPA and CARB Modeling Protocols when Analyzing Impacts of Toxic Air Contaminants.

The FEIR uses the SCREEN3 model to analyze some of the project's TAC emissions (hydrogen sulfide not analyzed).³⁸ The FEIR uses a single receptor site to evaluate the project's TAC emissions located 1.5 miles from the facility.³⁹ The FEIR's analysis is inconsistent with U.S. Environmental Protection Agency ("EPA") and CARB modeling guidance.

Receptor sites and the number of receptors should be selected to estimate the *highest* concentrations and violations of ambient air quality standards.⁴⁰ Moreover, in various interpretive memoranda, EPA consistently interprets ambient air and receptor location so

that for modeling purposes the air everywhere outside of contiguous plant property to which public access is precluded by a fence or other effective physical barrier should

³⁷FEIR at 3.2-53.

³⁸FEIR at 3.2-44.

³⁹FEIR at 3.2-43.

⁴⁰40 C.F.R. Part 51 Appendix W § 8.2.2, attached as Appendix Z.

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be considered in locating receptors. Specifically, for stationary source modeling, receptors should be placed anywhere outside inaccessible plant property. For example, receptors should be included over bodies of water, over unfenced property, on buildings, over roadways, and over property owned by other sources.⁴¹

For "Guidance Documents," CARB directs modelers to U.S. EPA's Guideline on Air Quality Models, 40 C.F.R. Part 51, Appendix W, for guidance.⁴²

Based on EPA and CARB guidance, receptors should be located at the points of highest concentration where the public has access, including San Antonio Creek, the Petaluma River, the Petaluma Marsh, neighboring private property, and publicly accessible areas up to and adjacent to areas of the facility from which the public is excluded.

The FEIR understates and distorts the nature and effect of the TAC pollution analyzed by locating the receptor 1.5 miles away, a location that allows concentrations of TACs and other pollutants to decrease over distance.⁴³ This distortion allows the FEIR to understate the effect on the public, misleading the public and decision-makers. Thus, the FEIR deprives them of the opportunity to meaningfully participate and consider the project's effects.

I. The FEIR fails to Conduct any Receptor Analysis of Criteria Air Pollutant Emissions and Hydrogen Sulfide Emissions.

The FEIR wholly fails to provide an analysis of criteria air pollutant and hydrogen sulfide emissions on nearby receptors. This analysis should follow the guidance described in Section II.H, *supra*, to provide the highest concentration of ozone, PM-10, PM2.5, and hydrogen sulfide in the ambient air at locations where the public has access. Absent this data, the public and decisionmakers are unable to determine whether the landfill expansion will directly result in the violation of an ambient air quality standard or otherwise affect the public health.

⁴¹Memorandum from Regional Meteorologists, Regions I-X, to Joseph Tikvart, Chief, Source Receptor Analysis Branch, May 16, 1985, attached as Appendix AA; *see also* Memorandum from G.T. Helms, Chief, Control Programs Operations Branch to Steve Rothblatt, Chief, Air Branch, Region V, April 30, 1987 (analyzing various scenarios for "ambient air" determinations for source receptor locations), attached as Appendix BB.

⁴²Air Resources Board, Software – Utilities and Modeling, at 5-6, attached as Appendix CC.

⁴³FEIR at 3.2-43; DEIR at Appendix E.

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J. The FEIR Fails to Conduct an Analysis of Diesel Emissions from Trucks Driving to and from the Landfill or Cumulative Diesel Emissions from Related Projects.

The FEIR only analyzes diesel TAC emissions from trucks entering and leaving the site and diesel equipment working on the site.⁴⁴ A TAC analysis has neither been performed on diesel emissions from the project's diesel truck traffic using the Highway 101/Highway 37 corridors nor has the EIR performed a cumulative TAC analysis of related projects' diesel TAC emissions. The public health of residents living in close proximity to the Highway 101/Highway 37 corridors has not been analyzed at all by the FEIR, depriving those residents of information to allow them to meaningfully participate in the EIR process and depriving decision-makers from considering the nature and effect of Redwood Landfill's transition to a "regional" landfill. This omission of relevant data violates CEQA.

K. Inadequate analysis of impact 3.2.11: The FEIR Fails to Analyze Total Project ROG, NOx, PM-10, Hydrogen Sulfide, and Particulate Matter Precursor Emissions on Regional Air Quality, Public Health, and Attainment of State and Federal Ambient Air Quality Standards.

The only basis for finding the project's combined emissions of ROG, NOx, and PM-10 significant was that the emissions exceeded District significance thresholds. The FEIR provides no analysis of ROG, NOx, and PM-10 emissions on local air quality, regional air quality, or public health. Even worse, the FEIR does not even acknowledge, analyze or discuss the effects from hydrogen sulfide emissions or particulate matter precursor emissions on local air quality, regional air quality, or public health.

"The significant effects should be discussed with emphasis in proportion to their severity and probability of occurrence." CEQA Guidelines § 15143. The EIR must "include detail sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project." *Laurel Heights Improvement Association* v. Regents of the University of California (1988) 47 Cal.3d 376, 404-405.

Merely disclosing the annual tonnage of emissions for several, and certainly not all, of the project's criteria and toxic emissions and comparing that to the District's threshold deprives the public and decision-makers from considering the project's effect on air quality and public health. Merely stating that a project's affect is significant does not substitute for the lead agency's

⁴⁴FEIR at 3.2-44, 45.

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obligation to *analyze* the impact. The failure to correlate the project's significant and unavoidable adverse impacts with the health consequences of those impacts violates CEQA. *See Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1219-1220.

Given the totality of the project's air pollution, combined with the FEIR's failure to disclose public health effects of that pollution beyond two, cursory, and scientifically incomplete sentences, the FEIR fails miserably in its purpose as an informational document. It provides the public and decision-makers with *no* analysis of the project's air pollution effect on public health and attainment of ambient air quality standards. The FEIR thus violates CEQA.

III. THE EIR FAILS TO ADEQUATELY ANALYZE THE IMPACT ON GROUND AND SURFACE WATER QUALITY FROM LEACHATE SEEPAGE

Impact 3.4.7 purports to analyze the effects of leachate on ground and surface water quality. The FEIR concludes that the perimeter Leachate Collection and Recovery System (LCRS), monitoring, and pumping leachate from the interior of the landfill will reduce the leachate impact to water quality to a less than significant level. 3.4-30 to 3.4-34.

The bottom of the landfill is *below* the groundwater elevation. "The groundwater present within the Bay Mud is in hydraulic communication with the landfill leachate."⁴⁵

Master Response 1: Five Foot Separation states that the Bay Mud has a "relatively low permeability" of 1×10^{-6} cm/s. The Bay Mud ranges from 7 to 45 feet thick beneath the unlined landfill and has "intermittent lenses of sand and silty sand channel deposits."⁴⁶ "These discontinuous sand and silty zones have much higher hydraulic conductivity that the Bay Mud."⁴⁷ All "significant" channel deposits "are believed to have been identified."⁴⁸ The FEIR admits that

[s]and lenses present beneath the landfill and extending off site beneath the perimeter drainage system could transport leachate chemicals and impact off-site groundwater and surface water. Additionally, potential adverse effects to downstream water

⁴⁵FEIR at 3.4-28.

⁴⁶FEIR at 6.3-5.

⁴⁷*Id*.

 48 *Id*.

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quality could occur through groundwater seepage into surface waterways such as the surrounding sloughs, creeks, and other waterways.⁴⁹

Despite the permeability of the Bay Mud at 1×10^{-6} cm/s and the even greater permeability of zones of sand and silt, the FEIR provides no volume of leachate seepage into groundwater and/or surface water. The public and decision-makers cannot possibly be expected to meaningfully consider the rate of discharge of leachate beneath the landfill when that rate of seepage is described by an engineering equation. The variable depth of the Bay Mud underlying the landfill, the zones of silt and sand with "higher hydraulic conductivity," and the fact that the bottom of the landfill actually rests in groundwater compound the public and decision-makers' inability to understand and meaningfully comment on the effects of leachate seepage on water quality.

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Without analyzing the discharge of leachate from the bottom of the landfill, the FEIR nevertheless concludes that pumping leachate, having a perimeter LCRS and monitoring groundwater mitigates seepage to a less than significant impact. Not only has the FEIR failed to disclose or analyze the nature of seepage from the landfill, but the FEIR manages to conclude that an unknown impact has been mitigated without disclosing the basis for that conclusion. Presenting the issue of seepage in an engineers equation and shrouded in mystery falls far short of the County's obligation to make a reasonable and good faith effort to discover, disclose, and analyze the project's environmental effects. The County's failure to do so here deprives the public and decision-makers of information necessary to meaningfully participate in the CEQA process.

IV. THE EIR ILLEGALLY LIMITS THE SCOPE OF CUMULATIVE AIR AND WATER QUALITY IMPACTS AND FAILS TO ANALYZE RELATED PROJECTS' CUMULATIVE EFFECTS

CEQA requires that an EIR discuss cumulative impacts when the project's effects are cumulatively considerable. Cumulatively considerable "means that the incremental effects on an individual project are considerable when viewed in connection with the effects of past projects, effects of other current projects, and the effects of probable future projects." CEQA Guidelines \$ 15064(i)(1), 15065©; Pub. Res. Code \$ 21083(b).

An adequate discussion of cumulative impacts includes (1) a discussion of past, present, or probable future projects producing related cumulative impacts, (2) a summary of the expected environmental effects to be produced by those projects, and (3) a reasonable analysis of the cumulative impacts of the relevant projects. CEQA Guidelines §§ 15130(b)(1), 15130(b)(2),

⁴⁹3.4-30.

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15130(b)(3). Standards of practicality and reasonableness guide the analysis of cumulative impacts. CEQA Guidelines § 15130(b). In performing this analysis, the lead agency must use "reasonable efforts to discover, disclose, and discuss" related projects. Discussion following CEQA Guidelines § 15130.

The EIR's "purposes are manifold, but chief among them is that of providing public agencies and the general public with detailed information about the effects of a proposed project on the environment." San Franciscans for Reasonable Growth v. City and County of San Francisco (1984) 151 Cal.App.3d 61, 72 ("SFRG"); Pub. Res. Code § 21061; CEQA Guidelines § 15003©. With that goal in mind, "it is vitally important that an EIR avoid minimizing the cumulative impacts. Rather, it must reflect a conscientious effort to provide public agencies and the general public with adequate and relevant detailed information about them." SFRG, supra, 151 Cal.App.3d at 79.

The discussion of cumulative impacts in the FEIR entirely fails to adhere to the law because (1) the FEIR limits the scope of the cumulative impacts analysis to Marin County; and (2) fails to consider past, present, and probable future landfills producing related impacts.

First, the FEIR impermissibly limits the scope of the cumulative impacts analysis to Marin County. The proper scope of the air quality cumulative impacts is the San Francisco Bay Area Air Basin⁵⁰ while the proper scope of the cumulative water quality impacts is the San Francisco/San Pablo Bay Estuary. *See Kings County Farm Bureau*, 221 Cal.App.3d at 723-724 (cumulative impact analysis violated CEQA because the scope of the cumulative impact analysis should have included entire San Joaquin Valley Air Basin).

The Fifth District Court of Appeals rejected an EIR in *Kings County Farm Bureau, supra*, when the City of Hanford limited the scope of the cumulative air quality impacts analysis to the Mid-San Joaquin Valley instead of the entire San Joaquin Valley Air Basin. The Court held that the scope of the cumulative impacts analysis, given reasonably available information on the entire air basin, rendered the EIR inadequate. *Id.* The FEIR here presents that same flaw. The lead agency and the public cannot meaningfully evaluate the cumulative impacts when the EIR artificially restricts the universe of related projects. It is unreasonable to consider the cumulative air quality impacts of related projects *only* in Marin County, as air pollution and water pollution are regional

⁵⁰The District's jurisdiction encompasses all of seven counties – Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara and Napa, and portions of two others – southwestern Solano and southern Sonoma. *See* http://www.baaqmd.gov/dst/jurisdiction.htm

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issues.

Second, the FEIR fails to consider other landfills that also emit air pollution in the Air Basin and threaten the water quality of the Bay. The list of related projects in the FEIR lists non-solid waste projects.⁵¹ Even though information on local landfills is available and the FEIR actually provided a list of landfills in the Responses to Comments to show the destination of waste produced in Marin County, the FEIR fails to include such related projects in the cumulative impact analysis.⁵²

The FEIR lists the Potrero Hills Landfill (southern Solano Co.), Keller Canyon Landfill (Contra Costa Co.), Altamont Landfill (Alameda Co.), and Vasco Road Sanitary Landfill (Alameda); all are located in the San Francisco Bay Area Air Basin under the jurisdiction of the District.⁵³ At least one currently operating landfill, Acme Landfill (Contra Costa Co.) is an unlined landfill on Bay Mud that presents the same or similar threat of impact to water quality as the Redwood Landfill.⁵⁴ The list of related projects must also consider closed landfills as "past" projects and any proposed landfills in the air or water basin. CEQA Guidelines § 15130(b)(1).

The failure to consider the cumulative impacts using the proper scope of analysis and considering past, present, and probable future projects producing related impacts violates CEQA.

V. THE ANALYSIS OF THE OFF-SITE ALTERNATIVE VIOLATES CEQA BECAUSE THE FEIR DOES NOT IDENTIFY THE ALTERNATIVE SITE LOCATION AND LIMITS ALTERNATIVE SITES TO MARIN COUNTY

The California Supreme Court has described the alternatives and mitigation sections as "the core" of an EIR. *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564. The discussion should contain facts and analysis, discussed in meaningful detail. *See Laurel Heights*, 47 Cal.3d at 404, 406.

In Laurel Heights, the Supreme Court emphasized that without "meaningful analysis of alternatives in the EIR, neither the courts nor the public can fulfill their proper roles in the CEQA

⁵³*Id*.

⁵⁴FEIR at 6.3-12, 13.

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⁵¹FEIR Table 4-1 at 4-5.

⁵²FEIR Table MR9-2 at 6.3-33.

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process." Laurel Heights, supra, 47 Cal.3d at 404 (emphasis added). In Laurel Heights, the Court held that the UC Regents violated CEQA by certifying an EIR that failed to include facts and analysis justifying the Regents' rejection of specific project alternatives before the Regents circulated the Draft EIR for public review. Id. at 403-406. The Regents argued that since they were fully informed as to the clear infeasibility of the project alternative, the EIR did not have to discuss or analyze reasons for rejecting it as infeasible. The Court reprimanded the Regents for missing "the critical point that the public must be equally informed." Id. at 405 (emphasis original). Underlining the importance of CEQA's emphasis on public participation, Laurel Heights held that the discussion of alternatives and the reasons for rejecting them as infeasible "must be discussed in the EIR in sufficient detail to enable meaningful participation and criticism by the public." Id. (emphasis added).

With respect to alternative sites in particular, at least one court has held an EIR inadequate because the EIR failed to specifically identify alternative sites, discuss their attributes, or indicate why the site would be infeasible. *See San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 735-736 (*"Raptor"*). This FEIR suffers from the same defect: the off-site alternative has not been identified. Without an identified location, the FEIR's analysis and conclusions with respect to impact are nothing more than mere speculation and conjecture.

Moreover, the FEIR inexplicable limits the location of the unidentified alternative site to Marin County with close proximity to the Highway 101 corridor. Because the FEIR acknowledges that the landfill now has sufficient capacity to meet Siting Element Goal 1 for Marin County waste,⁵⁵ the alternatives section neither considers nor offers a basis for finding an out-of-county alternative site infeasible. The EIR must consider a reasonable range of alternatives, and the failure to consider an alternative out-of-county site thus violates CEQA.

VI. THE EIR FAILS TO ANALYZE AND CONSIDER LANDFILL LINER DIFFERENCES IN REJECTING THE OFF-SITE ALTERNATIVE.

As set forth in Section III, *supra*, the FEIR has failed to consider the water quality impacts from the unlined landfill in hydraulic conductivity with groundwater. The FEIR fails to consider the environmental benefit of an alternative location that would mandate compliance with Subtitle D landfill liner requirements as compared to the unlined project as proposed. A project underlain by a landfill-grade liner instead of expanding a dump on permeable Bay Mud that contains zones of even

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⁵⁵The earliest closure date would be 2024 under the current permit, easily satisfying the 15 year Siting Element Goal. *Compare* FEIR 3.6-9 *with* FEIR 6.3-83.

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more permeable sand and silt would have a profound environmental benefit given the difference in groundwater protection. Since the off-site alternative is the only project alternative that would include a liner that meets Subtitle D liner requirements, the FEIR's failure to analyze and consider the benefit of this important regulatory requirement violates CEQA.

VII. CONCLUSION

No Wetland Landfill Expansion appreciates the County's efforts and looks forward to working with the County. For the reasons stated above, the EIR for the Redwood Landfill Solid Waste Facilities Permit Revision violates CEQA. No Wetland Landfill Expansion urges the County to revise and recirculate the EIR for further review.

If the County nevertheless certifies the EIR and approves the project, No Wetland Landfill Expansion requests a Notice of Determination be sent to its Counsel in Petaluma at the above address and to Christopher Gilkerson, Chair of NWLE Steering Committee, 220 Saddlewood Dr. Novato, CA 94945. Thank you for your time and consideration. If you have any questions or concerns, please contact either Mr. Gilkerson or counsel for NWLE.

Sincerely, Support Brent Newell

Attorney at Law

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Comment Letter O: Brent J. Newell, Attorney for No Wetlands Landfill Expansion

- O-1. The first part of this comment goes to the merits of the project, not the EIR. Regarding the alleged inadequacy of the EIR, the FEIR is consistent with the CEQA statute, *Guidelines*, case law, and current standards of practice.
- O-2. This comment describes the purpose of No Wetlands Landfill Expansion.
- O-3. This comment summarizes the allegations made in the remainder of this comment letter regarding the alleged inadequacies of the EIR. Each of these is repeated with more detail in the following comments. Please see the responses to the remainder of this comment letter.
- O-4. This comment quotes and paraphrases sections of the CEQA statute.
- O-5. Recirculation of the DSEIR is not necessary, as none of the tests for recirculation stated in CEQA *Guidelines* § 15088.5 has been met. In addition, the FEIR itself circulated for a period of 74 days, and the County accepted comments on the FEIR (to which this document is responding). This procedural step exceeds the requirements of CEQA for public participation and disclosure.
- O-6. Please refer to Master Response 110
- O-7. The commenter correctly summarizes that the FEIR identified significant and unavoidable impacts to be Impacts 3.2-2, 3.2-4, 3.2-5 and 3.2-11. The intent of the EIR was to provide sufficient detail to ensure informed decision making. The revised Air Ouality Section is provided as Section 3.2 in Volume 1 of the FEIR. Section 3.2 includes a complete review of setting information as typically included in EIR Air Quality Sections (Climate and Meteorology, Laws, Regulations, and Plans, Existing Air Quality in the Project Vicinity, Existing Emissions at Redwood Landfill, and Sensitive Receptors). Section 3.2 also identifies Significance Criteria and analyses 14 potentially significant air quality impacts. Section 3.2 also identifies feasible Mitigation Measures for the potentially significant air quality impacts. Section 3.2 contains the information and analyses suggested by the BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans (BAAQMD, 1999). Section 3.2 also incorporates comments from the BAAQMD on the Draft Subsequent EIR. Section 3.2 is supported by extensive calculations provided in FEIR Appendix D, Air Quality Calculations. See also Master Response 112 in this document.
- O-8. The comment covers some of the details of the air quality regulatory changes that have occurred since the Notice of Preparation for this EIR. The 8-hour ozone federal standard and the PM-2.5 24-hour and annual national standards are shown in the FEIR in Table 3.2-1 on page 3.2-5.

The changes in regulations have not affected the analysis of project emissions. The BAAQMD significance thresholds for ROG, NO_x and PM-10 are still 80 pounds per day or 15 tons per year as indicted on page 3.2-25 of the FEIR. These significance criteria reflect the concern of the BAAQMD to reduce emissions of ozone precursors to achieve the state and federal ozone standards. The newly adopted PM-2.5 national standard is less restrictive than the PM-10 state standard. To be more specific, PM-2.5 is a subset of PM-10, yet the new federal 24-hour standard for PM-2.5 (65 μ g/m3) is higher than the state 24-hour standard for total PM-10 (50 μ g/m3) (see FEIR Table 3.2-1 on page 3.2-5).

The purpose of Table 3.2-2 (FEIR page 3.2-13) is to provide representative air quality date for the project area. Table 3.2-2 focuses upon the monitoring station in San Rafael. The commenter provides information on Vallejo and Santa Rosa monitoring stations, but data from those stations do not change conclusions regarding the air quality in the project area. San Pablo and Vallejo pollutant summaries are provided in the FEIR on page 6.3-64 (for the years 1997 – 2001). See also response to Comment V-2 in this document for more recent and additional monitoring data.

With regard to the air basin's attainment status, the most current information is summarized on the BAAQMD website: http://www.baaqmd.gov/pln/air_quality/ambient_air_quality.htm

The final paragraph on page 3.2-4 has been updated as follows to reflect that the San Francisco Bay Area Air Basin is non-attainment for the 8-hour ozone standard and attainment for the national PM-2.5 standard.

"Pursuant to the 1990 federal Clean Air Act Amendments, the U.S. EPA classified air basins (or portions thereof) as either "attainment" or "nonattainment" for each criteria air pollutant, based on whether the national standards had been achieved. The project site lies within the San Francisco Bay Area Air Basin (Air Basin), which the U.S. EPA recently reclassified as nonattainment for ozone, precursors of which would be emitted by project generated vehicle traffic and landfill operation. In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard. The national 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005. The Air Basin is classified as an attainment area for carbon monoxide, sulfur dioxide and lead (which would not be substantially emitted by the proposed project) and is unclassified for the national 24-hour PM-10 standard respirable particulate matter (which would be emitted primarily by project construction activities and vehicle travel over unpaved surfaces) and nitrogen dioxide (CARB, 2002). "Unclassified" is defined by the Clean Air Act Amendments as any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant." The Air Basin status in 2006 is nonattainment for the state 24-hour PM-10 standard and nonattainment for the state annual PM-10 and PM-2.5 standards. The Air Basin is attainment for the national average PM-10 and PM-2.5 standards and the national 24-hour standards.

O-9. It is not the responsibility of an EIR to inform the public of the schedule for preliminary permit hearings held by responsible agencies (in this case the BAAQMD). The schedule for EIR releases can be unpredictable and thus the EIR is not an effective communication tool to notify the public of permit hearings other than those of the lead agency. BAAQMD procedures should be followed in noticing air permit hearings at the BAAQMD.

Please refer to footnote 15 on page 2-38 of the FEIR. The BAAQMD did issue an Authority to Construct permit for each of three engines in the summer of 2002. Redwood Landfill did not, however, install the engines, and the Authority to Construct expired after two years.

See also response to Comment A-2 in this document.

- O-9a. Please refer to the response to Comment O-9.
- O-10. Ozone and particulates are criteria pollutants that have been regulated nationwide since the adoption of the Clean Air Act in 1970. The general public is presented daily with air quality information in newspapers and television that describe air pollutant levels. For this reason, the EIR does not go into a detailed discussion of these commonly understood air pollutants.

The FEIR includes general information regarding the adverse health effects of ozone, particulate matter, and includes information about the formation of sulfate and nitrate particulates and absorbed gases (e.g., sulfates and nitrates). The level of information on health effects is similar to the general information provided in the *BAAQMD CEQA Guidelines* (BAAQMD, 1999). The air quality analysis in the FEIR does not try to interpret medical research and decide which research is best to present to the decision makers. The commenter does not dispute any of the general information presented in the FEIR, instead the commenter adds more health information.

In preparing the analyses, the EIR analyzed criteria pollutants that have been monitored for years by the EPA, because these criteria pollutants have adverse health effects. The health effects are considered to be significant when they exceed air quality standards (as presented in Table 3.2-2 on page 3.2-13 of the FEIR). This is standard practice in EIRs and follows the guidance from the BAAQMD. The EIR determined that the operations impacts were significant and unavoidable for ROG, NOx (ozone precursors) and PM-10 (see Table 3.2-6 on page 3.2-30 of the FEIR).

O-11. Hydrogen sulfide is not typically a pollutant that causes adverse health effects to the general public, so it does not warrant its own specific reference in the FEIR. There are many potentially toxic pollutants that can be emitted from landfills; however, it is not necessary to discuss the details of each pollutant in the FEIR unless that pollutant has the potential to cause health effects above CEQA significance levels. (See CEQA *Guidelines*, § 15126.2, subd. (a) (EIR should focus on the significant effects of a project).) This is not

the case with hydrogen sulfide, which is not a major constituent of concern for off-site receptors. The emissions of hydrogen sulfide from the landfill gas would not be expected to have a measurable effect on hydrogen sulfide concentrations off the site, because hydrogen sulfide released to the atmosphere oxidizes quickly.

Although there is a state ambient standard for hydrogen sulfide, hydrogen sulfide is not typically considered to cause or potentially cause significant impact for landfills undergoing CEQA review. First, the entire state is in attainment of the hydrogen sulfide standard. Second, BAAQMD has specific requirements to ensure compliance with the ambient air quality standard. (See generally BAAQMD Rule 9-2.).

The following paragraphs are from the October 2005, BAAQMD Statement for Basis for Major Facility Review Permit for Redwood Landfill, Inc. Facility #A1179. These paragraphs clearly show hydrogen sulfide is not an air quality impact of landfills:

Hydrogen Sulfide (H₂S) Discussion

Hydrogen sulfide can be detected by its odor at concentrations as low as 0.0005 ppmv and is generally identified by its characteristic rotten egg smell at a concentration of 0.005 ppmv or less. Therefore, H_2S emissions are typically discovered by smell well before the concentration approaches the lowest Regulation 9-2-301 emission limit of 0.03 ppmv.

The District rarely receives complaints about hydrogen sulfide odors from Bay Area landfills. Since H_2S odors have generally not been detected at landfills, the concentration of H_2S at the property line is expected to be well below the Regulation 9-2-301 limits. Monitoring for ground level H_2S concentrations is not appropriate when no H_2S odor problem exists. Furthermore, the BAAQMD Regulation 9-2-301 emission limits are not federally enforceable. Therefore, the District has not required H_2S monitoring for any Bay Area landfill sites.

Landfill gas flares emit small amounts of residual H_2S compared to fugitive H_2S emissions from landfills. In addition, these residual H_2S emissions will be quickly diluted in the atmosphere due to high stack temperatures and high exit velocities. As illustrated below for A-51, landfill gas flares have a negligible impact on compliance with the property line H_2S levels for a site. Therefore, H_2S monitoring is not appropriate for landfill gas flares.

The study regarding hydrogen sulfide attached as Appendix P to NWLE's comments concluded that "Additional research might help reduce uncertainties regarding the impacts of hydrogen sulfide on the health of infants and children." (Appendix P at p. 18.) However, the study did not recommend a lower standard or conclude that exposure at the state ambient standards, which there is no reason to believe would be exceeded at Redwood's nearest receptors, would cause health impacts.

O-12. SCS Engineers, the applicant's air quality consultant, has provided additional information regarding flare emissions, providing estimates of emissions under current permit conditions and under future emissions that would result from the project. These figures are shown in Table O-12. The first column shows the expected level of criteria air

	Current Facility Flare	Project Flare Emissions	Change		
	Emissions (based on flow rate of 4,744 scfm) (tons/year)	(based on flow rate of 5,662 scfm) (tons/year)	Pounds per day	tons/year	
ROG (aka POC)	8.73	10.42	9	1.69	
NOx	37.40	44.64	40	7.24	
CO	127.83	151.95	132	24.13	
PM-10	10.60	12.65	11	2.05	
SOx	88.24	105.32	94	17.08	
H ₂ S	0.94	1.12	1	0.18	

TABLE O-12
SUMMARY OF EXISTING AND PROJECT FLARE EMISSIONS

Key: **scfm**: standard cubic feet per minute.

SOURCE: SCS Engineers

pollutants that would result from a throughput of 4,744 standard cubic feet per minute (scfm); this flow rate is based on the amount of landfill gas that is expected to be captured by the flare under current permit conditions; the second column shows emissions at a flow rate of 5,662 scfm, and reflects the amount expected to be captured under project conditions. The incremental difference between the two is shown in the third and fourth columns, and carries over to a revised version of FEIR Table 3.2-6. The new flare that is referenced was recently permitted and installed at the site in the location of the previously existing flare station. This provides the facility with a total of 4,200 scfm of flaring capacity between the two flares. The increase in emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx) from this new flare were fully offset by the BAAQMD under its NSR rule. Other emissions were not required to be offset.

O-13. The SCAQMD emission factors for composting identified by the commenter are acknowledged in the FEIR. The SCAQMD emission factors for composting were the result of the first generally available composting emissions study, but other emission tests have been conducted since then. The final EIR applies the SCAQMD ROG emission factor for co-composting and the CIWMB emission factor for greenwaste composting (see FEIR, p. 3.2-39). The air quality analysis does not use the SCAQMD emission factor for all compost emissions because the CIWMB emission factor is considered to be more current and more accurate for greenwaste composting.

Also, the CIWMB factor used to estimate green/wood waste composting emissions was adjusted to reflect 39 percent ROG in the Total Non-Methane Hydrocarbons. No adjustment was used for the SCAQMD emission factor used for co-composting. See more explanation of these factors in FEIR Comment K-66 and Response to Comment K-66 (FEIR page 6.4-53).

	_		Emissions (p	ounds per day)	
Emission Source	Impact	со	ROG	NOx	PM-10
Construction Activities	3.2.1				NQ
On-Road Vehicles	3.2.2	207	6	123	16
Off-Road Equipment	3.2.2	20	7	118	3
Fugitive Dust from LF operations	3.2.4				375
Fugitive Landfill Gas	3.2.5		12		
Flare Emissions ^a	3.2.5	NQ 132	1 <u>9</u>	NQ 40	NQ 11
Composting/Co-Composting	3.2.6		105		
Sludge as ADC and Disposed	3.2.7		18		
Sludge Air Drying	3.2.10		150		
Designated waste disposal in Area G ^a	3.2.13		NQ	NQ	NQ
TOTAL QUANTIFIED EMISSIONS		227 359	262 271	242 282	394 405
BAAQMD Significance Criteria		550	80	80	80
Countywide Total ^b		246,400	44,420	37,400	15,740
Quantified Project Emissions as a % of Countywide Emissions		<u>0.09%</u> <u>0.15</u> %	<u>0.59%</u> <u>0.61</u> %	<u>0.65%</u> 0.75%	<u>2.50%</u> 2.57%

TABLE 3.2-6 (revised) **INCREASES IN EMISSIONS OF CRITERIA AIR POLLUTANTS FROM THE PROJECT** (without mitigation measures)

Key: NQ = Not Quantified **Bolded** values are in excess of applicable standard.

Underline and strikeout changes are relative to values presented in the FEIR

а Landfill gas flare and other combustion emissions, and designated waste emissions, could not be quantified due to insufficient

information from the applicant.

b Countywide emissions totals were obtained from CARB's 2001 Estimated Annual Average Emissions Inventory for Marin County, available on CARB's website at www.arb.ca.gov.

SOURCE: Environmental Science Associates, California Air Resources Board

O-14. As explained on page 3.2-40 of the FEIR, Mitigation Measure 3.2.6c would limit the increased emissions of ROG from composting to less than 80 pound per day, which is the BAAQMD significance criterion for ROG. Two methods are contained with Mitigation Measure 3.2.6c; either reducing the emissions through changes in handling and processing (e.g., use of a static pile system with biofilters) or by reducing the amount of compostable materials that are accepted at the site by 25 percent on a daily basis.

Although further reductions are possible by further reducing the amount of compostable materials, this would inhibit other environmental benefits achieved by composting (e.g., diverting materials from landfills). See footnote 13 on page 3.2-29 of the FEIR.

South Coast Air Quality Management Rule 1133.2 is not required, as Mitigation Measure 3.2.6c reduces the increase in ROG emissions to less than significant.

Rule 1133.2 appears to reflect a greater concern for ROG than the benefits from composting. This presumably comes from the more severe ozone problems faced in the South Coast Air Basin.

The Mitigated Alternative (see Master Response 20, FEIR page 6.3-80) would also reduce compost emissions by reducing compostable materials from 514 tons per day (with the revised project) to 170 tons per day (with the Mitigated Alternative).

- O-15. See response to Comment O-11.
- O-16. The FEIR disclosed the potential for formation of the secondary particulate matter, but did not estimate the level of secondary particulate matter because there are no good models known to the EIR preparers that could estimate this nor do the BAAQMD CEQA *Guidelines* indicate that such estimates should be completed in an EIR. BAAQMD CEQA *Guidelines* also have no standard of significance for ammonia emissions.

See response to Comment O-10 regarding health effects of particulate matter.

O-17. Under the proposed project, use of petroleum contaminated "PC" soils would be limited to a daily average of 640 tpd and a peak of 800 tpd (FEIR page 6.3-80). Under Redwood's existing and proposed Title V permit to operate from the BAAQMD, only soil with less than 50 parts per million ("ppm") volatile organic compounds ("VOC") may be used for daily and intermediate cover.

Since there is a 50 ppm VOC or hydrocarbon (HC) limit for cover soil, the total amount of HC present in the soil (using 800 tons per day for cover) would be no more than 80 lbs./day². Only a fraction of the HCs would evaporate before this material is covered the following day. Most of the lower molecular weight HCs with high vapor pressures would have already evaporated before the soils are delivered to the site, and only those HCs with higher molecular weights (and lower vapor pressure) would remain adsorbed to the soil particles. These HCs would evaporate very slowly, taking months or years. Thus, the emission rate of VOCs from the cover material would be well below the 80 lbs./day significance threshold.

O-18. As explained on page 3.2-26 of the FEIR, the incremental cancer risk at a receptor is based on the assumption that a person would be exposed to the given TAC at the estimated dosage constantly for 70 years. The SCREEN 3 model determined offsite concentrations of specific TAC species. Using fenceline locations or locations on the water does not make sense because receptors would not be at those locations for constant exposure over a 70-year period. The nearest location for residential receptors is the Buck Center, about 1.5 miles away. As explained below, the results of the screening model are considered as an upper limit to the risks (FEIR, page 3.2-45):

Redwood Landfill Final Environmental Impact Report Response to Comments Amendment

² The maximum day would be 800 tons of soil as cover material or 1,600,000 pounds of soil as cover material per day. This amount of soil with a limit of 50 ppm VOC would contain approximately 80 pounds of VOCs (1,600,000 lbs/day * .000050 lbs of VOC/lb of soil = 80 lb/day VOC).

"As stated earlier when discussing the screening model that was used in the analysis, the impacts can be considered as an upper limit because of the conservative nature of the methodology prescribed by agencies in a screening analysis. If historical meteorological data that are representative of the site are used, a more detailed modeling analysis can be carried out using EPA-approved models, such as ISC3 and AERMOD. If such an analysis were conducted, the estimated impacts would likely be lower. In addition, diesel PM emissions estimates for the offroad equipment do not take into consideration future reductions in these emissions because of the newly promulgated Federal Regulations (May 2004). These regulations require that, after 2010, new offroad equipment will have to reduce emissions of NOx and diesel PM by about 90%. However, equipment that is operating before 2010 would not be subject to the Regulation. Therefore future emissions of diesel PM are over-estimated, because this was not factored into the estimate. It is difficult to factor this in, because the longevity of existing equipment cannot be precisely defined."

- O-19. The BAAQMD CEQA *Guidelines* do not require modeling in an EIR for concentrations of ozone, PM-10, PM-2.5 and hydrogen sulfide. The BAAQMD reviews stationary sources to assure they don't represent an immediate threat to the public. Mobile sources are regulated by the federal and state government. Off-site dust is regulated by restrictions on the generation of off-site dust plumes.
- O-20. The BAAQMD CEQA *Guidelines* provides no methodology for a project-specific TAC analysis of emissions from project vehicles on Highway 101/Highway 37. In April 2005, the California EPA published *Air Quality and Land Use Handbook: A Community Health Perspective*. The purpose of the ARB Handbook was to avoid placing people in harm's way. Primarily because of diesel exhaust, the ARB Handbook recommends that sensitive land uses should not be sited within 500 feet of a freeway. The project would not be siting sensitive land uses within 500 feet of a freeway. The project would add more trucks to the freeways, but this is not an action addressed by the CARB Handbook.

A qualitative review of the project effect indicates the project would have a minimal effect on the concentration of TACs near freeways (including diesel PM – the primary emission of concern). The project does not involve changing roadway configurations near any sensitive receptors. According to the Transportation and Traffic Section of the FEIR (page 3.10-2) traffic on this section of Highway 101 is about 90,000 vehicles per day and trucks represent about 7.5 percent of the traffic (as of year 2000). Therefore the existing number of trucks on the highway is approximately 6,750 per day. Net new trips from the landfill for Medium-Heavy and Heavy-Heavy duty trucks are estimated to be 374 trips per day (see FEIR, page 3.2-44). This would be an increase of approximately 5.5 percent of the truck traffic on Highway 101 in the area of the landfill. This would increase diesel PM emissions on Highway 101 by about 5.5 percent. However, future emissions of diesel PM from all trucks should be reduced far more than 5.5 percent by a variety of measures to reduce diesel PM statewide. Therefore, diesel PM should be reduced in the future

compared to the existing emissions on Highway 101 and Highway 37, even it there is increased traffic on these corridors.

The primary driver behind ARB's efforts to reduce diesel PM is the Diesel Risk Reduction Plan³ or Diesel RRP, a comprehensive plan to reduce significantly diesel PM emissions in California. The basic premise behind the staff proposal is simple: to require all new diesel-fueled vehicles and engines to use state-of-the-art catalyzed diesel particulate filters (DPFs) and very low-sulfur diesel fuel. Further, all existing vehicles and engines should be evaluated, and wherever technically feasible and cost-effective, retrofitted with DPFs. As with new engines, very low-sulfur diesel fuel should be used by retrofitted vehicles and engines. In short, the staff's proposed plan contains the following three components:

- 1) New regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles to reduce diesel PM emissions by about 90 percent overall from current levels;
- 2) New retrofit requirements for existing on-road, off-road, and stationary dieselfueled engines and vehicles where determined to be technically feasible and costeffective; and
- 3) New Phase 2 diesel fuel regulations to reduce the sulfur content levels of diesel fuel to no more than 15 ppm to provide the quality of diesel fuel needed by the advanced diesel PM emission controls.

The projected emission benefits associated with the full implementation of this plan, including proposed federal measures, are reductions in DPM emissions and associated cancer risks of 75 percent by 2010 and 85 percent by 2020. The measures recommended in this plan will have a great impact on reducing the localized risks associated with activities that expose nearby individuals to DPM emissions. Furthermore, there are other benefits associated with reducing DPM emissions. These benefits include reduced ambient fine particulate matter levels, increased visibility, less material damage due to soiling of surfaces, and reduced incidences of noncancer health effects, such as bronchitis and asthma. CARB staff expects that the costs associated with carrying out this plan will be significant and will be on the order of the costs associated with other major CARB programs.

A direct benefit of the CARB strategy is the finalization of regulations in 2004 for "refuse removal vehicles," which are defined as "all vehicles involved in the systematic administration of activities, which provide for the collection, source separation, storage, transportation, transfer, processing, treatment, and disposal of solid waste." The rule requires owners to apply Best Available Control Technology (BACT) on their engines between 2004 and 2010. The rule will achieve a reduction in DPM emissions from

³ California Air Resources Board, Proposed Risk Reduction Plan for Diesel-Fueled Engines and Vehicles, October 2000.

collection vehicles by as much as 81 percent by 2010 and 85 percent by 2015. Some strategies to implement the rule will also result in lower levels of NOx emissions. This rule will have a positive impact at the Redwood Landfill because most haulers going to the Redwood Landfill will be required to comply with this rule.

In addition to lowering emissions for refuse removal vehicles, the CARB strategy will lower emissions from other vehicle fleets. For example, in December 2005 CARB adopted the Diesel Particulate Matter Control Measure for On-Road Heavy-Duty Diesel Vehicles operated by Public Agencies and Utilities. The rule mandates municipal and utility vehicle owners reduce diesel PM emissions from their affected vehicles through the application of Best Available Control Technology or BACT on these vehicles by specified implementation dates. Implementation is phased-in by engine model year groups.

O-21. Please see response to Comment O-11 regarding hydrogen sulfide.

The FEIR does analyze emissions in the manner suggested by the *BAAQMD CEQA Guidelines* (pg. 16). The method recommended by the BAAQMD guidelines is to analyze the quantity of emissions for a project and to compare those emissions to the significance criteria for the pollutant. The significance criteria thresholds for ROG and NOx are equivalent to the previous BAAQMD offset requirement threshold (15 tons per year) for stationary sources (Regulation 2-2-302). The threshold for PM-10 is based on the District's definition of a major modification to a major facility (Regulation 2-2-221). The BAAQMD current offset requirement for Precursor Organic Compounds (POCs – equivalent to ROG) and NOx has been raised to 35 tons per year, but the BAAQMD CEQA *Guidelines* are still based on the more restrictive 15 tons per year or 80 pounds per day for both ROG and NOx.

The BAAQMD uses these guidelines (emission quantity thresholds) in order to identify potential air quality impacts that would probably go undetected or be completely dismissed if the commenter's approach were followed. This is because the project would be expected to have minimal effect upon the ambient concentrations of these pollutants at the nearest sensitive receptors, which are all 1.5 miles or further from the Redwood Landfill, and with minimal changes in concentrations, with the commenter's approach, it would be difficult to identify the minimal changes in concentrations as the basis for a significant impact. Given that the commenter wants to encourage mitigations to improve air quality, the BAAQMD approach is the most direct approach to identifying when there would be a significant impact, requiring that feasible mitigations be implemented.

O-22. The theoretical function of the LCRS and the natural hydrogeologic conditions at the landfill site are thoroughly described in lay terms in Master Responses 1 and 13 in the FEIR. These master responses conclude that, despite the fact that there is groundwater intrusion into the bottom of the landfill, the LCRS will function to ensure that there is no discharge of leachate into groundwater beneath the landfill. See also Impacts and Mitigation Measures 3.4.6 and 3.4.7 in the FEIR. Updated information on leachate

management are described in Master Response 105 in the current document. Please note that the RWQCB has accepted the applicant's engineered alternative to the 5-foot separation requirement contained in CCR Title 27, as further described in response to Comment E-22 in the current document.

O-23. The FEIR properly considers cumulative impacts, in accordance with §15130 of the CEQA *Guidelines*.

The air quality analysis in the FEIR properly considers cumulative air quality impacts of the project. As discussed on page 3-2-26 of the FEIR, the BAAQMD recommends that cumulative air quality effects be discussed with reference to the consistency of a project with the current Bay Area Clean Air Plan. This approach to the cumulative impacts analysis is consistent with § 15130 (b)(1)(B) of the CEQA *Guidelines*. BAAQMD recommendations are used in the FEIR air quality analysis to identify significant effects of the project and significant cumulative effects. Impact CU-2, on page 4-7 of the FEIR, is identified as a significant, unavoidable cumulative air quality impact.

With regard to cumulative water quality impacts, as stated on page 3.5-7 of the FEIR, the project would result in a significant impact if it were to violate any water quality standards, waste discharge requirements, or otherwise substantially degrade water quality. In essence, any such violation would be both a project-specific impact and a cumulative impact, since it would impact water quality in the entire basin, and would be in violation of the RWQCB's Basin Plan. This approach to the cumulative impacts analysis is consistent with § 15130 (b)(1)(B) of the CEQA *Guidelines*. As the FEIR provides mitigation measures that would ensure no such violation, the document properly concludes that there would be neither project-specific nor cumulative significant unavoidable impacts to water quality. Please refer to the discussion on pages 4-8 and 4-9 of the FEIR. See also Master Response 105 and the discussion of subsurface conditions in Master Response 109.

- O-24. CEQA requires selection and analysis of a "range of reasonable alternatives" to a project (CEQA *Guidelines*, §15126.1(a)). There is no express requirement in the statute or *Guidelines* mandating an off-site alternative, nor for an out-of-county alternative. The rationale for selection of the Off-Site Alternative is given on page 5-34 of the FEIR. The rationale for rejection of previously identified alternative sites, of modification of another Waste Management, Inc. landfill outside of Marin County, and of a partial off-site alternative are given on page 5-2 of the FEIR. See also the response to Comment C-13 from the City of Novato
- O-25. The discussion of the potential water quality and hydrology impacts of the Off-Site alternative appears on page 5-35 of the FEIR, and notes that a new landfill would be required to comply with all applicable state and federal regulations, including the requirement for a liner and the requirement to comply with siting criteria. Table 5-1 indicates that impacts 3.4.6, 3.4.7, and 3.4.8 would be less under the Off-Site Alternative than under the project.

- O-26. Please refer to the responses to Comments O-1 and O-5.
- O-27. If the EIR is certified, Marin County will file a Notice of Determination in accordance with CEQA *Guidelines* § 15094.

Appendices to Letter O

Please note that this commenter submitted a large volume of materials as appendices to this comment letter, several of which are referred to in the text of the comments. These appendices are available to anyone wishing to review them at the County Community Development Agency EHS office or in electronic format, upon request to the Community Development Agency EHS Division at 415-499-6907.

LAW OFFICES OF BRENT J. NEWELL

515 Hayes Lane Petaluma, California 94952

(707) 280-4624 • FAX (707) 763-9932

September 20, 2005

Tim Haddad Environmental Coordinator Marin County Community Development Agency 3501 Civic Center Dr., Room 308 San Rafael, CA 94903

Re: Supplemental Comments on Final Environmental Impact Report and Responses to Comments; Redwood Landfill Solid Waste Facilities Permit Revision; SCH No. 1991033042

Dear Mr. Haddad:

You will find the enclosed Authority to Construct permit application # 011371 filed by Redwood Landfill on December 2, 2004. No Wetlands Landfill Expansion cited the ATC application in its comment letter dated September 12, 2005, but did not include it in the appendix. If you have any questions or concerns, please contact me.

Sincerely. ent Newell

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UEIVED

Attorney at Law

Comment Letter P	
	FORM P-101B
BAYAREA AIRQUALITY MANAGEMENT DISTRICT BAYAREA 939 Ellis Street San Francisco, CA 94105 (415) 749-4990 FAX (415) 749-5030 www.baaqmd.gov	AUTHORITY TO CONSTRUCT/ PERMIT TO OPERATE
011371 Application Information	
Plant No. A1179	NAICS (leave blank if unknown)
Business Name Redwood Landfill, Inc	
Equipment Description Municipal Solid Waste Landfill	
Equipment Description Municipal Cond Video If you qualify for the District's Accelerated Permitting Program, (see reverse for If you are applying to permit portable equipment, in accordance with Regulation 2	2-1-220, check here
New Plant Information If you have not previously been assigned a Plant Number by the District or if you w previously supplied to the District, please complete the New Plant Information box	vant to update any Plant data that you have
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previously copping			
Plant Address (equipment location) 8950 Redwood Highway			
	. *	State CA	Zip 94948
City Novato			
Mailing Address P.O Box 793		T	T
		State CA	Zip 94948
City Novato			····
Plant Contact Whitney King			
Title Environmental Programs Manager		······	
Telephone (415) 892-2851	Fax (415) 898-1	354	-
E-mail Address wking@wm.com			

Application Contact Information (if different from plant contact)

All correspondence regarding this application will be sent to the plant contact person unless you wish to designate a different contact for this application. If you are changing the plant contact person, complete the "New Plant Information" Section.

Application Contact Patrick Sullivan		-	Sec. 2				
Title/Company	Vice President/SCS Engineers						
induining -	3050 Fite Circle, Suite 106			State	CA	Zip	95827
	361-1297	Fax	(916) 361-12	99			
E-mail Address p	sullivan@scsengineers.com						
	Small Busines	s Cert	ification			Ϋ́Υ.	

You are entitled to a reduced permit fee if you qualify as a sma qualify, you must certify that your business meets all of the foll The business does not employ more than 10 persons ar The business is not an affiliate of a non-small business. and/or its gross income exceeds \$500,000.)	
Signature:	Date:

Accelerated	Permitting	Program	M
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 The Accelerated Permitting Program entitles you to install and operate qualifying sources of air pollution and abatement equipment without waiting for the District to issue a Permit to Operate. In order to participate this program you must certify that your project will meet all of the following criteria. Please acknowledge each item by checking each box and signing below. Uncontrolled emissions of any single pollutant are each less than 10 lb/highest day, or the equipment has been precertified by the BAAQMD. Emissions of toxic compounds do not exceed the trigger levels identified in Table 2-1-316 (see Regulation 2, Rule The project is not subject to public notice requirements (source is either more than 1000 ft. from the nearest school or source does not emit any toxic compound in table 2-1-316). For replacement of abatement equipment, the new equipment must have an equal or greater overall abatement efficiency for all pollutants than the equipment being replaced. For alterations of existing sources, for all pollutants the alteration does not result in an increase in emissions. Payment of applicable fees (the minimum permit fee to install and operate each source). See Regulation 3 or contained on the provide the provide the provide the permit for the provide the permit for the permit fee to install and operate each source).).
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the Engineering Division for help in determining your fees.	x
Signature: Date:	
All Applications	
All applications should contain the following additional information:	
M Completed data form(s) for each piece of equipment (data forms listed below)	
A facility map, drawn roughly to scale, that locates the equipment and its emission points	
Project/equipment description, manufacturer's data	
Fullularit now diagram	
Discussion/calculations relating to emissions from the equipment	
If a new Plant, a local street map showing the location of your business	
I hereby certify that the sources in this permit application: (check one)	
Are Are not within 1,000 feet of the outer boundary of the nearest school	· he
Has an Environmental Impact Report (EIR) or other California Environmental Quality Act (CEQA) document been prepa for this project?	
IMPORTANT: Under the California Public Records Act, all information in your permit application will be considered a main of public record and may be disclosed to a third party. If you wish to keep certain items separate as specified in	ler
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Form Diesel Loss of Exemption Diesel Engines

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tach to this form.	ations which burn fuel. If the op n. If the operation involves a pu if this source has a secondary to on Form A (using the source n	rocess which generates any function as an abatement de	vice for some	other source(s);	complete lines
2, and 7-13	on Form A (using the source in			If unknown, leave bla	
I. Company Name	e: Redwood Landfill, inc		Plant No:	1179 Source	e No. A-50
2. Equipment Nan	ne & Number, or Description:	Modified Landfill Gas Flare)		
3. Make, Model:	Power Strategies, EV-4000	Ма	ximum firing I	rate: 36MM	Btu/hr
4. Date of modific	ation or initial operation:	(if unknown, l	leave blank)		
5. Primary use (ch	🛛 abatement de			te disposal ource recovery	testing other
6. SIC Number 49	53				
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7. Equipment type Internal combustior	🔲 diesel engine	Displace	ement	cubic inches	
••••••	gas turbine other		hp	01	1371
Incinerator	Salvage operation	pathological waste other		Temperature Residence tim	⁰F eSec
Others	 ☐ boiler ☐ afterburner ☑ flare ☐ open burning ☐ other 	dryer dryer oven furnace Mate kiin	rial dried, bak	ed, or heated:	
8. Overfire air?	🗌 yes 🛛 no	If yes, what percent			
9. Flue gas recirc 10. Air preheat?	culation? 🗌 yes 🛛 no 🗌 yes 🖾 no	If yes, what percent Temperature •			
	ers? 🗌 yes 🖾 no	Make, Model			
	ne temperature <u>2000</u> °F	HUND, HIODOI		and the following in the second of the secon	
13 Combustion p	roducts: Wet gas flowrate <u>100</u> in Content <u>15</u> dry volume % o	0,000acfm at <u>1400</u> °F or wet volume % or	% excess	s air	
-	hours/day7				
	nnual total: Dec-Feb 25%				Nov <u>25</u> %
16. With regard to	air pollutant flow, what source	(s) or abatement device(s) ar	re immediatel	y UPSTREAM?	
With regard to	air pollutant flow, what source				
DOWNSTRE/ S		P -50 P			
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Person completing	this form: Pat Sullivan		Date:	11/28/04	
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FUELS

INSTRUCTIONS: Complete one line in Section A for each fuel. Section J is OPTIONAL. Please use the units at the bottom of each table. N/A means "Not Applicable."

SECTION A: FUEL DATA

	Fuel Name	Fuel Code**	Total Annual Usage*** CF¥11	Maximum Possible Fuel Use Rate	Typical Heat Content	Content	Nitrogen Content (optional)	Ash Content (optional)
1	Landfill Gas	511	6307E+04	2.4E+10	447.25	425 PPM4		
2.								
3.							 	
4.					-			
5.		<u> </u>			<u>.1</u>	JL	<u>n</u>	H
	Use the appropriate	Natural Gas	therm*	Btu/hr	N/A	N/A	N/A	N/A
	units for each fuel	Other Gas	MSCF*	MSCF/hr	Btu/MSCF	ppm	N/A	N/A
		Liquid	m gal*	m gal/hr	Btu/m gal	wt%	wt%	wt%
				to a line	Dtulton	wt%	wt%	wt%

ton/hr

SECTION B: EMISSION FACTORS (optional)

Solid

16 MMBTU

Btu/ton

wt%

wt%

		Particulates		NOx		<u> </u>	
Fuel Name	Fuel Code**	Emission Factor	**Basis Code	Emission Factor	**Basis Code	Emission Factor	**Basis Code
Landfill Gas	511	0.017	3	0.06		0.22	3
			·				
	I	<u>1</u>			<u> </u>	[

ton

Use the appropriate = Ib/MSCF* Other Gas

= Ib/m gal* Liquid Solid = Ib/ton

011371

wt%

MSCF = thousand standard cubic feet Note: *

m gal = thousand gallons

therm = 100,000 BTU

See tables below for Fuel and Basis Codes

Total annual usage is: - Projected usage over next 12 months if equipment is new or modified. - Actual usage for last 12 months if equipment is existing and unchanged.

**Fuel Codes					**Basis Codes			
Code	Fuel	Code	Fuel	Code	Method			
25 33 35 43 47 242 80 89 98 493 315 392 551 158 160 165 167 494	Anthracite coal Bagasse Bark Bituminous coal Brown coal Bunker C fuel oil Coke Crude oil Diesel oil Digester gas Distillate oil Fuel oil #2 Gasoline Jet fuel LPG Lignite Liquid waste Municipal solid waste	189 234 235 236 238 237 242 495 511 256 466 304 305 198 200 203	Natural Gas Process gas - blast furnace Process gas - CO Process gas - coke oven gas Process gas - nMG Process gas - other Residual oil Refuse derived fuel Landfill gas Solid propellant Solid waste Wood - hogged Wood - other Other - gaseous fuels Other - liquid fuels Other - solid fuels	0 1 2 3 4 5 6 7 8	Not applicable for this pollutant Source testing or other measurement by plant (attach copy) Source testing or other measurement by BAAQMD (give date) Specifications from vendor (attach copy) Material balance by plant using engineering expertise and knowledge of process Material balance by BAAQMD Taken from AP-42 (compilation of Air Pollutant Emission Factors, EPA) Taken from literature, other than AP-42 (attach copy) Guess			

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		omment Letter P		
9 Filis Street San	Franciscu, JA 94109 (415)	DISTRICT 749-4990 fax (415,	,9-5030	Data Form C FUEL COMBUSTION SOURCE
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nd attach to this form. ttach to this form.	If the operation involves a proce	tion on an electromont del	vice for some	other source(s): complete lines
Check box if the 2, and 7-13 on	his source has a secondary fund Form A (using the source num	ber below for the Abatem		
			Plant No:	If unknown, leave blank) 1179 Source No.
1. Company Name:	Redwood Landfill, Inc		Plant No.	
2. Equipment Name	& Number, or Description: N	lew Landfill Gas Flare		
3. Make, Model: T	o be determined	and a second	ximum firing	rate: 90MM Btu/hr
4. Date of modificatio	on or initial operation:	(if unknown,	leave blank)	
5. Primary use (chec	🔀 abatement devic	ation Space heat ce Cogeneration aterial heated		te disposal disposa disposal disposal disposad disposad disposad d
6. SIC Number 4953 If unkr	nown leave blank	·	~	
7. Equipment type (c				
Internal combustion	☐ diesel engine ☐ Otto cycle engine	Displace	ement	cubic inches 011371
	gas turbine other		hp	OTTOIT
Incinerator	Salvage operation	pathological waste dotset		Temperature°F Residence timeSe
Others	 □ boiler □ afterburner ⊠ flare □ open burning □ other 	☐ dryer ☐ oven ☐ furnace Mate ☐ kiln	erial dried, bal	ked, or heated:
 8. Overfire air? 9. Flue gas recircul 10. Air preheat? 	🗌 yes 🖂 no	·	% °F	
11. Low NO _x burners		Make, Model	- 	
	temperature <u>2000</u> °F			· · · · · · · · · · · · · · · · · · ·
40 0	ducts: Wet gas flowrate <u>250,0</u> Content <u>15</u> dry volume % or _	<u>00</u> actm at <u>1400</u> °F wet volume % or	% exces	ss air
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Typical Oxygen	24 hours/day 7	days/week	52 week	ks/year
Typical Oxygen	24 hours/day 7	days/week	52 week	ks/year
Typical Oxygen 14. Typical Use 15. Typical % of ann	24 hours/day 7 nual total: Dec-Feb 25%	_ days/week Mar-May <u>25</u> % or abatement device(s) a	52 week Jun-Aug 2 are immediate	ks/year 2 <u>5</u> % Sep-Nov <u>25</u> % ely UPSTREAM?
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FUELS

INSTRUCTIONS: Complete on ... line in Section A for each fuel. Section ... is OPTIONAL. Please use the units at the bottom of each table. N/A means "Not Applicable."

SECTION A: FUEL DATA

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Fuel Name	Fuel Code**	Total Annual Usage*** ビビリ	Maximum Possible Fuel Use Rate	Typical Heat Content	Sulfur Content	Nitrogen Content (optional)	Ash Content (optional)
L'andfill Gas		15768E+5	7.01E+11	447.25	425 ppmv		
-	<u> </u>					· · · · · · · · · · · · · · · · · · ·	
						<u> </u>	
					<u></u>		I
Use the appropriate	Natural Gas	therm*	Btu/hr	N/A	N/A	N/A	N/A
units for each fuel	Other Gas	MSCF*	MSCF/hr	Btu/MSCF	ppm	N/A	N/A
	Liquid	m gal*	m gal/hr	Btu/m gal	wt%	wt%	wt%
	Solid	ton	ton/hr	Btu/ton	wt%	wt%	wt%

011371

SECTION B: EMISSION FACTORS (optional)

SE(CTION B: EMISSION FACTORS	s (optional)		16 M	MBTU			
·			Particulates		NOx		CO	
	Fuel Name	Fuel Code**		**Basis Code	Emission Factor	**Basis Code	Emission Factor	**Basis Code
1.	Landfill Gas	511	0.017	0	0.06		0.2	0
2.								
3.			l	·				
4.			<u> </u>	<u> </u>	J		ال	

Liquid

Solid

Use the appropriate units for each fuel: Natural Gas = Ib/therm*

Other Gas = Ib/MSCF*

 $= lb/m gal^*$ = Ib/ton

MSCF = thousand standard cubic feet × Note:

m gal = thousand gallons

therm = 100,000 BTU

See tables below for Fuel and Basis Codes **

Total annual usage is: - Projected usage over next 12 months if equipment is new or modified. *** - Actual usage for last 12 months if equipment is existing and unchanged.

**Fuel Codes					**Basis Codes			
Code	Fuel	Code	Fuel	Code	Method			
25 33 35 43 47 242 80 89 98 493 315 392 551 158 160 165 167 494	Anthracite coal Bagasse Bark Bituminous coal Brown coal Bunker C fuel oil Coke Crude oil Digester oil Digester gas Distillate oil Fuel oil #2 Gasoline Jet fuel LPG Lignite Liquid waste Municipal solid waste	189 234 235 236 238 237 242 495 511 256 466 304 305 198 200 203	Natural Gas Process gas - blast furnace Process gas - CO Process gas - coke oven gas Process gas - RMG Process gas - other Residual oil Refuse derived fuel Landfill gas Solid propellant Solid propellant Solid waste Wood - hogged Wood - other Other - gaseous fuels Other - liquid fuels Other - solid fuels	0 1 2 3 4 5 6 7 8	Not applicable for this pollutant Source testing or other measurement by plant (attach copy) Source testing or other measurement by BAAQMD (give date) Specifications from vendor (attach copy) Material balance by plant using engineering expertise and knowledge of process Material balance by BAAQMD Taken from AP-42 (compilation of Air Pollutant Emission Factors, EPA) Taken from literature, other than AP-42 (attach copy) Guess			

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Comment Letter P: Brent J. Newell, Attorney for No Wetlands Landfill Expansion, Supplemental Comments

P-1. The County acknowledges receipt of the Authority to Construct permit application attached to this comment letter.

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Hydroikos Ltd.

2005 SEP 25 A 11: 06

MARSN COLINTY

COMMUNITY DEVELOPMENT



2175 E. Francisco Blvd., Ste. A San Rafael, CA 94901 Phone: (415) 482-8173 Fax: (415) 256-1123 coats@hydroikos.com www.hydroikos.com

September 20, 2005

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Dear Planning Commissioners and Mr. Haddad,

At the request of "No Wetlands Landfill Expansion", I have reviewed the "Redwood Landfill Solid Waste Facilities Permit Revision Final EIR and Response to Comments" (Vols. I and II), focusing on the sections relating to surface and groundwater hydrology and water quality. In general, the documents do not provide sufficient technical information and detail to permit an adequate evaluation of likely environmental impacts. My specific comments are as follows:

1. The plan calls for the perimeter levee to be raised to an elevation of 9 ft "msl", and a top width of 10 ft. This is apparently based on a 100-yr flood elevation of 6.0-7.0 ft. I note that the Corps of Engineers' 100 high tide elevation at the mouth of the Petaluma River is 6.5 ft NGVD, and (according to the "Joint Technical Document" of GeoSyntec), the FEMA 100-yr flood elevation at the site is 6.3 ft "MSL". An elevation of 9 ft would thus provide about 2.5 ft of freeboard, which is somewhat less than some flood control districts around the bay require. The effect of future sea level rise, however, has not been taken into account. There is considerable uncertainty about the rate of sea level rise over the next century, but the 2001 report of the Intergovernmental Panel on Climate Change (IPCC) found the median rise from many scenarios and models to be around 0.35 m by 2100. An increase of 0.9 m by 2100 is considered possible.

2. The Leachate Collection and Removal System (LCRS) will depend on pump operation. It is not clear what sort of back-up will be provided in the event of power failure. Will the pumps be powered by generators run with methane from the landfill, or by an external source? How long could be pumps be down before a positive groundwater gradient toward the bay develops? 2

Hydroikos Ltd.

3. Effectively containing the leachate and preventing it from contaminating surface or groundwater depends on the low permeability of the bay mud. The EIR and the Joint Technical Document recognize that there are lenses of sand, silty sand and decomposed organic material in old channel deposits that have much higher hydraulic conductivity than the clay-rich bay mud. The EIR states that "all significant channel deposits at the landfill are believed to have been identified". Believed by whom? Neither the basis for this statement (which could include a map of the existing deposits and boring locations) nor the degree of uncertainty is given in the EIR.

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4. A number of studies critical to the design and impact assessment have not yet been completed. According the EIR, these include 1) a study that demonstrates sufficient capacity in precipitation and drainage control facilities to accommodate the 100-yr 24-hr rainfall event; 2) the 100-yr water surface profile in San Antonio Creek;
3) a Stormwater Pollution Prevention Plan (SWPPP); 4) a refined water balance model showing that leachate extraction rates will exceed the leachate generation rate; 5) a Leachate Management Plan, incorporating the results of the water balance (p. 6.3-46);
6) site-specific studies showing that areas proposed for composting meet RWQCB specifications (p. 1-69); 7) a final Closure and Post-closure Maintenance Plan (p. 1-16). Without these important studies, certification of the EIR seems premature.

I hope these comments are helpful. Please call me if you have any questions.

Very Sincerely Yours,

Robert Coats, Ph.D. Principal

Comment Letter Q: Robert Coates, Principal, Hydroikos Ltd.

- Q-1. This comment is preamble to those that follow and is without sufficient detail to warrant response.
- Q-2. Please see Master Response 106 in this document.
- Q-3. Please see Master Response 105 discussion of Power Supply Availability.
- Q-4. Please see Master Response 109 in this document.
- Q-5. Please refer to Master Response 105 regarding additional information on the applicant's development of a water balance model and Leachate Management Plan. The FEIR's level of specificity for the other plans and reports required in mitigation measures in the FEIR and referred to in the comment is appropriate and meets the requirements of CEQA *Guidelines* §§ 15126.4 (a)(1)(B) and 15126.4 (a)(2).

RUSH CREEK NEIGHBORHOOD

September 12, 2005

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

We live in Rush Creek Estates about two miles from the Redwood Landfill. A number of us commented on the draft Environmental Impact Report (EIR). We continue to have serious concerns about and oppose Waste Management Inc.'s plans to expand substantially its Redwood Landfill dump on Rt. 101. As we understand it, after expansion 75% of the garbage will come from outside of Marin. To create this regional dump, Waste Management Inc. wants to add over 15 million cubic yards of waste to build a pyramid of garbage 160 feet tall, increase daily average intake of waste by almost 100%, and increase the number of daily truck trips in and out of the landfill by 550 per day.

The negative impacts of expansion would affect us. We can see the dump's operations from the top end of Saddlewood Drive. We use the Rush Creek Open Space and the surrounding wetlands for recreational and nature observing activities. We use Rt. 101 day-in and day-out. Given our close proximity, all of us could be impacted by the increased risks to ground water and of air contaminants presented by the expansion project. All of us would be impacted by the increase in truck traffic going by or near our neighborhood, located to the west of Route 37, to the north of Atherton Ave. (a trucking route), and to the east of Route 101.

<u>Air Quality and Risks to Health.</u> According to the EIR, the expansion of landfill activities will include an increase in large diesel trucks and equipment resulting in substantial increases in the emission of air pollutants and toxic air contaminants. This will create significant unavoidable impacts to air quality, (1-13), reason alone to reject the expansion. The EIR also states that the project will increase cancer risk for residents within 1.5 miles of the landfill, and that it used the Buck Center as the closest sensitive receptor (Response to Comment HH-20). Because the prevailing wind direction from the landfill is south, the wind is often strong as measured at Gnoss Field, and we live due south, we question the sufficiency of the EIR analysis. While recognizing Rush Creek and Bahia as nearby sensitive receptors that could be impacted by these risks (3.2-24), no direct analysis was included on the potential impacts to our safety and health. The EIR also fails to contain enough analysis regarding ultra-fine particulate matter or the

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emissions from the dump's current and proposed flares used to burn gas produced by decomposing waste.

Protection of Groundwater. The EIR proposes that Waste Management Inc. be excused from complying with the state law requirements that a landfill maintain at least 5 feet separation from groundwater and maintain a bed liner to keep landfill waste and contaminated water from the ground water. We object to this. The EIR fails to make the case that Waste Management Inc. has met its burden of showing an engineered alternative would be equally protective of the environment. The main component of the "engineered alternative" is simply a trench dug around the dump that goes no deeper than 5.5 feet below sea level, coupled with extraction pumps. But the EIR also states that there will be a permanent pool of contaminated water under the landfill at a depth of 9.5 feet below sea level. This is a potential unaddressed danger. The FEIR fails to discuss whether this method has been used successfully with any other landfill built so close to groundwater and a major wetlands area. What scientifically proven performance standards will be used? The EIR is silent on this.

<u>Risk from Earthquakes and Flooding.</u> The EIR states that in the event of a 7.0 earthquake "considerable structural damage would likely occur" as well as liquefaction. (3.4-11, -12.) This could result in mass movement of fill waste or contaminated leachate into the wetlands. We question whether the EIR has used the appropriate analytical techniques and assumptions regarding ground motion, shear strengths, and accelerations to reach the conclusion that mitigation is possible to reduce the risk to less than significant. In terms of flooding risks, Waste Management Inc. has asked to be excused from fully reconstructing the old earthen levees that protect the wetlands from the dump, something it was required to do 10 years ago with its last expansion. As the recent tragic events in Louisiana have shown, old levees must be thoroughly tested and updated to avoid risks to the public. The EIR does not explain satisfactorily why the old levees would be sufficient in the event of a 100-year flood. It also fails to take into account the impact of global warming and the future rise in sea level.

Incomplete Traffic Impact Analysis. The EIR concludes that the impact on traffic from the additional 550 truck trips per day will be less than significant. However, there is little or no analysis of where the new truck traffic from out-of-county haulers will come from and what roads they will likely traverse, other than Rt. 101. For example, Atherton Road, unfortunately, is a major truck route for haulers from the east taking a short-cut between Rt. 37 and Rt. 101. Any increased traffic would directly impact our neighborhood. The EIR is deficient because it does not address fully these traffic issues.

Questionable Need and Benefits of Expansion; Failure to Consider Alternatives. If there was some considerable benefit to Marin County, we might understand accepting some risks and allowing Waste Management Inc. to have its way. But there is no benefit. The EIR makes clear that the expanded capacity is not needed to meet Marin County's own needs. It will only enable other counties to export their trash here. The argument that the dump will have to close in the year 2024 without expansion does not support approving expansion now when many alternatives not discussed (or only briefly

mentioned) in the EIR may be possible. One alternative would be for Marin to pursue a "zero waste" strategy to reduce the garbage we generate for the dump. If we were left with minimal landfill needs 15-20 years from now, then shipping the remainder to a location not as environmentally sensitive would be both feasible and prudent. The EIR fails to consider that approach.

Land Use Permit Should be Reviewed. We understand that the dump is subject to a one-page 1958 land use permit granted to a local owner who wanted to establish a small local "rubbish dump." A lot has changed in 47 years, but the land use permit has not. It is past time to review that permit to see if additional conditions are appropriate consistent with 21st century land use planning. The Altamont landfill in Alameda County, also owned by Waste Management Inc., is subject to a 40-page land use permit that imposes multiple conditions and requirements to assure protection of local residents and the environment. The Marin County Planning Commission and the Board of Supervisors should review the scope of activities at the Redwood Landfill today and under its expansion plan to see if they go beyond what was contemplated in 1958. They should also review Waste Management Inc.'s violations of applicable laws or operational permit requirements - many are listed in the EIR. New or expanded activities, or legal violations, would enable the County to begin a proceeding to suspend or revoke the land use permit as a means to impose conditions appropriate for a major industrial operation that sits on historical wetlands adjacent to San Antonio Creek and the Petaluma River Estuary. It is the responsible thing to do. This review should take place before finalizing the EIR for the solid waste facility permit.

We appreciate this opportunity to comment on the EIR, and ask that our concerns be fully addressed before the EIR is certified as complete. Additionally, we understand that the grassroots organization, No Wetlands Landfill Expansion, is filing more extensive comment letter(s). We ask that you fully consider their points as well.

Very truly yours, Rush Creek Neighbors

Signed: - Mate

<u>Name</u>

Susan Mathews

Leslie and Chris Weber

Carole and Thor Hanson

John and Cathy Yee

Jeanette and Steve Weber

(on behalf of)

<u>Address</u>

220 Saddlewood Dr., Novato 94945

235 Saddlewood Dr.

250 Saddlewood Dr.

100 Saddlewood Dr.

185 Saddlewood Dr.

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11

RUSH CREEK NEIGHBORHOOD

Comment Letter on Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Signed: (continued)

Name

Address

Claire and Ray Savona Corey and Greg Stranger Michael and Susan Parnes James and Lamona Wood

Alex Goodman and Odet Okihara Bob and Anne Minkin Jacki Whyte Russell and Lisa Helfond Lisa and Terry Tuscher Jeff and Leslie Belingheri Robert and Georgina Shaw Margaret Schaub 30 Morningstar Ct.

260 Saddlewood Dr.

140 Saddlewood Dr.

330 Norton Ave. (Blackpoint – friend of Rush Creek)

130 Saddlewood Dr.

180 Saddlewood Dr.

200 Saddlewood Dr.

144 Oak Shade Ln.

70 Saddlewood Dr.

150 Saddlewood Dr.

245 Saddlewood Dr.

215 Saddlewood Dr.

Comment Letter R: Rush Creek Neighborhood

- R-1. All comments received on the DSEIR are included in Volume II of the FEIR.
- R-2. Development of Redwood Landfill as a regional landfill is discussed in Master Response 19 in the FEIR. Please note that the Mitigated Alternative, as described in Master Response 104 of the current document, would limit the amount of material that could be brought to Redwood Landfill from any source, including sources outside Marin County, and would furthermore require the Board of Supervisors to consider enactment of a waste import mitigation fee.
- R-3. The project's potential impacts on aesthetics, traffic, air quality, and water quality are discussed in the FEIR.
- R-4. The potential health risks of the project are evaluated in Impact 3.2.8 in Section 3.2 (Air Quality) of the FEIR assuming that the nearest sensitive receptor is the Buck Center, which is about 1.5 miles from the landfill; the health risk assessment is further described in FEIR Master Response 11 and individual responses to comments on the DSEIR (see, in particular the response to Comment HH-20). The screening analysis methodology assumes the worst possible wind conditions for the nearest receptor, regardless of what direction the receptor is in relation to the source. Therefore, receptors at a 1.5-mile distance in the direction of Rush Creek would have the same risk as the risk reported for the Buck Center. Since toxic air contaminants, like odors, tend to disperse and dilute with increasing distance from their source, the potential health risks for the Rush Creek neighborhood, which is farther from the landfill than the Buck Center, would be less than at the Buck Center. Since the FEIR finds that the health risks at the Buck Center can be reduced to a less-than-significant level with the identified mitigation measures, the health risks for the Rush Creek neighborhood would also be mitigated to a less-than-significant level.
- R-5. Comment noted. Please see response to Comment I-4 in regards to LFG flaring and ultrafine particulate matter.
- R-6. Please refer to Master Responses 1 and 13 in the FEIR, and Master Response 105 in this document. State landfill regulations provide for an engineered alternative to the prescriptive standard for separation between wastes and groundwater; please see the response to Comment N-18. Please note that the RWQCB has approved the applicant's engineered alternative to the 5-foot separation requirement (Seward, 2006).
- R-7. Please refer to Master Response 108 in this document.
- R-8. Please see Master Response 106 in this document.
- R-9. Please refer to Master Response 101 in this document.

- R-10. This comment addresses primarily the merits of the proposed project, not the EIR analysis. Regarding alternatives, please see the responses to Comments C-13 and O-24.
- R-11. Please refer to Master Response 103 in this document.
- R-12. These responses respond to the concerns raised by the commenter.



SIERRA CLUB MARIN GROUP

Box 3058 San Rafael CA 94912 sanfranciscobay.sierraclub.org/marin c/o Bennett 40 Sunnyside Dr Inverness CA 94937 415-663-1881/gbatmuirb@aol.com

September 12, 2005

2005 SEP 12 P 3: 02

MACIN COUNTY COMMUNITY DEVELOPMENT

Mr. Tim Haddad Marin County Community Development Agency 3501 Civic Center Drive San Rafael, CA 94903-4157

Re: Redwood Landfill Solid Waste Facilities Permit Revision Final EIR

Dear Mr. Haddad:

On behalf of the Sierra Club's 7,000 Marin County members, we request a 30day extension to comment on the Final Environmental Impact Report (EIR) for the Redwood Landfill Solid Waste Facilities Permit Revision.

This Final EIR is hundreds of pages long and highly technical. Marin County and its consultants needed almost 20 months to respond to comments on the Draft EIR and substantial changes have been made between the Draft EIR and this Final EIR. Furthermore, recent developments regarding waste from Sonoma have brought new focus to this Final EIR.

We also wish to support the City of Novato's similar 30-day extension request, which notes: "The Final EIR was released during the summer season when many City residents and decision makers are on vacation. In addition, the City Council will not be holding another meeting until September 13, 2005."

We have written this letter in the hope that you will authorize this 30-day extension as soon as possible. In the event that this extension is not authorized, then by the separate letter following, we submit our necessarily ρ is the possible of the separate letter following is possible.

Sincerely,

apply

Gordon Bennett, Chair Sierra Club Marin Group

cc: Marin County Planning Commission

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c/o Bennett 40 Sunnyside Dr Inverness CA 94937 415-663-1881/gbatmuirb@aol.com unities a way about the safe and and with head and compares. ERRA LUB

Mr. Tim Haddad on all bolan secretaria and antiba apata damages with a statistic for and Marin County Community Development Agency & Develop RER ed C. application of the 3501 Civic Center Drive, San Rafael, CA 94956 and a base of the second states of the second s anormana ADB tans assessed tota while accelsrices (#31 and _ resolution)

RE: Redwood Landfill Solid Waste Facilities Permit Revision Final EIR

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The 1958 Land Use Permit must be re-opened and modernized **CEQA Deficiencies in the FEIR must be remedied** the standard st Independent monitoring must be funded and effective and an approximately and the este craectorea e l'établissage0 - vou bistraste annalition bistoriageau a XIE

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Sierra Club Letter dated 9/12/05 to CDA re Redwood Landfill Final EIR Page 2

CEQA Deficiencies to be reported to the Alexandree of the state of the second s

The FEIR's Status Quo Alternative assumes that lack of enforcement would continue; instead the baseline should include only existing *permitted* uses. The FEIR proposes an ex-post facto approval of an otherwise improper lateral expansion of the permitted landfill footprint from 210 to 222.5 acres, The FEIR proposes to relieve WMI from prior conditions of its 1995 Solid Waste Facility Permit, including the reconstruction of the old levee intended to protect wetlands from spillage. The FEIR relieves WMI from its failure to meet state prescriptive standards re liner design and a mandated 5-foot separation of waste from groundwater. The FEIR also relieves WMI from floodplain and SCA violations.

Independent Third Party Monitoring and Oversight.

As the Marin County Department of Health official testified in 1958: "As far as pollution is concerned, if we are ever led to expect in any way shape or form, that there is pollution in San Antonio Creek, ...we can revoke [the use permit] on 24 hours notice," In response to the FEIR proposal that "arranging for third party oversight of the monitoring to eliminate a perceived influence of the monitoring results by the applicant's consultants should only be required if the data collection methods and analyses are suspect," we believe that a fair analysis of FEIR deficiencies and possible violations of the 1958 Use Permit meet the FEIR's independent monitoring standard now. Consequently, a monitoring plan should be prepared and conducted by an engineer independent from WMI and the reports made available at the same time to the County and the publo.

In addition, although not part of this FEIR, we urge the Board of Supervisors to adopt of additional landfill-based fees of \$8.75 per ton with an automatic annual Cost of Living Adjustment to fund four environmental programs;

Countywide Source Reduction and Recycling Surcharge \$	7.25
Host Community Impact Mitigation Fee	0.25
Recycling Education/Job Training Fee	0.25

Wildlife Habitat/Open Space Acquisition Fee was done 0.75 me and 0.75 West Marin Dump Closure Costs (until complete) was done 0.25 me and 0.25

These fees should be imposed on all wastes accepted, whether in- or out-ofcounty. The purpose of the programs is to mitigate the social and environmental costs of their using up Marin County landfill capacity. On going fees finance recycling programs that will reduce waste generated, educate the public about better recycling practices and acquire wetlands or open space to compensate for that being taken by the landfill's current operations. The West Marin Dump fee is to compensate the County for Court-ordered one-time fees and monitoring in connection with the closure of the West Marin Dump, whose refuse is now being delivered to Redwood Landfill.

Thank you for the opportunity to comment on the Redwood FEIR.

Sincerely where a state of the state of the

Gordon Bennett, Marin Group Chair

cc: Planning Commission

Comment Letter S: Gordon Bennet, Chair, Sierra Club Marin Group (September 12, 2005)

S-1. The public comment period for the FEIR was extended from 60 to 74 days. Subsequently, the commenter submitted another comment letter (Comment Letter T), and requested that this letter be withdrawn.

SIERRA CLUB MARIN GROUP

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SIERRA CLUB

Box 3058 San Rafael CA 94912 sanfranciscobay.sierraclub.org/marin c/o Bennett 40 Sunnyside Dr Inverness CA 94937 415-663-1881/gbatmuirb@aol.com

September 26, 2005

Mr. Tim Haddad

Marin County Community Development Agency 3501 Civic Center Drive, San Rafael, CA 94956

RE: Redwood Landfill Solid Waste Facilities Permit Revision Final EIR

(please disregard our 9/12 comment and replace it with this 9/26 comment)

Dear Mr. Haddad:

The Sierra Club, on behalf of our 7,000 Marin County members opposes the certification of this Final EIR and the expansion of the Landfill it would authorize unless amendments are made to conditions under which expansion would occur:

<u>The 1958 Land Use Permit</u> must be re-opened and modernized <u>CEQA Deficiencies</u> in the FEIR must be remedied <u>Independent monitoring must be funded and effective</u>

1958 Land Use Permit:

In 1958, Supervisors granted a one-page permit for a farmer to create a rubbish dump in an environmentally sensitive wetland adjacent to San Antonio Creek. At the permit hearings, a dump representative testified that "At present our plans" are to commence an operation that will be about one mile from the San Antonio Creek boundary...it will be a progressive operation, depending on how many years it remains in effect. It might go to within a couple of hundred feet of San Antonio Creek in future years if it is still in operation." Yet this promise was never incorporated into the 1958 use permit, nor were modern requirements for a liner and leachate collection system. In reviewing this now antiquated 1958 usepermit, Waste Management Inc (WMI), a multi-national conglomerate, seemingly did not see an environmental problem ... instead it saw an economic opportunity and bought Redwood Landfill in the early 1990's. Today garbage is piled within a few feet of San Antonio Creek within its 100-year floodplain and Streamside Conservation Area. By avoiding these environmental protections, WMI appears to be able to profit while still undercutting competitors' rates and heir proposed expansion seemingly wishes to further capitalize on the oversights of the 1958 use permit. But since lateral expansion would trigger the requirement for modern environmental protections. WMI may be attempting to circumvent these protections by building up rather than out. We believe that in spite of its onepage inadequacy, the 1958 use permit, which is the basis of the FEIR, may be being violated by WMI's current and proposed operations. Therefore, a careful review of WMI's adherence to the 1958 use permit should be performed before FEIR certification takes place.

Sierra Club Letter dated 9/26/05 to CDA re Redwood Landfill Final EIR Page 2

CEQA Deficiencies

The FEIR's Status Quo Alternative assumes that lack of enforcement would
continue; instead the baseline should include only existing *permitted* uses. The
FEIR proposes an ex-post facto approval of an otherwise improper lateral
expansion of the permitted landfill footprint from 210 to 222.5 acres. The FEIR
proposes to relieve WMI from prior conditions of its 1995 Solid Waste Facility
Permit, including the reconstruction of the old levee intended to protect wetlands
from spillage. The FEIR relieves WMI from its failure to meet state prescriptive
standards re liner design and a mandated 5-foot separation of waste from
groundwater. The FEIR also relieves WMI from floodplain and SCA violations.3

Independent Third Party Monitoring and Oversight.

As the Marin County Department of Health official testified in 1958: "As far as pollution is concerned, if we are ever led to expect in any way shape or form, that there is pollution in San Antonio Creek, ... we can revoke [the use permit] on 24 hours notice." In response to the FEIR proposal that "arranging for third party oversight of the monitoring to eliminate a perceived influence of the monitoring results by the applicant's consultants should only be required if the data collection methods and analyses are suspect," we believe that a fair analysis of FEIR deficiencies and possible violations of the 1958 Use Permit meet the FEIR's independent monitoring standard now. Consequently, a monitoring plan should be prepared and conducted by an engineer independent from WMI and the reports made available at the same time to the County and the pubic. Precedent for this exists per the Almont Landfill Community Monitor.

Lastly, as a comment on the FEIR and/or request to the Supervisors, we urge adoption of additional landfill-based fees of \$8.75 per ton with an automatic annual Cost of Living Adjustment to fund five environmental programs:

Countywide Source Reduction and Recycling Surcharge \$	7.25
Host Community Impact Mitigation Fee	0.25
Recycling Education/Job Training Fee	0.25
Wildlife Habitat/Open Space Acquisition Fee	0.75
West Marin Dump Closure Costs (until complete)	0.25

These fees should be imposed on all wastes accepted, whether in- or out-ofcounty. The purpose of the programs is to mitigate the social and environmental costs of their using up Marin County landfill capacity. On going fees finance recycling programs that will reduce waste generated, educate the public about better recycling practices and acquire wetlands or open space to compensate for that being taken by the landfill's current operations. The West Marin Dump fee is to compensate the County for Court-ordered one-time fees and monitoring in connection with the closure of the West Marin Dump, whose refuse is now being delivered to Redwood Landfill.

Thank you for the opportunity to comment on the Redwood FEIR.

Sincerely

Gordon Bennett, Marin Group Chair

cc: Planning Commission

Comment Letter T: Gordon Bennet, Chair, Sierra Club Marin Group (September 26, 2005)

- T-1. This comment is preamble. Please see the responses to the following comments.
- T-2. The Conditional Use Permit it not "the basis of the FEIR;" the FEIR addresses proposed revisions to the Solid Waste Facilities Permit. Regarding issues raised about the Conditional Use Permit, please refer to Master Response 103 in this document.
- T-3. The baseline for the EIR analysis only includes existing permitted uses, as described on pages x and xi of the Introduction to the FEIR. The Status Quo Alternative is not used as the baseline in the analysis.
- T-4. The FEIR does not propose to relieve the applicant from prior permit conditions. The applicant is proposing changes to the existing permit conditions. The FEIR analyzes the potential impacts of this proposal.
- T-5. Regarding levee reconstruction, please refer to Master Response 106.
- T-6. See the response to Comment T-4. Regarding the applicant's engineered alternative to the 5-foot separation requirement, see FEIR Master Response 1. See also response to Comment N-18 in the current document.
- T-7. See response to Comment T-4. See also Impact and Mitigation Measure 3.5.6 in the FEIR. See also Master Response 106 in the current document.
- T-8. The circumstances under which a third party monitoring program was established at Altamont Landfill are fundamentally different from the current CEQA process at Redwood Landfill. Third party monitoring was a component of a negotiated settlement agreement at Altamont, not mitigation specified in the EIR for a project. Please also refer to Master Response 111.
- T-9. As no significant impact regarding remaining landfill capacity is identified in the FEIR (see Impact 3.6.7 in the FEIR), the suggested surcharge is not required as a mitigation measure for compensating for depleted landfill capacity. The Mitigated Alternative, as described in Master Response 104 of this document, would require development of additional materials recovery and energy generation capacity at the Redwood Landfill. The Mitigated Alternative also requires consideration of a waste import mitigation fee.

From: Edward Mainland <emainland@comcast.net>

Subject: Redwood Landfill: Revised Solid Waste Facilities Permit; Final Subsequent EIR Date: September 11, 2005 8:38:27 PM PDT To: amorales@co.marin.ca.us, thaddad@co.marin.ca.us

NETHER

Cc: mayor@ci.petaluma.ca.us, ahinds@co.marin.ca.us, cmcglashan@co.marin.ca.us, novatocouncil@ci.novato.ca.us, cmurray@co.marin.ca.us, Susan Adams <sadams@co.marin.ca.us, DEVEL psmith@co.marin.ca.us, hbrown@co.marin.ca.us

LETTER TO MARIN COUNTY'S COMMUNITY DEVELOPMENT AGENCY and MARIN COUNTY PLANNING COMMISSIONS

Dear Sirs/Mesdames:

Sustainable Marin and Sustainable Novato wish to go on record as opposing the expansion of the Redwood Landfill. We urge you to do so as well and to take all appropriate measures against expansion. We believe expansion will not benefit residents of Marin County but rather the dump's corporate owners.

We also urge you to lend your support to re-opening the 1958 Land Use Permit of the landfill and taking back oversight functions so the Marin residents can return this important function to direct, democratic, **community control**. This decades-old permit no longer fits current circumstances: one of its particularly egregious flaws is its failure to stipulate conditions for land use.

We further urge you to support enactment of an ordinance by Marin County's Board of Supervisors to increase fees on out-ofcounty dumping as other jurisdictions have done. This will discourage import of solid waste to our landfill, extend its useful life and **3** impel out-of-county municipalities to do more to reduce, reuse and recycle their own waste.

We are concerned that expansion of the landfill will do nothing to promote greater waste reduction, reuse and recycling by residents of Marin County and other landfill users. If taken literally, the guiding principles of sustainability -- which are the central, strategic theme of Marin's draft Countywide 10-Year Plan -- imply acceleration of alternatives to Marin landfill disposal. We believe local government agencies need to install solid waste management as a fundamental element of planning. There must be new impetus toward contingency planning, closure and abatement. Starting immediately, there must be timely, competent analysis of alternative options, technologies and site locations.

Eventually, a truly sustainable community would organize itself to achieve a virtual zero-net-waste condition. That would prolong the life of any existing landfill far beyond current estimates. Sustainable communities do not export their wastes. As a matter of principle, they take care of their own residues, effluents and trash without shifting the burden to other municipalities and/or counties. Marin County has a creditable record in reducing solid waste. Now it must transcend its own record to guarantee a sustainable future for our generations to come.

If the past is any guide, the proposed expansion will hasten the transformation of the landfill into a major, regional garbage dump but will do little to prolong the dump's useful life, owing to substantially increased out-of-country tonnage, which we understand accounts for most of the landfill's increased business since the last expansion. The projected expansion reportedly will extend the dump's useful life only a few years. For whom? Certainly not Marin.

The problematic past record of Redwood Landfill's owners and operators itself makes a strong case against allowing further selfmonitoring and self-regulation. We ask you to consider requiring the posting of a penalty bond, insurance to remedy risk, and a fund to pay for the need of Novato and other jurisdictions to dump their garbage elsewhere in coming years.

The dump's proximity to environmentally sensitive bay lands and habitat heightens the ever-present risks of serious damage from earthquakes, sea level rise and extreme storms which may destabilize greatly heightened layers of trash and garbage -- "steeper, more massive", as much as 16 stories high. These are legitimate concerns that, in our view, haven't been satisfactorily answered. Katrina's hurricane devastation to New Orleans illustrates the danger in allowing public infrastructure to accumulate unmitigated risks -- in that case, sinking, deteriorating levees -- until disaster strikes and imposes horrific costs. The same principle applies to this landfill expansion, where slumping, washout and toxins are likely threats to surrounding areas if seismic-induced failure or extreme weather events occur.

Air pollution, including emissions of greenhouse gases during the landfill's active life and beyond, is an environmental impact that the corporate owners apparently cannot satisfactorily mitigate or eliminate. This is unsatisfactory, from a sustainability viewpoint.

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Out-gassing of methane -- 20 times more powerful a greenhouse gas than CO2 -- can no longer be allowed at a time when scientists tell us a 60 percent reduction of these gases is imperative as soon as possible lest global warming and drastic climate disruption exceed tolerable limits.

The landfill's owners will try to convince our leaders that even though there are major problems that cannot be totally mitigated, there are "over-riding benefits for our community." Talk about garbage, that strategy is as smelly as their proposal.

Sustainable Marin

(for) Aul Harry Moore, President

Sharyn Moore, President Sharyn Moss, Vice President John D. Quinley, Treasurer Edward Mainland, Secretary John Schlag Jack Kaplan

September 11, 2005

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Comment Letter U: Sustainable Marin

- U-1. This comment addresses the merits of the project, not the EIR analysis.
- U-2. Please refer to Master Response 103.
- U-3. A waste import mitigation fee is identified in the FEIR as Mitigation Measure 3.6.4b and in the Mitigated Alternative (see discussion of the Mitigated Alternative in Master Response 104 of this document). See also Master Response 8 in Volume II of the FEIR.
- U-4. The mitigated alternative is presented in the FEIR as an alternative that is more in line with the County's sustainability principles, and that reduces the reliance on disposal of solid wastes. See the discussion in Master Response 104 of this document. See also the response to Comment C-13 in this document.
- U-5. Development of Redwood Landfill as a regional facility is discussed in Master Response 19 in the FEIR. Site life is discussed in Master Response 21 in the FEIR, and further evaluated in Master Response 107 in the current document.
- U-6. The applicant's record of regulatory compliance is discussed in Master Response 18 in the FEIR. Regarding financial assurances, please see the response to Comment J-13 in the FEIR and the response to Comment II-6 in this document.
- U-7. Regarding seismic stability calculations used by the applicant, and the EIR consultant's peer review of these calculations, please see Master Response 108. Regarding levees, please see Master Response 106.
- U-8. The significant, unavoidable air quality impacts of the project are described in the FEIR; see the summary on pages 1-9 and 1-10 of Volume I of the FEIR. Please note that the Mitigated Alternative would reduce air quality impacts compared to the proposed project, but would probably not reduce all air quality impacts to a less-than-significant level. See the discussion in Master Response 20 in the FEIR and Master Response 104 of this document. Regarding greenhouse gas emissions and global climate change, see Master Response 112 of this document.
- U-9. Since the FEIR identifies significant, unavoidable environmental impacts of the project, the County Environmental Health Services Division must adopt a "statement of overriding considerations" if it approves the project. Please refer to CEQA *Guidelines* §15093.

TRANSPORTATION SOLUTIONS DEFENSE AND EDUCATION FUND

16 Monte Cimas Avenue Mill Valley, CA 94941 415-380-8600 383-077628 StP 12 A 11: 2

September 11, 2005 MARIN COUNTY By Hand Delivery CONMUNITY DEVELOPMENT

Tim Haddad, Environmental Coordinator Marin County Community Development Agency 3501 Civic Center Drive, Room 308 San Rafael, CA 94903

Re: Redwood Landfill FSEIR

Dear Mr. Haddad:

The Transportation Solutions Defense and Education Fund, TRANSDEF, is an advocate for the regional planning of transportation, land use and air quality. Our involvement in Bay Area air quality planning, along with our knowledge of Marin's local transportation issues, provides us with a unique perspective from which to offer comments on the Final Supplemental Environmental Impact Report for the Redwood Landfill Solid Waste Facilities Permit Revision ("FSEIR").

TRANSDEF's comments are focused on recommendations for further mitigations for the project's significant unavoidable impacts to air quality. However, we note that the State Air Quality Standards cited in Table 3.2-2 are out of date, failing to include the recently adopted State 8-hr. Ozone and PM-2.5 standards, and indicating an incorrect PM-10 annual average standard. The absence of an analysis of PM-2.5 Existing Conditions, Project Impacts, and Proposed Mitigations makes the Air Quality section of the FSEIR inadequate. PM-2.5 emissions have been regulated separately by the State because their serious consequences to human health are distinct from those of PM-10 emissions. (See <u>www.arb.ca.gov/regact/aaqspm/revfsor.pdf</u>) An EIR is presumptively inadequate if it ignores emissions deemed significant enough by the State to require regulation. (For further justification of the new ozone standard, see <u>www.arb.ca.gov/regact/ozone05/res0531.pdf</u>)

We are further concerned that the increases in the emissions of criteria air pollutants (Table 3.2-6) are not shown juxtaposed to the baseline conditions (Table 3.2-4). It is alarming to note the scale of the increases: NOx more than doubles while ROG and PM increase greatly. Even after identifying significant unavoidable environmental impacts, the FSEIR proposes nothing in the way of active mitigation measures to reduce these impacts (what is proposed is passive, and would be done by the sponsor anyway). The FSEIR places the economic concerns of the project sponsor ahead of the public's health, and timidly lets environmental quality be degraded. We dissent.

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TRANSDEF

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Mitigation

TRANSDEF's experience with regulatory agencies is that they seldom go as far as the law authorizes in requiring the mitigation of significant environmental impacts. To do more to protect the public health, TRANSDEF has found it necessary to sue BAAQMD, CARB and the USEPA. TRANSDEF finds the following mitigation measures proposed by the FSEIR to be inadequate, and recommends additional mitigations as being both feasible and capable of reducing the project's impacts on air quality:

<u>3.2.2b</u> We are unclear of the precise legal interpretation meant for the added phrase "to the extent that these materials are commercially available to Redwood Landfill." Ultra-low sulfur fuel is now in use by several Bay Area transit agencies. Whether Redwood's demand would be large enough for a supplier to find them attractive to serve as a separate customer is unknown. For the period prior to the mandatory statewide conversion to ultra-low sulfur fuel, the mitigation measure should require that fuel's use by Redwood as long as it is available to Bay Area transit districts.

<u>3.2.2c</u> While Appendix D Table D-4 shows off-road project operations doubling (9,507 to 19,301 hp-hours/day) from Year 2001 to 2005, the proposed mitigation doesn't even try to actively reduce the increase in emissions to a level of insignificance. Because the project proposes to increase the volume of material arriving daily, the project sponsor has the duty to mitigate the impacts of its actions. The measure should be rewritten to require Redwood to purchase as much new off-road equipment as can be legally mandated, to both replace its existing diesel equipment (BAAQMD Sources S-38, S-40, S-45, S-46, S-47, S-48 and S-49) and fill the need to handle the additional incoming material.

Because diesel particulate matter has been classified as a toxic air contaminant in California, there is ample justification to require the use of the Best Available Control Technology, namely diesel engines that meet the current State 2004 emissions standards. It may well be possible to eliminate the increase in emissions of ozone precursors and TACs with a complete diesel equipment replacement, thereby reducing the air quality impacts to a level of insignificance. Even if that is not possible, the FSEIR has an obligation to mitigate impacts to the maximum feasible amount. "A public agency shall not decide to approve or carry out a project for which an EIR was prepared unless ... the agency has eliminated or substantially lessened all significant effects on the environment where feasible..." (CEQA Guideline Section 15092(b)) Allowing the replacement of toxic-spewing equipment to dawdle until it is justified in business terms is no way to protect the environment or public health.

<u>3.2.2d</u> It is unclear from the text whether the use of the term "collection vehicles" is intended to exclude the larger vehicles that are used to transport waste from transfer stations to the Landfill. Such trucks are exempt from the Solid Waste Collection Vehicle Fleet Rule (www.arb.ca.gov/msprog/swcv/swcv_g&a.htm#3):

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"Q: To which of my trucks does the rule apply?

"A: The rule applies to solid waste collection vehicles starting with the 1960 model year. A "solid waste collection vehicle" is defined as an on-road heavy-duty vehicle (gross vehicle weight over 14,000 lbs.) used to collect residential and commercial solid waste for a fee. Roll-off vehicles, side loaders, rear loaders, and front loaders are all included, **but transfer trucks are not.**" (Emphasis added)

Because the project's increased on-road emissions are its most significant air quality impacts (see Table 3.2-6), more needs to be done with Measure 3.2.2d. We propose the following: Because collection vehicles are already regulated by the State, that part of the mitigation can be considered adequate. Because transfer trucks are not regulated by the State, the Landfill should be required to screen incoming trucks to ensure that transfer trucks meet the current State 2004 emissions standards prior to unloading.

A further mitigation measure becomes feasible if the Sonoma-Marin Area Rail Transit District commences passenger rail operations on the Northwestern Pacific Railroad. With the track and bridges repaired, it would be easy to ship waste by rail from the Jacoby Street Transfer Facility, which is located adjacent to the rail line, as is the Landfill itself. Not only could the mitigation measure be written to require rail shipment where and when it becomes available, the project sponsor could be required to pay into a mitigation fund to purchase a new technology clean air locomotive. Battery power and hybrid power are being developed now for freight railroads, with zero or much lower emissions. This mitigation would provide multiple benefits: the basic freight service would be cheaper than shipping by truck; it would reduce both the traffic impacts and the air emissions impacts of trucks on Highway 101; and would consume less energy per ton of waste hauled.

<u>3.2.8c</u> We vigorously disagree with the statement "If Mitigation Measures 3.2.2a-d (as revised in this FEIR) are adopted on the existing equipment, diesel PM emissions from off-road equipment can be reduced to levels that are less than significant." (p. 3.2-46). It is directly contradicted by the text on the preceeding page, which states "The incremental health risk at the offsite receptor from heavy equipment is estimated to be 18 new cancer cases for every million people exposed. This exceeds the significance threshold of 10 new cancer cases for every million people exposed." (p. 3.2-45). It is also contradicted by "The project would result in a substantial increase in the emissions of toxic air contaminants, with consequent effects on human health." (p. 1-12). We insist that the faulty conclusion be revised, and recommend that the appropriate way to reduce the public health risks is by implementing the mitigation measures described above.

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In addition, it is untrue that "Alternatively, all off-road diesel equipment at the site could be retrofitted with diesel particulate traps that are capable of removing over 85 percent of the diesel PM emissions, though this in itself would not reduce NOx emissions." (p. 3.2-46). Older engines built prior to the new regulations cannot be retrofitted. This is why it is important to have new engines installed (repowering) or to have the equipment replaced.

<u>3.2.11 and CU-2</u> We find the absence of proposed mitigation measures here unacceptable. Vigorous efforts to reduce mobile source emissions, as suggested above, would help reduce the combined emissions from project operations and reduce the cumulative air pollutant emissions. Given the fact that the Bay Area is nowhere near able to maintain the healthful air quality prescribed by the State ozone standard, it would be tremendously irresponsible to approve a project that provides no benefits to the county yet increases regional emissions--without having first required the business that plans to profit from the increased landfill activity to make every effort to mitigate.

<u>3.6.4b</u> These mitigation measures are the key to eliminating the project's harmful impacts on the residents of Marin County. The increase in the rate of landfilling activity caused by importing more material from outside the County would lead to the faster consumption of landfill capacity. This will inevitably lead to higher disposal fees on County residents as waste gets shipped farther and farther away, not to mention the attendant traffic, energy and air quality impacts of long distance shipping. As written, the second proposed measure is timid and potentially ineffective: "The County will consider the enactment of an ordinance that would impose a mitigation fee on waste imported to Redwood Landfill from areas of California outside Marin." (p. 3.6-17)

TRANSDEF proposes that the measure instead read: "To ensure that Marin residents can maintain adequate landfill capacity consistent with sound solid waste planning, the County may enact an ordinance that imposes a high enough mitigation fee on waste imported to Redwood Landfill from areas of California outside Marin to make such importation economically undesirable." Language along those lines could be useful in the future, if RLI starts using up its capacity the way Pacific Lumber has been liquidating its forest assets.

Because the higher future costs of waste disposal in a distant landfill would fall on County residents, the measure should be written in such a way that an eligible recipient of mitigation funds would be a fund that reduces the bills of current residents. Another way to express this concept is that the mitigation fee should be priced to make importing waste cost as much as the current replacement cost of landfill capacity. There certainly is no reason why we should be subsidizing other counties by selling our capacity at less than its replacement cost.

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TRANSDEF

9/11/05

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Land Use and Planning–Cumulative Impacts Even though the "Widening of U.S. 101" is listed in Table 4-1 as a project that could combine with the project to create cumulative effects, no mention is made of an alternative being studied in the Caltrans environmental document that places a full interchange adjacent to the Landfill. TRANSDEF is concerned that such a project would have significant land use and planning impacts on the area surrounding the Landfill. It would be useful to formally determine that, in order to reduce the impacts of such a future project to insignificance, it should not be allowed to go forward until and unless the Landfill is closed.

TRANSDEF appreciates this opportunity to provide its comments and expertise on behalf of the people of Marin County. Please contact us at the address above for further information or explanation.

Sincerely,

evid Achonbum

David Schonbrunn, President

Comment Letter V: David Schonbrunn, Transportation Solutions Defense and Education Fund

- V-1. This comment is preamble to the following comments and requires not response.
- V-2. Please see response to Comment O-8 in this document in regards to the State and Federal ambient air quality standards and adequacy of analysis. Also, Table 3.2-2 on page 3.2-13 and the last paragraph on page 3.2-12 of the FEIR have been revised as follows (additions shown as underlined; deletions as strikeout):

The BAAQMD's monitoring station located closest to the project site is in the City of San Rafael, roughly 15 miles south of the project site. <u>The San Rafael station</u> measures ozone, carbon monoxide, and PM-10, which are summarized below for the years 1997 through 2005 (Tables 3.2-2a and 3.2-2b). The only station in Marin County that measures PM-2.5 is in Point Reyes. Data from the Point Reyes station is summarized for the years 2002 through 2005 in Table 3.2-2b. Data collected at thesethis stations is considered to be generally representative of air quality in the region surrounding the project site. Table 3.2-2 summarizes the highest annual concentrations of ozone, carbon monoxide, and PM-10 for the most recent years available (1997-2001) and compares ambient air pollutant concentrations with the state standards, which are more stringent than the corresponding national standards. The health effects of each of these pollutants, and the sources and concentrations of these pollutants are discussed below.

	State		Monitoring Data by Year				
Pollutant	Standard ^b	1997	1998	1999	2000	2001	
San Rafael							
Ozone (O3):							
Highest 1-hr. average, ppm ^a	0.09	0.11	0.07	0.10	0.07	0.09	
Number of exceedances		1	0	2	0	0	
<u>Carbon Monoxide</u> (CO):							
Highest 1-hr. average, ppm	20	6	6	6	4	5	
Number of exceedances		0	0	0	0	0	
Highest 8-hr. average, ppm	9.0	2.6	3.3	2.9	2.3	2.4	
Number of exceedances		0	0	0	0	0	
Particulate Matter (PM-10):							
Highest 24-hr. average, μg/m ³	50	72	52	76	40	79	
Exceedances/Samples ^C		2/61	1/61	2/61	0/61	2/61	
Annual Geometric Mean, μg/m ³	30 20	20	18	19	18	18	

 TABLE 3.2-2a

 SAN RAFAEL AIR POLLUTANT SUMMARY (1997–2001)

^a ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

^b State standard, not to be exceeded.

c PM-10 is usually measured every sixth day (rather than continuously like the other pollutants). "Exceedances/ samples" indicates the number of exceedances of the state standard that occurred in a given year and the total number of samples that were taken that year.

NOTE: Values shown in **bold** type exceed the applicable standard.

SOURCE: California Air Resources Board (CARB), www.arb.ca.gov/adam, 2002.

In order to provide more recent and additional monitoring data, Table 3.2-2b has been inserted into the FEIR, page 3.2-13, as follows; no underlining is used in order to make the table more easily legible:

				,	
		Monitoring Data by Year			
Pollutant	Standard ^b	2002	2003	2004	2005
San Rafael Monitoring Station					
Ozone (O ₃):					
Highest 1-hr. average, ppm ^a		0.077	0.087	0.091	0.081
Days over State Standard	0.09	0	0	0	0
Days over National Standard	0.12	0	0	0	0
Highest 8-hr average, ppm		0.056	0.067	0.063	0.059
Days over National Standard	0.08	0	0	0	0
Carbon Monoxide (CO):					
Highest 8-hr. average, ppm		2	2	2	2
Days over State Standard	9.0	0	0	0	0
Days over National Standard	9.0	0	0	0	0
Particulate Matter (PM-10):					
Highest 24-hr. average, μ g/m ³		73	41	52	39
Days over State Standard	50	3	0	1	0
Days over National Standard	150	0	0	0	0
State Annual Average, μ g/m ³	20	22	18	18	17
Point Reyes Monitoring Station					
Fine Particulate Matter (PM-2.5):					
Highest 24-hr. average, μ g/m ³		70	32	52	43
Days over National Standard	65	NA	NA	NA	NA
State Annual Average, μ g/m ³	12	NA	NA	NA	NA

TABLE 3.2-2b SAN RAFAEL AIR POLLUTANT SUMMARY (2002–2005)

^a ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

b State and National standards, not to be exceeded.

^c PM-10 is usually measured every sixth day (rather than continuously like the other pollutants).

NOTE: Values shown in **bold** type exceed the applicable standard. NA = Data is Not Available

SOURCE: California Air Resources Board (CARB), www.arb.ca.gov/adam, 2006.

V-3. The emission values depicted in Table 3.2-6 on page 3.2-29 of the FEIR already represent the incremental increase in unmitigated criteria pollutant emissions generated by the project versus baseline conditions (shown in Table 3.2-4). Also, as noted in Table 3.2-6, the incremental increase of project-generated emissions of ROG, NOx, and PM-10 would

exceed the BAAQMD significance criteria without mitigation. Please see also response to Comment U-8 in regards to the significant air quality impacts of the project.

- V-4. The commenter does not find some of the mitigation measures to be adequate and recommends some additional measures as well. Comment noted. Individual comments and suggestions are addressed below in responses to Comments V-5 through V-12.
- V-5. Mitigation Measure 3.2.2b on page 3.2-31 of the FEIR has been clarified as follows (additions shown as <u>underlined</u>; deletions as strikeout):

Mitigation Measure 3.2.2b: The project applicant shall use ultra-low sulfur fuel (with low sulfur and low aromatic content) in combination with a fuel additive (such as $Puri-NO_x$) in all diesel-powered off-road equipment to minimize NO_x emissions to the extent that these materials are <u>available to Bay Area transit</u> <u>agencies and may be</u> commercially available <u>purchased by the to-</u>Redwood Landfill <u>as well</u>. Products such as this can reduce NO_x emissions by roughly 14 percent.

- V-6. Mitigation Measure 3.2.2c will require the replacement of aging equipment with new equipment over a number of years. The existing diesel equipment is part of the baseline and CEQA does not require reducing baseline project emissions. Please note that the Mitigated Alternative would reduce air quality impacts compared to the proposed project, but would not reduce all air quality impacts to a less-than-significant level. See the discussion in Master Response 104 in this document.
- V-7. In order to clarify the reduction of diesel PM health risk, Mitigation Measure 3.2.8c (page 3.2-46 of FEIR) has been revised as follows (additions shown as <u>underlined</u>; deletions as strikeout):

Mitigation Measure 3.2.8c: New federal regulations for offroad diesel equipment were promulgated in May 2004. These regulations require that, starting in 2010, new equipment will have to reduce emissions of NOx and diesel PM by about 90%. However, any equipment already in use at the time of the new regulation would be grandfathered and would not have to meet the new emissions limits. Since this equipment can operate for many years before needing replacement, future emissions would be at a higher rate. If Mitigation Measures 3.2.2a-d (as revised in this FEIR) are adopted on the existing equipment, diesel PM emissions from off-road equipment can be reduced to levels that are less than significant. Some of the measures specified to reduce NO_x emissions, such as the use of natural gas as an alternative fuel, would also reduce diesel PM emissions. Use of alternative fuels can reduce fine PM emissions by as much as 90 percent, and electrically-powered equipment does not emit any diesel PM. Alternatively, all offroad diesel equipment at the site could be retrofitted with diesel particulate traps that are capable of removing over 85 percent of the diesel PM emissions, and since diesel equipment with diesel PM traps must use ultra low sulfur fuel, this would also reduce NOx emissions. though this in itself would not reduce NO_x emissions. Therefore, the incremental health risk associated with offroad diesel equipment would be reduced from 18 in a million to 2.7 (with diesel PM traps) or less (with

electric or natural gas fueled engines) new cancer cases for every million people exposed.

Also, the Level of Significance after Mitigation discussion (page 3.2-46 of FEIR) has been revised accordingly:

Level of Significance After Mitigation

Mitigation Measure 3.2.8c will reduce this impact to a less-than significant level, with an incremental health risk from offroad diesel equipment of 2.7 or less in a million and a total combined incremental health risk from all sources of 4.7 or less new cancer cases for every million people exposed. Mitigation Measure 3.2-8d will further reduce the significance of this impact.

- V-8. As transfer trucks age and require replacement, the diesel PM emissions from new onroad trucks after 2007 will be reduced because the trucks will have to comply with the Federal regulations. The Mitigated Alternative, discussed in Master Response 104 in this document, would have lesser air quality impacts than the proposed project.
- V-9. Because the Northwestern Pacific Railroad is not functional, the suggested mitigation measure is not feasible at this time. Neither the Marin Resource Recovery Facility nor the Redwood Landfill has a rail spur, nor does either facility have an intermodal transfer facility. Development of such facilities would likely result in significant environmental impacts; in any event, analysis of this suggestion is beyond the scope of this EIR. Therefore, the suggested mitigation measure is infeasible at this time.
- V-10. Please see response to Comment V-7 above for a discussion of health risk associated with diesel PM. As described in that response, either the use of diesel particulate filters (which also require the use of ultra low sulfur fuel) or alternatively fueled engines (electric or natural gas) would reduce the incremental health risk below 10 in a million. The commenter's 'contradictions' are taken out of context and do not affect the impact significance. For instance, the quote that "the incremental health risk at the offsite receptor from heavy equipment is estimated to be 18 new cancer cases for every million people exposed. This exceeds the significance threshold of 10 new cancer cases for every million people exposed" is taken out of context since this 18 in a million health risk is prior to mitigation. The FEIR conclusion that Mitigation Measure 3.2.8c would reduce the health risk from off-road diesel equipment to less than significant is correct.

The commenter cites the identified incremental health risk before mitigation. As discussed and quoted in this comment, the EIR indicated the incremental risk (before mitigation) exceeds the established significance criteria. The conclusion referenced in this comment is for the impact following implementation of the identified mitigation.

V-11. Older engines, contrary to the commenter's assertion, can be retrofitted with diesel particulate traps. Many of the diesel particulate traps in production are muffler or silencer replacement units that fit in the exhaust system. For additional information, please see the

following manufacturer webpages: (http://www.cleanairsys.com/products.htm) and (http://www.dieselnet.com/nett/index.html?nettSL).

- V-12. Both Impact 3.2.11 and Impact CU-2 on pages 3.2-50 and 4-7 of the FEIR, respectively, already have associated mitigation measures. See Mitigation Measure 3.2.11 and Mitigation Measures CU-2a and CU-2b. Please see also response to Comment O-23 for a discussion of cumulative impact analysis adequacy.
- V-13. The authority to enact an ordinance imposing an import mitigation fee rests with the County Board of Supervisors. The language used in Mitigation Measure 3.6.4b in the FEIR is therefore appropriate. The potential uses of mitigation funds stated in the mitigation measure are appropriate.
- V-14. The overcrossing at Redwood Landfill has been completed and only provides access to the private road leading to the landfill. The comment is correct that alternatives under consideration for the Widening of U.S. 101 project listed in Table 4-1 include changes to the overcrossing, according to Draft Environmental Impact Report /Draft Environmental Impact Statement (DEIR/DEIS) for the Marin Sonoma Narrows (MSN) HOV Widening Project. The DEIR/DEIS was released by Caltrans for public comment in October 2007 (California Department of Transportation, 2007). According to the DEIR/DEIS several access options involve the Redwood Landfill access road, include conversion of the landfill overcrossing to a diamond interchange and new frontage roads that provide access to the landfill and the marina on the east side of the freeway and access to other points on the west side of the freeway. Access to the landfill and marina is currently available directly from the highway, but this could be interrupted or modified with construction of a freeway and an access option affecting the landfill access road. The appropriate place to express an opinion on the alternatives under consideration would have been in comments on the DEIR/DEIS (posted at the Caltrans website -http://www.dot.ca.gov/dist4/msn/index.html; however, the public comment period closed December 14, 2007.



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2005 SEP -7 P 2:56

MARIN COUNTY COLMERSTY DEALOPMENT STUMOS

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Bruce Baum 1165 Butterfield Road San Anselmo, CA 94960 <u>B-baum@comcast.net</u> Voice: 415.459.5859 Fax: 415.459.5110

September 7, 2005

Mr. Tim Haddad, Environmental Coordinator Marin County Community Development Agency 3501 Civic Center Drive, Room 308 San Rafael, California 94903

RE: Redwood Landfill Solid Waste Facilities Permit Revision SCH No 1991033042 - Dated July 2005

Dear Mr. Haddid,

I am writing to commenting on the Final Environmental Impact Report (FEIR) for Waste Management's Redwood Landfill (RLF), in Novato. I find the overall plan to expand is unacceptable; in this letter I will focus my comments on three specific aspects.

Hydrology and Water Quality

The terms "100 year storm", "100 year flood" and "24 hour precipitation event" do not belong in the FEIR. They do not reflect the recent weather changes which have impacted Marin County, the U.S., and the world.

Marin has had "100 year floods" twice in the past twenty five years. The U.S. had our 11th warmest year in recorded weather history last year while the world had the warmest year ever. Global warming is projected to cause sea levels to rise as much as three feet in thirty years. Yet currently during merely average high tides the RLF is less than three feet above sea level.

The RLF has repeatedly pumped overflowing leachate and storm water ponds into San Antonio Creek during past storms. Yet Waste Management offers no better plan to handle overflowing ponds in the future. This is evidenced by correspondence between Waste Management and the Regional Water Quality Control Board dated May 4, 1998 to Doug Diemer, Site Manager, RLF (attachment #1). Section 3.4.7 does not adequately address the issues.

The levees around the property on the San Antonio Creek, and the sloughs, surrounding property's perimeter were supposed to be improved in 1995. But

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Mr. Tim Haddad September 7, 2005 Page 2 of 2

they weren't. Now they are old, low and weak, prone to break down under stress.

The FEIR does not assure protection using the "100 year" and "24 hour precipitation" probability. The FEIR is neglecting the realities of what is happening today.

Biological Resources

The FEIR refers to the last formal study done for endangered species in 1992. Both Clapper Rail, on the Federal endangered species list, and Black Rail, listed by the state as endangered, are known to inhabit the marsh area adjacent to the RLF. Studies (attachment #2) conducted in 1994 in the Petaluma Marsh for the California Department of Fish & Game and a more recent study conducted for the Marin Audubon, owner of an adjacent property, have found evidence of nesting Rails.

I am requesting that a formal study of endangered and threatened species of Rails be conducted prior to any approvals of the Solid Waste Permit expansion.

Mitigation

The FEIR places mitigation plans and actions responsibility solely on Waste Management's RLF.

The FEIR should not allow RLF to design and implement their own mitigations to violations without oversight from independent monitoring.

Thank you for considering my comments.

Very truly yours,

Bruce Baum

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DATE: 5/4/98

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BAUM Letter SEPT 7, 2005

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San Francisco Bay Regional Water Ouality **Control Board**

2101 Webster St. #500 Oakland, CA 94612 (510) 286-1255 FAX (510) 286-1380

Doug Dieme	Redwood Landfill	1997 - 1997 - 1994 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997	in the Second		
Site Manage	Redwood Landfill	. Inc.		111 A. 445 A	en in de Les n
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Novato, CA	94948	and the second	un e tan A	geng an an training an	n Alta o ant age con co

Subject: Emergency onsite discharge of water from Leachate Pond

The second state second as File No. 2159.5065 (ADF)

Dear Mr. Diemer: the start of the second s State of the no man a standar a secondar a s

This is in reply to your letters dated March 12 and 26, 1998, in which you describe the release of water from the landfill's leachate pond during significant rainfalls during the month of February 1998. You indicated the intent of the release was to prevent the possible overflow from, or the failure of, the pond.

You initially requested permission to evacuate the water from the leachate pond directly to San Antonio Creek. We did not give permission for this. You then elected to pump the leachate to an onsite channel tributary to the site's stormwater basin, which then overflowed into the adjacent San Antonio Creek. Between February 13 and 25, approximately 8.6 million gallons was pumped from the leachate pond. The discharge volume from the stormwater pond is not known. You submitted analyses of both the leachate pond water and the stormwater basin water, for conventional parameters as well as metals and organics. You also sampled the water accumulated in your Main Sludge Impoundment, in anticipation of its also overflowing, but apparently no overflow took place.

Your analyses of the stormwater pond, as it discharged to San Antonio Creek, showed that several constituents exceeded Basin Plan effluent limitations. The average nickel concentration was 85 ppb (vs. the Basin Plan limit of 7.1), the average zinc concentration was 179 ppb (vs. a limit of 58), the average BOD was 48 (vs. a 7-day average limit of 45) and lastly, the pH ranged between 5.63 and 6.65 (vs. a limit of 6.5 to 8.5).

The discharge of leachate to the stormwater pond represents a violation of your Waste Discharge Requirements, contained in Board Order No. 95-110, as well as your Industrial Activities Stormwater General Permit. In consideration of the heavy rainfall this winter, we are not electing to recommend imposition of administrative civil liability at this time, though we will consider it for future discharges of leachate or sludge, particularly if it appears that the discharges could have been prevented through proper management prior to or during wet weather.

Č. **Recycled** Paper

Our mission is to preserve and enhance the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations. 9

Altachment#1

Pete Wilson

Goormor

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Accordingly, we are requesting the submission of a plan for improving the leachate management. The plan should compare the average generation rate with available storage and disposal capacity, and to see how much freeboard is available for differing rainfall return periods. If there is insufficient storage, options for improvement are requested.

We are requesting a similar analysis for improving the sludge management. While reportedly there was not an overflow from your main sludge impoundment, you built a spillway in anticipation of an overflow. Despite an obviously full pond, you apparently continued to receive sludge daily. Thus we are requesting a plan for management of the sludge so as to prevent the need for an overflow, to include the option of halting sludge receipt until sufficient storage is available.

The above information is to be received by June 15, 1998. Please note that this is a formal request for information pursuant to Water Code Section 13267(b). Failure to respond or late response to this request may subject you to civil liability imposed by this Board. All requests for an extension of the due date must be confirmed in writing by Board's staff. If you should have any questions, feel free to call Alan Friedman of my staff at (510) 286-0579.

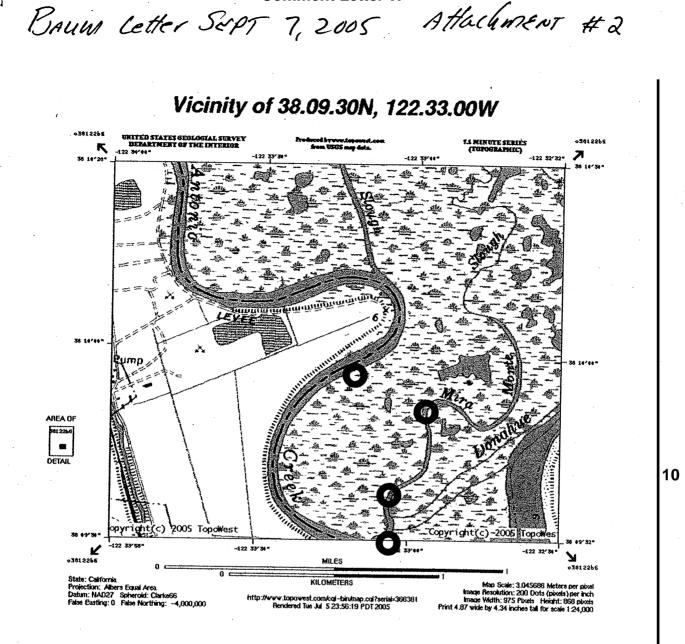
Sincerely.

Inette K. Barsamer

Loretta K. Barsamian **Executive** Officer

cc:

Ed Stewart, Marin County Environmental Health



Clapper Rail detections at San Antonio Creek, Marin County California.

Red circles indicate locations of California Clapper Rails (*Rallus longisostris obsoletus*) detected during a synoptic survey of San Francisco Bay tidal wetlands in the early 1990s. Subsequent field investigations have not been conducted, however the continued presence of this species at Black John Slough, Bahia Channel, and contiguous wetlands downstream suggest continued presence in the San Antonio Creek drainage.

Reference:

Collins, J., J.G. Evens, and B. Grewell. 1994. A synoptic survey of the distribution and abundance of the California clapper rail, *Rallus longirostris obsoletus*, in the northern reaches of the San Francisco Estuary during the 1992 and 1993 breeding seasons. Technical Report to <u>California Department of Fish and Game</u>.

Jules Evens, Avocet Research Associates. 415/663-1148 < jevens@svn.net>

Comment Letter W: Bruce Baum, Letter of September 7, 2005

- W-1. This comment is preamble to the following comments.
- W-2. The terms "100 year storm", 100 year flood" and "24-hour precipitation event" are indispensable statistical measures commonly used in planning studies. As the climate changes, the figures represented by these terms will also change.
- W-3. Regarding sea level rise, please refer to Master Response 106. Regarding elevations of the landfill site, as stated in the FEIR (p. 3.4. 1) elevations in areas not overlain by refuse range from -3 to +5 feet relative to mean sea level. The site is surrounded by a levee which is planned (as per previous CEQA review and existing approvals) to be increased from its current height of approximately 6-9 feet above mean sea level (msl), to 9 feet above msl (see FEIR Chapter 2, Project Description, and Section 3.5) To ensure that this planned improvement to the site levees is undertaken in a timely manner, FEIR Mitigation Measure 3.5.6, specifically states that the landfill's perimeter levee shall be constructed to 9 feet above mean sea level; this would place the top of the levee 2-3 feet above the anticipated level of the 100-year flood.
- W-4. Please refer to Impacts and Mitigation Measures 3.4.7 and 3.5.9 in the FEIR; see also the response to Comment K-16 and the updated discussion of the leachate management system in Master Response 105 in the current document.
- W-5. Please see Master Response 106.
- W-6. The commenter is referred to Impacts and Mitigation Measures 3.5.6 and 3.5.9 in the FEIR and Mitigation Measure 3.5.6d in Master Response 106.
- W-7. Please refer to Master Response 102.
- W-8. Please refer to the Mitigation Monitoring and Reporting Program (Appendix A in Volume II of the FEIR) for public agency oversight responsibility for each mitigation measure.
- W-9. The County acknowledges receipt of this letter.
- W-10. Please refer to Master Response 102.

Barnard, Cynthia

From:	Bruce Baum [b-baum@comcast.net]

Sent: Friday, September 16, 2005 4:01 PM

To: Barnard, Cynthia

Subject: 2005SolidWasteFee Survey

Per our discussion.

Site Name	County		FEES		County	State	TOTAL	
		LEA		Disposal	Total	FEES	FEES	
Altamont Landfill (1)	Alameda	\$0.22	\$11.02	\$0.95	\$13.59	\$1.40	\$14.99	
Vasco Road Landfill (1)	Alameda	\$0.22		1 1	\$12.10	\$1.40		
West Contra Costa Landfill	Contra Costa	\$1.20	\$0.15	?	\$1.35	\$1.40	\$2.75	closing s
Keller Canyon Landfill (2)	Contra Costa	\$1.20	\$0.15	\$4.30	\$5.65	\$1.40	-	Best est.
Acme	Contra Costa	\$1.20	\$0.15	?	\$1.35	\$1.40		Closed
Sacramento County Landfill (3)	Sacramento							Unusual
L-D Landfill Company (3)	Sacramento							.•
Foothill Sanitary Landfill (Bellota)	San Joaquin	\$0.50	\$1.00		\$1.50	\$1.40	\$2.90	and the second second
Forward, Inc.(Manteca)	San Joaquin	\$0.50	\$1.00		\$1.50	\$1.40		
North County Landfill (Lodi)	San Joaquin	\$0.50	\$1.00		\$1.50	\$1.40	\$2.90	
Ox Mountain Landfill (4)	San Mateo	* .	*	*	\$7.02	\$1.40	\$8.42	
Guadalupe Sanitary Landfill (5)	City of San Jose	\$0.80	\$3.85	\$12.95	\$17.60	\$1.40	\$19.00	
Kirby Recycl-Disposal Facility (5)	City of San Jose	\$0.80	\$3.85	\$12.95	\$17.60	\$1.40	\$19.00	
Newby Island Sanitary Landfill (5)	City of San Jose	\$0.80	\$3.85	\$12.95	\$17.60	\$1.40	\$19.00	
Zanker Road Class III Landfill (5)	City of San Jose	\$0.80	\$3.85	\$12.95	\$17.60	\$1.40	\$19.00	
Potrero Hills Landfill Hayroad Landfill	Solano Solano	\$0.65 \$0.65			\$4.82 \$4.82	\$1.40 \$1.40	\$6.22 \$6.22	

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(1) Has a voter approved initiative that dates to 1990. It includes fees for: LEA, AB939, HHW, Waste Management Authority business license, county planning, and county open space. (see Alameda County attachment with complete breakdown of fi

(2) \$3/ton of the disposal fees are for East County and City of Pittsburg for mitigation.

(3) Three part fee program: 1st part: Fixed Facility Fee (annual), e.g. transfer station, landfill, composting-- this pays for the facility, (a predetermined number of hours based on type facility);

2nd part: Regional Fee (annual), which pays for training, public outreach, etc, of waste and recycling; 3rd part: Exceptional Hours Fees, this amount is the hourly rate over and above the "fixed facility fee"

(4)The Total Fee represents AB939, Household Hazardous Waste, maintenance/mitigation at County landfills, postclosure r Note: Although the fee isn't broken down, there is a specific designation of \$2/ton for the "Children's Health Initiative"

(5) City of San Jose has 5 active landfills within their jurisdiction and does all of the LEA functions; the County of Santa Clai two landfills (one closed) that they oversee as the LEA (The \$3.85 shown under AB939 is a County imposed fee; the rest ar

9/16/2005

Comment Letter X: Bruce Baum, E-Mail sent September 16, 2005

X-1. This appears to be information being provided to the e-mail recipient (Cynthia Barnard of the County Environmental Health Services Division), rather than a comment on the FEIR.

MO FR **BECKNER & BECKNER** S PORTOLA AVE. www.compostair.com AN RAFAEL, CA 94903 Phone/Fax (415) 479-9542 RDERS AT ANY TIME COMPOST DU/Www.compostair.com> Reference: Red woodilds Strugt 5:1(2) WAIN C COMPOST WHY A Land F:11 9 difacent 5:0 WHY A Land F:11 9 difacent 5:0 WHY A Land F:11 9 difacent 5:0 HEACH. HEACH. RuthBackach OR INFORMATION CALL (415) 472-4203 OR PLACING ORDERS AT ANY TIME CALL 800-58COMPOST Web Page <http://www.compostair.com> Email <jabeck1924@cs.com> http://www.familyplan-ssa.org

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City State Zip		
Delivery Address if different		
City State Zip		
	Thank you for your order	

All Orders will be shipped FOB San Rafael, CA

DESC A	CRIPTION Individual Tool California Resident Sales Tax* Shipping Cost	QUANIITY One Unit	UNIT PRICE \$24.95 1.80 5.75	TOTAL
B.	Store Bulk Packaged with directions	10 Unit Pack	\$150.00	
	California Resident Sales Tax* Shipping Cost		10.44 10.00	
С.	Bulk Packaged with Directions California Resident Sales Tax* Shipping Cost	50 Unit Pack	\$750.00 36.25 30.00	• •
			TOTAL	

Note: Power Pac Drill Not Included

*California Resident must add 7.75% or supply Resale#

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PRESS RELEASE FOR IMMEDIATE USE

Compost can now be totally aerated in only 3 minutes. <u>Sound Impossible? Not So!!</u> The hours of intensive labor over a compost bin is a thing of the past. After two years of experimentation, Ruth Beckner, a Master Composter, certified by

Marin County Municipal Waste Management, has designed and patented a tool that performs in three minutes a task that has traditionally taken three hours. Deceptively simple, COMPOST AIR® works like an ordinary drill bit, but is designed specifically to get through a compost heap in seconds. The bit fits a conventional 3/8" electric power drill.

By drilling air holes into compostable material for three minutes a day, the gardener sufficiently aerates the pile to produce compost within a month. This tool benefits gardeners who do not have the time or strength to turn a pile every three days or space to wait for the piles to decompose naturally.

The COMPOST AIR® can be inserted into composting material at any angle and to the entire length of the shaft. It works well with commercially designed compost containers made of wire, wood, or plastic and with composting material piled on the ground. Turning compost, especially at the depth of several feet, requires a degree of physical strength beyond the ability of most gardeners. COMPOST AIR® makes this task easy and convenient for all gardeners, including the elderly and handicapped.

Ruth Beckner is a Master Gardener, certified by the University of California in 1987, and has been growing vegetables organically in a community garden for the past 15 years.

The COMPOST AIR® is hand-crafted in the U.S.A., has a lifetime guarantee, and is available for \$24.95 plus \$5.75 shipping (California residents add \$1.80 tax) Contact Ruth Beckner at 15 Portola Avenue, San Rafael, CA 94903.

For placing orders at any time call 1-800-58COMPOST. 1-800-582-6676 For information 415-472-4203











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Adds air not sweat. Make it happen with your power drill.

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Web Page <http://www.compostair.com> Email <jabeck1924@cs.com>

COMPOST AIR® is a patented drill bit for adding air to compost.

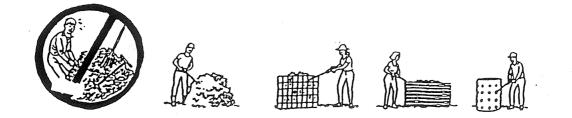
<u>COMPOST AIR</u>® has been featured in many National Magazine, including "Compost News, Organic Gardening and the Washington Post Garden Pages.

ADVANTAGES OF COMPOST AIR®

- 1. In one second it will penetrate 36 inches into compostable material, thus allowing AIR to penetrate.
- 2. COMPOST AIR® can be used from any angle. 3 minutes with this tool will equal 3 hours of hand labor.
- 3. The Tool can be used with any "standing "compost bin; wood, wire or plastic. It can also be used on organic material piled on the ground.
- 4. Each Tool is hand-crafted in America.
- 5. COMPOST AIR®: is:
 - a) Economical
 - b) Lifetime guaranteed
 - c) USER FRIENDLY
 - d) Eliminates bad odor problems in the Compost Pile
 - e) Keeps a Compost Pile aerobic with "friendly bacteria."
- 6. COMPOST AIR® is shipped in units of 12 individually packaged for mailing and selling.
- 7. Free "How to-Composting and Recycling Guide" is enclosed with each Tool.

Please call if you have questions. (415-472 4203)

Ruth Beckner



Comment Letter Y: Ruth Beckner

Y-1. The comment addresses the merits of the project, not the FEIR. The relevance of the information provided on an aeration tool for small-scale compost piles is not stated and is unclear.

RECEIVED

LEO BOURKE 2320 Laguna Vista Dr. Novato, CA. 94945 2005 SEP 12 P 4:07

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COMMUNITY DEVELOPMENT

Sept. 9, 2005

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA. 94903 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Plannining Commissioners and Mr. Haddad:

I have a number of serious concerns regarding Waste Management Inc.'s plans to expand its Redwood Landfill on highway 101 north of Novato.

The creation of a regional dump alongside the Petaluma River is a disaster in the making. The Gulf Coast has it's hurricanes and our threat is earthquake. A rupture of this bloated landfill would be an environmental catastrophe.

An adittional 550 truck trips per day is an issue. Will they all use highway 101 or will we find a large number of trucks using Atherton Ave., which is a secondary route used by trucks now ?

Leakage from this facility will contaminate the ground water in this area, posing a health risk.

Air quality will be impacted beyond what it is now.

What is the benefit to Marin County in taking out of county garbage ?

Please consider long and hard prior to issuing this permit.

Thank you,

Leo Bourke

Comment Letter Z: Leo Bourke

- Z-1. This comment is preamble to the following comments.
- Z-2. Seismic stability of the landfill is discussed in Impact 3.4.1 and Master Response 22 in the FEIR, and in Master Response 108 in the current document.
- Z-3. Please refer to Master Response 101.
- Z-4. Please refer to Impacts and Mitigation Measures 3.4.6, 3.4.7, and 3.4.8 in the FEIR; see also Master Responses 1 and 13 in the FEIR and Master Response 105 in the current document. See also response to Comment E-22 in this document.
- Z-5. Please refer to the air quality analysis in Section 3.2 in the FEIR. See also Master Response 112 in the current document.
- Z-6. This comment poses a rhetorical question, and does not address the analysis presented in the FEIR.
- Z-7. This comment addresses the merits of the project.

September 9, 2005

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: **Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report**

Dear Planning Commissioners and Mr. Haddad:

I am opposed to Waste Management Inc.'s plans to expand substantially its Redwood Landfill dump on Rt. 101. As I understand it, after expansion 75% of the garbage will come from outside of Marin. To put this strain on an area adjacent to important wetlands is unacceptable. Not to mention the lowering of air quality, increased truck traffic, and the threat to clean ground water. The EIR does not adequately address the issues listed below:

Air Quality and Risks to Health.

Protection of Groundwater.

Risk from Earthquakes and Flooding.

Incomplete Traffic Impact Analysis.

Questionable Need and Benefits of Expansion; Failure to Consider Alternatives.

Land Use Permit Should be Reviewed.

I appreciate this opportunity to comment on the EIR, and ask that our concerns be fully addressed before the EIR is certified as complete. Additionally, I understand that the grassroots organization, No Wetlands Landfill Expansion, is filing more extensive comment letter(s). I ask that you fully consider their points as well.

Very truly yours,

Ann W Brown



147 Humboldt Ave San Anselmo CA 94960-2250

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MARIN COUNTY

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2005 SEP 12

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Comment Letter AA: Ann W. Brown

AA-1. The commenter's opposition to the project is noted. Regarding Air Quality and Risks to Health, see section 3.2 of the FEIR and Master Response 112 in the current document. Regarding protection of groundwater, see section 3.4 of the FEIR and Master Responses 105 and 109 in the current document. Regarding risk from earthquakes and flooding, see sections 3.4 and 3.5 of the FEIR and Master Responses 106 and 108 in the current document. Regarding traffic impacts, see section 3.10 of the FEIR; see also Master Response 101 in the current document. Regarding alternatives, see Chapter 5 in the FEIR; see also the discussion of the Mitigated Alternative in Master Response 104 of the current document. Regarding the facility's land use permit, please see Master Response 103 in the current document.

Comment Letter BB

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2005 SEP - 9 P 1: 54

MARIN COUNTY COMMUNITY DEVELOPMENT Marin County Community Development Agency Marin County Planning Commission3501 Civic Center Dr., Room 308 San Rafael, CA 94903-Attention: Tim Haddad, Environmental Coordinator

Teri Cundall, registered voter 222 Alexander Ave. San Rafael, CA.94901

Dear Planning Commissioners and Mr. Haddad:

I have serious concerns about Waste Management Inc.'s plans to expand substantially its Redwood Landfill dump on Rt. 101. As I understand it, after expansion 75% of the garbage will come from outside of Marin. To create this regional dump, Waste Management Inc. wants to add over 15 million cubic yards of waste to build a pyramid of garbage 160 feet tall, increase daily average intake of waste by almost 100%, and increase the number of daily truck trips in and out of the landfill by 550 per day. Any negative impacts could affect us.

The Open Space and surrounding wetlands are used for recreational and nature observing activities and many of us use Rt. 101 day-in and day-out. Many could be affected by the increased risks to ground water and air contaminants presented by the expansion project. We would also be impacted by the increase in truck traffic on Route 101.

Air Quality and Risks to Health.

According to the EIR, the expansion of landfill activities will include an increase in large diesel trucks and equipment resulting in substantial increases in the emission of air pollutants and toxic air contaminants. This will create significant unavoidable impacts to air quality, (1-13), reason alone to reject the expansion. The EIR also states that the project will increase cancer risk for residents within 1.5 miles of the landfill, and that it used the Buck Center as the closest sensitive receptor (Response to Comment HH-20). Because the prevailing wind direction from the landfill is south, the wind is often strong as measured at Gnoss Field. We question the sufficiency of the EIR analysis. While recognizing neighborhoods in close proximity as nearby sensitive receptors that could be impacted by these risks (3.2-24), no direct analysis was included on the potential impacts to safety and health. The EIR also fails to contain enough analysis regarding ultra-fine particulate matter or the emissions from the dump's current and proposed flares used to burn gas produced by decomposing waste.

Protection of Groundwater

The EIR proposes that Waste Management Inc. be excused from complying with the state law requirements that a landfill maintain at least 5 feet separation from groundwater and maintain a bed liner to keep landfill waste and contaminated water from the ground water. I object to this.

Comment Letter BB

The EIR fails to make the case that Waste Management Inc. has met its burden of showing an engineered alternative would be equally protective of the environment. The main component of the "engineered alternative" is simply a trench dug around the dump that goes no deeper than 5.5 feet below sea level, coupled with extraction pumps. But the EIR also states that there will be a permanent pool of contaminated water under the landfill at a depth of 9.5 feet below sea level. This is a potential unaddressed danger. Has any other landfill built so close to groundwater and a major wetlands area used this system to protect the environment and the public? What scientifically proven performance standards will be used? The EIR is silent on this.

Risk from Earthquakes and Flooding

The EIR states that in the event of a 7.0 earthquake "considerable structural damage would likely occur" as well as liquefaction. (3.4-11, -12.) This could result in mass movement of fill waste or contaminated leachate into the wetlands. We question whether the EIR has used the appropriate analytical techniques and assumptions regarding ground motion, shear strengths, and accelerations to reach the conclusion that mitigation is possible to reduce the risk to less than significant. In terms of flooding risks, Waste Management, Inc. has asked to be excused from fully reconstructing the old earthen levees that protect the wetlands from the dump, something it was required to do 10 years ago with its last expansion. As the recent tragic events in Louisiana have shown, old levees must be thoroughly tested and updated to avoid risks to the public. The EIR does not explain satisfactorily why the old levees would be sufficient in the event of a 100-year flood. It also fails to take into account the impact of global warming and the future rise in sea level.

Incomplete Traffic Impact Analysis

The EIR concludes that the impact on traffic from the additional 550 truck trips per day will be less than significant. However, there is little or no analysis of where the new truck traffic from out-of-county haulers will come from and what roads they will likely traverse, other than Rt. 101. For example, Atherton Avenue, unfortunately, is a major truck route for haulers from the east taking a short-cut between Rt. 37 and Rt. 101. Any increased traffic would directly affect neighborhoods on that road. The EIR is deficient because it does not fully address these traffic issues.

Questionable Need and Benefits of Expansion

Failure to Consider Alternatives.

If there was some considerable benefit to Marin County, I might understand accepting some risks and allowing Waste Management Inc. to have its way. But there is no benefit. The EIR makes clear that the expanded capacity is not needed to meet Marin County's own needs. It will only enable other counties to export their trash here. The argument that the dump will have to close in the year 2024 without expansion does not support approving expansion now when many alternatives not discussed (or only briefly mentioned) in the EIR may be possible. One alternative would be for Marin to pursue a "zero waste" strategy to reduce the garbage we generate for the dump. If we were left with minimal landfill needs 15-20 years from now, then shipping the remainder to a location not as environmentally sensitive would be both feasible and prudent. The EIR fails to consider that approach.

Land Use Permit Should be Reviewed

I understand that the dump is subject to a one-page 1958 land use permit granted to a local owner who wanted to establish a small local "rubbish dump." A lot has changed in 47 years, but the land use permit has not. It is past time to review that permit to see if additional conditions are appropriate consistent with 21st century land use planning. The Altamont landfill in Alameda County, also owned by Waste Management Inc., is subject to a 40-page land use permit that imposes multiple conditions and requirements to assure protection of local residents and the environment. The Marin County Planning Commission and the Board of Supervisors should review the scope of activities at the Redwood Landfill today and under its expansion plan to see if they go beyond what was contemplated in 1958.

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They should also review Waste Management Inc.'s violations of applicable laws or operational permit requirements - many are listed in the EIR. New or expanded activities, or legal violations, would enable the County to begin a proceeding to suspend or revoke the land use permit as a means to impose conditions appropriate for a major industrial operation that sits on historical wetlands adjacent to San Antonio Creek and the Petaluma River Estuary. It is the responsible thing to do. This review should take place before finalizing the EIR for the solid waste facility permit.

I appreciate this opportunity to comment on the EIR, and ask that my concerns be fully addressed before the EIR is certified as complete. Additionally, I understand that the grassroots organization, No Wetlands Landfill Expansion, is filing more extensive comment letter(s). I ask that you fully consider their points as well.

Very truly yours,

Teri Cundall, concerned citizen

Comment Letter BB: Teri Cundall

BB-1. This letter substantially repeats Comment Letter R. Please refer to the responses to Comment Letter R, above.

Comment Letter CC

Shirley Fleischman 8934 Redwood Hwy., Novato 94945 P.O.Box 2610 Novato, CA 94948

September 8, 2005

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

I own and have lived on the Mira Monte property, next-door to the Redwood Landfill, for twenty five years and oppose Waste Management Inc.'s proposed expansion. I have great concern for the safety of the wildlife on my land and the negative impact this proposal will have on the enjoyment and access to my home. It will also negatively affect my business and the value of my property.

I hereby adopt the positions, reasoning, arguments, and requests made in the letters submitted by the group <u>No Wetlands Landfill Expansion</u>.

Very truly yours,

Furley Fleischman

Shirley Fleischman

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2005 SEP - 9 P 1: 54

MARIN COUNTY COMPLETE DEVELOPMENT

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Comment Letter CC: Shirley Fleischman

- CC-1. Regarding impacts on wildlife of the proposed project, please refer to Section 3.3 of the FEIR and Master Response 102 in the current document. Regarding impacts on the Mira Monte property, refer particularly to Impact 3.7.1 in the FEIR.
- CC-2. Economic and social effects of a project are not considered environmental impacts in an EIR. See CEQA *Guidelines* §15131(a).
- CC-3. The commenter refers to Comment Letters M, N, O, P, and Q.

Comment Letter DD

Tim Haddad

These are my concerns pertaining to the expansion of Redwood Sanitary Land fill

- 1. The increase in traffic from 400 to apron. 100 "vehicles" per day. The "vehicles" are actually tractortrailer trucks that occupy the space of 10 passenger cars in traffic due to their braking capacity and length. They will occupy the space of 10,000 passenger cars in traffic.
- 2. Fully loaded trucks are usually routed around urban areas. This means that trucks from the east bay will likely come here by way of Hwy. 37. I am afraid that they will use the old Black Point cut off at (Atherton Ave.) as a "short cut" to the landfill. I would like your assurance that the trucks will be required to use the Hwy. 101 north bound on ramp at the Hwy. 37-Hwy. 101 interchange to access the land fills. I request that this condition be included in the provisions for approval OT the expansion.
- 3. The traffic impact report should include the traffic generated by the Indian casino planned for Rohnert Park. The casino does not require a permit and therefore need not be included in the traffic impact report under current regulations. The casino development poses an extraordinary situation as it is outside the county land use authority. The traffic that it generates must be included to the cumulative negative impact irrespective of the weather or not a permit will be needed

Novato has required that residents recycle 60% of material when remolding their homes in order to extend the life of the landfill. Will this be required of the new customers as a condition for approval? Please address these concerns in the final report.

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Thank You Al Goerndt 675 Bugeia Lane Novato, ca. 94947

2005 JUL 19 P 2:00

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Comment Letter DD: Al Goerndt, letter of 7/13/05

DD-1. The concept to which the commenter refers is "passenger car equivalent (PCE)", defined as the number of passenger cars "equivalent" to other vehicles (e.g., trucks) in terms of operating characteristics and space occupied on a road. However, the commenter overstates the PCE relationship. The standard practice for traffic analyses is to use a PCE of 2.0 to 3.0, depending on the type of truck, not 10.0 as suggested by the commenter. Level-of-service analyses equally represent the effects of trucks by either applying PCE factors or using the percent Heavy Vehicles; the analysis presented in this EIR used the latter, and the results support the findings of less-than-significant traffic impacts for both the original proposed project (analyzed in the DSEIR) and the revised project (analyzed in the FSEIR).

It also is noted that the commenter misstates the project-generated increase in traffic volumes. As described on pages 3.10-7 and 3.10-8 of the FEIR:

As <u>now</u> proposed by the project applicant <u>(the proposal has changes since publication of the DEIR; see Master Response 17 in Volume 2 of this FSEIR)</u>, a maximum of <u>900 590</u> vehicles per day would be permitted to enter the landfill (i.e., <u>840 540</u> waste-carrying vehicles and <u>60 50</u> vehicles for employees, visitors and deliveries) on a regular basis, and in addition up to 100 construction vehicles per day on a seasonal or occasional basis. That level of permitted traffic would more than double_increase the current permitted traffic of 415 vehicles per day <u>by</u> about two-thirds. The additional vehicles day-in and day-out would generate <u>970</u> 350 vehicle trips (i.e., <u>485 175</u> vehicles in and <u>485 175</u> vehicles out); the seasonal construction traffic would generate an additional 200 vehicle trips (half in and half out). To ensure that potential impacts are not underestimated, impact determination will be made on the basis of the maximum increase in traffic (i.e., inclusive of seasonal construction traffic).

For further discussion of traffic issues, please refer to Master Response 101 in the current document.

- DD-2. Please refer to Master Response 101 in this document.
- DD-3. Analysis of potential traffic impacts (as well as other issues) associated with the casino planned by the Federated Indians of Graton Rancheria for Rohnert Park has not been completed (the Final Environmental Impact Statement has not been released [the Draft Environmental Impact Statement was released for public comment in March 2007]). The planned casino would be located about 15 miles away from the landfill, which is generally outside the study area relevant for analysis in the EIR (i.e., traffic volumes tend to disperse among the travel paths possible as one gets farther away from the trip generating source). In addition, the cumulative traffic analysis in the FSEIR relies on the plan projection method of analysis, which assumes that traffic volumes in the a.m. peak hour are projected to increase by about 53 percent by the year 2020 (as stated on page 4-10 of the FSEIR). As described under Impact CU-3 (Transportation and Traffic),

the a.m. peak-hour traffic level of service on the four-lane mainline and at the ramp junction areas in the peak-direction (southbound) will degrade to LOS F under cumulative conditions. The policy of the Marin Congestion Management Agency is to accept LOS F as the standard for this section of highway. The project-generated increase in traffic on southbound Highway 101 would represent no more than one percent of the cumulative volume, and the impact would be considered to be less than significant because the project-generated increase in traffic would cause an increase of less than two percent in the vehicle service flow rate. The less-than-significant impact determination would be unaffected by a potential increase in cumulative traffic volumes above the 53-percent increase because the landfill's percent contribution to vehicle service flow rate would remain less than two percent.

DD-4. The commenter is evidently referring to the City of Novato's construction and demolition materials recycling ordinance. The FEIR takes a different approach to recycling of construction and demolition materials by requiring Redwood Landfill to implement a construction and demolition materials recycling facility. See Mitigation Measure 3.6.4b in Volume I of the FEIR. Furthermore, the Mitigated Alternative, as discussed in Master Response 104 of the current document, also includes development of such a facility.

Comment Letter EE

Tim Haddad

These are my concerns pertaining to the expansion of Redwood Sanitary Land fill

- 1. The increase in traffic from 400 to aprox. 1000 "vehicles" per day. The" vehicles" are actually tractor-trailer trucks that occupy the space of 10 passenger cars in traffic due to their braking capacity and length. They will occupy the space of 10,000 passenger cars in traffic.
- 2. Fully loaded trucks are usually routed around urban areas. This means that trucks from the east bay will likely come here by way of Hwy, 37. I am afraid that they will use the old Black Point cut off (Atherton Ave.) as a "short cut" to the landfill. I would like your assurance that the trucks will be required to use the Hwy. 101 north bound on ramp at the Hwy. 37-Hwy. / 101 interchange to access the land fill. I request that this condition be included in the provisions for approval of the expansion.
- The traffic impact report should include the traffic generated by the Indian casino planned for Rohnert 3. Park. The casino does not require a permit and therefore need not be included in the traffic impact report under current regulations. The casino development poses an extraordinary situation as they are a sovereign nation apart from the United States. The Pomo tribe has recently purchased 160 acres of land adjacent the land fill. They are, or soon will be, unaccountable to state and local land use authority, The potential cumulative traffic impacts on all of Marin would be nothing short of catastrophic. Marin is a peninsula with two dry exits, (eg. Hwy, 37 & Hwy, 101), each has two lanes of traffic. In the event of an emergency, we could be faced with evacuating Marin on only four (4) lanes of traffic. The land fill expansion is a major of this of this equation. The cumulative negative traffic impact report must be extraordinarily broad in scope irrespective of the EIR requirements. Our lives depend on it.
- 4. Novato requires us to recycle 60% of our construction debris in an attempt to extend the life of the landfill. Will this be required of the new customers?

Please address these concerns in the final report

Thank You Al Goerndt 675 Bugeia Lane

Novato, ca. 94947



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Comment Letter EE: AI Goerndt, letter of 9/13/05

- EE-1. Please refer to the response to Comment DD-1.
- EE-2. Please refer to the response to Comment DD-2.
- EE-3. Please refer to the response to Comment DD-3 regarding the comment about the casino planned for Rohnert Park. Regarding the potential development of a casino north of the landfill, according to news reports, a request has been submitted to the federal government to take into trust 277 acres of land purchased by the Dry Creek Rancheria Band (Marin Independent Journal, 2006). The County is unaware of any definitive plans for the future development or changes in use of the parcel. Therefore, it would be speculative to assume development of a casino (about which all particulars would also be speculative) on the parcel. In any case, the cumulative traffic analysis in the FSEIR relies on the plan projection method of analysis, which assumes that by the year 2020, traffic volumes in the a.m. peak hour are projected to increase by about 53 percent (as stated on page 4-10 of the FSEIR). Conceptually, this plan prediction includes all development projects, including development on the lands purchased by the Pomo Indians. As described under Impact CU-3 (Transportation and Traffic), the a.m. peak-hour traffic level of service on the four-lane mainline and at the ramp junction areas in the peak-direction (southbound) will degrade to LOS F under cumulative conditions. The project-generated increase in traffic on southbound Highway 101 would represent no more than one percent of the cumulative volume. The policy of the Marin Congestion Management Agency is to accept LOS F as the standard for this section of highway, and the impact would be considered to be less than significant because the project-generated increase in traffic would cause an increase of less than two percent in the vehicle service flow rate. The lessthan-significant impact determination would be unaffected by a potential increase in cumulative traffic volumes above the 53-percent increase because the landfill's percent contribution to vehicle service flow rate would remain less than two percent.
- EE-4. Please refer to the response to Comment DD-4.

Comment Letter FF

8 Austra Wa Mad AUG 2 9 2005. arin Community Develo Centrammen Marin Co. Comminuty Devel 3501 Cine Center Saw Rafael CA 94903 Be : Comments public review of EIR: Reduoud Dear Mu Haddad Mank you for the opportuni public reveire of proposed changes Hedunod Land Lot I unge full consideration of the impacts of MTBE in petterleum - contaminated soils which are proposed additions to Reduvod Lanafill, Under certain circumstances this could be leaked through sand in Bay Meed, and further containing the creek and Bay. I do not believe the full impact of MTBE in soil is given pufer Crisideration. One huge motance of the is that of Meyers and So. Lake Takine when 597 giblund water wells lucre forced to shut down following discovering of MTBE leakage from gas stations, etc., nearby. MTBE will remain in the soil for and containinate the soil and watter Please consider the Bay, and the life within it, as well as the wetlands, wheman I also urge you consider that Marin

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Comment Letter FF

Kelds its our space for it waste; we do not need waste from other regions in Northern California nor from any in Central California . Please be responsible to Marin County and its residents. 2 Sincerely, Par Harler Marin (50 plus) year

Comment Letter FF: Pat Hasler

- FF-1. Potential groundwater contamination is addressed in Impacts and Mitigation Measures 3.4.6, 3.4.7, and 3.4.8 in Volume I of the FEIR and Master Response 105 of this document. See also the discussion of petroleum contaminated soil in the discussion of the Mitigated Alternative in Master Response 104 of the current document.
- FF-2. The Mitigated Alternative, discussed in Master Response 104 of this document, would permit a landfill that is more appropriately scaled for serving Marin County, and would limit the landfill's ability to accept waste from out of County.

Rick W. Johnson P.O. Box 981 Inverness, CA 94937

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Annual

August 30, 2005

Tim Haddad Environmental Coordinator Marin County Community Development Agency 3501 Civic Center Drive Room 308 San Rafael, CA 94903

Re: Final EIR for Redwood Landfill Revised Solid Waste Permit

Dear Mr. Haddad,

The following are my comments on the Final EIR for Redwood Landfill Revised Solid Waste Permit.

The "Mitigated Alternative" (5.2.4), with its lower growth rate, is superior to the project.

As stated in the EIR, the main geotechnical issue is the stability of the landfill, which is controlled by the strength of the underlying soft bay mud. The mud is not now strong enough to support the maximum capacity of fill. The mud gains strength in a time-dependent process of filling. The safest choice is to fill as slowly as possible, and achieve the time-dependent benefits.

In conjunction with the mitigated alternative, charging an import mitigation fee may also help slow the rate of growth by introducing a market factor to reduce imports. In addition, the funds raised can help pay for county costs to monitor mitigation, to fund public programs for waste reduction, and, eventually, to fund development of a follow on solid waste solution after this landfill is filled.

Redwood Landfill might also charge more for imports to help provide the stability of revenue that they seek. The Redwood Landfill operation should not be a low price, high growth regional landfill given its environmental risks.

The Final EIR does not fully evaluate biological impacts on Petaluma Marsh (comment responses N-16 and Z-4)

Marin Audubon commented that the discussion of the biological setting was inadequate (see paragraph marked N-16), especially regarding Petaluma Marsh. The Final EIR response to N-16 guides one to a comment marked Z-4 which also discusses impacts on Petaluma Marsh's biological resources. In response Z-4, The Final EIR simply states that past negative impacts are not relevant to this EIR.

I don't know if that is a valid statement. Regarding several potential impacts on the Petaluma Marsh, the FEIR seems to be thorough: namely on landfill slippage into Petaluma Marsh, leakage of leachate into the marsh, and noise reduction around the composting operation. But, in the areas of night time operations and use of the gas cannons and pyrotechnic devices, has there ever been CEQA evaluation of those operations? Even if there has been a prior review, there may be a cumulative impact on the marsh by continuing these operations.

A survey should be done to see if the landfill operations have reduced the density of breeding birds and migratory waterfowl as compared to similar North Bay marsh areas. It would also be fairly easy to measure the sound levels in Petaluma Marsh from the gas cannons and pyrotechnics to see if they exceed the thresholds indicated in the EIR. See page 3.3-23 "For this EIR, the USFWS standard used by Caltrans (Morton, 2003) is more appropriate, i.e. that short-term noise levels above 76 dBA6 at the nest may disturb California clapper rail nesting, for which potential habitat occurs in the brackish marsh east of the levee."

Redwood Landfill uses a gas cannon and noisy pyrotechnic devices to scare birds away from the landfill. It stands to reason that potential breeding birds and migratory waterfowl next to the landfill may be driven away by the same techniques. The use of these techniques is likely to increase in this project. See page 3.6-15 "The proposed increase in composting operations, especially the addition of food as a composting feedstock, also could increase bird activity at the site and contribute to increased risk of bird/aircraft strikes. This would be a significant impact." The proposed mitigation is to use more of the gas cannon and pyrotechnic. Better mitigation is to not compost food wastes, and find alternative quiet means of keeping gulls off the landfill.

If a biological impact study of the gas cannon and pyrotechnic devices finds significant impacts, then I believe that these disturbances can be reduced by using alternative methods, so I do not feel the project should be stopped or delayed for these reasons. But, I do think it is important to look directly at the impacts of landfill operations on Petaluma Marsh wildlife and to mitigate impacts if they are found to be significant. Significant cumulative impacts from continuing operations should be mitigated.

Vegetative cover and effects on native plants

On page 3.4-26, Mitigation Measure 3.4.4b, "sediment and erosion control features implemented include: placement of yard waste and grass seeds on slopes to promote vegetation of slopes." I believe it is a mistake to use green yard waste to promote vegetative cover on the slopes as that could propagate invasive weeds such as Star Thistle, Pampas Grass, Arundo donax, and the brooms.

Mitigation Measure 3.4.4b seems to be contradicted by other parts of the EIR. Page 3.4-31 "placement of well-compacted, vegetation-free intermediate cover (defined in 27 CCR

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§20164 as cover material placed on all fill surfaces where additional cells are not to be constructed for 180 days or more, to control vectors, fires, odors, blowing litter, scavenging, and drainage) over the refuse." And on page 3.1-10 "According to the Preliminary Closure Plan in the Redwood Landfill Joint Technical Document (GeoSyntec, 1998), the specific vegetation seed mix for the final cover is yet to be established and will be covered in the facility's Final Closure Plan."

Thank you for considering my comments.

Sincerely,

Rick W. Johnson

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Comment Letter GG: Rick W. Johnson

- GG-1. Landfill stability and the geotechnical properties of constructing a fill on Bay Mud are discussed in Impacts and Mitigation Measures 3.4.1 and 3.4.2 in Volume I of the FEIR, and in Master Response 7 in Volume II of the FEIR.
- GG-2. Further discussion of the Mitigated Alternative and a import mitigation fee may be found in Master Response 104 of this document.
- GG-3. Please refer to Master Response 102 in this document.
- GG-4. Please refer to Master Response 102 in this document.
- GG-5. Please refer to Master Response 102 in this document.
- GG-6. Please refer to Master Response 102 in this document.
- GG-7. Please refer to Master Response 102 in this document.
- GG-8. Impact 3.4.4 refers to the potential for stormwater to cause erosion of daily and intermediate cover of the landfill. Specifics of erosion control on the final cover will be proposed and evaluated when the Final Closure Plan is submitted prior to closure of the landfill per Title 27 requirements. The term "vegetation-free intermediate cover" means cover material such as clean soil that itself does not contain vegetation or other materials that would negatively affect the performance of the cover material. Typically, intermediate covers are seeded for erosion control after placement.

Robert L. Koch M.D. 1169 Santolina Drive, Novato, CA 94945 Phone (415) 898-8823 fax (415) 893-9888 e-mail, bobkoch415@comcast.net

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Tim Haddad, Environmental Coordinator 3501 Civic Center Drive, Room 308 San Rafael, CA 94903

September 20, 2005

Re: Final Environmental Impact Report, Redwood Landfill Revised Solid Waste Facilities Permit Application

This application revolves about the present permitted & actual, and future permitted & actual size of the landfill. It is the single most important issue. Yet, "actual" size has received little and contradictory attention.

It is clear that the permitted landfill volume specified in the 1995 SWFP is 19.1 million cubic yards, and that the new application asks for 34.774 million cubic yards.

The actual landfill volume is not so clear. At the Marin County Planning Commission meeting 8-18-03 I and several other attendees heard Mr. Glen Roycroft, engineer for Redwood Landfill, state that by his measurements (he did not give the exact date) the present size of the landfill was 25 million cubic yards. This would have exceeded the permitted volume by some 6 million cubic yards. However, in volume 2 of the revised application (Master Response 12, pp 6.39 & 6.40), the applicants state that as of 5-14-04, by their measurements, the volume of the landfill is only 13.9 million cubic yards. This is 55% of the previous measurement. Assuming that this busy landfill was growing, not shrinking, during the time between these measurements, the difference between the measurements is very close to a factor of 2.

Engineers as a profession are not known for measurement errors of a factor of 2.

It is clear that the smaller subsequent measurement of the landfill size is more advantageous to the applicant than the larger previous one. First, it does not put them in violation of the 1995 SWFP. Second, it adds 11 million cubic yards to their permitted waste receipts should their application be approved.

I understand that the applicant (V. 2, P. 6.3-39) asserts that Mr. Roycroft was referring to "permitted" landfill volume, not his measurements, and that somehow he picked the number of 25 million cubic yards instead of the correct number (19.1 million). This assertion is at variance with the facts. Many of us heard engineer Roycroft's public statement. It is (although somehow left out of the written minutes of the Planning Commission meeting) recorded on the audio tape.

When the landfill volume as alleged on this FEIR is viewed critically, other tests of our credulity surface:

- What was the alleged landfill volume as reported in the 1995 SWFP permit application? If it is now only 14 million cubic yards (rounded) after 10 more years of function as a regional dump serving several local counties, what could it have been reported to be 10 years ago, at which time it had been in operation some 40 years? This figure is surely in your records of the 1995 SWFP, and is crucial to assessing the veracity of the claimed present landfill volume. We concerned citizens do not have this figure and would like to be informed of it. Please advise how we can obtain it.
- If the present landfill volume is now 14 million cubic yards (rounded), how could increasing the steepness of the sides a bit without enlarging the "footprint" (area) nor increasing the height, increase this volume to (asked in the permit application) 35 million cubic yards (rounded)? This would be a 2 ½ times volume increase! The drawings in this FEIR lead one to view a slight increase, not an increase of this magnitude. Either the drawings are wrong or the numbers are wrong.

I conclude that allowing the applicants to be in control of landfill volume measurements produced in this FEIR is too much like letting the fox be in charge of the chickens. I reject the measurements that they have most recently advanced. I recommend that no action be taken on this FEIR until an independent study of the volume of the landfill, commissioned by our representatives at county or state level, has been made.

I am not sure if it is germane here, but I also recommend that, if this application is approved, **future** measurements of landfill size would be made by agents of our local or state government, not by the landfill operators.

Best wishes,

1. Koth Robert

Robert L. Koch

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Comment Letter HH: Robert L. Koch, M.D.

- HH-1. The commenter confuses current in-place volume (13.9 million cubic yards as of May 14, 2004) and the applicant's statement regarding their calculation of the total volume capacity of the permitted landfill, which they claim to be 25 million cubic yards, based on their calculation of volume as represented by a set of drawings of the landfill's final grades. As noted by the commenter, the permitted volume of the landfill is 19.1 million cubic yards. This figure includes total permitted volume of waste plus daily and intermediate cover, but not final cover, as discussed in Master Response 12 in the FEIR. See further discussion in Master Response 107 in the current document.
- HH-2. Please refer to the prior response. The currently permitted landfill volume is 19.1 million cubic yards, not including final cover. With final cover, the total volume is approximately 20.5 million cubic yards. The applicant's proposal is to increase total volume, including cover, to 34,774,000 cubic yards, an increase of approximately 75% of the current permitted volume. See further discussion and table in Master Response 107 in the current document.
- HH-3. ESA, the EIR consultant, has conducted independent calculations of permitted and proposed site life. calculations were reviewed by a registered Professional Engineer with expertise in landfill design and construction. See Table MR104-4 in Master Response 104 in Chapter 2, and also Master Response 107.

Comment Letter II

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September 9, 2005

Tim Haddad, Environmental Coordinator Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517

Re: Redwood Landfill Expansion FEIR

Dear Mr. Haddad and Planning Commissioners:

Please consider the following comments on the Redwood dump's proposed expansion Final Environmental Impact Report (FEIR). I pointed out in my comments on the Draft EIR (DEIR) that it failed to take into account that global warming would raise the sea level, which will raise the water level of the estuary in which the Redwood dump sits. The impact this will have on the dump and possible pollution to the estuary and nearby San Francisco Bay is critical for determining whether to grant the proposed expansion permit.

The FEIR response to my comment says that the effects of global warming and rising sea levels were "not" taken into account! (FEIR 6.4-110)

The FEIR response to my comment attempts to obfuscate the impact of the global warming water rising problem. It says that the dump's perimeter Levee can just be raised. (FEIR 6.1-110) But the Redwood dump's permit application is asking it to be exempt from even "reconstructing" the existing Levee, which it promised to do in 1995. (FEIR 3.4-18; 3.4-21)

The FEIR response argues that the perimeter Levee will protect the dump from floods as well as rising sea levels. (FEIR 6.4-110) There is no factual analysis or engineering studies cited to support this contention. Even if this is so, the FEIR ignores the fact that rising sea levels will cause the groundwater table to also rise in the estuary in which the Redwood dump sits.

The FEIR comment says the extent of the sea level rise caused by global warming is speculative. Attached at Exhibit "A" are five articles which explain that global warming will cause sea level to rise from 1 to 20 feet.

Comment Letter II

According to the FEIR, the dump sits two to five feet above the water table. Taking the conservative two-feet clearance means that the estuary's water level needs to rise only a minimal amount before the dump will be sitting in groundwater. Adding the proposed massive amounts of additional weight to the dump will push it even further down into the soft bay mud and, thus, the bare minimum expected one-foot rise in sea level may have the dump sitting in or within inches of the water table. What effect this will have on the dump's stability and possible pollution of the groundwater and/or bay is not addressed in the FEIR.

New Orleans has proven that disasters happen and levees break. This is also not addressed by the FEIR. There is no engineering study of how well the existing 5 levee, to the extent that one exists, will protect the dump from the rising sea level.

And what happens when the dump is full, the owner is long gone, and the estuary is threatened by the dump being swamped by the rising sea level? Who will pay the millions it will take to build, raise, and maintain the levee, which may need to be up to 20 feet high?

The dump has expanded to within a few feet of the adjacent waterway—San Antonio Creek. Is there enough room to raise a levee 5, 10, or 20 feet? Levees are sloped berms, wider at the bottom than the top. The whole concept of the dump's expansion is to steepen the sides. The waste is now within a few feet of San Antonio Creek (not the 200 feet required by the original land use permit). Will the dump's base of the proposed steepened walls have to be excavated to make room for the wider/higher levee to keep the rising sea level out? What will this do to the stability of the proposed expanded dump with its steeper slope? The FEIR does not address this,

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How can Marin County possibly allow a dump filled with toxic chemicals to be expanded by 75%, yet be exempt from a levee needed to protect the wetlands in which the dump sits? The dump has no liner. How soon will it take for the rising water levels to inundate the dump with ground or estuary water? What effect will this have on the estuary and bay? This is not addressed by the FEIR.

The real world is one where the water level is rising. The drafters of the FEIR want us to live in fantasyland where there is no effect from global warming. The "Titanic Syndrome" should not be tolerated. The dump's proposed expansion will guarantee that it is a matter of time before the dump causes the beautiful Petaluma Estuary to become a sewer on the bay.

I also pointed out at the Planning Commission hearings and in my written comments on the DEIR that its analysis stopped at the county line and did not take into account any impact on farm workers, horse attendants, dairy employees, and others working in the Petaluma River valley (just across the Sonoma County line from the dump). The FEIR dismisses these concerns with a reply (6.4–109) that this is a Marin County September 9, 2005 Page 3

sparsely populated agricultural area which may be affected like Marin. Such a comment is contrary to the principles of ecological justice.

The best example of ecological injustice has been witnessed in New Orleans, where the environmental consequences were disproportionately felt by the poor, sick, and elderly. Disregarding the ecological impact of the dump expansion on the adjacent Sonoma County because it is an agricultural area is ecological injustice. Sonoma's adjacent agricultural area is principally worked by poor farm workers, horse grooms and others on the lower rungs of the economic ladder. Subjecting these individuals to air and other pollution caused by the dump consisting of wealthy Marin and other counties' residents' garbage and its toxic chemicals and gases is unjust and immoral. Whether the FEIR intentionally or inadvertently disregards the welfare of lower class individuals in this area is not relevant. In this regard, the FEIR fails the principles of ecological justice because the dump expansion may have disproportionate impact on the poor. The FEIR does not address this matter.

The FEIR must be based on facts. In order to complete the required analysis, the lead agency is to "attempt in good faith to fulfill its obligation under CEQA to provide sufficient meaningful information regarding the types of activity and environmental effects that are reasonably foreseeable." *Stanislaus Natural Heritage Project v. County of Stanislaus* (1996) 48 Cal. App.4th 182, 206. In *Stanislaus*, the disputed EIR stated that there would be a "significant unavoidable impact," but did not include the facts describing that impact, citing the lack of studies and lack of determination of the exact source of water for a housing development. The court stated that this kind of conclusory statement with no facts to assist in the decision-making process defeated the purpose of CEQA. *Id.* at 195. The Redwood dump FEIR is an incompetent document if such an obvious problem as the rising sea level is ignored. A new, independent fact-based EIR process should be initiated.

Thank you for considering these comments.

Sincerely.

Martin J. Lawler 2401 Laguna Vista Drive Novato, CA 94945

MJL:am Enclosure 10

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From: Nancy Spencer <spencer.nancy@comcast.net> To: Martin Lawler <MLAWLER@aboutvisas.com>, HopeFrye@comcast.net Subject: USGS FS 002-00: Sea Level and Climate Date: Sun, 11 Sep 2005 23:51:52 +0000

http://pubs.usgs.gov/fs/fs2-00/

× U.S. Geological Survey

Sea Level and Climate

Introduction

Global sea level and the Earth's climate are closely linked. The Earth's climate has warmed about 1°C (1.8°F) during the last 100 years. As the climate has warmed following the end of a recent cold period known as the "Little Ice Age" in the 19th century, sea level has been rising about 1 to 2 millimeters per year due to the reduction in volume of ice caps, ice fields, and mountain glaciers in addition to the thermal expansion of ocean water. If present trends continue, including an increase in global temperatures caused by increased greenhouse-gas emissions, many of the world's mountain glaciers will disappear. For example, at the current rate of melting, all glaciers will be gone from Glacier National Park, Montana, by the middle of the next century (fig. 1). In Iceland, about 11 percent of the island is covered by glaciers (mostly ice caps). If warming continues, Iceland's glaciers will decrease by 40 percent by 2100 and virtually disappear by 2200.

Most of the current global land ice mass is located in the Antarctic and Greenland ice sheets (table 1). Complete melting of these ice sheets could lead to a sea-level rise of about 80 meters, whereas melting of all other glaciers could lead to a sea-level rise of only one-half meter.

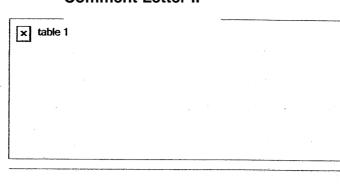
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Figure 1. Grinnell Glacier in Glacier National Park, Montana; photograph by Carl H. Key, USGS, in 1981. The glacier has been retreating rapidly since the early 1900's. The arrows point to the former extent of the glacier in 1850, 1937, and 1968. Mountain glaciers are excellent monitors of climate change; the worldwide shrinkage of mountain glaciers is thought to be caused by a combination of a temperature increase from the Little Ice Age, which ended in the latter half of the 19th century, and increased greenhouse-gas emissions.

Table 1. Estimated potential maximum sea-level rise fromthe total melting of present-day glaciers.[Modified from Williams and Hall (1993). See alsohttp://pubs.usgs.gov/factsheet/fs50-98/]

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Comment Letter II



Glacial-Interglacial Cycles

Climate-related sea-level changes of the last century are very minor compared with the large changes in sea level that occur as climate oscillates between the cold and warm intervals that are part of the Earth's natural cycle of long-term climate change.

During cold-climate intervals, known as glacial epochs or ice ages, sea level falls because of a shift in the global hydrologic cycle: water is evaporated from the oceans and stored on the continents as large ice sheets and expanded ice caps, ice fields, and mountain glaciers. Global sea level was about 125 meters below today's sea level at the last glacial maximum about 20,000 years ago (Fairbanks, 1989). As the climate warmed, sea level rose because the melting North American, Eurasian, South American, Greenland, and Antarctic ice sheets returned their stored water to the world's oceans. During the warmest intervals, called interglacial epochs, sea level is at its highest. Today we are living in the most recent interglacial, an interval that started about 10,000 years ago and is called the Holocene Epoch by geologists.

Sea levels during several previous interglacials were about 3 to as much as 20 meters higher than current sea level. The evidence comes from two different but complementary types of studies. One line of evidence is provided by old shoreline features (fig. 2). Wave-cut terraces and beach deposits from regions as separate as the Caribbean and the North Slope of Alaska suggest higher sea levels during past interglacial times. A second line of evidence comes from sediments cored from below the existing Greenland and West Antarctic ice sheets. The fossils and chemical signals in the sediment cores indicate that both major ice sheets were greatly reduced from their current size or even completely melted one or more times in the recent geologic past. The precise timing and details of past sea-level history are still being debated, but there is clear evidence for past sea levels significantly higher than current sea level.

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Figure 2. Wave-cut terraces on San Clemente Island, California. Nearly horizontal surfaces, separated by steplike cliffs, were created during former intervals of high sea level; the highest terrace represents the oldest sea-level high stand. Because San Clemente Island is slowly rising, terraces cut during an interglacial continue to rise with the island during the following glacial interval. When sea level rises during the next interglacial, a new wave-cut terrace is eroded below the previous interglacial terrace. Geologists can calculate the height of the former high sea levels by knowing the tectonic

Comment Letter II

uplift rate of the island. Photograph by Dan Muhs, USGS.

Potential Sea-Level Changes

If Earth's climate continues to warm, then the volume of present-day ice sheets will decrease. Melting of the current Greenland ice sheet would result in a sea-level rise of about 6.5 meters; melting of the West Antarctic ice sheet would result in a sea-level rise of about 8 meters (table 1). The West Antarctic ice sheet is especially vulnerable, because much of it is grounded below sea level. Small changes in global sea level or a rise in ocean temperatures could cause a breakup of the two buttressing ice sheets (Ronne/Filchner and Ross). The resulting surge of the West Antarctic ice sheet would lead to a rapid rise in global sea level.

Reduction of the West Antarctic and Greenland ice sheets similar to past reductions would cause sea level to rise 10 or more meters. A sea-level rise of 10 meters would flood about 25 percent of the U.S. population, with the major impact being mostly on the people and infrastructures in the Gulf and East Coast States (fig. 3).

Figure 3. Red shows areas along the Gulf Coast and East Coast of the United States that would be flooded by a 10meter rise in sea level. Population figures for 1996 (U.S. Bureau of the Census, unpublished data, 1998) indicate that a 10-meter rise in sea level would flood approximately 25 percent of the Nation's population.

× Figure 3			

Researchers at the U.S. Geological Survey and elsewhere are investigating the magnitude and timing of sea-level changes during previous interglacial intervals. Better documentation and understanding of these past changes will improve our ability to estimate the potential for future large-scale changes in sea level.

References

Fairbanks, R.G., 1989, A 17,000-year glacio-eustatic sea level record; influence of glacial melting rates on the Younger Dryas event and deep-ocean circulation: Nature, v. 342, no. 6250, p. 637-642.

Williams, R.S., and Hall, D.K., 1993, Glaciers, in Chapter on the cryo-sphere, in Gurney, R.J., Foster, J.L., and Parkinson, C.L., eds., Atlas of Earth observations related to global change: Cambridge, U.K., Cambridge University Press, p. 401-422.

For more information, please contact:

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More USGS information on climate change can be found on the Internet at:

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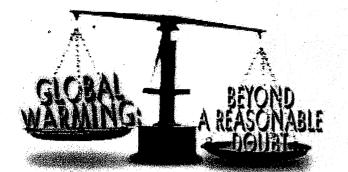
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1. Roast, or idle boast?

Soggy predictions

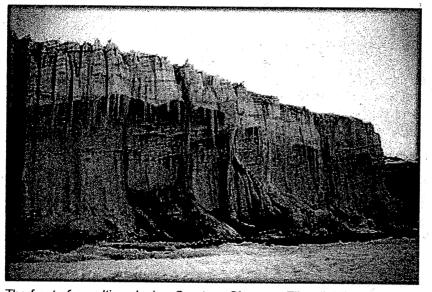
2. Ultimate cooker

3. See rising sea level

4. Know for sure?

5. What to do?

Curiously, a major prediction about global warming concerned the ocean, not the atmosphere: Melting glaciers and warming water would raise sea levels, threatening coastlines that are home to huge numbers of people.



The front of a melting glacier. Courtesy Giuseppe Zibordi, Michael Van Woert, NOAA NESDIS, ORA.

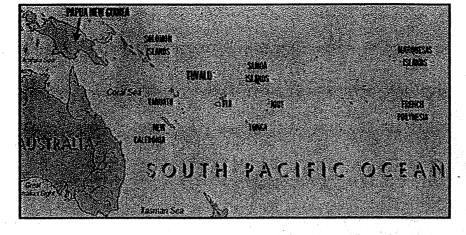
Measurements show that sea level has risen about 15 centimeters over the past century.

Climatologist Kevin Trenberth notes that while predictions for sea level have changed over the years, rising seas remain "a major problem on long-time scales.... Even if you stabilize temperature and greenhouse gases, sea level will continue to rise."

Watery and grave

Low-lying atolls in the Pacific and Indian Oceans are already threatened. The first environmental refugees of the greenhouse century could come from a place like the Carteret (or Tulun) islands of Papua New Guinea.

The island's 1,400 residents say the rising sea has polluted their gardens with salt water, and they may starve even before the sea inundates their homes. The residents have applied for relocation money, but the government says it lacks the cash.



Rising seas also endanger the Pacific nation of Tuvalu, which may sue the developed world that creates most greenhouse gas pollution. The David-and-Goliath lawsuit would be hard to win, but it could raise the profile of island flooding.

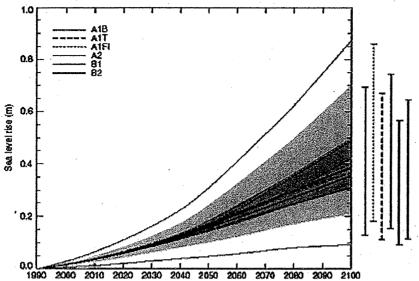
Even small sea rises could have enormous effects, Trenberth points out, since a storm surge at high tide can produce severe damage. The 1998 El Nino in California, he says, cause "a tremendous amount of erosion, houses toppling into ocean. It was a real indicator of the type of thing you would expect to see with rising sea level."

In general, Trenberth says, sea level rise "is not a gradual process. It's not that you wait and gradually the sea trickles up and covers your toes. ... it happens in episodic fashion, for the most part you may be fine, but in a tropical storm, a whole island can be inundated. ...Some of these nations could disappear overnight."

The unfrozen continent

Because so much water is stored in Antarctica, concern over rising sea levels inevitably causes a glance to the south, and the news has been ominous. Last March, a section of ice as big as Rhode Island broke away and disintegrated, stunning glaciologists.





Estimates for sea-level rise show the effects of various scenarios for economic and technological development. Courtesy IPCC Climate Change 2001, <u>Technical Summary</u>, Working Group I, 2001, p. 74.

By itself, this breakup will not raise sea level, since floating ice does not raise sea level when it melts. However, ice surrounding the continent helps restrain ice in the interior, which may flow more quickly toward the ocean.

A big melting in Antarctica could cause a huge rise in sea level, but since other parts of the continent are cooling, the overall message is confusing.

Greenland's white cap

We've just gotten disturbing evidence from Greenland. About 10 percent of Earth's fresh water is locked in a giant icecap there. This June, NASA scientists reported that the icecap is rapidly melting.

Because ice conducts little heat, experts had expected the icecap to respond slowly to warming. But meltwater from the surface is seeping through cracks and lubricating the rock below.

"Previous models suggested that it might take hundreds, even thousands of years for changes in an ice sheet's surface to be felt at the base," NASA glaciologist H. Jay Zwally told the Atlanta Journal and Constitution. "This shows that summer melting can accelerate the ice flow in a matter of weeks" (see "Glacial Melt ..." in the <u>bibliography</u>).

Rising seas. Hot temperatures. Is this global warming?

It looks like hot duck. It smells like hot duck. Is it <u>roast</u> <u>duck</u>?

SLOWLY & STEADILY, SEA LEVEL HISING INSTANCE

EVIDENCE OF GLOBAL WARMING.

Boston Cod - The Chilling Spin On Global Warming

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Sunday, September 11th, 2005



Greg O'Brien is editor and president of Codfish Press, a publishing and

political/communications strategy company. He is the author/editor of several books, a Boston Metro newspaper columnist, a contributor to New York Metro, a freelance writer for national and regional magazines, a television script writer and a documentary producer. He has contributed in the past to Boston Magazine, the old Boston Herald American, USA Today, The Arizona Republic, the Los Angeles Times, the Associated Press, UPI. and is former editor and publisher of The Cape Codder newspaper and a former managing director of **Community Newspaper Company** of Boston. He comments here about Boston and the world beyond, and about Cape Cod, Martha's Vineyard and Nantucket on his local blog, Codfish Press.

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The Chilling Spin On Global Warming

09/11/05 · 11:11 am posted by Codfish Press [Permalink]

Greg O'Brien, Codfish Press

Can you hear me now? Weeks ago before Hurricane Katrina rearranged the geography along the Gulf Coast, flushing out the Big Easy, inflicting billions of dollars in property damage and claiming the lives of hundreds, with the body count likely to reach into the thousands, I posted a commentary on global warming on my Codfish Press blog (24 comments to date), citing evidence that global warming may be intensifying storms in the Atlantic.

We got a taste of what a powerful storm can do locally with Hurricane Bob in 1991, and for those who were alive then, there was the Great Storm of 1938 that took hundreds of lives. Don't touch that dial! The Weather Channel, no doubt



in years to come, will be reporting on a big blow— Category 4 or 5—lumbering in our direction. It will carve Cape Cod up into a series of islands like the Florida Keys and will flood low-lying areas downtown Boston like Revere Beach on a moon tide.

I saw Congressman **William Delahunt** Saturday at a social gathering in Boston and engaged him in a discussion on the subject. "I want to know what the federal government's plan is in the event a major hurricane hits Boston or Cape Cod?" Delahunt asked rhetorically.

The answer is a fat: nothing. Every man, woman, child and politician to him or herself!

I repeat my global warming column here, just to keep the





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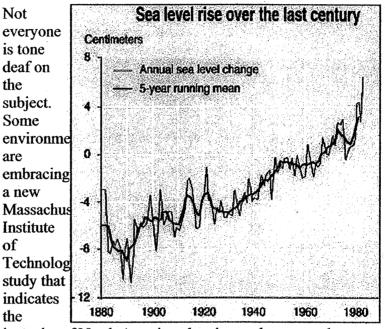
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debate going. There are many angles to this issue, some of them sharp as you can discern from comments on the Codfish Press blog. You may subscribe to global warming theories; you may not. But one thing is as certain as sunset, a killer storm will be headed in our direction one day. And what are we doing about it? I'm reminded of the closing line in the grim television movie: The Day After.

"Is anyone listening? Anyone at all?"



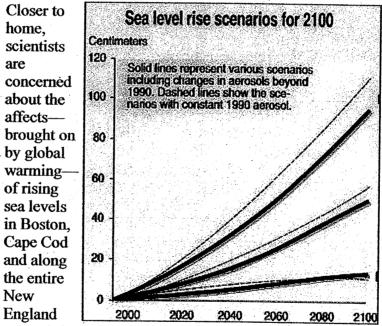
intensity of North American hurricanes has more than doubled in the last 30 years and that the force of western North Pacific cyclones has swelled by an alarming 75 percent since the mid-1970s. The glee is over speculation that the increase is the result of global warming from a buildup in the ozone layer of man-induced carbon dioxide, methane, various pollutants and other chlorinebased chemicals that have caused a depletion of the outer layer of our atmosphere, which shields us from dangerous radiations, like cancer-causing ultraviolet rays. Harmful radiation, seeping through the ozone layer, also causes genetic damage to plants and animals.

For years, critics—many of them corporate defenders fearing government regulations on chlorine-based fluids for refrigeration, plastic foam compounds and aerosol cans—have tried to poke holes in global warming presumptions, questioning their veracity and insisting global temperatures are directly related to sunspot activity.

But the environmentalists look like they might have it right this time. Now there is evidence, although disputed by some, that global warming intensifies hurricanes, cyclones and tropical storms. Warmer ocean temperatures, caused by rising air temperatures, as the theory goes, provide hurricanes with more fuel for energy. Warmer water temperatures also result in the release of more carbon dioxide, which holds heat and increases warming.

"When I look at these results at face value, they are rather alarming," National Oceanic and Atmospheric Administration researcher Tom Knutson, commenting in the Associated Press, said of the MIT study that was conducted by climatologist Kerry Emanuel.

Equally disturbing is a recent report from two University of Maine scientists that two glaciers in Greenland are moving at a record pace, suggesting that global warming is melting the ice and causing it to slide at a faster rate, in one case at a rate of 8.7 miles a year, up from 3.5 miles a year in the 1990's. Such changes in conditions, experts say, usually take thousands of years.



coast. Scientists estimate that in the next 40 years the Cape's shoreline will retreat more than 100 feet and by the year 2100 more than 1,200 feet of Cape shoreline will be inundated. The center of Provincetown may be flooded in tens of years, one erosion authority predicts. Martha's Vineyard will also be severely impacted, and Nantucket is expected to be under water in the next 800 years—a New York minute in geologic terms.

Adding to this problem is that while the sea level is rising, some coastal areas of the Cape and Islands, formed from silt sediments, are actually sinking—slowly compressing under their own weight.

Provincetown and Chatham aren't the only areas of the

Cape facing severe erosion. Others include Falmouth Heights, where the cliff is falling into Vineyard Sound and still undermining the coastal road above it: Sandwich and West Barnstable, where beaches like Sandy Neck can lose 10-to15 feet in a single storm; Mashpee, where the shoreline is eroding from Waquoit Bay to Popponesset Bay and exposing high-priced homes to the sea; Dennis on the bay side, where the popular Corporation and Cold Storage beaches are losing ground; and Orleans (most recently the Outer Beach which has experienced storm and tidal breaches into Pleasant Bay, creating a temporary island that in time may be permanent) Eastham, Wellfleet, and Truro on the bayside and ocean sides.

The same uncompromising forces are at play on Nantucket, Martha's Vineyard, and the neighboring Elizabeth Islands, all part of the same moraines and outwash plains that formed Cape Cod. Time is running out for Nantucket: on the east, south and west shores, from Great Point to Siasconset to Madaket, beaches of this low-lying spit are losing an average of ten to 30 feet a year. That's impressive when you consider the island is about three and a half miles wide and 14 miles long.

The menacing oboe you hear today over on the Vineyard has nothing to do with sharks. Martha's Vineyard, which is losing shoreline a similar washout rate on its northeastern, eastern and southern shorelines, faces similar fate.

So why the fuss about global warming? It is what it is, and to ignore it invites disastrous consequences. Evidence of human-induced global warning cannot be ignored, warns the Union of Concerned Scientists. The debate over what to do about it ought to be driven by science not politics. And the science here sadly suggests that one day we may all have a water view.

9 comments

Comments:

Jerry Berne, www.sustainableshorelines.org writes:

09/11/05 @ 1:08 pm Ø

A major problem with our current concentration on the causes of the warming is that we are not currently employing sustainable options to mitigate its effects which are happening now. One its most visible effects is coastal erosion. Unfortunately, everthing we are currently employing to prevent this is counterproductive, especially beach nourishment. We do have methods proven to be

http://www.capecodtoday.com/blogs/index.php/bostoncod/2005/09/11/the chilling spin on global ... 9/11/2005

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sustainable and environmnetally sound (one of these, Holmberg Technologies, www.erosion.com, has over 30 years of credible documentation of success). There are even innovative new methods, including a biochemical product currently being tested in the Cape Cod area.

We are losing our shorelines and the habitats these sustain. Most of this loss is the direct result of man's activities. As such, we must mitigate this as we would any other manmade environmental problem.

Jerry Berne

Sustainable Shorelines, Inc. (www.sustainableshorelines.org)

Sustainable Shorelines is a nonprofit corporation dedicated to documenting current environmental events on our shorelines, identifying and seeking to change those coastal policies and practices which are harmful and advocating protecting our coastal habitats and the ecosystems these support with methods proven to be environmentally sound and sustainable.

David writes:

09/11/05 @ 1:12 pm Ø

As someone who has worked for a long time on global warming issues for an environmental organization (and coincidentally owner of a cottage in Wellfleet), let me add my voice for making the connections between storm intensity and global warming. Whatever intensity increase has occurred to date, the future is certain to bring far greater increases in storm strength unless global warming emissions are cut dramatically. To avoid locking ourselves into this future, we need to start now to cut emissions--gradually at first but with much greater cuts in the next few decades. All this can be done without economic disruption, indeed, we can improve energy security (and thus economic performance) at the same time by depending less on oil, increasing reliance on renewable energy like wind and solar, and disposing of carbon dioxide from the fossil fuel we continue to use.

Codfish Press writes:

09/11/05 @ 1:56 pm Ø

Jerry,

Appreciate your thoughtful comments on the subject. Man's activities and inactivity always seem to get us into trouble.

O'B. Codfish Press

Codfish Press writes:

09/11/05 @ 1:59 pm Ø

David,

There is much at stake here. A little prevention now, could save much heartburn later.

O'B.

Codfish Press

Ben writes:

09/11/05 @ 5:53 pm Ø

Before we start crediting global warming with all conceivable threats to the Cape Cod environment, it might be wise to check the actual temperature record. In my lifetime, since 1944, the trend in annual mean temperature for the Northeast United States (NOAA Climate at a Glance) is slightly down, not up.

Buster writes:

09/11/05 @ 6:29 pm Ø

The problem with Global Warming for humans is that it is occurring to slowly. Yes, the scientific communuty can get a handle on it, but the evidence is still to questionable for the average person. This is especially true to the politicians that owe thier soles to the energy industries. If a Global Warming event would occur like a volcano, then humans would catch on to the warming process, but warming over one or two hundred year period is too subtle for the human species to catch on to. The average temperature of the Earth is 51 degrees farenheit. Think of what the planet may look like if it goes to two or three degrees higher. Will the climate spin out of control to catastrophic high temeratures? Think of what it will take to bring us back to climatic equillibrium. We need to reduce CO2 levels of the atmosphere. It may be already be to late for mankind to stop the Global Warming trend.

We in the US can not even begin to part wiht our SUVs or even drive slower to improve the fuel economy. So, how are we going to possibly make the sacifices to stop GW?

Anonymous writes:

09/11/05 @ 7:46 pm Ø

Oh, the Kool Aid drinkers!

I quote a statement by Prof. Bob Carter of James Cook University in Queensland, Austrailia in today's papers down there. He's studied climate change, not just recently, but of that taking place over millions of years. "I question why global warming has become a religion and is presented as a fervent belief. It is relentlessly pushed by people who want to stir up alarm and who say there is consensus on the issue. There is no scientific consensus yet as we are not even close to achieving a general theory of climate change. The matter has become a political issue instead of a scientific debate." Professor Carter further states, "compared with the

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ancient climate record, modern temperatures are neither particularly high nor particularly fast changing."

Codfish Press writes:

09/11/05 @ 8:00 pm Ø

Buster,

You are correct in saying global warming is occurring too slowly for humans to respond. We are an after-the-fact species that sadly responds only to a crisis.

O'B. Codfish Press

Codfish Press writes:

09/11/05 @ 8:17 pm Ø

Anonymous,

Kool Aid drinkers? I always liked the orange flavor when I was a kid.

It would be nice to know who you are. Great to have strong opinions, Anonymous, but you ought to stand behind them, instead of hide behind them.

As I noted in the commentary, there are many points of view on this complex subject, and I don't pretend to have the answers. But there has been enough smoke on this issue to merit serious, candid public debate on global warming, not one liners.

Drink up.

O'B. Codfish Press

Leave a comment:

Comment on this post below! Leave the Name field blank to post as "Anonymous"

Name:

Enter your name/nickname or leave blank to post as **Anonymous**.

Your Comments:

Line breaks will be preserved. HTML is not allowed and will be stripped out when posting.

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Finish this phrase: Cape

This is a measure against comment-spammers. Your comment cannot be posted if you don't enter the right word. (Hint: it's Cod)

Options:

Remember me (Set cookie for your name.)

Send comment

[top of page]

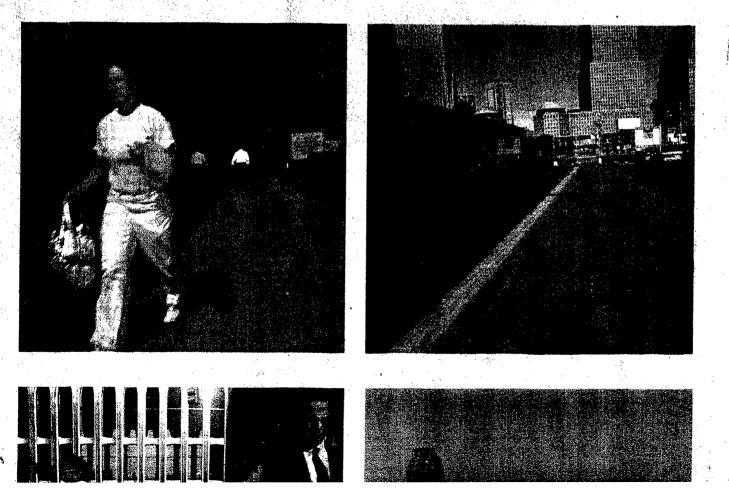
Want to host your website or advertise on the #1 community website on Cape Cod? <u>Check out our online media kit</u> Website ©2005 <u>eCape, Inc.</u> & Best Read Guide <u>Cape Cod</u>. Questions? Comments? Call (508) 385-0003 or email <u>info@ecape.com</u> Comment Letter II

THE NEW YORK TIMES **OP-ED** SUNDAY, SEPTEMBER 11, 2005

Op-Art KRISTINE LARSEN

Then and Now

For 12 years, I lived a block from the World Trade Center. In 1997, I began documenting the street life of the area. After 9/11, the project changed. In 2002, trying to grasp the unthinkable, I began returning to places in the neighborhood that I had photographed before, often with little more than lines in the pavement to guide me. New Yorkers have spent the last four years trying to reframe and reorient themselves to our city. This is my attempt. - KRISTINE LARSEN



NICHOLAS D. KRISTOF

The Storm Next Time

If the White House wants to move the debate about Hurricane Katrina beyond what it calls the "blame game" for bodies decomposing in the streets of New Orleans, then here's a constructive step that President Bush could take to protect people in the future: Tackle global warming.

True, we don't know whether Katrina was linked to global warming. But there are indications that global warming will produce more Category 5 hurricanes. Now that we've all seen what a Katrina can do - and Katrina was only Category 4 when it hit Louisiana - it would be crazy for President Bush to continue to refuse to develop a national policy on greenhouse gases.

"The available scientific evidence indicates that it is likely that global warming will make - and possibly already is making - those hurricanes that form more destructive than they. otherwise would have been," declares an analysis by five climate scientists at www.realclimate.org.

Hurricanes derive their power in part from warm water, and so forecasting models show future hurricanes becoming more severe as sea surface temperatures rise. One summary of 1.200 simulations published in the Journal of Climate last year showed that rising levels of greenhouse gases could triple the number of Category 5 hurricanes. (I havelinks to that study and others in the Web version of this column at nytimes.com/opinion.) Moreover, there's empirical evi-%



iber 1998 (left) and July 2002; northeast corner of World Trade Plaza, July 2001 (left) and August 2002; Washington Street just f Liberty Street, November 1998 (left) and July 2002.

for the laughter in these new and the love: they're listening reasons it's still good to be t this waning human culture d like a seam of coal between stone religions. Because know — it is precisely that d that laughter that, though that laughter that, though that laughter that, though mendous pressure of hate and rmed in our time, either to to diamond.

Correction

An Op-Ed article about the history of nominations to the Supreme Court misstated the period of time that Byron R. White was questioned by members of the Senate Judiciary Committee during confirmation hearings in 1962. It was 11 minutes, not two hours. the effect of global warming." We adds: "My results suggest that future warming may lead to ... a substantial increase in hurricane-relatedlosses in the 21st century."

Global warming also makes hurricanes more destructive by raising the sea level. One Environmental Protection Agency study foresees a one-foot rise in sea levels on the Atlantic and Gulf coasts by 2050 and a two-foot." (and possibly four-foot) rise by 2100. A two-loot rise would swallow a chunk of the United States bigger* than Massachusetts, according to the E.P.A., and would also result in much more coastal flooding. One study by FEMA found that just a one-foot rise. in sea levels would increase, flood damage by 36 to 58 percent - underscoring that we need to bolster coastal protections as well as curb carbon emissions.

So far, Mr. Bush has resisted serious action on global warming on the basis that strong measures "would have wrecked our economy."

Tell that to Portland, Ore. In early-July, I wrote a column from Portland about its pioneering efforts to cut greenhouse gases. New calculations had indicated that it had cut total emissions below the level of 1990 – the benchmark for the Kyoto accord — even as nationally, emissions have increased 13 percent. And Portland has been booming economically.

Since then, Portland has discovered a small error in its calculations: Infact, total emissions were reduced to a hair over 1990 levels, not to a hair under. In any case, while the numbers aren't perfect, the trend is clear.

So Portland remains a model for what the Bush administration could do if it wanted to get serious about climate change. The steps Portland took included encouraging walking and bicycle commuting, telling local companies that if they give employees free parking they should also subsidize bus passes, and replacing bufbs in traffic lights with light-emitting diodes that cut electrical use by 80 percent. That last move saved the city almost \$500,000 a year in electrical costs. I can't figure out why Mr. Bush is so reluctant to embrace such steps.

Portland has also put teeth into its environmentalism by joining the Chicago Climate Exchange and making a legally binding commitment to reduce emissions. The Chicago Climate Exchange also counts as members cities like Chicago and Oakland, as well as universities like Tufts and the University of Minnesota. Those members are leading the way in addressing climate change — a contrast with the paralysis in Washington.

With corpses on the streets of New Orleans, we may have seen a glimpse of the future of climate change. Let's hope it shakes Mr. Bush out of his complacency.

E-mail: nicholas@nytimes.com

Comment Letter II

Warming to Cause Catastrophic Rise in Sea Level? Stefan Lovgren for National Geographic News Updated April 26, 2004

Most scientists agree that global warming presents the greatest threat to the environment.

There is little doubt that the Earth is heating up. In the last century the average temperature has climbed about 0.6 degrees Celsius (about 1 degree Fahrenheit) around the world.

From the melting of the ice cap on Mount Kilimanjaro, Africa's tallest peak, to the loss of coral reefs as oceans become warmer, the effects of global warming are often clear.

However, the biggest danger, many experts warn, is that global warming will cause sea levels to rise dramatically. Thermal expansion has already raised the oceans 4 to 8 inches (10 to 20 centimeters). But that's nothing compared to what would happen if, for example, Greenland's massive ice sheet were to melt.

"The consequences would be catastrophic," said Jonathan Overpeck, director of the Institute for the Study of Planet Earth at the University of Arizona in Tucson. "Even with a small sea level rise, we're going to destroy whole nations and their cultures that have existed for thousands of years."

Overpeck and his colleagues have used computer models to create a series of maps that show how susceptible coastal cities and island countries are to the sea rising at different levels. The maps show that a <u>1-meter (3-foot)</u> rise would swamp cities all along the U.S. eastern seaboard. <u>A 6-meter</u> (20-foot) sea level rise would submerge a large part of Florida.

Uncertainties

Just as the evidence is irrefutable that temperatures have risen in the last century, it's also well established that carbon dioxide in the Earth's atmosphere has increased about 30 percent, enhancing the atmosphere's ability to trap heat.

The exact link, if any, between the increase in carbon dioxide emissions and the higher temperatures is still under debate.

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Most scientists believe that humans, by burning fossil fuels such as coal and petroleum; are largely to blame for the increase in carbon dioxide. But some scientists also point to natural causes, such as volcanic activity.

"Many uncertainties surround global warming," said Ronald Stouffer at the U.S. National Oceanic and Atmospheric Administration's Geophysical Fluid Dynamics Laboratory in Princeton, New Jersey. "How much of it would still occur if humans were not modifying the climate in any way?"

The current rate of warning is unprecedented, however. It is apparently the fastest warming rate in millions of years, suggesting it probably is not a natural occurrence. And most scientists believe the rise in temperatures will in fact accelerate. The United Nations-sponsored Intergovernmental Panel on Climate Change reported in 2001 that the average temperature is likely to increase by between 1.4 and 5.8 degrees Celsius (2.5 and 10.4 degrees Fahrenheit) by the year 2100.

The climate change is likely to impact ecosystems, agriculture, and the spread of disease. An international study published in the science journal Nature earlier this year predicted that climate change could drive more than a million species towards extinction by the year 2050.

"Global warming is a serious threat to biodiversity," said Jay Malcolm, a forestry professor at the University of Toronto. "As climates warm, more southerly species will begin appearing further north, and species that occur at lower altitudes will start showing up at higher altitudes S species will find themselves in habitats where they don't belong."

Underwater

Glaciers and sea ice in both the Northern and Southern Hemispheres are already melting at a rapid pace, placing animals like polar bears at risk.

"Polar bears are entirely dependent on sea ice," Malcolm said. "You lose sea ice, you lose polar bears."

So far, the rise in sea level is because warmer water takes up more room than colder water, which makes sea levels go up, a process known as thermal expansion.

"The real question is what's going to happen to Greenland and Antarctica," Stouffer said. "That's where the bulk of all the fresh water is tied up."

A recent Nature study suggested that Greenland's ice sheet will begin to melt if the temperature there rises by 3 degrees Celsius (5.4 degrees Fahrenheit). That is something many scientists think is likely to happen in another hundred years.

The complete melting of Greenland would raise sea levels by 7 meters (23 feet). But even a partial melting would cause a one-meter (three-foot) rise. Such a rise would have a devastating impact on low-lying island countries, such as the Indian Ocean's Maldives, which would be entirely submerged.

Densely populated areas like the Nile Delta and parts of Bangladesh would become uninhabitable, potentially driving hundreds of millions of people from their land.

A one-meter sea level rise would wreak particular havoc on the Gulf Coast and eastern seaboard of the United States.

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"No one will be free from this," said Overpeck, whose maps show that every U.S. East Coast city from Boston to Miami would be swamped. A one-meter sea rise in New Orleans, Overpeck said, would mean "no more Mardi Gras."

Other scientists emphasize that such doomsday scenarios may be hundreds of years in the future.

"You can't say with any certainty that sea level rises are going to have a huge impact on society," Stouffer said. "Who knows what the planet will look like 500 years from now?"

Future Generations

Most climate scientists, however, agree that global warming is a threat that has gone unchecked for too long.

"Is society aware of the seriousness of climate warning? I don't think so," said Marianne Douglas, a geology professor at the University of Toronto. "If we were, we'd all be leading our lives differently. We'd see a society that embraced alternative sources of energy, with less dependency on fossil fuels."

Overpeck says passing on the problem of global warming to future generations is like ignoring a government budget deficit. "Except with the deficit, there are economic mechanisms that could be put in place to get out of the large deficit," he said. "With sea level rise, there's really no technological way to put the ice back on Greenland."

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Comment Letter II: Martin J. Lawler

- II-1. Please refer to Master Response 106 in this document.
- II-2. A rise in the groundwater table would not affect the ability of the leachate collection system (LCRS) to maintain a hydraulic gradient toward the collection trench and wells, although additional pumping, and consequently additional storage capacity, may be required.

The degree of change in the LCRS pumping regime or impoundment capacity that may be needed depending upon future sea level rise is, at this time, speculative and therefore beyond the scope of an EIR analysis.

- II-3. Please see Master Response 106 in this document.
- II-4. As described in Section 3.4 and Master Response 1 in the FEIR, much of the base of the landfill, that is, where refuse contacts the underlying material, is already below sea level, and in contact with groundwater. Regarding the ability of the LCRS to protect against contamination of ground and surface water, please see the response to Comment E-22 and Master Response 105 in the current document.
- II-5. Please refer to Master Response 106 in the current document.
- II-6. CCR Title 27 requires landfill owners to plan for and provide financial assurances to implement landfill closure and post-closure maintenance. The post-closure maintenance period must extend as long as the wastes pose a threat to water quality (CCR Title 27 §20950(a)(1)). See also the discussion global climate change and sea level rise in Master Response 106 of this document.
- II-7. The eastern edge of the landfill is set back from adjacent San Antonio Creek. If the levee needs to be raised, the expansion would occur from the top of the existing levee and inboard. If area inboard of the existing levee is required for expansion, any material such as refuse excavated and not appropriate for use in levee construction would be removed and likely placed within the active landfill. Refinements to Mitigation Measure 3.5.6 (see Measure 3.5.6d) described in Master Response 106 of this document would ensure that any stability issues associated with levee construction are addressed through appropriate planning, design, and engineering.
- II-8. Potential impacts on ground and surface water quality are extensively analyzed in sections 3-4 and 3-5 of the FEIR. See also Master Responses 1, 13, and 14 in the FEIR, and in, in the current document, the response to Comment E-22 and Master Responses 105, 106, and 109. The commenter's reference to "a dump filled with toxic chemicals" is unclear and probably erroneous; the EIR authors have not, in their extensive review of landfill documents, found evidence of toxic chemicals having been disposed at the Redwood Landfill, other than in incidental quantities; nor have tests of

leachate and groundwater revealed high concentrations of toxic constituents. The commenter provides no evidence to suggest otherwise.

- II-9. The EIR authors are cognizant of the potential catastrophic consequences of global warming. A sea level rise of 10-20 feet would not only inundate the low lying portions of the Redwood Landfill, leaving as an island the higher portions of the fill structure; but would also turn Petaluma Marsh into a shallow bay, would drown thousands of acres of low lying land all around the San Francisco Estuary, causing widespread ecological change, disruption of populations, and destruction of built environments and infrastructure. Water quality problems would be of almost unimaginable scope, as industrial and public works facilities, refineries, contaminated lands, roadways, and residential areas are inundated. Water quality issues related to inundation of the landfill, in this context, would constitute a minor contribution to an enormous problem. Also see the discussion global climate change and sea level rise in Master Response 106 of this document.
- II-10. As stated in the response to Comment KK-6 in Volume II of the FEIR, the environmental impact analysis does consider inhabitants and natural environments in Sonoma County.
- II-11. Please refer to the responses to the previous comments by this commenter.
- II-12. Regarding sea level rise, please see Master Response 106.

September 12, 2005

Marin County Community Development Agency Marin County Planning Commission P 12 P 4: 08 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

I have serious concerns about Waste Management Inc.'s plans to expand substantially its Redwood Landfill dump on Rt. 101. As I understand it, after expansion 75% of the garbage will come from outside of Marin. To create this regional dump, Waste Management Inc. wants to add over 15 million cubic yards of waste to build a pyramid of garbage 160 feet tall, increase daily average intake of waste by almost 100%, and increase the number of daily truck trips in and out of the landfill by 550 per day. Any negative impacts could affect us. The Open Space and surrounding wetlands are used for recreational and nature observing activities and many of us use Rt. 101 day-in and dayout. Many could be affected by the increased risks to ground water and air contaminants presented by the expansion project. We would also be impacted by the increase in truck traffic on Route 101.

Air Quality and Risks to Health. According to the EIR, the expansion of landfill activities will include an increase in large diesel trucks and equipment resulting in substantial increases in the emission of air pollutants and toxic air contaminants. This will create significant unavoidable impacts to air quality, (1-13), reason alone to reject the expansion. The EIR also states that the project will increase cancer risk for residents within 1.5 miles of the landfill, and that it used the Buck Center as the closest sensitive receptor (Response to Comment HH-20). Because the prevailing wind direction from the landfill is south, the wind is often strong as measured at Gnoss Field. We question the sufficiency of the EIR analysis. While recognizing neighborhoods in close proximity as nearby sensitive receptors that could be impacted by these risks (3.2-24), no direct analysis was included on the potential impacts to safety and health. The EIR also fails to contain enough analysis regarding ultra-fine particulate matter or the emissions from the dump's current and proposed flares used to burn gas produced by decomposing waste.

Protection of Groundwater. The EIR proposes that Waste Management Inc. be excused from complying with the state law requirements that a landfill maintain at least 5 feet separation from groundwater and maintain a bed liner to keep landfill waste and contaminated water from the ground water. I object to this. The EIR fails to make the case that Waste Management Inc. has met its burden of showing an engineered alternative would be equally protective of the environment. The main component of the "engineered alternative" is simply a trench dug around the dump that goes no deeper than 5.5 feet below sea level, coupled with extraction pumps. But the EIR also states that there

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will be a permanent pool of contaminated water under the landfill at a depth of 9.5 feet below sea level. This is a potential unaddressed danger. Has any other landfill built so close to groundwater and a major wetlands area used this system to protect the environment and the public? What scientifically proven performance standards will be used? The EIR is silent on this.

Risk from Earthquakes and Flooding. The EIR states that in the event of a 7.0 earthquake "considerable structural damage would likely occur" as well as liquefaction. (3.4-11, -12.) This could result in mass movement of fill waste or contaminated leachate into the wetlands. We question whether the EIR has used the appropriate analytical techniques and assumptions regarding ground motion, shear strengths, and accelerations to reach the conclusion that mitigation is possible to reduce the risk to less than significant. In terms of flooding risks, Waste Management Inc. has asked to be excused from fully reconstructing the old earthen levees that protect the wetlands from the dump, something it was required to do 10 years ago with its last expansion. As the recent tragic events in Louisiana have shown, old levees must be thoroughly tested and updated to avoid risks to the public. The EIR does not explain satisfactorily why the old levees would be sufficient in the event of a 100-year flood. It also fails to take into account the impact of global warming and the future rise in sea level.

Incomplete Traffic Impact Analysis. The EIR concludes that the impact on traffic from the additional 550 truck trips per day will be less than significant. However, there is little or no analysis of where the new truck traffic from out-of-county haulers will come from and what roads they will likely traverse, other than Rt. 101. For example, Atherton Avenue, unfortunately, is a major truck route for haulers from the east taking a short-cut between Rt. 37 and Rt. 101. Any increased traffic would directly affect neighborhoods on that road. The EIR is deficient because it does not fully address these traffic issues.

Questionable Need and Benefits of Expansion; Failure to Consider Alternatives. If there was some considerable benefit to Marin County, I might understand accepting some risks and allowing Waste Management Inc. to have its way. But there is no benefit. The EIR makes clear that the expanded capacity is not needed to meet Marin County's own needs. It will only enable other counties to export their trash here. The argument that the dump will have to close in the year 2024 without expansion does not support approving expansion now when many alternatives not discussed (or only briefly mentioned) in the EIR may be possible. One alternative would be for Marin to pursue a "zero waste" strategy to reduce the garbage we generate for the dump. If we were left with minimal landfill needs 15-20 years from now, then shipping the remainder to a location not as environmentally sensitive would be both feasible and prudent. The EIR fails to consider that approach.

Land Use Permit Should be Reviewed. I understand that the dump is subject to a onepage 1958 land use permit granted to a local owner who wanted to establish a small local "rubbish dump." A lot has changed in 47 years, but the land use permit has not. It is past time to review that permit to see if additional conditions are appropriate consistent with 21st century land use planning. The Altamont landfill in Alameda County, also owned by Waste Management Inc., is subject to a 40-page land use permit that imposes multiple conditions and requirements to assure protection of local residents and the environment. The Marin County Planning Commission and the Board of Supervisors should review the scope of activities at the Redwood Landfill today and under its expansion plan to see if they go beyond what was contemplated in 1958.

They should also review Waste Management Inc.'s violations of applicable laws or operational permit requirements – many are listed in the EIR.

New or expanded activities, or legal violations, would enable the County to begin a proceeding to suspend or revoke the land use permit as a means to impose conditions appropriate for a major industrial operation that sits on historical wetlands adjacent to San Antonio Creek and the Petaluma River Estuary. It is the responsible thing to do. This review should take place before finalizing the EIR for the solid waste facility permit.

I appreciate this opportunity to comment on the EIR, and ask that my concerns be fully addressed before the EIR is certified as complete.

Additionally, I understand that the grassroots organization, No Wetlands Landfill Expansion, is filing more extensive comment letter(s). I ask that you fully consider their points as well.

Very truly yours,

David Mathison 97 Barbaree Way Tiburon, CA 94920 Tel: 415 380-1912 Fax: 415 380-1913

Comment Letter JJ: David Mathison

JJ-1. This letter repeats Comment Letter R. Please refer to the responses to that comment letter.

September 12, 2005

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

I have serious concerns about Waste Management Inc.'s plans to expand the Redwood Landfill dump on Rt. 101. I understand that 75% of the garbage will come from outside of Marin. To create this regional dump, Waste Management Inc. wants to add over 15 million cubic yards of waste to build a pyramid of garbage 160 feet tall. I worry about the increased risks to ground water and air contamination presented by the expansion project.

Risks to Marin County citizens include: a substantial increase in air pollutants and toxic air contaminants, increased cancer risk for residents within 1.5 miles of the landfill, and increased ultra-fine particulate matter from the dump's flares which burn gas produced by decomposing waste.

The EIR states that there will be a permanent pool of contaminated water under the landfill at a depth of 9.5 feet below sea level. This is a potential unaddressed danger.

The EIR states that a 7.0 earthquake could result in mass movement of fill waste or contaminated leachate into the wetlands. I question the EIR's conclusion that mitigation is possible to sufficiently reduce the risk. The EIR also does not explain satisfactorily why the old levees would hold in the event of a 100-year flood. Nor does the EIR take into account the impact of global warming and future rise in sea level.

The EIR concludes that the impact on traffic from the additional 550 truck trips per day will be less than significant. The EIR is deficient because it does not fully address traffic issues.

Expanded capacity is not needed to meet Marin County's own needs, but rather to enable other counties to export their trash here. I would advocate a "zero waste" strategy to reduce the garbage we generate for the dump. If we were left with minimal landfill needs 15-20 years from now, then shipping the remainder to a location not as environmentally sensitive would be both feasible and prudent. The EIR fails to consider that approach.

I understand that Redwood Landfill is subject to a one-page 1958 land use permit granted to a local owner who wanted to establish a small local "rubbish dump." It is past time to

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review that permit to see if additional conditions and restrictions are needed, consistent with 21^{st} century land use planning.

The Altamont landfill in Alameda County, also owned by Waste Management Inc., is subject to a 40-page land use permit that imposes multiple conditions and requirements to assure protection of local residents and the environment. The Marin County Planning Commission and the Board of Supervisors should review the activities and proposed expansion of the Redwood Landfill for compliance with the 1958 permit.

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Many of Waste Management Inc.'s violations of applicable laws or operational permit requirements are listed in the EIR. New or expanded activities or legal violations allow the County to suspend or revoke the land use permit and to impose appropriate conditions or restrictions to protect wetlands adjacent to San Antonio Creek and the Petaluma River Estuary. This review should take place before finalizing the EIR for the facility permit.

I appreciate this opportunity to comment on the EIR, and ask that my concerns be fully addressed before the EIR is certified as complete. I understand that the grassroots organization, No Wetlands Landfill Expansion, is filing more extensive comment letter(s). I ask that you fully consider their points as well.

Very truly yours,

Caral helson

Carol Nelson Secretary of Marin NWPC and of the DCCM, Graduate of the Environmental Forum of Marin, and past secretary of SEED.

Comment Letter KK: Carol Nelson

- KK-1. The development of Redwood Landfill as a regional landfill is discussed in Master Response 19 in the FEIR. The landfill is already permitted to be built to a maximum height of 166 feet.
- KK-2. Increased risks to ground water are discussed in section 3.4 of the FEIR. Increased air contamination is discussed in section 3.2 and Master Response 11 of the FEIR. See also Master Response 112 of the current document.
- KK-3. Increased air contamination and increased health risks are discussed in section 3.2 and Master Response 11 of the FEIR.
- KK-4. Comment noted. Please see response to Comment I-4.
- KK-5. Potential contamination of groundwater is discussed in section 3.4 of the FEIR. The "permanent pool of contaminated water" alluded to by the commenter is discussed in Master Response 1 in Volume II of the FEIR. See also Master Response 105 of this document.
- KK-6. Dynamic stability of the landfill is discussed in Impact and Mitigation Measure3.4.1 and in Master Response 22 in the FEIR. See also Master Response 108 in the current document.
- KK-7. Regarding levees, please refer to Master Response 106 in this document.
- KK-8. Regarding global warming, see Master Response 106 and the response to Comment II-9 in this document.
- KK-9. For further discussion of traffic issues, please refer to Master Response 101 in the current document. See also the discussion of traffic for the Mitigated Alternative in Master Response 104 of this document.
- KK-10. Please see the response to Comment C-13 in this document.
- KK-11. Please see Master Response 103 in this document.
- KK-12. Comment noted.

Comment Letter LL

Marin County Planning Commission 3501 Civic Center Drive, #308 San Rafael, 94903 Attention of: Tim Haddad, Environmental Coordinator

September 7, 2005

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MARIN COUNTY COMMUNITY DEVELOPMENT

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Dear Commissioners:

I urge you to reject the planned Redwood Landfill expansion as it is proposed.

My concerns are lack of adequate mitigation for effects on groundwater and surrounding marsh and bay waters. Containment systems appear marginal now, inadequate as proposed, and dangerously ineffective in the event of any naturally occurring event such as an earthquake.

Once poisoned by leachate, clean-up attempts of the area are likely to be difficult. lengthy, and to affect very adversely the environment and the County's fiscal stability.

Increased intensity of use by the proposed project will generate unwanted traffic and air pollution from added truck traffic. I fail to see mitigation equal to the ill effects.

Speaking as a person with cancer, I will state emphatically that increased cancercausing risks associated with this project are intolerable in a County with what has 3 already been identified as one of the highest breast cancer rates in the world. We cannot live in a cocoon, but we do NOT need to worsen the current situation.

Why are exemptions to state law being considered for this project? Waste management as a science has made progress which should be encouraged. resulting in refinement and development of improved technology and recycling. 5 This project appears to enable shortcuts to profits. Mitigation measures could be more complete and stringent in order to minimize waste generated. This E.I. R. portion is deficient.

Worst of all, are the disproportionate allocation of benefits. The E.I. R. lays out quite clearly: Marin County, while generating very little of the waste, and without 6 adequate safeguards or benefit to our County, gets almost all the identified negative effects of the proposed expansion.

Since the current landfill is adequate to our needs until approximately 2024, I urge 7 you not accept this project. We can do better.

Thank you.

Garril Page

) 70 Fawn

San Anselmo, CA 94960

Comment Letter LL: Garril Page

- LL-1. Containment of leachate is evaluated thoroughly in the FEIR. In the FEIR see Impacts and Mitigation Measures 3.4.6, 3.4.7, and 3.4.8; and Master Responses 1, 7, 13, and 14. See also the response to Comment E-22 and Master Responses 105 and 109 in the current document.
- LL-2. Traffic impacts and mitigation measures are discussed in section 3.10 of the FEIR. See also Master Response 101 in the current document, and the discussion of traffic under the Mitigated Alternative in Master Response 104 of the current document.
- LL-3. Increased risk of cancer caused by increased release of toxic air contaminants is discussed in Impact 3.2.8 and Master Response 11 in the FEIR. Please note that the Mitigated Alternative, as discussed in Master Response 104 of this document, would substantially reduce the release of toxic air contaminants, relative to the applicant's proposed project.
- LL-4. The comment is unclear regarding the particular exemptions to state law being considered. Regarding the engineered alternative to the 5-foot separation from groundwater requirement, please see Master Response 1 in the FEIR and the response to Comment E-22 in the current document. Regarding recycling, please see the discussion of the Mitigated Alternative in Master Response 104 of this document.
- LL-5. Regarding waste minimization, please see the discussion of the Mitigated Alternative in Master Response 104 of this document. See also Mitigation Measure 3.6.4b in the FEIR. Regarding the goal in the County's recently-adopted Marin Countywide Plan Update that includes the concept of zero waste, see Comment C-13 in this document.
- LL-6. This comment addresses the merits of the project, not the EIR analysis.
- LL-7. This comment addresses the merits of the project, not the EIR analysis.

Comment Letter MM

September 8, 2005

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

I have serious concerns about Waste Management Inc.'s plans to expand substantially its Redwood Landfill dump on Rt. 101. As I understand it, after expansion 75% of the garbage will come from outside of Marin.

To create this regional dump, Waste Management Inc. wants to add over 15 million cubic yards of waste to build a pyramid of garbage 160 feet tall, increase daily average intake of waste by almost 100%, and increase the number of daily truck trips in and out of the landfill by 550 per day. Any negative impacts could affect us.

The Open Space and surrounding wetlands are used for recreational and nature observing activities and many of us use Rt. 101 day-in and day-out. Many could be affected by the increased risks to ground water and air contaminants presented by the expansion project. We would also be impacted by the increase in truck traffic on Route 101.

Air Quality and Risks to Health are of major concern.

According to the EIR, the expansion of landfill activities will include an increase in large diesel trucks and equipment resulting in substantial increases in the emission of air pollutants and toxic air contaminants. This will create significant unavoidable impacts to air quality, (1-13), reason alone to reject the expansion. The EIR also states that the project will increase cancer risk for residents within 1.5 miles of the landfill, and that it used the Buck Center as the closest sensitive receptor (Response to Comment HH-20). Because the prevailing wind direction from the landfill is south, the wind is often strong as measured at Gnoss Field. We question the sufficiency of the EIR analysis. While recognizing neighborhoods in close proximity as nearby sensitive receptors that could be impacted by these risks (3.2-24), no direct analysis was included on the potential impacts to safety and health. The EIR also fails to contain enough analysis regarding ultra-fine particulate matter or the emissions from the dump's current and proposed flares used to burn gas produced by decomposing waste.

We must protect the Groundwater

The EIR proposes that Waste Management Inc. be excused from complying with the state law requirements that a landfill maintain at least 5 feet separation from groundwater and maintain a bed liner to keep landfill waste and contaminated water from the ground water. I object to this!

The EIR fails to make the case that Waste Management Inc. has met its burden of showing an engineered alternative would be equally protective of the environment. The main component of the "engineered alternative" is simply a trench dug around the dump that goes no deeper than 5.5 feet below sea level, coupled with extraction pumps. But the EIR also states that there will be a permanent pool of

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MARIN COUNTY COMMUNITY DEVELOPMENT

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contaminated water under the landfill at a depth of 9.5 feet below sea level. This is a potential unaddressed danger. Has any other landfill built so close to groundwater and a major wetlands area used this system to protect the environment and the public? What scientifically proven performance standards will be used? The EIR is silent on this.

Risk from Earthquakes and Flooding

The EIR states that in the event of a 7.0 earthquake "considerable structural damage would likely occur" as well as **liquefaction**. (3.4-11, -12.) This could result in mass movement of fill waste or contaminated leachate into the wetlands. We question whether the EIR has used the appropriate analytical techniques and assumptions regarding ground motion, shear strengths, and accelerations to reach the conclusion that mitigation is possible to reduce the risk to less than significant. In terms of flooding risks, '*Naste Management* **Inc.** has asked to be excused from fully reconstructing the old earthen levees that protect the wetlands from the dump, something it was required to do 10 years ago with its last expansion. Look, haven't we learned what can happen. As the recent tragic events in Louisiana have shown, old levees must be thoroughly tested and updated to avoid risks to the public. The EIR does not explain satisfactorily why the old levees would be sufficient in the event of a 100-year flood. It also fails to take into account the impact of global warming and the future rise in sea level.

Incomplete Traffic Impact Analysis

The EIR concludes that the impact on traffic from the additional 550 truck trips per day will be less than significant. However, there is little or no analysis of where the new truck traffic from out-of-county haulers will come from and what roads they will likely fraverse, other than Rt. 101. For example, Atherton Avenue, unfortunately, is a major truck route for haulers from the east taking a short-cut between Rt. 37 and Rt. 101. Any increased traffic would directly affect neighborhoods on that road. The EIR is deficient because it does not fully address these traffic issues.

Questionable Need and Benefits of Expansion Failure to Consider Alternatives.

If there was some considerable benefit to Marin County, I might understand accepting some risks and allowing Waste Management Inc.

to have its way. But there is no benefit. The EIR makes clear that the expanded capacity is not needed to meet Marin County's own needs. It will only enable other counties to export their trash here. The argument that the dump will have to close in the year 2024 without expansion does not support approving expansion now when many alternatives not discussed (or only briefly mentioned) in the EIR may be possible. One alternative would be for Marin to pursue a "zero waste" strategy to reduce the garbage we generate for the dump. Education of the good people of Marin would encourage households to participate. If we were left with minimal landfill needs 15-20 years from now, then shipping the remainder to a location not as environmentally sensitive would be both feasible and prudent. The EIR fails to consider that approach.

Land Use Permit Should be Reviewed

I understand that the dump is subject to a one-page **1958 land use permit** granted to a local owner who wanted to establish a small local "rubbish dump." A lot has changed in 47 years, but the land use permit has not. It is past time to review

that permit to see if additional conditions are appropriate consistent with 21st century land use planning. The Altamont landfill in Alameda County, also owned by Waste Management Inc., is subject to a 40-page land use permit that imposes multiple conditions and requirements to assure protection of local residents and the environment. The Marin County Planning Commission and the Board of Supervisors should review the scope of activities at the Redwood Landfill today and under its expansion plan to see if they go beyond what was contemplated in 1958. They should also review Waste Management Inc.'s violations of applicable laws or operational permit requirements - many are listed in the EIR. New or expanded activities, or legal violations, would enable the County to begin a proceeding to suspend or revoke the land use permit as a means to impose conditions appropriate for a major industrial operation that sits on historical wetlands adjacent to San Antonio Creek and the Petaluma River Estuary. It is the responsible thing to do. This review should take place before finalizing the EIR for the solid waste facility permit.

I appreciate this opportunity to comment on the EIR, and ask that my concerns be fully addressed before the EIR is certified as complete. Additionally, I understand that the grassroots organization, No Wetlands Landfill Expansion, is filing more extensive comment letter(s). I ask that you fully consider their points as well.

Thank you for your time,

Emergle Poindexte

Emeigh Poindexter 1151 Butterfield Rd San Anselmo CA. 94960

Comment Letter MM: Emeigh Poindexter

MM-1. This letter repeats Comment Letter R. Please refer to the responses to that comment letter.

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September 8, 2005

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MAFRIN COLINIY COMMUNITY DEVELOPMENT

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Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

I have serious concerns about Waste Management Inc.'s plans to expand substantially its Redwood Landfill dump on Rt. 101. As I understand it, after expansion 75% of the garbage will come from outside of Marin. To create this regional dump, Waste Management Inc. wants to add over 15 million cubic yards of waste to build a pyramid of garbage 160 feet tall, increase daily average intake of waste by almost 100%, and increase the number of daily truck trips in and out of the landfill by 550 per day. Any negative impacts could affect us. The Open Space and surrounding wetlands are used for recreational and nature observing activities and many of us use Rt. 101 day-in and day-out. Many could be affected by the increased risks to ground water and air contaminants presented by the expansion project. We would also be impacted by the increase in truck traffic on Route 101.

Air Quality and Risks to Health. According to the EIR, the expansion of landfill activities will include an increase in large diesel trucks and equipment resulting in substantial increases in the emission of air pollutants and toxic air contaminants. This will create significant unavoidable impacts to air quality, (1-13), reason alone to reject the expansion. The EIR also states that the project will increase cancer risk for residents within 1.5 miles of the landfill, and that it used the Buck Center as the closest sensitive receptor (Response to Comment HH-20). Because the prevailing wind direction from the landfill is south, the wind is often strong as measured at Gnoss Field. We question the sufficiency of the EIR analysis. While recognizing neighborhoods in close proximity as nearby sensitive receptors that could be impacted by these risks (3.2-24), no direct analysis was included on the potential impacts to safety and health. The EIR also fails to contain enough analysis regarding ultra-fine particulate matter or the emissions from the dump's current and proposed flares used to burn gas produced by decomposing waste.

Protection of Groundwater. The EIR proposes that Waste Management Inc. be excused from complying with the state law requirements that a landfill maintain at least 5 feet separation from groundwater and maintain a bed liner to keep landfill waste and contaminated water from the ground water. I object to this. The EIR fails to make the case that Waste Management Inc. has met its burden of showing an engineered alternative would be equally protective of the environment. The main component of the "engineered alternative" is simply a trench dug around the dump that goes no deeper than 5.5 feet below sea level, coupled with extraction pumps. But the EIR also states that there will be a permanent pool of contaminated water under the landfill at a depth of 9.5 feet below sea level. This is a potential unaddressed danger. Has any other landfill built so close to groundwater and a major wetlands area used this system to protect the environment and the public? What scientifically proven performance standards will be used? The EIR is silent on this.

The whole idea is stupid! What are you thinking?

I appreciate this opportunity to comment on the EIR, and ask that my concerns be fully addressed before the EIR is certified as complete. Additionally, I understand that the grassroots organization, No Wetlands Landfill Expansion, is filing more extensive comment letter(s). I ask that you fully consider their points as well.

Very truly yours,

LISA C. RIDGE, ESQ. 26 Los Padres Circle Novato, CA 94947 415.899.9411

Comment Letter NN: Lisa C. Ridge

NN-1. This letter repeats Comment Letter R. Please refer to the responses to that comment letter.

1147 Santolina Drive Novato, CA 94945 (415) 898-2532 September 9, 2005

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MARIN COUNTY COMMUNITY DEVELOPMENT

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Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Drive, Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

Thank you for sending me the FEIR for the proposed changes at Redwood Landfill. I found the responses to my concerns quite helpful. I particularly appreciated learning more about the governmental processes that potentially influence decisions concerning landfill permits and enforcement of agreements.

When first I heard about the proposed expansion of the landfill, I became frightened that the previous problems with sludge odors and potential loss of property values would return to my neighborhood. Then, as I learned more about the landfill, I grew concerned about the lack of state and county oversight of the landfill, the health and other environmental risks listed in the DEIR, and even slope failure. I came to see that expansion would effect not just Novato but all of the County and beyond. As such, I came to believe that the proposed expansion not only does not serve the public; it stands to harm the community in the short and long term.

The FEIR confirms my conviction that what the landfill is asking for is truly bad for the community. Even the mitigated alternative allows "unacceptable" levels of pollutants and other harms for a project that would mainly benefit the deep pockets of Waste Management, Inc.

As I stated in my earlier letter, the DEIR at times showed a bias in favor of expansion and against the public good. The FEIR's responses to this concern is that its stated purpose is, indeed, not merely descriptive but advisory, especially in proposing a mitigated alternative. However, the very idea that harm to the community should be weighed against a private interest stacks the deck in favor of the latter. The report on some level assumes that the landfill has a right to cause negative environmental effects. I hope that the planning commissioners will take this built-in bias toward development into account. Further, I urge them to represent the community's interest by focusing only on how the proposed changes might benefit the community rather than considering how best to give the landfill company "what they want," as the FEIR does at times. I also hope that the commissioners fight the current bias that seems to assume that private businesses have an inherent "right" to make a profit, a "right" that is all too often pitted against the public good, as if they were equivalent. A corporation wields power far beyond that of a group of citizens or even a town; the playing field is uneven from the start.

Since the publication of the DEIR, the landfill has revised many of its proposals. However, apart from the withdrawal of the outrageously inappropriate Class II request, these revisions mainly involve changing maximums intake levels. They do little or nothing to offset the likely harm that new operations would produce. These proposals strike me as a smokescreen, an apparent compromise meant only to appear helpful. I feel that the government agencies involved need to take a hard line with any company that apparently has no interest in either true compromise or the public good.

One of my stated concerns centered on the landfill becoming a regional site, accepting more waste from without Marin County than within. The FEIR responses to my inquiries suggested that the County must protect its relationships with other counties by allowing waste to be imported. Because the public's safety should never be a "bargaining chip" in negotiations with the landfill company or any other business or concern, I sincerely hope that the County Development Agency will not compromise in ways that counter the findings of the FEIR or, worse, cause harm to the public.

Several points concerning the sufficiency of the FEIR have also been brought to my attention. Please consider these points in reviewing the current draft of the EIR.

• The FEIR fails to contain enough analysis regarding ultra-fine particulate matter or the emissions from the dump's current and proposed flares used to burn gas produced by decomposing waste.

• The FEIR proposes that Waste Management, Inc., be excused from complying with the state law requirements that a landfill maintain at least 5 feet separation from groundwater and maintain a bed liner to keep landfill waste and contaminated water from the ground water. However, the FEIR fails to make the case that the company has met its burden of showing an engineered alternative would be equally protective of the environment.

• Waste Management, Inc., has asked to be excused from fully reconstructing the old earthen levees that protect the wetlands from the dump, something it was required to do 10 years ago with its last expansion. The FEIR does not explain satisfactorily why the old levees would be sufficient in the event of a 100-year flood.

• The FEIR concludes that the impact on traffic from the additional 550 truck trips per day will be less than significant. However, there is little or no analysis of where the new truck traffic from out-of-county haulers will come from and what roads they will likely traverse, other than Route 101. I would especially like to see a likely scenario involving Atherton Avenue and San Marin Drive.

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Further, I would like to see the following done before the EIR is approved, in order to "keep our house in order":

• Review and update the land-use permit from 1958. This is ancient history **9** in terms of current developments in landfill operations. The FEIR explains that the landfill business has moved toward consolidation and regional operations. From what I understand, the 1958 permit does not take this into account.

• Conduct a further review of Waste Management's history of violations of applicable laws or operational permit requirements. Many are listed in the EIR. This is crucial, especially if part of the permit process involves the "Status Quo" alternative of allowing current changes to be approved.

In many ways, the FEIR has done a great job in presenting the pros and cons of the proposal. Again, it confirms my conviction that the increases sought by the landfill company would cause more harm that good to the community. I sincerely hope that the county and state agencies who will be considering the proposal will take seriously each of the "unacceptable" levels of pollutants and other harms revealed in the report. Because these also appear in the mitigated alternative, I see "no expansion" as the only ethically sound choice. Anything else would literally be poison in the well.

Thank you for this chance to comment on the EIR. I hope you can address my concerns fully before the EIR is certified as complete. Additionally, I understand that the grassroots organization No Wetlands Landfill Expansion is filing more extensive comment letters. I ask that you fully consider their points as well. Thank you for your time.

Sincerely,

Molly D. Roth

cc: Cynthia Murray, Judy Arnold

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Comment Letter OO: Molly D. Roth

OO-1. This comment addresses the merits of the project, not the EIR analysis.

- OO-2. Due process requires the County to consider the applicant's proposal, once deemed complete. The EIR has no bias toward the applicant, provides an objective analysis of the proposed project and a range of reasonable alternatives to the project, and, in accordance with CEQA, when potentially significant impacts are identified, feasible mitigation measures are specified to reduce the severity of these impacts. Economic analysis of the proposed project is beyond the scope of this EIR.
- OO-3. Many of the impacts of the project, as originally proposed, stem from increased levels of waste intake. The applicant's revised proposal has resulted in a decrease in some of these impacts. See especially Master Response 16 in the FEIR. The commenter is referred to the discussion of the Mitigated Alternative in Master Response 104 of the current document; the Mitigated Alternative further reduces project impacts associated with the project.
- OO-4. If the County Environmental Health Services Division approves the project, it would have to do so with a statement of overriding considerations, as required by CEQA *Guidelines* §15093:

15093. Statement of Overriding Considerations

- (a) CEQA requires the decision-making agency to balance, as applicable, the economic, legal, social, technological, or other benefits of a proposed project against its unavoidable environmental risks when determining whether to approve the project. If the specific economic, legal, social, technological, or other benefits of a proposed project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered "acceptable."
- (b) When the lead agency approves a project which will result in the occurrence of significant effects which are identified in the final EIR but are not avoided or substantially lessened, the agency shall state in writing the specific reasons to support its action based on the final EIR and/or other information in the record. The statement of overriding considerations shall be supported by substantial evidence in the record.
- OO-5. Comment noted. Please see response to Comment I-4.
- OO-6. Please refer to the responses to Comments E-22 and I-5
- OO-7. Please refer to Master Response 106.
- OO-8. Please refer to Master Response 101.
- OO-9. Please refer to Master Response 103.

Redwood Landfill Final Environmental Impact Report Response to Comments Amendment

- OO-10. Please refer to Master Response 18 in the FEIR and to Master Response 111 in the current document.
- OO-11. This comment addresses the merits of the project, not the EIR analysis.

Comment Letter PP

September 12, 2005

Don Schwartz

26 Skylark Drive #12-A

Larkspur, CA 94939

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COMMUNETY DEVELOPMENT

Marin County Community Development Agency

Marin County Planning Commission

3501 Civic Center Dr., Room 308

San Rafael, CA 94903-4517

Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit

Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

I have serious concerns about Waste Management Inc.'s plans to expand substantially its Redwood Landfill dump on Rt. 101. As I understand it, after expansion 75% of the garbage will come from outside of Marin. To create this regional dump, Waste Management Inc. wants to add over 15 million cubic yards of waste to build a pyramid of garbage 160 feet tall, increase daily average intake of waste by almost 100%, and increase the number of daily truck trips in and out of the landfill by 550 per day. Any negative impacts could affect us.

The Open Space and surrounding wetlands are used for recreational and nature observing activities and many of us use Rt. 101 day-in and day-out. Many could be affected by the increased risks to ground water and air contaminants presented by the expansion project. We would also be impacted by the increase in truck traffic on Route 101.

Air Quality and Risks to Health.

According to the EIR, the expansion of landfill activities will include an increase in large diesel trucks and equipment resulting in substantial increases in the emission of air pollutants and toxic air contaminants. This will create significant unavoidable impacts to air quality, (1-13), reason alone to reject the expansion. The EIR also states that the project will increase cancer risk for residents within 1.5 miles of the landfill, and that it used the Buck Center as the closest sensitive receptor (Response to Comment HH-20). Because the prevailing wind direction from the landfill is south, the wind is often strong as measured at Gnoss Field. We question the sufficiency of the EIR analysis. While recognizing neighborhoods in close proximity as nearby sensitive receptors that could be impacted by these risks (3.2-24), no direct analysis was included on the potential impacts to safety and health. The EIR also fails to contain enough analysis regarding ultrafine particulate matter or the emissions from the dump's current and proposed flares used to burn gas produced by decomposing waste.

Protection of Groundwater

The EIR proposes that Waste Management Inc. be excused from complying with the state law requirements that a landfill maintain at least 5 feet separation from groundwater and maintain a bed liner to keep landfill waste and contaminated water from the ground water. I object to this.

The EIR fails to make the case that Waste Management Inc. has met its burden of showing an engineered alternative would be equally protective of the environment. The main component of the "engineered alternative" is simply a trench dug around the dump that goes no deeper than 5.5 feet below sea level, coupled with extraction pumps. But the EIR also states that there will be a permanent pool of contaminated water under the landfill at a depth of 9.5 feet below sea level. This is a potential unaddressed danger. Has any other landfill built so close to groundwater and a major wetlands area used this system to protect the environment and the public? What scientifically proven performance standards will be used? The EIR is silent on this.

Risk from Earthquakes and Flooding

The EIR states that in the event of a 7.0 earthquake "considerable structural damage would likely occur" as well as liquefaction. (3.4-11, -12.) This could result in mass movement of fill waste or contaminated leachate into the wetlands. We question whether the EIR has used the appropriate analytical techniques and assumptions regarding ground motion, shear strengths, and accelerations to reach the conclusion that mitigation is possible to reduce the risk to less than significant. In terms of flooding risks, Waste Management, Inc. has asked to be excused from fully reconstructing the old earthen levees that protect the wetlands from the dump, something it was required to do 10 years ago with its last expansion. As the recent tragic events in Louisiana have shown, old levees must be thoroughly tested and updated to avoid risks to the public. The EIR does not explain satisfactorily why the old levees would be sufficient in the event of a 100-year flood. It also fails to take into account the impact of global warming and the future rise in sea level.

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Questionable Need and Benefits of Expansion

Failure to Consider Alternatives.

If there was some considerable benefit to Marin County, I might understand accepting some risks and allowing Waste Management Inc. to have its way. But there is no benefit. The EIR makes clear that the expanded capacity is not needed to meet Marin County's own needs. It will only enable other counties to export their trash here. The argument that the dump will have to close in the year 2024 without expansion does not support approving expansion now when many alternatives not discussed (or only briefly mentioned) in the EIR may be possible. One alternative would be for Marin to pursue a "zero waste" strategy to reduce the garbage we generate for the dump. If we were left with minimal landfill needs 15-20 years from now, then shipping the remainder to a location not as environmentally sensitive would be both feasible and prudent. The EIR fails to consider that approach.

Land Use Permit Should be Reviewed

I understand that the dump is subject to a one-page 1958 land use permit granted to a local owner who wanted to establish a small local "rubbish dump." A lot has changed in 47 years, but the land use permit has not. It is past time to review that permit to see if additional conditions are appropriate consistent with 21st century land use planning. The Altamont landfill in Alameda County, also owned by Waste Management Inc., is subject to a 40-page land use permit that imposes multiple conditions and requirements to assure protection of local residents and the environment. The Marin County Planning Commission and the Board of Supervisors should review the scope of activities at the Redwood Landfill today and under its expansion plan to see if they go beyond what was contemplated in 1958.

They should also review Waste Management Inc.'s violations of applicable laws or operational permit requirements - many are listed in the EIR. New or expanded activities, or legal violations, would enable the County to begin a proceeding to suspend or revoke the land use permit as a means to impose conditions appropriate for a major industrial operation that sits on historical wetlands adjacent to San Antonio Creek and the Petaluma River Estuary. It is the responsible thing to do. This review should take place before finalizing the EIR for the solid waste facility permit.

I appreciate this opportunity to comment on the EIR, and ask that my concerns be fully addressed before the EIR is certified as complete. Additionally, I understand that the grassroots organization, No Wetlands Landfill Expansion, is filing more extensive comment letter(s). I ask that you fully consider their points as well.

Very truly yours,

Dr. In

Don Schwartz

Comment Letter PP: Don Schwartz

This letter repeats Comment Letter R. Please refer to the responses to that comment letter.

Comment Letter QQ

hand delivered

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2005 SEP - 0 P 3 37

MAREN COUNTY COMMUNITY DEVELOPMENT

1

September 9, 2005 Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517

Re: Redwood Landfill Revised Solid Waste Facilities Permit

Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

I am writing this letter because I have been concerned about the garbage dump-i.e. the landfill, since I first did research for my project on the landfill in November 2004 for the Environmental Forum of Marin, and after joining the Marin Conservation League, and No Landfill Expansion group, speaking to the supervisors, the planning commisioners, Novato City Council, EHS, and others, and currently running for councilmember of Novato, that I still feel the same after reviewing the FEIR. Please relook at this serious situation of inappropriate land use at this location and the consequences for the future of my children and grandchildren and yours.

This expansion will increase by 75-82 % of the waste coming from out of Marin. To create this regional dump, Waste Management Inc. wants to add over 15 million cubic yards of waste to build a pyramid of garbage 160 feet tall, increase daily average intake of waste by almost 100%, and increase the number of daily truck trips in and out of the landfill by 550 per day. Any negative impacts could affect us.

The Open Space and surrounding wetlands are used for recreational and nature observing activities and many

of us use Rt. 101 day-in and day-out. Many could be affected by the increased risks to ground water and air contaminants presented by the expansion project. We would also be impacted by the increase in truck traffic on Route 101.

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Land Use Permit Should be Reviewed

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I appreciate this opportunity to comment on the EIR, and ask that my concerns be fully addressed before the EIR is certified as complete.

Additionally, I understand that the grassroots organization, No Wetlands Landfill Expansion, is filing more extensive comment letter(s). I ask that you fully consider their points as well.

Eleanopies 9/9/05

415-0128 PO Box 240 Novato, Ca. 94948 Residence: 487 Ridge Rd. Novato. Ca.

Very truly yours,

Eleanor Sluis

Comment Letter QQ: Eleanor Sluis

QQ-1. Land use is discussed in Section 3.6 of the FEIR. See also Master Response 10 in the FEIR. The remainder of this comment letter substantially repeats Comment Letter R. Please refer to the responses to that letter.

Comment Letter RR

Nancy Spencer 4 Ashley Ct. Novato, CA 94945

September 12, 2005

RECEIVED

2005 SEP 13 P 1:23

MARIN COUNTY COMMUNITY DEVELOPMENT

1

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

I am writing to voice my concerns about the proposed expansion of the Redwood Landfill. I won't enumerate every area of concern since that has been done, in detail, by people who are more eloquent and have more expertise than I.

I first became aware of the problems in 1995 when my neighbors and I were severely affected by the odor coming from the landfill. Since that time it has diminished but is not totally gone. Since our focus was the noxious smell we somehow missed the fact that a new height limit was approved from 40 to 166 feet! About two years ago I was appalled to learn about this as I'm sure a 16 story building would never get approval for construction next to these virgin wetlands.

The Final EIR states, "Historically, diked and drained bay lands have been used for waste disposal in the San Francisco Bay Area. Over the past several decades, however, there has been a trend to close these old Bayfront landfills and shift refuse disposal facilities to dry canyons. The project would involve a substantial expansion of one of the few remaining Bayfront landfills in the Bay Area." (1-11) Why are we even considering expansion?

We all are acutely aware of the importance of wetlands and levees and what can happen in a natural disaster. So much more is known about the toxins in the products we use than in 1958 when the original land use permit was approved. It doesn't take much to imagine the devastation that would take place if major flooding or earthquake should occur in this area.

Please don't approve expansion of this dump!

Very truly yours,

haran

Comment Letter RR: Nancy Spencer

RR-1. Regarding odors, please refer to Impact and Mitigation Measure 3.2.9 and Master Response 15 in the FEIR. Regarding seismic stability of the landfill, please see Impact and Mitigation Measure 3.4.1 and Master Response 22 in the FEIR, and Master Response 108 in the current document. Regarding flooding, please see Impact and Mitigation Measure 3.5.6 in the FEIR, and Master Response 106 in the current document. The remainder of this comment addresses the merits of the project, not the EIR analysis **Comment Letter SS**

55-52P 14 P 1:01 Thom: Jack Watson #14 KRISTIG LAUK CUMY ASSESSONS PARCEL # 145-160-13 HOVATO, CM:F, 9199 EgARdias: Nounto's To: MARIA Courts Redusood LAND Fill Solid Wastr · Environmental Co- Condigaton FACILITIES HERMIT REVISION TO MR. Tim HAdda O ENVIRONMENTAL CO ON D'UNTER THE DRAFT Substance A · MARIN COULTY BOARD ESUPERVISENS ENVIRONMENTAL Imprest Kripent. · MOVATE City Coulcil And Mayor (FEIR) And SWEP MR. ALEX Hinds - Dixpeter o Housto P.D. Public HEAlth, SAFETZ And Environment hat New PACE THE DAMAGE ARE MAIN ISSUES Citizeus OF NovATO And (PETALUMA. PARTiculates With Wind Erosion From Exposed Land Fill SUR FACKS Contain CERTAin SubsTANCES (E.g. SULFATES And NiTRATES) That CAN CAUSE Long DAMAGE DIRECTLY, On CAN CONTAIN Absorbed GASES (E.g. Chlorides OR AMMONIUM) That MAY DE INJUNIOUS TO HEATH. THESE PARTicles CAN ALSO DAMAGE MATERIALS AND REDUCE VISIBILITY. IF This LANDFILL IS Allow tel To BE Expanded Other CRITERIA Air Pollutants In the Toxic Air ContAmiNANT NETWORK Like Litrogen Dioxide And Sitin Dioxide WILL REACH Concentrations As Pollutants that WILL VIOLATE STATE And FEDERAL STANDARds In The FUTURE (EARB, 2002). LAND Fill GAS PRODUCTION AT This SITE DEPEnding On Spacific Guditions Could HAUR This SITE DEPEnding On Spacific Guditions Could HAUR A GENERATION LIFE TO HUNDRE OF JEARS D THE DOON AUSTANCE IS A GIVEN FROM METHANE EMISSIONS BUT THE pLosion HAZARd'S Would TUCREASE With An EANThy JAKE At-SEE MEST PAGE

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72 This Kidwood LAND Fill SITE IF THE GROUND ShiFted. PLEASE KEMEMDER This Site SETS 100% On MASH LAND AND IS Also Located In VERY Close PROXIMITY TO # 3 EANTHQUAKE FACTS BUT At Total OK #5 on 6 EANTH SUMME FAULT JOURS -Atthis Site. Could CAUSE The Ground To Shift YES This IS A VERY, VERY DAugenous Site The Reduced And Fill To Be LOONTHI Much LESS BE In Cossideration For Au Expansion PERMilo My Vote Is For Notermit Expansion that 80% OF MATIN 5 TAKI his Jump Site BE From MARIN Poned And In Conclusion Under PRESENT THA * * * THE MARIN BOAME OF SAPANVISONS HOW MUE In HEAR'S DO WE MARIA County ime This Site 14 Knisting Calif Mark Hun Rapy IsU Movato, Calif Mark For USK JACK WATSON 1. WATSON HOUNDO RASI dint

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Comment Letter SS: Jack Watson

- SS-1. The commenter refers to the health effects described for Respirable Particulate Matter described on page 3.2-14 of the FEIR. The actual FEIR text does not refer to landfills in particular but rather exposed surfaces in general.
- SS-2. Project-related emissions of criteria air pollutants and toxic air contaminants are discussed in section 3.2 of the FEIR. See also the response to Comment V-2 in the current document. There is no likelihood that emissions from this project could make the Bay Area Air Basin non-attainment for NO₂ or SO₂.
- SS-3. Landfill gas emissions are discussed in Impact and Mitigation Measure 3.2.5 in the FEIR. See also Appendix D-1 in the FEIR. Regarding greenhouse gas emissions, see Master Response 112 of the current document.
- Regarding odors, please refer to Impact and Mitigation Measure 3.2.9 and Master SS-4. Response 15 in the FEIR. The commenter's statement that explosion hazards would increase with an earthquake are unsubstantiated. The seismic stability of the landfill is discussed in FEIR Section 3.4 and Master Response 22 and in Master Response 108 in this document. State landfill regulations (Title 27 CCR) require that the landfill's landfill gas collection system also meet seismic standards. Siting and design standards in Chapter 3, Criteria for All Waste Management Units, Facilities and Disposal Sites, require Class III landfills to be designed "to withstand the maximum probable earthquake without damage to the foundation or to the structures which control leachate, surface drainage, or erosion, or gas." (27CCR Section 20370(a)(5). Gas monitoring and control requirements specify additional standards for the design and installation of the gas collection system. Slope stability of the landfill is the focus of the seismic analysis since that is the component proposed to be changed under the proposed project. The adequacy of the slope design (as discussed in referenced FEIR sections) in combination with state standards contained in Title 27 help reduce explosion hazards in the event of a major earthquake.
- SS-5. Seismic stability of the landfill is discussed in Impact and Mitigation Measure 3.4.1 and Master Response 22 in the FEIR, and Master Response 108 in the current document.
- SS-6. As discussed in Master Response 19 of the FEIR, most of Marin County's waste is disposed of at Redwood Landfill (78 percent in 2002). Site life is discussed in Master Response 21 in the FEIR and in Master Response 107 in the current document.

CINTHIA WILLIAMSON 1907 WINCHESTER LANE PETALUMA CA **949**54

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2005 SEP 13 P 1: 24

MARIN COUNTY COMMUNITY DEVELOPMENT

1

September 12, 2005

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

I have serious concerns about Waste Management Inc.'s plans to expand substantially its Redwood Landfill dump on Rt. 101. As I understand it, after expansion 75% of the garbage will come from outside of Marin. To create this regional dump, Waste Management Inc. wants to add over 15 million cubic yards of waste to build a pyramid of garbage 160 feet tall, increase daily average intake of waste by almost 100%, and increase the number of daily truck trips in and out of the landfill by 550 per day. Any negative impacts could affect us. The Open Space and surrounding wetlands are used for recreational and nature observing activities and many of us use Rt. 101 day-in and day-out. Many could be affected by the increased risks to ground water and of air contaminants presented by the expansion project. We would also be impacted by the increase in truck traffic on Route 101.

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Comment Letter TT

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Questionable Need and Benefits of Expansion; Failure to Consider Alternatives. If there was some considerable benefit to Marin County, I might understand accepting some risks and allowing Waste Management Inc.

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I appreciate this opportunity to comment on the EIR, and ask that my concerns be fully addressed before the EIR is certified as complete.

Additionally, I understand that the grassroots organization, No Wetlands Landfill Expansion, is filing more extensive comment letter(s). I ask that you fully consider their points as well.

Very Truly Gover, Cinthe Williamsen

Comment Letter TT: Cinthia Williamson

TT-1. This letter repeats Comment Letter R. Please refer to the responses to that comment letter.

SECEIVED 2005 SEP 13 P 1:21

September 12, 2005

Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr., Room 308 San Rafael, CA 94903-4517 Attention: Tim Haddad, Environmental Coordinator

Re: Redwood Landfill Revised Solid Waste Facilities Permit Final Subsequent Environmental Impact Report

Dear Planning Commissioners and Mr. Haddad:

I am writing to express my concern over the expansion of the Redwood Landfill. To expand an existing landfill on Bay wetlands should not be approved, and only emphasizes your lack of planning in the first place.

To double the daily tonnage and receive garbage on a regional basis will only shorten the time where a new site will be needed.

The processing of Sewage Sludge and the associated smell on The City of Novato, as practiced in the past is unacceptable.

Before the overpass is complete and further expansion is approved at the current sight, it is essential that you begin the process of finding another location. This must be done with enough lead time and before the Redwood Landfill reaches its new limit, or fails catastrophically, and becomes another environmental super fund clean up site.

> Sincerely, Bund m. witte

David and Leigh Ann Witter

Comment Letter UU: David and Leaigh Ann Witter

UU-1. This comment only obliquely refers to the EIR analysis, and addresses the merits of the project.

Comment Letter VV

RECEIVED

PO Box 1160 Tiburon, CA 94920 September 9, 2005

2005 SEP 12 P 4:09

MARIN COUNTY COMMUNITY DEVELOPMENT FORFICY

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Marin County Community Development Agency Marin County Planning Commission 3501 Civic Center Dr, Room 308 San Rafael, CA 9493-4517

Atten: Tim Haddad, Environmental Coordinator

Re: REDWOOD LANDFILL REVISED SOLID WASTE FACILITIES PERMIT

Dear Planning Commissioners and Mr. Haddad:

I have serious concerns about Waste Management Inc's plans to expand if f present facility on Route 101. As I understand this regional concept will bring in a huge amount of garbage from outside Marin which does nothing to benefit our citizens or the environment.

I have grave concerns about air quality and associated health risks that this expansion will bring on, including increased diesel traffic, contamination of ground water and risk from earthquakes and flooding.

One of the biggest issues is the increased traffic in a stretch of highway that has long been a terrible problem. I understand that the EIR analysis is incomplete on traffic as it fails to address hauling from outside the county.

This is time to have a formal review of the land use permit and determine if such an expansion is necessary both for Waste Management and for the County of Marin.

I appreciate the opportunity to comment on the EIR, and ask that my concerns be fully addressed before the EIR is certified as complete. I understand that the grassroots organization, "No Wetlands Landfill Expansion", is filing more extensive comment letters. I ask that you fully consider their points as well.

Sincerely,

loodu

M. Dougtas Woodring

Comment Letter VV: M. Douglas Woodring

- VV-1. Please refer to Master Response 19 in the FEIR for discussion of development of Redwood Landfill as a regional landfill, and Master Response 9 regarding origin of wastes arriving at the landfill. Regarding air quality and associated health risks, see Section 3.2 of the FEIR. Regarding potential contamination of groundwater and risk from earthquakes, see section 3.4 of the FEIR; see also Master Responses 105 and 108 of the current document. For a discussion of potential flooding, see Impact 3.5.6 in the FEIR. See also Master Response 106 in the current document.
- VV-2. For further discussion of potential traffic impacts, see Master Response 101 in this document.
- VV-3. Please see Master Response 103.
- VV-4. Comment noted.

David M. Yearsley 521 Walnut Street Petaluma, Ca. 94952 (707) 763-7756

9/12/05

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SECETVEN

2005 SEP 13 P 1:23

Mr. Tim Haddad, Environmental Coordinator Marin Community Development Agency 3501 Civic Center Dr. Room 308 San Rafael, Ca. 94903

Re: Redwood Landfill FSEIR

Dear Mr. Haddad;

Upon reviewing the FSEIR for the Redwood Landfill's Revised Solid Waste Facilities Permit I find that it fails to address or adequately answer key concerns that were raised by myself and others in the DEIR. In addition it contains some erroneous information that undermines its validity. I therefore request that you reject this document as inadequate and seek further clarification on the complete and actual environmental impacts that permitting the Landfill to expand its operations will cause. The following are just a few of the conditions that are of concern.

Bay mud liner

It is asserted that there is a continuous "bay mud" liner of between 5' and 56' thick beneath the landfill. This is contradicted on p 3.4-2 as no bay mud liner was found beneath a 4 acre pond area in the North portion of the site. There is also no supporting evidence that the remainder of the site has a continuous bay mud membrane beneath it. Historic maps indicate several substantial sloughs traversed the area in which the landfill was created. These channels, some of which were probably 6-10' deep if typical, could represent fissures or porous seams in the bay mud lining. A lot depends on how and with what they were filled. More testing should be required to show that the mud membrane has no other gaps or seams that would allow leachate and other contaminants to pass through it into the aquifer.

Slope configuration

By increasing the angle of the slopes and reducing the width and frequency of the stabilizing terraces there are several consequences that are not adequately addressed. The existing permit requires terraces up to 100' wide in every 15' of elevation. This requirement seems to have already been ignored as in most places the current elevation to the first terrace is closer to 50' in elevation. With the requested change of increased slope angles, narrower terraces, and heights between

terraces increased from 15' to 50' a major change in water hydrology will take place. There will be far less horizontal surface for rainwater to dissipate in. Instead it will be directed downward at greater velocity by the higher steeper slopes and put increased pressure on the narrower stabilizing terraces. In the event of continuous heavy rain storms this could cause undue pressure on the terraces, especially near the bottom where the cumulative effects of runoff would be most severe, perhaps causing their failure. Why weren't the terraces required to be graduated in width top to bottom?

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Future use of the site

The document fails to address the possible future use of the site. The new configuration of the landfill sides, with 50' tall tiers, steeper slopes, and narrower terraces would seem to preclude the closed landfill from ever being converted to future beneficial use; as has been the case with closed landfills elsewhere. For the short term solution of storing more garbage in a 160' pile the public could forever lose the possibility of using this site once it is closed. This short term thinking is not part of an adequate planning document.

Levee concerns

Many portions of the perimeter levee have not been reconstructed as required in the 1994 permit. The current FSEIR erroneously states on 3.5-1 that "a perimeter levee of 6.5' to 9' above mean sea level separates the site from surrounding waterways". It has been my observation, on many trips to the site by water, that there is little or no levee remaining in large stretches of the Northern and Western areas which are adjacent to soughs and marshlands. As a matter of fact fact, in several areas the perimeter road is all that separates the bottom edge of the landfill from the bull rushes and pickleweed at the edge of the sloughs. To construct the required perimeter levees in these areas would likely encroach on and negatively impact tidal wetlands. This situation is not addressed adequately in the FSEIR.

Wildlife disturbance factors

The impacts of bird abatement practices and night time operations at the landfill on wildlife in the adjacent Petaluma Marsh are not adequately addressed in this document. The Petaluma Marsh is California's largest remaining intact tidal wetland and used by many agencies as a benchmark for what a pristine tidal marsh should be. It is directly adjacent to the Redwood landfill on its entire eastern border and only separated by the width of San Antonio Creek. Since the FSEIR addresses concerns of the human communities well outside of its boundaries it should also consider its impacts on the neighboring wildlife communities. Many migratory waterfowl as well as resident wildlife, including several endangered or threatened species, have traditionally used the marshes adjacent to what is now the landfill. In fact California Clapper Rail have been found near Mira Monte and Mud Hen sloughs in the vicinity of the oxbow area of the dump. Construction of composting

facilities in this area means a marked increase in noise and air pollution; adversely affecting their nesting and is not adequately addressed.

In response to Marin Audubon's letter by Barbara Saltzman in p-4 on 6.4-74 the FSEIR claims a scarcity of data in disturbance factors on wildlife. In fact there are many resources that document this phenomenon. One is Ducks Unlimited's "Valley Habitats pamphlet #17: Disturbance as a component of Waterfowl Habitat Quality. It states in part "disturbance is probably the most important and overlooked factor that can cause a reduction in waterfowl use in otherwise optimal habitat types". Likewise, the Dark Sky Society has a website that documents the deleterious effects of bright lights at night on wildlife. The FSEIR dismisses these effects as ambient conditions. They are requesting increased night time operations and these impacts need to be addressed. A study should be done to determine the effects the Landfill's operations have on the Petaluma Marsh's wildlife before the FSEIR is certified.

Conclusion

The above points and other deficiencies in addressing environmental concerns all point to what a travesty it was to locate a landfill in such a sensitive area. It does not make good sense to build on a bad idea. Now is the time for Marin County to change this situation rather than exacerbate it. Who will be held accountable for the damage and degradation this landfill is causing, and the potential disaster it poses in the future? Not Waste Management Inc. They plan to pay a bond and walk away when they are through using Redwood Landfill. By doubling its capacity, extending its operations for another 15 years or so, and reaping the rewards of operating an unlined regional dump they will be leaving a permanent scar left on this County's land. There will also be a potential environmental time bomb ticking away forever on the shores of San Antonio Creek, the Petaluma River, and San Francisco Bay.

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Sincerely,

David M. Yearsley

Shipe Former Petaluma Riverkeeper

A member of: No Wetlands Landfill Expansion Madrone Audubon Chapter of Audubon Society Marin Conservation League Petaluma Wetlands Alliance The Sierra Club Waterkeepers Alliance The Bay Institute Natural Resources Defense Council

Comment Letter WW: David M. Yearsley

- WW-1. This comment is preamble to those that follow. Regarding the alleged inadequacy of the EIR, the FEIR is consistent with the CEQA statute, *Guidelines*, case law, and current standards of practice.
- WW-2. Please see Master Responses 105 and 109.
- WW-3. As described on page 2-13 of the FEIR, currently permitted bench widths are 25-100 feet at 15 foot intervals. The applicant's proposal is to change this to 25 foot width at 50 foot intervals. In December 2004 the LEA issued a letter to RLI regarding the agency's observation of a section of landfill slopes constructed consistent with proposed (3:1) slopes rather than the currently permitted profile of 4:1 (horizontal to vertical) slopes with bench intervals at 15 feet. The LEA subsequently noted on the LEA Inspection Report for that month (12-22-04) that landfill operations staff has suspended placing waste according to the proposed fill plan. Regarding erosion of the landfill surface, see Impacts and Mitigation Measures 3.4.4. and 3.5.7 in the FEIR. Terraces are currently sloped to drainage inlets (plastic piping) that flow down the slope. Similar drainage inlets would occur as the landfill increases in height. Mitigation Measure 3.4.4d in the FEIR requires the applicant to provide a drainage report demonstrating the drainage control facilities meet Title 27 requirements before project implementation.
- WW-4. The applicant is not proposing a change in the currently planned post-closure land use, that is, non-irrigated open space.
- WW-5. Please see Mitigation Measure 3.5.6 in the FEIR and Master Response 106 in the current document.
- WW-6. Please see Master Response 102.
- WW-7. As noted in the FEIR, the applicant is not proposing to change currently permitted hours of operation. The potential for increased levels of nighttime activity are addressed in Impact 3.1.5 in the FEIR, and in Master Response 102 in the current document.
- WW-8. Regarding requirements for post-closure maintenance of landfills, see the response to Comment II-6 in this document.

References

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- GeoChem Applications. 2004b. Technical Memorandum, To Mark S. Verwiel, Waste Management, Inc., From William L. Neal, GeoChem Applications, Subject: Re-Evaluation of Monitoring Parameters, Redwood Landfill. June 17, 2004.
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- GeoSyntec Consultants, Inc., Waste Management, Inc., Treadwell & Rollo, and Environmental Science Associates), Minutes of a Conference Call Meeting, (involving representatives of the firms named) Regarding: Geotechnical Issues for Redwood Landfill Permit Revisions EIR. Minutes prepared by Environmental Science Associates and confirmed by meeting participants. March 8, 2002.
- Marin Independent Journal, Casino showdown builds, http://www.marinij.com/marin/ci_3825145, May 15, 2006.
- McMurty, Richard K., California Regional Water Quality Control Board, letter to Mr. Doug Diemer, Redwood Landfill, Inc., Subject: Approval of Demonstration Project Using Biosolids as Alternative Daily Cover – Redwood Landfill, Marin County, September 13, 1995.
- Seward, Terry, P.E., Senior Water Resources Control Engineer, California Regional Water Quality Control Board San Francisco Bay Region, letter to Waste Management, Inc., Subject: Approval of Engineered Alternative to Groundwater Five Foot Separation Criteria, Only Applicable to Existing Units, Redwood Landfill, Novato, Marin County, File No. 2159.5065 (DCE), February 9, 2006.

CHAPTER 4 Text Changes to the FEIR

The following text changes are made to the Final Environmental Impact Report. These include both the text changes made in Sections 2 and 3 of this document in response to comments, and staff-initiated text changes and corrections to errata. Additions to text in this section are <u>underlined</u>, and deletions to the text are indicated with strike through lines.

Aesthetics (Section 3.1)

Mitigation Measure 3.1.6, on page 3.1-18 of the FEIR, is amended as follows:

<u>Mitigation Measure 3.1.6e:</u> Any changes to procedures or practices in the approved project must be reported to and approved (with conditions of approval, as appropriate) by the appropriate oversight agency.

Air Quality (Section 3.2)

The final paragraph on page 3.2-4 of the FEIR is amended as follows:

Pursuant to the 1990 federal Clean Air Act Amendments, the U.S. EPA classified air basins (or portions thereof) as either "attainment" or "nonattainment" for each criteria air pollutant, based on whether the national standards had been achieved. The project site lies within the San Francisco Bay Area Air Basin (Air Basin), which the U.S. EPA recently reclassified as nonattainment for ozone, precursors of which would be emitted by projectgenerated vehicle traffic and landfill operation. In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard. The national 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005. The Air Basin is classified as an attainment area for carbon monoxide, sulfur dioxide and lead (which would not be substantially emitted by the proposed project) and is unclassified for the national 24-hour PM-10 standard respirable particulate matter (which would be emitted primarily by project construction activities and vehicle travel over unpaved surfaces) and nitrogen dioxide (CARB, 2002). "Unclassified" is defined by the Clean Air Act Amendments as any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant. The Air Basin status in 2006 is nonattainment for the state 24-hour PM-10 standard and

nonattainment for the state annual PM-10 and PM-2.5 standards. The Air Basin is attainment for the national average PM-10 and PM-2.5 standards and the national 24-hour standards.

Table 3.2-2 on page 3.2-13 and the last paragraph on page 3.2-12 of the FEIR have been revised as follows:

The BAAQMD's monitoring station located closest to the project site is in the City of San Rafael, roughly 15 miles south of the project site. <u>The San Rafael station measures ozone</u>, carbon monoxide, and PM-10, which are summarized below for the years 1997 through 2005 (Tables 3.2-2a and 3.2-2b). The only station in Marin County that measures PM-2.5 is in Point Reyes. Data from the Point Reyes station is summarized for the years 2002 through 2005 in Table 3.2-2b. Data collected at <u>thesethis</u> stations is considered to be generally representative of air quality in the region surrounding the project site. <u>Table 3.2-2</u> summarizes the highest annual concentrations of ozone, carbon monoxide, and PM-10 for the most recent years available (1997-2001) and compares ambient air pollutant concentrations with the state standards, which are more stringent than the corresponding national standards. The health effects of each of these pollutants, and the sources and concentrations of these pollutants are discussed below.

Pollutant	State	Monitoring Data by Year					
	Standard ^b	1997	1998	1999	2000	2001	
San Rafael							
Ozone (O3):							
Highest 1-hr. average, ppm ^a	0.09	0.11	0.07	0.10	0.07	0.09	
Number of exceedances		1	0	2	0	0	
Carbon Monoxide (CO):							
Highest 1-hr. average, ppm	20	6	6	6	4	5	
Number of exceedances		0	0	0	0	0	
Highest 8-hr. average, ppm	9.0	2.6	3.3	2.9	2.3	2.4	
Number of exceedances		0	0	0	0	0	
Particulate Matter (PM-10):							
Highest 24-hr. average, μg/m ³	50	72	52	76	40	79	
Exceedances/Samples ^C		2/61	1/61	2/61	0/61	2/61	
Annual Geometric Mean, μg/m ³	30 20	20	18	19	18	18	

TABLE 3.2-2aSAN RAFAEL AIR POLLUTANT SUMMARY (1997–2001)

^a ppm = parts per million; μ g/m³ = micrograms per cubic meter.

^b State standard, not to be exceeded.

^c PM-10 is usually measured every sixth day (rather than continuously like the other pollutants). "Exceedances/ samples" indicates the number of exceedances of the state standard that occurred in a given year and the total number of samples that were taken that year.

NOTE: Values shown in **bold** type exceed the applicable standard.

SOURCE: California Air Resources Board (CARB), www.arb.ca.gov/adam, 2002.

Table 3.2-2b has been inserted into the FEIR, page 3.2-13, as follows; no underlining is used in order to make the table more easily legible:

		Monitoring Data by Year			
Pollutant	Standard ^b	2002	2003	2004	2005
San Rafael Monitoring Station					
Ozone (O ₃):					
Highest 1-hr. average, ppm ^a		0.077	0.087	0.091	0.081
Days over State Standard	0.09	0	0	0	0
Days over National Standard	0.12	0	0	0	0
Highest 8-hr average, ppm		0.056	0.067	0.063	0.059
Days over National Standard	0.08	0	0	0	0
Carbon Monoxide (CO):					
Highest 8-hr. average, ppm		2	2	2	2
Days over State Standard	9.0	0	0	0	0
Days over National Standard	9.0	0	0	0	0
Particulate Matter (PM-10):					
Highest 24-hr. average, μg/m ³		73	41	52	39
Days over State Standard	50	3	0	1	0
Days over National Standard	150	0	0	0	0
State Annual Average, μg/m ³	20	22	18	18	17
Point Reyes Monitoring Station					
Fine Particulate Matter (PM-2.5):					
Highest 24-hr. average, µg/m ³		70	32	52	43
Days over National Standard	65	NA	NA	NA	NA
State Annual Average, μg/m ³	12	NA	NA	NA	NA

 TABLE 3.2-2b

 SAN RAFAEL AIR POLLUTANT SUMMARY (2002–2005)

^a ppm = parts per million; μ g/m³ = micrograms per cubic meter.

b State and National standards, not to be exceeded.

^c PM-10 is usually measured every sixth day (rather than continuously like the other pollutants).

NOTE: Values shown in **bold** type exceed the applicable standard. NA = Data is Not Available

SOURCE: California Air Resources Board (CARB), www.arb.ca.gov/adam, 2006.

Table 3.2-6 on Page 3.2-30 of the FEIR is amended as follows:

Emission Source		Emissions (pounds per day)					
	Impact	со	ROG	NO _x	PM-10		
Construction Activities	3.2.1				NQ		
On-Road Vehicles	3.2.2	207	6	123	16		
Off-Road Equipment	3.2.2	20	7	118	3		
Fugitive Dust from LF operations	3.2.4				375		
Fugitive Landfill Gas	3.2.5		12				
Flare Emissions ^a	3.2.5	NQ 132	1 <u>9</u>	NQ 40	NQ 11		
Composting/Co-Composting	3.2.6		105				
Sludge as ADC and Disposed	3.2.7		18				
Sludge Air Drying	3.2.10		150				
Designated waste disposal in Area G ^a	3.2.13		NQ	NQ	NQ		
TOTAL QUANTIFIED EMISSIONS		227 359	262 271	242 282	394 405		
BAAQMD Significance Criteria		550	80	80	80		
Countywide Total ^b		246,400	44,420	37,400	15,740		
Quantified Project Emissions as a % of Countywide Emissions		<u>0.09%</u> <u>0.15</u> %	<u>0.59%</u> <u>0.61</u> %	<u>0.65%</u> <u>0.75</u> %	<u>2.50%</u> 2.57%		

TABLE 3.2-6 (revised) **INCREASES IN EMISSIONS OF CRITERIA AIR POLLUTANTS FROM THE PROJECT** (without mitigation measures)

Key: NQ = Not Quantified Bolded values are in excess of applicable standard.

Underline and strikeout changes are relative to values presented in the FEIR

а Landfill gas flare and other combustion emissions, and designated waste emissions, could not be quantified due to insufficient

information from the applicant. b Countywide emissions totals were obtained from CARB's 2001 Estimated Annual Average Emissions Inventory for Marin County, available on CARB's website at www.arb.ca.gov.

SOURCE: Environmental Science Associates, California Air Resources Board

Mitigation Measure 3.2.2 on page 3.2-31 of the FEIR is amended as follows:

Mitigation Measure 3.2.2b: The project applicant shall use ultra-low sulfur fuel (with low sulfur and low aromatic content) in combination with a fuel additive (such as $Puri-NO_x$) in all diesel-powered off-road equipment to minimize NO_x emissions to the extent that these materials are available to Bay Area transit agencies and may be commercially available purchased by the to-Redwood Landfill as well. Products such as this can reduce NO_x emissions by roughly 14 percent.

Mitigation Measure 3.2.2c: As off-road equipment ages and requires replacement, the project applicant can be expected to purchase new equipment that incorporates technology that meets more stringent emission standards mandated by CARB. Alternatively, the project applicant may purchase electrically-powered equipment, or equipment fueled by an alternative, less-emitting fuel (e.g., liquefied natural gas [LNG] or compressed natural gas [CNG]). Use of alternative fuel engines can be expected to achieve a reduction in NO_x emissions of at least 37 percent. At the time of replacement, Tthe applicant shall purchase of-new equipment that meets then-current emission and pollution control standards.shall be limited to that which is available on the market at the time of replacement.

Mitigation Measure 3.2.2e: The project applicant shall require all diesel trucks and equipment on-site to limit engine idling to three minutes or less.

Mitigation Measure 3.2.5 on page 3.2-38 of FEIR is amended as follows:

Mitigation Measure 3.2.5f: Within two years of project approval, the applicant will develop a Greenhouse Gas Reduction plan that demonstrates how the landfill will achieve by 2020 a reduction in annual GHG emissions such that emissions are no greater than 15 percent below 1990 levels. This will include but is not limited to development of additional landfill gas-to-energy production capacity; use of alternative fuels in on-site equipment and in truck fleets, increased diversion of organic material from landfill disposal and use as landfill cover material, increased recycling, development of other on-site renewable energy generation capacity, and carbon offsets. The plan will include cost estimates for GHG reduction measures and identify funding sources, including but not limited to tip fee increases. The plan will include an implementation schedule that demonstrates substantial GHG emission reductions prior to the 2020 deadline, including implementation of "early action" measures that may be implemented within two years of plan approval. The plan will include an updated inventory of projected GHG emissions and an updated estimate of GHG emissions in 1990. The plan will be subject to review and approval by Marin County Community Development Agency and the Bay Area Air Quality Management District.

Mitigation Measure 3.2.5g: Following closure of the landfill, the applicant shall continue to operate, maintain, and monitor the landfill gas collection and treatment system as long as the landfill continues to produce landfill gas, or until it is determined by the BAAQMD that emissions no longer constitute a considerable contribution to greenhouse gas emissions, whichever comes first. Because the landfill will continue to produce substantial quantities of landfill gas well beyond the 30-year post-closure maintenance period specified in the JTD, the applicant shall prepare a revised Preliminary Post-Closure Maintenance Plan that plans for and provides financial assurances for operation, maintenance, and monitoring of the landfill gas collection and treatment system for an indefinite period.

Mitigation Measure 3.2.8 on page 3.2-46 of FEIR is amended as follows:

Mitigation Measure 3.2.8c: New federal regulations for offroad diesel equipment were promulgated in May 2004. These regulations require that, starting in 2010, new equipment will have to reduce emissions of NOx and diesel PM by about 90%. However, any

equipment already in use at the time of the new regulation would be grandfathered and would not have to meet the new emissions limits. Since this equipment can operate for many years before needing replacement, future emissions would be at a higher rate. If Mitigation Measures 3.2.2a-d (as revised in this FEIR) are adopted on the existing equipment, diesel PM emissions from off-road equipment can be reduced to levels that are less than significant. Some of the measures specified to reduce NO_x emissions, such as the use of natural gas as an alternative fuel, would also reduce diesel PM emissions. Use of alternative fuels can reduce fine PM emissions by as much as 90 percent, and electricallypowered equipment does not emit any diesel PM. Alternatively, all off-road diesel equipment at the site could be retrofitted with diesel particulate traps that are capable of removing over 85 percent of the diesel PM emissions, and since diesel equipment with diesel PM traps must use ultra low sulfur fuel, this would also reduce NOx emissions though this in itself would not reduce NO_x emissions. Therefore, the incremental health risk associated with offroad diesel equipment would be reduced from 18 in a million to 2.7 (with diesel PM traps) or less (with electric or natural gas fueled engines) new cancer cases for every million people exposed.

Also, the Level of Significance after Mitigation discussion (page 3.2-46 of FEIR) has been revised accordingly:

Level of Significance After Mitigation

Mitigation Measure 3.2.8c will reduce this impact to a less-than significant level, with an incremental health risk from offroad diesel equipment of 2.7 or less in a million and a total combined incremental health risk from all sources of 4.7 or less new cancer cases for every million people exposed. Mitigation Measure 3.2-8d will further reduce the significance of this impact.

Biological Resources (Section 3.3)

Mitigation Measure 3.3.4 on page 3.3-22 of the FEIR is amended as follows:

Mitigation Measure 3.3.4<u>a</u>: Levee reconstruction work during the California clapper rail nesting season (February 1 – August 31) shall be avoided, unless surveys by a qualified biologist with a current federal scientific take permit for California clapper rail indicate that black or California clapper rails are not nesting within 500 700 feet of the work area. The surveys should be conducted consistent with the current U.S. Fish and Wildlife Service survey protocol for California clapper rail. Furthermore, the surveys should be conducted to determine the pair status of any observed individuals, local habitat use, and location of nests (if any) to within at least 30 feet. If nesting California clapper rails are found or highly suspected, one of the following measures should be implemented:

- (a) No construction activities should be conducted within 700 feet of a known or suspected California clapper rail nest; or
- (b) Construction activities that must occur within 700 feet of a known or suspected California clapper rail nest should not be conducted until between September 1 and January 31.

Proper precautions shall be taken to confine the necessary disturbances to the smallest area possible. Although salt marsh harvest mice were absent from the landfill in 1992, they should be considered potentially present during high tides, when mice may use the outer levee slope as a refuge. Care should be taken to avoid construction that disturbs the outer levee bank during spring tides.

Mitigation Measure 3.3.4b: Levee reconstruction work throughout the year (regardless of time) should be conducted consistent with the following provisions to address potential impacts to California clapper rail and salt marsh harvest mouse:

- (a) No construction activities should be conducted any earlier than 1.5 hours after sunrise and any later than 1.5 hours prior to sunset (to address the crepuscular activity peaks of this taxon):
- (b) No construction activities should be conducted 1.5 hours prior to or 1.5 hours after high tides that are of sufficient elevation to flood the adjacent middle intertidal marsh (when clapper rails and salt marsh harvest mice may need to seek refuge in high intertidal marsh or upland from rising tidal waters); and
- (c) Upon completion of the construction activities all disturbed soils in marsh habitat shall be winter stabilized to prevent erosion and allow for passive restoration of brackish marsh vegetation.

Mitigation Measure 3.3.5 on page 3.3-23 of the FEIR is amended as follows:

Mitigation Measure 3.3.5a: <u>Bird deterrent practices and Compost machinery, including</u> tubgrinders, trammel screens, and windrow turners, and other composting equipment capable of generating high noise levels shall be <u>positioned operated</u> to assure that noise levels do not exceed 76 dBA at the marsh boundary east of the levee during <u>the California</u> clapper rail nesting season (February 1 – August 31). <u>Furthermore, the existing screening</u> <u>between the composting area and the marsh shall be maintained in place to minimize line-of-sight views of composting activities from the adjacent low intertidal marsh.</u> See also Mitigation Measure 3.7-3.

Mitigation Measure 3.3.5b: If landfill activities, including but not limited to bird deterrent practices, are to take place in Areas A or B during the California clapper rail nesting season (February 1 – August 31), they must be preceded by either (1) a biological survey to determine presence or absence of <u>California</u> clapper rail nests in the marsh area adjacent to the landfill (consistent with Mitigation Measure 3.3.4) or (2) a noise study to determine noise levels from landfill operations at the marsh boundary. Landfill activities may proceed in these areas during the nesting season only if it is determined that nests are not present, or that sound levels at the marsh boundary are below 76 dBA. Furthermore, if landfill activities are to take place in these areas during the nesting season, and surveys do not support a finding of absence of California clapper rail in the intertidal marsh adjacent to the landfill, visual screening shall be implemented at the top-of-slope of the active fill area (i.e., at the edge of the fill plateau) to minimize line-of-sight views from the adjacent intertidal marsh. It should be noted that this fence will need to be continually moved to the new edge of the fill plateau as the active fill area increases in height.

Geology, Soils, and Seismicity (Section 3.4)

Mitigation Measure 3.4.1 on page 3.4-20 of the FEIR is amended as follows:

Mitigation Measure 3.4.1d: Prior to issuance of a Solid Waste Facility Permit for the project as proposed, the applicant shall perform additional seismic slope stability analyses to determine if the design of the landfill is adequate to withstand the Maximum Probable Earthquake during interim (short-term) conditions, in accordance with California Code of Regulations Title 27. The selection of the Maximum Probable Earthquake and the analyses themselves shall be subject to peer review by a geotechnical engineer. If the results of the analyses indicate an insufficient factor of safety or an excessive degree of seismically-induced deformation, the applicant shall prepare and submit a revised design for the landfill and demonstrate that the design meets the seismic stability requirements of Title 27. The revised design shall be subject to peer review by a geotechnical engineer.

Mitigation Measure 3.4.2 on page 3.4-24 is amended as follows:

Mitigation Measure 3.4.2e: The geotechnical monitoring program shall include monitoring the rate of Bay Mud consolidation due to the weight of the overlying waste by the following method. The elevation of the bottom of LCRS riser LS1 located in Area G shall be recorded immediately before, and then periodically after, each lift of waste is placed in Area G. The observed rate of settlement will be compared with the predicted rate of settlement. The supervision, reporting, and remedial action elements of Mitigation Measures 3.4.2b through 3.4.2d shall also apply to this consolidation monitoring.

Mitigation Measure 3.4.4 on page 3.4-27 is amended as follows:

Mitigation Measure 3.4.4e: To ensure that raw yardwaste used for erosion control on landfill side slopes does not become a source for the spread of invasive weed species into the adjoining marsh, Redwood Landfill shall undertake an invasive weed monitoring and control program. At the least, this program will consist of the following:

- 1. Conduct a baseline survey of areas of the landfill where yardwaste has been applied for erosion control, and of the perimeter of the landfill, to determine the presence and extent of invasive weed species already established, if any:
- 2. Remove invasive weeds that become established on the landfill property and monitor annually for removal;
- 3. If after monitoring it is determined that use of raw yardwaste for erosion control at the site is not a source of invasive weed species, the frequency of monitoring may be reduced and/or the control program discontinued.
- 4. Alternatively, Redwood Landfill could substitute composted or heat-sterilized yardwaste that does not contain viable weed seeds for raw yardwaste.

Mitigation Measure 3.4.7 (beginning on page 3.4-31) is amended as follows:

Mitigation Measure 3.4.7f: RLI shall update its Leachate Facilities Leak or Spill Contingency Plan to accommodate proposed project changes. At a minimum, the revised plan shall address the following issues:

- (1) Areas in the Oxbow shown in the existing plan (RLI, 1995b) as the location of the contingent leachate pond (Fields 2 and 3 and the narrow strip between the eastern edge of the existing leachate pond and Field 5) are proposed under the project to be used for composting and co-composting, and Fields 3, 4, and 5 are proposed under the project to be used for composting, co-composting, and are "also available for Class II leachate impoundments." The revised leachate contingency plan shall identify which area or areas will be used for contingent leachate storage or, alternatively, explain/clarify how composting operations and emergency leachate storage will be accommodated in the same area. The updated leachate contingency plan shall demonstrate that the compost operation shall be isolated from and not affected by use of any area as a contingency/emergency leachate impoundment. (Refer to Mitigation Measures 3.5.3a, 3.5.3b, and 3.5.3d regarding leachate potentially generated at these new composting areas.)
- (2) Because an additional leachate storage/evaporation pond that, according to the 1995 Leachate Facilities Leak and Spill Contingency Plan (RLI, 1995b), was to have been constructed in the summer of 1996 to provide additional pond storage capacity, has not been constructed, yet additional capacity has been shown to be needed to prevent overflow during especially wet months, the revised plan shall indicate also include the reason(s) that the RLI's plans to provide additional leachate storage capacity. evaporation pond is no longer planned or needed, especially in the event of a leak at the existing 11 acre leachate pond or malfunction of the leachate vaporator. To address revisions to the estimates of the depth and capacity of the existing pond reflected in each of the last three annual monitoring reports, the plan shall also include an updated calculation of the capacity of the existing pond based on a survey of the pond area and depth, conducted by a licensed surveyor.
- (3) With regard to potential overtopping of the leachate pond during periods of extreme rainfall, the 1995 plan indicated that pumping directly into San Antonio Creek, if leachate water was confirmed to be clean, was the most effective contingency measure to quickly evacuate the leachate pond. The updated leachate contingency plans shall not rely solely on such a measure for leak or spill contingencies, but shall include other contingency measures as discussed under item (1), above (i.e., identification of the location of on-site contingent impoundments), that prevent the off-site release of leachate. Any such on-site impoundment(s) designated to receive leachate shall be constructed to meet applicable state standards for leachate impoundments.

The updated Leachate Facilities Leak or Spill Contingency Plan shall be submitted to the LEA and the RWQCB prior to project approval. Approval of use of Oxbow areas for composting, <u>other than Field 2</u>, where the applicant commenced composting on a new pad in 2005, shall be conditioned upon approval of the updated leachate contingency plan, in addition to other relevant approvals required as mitigations in this report.

Mitigation Measure 3.4.7g: To more clearly demonstrate the effectiveness of the LCRS perimeter trench, RLI shall implement a continuous hydraulic gradient monitoring program, through at least one above-average wet season, or until a gradient toward the trench is consistently demonstrated (whichever occurs later), through the use of automatic devices to measure and record water level (water level loggers) as described herein. All such devices will be set to record a measurement at least every 15 minutes:

- <u>Water level loggers shall be installed and maintained at each of the transects</u> <u>currently established to monitor hydraulic gradient.</u>
- <u>A piezometer transect consisting of one piezometer located within the landfill</u> (inboard of the trench), one piezometer within the perimeter trench, and one piezometer outboard of the trench shall be constructed in landfill Area F, which currently does not have such a piezometer cluster. Water level loggers shall be installed and maintained in the newly constructed piezometers and set for continuous monitoring.
- <u>Water level loggers shall be installed and maintained in sand channel monitoring</u> wells G-18, MWH-24, MWH-9 and piezometer P-2R.
- Water level loggers (or stage recorders) shall be installed and maintained in San Antonio Creek and one of the sloughs adjacent to the landfill footprint.

RLI shall compile data recorded by the water level loggers and notify the LEA and RWQCB within 14 days in the event that monitoring indicates a gradient away from the trench. If monitoring indicates a consistent gradient toward the trench, monitoring results shall be reported as part of the facility's annual Leachate Management and Monitoring Report.

If monitoring reveals evidence of a gradient away from the trench, RLI shall evaluate the potential cause(s) of the reversed gradient and implement measures to remediate the problem and provide a consistent gradient toward the LCRS trench. RLI and its geotechnical consultant, GeoSyntec, have proposed the following remedial measures if monitoring indicates a gradient away from the trench (RLI and GeoSyntec, 2006). Remediation measures may include, but would not be limited to, the following:

- <u>Grading and surface water control features shall be observed to assess the possibility</u> <u>that surface water infiltration has occurred. RLI shall implement additional grading</u>, piping, or other surface water control features if deemed necessary.
- <u>Pump inlets shall be lowered at the two nearest sump locations to increase the gradient and associated discharge within the trench.</u>
- If the two preceding measures do not result in resumption of a demonstrated inward gradient (toward the LCRS trench), RLI shall install and connect to the existing system an additional trench sump and discharge system.
- <u>If none of the above measures result in a resumption of demonstrated inward gradient</u> toward the LCRS trench, RLI shall seek approval from the RWQCB to address the situation through an engineered solution such as deepening the extraction trench or constructing a subsurface cut-off wall.

In addition, if an outward gradient is detected, RLI shall seek direction from the RWQCB to determine whether additional water quality or water level monitoring locations or methods are required.

Mitigation Measure 3.4.7h. A backup power generator capable of powering the LCRS sump pumps and other basic facilities needed to ensure the continuing effectiveness of the landfill's environmental controls, shall be maintained at the landfill site. Adequate fuel to power the generator shall be maintained consistent with all applicable regulations and permit requirements.

Mitigation Measure 3.4.7i: The applicant shall, through historical research and site investigations, map the location and dimensions (including depth) of all trench fills located at the site. The applicant shall undertake any necessary subsurface investigations to

ascertain whether any trench fills were excavated into the Pleistocene Alluvium underlying the Bay Mud. If not, no further action is required. If so, the applicant shall develop and implement a plan to correct this condition. The plan shall be reviewed and approved by the RWQCB. The plan may entail: a. installation of leachate extraction wells at sufficient frequency and depth within the old trenches to prevent downward migration of leachate into the underlying alluvium; b. excavation of all waste from the trench and replacement with a liner that meets current regulatory standards; or c. another engineered solution.

Mitigation Measure 3.4.7 i: The applicant shall implement an improved program to monitor groundwater within the Pleistocene Alluvium that underlies the Bay Mud. In consultation with the RWQCB, the applicant shall locate and install additional wells, screened in the alluvium, to augment the existing wells (currently there are 4 wells in the alluvium – P-10, P-6B, P-5B, MWH-25R). Since the gradient within the alluvium is tidally influenced, the network will include both wells that are in locations that are at least at times down-gradient of the landfill, as well as reference wells that are never down gradient of the landfill, but which otherwise exhibit similar hydrogeologic characteristics and water chemistry. A sufficient number of wells shall be installed to ensure that localized inconsistencies in the hydrogeologic system are considered, and that monitoring data characterize the quality of groundwater under both reference conditions and that which could be contaminated by leachate from the landfill. A sampling and analysis plan, including schedule, shall be developed in consultation with the RWQCB, and monitoring results will be added to the facility's semi-annual and annual monitoring reports to the RWQCB. If monitoring reveals that contamination is occurring in the alluvium, the applicant shall develop a remediation plan. The remediation plan shall be reviewed and approved by the RWQCB. Remediation may entail pump and treat methods, treat-in-place methods, or other methods approved by the RWQCB. Treatment shall continue as long as contamination is present or until a water quality objective established by the RWQCB is met.

Mitigation Measure 3.4.7k: Following closure of the landfill, the applicant shall continue to operate and maintain the LCRS, including extraction of fluid from the LCRS trench and from interior wells. To demonstrate the effectiveness of the LCRS post-closure, the applicant shall verify that one of the following conditions is met:

1) Demonstrate that the piezometric head in the basal (laterally continuous) leachate is no greater than 1 ft MSL;

Redwood Landfill Final Environmental Impact Report Response to Comments Amendment 2) Demonstrate that the extracted leachate is chemically indistinguishable from the groundwater in the vicinity of the landfill.

Until it can be demonstrated that condition 2 is met consistently over a 3-year period, the applicant shall continue to operate and maintain the LCRS, and to maintain and monitor the sand channel and Pleistocene Alluvium monitoring wells at the site. Because it may be necessary to continue to operate and maintain the LCRS, and to monitor wells beyond the 30-year post-closure period specified in the JTD, the applicant shall prepare a revised Preliminary Post-Closure Maintenance Plan that plans for and provides financial assurances for perpetual maintenance of these environmental control and monitoring systems.

Hydrology and Water Quality (Section 3.5)

Mitigation Measures 3.5.6 on page 3.5-14 of the FEIR is amended as follows:

Mitigation Measure 3.5.6b: The applicant shall conduct slope stability analyses of the recently completed levee upgrades to determine whether the factor of safety is adequate for static and dynamic stability. The slope stability analyses shall utilize the methods and factors recommended by GeoSyntec (2007d), and shall take into account site-specific differences in surface and subsurface conditions. The same analyses shall be applied to designs for future levee upgrades. All analyses shall be independently peer reviewed by a Registered Geotechnical Engineer at the Applicant's expense and subject to approval by the LEA or, if subsequent work requires a Grading Permit, by the Marin County Department of Public Works, or, if a building permit is required, by the Community Development Agency Building and Safety Division. If analysis of the recently-completed levee sections reveals that they do not meet minimum static factor of safety and seismic performance standards, the applicant shall develop a remedial action plan for further levee improvements. Any such plan shall be independently peer reviewed by a Registered Geotechnical Engineer at the applicant's expense and subject to approval by the LEA or the Marin County Department of Public Works or Community Development Agency Building and Safety Division.

Mitigation Measure 3.5.6c: The applicant shall re-analyze the stability analysis contained in the remedial action plan for the failed levee segment, per the recommendations of Treadwell and Rollo's peer review (Appendix F). All analyses shall be independently peer reviewed by a Registered Geotechnical Engineer at the applicant's expense and subject to approval by the LEA, or, if a Grading Permit or a Building Permit is required, by the Marin County Department of Public Works or Community Development Agency Building and Safety Division, respectively. If the new analysis reveals that the design contained in the remedial action plan does not achieve an acceptable static factor of safety and seismic performance standard, the applicant shall develop a new design for the levee repair. This may require, for example, use of higher sheet piles as a parapet wall along the creek to provide flood protection, with the earthen fill and roadway placed at a lower elevation to reduce the static load on the Bay Mud. Any new design shall be independently peer reviewed by a Registered Geotechnical Engineer and subject to approval by the Marin County Department of Public Works. **Mitigation Measure 3.5.6d:** Within 2 years of project approval, the applicant shall prepare and submit to the LEA and the San Francisco Bay Regional Water Quality Control Board a plan for long-term flood protection of the site. The plan will include a consideration of feasible options for achieving protection from the 100-year flood in the face of rising sea level and increased flood frequency and intensity. The plan shall include selection of the preferred method or methods for achieving flood protection, and both a schedule and financial assurances for their implementation. The engineering basis for the plan shall be independently peer reviewed by a Registered Geotechnical Engineer prior to submittal for approval. The plan will be drafted and then updated every 5 years during the remaining operational life of the landfill and the post-closure maintenance period to ensure that it is current with the most recent and broadly-accepted predictions for flood levels, following consultation with the U.S. Geological Survey, the San Francisco Bay Conservation and Development Commission, and other monitoring agencies that track bay and ocean levels and that may provide estimates of mean sea level rise and areas subject to future inundation.

Mitigation Measure 3.5.10 on page 3.5-17 of the FEIR is amended as follows:

Mitigation Measure 3.5.10b: <u>The operator shall not use ADC, or shall cover it with a</u> <u>geosynthetic blanket after application at the working face.</u> Dirt shall continue to be used as <u>the cover material Dirt Soil</u> shall continue to be used as the cover material on <u>any day</u> <u>preceding closed days (e.g., Saturdays)</u>; ADC may continue to be used as the daily cover the rest of the week (i.e., Monday through Friday; the landfill is closed on Sunday).

Transportation and Traffic (Section 3.10)

Table 3.10-5 on page 3.10-10 of the FEIR is amended as follows (for clarity, changes are NOT shown in underline and strikeout):

		Number of Vehicles			
Roadway / Turning Movement	Direction	DSEIR ^a	FSEIR ^b	Now ^c	
Northbound Highway 101 (south of Access Road) – Right Turn from Highway 101	Inbound	58	26	23	
Southbound Highway 101 (north of Access Road) – Diverge from Highway 101 to Access Road Overcrossing	Inbound	8	4	7	
Southbound Highway 101 (south of Access Road) – Merge from Access Road Overcrossing to Highway 101	Outbound	55	25	22	
–Northbound Highway (north of Access Road) - Right Turn onto Highway 101	Outbound	8	3	6	

TABLE 3.10-5 (modified) PROJECT VEHICLE TRIP DISTRIBUTION – AM PEAK HOUR

^a Based on a directional split 88%/12% south and north of the site, and an inbound/outbound split of 66/63 project trips.

^b Based on a directional split 88%/12% south and north of the site, and an inbound/outbound split of 30/28 project trips.

^c Based on a directional split 78%/22% south and north of the site, and an inbound/outbound split of 30/28 project trips.

SOURCE: Environmental Science Associates, using data provided by Waste Management (G. Roycroft)

CHAPTER 5 FEIR Response to Comments Amendment Preparers

5.1 FEIR Response to Comments Amendment Authors

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Review of Project Description:

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5.3 Persons and Organizations Consulted

List of other people and organizations consulted are provided in the references at the end of each section.

APPENDICES

- A. Letter from Applicant re: Mitigated Alternative
- B. Letter from Applicant re: Responses to Comments on Geotechnical Issues
- C. Letter from Applicant re: Responses to Comments on Air Quality Issues
- D. Revised Mitigated Alternative Air Quality Calculations
- E. Greenhouse Gas Emissions Calculations
- F. Peer Review of Levee Failure Analysis
- G. Peer Review of Slope Stability Analysis for the Mitigated Alternative

APPENDIX A

Letter from Applicant re: Mitigated Alternative



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Philip Smith Deputy Director Environmental Health Services County of Marin 3501 Civic Center Drive, Suite 303 San Rafael, CA 94903

Re: Mitigated Alternative

Dear Mr. Smith:

This firm represents the Redwood Landfill and Recycling Center ("Redwood"). This letter follows up on discussions with County staff regarding the project alternative described as the Mitigated Alternative in the Redwood Landfill Solid Waste Facilities Permit Revision Final Environmental Impact Report ("FEIR").

Under the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq., ("CEQA")) the primary purpose of an Environmental Impact Report ("EIR") is to identify alternatives to a proposed project that substantially lessen the significant effects of the project. (See, e.g., Pub, Resources Code, §§ 21002, 21002.1, subd. (a); CEQA Guidelines, § 15126.6.) As explained in the FEIR, under the Mitigated Alternative, recycling activities increase, but there is no daily increase in tons of materials accepted for disposal¹ and no increase in permitted landfill volumetric capacity.²

¹/ See Table MR104-1 (Mitigated Alternative: Updated Details), attached as Exhibit A. Though the FEIR shows an increase of 100 tons per day ("tpd") of nonhazardous sludge (Class B biosolids) for disposal, the RWQCB already allows Redwood to dispose 1 ton of "wet biosolids" (80% moisture) for every 9.5 tons of dry solid waste (10% moisture) disposed. (See RWQCB Letter, dated October 23, 1995, 1710-019d

Because the Mitigated Alternative would substantially lessen the severity of environmental impacts associated with implementation of the project proposed by Redwood ("Proposed Project"), the FEIR identifies the Mitigated Alternative as the environmentally superior alternative under CEQA. (CEQA Guidelines, § 15126.6, subd. (e)(2).)

Several comments on the FEIR and the Draft Subsequent Environmental Impact Report ("DSEIR") express a preference for the Mitigated Alternative over the Proposed Project. It is also Redwood's understanding that County staff, including the Local Enforcement Agency ("LEA"), believe that the Mitigated Alternative best matches the County's recycling, environmental and policy concerns. Given the stated concerns regarding the Proposed Project, and after much review and discussion, Redwood has determined that it is willing to pursue implementation of the Mitigated Alternative once the EIR is certified as complete.³

The FEIR describes the Mitigated Alternative and analyzes the environmental effects associated with implementation of this alternative as compared to the Proposed Project. (FEIR, pp. 5-30 to 5-34, 6.3-79 to 6.3-82.) Redwood recognizes that the Mitigated Alternative is the County's preferred,

attached as <u>Exhibit B</u>.) Therefore, on days the facility receives the maximum permitted tonnage of solid waste (1270), Redwood may dispose approximately 120 tpd of wet sludge. Therefore, Redwood considers the inclusion of 100 tpd sludge for disposal in the revised solid waste facility ("SWF") permit to be a clarification of existing entitlements.

²/ Redwood's position on current permitted capacity is explained in Redwood's previous correspondence, including letters dated October 13, 2003 (p. 5, fn. 3), July 2, 2004 (pp. 16-18 and <u>Exhibit P</u>, pp. 2-4), and September 12, 2005 (p. 2). In summary, Redwood's 1995 SWF permit provided a <u>waste only</u> volume of 19.1 million cubic yards ("mcy"); with daily and final cover, the total permitted capacity of the 1995 SWF permit is approximately 25.4 mcy. This is basically the same capacity included in the Mitigated Alternative. (FEIR, p. 5-31.) Therefore, Redwood recognizes no increase in volumetric permitted capacity between the current permit and the Mitigated Alternative interpretation provided by the County.

³ / Redwood continues to prefer the Proposed Project because it meets Redwood's project objectives more completely than any of the alternatives. (See FEIR, p. 5-25 (Table 5-2).)

1710-019d

reduced scale project. This letter clarifies and discusses in more detail the FEIR's description of the Mitigated Alternative for use in the County's response to comments document on the FEIR and related processes.

Landfilled Waste

<u>Exhibit A</u> (Table MR 104-1) includes the relevant tonnage limitations for each material type that would be accepted for disposal at Redwood under the Mitigated Alternative. Landfilled waste would be capped at a total of 1390 tons per day ("tpd"), including 1270 tpd nonhazardous Class III municipal solid waste ("MSW"), 20 tpd designated waste and 100 tpd nonhazardous biosolids (Class B).⁴

Recyclable, Reusable and Compostable Materials

Under the Mitigated Alternative, recycling of nonhazardous separated or commingled materials⁵ would increase to 400 tpd. Residue from recycling would be disposed in the landfill and would count toward Redwood's daily disposal tonnage limits.

To the extent Redwood's current facilities can accommodate an increase in recycling activities, Redwood would begin increased recycling when the revised SWF permit becomes effective.⁶ For instance, Redwood currently provides a self-sort recycling area that is available to customers after tipping fees have been paid. Under the Mitigated Alternative, Redwood would place bins for cardboard and other paper grades, glass, metal, plastic containers and other basic recycled commodities in an area accessible prior to entering the scale house for self-haul public customers. This change could provide

 $^{^4}$ / Total biosolids (Class B) use for all purposes would be reduced to 230 tpd under the Mitigated Alternative, as compared to a current permitted peak of 1000 tpd. (See <u>Exhibit A</u>.)

⁵ / This amount excludes green yard/wood waste, nonhazardous minimally contaminated soils (less than 50 parts per million by weight of volatile organic compounds ("VOCs"), clean concrete (not requiring sorting), and clean soils.

⁶ / This includes processing of presorted and customer-sorted recyclable materials at Redwood's existing facilities.

more encouragement for self-haul customers to recycle, thus reducing the weight and volume of loads destined for disposal in the landfill. Redwood also already accepts concrete asphalt, and other separated inert waste for recycling, which are either used directly or crushed onsite to make recycled road and construction materials for use at the landfill.⁷

Redwood currently has authorization to divert Construction and Demolition ("C&D") waste from disposal.⁸ Such diverted wastes are transported to the Davis Street Transfer Station. There is currently no sorting or processing of C&D waste at Redwood.

The Mitigated Alternative contemplates additional C&D processing facilities at Redwood. The increased C&D recycling activities contemplated in the Mitigated Alternative may ultimately require additional entitlements to process and transfer sorted C&D materials. Redwood would apply separately for any additional entitlements needed after issuance of the revised solid waste facility ("SWF") permit modeled after the Mitigated Alternative.⁹ Tipping and processing capability would be added for clean recyclable materials, and other inert materials; mattresses, other bulky items and carpet; and building materials, such as salvaged lumber and roofing materials. (FEIR, p. 6-3.79.)

Under the Mitigated Alternative, co-composting tonnage would include a total of 170 tpd, including green, yard and wood waste; food waste; and Class B biosolids. This is a reduction from a limit of 514 tpd of compostable materials under the Proposed Project, and a reduction from historic peak composting levels at Redwood. (See <u>Exhibit A</u>.)

⁷ / The continued acceptance and onsite use of these materials would not count against the 400 tpd limit on nonhazardous separated or commingled recyclable materials included in the Mitigated Alternative.

⁸ / LEA Letter, August 27, 2003, and LEA Staff Report, August 25, 2003, attached as <u>Exhibit C</u>.

⁹ / Environmental review for the C&D processing facilities and related recycling activities may be tiered off of the existing FEIR. 1710-019d

Materials Used for Interim, Daily and Alternative Daily Cover

Interim, daily and alternative daily cover tonnage limitations would also be in accordance with <u>Exhibit A</u>. Under the Mitigated Alternative, acceptance of green/yard/wood waste for daily or interim cover would be limited to 300 tpd.¹⁰ Mitigation Measure 3.4.4b requires the placement of yard waste and grass seeds on slopes to promote vegetation and control sediment transport and erosion. (FEIR, p. 3.4-26.) Acceptance of clean soil/ nonhazardous minimally contaminated soil for use as cover would not be limited in terms of tonnage.¹¹ Acceptance of such materials, however, would continue to be subject to: (1) RWQCB and Bay Area Air Quality Management District ("BAAQMD") contamination limitations for cover soils,¹² and (2) the site's daily traffic limits (FEIR, at p. 6.3-81). Class B biosolids for alternative daily cover ("ADC") would be reduced to 50 tpd.

Mitigation Measures

The FEIR states that all of the mitigation measures applicable to the Proposed Project would also be applicable to the Mitigated Alternative. (FEIR, p. 5-30.) Given the scaled back operations as compared to the Proposed Project, however, some mitigation measures are not necessary to reduce significant impacts, and should not be required as part of the Mitigated Alternative. Redwood expects that consideration will be given to

¹¹ / See LEA letter, dated April 13, 2006, attached as Exhibit E.

¹⁰ / The LEA and the RWQCB have also approved green/yard/wood waste for use as Alternative Daily Cover ("ADC"). (See LEA letter, dated May 16, 1996 and RWQCB letter, dated June 17, 1996, attached as <u>Exhibit D</u>.) It appears that a separate entry for green/yard/wood waste was inadvertently omitted from the cover section of Table MR20-1 in the FEIR. This is corrected in <u>Exhibit A</u>.

¹²/ See FEIR, Appendix B (RWQCB Waste Acceptance Criteria) and <u>Exhibit F</u> to this letter (BAAQMD Major Facility Review Permit condition 19867, terms 13 and 14, relating to use of nonhazardous minimally contaminated soils (referred to as "VOC laden soils"). Redwood does not propose to use nonhazardous minimally contaminated soils that contain more than 50 parts per million by weight of VOCs for cover.

¹⁷¹⁰⁻⁰¹⁹d

whether the mitigation measures discussed below (and potentially others) should logically be required as part of the Mitigated Alternative.

Mitigation measures aimed at reducing gaseous emissions from composting would not be necessary under the Mitigated Alternative because the Mitigated Alternative includes a reduction in total composting from a currently permitted peak of 545 tpd of total compostable materials to 170 tpd. With a significant reduction in permitted composting capacity, the following mitigation measures are unnecessary:

- (1) increased monitoring of composting emissions (Mitigation Measure 3.2.6b); and
- (2) a feasibility study regarding composting processes that curb gaseous emissions and, depending on the results of that study, potentially reducing composting levels by an additional twentyfive percent (25%) (Mitigation Measure 3.2.6c).

Mitigation Measure 3.6.4a calls for increased composting to improve consistency with Source Reduction and Recycling Element goals. As explained above, composting levels would actually be reduced under the Mitigated Alternative. FEIR Table 5-1 shows that Impact 3.6.4 would be less than significant under the Mitigated Alternative and that no mitigation is required. Therefore, Mitigation Measure 3.6.4a should not be implemented as part of the Mitigated Alternative.

The FEIR states that Redwood must provide expanded household hazardous waste ("HHW") services in order to be consistent with Summary Plan Goal 12 and Summary Plan Policy 14 of the Marin County Regional Summary Plan (ensure that all residents have access to a program that safely and effectively manages HHW). (See FEIR, at p. 3.6-18, Mitigation Measure 3.6.5.) Redwood currently offers recycling of used motor oil and automotive batteries to its customers. County staff has indicated that additional HHW recycling opportunities, in addition to the two existing HHW programs in Marin County, are in fact not needed in order to be consistent with the Marin County Regional Summary Plan. Therefore, the Mitigated Alternative should not include expanded HHW services.

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Mitigation Measure 3.6.4b requires the "County to consider the enactment of an ordinance that would impose a mitigation fee on waste imported to Redwood Landfill from areas of California outside of Marin County." (FEIR, p. 3.6-17.) According to the FEIR, this measure is intended to reduce an identified impact caused by inconsistencies of the Proposed Project with certain goals of the Source Reduction and Recycling Element ("SRRE"). Under the Mitigated Alternative, there would be no increase in receipts of MSW for disposal; Table 5-5 shows that under the Mitigated Alternative the impact related to SRRE goals would be less than significant and no mitigation is warranted. (FEIR, p. 5-16.) Thus, Mitigation Measure 3.6.4b should not be required under the Mitigated Alternative.

Energy Production

The FEIR states that Redwood would maximize capabilities for energy production under the Mitigated Alternative. (FEIR, p. 6-3.81.) Under Mitigation Measures 3.2.5c, 3.9.3a and 3.9.3b, Redwood would apply to construct power generation engines to be fueled by landfill gas capable of producing 4 to 5 megawatts of power within 2 years of concurrence on the revised SWF permit by the California Integrated Waste Management Board ("CIWMB"). The FEIR further states that Redwood would be encouraged to develop renewable energy generation capacity, such as solar and wind power. These additional renewable energy activities, however, would be subject to further environmental review after more detailed plans are developed. (FEIR, p. 6.3.81.) Thus, only the energy facilities described in Mitigation Measures 3.2.5c, 3.9.3a and 3.9.3b would be implemented under the Mitigated Alternative.

Traffic

Under the Mitigated Alternative, a total of 662 vehicles would be allowed to enter the site each day. ¹³ (FEIR, at p. 6.3-81.)

 $^{^{13}}$ / The FEIR states that a total of 712 vehicles would be allowed to enter the site each day, though the text correctly accounts for a total of 662 vehicles (612 vehicles carrying waste or construction materials and 50 vehicles for employees and non-material deliveries). (FEIR, at p. 6.3-81.)

Permitted Capacity and Fill Plan

Under the Mitigated Alternative, total permitted capacity would be 26,076,900 million cubic yards (including all daily, intermediate, and final covers).¹⁴ A conceptual grading plan and narrative is attached as <u>Exhibit G</u>, which depicts the final landfill grades under the Mitigated Alternative.¹⁵ Redwood has voluntarily included a 200-foot minimum horizontal setback from San Antonio Creek for future filling operations. A final, detailed grading plan and related documents will be submitted with the amended Joint Technical Document to the LEA following FEIR certification. (See, e.g., Cal. Code Regs., tit. 27, § 21600, subds. (b)(1)(B), (b)(4)(D).)

Conclusion

In 1999, the Stipulated Notice and Order Regarding Redwood Landfill ("SNO") obligated the County and Redwood to "proceed with timely environmental review and permit processing for the revised SWF application." (SNO, p. 9, para. 6.) EIRs should normally be completed within one year. (See Pub. Resources Code, § 21151.5, subd. (a)(1)(A); CEQA Guidelines, § 15108; *Sunset Drive Corporation v. City of Redlands* (1999) 73 Cal.App.4th 215, 223-224.) In recognition of the community and County opinion regarding the Proposed Project, Redwood is now expressing its willingness to implement the Mitigated Alternative, as described in the FEIR and supplemented by the information in this letter.

¹⁴ / See footnote 2, *ante*, regarding Redwood's position that this is the same capacity as was permitted in 1995.

¹⁵ / See Mike Minch Letter, dated June 15, 2006, attached as <u>Exhibit G</u>.

Please contact me if any further information is needed by the County to move forward with the environmental review and permitting process.

Very truly yours,

Iph Mill

Ósha R. Meserve

ORM:cnh Enclosures

- Exhibit A Table MR104-1
- <u>Exhibit B</u> RWQCB Letter, dated October 23, 1995 re Sludge Disposal Criteria
- <u>Exhibit C</u> LEA Letter, August 27, 2003, and LEA Staff Report, August 25, 2003 re C&D Recycling
- Exhibit D LEA Letter, dated May 16, 1996 and RWQCB letter, dated June17, 1996, re Shredded Green Material as ADC
- <u>Exhibit E</u> LEA Letter, dated April 13, 2006, re Clarification on Use of Minimally Contaminated Soils for Cover
- Exhibit F BAAQMD Major Facility Review Permit Excerpt
- Exhibit G Conceptual Final Grading Plan for Mitigated Alternative
- cc: Tim Haddad (w/ encls.) Cynthia Barnard (w/ encls.) Nancy Stuart Grisham (w/ encls.) Dan Sicular (w/ encls.)

Α

Table MR104-1 Mitigated Alternative: Updated Details (Tons per Day)

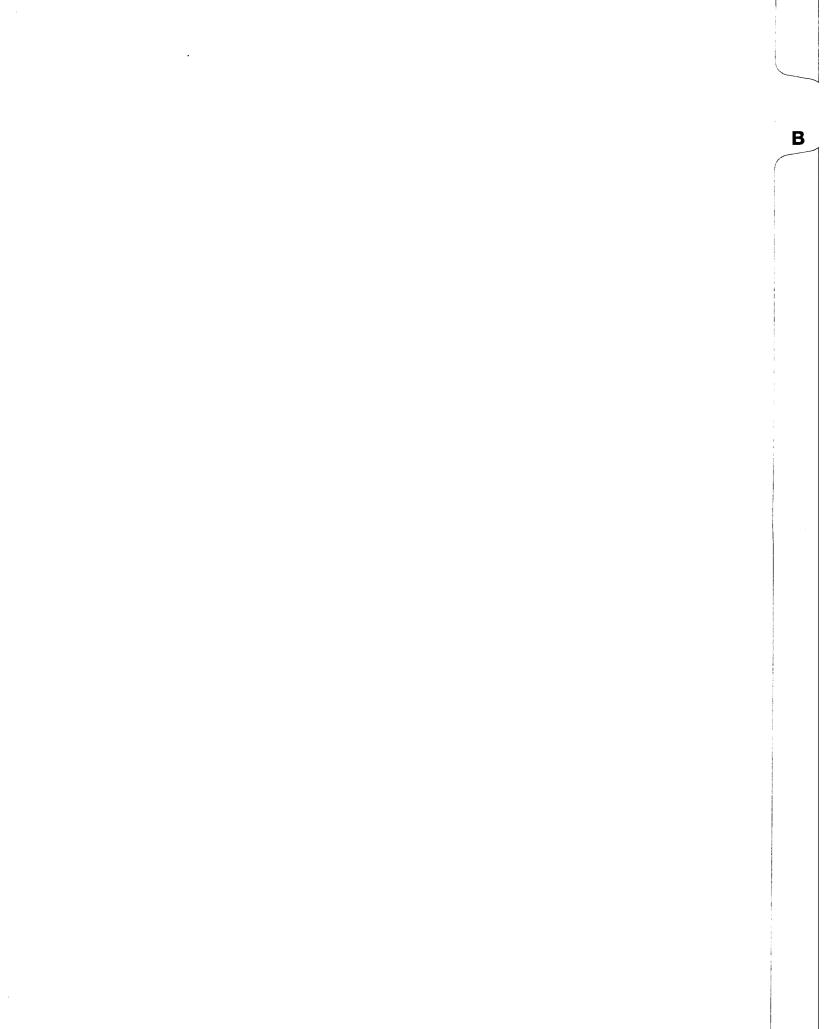
(1	Fons per Day)					
	Revised C		Refined M		Applicant's	
	Permi		Alterna		Propo	sal
Material Type	Average	Peak Day	Average	Peak Day	Average	Peak Day
Landfilled Non-hazardous Class III waste		4			_	
Non-hazardous class III waste	N/S	1,270	1,270	1,270	1,350	1,350
"Class III waste to replace previous Class II waste proposal"	N/S	N/S	N/S	N/S	500	500
Subtotal: Non-Hazardous Class III Waste	N/S	1,270	1,270	1,270	1,850	1,850
Non-hazardous sludge (Class B biosolids) for direct disposal or to main impoundment (for current permit, see below)	N/S	N/S	100	100	100	100
Class II Petroleum contaminated soil (not meeting RWQCB criteria)	N/S	N/S	0	o	0	0
Other designated wastes (including PC soil meeting RWQCB waste acceptance criteria) /1/	N/S	20	⊛ 20	20	200	200
Total Landfilled Waste	N/S	1,290	1,390	1,390	2,150	2,150
<u>Recycable. Reusable, Compostable</u> Non-hazardous separated or commingled materials (not including green/yard/wood waste, non-hazardous minimally contaminated soils and clean soils) for Recycling only	10	10	400	400	10	10
<i>Compostable</i> Green/yard/wood waste Biosolids (Class B) (for composting) Food Waste	42 84 -	238 307 -	60 80 30	60 80 30	400 82 32	400 82 32
Subtotal: Compostable	126	545	170	170	514	514
<u>Materials used for interim, daily, and alternative daily cover</u> Green/yard/wood waste (includes erosion control and slope stabilization) Petroleum Contaminated (PC) soil meeting RWQCB criteria (for ADC) Biosolids (Class B) (for ADC)	N/S N/S 424	N/S N/S 455	300 0 50	300 I 0 50	ncluded under Co 640 50	800
Clean soil/non-hazardous minimally-contaminated soil (for cover) /2/	0		Not Counted in T		500	50 800
Subtotal Cover Materials	424	455	350	350	1,190	1,650
Total Recyclable, Reusable, Compostable, and Cover Material	560	1,010	920	920	1,714	2,174
TOTAL	N/A	2,300	2,310	2,310	3,864	4,324
Total biosolids (Class B) for all purposes - Full and Registration Tier SWFPs	550	1,000	230	230	232	232

Key: N/A: Not applicable; N/S: Not specified in permits

Note: Some totals may not sum due to rounding.

/1/Types of designated waste are the same as in the current SWFP.

/2/ Must have approvals and adhere to guidelines of RWQCB, BAAQMD, and DTSC.

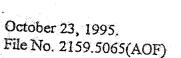


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PETE WILSON

IRNIA REGIONAL WATER QUALITY CONTROL BOARD



Mr. Doug Diemer Redwood Landfill, Inc. 8950 Redwood Hwy. P. O. Box 793 Novato, CA 94948

Subject: Sludge Disposal Criteria - Redwood Landfill, Marin County

Dear Mr. D. Diemer:

This letter provides approval for the disposal of wet sludges (20% solids) to the Redwood Landfill at a ratio of one part wet sludge to 9.5 parts municipal solid wastes to maintain a minimum solid to liquids ratio of 5:1 by weight for the overall disposal operation as required in Prohibition A.7. of the facility Waste Discharge Requirements Order No. 95-110.

If you have any questions, please contact Ade Fagorala at (510) 286-0602.

Sincerely,

VIIIre

Lawrence P. Kolb Acting Executive Officer

cc:

Cynthia Bernard, R.E.H.S., Environmental Health Services, Marin County Civic Center, San Rafael, CA 94903 See Chuan Lee, IWMB, 8800 Cal-Centre Dr., Sac., CA. 95826-3268



3950 Redwood Hwy., P.C. Box 793. Novato, CA 94948 (415) 892-2851 FAX (415) 898-1354

A Bandal Cempany

September 29, 1995

Mr. Ade Fagorala California Regional Water Quality Control Board San Francisco Region 2101 Webster Street Oakland, CA 94612

Subject: Redwood Landfill; Sludge Disposal Criteria Verification

Dear Mr. Fagorala:

This letter is written to confirm our discussions and mutually agreed understanding of the requirements of Redwood Landfill's Waste Discharge Requirements, Order No. 95-110, as applied to Section A. Prohibitions, item Number 7 (Pages 15 and 16).

Prohibition 7 limits the disposal of sludges containing less than 20% solids for primary sludges and less than 15% solids if secondary sludges, mixtures of primary and secondary sludges, or water treatment sludges. By Prohibition 7, the sludges must meet the minimum moisture contents, and to be disposed to the Landfill they must be mixed so that a minimum solid-to-liquids ratio of 5:1 by weight is maintained for the disposal operation overall.

As you are aware, Redwood accepts municipal wastewater sludges, typically exceeding 20% solids. As we have discussed and agreed, Redwood is permitted to discharge these sludges and other sludges meeting the criteria of Prohibition 7, directly to the Landfill provided a minimum total solid-to-liquids ratio of 5:1 is maintained.

Typical landfill refuse total moisture content as described in the literature ranges from approximately 15-40 percent, including greenwaste which has a relatively high level of moisture (typically 60%). The predominant components of the waste stream Redwood receives for disposal include paper, cardboard, plastics, etc., which all have moisture contents of less than 10 percent (Integrated Solid Waste Management; Tchobanoglous, et al. 1993). Redwood Landfill currently diverts all incoming greenwaste for other beneficial reuse, so we will be assuming that refuse being disposed, including MSW, debris, and demolition materials, etc., has an average total moisture content of 10 percent. Sludges to be disposed have a total typical moisture content of 80 percent.

Given the above facts relative to Redwood's waste stream and relative moisture contents, and the requirement to maintain a minimum solids to liquids ratio of 5:1 by weight, we propose disposing of wet sludges (20% solids) to the Landfill at a ratio of one part wet sludge to 9.5 parts MSW. In short for every 9.5 tons of MSW disposed, one ton of wet sludge will be disposed. This will result in a minimum 5:1 solids-to-liquids ratio for the overall disposal operation as detailed in the calculation below:

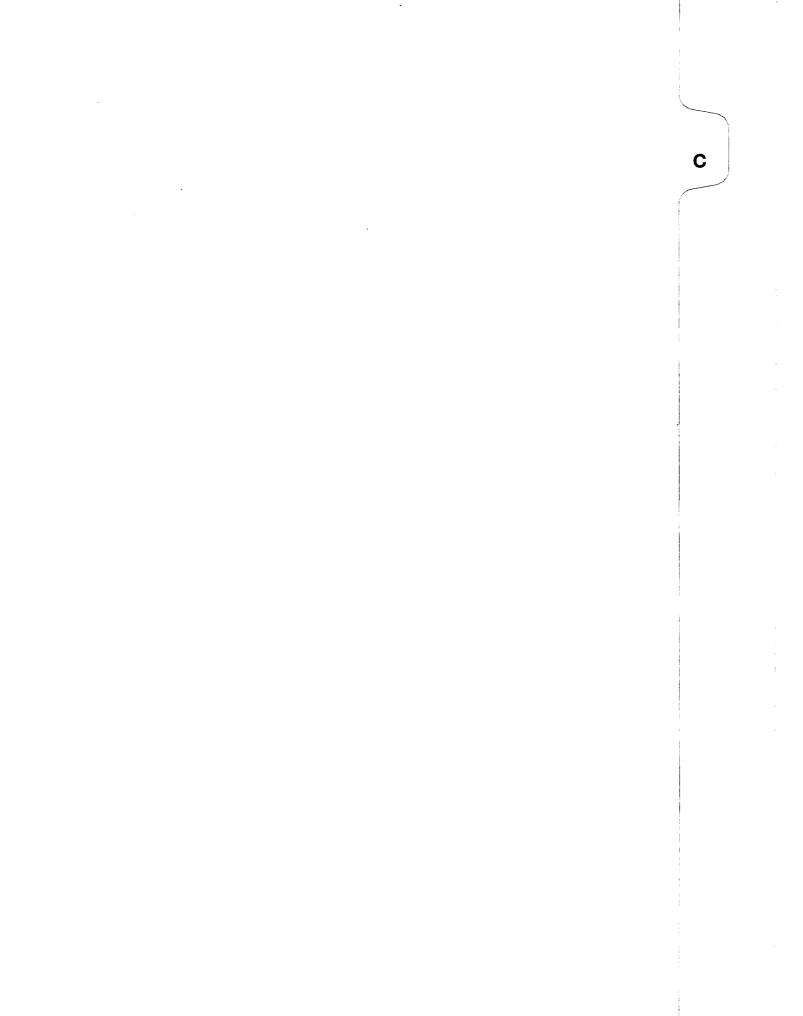
,	total weight	weight of water	weight of solids
9.5 tons MSW at 10% moisture	19,000 lbs	1900 lbs	17,100 lbs
1 ton sludge at 80% moisture	2000 lbs	1600 lbs	400 lbs
TOTALS	21,000 lbs	3500 lbs	17,500 lbs

We are proposing to begin this program immediately. Please call me directly at (415) 892-2851 if you have any further questions or comments.

Sincerely,

P.E. Doug Die Site Man

cc: Cynthia Barnard, Marin County Department of Environmental Health Services



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COUNTY OF MARIN ENVIRONMENTAL HEALTH SERVICES

Community Development Agency

3501 Civic Center Drive, Rm 236 San Rafael, CA 94903 (415) 499-6907 EAX (415) 507-4120 www.co.marin.ca.ns/ebs

August 27, 2003

Ramin Khany, Site Manager Redwood Landfill, Inc. P.O. Box 793 Novato, CA 94945

RE: Redwood Landfill's Application for Report of Disposal Site Information Amendment

Marin County Solid Waste Local Enforcement Agency (LEA) staff has reviewed your proposal for a change in operation and application for a Report of Disposal Site Information (RDSI) amendment. Your request is consistent with the provisions in the California Code of Regulations. Title 27, §21665 – Processing Report of Facility Information (RFI) Amendments.

Please refer to the enclosure (Staff Report, August 25, 2003) for the terms and conditions of approval. If you are in agreement with the terms and conditions of approval, please send a written confirmation and 2 copies of your RDSI amendment to the LEA. Upon the LEA's receipt of the aforementioned information, you may begin the proposed change in operation.

Your cooperation with this process and the advancement of the County's AB939 civersion goals is appreciated.

Sincerely,

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Cynthia P. Barnard Senior Environmental Health Specialist

Alex Hinds, Director, CDA
 Philip Smith, Chief, Environmental Health
 Reinhard Hontwein, CA Integrated Waste Management Board
 Alan Friedman, S.F. Bay Regional Water Quality Control Board
 Carol Allen, Bay Area Air Quality Management District
 Nancy Stuart Grisham, Deputy County Counsel
 Michael Frost, Marin County Office of Waste Management

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Community Development Agency

3501 Civic Center Drive, Rm 236 San Rafael, CA 94903 (415) 499-6907 FAX (415) 507-4120 www.co.marin.ca.us/ebs

STAFF REPORT August 25, 2003

SUBJECT: Redwood Landfill's proposal to modify its handling of construction and demolition wastes and application to amend its Report of Disposal Site Information accordingly.

BACKGROUND:

Redwood Landfill, Inc. (Redwood), a wholly owned subsidiary of Waste Management has been operating in Marin County under several ownerships since 1958. Construction and demolition (C&D) materials have been part of the incoming waste stream since the beginning of its operations. Historically, these materials have been disposed of in the Landfill and this practice continues today.

Recently, Marin County has proposed a CONSTRUCTION AND DEMOLITION WASTE RECOVERY ORDINANCE requiring contractors to recycle a minimum of 50% of their building materials. Marin County has one Resource Recovery Center serving southern and central Marin. Without an additional facility capable of recycling CAD waste, Novato and West Marin would likely be exempted from this ordinance.

Redwood is currently involved in an environmental review process for a revision of its Solid Weste Facility Permit (SWFP).

PROJECT DESCRIPTION:

Waste Management owns and operates Davis Street Transfer Station located in Alameda County, California. At present, municipal solid waste collected at the Davis Street Transfer Station is transported by transfer trailers for disposal at Redwood. The trucks ratum empty to the Davis Street Facility.

The applicant proposes that some of the emptied trucks be loaded at Redwood with potentially recyclable C&D waste received at Redwood. The C&D material will be taken to the Davis Street Transfer Station (a State of California Certified Waste Recycling Facility) for sorting and processing.

The proposed C&D operation at Redwood would consist of a small staging area where C&D waste will be directed and deposited prior to being loaded onto the

trucks returning to the Davis Street Transfer Station. There will be no sorting or processing of C&D waste at Redwood Landfill,

The planned C&D staging area will be situated within Redwood's existing facility boundaries and will not disrupt current operations. Concrete stabs (estimated to be 10 feet long by 8 feet wide) will be laid side-by-side at a location that is adjacent to the working face of permitted solid waste disposal areas to form a small (estimated 150 feet by 100 feet) staging area. The concrete slabs may be eesily moved and the portable pad would hold up to 100 tons per day of potentially recyclable C&D wastes.

The applicant is not requesting an increase in daily waste receipts nor any increase in traffic volume or vehicle trips. The C&D wastes to be diverted will be taken from the existing waste stream at Redwood and will not be the result of new activity.

DOCUMENTS REVIEWED:

Decourses the second	Document Code	Date
1995 Solid Waste Facility Permit	SWFP	July 1995
Final Environmental Impact Report	FER	May 1994
Report of Disposal Information	RDSI	April 1995
Waste Discharge Requirements 95-110	WDR	May 1995
California Code of Regulations, Titla 27	27008	Feb. 2003
Public Resources Code, 44004, 44012	PRC	Jan. 2001

FINDINGS:

Document Code	Page Numiser	Finding
FEIR	2-11	Identifies construction and demolition waste as part of the current "nonhazardous solid waste" accepted.
SWFP	5	Recognizes construction and demolition waste as part of the parmitted nonhazardous waste receipts.
RDSI	4	Describes construction and demolition wastes as part of the permitted waste stream.
WDR	4	Wastes to be discharged to the landfill include municipal solid waste, classified as "nonhazardous solid wastes or inert wastes" using the criteria set forth in Chapter 15.
27CCR	859	27CCR21665 provides an opportunity for an operator / applicant to request an amendment to a report of facility information without a permit revision with specific findings. The LEA has made the following requisite findings: 1. The applicants proposed amendments to the RFI do not require a change in the current permit.

the existing certi 3. The change is c standards pursu	hange in operation is consistent with fied CEQA document (May 1994). onsistent with state minimum ant to Chapter 4 of 27CCR. s not conflict with the terms and current SWEP
25 The applicant's request sections of the PRC.	is consistent with the referenced

CONCLUSIONS:

It is the LEA staff's position that the proposed change in operation requested by Redwood with respect to their construction and demolition waste stream is consistent with all of the referenced governing documents. Staff does not foresee or anticipate additional environmental effects due to the request. The request is consistent with and enhances the AB939 goals of the state and county. Staff recommends that the RFI request be granted with the terms and conditions specified in the staff report.

TERMS AND CONDITIONS OF APPROVAL:

- Existing environmental controls employed on site shall be extended to this operation. These controls include but are not limited to the following:
 - a) Dust control
 - b) Vector conirol
 - c) Leachate control
 - d) Litter control
 - e) Nuisance control
- 2. Diverted C&D material shall not be retained on site more than one week.
- 3 Landfill staff shall monitor daily for nuisance conditions at the C&D operation.
- 4. Provision shall be made for wet weather operation.
- 5. Incoming C&D materials will be subject to random load checks.
- 6. In the event of a fire, the operator shall notify the Novato Fire Department immediately.
- The traffic and tonnage limits established by the Stipulated Notice and Order signed by Redwood and Marin County on November 16, 1999 shall not be exceeded by this operation.
- 8. The operator shall provide the Office of Waste Management with reports, as required under Public Resources Code 41821 5 for dependent and

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shall be sent to the LEA and the CIWMB for inclusion in their respective documents.

10.LEA approval of this change in operation and RDSI amendment is based solely upon information provided in the applicant's proposal and project description (*Redwood Landfill Request for Report of Disposal Information Amendment*), August 15, 2003). If the operator wants to change or modify the operation from that described, prior approval must be granted from the LEA.

Prepared by:

Cynthia P. Barnard Sr. Environmental Health Specialist Date: 8/27/03

Approved by:

Chief Environmental Health Services Date: _________

Philip D. Smith

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COUNTY OF MARIN COMMUNITY DEVELOPMENT AGENCY

May 16, 1996

Environmental Health Services Civic Center, Room 283 San Rafael, CA 94903 (415).499-6907 FAX (415) 507-4120

RECEIVED MAY 1 7 1995

,0-60,20

Doug Diemer Site Manager Redwood Landfill 8950 Redwood Highway Novato, CA 94948

Dear Mr. Diemer:

Redwood Landfill completed a six month demonstration project to determine the suitability of shredded green material as an alternative daily cover (ADC) for refuse on November 30, 1995. The results of the demonstration project indicate that shredded green material complies with the performance standards for ADC specified in 14 CCR 17683.

A demonstration project to determine the auitability of dried biosolids, wet biosolids mixed with soil, and wet biosolids mixed with shredded green material as ADC is currently in progress at Redwood Landfill.

When the current ADC project has been completed, Redwood Landfill's Solid Waste Facilities Permit (SWFP) will be revised to include ADC and changes in the sludge management program.

Permission is hereby granted to continue the use of shredded green material as ADC at Redwood Landfill during this interim period before the SWFP is revised, as per the California Integrated Waste Management Board, Closure and Remediation Branch. This approval is contingent upon compliance with the following requirements:

1) Should a fire occur at the site, the operator shall immediately notify the Novato Fire Department.

2) The operator must not allow applied green material cover to remain exposed longer than seven (7) days unless the material is wetted by a water truck to prevent excessive dryness. A wetting agent, as recommended by the local fire department, must be available at the site for addition to a water truck in case of fire. Shredded green material must not remain exposed longer than 21 days under any conditions.

3) The operator must apply shredded green material to a minimum compacted depth of six (6) inches. Insufficient compaction or coverage is considered a performance failure

TRAVIES ON SECURI DAVIS

Dong Diemer May 16, 1996 Page 2

and a violation of the cover standards under 14 CCR 17682. The operator must avoid applying excessive depths of shredded green material cover, generally above 18 inches.

4) The operator must place a minimum of six (6) inches of compacted soil over the entire working face on any preceding closed days if unattended.

5) The operator shall provide the Office of Waste Management with reports, as required under PRC 41821.5, dealing with disposal and diversion reporting requirements. Reports shall be provided to the Office of Waste Management on a quarterly basis and shall comply with the state regulations and local requirements governing diversion reporting.

6) Application of green material ADC shall not occur when there is precipitation, or when there is forecast of greater than 40 per cent chance of precipitation within 12 hours of application time in the vicinity of the landfill, unless the applied and compacted ADC is supplemented with an approved waterproof cover.

7) Shredded green material shall be used within ten (10) days of receipt and three (3) days of processing unless the operator demonstrates that a longer or shorter storage period is necessary.

8) The operator shall obtain written clearances for ongoing use of the ADC from the San Francisco Bay Regional Water Quality Control Board and the Novato Fire Department.

Please do not hesitate to contact this office if you have any questions.

Sincerely,

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Mark Janofsky, R.E.H.S.

cc: See Chian Lee, CIWMB Ade Fagorala, RWQCB Novato Fire Department

STATE OF CALIFORNIA - CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN FRANCISCO BAY REGION 2101 WEBSTER STREET, Suite 600 CARLAND, CA 94612 Tel: 1510) 286-1255 FAX: (510) 286-1380 S85: (510) 286-0404

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Date: JUN 1 7 1996 File No. 2159.5065(AOF)

Mr. Doug Diemer Site Manager Redwood Landfill Inc. 8950 Redwood Hwy. P. O. Box 793 Novato, CA 94948

Approval of Shredded Greenwaste as an Alternative Daily Cover -Redwood Landfill, Marin County

Dear Mr. D. Diemer:

SUBJECT:

This letter provides approval for the continuing use of shredded greenwaste as alternative daily covers (ADC) based on the report of Performance Standards Monitoring for the Greenwaste Alternative Daily Cover Demonstration Project for the Redwood Landfill, prepared by LSA Associates, Inc.

Staff concur with the findings and recommendations of the Local Enforcement Agency established during the six month demonstration period at the Redwood Landfill. The requirements and guidelines specified by the Local Enforcement Agency in the letter dated May 16, 1996 must be complied with while implementing the project and no violation of water quality provisions of the site's Waste Discharge Requirements or NPDES Permit shall result from runoff from the ADC.

Please address any questions concerning this letter to Ade Fagorala of my staff at (510) 286-0602.

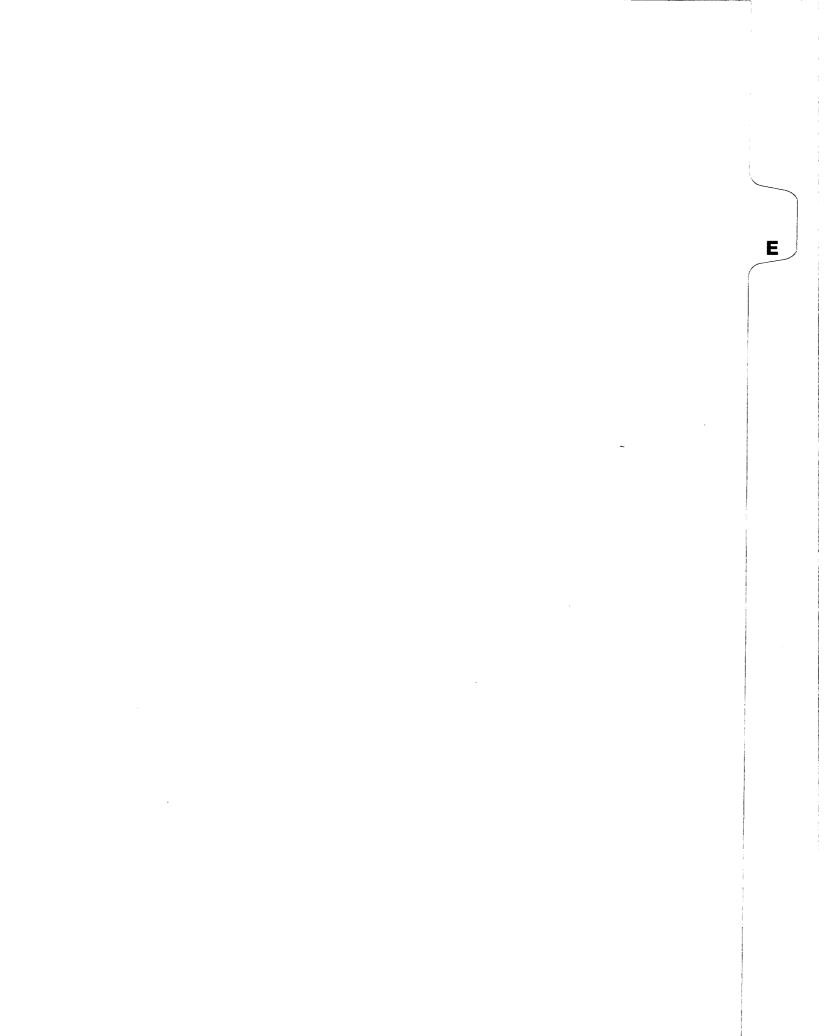
Sincerely, 20 1 Jukh

Richard K. McMurtry Chief, Groundwater Protection/ Waste Containment Division

CC:

Scott Walker, IWMB, Permitting & Enforcement Division, 8800 Cal-Centre Dr., Sac., CA., 95826 Cynthia Bernard, R.E.H.S., Environmental Health Services, Marin County Civic Center, San Rafael, CA 94903

See Chuan Lee, Integrated Waste Management Board, 8800 Cal- Centre Dr., Sac., CA 95826-3268



COUNTY OF MARIN COMMUNITY DEVELOPMENT AGENCY

April 13, 2006

Jessica Jones Site Manager Redwood Landfill, Inc. P.O. Box 793 8950 Redwood Highway Novato, CA 94948

1001 BY:

Environmental Health Services 3501 Civic Center Drive, Rm 236 San Rafnel, CA 94903 (415) 499-6907 FAX (415) 507-4120 www.co.marin.ca.us/ehs

This letter is intended to provide additional clarification of the LEA's position on the use and receipt of minimally contaminated (non-hazardous) soil for landfill cover. The LEA recognizes the need to provide more information than that given in the March 30, 2006 letter to Beth Shiverdecker.

The LEA acknowledges Redwood's long-term use of non-hazardous, minimally contaminated soil for cover. This practice has been occurring since the early 1990's. The California Integrated Waste Management Board (CIWMB) recorded its policy in an advisory dated December 15, 1993.

The CIWMB concurred in the following policies relating to the use of clean and/or non-hazardous contaminated soil (hereinafter referred to as contaminated soil) as daily cover.

- The use of non-hazardous contaminated soil as daily cover does not require a demonstration project pursuant to the Board's Alternetive Daily Cover Policy of 1990.
- Soil (clean or contaminated) used as daily cover will not be included in the permitted daily tonnage of the facility.
- 3. Soll (clean or contaminated) used as daily cover will not be subject to the landfill disposal surcharge.
- 4. The use of non-hazardous contaminated soil as daily cover must meet all required Air and Water Board rules and regulations.

Although Redwood has been using contaminated soil for daily cover for many years, its use was not conditioned in their 1995 Solid Waste Facilities Permit. The LEA wishes to clarify its position on the acceptance and use of contaminated solls at Redwood Landfill. It is anticipated that any future permit revision would be conditioned to include the following:

 Redwood is allowed under its current permit to receive 20 tons per day of designated waste as specified (petroleum contaminated soil is included). The aforementioned designated waste category is included within the collective disposal entitlement.

- Redwood's proposed permit revision would reflect the use of nonhazardous, minimally contaminated soil for use as daily cover (petroleum contaminated soil, not for disposal, would be included in that classification).
- The LEA will not include contaminated soil in daily municipal solid waste or designated waste tonnage entitlements. Such contaminated soil will be recognized as daily cover only, not as disposable waste.
- Receipts of contaminated soil should be commensurate with use.
- Redwood must gain approval and adhere to guidelines provided by the San Francisco Bay Regional Water Quality Control Board, Bay Area Alr Quality Management District and the Department of Toxic Substances Control regarding the receipt of contaminated soil.
- Redwood must maintain written records of screening procedures for contaminated soil and provide on-site records of analytical test results for contaminated soil received to include descriptions of the source(s) and nature of contamination. Records of daily usage shall include dates and volumes used.

If you need further clarification regarding the LEA's position relative to soil and non-hazardous minimally contaminated soil, please call me at 415-499-6919.

Sincerely, Cindhia Barnard

Cynthia Barnard Supervising Environmental Health Specialist

Cc: Philip Smith, Deputy Director EHS Nancy Grisham, County Counsel Reinhard Hohlwein, CIWMB Carol Allen, BAAQMD David Elias, RWQCB F

Bay Area Air Quality Management District

939 Ellis Street San Francisco, CA 94109 (415) 771-6000

Final

MAJOR FACILITY REVIEW PERMIT

Issued To: Redwood Landfill, Inc. Facility #A1179

> Facility Address: 8950 Redwood Highway Novato, CA 94948

Mailing Address: P. O. Box 793 Novato, CA 94948

Responsible Official Ramin Khany Landfill Manager 415-892-2851

Facility Contact Beth Shiverdecker Environmental Compliance Specialist 415-892-2851

Type of Facility: Primary SIC: Product: Landfill for Solid Waste Disposal 4953 Refuse and Sludge Disposal

BAAQMD Engineering Division Contact: Carol S. Allen

ISSUED BY THE BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Signed by Jack P. Broadbent Jack P. Broadbent, Executive Officer/Air Pollution Control Officer

April 18, 2006

Date

VI. Permit Conditions

Condition # 19867

FOR: S-5 REDWOOD LANDFILL WITH GAS COLLECTION SYSTEM; A-18 WATER SPRAYS; A-50 LANDFILL GAS FLARE; AND A-51 LANDFILL GAS FLARE

- *13. The Permit Holder may use non-hazardous contaminated materials containing no more than 50 ppm by weight of Volatile Organic Compounds (VOC) as daily or interim cover material, provided that these materials are properly handled and disposed of in accordance with this part and any other applicable requirements.
 - a. Any metal laden materials (materials that have been contaminated with arsenic, asbestos, beryllium, cadmium, hexavalent chromium, nickel, copper, lead, mercury, selenium, or zinc) shall be properly handled at all times and shall be abated by appropriate dust mitigation measures including: the use of covers during on-site transport, the use of frequent water sprays during active handling (loading, unloading, spreading, etc.) of these materials, and the use of water sprays, covers, or chemical dust suppressants on inactive storage areas.
 - b. If metal laden materials are used as interim cover, the metal laden material shall be covered with a non-contaminated material such as clean soil or compacted green waste prior to subjecting the area to frequent vehicle or construction equipment traffic.
 - c. Metal laden materials shall not be used in the construction of unpaved roadways or parking lots.

(Basis: Toxic Risk Management Policy)

This part applies to the acceptance, handling, storage, and on-site reuse of VOC-14. laden soil. VOC-laden soil is any soil that contains volatile organic compounds, as defined in Regulation 8-40-213, other than contaminated soil. As defined in Regulation 8-40-205, contaminated soil contains more than 50 ppmw of VOC or has a surface concentration greater than 50 ppmv of VOC as C1, and contaminated soil is subject to Part 15 below instead of this part. Materials containing only non-volatile hydrocarbons and materials meeting the requirements of Regulation 8-40-113 are not subject to this part. For each lot of VOC-laden soil accepted at this site, the Permit Holder shall comply with the daily limits identified in either subpart a or subpart b below and shall comply with the annual emissions limit identified in subpart c below. To demonstration compliance with the daily and annual emission limits, the Permit Holder shall comply with the monitoring procedures listed in subpart a(i-v). If the Permit Holder opts to comply with the daily concentration limit in subpart b rather than the daily emission limit in subpart a, then the Permit Holder shall also comply with the soil screening procedures listed in subpart b(i-v).

VI. Permit Conditions

Condition # 19867

FOR: S-5 REDWOOD LANDFILL WITH GAS COLLECTION SYSTEM; A-18 WATER SPRAYS; A-50 LANDFILL GAS FLARE; AND A-51 LANDFILL GAS FLARE

- a. Unless the Permit Holder demonstrates compliance with Regulation 8-2-301 in accordance with subpart b below, the Permit Holder shall limit the quantity of VOC laden soil handled per day such that no more than 15 pounds of total carbon could be emitted to the atmosphere per day. In order to demonstrate compliance with this subpart and the annual emissions limit specified in subpart c, the Permit Holder shall maintain the following records in a District approved log for all VOC-laden soil accepted at the landfill.
 - i. Record on a daily basis the amount of VOC laden soil accepted for each truckload or each soil lot, as appropriate. This amount (in units of pounds per day) is Q in the equation in subpart a(iii) below.
 - ii. Record on a daily basis the VOC content for each truckload or each soil lot, as appropriate. This VOC Content (C in the equation below) should be expressed as parts per million by weight as total carbon (or C1).
 - iii. Calculate and record on a daily basis the VOC Emission Rate (E) using the following equation: E = Q * C / 1E6This equation may be applied to each truckload or to each soil lot received per day depending on the amount of soil that is represented by the VOC Content data. If the equation is applied to
 - multiple loads per day, the VOC Emission Rate shall be totaled for all loads received each day.iv. Summarize all daily emission rates on a monthly and calendar year
 - basis.
 v. All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry.
- b. Unless the Permit Holder demonstrates compliance with Regulation 8-2-301 in accordance with subpart a above, the Permit Holder shall screen each lot of VOC laden soil accepted per day for VOC surface emissions to show that each lot of VOC laden soil is not contaminated soil.
 - i. The Permit Holder shall use the testing procedures outlined in Regulation 8-40-604.
 - ii. The screening test shall be representative of the entire lot of VOCladen soil. The soil surface shall be disturbed prior to screening to ensure that the screening is representative of the entire load.

VI. Permit Conditions

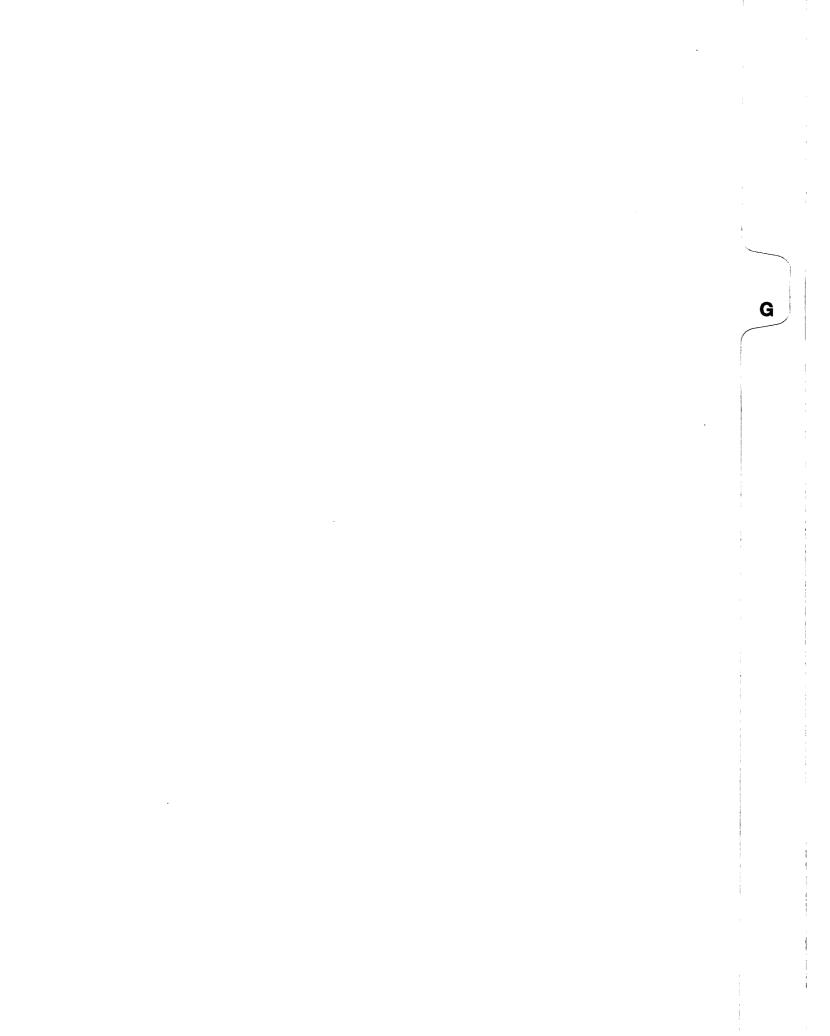
Condition # 19867

FOR: S-5 REDWOOD LANDFILL WITH GAS COLLECTION SYSTEM; A-18 WATER SPRAYS; A-50 LANDFILL GAS FLARE; AND A-51 LANDFILL GAS FLARE

- iii. The Permit Holder shall maintain records of all testing conducted to satisfy this subpart and shall record the amount of VOC-laden soil accepted and the highest surface concentration measured pursuant to this subpart. These records shall be maintained for each truckload or each soil lot accepted, as appropriate, provided that the records are made or summarized on at least a daily basis.
- iv. Summarize the daily waste acceptance rates and the weighted average of the surface concentration records on a monthly basis and for each calendar year.
- v. All records shall be maintained on site or shall be made readily available to District staff upon request for at least 5 years from the date of entry.
- c. The Permit Holder shall limit the quantity of VOC laden soil handled per year such that annual VOC emissions due to on-site handling, storage, disposal, or reuse of VOC laden soil shall not exceed 10,530 pounds per calendar year. The Permit Hold shall comply with the monitoring procedures in subpart a(i-v) above to demonstrate compliance with this annual emissions limit.

(Basis: Offsets and Regulation 8-2-301)

- 15. Handling Procedures for Soil Containing Volatile Organic Compounds: a. The procedures listed below in subparts hal do not apply if the fo
 - The procedures listed below in subparts b-l do not apply if the following criteria are satisfied. However, the record keeping requirements in subpart m below are applicable.
 - The Permit Holder has appropriate documentation demonstrating that either the organic content of the soil or the organic concentration above the soil is below the "contaminated" level (as defined in Regulation 8, Rule 40, Sections 205, 207, and 211). The handling of soil containing VOCs in concentrations below the "contaminated" level is subject to Part 14 above.
 - ii. The Permit Holder has no documentation to prove that soil is not contaminated, but source of the soil is known and there is no reason to suspect that the soil might contain organic compounds.





14 June 2006

Ms. Jessica Jones, P.E., S.E. Redwood Landfill, Inc. PO Box 793 Novato, California 94948

Subject: 2006 Conceptual Mitigated Alternative Final Grading Redwood Landfill, Novato, California

Dear Ms. Jones:

At your request, GeoSyntec Consultants, Inc. (GeoSyntec) has prepared a conceptual final grading plan for the Redwood Landfill that will result in a smaller increase in capacity than the proposed project analyzed in the EIR^1 and proposed in the 1997 Revised Fill Sequencing Plan². This revised grading plan (referred to as the "2006 conceptual mitigated alternative final grading plan") is based on the mitigated alternative, as described in the EIR. The total fill volume of this conceptual grading plan will be approximately 26.1 million cubic yards, inclusive of daily, intermediate, and final covers.

The attached Sheet No. 1 presents the 2006 conceptual mitigated alternative final grading plan. Sheet No. 2 also shows cross-sections A-A' and B-B' along with equivalent cross-sections through the originally proposed project, which was analyzed as the proposed project in the EIR.

As shown, the 2006 conceptual mitigated alternative final grading plan represents an overall reduction of slopes relative to the final grading plan designed in 1997. The reduced slopes are achieved through a combination of increasing bench widths in some areas and reducing the elevation of the slope crest in others. Between benches, slopes remain at 3H:1V, consistent with the 1997 proposed final grading plan. These changes all act to reduce overall slope inclinations as shown by the cross sections in Sheet No. 2.

¹ Environmental Science Associates [2005] Redwood Landfill Solid Waste Facilities Permit Revision, Final Environmental Impact Report and Response to Comments, July 2005.

² GeoSyntec Consultants [1997] Revised Fill Sequencing Plan, Redwood Landfill, Novato, California, October 1997.

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Ms. Jessica Jones, P.E., S.E. 14 June 2006 Page 2

The mitigated alternative final grading plan will meet all engineering standards and regulations regarding required stability, and generally has wider benches, flatter slopes, and a reduced volume relative to the 1997 proposal. In geotechnical engineering, a flattening or a shortening of slopes leads to enhanced stability because there is less mass (in this case less waste) contributing to potential instability. The 2006 conceptual mitigated alternative final grading plan moves future waste fill placement away from the perimeter of the landfill where stability conditions are the most sensitive. This results in an increase of slope stability relative to the 1997 proposal, which was previously reviewed by Marin County's geotechnical consultant.

Should you have any questions or need additional information, do not hesitate to call either of the undersigned.

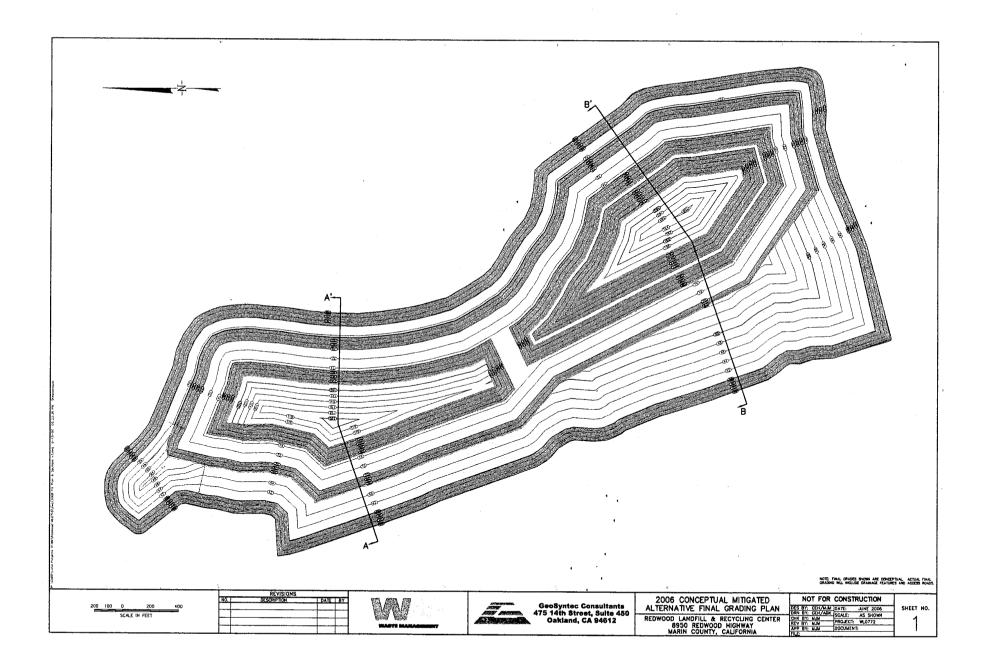
Sincerely,

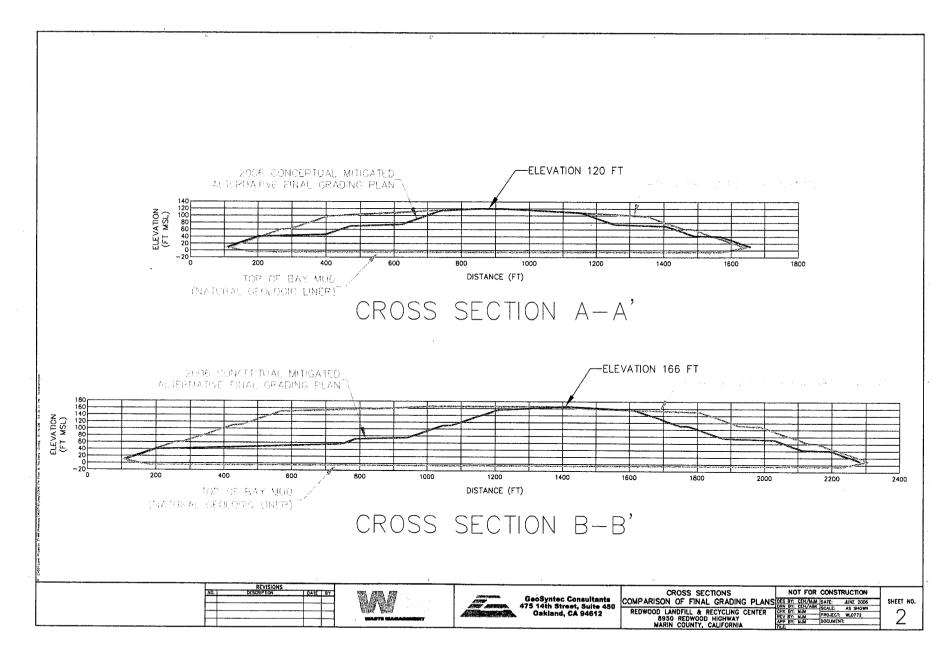
Michael J. Minch, P.E., G.E. Senior Engineer

Patrick C. Lucia, Ph.D., P.E., G.E. Principal

Attachments: Sheet No. 1–2006 Conceptual Mitigated Alternative Final Grading Plan Sheet No. 2–Cross Sections, Comparison of Final Grading Plans

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APPENDIX B

Letter from Applicant re: Responses to Comments on Geotechnical Issues



23 March 2006

Mr. Glen Roycroft Waste Management 172 98th Avenue Oakland, California 94603

Subject: Response to 7 September 2005 Letter from Craig Herzog regarding Geotechnical Review of Final Environmental Impact Report Redwood Landfill Novato, California

Dear Mr. Roycroft:

At your request, GeoSyntec Consultants (GeoSyntec) has reviewed the comments presented by Mr. Craig Herzog of Herzog Geotechnical (Herzog) in his geotechnical review of the Redwood Landfill Final Environmental Impact Report (FEIR)¹. The majority of Mr. Herzog's questions have been addressed previously by GeoSyntec in responses to the EIR geotechnical review performed by Treadwell & Rollo in 2001. This letter will serve to revisit those issues and add additional details as necessary to clarify the earlier GeoSyntec responses.

This response will be presented in a comment and response format. The comment will be shown in italics, with the response immediately following.

Comment #1: The landfill is situated within an area of high seismicity, and current geotechnical standards of practice and Section 20370 of Title 27 of the California Code of Regulations (CCR) require that the seismic stability of structures and significant embankments be evaluated utilizing Maximum Probable Earthquake (MPE) earthquake ground motions with a probability of exceedance of 10 percent in 50 years. The stability analyses for the FEIR do not appear to conform to these requirements. Although MPE ground motions appear to have been used to evaluate final closure

¹ Letter to Mr. Christopher Gilkerson of "No Wetlands Landfill Expansion" dated 7 September 2005.

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Mr. Glen Roycroft 23 March 2006 Page 2/19

stability, the motions utilized to evaluate stability during the approximately 30+ year operational life of the landfill are much lower and less conservative. Although the calculated MPE bedrock acceleration at the site is 0.58g, less than half this value (0.20g and 0.25g) was used in the FEIR analyses. The accelerations used have greater than 90 and 70 percent chance of being exceeded over the next 50 years, respectively. Inadequate seismic design could result in failure of the landfill and levee slopes, and damage to the LCRS. Accordingly, the fill sequencing plan should be revised to incorporate the MPE ground motions specified in CCR Title 27.

<u>Response</u> #1: The seismic criteria utilized in the 1997 Fill Sequencing Plan (GeoSyntec, 1997a) were appropriate and consistent with Title 27.

Seismic response of a landfill is governed by both Peak Horizontal Ground Acceleration (PHGA) and significant duration of strong shaking (Ds). Both PHGA and Ds were established, in accordance with Title 27 of CCR, based upon deterministic analysis. By definition, deterministically established ground motions are not related to the probabilistic ground motions, i.e., ground motions established by GeoSyntec, and used for evaluation of long-term performance of the landfill, are not related to the probabilities of exceedence cited by Herzog. It is widely recognized that a largemagnitude low-intensity distant event (i.e., event with low PHGA but long D_s) can induce more damage than its high-intensity short duration counterpart in the relative proximity of the site. Therefore, GeoSyntec characterized the design ground motions at this site by both PHGA and D_s. Both MPE near-field (large intensity/short duration) and MPE far-field (low-intensity long duration) events were considered by GeoSyntec. The near-field event was characterized by PHGA = 0.58 g and $D_s = 16$ seconds. The far-field event was characterized by PHGA = 0.33 g and $D_s = 19$ seconds. These parameters were used in evaluating the long-term seismic stability of the landfill.

Though not required by Title 27, GeoSyntec evaluated stability of the interim (shortterm) conditions of landfill development subject to seismic loading. A semiprobabilistic approach was taken using a time period of 15 years to account for partial consolidation of Bay Mud deposits at the time of an earthquake (i.e., to account for a possibility that the full shear strength of Bay Mud may not be achieved at an early stage of landfill development). As smaller earthquakes occur more frequently than larger

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Mr. Glen Roycroft 23 March 2006 Page 3/19

earthquakes, the particular values of PHGA selected for the interim condition were established based upon back-calculation from earthquake magnitudes likely to occur in a 15-year interval (0.25 g versus 0.58 g for the near-field event; 0.20 g versus 0.33 g for the far-field event). We note that the design D_s values were not reduced for interim conditions, thus providing an additional conservative element in seismic analysis of the site.

Comment #2: Although there is abundant site-specific consolidation and shear strength data available to perform an accurate analysis of the stability of the fill sequence using well-established conventional methods, a large portion of the evaluation presented in the FEIR was performed using more complex finite element methods. The results derived from the finite element methods used in the FEIR are highly sensitive to a wide array of input parameters. Many of the parameters used in the FEIR analyses were not developed by site specific testing, but instead were derived based on assumptions, generalized correlations, or calibrations to limited testing of material from a different site. In addition, several of the parameters used are inconsistent with previous on-site testing and with published ranges of typical values for Bay Mud (Bonaparte and Mitchell, 1979). Parameters should be determined based on the testing of on-site materials. The parameters should be incorporated into revised stability analyses to evaluate whether Mitigation Measures 3.4.1 and 3.4.2 will reduce impacts to a less than significant level.

Response #2: GeoSyntec used both on-site and nearby off-site test data to develop strength and consolidation parameters used in the Revised Fill Sequencing Plan (RFSP; GeoSyntec, 1997a). Site-specific testing performed by GeoSyntec and others (e.g. GeoSyntec, 1997b; HLA, 1992) was reviewed and incorporated as appropriate. Additional off-site test data was based on extensive research and testing on samples from the Hamilton Air Force Base (HAFB), which lies approximately 7 miles south of Redwood Landfill. The HAFB site has been the subject of advanced study on Bay Mud properties by researchers at the University of California, Berkeley over the last several decades. The quality of the testing performed on the HAFB materials, in combination with it's proximity to the Redwood Landfill site and corresponding similar geologic depositional history, make it an ideal set of data to complement the site specific testing.

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It is our opinion that the combination of the two data sets served only to enhance the understanding of site behavior, and reanalysis based solely on on-site data is unnecessary.

Figure 3-1 from the RFSP (annotated copy attached herein as Figure 1) shows onedimensional compression (e-log p) curves for Bay Mud samples from both the Redwood Landfill and the HAFB. Adding the HAFB curves was necessary to provide coverage over a wider effective stress than that covered by the tests performed on the samples recovered from the Redwood Landfill. In addition to their physical proximity, Figure 3-1 of the RFSP (attached herein as Figure 1) shows that Bay Mud specimens from both sites have essentially the same compressibility, thereby validating the use of the HAFB data. GeoSyntec used the results from the consolidation tests on samples from both the Redwood Landfill and the HAFB to calibrate the Cam-Clay parameters used in the finite element model.

High quality laboratory strength testing results from HAFB, as presented in Bonaparte and Mitchell (1979), were also used as the basis for finite element model calibration of the stress-strain relationship for Bay Mud. However, the undrained strength relationship used to calculate factor of safety in slope stability analyses is completely consistent with site-specific strength test data. This comparison will be presented subsequently in response to Comment #8.

The fill sequencing plan was developed by incorporating the soil and waste property evaluations within a 3-step model: (1) 2-dimensional finite element analysis was used to evaluate the time-rate of consolidation under waste loading along several cross-sections around the site; (2) conventional slope stability analysis was used to evaluate stability of the landfill slopes over time as consolidation progressed; and (3) iterate steps 1 and 2 over time to represent the gradual filling of the site and evaluate stability of the slopes over time and under final buildout conditions. This "more complex" approach relative to the HLA (1992) methodology, in which Step 1 was performed using 1-dimensional columns of soil and fewer iterations were performed, is justified due to the complex nature of filling at the landfill. The finite element analysis approach allows for more refined predictions of site behavior and a better understanding of the impacts that filling can have on the underlying Bay Mud.

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<u>Comment #3:</u> The results of the finite element analyses do not appear to have been compared to the extensive monitoring data prepared at the site, or to conventionally calculated consolidation behavior. Since the static and seismic stability of the proposed fill sequencing is highly dependent upon the finite element analyses, these comparisons should be performed and provided for review.

Response #3: Instrumentation monitoring at Redwood Landfill has been ongoing since the early 1990's. The monitoring includes a series of inclinometers and piezometers located around the perimeter of the landfill. The data from these instruments are used to help monitor the slope behavior as described in Mitigation Measure 3.4.2a in the EIR. As such, most of these instruments are located near the toe of the landfill where the onset of deformations can most readily be detected (i.e. potential failure surfaces through Bay Mud would pass beneath the toe of the landfill). However, these instruments were not intended to monitor the progression of consolidation, and therefore are located in areas where the requested comparisons with the finite element (FE) analyses are of limited value.

Therefore, in order to provide comparisons of the predicted consolidation behavior of the FE analyses with field monitoring, GeoSyntec recommends that consolidation monitoring be carried out near the center of the landfill. For the most direct measurement, the vertical LCRS sump riser located in Area G can be used as a settlement plate to evaluate the actual field-scale rate of Bay Mud consolidation. The bottom of the riser is located directly below the waste and immediately above the top of the Bay Mud and can provide access for direct physical measurement. Therefore, GeoSyntec recommends that the EIR for the project include the following additional mitigation measure:

[Proposed] Mitigation Measure 3.4.2e: The geotechnical monitoring program shall include monitoring the rate of Bay Mud consolidation due to the weight of the overlying waste by the following method. The elevation of the bottom of LCRS riser LS1 located in Area G shall be recorded immediately before, and then periodically after, each lift of waste is placed in Area G. The observed rate of settlement will be compared with the

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predicted rate of settlement. The supervision, reporting, and remedial action elements of Mitigation Measures 3.4.2b through 3.4.2d shall also apply to this consolidation monitoring.

<u>Comment #4:</u> Previous stability analyses by Harding Lawson Associates (1995) at the site utilized refuse shear strengths corresponding to a cohesion of 300 pounds per square foot (psf) and a friction angle of 20 degrees. The stability analyses in the FEIR utilized a refuse cohesion of 900 psf and a friction angle of 31 degrees. These strengths are substantially higher than typical published values. We understand that these values were derived from test results at a landfill in Monterey, and have not been verified by site-specific testing or back-calculation. Accurate strength characterization is necessary to avoid static or seismic slope instability. As such, strength parameters should be derived from laboratory testing and/or back-calculation of material from the Redwood Landfill site. As with the Harding Lawson Associates analyses, refuse strengths should be reduced as necessary to account for strain incompatibility between the refuse and underlying Bay Mud (i.e. the potential for the Bay Mud to fail prior to the refuse deforming enough to obtain its design strength). Revised analyses should be performed to evaluate whether the on-site parameters will result in Mitigation Measures 3.4.1 and 3.4.2 reducing stability impacts to less than significant levels.

Response #4: The shear strength parameters used in the analysis represented the state of the art with respect to solid waste shear strength at the time the report was written (1997). The refuse shear strengths used by HLA, based on the work of Singh and Murphy (1990), were considered outdated by 1997. The waste shear strength parameters used in the analysis were based upon large diameter (18 in. diameter) simple shear and direct shear tests performed on solid waste at the OII landfill in Monterey Park, CA (GeoSyntec, 1996), which is located in Southern California. This study is one of the most comprehensive published to date, represents the best available data, and has been independently confirmed by others in subsequent studies, e.g., see Eid below. The results, published by Kavazanjian et al. (1999), have since been referenced in numerous other studies on strengths of municipal solid waste and are commonly used in the practice of landfill design.

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As shown in Figure 2, the strength parameters used in the RFSP correspond to the statistical best fit line of the OII strength data (note: 900 psf = 43 kPa). For reference, the recommended strengths presented by Eid et al. (2000) are also shown on the figure. Figure 2 indicates that, while the OII strength parameters result in slightly higher shear strengths than Eid et al. (2000) at confining pressures less than about 175 kPa, corresponding to 14 to 17 m (45 to 55 ft) of waste, at higher confining pressures, it yields lower strengths than Eid et al. (2000). Thus, given buildout waste heights for Redwood Landfill on the order of 120 to 160 ft, overall the OII strength values.

In addition, results of the tests at OII show that waste has a shear-strain behavior similar to that of soft to medium clays. Figure 3 shows the results of a simple shear test on OII waste. The backbone curve on Figure 3 (considered representative of the static shear behavior of the waste) is similar in ductility to that of the undrained triaxial test on Bay Mud shown in Figure 3-4 of the RFSP (repeated here as Figure 4), and other site-specific testing performed by HLA (1992) and GeoSyntec (1997). The shear strength envelope established on the basis of the OII simple shear tests and employed in the RFSP was based upon the shear strength at a shear strain of 10 percent. This is the same strain level typically employed to develop Bay Mud shear strength parameters. Therefore, there is no need to apply strain-compatibility strength reduction factors to the waste shear strength parameters.

<u>Comment #5:</u> The vertical permeability utilized in the finite element analyses was reportedly obtained from testing at an adjacent site, and is significantly higher than the values previously measured at Redwood Landfill. Permeability dictates the rate of increase in Bay Mud strength due to consolidation, and analyses should be performed using values developed based on on-site testing.

<u>Response #5:</u> The soil permeability model used in the finite element analyses was calibrated based on the results of high quality testing from the nearby Hamilton Air Force Base (see Response #2 above for further details on HAFB). However, as described in the RFSP, the resulting calibrated model was checked relative to on-site test results presented by GeoSyntec (1997b) and found to be consistent.

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Permeability cannot be truly characterized by a single value. Its value depends on void ratio, which is in turn dependent on effective stress (i.e. higher effective stress results in a denser sample and correspondingly smaller void ratio and lower permeability). To account for this dependency, in the finite element analyses performed by GeoSyntec, hydraulic conductivity was expressed as a function of void ratio in accordance with Equation 3-3 of the RFSP, which is repeated here:

$$K_{yy} = K_{yyo} \cdot 10^{\left[\frac{e-e_o}{0.5e_o}\right]}$$

This relationship is attributed to Hsieh (1987) in the RFSP and has been presented more recently in Terzaghi et al. (1996).

The permeability value of 1.5×10^{-7} cm/s presented in Table 3-1 of the RFSP is an initial permeability (K_{yyo}), and applies only to the initial void ratio (e_o) of 2.5 (the void ratio at a unit effective stress). This initial permeability is used with the above equation to predict the void ratio dependent permeability at any other void ratio or effective stress.

A comparison between predicted and measured permeability vs. void ratio is presented on Figure 5. While the predicted values used in the RFSP are slightly higher than those measured in the laboratory, this discrepancy is less than half an order of magnitude at all points, and much less than that at higher void ratios (corresponding to shallower soils under lower confinement). This discrepancy in the permeability values is not significant, as it is well recognized that field permeabilities on a macro-scale (e.g. 10 to 40 ft thick clay layer with interbedded lenses of more permeable materials) are almost always higher than the permeabilities measured on a micro-scale (e.g. 6 inch high laboratory specimen).

<u>Comment #6:</u> The seismically induced slope deformations calculated by GeoSyntec Consultants (2-1/2 to 12 inches) are substantially less than those calculated by HLA, 1992 (1-1/2 to 6 feet). The seismic deformations should have increased since steeper slopes are proposed than those evaluated by HLA. An evaluation of the adequacy of

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Mitigation Measure 3.4.1 will necessitate that the cause(s) for this discrepancy be addressed.

<u>Response</u> #6: GeoSyntec employed more recent parameters for the seismic performance of municipal solid waste that were unavailable at the time of the HLA (1992) work, along with a more advanced and thorough analysis technique to evaluate seismically induced slope deformations. This resulted in lower deformation predictions than HLA (1992).

The statement that the GeoSyntec analyses should produce higher seismic deformations than HLA analyses would hold true if the two slope geometries were analyzed using the same approach and the same material parameters. However, the HLA (1992) and GeoSyntec (1997a) seismic site response and deformation analyses do not follow the same approach and employed significantly different material properties. The HLA seismic site response and deformation analysis is based on an equivalent-linear totalstress approach. The HLA approach assumed that solid waste behaves as a linearelastic material and used a generic set of ground motions and material parameters. GeoSyntec used a more advanced non-linear effective-stress analysis with ground motion parameters developed based both on site-specific evaluations and on field and laboratory testing and back analysis of measured seismic response at the OII landfill. Given the more rigorous methodologies and assumptions used in 1997, it is not surprising that the seismically-induced permanent deformations calculated by GeoSyntec for steeper slopes are lower than the seismically-induced permanent deformations calculated by HLA in 1992 for the flatter slopes.

<u>Comment #7:</u> The required interface shear strengths presented in Table 3.4-5 of the FEIR are very high, and clarification should be provided as to the types of available material which would satisfy the shear strength requirements.

<u>Response #7:</u> It is common practice to construct final covers on landfills with slopes of 3 Horizontal to 1 Vertical (3H:1V) and steeper. The required interface shear strengths presented in the table are attainable with commonly available materials.

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The interface shear strengths presented in Table 3.4-5 of the FEIR were originally analyzed and presented as part of the Redwood Landfill Joint Technical Document (JTD, GeoSyntec, 1998). The values presented in both documents represent a *range* of acceptable strength parameters. For example, for long-term static and seismic stability, the required interface strength is a combination ranging from 0 psf adhesion and a 34° friction angle, to 50 psf adhesion and a 9° friction angle. Intermediate values of friction angle between 34° and 9° are required for available adhesion between 0 psf and 50 psf respectively. Similar trends hold true in the assumed case where the cover soils become saturated and seepage forces must be taken into account. In this case, the range lies between zero adhesion and a 49° friction angle, and 50 psf and a 3° friction angle.

Shear strength testing for cover system components is necessarily conducted under low normal stresses because the overburden caused by a 1 ft minimum thickness vegetative layer is low. Under these low normal stresses, laboratory interface testing typically reveals both adhesion and frictional strength components. Based on GeoSyntec experience, the required strengths are attainable with conventional materials. For example, the combination of a suitable vegetative layer soil, along with a double-sided geocomposite drainage layer, and a double-sided textured geomembrane will likely meet or exceed the strength requirements. Prior to construction of the final cover, the site-specific materials will be tested to ensure that the strength requirements are met.

Comment #8: For verification purposes, the relationship utilized by GeoSyntec Consultants to characterize the undrained shear strength of normally consolidated Bay Mud as a function of effective overburden stress should be plotted along side the values of Bay Mud strengths previously measured at the Redwood Landfill site. This is necessary to evaluate the appropriateness of the strength parameters used in the stability analyses.

<u>Response</u> #8: GeoSyntec used the following relationship to model the strength of Bay Mud in slope stability analyses:

 $S_u = 0.24 \text{ x } \sigma'_v \text{ (psf)} + 75 \text{ psf}$

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This relationship is shown in Figure 6 superimposed over site-specific corrected field vane shear test results and isotropically consolidated-undrained triaxial strength test results. The figure demonstrates that the above strength relationship forms a conservative representation of the measured strengths. Based on GeoSyntec's experience with Bay Mud at this and other sites, along with the comparison with test data, the strength relationship is appropriate for its intended use.

Should you have any questions, please do not hesitate to contact any of the undersigned.

Sincerely,

Christopher E. Hunt, Ph.D., P.E. Senior Engineer

Patrick C. Lucia, Ph.D., P.E., G.E. Principal

Michael J. Minch, P.E., G.E. Senior Engineer

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Terzaghi, K., Peck, R.B., and Mesri, G. (1996) Soil Mechanics in Engineering Practice, Third Edition, John Wiley & Sons, Inc.

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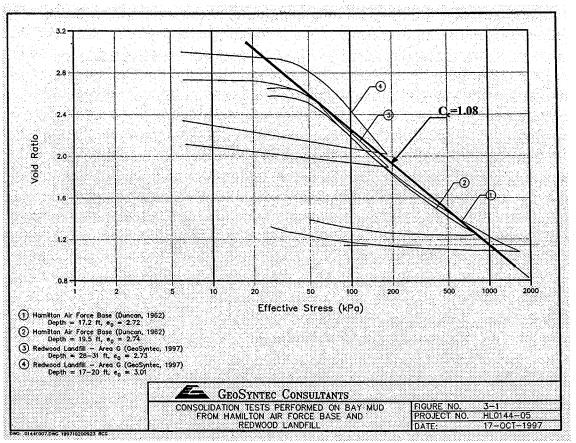
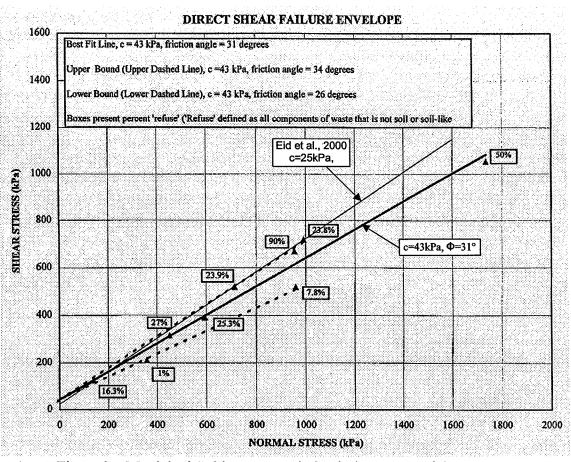
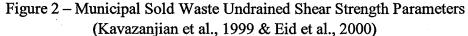


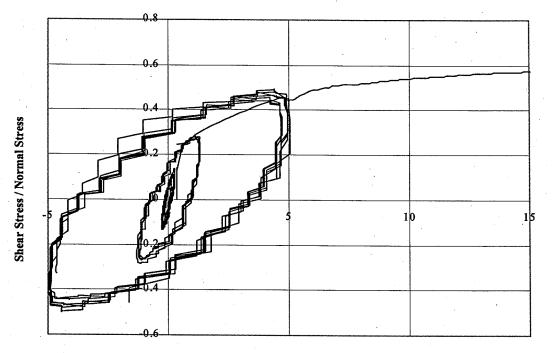
Figure 1 – Annotated Figure 3-1 from RFSP

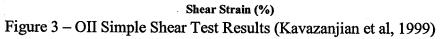
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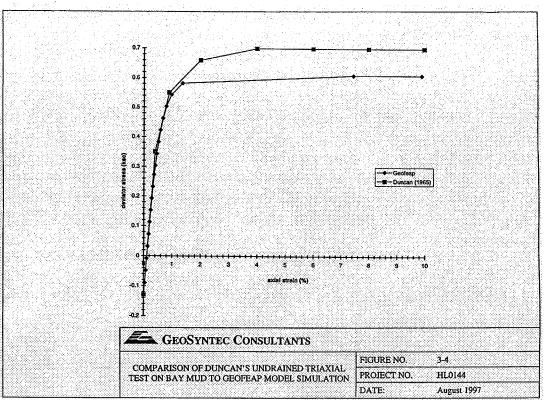
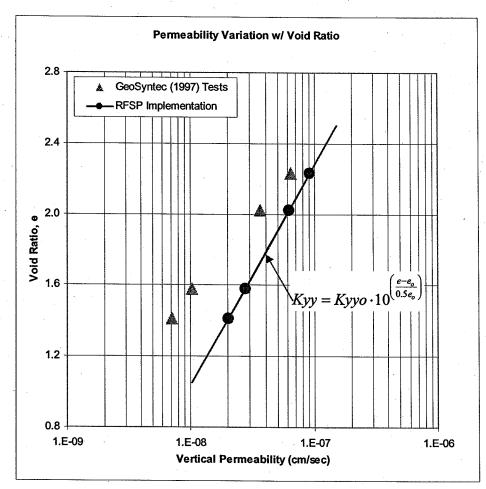


Figure 4 – Figure 3-4 from RFSP

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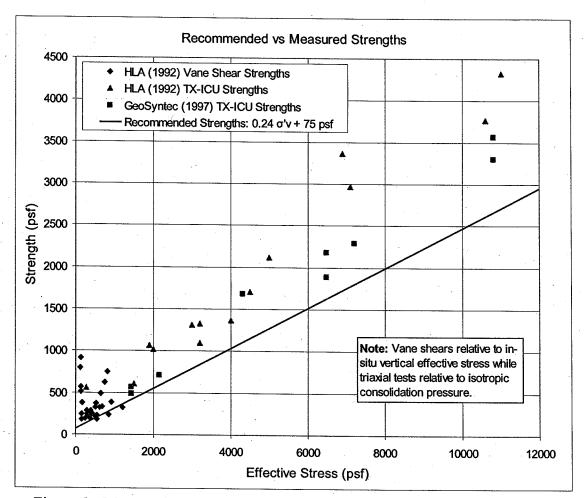


Figure 6 - Measured Field and Laboratory Strengths vs Recommended Strengths

RECYCLED AND RECYCLABLE

APPENDIX C

Letter from Applicant re: Responses to Comments on Air Quality Issues

SCS ENGINEERS

February 9, 2006

To: Doug Diemer, Ramin Khany, and Glen Roycroft Waste Management, Inc.

From: Patrick S. Sullivan SCS Engineers

SUBJECT REVIEW OF COMMENTS ON FINAL ENVIRONMENTAL IMPACT REPORT AND RESPONSES TO COMMENTS, REDWOOD LANDFILL SOLID WASTE FACILITIES PERMIT (SCH No. 1991033042)

At your request, SCS Engineers (SCS) reviewed the comments on the final environmental impact report (FEIR) prepared and submitted by the Law Offices of Brent J. Newell, which were submitted on behalf of the No Wetland Landfill Expansion (NWLE) group (September 12, 2005). Specifically, SCS reviewed any comments pertaining to air quality issues, which were detailed in the September 12, 2005 letter from NWLE. Based on our review, we have the following responses to the aforementioned comments:

1. On Page 5 of 24, NWLE indicates that the FEIR fails to provide an adequate discussion of applicable federal and state ambient air quality standards. This issue stems from the fact that the new federal standards and attainment designations for the Bay Area Air Basin (BAAB) for 8-hour ozone and particulate matter less than 2.5 microns (PM2.5) were promulgated between the time period of the draft subsequent EIR and FEIR.

The importance of these new standards and the attainment designations for the BAAB are overstated in NWLE's comments. To begin with, the FEIR does list these new standards on Table 3.2-1, so the standards are clearly delineated in the document. Second, the BAAB has been designated as attainment for the new federal PM2.5 standard; therefore, no new requirements will be imposed to achieve compliance with this standard, and there will be no affects on the proposed project. Even though the BAAB has been designated as marginal non-attainment for the new 8-hour ozone standard, this will have no effect on requirements for the project or the levels of significance used under the California Environmental Quality Act (CEQA). This is because the Bay Are Air Quality Management District (BAAQMD) rules and regulations are already more stringent than what would be required for a marginal ozone non-attainment area and because attainment of this standard is expected by the District in the near future.

Finally, the exclusion of the specific designations for these pollutants in the FEIR, which were made after the DEIR was published, in no way prevents the public from evaluating the project's effects on air quality. The level of analysis of these impacts (i.e., comparison to CEQA significance levels) is similar to way this is typically handled in EIRs throughout the BAAQMD jurisdiction and state-wide and sufficient to assess the project impacts and possible mitigation.

2. On Page 6 of 24, the NWLE indicates that FEIR fails to provide an adequate discussion of the New Source Review (NSR) requirements. NSR requirements are built into the rules and regulations of the BAAQMD, which are referenced on Page 3.2-8 and 3.2-9 of the FEIR. By referencing these regulations, the FEIR incorporates all of these requirements into the document. Also, the BAAMD implements NSR through its District permitting process; therefore, the issuance of a permit to operate (PTO) for the facility is evidence that it is in full compliance with the NSR provisions. The PTO is discussed on Page 3.2-11 of the FEIR.

An application for the landfill expansion was filed November 29, 2004 with the BAAAMD, and this application provides documentation as to how the facility will continue to comply with NSR for the expansion. This application has been deemed complete by the District and a revised PTO would be granted once the FEIR is certified. Based on this information, NSR and its requirements are adequately addressed within the FEIR.

3. On Page 7 of 24, the NWLE suggests that the FEIR fails to meaningfully describe the health effects of ozone, PM, and hydrogen sulfide. The discussions of the health effects of ozone and PM10 are detailed on Pages 3.2-13 and 3.2-14 of the FEIR. These discussions are adequate to satisfy CEQA and are consistent with the level of detail provided in many certified EIRs in the State of California. (See CEQA Guidelines, § 15151 (good faith effort at full disclosure required).

Further, ozone and PM are well known pollutants for which the health effects are understood by the general public as evidenced by the fact that every major newspaper in metropolitan areas lists these pollutant forecasts on a daily basis.

Hydrogen sulfide is not typically a pollutant that causes adverse health effects to the general public, so it does not warrant its own specific reference in the FEIR. There are many potential toxic pollutants that can be emitted from a landfill or an industrial facility; however, it is not necessary to discuss the details of each pollutant in the FEIR unless that pollutant has the potential to cause health effects above CEQA significance levels. (See CEQA Guidelines, § 15126.2, subd. (a) (EIR should focus on the significant effects of a project).) This is not the case with hydrogen sulfide, which is not a major constituent of concern for off-site receptors.

Finally, only minor impacts would be expected from these pollutants based on the increase in emissions from the proposed project, and any reduced project scenario would have even fewer impacts.

4. On Page 9 of 24, the NWLE makes further comments regarding the air quality impacts of hydrogen sulfide. Although there is state ambient standard for hydrogen sulfide, it is not typically considered to cause or potentially cause significant impact for landfills undergoing CEQA review. First, the entire state is in attainment of the hydrogen sulfide standard. Second, BAAQMD has specific requirements to ensure compliance with the ambient air quality standard. (See generally BAAQMD Rule 9-2.).

The BAAQMD may require monitoring to ensure compliance with the hydrogen sulfide standard (BAAQMD Rule 9-2-501); however, Redwood's PTO does not require such monitoring. Given the expected levels of hydrogen sulfide emissions from the landfill, the fact that hydrogen sulfide has not been found to be a risk driver for landfill projects, and the attainment status of the entire state for hydrogen sulfide, the level of detail in the EIR is appropriate for this pollutant.

The study regarding hydrogen sulfide attached as Appendix Q to NWLE's comments concluded that "Additional research might help reduce uncertainties regarding the impacts of hydrogen sulfide on the health of infants and children." (Appendix Q at p. 18.) However, the study did not recommend a lower standard or conclude that exposure at the state ambient standards, which there is no reason to believe would be exceeded at Redwood's nearest receptors, would cause health impacts.

5. On Page 10 of 24, the NWLE points out that the FEIR does not calculate emissions from landfill gas (LFG) flaring. In the interest of full disclosure, we have attached emission estimates for the proposed project from LFG flaring (Attachment 1). The new flare that is referenced was recently permitted and installed at the site in the location of the existing flare station. This provides the facility with a total of 4200 standard cubic feet per minute (scfm) of flaring capacity between the new and existing flare. The increase in emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx) from this new flare were fully offset by the BAAQMD under its NSR rule. Other emissions were not required to be offset.

On Table 1 of the September 12 letter, NWLE attempts to summarize the LFG flare emissions for the proposed project; however, this analysis only looks at the total emissions after tonnage is increased according to the proposed project, not the increase in emissions from the proposed project. As pointed out in the FEIR on Page 3.2-35 and 36, the increase in LFG combustion is only expected to be 918 scfm, which would produce a much smaller increase in emissions (84% less than the information provided by NWLE in Table 1). In addition, the 918 scfm estimate may be overstated and is theoretical. LFG combustion technologies continue to produce lower emissions all

the time; therefore, the increase in emissions from the proposed project may cause a smaller increase than projected due to improved combustion technologies and more stringent regulatory requirements in the future.

- 6. On Page 12 of 24, the NWLE suggests that composting emissions have been understated. We disagree with this contention, which is derived from the proposed use of the South Coast AQMD (SCAQMD) testing data and emissions factors for emissions of reactive organic gases (ROG). We believe that the SCAQMD factors are not accurate and cause a significant overestimate of the ROG emissions from composting operations. The emissions factors developed by the California Integrated Waste Management Board (CIWMB) and used in the FEIR are more up-to-date and accurate than the SCAQMD factors and were developed specifically to address the inaccuracies in the SCAQMD data that the CIWMB believed existed.
- 7. On Page 13 of 24, the NWLE suggests that the FEIR should require mitigation for composting emissions similar to that required in the SCAQMD. The SCAQMD is an extreme non-attainment area for ozone and a serious non-attainment area for PM10 and PM2.5. As such, SCAQMD developed a series of rules and regulations targeted at any sources of these pollutants, including composting. The BAAQMD has no such rule for composting facilities and does not have the non-attainment status of the SCAQMD. As such, mitigation measures for a facility in the SCAQMD are not appropriate and would be unprecedented in the BAAQMD. In any case, under Mitigation Measure 3.2.6c, Redwood Landfill will conduct a feasibility study to determine the technologic and economic feasibility of a composting method that allows for collection and treatment of gaseous emissions from active composting piles.
- 8. On Page 15 of 24, the NWLE repeats a comment related to hydrogen sulfide emissions. As discussed above, hydrogen sulfide emissions from the landfill are not expected to cause any adverse health effects or impacts to air quality that would exceed any CEQA significance levels. The projected increase in fugitive LFG emissions of 336 scfm is not expected to produce any significant increase in hydrogen sulfide or any other pollutant emissions.
- 9. On Page 15 of 24, the NWLE suggests that the FEIR fails to analyze impacts from ammonia, NOx, ROG, volatile organic compounds (VOCs), which are the same as ROG, and sulfur oxides (SOx) emissions as PM10 and PM2.5 precursors. Emissions of these pollutants are discussed in the document, and their impacts summarized. The level of analysis is similar to that included in many other certified EIRs in the state and is adequate. (See CEQA Guidelines, § 15151 (good faith effort at full disclosure required).) It is very difficult, if not impossible, to estimate some of these pollutants contribution as precursors of PM10 or PM2.5. It would require a very sophisticated modeling analysis that would be unprecedented for an EIR, particularly for pollutants where the air basin is in attainment of the federal standards for these pollutants. The

emissions from the project will have negligible impact, if any, on the ambient concentrations of PM10 and PM2.5 in the surrounding area.

10. On Page 16 of 24, the NWLE indicates that the FEIR fails to estimate VOC emissions from petroleum contaminated (PC) soil operations. Redwood's existing SWF permit does not include a limitation on use of PC soils for alternative daily cover (ADC). Under the proposed project, use of PC soils would be limited to a daily average of 640 tpd and a peak of 800 tpd. Under Redwood's existing and proposed Title V permit to operate from the BAAQMD, only soil with less than 50 parts per million ("ppm") volatile organic compounds ("VOC") may be used for daily and intermediate cover.¹

By continuing to comply with BAAQMD limitations applicable to soils used for cover, there would be no increase in facility emissions from continuing to use minimally contaminated soils for cover, even if PC soil tonnages are assumed to increase. Further, PC soils emissions estimates are included in the fugitive LFG emissions estimated for the facility (see Table 3.2-4 of FEIR) since after the soils are placed and buried, they become part of the VOC/ROG emissions from fugitive LFG. As such, additional calculations of PC soil emissions would result in double-counting of PC soils emissions.

11. Also on Page 16 of 24, the NWLE states that the FEIR violates U. S. EPA and California Air Resources Board (CARB) guidelines for analyzing toxic emission impacts. We disagree with this assertion and believe that the NWLE is misinterpreting the cited guidelines. The guidelines submitted by NWLE refer to ambient air quality modeling applicable to NSR and Prevention of Significant Deterioration (PSD) compliance for criteria air pollutants, and are not specific to risk analysis. The risk assessment completed in the FEIR is consistent with BAAQMD guidelines for risk screening, which direct analysis of risk at the nearest residential and commercial receptors. (See BAAQMD Risk Management Plan, Appendix B Risk Analysis Procedures, § 1.A.5, available at: http://www.baaqmd.gov/pmt/air_toxics/risk_procedures_policies/appendix_b.htm; see

also BAAQMD CEQA Guidelines (1999) at pp. 49-50.) Other receptors, such as recreational receptors in the Bay, are expected to have much lower risks than what was reported in the FEIR since their exposure duration and

lower risks than what was reported in the FEIR since their exposure duration and frequency is much less than a residential receptor; these receptors are not expected to spend significant amount of time in the same location in the Bay. Finally, the risk assessment for the FEIR was done with the very conservative screening model for air

¹ / BAAQMD Major Facility Review Permit for Facility A1179, Condition 19867, No. 13 (November 10, 2004). Redwood's Waste Discharge Requirements from the RWQCB also limit contaminant levels in materials used for daily cover; with respect to VOCs, the BAAQMD limits are more specific and stricter than RWQCB criteria. (See FEIR, Vol. 2, Appendix B.)

dispersion. As such, actual health risks are probably much less than what was estimated in the FEIR. (See FEIR, p. 3.2-45.)

- 12. On Page 17 of 24, the NWLE suggests that the FEIR fails to conduct receptor analyses of criteria pollutant and hydrogen sulfide emissions. The analysis conducted in the FEIR includes a summary of ambient standards, estimates of project emissions, and comparison to CEQA significance thresholds (discussed on pp. 3.2-24 to 3.2-26 of the FEIR) and is sufficient. With regard to criteria air pollutants, BAAQMD significance levels are created as a gauge of potential impacts to receptors in order to avoid the complicated air dispersion modeling that NWLE suggests. The BAAQMD does not require such analyses beyond the use of significance levels. With regard to hydrogen sulfide, emissions levels are not expected to cause an exceedance of the ambient air quality standards within the site or at any off-site location even under worst-case conditions. Therefore, dispersion modeling for hydrogen sulfide for sensitive receptors is unnecessary.
- 13. On Page 18 of 24, the NWLE states that the FEIR does not adequately evaluate the impacts from diesel emissions from vehicles driving to and from the landfill and from cumulative diesel impacts from related projects. This type of analysis is very difficult to complete since it has to take into account emissions occurring on public roads that are constantly in motion and constantly changing relative to the receptors of concern for this project.

Because of the practical constraints on producing the type of analysis suggested by NWLE, EIRs of landfills, transfer stations, and other solid waste facilities generally evaluate the on-site diesel emissions from the facility as part of any risk assessment while qualitatively addressing diesel emissions from off-site vehicles. This is consistent with BAAQMD guidance on calculating mobile source emissions. (See BAAQMD CEQA Guidelines (1999) at pp. 30-33.)

Many CEQA lead agencies are not requiring diesel risks to be quantified as part of EIRs because of the uncertainty with the risk methodologies. Also, the contribution of off-site diesel emissions from the proposed project will likely be negligible against the existing and future diesel emissions that will occur on the major Highways 101 and 37, where there is substantial vehicular traffic of diesel sources. Finally, CARB has instituted a program for reduction of diesel emissions statewide that, when fully implemented, will reduce diesel emissions across the state to less then significant levels. A summary of this CARB program is provided in Attachment 2.

The FEIR does analyze health risks associated with on-site diesel emissions. (FEIR, at pp. 3.2-44 to 3.2-45.)

- 14. Also on Page 18 of 24, the NWLE repeats the same argument on Page 16 regarding the failure of the FEIR to include analyses of criteria pollutant emissions on regional air quality, public health, and federal and state attainment status. As noted above, the analysis conducted in the FEIR, which included a summary of ambient standards, estimates of project emissions, and comparison to CEQA significance levels is sufficient for CEQA compliance. The significance levels are created as a gauge of potential impacts on all of these potential areas of concern in order to avoid the complicated air dispersion modeling that would have to occur to do what the NWLE suggests. BAAQMD CEQA guidance does not require such analyses beyond the use of significance levels, and the completion of the suggested studies would be unprecedented in an EIR for this type of facility. Such an analysis would provide no additional useful information for making informed decisions regarding this project.
- 15. On Page 20 of 24, the NWLE indicates that the FEIR limits the scope of the cumulative air quality impacts and fails to analyze related project impacts for cumulative effects. The analysis of cumulative air impacts is, consistent with BAAQMD guidance for cumulative impacts under CEQA (see BAAQMD CEQA Guidelines (1999), at p. 19), and provides adequate information for the public and other stakeholder to assess the project impacts. "The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness." (CEQA Guidelines, § 15130, subd. (b).)

SCS is hopeful that the above responsive information meets your needs at this time. My professional resume is provided as Attachment 3 to this memorandum, as requested.

ATTACHMENT 1

LFG Flare Emission Estimates

Plant # 1179, Redwood Landfill

Landfill Gas From S-5 Redwood Landfill

Contants Used in Calculations									
Molar Volume of Gas at 70 °F, scf/lbmol:	MV	387.006							
Methane Content for all Calculations, %	CH4	50%							
Methane Heat Content, BTU/ft ³ at 60 °F	HCM	1013							
Heat Content for LFG at 50% CH ₄ , BTU/scf at 70 °F	HCL	496.943							
F-Factor at 0% O ₂ for LFG at 50% CH ₄ , sdcf/MM BTU	FFac	9628.24							
		Molecular							
	Name	Weight							
Hydrogen	Hy	1.00794							
Carbon	Ca	12.01100							
Nitrogen	Ni	14.00670							
Oxygen	Ox	15.99940							
Fluorine	FI	18.99840							
Sulfur	Su	32.06000							
Chlorine	CI	35.45300							
Bromine	Br	79.90400							
Mercury	Hg	200.59000							

Plant # 1179, Redwood Landfill, Application # 8501 for Heat Input Increases at the A-50 Landfill Gas Flare

Landfill Gas Concentration Data and Flare Emission Factors

		Maximum	Uncontrolled	Uncontrolled		Abated	Abated
	Molecular	Concen-	Emission Factor	Emission Factor	Control	Emission Factor	Emission Factor
Compounds, basis	Weight	tration	lbs / M scf	lbs / MM BTU	Efficiency	lbs / M scf	lbs / MM BTU
Total NMOC, as hexane, based on C#19867, Part 18	86.18	0.043%	9.464E-02	1.904E-01	98.0%	1.893E-03	3.809E-03
Total NMOC, as methane, based on C#19867, Part 18	16.04	0.255%	1.057E-01	2.127E-01	98.0%	2.114E-03	4.254E-03
Total NMOC, as methane, based on 8-34-301.3	16.04					6.948E-03	1.398E-02
Criteria Pollutants From A-50 Flare		PPMV					
Total NPOC, sum of individual NPOCs	16.04	14.560	1.329E-03	2.674E-03	98.0%	2.658E-05	5.348E-05
Total POC, maximum NMOC as methane - NPOC	16.04					6.921E-03	1.393E-02
NOx, RACT Limit in C#19867, Part 25	46.01					2.982E-02	6.000E-02
CO, RACT Limit in C#19867, Part 26	28.01					1.491E-01	3.000E-01
PM10, New Limit: 6.023 tons/yr / 745000 MM BTU/yr						8.500E-03	1.710E-02
SO2, TRS Limit for LFG, C#19867, Part 18a	64.06					7.035E-02	1.416E-01
Significant TACs, basis: C#19867, Part 18b & site test data		PPBV					
Acrylonitrile	53.06	280	3.839E-05	7.726E-05	99.7%	1.152E-07	2.318E-07
Benzene	78.11	1000	2.018E-04	4.062E-04	99.7%	6.055E-07	1.218E-06
1,3 Butadiene	54.09	278	3.890E-05	7.829E-05	98.0%	7.781E-07	1.566E-06
Carbon Tetrachloride	153.82	70	2.782E-05	5.599E-05	98.0%	5.565E-07	1.120E-06
Chloroform	119.38	70	2.159E-05	4.345E-05	98.0%	4.319E-07	8.690E-07
1,4 Dichlorobenzene	147.00	400	1.519E-04	3.057E-04	98.0%	3.039E-06	6.115E-06
1,1 Dichloroethane	98.96	150	3.836E-05	7.718E-05	98.0%	7.671E-07	1.544E-06
Ethylene Dibromide	187.86	70	3.398E-05	6.838E-05	98.0%	6.796E-07	1.368E-06
Ethylene Dichloride	98.96	70	1.790E-05	3.602E-05	98.0%	3.580E-07	7.204E-07
Hydrogen Bromide	80.91	4731	9.891E-04	1.990E-03	0.0%	9.891E-04	1.990E-03
Hydrogen Chloride	36.46	20320	1.914E-03	3.852E-03	0.0%	1.914E-03	3.852E-03
Hydrogen Fluoride	20.01	1947	1.007E-04	2.026E-04	0.0%	1.007E-04	2.026E-04
Hydrogen Sulfide	34.08	424000	3.733E-02	7.513E-02	98.0%	7.467E-04	1.503E-03
Methylene Chloride	84.93	1000	2.195E-04	4.416E-04	98.0%	4.389E-06	8.832E-06
Perchloroethylene	165.83	450	1.928E-04	3.880E-04	98.0%	3.857E-06	7.761E-06
1,1,2,2 Tetrachloroethane	167.85	70	3.036E-05	6.109E-05	98.0%	6.072E-07	1.222E-06
1,1,2 Trichloroethane	133.40	69	2.381E-05	4.791E-05	98.0%	4.762E-07	9.583E-07
Trichloroethylene	131.39	250	8.488E-05	1.708E-04	98.0%	1.698E-06	3.416E-06
Vinyl Chloride	62.50	880	1.421E-04	2.860E-04	98.0%	2.842E-06	5.720E-06

		Maximum	Uncontrolled	Uncontrolled		Abated	Abated
	Molecular	Concen-	Emission Factor	Emission Factor	Control	Emission Factor	Emission Factor
Compounds, basis	Weight	tration	lbs / M scf	lbs / MM BTU	Efficiency	lbs / M scf	lbs / MM BTU
Sulfur Compounds, C#19867, Part 18a and site tests		PPBV					
Hydrogen Sulfide	34.08	424000	3.733E-02	7.513E-02	98.0%	7.467E-04	1.503E-03
Cabonyl Sulfide	60.07	50	7.761E-06	1.562E-05	98.0%	1.552E-07	3.123E-07
Methyl Mercaptan	48.10	300	3.729E-05	7.504E-05	98.0%	7.458E-07	1.501E-06
Ethyl Mercaptan	62.13	50	8.027E-06	1.615E-05	98.0%	1.605E-07	3.231E-07
Dimethyl Sulfide	62.13	200	3.211E-05	6.461E-05	98.0%	6.422E-07	1.292E-06
Carbon Disulfide	76.13	100	1.967E-05	3.959E-05	98.0%	3.934E-07	7.917E-07
iso-propyl Mercaptan	76.16	50	9.839E-06	1.980E-05	98.0%	1.968E-07	3.960E-07
n-propyl Mercaptan	76.16	50	9.839E-06	1.980E-05	98.0%	1.968E-07	3.960E-07
Dimethyl Disulfide	94.19	50	1.217E-05	2.449E-05	98.0%	2.434E-07	4.898E-07
Total Reduced Sulfur, as H ₂ S	34.08	425000	3.742E-02	7.530E-02	98.0%	7.484E-04	1.506E-03
Halogenated Organic Compounds, Site Tests	01.00	PPBV	0.1 122 02	1.0002 02	00.070	1.1012.01	1.0002.00
1,1 Dichloroethylene (vinylidine dichloride)	96.94	150	3.757E-05	7.561E-05	98.0%	7.515E-07	1.512E-06
1.1.1 Trichloroethane	133.40	69	2.381E-05	4.791E-05	98.0%	4.762E-07	9.583E-07
1,1,2 Trichloroethane	133.40	69	2.381E-05	4.791E-05	98.0%	4.762E-07	9.583E-07
1,2 Dichloroethene (cis)	96.94	577	1.446E-04	2.910E-04	98.0%	2.892E-06	5.820E-06
1,2 Dichloroethene (trans)	96.94	278	6.973E-05	1.403E-04	98.0%	1.395E-06	2.806E-06
1,2 Dichloropropane (propylene dichloride)	112.99	69	2.017E-05	4.058E-05	98.0%	4.033E-07	8.116E-07
1,2,4 Trichlorobenzene	181.45	69	3.238E-05	6.517E-05	98.0%	6.477E-07	1.303E-06
1,3 Dichloropropene (cis)	110.97	69	1.981E-05	3.986E-05	98.0%	3.961E-07	7.971E-07
1,3 Dichloropropene (trans)	110.97	69	1.981E-05	3.986E-05	98.0%	3.961E-07	7.971E-07
Bromodichloromethane	163.83	3130	1.325E-03	2.666E-03	98.0%	2.650E-05	5.333E-05
Bromoform	252.73	278	1.818E-04	3.658E-04	98.0%	3.635E-06	7.316E-06
Carbon Tetrachloride	153.82	70	2.782E-05	5.599E-05	98.0%	5.565E-07	1.120E-06
Chlorobenzene	112.56	76	2.219E-05	4.465E-05	98.0%	4.438E-07	8.930E-07
Chloroform	119.38	70	2.159E-05	4.345E-05	98.0%	4.319E-07	8.690E-07
Chloroprene	88.54	278	6.368E-05	1.281E-04	98.0%	1.274E-06	2.563E-06
Chlorotoluene	126.59	69	2.259E-05	4.546E-05	98.0%	4.519E-07	9.093E-07
Dibromochloromethane	208.28	278	1.498E-04	3.014E-04	98.0%	2.996E-06	6.029E-06
1.4 Dichlorobenzene	147.00	400	1.519E-04	3.057E-04	98.0%	3.039E-06	6.115E-06
1.1 Dichloroethane	98.96	150	3.836E-05	7.718E-05	98.0%	7.671E-07	1.544E-06
Ethyl Chloride (chloroethane)	64.51	300	5.001E-05	1.006E-04	98.0%	1.000E-06	2.013E-06
Ethylene Dibromide	187.86	70	3.398E-05	6.838E-05	98.0%	6.796E-07	1.368E-06
Ethylene Dichloride	98.96	70	1.790E-05	3.602E-05	98.0%	3.580E-07	7.204E-07
Freon-11 (trichlorofluoromethane)	137.37	140	4.969E-05	1.000E-04	98.0%	9.939E-07	2.000E-06
Freon-113 (1,1,2 trichloro 1,2,2 trifluoroethane)	187.38	69	3.344E-05	6.730E-05	98.0%	6.689E-07	1.346E-06
Freon-114 (1,2 dichloro 1,1,2,2 tetrafluoroethane)	170.92	70	3.096E-05	6.230E-05	98.0%	6.192E-07	1.246E-06
Freon-12 (dichlorodifluoromethane)	120.91	660	2.061E-04	4.148E-04	98.0%	4.123E-06	8.296E-06
Hexachlorobutadiene	260.76	69	4.654E-05	9.365E-05	98.0%	9.308E-07	1.873E-06
Methyl Bromide	94.94	69	1.694E-05	3.410E-05	98.0%	3.389E-07	6.819E-07
Methyl Chloride (chloromethane)	50.49	69	9.011E-06	1.813E-05	98.0%	1.802E-07	3.627E-07

		Maximum	Uncontrolled	Uncontrolled		Abated	Abated
	Molecular	Concen-	Emission Factor	Emission Factor	Control	Emission Factor	Emission Factor
Compounds, basis	Weight	tration	lbs / M scf	lbs / MM BTU	Efficiency	lbs / M scf	lbs / MM BTU
Methylene Chloride	84.93	1000	2.195E-04	4.416E-04	98.0%	4.389E-06	8.832E-06
Perchloroethylene	165.83	450	1.928E-04	3.880E-04	98.0%	3.857E-06	7.761E-06
1,1,2,2 Tetrachloroethane	167.85	70	3.036E-05	6.109E-05	98.0%	6.072E-07	1.222E-06
Trichloroethylene	131.39	250	8.488E-05	1.708E-04	98.0%	1.698E-06	3.416E-06
Vinyl Chloride	62.50	880	1.421E-04	2.860E-04	98.0%	2.842E-06	5.720E-06
Non-Halogenated Organic Compounds, Site Tests		PPBV					
Acrylonitrile	53.06	280	3.839E-05	7.726E-05	99.7%	1.152E-07	2.318E-07
Benzene	78.11	1000	2.018E-04	4.062E-04	99.7%	6.055E-07	1.218E-06
1,3 Butadiene	54.09	278	3.890E-05	7.829E-05	98.0%	7.781E-07	1.566E-06
1,4 Dioxane	88.11	278	6.337E-05	1.275E-04	98.0%	1.267E-06	2.550E-06
2-Propanol	60.10	5052	7.844E-04	1.579E-03	98.0%	1.569E-05	3.157E-05
4-Ethyl Toluene	120.19	1031	3.202E-04	6.443E-04	98.0%	6.404E-06	1.289E-05
Acetone	58.08	3814	5.725E-04	1.152E-03	98.0%	1.145E-05	2.304E-05
Butane	58.12	10309	1.548E-03	3.116E-03	98.0%	3.097E-05	6.231E-05
Cyclohexane	84.16	960	2.088E-04	4.201E-04	98.0%	4.175E-06	8.402E-06
Ethanol	46.07	24742	2.945E-03	5.927E-03	98.0%	5.891E-05	1.185E-04
Ethyl Benzene	106.17	2062	5.656E-04	1.138E-03	98.0%	1.131E-05	2.276E-05
Heptane	100.20	1134	2.936E-04	5.909E-04	98.0%	5.872E-06	1.182E-05
Hexane	86.18	880	1.960E-04	3.943E-04	98.0%	3.919E-06	7.886E-06
Methyl Ethyl Ketone	72.11	7526	1.402E-03	2.822E-03	98.0%	2.804E-05	5.643E-05
Methyl Isobutyl Ketone	100.16	763	1.974E-04	3.973E-04	98.0%	3.949E-06	7.946E-06
Methyl n-Butyl Ketone	100.16	278	7.204E-05	1.450E-04	98.0%	1.441E-06	2.899E-06
Methyl t-Butyl Ether	88.15	278	6.340E-05	1.276E-04	98.0%	1.268E-06	2.552E-06
Pentane	72.15	10309	1.922E-03	3.868E-03	98.0%	3.844E-05	7.735E-05
Propane	44.10	20619	2.349E-03	4.728E-03	98.0%	4.699E-05	9.455E-05
Propylene	42.08	278	3.027E-05	6.090E-05	98.0%	6.053E-07	1.218E-06
Styrene	104.15	330	8.878E-05	1.787E-04	98.0%	1.776E-06	3.573E-06
Tetrahydrofuran	72.11	2062	3.842E-04	7.731E-04	98.0%	7.683E-06	1.546E-05
Toluene	92.14	10206	2.430E-03	4.890E-03	98.0%	4.860E-05	9.780E-05
Trimethyl Benzene	120.19	2557	7.940E-04	1.598E-03	98.0%	1.588E-05	3.196E-05
Vinyl Acetate	86.09	278	6.192E-05	1.246E-04	98.0%	1.238E-06	2.492E-06
Xylenes (o, m, p)	106.17	7900	2.167E-03	4.361E-03	98.0%	4.334E-05	8.722E-05
Inorganic Compounds, basis: AP-42		PPBV					
Mercury	200.59	0.292	1.513E-07	3.046E-07	0.0%	1.513E-07	3.046E-07
Secondary Pollutants, sum of site test data		PPBV					
Hydrogen Chloride	36.46	20320	1.914E-03	3.852E-03	0.0%	1.914E-03	3.852E-03
Hydrogen Fluoride	20.01	1947	1.007E-04	2.026E-04	0.0%	1.007E-04	2.026E-04
Hydrogen Bromide	80.91	4731	9.891E-04	1.990E-03	0.0%	9.891E-04	1.990E-03

TABLE 1. EMISSIONS ESTIMATES FOR LFG FLARES - CURRENT CONDITIONS REDWOOD LANDFILL NOVATO, CALIFORNIA

Emission Sources: Landfill Gas Combustion Sources

0					MM BTU /				NIDOC							(tons/year)	
Source Number	Description Additional Th	roughput	MM BTU/hour 16.320	Hours/Year 8760	year 142963.2	NOx 0.060	CO 0.200	POC 0.014	NPOC 9.27E-05	PM10 0.017	SO2 0.142	NOx 4.289	CO 14.296	1.001	0.007	PM10 1.215	10.
A-52	New Landfill		90.000	8760	788400	0.060	0.200	0.014	9.27E-05	0.017	0.142	23.652	78.840	5.519	0.037		55.
A-50	Modified Old	Flare	36.000	8760	315360	0.060	0.220	0.014	9.27E-05	0.017	0.142	9.461	34.690	2.208	0.015	2.681	22.
Total	All LFG Com	bustion Sources							L			37.402	127.826	8.727	0.058	10.597	88.
	1						ı										
	Molecular		New Flare	Old Flare	Additional	Total Flare											
	Weight	Emission Factor (lb/MM BTU)	Emissions	Emissions	Throughput	Emissions (tons/vr)											
Pollutant	(g/Mol)	(Ib/MM BTU)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)											
ignificant Toxic Air Contaminants																	
1,2-Trichloroethane (methyl chloroform)	133.41	9.58E-07	3.78E-04	1.51E-04	6.85E-05	5.97E-04											
,1,2,2-Tetrachloroethane	167.85	1.22E-06	4.82E-04	1.93E-04	8.73E-05	7.62E-04											
1-Dichloroethane (ethylidene dichloride)	98.97	1.54E-06	6.09E-04	2.43E-04	1.10E-04	9.62E-04											
2-Dichloroethane (ethylene dichloride)	98.96	7.20E-07	2.84E-04	1.14E-04	5.15E-05	4.49E-04	-										
,3-Butadiene	54.09 53.06	1.57E-06 2.32E-07	6.17E-04	2.47E-04 3.65E-05	1.12E-04	9.76E-04	-										
crylonitrile	78.11	2.32E-07 1.22E-06	9.14E-05 4.80E-04	3.65E-05 1.92E-04	1.66E-05 8.71E-05	1.44E-04 7.60E-04	-										
enzene arbon tetrachloride	153.84	1.22E-06 1.12E-06	4.80E-04 4.41E-04	1.92E-04 1.77E-04	8.00E-05	6.98E-04											
hloroform	133.84	8.69E-07	4.41E-04 3.43E-04	1.37E-04	6.21E-05	5.42E-04											
tichlorobenzene (1.4-Dichlorobenzene)	147.00	6.11E-06	2.41E-03	9.64E-04	6.21E-03 4.37E-04	3.42E-04 3.81E-03											
tichloromethane (Methylene Chloride)	84 94	8.83E-06	3.48E-03	1 39E-03	6.31E-04	5.51E-03	1										
thylene dibromide (1,2-Dibromoethane)	187.88	1.37E-06	5.39E-04	2.16E-04	9.78E-05	8.52E-04											
erchloroethylene (tetrachloroethylene)	165.83	7.76E-06	3.06E-03	1.22E-03	5.55E-04	4.84E-03											
richloroethylene (trichloroethene)	131.40	3.42E-06	1.35E-03	5.39E-04	2.44E-04	4.84E-03 2.13E-03	1										
'invl chloride	62.50	5.72E-06	2.25E-03	9.02E-04	4.09E-04	3.57E-03	1										
ulfur Compounds							1										
lydrogen Sulfide	34.08	1.50E-03	5.92E-01	2.37E-01	1.07E-01	9.37E-01	1										
abonyl Sulfide	60.07	3.12E-07	1.23E-04	4.93E-05	2.23E-05	9.37E-01 1.95E-04	1										
lethyl Mercaptan	48.10	3.12E-07 1.50E-06	5.92E-04	4.93E-03 2.37E-04	1.07E-04	9.35E-04	1										
thyl Mercaptan	62.13	3.23E-07	1.27E-04	2.37E-04 5.09E-05	2.31E-05	9.53E-04 2.01E-04	1										
imethyl Sulfide	62.13	1.29E-06	5.09E-04	2.04E-04	9.24E-05	8.06E-04	1										
arbon Disulfide	76.13	7.92E-07	3.12E-04	1.25E-04	5.66E-05	4.94E-04	1										
o-propyl Mercaptan	76.16	3.96E-07	1.56E-04	6.24E-05	2.83E-05	2.47E-04	1										
-propyl Mercaptan	76.16	3.96E-07	1.56E-04	6.24E-05	2.83E-05	2.47E-04	1										
Dimethyl Disulfide	94.19	4.90E-07	1.93E-04	7.72E-05	3.50E-05	3.05E-04	1										
otal Reduced Sulfur, as H2S	34.08	1.51E-03	5.94E-01	2.37E-01	1.08E-01	9.39E-01											
Combustion By-Products	0.000	1010.00		210722-012		,											
lydrogen Chloride	36.46	3.85E-03	1.52E+00	6.07E-01	2.75E-01	2.40E+00											
lydrogen Fluoride	20.01	2.03E-04	7.98E-02	3.19E-02	1.45E-02	1.26E-01											
lydrogen Bromide	80.91	1.99E-03	7.85E-01	3.14E-01	1.42E-01	1.24E+00											
Other Halogenated Compounds							1										
,1 Dichloroethylene (vinylidine dichloride)	96.94	1.51E-06	5.96E-04	2.38E-04	1.08E-04	9.43E-04	1										
,1,1 Trichloroethane	133.40	9.58E-07	3.78E-04	1.51E-04	6.85E-05	5.97E-04											
,2 Dichloroethene (cis)	96.94	5.82E-06	2.29E-03	9.18E-04	4.16E-04	3.63E-03	1										
,2 Dichloroethene (trans)	96.94	2.81E-06	1.11E-03	4.42E-04	2.01E-04	1.75E-03	1										
,2 Dichloropropane (propylene dichloride)	112.99	8.12E-07	3.20E-04	1.28E-04	5.80E-05	5.06E-04	1										
,2,4 Trichlorobenzene	181.45	1.30E-06	5.14E-04	2.06E-04	9.32E-05	8.12E-04	1										
,3 Dichloropropene (cis)	110.97	7.97E-07	3.14E-04	1.26E-04	5.70E-05	4.97E-04	1										
1,3 Dichloropropene (trans)	110.97	7.97E-07	3.14E-04	1.26E-04	5.70E-05	4.97E-04											
Bromodichloromethane	163.83	5.33E-05	2.10E-02	8.41E-03	3.81E-03	3.32E-02											
Bromoform	252.73	7.32E-06	2.88E-03	1.15E-03	5.23E-04	4.56E-03											
Chlorobenzene	112.56	8.93E-07	3.52E-04	1.41E-04	6.38E-05	5.57E-04											
Chloroprene	88.54	2.56E-06	1.01E-03	4.04E-04	1.83E-04	1.60E-03											
Chlorotoluene	126.59	9.09E-07	3.58E-04	1.43E-04	6.50E-05	5.67E-04											
Dibromochloromethane	208.28	6.03E-06	2.38E-03	9.51E-04	4.31E-04	3.76E-03											
Ethyl Chloride (chloroethane)	64.51	2.01E-06	7.93E-04	3.17E-04	1.44E-04	1.25E-03											
reon-11 (trichlorofluoromethane)	137.37	2.00E-06	7.88E-04	3.15E-04	1.43E-04	1.25E-03	1										
reon-113 (1,1,2 trichloro 1,2,2 trifluoroethane)	187.38	1.35E-06	5.31E-04	2.12E-04	9.62E-05	8.39E-04											
reon-114 (1,2 dichloro 1,1,2,2 tetrafluoroethane)	170.92	1.25E-06	4.91E-04	1.96E-04	8.91E-05	7.77E-04	1										
reon-12 (dichlorodifluoromethane)	120.91	8.30E-06	3.27E-03	1.31E-03	5.93E-04	5.17E-03	1										
Hexachlorobutadiene	260.76	1.87E-06	7.38E-04	2.95E-04	1.34E-04	1.17E-03	1										
Aethyl Bromide	94.94 50.49	6.82E-07 3.63E-07	2.69E-04 1.43E-04	1.08E-04	4.87E-05 2.59E-05	4.25E-04 2.26E-04	-										
Methyl Chloride (chloromethane)	50.49	3.03E-0/	1.43E-04	5.72E-05	2.598-05	2.20E-04	1										
Other Non-Halogenated Compounds	00.11	2.555.04	1.015.02	4.025.07	1.005.07	1.505.05	1										
,4 Dioxane -Propanol	88.11 60.10	2.55E-06 3.16E-05	1.01E-03 1.24E-02	4.02E-04 4.98E-03	1.82E-04 2.26E-03	1.59E-03 1.97E-02	4										
	60.10	3.16E-05 1.29E-05	1.24E-02 5.08E-03	4.98E-03 2.03E-03	2.26E-03 9.21E-04	1.97E-02 8.03E-03	1										
-Ethyl Toluene	120.19 58.08	1.29E-05 2.30E-05	5.08E-03 9.08E-03			8.03E-03 1.44E-02	1										
Acetone	58.08 58.12	2.30E-05 6.23E-05	9.08E-03 2.46E-02	3.63E-03	1.65E-03 4.45E-03	1.44E-02 3.88E-02	1										
Butane Cyclohexane	58.12 84.16	6.23E-05 8.40E-06	2.46E-02 3.31E-03	9.83E-03 1.32E-03	4.45E-03 6.01E-04	3.88E-02 5.24E-03	1										
zycionexane	46.07	8.40E-06 1.19E-04	3.51E-05 4.67E-02	1.32E-03 1.87E-02	6.01E-04 8.47E-03	5.24E-03 7.39E-02	1										
thanoi Ethyl Benzene	46.07	2.28E-05	4.67E-02 8.97E-03	1.8/E-02 3.59E-03	8.47E-03 1.63E-03	7.39E-02 1.42E-02	1										
leptane	100.17	1.18E-05	4.66E-03	1.86E-03	8.45E-03	7.37E-02	1										
Iexane	86.18	7.89E-06	3.11E-03	1.24E-03	5.64E-04	4.92E-03	1										
Aethyl Ethyl Ketone	72.11	5.64E-05	2.22E-02	8.90E-03	4.03E-03	4.52E-03 3.52E-02	1										
Aethyl Isobutyl Ketone	100.16	7.95E-06	3.13E-03	1.25E-03	4.03E-03 5.68E-04	4.95E-03	1										
fethyl n-Butyl Ketone	100.16	2.90E-06	1.14E-03	4.57E-04	2.07E-04	1.81E-03	1										
Aethyl t-Butyl Ether	88.15	2.55E-06	1.01E-03	4.02E-04	1.82E-04	1.59E-03	1										
Pentane	72.15	7.74E-05	3.05E-02	1.22E-02	5.53E-03	4.82E-02	1										
Propane	44.10	9.46E-05	3.03E-02 3.73E-02	1.22E-02 1.49E-02	6.76E-03	4.82E-02 5.89E-02	1										
Propylene	44.10	9.46E-03	4.80E-04	1.49E-02 1.92E-04	8.71E-05	7.59E-02	1										
ityrene	42.08	3.57E-06	4.80E-04 1.41E-03	5.63E-04	2.55E-04	2.23E-04	1										
Fetrahydrofuran	72.11	1.55E-05	6.09E-03	2.44E-03	1.11E-03	9.64E-03	1										
foluene	92.14	9.78E-05	3.86E-02	1.54E-02	6.99E-03	6.10E-02	1										
Trimethyl Benzene	120.19	3.20E-05	1.26E-02	5.04E-03	2.28E-03	1.99E-02	1										
/inyl Acetate	86.09	2.49E-06	9.82E-04	3.93E-04	1.78E-04	1.55E-03	1										
iylenes (o, m, p)	106.17	8.72E-05	3.44E-02	1.38E-02	6.23E-03	5.44E-02	1										
			1.20E-04	4.80E-05	2.18E-05	1.90E-04	4										

TABLE 2. EMISSIONS ESTIMATES FOR LFG FLARES - PROJECT REDWOOD LANDFILL NOVATO, CALIFORNIA

Emission Sources: Landfill Gas Combustion Sources

Criteria Pollutants			ММ		MM BTU/		Emissio	n Limits (p	ounds/MM	BTU)		-	Maximun	n Annual	Emissions	(tons/year)	
Source Number	Description		BTU/hour	Hours/Year	year	NOx	со	POC	NPOC	PM10	SO2	NOx	со	POC	NPOC	PM10	SO2
A-52	Additional Throughput New Landfill Gas Flare		43.860 90.000	8760 8760	384213.6 788400	0.060	0.200	0.014 0.014	9.27E-05 9.27E-05	0.017 0.017	0.142 0.142	11.526 23.652	38.421 78.840	2.689 5.519	0.018 0.037	3.266 6.701	27.195 55.803
A-50	Modified Old Flare		36.000	8760	315360	0.060	0.200	0.014	9.27E-05	0.017	0.142	9.461	34.690	2.208	0.037	2.681	22.321
Total	All LFG Combustion Sou	rces										44.639	151.951	10.416	0.069	12.648	105.319
		Emission					1										
		Factor	New Flare	Old Flare	Additional	Total Flare											
	Molecular Weight	(lb/MM	Emissions	Emissions	Throughput	Emissions											
Pollutant Significant Toxic Air Contaminants	(g/Mol)	BTU)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)											
1,1,2-Trichloroethane (methyl chloroform)	133.41	9.58E-07	3.78E-04	1.51E-04	1.84E-04	7.13E-04											
1,1,2,2-Tetrachloroethane	167.85	1.22E-06	4.82E-04	1.93E-04	2.35E-04	9.09E-04											
1,1-Dichloroethane (ethylidene dichloride)	98.97	1.54E-06	6.09E-04	2.43E-04	2.97E-04	1.15E-03											
1,2-Dichloroethane (ethylene dichloride) 1,3-Butadiene	98.96 54.09	7.20E-07 1.57E-06	2.84E-04 6.17E-04	1.14E-04 2.47E-04	1.38E-04 3.01E-04	5.36E-04 1.16E-03											
Acrylonitrile	53.06	2.32E-07	9.14E-04	3.65E-05	4.45E-05	1.72E-04											
Benzene	78.11	1.22E-06	4.80E-04	1.92E-04	2.34E-04	9.07E-04											
Carbon tetrachloride	153.84	1.12E-06	4.41E-04	1.77E-04	2.15E-04	8.33E-04											
Chloroform Dichlorobenzene (1,4-Dichlorobenzene)	119.39 147.00	8.69E-07 6.11E-06	3.43E-04 2.41E-03	1.37E-04 9.64E-04	1.67E-04 1.17E-03	6.47E-04 4.55E-03											
Dichloromethane (Methylene Chloride)	84.94	8.83E-06	3.48E-03	1.39E-03	1.70E-03	6.57E-03											
Ethylene dibromide (1,2-Dibromoethane)	187.88	1.37E-06	5.39E-04	2.16E-04	2.63E-04	1.02E-03											
Perchloroethylene (tetrachloroethylene)	165.83 131.40	7.76E-06 3.42E-06	3.06E-03 1.35E-03	1.22E-03 5.39E-04	1.49E-03 6.56E-04	5.77E-03 2.54E-03											
Trichloroethylene (trichloroethene) Vinyl chloride	62.50	5.72E-06	2.25E-03	9.02E-04	0.56E-04 1.10E-03	4.26E-03											
Sulfur Compounds																	
Hydrogen Sulfide	34.08	1.50E-03	5.92E-01	2.37E-01	2.89E-01	1.12E+00											
Cabonyl Sulfide Methyl Mercaptan	60.07 48.10	3.12E-07 1.50E-06	1.23E-04 5.92E-04	4.93E-05 2.37E-04	6.00E-05 2.88E-04	2.32E-04 1.12E-03											
Ethyl Mercaptan	48.10	1.50E-06 3.23E-07	5.92E-04 1.27E-04	2.37E-04 5.09E-05	2.88E-04 6.21E-05	2.40E-04											
Dimethyl Sulfide	62.13	1.29E-06	5.09E-04	2.04E-04	2.48E-04	9.61E-04											
Carbon Disulfide	76.13	7.92E-07	3.12E-04	1.25E-04 6.24E-05	1.52E-04 7.61E-05	5.89E-04											
iso-propyl Mercaptan n-propyl Mercaptan	76.16 76.16	3.96E-07 3.96E-07	1.56E-04 1.56E-04	6.24E-05 6.24E-05	7.61E-05 7.61E-05	2.95E-04 2.95E-04											
Dimethyl Disulfide	94.19	4.90E-07	1.93E-04	7.72E-05	9.41E-05	3.64E-04											
Total Reduced Sulfur, as H2S	34.08	1.51E-03	5.94E-01	2.37E-01	2.89E-01	1.12E+00											
Combustion By-Products						2.87E+00											
Hydrogen Chloride Hydrogen Fluoride	36.46 20.01	3.85E-03 2.03E-04	1.52E+00 7.98E-02	6.07E-01 3.19E-02	7.40E-01 3.89E-02	2.8/E+00 1.51E-01											
Hydrogen Bromide	80.91	1.99E-03	7.85E-01	3.14E-01	3.82E-01	1.48E+00											
Other Halogenated Compounds																	
1,1 Dichloroethylene (vinylidine dichloride)	96.94	1.51E-06	5.96E-04	2.38E-04	2.91E-04	1.13E-03											
1,1,1 Trichloroethane 1,2 Dichloroethene (cis)	133.40 96.94	9.58E-07 5.82E-06	3.78E-04 2.29E-03	1.51E-04 9.18E-04	1.84E-04 1.12E-03	7.13E-04 4.33E-03											
1,2 Dichloroethene (trans)	96.94	2.81E-06	1.11E-03	4.42E-04	5.39E-04	2.09E-03											
1,2 Dichloropropane (propylene dichloride)	112.99	8.12E-07	3.20E-04	1.28E-04	1.56E-04	6.04E-04											
1,2,4 Trichlorobenzene	181.45 110.97	1.30E-06 7.97E-07	5.14E-04 3.14E-04	2.06E-04 1.26E-04	2.50E-04 1.53E-04	9.70E-04 5.93E-04											
1,3 Dichloropropene (cis) 1,3 Dichloropropene (trans)	110.97	7.97E-07 7.97E-07	3.14E-04 3.14E-04	1.26E-04 1.26E-04	1.53E-04 1.53E-04	5.93E-04 5.93E-04											
Bromodichloromethane	163.83	5.33E-05	2.10E-02	8.41E-03	1.02E-02	3.97E-02											
Bromoform	252.73	7.32E-06	2.88E-03	1.15E-03	1.41E-03	5.44E-03											
Chloroprene	112.56 88.54	8.93E-07 2.56E-06	3.52E-04 1.01E-03	1.41E-04 4.04E-04	1.72E-04 4.92E-04	6.64E-04 1.91E-03											
Chlorotoluene	126.59	9.09E-07	3.58E-04	1.43E-04	1.75E-04	6.76E-04											
Dibromochloromethane	208.28	6.03E-06	2.38E-03	9.51E-04	1.16E-03	4.49E-03											
Ethyl Chloride (chloroethane)	64.51 137.37	2.01E-06 2.00E-06	7.93E-04 7.88E-04	3.17E-04 3.15E-04	3.87E-04 3.84E-04	1.50E-03 1.49E-03											
Freon-11 (trichlorofluoromethane) Freon-113 (1,1,2 trichloro 1,2,2 trifluoroethane)	137.37	2.00E-06 1.35E-06	7.88E-04 5.31E-04	3.15E-04 2.12E-04	3.84E-04 2.59E-04	1.49E-03 1.00E-03											
Freon-114 (1,2 dichloro 1,1,2,2 tetrafluoroethane)	170.92	1.25E-06	4.91E-04	1.96E-04	2.39E-04	9.27E-04											
Freon-12 (dichlorodifluoromethane)	120.91	8.30E-06	3.27E-03	1.31E-03	1.59E-03	6.17E-03											
Hexachlorobutadiene Methyl Bromide	260.76 94.94	1.87E-06 6.82E-07	7.38E-04 2.69E-04	2.95E-04 1.08E-04	3.60E-04 1.31E-04	1.39E-03 5.07E-04											
Methyl Chloride (chloromethane)	50.49	3.63E-07	1.43E-04	5.72E-05	6.97E-05	2.70E-04											
Other Non-Halogenated Compounds																	
1,4 Dioxane	88.11	2.55E-06	1.01E-03	4.02E-04	4.90E-04	1.90E-03 2.35E-02											
2-Propanol 4-Ethyl Toluene	60.10 120.19	3.16E-05 1.29E-05	1.24E-02 5.08E-03	4.98E-03 2.03E-03	6.06E-03 2.48E-03	2.35E-02 9.59E-03											
Acetone	58.08	2.30E-05	9.08E-03	3.63E-03	4.43E-03	1.71E-02											
Butane	58.12	6.23E-05	2.46E-02	9.83E-03	1.20E-02	4.64E-02											
Cyclohexane	84.16	8.40E-06	3.31E-03 4.67E-02	1.32E-03	1.61E-03 2.28E-02	6.25E-03 8.82E-02											
Ethanol Ethyl Benzene	46.07	1.19E-04 2.28E-05	4.67E-02 8.97E-03	1.8/E-02 3.59E-03	2.28E-02 4.37E-03	8.82E-02 1.69E-02											
Heptane	100.20	1.18E-05	4.66E-03	1.86E-03	2.27E-03	8.79E-03	1										
Hexane	86.18	7.89E-06	3.11E-03	1.24E-03	1.52E-03	5.87E-03											
Methyl Ethyl Ketone Methyl Isobutyl Ketone	72.11 100.16	5.64E-05 7.95E-06	2.22E-02 3.13E-03	8.90E-03 1.25E-03	1.08E-02 1.53E-03	4.20E-02 5.91E-03											
Methyl n-Butyl Ketone	100.16	2.90E-06	1.14E-03	4.57E-04	5.57E-04	2.16E-03											
Methyl t-Butyl Ether	88.15	2.55E-06	1.01E-03	4.02E-04	4.90E-04	1.90E-03	1										
Pentane	72.15	7.74E-05	3.05E-02	1.22E-02	1.49E-02	5.75E-02											
Propane Propylene	44.10 42.08	9.46E-05 1.22E-06	3.73E-02 4.80E-04	1.49E-02 1.92E-04	1.82E-02 2.34E-04	7.03E-02 9.06E-04											
Styrene	104.15	1.22E-06 3.57E-06	4.80E-04 1.41E-03	1.92E-04 5.63E-04	2.34E-04 6.86E-04	9.06E-04 2.66E-03											
Tetrahydrofuran	72.11	1.55E-05	6.09E-03	2.44E-03	2.97E-03	1.15E-02											
Toluene	92.14	9.78E-05	3.86E-02	1.54E-02	1.88E-02	7.28E-02											
Trimethyl Benzene	120.19 86.09	3.20E-05 2.49E-06	1.26E-02 9.82E-04	5.04E-03 3.93E-04	6.14E-03 4.79E-04	2.38E-02 1.85E-03											
			9.675-04														
Vinyl Acetate Xylenes (o, m, p)	106.17	8.72E-05	3.44E-02	1.38E-02	1.68E-02	6.49E-02											

TABLE 3. REDWOOD LANDFILL EXPANSION PROJECT FLARE EMISSIONS INCREASE FROM PROJECT REDWOOD LANDFILL NOVATO, CALIFORNIA

	Current Facility Flare Emissions	Project Flare Emissions	Change
	tons/year	tons/year	tons/yr
ROG (aka POC)	8.73	10.42	1.69
NOx	37.40	44.64	7.24
СО	127.83	151.95	24.13
PM-10	10.60	12.65	2.05
SOx	88.24	105.32	17.08
H_2S	0.94	1.12	0.18

ATTACHMENT 2

CARB Diesel Risk Reduction Program Summary

RISK EVALUATION OF DIESEL EXHAUST EMISSIONS

Regulatory Background

The California Air Resources Board (CARB) identified particulate emissions from diesel-fueled engines (diesel PM) as toxic air contaminants (TACs) in August 1998. Following the identification process, CARB was required to determine if there is a need for further control, which necessitated the initiation of the risk management phase of the diesel PM program.

For the risk management phase, CARB created the Diesel Advisory Committee to assist in the development of a risk management guidance document and a risk reduction plan. The Diesel Advisory Committee and its four subcommittees have convened numerous meeting to discuss possible diesel PM control approaches. Representatives on the committee and its subcommittees consisted of staff from CARB, U.S. EPA, State and local agencies, industry, environmental groups, and interested public. In addition to formal committee and subcommittee meetings, CARB staff also met with individual stakeholders.

With the assistance of the Diesel Advisory Committee and its subcommittees, the CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB, October 2000a) and the *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines* (CARB, October 2000b). CARB approved these documents on September 28, 2000, which began the step in the regulatory process: the control measure phase.

The CARB is currently in the process of implementing this phase of the diesel PM program. During the control measure phase, specific statewide regulations designed to further reduce diesel PM emissions from diesel-fueled engines and vehicles will be evaluated and developed. The goal of each regulation is to make diesel engines as clean as possible by establishing stateof-the-art technology requirements or emission standards to reduce diesel PM emissions. The regulations will be developed in an open and public process where availability, applicability, and cost of technology will all be evaluated. The interested members of the public, manufacturers, and other stakeholders will be asked to participate in the development of all proposed regulations.

Diesel PM Regulations

Although diesel PM program is ongoing, there are already existing regulations, which mandate lower PM emissions from new on-road diesel-fueled vehicles. These regulations will require substantial reductions in PM and other emissions from on-road heavy-duty diesel-fueled engines (e.g., refuse hauling vehicles) beginning with 2004 model year. Additional more stringent standards will apply to engines starting in the 2007 model year because of the adoption of federal standards at the State level, resulting in PM emissions of less than 0.01 gm/bhp-hr for these types of engines.

Off-road vehicles (e.g., landfill equipment) will come under more stringent regulation beginning with the 2005 model year. CARB is currently working on proposed regulations to include a PM reduction requirement, which would require PM emissions to be less than 0.02 gm/bhp-hr for these types of engines.

Each of these sets of regulations will serve to significantly reduce diesel PM emissions and resulting human health risks attributable to vehicles and equipment, which might operate at and/or deliver refuse to a landfill. However, these regulations do not address the potential emissions and risks from in-use diesel-fueled vehicles currently in operation at landfill sites.

CARB staff began the public process of developing regulations for the control of PM emissions from in-use diesel-fueled engines. Currently, according to the Risk Reduction Plan, PM emissions from heavy-duty diesel engines are on the average approximately 0.1 grams (gm) per brake horsepower (bhp)-hour (hr) without controls. In fact, CARB proposes the use of the 0.1 gm/bhp-hr emission factor for the completion of risk assessments for current in-use stationary diesel engines.

One of the first engine categories addressed by CARB under this regulation included the "refuse removal vehicles," which are defined as "all vehicles involved in the systematic administration of activities, which provide for the collection, source separation, storage, transportation, transfer, processing, treatment, and disposal of solid waste." CARB developed a *Proposed Refuse Removal Vehicle Rule Concepts* (CARB, June 2001). In 2004, this rule was finalized requiring vehicle owners to employ best available control technology (BACT) on in use engines. Owners must apply BACT on their engines between 2004 and 2010, with specific deadlines depending on factors such as engine model year, number of vehicles in a fleet, and whether the fleet has dual-fuel or bi-fuel engines. CARB's Executive Officer can also grant specific extensions and exemptions based on a variety of situations.

The health and environmental benefits of this measure are substantial. The rule will achieve a reduction in toxic PM emissions from collection vehicles by as much as 81 percent by 2010 and 85 percent by 2015 from levels that existed in 2000. This means that more than two million pounds of PM and 30,000 tons on NOx will not be released into the air.

Risk Assessment Methodology

Because of the difficulty in estimating emissions and resulting air dispersion of TACs from mobile sources, CARB has not yet developed an approved methodology for risk assessment for diesel PM emitted from mobile equipment and vehicles. The risk assessment guidance set forth in the Risk Reduction Plan for stationary sources is not appropriate and is not recommended to address PM emissions from mobiles sources. Therefore, in lieu of a fully quantitative risk assessment for diesel exhaust emissions, a qualitative approach for evaluating potential health risks from PM emissions from landfill vehicles and equipment is appropriate. This methodology takes into consideration the PM emission reductions that will occur through existing regulations related to new on-road and off-road engines as well as the proposed regulations for in-use diesel-fueled refuse removal vehicles.

ATTACHMENT 3

Resume

PATRICK S. SULLIVAN, R.E.A., C.P.P. VICE PRESIDENT

Education

B.A. - Harvard University, 1989 Biology/Ecology

Licenses, Certifications, and Specialized Training

South Coast Air Quality Management District, Certified Permitting Professional (A-1716)

State of California, Registered Environmental Assessor (No. 05952)

OSHA 40-Hour Health and Safety Training for Hazardous Waste Workers

AHERA Certification for Asbestos Inspector, Management Planner, Contractor/Supervisor, and Project Designer

Air and Waste Management Association Course on Risk Assessment and Air Dispersion Modeling; Trinity Consultants' Course on Air Dispersion Modeling; and General Sciences Corporation Course on Exposure Modeling and Risk Assessment (Air, Vadose Zone, and Groundwater Modeling Using EPA Models)

Affiliations

Air and Waste Management Association; Vice Chairman, Mother Lode Chapter

- Solid Waste Association of North America, Landfill Gas Division; Chairman of Rules and Regulations Committee
- Waste Industry Air Coalition; Chairman
- California Biomass Collaboration; Executive Board
- California Integrated Waste Management Board, Technical Advisory Group for Landfill; Consulting Industry Representative

Professional Experience

Mr. Sullivan has over 16 years of experience in the area of environmental engineering, specializing in air quality and risk assessment issues for landfills and solid waste facilities. He is a Certified Permitting Professional within the South Coast Air Quality Management District (SCAQMD) and a Registered Environmental Assessor in the State of California.

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Mr. Sullivan is a Vice President and Project Director within SCS' California office, is the Director of SCS's Solid Waste Practice in California, and the Group Leader for the Landfill Gas/Landfill Engineering and Technical Services (which include risk assessment and air quality). He is also a National Partner for SCS's company-wide air quality compliance program and National Partner for risk assessment.

He has participated in numerous projects related to air quality permitting and compliance. Typical activities completed by Mr. Sullivan on these projects included air quality permitting, regulatory advocacy, emissions estimation, preparation of air toxics risk assessments, computer modeling for air emissions and dispersion, air sampling/analysis, and regulatory negotiations. The risk assessment work completed by Mr. Sullivan includes human health and ecological risk assessment, chemical fate and transport modeling, and air toxics evaluation.

Selected air quality projects include the following:

- Preparation of the air quality and risk assessment sections of Environmental Impact Reports (EIRs) for approximately 15 landfill expansions and new landfills in California, including evaluations of health risks, air quality impacts, and odors.
- Preparation of Title V and New Source Review (NSR)/Prevention of Significant Deterioration (PSD) permit applications and documentation for industrial facilities and landfill sites. Mr. Sullivan has been involved with over 75 Title V permitting projects for landfill sites.
- Completion of National Emission Standards for Hazardous Air Pollutants (NESHAPs) and New Source Performance Standard (NSPS) applicability reviews and implementation plans for various sources, including landfill sites and industrial facilities. Completion of NSPS Tier 1 and 2 emission rate studies and reports, design plans, surface emission monitoring plans, and other documentation for landfills under the NSPS program. Mr. Sullivan has been involved with over 100 NSPS/Emission Guideline (EG) projects for landfills.
- Development and teaching of training courses for landfill air quality compliance at over 25 seminars. Compliance and regulatory issues that have been taught included Title V, NSPS, NESHAPS, NSR/PSD, Urban Air Toxic Strategy (UATS), and related state and local requirements.
- Preparation of comments for the landfill industry on the NSPS rule, Title V operating permit programs, proposed Maximum Achievable Control Technology (MACT) standard, and the upcoming UATS, where landfills are included as a regulated source.
- Preparation of numerous local air district, state, and federal permitting documents for the installation of air pollution control devices and industrial equipment, including boilers, cooling towers, air strippers, wastewater treatment plants, landfill gas collection systems and flares, landfill gas energy and recovery plants, and various industrial systems.

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- Permitting, compliance, and due diligence projects for over 20 landfill gas-to-energy projects throughout the United States. This has also included registration of greenhouse gas credits, facilitation of trades for greenhouse gas credits, and development of methodologies for estimation of greenhouse gas reductions from landfills.
- Utilization of air dispersion models and preparation of air toxics risk assessments for volatile organic compound and fugitive dust emissions from landfill sites and other industrial sources.
- Completion of emission inventories and air quality compliance audits and compliance plans for aerospace facilities, steel mills, jewelry manufacturing facilities, landfill sites, landfill gas recovery plants, and other industrial operations.
- Preparation of AB 2588 air toxics emissions inventory plans, reports, and risk assessments for various industrial clients in California, including a large commercial complex, a jewelry manufacturing facility, a oil well field equipment manufacturer, and numerous landfill sites and related solid waste facilities. Air toxic emissions from industrial sources were calculated and evaluated and the human health risks posed by these contaminants were estimated. Risk management procedures were developed.
- Completion of Air Quality Solid Waste Assessment Tests (SWATs) for various landfill sites in California.
- Air sampling and source testing for various emitting devices, including sampling for volatile organic compounds, criteria pollutants, particulate heavy metals, and asbestos fibers. Completion of all air sampling associated with asbestos abatement. Oversight of sources testing at over 25 landfill sites and development of a database of landfill source tests for use in the work of the Waste Industry Air Coalition.

Mr. Sullivan is also experienced in computer database management and computer modeling as related to air quality. He has worked extensively with the EPA-approved air dispersion models, Industrial Source Complex (ISC3), Dense Gas Dispersion Model (DEGADIS), and SCREEN3, as well as air emissions estimation techniques and models. Mr. Sullivan has worked extensively with the South Coast and Bay Area Air Quality Management Districts in California, two of the most stringent air districts in the country, and is well versed in their rules and regulations. Mr. Sullivan has also completed air quality compliance and permitting projects in the states of Arizona, New Mexico, Nevada, Oregon, Washington, Texas, Oklahoma, Michigan, Ohio, Florida, Virginia, Massachusetts, Wisconsin, Tennessee, Indiana, Illinois, Colorado, and Louisiana.

Mr. Sullivan is also responsible for the management and oversight of the majority of the risk assessment projects conducted by the corporation. Mr. Sullivan has been the Project Manager and lead technical expert for over 25 projects relating to risk assessment, environmental modeling, and risk management for contaminated industrial properties and landfills. These projects accounted for over \$1,000,000 in consulting fees associated with risk assessment work and over \$5,000,000 in total fees.

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Selected risk assessment projects and studies Mr. Sullivan has managed or otherwise participated in for landfills and solid waste facilities include the following:

- Environmental Investigations and Risk Assessment at the Former BKK Main Street Landfill in Los Angeles County. This landfill is an old, closed site that may have received both hazardous and non-hazardous wastes. It is current occupied by two golf courses and other commercial and residential developments. Project work at this facility has included completion of soil vapor surveys, installation and monitoring of landfill gas migration probes, landfill gas sampling/analysis, oversight of soil and groundwater sampling, completion of a human health risk assessment, and negotiations with regulatory agencies. The site is currently being considered for listing on the National Priorities List (NPL) as a potential Superfund site.
- Human Health Risk Evaluation and Impact Assessment, Proposed Residential Developments, Adjacent to the Otay Landfill, Chula Vista, California. Contaminants at the site included a variety of organic and inorganic chemicals associated with a former hazardous waste and municipal solid waste landfill operations. Other activities at the site have includes evaluation of landfill gas migration, LFG design, air quality permitting, and other landfill engineering services.
- Human Health Risk Evaluation and Impact Assessment, Proposed Residential Development, Adjacent to a Landfill Site, Union City, California. Contaminants at the site included PAHs, heavy metals, and landfill gas emissions containing various organic constituents.
- Human Health Risk Evaluation and Impact Assessment, Proposed Commercial Developments, On and Adjacent to the BKK Landfill Site, West Covina, California. Contaminants at the site included a variety of organic and inorganic chemicals associated with a former hazardous waste and municipal solid waste landfill. The BKK site includes two landfills: one municipal solid waste landfill and one hazardous waste site.
- Investigation, Risk Assessment, and Remediation Kaiser Ventures Inc. Facilities, Fontana, California. For the former Kaiser Steel plant in Fontana, RI/FSs, RAPs, and Remedial Designs were prepared for three on-site operable units. Mr. Sullivan was responsible for a number of individual soil, ground water, surface water, and waste investigations at the Kaiser site, including treatability studies, risk assessments, remedial action plans, and hydrogeological studies, storm water pollution prevention plans, and spill prevention, control, and countermeasure (SPCC) plans. These projects included investigations of two landfill sites, with both hazardous and nonhazardous wastes, including soil, waste materials, hazardous waste, groundwater, and surface water issues.
- Human Health Risk Evaluation and Impact Assessment, Proposed Residential Development, 38th Street Burn Dump, San Diego, California. Contaminants at the site included organics, heavy metals, and other landfill-related contaminants.

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- Environmental Investigations at the Ostrom Road Landfill in Wheatland, California. Project work at this site included sampling/analysis of landfill gas, assessment of landfill gas migration using soil-vapor techniques, sampling and monitoring of LFG migration probes, installation of additional migration probe for landfill gas, design and installation of a LFG collection and control system to mitigate groundwater impacts, as well as other engineering and permitting assignments.
- Ecological Risk Assessment for a Seasonal Wetland located along the San Francisco Bay in Hayward, California. The wetlands property was impacted by petroleum hydrocarbons originating from an active automobile recycling facility. The ecological risk assessment included both terrestrial and aquatic ecosystems.
- Burn Dump Investigation in San Joaquin County, California. As part of this project, Mr. Sullivan provided technical oversight for investigations of a possible burn dump site, which included soil investigations, trenching investigations to determine extent of refuse, LFG migration assessment, waste sampling/analysis, hazardous waste determination, and other project tasks. The project site was slated for residential development; therefore, all project elements we completed in consideration for this type of development.
- Air Quality Impact Analysis and Human Health Risk Evaluation, Fink Road Landfill, Stanislaus County, California. Regional air quality impacts, including a human health risk assessment, were evaluated as part of an Environmental Impact Report for a large landfill expansion.
- Air Quality Impact Analysis and Human Health Risk Evaluation, Regional Landfill Project, Salinas Valley Solid Waste Authority, Monterey County, California. Regional air quality impacts, including a human health risk assessment were evaluated as part of an Environmental Impact Report for four different combinations of the expansion of three regional landfills and placement of 10 regional transfer stations throughout the Salinas Valley in California.

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APPENDIX D

Revised Mitigated Alternative Air Quality Calculations

Table MD-1: Mitigated On-Road Vehicle Trip Assumptio	ns					rev. 3/21/05	DS&NMS											
Redwood LF 200238							DS											
							7 tons	/payload	23 to	ns/payload				Payload by '	Vehicle Type (t	ons)		
					0.5 to	ons/payload	Medium H	leavy Trucks	Heavy H	Heavy Trucks			Light	Medium	Heavy			
		Ave.			Ligh	Duty Auto	(D	iesel)	(Diesel)			Duty Auto	Heavy Trucks	Heavy Trucks			
Proposed - Permit - 2005 Conditions (Mitigated)	Daily Trips	Tons/ #	# of Daily			Catal.)	(GVW = 14,0	01 - 33,000 lbs)	(GVW = 33,	,001 - 60,000 lbs)	Total	Total		Payload (tons)				
	(one way)	Vehicle	Loads		% of Fleet	# of Daily Trips	% of Fleet	# of Daily Trips	% of Fleet	# of Daily Trips	%	Trips	0.5	<u>7</u>	<u>23</u>	Total	Target	
1. Trucks (landfill operations)																		
A. Landfilled Materials	319																	
- MSW	302	8.4	151	95%	40%		35%	106	25%		100%		30	370	869	1,270	1270	
- Sludge	13	15.0	7	4%	0%		50%	7	50%		100%	13	-	23	77	100	100	
- Other Designated	3	13.4	1	1%	0%	-	60%	2	40%			3	-	6	14	20	20	
		Subtotal	159	100%							Subtotal:	319			Subtotal:	1,390	1,390	
B. Reycled/Reused/Cover Materials	661																	
- Separated/Commingled Recyclables (incl. white gds and scrap metals)	542	1.5	271	82%	85%		15%	81	0%		100%	542	115		-	400	400	
- Greenwaste/Yardwaste/Woodwaste/Food Waste/Biosolids for Compostin		4.7	36	11%	60%	43		22				72	11	-	83	170	170	
-Greenwaste/Yardwaste/Woodwaste for ADC & Erosion Control	40	15.0	20	6%	0%		50%	20				40	-	70	230	300	300	
-Biosolids for ADC	7	15.0	3	1%		-	50%	3	50%	-		7	-	12	38	50	50	1
											Subtotal:	661			Subtotal:	920	920	-
			331	100%														
C. Outgoing Compost Product and Recyclables	44	16.8	22		10%			11	65%	29	100%	44	1	38	328	368	368	
						t mix for landfill o												
Subtotal:	1,024		1,024		61%	630	25%	252	14%	143	100%	1,024						
2. Non-Truck Deliveries	100				100%	100	0%	-	0%	-	100%	100	NA	NA NA	NA I	NA	NA	
employees (35) & deliveries																		
		10.5	400		00/		500/	100	500/	100	40000	000		050	1.150	4 500	1500	
3. Construction	200	18.5	100		0%	-	50%	100	50%	100	100%	200	-	350	1,150	1,500	1500	
100 vehicles, 200 trips per day, 50%=18 CY, 50% 10CY																		
TOTAL	4 224				55%	730	27%	252	4.00/	0.40	4000/	4 004						
TOTAL	1,324				55%	730	21%	352	18%	243	100%			enath x # of trips			Ave. lenath	
Distance (miles per trip)	955				12.7		12.7		24.0			1,324	9,268	4,466	5,822	19,556	Ave. length 15	
Distance (miles per trip)	900				12.7		12.7		24.0				9,200	4,400	5,622	19,000	15	
							7 tons	/payload	23 to	ns/payload								
					0.5 tr	ons/payload		leavy Trucks		Heavy Trucks				Payload by '	Vehicle Type (t	ons)		
		Ave.				Duty Auto		iesel)		Diesel)			Light	Medium	Heavy	0113/		
Baseline - Permit -1994 Conditions	Daily Trips	Tons/				Catal.)		01 - 33,000 lbs)		,001 - 60,000 lbs)	Total	Total		Heavy Trucks				
	(one way)					# of Daily Trips		# of Daily Trips		# of Daily Trips	%	Trips	0.5	7	23	Total	Target	
	, 5110 11dy1					<u></u>		<u></u>		<u></u>			0.0				ranger	
1. Trucks (landfill operations)	730	NA			65%	475	20%	146	15%	110	100%	730	119	511	1,259	1,889	2.310	
- vehicle split similar to that assumed in 1994 EIR.					2370		_070	110					.10		.,_50	.,250	_,	
2. Non-Truck Deliveries	100	NA			100%	100	0%	-	0%	-	100%	100	NA	NA	NA	NA	NA	
employees (35) & deliveries																		
										1								
TOTAL	830				69%	575	18%	146	13%	110	100%							
							0,0			1			VMT = Trip le	ength x # of trips			Ave. length	
Distance (miles per trip)					10		10		18		1		4,745	1,460	1.971	8.176	10	

Table MD-2: Baseline On	-Road Vehicle E	missions (2	006)	rev. 3/21/05		DS & NMS
Redwood LF 200238				rev. 6/9/06		DS
	0.5 tons/payload Light Duty Auto	Medium Heavy Trucks	23 tons/payload Heavy Heavy Trucks			
Trip Characteristics /a/	<u>(ALL)</u>	<u>(Diesel)</u>	(Diesel)	rev. 10/18/07		cls
# of Daily Trips	575	146	110	830		
Avg. Daily Trip Length (miles)	10	10	18			
Vehicle Miles Travelled (per day)	5,745	1,460	1,971			
/a/ See trip assumptions table.						
Pollutant	Running Exhaus	t Emissions Fact	tor at <u>30 mph (g</u> ra	ams/mile)		
ROG	0.172	0.256				
СО	4.218	2.01	6.363			
NOX	0.322	8.868				
SO2	0.004	0.134				
Total PM10	0.721	1.038				
PM10 - Exhaust	0.01	0.323				
PM10 - Tire Wear	0.008	0.012	0.036			
PM10 - Break Wear	0.013	0.013				
PM10 - Entrained Road Dust	0.69	0.69				
CO2	388.028	1505				
CH4	0.04	0.07				
N2O	0.04	0.05	0.05			
				Total for		
Pollutant		haust Emissions		(grams/day)	(lbs/day)	
ROG	988	374	2,324	3,686	8	
CO	24,232	2,935	12,541	39,708	88	
NOX	1,850	12,947	35,021	49,818	110	
SO2	23	196	337	556	1	
Total PM10	4,142	1,515	2,996	8,654	19	
PM10 - Exhaust	57	472	1,510	2,039	4	
PM10 - Tire Wear	46	18	71	134	0	
PM10 - Break Wear	75	19	55	149	0	
PM10 - Entrained Road Dust	3,964	1,007	1,360	6,331	14	
CO2	2.23E+06				1.81E+04	
CH4	2.30E+02				1.04E+00	
N2O	2.30E+02	7.30E+01	9.86E+01	4.01E+02	8.85E-01	
Notes 1 - Emission factors derived using E The BAAQMD-recommended fac 2 - All emission factors are for summ	tor of 0.69 grams of P	M10 per vehicle m	nile traveled was u		and	
50% relative humidity) except for						
55 degrees Fahrenheit and 60%	relative humidity).					
3 - CH4 and N20 emission factors ar			and speed) as pub	lished bythe Ca	alifornia	
Climate Action registry in its Gene	eral Reporting Protoco	l March 2007				

Table MD-3: Mitigated Pro	pject On-Roa	d Vehicle En	nissions (201	0)	rev. 3/21/05	
Redwood LF 200238					rev. 6/9/06	
Trip Characteristics /a/	0.5 tons/payload Light Duty Auto (<u>All)</u>	Medium Heavy	23 tons/payload Heavy Heavy Trucks (Diesel)		rev. 10/18/07	
# of Daily Trips	730		243	1324		
Avg. Daily Trip Length (miles)	12.7		24	1021		
Vehicle Miles Travelled (per day)	9,268	4,466	5,822	19556		
/a/ See trip assumptions table.						
Pollutant	Running Exhaus	at Emissions Fac	ctor at <u>30 mph (gr</u>	ams/mile)		
ROG	0.091	0.22	0.9			
CO	2.666		4.451			
NOX	0.198		13.037			
SO2	0.004		0.018			
Total PM10	0.72	0.982	1.24			
PM10 - Exhaust	0.009	0.267	0.486			
PM10 - Tire Wear	0.008	0.012	0.036			
PM10 - Break Wear	0.013	0.013	0.028			
PM10 - Entrained Road Dust	0.69		0.69			
CO2	383.317	1505	1924.234			
	0.04	0.07	0.07			
N2O	0.04	0.05	0.05			
				Total fo	r 2010	
Pollutant	Running Ext	haust Emissions	(grams/day)	(grams/day)	(lbs/day)	
ROG	843	983	5,240	7,066	<u>(186/44)</u> 16	
CO	24,709	8,044	25,914	58,666	129	
NOx	1,835	29,146	75,902	106,883	236	
SO ₂	37	63	105	204	0	
Total PM ₁₀	6,673	4,386	7,219	18,278	40	
PM10 - Exhaust	83	1,192	2,830	4,105	9	
PM10 - Tire Wear	74	54	210	337	1	
PM ₁₀ - Break Wear	120	58	163	342	1	
PM ₁₀ - Entrained Road Dust	6,395	3,082	4,017	13,494	30	
CO2	3.55E+06		1.12E+07	2.15E+07	4.73E+04	
CH4	3.71E+02		4.08E+02	1.09E+03	2.40E+00	
N2O	3.71E+02	2.23E+02	2.91E+02	8.85E+02	1.95E+00	
<u>Notes</u> 1 - Emission factors derived using El The BAAQMD-recommended fact 2 - All emission factors are for summ 50% relative humidity) except for	or of 0.69 grams o er (assuming an av	f PM10 per vehic verage daytime te	le mile traveled wa emperature of 80 de	s used. egrees Fahrenł		
55 degrees Fahrenheit and 60% r				·		
		dent of tomporati	ure and speed) as p	published bythe	Colifornia	

Redwood Landfill Mobile Emissions

On-Road Vehicle Emissions Sum	mary		rev. 3/22/05	DS & NMS
			rev. 6/9/06	DS
	(lbs/	day)	rev. 10/18/07	cls
Pollutant	2006	2010	Increment	CEQA Significance Thresholds
ROG	8	16	7	80
со	88	129	42	550
NOx	110	236	126	80
SO ₂	1	0	(1)	80
Total PM ₁₀	19	40	21	80
PM10 - Exhaust	4	9	5	
PM10 - Tire Wear	0	1	0	
PM10 - Break Wear	0	1	0	
PM10 - Entrained Road Dust	14	30	16	
CO ₂	18,120	47,348	29,228	

Additional CO2 Considerations

Increment

1S =

9.12E+06 pounds per year

4.14E+03 metric tonnes per year

Annual	CO2 e	miss	ions =
--------	-------	------	--------

Daily non CO2 ghg Emissions Increment 1.04E+00 2.40E+00 1.37E+00 CH4 pounds per day = 4.27E+02 pounds/year 8.85E-01 1.95E+00 1.07E+00 N2O pounds per day = 3.33E+02 pounds/year Global Warming Potential

Global Warming Potential					
CH4	25				
N20	298				
Incremental emissions as eCO2					
CH4		1.07E+04	pounds per year	=	4.84E+00 metric tonnes per year
N2O		9.92E+04	pounds per year	=	4.50E+01 metric tonnes per year

TOTAL ANNUAL GHG =

4.19E+03 metric tonnes of eCO2 per year

Table MD-4: Mitigated Off-Road Equipment Emissions Redwood LF 200238

rev. 3/21/05

Redwood	LF 200238							rev 10/25/	07	cls		
										Mitigate	ed	
					Typical	Existing	Operatio	ons (<mark>2006</mark>)	Project	t Operatio	ons (<mark>2010</mark>)	
				Hours/Week/	Operating	Total	Total	Total	Total	Total	Total	
Equipment	General	Number	Assumed	Piece	Load	Hours/	Hours/	hp-hours/	Hours/	Hours/	hp-hours/	
Model	Description	Used	hp-rating	of Equipment	Factor	<u>Week</u>	Day	Day	<u>Week</u>	Day	Day	Description of Use
Cat 826C	Compactor	2	380	49	0.55	98	16	3,414	107	18	3,725	Refuse Management
Cat D300	Dump Truck	3	240	29	0.65	87	15	2,262	95	16	2,469	Hauling dirt and daily cover
Cat D6H	Track-type tractor	1	165	24	0.55	24	4	363	26	4	396	Refuse Management
Cat D9	Track-type tractor	1	405	20	0.55	20	3	743	22	4	810	Moving soil/construction/cover
Komatsu D65	Track-type tractor	1	180	4	0.55	4	1	66	4	1	72	Moving soil/construction/cover
Komatsu D60	Track-type tractor	1	180	2	0.55	2	0	33	2	0	36	Moving soil/construction/cover
Cat 980	Rubber-tire loader	1	311	34	0.54	34	6	952	37	6	1,039	Loading dirt and materials
Cat 950	Rubber-tire loader	1	180	17	0.54	17	3	275	19	3	301	Loading materials/composting ops
Cat 966	Rubber-tire loader	1	235	18	0.54	18	3	381	20	3	415	Loading materials/composting ops
Komatsu W60	Rubber-tire loader	1	200	16	0.54	16	3	288	17	3	314	Loading dirt and materials
Terrex	Water truck 4k gal	1	180	10	0.65	10	2	195	11	2	213	Dust and fire control
Cat 14G	Motorgrader	1	180	23	0.61	23	4	421	25	4	459	Site and road maintenance, repair
Brown Bear	Rubber-tire tractor	1	180	0	0.59	-	-	-	-	-	-	Sludge processing/turning
Columbia	Truck tipper	2	180	NA	0.55	NA	-	NA	50	8	828	Trailer tipping (refuse & compost)
Frontier	Windrow turner	1	180	7	0.55	7	1	116	8	1	126	Composting operations
			Total:	253		360	60	9,507	443	74	11,204	

		Emissior	ns (lbs/day)	
	Emission Factor	Existing	M. Project	Net
Pollutant	(grams/hp-hour)	<u>(2001)</u>	(2005)	Increment
ROG	0.32	7	8	1
CO	0.92	19	23	3
NOx	5.47	115	135	20
PM10	0.13	2.82	3.32	0.50

Notes

- 1 -- Information on equipment type, use and usage rate on a weekly basis for existing conditions provided by project applicant. A tub grinder was not included on an update of the JTD Table 5-5 equipment list provided by the applicant (G. Roycroft, July 21, 2001), presumably as an oversight. The tub grinder is not included in this emissions inventory list because the applicant currently is permitted to operate the tub grinder up to 8 hours per day (peak); daily use is not expected to increase substantially beyond this under the project.
- 2 -- In the summer of 1997, RLI acquired and began using the waste tipper. For that reason, its use is not considered for the 1994 existing conditions scenario.
- 3 -- Off-road equipment use is assumed to increase proportionally with the overall increase in peak day material receipts from Table 2-1.

1994 Permit Conditions:	2,300 tons	
2005 Project Conditions:	2,510 tons	
	 1.1 Increase applied to equipment us 	se

- 4 -- Where feasible, hp-ratings for individual models of equipment were obtained from the applicable manufacturer's website. Professional judgement was used to estimate the remaining hp-ratings.
- 5 -- Based on composite uncontrolled emission factors for post-1987 model years for equipment with a hp-rating below 175 hp and Tier 1 emission rates for engines with a hp-rating greater than 175 hp. Emission factor data was obtained from the California Air Resources Board's Emission Inventory of Off-Road Large Compression-Ignited Engines (>25 hp) Using the New OFFROAD Emissions Model Mail Out#: MSC 99-32, January 27, 2000 (Tables 12 and 13). Load factors are taken from Appendix B. of this document.

6 -- Emission factors for NOx and PM10 have been adjusted using fuel correction factors (Table 15) to account for the use of California diesel fuel.

APPENDIX E

Greenhouse Gas Emissions Calculations

Appendix E-1 Redwood Landfill Estimated Greenhouse Gas Emissions from Waste Decomposition Current Permit Based on LandGEM Output and Reported Landfill Gas System Performance (2002-2006)

Prepared by D. Sicular, Oct. 24, 2007

Methane Generation and Fugitive Emissions Emission Offset for Electricity Production GWP of Cumulative Electricity Methane Net Euclitive Fugitive Total Eugitive GWP of Fugitive Fugitive Power Producti Generation LFG LFG Capture Methane Methane not Oxidvzed Methane From Methane Potential of Waste Methane From Methane - Flan Methane Emission Offset Net Emissions Accepted Vaste in Plac LFG Capture(1) Rate Captured Captured Landfill Flare/ Engines and Landfill Emissions Captured LFG(2) CO2 equivalent CO2 Equivalent Yea Generatio hrough Cove Emissions Avg ft3/min Mg/year Percent Short Tons Short Tons m3/year m3/yea Mg/year Mg/year Mg/year Mg/year Mg/year Mg/Year Mg/yr eCO2 Mg/yr eCO2 kWH/year Mg/yr eCO2 Mg/yr eCO2 92.80 1959 98,388 92.805 662.950 0% 221 22 199 199 4.976 4.976 4,976 1960 1961 103.97 191,193 1.339.786 0% 0% 447 677 402 402 10,056 15,031 10 056 45 609 609 15.236 109.554 295.164 2.029.964 68 15.236 30.267 1962 115,137 404.71 2,732,960 0% 912 91 820 820 20.512 50.779 20,512 0% 0% 1,035 1,254 1963 1964 120.719 519.854 3,448,273 1,150 115 139 1,035 25,881 76,660 25.881 126,302 640,574 4,175,419 1,393 1,254 31,338 107,998 31,338 1965 131,885 766,876 4,913,934 0% 0% 1,639 164 1,475 1,475 36,881 144,879 36,881 1966 137.468 898.761 5.663.373 1.889 189 1.700 1.700 42,506 187.385 42,506 1967 143,051 1,036,229 6,423,307 0% 2,143 214 1,928 1,928 48,210 235,595 48,210 0% 1968 148,634 1,179,280 7 193 324 2,400 240 266 2,160 2,160 53,989 289,584 53,989 1969 154,217 1,327,914 7,973,030 0% 2,660 2,394 2,394 59,841 349,425 59,841 1970 1971 2,923 3,189 2,631 2,870 159,800 1.482.13 8,762,044 0% 0% 292 319 2,631 65,763 415,188 65,763 165,382 1,641,930 71,752 71,752 9,560,001 2,870 486,939 1972 170,965 1,807,313 10,366,551 0% 0% 3,458 346 3,112 3,112 77,805 564,745 77.80 1973 176,548 1,978,278 11.181.356 3,730 373 3,357 3,357 83,921 648,665 83,921 1974 0% 4,004 400 3,604 3,604 182,131 2,154,826 12,004,094 90,096 738,761 90,096 4,281 4,561 1975 187.714 2.336.957 12.834.453 0% 0% 428 3,853 3.853 96.328 835.089 96.328 1976 193.297 2.524.67 13.672.134 456 4.105 4.105 102.615 937.704 102.615 1977 198.880 2,717,968 14,516,849 0% 0% 4,842 484 4,358 4,358 108,955 1,046,659 108,955 513 4.614 1978 204.463 2.916.848 15.368.325 5.126 4.614 115.346 1.162.005 115.346 0% 0% 0% 1979 4,871 210,045 3,121,310 16,226,294 5,413 541 4,871 121,785 1,283,790 121.785 1980 215 628 3 331 356 17 090 503 5 701 570 5,131 5,392 5 131 128 271 1 412 062 128 271 1981 599 221.211 3,546,984 17.960.707 5.991 5,392 134,803 1.546.864 134,803 1982 226,794 3 768 19 18 836 670 0% 0% 6,283 628 5,655 5 655 141 377 1.688.241 141 377 1983 232.377 3.994.989 19.718.168 6.577 658 5.920 5.920 147.993 1.836.234 147.993 1984 237.96 4,227,366 20.604.983 0% 6,873 687 6,186 6,186 154,649 1,990,883 154,649 0% 1985 243.543 4.465.326 21.496.906 7,171 717 6.454 6.454 161.343 2.152.227 161.343 7,470 747 1986 4.708.86 22.393.737 0% 168,074 2.320.30 168.07 249,12 6,723 6,723 1987 254 70 4 957 99 23 295 284 933 13 880 365 9 260 60% 4 630 3 141 314 2,827 46 2.873 71.820 2.392.122 71.820 Landfill Gas Collection System Installe 14.420.247 326 2,936 1988 260.291 5,212,702 24.201.362 969 9.620 60% 4.810 3.263 48 2.985 74.614 2 466 735 74.614 1989 265,87 5,472,99 25,111,794 1,005 14,962,722 9,982 60% 4,99 3,385 339 3,047 50 3,097 77,421 2,544,156 77,421 3,158 3,269 1990 271.457 5,738,867 26.026.407 1,042 15,507,690 10.346 60% 5,173 3,509 351 363 52 3,210 80,241 2,624,397 80,241 1991 277,040 6,010,324 26,945,039 1,079 16,055,051 10,711 60% 5,356 3,633 54 3,323 83,073 2,707,470 83,073 11,078 11,446 3,757 3,882 3,381 3,494 55 57 1992 282,623 6,287,364 27 867 532 1,116 16.604.714 60% 5,539 376 3,437 85,917 2 793 387 85,917 1993 6,569,987 28,793,735 60% 5,723 388 3,551 88,772 2,882,159 288,206 1,153 17,156,587 88,772 1994 293,788 6,858,192 29,723,502 1,190 17,710,583 11,816 60% 5,908 4,007 401 413 3,606 3,720 59 61 3,666 91,639 2,973,798 91,639 1995 12,187 3,781 299.008 7.151.981 30,656,693 1.227 18,266,620 60% 6.093 4.133 94,516 3.068.314 94,516 1996 7,450,989 18,823,071 12,558 6,279 4,259 426 3,833 3,896 97,395 402,57 31,590,579 1,265 60% 63 3,165,709 97,395 4,032 4,208 1997 1998 385,932 7,853,564 33,227,671 1,330 19,798,522 13,209 60% 6,604 4,480 448 66 4.098 102,442 3 268 152 102,442 34,681,682 1,388 20,664,887 13,787 6,893 4,676 468 69 4,277 106,925 3,375,077 423,114 8,239,495 60% 106,925 1999 449,263 8,662,609 36,344,292 1,455 21,655,544 14.447 60% 7,224 4,900 490 4,410 72 4,482 112,051 3,487,128 112.05 15.157 76 79 2000 444.320 9.111.872 38.128.501 1.526 22.718.655 60% 7.578 5.140 514 4.626 4.702 117.552 3.604.680 117.552 1,594 537 4,830 2001 450,899 9,556,192 39,807,444 23,719,043 15,824 60% 7,912 5,367 4,909 122,728 3,727,408 122,728 2002 443 540 10 007 090 41 467 548 1.302 19 378 102 12 928 60% 8 242 5 590 559 5,031 5,219 82 5 114 127 846 3 855 255 127 846 1,585 85 2003 452.810 10,450,630 43,009,991 23,595,731 15,742 60% 8,549 5,798 580 5,304 132,602 3,987,856 132,602 2004 2005 447.385 10.903.440 44.558.176 1.457 21.691.195 14,471 60% 8.856 6.007 601 5,406 5,582 89 91 5,495 5,674 137.375 4.125.231 137 375 423.617 11.350.825 46.006.900 2.009 29.901.713 19.949 60% 9.144 6.202 620 141.841 4.267.073 141.841 2006 441,270 11,774,441 47,229,032 2,623 39,037,539 26,044 60% 9,387 6,367 637 5,731 94 5,824 145.609 4,412,682 145.609 2007 434.46 12.215.71 48.529.354 1.943 28.915.945 19.291 60% 9.646 6.543 654 5.888 96 5.985 149.618 4.562.300 149.618 2008 670 434,467 49,730,088 1,991 29,631,39 19,769 60% 9.884 6,704 6,034 99 6,133 153,320 12,650,17 4,715,621 153,320 Projections start here 2000 434 46 13 084 64 50 883 742 30 318 79 20.227 60% 6.860 686 6,174 6,308 202 6 376 159 405 4 875 026 159,405 Assume gas-fired engines installed 2010 434,467 13,519,113 51,992,160 2,081 30,979,238 20,668 60% 10,334 7,009 701 207 6,515 162,878 5,037,904 162.878 5,204,118 5,373,537 2011 434 467 13 953 580 53.057.116 2,124 31.613.787 21,091 60% 10 546 7,153 715 729 6,438 211 6.649 166 214 166 214 2012 434.467 14.388.047 54.080.315 2.165 32.223.454 21.498 60% 10.749 7.291 6.562 215 6.777 169.419 169.419 2013 434,467 14,822,514 55,063,393 2,204 32,809,216 21,889 60% 10,944 7,423 742 6,681 219 6,900 172,499 5,546,036 172,499 56,007,925 56,915,420 7,018 2014 2015 434,467 15,256,98 2,242 33,372,009 22,264 60% 11.132 7.551 755 767 6,796 223 175,458 5 721 494 175,458 7,673 15,691,448 60% 434,467 2,279 33,912,736 22,625 11,312 6,906 226 178,301 5,899,795 178,301 2016 434,467 16,125,915 57,787,333 2,313 34,432,260 22,971 60% 11,486 7,791 779 7,012 230 7,241 181,032 6,080,828 181,032 Projected Closure 201 16,560,382 58 625 057 2.954 43,968,793 29.334 75% 14.667 4.889 489 4.400 293 4.693 117.335 6.198.162 117.335 2018 42,244,752 28,184 14,092 4,697 470 4,228 282 4,509 112,734 6,310,897 112,734 16,560,382 56,326,336 2,838 75% 4,062 3,902 2019 16,560,382 54,117,748 2,727 40,588,311 27.078 75% 13,539 4,513 451 271 4,333 108,314 6 419 210 108,314 2020 16,560,382 51,995,761 2,620 38,996,821 26,017 13,008 4,336 434 260 104,067 4,163 6,523,277 104,067 75% 2021 2022 16,560,382 49,956,978 2,517 37,467,734 24,997 75% 12,498 4.166 417 400 3,749 3,602 250 240 3,999 99,986 6 623 263 99,986 16,560,382 47,998,137 2,419 35,998,603 24,016 75% 12,008 4,003 3,843 96,066 6,719,329 96,066 2023 16,560,382 46,116,103 2,324 34,587,077 23,075 75% 11,537 3,846 385 3,461 231 3,692 92,299 6,811,628 92,299 3,695 3,547 2024 16,560,382 44.307.865 2.233 33,230,899 22.170 75% 11.085 369 3.325 222 88,680 6,900,307 88,680 2025 16,560,382 42,570,529 2.145 31,927,897 21,301 10.650 3,550 355 3,195 213 3,408 85,203 6,985,510 85,203 -75% 2026 16,560,382 40.901.314 2,061 30.675.986 20,465 75% 10.233 3,411 341 328 3,070 2,949 205 197 3,274 81.862 7.067.372 81.862 2027 16.560.382 39.297.551 1.980 29.473.163 19.663 75% 9.831 3.277 3.146 78.652 7.146.023 -78.652 2028 16,560,382 37,756,672 1,903 28,317,504 18,892 75% 9,446 3,149 315 2,834 189 3,023 75,568 7,221,591 75,568 2.723 2029 16.560.382 36.276.212 1.828 27.207.159 18.151 75% 9.076 3.025 303 182 2.904 72.605 7.294.196 -72.605 17,439 2,616 2030 16,560,382 34,853,801 1,756 26,140,351 75% 8,720 2,907 291 174 2,790 69,758 7,363,954 69,758 2031 16 560 382 33 487 164 1 687 25 115 373 16 756 75% 8 378 2 793 279 268 2,513 168 2 681 67 023 7 430 977 67 023 2,415 2032 16,560,382 32,174,113 1,621 24,130,585 16,099 75% 8.049 2.683 161 2,576 64,395 7,495,372 64.395 -2,320 2,229 2033 16.560.382 30,912,548 1,558 23,184,411 15,467 75% 7,734 2.578 258 155 2,475 61.870 7.557.241 61.870 2.477 2034 16.560.382 29,700,450 1.497 22.275.338 14.861 75% 7.430 248 149 2.378 59.444 7.616.685 59,444 2,142 2035 16,560,382 28,535,879 1,438 21,401,909 14,278 75% 7,139 2,380 238 143 2,285 57,113 7,673,798 57,113 2036 137 16.560.382 27.416.971 1.382 20.562.728 13.718 75% 6.859 2.286 229 2.195 54.874 7.728.672 54.874 13,180 75% 220 1,977 132 203 16,560,382 26.341.936 1.327 19,756,452 6,590 2,197 2,109 52,722 7.781.394 52,722 2038 16,560,382 25,309,054 1,275 18,981,791 12,664 75% 6,332 2,111 211 1,900 127 2,026 50,655 7,832,048 50,655 122 117 2039 75% 203 1.825 16,560,382 24.316.672 1.225 18,237,504 12.167 6.084 2.028 1.947 48,668 7.880.717 48.668 2040 1,177 11,690 5,845 1,948 195 1,754 1,870 16,560,382 23,363,202 17,522,401 75% 46,760 7,927,477 46,760

										Mathema	Net Freitige	Funition	Total Evolution	OWD of Eurithur	GWP of Cumulative	Revers Readouties	Electricity		
	Waste		LFG				LFG Capture	Methane	Methane not	Methane Oxidyzed	Net Fugitive Methane From	Fugitive Methane From	Methane - Flare	GWP of Fugitive Methane	Fugitive Methane	Power Production Potential of	Generation Emission Offset -	Net Emissions-	
Year	Accepted Short Tons	Waste in Place Short Tons	Generation m3/vear	Ava ft3/min	LFG Capture(1) m3/vear	Mg/year	Rate Percent	Captured Mg/year	Captured Mg/year	Through Cover Mg/year	Landfill Mg/year	Flare/ Engines Mg/year	and Landfill Mo/Year	Emissions Ma/vr eCO2	Emissions Mg/yr eCO2	Captured LFG(2) kWH/vear	CO2 equivalent Mg/yr eCO2	CO2 Equivalent Mg/yr eCO2	Notes
2041		16,560,382	22,447,117	1,131	16,835,338	11,232	75%	5,616	1,872	187	1,685	112	1,797	44,927	7,972,404		-	44,927	
2042 2043	1	16,560,382 16,560,382	21,566,953 20,721,301	1,087 1,044	16,175,215 15,540,976	10,791 10,368	75% 75%	5,396 5,184	1,799 1,728	180 173	1,619 1,555	108 104	1,727 1,659	43,165 41,473	8,015,569 8,057,041		-	43,165 41,473	
2044		16,560,382	19,908,807	1,003	14,931,605	9,962	75%	4,981	1,660	166	1,494	100	1,594	39,846	8,096,888		-	39,846	
2045 2046	1	16,560,382 16,560,382	19,128,172 18,378,145	964 926	14,346,129 13,783,609	9,571 9,196	75% 75%	4,785 4,598	1,595 1,533	160 153	1,436 1,379	96 92	1,531 1,471	38,284 36,783	8,135,172 8,171,955		-		End 30-yr Post-Closure Maint Period
2047 2048		16,560,382 16,560,382	17,657,528 16,965,166		:		0% 0%		5,890 5.659	589 566	5,301 5,093		5,301 5,093	132,527 127,331	8,304,482 8,431,812		-	132,527 127,331	
2049		16,560,382	16,299,953		-	-	0%	-	5,437	544	4,894	-	4,894	122,338	8,554,150		-	122,338	
2050 2051	1	16,560,382 16,560,382	15,660,822 15,046,753	1	-		0% 0%	-	5,224 5,019	522 502	4,702 4,517		4,702 4,517	117,541 112,932	8,671,691 8,784,624		-	117,541 112,932	
2052 2053		16,560,382 16,560,382	14,456,761 13,889,903				0% 0%	-	4,822 4,633	482 463	4,340 4,170		4,340 4,170	108,504 104,250	8,893,128 8,997,377		-	108,504 104,250	
2054	-	16,560,382	13,345,272	-		-	0%	-	4,452	445	4,006		4,006	100,162	9,097,539		-	100,162	
2055 2056	1	16,560,382 16,560,382	12,821,997 12,319,239	1		-	0% 0%		4,277 4,109	428 411	3,849 3,698		3,849 3,698	96,234 92,461	9,193,774 9,286,235			96,234 92,461	
2057		16,560,382	11,836,195		-		0%	-	3,948	395	3,553		3,553	88,836	9,375,070			88,836	
2058 2059	1	16,560,382 16,560,382	11,372,091 10,926,185		-	-	0% 0%	-	3,793 3,645	379 364	3,414 3,280	-	3,414 3,280	85,352 82,006	9,460,423 9,542,428			85,352 82,006	
2060 2061		16,560,382 16,560,382	10,497,763 10,086,140				0% 0%		3,502 3,364	350 336	3,152 3,028		3,152 3,028	78,790 75,701	9,621,218 9,696,919			78,790 75,701	
2062		16,560,382	9,690,657	-	-		0%	-	3,233	323	2,909	-	2,909	72,732	9,769,651			72,732	
2063 2064	1	16,560,382 16,560,382	9,310,681 8,945,604	1		-	0% 0%		3,106 2,984	311 298	2,795 2,686		2,795 2,686	69,881 67,141	9,839,532 9,906,673			69,881 67,141	
2065 2066	1	16,560,382 16,560,382	8,594,842 8,257,833		-	-	0% 0%		2,867 2,755	287 275	2,580 2,479	1	2,580 2,479	64,508 61,978	9,971,180 10,033,159			64,508 61,978	
2067		16,560,382	7,934,039				0%	-	2,647	265	2,382	-	2,382	59,548	10,092,707			59,548	
2068 2069	1	16,560,382 16,560,382	7,622,941 7.324.041	1	-		0% 0%		2,543 2,443	254 244	2,289 2,199		2,289 2,199	57,213 54,970	10,149,921 10,204,891			57,213 54,970	
2070	-	16,560,382	7,036,861		-		0%	-	2,347	235	2,113	-	2,113	52,815	10,257,705			52,815	
2071 2072	1	16,560,382 16,560,382	6,760,942 6,495,841	1	-	-	0% 0%	-	2,255 2,167	226 217	2,030 1,950		2,030 1,950	50,744 48,754	10,308,449 10,357,203			50,744 48,754	
2073 2074	1	16,560,382 16,560,382	6,241,136 5,996,417				0% 0%		2,082 2,000	208 200	1,874 1.800	-	1,874 1.800	46,842 45.006	10,404,045 10,449,051			46,842 45.006	
2075		16,560,382	5,761,295	-	-		0%		1,922	192	1,730	-	1,730	43,241	10,492,292			43,241	
2076 2077	1	16,560,382 16,560,382	5,535,391 5,318,345	1	-		0% 0%		1,846 1,774	185 177	1,662 1,597		1,662 1,597	41,545 39,916	10,533,837 10,573,754			41,545 39,916	
2078 2079	:	16,560,382 16,560,382	5,109,810	-	-	-	0%	-	1,705 1,638	170 164	1,534 1,474		1,534 1,474	38,351 36,847	10,612,105 10,648,952			38,351 36,847	
2079		16,560,382	4,909,451 4,716,949		-		0% 0%	-	1,636	164	1,474	-	1,474	35,403	10,684,355			35,403	
2081 2082	1	16,560,382 16,560,382	4,531,995 4,354,293	1		:	0% 0%		1,512 1,452	151 145	1,361 1,307	1	1,361 1,307	34,015 32,681	10,718,370 10,751,050			34,015 32.681	
2083		16,560,382	4,183,558	-	-	-	0%	-	1,396	140	1,256	-	1,256	31,399	10,782,450			31,399	
2084 2085	1	16,560,382 16,560,382	4,019,519 3,861,911	1		-	0% 0%	-	1,341 1,288	134 129	1,207 1,159		1,207 1,159	30,168 28,985	10,812,618 10,841,603			30,168 28,985	
2086	:	16,560,382 16,560,382	3,710,484 3,564,993	-		-	0%	:	1,238	124 119	1,114	-	1,114	27,849 26,757	10,869,452 10,896,209			27,849 26,757	
2088		16,560,382	3,425,208		-		0%		1,143	114	1,028		1,028	25,708	10,921,916			25,708	
2089 2090	1	16,560,382 16,560,382	3,290,904 3,161,865	1		-	0% 0%		1,098 1,055	110 105	988 949		988 949	24,700 23,731	10,946,616 10,970,347			24,700 23,731	
2091		16,560,382	3,037,887	-		-	0%		1,013	101	912	-	912	22,801	10,993,148			22,801	
2092 2093	1	16,560,382 16,560,382	2,918,770 2,804,323			-	0% 0%	-	974 935	97 94	876 842		876 842	21,907 21,048	11,015,054 11,036,102			21,907 21,048	
2094 2095	:	16,560,382 16,560,382	2,694,364 2,588,717	-			0% 0%	:	899 864	90 86	809 777		809 777	20,222 19,429	11,056,324 11,075,754			20,222 19,429	
2096	-	16,560,382	2,487,211	1		-	0%	-	830	83	747	-	747	18,668	11,094,421			18,668	
2097 2098	1	16,560,382 16,560,382	2,389,687 2,295,986	1		-	0% 0%		797 766	80 77	717 689		717 689	17,936 17,232	11,112,357 11,129,589			17,936 17,232	
TOTAL	16.560.382				1.507.363.825	1.005.635	51%	502.429	485,199	48.520	436.679	8.504	445.184						†
		8 through 2098	2,960,745,170 1,924,392,558		1,507,363,825	1,005,635 715,783	51% 56%	502,429 357,892	485,199 284,036	48,520 28,404		8,504 7,059	445,184 262,692	11,129,589 6,567,289		-	-	11,129,589 6,567,289	

Appendix E-2 Redwood Landfill Estimated Greenhouse Gas Emissions from Waste Decomposition Current Permit Based on LandGEM Output and Reported Landfill Gas System Performance (2002-2006)

Prepared by D. Sicular, Oct. 24, 2007

Methane	Generation a	nd Fugitive Emis	sions												r	Emission Offset fo	r Electricity Produc	tion	1		1
Year	Waste Accepted	Waste in Place	LFG Generation		LFG Capture(1)		LFG Capture Rate	Methane Captured	Methane not Captured	Methane Oxidyzed Through Cover	Net Fugitive Methane From Landfill	Fugitive Methane From Flare/ Engines	Total Fugitive Methane - Flare and Landfill	GWP of Fugitive Methane Emissions	GWP of Cumulative Fugitive Methane Emissions	Power Production Potential of Captured LFG(2)	Potential Power Production Rate	Original Proposal Annual Power Production (4 mW capacity)	Electricity Generation Emission Offset - CO2 equivalent (assumes maximum power production)	Net Emissions- CO2 Equivalent	Notes
	Short Tons	Short Tons	m3/year	Avg ft3/min	m3/year	Mg/year	Percent	Mg/year	Mg/year	Mg/year	Mg/year	Mg/year	Mg/Year	Mg/yr eCO2	Mg/yr eCO2	kWH/year	mW	kWH/year	Mg/yr eCO2	Mg/yr eCO2	
1958 1959	92,805 98,388	- 92,805	- 662,950				0% 0%		- 221	- 22	- 199	•	- 199	4,976	4,976					4,976	
1960 1961	103,971 109,554	191,193 295,164 404,718	1,339,786 2,029,964				0% 0%	-	447 677	45 68	609		402 609	10,056 15,236	15,031 30,267					10,056 15,236	
1962 1963 1964	115,137 120,719 126,302	404,718 519,854 640,574	2,732,960 3,448,273 4,175,419				0% 0% 0%	-	912 1,150 1,393	91 115 139	820 1,035 1,254	-	820 1,035 1,254	20,512 25,881 31,338	50,779 76,660 107,998					20,512 25,881 31,338	
1964 1965 1966	126,302 131,885 137,468	640,574 766,876 898,761	4,175,419 4,913,934 5,663,373				0% 0% 0%	-	1,393 1,639 1,889	139 164 189	1,254 1,475 1,700	-	1,254 1,475 1,700	31,338 36,881 42,506	107,998 144,879 187,385					31,338 36,881 42,506	
1966 1967 1968	143,051 148,634	1,036,229 1,179,280	6,423,307 7,193,324				0% 0%	-	2,143 2,400	214 240	1,700 1,928 2,160		1,928 2,160	42,506 48,210 53,989	235,595 289,584					42,506 48,210 53,989	
1969	154,217	1,327,914	7,973,030 8,762,044				0% 0%	-	2,400 2,660 2,923	240 266 292	2,394 2,631		2,394 2,631	59,841 65,763	349,425 415,188					59,841 65,763	
1971	165,382 170,965	1,641,930	9,560,001 10,366,551				0% 0%	-	3,189 3,458	319 346	2,870		2,870 3,112	71,752	486,939 564,745					71,752 77,805	
1973 1974	176,548 182,131	1,978,278 2,154,826	11,181,356 12,004,094				0% 0%		3,730 4,004	373 400	3,357 3,604	:	3,357 3,604	83,921 90,096	648,665 738,761					83,921 90,096	
1975 1976	187,714 193,297	2,336,957 2,524,671	12,834,453 13,672,134				0% 0%	:	4,281 4,561	428 456	3,853 4,105	:	3,853 4,105	96,328 102,615	835,089 937,704					96,328 102,615	
1977 1978	198,880 204,463	2,717,968 2,916,848	14,516,849 15,368,325				0% 0%	-	4,842 5,126	484 513	4,358 4,614	:	4,358 4,614	108,955 115,346	1,046,659 1,162,005					108,955 115,346	
1979 1980	210,045 215,628	3,121,310 3,331,356	16,226,294 17,090,503				0% 0%	-	5,413 5,701	541 570	4,871 5,131	-	4,871 5,131	121,785 128,271	1,283,790 1,412,062					121,785 128,271	
1981 1982	221,211 226,794	3,546,984 3,768,195	17,960,707 18,836,670				0% 0%	:	5,991 6,283	599 628	5,392 5,655		5,392 5,655	134,803 141,377	1,546,864 1,688,241					134,803 141,377	
1983 1984	232,377 237,960	3,994,989 4,227,366	19,718,168 20,604,983				0% 0%	-	6,577 6,873	658 687	5,920 6,186	-	5,920 6,186	147,993 154,649	1,836,234 1,990,883					147,993 154,649	
1985 1986	243,543 249,125	4,465,326 4,708,868	21,496,906 22,393,737				0% 0%	-	7,171 7,470	717 747	6,454 6,723		6,454 6,723	161,343 168,074	2,152,227 2,320,301					161,343 168,074	
1987 1988	254,708 260,291	4,957,994 5,212,702	23,295,284 24,201,362	933 969	13,880,365 14,420,247	9,260 9,620	60% 60%	4,630 4,810	3,141 3,263	314 326	2,827 2,936	46 48	2,873 2,985	71,820 74,614	2,392,122 2,466,735					71,820 74,614	Landfill gas collection system installed
1989 1990	265,874 271,457	5,472,993 5,738,867 6,010,324	25,111,794 26,026,407 26,945,039	1,005 1,042	14,962,722 15,507,690 16,055,051	9,982 10,346	60% 60%	4,991 5,173	3,385 3,509	339 351 363	3,047 3,158	50 52 54	3,097 3,210	77,421 80,241 83,073	2,544,156 2,624,397 2,707,470					77,421 80,241 83,073	
1991 1992 1993	277,040 282,623 288,206	6,010,324 6,287,364 6,569,987	26,945,039 27,867,532 28,793,735	1,079 1,116	16,055,051 16,604,714 17,156,587	10,711 11,078 11,446	60% 60%	5,356 5,539	3,633 3,757 3,882	363 376 388	3,269 3,381 3,494	54 55 57	3,323 3,437	83,073 85,917 88,772	2,707,470 2,793,387 2,882,159					83,073 85,917 88,772	
1993 1994 1995	288,206 293,788 299,008	6,858,192 7,151,981	28,793,735 29,723,502 30,656,693	1,153 1,190 1,227	17,156,587 17,710,583 18,266,620	11,446 11,816 12,187	60% 60% 60%	5,723 5,908 6,093	3,882 4,007 4,133	388 401 413	3,494 3,606 3,720	57 59 61	3,551 3,666 3,781	88,772 91,639 94,516	2,882,159 2,973,798 3,068,314					88,772 91,639 94,516	
1995	402,575	7,450,989	31,590,579	1,265	18,823,071	12,558	60% 60%	6,279 6,604	4,133 4,259 4,480	413 426 448	3,833	63	3,896	97,395 102,442	3,165,709					94,516 97,395 102,442	
1998	423,114 449,263	8,239,495	34,681,682	1,388	20,664,887	13,787	60% 60%	6,893 7,224	4,676	468	4,002	69 72	4,030	106,925	3,375,077					106,925	
2000	444,320	9,111,872	38,128,501	1,526	22,718,655	15,157	60% 60%	7,578	5,140 5,367	514 537	4,626	76	4,702	117,552	3,604,680					117,552	
2002	443,540	10,007,090	41,467,548	1,302	19,378,102	12,928	60%	8,242	5,590	559	5,031	82 85	5,114	127,846	3,855,255					127,846	
2004	447,385 423.617	10,903,440 11,350.825	44,558,176 46,006,900	1,457	21,691,195 29,901,713	14,471 19,949	60% 60%	8,856 9,144	6,007 6,202	601 620	5,406	89 91	5,495 5,674	137,375 141,841	4,125,231 4,267,073					137,375 141.841	
2006	441,270 475,519	11,774,441	47,229,032 48,529,354	2,623	39,037,539 28,915,945	26,044 19,291	60% 60%	9,387 9,646	6,367 6,543	637 654	5,731 5,888	94 96	5,824 5,985	145,609 149,618	4,412,682 4,562,300					145,609 149,618	
2008 2009	475,519 475,519	12,691,231 13,166,750	50,023,342 51,458,750	2,003 2,060	29,806,129 30,661,409	19,885 20,456	60% 60%	9,943 10,228	6,744 6,937	674 694	6,070 6,244	99 205	6,169 6,448	154,224 161,207	4,716,525 4,877,731	95,676,964	10.9	35,040,000	34,971		Projections start here Assume gas-fired engines installed
2010 2011	475,519 475,519	13,642,269 14,117,788	52,837,875 54,162,923	2,115 2,168	31,483,153 32,272,676	21,004 21,531	60% 60%	10,502 10,765	7,123 7,302	712 730	6,411 6,572	210 215	6,621 6,787	165,527 169,678	5,043,259 5,212,937	98,241,163 100,704,818	11.2 11.5	35,040,000 35,040,000	35,908 36,809	129,619 132,870	
2012 2013	475,519 475,519	14,593,307 15,068,826	55,436,016 56,659,190	2,219 2,268	33,031,241 33,760,062	22,037 22,523	60% 60%	11,018 11,261	7,474 7,639	747 764	6,726 6,875	220 225	6,947 7,100	173,666 177,498	5,386,603 5,564,101	103,071,872 105,346,113	11.8 12.0	35,040,000 35,040,000	37,674 38,505	135,993 138,993	
2014 2015	475,519 475,519	15,544,345 16,019,864	57,834,403 58,963,535	2,315 2,361	34,460,306 35,133,093	22,990 23,439	60% 60%	11,495 11,719	7,797 7,949	780 795	7,017 7,154	230 234	7,247 7,389	181,180 184,717	5,745,281 5,929,999	107,531,179 109,630,568	12.3 12.5	35,040,000 35,040,000		141,876 144,646	
2016 2017	475,519 475,519	16,495,383 16,970,902	60,048,393 61,090,713	2,404 2,446	35,779,500 36,400,561	23,870 24,285	60% 60%	11,935 12,142	8,095 8,236	810 824	7,286 7,412	239 243	7,525 7,655	188,116 191,381	6,118,114 6,309,495	111,647,638 113,585,618	12.7 13.0	35,040,000 35,040,000		147,307 149,864	
2018 2019	475,519 475,519	17,446,421 17,921,940	62,092,163 63,054,346	2,486 2,524	36,997,269 37,570,580	24,683 25,065	60% 60%	12,341 12,533	8,371 8,501	837 850	7,534 7,651	247 251	7,781 7,901	194,518 197,533	6,504,014 6,701,546	115,447,609 117,236,590	13.2 13.4	35,040,000 35,040,000	42,197 42,851	152,321 154,682	
2020 2021	475,519 475,519	18,397,459 18,872,978	63,978,801 64,867,008	2,561 2,597	38,121,412 38,650,645	25,433 25,786	60% 60%	12,716 12,893	8,625 8,745	863 875	7,763 7,871	254 258	8,017 8,128	200,429 203,211	6,901,975 7,105,186	118,955,424 120,606,862	13.6 13.8	35,040,000 35,040,000	43,479 44,083	156,949 159,128	
2022 2023 2024	475,519 475,519 475,519	19,348,497 19,824,016 20,299,535	65,720,387 66,540,305 67,328,074	2,631 2,664 2,695	39,159,126 39,647,670 40,117,057	26,125 26,451 26,764	60% 60% 60%	13,062 13,225 13,382	8,860 8,971 9,077	886 897 908	7,974 8,074 8,169	261 265 268	8,235 8,338 8,437	205,885 208,453 210.921	7,311,071 7,519,524 7,730,445	122,193,546 123,718,015 125,182,709	13.9 14.1 14.3	35,040,000 35,040,000 35,040,000	44,663 45,220 45,756	161,222 163,233 165,166	
2024 2025 2026	4/5,519	20,299,535 20,775,054 20,775,054	67,328,074 68,084,954 65,415,305	2,695 3,431 3,296	40,117,057 51,063,715 49,061,478	26,764 34,067 32,731	75%	13,382 17,034 16,366	9,077 5,678 5,455	908 568 546	8,169 5,110 4,910	268 341 327	8,437 5,451 5,237	210,921 136,268 130,925	7,730,445 7,866,714 7,997,639	125,182,709 159,341,054 153,093,202	14.3 18.2 17.5	35,040,000 35,040,000 35,040,000	45,756 58,241 55,957	165,166 78,028 74,968	
2026 2027 2028		20,775,054 20,775,054 20,775,054	62,850,334 60,385.937	3,296 3,167 3.043	49,061,478 47,137,750 45,289,453	32,731 31,448 30,215	75% 75% 75%	16,366 15,724 15.107	5,455 5,241 5.036	546 524 504	4,910 4,717 4,532	327 314 302	5,237 5,032 4,834	130,925 125,791 120,859	7,997,639 8,123,430 8,244,289	153,093,202 147,090,331 141,322,837	17.5 16.8 16.1	35,040,000 35,040,000 35,040,000		74,968 72,029 69,204	
2028 2029 2030	-	20,775,054 20,775,054 20,775,054	58,018,170 55,743,245	2,924 2,809	45,289,453 43,513,628 41,807,434	30,215 29,030 27,892	75% 75% 75%	15,107 14,515 13,946	5,036 4,838 4,649	504 484 465	4,532 4,355 4,184	302 290 279	4,834 4,645 4,463	120,859 116,120 111,567	8,244,289 8,360,410 8,471,977	141,322,837 135,781,489 130,457,421	16.1 15.5 14.9	35,040,000 35,040,000 35,040,000	51,655 49,629 47,683	69,204 66,491 63,884	
2030 2031 2032	-	20,775,054 20,775,054 20,775,054	55,743,245 53,557,522 51,457,501	2,809 2,699 2,593	41,807,434 40,168,141 38,593,126	27,892 26,798 25,747	75% 75% 75%	13,946 13,399 12,874	4,649 4,466 4,291	465 447 429	4,184 4,020 3.862	279 268 257	4,463 4,288 4,120	111,567 107,192 102,989	8,471,977 8,579,169 8,682,158	130,457,421 125,342,112 120,427,378	14.9 14.3 13.7	35,040,000 35,040,000 35,040,000	47,683 45,814 44,017	63,884 61,379 58,972	
2032 2033 2034	-	20,775,054 20,775,054 20,775,054	49,439,824 47,501,260	2,593 2,491 2,394	38,593,126 37,079,868 35,625,945	25,747 24,738 23,768	75% 75% 75%	12,874 12,369 11.884	4,291 4,123 3.961	429 412 396	3,862 3,711 3,565	257 247 238	4,120 3,958 3,803	98,951 95.071	8,682,158 8,781,110 8,876,181	115,705,353 111,168,481	13.7 13.2 12.7	35,040,000 35,040,000 35,040,000	44,017 42,291 40.633	56,660 54,438	
2034 2035 2036	-	20,775,054 20,775,054 20,775,054	47,501,260 45,638,709 43,849,190	2,394 2,300 2,210	35,625,945 34,229,032 32,886,892	23,768 22,836 21,940	75% 75% 75%	11,884 11,418 10,970	3,961 3,806 3,657	396 381 366	3,565 3,425 3,291	238 228 219	3,654 3,510	95,071 91,343 87,762	8,967,524 9,055,286	106,809,502	12.7 12.2 11.7	35,040,000 35,040,000 35,040,000	40,633 39,040 37,509	54,438 52,303 50,253	
2036 2037 2038	-	20,775,054 20,775,054 20,775,054	43,849,190 42,129,839 40,477,904	2,210 2,123 2,040	32,886,892 31,597,379 30,358,428	21,940 21,080 20,254	75% 75% 75%	10,970 10,540 10,127	3,513 3,376	366 351 338	3,291 3,162 3,038	219 211 203	3,373 3,241	87,762 84,321 81,014	9,055,286 9,139,606 9,220,621	98,597,598 94,731,531	11.7 11.3 10.8	35,040,000 35,040,000 35,040,000	36,038 34,625	50,253 48,282 46,389	
2039 2040	-	20,775,054 20,775,054 20,775,054	38,890,743 37,365,815	1,960	29,168,057 28,024,361	19,459 18,696	75% 75%	9,730 9,348	3,243 3,116	324 312	2,919	203 195 187	3,114 2,991	77,838	9,220,021 9,298,458 9,373,244	91,017,054 87,448,224	10.4	35,040,000 35,040,000 35.040,000	33,268 31,963	40,309 44,570 42,822	
2040 2041 2042	-	20,775,054 20,775,054	35,900,680 34,492,994	1,809	26,925,510 25,869,746	17,963	75% 75%	8,982 8,629	2,994	299 288	2,694 2,589	180 173	2,874	71,853	9,445,097 9,514,133	84,019,330 80,724,885	9.6	35,040,000 35,040,000	30,710 29,506	41,143 39,530	
2042 2043 2044	-	20,775,054 20,775,054 20,775,054	33,140,505 31,841,047	1,670	24,855,379 23,880,785	16,582 15,932	75% 75%	8,291 7,966	2,764	200 276 266	2,487	166 159	2,653	66,329 63,728	9,580,462 9,644,190	77,559,617	8.9 8.5	35,040,000 35,040,000	28,349	37,980 36,491	
1 -044	ļ			.,000		10,002	. 576	1,000	2,000	200	2,000	133	2,010	00,720	-,, 100	. ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	5.5	11,010,000	21,201	00,-01	

Metha	e Generati	n and Fugitive Emis	sions													Emission Offset for	or Electricity Producti	on			
Year	Waste Accepte	Waste in Place	LFG Generation		LFG Capture(1)		LFG Capture Rate	Methane Captured	Methane not Captured	Methane Oxidyzed Through Cover	Net Fugitive Methane From Landfill	Fugitive Methane From Flare/ Engines	Total Fugitive Methane - Flare and Landfill	GWP of Fugitive Methane Emissions	GWP of Cumulative Fugitive Methane Emissions	Power Production Potential of Captured LFG(2)	Potential Power Production Rate	Original Proposal Annual Power Production (4 mW capacity)	(assumes	Net Emissions- CO2 Equivalent	Notes
	Short Tor	s Short Tons	m3/year	Avg ft3/min	m3/year	Mg/year	Percent	Mg/year	Mg/year	Mg/year	Mg/year	Mg/year	Mg/Year	Mg/yr eCO2	Mg/yr eCO2	kWH/year	mW	kWH/year	Mg/yr eCO2	Mg/yr eCO2	
2045 2046		20,775,054	30,592,542		22,944,406	15,307	75%	7,654	2,551	255	2,296	153	2,449	61,229	9,705,419	71,596,551	8.2	35,040,000	26,169	35,060	
2046	-	20,775,054 20,775,054	29,392,991 28,240,475		22,044,743 21,180,357	14,707 14,130	75% 75%	7,354 7,065	2,451 2,355	245 236	2,206 2,120	147 141	2,353 2,261	58,828 56,522	9,764,248 9,820,770	68,789,210 66,091,946	7.9 7.5	35,040,000 35,040,000	25,143 24,157	33,685 32,365	
2048	-		27,133,150		20,349,863	13,576	75%	6,788	2,263	226	2,036	136	2,172	54,306	9,875,075	63,500,444	7.2	35,040,000	23,210	31,095	
2049 2050			26,069,244 25,047,055		19,551,933 18,785,291	13,044 12,533	75% 75%	6,522 6,266	2,174 2,089	217 209	1,957 1,880	130 125	2,087 2,005	52,176 50,130	9,927,251 9,977,382	61,010,556 58,618,298	7.0 6.7	35,040,000 35,040,000	22,300 21,426	29,876 28,705	
2051		20,775,054	24,064,946	5 1,213	18,048,709	12,041	75%	6,021	2,007	201	1,806	120	1,927	48,165	10,025,546	56,319,841	6.4	35,040,000	20,585	27,579	
2052	-	20,775,054	23,121,346		17,341,009	11,569	75% 75%	5,785 5,558	1,928	193 185	1,735 1.667	116 111	1,851 1,778	46,276	10,071,822	54,111,509 51,989,766	6.2	35,040,000 35.040.000	19,778	26,498	
2053		20,775,054 20,775,054	22,214,745 21,343,692		16,661,059 16,007,769	11,115 10,680	75% 75%	5,558	1,853 1,780	185	1,667	111	1,778	44,462 42,718	10,116,284 10,159,002	51,989,766 49,951,218	5.9 5.7	35,040,000	19,003 18,258	25,459 24,461	End 30-yr Post-Closure Maint Period
2055	-	20,775,054	20,506,794	1,033	15,380,095	10,261	75%	5,130	1,710	171	1,539	51	1,590	39,761	10,198,763	47,992,603	5.5		17,542	22,219	
2056		20,775,054 20,775,054	19,702,711 18,930,157	993 954	14,777,033 14,197,618	9,858 9,472	75% 75%	4,929 4,736	1,643 1,579	164 158	1,479 1,421	49 47	1,528 1,468	38,202 36,704	10,236,964 10,273,668	46,110,786 44,302,756	5.3 5.1		16,854 16,193	21,348 20,511	
2058		20,775,054	18,187,895	5 917	13,640,921	9,101	75%	4,550	1,517	152	1,365	46	1,411	35,265	10,308,933	42,565,620	4.9		15,558	19,706	
2059	-		17,474,737 16,789,543		13,106,053	8,744 8,401	75% 75%	4,372 4,200	1,457 1,400	146 140	1,312 1,260	44 42	1,355	33,882	10,342,814 10,375,368	40,896,599	4.7 4.5		14,948 14,362	18,934 18,191	
2060	-	., .,	16,789,543		12,592,157 12,098,412	8,401 8,071	75% 75%	4,200	1,400	140	1,260	42 40	1,302 1,251	32,553 31,277	10,375,368 10,406,644	39,293,020 37,752,319	4.5		14,362	18,191 17,478	
2062		20,775,054	15,498,701	781	11,624,026	7,755	75%	3,877	1,292	129	1,163	39	1,202	30,050	10,436,695	36,272,029	4.1		13,258	16,793	
2063	-		14,890,989 14,307,105		11,168,242 10,730,329	7,451 7,159	75% 75%	3,725 3,579	1,242 1,193	124 119	1,118 1.074	37 36	1,155 1,110	28,872 27,740	10,465,567 10,493,307	34,849,783 33,483,303	4.0 3.8		12,738 12,238	16,134 15,502	
2064			13,746,115		10,309,586	6,878	75%	3,579	1,193	115	1,074	36	1,066	26,652	10,493,307	32,170,404	3.8		12,238	15,502	
2066	-		13,207,122		9,905,342	6,608	75%	3,304	1,101	110	991	33	1,024	25,607	10,545,567	30,908,984	3.5		11,298	14,310	
2067			12,689,264 12,191,710		9,516,948 9,143,783	6,349 6,100	75% 75%	3,175 3.050	1,058 1,017	106 102	952 915	32 31	984 946	24,603 23,639	10,570,170 10,593,808	29,697,026 28,532,589	3.4 3.3		10,855 10,429	13,749 13,210	
2069			11,713,667		8,785,250	5,861	75%	2,931	977	98	879	29	908	22,712	10,616,520	27,413,810	3.1		10,020	12,692	
2070	-	20,775,054	11,254,367		8,440,775	5,631	75%	2,816	939	94	845	28	873	21,821	10,638,341	26,338,899	3.0		9,627	12,194	
2071		20,775,054 20,775,054	10,813,077 10,389,090	545 524	8,109,808 7,791,818	5,410 5,198	75% 75%	2,705 2,599	902 866	90 87	812 780	27 26	839 806	20,965 20,143	10,659,307 10,679,450	25,306,136 24,313,868	2.9 2.8		9,250 8.887	11,716 11,256	
2073	-	20,775,054	9,981,728		7,486,296	4,994	75%	2,497	832	83	749	25	774	19,354	10,698,804	23,360,508	2.7		8,538	10,815	
2074			9,590,339 9,214,296		7,192,754 6,910,722	4,799 4,610	75% 75%	2,399 2,305	800 768	80 77	720 692	24 23	744 715	18,595 17,866	10,717,398 10,735,264	22,444,529 21,564,467	2.6 2.5		8,204 7,882	10,391 9,984	
2076			8,852,999		6,639,749	4,430	75%	2,215	738	74	664	23	687	17,165	10,752,429	20,718,912	2.3		7,573	9,592	
2077	-		8,505,868		6,379,401	4,256	75%	2,128	709	71	638	21	660	16,492	10,768,921	19,906,512	2.3		7,276	9,216	
2078	-		8,172,348 7,851,906		6,129,261 5,888,929	4,089 3,929	75% 75%	2,045 1,964	682 655	68 65	613 589	20 20	634 609	15,845 15,224	10,784,766 10,799,990	19,125,966 18,376,026	2.2 2.1		6,991 6,717	8,855 8,507	
2080	-	20,775,054	7,544,028	380	5,658,021	3,775	75%	1,887	629	63	566	19	585	14,627	10,814,618	17,655,492	2.0		6,453	8,174	
2081 2082	-		7,248,222 6,964,015		5,436,167 5,223,012	3,627 3,485	75% 75%	1,813 1,742	604 581	60 58	544 523	18 17	562 540	14,054 13,503	10,828,671 10,842,174	16,963,210 16,298,073	1.9 1.9		6,200 5,957	7,853 7,545	
2082			6,690,953		5,018,214	3,485	75%	1,742	558	56	523	17	540	12,973	10,842,174	15,659,017	1.9		5,957	7,545	
2084	-	20,775,054	6,428,597	324	4,821,447	3,217	75%	1,608	536	54	482	16	499	12,464	10,867,611	15,045,018	1.7		5,499	6,965	
2085		20,775,054 20,775,054	6,176,528 5,934,343		4,632,396 4,450,757	3,090 2,969	75% 75%	1,545 1,485	515 495	52 49	464 445	15 15	479 460	11,976 11,506	10,879,587 10,891,093	14,455,094 13,888,302	1.7 1.6		5,283 5,076	6,692 6,430	
2087		20,775,054	5,701,654	287	4,276,240	2,853	75%	1,426	475	48	428	14	442	11,055	10,902,148	13,343,734	1.5		4,877	6,178	
2088		20,775,054	5,478,089		4,108,566 3,947,467	2,741	75%	1,371 1,317	457 439	46 44	411 395	14 13	425	10,621	10,912,769	12,820,519	1.5 1.4		4,686	5,935 5,703	
2089			5,263,290 5,056,913	265	3,947,467 3,792,685	2,634 2,530	75% 75%	1,317	439	44 42	395	13	408 392	10,205 9,805	10,922,974 10,932,779	12,317,819 11,834,830	1.4		4,502 4,326	5,703	
2091	-	20,775,054	4,858,629	245	3,643,972	2,431	75%	1,216	405	41	365	12	377	9,420	10,942,200	11,370,780	1.3		4,156	5,264	
2092	-	., .,	4,668,119 4,485,080		3,501,089 3,363,810	2,336 2,244	75% 75%	1,168 1,122	389 374	39 37	350 337	12	362 348	9,051 8,696	10,951,251 10,959,947	10,924,925 10,496,553	1.2 1.2		3,993 3,837	5,058 4,860	
2094			4,485,080		3,231,913	2,244 2,156	75%	1,122	374 359	36	323	11	348	8,355	10,959,947	10,496,553	1.2		3,686	4,860 4,669	
2095	-	20,775,054	4,140,250	209	3,105,188	2,072	75%	1,036	345	35	311	10	321	8,028	10,976,329	9,689,539	1.1		3,542	4,486	
2096		20,775,054 20,775,054	3,977,909 3,821,933		2,983,432 2,866,450	1,990 1,912	75% 75%	995 956	332 319	33 32	299 287	10	309 296	7,713 7,410	10,984,042 10,991,452	9,309,607 8,944,572	1.1 1.0		3,403 3,269	4,310 4,141	
2097	-	20,775,054	3,672,073		2,754,054	1,812	75%	919	306	31	276	9	290	7,120	10,991,452	8,593,851	1.0		3,209	3,979	
τοται	20,775.0	54	3,694,864,081		2.272.327.848	1.515.980	61%	757.601	474,910	47 491	427,419	12.524	439.943	10.998.572		5.641.926.696		1.611.840.000	2.062.179	8,936,393	
		2008 through 2098			1,837,863,324	1,226,128		613,064	273,747	27,375	246,372	11,079	257,451	6,436,272		5,641,926,696		1,611,840,000			<u> </u>
				•																	

Appendix E-3

Landfill Gas Monitoring Results From Redwood Landfill Rule 8-34 and Title V Semi-Annual and Annual Reports to the BAAQMD, 2002-2006 Prepared by Dan Sicular, ESA Nov 15, 2007

		Flow Rate - Corrected to 50%	A-51 Flare: Average Flow Rate - Corrected to 50% Methane or 500 Btu (scfm)		Annual LFG Capture (scf)_	Annual Methane Capture (scf)	Annual Methane Capture (m3)	Annual Methane Capture (Mg)	Revised/uncorrected		Average Flow Corrected to			Average Flow Corrected
Month Ye	/ear								Flow - A- 50 Flare	Average CH4 (%)	50% Methane		Average CH4 (%)	to 50% Methane
July	2002	1,548		1,548										
August	2002	1,459		1,459										
September October	2002 2002	1,331 1,176		1,331 1,176										
November	2002	1,178		1,178										
December	2002	1,145		1,145										
2002 Annual Average			data	1,302	684.331.200	342,165,600	9,689,051	6,464.03						
	-(.,		,,	-,,	-,						
January	2003	1,271		1,271										
February	2003	1,302		1,302										
March	2003	1,670		1,670										
April	2003	1,774		1,774										
May	2003	1,703		1,703										
June	2003 2003	1,665 1,600		1,665 1,600										
July August	2003	1,810		1,816										
September	2003	1,608		1,608										
October	2003	1,578		1,578										
November	2003	1,462		1,462					1.411	51.8%	1,462			
December	2003	1,576		1,576					1,521	51.8%				
2003 Annual Average	e	1,585		1,585	833,275,378	416,637,689	11,797,866	7,870.93						
January	2004	1,708		1,708					1,649	51.8%	1,708			
February	2004	1,576		1,576					1,521	51.8%				
March	2004	1,430		1,430					1,380	51.8%	1,430			
April	2004	1,563		1,563					1,509	51.8%	1,563			
May	2004	1,545		1,545					1,491	51.8%				
June	2004	1,645		1,645					1,588	51.8%				
July	2004	1,464		1,464					1,461	50.1%				
August	2004	1,405		1,405					1,402	50.1%				
September	2004	1,383		1,383					1,380	50.1%				
October November	2004 2004	1,272 1,269		1,272 1,269					1,269 1,266	50.1% 50.1%				
December	2004	1,203		1,209					1,228	50.1%				
2004 Annual Average		1,200		1,457	766,017,324	383,008,662	10,845,598	7,235.62	1,220	50.170	1,200			
1	2005	1,315		4.045					1,312	50.1%	1,315			
January February	2005	1,315		1,315 1,385					1,312	50.1%				
March	2005	1,303		1,401					1,398	50.1%				
April	2005	1,518		1,518					1,515	50.1%				
May	2005	1,510		1,510					1,507	50.1%				
June	2005	1,492	2,342	3,834					1,486	50.2%	1,492	2,337	50.1%	2,342
July	2005		2,458	2,458								2,473	49.7%	2,458
August	2005		2,339	2,339								2,483	47.1%	
September	2005		1,837	1,837								1,950	47.1%	1,837
October	2005		1,911	1,911								2,029	47.1%	1,911
November	2005 2005		2,375 2,227	2,375 2,227								2,521.00 2,364.00	47.1% 47.1%	2,375 2,227
December 2005 Annual Average			2,227	2,227	1,055,969,032	527,984,516	14,950,857	9,974.44				2,364.00	47.1%	2,221
January	2006		2,094	2,094								2,223.00	47.1%	2,094
February	2006		2,034	2,034								2,220.00	47.1%	
March	2006		2,170	2,170								2,304.10	47.1%	
April	2006		2,216	2,216								2,352.90	47.1%	
May	2006	853	2,335	3,188					820	52.0%		2,478.52	47.1%	2,335
June	2006	917	2,446	3,363					882	52.0%	917	2,596.30	47.1%	
July	2006		2,831	2,831								2,900.69	48.8%	
August	2006		2,765	2,765								2,832.81	48.8%	
September	2006		2,723	2,723								2,790.10	48.8%	
October	2006 2006		2,749	2,749								2,816.20	48.8%	2,749
November December	2006			-										
2006 Annual Average		hs)		2,623	1,378,597,672	689 298 836	19,518,769	13,021.92						
2000 Annual Average	1.0 11011			2,025	.,510,551,512	555,250,050	.5,510,705	10,021.02						

APPENDIX F

Peer Review of Levee Failure Analysis

Treadwell&Rollo

13 November 2007 Project No. 3029.01

Dan Sicular Environmental Science Associates 225 Bush Street, Suite 1700 San Francisco, California 94111

Subject: Review Comments Sheet Pile Wall Design Redwood Landfill Novato, California

Dear Mr. Sicular:

This letter presents Treadwell & Rollo's review comments on the design report prepared by Miller Pacific Engineering Group (MPEG) titled "Geotechnical and Structural Design, Exterior Levee Construction Failure and Sheetpile Wall repair, Redwood Landfill Exterior Levee Maintenance, Novato, California", dated 24 May 2007.

BACKGROUND

The Redwood Landfill is an existing Class III municipal solid waste landfill; levees surrounding the property provide flood control protection from the adjacent waters of San Antonio Creek and West Slough. In the spring of 2006, Redwood Landfill initiated an improvement project for a section of the exterior levee to improve flood protection. MPEG performed the design and prepared construction documents for this project. The construction of this maintenance project, which included placement of engineered fill to raise the levee to a design elevation of 9.5 feet above mean sea level (MSL) commenced in early October 2006 and was completed in November 2006.

Between 16 and 18 December 2006, a portion of the newly upgraded exterior levee failed toward the San Antonio Creek. Subsequently, Geosyntec Consultants (Geosyntec) evaluated the cause(s) of the failure and presented the results in a report dated 3 April 2007. For the failure evaluation, Geosyntec compiled existing information regarding the levee and creek geometry, creek water levels, and geotechnical material properties and performed slope stability analyses. Geosyntec concluded the subsurface conditions, the levee and creekside geometry, and the low-tide elevation of the creek result in a factor of safety of close to one and the failure was caused by insufficient shear strength of the underlying bay mud to support the newly constructed levee improvements under static, short-term, undrained conditions. Geosyntec recommends that slope stability analyses be performed for exterior levee improvements to check that the levees are designed to achieve adequate static factors of safety and seismic performance in accordance with applicable standards for engineered levee structures. Geosyntec also recommends these analyses be reviewed by a Registered Geotechnical Engineer.

MPEG proposed three phases of remedial action plan: 1) installing sheet piles with the tops at Elevation 7.5 feet, 2) installing sheet pile deadman and tierods, and placing fill on the landside of the wall to Elevation 6 feet, and 3) placing fill on the landside of the wall to Elevation 9.5 feet. Between 23

Dan Sicular Environmental Science Associates 13 November 2007 Page 2

December 2006 and 11 January 2007, 40 to 50 feet long, 103 pairs of PZC 18 and one pair of PZ 35 sheet piles were installed¹.

REVIEW OF SHEET PILE WALL DESIGN

Following the levee failure, Geosyntec Consultants² evaluated the cause of the failure. As part of the study, Geosyntec compiled the bay mud strength data in the failed area and back calculated the bay mud strength. They concluded that the best-estimate bay mud strength profiles are: 1) for landside bay mud: shear strength of 185 pounds per square foot (psf) from Elevation 0 to -15 feet, and increases at a rate of 9 psf/foot below Elevation -15 feet, and 2) for offshore bay mud: 50 psf at Elevation 0, increases at a rate of 9 psf/foot below Elevation 0. MPEG used these shear strength profiles to design the sheet pile wall.

We reviewed MPEG design report; our review comments are presented below:

- Appendix C Structural design of sheet pile wall (text), page 2, Phase 3 Work: MPEG states that Phase 3 work should be performed when 90% of the pre-failure bay mud strength has been attained, as verified with cone penetration testing. Comments: Geosyntec's bay mud strength profiles appear to correlate better with the strengths measured by field vane shear tests (reportedly with Bjerrum correction) than cone penetration tests. Accordingly, we recommend that the verification tests include field vane shear tests.
- 2. Calculations (sheets C-3, etc): MPEG calculated bay mud active and passive pressures using undrained strength and buoyant unit weight. Comments: According to basic soil mechanics, for total stress analyses using undrained strength, total unit weight should be used for the calculation of active and passive pressures.

It may be argued that the net pressure (passive minus active pressure) is the same whether buoyant or total unit weight is used. Our responses to this argument are: a) the factor of safety of the sheet pile wall is different even if the net pressure is the same, and b) the net pressure is different when creek water level other than Elevation 0 is used in the design; for example, the design may be performed using low tide water level, which is approximately Elevation -3 feet. For this case, the net pressure calculated using total unit weight will be different than that computed by MPEG.

- 3. Calculations (sheets C-4, etc): MPEG calculated the passive pressure of bay mud using the equation for level ground. Comments: Because the mud line slopes downward away from the sheet piles, the passive pressure calculations should account for the ground slope.
- 4. Calculations (sheets C-4, etc): MPEG calculated the passive pressure of bay mud using the strength profiles based on Geosyntec's 3 April 2007 report. Comments: The bay mud strength profiles were the average values of the strength along the entire circle of slope failure plane. Bay

¹ MPEG, 2007, "Construction Observations of Remedial Action Plan, Phase 1 Repair, Sheetpile Installation, Redwood Landfill Levee Failure, Novato, California", dated 2 February 2007.

² Geosyntec Consultants, 2007, "Evaluation of Exterior Levee Construction Failure, Redwood Landfill, Marin County, California", dated 3 April 2007.

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mud exhibits strength anisotropy. Accordingly, the bay mud strength used for passive pressure calculations should account for the anisotropy effect.

- 5. Calculations (sheets C-8, etc [pressure diagram]): MPEG neglected the effect of water on the pressure against the sheet piles and on the passive pressure of the underlying bay mud. Comments: For total stress analyses, the water (we recommend using Elevation -3 feet [low tide]) exerts a lateral pressure against the sheet piles and provides confinement (increase vertical stress, hence also the passive pressure) of the underlying bay mud. To take advantage of the water pressure against the sheet piles, total stress analysis should be used.
- 6. Calculations (sheet C-15A): the diagram on this sheet was used to illustrate the appropriate location of deadman, which is to be below the imaginary line drawn at an angle φ. Question: the analyses were performed using a φ equal to zero; therefore, this guideline does not work. MPEG should indicate the basis for determining the location of the sheet pile deadman.

If you have any questions, please call.

Sincerely, TREADWELL & ROLLO, INC.

Linda Liang, GE Senior Engineer

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Hadi J, Yap, PhD, GE Principal

APPENDIX G

Peer Review of Slope Stability Analysis for the Mitigated Alternative

11 March 2008 Project No. 3029.01

Mr. Dan Sicular Environmental Science Associates 225 Bush Street, Suite 1700 San Francisco, California 94111

Subject: Review Comments Mitigated Alternative Redwood Landfill Novato, California

Dear Mr. Sicular:

This letter presents Treadwell & Rollo's review comments on the Mitigated Alternative for the Redwood Landfill that was prepared in response to comments for the FEIR. Specifically, we reviewed the document titled "Mitigated Alternative Final Grade Fill Sequencing Plan and Seismic Slope Stability Evaluation," Volumes I and II, dated 23 February 2007, and prepared by Geosyntec Consultants. Previously, we presented the geotechnical concerns that the Applicant should address in their application for a reduced scale alternative (Mitigated Alternative) in a memorandum dated 18 July 2006, which is attached.

Based on our review of the mitigated alternative documents and Geosyntec's supplemental analyses and responses to our review comments, as summarized in this letter, we conclude that the geotechnical concerns presented in our memorandum dated 18 July 2006 has been satisfactorily addressed. In addition, we conclude the studies performed by Geosyntec indicate the geotechnical aspects of the mitigated alternative are consistent with the regulations set forth in the California Code of Regulations, Title 27, as well as 40 Code of Federal Regulations (CFR) Part 258.

REVIEW OF GEOSYNTEC REPORT

We had presented our review comments via electronic mail and Geosyntec had responded to our comments via electronic mail between October 2007 and January 2008. A summary of our key comments and Geosyntec's responses are presented below:

Comment 1a: Considering the material strength for the waste is much higher than the underlying Bay Mud, was the waste strength value reduced in the stability analyses to account for progressive failure?

Response 1a: Results of testing at the OII Landfill (Kavazanjian, et al. 1999¹) and other landfills (Pelkey et al. 2001²) show that waste has a shear-strain behavior in simple

¹ Kavazanjian, E., Jr., Matazovic, N., and Bachus, R.C. (1999) "Large-Diameter Static and Cyclic Laboratory Testing of Municipal Solid Waste," Proceedings of Seventh International Waste Management and Landfill Symposium, Sardinia, October 1999.

² Pelkey, S.A., Valsangkar, A.J. and Landva, A. (2001), Shear displacement dependent strength of municipal solid waste and its major constituents, Geotechnical Testing Journal, Dec. 2001, pp. 381-390.

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shear similar to that of soft to medium stiff clays. The attached Figure 1 shows the results of a simple shear test on OII waste. The backbone curve on Figure 1 (considered representative of the static shear behavior of the waste) is similar in ductility to that of the undrained triaxial test on Bay Mud shown in Figure 2 (Figure 3-1 from the report). Furthermore, as described in Section 2.4.3 of the report, the bilinear strength envelope utilized for waste is considered a <u>lower bound</u> strength envelope for MSW. Therefore, Geosyntec considers that there is no need to apply any additional strain-compatibility strength reduction factors to the waste shear strength parameters.

- **Comment 1b:** Geosyntec stated that the stress-strain behavior of the waste is similar to that of bay mud; therefore, the strength of the waste need not be reduced for slope stability analyses. As described by Chirapuntu and J. M. Duncan (1975), even when the shapes of the stress-strain curves are similar, when the strength of the embankment fill is greater than that of the foundation, large deformation can occur at computed safety factor greater than 1. Chirapuntu and Duncan gave an example of analysis (Embankment No. 2 in Attachment 1) for materials exhibiting similar stress-strain characteristics. As shown in Attachment 2, when local failure begins beneath the center of the embankment (shear strength exceeding 90% occurs in a large zone of the embankment) only about 30% of the strength is mobilized in the fill. Under this condition, the computed factor of safety is 1.75. Accordingly, Chirapuntu and Duncan recommend a correction factor to the embankment strength (Attachment 3). The US Department of the Navy adopted this recommendation and presented it in the US Navy Design Manual (Attachment 4). Because the waste strength is 1.5 times stronger than the bay mud, the slope stability analyses should be performed with reduced waste strength by multiplying it with a factor of 0.75
- **Response 1b:** The shear strengths of both the waste and Bay Mud used in the February 2007 report are identical to the strengths proposed in Geosyntec's August 2006 design basis memorandum (DBM) which is included in Appendix A of the report. The DBM was submitted and was discussed between Geosyntec, Waste Management, T&R, ESA, and the County at a meeting at Redwood Landfill in August 2006. The DBM was submitted to T&R in advance of the meeting, which allowed T&R to review the DBM prior to the meeting. At that meeting, T&R indicated that the methodology and design criteria presented in the DBM were appropriate, no objections were raised by others, and it was agreed that the DBM would be followed. Therefore, Geosyntec proceeded with the described shear strengths for the subsequent analyses.

As described in Section 2.4.3 of the report, the selected bi-linear MSW shear strength from Kavazanjian et al. [1995] is a lower-bound conservative shear strength based which is based on direct shear testing. In addition, waste is anisotropic. Zekkos [2005] demonstrated that direct shear testing of waste is representative of the shear strength along its weakest orientation, because the shear plane is forced to be parallel to the orientation of the waste fibers. Since waste is compacted in horizontal lifts, the waste fiber orientation in the field is also horizontal. In the Redwood stability analyses, all potential failure surfaces will pass through the waste at an angle significantly steeper than horizontal, more representative of a triaxial mode of shearing. Triaxial shear testing

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of MSW typically results in higher measured strengths. Therefore, the waste strengths used in the analyses are not only lower bound, but are additionally already reduced relative to the expected mode of failure (across rather than parallel to the fiber orientation).

Additionally, Geosyntec reviewed the work by Chirapuntu (1975) in which he states:

"The uncertainty with regard to the portion of the embankment strength which can be relied on for stability stems primarily from the facts that:

- The peak strength of the embankment may not be mobilized simultaneously with the peak strength of the foundation, because of progressive failure effects.
- Embankment strength may not contribute at all to the stability if the embankment is cracked.
- Progressive failure is most likely if the stress-strain characteristics of the embankment and the foundation soils differ markedly. ...
- Cracks may develop in embankments because of excessive tensile stresses in the fill due to differential settlements or because of shrinkage due to drying."

Chirapuntu (1975) also states:

• "Because of the considerable effect of embankment cracking on the stability of fills on soft clay, a preliminary study of the effectiveness of reinforcing in preventing cracking was conducted. This study, which is summarized in Chapter 9 [of Chirapuntu (1975)], indicates that reinforcing could be very effective in preventing cracking of cohesive fills."

In light of Chirapuntu's (1975) work, Geosyntec notes that:

- Our earlier response on this topic demonstrated that the stress-strain characteristics of the waste and Bay Mud are similar, and the waste does not show significant post-peak reduction in strength;
- Waste is a relatively ductile material and is not prone to significant cracking such as described by Chirapuntu; and
- The presence of horizontally aligned fibers in waste is well documented and has been shown to provide tensile reinforcement and resultant strength improvements in the waste.
- The Kavazanjian direct shear strengths are already lower bound waste shear strengths and were tested in the weakest orientation.

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Geosyntec remains confident that the strength used for the waste is appropriate for these analyses, and no additional strength reduction factor is necessary.

- **Comment 2:** We judge that a monitoring plan, similar to the one presented for the Revised Fill Sequencing Plan, should be included for the Mitigated Alternative. Please confirm. The monitoring program should establish thresholds that signal when waste loading should stop and resume.
- **Response 2:** A monitoring program is already established under Mitigation Measure 3.4.2a. From the perspective of geotechnical monitoring, filling to the originally proposed final grades and the Mitigated Alternative Final Grading Plan are not materially different from each other.

As stated in Section 6 of the report, Geosyntec recommends that the geotechnical monitoring program in place at Redwood Landfill continue. As landfill development progresses, the monitoring program should be periodically re-evaluated and adjusted as necessary. As an example, current waste filling is moving farther from the perimeter slopes in Areas A, B, C, D, and E. In these areas, the current filling will have little observable influence on instrumentation, which is hundreds of feet away. At some point in the future, this monitoring may be reduced.

Additionally, in March 2006, Redwood Landfill and Geosyntec proposed additional geotechnical monitoring as Mitigation Measure 3.4.2e as follows:

- "The geotechnical monitoring program shall include monitoring the rate of Bay Mud consolidation due to the weight of the overlying waste by the following method. The elevation of the bottom of LCRS riser LS1 located in Area G shall be recorded immediately before, and then periodically after, each lift of waste is placed in Area G. The observed rate of settlement will be compared with the predicted rate of settlement. The supervision, reporting, and remedial action elements of Mitigation Measures 3.4.2b through 3.4.2d shall also apply to this consolidation monitoring."
- **Comment 3:** We understand the report and Appendix D documented that static and pseudostatic slope stability analyses were performed for (1) initial conditions, (2) final conditions, and (3) end of primary Bay Mud consolidation for each phase of fill placement. Did GeoSyntec evaluate the static and seismic stability immediately after each phase of waste loading, prior to the Bay Mud gaining strength for that phase of waste loading? For example, for cross section A06, what is the static and seismic slope stability right after Phase 2 waste placement and before the end of primary Bay Mud consolidation due to the Phase 2 load increment?
- **Response 3:** Static and pseudostatic analyses were performed based on strengths at: (1) initial conditions, (2) final conditions, and (3) immediately prior to placement of each intermediate stage of fill. Consolidation after each stage of waste placement was only allowed to progress until the associated consolidation strength gain resulted in the ability to place the next stage of waste without allowing the factor of safety to drop below 1.3.

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The final conditions analysis was the only stage in which the end of primary Bay Mud consolidation was reached.

As such, for cross section A06, the reported Phase 2 static stability and yield acceleration (FS = 1.4 and ky = 0.047g) correspond to conditions immediately after waste placement and before any consolidation due to the Phase 2 waste load increment.

- **Comment 4:** MPE was assigned a 0.5 magnitude less than the MCE. What is the basis for this determination? This is critical with respect to the Rodgers Creek fault seismic event and the subsequent ground motion estimation. While the MCE magnitude assigned to Rodgers is consistent with those presented in the USGS Working Group for California Probability for the Bay Area (2003) report it is important to note that the Rodgers Creek fault is a complicated fault in light of its interaction with the Hayward and also other faults such as Maacama and Healdsburg to the north. USGS WG03 assigned the highest probability of a magnitude greater than 6.7 to the combination of Hayward-Rodgers Creek fault by the year 2032. The Hayward-Rodgers Creek event has been assigned a magnitude of 7.26. Furthermore, if one is to assume that the "final" condition will be reached in some years it appears that it is more appropriate to use a larger magnitude for this fault.
- **Response 4:** California Title 27 defines two different design level earthquake events for solid waste landfills. Class II landfills are to be designed for the maximum credible earthquake (MCE) whereas Class III landfills are to be designed for the Maximum Probable Earthquake (MPE). Redwood Landfill is a Class III facility, therefore the MPE was used in design.

As background on the process for selecting the design earthquake, Geosyntec notes the following:

- In its 5 December 2002 memorandum to ESA, T&R noted that the Rodgers Creek has an MCE with a magnitude of 7.0.
- In its 13 June 2006 memorandum to ESA, T&R stated that "We judge that there is a potential for a MPE event to occur at the site during the interim conditions. Therefore, the seismic slope stability of the interim conditions should be evaluated using the MPE..." It was on the basis of this comment that Geosyntec embarked on the seismic slope stability design of the Mitigated Alternative Final Grades.
- In October 2006, Geosyntec issued the seismic hazard evaluation to T&R outlining the proposed MPE event of 6.5 for the Rodgers Creek Fault that would be used in design.
- Building upon this October 2006 seismic hazard evaluation, Geosyntec proceeded with the seismic slope stability evaluation of the mitigated alternative final grading plan as presented in our February 2007 report.

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> Regarding MCE vs. MPE, it is commonly assumed that the entire mapped fault plane ruptures during the MCE, while only a portion of that plane ruptures during the MPE. There is no general agreement on what exact portion (percent) of a mapped fault plane ruptures during the MPE. Therefore, to provide a conservative basis for design, it is commonly assumed that approximately 90 percent of the mapped fault plane ruptures during the MPE. Using the well-known Wells and Coppersmith equation, it can be demonstrated that this assumption translates into reduction of MCE moment magnitude by at least half a magnitude. The approach used is the standard of practice for seismic design of Class III landfills in California.

> T&R also notes in their question that, per Title 27, the MPE event is superseded by any more powerful seismic event that has occurred within historic time. Geosyntec notes the following:

• In its 5 December 2002 memorandum to ESA, Treadwell and Rollo noted that the Rodgers Creek had historic earthquakes with magnitudes of 5.6 and 5.7 on 1 October 1969.

The recent study by Hecker et al. (2005)³ indicates that the most recent large earthquake on the Rodgers Creek fault was probably before 1776 (Hecker's best estimate is that the earthquake occurred between 229 and 290 years ago). There are other papers that present other interpretations of this fault and its pre-historic activity and there is no single consensus within the geologic community regarding the highest magnitude or date of the largest earthquake which occurred prior to the historic record. In absence of such consensus, Geosyntec looked to the State of California to define the design event in order to comply with the State's Title 27 requirements.

As shown in the Fault Activity Map of California by Jennings and Saucedo, and its latest update by Toppozada and Branum (CGS Map Sheet 54), the State of California recognizes Rodgers Creek as a fault separate from the Hayward Fault. The map also shows the highest historic magnitude is reported as M_w 6.4.

Further, the California Geological Survey assigned M_w 7.0 to the Rodgers Creek fault for the MCE event. Geosyntec also assigned a magnitude 7.0 to the MCE. This magnitude is also consistent with T&R's 5 December 2002 memorandum.

In accordance with this information established by the State of California for an MCE 7.0 and common practice to evaluate MPE explained above, Geosyntec assigned a Mw 6.5 to the MPE at this site. We note that the Mw 6.5 assigned by Geosyntec to the MPE is higher than the highest historic magnitude of Mw 6.4 assigned by the State of California. Therefore, Geosyntec estimates that M_w 6.5 is a reasonably conservative estimate for the MPE design event.

³ See attached abstract.

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The magnitude 7.26 event mentioned by T&R in the latest set of comments is not an MCE, an MPE, nor the established historic earthquake. Field (2007) summarized the work performed by the working groups on California Earthquake Probabilities. In the author's words, "*These studies represent the most official time-dependent earthquake forecasts ever published in the United States. Collectively they constitute hundreds of pages of technical documentation.*" The paper summarizes the work performed by the 1988, 1990, 1995, and 2002 Working Groups. As presented, the 2002 Working Group defined a mean Magnitude of 6.98 for the Rodgers Creek fault whereas a mean magnitude of 7.1 was assigned for a continuous rupture of the Northern Segment of the Hayward fault and the Rodgers Creek fault segment.

It is well known that there is a segmentation point between the Northern Hayward fault and the Rodgers Creek fault within the San Pablo Bay. As explained in detail in the Open File Report of the 2002 Working Group (USGS, 2003), the San Pablo Bay segmentation point "*continues to be viewed as a major structural and geometric barrier for ruptures propagating into it. That is the SCG* [Source characterization group] *viewed the San Pablo Bay step-over as a particularly strong segmentation point.*" Thus, based on the official and latest understanding, a Mw 7.1 or higher is very unlikely for the Rodgers Creek fault. This very unlikely event is not appropriate for the design analysis.

The opinion that a Mw 7.1 or higher earthquake is very unlikely on the Rodgers Creek fault is shared by many researchers. For example, Parsons et al. (2003) consider the Rodgers Creek fault the likely site of the 1898 M 6.3 earthquake, and following studies, conclude that the Hayward and Rodgers Creek fault overlap across much of San Pablo Bay and thus the there is likely no transfer fault that connects them. Wong and Bott (1995) report that Rodgers Creek fault has "the potential for a moment magnitude (M_w) 7 earthquake." Paleoseismological studies by Budding et al. (1991) and Schwartz et al. (1992) also suggest that the Rodgers Creek fault may be capable of generating a M_w 7 earthquake.

As part of a limited sensitivity analysis, Geosyntec has recently conducted subsequent analyses to evaluate the impacts of M_w 7.0 events. Using the Abrahamson and Silva attenuation and duration models [1997 and 1996], respectively, for a M_w 7.0 at 9 km, values of peak horizontal ground acceleration (PHGA) and significant duration (D_s) were estimated.⁴ For the purposes of the limited sensitivity analysis, Geosyntec "scaled up" the design time histories and estimated permanent seismic displacements. The results are presented in Table 1.

⁴ Note that after Geosyntec issued the Seismic Hazard Evaluation for Redwood Landfill on 18 October 2006, new attenuation and spectral acceleration models [NGA, 2007] have superseded the earlier Abrahamson and Silva models previously used. The new models, which are rapidly becoming the current state of practice, generally result in lower peak and spectral accelerations for the Rodgers Creek fault scenario than the models used in Geosyntec's report and in the sensitivity analyses described above. Therefore, there is now recognition of additional conservatism built into the original analyses.

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			_	_	Calculated u _{max}	
Design Event ⁽¹⁾	R	PHGA ⁽²⁾ (bedrock)	D _s (in bedrock) ⁽³⁾	D _s (of Accel.) ⁽⁴⁾	Initial Cond. ⁽⁵⁾	Final Cond. ⁽⁶⁾
M _w 6.5 (MPE)	9.0 km	0.35 g	9.1 s	11.4 s - 15.4 s	≈ 7 in.	≈ 7 in.
M _w 7.0 (MCE)	9.0 km	0.40 g	14 s	15.4 s	pprox 12 in.	\approx 12 in.

Table 1 Sensitivity Analysis Input Parameters and Results

R = site-to-source distance; $D_s =$ significant duration of strong shaking;

 u_{max} = Max. calculated permanent seismic displacement.

- ⁽¹⁾ Design event on the Rodgers Creek Fault.
- ⁽²⁾ Evaluated using the Abrahamson and Silva (1997) attenuation relationship.
- ⁽³⁾ Evaluated using the Abrahamson and Silva (1996; 2001) duration model; 5-95%.
- ⁽⁴⁾ Calculated value (5-95%); listed for time history response to which results in largest calculated displacement.
- ⁽⁵⁾ Lower Bound S_u; 1-D D-MOD2000 Analysis; $k_y = 0.05$ g.
- $^{(6)}$ Upper Bound S_u / 2-D QUAD4M Analysis; k_{y} = 0.07 g.

The values for M_w 7.0 are larger than those calculated in the February 2007 report for the MPE event, but are still within the maximum displacement criteria established for the site as described in the August 2006 Design Basis Memorandum (included in Appendix A of the report).

CONCLUSION ON GEOSYNTEC REPORT

We find Geosyntec's responses and supplemental analyses, as summarized in this letter, satisfactorily addressed our review comments. Therefore, we conclude Geosyntec's document, "Mitigated Alternative Final Grade Fill Sequencing Plan and Seismic Slope Stability Evaluation" and Geosyntec's responses to our review comments satisfactorily addressed the geotechnical concerns presented in our memorandum dated 18 July 2006.

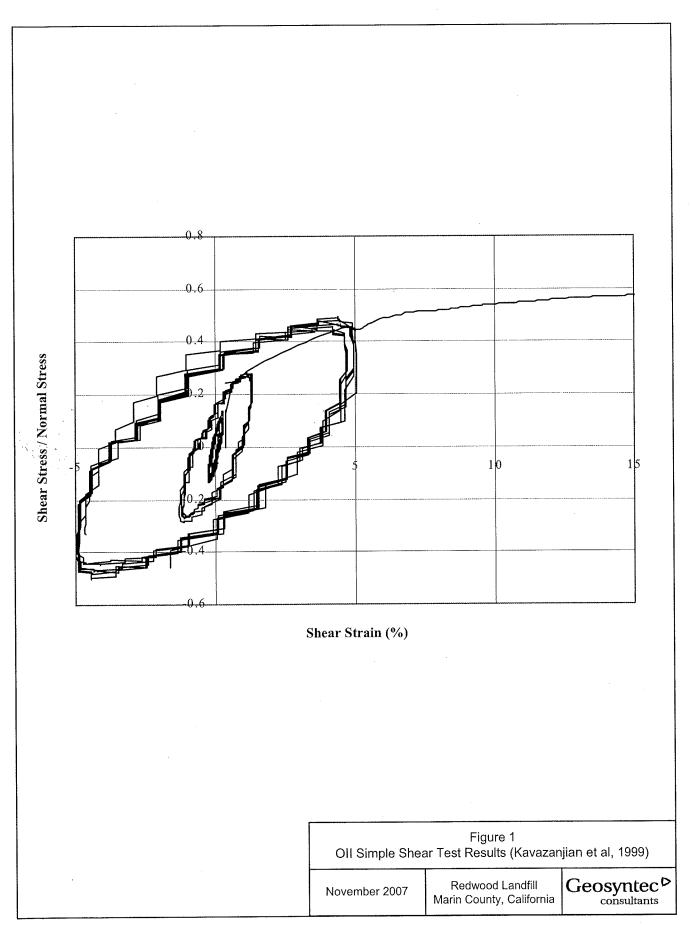
Mr. Dan Sicular Environmental Science Associates 11 March 2008 Page 9

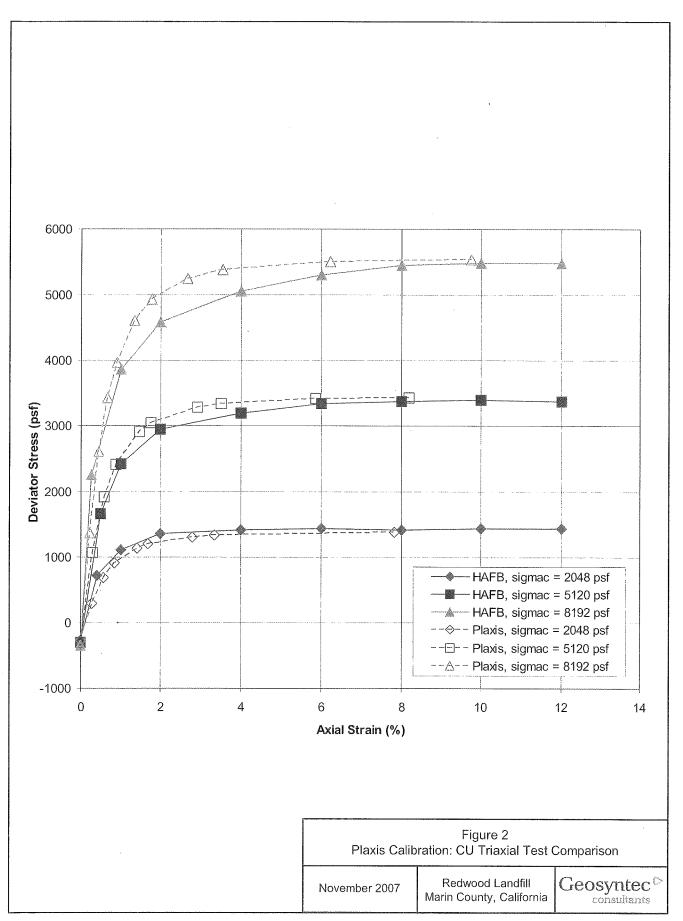
REGULATORY COMPLIANCE

We reviewed the geotechnical aspects of the proposed mitigated alternative, as presented in Geosyntec's document. Based on our review of the document and Geosyntec's subsequent responses to our review comments and supplemental analyses, we conclude the geotechnical aspects of the proposed mitigated alternative are consistent with the regulations set forth in the California Code of Regulations, Title 27, as well as 40 CFR Part 258.

If you have any questions, please call.

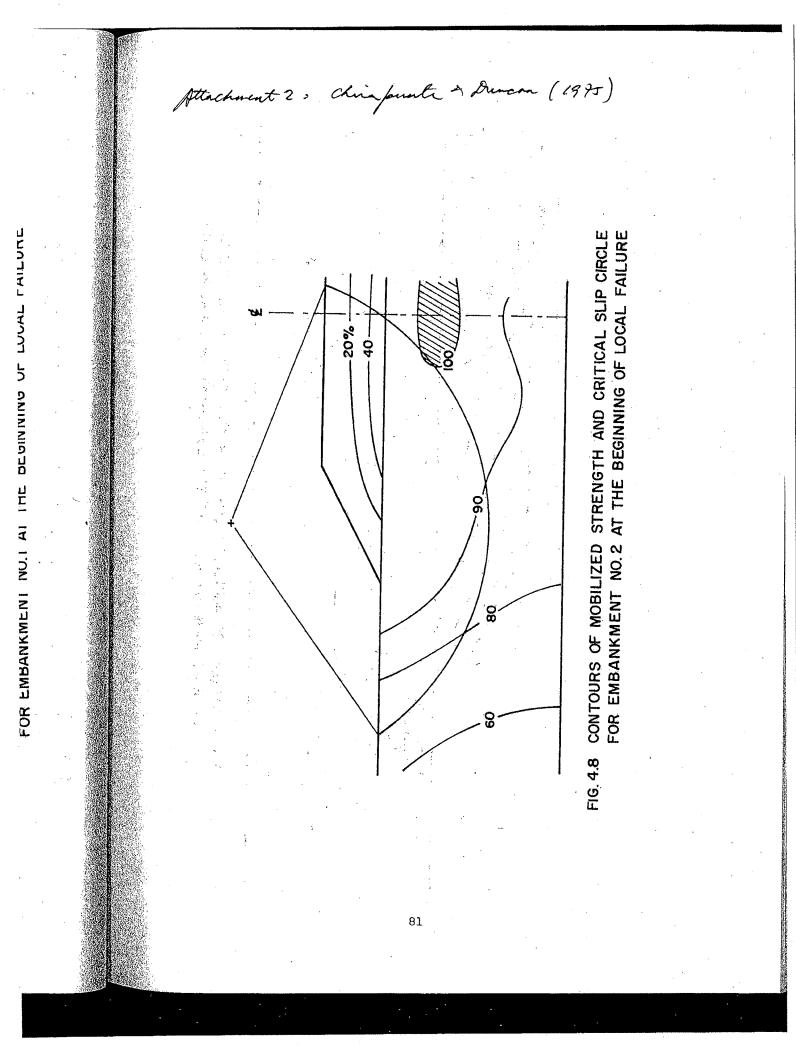
Sincerely yours, PROFES TREADWELL & ROLLO, INC (Jan 8 ant REGIST GE2663 Hadi J, Yap, Ph.D., GE Linda Liang, GE Senior Engineer Principal 30290111.OAK CALIF Figures 1 and 2 for Response 1a Attachments: Attachments 1 through 4 for Comment 1b Abstract for Response 4 18 July 2006 Memorandum

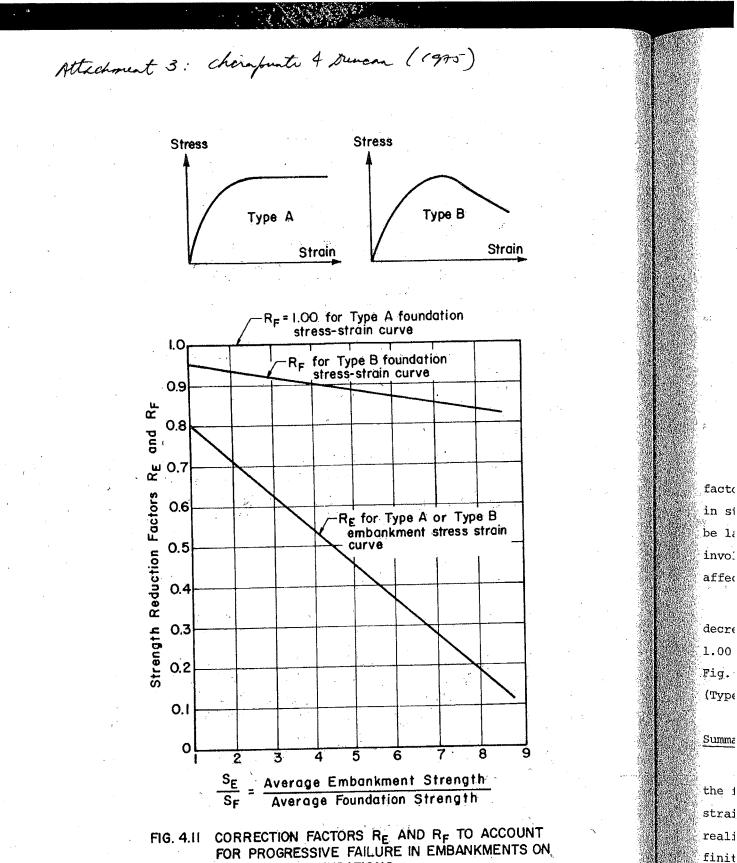




Attachment 1: Chirapunto & Duncan (1975) 4.9, 6 ments Pittsburg Sandy Clay Fill occur cente stren criti 2 EMBANKMENT NO. I failt Fill Soft Bay Mud Foundation cente excee ol-03 -kst Δ Sandy Clay Fill for t of lo dista Deviator Stress, 2 EMBANKMENT NO. 2 toe (tion Soft Bay Mud **Foundation** crit: strei in c 2 Pittsburg Sandy Clay Fill Fact Medium Boy Mud usin **EMBANKMENT NO.3** Two . Foundation cula Fill emba 0 8 12 16 20 24 were 4 0 Axial Strain, Ea, % RANGES OF CALCULATED STRAINS IN FILLS AND

FIG.4.6 RANGES OF CALCULATED STRAINS IN FILLS AND FOUNDATIONS AT THE BEGINNING OF LOCAL FAILURE

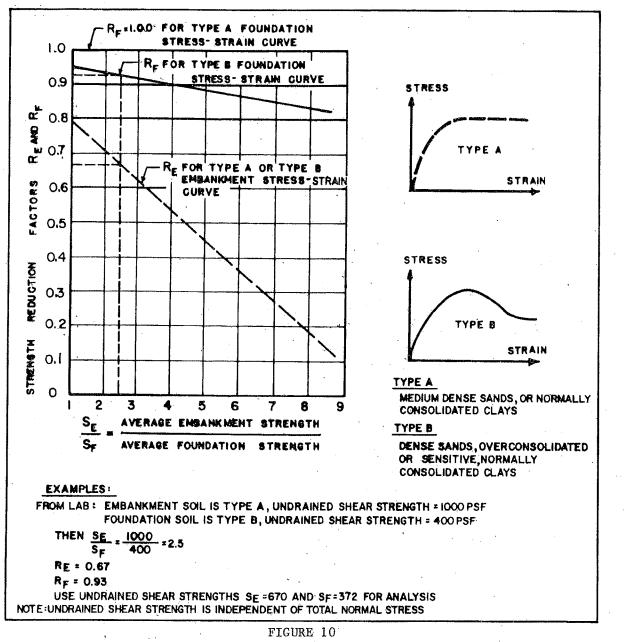




SOFT CLAY FOUNDATIONS

92

ments



Correction Factors R_E and R_F to Account for Progressive Failure in Embankments on Soft Clay Foundations

Attachment 4: NAVPAC DM 7-1 (1982)

7.1-332

THE MOST RECENT LARGE EARTHQUAKE ON THE RODGERS CREEK FAULT, ... Page 1 of 1

Cordilleran Section - 101st Annual Meeting (April 29-May 1, 2005) Paper No. 25-13

Presentation Time: 9:00 AM-5:00 PM

THE MOST RECENT LARGE EARTHQUAKE ON THE RODGERS CREEK FAULT, SAN FRANCISCO BAY REGION

HECKER, Suzanne¹, PANTOSTI, Daniela², SCHWARTZ, David P.¹, REIDY, Liam M.³, and HAMILTON, John C.¹, (1) U.S. Geol Survey, 345 Middlefield Rd, Menio Park, CA 94025, shecker@usgs.gov, (2) Istituto Nazionale di Geofisica e Vulcanologia, Sezione Sismologia e Tettonofisica, Via di Vigna Murata 605, Roma, I-00143, Italy, (3) Department of Geography, Univ of California, Berkeley, 507 McCone Hall, #4740, Berkeley, CA 94720

The Rodgers Creek fault (RCF) is a principal component of the San Andreas fault system north of San Francisco. No evidence appears in the historical record of a large earthquake on the RCF, implying that the most recent earthquake (MRE) occurred before 1824, when a Franciscan mission was built near the fault at Sonoma, and probably before 1776, when the written record began regionally in San Francisco. The first appearance of nonnative pollen in the stratigraphic record at the Triangle G Ranch study site on the south-central RCF confirms that the MRE occurred before local settlement and the beginning of livestock grazing. Chronological modeling of earthquake age using radiocarbon-dated detrital charcoal from near the top of a faulted alluvial sequence at the site indicates that the MRE occurred no earlier than A.D. 1690 and most likely occurred after A.D. 1715. With these age constraints, we know that the elapsed time similar to published recurrence-interval estimates of 131 to 370 years (preferred value of 230 years) and 136 to 345 years (mean of 205 years), calculated from geologic data and a regional earthquake model, respectively. Importantly, then, the elapsed time may have reached or exceeded the average recurrence time for the fault. The timing of the MRE on the RCF is similar to published recurrence interval estimates of 131 to 370 years (preferred value of 230 years) and 136 to 345 years (mean of 205 years), calculated from geologic data and a regional earthquake model, respectively. Importantly, then, the elapsed time may have reached or exceeded the average recurrence time for the fault. The timing of the MRE on the RCF is similar to published recurrence time of the fault. The timing of the MRE on the RCF is similar to prehistoric rupture on the north and south segments of the Hayward fault (A.D. 1640-1776). This allows the possibility that an earthquake, or closely timed earthquakes, ruptured both the RCF and the Hayward fault across the San Pablo Bay step-over.

A buried channel is offset 2.2 (+1.2, -0.8) m along one side of a pressure ridge at the Triangle G Ranch site. This provides a minimum estimate of rightlateral slip during the MRE at this location. Total slip at the site may be similar to, but is probably greater than, the 2 (+0.3, -0.2) m measured previously at the nearby Beebe Ranch site.

Cordilieran Section - 101st Annual Meeting (April 29-May 1, 2005). General Information for this Meeting

Session No. 25-Booth# 26 Late Cenozoic Transition from Subduction to Transform Margin Inboard of the San Andreas Fault, Northern San Francisco Bay Area to Cape Mendocino (Posters) Fairmont Hotet: Market Street Foyer/Exhibit Hall 9:00 AM-5:00 PM. Saturday, April 30, 2005

Geological Society of America Abstracts with Programs, Vol. 37, No. 4, p. 70.

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MEMORANDUM

TO:Dan Sicular, ESAFROM:Linda H. Liang, G.E. and Hadi J. Yap, Ph.D., G.E.DATE:18 July 2006PROJECT:Redwood Landfill
Marin County, California
Project No. 3029.01SUBJECT:Reduced Scale Alternative

This memorandum presents geotechnical concerns that should be addressed by Redwood Landfill regarding the reduced scale alternative for the proposed Redwood Landfill expansion in Marin County, California. As presented in the Final Environmental Impact Report and Response to Comments document, dated July 2005, one alternative to the project is a reduced scale alternative.

The reduced scale alternative differs from both the existing permit conditions and the proposed project in the following ways:

- The total maximum daily receipt of waste would be less than the proposed project, but greater than the currently permitted;
- The maximum daily number of vehicles entering the site would also be less than the proposed project, but greater than the currently permitted traffic volume;
- The capacity of the landfill would be increased from the currently permitted volume of approximately 19.1 million cubic yard, but the increase would be less than the proposed project (about half of what is proposed about 26 million cubic yards, versus the project's approximately 33.7 million cubic yards, not including the final cover). Consequently, the side slopes of the finished landfill need not be as steep as the proposed project, but steeper than currently permitted.

Geotechnical concerns that applied to the project also apply to the reduced scale alternative. Specifically, these geotechnical concerns include, but not limited to, the following:

- strength gain of underlying foundation soil (Bay Mud) due to placement of new fill
- staging of fill placement (fill height, lateral extent, and duration)
- short-term and long-term static slope stability
- short-term and long-term seismic slope stability and seismically-induced deformations, if any
- settlement of refuse and underlying foundation soil
- pore pressure generation in refuse and foundation soil
- static and seismic stability of perimeter levee
- monitoring and observations for slope movement, settlement, and pore pressure generation of refuse and foundation soil during and following active filling of each stage.

We trust this memorandum provides you with the information you need at this time. If you have any questions, please call.