

# SOLID WASTE FACILITY PERMIT

Facility Number:

**26-AA-0003**

**1. Name and Street Address of Facility:**

Pumice Valley Landfill  
200 Dross Road  
Lee Vining, California 93541

**2. Name and Mailing Address of Operator:**

Mono County Department of Public Works  
74 North School Street  
PO Box 457  
Bridgeport, California 93517

**3. Name and Mailing Address of Owner:**

Mono County Department of Public Works  
74 North School Street  
PO Box 457  
Bridgeport, California 93517

**4. Specifications:**

- a. Permitted Operations:**  Solid Waste Disposal Site  Transformation Facility  
 Transfer/Processing Facility (MRF)  Other: \_\_\_\_\_  
 Composting Facility (MSW/green material/C&G)

- b. Permitted Hours of Operation:** Receipt of Refuse/Waste: See condition 17.n  
 Ancillary Operations/Facility Operating Hours: See condition 17.n

**c. Permitted Maximum Tonnage:** 110 Tons per Day

**d. Permitted Traffic Volume:** 30 Vehicles per Day

**e. Key Design Parameters (Detailed parameters are shown on site plans bearing EA and CalRecycle validations):**

	Total	Disposal	Transfer/Processing	Composting	Transformation
Permitted Area (in acres)	48.4	23.6	0	0	0
Design Capacity (cu.yds)		741,360	0	0	0
Max. Elevation (Ft. MSL)		6946			
Max. Depth (Ft. MSL)		30			
Estimated Closure Year		2048			

Upon a significant change in design or operation from that described herein, this permit is subject to revocation or suspension. The attached permit findings and conditions are integral parts of this permit and supersede the conditions of any previously issued solid waste facility permit.

**5. Approval:**

  
 Approving Officer Signature  
 (Louis Molina, Environmental Health Director)

**6. Enforcement Agency Name and Address:**

Mono County Environmental Health  
437 Old Mammoth Road, #Q  
PO Box 3329  
Mammoth Lakes, California 93546

**7. Date Received by CalRecycle:** August 9, 2016

**8. CalRecycle Concurrence Date:** September 23, 2016

**9. Permit Issued Date:**

September 26, 2016

**10. Permit Review Due Date:**

September 26, 2021

**11. Owner/Operator Transfer Date:**

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## 12. Legal Description of Facility:

The legal description of this facility is contained on page 1 and in Appendix A of the Report of Disposal Site Information, dated June, 2016. The legal description of the site by the government survey method is NW¼, NW¼, Section 36, Township 1 North, Range 26 East, Mount Diablo Baseline and Meridian (MDB&M).

## 13. Findings:

- a. This permit is consistent with the Mono County Integrated Waste Management Plan, which was approved by CalRecycle on May 23, 2000. The location of the facility is identified in the Countywide Siting Element, pursuant to Public Resources Code (PRC), Section 50001(a).
- b. This permit is consistent with the standards adopted by CalRecycle, pursuant to PRC 44010.
- c. The design and operation of the facility is consistent with the State Minimum Standards for Solid Waste Handling and Disposal as determined by the enforcement agency, pursuant to PRC 44009.
- d. The California Department of Forestry and Fire Protection has determined that the facility is in conformance with applicable fire standards, pursuant to PRC, 44151.
- e. A Supplemental Environmental Impact Report and Addendum was filed with the State Clearinghouse (SCH #1998122016, 2004102104) and certified by the Mono County Board of Supervisors on August 9, 2005 (Supplemental EIR), and August 2, 2016 (Addendum). The Supplemental EIR and Addendum describe and support the design and operation which will be authorized by the issuance of this permit. A Notice of Determination was filed with the State Clearinghouse on August 18, 2005 (Supplemental EIR) and August 2, 2016, (Addendum).
- f. A transfer station operated within the landfill permitted boundaries is operated under Enforcement Agency Notification (26-AA-0017) with its own allotted tonnage and traffic volume (vehicles per day).

## 14. Prohibitions:

The permittee is prohibited from accepting the following wastes:

Hazardous, radioactive, medical (as defined in Chapter 6.1, Division 20 of the Health and Safety Code), liquid, designated, or other wastes requiring special treatment or handling, except as identified in the Report of Facility Information and approved amendments thereto and as approved by the enforcement agency.

## 15. The following documents describe and/or restrict the operation of this facility:

	Date		Date
Report of Disposal Site Information/ JTD	6-1-2016	Preliminary Closure and Postclosure Maintenance Plan	6-1-2016
Waste Discharge Requirements Order No. 6-01-56	10-10-2001	Closure Financial Assurance Documentation	11-4-2015
APCD Permit to Operate #	n/a	Operating Liability Certification	7-1-2015
<u>Addendum to Supplemental Environmental Impact Report (SCH #2004102104 )</u>	8-2-2016	Land Use and/or Conditional Use Permit	8-9-2005

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## 16. Self Monitoring:

The owner/operator shall submit the results of all self monitoring programs to the Enforcement Agency within 30 days of the end of the reporting period.

Program	Reporting Frequency
a. The types and quantities (in tons) of waste, including separated or commingled recyclables, entering the facility per day.	Quarterly
b. The number and types of vehicles using the facility per day.	Quarterly
c. Results of the hazardous waste load checking program, including the quantities and types of hazardous wastes, medical wastes or otherwise prohibited wastes found in the waste stream and the disposition of these materials.	Quarterly
d. Copies of all written complaints regarding this facility and the operator's actions taken to resolve these complaints.	Quarterly
e. Results of the landfill gas monitoring program.	Quarterly
f. Wet weather preparedness report/winter operations plan.	Annual – due by November 1
g. Fill sequencing plan for the forthcoming year.	Annually
h. Remaining site capacity.	Annually
i. The operator shall maintain a record of waste-derived alternative daily cover in accordance with Title 14, CCR, Section 18800, et. seq. The record shall be available for inspection by authorized representatives of the EA and CalRecycle during normal business hours and retained in the operating record near the site or in an alternative location approved by the EA.	Available Upon Request
j. The operator shall maintain records of training provided in accordance with Title 27, CCR, Section 20510. The training records shall be available for inspection by authorized representatives of the EA and CalRecycle during normal business hours and retained in the operating record near the site or in an alternative location approved by the EA.	Available Upon Request

# SOLID WASTE FACILITY PERMIT

Facility Number:

**26-AA-0003**

## 17. Enforcement Agency (EA) Conditions:

- a. The operator shall comply with all State Minimum Standards for solid waste handling and disposal as specified in Title 27, California Code of Regulations.
- b. The operator shall maintain a log of special/unusual occurrences. This log shall include, but is not limited to, fires, explosions, the discharge and disposition of hazardous or unpermitted wastes, and significant injuries, accidents or property damage. Each log entry shall be accompanied by a summary of any actions taken by the operator to mitigate the occurrence. The log shall be available to site personnel and the EA at all times.
- c. Additional information concerning the design and operation of the facility shall be furnished upon request and within the time frame specified by the EA.
- d. The maximum permitted daily tonnage for this facility is 110 tons per day for all waste types. The facility shall not receive more than this amount without a revision of this permit.
- e. This permit is subject to review by the EA and may be temporarily suspended or revoked at any time by the EA for sufficient cause, in accordance with Division 30 of the Public Resource Code, Part 4, Chapter 4, Article 2, Sections 44305 et seq and associated regulations.
- f. The EA reserves the right to suspend or modify waste receiving and handling operations due to an emergency, a potential health hazard, or the creation of a public nuisance.
- g. Any change that would cause the design or operation of the facility not to conform to the terms and conditions of this permit is prohibited. Such a change may be considered a significant change, requiring a permit revision. In no case shall the operator implement any change without first submitting a written notice of the proposed change, in the form of an RFI amendment, to the EA at least 180 days in advance of the change.
- h. A copy of this permit shall be maintained at the facility.
- i. Daily cover shall be applied according to the schedule described in the Joint Technical Document.
- j. The operator is permitted to use approved alternative daily covers listed in, and according to, Title 27, CCR, Section 20690 and as described in the facility's RDSI.
- k. The operator has approval to accept non-friable asbestos for disposal. Non-friable asbestos shall be handled and disposed as described in the facility's RDSI.
- l. The operator has approval to accept dead animals for disposal. Dead animals shall be handled and disposed as described in the facility's RDSI.
- m. Any salvage operations at the facility shall be conducted as described in the facility's RDSI.
- n. Hours of operation vary seasonally and are generally daylight hours. Hours are described in the RDSI and will not exceed the hours of operation evaluated in the CEQA analysis.



**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION**

**BOARD ORDER NO. 6-01-56  
WDID NO. 6B260300011**

**REVISED WASTE DISCHARGE REQUIREMENTS**

**FOR**

**THE COUNTY OF MONO AND THE LOS ANGELES  
DEPARTMENT OF WATER AND POWER  
PUMICE VALLEY CLASS III LANDFILL**

Mono County

The California Regional Water Quality Control Board, Lahontan Region (Regional Board) finds:

1. Dischargers

On June 25, 2001, the County of Mono submitted information that constitutes a complete revised Report of Waste Discharge (RWD) in accordance with Title 27, California Code of Regulations (CCR) for the active Pumice Valley Class III Landfill. The revised RWD contains updated information of the operation of the Facility. For the purposes of this Regional Board Order (Order) the County of Mono (Operator) and the Los Angeles Department of Water and Power (landowner) are referred to as the "Discharger."

2. Facility

For the purposes of this Order, the Pumice Valley Class III Landfill is referred to as the "Facility." The Facility is a municipal solid waste landfill located approximately seven miles southeast of the Community of Lee Vining at the NW1/4, NW1/4 of Section 36, T1N, R26E, MDB&M as shown on Attachment "A," which is made a part of this Order.

3. Order History

The Regional Board previously adopted Waste Discharge Requirements (WDRs) for the Facility in Board Order No. 6-73-75, which was adopted on May 24, 1973. Board Order No. 6-87-139 rescinded the previous Board Order and established new WDRs and was adopted November 12, 1987. Board Order No. 6-93-100-33 was adopted on September 9, 1993, and amended the WDRs to incorporate the requirements of Title 40, Code of Federal Regulations, Parts 257 and 258 (Subtitle D) as implemented in California under State Water Resources Control Board (SWRCB) Resolution No. 93-62. Board Order No. 6-87-139A1 amended Board Order No. 6-87-139 and was adopted on September 14, 1995. New WDRs for Pumice Valley were issued through Board Order No. 6-96-12 which was adopted on February 8, 1996 and rescinded Board Order Nos. 6-87-139, 6-87-139A1 and 6-93-1033.

4. Reason For Action

The Regional Board is revising these WDRs as part of a process to periodically review and update requirements and to achieve compliance with requirements of Title 27, CCR.

5. Description of Facility

The existing Facility is an unlined landfill, which receives approximately 12 tons of waste per day as of January 1, 2001. The Facility maintains a waste load checking program as required by Section 20008 of Title 27, CCR. Based on the quantity of waste received per day, the Facility is a Very Small Landfill as defined in Subtitle D. As such, Subtitle D requirements became effective for this Facility on October 9, 1995. Regional Board staff reviewed information submitted by the Discharger which illustrates the existing footprint of waste discharged. The footprint documents the limits of waste which are exempt from Subtitle D requirements for composite liners, and is shown as Attachment "B" of this Order. All new future expansion areas will be required to be lined and otherwise be designed and operated to comply with Subtitle D liner requirements as well as Title 27, CCR. The existing unlined area will continue to receive waste until final grade elevations are attained. When the grade elevations are attained, then the Facility is proposed to be closed in accordance with an approved final closure plan. A final closure plan must be submitted for approval at least 180 days prior to beginning closure activity.

6. Authorized Disposal Sites

The footprint of waste shown in Attachment "B" is the only authorized landfill disposal site. A revised RWD is required if the Discharger proposes to discharge waste outside the landfill footprint area.

7. Landfill Waste Classification

The Facility receives waste from the surrounding communities and from Lee Vining. The waste received at the Facility is defined in Sections 20220 and 20230 of Title 27, CCR as non-hazardous solid and inert waste, respectively, and is defined as municipal solid waste in Subtitle D.

8. Waste Management Unit Classification

Pursuant to Section 20260 of Title 27, CCR, the Facility is classified as a Class III Waste Management Unit.

9. Subtitle D Compliance Status

Board Order No. 6-93-100-33 required the submittal of several items in order for the Facility to comply with Subtitle D. The Discharger submitted complete information regarding the acceptance of liquids, the existing waste footprint, the distance from the Facility to the nearest drinking water source, and whether the Facility is located in a 100 year floodplain or

a wetlands. The above listed items submitted in accordance with Order No. 6-93-100-33 fulfill the submittal requirements of Subtitle D as implemented by SWRCB Resolution No. 93-62.

10. Water Quality Protection Standards (WQPS)

The WQPS requirements of Title 27, CCR, consist of constituents of concern (including monitoring parameters), concentration limits, monitoring points, and the point of compliance. The standard applies over the active life of the Facility, the closure and post-closure maintenance period, and the compliance period. The constituents of concern, monitoring points, and point of compliance are described in the Monitoring and Reporting Program No. 01-56.

11. Statistical Methods

Statistical analysis of monitoring data is necessary for the earliest possible detection of a statistically significant release of waste from the Facility. Section 20415, Title 27, CCR, and Subtitle D regulations require statistical data analysis. The attached Monitoring and Reporting Program No. 01-56 includes general methods for statistical data analysis.

12. Detection Monitoring

The Discharger has implemented a Detection Monitoring Program (DMP). To date, there has been no detected release at the Facility.

13. Evaluation Monitoring

An Evaluation Monitoring Program (EMP) should be implemented, in accordance with Section 20430 of Title 27, CCR, if a release is detected at the Facility.

14. Corrective Action

A Corrective Action Program (CAP) pursuant to Section 20430 of Title 27, CCR may be required if results of an EMP warrant a CAP.

15. Site Geology

The Facility is located on an alluvial plain of gravel, sand and silt which, slopes westerly toward Rush Creek. Intermittent facies of silty sand inter-finger with sands and gravel beneath the Facility.

16. Site Hydrogeology

Ground water beneath the Facility is found in unconsolidated materials ranging in depth from approximately 240 to 260 feet below ground surface (bgs). Ground water beneath the Facility flows generally northeast at a slope of 0.0043 ft/ft.



17. Site Surface Hydrology and Storm Water Runoff

There are no perennial surface waters at the Facility. All storm water upgradient of the Facility is to be routed around the Facility. All storm water generated onsite is to be managed on site and is regulated under the State Amended General Industrial Activities Storm Water Permit.

18. Site Topography

The land generally slopes to the northwest. Site topography is shown on Attachment "B," which is made a part of this Order.

19. Climatology

The average precipitation in the area of the Facility is approximately 14 inches annually. The evaporation rate is approximately 69 inches annually as reported in the RWD.

20. Land Uses

The land use surrounding the Facility consists of open space. The Community of Lee Vining is located approximately seven miles northwest of the Facility.

21. Closure and Post-Closure Maintenance

The Discharger has submitted a Preliminary Closure and Post-Closure Maintenance and Monitoring Plan (PCPCMP) in April of 1998 by Vector Engineering, Inc. The plan generally proposes in-place closure of the waste and an extended period of site monitoring. The PCPCMP was determined to be complete and technically adequate by Regional Board staff. This Order provides Regional Board approval of the PCPCMP. This Order requires that the Discharger review the PCPCMP annually to determine if significant changes in the operation of the Facility warrant an update of the plan. A final CPCMP must be submitted at least 180 days, for approval, prior to beginning closure activities.

22. Financial Assurance

The Discharger has provided documentation that a financial assurance fund has been developed for closure and post-closure maintenance, and potential corrective action requirements. The California Integrated Waste Management Board (CIWMB) determined as of January 2001, that the requirements of the financial assurance Sections 22241 and 22245 of Title 27, CCR, were met. This Order requires that the Discharger demonstrate in an annual report that the amount of financial assurance (for Closure, Post-Closure Maintenance and Monitoring and Corrective Action) is adequate, or increase the amount of financial assurance.

23. Receiving Waters

The receiving waters are the ground waters of the Mono Valley Ground Water Basin (Department of Water Resources Basin No. 6-9).

24. Lahontan Basin Plan

The Regional Board adopted a Water Quality Control Plan for the Lahontan Region (Basin Plan) which became effective on March 31, 1995. This Order implements the Basin Plan.

25. Beneficial Uses

The present beneficial uses of the ground waters of the Mono Valley as set forth and defined in the Basin Plan are:

- a. municipal and domestic supply (MUN);
- b. freshwater replenishment (FRSH);
- c. agricultural supply (AGR);
- d. industrial supply (IND); and
- e. wildlife habitat (WILD).

26. California Environmental Quality Act Compliance

These WDRs govern an existing Facility that the Discharger is currently operating. The project consists only of the continued operation of the Facility and is exempt from the provisions of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) in accordance with Section 15301 of the CEQA Guidelines.

27. Notification of Interested Parties

The Regional Board has notified the Discharger and all known interested agencies and persons of its intent to adopt revised WDRs for this project.

28. Consideration of Interested Parties

The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge.

**IT IS HEREBY ORDERED** that the Discharger shall comply with the following:

I. DISCHARGE SPECIFICATIONS

A. Receiving Water Limitations

This discharge shall not cause a violation of any applicable water quality standard for receiving water adopted by the Regional Board or the SWRCB as required by the Federal Water Pollution Control Act, the California Water Code and regulations adopted thereunder. The discharge of waste shall not cause the presence of the following substances or conditions in ground waters of the Mono Valley.

1. Nondegradation - SWRCB Resolution No. 68-16 "Statement of Policy With Respect to Maintaining High Quality of Waters In California", known as the Nondegradation Objective, requires maintenance of existing high quality in surface waters, ground waters, or wetlands. Whenever the existing quality of water is better than the quality of water established in the Basin Plan, such existing quality shall be maintained unless appropriate findings are made under Resolution No. 68-16.
2. Bacteria - Waters shall not contain concentrations of coliform organisms attributable to human wastes. The median concentration of coliform organisms, over any seven-day period, shall be less than 1.1/100 mL in ground waters.
3. Chemical Constituents - Ground waters designated as MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in the following provisions of Title 22 of the CCR: Table 64431-A of Section 64431 (Inorganic Chemicals), Table 64431-B of Section 64431 (Fluoride), Table 6444-A of Section 64444 (Organic Chemicals), Table 64449-A of Section 64449 (SMCLs-Consumer Acceptance Limits), and Table 64449-B of Section 64449 (SMCLs-Ranges). This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.
4. Chemicals - Waters shall not contain concentrations of chemical constituents that adversely affect the water for beneficial uses.
5. Radioactivity - Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life, or that result in the accumulation of radionuclides in the food chain to an extent that it presents a hazard to human, plant, animal, or aquatic life. Waters shall not contain concentrations of radionuclides in excess of limits specified in the CCR, Title 22, Chapter 15, Article 5, Section 64443.
6. Taste and Odors - Ground waters shall not contain taste or odor-producing substances in concentrations that cause nuisance or that adversely affect beneficial uses. For ground waters designated as MUN, at a minimum, concentrations shall not exceed adopted SMCL specified in Table 64449-A of Section 64449 (SMCLs -Ranges), and Table 64449-B of Section 64449 (SMCLs-Ranges) of Title 22 of the CCR, including future changes as the changes take effect.

II. REQUIREMENTS AND PROHIBITIONS

A. General

1. The discharge shall not cause a pollution as defined in Section 13050 of the California Water Code, or a threatened pollution.
2. The discharge shall not cause a nuisance as defined in Section 13050 of the California Water Code.
3. The discharge of solid wastes, leachate, or any other deleterious material to the ground waters of the Mono Valley is prohibited. Waste discharged to the Facility is limited to that described in the RWD and in compliance with wastes classified as non-hazardous solid, inert waste or municipal solid waste.
4. The discharge of waste except to the authorized disposal sites is prohibited.
5. The disposal sites shall be protected from inundation, washout, or erosion of wastes and erosion of covering materials resulting from a storm or a flood having recurrence interval of once in 100 years.
6. Surface drainage from tributary areas, and internal site drainage from surface or subsurface sources shall not contact or percolate through solid wastes discharged at the site.
7. The exterior surfaces of the disposal sites shall be graded to promote lateral runoff of precipitation and to prevent ponding. Lateral runoff shall be contained on site.
8. Water used for dust control during disposal site operations shall be limited to a minimal amount. A "minimal amount" is defined as that amount which will not result in runoff.
9. Wastes shall not be placed in ponded water from any source whatsoever.
10. The discharge of wastes in a manner that does not maintain a five-foot soil separation between the wastes and the seasonal high ground water elevation is prohibited.
11. Waste discharged to the Facility shall have solids content of 50 percent or greater.
12. The Discharger shall remove and relocate any waste, which is or has been discharged at the disposal sites in violation of these requirements. The waste shall be relocated to a site that is permitted to receive such wastes. All removal and relocation projects shall be coordinated with regulatory agencies, including the County of Mono.

13. During periods of precipitation, the disposal activity shall be confined to the smallest area possible based on the anticipated quantity of wastes and operation procedures.
14. At closure, all facilities must be closed in accordance with a final CPCMP approved by the Regional Board.
15. The concentration limit for each constituent of concern shall be determined pursuant to Section 20400, Title 27, CCR.

B. Detection Monitoring Program

The Discharger shall maintain the DMP as required in Section 20385, Title 27, CCR.

C. Evaluation Monitoring Program

The Discharger shall institute an EMP when required pursuant to Section 20425 of Title 27, CCR.

D. Corrective Action Program

The Discharger shall institute a CAP when required pursuant to Section 20430 of Title 27, CCR.

III. DATA ANALYSIS

A. Statistical Analysis

Monitoring data shall be collected according to the DMP for the Facility. Statistical analysis of ground water and unsaturated zone DMP data shall be conducted. Analysis shall be conducted in accordance with statistical methods detailed in Monitoring and Reporting Program No. 01-56 to determine the data indicates evidence of a release from the Facility.

B. Nonstatistical Analysis

The Discharger shall determine whether there is significant physical evidence of a release from the Facility. Significant physical evidence may include unexplained volumetric changes in the Facility, unexplained stress in biological communities, unexplained changes in soil characteristics, visible signs of leachate migration, and unexplained water table mounding beneath or adjacent to the Facility, or any other change in the environment that could be reasonably expected to be the result of a release from the Facility.

C. Verification Procedures

1. The Discharger shall immediately initiate verification procedures as specified below whenever there is a determination by the Discharger or Executive Officer that there is statistical or non-statistical evidence of a release. If the Discharger declines the opportunity to conduct verification procedures, the Discharger shall submit a technical report as described below under the heading Technical Report Without Verification Procedures.
2. The verification procedure must only be performed for the constituent(s) that have shown evidence of a release, and for those monitoring points at which a release is indicated.
3. The Discharger shall either conduct a composite retest using data from the initial sampling event with all data obtained from the resampling event or shall conduct a discrete retest in which only data obtained from the resampling event shall be analyzed in order to verify evidence of a release.
4. The Discharger shall report to the Regional Board by certified mail the results of the verification procedure, as well as all concentration data collected for use in the retest within seven days of the last laboratory analysis.
5. The Discharger shall determine, within 45 days after completion of sampling, whether there is statistically significant evidence of a release from the landfill at each monitoring point. If there is evidence of a release, the Discharger shall immediately notify the Regional Board by certified mail. The Executive Officer may make an independent finding that there is evidence of a release.
6. If the Discharger or Executive Officer verifies evidence of a release, the Discharger is required to submit, within 90 days of a determination that there is or was a release, a technical report pursuant to Section 13267(b) of the California Water Code. The report shall propose an EMP, **OR**, make a demonstration to the Regional Board that there is a source other than the Facility that caused evidence of a release.

D. Technical Report Without Verification Procedures

If the Discharger chooses not to initiate verification procedures, a technical report shall be submitted pursuant to Section 13267(b) of the California Water Code. The report shall propose an EMP, **OR**, attempt to demonstrate that the release did not originate from the Facility.

IV. PROVISIONS

A. Rescission of Waste Discharge Requirements

Board Order No. 6-96-12 is hereby rescinded.

B. Standard Provisions

The Discharger shall comply with the "Standard Provisions for Waste Discharge Requirements," dated September 1, 1994, which are attached to and made part of this Order.

C. Monitoring and Reporting

1. Pursuant to the California Water Code Section 13267(b), the Discharger shall comply with the Monitoring and Reporting Program No. 01-56 as specified by the Executive Officer.
2. The Discharger shall comply with the "General Provisions for Monitoring and Reporting," dated September 1, 1994, which is attached to and made part of the Monitoring and Reporting Program. The Monitoring and Reporting Program is attached to the WDRs and is a part of this Order.

D. Closure and Post-Closure Monitoring

This Order provides Regional Board approval of the PCPCMP. The PCPCMP shall be updated if there is a substantial change in operations. A report shall be submitted annually indicating conformance with existing operations. To comply with Title 27, CCR, a complete final CPCMP shall be submitted at least 180 days prior to beginning any partial or final closure activities or at least 120 days prior to discontinuing the use of the site for waste treatment, storage or disposal, whichever is greater. The CIWMB, pursuant to Title 27, CCR, requires the submittal of a final closure plan a minimum of two years prior to closure. Information shall be submitted annually indicating conformance with the existing operations. The Regional Board must approve the Final CPCMP.

E. Time Schedule

The Discharger shall submit a workplan for the installation of an unsaturated zone (vadose zone) monitoring system, as required by Title 27, CCR, Section 20415. The workplan shall be submitted by November 30, 2001.

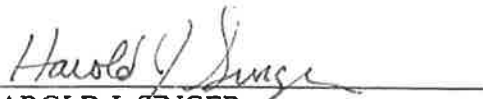
F. Financial Assurance

The Discharger shall submit a report annually providing evidence that adequate financial assurance pursuant to the requirements of the WDRs has been provided for closure, post-closure, and for potential releases. Evidence shall include the total amount of money available in the fund developed by the Discharger. In addition, the Discharger shall either provide evidence that the amount of financial assurance is still adequate or increase the amount of financial assurance by the appropriate amount. An increase may be necessary due to inflation, a change in regulatory requirements, and a change in the approved closure plan, or other unforeseen events.

G. Modifications to the Landfill

If the Discharger intends to expand the capacity of the Facility, a report shall be filed no later than 90 days after the total quantity of waste discharged at this site equals 75 percent of the reported capacity of the site. The report shall contain an estimate of the remaining life of the existing Facility and a detailed plan for site expansion. This plan shall include, but is not limited to, a time schedule for studies design, and other steps needed to provide additional capacity. If site expansion is not undertaken prior to the site reaching the reported capacity, the total quantity of waste discharged shall be limited to the reported capacity.

I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on October 10, 2001.

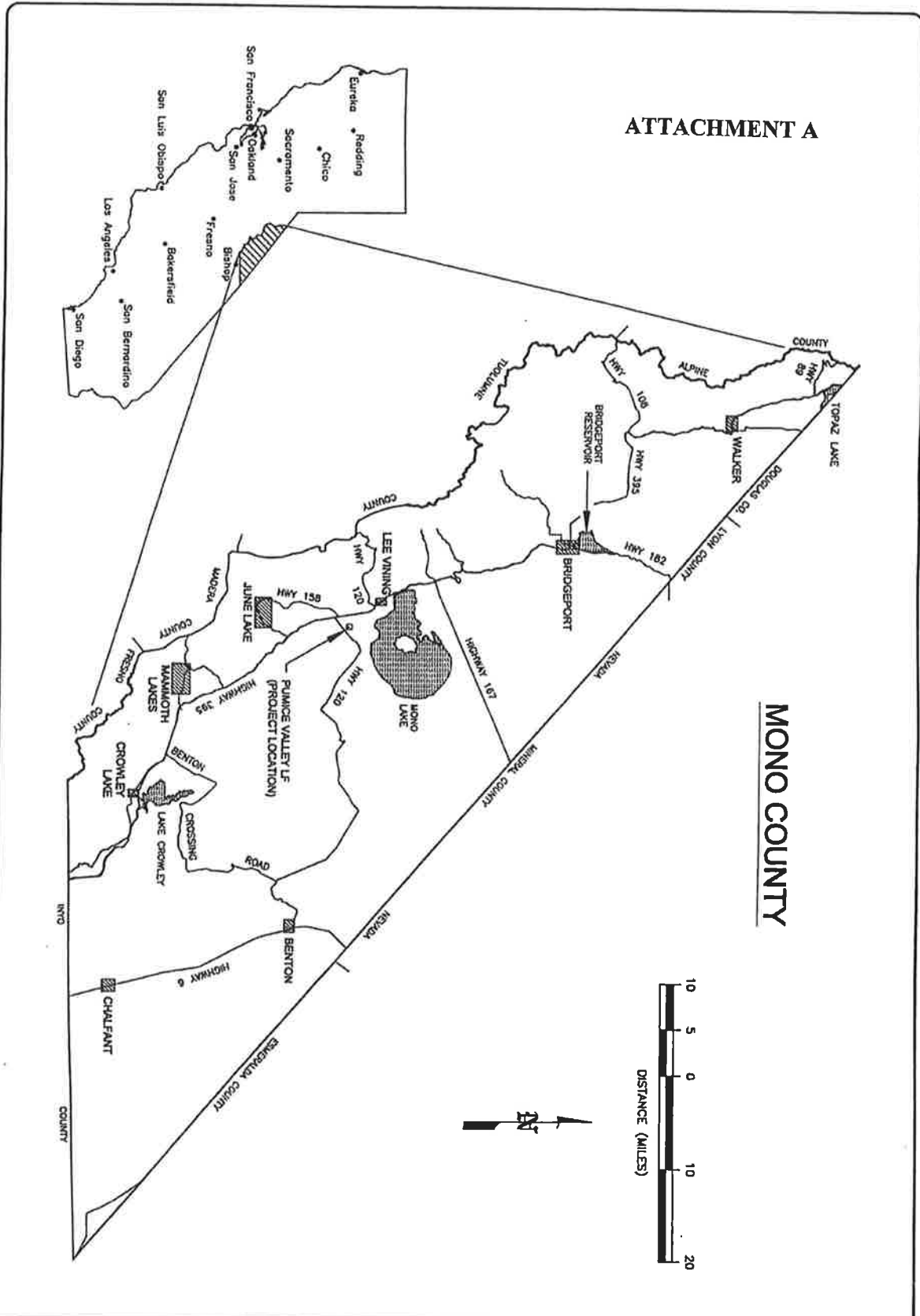


HAROLD J. SINGER  
EXECUTIVE OFFICER

- Attachments:
- A. Location Map
  - B. Landfill Footprint of Waste and Topography
  - C. Standard Provisions for Waste Discharge Requirements



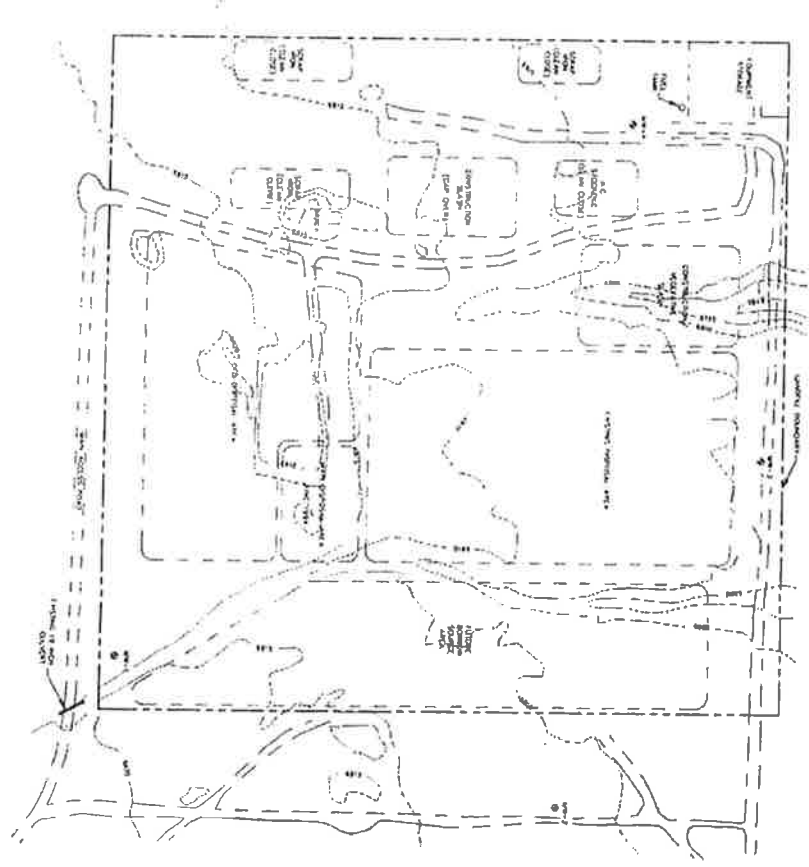
ATTACHMENT A



MONO COUNTY

<p>Figure <b>1</b></p>	<p><b>PUMICE VALLEY LANDFILL DETECTION MONITORING PROGRAM Mono County, California</b></p>	<p><b>MONO COUNTY PUBLIC WORKS DEPARTMENT</b></p>		
	<p><b>LOCATION MAP</b></p>	<p>Drawing Date: <u>2/10/00</u></p>	<p>Rev.#</p>	<p>Date</p>
		<p>Prepared By: <u>E. Nikirk</u></p>		<p>Revision</p>
		<p>Checked By: <u>E. Nikirk</u></p>		
	<p>Approved By: <u>R. Boardman</u></p>			

# ATTACHMENT B



<p> <b>VECTOR</b>                  ENGINEERING, INC.                  12345 Main Street, Suite 200, Grand Valley, CA 92423 (916) 370-7410             </p>	
<p>                 DEPARTMENT OF PUBLIC WORKS                  MONO COUNTY, CALIFORNIA  <b>PUMICE VALLEY SOLID WASTE DISPOSAL FACILITY</b>                  EXISTING TOPOGRAPHY AND FACILITIES             </p>	
Drawing No. 27-24-LA3 11P OF 109P	Date: 11/19/06
Project No. 27-24	Title: PUMICE VALLEY
Revision: 1	Date: 11/19/06

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

**STANDARD PROVISIONS**  
FOR WASTE DISCHARGE REQUIREMENTS

1. Inspection and Entry

ATTACHMENT C

The Discharger shall permit Regional Board staff:

- a. to enter upon premises in which an effluent source is located or in which any required records are kept;
- b. to copy any records relating to the discharge or relating to compliance with the Waste Discharge Requirements;
- c. to inspect monitoring equipment or records; and
- d. to sample any discharge.

2. Reporting Requirements

- a. Pursuant to California Water Code 13267(b), the Discharger shall immediately notify the Regional Board by telephone whenever an adverse condition occurred as a result of this discharge; written confirmation shall follow within two weeks. An adverse condition includes, but is not limited to, spills of petroleum products or toxic chemicals, or damage to control facilities that could affect compliance.
- b. Pursuant to California Water Code Section 13260(c), any proposed material change in the character of the waste, manner or method of treatment or disposal, increase of discharge, or location of discharge, shall be reported to the Regional Board at least 120 days in advance of implementation of any such proposal. This shall include, but not limited to, all significant soil disturbances.
- c. The Owners/Discharger of property subject to Waste Discharge Requirements shall be considered to have a continuing responsibility for ensuring compliance with applicable Waste Discharge Requirements in the operations or use of the owned property. Pursuant to California Water Code Section 13260(c), any change in the ownership and/or operation of property subject to the Waste Discharge Requirements shall be reported to the Regional Board. Notification of applicable Waste Discharge Requirements shall be furnished in writing to the new owners and/or operators and a copy of such notification shall be sent to the Regional Board.
- d. If a Discharger becomes aware that any information submitted to the Regional Board is incorrect, the Discharger shall immediately notify the Regional Board, in writing and correct that information.
- e. Reports required by the Waste Discharge Requirements, and other information requested by the Regional Board, must be signed by a duly authorized representative of the Discharger. Under Section 13268 of the California Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars (\$1,000) for each day of violation.

- f. If the Discharger becomes aware that their Waste Discharge Requirements (or permit) is no longer needed (because the project will not be built or the discharge will cease) the Discharger shall notify the Regional Board in writing and request that their Waste Discharge Requirements (or permit) be rescinded.

3. Right to Revise Waste Discharge Requirements

The Regional Board reserves the privilege of changing all or any portion of the Waste Discharge Requirements upon legal notice to and after opportunity to be heard is given to all concerned parties.

4. Duty to Comply

Failure to comply with the Waste Discharge Requirements may constitute a violation of the California Water Code and is grounds for enforcement action or for permit termination, revocation and reissuance, or modification.

5. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of the Waste Discharge Requirements which has a reasonable likelihood of adversely affecting human health or the environment.

6. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with the Waste Discharge Requirements. Proper operation and maintenance includes adequate laboratory control, where appropriate, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by the Discharger, when necessary to achieve compliance with the conditions of the Waste Discharge Requirements.

7. Waste Discharge Requirement Actions

The Waste Discharge Requirements may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for waste discharge requirement modification, revocation and reissuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any of the Waste Discharge Requirements' conditions.

8. Property Rights

The Waste Discharge Requirements do not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

9. Enforcement

The California Water Code provides for civil liability and criminal penalties for violations or threatened violations of the Waste Discharge Requirements including imposition of civil liability or referral to the Attorney General.

10. Availability

A copy of the Waste Discharge Requirements shall be kept and maintained by the Discharger and be available at all times to operating personnel.

11. Severability

Provisions of the Waste Discharge Requirements are severable. If any provision of the requirements is found invalid, the remainder of the requirements shall not be affected.

12. Public Access

General public access shall be effectively excluded from disposal/treatment facilities.

13. Transfers

Providing there is no material change in the operation of the facility, this Order may be transferred to a new owner or operator. The owner/operator must request the transfer in writing and receive written approval from the Regional Board's Executive Officer.

14. Definitions

- a. "Surface waters" as used in this Order, include, but are not limited to, live streams, either perennial or ephemeral, which flow in natural or artificial water courses and natural lakes and artificial impoundments of waters. "Surface waters" does not include artificial water courses or impoundments used exclusively for wastewater disposal.
- b. "Ground waters" as used in this Order, include, but are not limited to, all subsurface waters being above atmospheric pressure and the capillary fringe of these waters.

15. Storm Protection

- a. All facilities used for collection, transport, treatment, storage, or disposal of waste shall be adequately protected against overflow, washout, inundation, structural damage or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of once in 100 years.

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION**

**REVISED MONITORING AND REPORTING PROGRAM NO. 01-56  
WDID NO. 6B260300011**

FOR

**THE COUNTY OF MONO AND THE  
LOS ANGELES DEPARTMENT OF WATER AND POWER  
PUMICE VALLEY CLASS III LANDFILL**

Mono County

---

I. WATER QUALITY PROTECTION STANDARD

A Water Quality Protection Standard is required by Title 27, California Code of Regulations (CCR) to assure the earliest possible detection of a release from the Pumice Valley Class III Landfill (Facility) to the underlying soil and/or ground water. The Facility is currently under a Detection Monitoring Program (DMP). This Monitoring and Reporting Program maintains the DMP for the existing Facility.

II. MONITORING

A. Discharge

The following shall be reported semi-annually (twice per year).

1. The volume of solid waste (in-place compacted volume in cubic yards) discharged to the Facility.
2. The percent of the total landfill volume used for solid waste disposal, including waste disposed this monitoring period.
3. Comments describing effectiveness of the load checking program for the Facility.
4. Water quality monitoring data collected in accordance with this Monitoring and Reporting Program No. 01-56, including actual values of constituents and parameters, shall be maintained in the Facility operating record and reported semi-annually.

B. Detection Monitoring Program

The Discharger as required by Section 20420 of Title 27, CCR, has developed an DMP. The DMP consists of four monitoring wells, one downgradient, one upgradient, and two cross gradient. The locations of the ground water monitoring wells and gradient are illustrated on Attachment "A." Monitoring shall be according to the DMP and shall be as follows:

1. Ground Water

a. Monitoring Parameters

The monitoring parameters are the metal surrogates, chloride, sulfate, nitrate as nitrogen, total dissolved solids, and volatile organic constituents as defined by Appendix I of 40 Code of Federal Regulations, Part 258. The monitoring parameters listed in Table 1, below, shall be measured from samples collected at the Facility according to the frequency specified. Data shall be reported in graphic and tabular form.

**Table No. 1**

<b><u>Parameters</u></b>	<b><u>Sampling Frequency</u></b>	<b><u>Units</u></b>
Total Dissolved Solids	semi-annually	mg/L
Chloride	semi-annually	mg/L
Nitrate as Nitrogen	semi-annually	mg/L
Sulfate	semi-annually	mg/L
Volatile Organic Compounds (Appendix I of 40 CFR, Part 258)	semi-annually	µg/L
Appendix II of 40 CFR, Part 258	five years	µg/L

b. Concentration Limits

- i. The Discharger is allowed, under Section 20400(a)(2), Title 27, CCR to calculate using a formula-based system, the concentration limits for each monitoring parameter and constituent of concern, which will equal the background value of that constituent as determined pursuant to Section 20415(e)(10)(B), Title 27, CCR.
- ii. The concentration limit for each man-made organic constituent, which is not proven to have originated from a source other than the Facility, is a laboratory detection limit for that constituent.

c. Monitoring Points

Well MW-2 is utilized as a monitoring point for detection monitoring at the point of compliance. Well MW-4 is utilized for background water quality monitoring. Well MW-1 and MW-3 are cross gradient wells and are not points of compliance. The ground water monitoring well locations are shown in Attachment "A" of this Monitoring and Reporting Program.

d. Monitoring Parameters

Ground water samples are to be collected and submitted for laboratory analysis at all monitoring points semi-annually for the monitoring parameters listed in Table No. 1 of this Monitoring and Reporting Program.

e. Constituents of Concern

Ground water samples shall be collected and submitted for laboratory analysis at all monitoring points for monitoring parameters listed in Table No. 1 of this Monitoring and Reporting Program.

f. Aquifer Characteristics

The aquifer characteristics listed in Table 2 shall be calculated and reported in graphic and tabular form semi-annually.

**Table No. 2**  
**Ground Water Field Measurements**

<b><u>Parameter</u></b>	<b><u>Units</u></b>
Depth to Ground Water	feet bgs
Static Water Level	feet above mean sea level
Electrical Conductivity	micromhos/cm
pH	pH Units
Temperature	deg. F or C
Turbidity	NTUs

**Ground Water Calculations**

Slope of Ground	
Water Gradient	ft/mile
Direction of Ground	
Water Gradient	degrees
Velocity of Ground	
Water Flow	feet/year



### III. DATA ANALYSIS

#### A. General Nonstatistical Data Analysis Method

In order to determine if a release has occurred from the Facility, evaluation of data will also be conducted using non-statistical methods. Non-statistical analysis shall be as follows:

##### 1. Physical Evidence

Physical evidence can include vegetation loss, unexplained volumetric changes in the landfill, ground water mounding, or soil discoloration. Each semi-annual report shall include comments on these physical elements.

##### 2. Time Series Plots

Each annual report shall include a time series plot for each constituent detected during the last year. Evidence of a release may include trends of increasing concentrations of one or more constituents over time.

#### B. General Statistical Analysis Method

The report titled "Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities" (U.S. EPA, 1989), shall be used to select the statistical test to use for comparing evaluation monitoring well data to background monitoring data. If more than 50 percent of the observations in the evaluation monitoring wells are below the detection limit, then the Test of Proportions will be used. If more than 50 percent are above the detection limit, then a One-Way Analysis of Variance (ANOVA) will be used (i.e., Bartlett's Test for Equality of Variances). For multiple well computations the computed F Statistic will be compared to the tabulated F Statistic at the five (5) percent significance level. If the calculated F value exceeds the tabulated value, then the hypothesis of equal means will be rejected. The Bonferroni t-Statistics will be computed to determine if the significant F is due to differences between background and compliance wells at the five (5) percent significance level.

### IV. REPORTING REQUIREMENTS

#### A. Scheduled Reports To Be Filed With The Regional Board

The following periodic reports shall be submitted to the Regional Board as specified below.

##### Semi-Annual Detection Monitoring Reports

1. Submit results of semi-annual sampling and laboratory analysis of ground water.

2. A letter transmitting the essential points in each report shall accompany each report. The letter shall include a discussion of any requirement violations found since the last report was submitted, and shall describe actions taken or planned for correcting those violations.
3. If the Discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to the correspondence transmitting this schedule will be satisfactory. If no violations have occurred since the last submittal, this shall be stated in the letter of transmittal.
4. For each monitored ground water body, a description and graphical presentation of the velocity and direction of ground water flow under/around the Unit, based upon water level elevations taken during the collection of the water quality data shall be submitted in the report.
5. A map or aerial photograph showing the locations of vadose zone and ground water monitoring points shall be submitted in the report.

B. Unscheduled Reports To Be Filed With The Regional Board

1. Notice of Tentative Release

Should the appropriate statistical or non-statistical data analysis indicate, for a given constituent of concern, that a release is tentatively identified, the Discharger shall:

- a. Immediately notify the Regional Board verbally as to the monitoring point(s) and constituent(s) or parameter(s) involved;
- b. Provide written notification by certified mail within seven days of such determination (Section 20420, Title 27, CCR). The notification should indicate the Discharger's intent to conduct verification sampling, initiate evaluation monitoring procedures, or demonstrate that a source other than the Facility is responsible of the release.
- c. If the Discharger chooses to attempt to demonstrate that a source other than the Facility is responsible for the release, the Discharger shall submit a supporting technical report within 90 days of detection of the release.

2. Engineering Feasibility Study Report

The Discharger shall, within 180 days of verifying the release, submit an Engineering Feasibility Study (Section 20420, Title 27) to preliminarily propose methods for corrective action.

C. General Provisions

The Discharger shall comply with the "General Provisions for Monitoring and Reporting," dated September 1, 1994, which is attached to and made part of this Monitoring and Reporting Program.

D. Submittal Periods

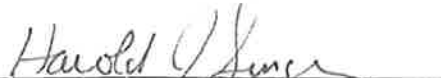
Semi-annual monitoring reports shall be submitted to the Regional Board semi-annually on the **15th day of the month** following the semester (**January 15th** and **July 15th** of each year).

E. Annual Report

On or before **March 1, 2002** and before **March 1** every year thereafter, the Discharger shall submit an annual report to the Regional Board. This report shall include an analysis of data from previous year(s), as described in the General Provisions for Monitoring and Reporting and Title 27 of the CCR. The annual report should include, but is not limited to the following:

1. graphical presentation and tabular form of analytical data from pervious monitoring over the last five year period;
2. demonstration of adequate load checking in compliance with the WDRs;
3. compliance record discussion;
4. waste allocation map and percent of remaining space for waste disposal; and
5. summary of changes along with financial review.

Ordered by:

  
HAROLD J. SINGER  
EXECUTIVE OFFICER

Dated: **October 10, 2001**

- Attachments:
- A. Location of Ground Water Monitoring Points
  - B. General Provisions for Monitoring and Reporting



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION

GENERAL PROVISIONS  
FOR MONITORING AND REPORTING ATTACHMENT B

1. SAMPLING AND ANALYSIS

- a. All analyses shall be performed in accordance with the current edition(s) of the following documents:
  - i. Standard Methods for the Examination of Water and Wastewater
  - ii. Methods for Chemical Analysis of Water and Wastes, EPA
- b. All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Health Services or a laboratory approved by the Regional Board. Specific methods of analysis must be identified on each laboratory report.
- c. Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The method used shall also be reported. If methods other than USEPA approved methods or Standard Methods are used, the exact methodology must be submitted for review and must be approved by the Regional Board prior to use.
- d. The Discharger shall establish chain-of-custody procedures to ensure that specific individuals are responsible for sample integrity from commencement of sample collection through delivery to an approved laboratory. Sample collection, storage and analysis shall be conducted in accordance with an approved Sampling and Analysis Plan (SAP). The most recent version of the approved SAP shall be kept at the facility.
- e. The Discharger shall calibrate and perform maintenance procedures on all monitoring instruments and equipment to ensure accuracy of measurements, or shall ensure that both activities will be conducted. The calibration of any wastewater flow measuring device shall be recorded and maintained in the permanent log book described in 2.b, below.
- f. A grab sample is defined as an individual sample collected in fewer than 15 minutes.
- g. A composite sample is defined as a combination of no fewer than eight individual samples obtained over the specified sampling period at equal intervals. The volume of each individual sample shall be proportional to the discharge flow rate at the time of sampling. The sampling period shall equal the discharge period, or 24 hours, whichever period is shorter.

## 2. OPERATIONAL REQUIREMENTS

### a. Sample Results

Pursuant to California Water Code Section 13267(b), the Discharger shall maintain all sampling and analytical results including: strip charts; date, exact place, and time of sampling; date analyses were performed; sample collector's name; analyst's name; analytical techniques used; and results of all analyses. Such records shall be obtained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

### b. Operational Log

Pursuant to California Water Code Section 13267(b), an operation and maintenance log shall be maintained at the facility. All monitoring and reporting data shall be recorded in a permanent log book.

## 3. REPORTING

- a. For every item where the requirements are not met, the Discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time and submit a timetable for correction.
- b. Pursuant to California Water Code Section 13267(b), all sampling shall be made available to the Regional Board upon request. Results shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.
- c. The Discharger shall provide a brief summary of any operational problems and maintenance activities to the Regional Board with each monitoring report. Any modifications or additions to, or any major maintenance conducted on, or any major problems occurring to the wastewater conveyance system, treatment facilities, or disposal facilities shall be included in this summary.
- d. Monitoring reports shall be signed by:
  - i. In the case of a corporation, by a principal executive officer at least of the level of vice-president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates;
  - ii. In the case of a partnership, by a general partner;

- iii. In the case of a sole proprietorship, by the proprietor;
  - iv. In the case of a municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.
- e. Monitoring reports are to include the following:
- i. Name and telephone number of individual who can answer questions about the report.
  - ii. The Monitoring and Reporting Program Number.
  - iii. WDID Number.
- f. Modifications

This Monitoring and Reporting Program may be modified at the discretion of the Regional Board Executive Officer.

#### 4. NONCOMPLIANCE

Under Section 13268 of the Water Code, any person failing or refusing to furnish technical or monitoring reports or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars (\$1,000) for each day of violation under Section 13268 of the Water Code.





# Preliminary Closure and Postclosure Maintenance Plan for the Pumice Valley Landfill

Report Prepared for



**Mono County  
Department of Public Works  
Solid Waste Division**



Report Update Prepared by:



**Mono County - Department of Public Works**

Prepared Date: June 1, 2016

*This document is an update to the report of disposal site information prepared for Mono County Public works by SRK Consulting (U.S.), Inc. dated: February 15, 2013*

# Preliminary Closure and Postclosure Maintenance Plan for the Pumice Valley Landfill

## Mono County Department of Public Works

Post Office Box 457  
Bridgeport, California 93517  
760.932.5440

### Certification Statement

This *Preliminary Closure and Postclosure Maintenance Plan for the Pumice Valley Landfill* was prepared pursuant to Title 27 of the California Code of Regulations as one component of the Joint Technical Document for the facility. This document was prepared by Mono County Public Works, under the direct supervision of the undersigned registered professional engineer. All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed, and the professional services have been performed, findings determined, and recommendations prepared in accordance with standard engineering principles and practices generally accepted at the time of document preparation. I certify that I have been authorized by Mono County to prepare this document on its behalf and that the information contained in this report is, to the best of my knowledge, true and correct. As such, this *Preliminary Closure and Postclosure Maintenance Plan* is certified for accuracy.



**Mono County - Department of Public Works**

Paul E. Roten, P.E. 56891 – Date: June 1, 2016



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- Appendix H: Landfill Gas Monitoring and Control Program
- Appendix I: Ground Water Monitoring Well Construction Logs
- Appendix J: Closure and Postclosure Cost Estimates
- Appendix K: Financial Assurance Documentation

# 1 Introduction

This *Preliminary Closure and Postclosure Maintenance Plan (PCPMP)* and the *Report of Disposal Site Information (RDSI)* together form the Joint Technical Document (JTD) for Mono County's Pumice Valley Landfill. The JTD has been prepared in accordance with Section 21585, Article 2, Subchapter 3, Chapter 4 of Title 27 of the California Code of Regulations (27 CCR). This PCPMP conforms to the requirements specified in 27 CCR Sections 21769(b), 21790, and 21825, and describes facility closure and postclosure maintenance activities developed to satisfy the performance standards specified in 27 CCR 20950(a)(2).

# 2 Site Description

The Pumice Valley Landfill is a Class III municipal solid waste landfill as defined by 27 CCR Section 20200 and is permitted under existing Solid Waste Facility Permit No. 26-AA-0003, issued in 1978. The site is also authorized to operate as a municipal solid waste landfill by the Lahontan Regional Water Quality Control Board (LRWQCB) under Waste Discharge Requirements WDID No. 6B260300011, issued in October 2001. Facility operations are administered by the Mono County Department of Public Works, Solid Waste Division (Division).

The facility is located at 200 Dross Road, approximately 1.8 miles east of the junction of State Highway 120(E) and U.S. Highway 395, south of the community of Lee Vining in central Mono County. According to the Public Land Survey System, the 50-acre site is situated within the NW $\frac{1}{4}$  NW $\frac{1}{4}$ , Section 36, Township 1 North, Range 26 East, Mount Diablo Baseline and Meridian (MDB&M). The location of the site in the context of state and county boundaries is illustrated on **Drawing 1**, which is enclosed in **Appendix A**.

The Pumice Valley Landfill has been in operation as a municipal solid waste disposal site since 1972. In 1973, Mono County entered into a lease agreement for the landfill property with the City of Los Angeles, Department of Water and Power (LADWP). The lease was renewed in 1975 for a five-year term and was renewed every five years until 2007 when the lease expired and the County operated under a "hold-over" occupancy status until March 2016 when the County acquired the property from LADWP and now operates the facility as both owner and operator.

Disposal operations occurred via trench and area-fill disposal methods until April 2001, at which time a temporary transfer station was installed to transfer residential and commercial municipal waste to Mono County's regional Benton Crossing Landfill. A permanent transfer station was subsequently constructed and has been operational since August 2004. The Transfer Station is a separate operation from the landfill, operating under a separate EA notification (26-AA-0017). The transfer station is currently operated under contract with D&S Waste Removal, Inc. (Yerington, Nevada), which is responsible for providing facility personnel, mobile equipment and rolling stock (e.g., transfer truck, compaction bins, debris boxes), litter control, and other facility support. Sanitary facilities are provided through a separate contract administered by the County. The transfer station includes a 70-foot truck scale, a solid waste compactor equipped with a generator and an enclosed 40-cubic-yard compaction bin, and a 40-cubic-yard debris box for scrap metal, white goods, waste tires, and bulky items.

The Pumice Valley Landfill is permitted to accept any Class III non-hazardous municipal solid waste in accordance with 27 CCR Section 20260. With household and commercial waste managed through the transfer station, on-site disposal is currently limited to inert debris and construction and demolition waste via above-grade area-fill disposal. However, loads of commercial and residential waste may be disposed of on-site in the event that transfer operations are temporarily discontinued due to equipment break-down, impassible road conditions, or for other unforeseen circumstances. In such an event, the Local Enforcement Agency (LEA) will be notified and the Division will implement daily cover operations in accordance with regulatory requirements.

In addition to the preceding, provisions have been made in the design and planning for the Pumice Valley Landfill should the site be needed to provide disposal capacity for unincorporated Mono County, following closure of the Benton Crossing Landfill. For the purposes of this plan and the site life calculations presented in **Appendix B**, it is assumed that the Pumice Valley Landfill will receive waste from unincorporated Mono County following closure of Benton Crossing Landfill for approximately 25 years from 2023 through mid-2048. Although the site life estimate reflects this scenario, Mono County is actively planning for the future management of the countywide waste stream, which includes discussions of a material recovery facility to reduce the waste stream, a long-haul transfer station to export the waste, the siting of a new regional landfill, as well as conversion technologies. The implementation of any of these alternatives will affect the need for disposal capacity and the site life at the Pumice Valley Landfill.

## 2.1 General

The facility is a combined landfill and transfer station accepting non-hazardous solid waste and construction and demolition waste from a service area that includes the communities of Lee Vining, June Lake, Mono City, and surrounding unincorporated areas. The Mono County Department of Public Works, Solid Waste Division (Division), is responsible for landfill operations, including providing personnel and equipment necessary for disposal and cover activities. Following diversion efforts, all residual household and commercial waste received at the transfer station is consolidated and hauled to the Benton Crossing Landfill for disposal.

The Division has compiled a detailed record of waste received from 2011 through 2015, which indicates that the site receives an average of 11.68 tons of waste per day (TPD, based on a 104-day annual average for the period) for diversion and disposal. Approximately 56 percent (or, 6.59 TPD) is accepted for disposal, while 44 percent (or, 5.08 TPD) is accepted and diverted through various diversion programs. Landfilled waste is comprised of inert waste and construction and demolition debris.

The existing waste footprint and the largest area requiring closure at any given time during the life of the landfill comprises approximately 23.6 acres. The waste footprint was established prior to promulgation of state solid waste regulations requiring the installation of bottom liners and leachate collection and removal systems in waste management units. Therefore, the Pumice Valley Landfill is an unlined facility without either of these protection systems. Existing sitewide environmental monitoring systems include a network of four ground water monitoring wells and a perimeter network of seven landfill gas monitoring wells.

Stormwater drainage control is accomplished via a system of temporary (during operations) and permanent (postclosure period) diversion and collection channels and retention basins designed to control the predicted runoff volumes generated by a 100-year, 24-hour storm event.

Existing site facilities and topography, sitewide monitoring systems, and the proposed final closure design are illustrated in the drawing set included in **Appendix A**. The design drawing set consists of the following:

- Drawing 1 – Title Sheet & Location Map;
- Drawing 2 – Existing Topography and Facilities;
- Drawing 3 – Final Grading Plan;
- Drawing 4A and 4B – Fill Sequencing Plan;
- Drawing 5 – Cross-Sections;
- Drawing 6 – Hydrologic Sub-Area Layout;
- Drawing 7 – Details, Sheet 1 of 2; and,
- Drawing 8 – Details, Sheet 2 of 2.

## 2.2 Site Life Calculations

The Pumice Valley Landfill has been designed with an approximate remaining site life of 32 years (i.e., through mid-2048). For purposes of the current planning scenario, the design is intended to accommodate the existing Pumice Valley Landfill waste stream through January 1, 2023, with the potential addition of the waste stream from unincorporated Mono County from 2024 through mid-2048. Based on the design presented by the final grades in **Drawing 3**, the landfill has an available remaining capacity (not including final cover) of approximately 508,840 cubic yards (cy), consisting of an estimated 363,840 cy of waste and 144,990 cy of cover soil. Detailed site life and remaining capacity calculations are included in **Appendix B**.

## 2.3 Surrounding and Postclosure Land Use

The property surrounding the Pumice Valley Landfill and Transfer Station is either owned by the LADWP, or owned by the public and administered by the United States Department of Interior, Bureau of Land Management, Bishop Field Office (BLM), or the United States Department of Agriculture, Inyo National Forest (INF). There are no residences or structures within 1,000 feet of the facility property boundary. City of Los Angeles lands in the vicinity are zoned as “OS – Open Space.” Lands in the area managed by BLM and INF are assigned a zoning designation of “RM – Resource Management” and are primarily used for grazing, recreation, and open space. The landfill property is designated in the Land Use Element of the Mono County General Plan as “PF” for public facilities, which explicitly allows for use as a solid waste landfill. Land uses in the surrounding area are depicted on **Figure 1** in **Appendix A**.

It is currently anticipated that postclosure use of the site will include maintenance and operation of the transfer station. The transfer station consists of a 70-foot-long truck scale with concrete approach ramps and foundation, a concrete sidewalk, a portable scalehouse, two portable secondary-containment storage sheds for temporary storage of household hazardous waste, a portable 500-gallon above-ground used oil storage tank, and an open-air, split-level transfer station, as described in Section 2.0.

The remainder of the site will be closed in accordance with this plan, and its end use (except for the transfer station) will be consistent with surrounding terrain, land uses, and the current agricultural use zoning. It is anticipated that following site closure and completion of the postclosure maintenance period, the site will be maintained as non-irrigated “open space” designation in accordance with the Mono County General Plan.

# 3 Preliminary Closure Plan

This Preliminary Closure Plan has been prepared in accordance with 27 CCR Sections 21769(b), 21790. The primary purpose of this Plan is to provide a basis for developing a detailed estimate of closure construction costs.

## 3.1 Site Security and Structure Removal

At least 60 days prior to the projected final receipt of waste at the Pumice Valley Landfill, the Division will post a sign at the facility entrance gate and gatehouse notifying customers of the intended last day of operation and the location of an alternative permitted disposal site. The sign will remain in place at the Pumice Valley Landfill for a minimum of 180 days following the final receipt of waste. Additional measures taken by the Division to notify landfill users within the last 60 days of the final receipt of waste will be to: 1) place an ad in local newspapers; 2) hand out notices to customers during gate transactions; 3) mail notices to all users that have established accounts (i.e., utility bill inserts); and, 4) present information to the public at a meeting of the Mono Basin Regional Planning Advisory Committee (RPAC).

The full perimeter of the waste footprint is currently enclosed by a 6-foot-high chain-link fence with a locking entrance gate. This perimeter fence and locking gate will remain in place during the postclosure maintenance period to prevent unauthorized access. Existing soil borrow pits within the fenced perimeter will be converted to stormwater retention basins. Once the postclosure maintenance period has expired, public access to the site may be allowed in accordance with the *Final Postclosure Maintenance Plan*, if approved at that time by the LEA and other applicable regulatory agencies.

As part of closure construction activities, all site structures and facilities not needed during the postclosure period or for the remaining transfer station will be dismantled and removed from the site. Structures to be dismantled will be removed during closure construction and disposed within the landfill or transported to another landfill approved for receipt of such materials. It is anticipated that the only facilities existing at the time of closure that will remain on-site throughout the postclosure maintenance period will be the truck scale, scalehouse, and other transfer station facilities, the environmental monitoring and venting systems, components of the stormwater management system, access roads, perimeter fencing, and the entrance gate. The scalehouse, and any other structure remaining on-site, will be routinely monitored for the presence of methane gas throughout the postclosure period as described in Section 4.5.

### 3.2 Final Grading Plan and Final Cover Design

The final grading plan for the Pumice Valley Landfill is illustrated on **Drawing 3** in the plan set enclosed in **Appendix A**. Landfill sideslopes have been designed with an overall slope of 3H:1V (horizontal to vertical), while the top surface of the landfill has been designed as a series of ridges and swales with surface slopes of four percent graded toward collection channels constructed with a flowline of three percent.

Through the completion of settlement calculations presented in **Appendix C**, it is estimated that the waste fill may settle as much as 4.3 feet during the 30-year postclosure maintenance period. The potential for differential settlement due to the varying fill thicknesses and waste composition across the site has been accounted for by establishing the final surface grade of the landfill slightly steeper than the minimum of three percent established by 27 CCR Section 21090(b)(1)(A). While not a substitute for the five-year aerial surveys required by 27 CCR 21090(e)(2), the settlement at specific reference points on the waste mass will be monitored annually during the postclosure period to ensure that final surface grades continue to prevent ponding and erosion of the final cover. Consistent with 27 CCR 20950(d), a network of 15 settlement monuments will be installed on the closure cap following final cover construction to provide a fixed location to which routine surveys can be made to monitor settlement throughout the postclosure maintenance period. Two additional monuments will be established on native ground near the gatehouse to serve as fixed reference points. Proposed locations of the monuments and a detailed design are presented on **Drawing 3** and **Drawing 7**, respectively.

The final cover for the landfill has been designed in accordance with the requirements of 27 CCR 21090(a). Twelve inches of compacted clean fill will be placed over the existing 12-inch-thick interim cover layer to form a 24-inch foundation layer. Prior to placement of clean fill, the interim cover layer will either be demonstrated to already satisfy the minimum compaction specifications, or will be scarified to a minimum depth of 12 inches, moisture conditioned, and recompacted to a minimum of 90 percent of maximum dry density at  $\pm 2$  percent of optimum moisture content as determined by modified Proctor testing (ASTM D1557). The upper 12 inches of foundation material will be placed in loose lifts not exceeding 8 inches thick, moisture conditioned, and compacted to a minimum of 90 percent of maximum dry density at  $\pm 2$  percent of optimum moisture content (ASTM D1557). Upon completion, the top surface of the foundation layer will be inspected to ensure it is free of large rocks, wood, or other debris that could damage the geosynthetic liner during installation. Construction of the foundation layer will comply with the engineering design plans and technical specifications.



A geosynthetic clay liner (Bentomat ST or equivalent) will be placed over the foundation layer and will form the low-hydraulic conductivity component of the final cover. A minimum 12 inches of nominally compacted soil will then be placed over the GCL to protect its integrity, for erosion protection, and to accommodate root growth of naturally-occurring vegetation. This upper soil layer will be covered by one to three inches of wood chips generated and stockpiled through on-site waste diversion activities performed during the operational life of the landfill.

The wood chip layer will serve to protect the final cover from the effects of wind and water erosion and rain drop impact. The Division has successfully used wood chips for erosion protection at several of their existing landfill and transfer station sites. The feedstock for wood chips to be used in final cover construction will be clean green material generated through shredding trees, tree limbs, brush, or clean unpainted, untreated lumber. In no case will painted, treated or any wood products that contain glues or adhesives be used as feedstock during wood chip processing. The effectiveness of wood chips in this application will be routinely evaluated and documented during the postclosure maintenance period to ensure the requirements of 27 CCR 21090(a)(3) are satisfied. Should this method prove to be ineffective in preventing erosion, an alternative approach will be developed and submitted for regulatory approval. Because the wood chip layer will be placed as part of the final cover, the potential for wind and water erosion of the final cover surface is considered negligible. As a result, wind erosion and soil loss calculations have not been performed as part of this PCPMP.

In accordance with 27 CCR Section 221750(f), a slope stability analysis of the final cover layer was performed using the XSTABL computer software. This analysis indicated the proposed final cover system is stable on 3H:1V sideslopes under static conditions with a factor of safety of 1.9. The results of pseudostatic analyses predicted the potential for failure under seismic loading, but a deformation analysis indicates the predicted displacements are acceptable. The details of this analysis are included in the *Slope Stability Analysis* in **Appendix D**.

It is estimated that approximately 77,500 cy of soil will be required for final cover construction, plus an additional 38,800 cy for interim cover construction, which will be applied to fill surfaces as they reach final design grades during the operational life of the facility. Wood chip requirements for erosion control will be in the range of 3,200 cy to 9,700 cy. Soil to be used in final cover construction will be obtained from the on-site borrow source east of the waste disposal footprint, as depicted on **Drawing 3** in **Appendix A**. Borrow soils include gravels, sands and silts. Laboratory soil testing reports are included in **Appendix E**.

Final cover construction will be managed and documented in accordance with the *Construction Quality Assurance Manual* presented in **Appendix F**.

### 3.3 Drainage and Erosion Control System Design

The final configuration of the landfill was designed with a series of ridges and swales on the top deck, downdrains on sideslopes, and open diversion channels along the perimeter of the waste footprint. The ridge and swale system on the top surface limits the length of sheet flow and captures surface runoff in central drainage swales before flows can concentrate and become erosive. Surface swales then route storm flows to headwall diversion berms, into overside culvert drains, then into a series of perimeter collection channels. The perimeter channels will route flows into one of two retention basins located between the waste footprint and the property boundary. The combination of surface swales, headwall diversion berms, and overside drains minimize the potential for erosion of the final cover due to surface run-off.

With its location on a local topographic high between ephemeral drainages, the Pumice Valley Landfill is only susceptible to run-on flows during storm events from the area between the landfill's southern boundary and State Highway 120E. The topography presented on **Drawing 2** indicates that natural grades on all but the south side of the site slope outward to surrounding lower elevations. The area

between the landfill and State Highway 120E is characterized as relatively flat and densely vegetated with sagebrush, and is not a significant source of run-off.

The final grading plan and components of the storm water control system for the facility are illustrated in the drawing set in **Appendix A**. The *Drainage Facility Design Report* in **Appendix G** presents a discussion and detailed design of the sitewide drainage control system.

### 3.4 Landfill Gas Monitoring System

The Solid Waste Division currently monitors for the presence of landfill gas in the subsurface and ambient air at the landfill perimeter and in all site structures in accordance with the *Landfill Gas Monitoring and Control Program* included in **Appendix H**.

Seven landfill gas monitoring wells (GW-1 through GW-7) were installed around the perimeter of the property in October 2011 to complete the monitoring network required by 27 CCR Section 20921. Six wells were constructed with two probes each to measure separate intervals in the subsurface, while one well (GW-1) required only a single probe. Well construction logs and a typical construction detail are included in the *Landfill Gas Monitoring and Control Program* in **Appendix H**. The approximate locations of monitoring wells are illustrated on **Drawing 3** in **Appendix A**. A detailed discussion of postclosure landfill gas monitoring is provided in Section 4.5.

### 3.5 Leachate Monitoring and Control System

As previously discussed in Section 2.1 of this Plan, neither the existing landfill nor the proposed final landfill configuration includes provisions for a leachate collection and removal system. Therefore, a leachate monitoring and control system will not be required as part of site closure.

### 3.6 Details of Closure and Preliminary Closure Schedule

Rough grading will be performed by landfill equipment operators throughout the active life of the site. As a particular area of the landfill approaches finished grade, site equipment operators will place waste and intermediate cover soil so as to bring the grade as close to the final design elevations as possible, less the thickness of the constructed final cover. Interim cover consisting of a minimum compacted thickness of 12 inches of soil will be applied to all landfill surfaces that have reached final design elevations. The final cover will be constructed over the entire waste footprint once the site reaches its final design capacity – partial site closure is not proposed. All fill slopes and surfaces will be prepared at that time for the placement of final cover. Areas that have settled will be filled in, all slopes will be uniformly graded, and any protruding objects will be removed for proper disposal. The method of final cover installation is described below.

Following fine-grading of the final fill surface, the landfill will be surveyed to establish baseline elevations for final cover construction. The 12-inch interim cover layer in place at that time will be evaluated to determine whether it satisfies the minimum compaction specifications; if not, it will be scarified to a minimum depth of 12 inches, moisture conditioned, and recompacted to a minimum of 90 percent of maximum dry density at  $\pm 2$  percent of optimum moisture content as determined by modified Proctor testing (ASTM D1557). An additional 12 inches of compacted soil will be placed over the existing interim cover layer to form a 24-inch-thick foundation layer for placement of the low-hydraulic-conductivity layer. The upper 12 inches of foundation material will be placed in loose lifts not exceeding 8 inches thick, moisture conditioned, and compacted to a minimum of 90 percent of maximum dry density at  $\pm 2$  percent of optimum moisture content (ASTM D1557). The top surface of the foundation layer will be free of large rocks, wood, or other debris that could damage the liner during installation. Construction of the foundation layer will comply with the approved engineering plans and technical specifications. A geosynthetic clay liner (GCL) will then be placed over the foundation layer and, in accordance with 27 CCR Section 21090(a)(2), will have a hydraulic conductivity of  $1 \times 10^{-6}$

centimeters per second (cm/sec), or less. Both the foundation and low-hydraulic-conductivity layers will be installed in accordance with the *Construction Quality Assurance Manual* in **Appendix F**.

Following placement and certification of the low-hydraulic-conductivity layer, a minimum of 12 inches of soil will be placed over the GCL, followed by the placement of one to three inches of wood chips hauled from on-site stockpiles generated by waste diversion activities during the operational life of the facility. Because of the relatively arid climate and the potential difficulties in revegetating the final cover, the Division has elected to use a mechanically erosion-resistant layer to protect the final cover surface. It is expected, however, that natural vegetative processes will ultimately result in growth of native plant species throughout the site. Settlement monuments will then be installed on the cover surface pursuant to 27 CCR 20950(d) and as described in Section 3.2 of the Plan.

Drainage channels and soil borrow pits serving as retention basins will be constructed throughout the life of the facility in accordance with Section 4.3 of this Plan, the *Drainage Facility Design Report* in **Appendix G**, and as shown on **Drawing 3 and 6 (Appendix A)**. Drainage facilities will assist in maintaining the integrity of the final cover and preventing a washout of waste due to uncontrolled runoff during precipitation events.

At the completion of closure activities, the Division will have an aerial survey performed and the a topographic map of the entire site will be prepared to document as-built conditions of landfill closure construction in accordance with 27 CCR 21090(e).

Based on the site life estimate and loading rate calculations presented in Section 3.2, the Pumice Valley Landfill is expected to reach the end of its design life sometime in mid-2048. The Division will prepare and submit a *Final Closure and Postclosure Maintenance Plan* two years prior to the anticipated closure date. Notification of site closure shall be performed according to the schedule detailed in Section 3.1, above. Closure construction will be initiated within 30 days of the final receipt of waste and will be completed within 180 days of implementation.

### 3.7 Construction Quality Assurance Manual

A detailed *Construction Quality Assurance Manual* has been prepared in accordance with 27 CCR Sections 20323 and 20324 and is included in **Appendix F**. Final cover construction shall be performed in accordance with the details of that plan.

## 4 Preliminary Postclosure Maintenance Plan

This *Preliminary Postclosure Maintenance Plan* has been prepared in accordance with 27 CCR Section 21825. The primary purpose of this Plan is to provide a basis for establishing a preliminary estimate of postclosure monitoring, maintenance, and inspection costs. Although the cost estimate included in **Appendix J** has been prepared to reflect inspection and maintenance tasks conducted by a third party, it is anticipated that this work will actually be performed in-house by Public Works personnel.

Routine postclosure inspections will be scheduled once per quarter. Inspections may be postponed or rescheduled when the site is snow-covered and elements that require inspection, such as perimeter access roads (necessary for site security inspection), final cover, and drainage facilities, are unable to be properly inspected.

It is anticipated that the site will reach a state of equilibrium over time, and as such, the frequency of monitoring may be incrementally reduced as the postclosure maintenance period progresses. Should the Division feel that such an action is justified, a petition for a reduction in monitoring frequency will be submitted to regulatory agencies at that time for consideration.

## 4.1 Maintenance of Site Security and Access Features

The perimeter fence and locking gate will be inspected at least three times a year (second, third, and fourth quarters) for areas needing repair and for evidence of vandalism and illegal dumping. Repairs will be completed as soon as is practicable following discovery. Site access roads remaining on-site during the postclosure maintenance period will also be inspected at least three times a year for excessive erosion and rutting. Should repairs be required, they will be scheduled to be completed as soon as is practicable.

## 4.2 Final Cover Maintenance

The final cover has been designed in accordance with 27 CCR Section 21090(a) to require minimum maintenance. With proper construction and maintenance, it will provide a long-term barrier to fluid infiltration, isolate the waste mass from the environment, and promote drainage away from landfill areas. The following inspection and maintenance procedures have been developed to ensure the effectiveness of the final cover layer throughout the postclosure period.

A cover-integrity monitoring and maintenance program will be established in accordance with 27 CCR Section 21090(a)(4) to provide for periodic searches for leaks, identification of problem areas such as areas lacking free drainage and areas of erosion. The final cover will be visually inspected at least three times a year (second, third, and fourth quarters) during the postclosure period and immediately following significant storm events to identify any breach of the final cover integrity. The individual performing the inspection will search for areas of settlement, subsidence, or erosion and areas that may have been damaged by vandalism or burrowing animals. Problem areas identified during inspections will be promptly repaired in accordance with the original *Construction Quality Assurance Manual (Appendix F)*. In the case of subsidence or settlement, the integrity of the low-permeability layer will be evaluated, and any repairs will be made using imported materials (if necessary) or soil from the on-site borrow pit to repair the area to a uniform slope consistent with the original design configuration.

In addition to the above-described regular inspections of the final cover, the Division will perform a leak search once per year during the postclosure period in accordance with 27 CCR 21090(a)(4)(A). The leak search will consist of walking the closed surface of the landfill in a regularly-spaced grid pattern while using a hand-held gas detection monitor (e.g., RKI Eagle portable multi-gas detector) to search for the presence of methane. The leak search will be performed at a time when winds are calm to maximize the possibility of methane detection. The gas detection monitor will be held at waist height and remain in continuous measuring mode while the inspector slowly walks the landfill. Methane readings will be recorded and plotted on a map of the landfill using GPS coordinates, and areas of methane concentration, if present, will be closely inspected for evidence of damage to the final cover layer. The results of the leak inspection will be incorporated into the postclosure landfill gas monitoring reports. If the results of the leak search indicate an area of the final cover may require repair, the area will be repaired and the repair documented and tested in accordance with the original *Construction Quality Assurance Manual (Appendix F)*.

## 4.3 Drainage and Erosion Control System Maintenance

The drainage control system presented on **Drawing 3** and **6 (Appendix A)** has been designed to accommodate the anticipated volume of precipitation and peak flows and surface run-off resulting from a 100-year, 24-hour storm event. All components of the sitewide drainage control system will be inspected as part of routine landfill inspections conducted during the operating life and quarterly during the postclosure period to ensure the effectiveness of the system is preserved. In addition, the drainage

control system will be inspected during the active life and the postclosure period after each heavy precipitation event to verify the integrity of the run-off control system. Any channels or system components that require repair will be restored to design grades (after taking settlement into account) according to the approved plan. All drainage facilities will be constructed and maintained in accordance with the requirements of 27 CCR 21150.

#### 4.4 Leachate Monitoring and Control System Maintenance

As previously discussed in Section 2.1 of this Plan, neither the existing landfill nor the proposed final landfill configuration includes provisions for a leachate collection and removal system. Therefore, inspection and maintenance of a leachate monitoring and control system will not be required during the postclosure period.

#### 4.5 Landfill Gas Monitoring

Section 20921 of 27 CCR requires all municipal solid waste landfill operators to ensure that the concentration of methane gas generated by waste management units does not exceed 1.25 percent by volume in air (i.e., 25 percent of the lower explosive limit, LEL) in on-site structures or five percent by volume in air (i.e., 100 percent of the LEL) migrating from the landfill at the property boundary. Accordingly, the Division will monitor methane concentrations in ambient air in remaining on-site structures, at the landfill property boundary, and in a perimeter network of subsurface landfill gas monitoring wells on a quarterly basis during the postclosure period to ensure that gas generation is detected, if present. As previously stated, it is anticipated that all structures not related to transfer station operations will be removed from the site either prior to, or as a part of, closure construction activities. Construction logs for the existing landfill gas monitoring wells are included as an attachment to the *Landfill Gas Monitoring and Control Program* enclosed in **Appendix H**.

An RKI Eagle portable multi-gas detector is currently used to monitor for the presence of methane in ambient air at the landfill perimeter and in site structures. The RKI Eagle samples air continuously and electronically records results in an internal memory that can be downloaded to a personal computer. The RKI Eagle is capable of measuring methane concentrations from zero to 1,000 ppm and the lower explosive limit (LEL) for methane from zero to 100 percent. For structure monitoring, the RKI Eagle sampling tube is slowly moved throughout the interior of each structure at both floor and ceiling height. Monitored locations include all areas where gas may potentially accumulate. Structures currently monitored at the Pumice Valley Landfill include the modular office/storage building, scalehouse, and household hazardous waste storage lockers (refer to **Drawing 2**). The base of each of these structures is elevated above the surrounding grade either due to a skid-mounted frame (scalehouse and storage locker) or by pedestals (modular office/storage building), which allows the free circulation of air between the floor frame and ground surface. As integral components to transfer station operations, these structures will remain in-place following landfill closure. Should there be any additional structures constructed or installed at the site, they will be added to the inventory of monitoring locations.

Ambient air monitoring in structures (those remaining after landfill closure for transfer station operations) and at the property boundary will continue during the postclosure period. In addition, the network of perimeter landfill gas monitoring wells (GW-1 through GW-7) will be sampled for methane concentrations using the RKI Eagle or other equivalent approved monitor. Existing landfill gas monitoring well locations are illustrated on **Drawing 3**. The RKI Eagle's sampling pump inlet tube will be connected to the valve at the top of each gas probe, the sampling pump and monitor will be set to continuous monitoring mode, and air within the probe will be sampled until the measurements stabilize. The variation of gas concentrations over time will be recorded until the concentrations of all gases

(CO<sub>2</sub>, O<sub>2</sub> and CH<sub>4</sub>) do not fluctuate more than 0.5 percent. During landfill perimeter monitoring, the technician holds the RKI Eagle sampling tube at waist height and walks the landfill perimeter in between landfill gas monitoring wells.

Results of landfill gas monitoring, including the initial and steady state concentrations of methane, as well as any other landfill gases that exceed regulatory limits, will be submitted to the LEA within 90 days of sampling. Monitoring reports will include:

- the concentration of methane, and any other landfill gas that exceeded regulatory limits, measured at each monitoring location;
- date, time, barometric pressure, atmospheric temperature, and weather conditions;
- the name(s) of sampling personnel, equipment utilized, and a brief description of the methods used; and,
- a numbering system to correlate monitoring results to a corresponding probe location.

If the concentration of methane exceeds the compliance levels described above, Division personnel will immediately take all steps necessary to protect public health and safety and the environment. The LEA will be notified by telephone or electronic means as soon as practicable after learning that compliance levels have been exceeded. LEA notification will include a description of the actions taken or proposed to be taken to resolve the problem.

Within seven days, the Solid Waste Superintendent or his designee will verify the validity of the results by reviewing the readings and determining the influence of potential factors such as liquid interference, control well influence, and barometric pressure. At that time, the Division will submit correspondence to the LEA, with a copy to the operating record, presenting the readings and describing the nature and extent of the problem and any immediate corrective actions taken to protect public health and safety and the environment. In its correspondence, the Division will also describe any short-term actions that will be taken to protect public health and safety and the environment prior to the development of a remediation plan. If the nature of the problem requires the development of a remediation plan and landfill gas control system, a plan and control system design will be prepared in accordance with 27 CCR Section 20937(a)(3) and (4). Approval will be obtained from the LEA prior to plan implementation. Following approval, the Division will enter the plan in the facility's operating record, implement the plan within 60 days (or as otherwise specified by the LEA), and notify the LEA when the plan has been implemented.

## 4.6 Ground Water Monitoring Plan

The LRWQCB adopted Waste Discharge Requirements (WDRs) for the Pumice Valley Landfill in November, 1987. These WDRs, together with subsequent amendments, required implementation of a ground water monitoring program at the facility that incorporates portions of Title 40 of the Code of Federal Regulations (CFR), Part 258 (Subtitle D), as implemented in the State of California under State Water Resources Control Board Resolution No. 93-62. In compliance with these requirements, four ground water monitoring wells were installed at the facility in January 1989 as part of the SWAT program (Kleinfelder, 1989). These wells were intended to provide background and detection monitoring ground water quality data. Well MW-3 became obstructed shortly after its installation and was replaced in October, 1995. Sampling of MW-4 was discontinued in the fall of 1997 when it was determined that the well is hydraulically cross-gradient rather than down-gradient from waste disposal areas and, as a redundant well, useful data was not being obtained. At the request of the LRWQCB, sampling of MW-4 was resumed in 2003 in place of MW-1. Existing ground water monitoring well locations are illustrated on **Drawing 2** and **3** in **Appendix A**. Well construction logs are included in **Appendix I**.

The depth to ground water at each monitoring location in the four most recent semi-annual sampling events are summarized in **Table 4-1**. All depths are in feet below ground surface (bgs).

**Table 4.6. Depth to Ground Water, 2014-2015**

Date	Location and Depth (ft. bgs)			
	MW-1	MW-2	MW-3	MW-4
May 2014	276.70	>270.5	261.58	256.50
October 2014	277.24	>270.5	262.02	257.11
May 2015	278.39	>270.5	263.03	>257.30
November 2015	279.69	>270.5	264.24	>257.30

Source: TEAM Engineering and Management

In November 1996, a sampling and analysis plan (Vector, 1996) was submitted to the LRWQCB and in January 1997, Water Quality Protection Standards (WQPS), including concentration limits for the Constituents of Concern (COCs) and Monitoring Parameters specified in the amended WDRs, were established for the facility (Vector, 1997).

The 1997 WQPS report established a procedure for verifying the effectiveness of the detection monitoring program. The procedure requires that, at least once every five years, groundwater from facility wells be analyzed for the complete COC list of analytes. The most recent round of such sampling was completed in November, 2011, when no constituents were detected in groundwater underlying the facility.

In Autumn 1999, the LRWQCB, in response to a petition from the County, approved a reduction in monitoring frequency required at the landfill. As a result, ground water sampling and hydrologic measurements are currently performed semi-annually. It is currently anticipated that this sampling scheduled will be continued during the postclosure period.

## 5 Closure and Postclosure Cost Estimates

Detailed closure and postclosure cost estimates have been prepared in accordance with the details of this *Preliminary Closure and Postclosure Maintenance Plan* and 27 CCR Section 21820. The costs estimates are included in **Appendix J**.

Mono County has established financial assurance mechanisms for closure construction and postclosure maintenance as required by 27 CCR, sections 22205, 22207, 22210, and 22212. On August 14, 1990, the Mono County Board of Supervisors adopted Resolution No. 90-63, which pledged that revenues generated by various solid waste fees in effect at that time were to be deposited in the previously-established Solid Waste Enterprise Trust Fund to finance the requirements for closure and postclosure funding. Subsequent resolutions have amended the Enterprise Fund, the charges and fees for solid waste services within Mono County, and the administration of revenues generated by those charges and fees.

Currently, Mono County has established special revenue accounts within its Solid Waste Enterprise Fund to deposit annual closure funds for each of its landfills, consistent with 27 CCR 22241. Further, Mono County has a Pledge of Revenue fund agreement with CalRecycle (formerly the California Integrated Waste Management Board, or CIWMB) for postclosure maintenance in accordance with 27 CCR Section 22245. To that end, the Mono County Board of Supervisors adopted Resolution No. 97-67 authorizing the agreement between Mono County and CalRecycle, and subsequently executed a pledge of revenue agreement for financial assurance. Mono County has adopted a similar pedge of revenue and associated agreement with CalRecycle for corrective action. Copies of both resolutions and agreements are included in **Appendix K**, together with an updated summary of the 2016 financial assurance contributions to Mono County's financial assurance fund.

## 6 References

Edil, T. B., Ranguette, V. J., and Wuellner, W. W., "Settlement of Municipal Refuse," Geotechnics of Waste Fills – Theory and Practice, ASTM STP 1070, Arvid Landva and G. David Knowles, Eds., American Society for Testing and Materials, Philadelphia, 1990.

Kleinfelder, 1989, *Final Report – Calderon Water Quality Solid Waste Assessment Test (SWAT) at Pumice Valley Landfill – Mono County, California*: unpublished report prepared for Mono County by Kleinfelder, Inc., December 28, 1989.

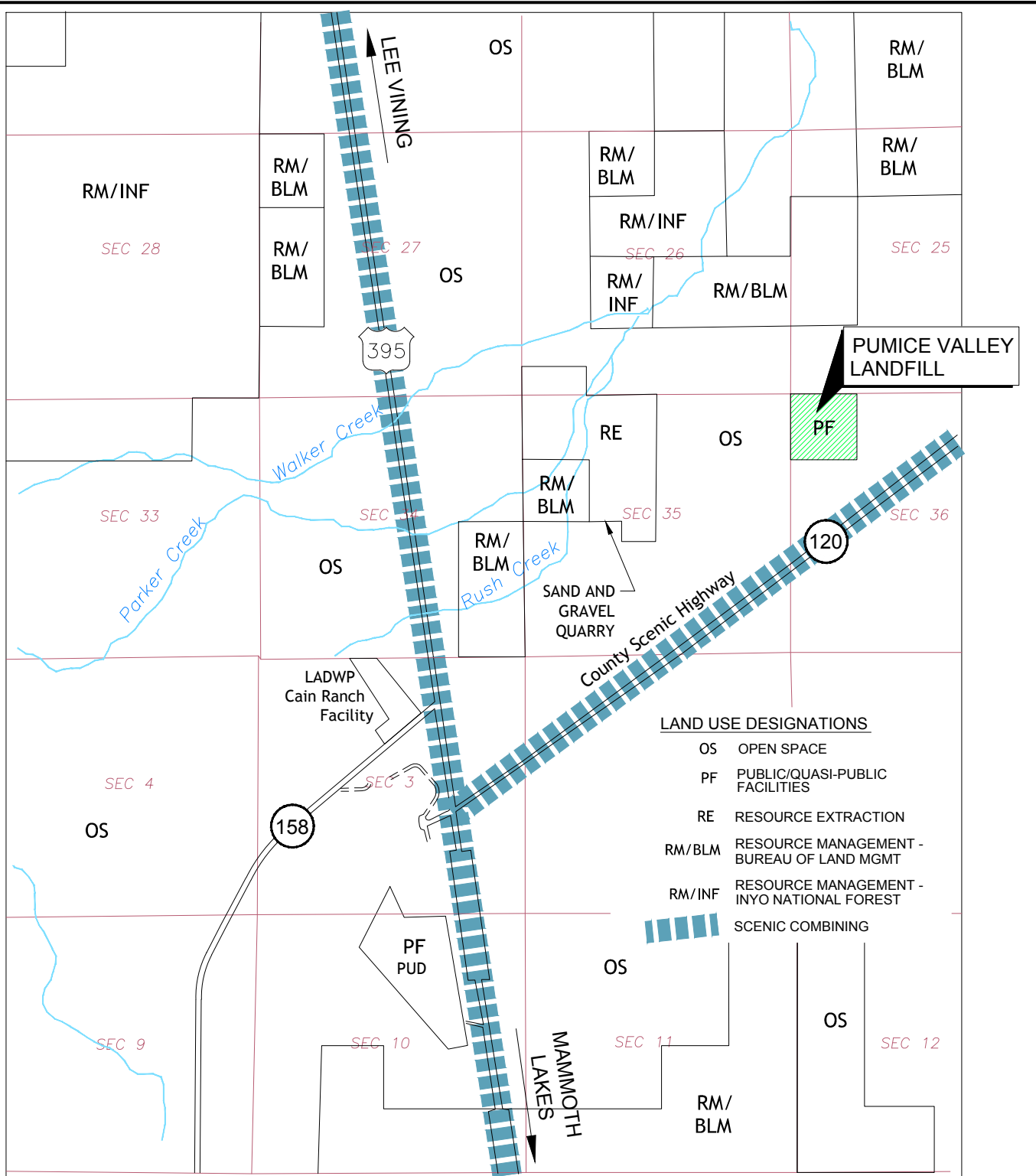
Vector Engineering, 1997, *Water Quality Protection Standard and Statistical Methods for the Pumice Valley Landfill, Mono County, California*; unpublished report prepared for the Mono County Department of Public Works, Vector Engineering, Inc., Carson City, Nevada, January 1997.

Vector Engineering, 1996, *Sampling and Analysis Plan for Six Landfills in Mono County, California*; unpublished report prepared for the Mono County Department of Public Works, Vector Engineering, Inc., Carson City, Nevada, November 15, 1996.



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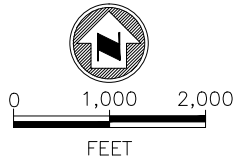
**Appendix A**  
**Figure and Reduced Drawing Set**



- LAND USE DESIGNATIONS**
- OS OPEN SPACE
  - PF PUBLIC/QUASI-PUBLIC FACILITIES
  - RE RESOURCE EXTRACTION
  - RM/BLM RESOURCE MANAGEMENT - BUREAU OF LAND MGMT
  - RM/INF RESOURCE MANAGEMENT - INYO NATIONAL FOREST
  - SCENIC COMBINING

Note:  
Development along County Scenic Highways are subject to Scenic Combining Visual Standards.

Modified from Figure 63,  
Mono County General  
Plan (November, 2000).



DESIGN: EN
DRAWN: TWW
REVIEWED: ---
CHECKED: EN
APPROVED: EN
IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

PREPARED BY:

PROJECT:

PRELIMINARY CLOSURE & POSTCLOSURE MAINTENANCE PLAN  
PUMICE VALLEY LANDFILL  
MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
MONO COUNTY, CALIFORNIA

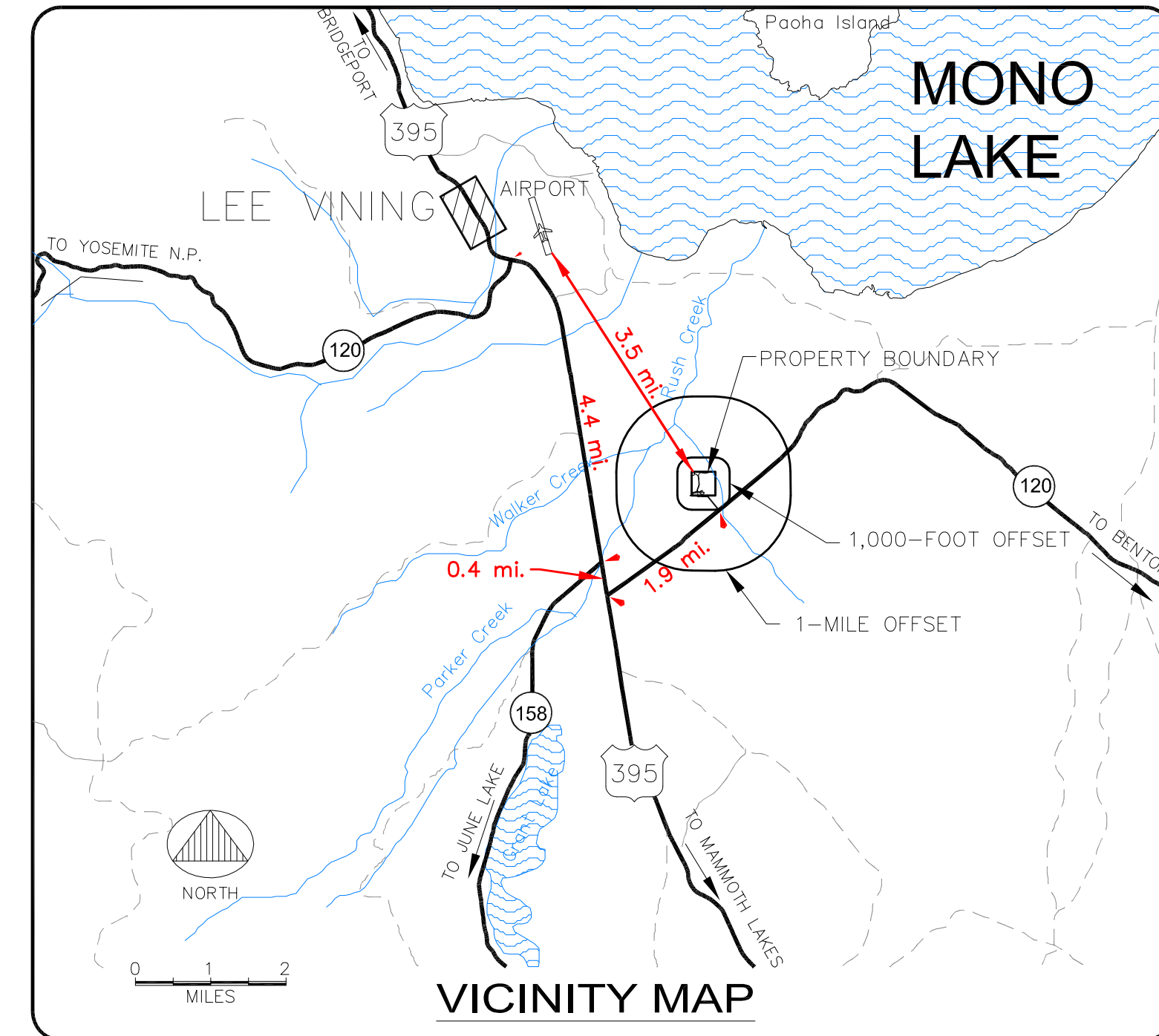
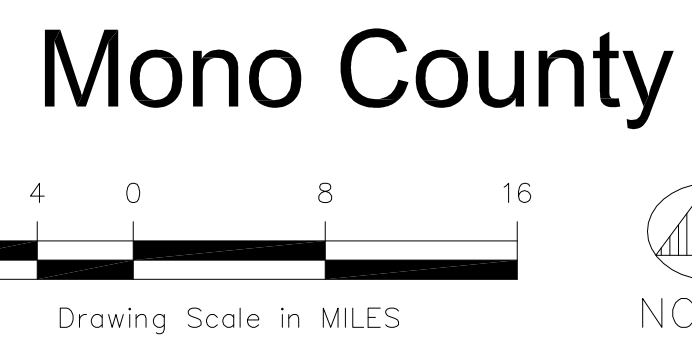
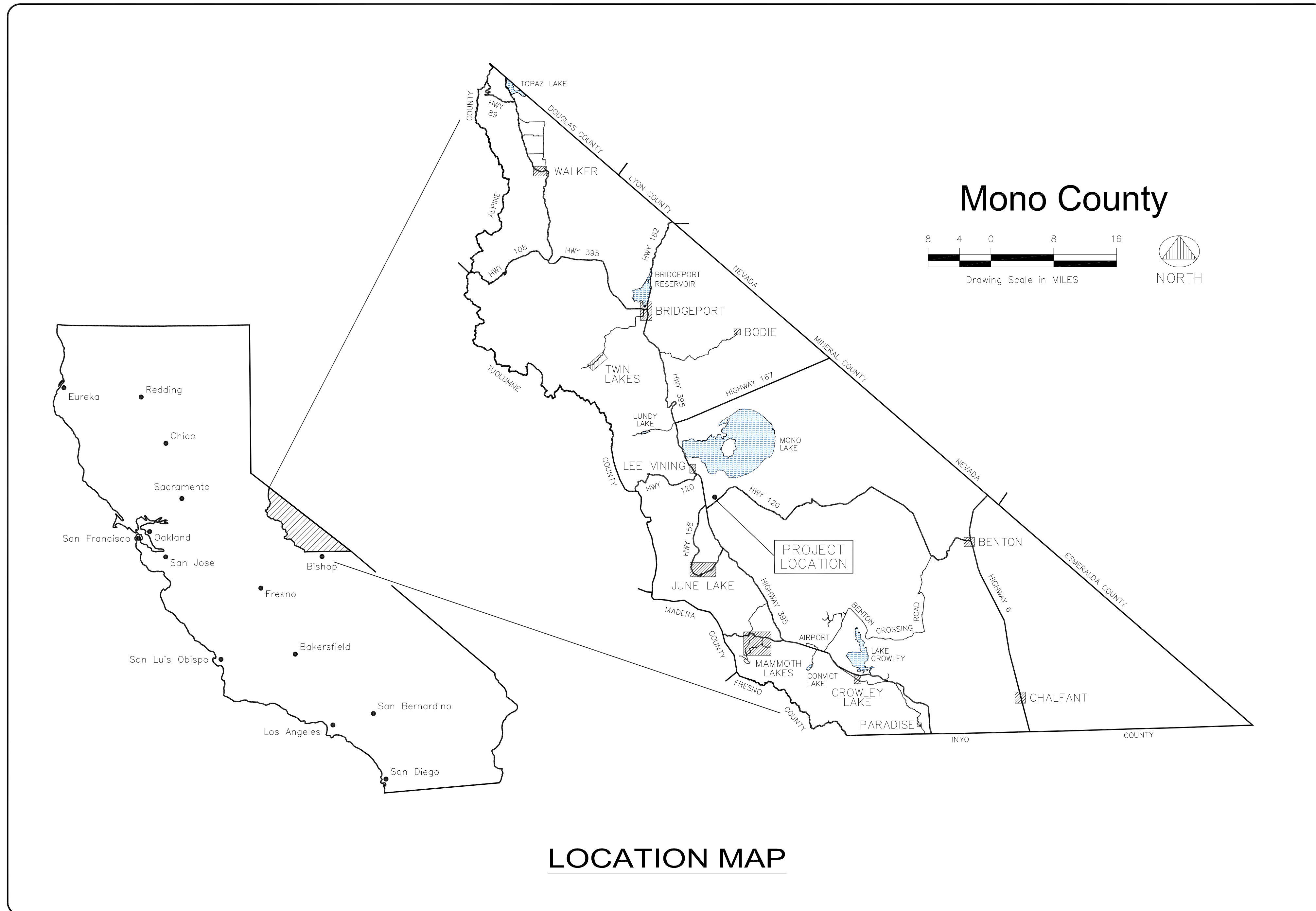
DRAWING TITLE: LAND USE MAP	
DRAWING NO.: FIGURE 1	REV. NO.
DATE: 02.15.2013	<b>A</b>
SRK JOB NO.: 146900.160	

# JOINT TECHNICAL DOCUMENT

## FOR THE

# PUMICE VALLEY LANDFILL

## MONO COUNTY, CALIFORNIA



### DRAWING INDEX

NO.	DRAWING NAME
1	TITLE SHEET & LOCATION MAP
2	EXISTING TOPOGRAPHY AND FACILITIES
3	FINAL GRADING PLAN
4A	FILL SEQUENCING PLAN A
4B	FILL SEQUENCING PLAN B
5	CROSS-SECTIONS
6	HYDROLOGIC SUB-AREA LAYOUT
7	DETAILS, SHEET 1 OF 2
8	DETAILS, SHEET 2 OF 2

### SYMBOLS

	EXISTING GROUND WATER MONITORING WELL
	PROPOSED LANDFILL GAS VENT
	EXISTING LANDFILL GAS MONITORING WELL
	EXISTING SURFACE ELEVATION
	EXISTING 2' CONTOUR GRADE
	EXISTING 10' CONTOUR GRADE
	PROPOSED FINAL GRADE 2' CONTOUR
	PROPOSED FINAL GRADE 10' CONTOUR
	FINAL SURFACE SLOPE
	PROPOSED DRAINAGE CHANNEL
	EXISTING FENCELINE
	GRAVEL ROAD / SITE ACCESS ROAD
	LIMITS OF DISPOSAL AREA OR STOCKPILE
	EXISTING PROPERTY BOUNDARY
	*SUBTITLE D* WASTE FOOTPRINT
	TRANSFER STATION FACILITIES
	DETAIL DESIGNATION
	REFERENCE PAGE
	CROSS-SECTION LOCATION

REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016

DESIGN: EN  
DRAWN: TWW  
REVIEWED: RBB  
CHECKED: EN  
APPROVED: EN  
SHEET: 01 OF 08

2016 UPDATE PREPARED BY  
MONO COUNTY PUBLIC WORKS

ORIGINAL DRAWINGS BY: st consulting

PREPARED FOR:  
MONO COUNTY  
DEPARTMENT OF  
PUBLIC WORKS  
SOLID WASTE DIVISION

REGISTERED PROFESSIONAL ENGINEER  
PAUL EDWARD ROTEN  
56891  
CIVIL  
STATE OF CALIFORNIA

IF THE ABOVE SCALES ARE NOT SCALE  
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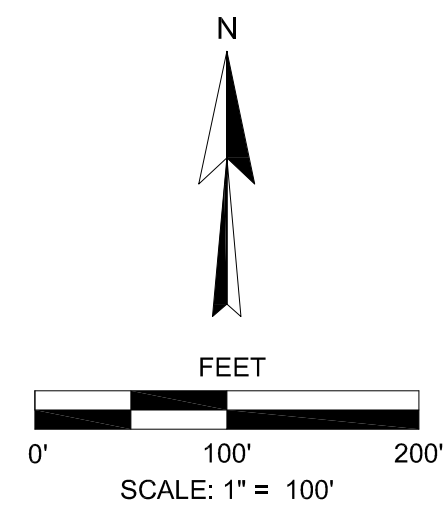
DRAWING TITLE: TITLE SHEET AND LOCATION MAP

PROJECT: PUMICE VALLEY LANDFILL  
JOINT TECHNICAL DOCUMENT

DATE: 02/15/2013  
SRK JOB NO.: 146900.160

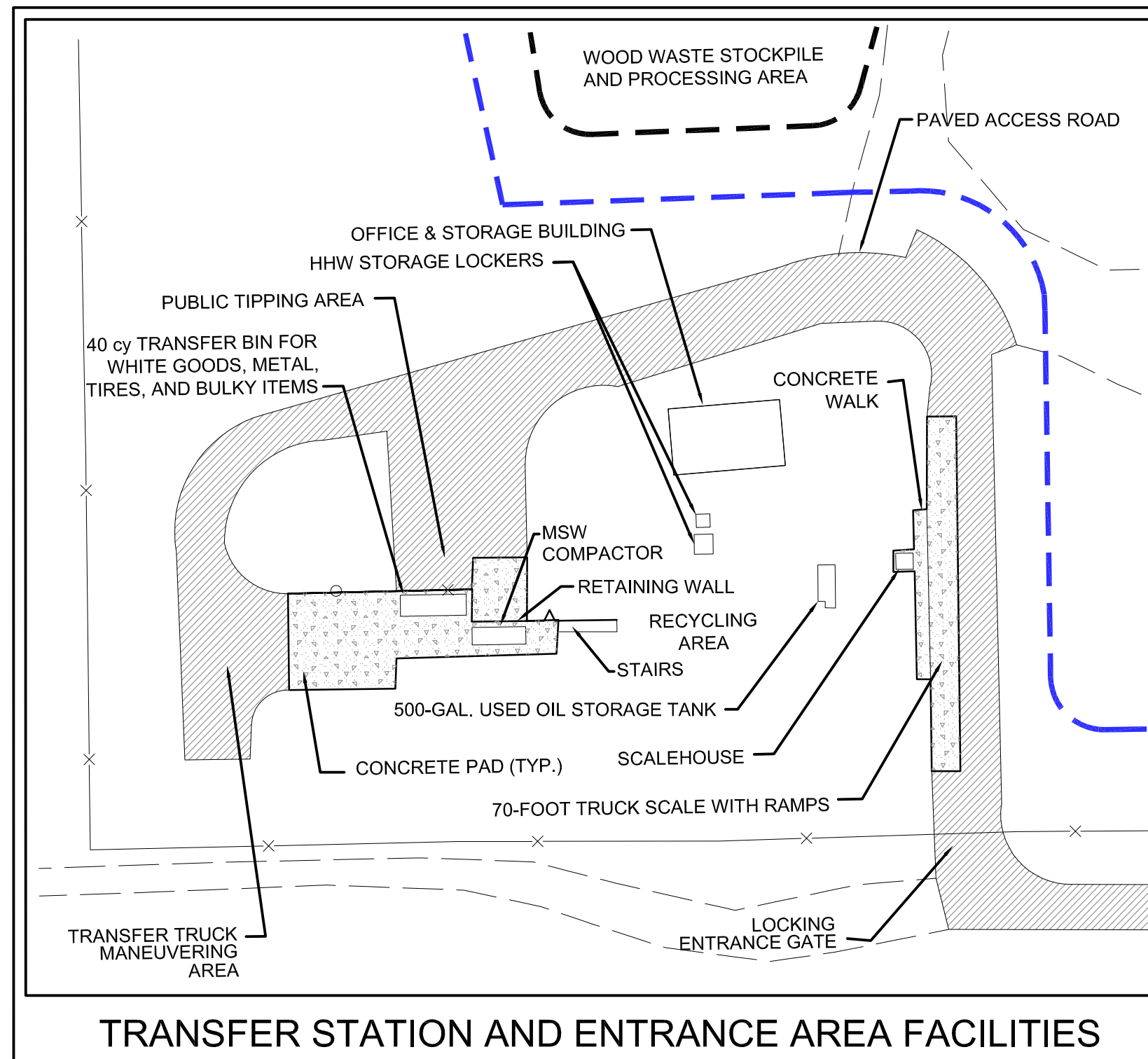
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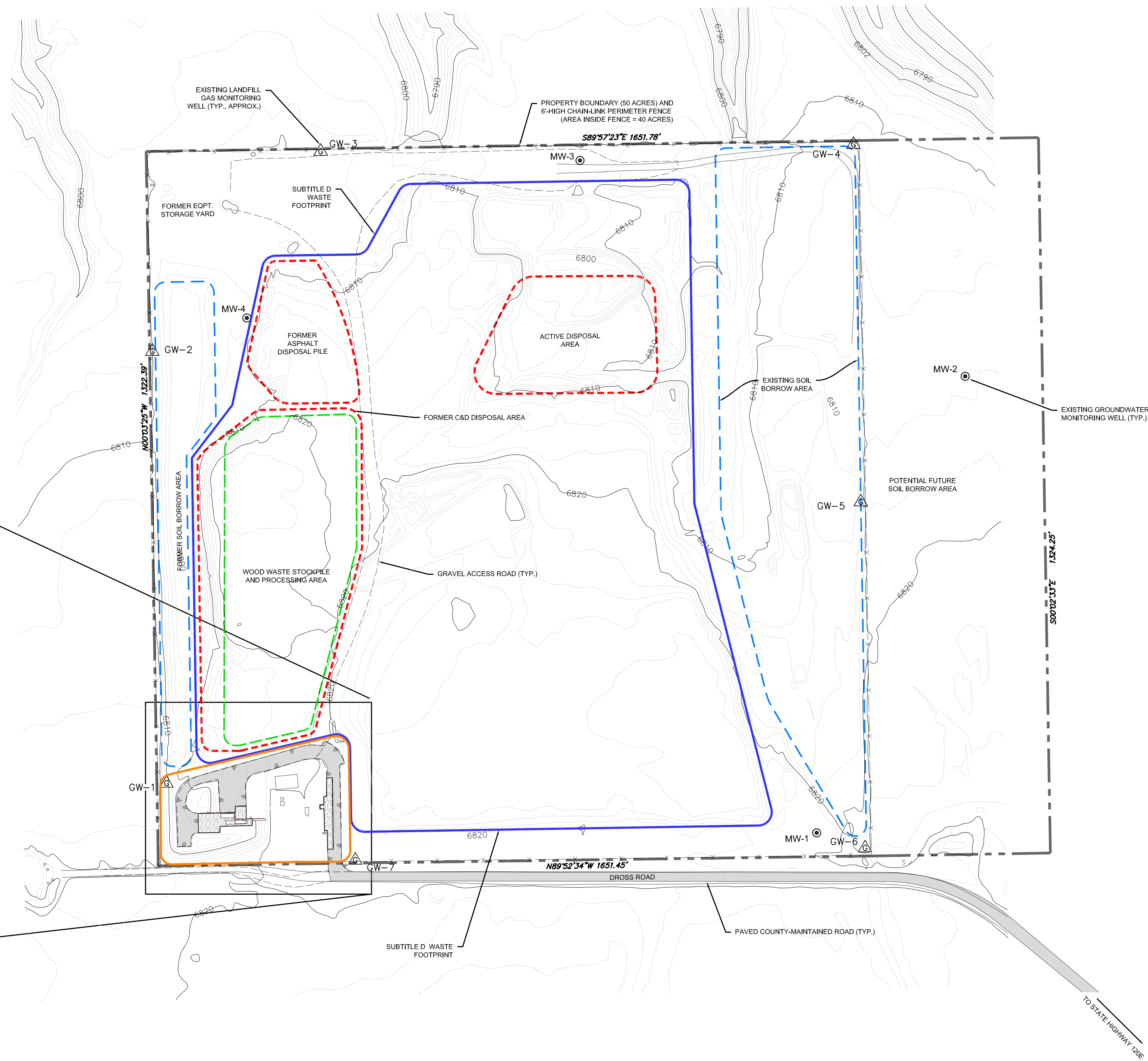


**PUMICE VALLEY LANDFILL AND TRANSFER STATION SUMMARY:**

LANDFILL 48.4 ACRES  
 SUBTITLE D WASTE FOOTPRINT 23.6 ACRES  
 TRANSFER STATION 1.6 ACRES

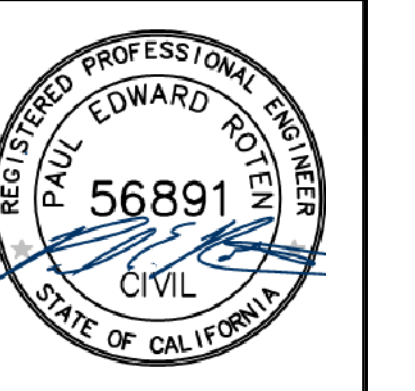


**TRANSFER STATION AND ENTRANCE AREA FACILITIES**



NOTE:  
 BASE TOPOGRAPHIC MAP PREPARED BY SPENCER B.  
 GROSS, INC.(RENO, NV). DATE OF PHOTOGRAPHY: 06.03.2011

REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016



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 CHECKED: EN  
 APPROVED: EN  
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**MONO COUNTY PUBLIC WORKS**

ORIGINAL DRAWINGS BY: **st consulting**

PREPARED FOR:  
**MONO COUNTY OF CALIFORNIA**  
**DEPARTMENT OF PUBLIC WORKS**  
**SOLID WASTE DIVISION**

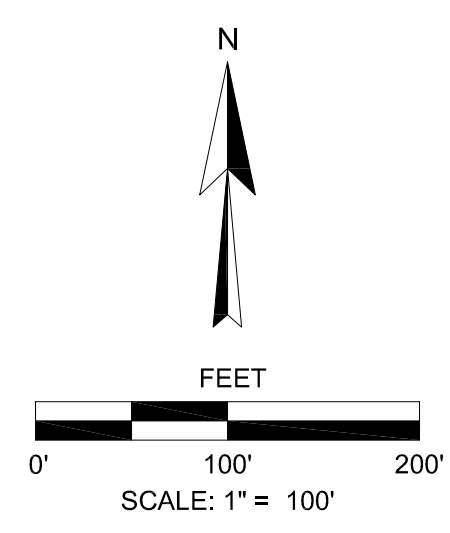
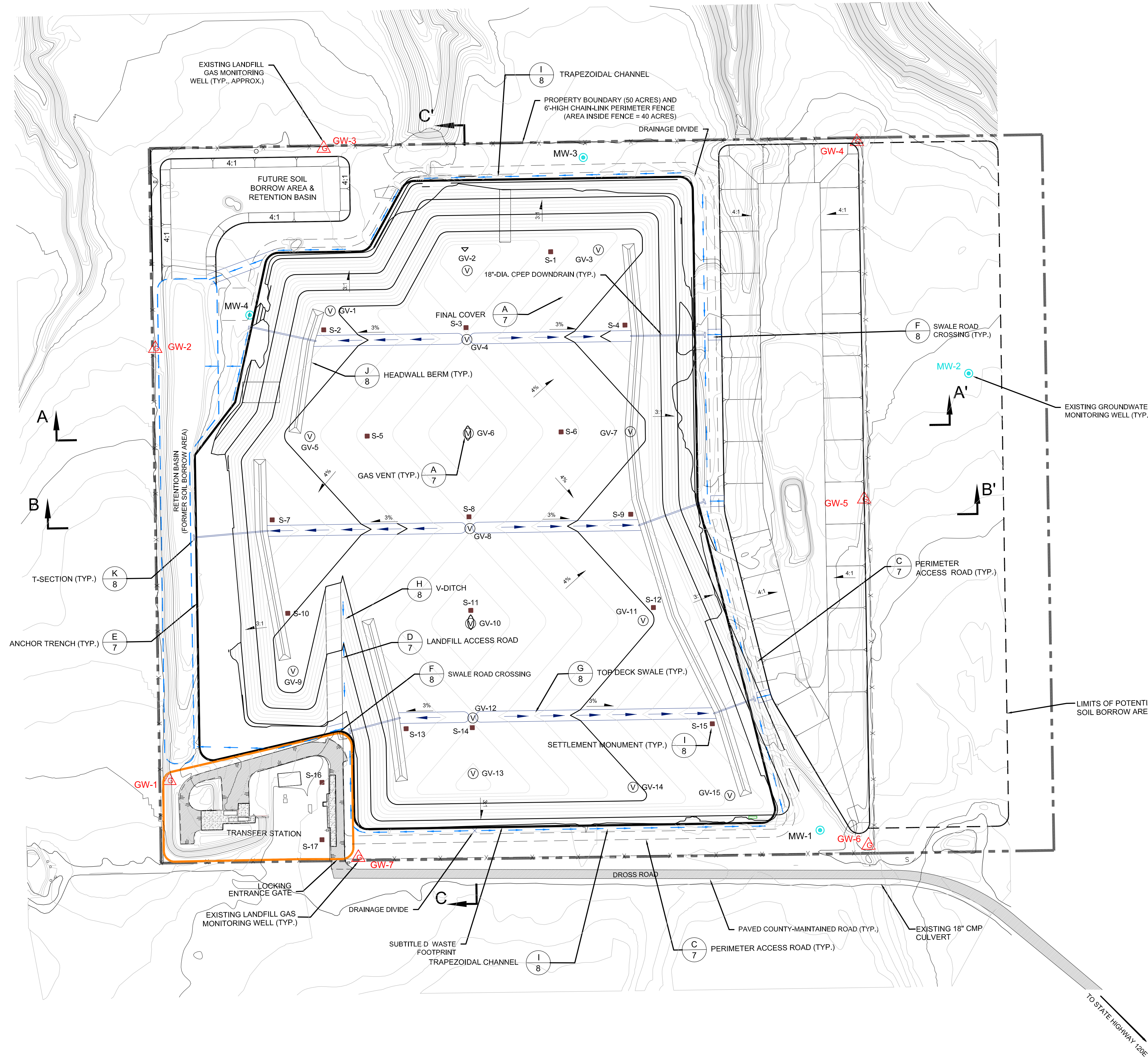
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**EXISTING TOPOGRAPHY AND FACILITIES**

PROJECT:  
**PUMICE VALLEY LANDFILL  
 JOINT TECHNICAL DOCUMENT**

DATE: 02/15/2013  
 SRK JOB NO.: 146900.160

REV. NO. A  
 DRAWING NO. C 02

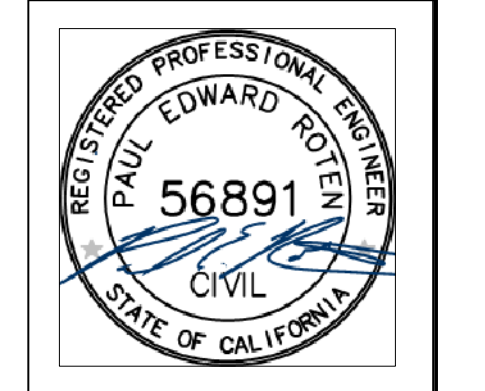
FILE NAME: 02 146900 10SPN01.dwg



**LEGEND**

- MW-2 EXISTING GROUNDWATER MONITORING WELL
- GV-15 PROPOSED LANDFILL GAS VENT
- GW-7 EXISTING LANDFILL GAS MONITORING WELL
- S-1 PROPOSED SETTLEMENT MONUMENT
- WASTE FOOTPRINT (APPROX.)
- DRAINAGE CHANNEL

REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
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 CHECKED/EN: [blank]  
 APPROVED/EN: [blank]  
 SHEET: 03 OF 08

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ORIGINAL DRAWINGS BY: **st consulting**

PREPARED FOR:  
**MONO COUNTY OF PUBLIC WORKS**  
**SOLID WASTE DIVISION**

DRAWING TITLE: **FINAL GRADING PLAN**

PROJECT: **PUMICE VALLEY LANDFILL JOINT TECHNICAL DOCUMENT**

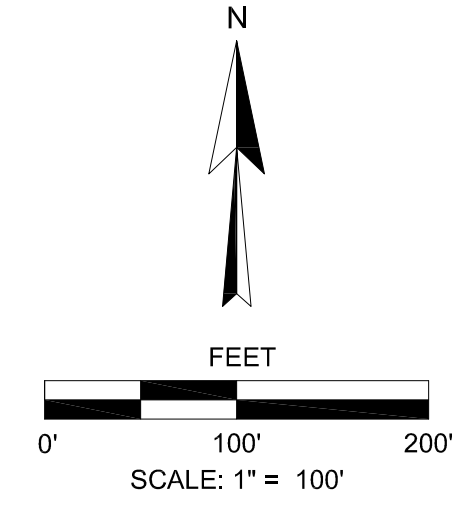
DATE: 02/15/2013  
 SRK JOB NO.: 146900.160

REV. NO.: **B**  
 DRAWING NO.: **C 03**

FILE NAME: 03 146900 110CRP01.dwg

**FIRST LEVEL**

- (C1)** C&D WASTE CELL (TO ELEV. 6810')
- (C2)** C&D WASTE CELL (TO ELEV. 6810')
- (M1)** MSW CELL (TO ELEV. 6825')
- (M2)** MSW CELL (TO ELEV. 6825')
- (M3)** MSW CELL (TO ELEV. 6825')
- (M4)** MSW CELL (TO ELEV. 6825')



REV.	DESCRIPTION	DATE
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 DRAWN: TWW  
 REVIEWED: RBB  
 CHECKED: EN  
 APPROVED: EN  
 SHEET: 04 OF 08

IF THE ABOVE BAR SCALES WERE NOT SCALE  
 1 INCH, THE DRAWING SCALE IS ALTERED

2016 UPDATE PREPARED BY  
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ORIGINAL DRAWINGS BY: **st consulting**

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 PUBLIC WORKS  
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DRAWING TITLE  
**FILL SEQUENCING PLAN**

PROJECT  
**PUMICE VALLEY LANDFILL  
 JOINT TECHNICAL DOCUMENT**

DATE: 02/15/2013  
 SRK JOB NO.: 146900.160

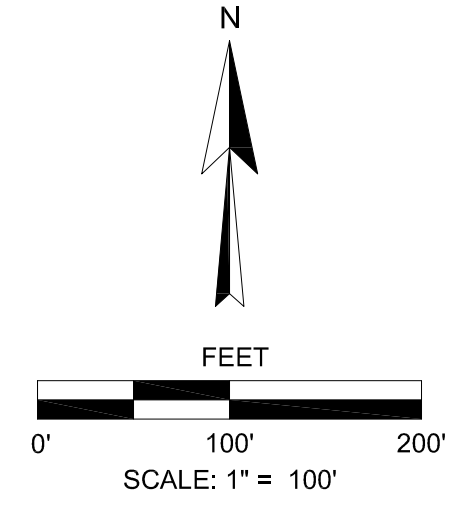
DRAWING NO.  
**C-04A**

REV. NO.  
**A**

FILE NAME: 04\_146900\_1105EC001.dwg

**SECOND LEVEL**

- (M5) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M6) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M7) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M8) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M9) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M10) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M11) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE



REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016

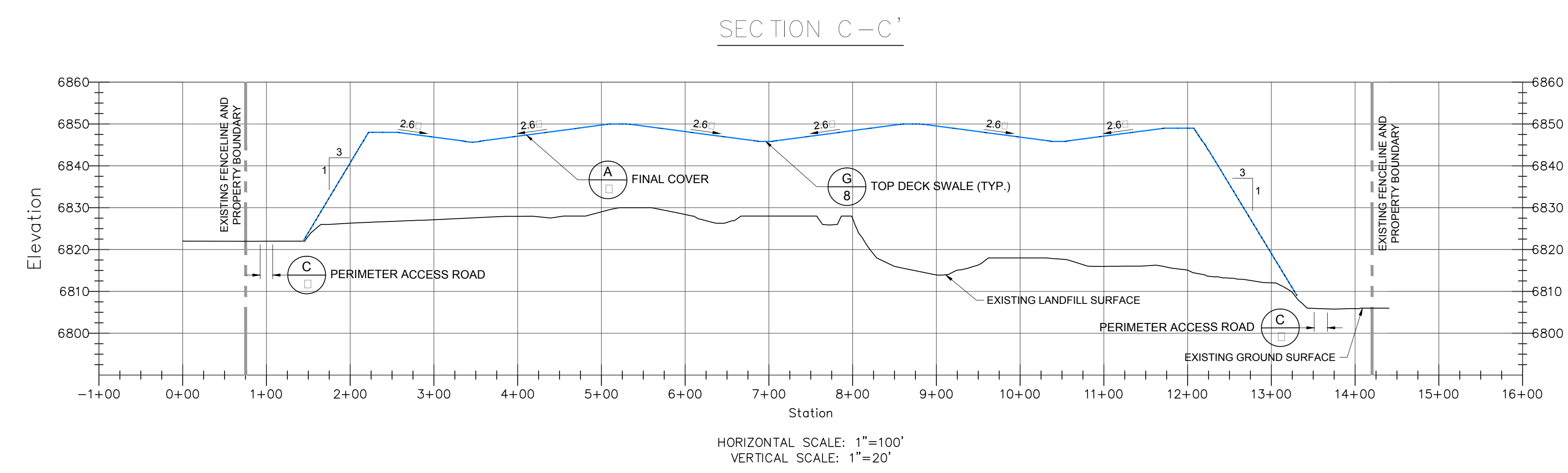
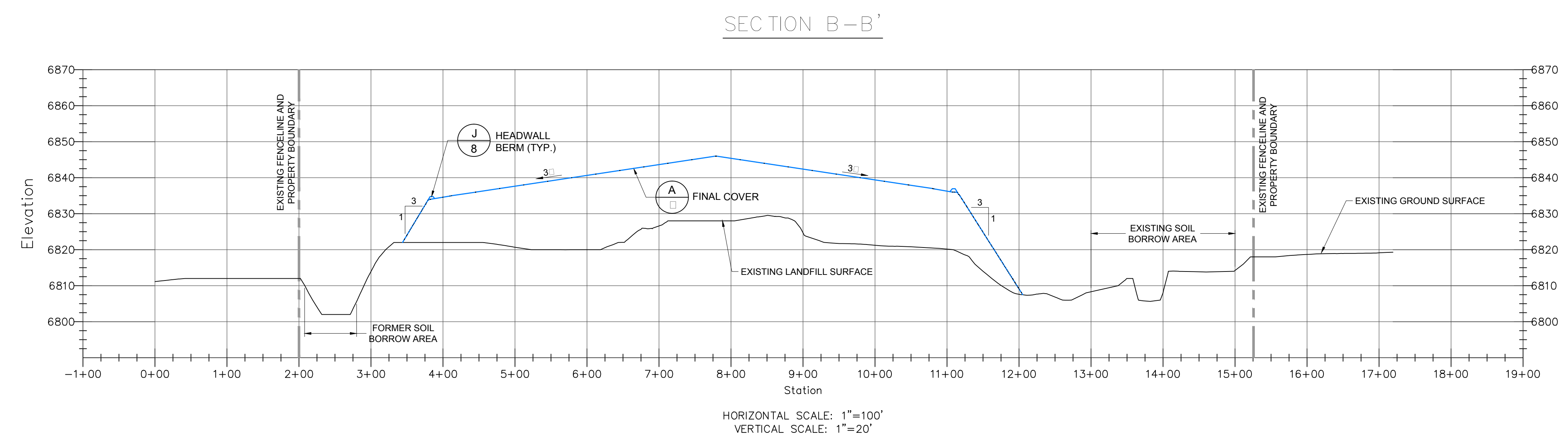
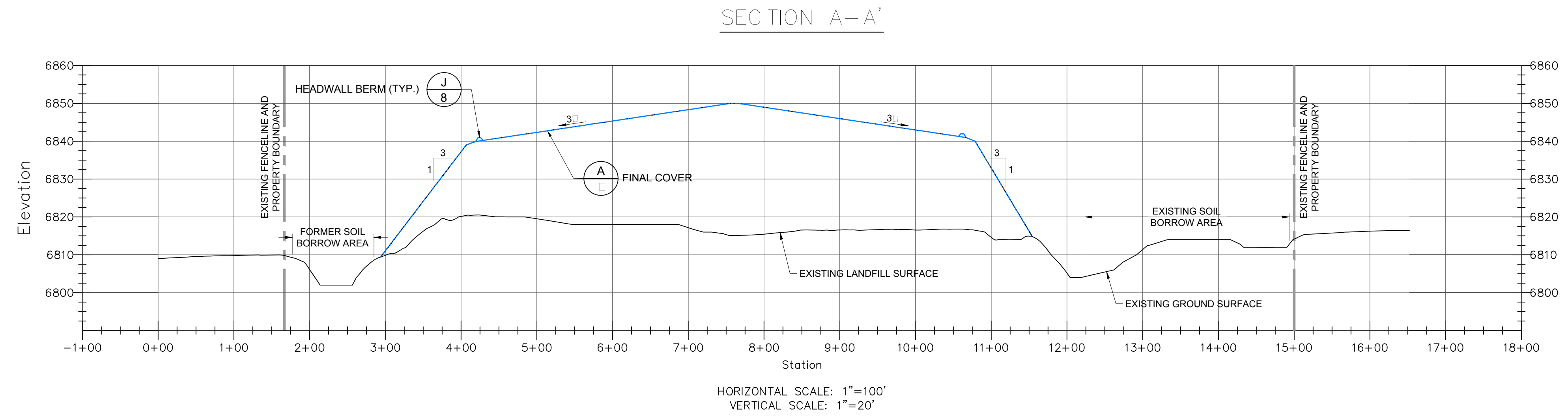


DESIGN/EN	PAUL EDWARD ROTEN
DRAWN/TW	REVIEWED/RBB
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SHEET: 04	OF 08

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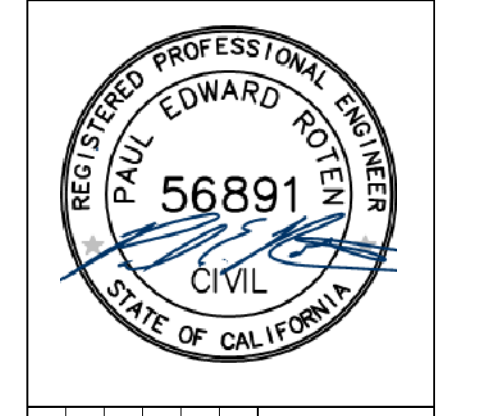
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PROJECT	PUMICE VALLEY LANDFILL JOINT TECHNICAL DOCUMENT
DATE: 02/15/2013	REV. NO. A
SRK JOB NO.: 146900.160	DRAWING NO. C-04B

FILE NAME: 04\_146900\_1105EC001.dwg  
 IF THE ABOVE BAR SCALERS WERE NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED



REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016

FILE NAME: 05 146900 110PROCF01.dwg



DESIGNER: [Redacted]  
 DRAWN/TW: [Redacted]  
 REVIEWED/RB: [Redacted]  
 CHECKED/EN: [Redacted]  
 APPROVED/EN: [Redacted]  
 SHEET: 05 OF 08

IF THE ABOVE BAR CODES ARE NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

2016 UPDATE PREPARED BY  
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PREPARED FOR:  
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CROSS-SECTIONS

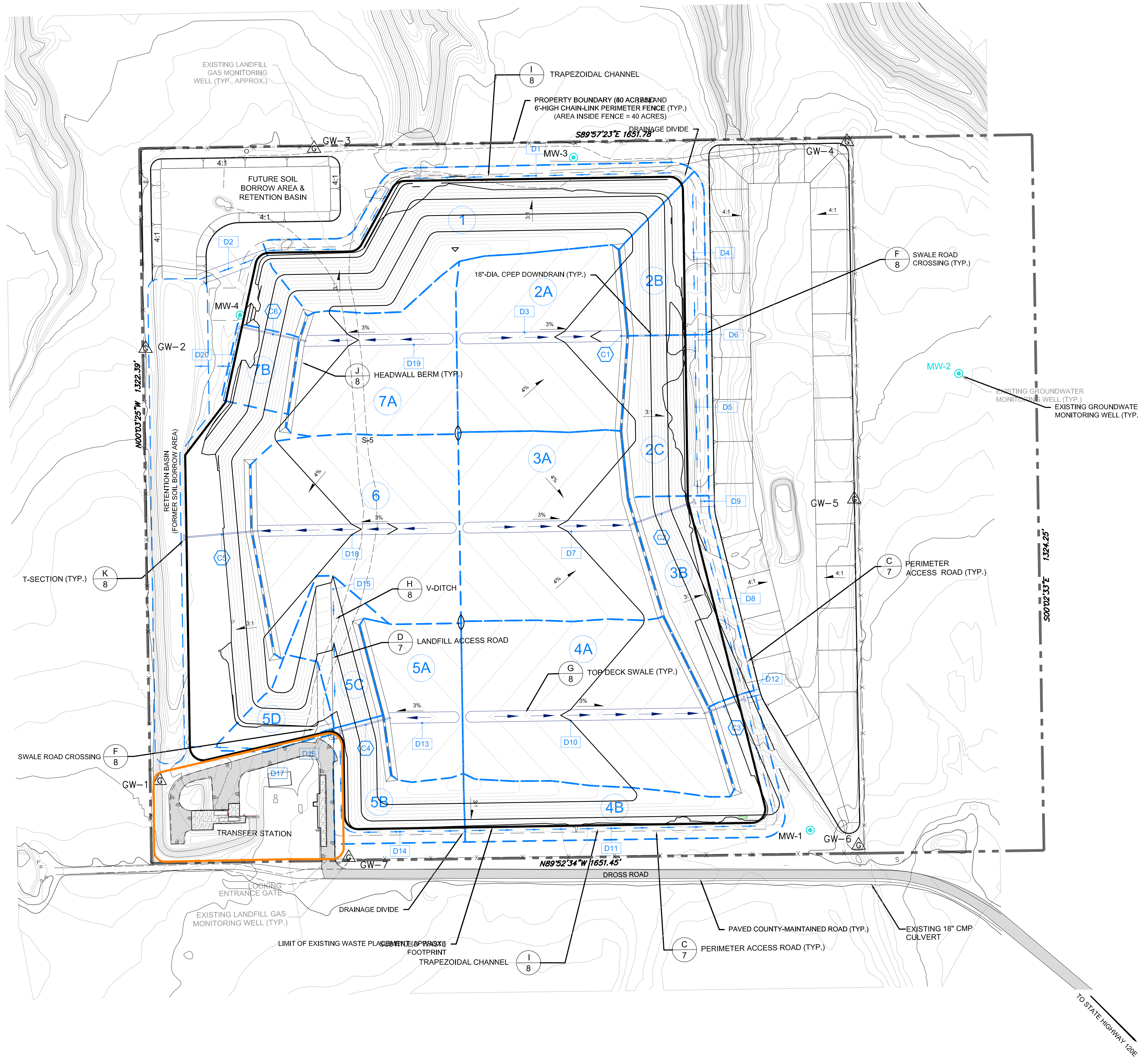
PUMICE VALLEY LANDFILL  
 JOINT TECHNICAL DOCUMENT

DATE: 02/15/2013  
 SRK JOB NO.: 146900.160

DRAWING NO. C 05

REV. NO. A





**LEGEND**

- MW-2 EXISTING GROUND WATER MONITORING WELL
- GW-7 PROPOSED LF GAS MONITORING WELL
- WASTE FOOTPRINT
- DRAINAGE CHANNEL
- HYDROLOGIC SUB-AREA DESIGNATION
- CULVERT DESIGNATION
- CHANNEL DESIGNATION
- OVERSIDE DRAIN W/ T-SECTION

NOTE: SEE DRAINAGE REPORT IN THE "PRELIMINARY CLOSURE AND POSTCLOSURE MAINTENANCE PLAN" FOR HYDROLOGIC ANALYSES.

**SUMMARY OF OPEN CHANNEL DESIGN**

Channel No.	Description	Refer to Detail	Avg Flowline Slope
D1	Trapezoidal Channel	I	0.5%
D2	Swale Road Crossing	F	0.5%
D3	Top Deck Swale	G	3.0%
D4	Trapezoidal Channel	I	0.5%
D5	Trapezoidal Channel	I	0.5%
D6	Swale Road Crossing	F	1.0%
D7	Top Deck Swale	G	3.0%
D8	Trapezoidal Channel	I	0.5%
D9	Swale Road Crossing	F	1.0%
D10	Top Deck Swale	G	3.0%
D11	Trapezoidal Channel	I	0.5%
D12	Swale Road Crossing	F	1.0%
D13	Top Deck Swale	G	3.0%
D14	Trapezoidal Channel	I	0.5%
D15	V-Ditch	H	8.0%
D16	Swale Road Crossing	F	1.0%
D17	Trapezoidal Channel	I	1.8%
D18	Top Deck Swale	G	3.0%
D19	Top Deck Swale	G	3.0%
D20	Trapezoidal Channel	I	0.5%

**REVISIONS**

REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016

DESIGNER: DRAWN: TWW  
 REVIEWED: RBB  
 CHECKED: EN  
 APPROVED: EN  
 SHEET: 06 OF 08

2016 UPDATE PREPARED BY  
 MONO COUNTY PUBLIC WORKS

ORIGINAL DRAWINGS BY: st consulting

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 DEPARTMENT OF PUBLIC WORKS  
 SOLID WASTE DIVISION

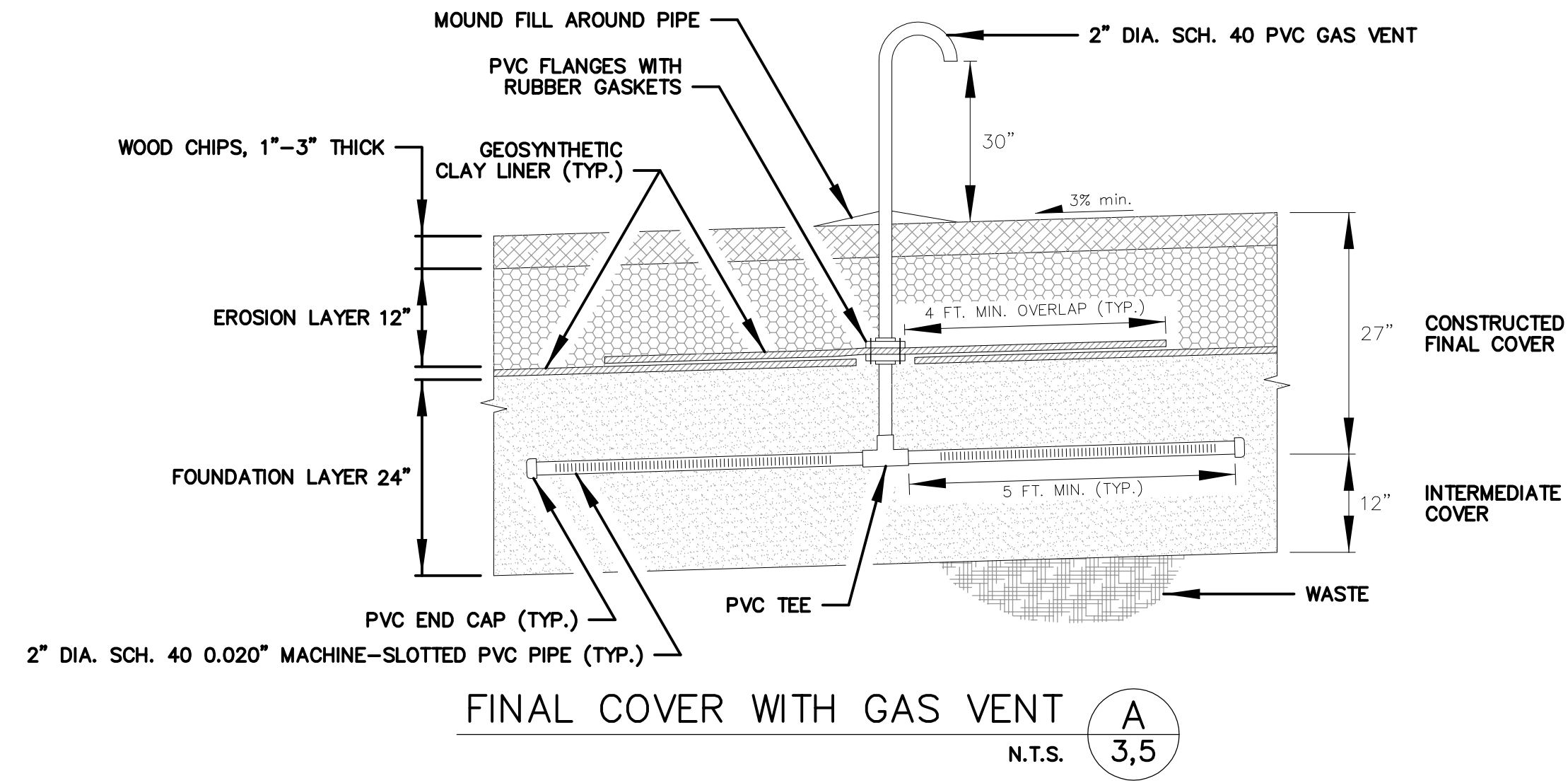
HYDROLOGIC SUB-AREA LAYOUT

PUMICE VALLEY LANDFILL  
 JOINT TECHNICAL DOCUMENT

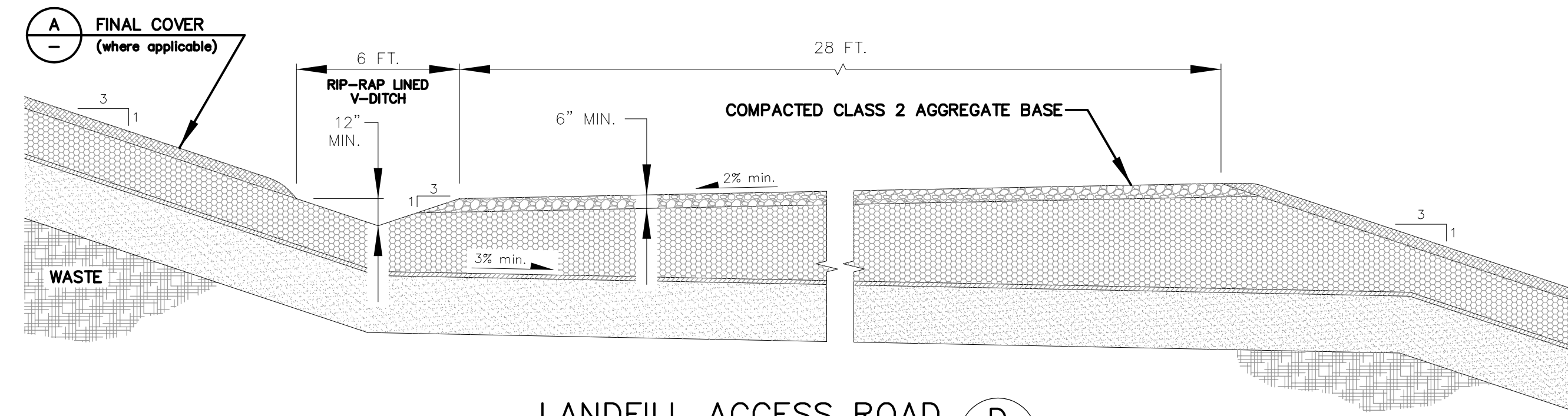
DATE: 02/15/2013  
 SRK JOB NO.: 146900.160

REV. NO. A  
 DRAWING NO. C 06

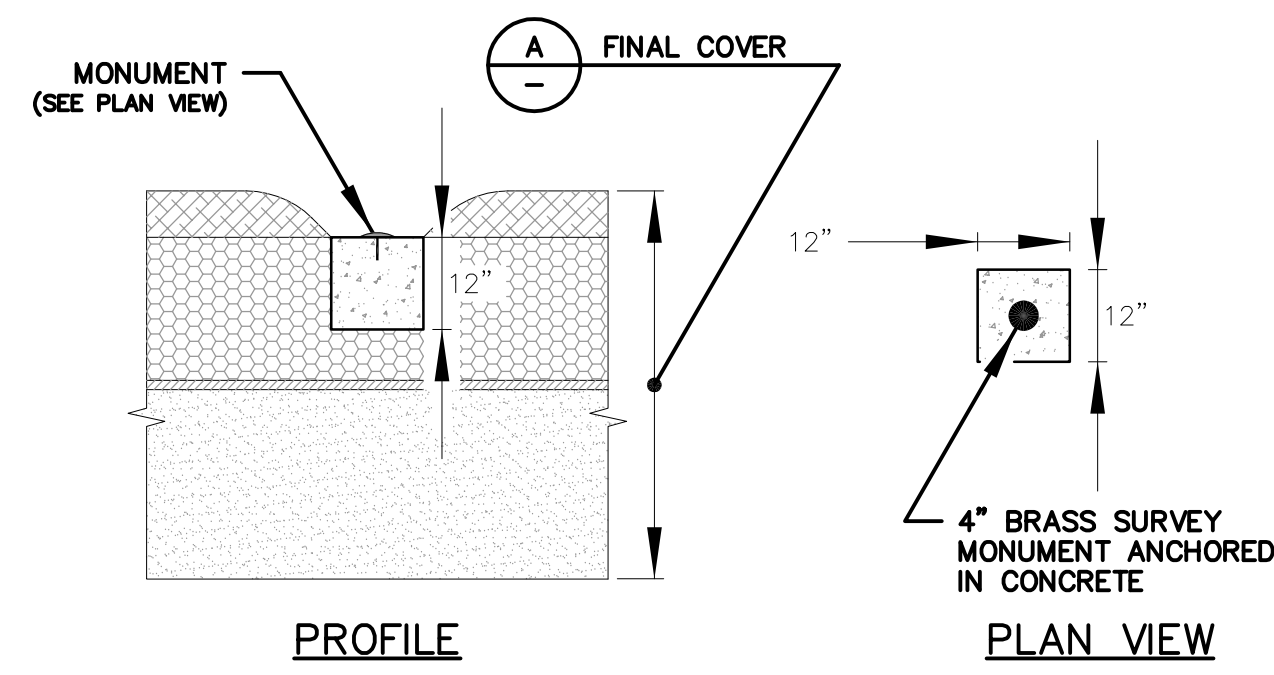
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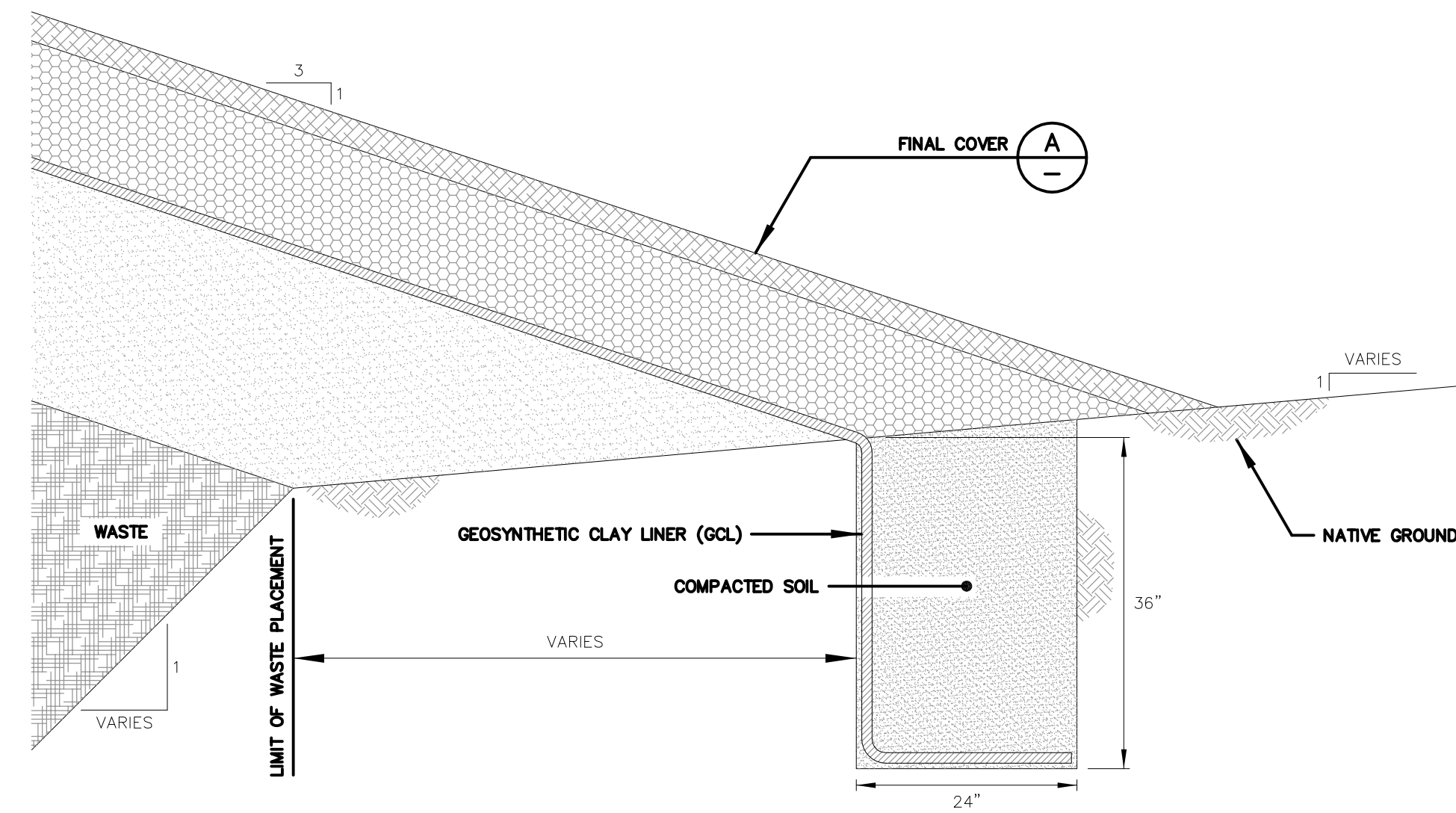
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N.T.S. **3,5**



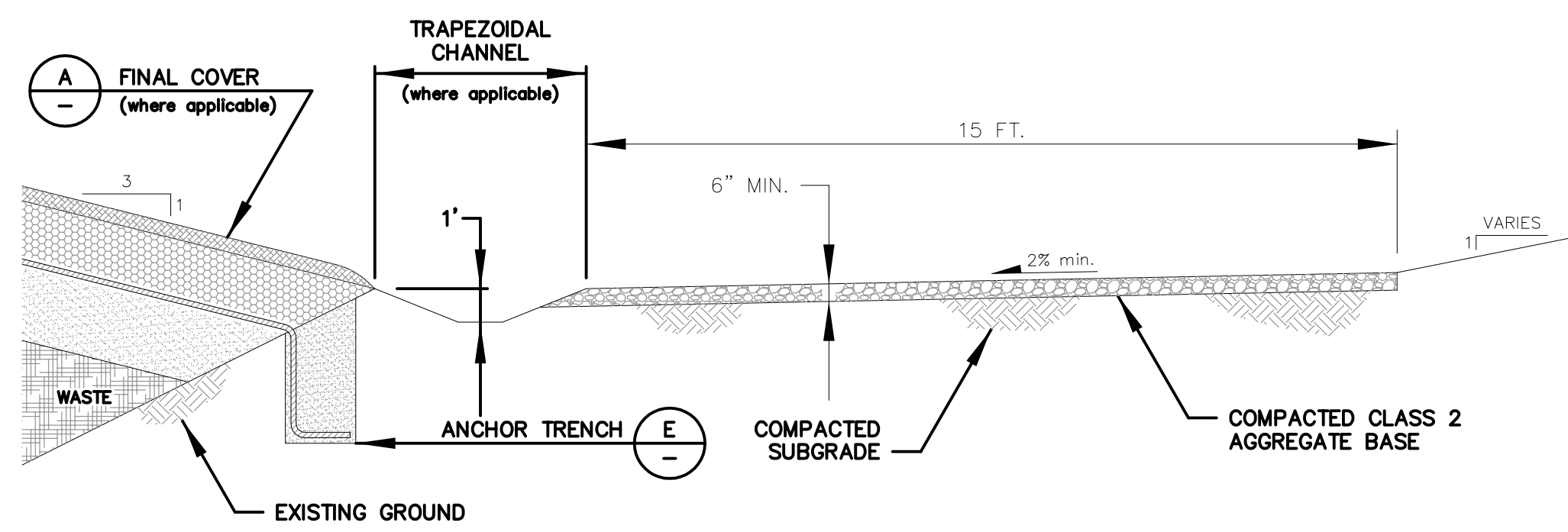
LANDFILL ACCESS ROAD **D**  
N.T.S. **3,6**



PROFILE  
SETTLEMENT MONUMENT **B**  
N.T.S. **3**



ANCHOR TRENCH **E**  
N.T.S. **3,5**



PERIMETER ACCESS ROAD **C**  
N.T.S. **3,5,6**

REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016



DESIGNER	PAUL EDWARD ROTEN
DRAWN BY	T.M.W.
CHECKED BY	R.B.B.
APPROVED BY	E.N.
SHEET	07 OF 08

2016 UPDATE PREPARED BY  
MONO COUNTY PUBLIC WORKS

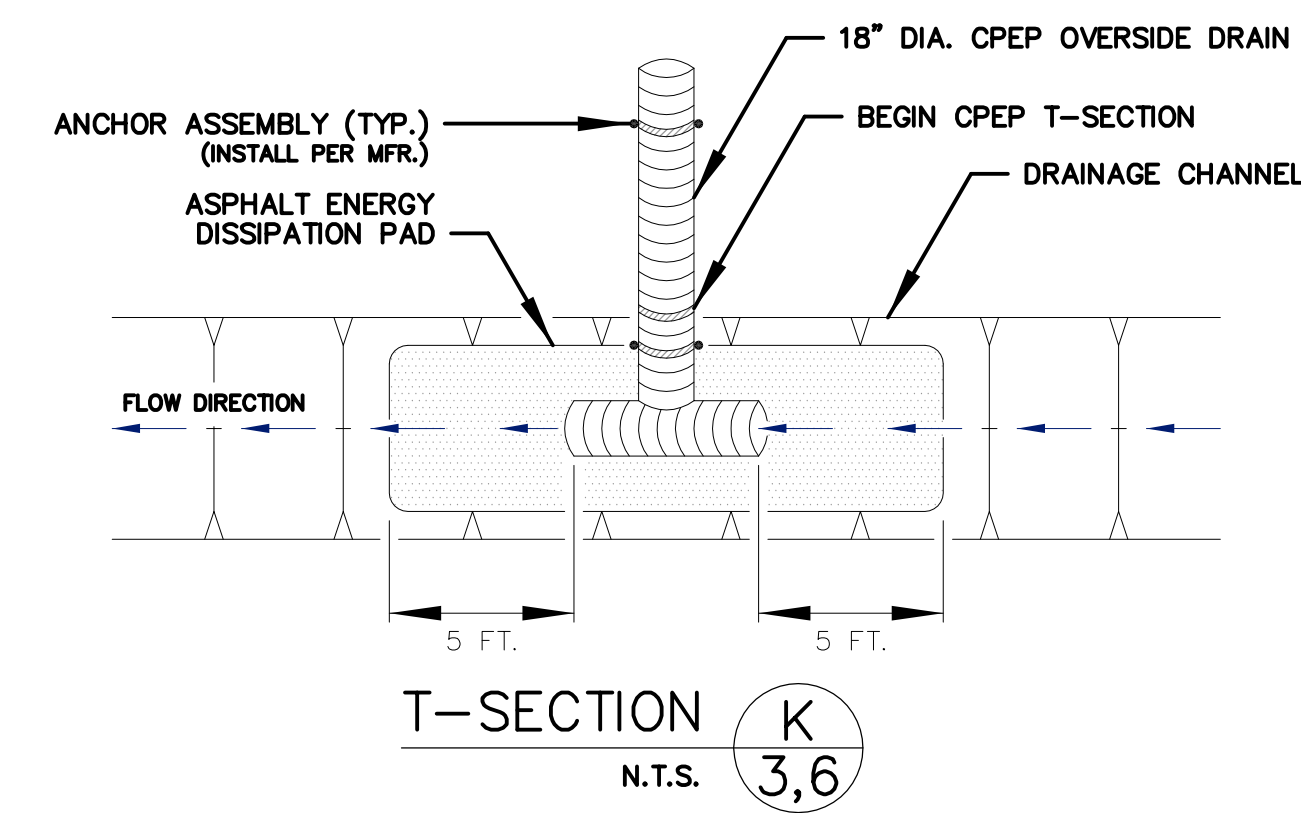
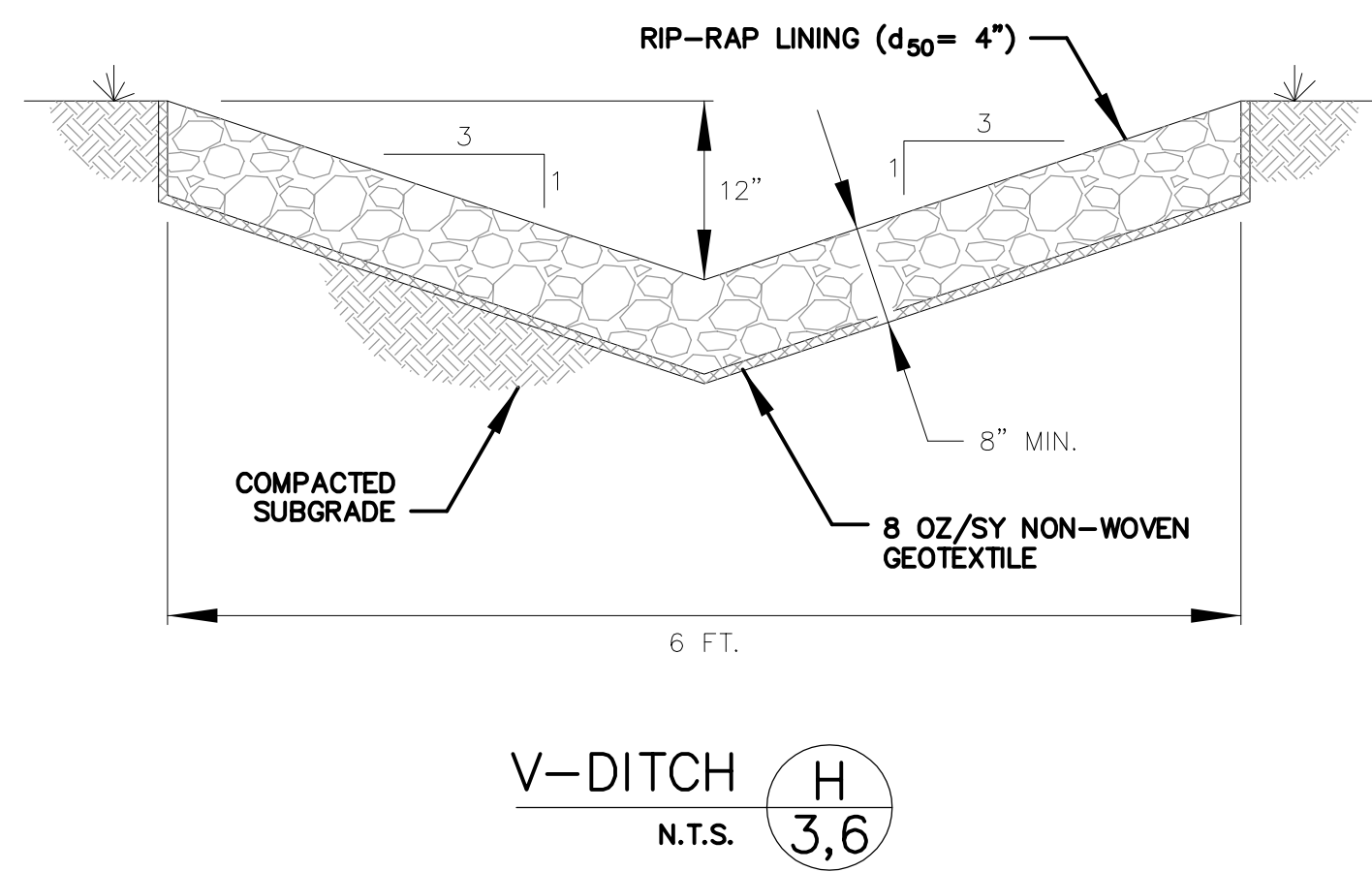
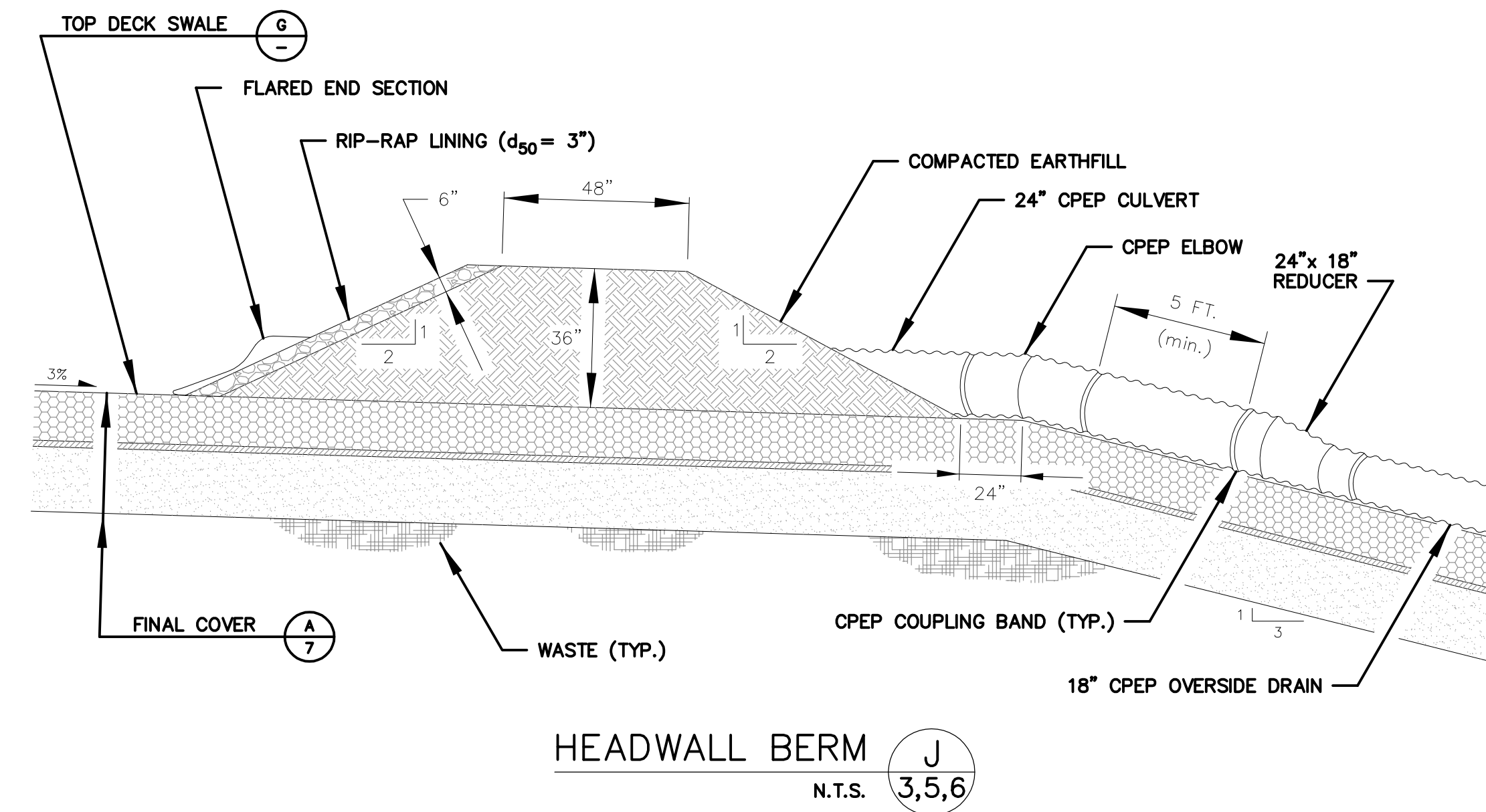
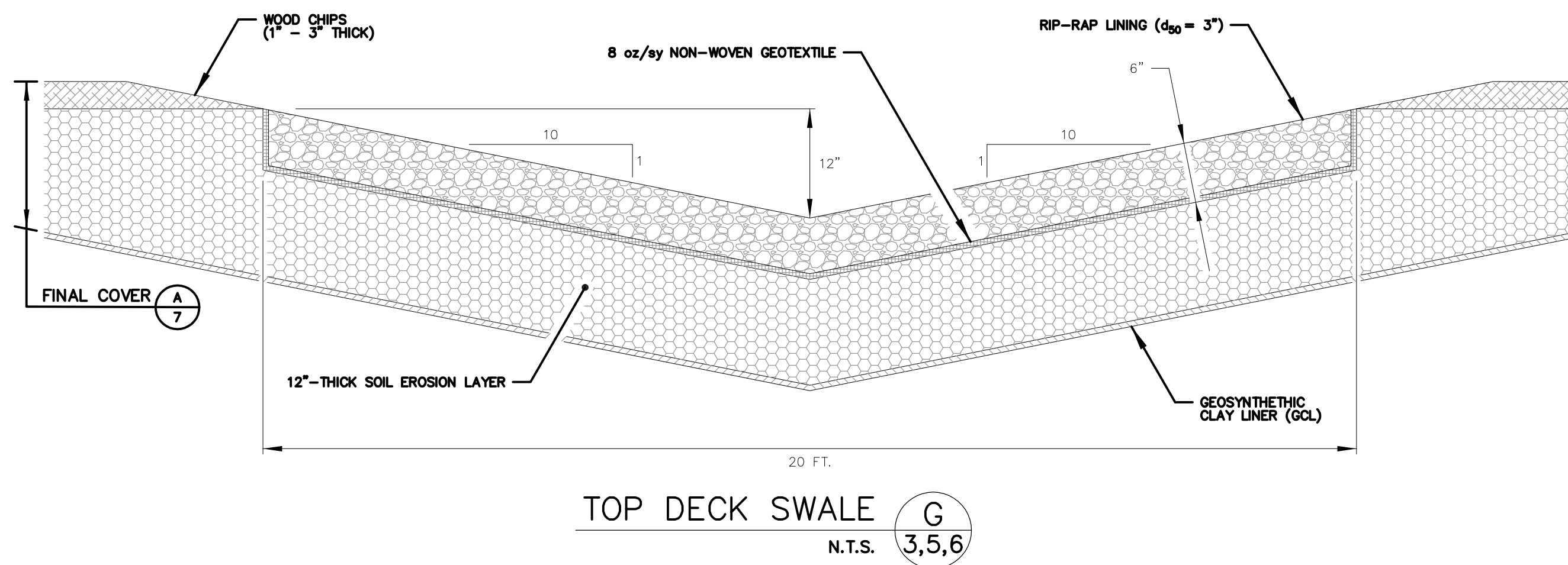
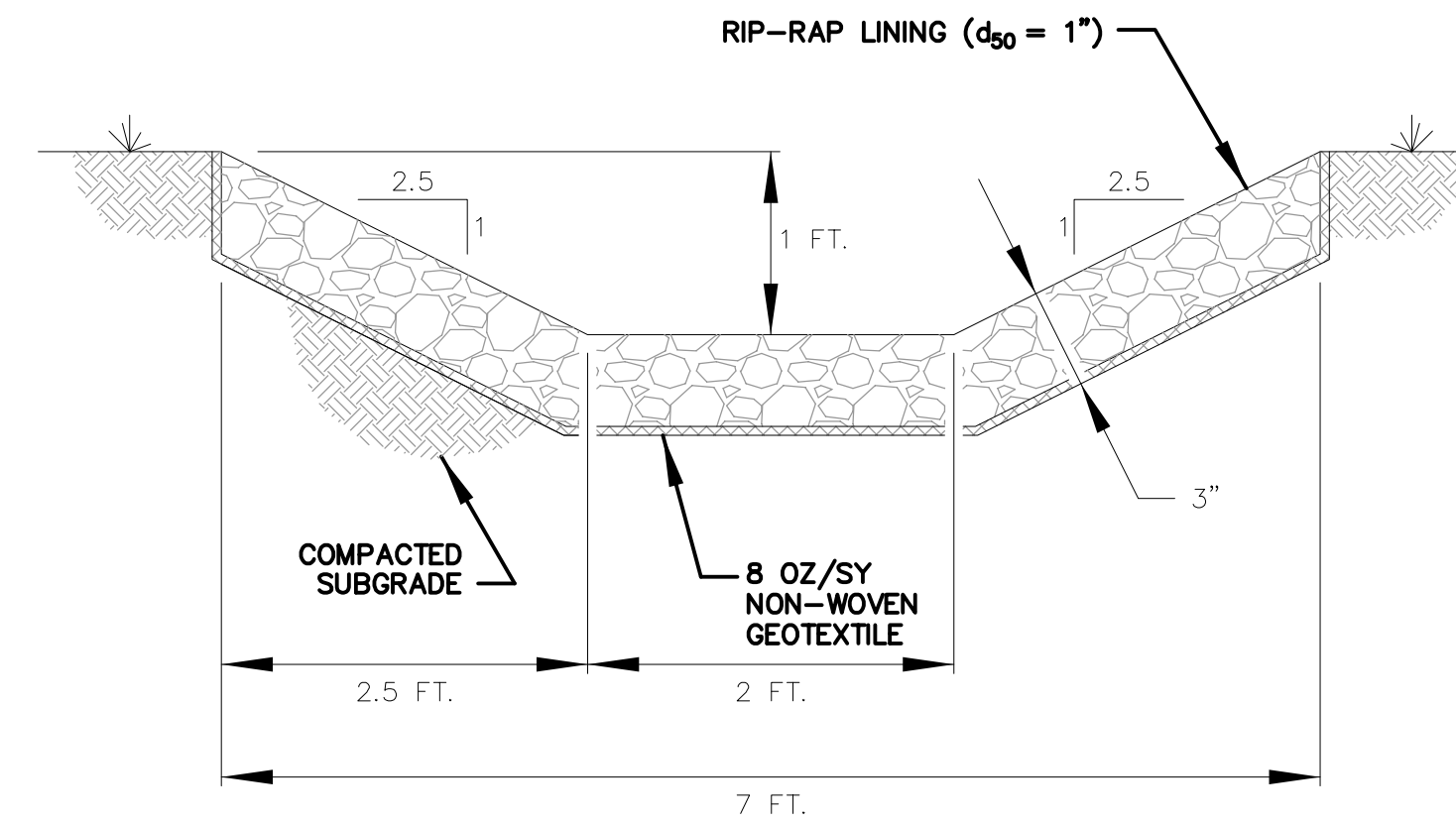
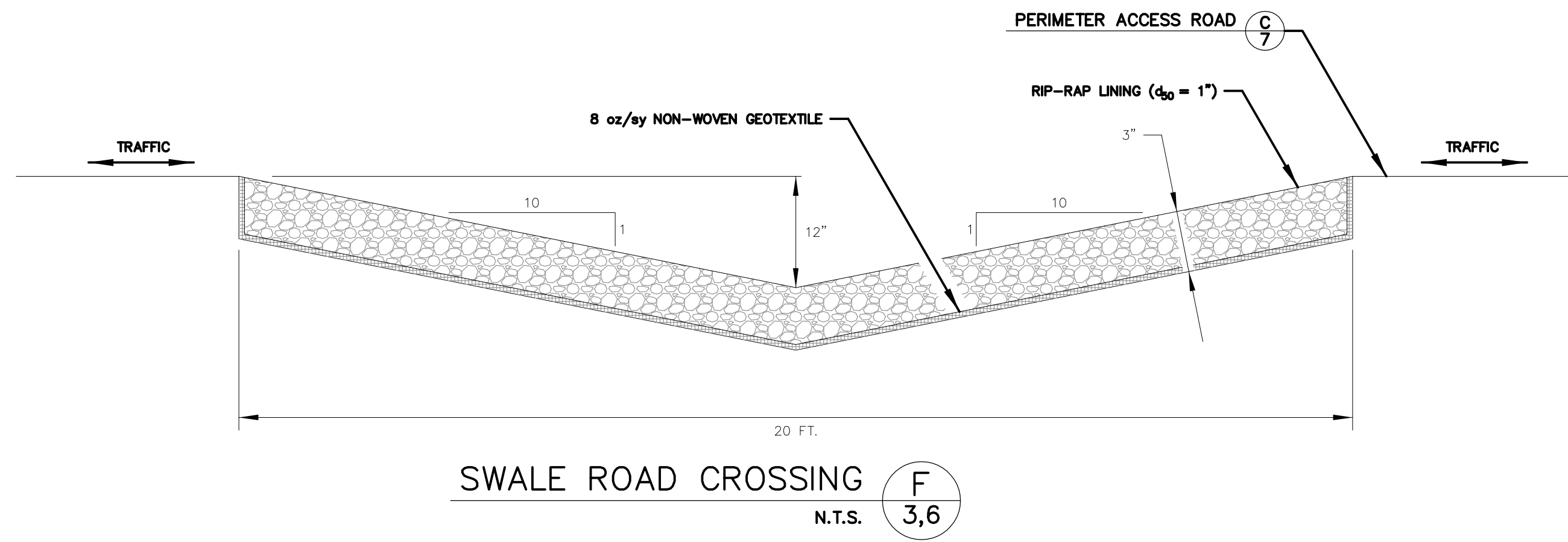
ORIGINAL DRAWINGS BY: **st consulting**

PREPARED FOR:  
MONO COUNTY  
DEPARTMENT OF  
PUBLIC WORKS  
SOLID WASTE DIVISION

DRAWING TITLE	DETAILS, SHEET 1 OF 2
PROJECT	PUMICE VALLEY LANDFILL JOINT TECHNICAL DOCUMENT
DATE	02/15/2013
SRK JOB NO.	146900.160
DRAWING NO.	C 07
REV. NO.	B

FILE NAME: 07 146900 110DET01.dwg

IF THE ABOVE BAR SCALING IS NOT SCALE  
1 INCH THE DRAWING SCALE IS ALTERED



REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
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DESIGNER: DRAWN/TW: REVIEWED/RB: CHECKED/EN: APPROVED/EN: SHEET: 08 OF 08

IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

2016 UPDATE PREPARED BY MONO COUNTY PUBLIC WORKS

ORIGINAL DRAWINGS BY: **st consulting**

PREPARED FOR: MONO COUNTY DEPARTMENT OF PUBLIC WORKS SOLID WASTE DIVISION

DRIVING TITLE: DETAILS, SHEET 2 OF 2

PROJECT: PUMICE VALLEY LANDFILL JOINT TECHNICAL DOCUMENT

DATE: 02/15/2013 SRK JOB NO.: 146900.160

REV. NO. B

DRAWING NO. C 08

FILE NAME: 08\_146900\_110DET02.dwg

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**Appendix B**  
**Site Life Calculations**

**Table B-1**  
**SITE LIFE / LOADING RATE CALCULATIONS**  
(2016 -2048)

*Pumice Valley Landfill*

**Operational Assumptions & Parameters through 2022**

Projected 2016 Disposal Qty <sup>1</sup> :	693 tons	No. Days of Landfill Operation <sup>3</sup> :	104 days / year
In-Place Waste Density <sup>2</sup> :	1,200 lb/cy	<b>Remaining Disposal Capacity (see Table B-2):</b>	<b>508,840 cu. yds.</b>
Waste-to-Soil Ratio <sup>2</sup> :	3 : 1		

**Operational Assumptions & Parameters 2023 - 2029**

In-Place Waste Density <sup>4</sup> :	1,000 lb/cy	No. Days of Landfill Operation <sup>3</sup> :	208 days / year
Waste-to-Soil Ratio <sup>5</sup> :	2.5 : 1		

Year Ending	Years of Operation	Projected Annual Growth Rate <sup>6</sup>	WASTE DISPOSAL						COVER SOIL		TOTAL FILL	
			PV LF Total <sup>1</sup> (tons/yr)	Uninc. Mono To PV LF Total <sup>1</sup> (tons/yr)	TOTAL (tons/yr)	Disposal Rate <sup>3</sup> (tons/day)	In-Place Volume <sup>2,4</sup> (cy)	Cumulative Volume (cy)	In-Place Volume <sup>2,5</sup> (cy/yr)	Cumulative Volume (cy)	Annual Volume (cy/yr)	Cumulative Volume (cy)
2016	1	1.14%	693	0	693	6.7	1,160	1,160	390	390	1,550	1,550
2017	2	0.59%	697	0	697	6.7	1,160	2,320	390	780	1,550	3,100
2018	3	1.27%	706	0	706	6.8	1,180	3,500	390	1,170	1,570	4,670
2019	4	1.18%	714	0	714	6.9	1,190	4,690	400	1,570	1,590	6,260
2020	5	-1.50%	703	0	703	6.8	1,170	5,860	390	1,960	1,560	7,820
2021	6	0.79%	709	0	709	6.8	1,180	7,040	390	2,350	1,570	9,390
2022	7	0.82%	715	0	715	6.9	1,190	8,230	400	2,750	1,590	10,980
<b>JANUARY 1, 2023 - BENTON CROSSING LANDFILL CLOSES - MONO COUNTY WASTE REDIRECTED TO PUMICE VALLEY LANDFILL</b>												
2023	8	0.78%	720	5,599	6,319	30.4	12,640	20,870	5,060	7,810	17,700	28,680
2024	9	0.76%	726	5,641	6,367	30.6	12,730	33,600	5,090	12,900	17,820	46,500
2025	10	0.77%	731	5,685	6,416	30.8	12,830	46,430	5,130	18,030	17,960	64,460
2026	11	0.77%	737	5,728	6,465	31.1	12,930	59,360	5,170	23,200	18,100	82,560
2027	12	0.77%	743	5,773	6,515	31.3	13,030	72,390	5,210	28,410	18,240	100,800
2028	13	0.77%	748	5,817	6,565	31.6	13,130	85,520	5,250	33,660	18,380	119,180
2029	14	0.81%	754	5,864	6,618	31.8	13,240	98,760	5,300	38,960	18,540	137,720
2030	15	0.81%	761	5,912	6,672	32.1	13,340	112,100	5,340	44,300	18,680	156,400
2031	16	0.81%	767	5,959	6,726	32.3	13,450	125,550	5,380	49,680	18,830	175,230
2032	17	0.81%	773	6,008	6,781	32.6	13,560	139,110	5,420	55,100	18,980	194,210
2033	18	0.81%	779	6,056	6,835	32.9	13,670	152,780	5,470	60,570	19,140	213,350
2034	19	0.81%	785	6,105	6,891	33.1	13,780	166,560	5,510	66,080	19,290	232,640
2035	20	0.81%	792	6,155	6,946	33.4	13,890	180,450	5,560	71,640	19,450	252,090
2036	21	0.81%	798	6,204	7,003	33.7	14,010	194,460	5,600	77,240	19,610	271,700
2037	22	0.81%	805	6,255	7,059	33.9	14,120	208,580	5,650	82,890	19,770	291,470
2038	23	0.81%	811	6,305	7,116	34.2	14,230	222,810	5,690	88,580	19,920	311,390
2039	24	0.81%	818	6,356	7,174	34.5	14,350	237,160	5,740	94,320	20,090	331,480
2040	25	0.81%	824	6,408	7,232	34.8	14,460	251,620	5,780	100,100	20,240	351,720
2041	26	0.81%	831	6,460	7,291	35.1	14,580	266,200	5,830	105,930	20,410	372,130
2042	27	0.81%	838	6,512	7,349	35.3	14,700	280,900	5,880	111,810	20,580	392,710
2043	28	0.81%	844	6,564	7,409	35.6	14,820	295,720	5,930	117,740	20,750	413,460
2044	29	0.81%	851	6,618	7,469	35.9	14,940	310,660	5,980	123,720	20,920	434,380
2045	30	0.81%	858	6,671	7,529	36.2	15,060	325,720	6,020	129,740	21,080	455,460
2046	31	0.81%	865	6,725	7,590	36.5	15,180	340,900	6,070	135,810	21,250	476,710
2047	32	0.81%	872	6,779	7,652	36.8	15,300	356,200	6,120	141,930	21,420	498,130
2048	33	0.81%	879	6,834	3,820	18.4	7,650	363,850	3,060	144,990	10,710	508,840

**JULY 2048, PUMICE VALLEY LANDFILL REACHES CAPACITY OF 508,840 CUBIC YARDS OF COMBINED WASTE AND SOIL**

**Notes:**

1. Projected from Pumice Valley waste volumes 2012-2016. 2023 quantities projected from current Unincorporated Mono County landfilled at Benton Crossing.
2. Initial estimate (to end of 2023) based on quarterly burial of C&D waste. Also, density and waste-to-soil ratio used in annual financial assurance deposit calculations.
3. Annual operation of 2 days per week through 2023, then 4 days per week for the Unincorporated Mono County waste in 2024 through 2029.
4. Based on waste compaction survey completed in May 2003.
5. Computed ratio based on operational practices using daily cover soil and synthetic tarps, as calculated in Benton Crossing Landfill JTD (August 2012)..
6. Determined from Report P-3, *State and County Total Population Projections by Race/Ethnicity and Detailed Age, 2010-2060* (Calif. Dept. of Finance, Jan. 31, 2013).

**Table B-2**  
**REMAINING SITE CAPACITY CALCULATIONS**  
*Pumice Valley Landfill*

**2011-2016 DISPOSAL CAPACITY CONSUMPTION (06.03.11 Base Topography)**

C&D In-Place Waste Density <sup>1</sup> = 1,200 lb/cy      Waste-to-Soil Ratio <sup>1</sup> = 3 : 1

Time Period	C&D Landfilled <sup>2</sup> (tons)	Airspace Consumed <sup>3</sup>		
		Waste (cy)	Soil (cy)	Total (cy)
June, 2011	131.21	220	70	290
3rd Quarter 2011	163.00	270	90	360
4th Quarter 2011	36.30	60	20	80
1st Quarter 2012	45.00	80	30	110
2nd Quarter 2012	119.19	200	70	270
3rd Quarter 2012	746.26	1,240	410	1,650
4th Quarter 2012	218.95	360	120	480
1st Quarter 2013	4.91	10	0	10
2nd Quarter 2013	227.05	380	130	510
3rd Quarter 2013	577.80	960	320	1,280
4th Quarter 2013	73.97	120	40	160
1st Quarter 2014	196.44	330	110	440
2nd Quarter 2014	81.14	140	50	190
3rd Quarter 2014	52.29	90	30	120
4th Quarter 2014	96.72	160	50	210
1st Quarter 2015	22.54	40	10	50
2nd Quarter 2015	332.99	550	180	730
3rd Quarter 2015	187.85	310	100	410
4th Quarter 2015	82.70	140	50	190
<b>TOTALS =</b>	<b>3,396</b>	<b>5,660</b>	<b>1,880</b>	<b>7,540</b>

Notes:

1. Estimated from typical values observed in industry (used in annual financial assurance calculations).
2. Disposal data from site records.
3. Calculated values rounded to nearest 10 cubic yards (cy).

**REMAINING DISPOSAL CAPACITY CALCULATIONS**

Available Airspace, June 3, 2011 Topography vs. Final Grades:	632,690 cu. yds.
Airspace Capacity Consumed, June 2011 through January 1, 2016:	7,540 cu. yds.
Volume Required for Final Cover Construction (Final Grading Plan, Dwg. -03):	
Footprint (2D) Requiring Final Cover Construction =	1,028,700 sq. ft., or 23.62 acres
Slope-Adjusted (3D) Final Cover Surface Area =	1,046,800 sq. ft., or 24.03 acres
Total Design Thickness of Final Cover =	3.0 feet
Volume Required for Final Cover Design =	116,310 cu. yds.
Total Thickness of <u>Constructed</u> Final Cover =	2.0 feet
Total <u>Constructed</u> Final Cover Volume (cy) =	77,540 cu. yds.
<b>TOTAL REMAINING DISPOSAL CAPACITY, AS OF JANUARY 1, 2016 =</b>	<b>508,840 cu. yds.</b>

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**Appendix C**  
**Settlement Calculations**

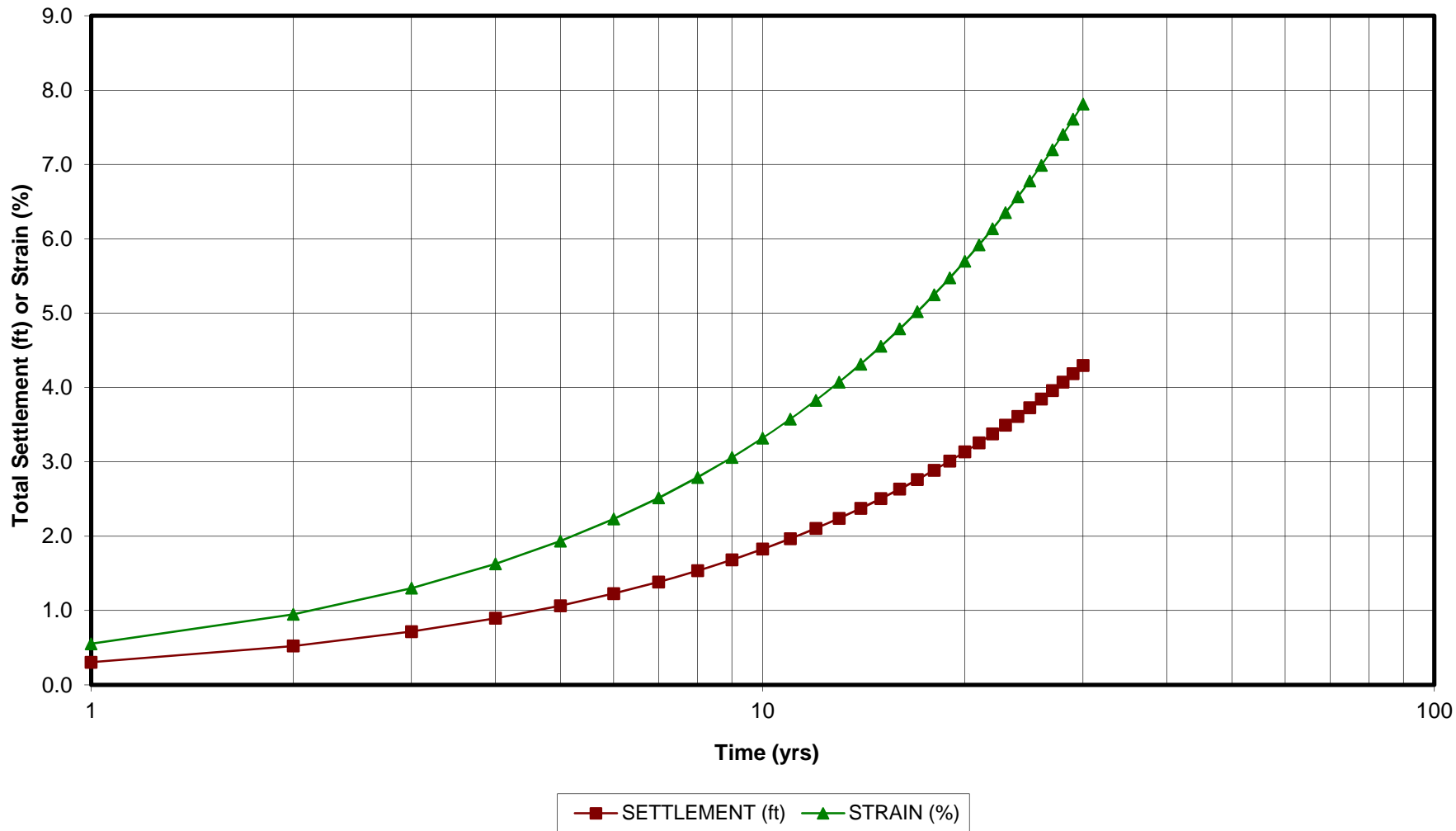
## SETTLEMENT CALCULATIONS

### Pumice Valley Landfill

<b>INPUT PARAMETERS</b>			
Compressibility - old waste (m):	7.85E-07 1/kPa		
Rate of Compression - old waste (n):	0.779 (dimesionless)		
Reference Time (t <sub>r</sub> ):	1 day(s)		
Initial Total Height (H): (above and below grade refuse + cover)	55 ft		
Final Cover Soil Thickness:	3 ft		
Unit Weight of Final Cover (pcf):	85 pcf		
Unit Weight of Daily Cover (pcf):	75 pcf		
Unit Weight of Municipal Waste (pcf):	37 pcf at 1,000pcy		
Waste to Soil Ratio (by volume):	4 :1		
Average Unit Weight of Waste: (includes waste and cover soil)	45 pcf		
Average Stress in Refuse Layer: (at midpoint of waste fill)	1482 psf or 71.0 kPa		
<b>CALCULATIONS</b>			
TIME (yrs)	TIME (days)	SETTLEMENT (ft)	STRAIN (%)
1	365	0.3	0.55
2	730	0.5	0.95
3	1095	0.7	1.30
4	1460	0.9	1.63
5	1825	1.1	1.93
6	2190	1.2	2.23
7	2555	1.4	2.51
8	2920	1.5	2.79
9	3285	1.7	3.06
10	3650	1.8	3.32
11	4015	2.0	3.58
12	4380	2.1	3.83
13	4745	2.2	4.07
14	5110	2.4	4.32
15	5475	2.5	4.55
16	5840	2.6	4.79
17	6205	2.8	5.02
18	6570	2.9	5.25
19	6935	3.0	5.47
20	7300	3.1	5.70
21	7665	3.3	5.92
22	8030	3.4	6.14
23	8395	3.5	6.35
24	8760	3.6	6.57
25	9125	3.7	6.78
26	9490	3.8	6.99
27	9855	4.0	7.20
28	10220	4.1	7.40
29	10585	4.2	7.61
30	10950	4.3	7.81
NOTE: Calculation based on the article "Settlement of Municipal Refuse", by Edil, et. al. (1990), in <i>Geotechnics of Waste Fill</i> , by A. Landva and G.D. Knowles, 1990, ASTM Special Technical Publication 1070, October 1990.			



### PUMICE VALLEY LANDFILL Predicted Settlement Through Time [based on "Settlement of Municipal Refuse", by Edil, et. al. (1990)]



## CONCLUSIONS

The results of the investigation of the 1988 slope stability failure at the Kettleman Hills Class I hazardous waste repository teach valuable lessons about the safe design and construction of lined waste landfills. These include:

- (1) Multi-layer liner systems which have been devised for the safe containment and removal of landfill leachate may contain liner interfaces with low shear strength, including friction angles as low as 8 degrees or less.
- (2) Simple direct shear tests can be used to determine reliable values for interface strength properties.
- (3) Because of the variability in interface strengths that is associated with different geosynthetic liner system components and compacted clays used in composite double liner systems, values of interface strength should be determined specifically for each project using samples of the actual materials and representative placement, loading, and wetting conditions.
- (4) In situations involving low shear strengths such as may occur in liner systems, three-dimensional effects may be important in evaluating stability.
- (5) The repository filling operations should be planned in such a way that an adequate factor of safety can be maintained at all times and for all fill heights. This can be done by means of systematic analyses of stability for different fill geometries.
- (6) While the concept embodied in (5) is simple in principle, it is presently difficult in detail owing to (1) the lack of a suitable generalized method for doing three-dimensional stability analyses, and (2) uncertainties about the effects of seismic loadings on the response and stability of lined landfills. Both of these issues need further study.

## ACKNOWLEDGMENTS

The authors thank Clarence K. Chan, Richard C. Sisson, Makram Jaber, Mu Hsiung Chang, and Peter G. Nicholson of the University of California, Berkeley Geotechnical Group who assisted in the testing.

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Tuncer B. Edil<sup>1</sup>, Valeri J. Ranguette<sup>2</sup> and William W. Wuellner<sup>3</sup>

## SETTLEMENT OF MUNICIPAL REFUSE

**REFERENCE:** Edil, T. B., Ranguette, V. J., and Wuellner, W. W., "Settlement of Municipal Refuse, Geotechnics of Waste Fills - Theory and Practice, ASTM STP 1070, Arvid Landva and G. David Knowles, Eds., American Society for Testing and Materials, Philadelphia, 1990.

**ABSTRACT:** Refuse settlement in sanitary landfills is a complex process, which is dominated by secondary compression. Two mathematical models are used to model refuse settlement at four different sites. A data bank of empirical parameters was obtained and the trends observed.

**KEYWORDS:** refuse, settlement, settlement model, empirical settlement parameters, compression, rate of compression, landfill

## INTRODUCTION

Refuse settlement in sanitary landfills, though frequently a troublesome and unpredictable problem offers at the same time a significant opportunity to the landfill operator for increasing the potential disposal capacity. Although filled to design grades, after closure landfill surfaces rapidly settle below the approved final grades. While this phenomenon is understood, a suitable model to predict this behavior has not been available or generally accepted. Consequently, valuable air space (volume), previously approved by regulatory agencies, may not be fully used. More accurate prediction of this settlement may permit a range of opportunities including better estimates of the remaining life of existing landfills, and improved predictability of surficial refuse movement and its impact on cover integrity, future vertical expansions, and ultimate use of the landfill surface.

The mechanics of compression of refuse are many and complex. Settlement-time curves from sanitary landfills differ from those for typical clay settlement curves; however, they are similar to those from organic soils and peats. This paper outlines an analysis approach using two different mathematical functions for the refuse settlement-time relationship. These relationships, which have previously been used to predict peat and soil settlement incorporate the significant factors controlling refuse settlement.

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The mathematical models were applied to the settlement data obtained from four different landfills and the parameters characterizing the compression of refuse were calculated. The dependency of the refuse settlement parameters on the stress level and the strain rate was evaluated for a range of conditions such as age of refuse, active filling or post-closure and leachate extraction. The limited data preclude broad generalization of the models for a variety of conditions; however, their versatility and utility as a tool for estimating the settlement of refuse, especially during active filling or post-closure, are demonstrated.

#### MECHANICS OF REFUSE SETTLEMENT

The mechanics of refuse settlement are many and complex, even more so than for a soil due to the extreme heterogeneity of, and large voids present in, the refuse fill. The main mechanisms involved in refuse settlement are the following:

1. Mechanical (distortion, bending, crushing and reorientation; similar to consolidation of organic soils);
2. Ravelling (movement of fines into large voids);
3. Physical-chemical change (corrosion, oxidation and combustion); and
4. Bio-chemical decomposition (fermentation and decay, both aerobic and anaerobic processes).

The factors affecting the magnitude of settlement are many and are influenced by each other. These factors include: 1) initial refuse density or void ratio; 2) content of the decomposable materials in the refuse; 3) fill height; 4) stress history; 5) leachate level and fluctuations thereof; and 6) environmental factors (such as moisture content, temperature and gases present or generated within the landfill).

It should be noted that refuse settles substantially both under its own self weight as well as under the weight of a new load (for example, the placement of new refuse over existing refuse). A factor complicating the computation of stress changes due to these weights is the introduction of cover soil to refuse fill. The addition of cover soil makes the measurement and interpretation of unit weight values more difficult. As a result, two types of refuse unit weight can be defined: 1) Actual refuse unit weight (weight of refuse per unit volume of refuse); and 2) Effective refuse unit weight (weight of refuse plus cover per unit volume of landfill), [1].

In themselves, actual refuse unit weights are highly erratic. Within a landfill, refuse unit weights typically vary from 5 to 11 kN/cu m. Moisture contents typically range from 10 to 50 percent, on a percent of dry weight basis [1-3].

Settlement of refuse fill is characteristically irregular. Initially, there is a large settlement within one or two months of completing construction, followed by a substantial amount of secondary compression over an extended period of time. The magnitude of settlement decreases over time and with increasing depth below the surface of the fill. Under its own weight, refuse settlement typically ranges from 5 to 30 percent of the original thickness, with most of the settlement occurring in the first year or two.

#### PREVIOUS REFUSE SETTLEMENT STUDIES

Various methods of analysis and prediction of post-construction refuse fill settlement are reported by several investigators [2-5]. Settlement due to compression of refuse fill under external surface load can be plotted in terms of strain (ratio of settlement to initial fill height) versus the logarithm of effective stress (pressure). Settlement magnitude can be predicted based on the settlement coefficient, the slope of the straight line connecting two selected stresses [2, 4]. The problems with this method include: 1) for older fills, the initial fill height is usually unknown; 2) effective stress is a function of refuse density, which usually cannot be determined accurately; and 3) the strain-log stress relationship is not a straight-line relationship; therefore, the settlement coefficient, which is proportional to settlement magnitude, varies as the stresses (pressures) within the fill change.

Another approach, is to calculate settlement rate as settlement magnitude per unit time interval. Yen and Scanlon [5] collected settlement platform data from several landfill sites and calculated settlement rate as the ratio of change in platform elevation to elapsed time between surveys. Since the settlement platform data for these sites covered periods of up to nine years following the end of construction, they were able to plot settlement rate versus log time and determine the best-fit linear relationship by the least-squares method.

Yen and Scanlon compared their data with Sowers' field observations and noted that the rate of settlement decreases with time logarithmically [5]. Sowers noted the time-dependent secondary compression of refuse and reported values of the coefficient of secondary compression,  $\alpha$  (based on Buisman's definition for soils) for some sanitary landfills. Sowers noted that the  $\alpha$  values for refuse were comparable to those of peat and organic soils and dependent on how favorable the conditions were for decomposition [2, 3].

### PROPOSED REFUSE SETTLEMENT MODELS USED

The conventional approach to soil compression requires a separation of primary and secondary compression and treatment of each with different mathematical expressions. In the long term, secondary compression of refuse is larger than other compression, and it is often difficult to make a distinction between primary and secondary compression. Therefore, a simple model combining all stages of compression is needed. Two such models are investigated in this study.

#### Gibson and Lo Model

The rheological model proposed by Gibson and Lo [6] for the long-term (secondary) compression of soils was found to be rather useful in predicting the settlement of peats [7]. Peat, like refuse, involves mechanisms of compression different than those in inorganic clays. Both peat and refuse have relatively large void spaces that compress quickly during initial and primary settlement, but by far the largest compression is due to the slow and continuous process of secondary settlement, where the particle structures begins to break down. Encouraged by the simplicity and usefulness of the rheological model proposed by Gibson and Lo we decided to apply the same model to field refuse settlement records.

This rheological model is shown in Fig. 1a, and it represents the average compression characteristics in the one-dimensional compression of the refuse fill shown in Fig. 1b. The applied increment of stress can be either the self-weight of the refuse or it may be imposed on the refuse surface.

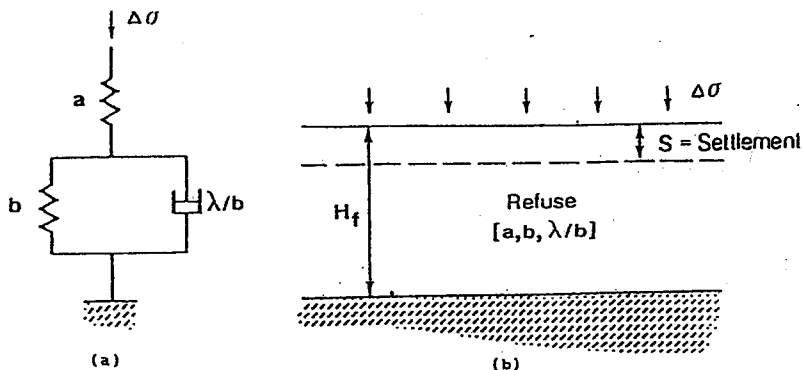


Figure 1 Rheological Model

When a stress increment,  $\Delta\sigma$ , acts on the model, the Hookean spring, with a spring constant of  $a$ , compresses instantaneously. This is analogous to primary compression. The compression of the Kelvin element, with a spring (spring constant of  $b$ ) parallel to a dashpot (viscosity of  $\lambda/b$ ) is retarded by the Newtonian (linear) dashpot. This is similar to the continuous process of secondary compression under sustained effective stress. The sustained load is transferred progressively to the Hookean spring from the Newtonian dashpot. After a long time, (i.e., in the secondary compression range), the full effective stress will be taken by the two springs, thus the dashpot will sustain no load. The time-dependent settlement can be expressed as:

$$S(t) = H \epsilon(t) = H \Delta\sigma [a + b(1 - \exp[-(\lambda/b)t]] \quad (1)$$

where

- $S$  = settlement
- $H$  = initial height of refuse
- $\epsilon$  = strain (settlement divided by the layer thickness, i.e.,  $S/H$ )
- $\Delta\sigma$  = compressive stress
- $a$  = primary compressibility parameter
- $b$  = secondary compressibility parameter
- $\lambda/b$  = rate of secondary compression
- $t$  = time since load application

#### Power Creep Law

One of the simplest forms of a relation for time-dependent deformation under constant stress and one that has been extensively used in representing the transient creep behavior of many engineering materials is the power creep law. According to this law, the time-dependent settlement can be expressed as:

$$S(t) = H \epsilon(t) = H \Delta\sigma m(t/t_r)^n \quad (2)$$

where

- $m$  = reference compressibility
  - $n$  = rate of compression
  - $t_r$  = reference time introduced into the equation to make time dimensionless ( $t_r = 1$  day in this study)
- Other terms are as defined before.

#### Determination of Model Parameters

An interactive spread sheet program was developed at the University of Wisconsin-Madison on a personal computer in fitting Eqs 1 and 2 to the settlement-time records from various fills. The program uses the method of the logarithm of strain rate ( $\Delta\epsilon/\Delta t$ ) versus time in determining the parameters,  $a$ ,  $b$ , and  $\lambda$  [7, 8] and the method of the logarithm of strain ( $\epsilon$ ) versus logarithm of time in determining parameters  $m$  and  $n$  from the settlement-time record.

Accordingly, the settlement-time record is incrementalized and the operator chooses the range over which these functions give a linear plot. From this portion of the plots, model parameters are calculated. The program provides a plot of the actual strain versus time, along with the calculated strain (from the calculated model parameters) versus time so that the quality of curve-fitting can be visually evaluated.

### SITES MODELED

Data from four different existing refuse fills were analyzed. All four of these sites are municipal landfills. It was assumed that the refuse in each of these four sites is about the same composition. The sites are in northern climates, thus there is sufficient rainfall to promote the degradation of the refuse which affects settlement. Table 1 summarizes the known values of refuse thickness, settlement, data collection duration, and refuse placement conditions.

#### Site A

This refuse site is in southeastern Wisconsin. Placement of the refuse fill at this site began in the early 1970's. The settlement data was collected using settlement platforms surveyed periodically from 1984 to 1986. The age of the refuse fill below each platform varied but was estimated to be between 0 to 4 years at the time the data were obtained. The data collection at this site continued for approximately 1.8 years. For this study two categories of loading conditions were considered. The first category is called "minimal filling". This category represents a condition of settlement under essentially self weight during data collection. The second category is called "active filling", since additional refuse and daily cover were added during data collection. Thus, the second category represents a condition of settlement under both self weight and the placement of additional fill above the platforms [9]. The leachate level was about 7.6 m above the base of the landfill during data collection. Near Platforms 7 and 9, there was occasional leachate extraction.

#### Site B

This refuse site is in southern Michigan. The refuse fill has been placed in the landfill since 1969. In 1985 an expansion area was constructed on top of the existing fill. The settlement data collection began in 1985, during placement of the additional fill in the expansion area. Again, two differing conditions existed during this 1.2 year study. The first was the old refuse that was already in place below the settlement platform. After the placement of new refuse, settlement was monitored at varying horizontal distances of between 50 to 250 feet from the expansion

TABLE 1 -- REFUSE SETTLEMENT DATA

Platform Number	Refuse Thickness (m)	Settlement (m)	Time Duration (yr)	Placement Condition
<b>SITE A</b>				
1	13.73	0.52	1.6	Fresh Refuse: No filling
2	8.01	0.59	1.6	Fresh Refuse: No filling
3	9.25	1.11	1.6	Fresh Refuse: No filling
4	9.84	1.19	1.8	Fresh Refuse: No filling
15	26.74	0.37	1.5	Fresh Refuse: Minimal filling < 1m
16	25.15	0.43	1.3	Fresh Refuse: Minimal filling < 1m
7	36.28	1.89	1.7	Fresh Refuse: Minimal filling < 1m
9	34.72	1.12	1.5	Fresh Refuse: Minimal filling < 1m
8	36.75	3.20	1.5	Fresh Refuse: Active filling > 6m
10	37.38	2.99	1.7	Fresh Refuse: Active filling < 6m
11	19.66	2.10	1.4	Fresh Refuse: Active filling < 6m
12	27.94	1.94	0.7	Fresh Refuse: Active filling < 6m
13	23.46	0.72	1.1	Fresh Refuse: Active filling > 6m
14	19.86	1.62	1.3	Fresh Refuse: Active filling > 6m
17	22.28	2.74	1.1	Fresh Refuse: Active filling > 6m
<b>SITE B</b>				
S-4	15.24	0.09	1.2	Old Refuse: No filling
S-5	15.24	0.21	1.2	Old Refuse: No filling
S-6	15.24	0.94	1.2	Fresh Refuse: Active filling
<b>SITE C</b>				
84-2	10.06	0.65	4.0	Old Refuse: Relocated/Compacted
84-3	10.06	0.58	4.0	Old Refuse: Relocated/Compacted
84-4	11.58	0.60	4.1	Old Refuse: Relocated/Compacted
84-5	5.49	0.33	4.1	Old Refuse: Relocated/Compacted
84-6	10.06	0.61	3.9	Old Refuse: Relocated/Compacted
84-7	11.58	0.52	3.3	Old Refuse: Relocated/Compacted
<b>SITE D</b>				
SP1	3.05	0.38	0.9	Old Refuse: Surcharge
SP2	3.05	0.64	0.9	Old Refuse: Surcharge
SP3	3.05	0.44	0.9	Old Refuse: Surcharge

area. The second condition was the active filling of fresh refuse directly above the settlement platform [10].

Site C

This refuse site is in western Connecticut. A 40 to 50 year old "town dump" was excavated and relocated at a new site. This site was monitored for 5 years. The only settlement that occurred was due to the self weight of the compacted refuse [11].

Site D

Site D consisted of (a) experimental cells that were constructed to monitor settlement and (b) an area of old refuse below the settlement platform when an embankment load was added. The duration for this study was 1 year [12].

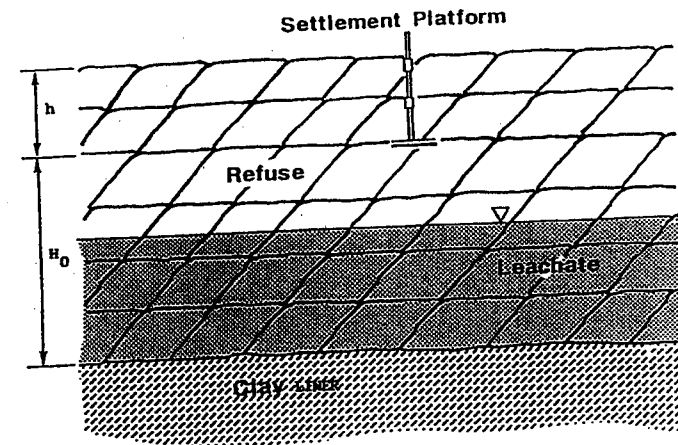


Figure 2 Typical Settlement Platform

MODELING

The settlement platforms were placed as shown in Fig. 2. The refuse thickness ( $H_0$ ) is the initial thickness of the refuse below the settlement plate. Additional refuse was placed above the settlement platform ( $h$ ). The times of placement of the additional refuse above the platforms were unavailable for the four sites. It was assumed that the additional refuse above the platform was placed at time zero, when the data collection was started. The average applied stress ( $\Delta\sigma$ ) in the layer of refuse below the platform was calculated as follows:

$$\Delta\sigma = \gamma h + 1/2(\gamma H_0) - 1/2(\gamma + \gamma_w - \gamma_{sat})(H_w^2/H_0) \quad (3)$$

where:

- $\Delta\sigma$  = average applied stress
- $\gamma$  = moist unit weight of refuse
- $\gamma_{sat}$  = saturated unit weight of refuse
- $\gamma_w$  = unit weight of leachate (water)
- $H_0$  = initial height of refuse below platform
- $h$  = height of refuse above platform
- $H_w$  = height of leachate above base liner

A moist unit weight of  $10.7 \text{ kN/m}^3$  and a saturated unit weight of  $14.6 \text{ kN/m}^3$  were used in computing the average applied stress at each of the sites.

The programs that were used to model the Gibson and Lo model and the power creep law plotted predicted strain versus log time, along with the actual strain versus log time for the data that was input. Emphasis was placed on the later portion of the curve in the case of the Gibson and Lo model, where secondary compression occurs, and there is a constant effective stress. In the case of the power creep law, the whole range of the data was considered in

curve-fitting. The curve fitting predictions were generally accurate, with a few exceptions of the early data not fitting the computed curve, especially for the Gibson and Lo model. Fig. 3 shows typical curves fitted to the data using the two methods.

A few of the settlement records could not be analyzed with these models. It is believed that these records violated the assumption of constant stress change. Overall, the power creep law gave a better representation of the data in 65% of the cases than the Gibson and Lo model. For the remaining 35% of the cases, it was comparable to the Gibson and Lo model, except only one case.

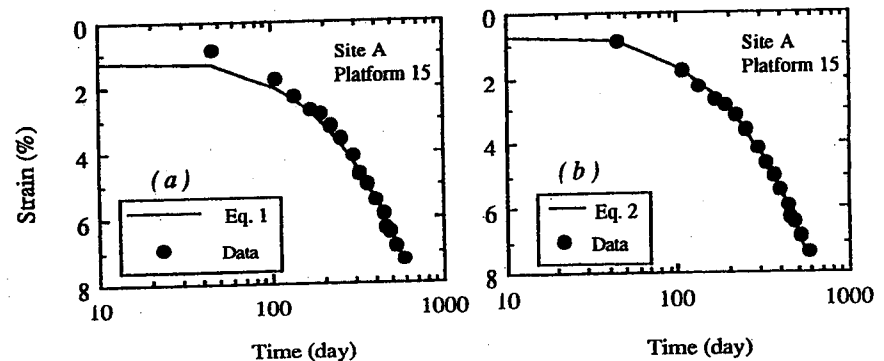


Figure 3 Strain-time curves by a) the rheological model and b) the power creep law fitted to the measured data

REFUSE COMPRESSION MODEL PARAMETERS

Gibson and Lo Model Parameters

The three empirical parameters of the Gibson and Lo model derived for the four sites are summarized in Table 2 and plotted in Figs. 4, 5 and 6. The curves in these figures are trends not actual relations. Fig. 4 plots  $a$ , the primary compressibility as a function of stress. The amount of primary compression decreases with an increase in stress. For the "active" filling in Site A, a higher value was obtained indicating more primary settlement was occurring during placement of the fresh refuse. In Fig. 5 the secondary compressibility,  $b$ , is shown to decrease with increasing stress. Generally, the "active" filling sites show lower amounts of secondary settlement than for the "minimal" filling sites. This is due to the fact that the "active" filling cases were still experiencing substantial primary settlement. Undisturbed old refuse from sites B and C has a lower secondary compressibility compared to fresh refuse or old refuse recently surcharged (Sites A and D and Platform S6 from Site B). The rate of secondary compression,  $\lambda/b$ , as a function of average strain rate is illustrated in Fig. 6. Average strain rate is defined as total strain divided by elapsed time during data collection. As expected, as the average strain rate increases, so does the rate of secondary compression. This behavior was also observed for peat soils [7] and indicates that the dashpot is essentially nonlinear in the model. The implication of this is that the parameters obtained from a fill must be extrapolated with care to another fill with different refuse thickness and applied stress even if the composition and location are similar. There was not any observable effect of leachate extraction on the parameters, perhaps because of its limited scope.

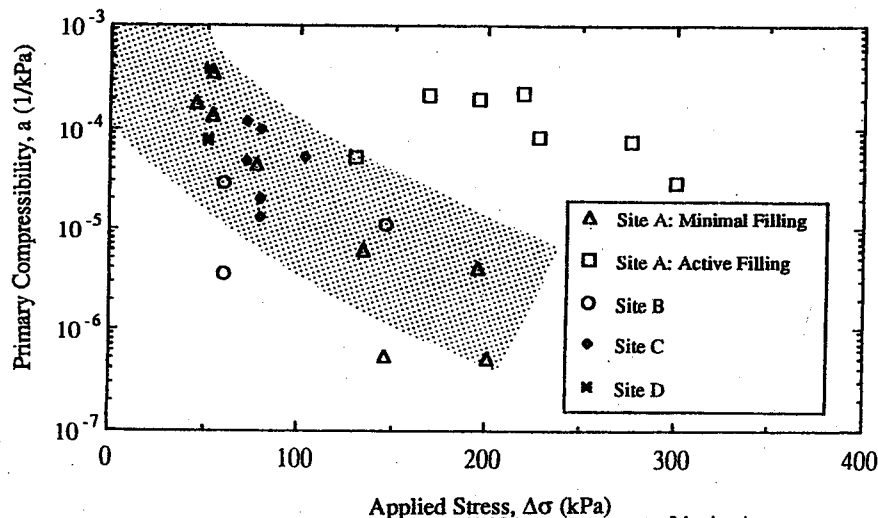


Figure 4 Primary compressibility versus applied stress

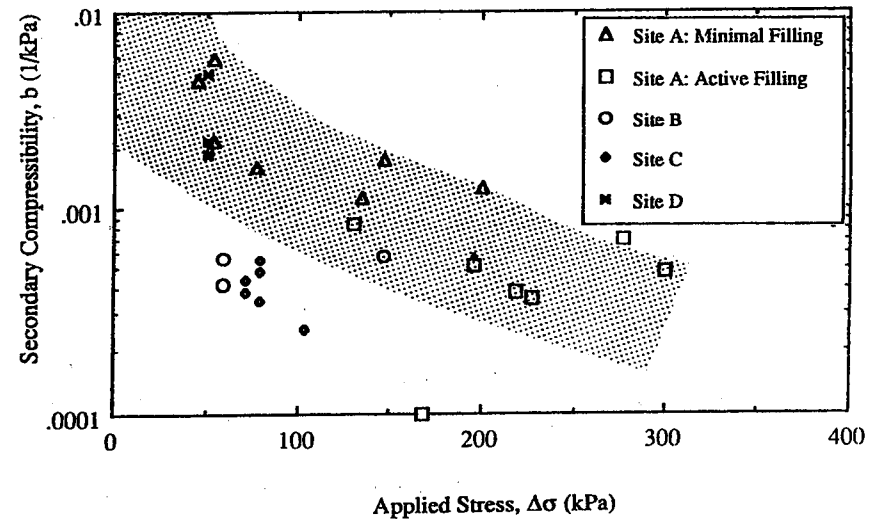


Figure 5 Secondary compressibility versus applied stress

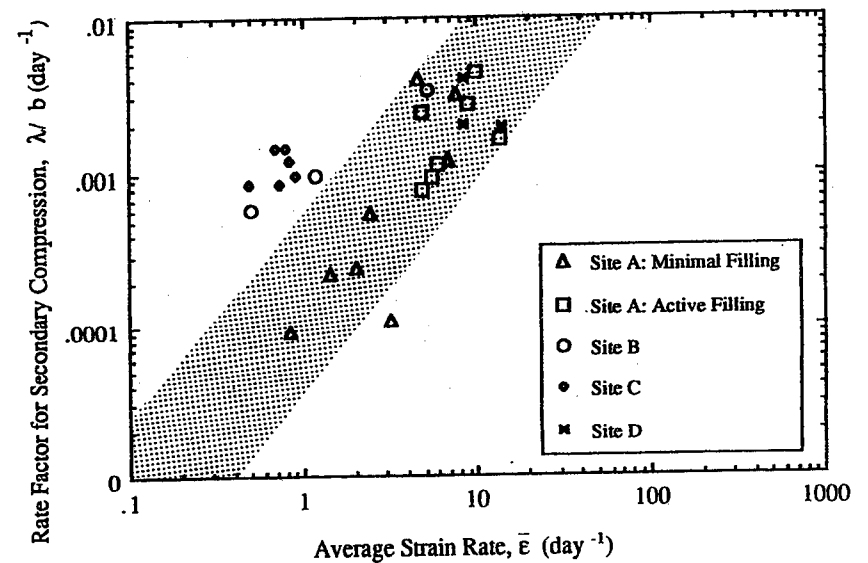


Figure 6 Rate of secondary compression versus average strain rate

TABLE 2 -- EMPIRICAL MODEL PARAMETERS

Platform Number	Applied Stress (kPa)	Average Strain (%/yr)	Gibson & Lo			Power Creep	
			a (1/kPa)	b (1/kPa)	$\lambda/b$ (1/day)	m (1/kPa)	n ( $t_r = 1$ day)
<b>SITE A</b>							
1	77.21	2.37	4.42e-5	1.62e-3	5.60e-4	5.48e-6	0.702
2	54.09	4.59	1.40e-4	5.87e-3	4.00e-3	5.75e-6	0.862
3	53.58	7.51	3.52e-4	2.18e-3	3.10e-3	1.38e-4	0.438
4	45.00	6.81	1.78e-4	4.58e-3	1.20e-3	1.18e-5	0.850
15	146.27	0.83	5.32e-7	1.77e-3	9.20e-5	7.52e-8	1.131
16	134.12	1.42	6.11e-6	1.13e-3	2.30e-4	9.00e-8	1.170
7	195.65	3.14	4.10e-6	5.49e-4	1.10e-4	1.61e-6	0.804
9	200.16	2.01	5.11e-7	1.24e-3	2.50e-4	3.15e-7	0.980
8	276.40	5.50	7.76e-5	6.01e-4	9.40e-4	3.10e-6	0.744
10	227.76	4.84	8.35e-5	3.54e-4	2.40e-3	3.40e-6	0.746
11	168.01	13.58	2.12e-4	1.00e-4	1.60e-3	1.67e-5	0.619
12	195.32	4.74	1.99e-4	5.05e-4	7.70e-4	5.48e-5	0.297
13	219.07	5.89	2.30e-4	3.75e-4	1.10e-3	5.89e-5	0.302
14	130.12	8.98	5.34e-5	8.40e-4	2.70e-3	1.30e-5	0.670
17	300.29	9.82	2.86e-5	4.74e-4	4.30e-3	1.16e-6	1.005
<b>SITE B</b>							
S-4	59.88	0.50	3.60e-6	4.10e-4	6.00e-4	7.85e-7	0.779
S-5	59.88	1.17	2.80e-5	5.60e-4	9.70e-4	2.25e-6	0.759
S-6	146.10	5.17	1.10e-5	5.70e-4	3.30e-3	8.83e-6	0.648
<b>SITE C</b>							
84-2	79.42	0.90	1.00e-4	4.70e-4	9.70e-4	6.48e-5	0.264
84-3	79.42	0.48	1.30e-5	3.50e-4	8.40e-4	1.10e-5	0.409
84-4	71.66	0.83	1.20e-4	4.30e-4	1.20e-3	5.14e-5	0.304
84-5	102.79	0.68	5.20e-5	2.50e-4	1.40e-3	2.75e-5	0.314
84-6	79.42	0.72	2.00e-5	5.40e-4	8.40e-4	1.40e-5	0.465
84-7	71.66	0.79	4.90e-5	3.80e-4	1.40e-3	1.67e-5	0.443
<b>SITE D</b>							
SP1	50.97	8.33	7.50e-5	1.90e-3	4.00e-3	4.69e-5	0.593
SP2	50.97	14.00	8.00e-5	4.90e-3	1.90e-3	4.85e-5	0.666
SP3	50.97	8.44	3.80e-4	2.20e-3	2.00e-3	8.57e-5	0.486

Power Creep Law Parameters

The two empirical parameters of the power creep law derived for the four sites are given in Table 2. These parameters did not indicate any discernible trends with the respect to applied stress or average strain in each site within the range of variation of these factors. Reference compressibility, m has an average value of about  $2.5 \times 10^{-5}$  1/kPa and it is about 1.7 times higher for old refuse ( $3.4 \times 10^{-5}$  1/kPa) than fresh refuse ( $2.0 \times 10^{-5}$  1/kPa). It shows no discernible patterns with respect to placement conditions of the refuse. However, it is quite variable, especially in Sites A and B. Rate of compression, n has an average of 0.65 and indicates some patterns with respect to age and placement conditions of the refuse. For instance, old relocated refuse from Site C that was compacted during placement had the lowest average n = 0.37 and, in general, fresh refuse had an average n value of nearly 1.5 times as that of old refuse. The variability of n is not as great as that of m; however, it is more variable in Site A than the other three sites.

COMPARISON OF THE MODELS

For Site A, the first year of data obtained was used to predict the amount of settlement that could be expected at the end of the data collection period which was about two years. The results obtained using both models are compared with the actual measurements in Table 3. The Gibson and Lo model predicted the amount of settlement at the end of two years within 2 to 18% of the actual settlement that occurred for minimal filling and 4 to 21% for active filling. The power creep law predictions for the same conditions were 0 to 6% and 0 to 14%, respectively.

TABLE 3 -- COMPARISON OF PREDICTED SETTLEMENT

Platform Number	Settlement (m)			Percent Diviation (%)	
	Actual	Gibson & Lo	Power Creep	Gibson & Lo	Power Creep
<b>Minimal Filling</b>					
1	0.52	0.43	0.53	-17	2
2	0.59	0.59	0.59	0	0
3	1.11	1.09	1.06	-2	-4
4	1.19	1.23	1.24	4	5
7	1.88	1.54	2.00	-18	6
<b>Active Filling</b>					
8	3.34	3.19	3.38	-4	1
10	2.99	2.93	3.18	-2	6
12	1.94	1.91	1.94	-1	0
13	2.03	2.00	1.97	-2	-3
14	2.95	2.32	2.53	-21	-14



## CONCLUSIONS

From the limited data, the following conclusions can be made:

1. Refuse settlement can be modeled satisfactorily with either a rheological model as presented in the Gibson and Lo theory or the power creep law.
2. Power creep law provides a better representation of the settlement data than the rheological model. However, the rheological model has parameters that can be assigned physical meaning and reflect the effects of certain refuse placement conditions.
3. While active filling is ongoing, primary compression is significant compared to secondary compression; and
4. Once filling has stopped, secondary compression is more evident.

Further landfill sites need to be instrumented for data collection and analyzed to develop a data bank of ranges for the empirical parameters for different stages of the landfill life.

## ACKNOWLEDGEMENTS

The authors would like to thank Waste Management of Wisconsin, Inc. and Debra L. Nelson of Warzyn Engineering Inc., for supplying some of the initial data used in preparation of this paper.

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**Appendix D**  
**Slope Stability Analysis**

Mono County Department of Public Works

# FINAL REPORT

## Slope Stability Analysis

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**Pumice Valley Landfill  
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*August 2004*  
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## 1.0 INTRODUCTION

This slope stability analysis of the proposed final configuration of the Pumice Valley Landfill has been prepared in accordance with Title 27 of the California Code of Regulations (27 CCR) Section 21090, 21145 and 21750. This report presents the information specifically required by 27 CCR 21750(f). A geologic cross section was prepared as part of the original Solid Waste Assessment Test (SWAT) report for the site (Kleinfelder, 1989). In addition to this cross section, SRK Consulting (SRK) reviewed available well logs from monitoring well installations at the site and available laboratory tests of on-site soils. Copies of the geologic cross section, monitoring well construction logs and available laboratory testing information are included in Attachment 1 and characterize the subsurface strata and groundwater conditions in the vicinity of the Pumice Valley Landfill.

## 2.0 REGIONAL AND LOCAL GEOLOGY

The Pumice Valley Landfill is located on Dross Road in central Mono County, approximately four miles southeast of the town of Lee Vining, California and two miles northeast of the intersection of State Route 120 and U.S. Highway 395. The landfill property, as defined by the Public Land Survey System, occupies approximately 40 acres in the NW $\frac{1}{4}$  of the NW $\frac{1}{4}$  of Section 36, Township 1 North, Range 26 East, Mount Diablo Baseline and Meridian (MDB&M). The landfill is situated at an elevation of approximately 6,800 feet above mean sea level (amsl). The location of the site is illustrated on Figure 1.

The landfill lies east of the Sierra Nevada mountain range along the southwestern margin of the Mono Basin approximately two miles south of Mono Lake and four miles northwest of Crater Mountain, the highest point within the Mono Craters volcanic complex. This region marks the western rim of the Basin and Range province of North America, and is associated with extensional tectonism. The Mono Craters volcanic complex consists of a young volcanic chain of plug dome volcanoes arranged along a concave arc south of the Mono Basin. These volcanoes are part of a larger structure that includes the Long Valley Caldera and Inyo Craters to the south and the volcanoes of Mono Lake to the north. Together, these volcanoes form a 40-km-long chain of Late Pleistocene and Holocene craters, domes, and flows. Rhyolite flows erupted from the Mono Craters volcanic chain approximately 40,000 years ago, with eruptive episodes continuing until about 600 years ago (Wood, 1977). The rocks associated with the Mono Craters are typically rhyolitic in composition and consist of pumice, obsidian, and ash deposits.

Panum Crater, the youngest extrusive volcanic feature in the Mono Basin, was formed in an eruption that occurred at the northern end of the Mono Craters chain. This crater consists of a small dome of rhyolite and a tephra ring, which has a maximum rim-to-rim diameter of 4,000 feet and is comprised of pumice ash and lapilli, and obsidian fragments. The Panum Crater is the closest volcanic feature to the Pumice Valley Landfill and is located approximately 2 miles to the northeast.

The Pumice Valley Landfill is located on an alluvial plain that slopes toward Rush Creek northwest of the site. Soils in the vicinity of the landfill have formed by several depositional processes including alluvial deposition from surrounding mountain slopes, lacustrine deposition from Mono Lake and Pleistocene Lake Russell (the predecessor of Mono Lake), and ash cinders and volcanic debris deposited during volcanic events associated with the Mono Craters volcanic chain.

Subsurface sediments within the landfill area are described by Kleinfelder (1989) from drillholes advanced in excess of 200 feet during ground water monitoring well installation. The sediments mainly consist of unconsolidated interbedded aeolian, fluvial and lacustrine deposits. Near the surface (i.e., 5-10 feet below ground surface, bgs) the sediments are generally comprised of loose, unconsolidated sand derived from weathered volcanic parent rock. Lacustrine deposits that occur below these sediments (i.e., at approximately 30 feet bgs) are characterized as dense, fine sand and silt containing volcanic ash and pumice. These lacustrine sediments are underlain by interbedded coarse sands and gravels likely deposited in alluvial outwash channels (Kleinfelder, 1989). The larger particles of gravel are subangular to subrounded and consist of granitic and metamorphic material indicating these particles were transported by fluvial processes from the surrounding hills to the west and south prior to deposition (Kleinfelder, 1989).

Groundwater was encountered during drilling between 240 and 260 feet below ground surface (bgs) in unconsolidated alluvial deposits consisting of gravelly sand to sandy gravel. Current groundwater monitoring data indicate static groundwater levels between 248 and 268 feet bgs. Due to the similarity between the original depth to groundwater encountered during drilling and groundwater elevations measured in the groundwater wells during subsequent monitoring events, it is likely the aquifer beneath the site exists under unconfined conditions. Based on the most recent monitoring data, the groundwater flow direction is generally slightly north of east, which is consistent with regional groundwater flow toward Mono Lake, and at a gradient of 0.005 feet per foot (2003 Annual Report, Detection Monitoring Program for the Pumice Valley Landfill).

### **3.0 REGIONAL AND LOCAL FAULTING AND SEISMICITY**

The Pumice Valley Landfill is situated within the Eastern California Shear zone as defined by Jennings (1985). This region is still volcanically and tectonically active and the Mono Crater Caldera is structurally bordered on the west by the northwest-trending Hartley Springs Fault and Mono Lake Fault and on the southeast by the Hilton Creek Fault. Regional and local faulting is illustrated on Figures 1 and 2.

The site is not located within a currently-designated Alquist-Priolo Earthquake Fault Zone, as shown on Figure 2. There are no known active faults located at the site. The closest Holocene (i.e., active) faults to the landfill site identified by Jennings (1994) are the Mono Lake Fault (approximately 3 miles northwest of the site) and a group of splays on the Hartley Springs Fault where the northwest-trending fault enters the Mono Crater Caldera, approximately 3 miles south of the facility (Figures 1 and 2). The Mono Lake

Fault is a range-bounding normal fault that borders the western side of Mono Lake. Holocene stream-terrace deposits that have been displaced by the Mono Lake Fault suggest two surface-faulting earthquakes occurred along this fault during the Holocene. The Hilton Creek Fault is also a range-bounding normal fault (USGS, 2004). Surface fault rupturing evident in the area is a result of four earthquakes in 1980 with moment magnitudes greater than  $M_w$  6 (Taylor and Bryant, 1980). The Hilton Creek Fault generally steps complexly northwest and joins up with the Hartley Springs Fault (USGS, 2004). The seismic characteristics of these active faults are given in Table 1.

TABLE 3.1. Seismic Characteristics of Regional Faults					
Fault Name	Minimum Distance to Site (miles)	Fault Length <sup>1</sup> (miles)	Maximum Moment Magnitude <sup>1</sup> ( $M_w$ )	Slip Rate <sup>1</sup> (mm/yr)	Recurrence Interval (yrs) <sup>1</sup>
Mono Lake Fault	3	16	6.6	2.5	305
Hilton Creek Fault	6	18	6.7	2.5	386
Hartley Springs Fault	3	15.5	6.6	0.5	1,584

<sup>1</sup> Petersen et al., 1996.

#### 4.0 STABILITY ANALYSIS

The computer program XSTABL (Version 5.202) was used to analyze the static and pseudostatic stability of the critical cross section and final cover profile defined in Subsection 4.1 below. XSTABL utilizes a modified version of the widely-accepted STABL4 program, originally developed at Purdue University, to calculate factors of safety based on the simplified Bishop and Janbu methods of analysis. Both methods use a limit equilibrium approach to analyze the stability of a slide-mass by dividing it into slices and calculating and resolving the various forces on each slice. The slide-mass is defined by a circular, angular, or pre-defined slip surface, depending on the method of analysis selected. Randomly generated slip surfaces are analyzed in accordance with input parameters and the 10 most critical failure surfaces are returned as program output.

For the mass landfill stability presented in this report (Critical Section A-A'), 20 circular slip surfaces were randomly generated from each of 10 points equally spaced within a zone of initiation defined generally between the left limit or toe of the critical slope section and the uppermost slope crest of the waste mass. As a result, each analysis included the assessment of 200 potential failure surfaces. In developing the final analysis, several combinations of initiation and termination zones were analyzed and the factors of safety returned by the program were evaluated. The initiation and termination zones which resulted in a reasonable mass failure with the lowest factor of safety were used to determine the static and pseudostatic stability of the waste mass at the critical section described in Section 4.1. XSTABL runs which resulted in relatively minor surface sloughing failures were discarded in order to assess the potential for

significant mass failure. Surface sloughing slope failures are addressed in detail in the analysis of the final cover configuration.

The final cover configuration was analyzed using separate model runs to determine the potential of portions of the final cover system to fail under both static and seismic conditions. In these analyses, the failure plane was forced through the "weak link" of the cover system, the clay core of the geosynthetic clay liner, using specified "search boxes" and the Rankine block surface generation method. The Rankine method generates the passive and active portions of the block failure surface using the friction angle of the pertinent slope material.

## **4.1 INPUT: Definition of Critical Section and Physical Model**

### **4.1.1 Waste Mass Stability**

The critical cross section was defined from the existing and proposed topography presented on the Final Grading Plan illustrated on Figure 3. Cross section A-A' was selected based on the maximum thickness of waste along the section (approximately 40 feet above grade) and the potential lack of confining pressures at the slope toe due the subgrade sloping gently away from the waste mass in the area of the critical section. The critical section used in the slope stability analysis is illustrated on Figure 4.

As previously discussed, sand and silt layers were identified beneath the site within 10 to 30 feet of the surface, and underlain by interbedded coarse sands and gravels. Based on this, the soil adjacent to and below the waste was assumed to consist of sand and silt. The sand and silt layers contain a significant amount of volcanic ash and pumice, which gives them a lower dry unit weight than typical sands and silts. Results from compaction testing (Attachment 1) give a maximum dry density of approximately 91 pounds per cubic foot (pcf), compared to a typical value for loose sand with mixed grain size of 99 pcf with friction angles from 34° to 40° (Hoek and Bray 1981). For the stability analysis, on-site soils, either underlying the waste mass or within the final cover, were considered to have a density of 80 pcf (approximately 90 percent of maximum dry density), a friction angle at the low end of the reported range at 32°, with no cohesive strength. Because on-site soils will be compacted when used in final cover construction, they are likely to exhibit a higher friction angle than that used in the modeling.

Physical properties of the waste mass were derived from published research data from Kavazanjian et al. (1995) and Landva and Knowles (1990). Assuming a waste to soil ratio of 4:1, a compacted in-place waste density of 1,000 pounds per cubic yard (pcy, representing the majority of the waste planned for disposal at the site), and a cover soil density of 80 pcf, a weighted waste/cover soil density of 45.6 pcf was calculated for use in the stability analysis. The waste mass was represented in the stability analysis with a friction angle of 30° and no cohesive strength based on a summary of stability analyses presented by Kavazanjian et al. (1995).



#### **4.1.2 Final Cover Stability**

For the independent analysis of the final cover layer, a typical landfill sideslope was modeled at the proposed slope angle of 3H:1V (horizontal to vertical). The final cover profile is presented on Figure 4, and includes the waste mass overlain by a 24-inch foundation layer, which in turn is overlain by a 4-inch-thick layer representing the geosynthetic clay liner (GCL). The GCL layer thickness was arbitrarily chosen to facilitate modeling without imparting a significant increase in normal stress. The GCL is overlain within the model by an 18-inch layer of soil. The top cover layer will actually include 12 inches of soil and 3 to 6 inches of bark chips for erosion protection. For the purposes of the analysis, the added weight of the soil (versus lighter bark chips) adds another degree of conservatism to the model results.

The physical properties of the GCL layer were conservatively represented based on GCL descriptions provided in Richardson (1997). The shear strength of un-reinforced GCL is dictated by the strength characteristics of bentonite. Reinforced GCLs exhibit an effective shear strength enhanced by reinforcing fibers between geotextile layers. However, following a sufficient lateral displacement, the reinforcing fibers fail and the residual strength approaches that of un-reinforced GCLs. Richard (1997) proposes a minimum internal shear strength of 500 psf for reinforced GCLs, which is in agreement with manufacturer's recommendations from GSE. The friction angle for bentonite varies considerably with moisture content. Hoek and Bray (1981) report a range of friction angles from 7° to 13° for soft bentonite. For the purposes of the stability modeling presented herein, the GCL layer was assigned a residual friction angle of 0° and a cohesion of 500 psf.

As previously mentioned, the failure plane was forced through the GCL layer using the block failure method. Based on strength parameters, the GCL is considered to be the weak layer in the final cover system. The internal strength of the GCL is considered to be more critical with respect to stability than the interface characteristics between the GCL and over- or underlying soil layers. As a result, only the internal strength of the GCL was considered. It is important to note that the parameters used to model the GCL component of the final cover have been estimated based on available information. Detailed interface and material testing is recommended during the final landfill closure process to ensure that the proposed final cover layer will satisfy applicable requirements.

#### **4.2 INPUT: Seismic Design Parameters**

Seismic design parameters for the stability evaluation of the Pumice Valley Landfill were developed based on applicable requirements of 27 CCR. California solid waste regulations require consideration of seismic loading resulting from the Maximum Probable Earthquake (MPE) for Class III facilities. The MPE is defined as the earthquake resulting in a site-specific ground motion with a 10 percent probability of being exceeded in 50 years, and is the minimum ground motion representation based on 27 CCR. The regional Probabilistic Seismic Hazard Map published by the United States Geological Survey (USGS, 1996) was used to determine the peak acceleration at the site corresponding to the MPE for this analysis. A copy of the regional seismic

hazard map is included in Attachment 2. A search within the USGS Internet database (upon which the seismic hazard maps are based) using the latitude and longitude of the site returned a 10%-in-50-years peak acceleration value of 0.414g. Database search results are also presented in Attachment 2.

Based on information presented by the Army Corps of Engineers in Hynes and Franklin (1984), it is reasonable to reduce the peak ground acceleration (PGA) associated with the MPA by half for the purpose of pseudostatic slope stability assessment. In addition, Seed and Idriss (1982) suggest a reduction factor of 0.65 for peak ground acceleration, based on numerous time-history data sets of earthquake shear stresses having an average equivalent shear stress of approximately 65 percent of the peak ground acceleration. Based on this information, the PGA (0.414g) was reduced to 0.269g, hereinafter referred to as the effective peak ground acceleration (EPGA), using the more conservative reduction factor of 0.65 to obtain seismic loading parameters for pseudostatic stability analyses.

### 4.3 OUTPUT: Results of Stability Analysis

Stability analyses using the configurations and material properties described in Section 4.1 were performed and resulted in minimum static factors of safety of 1.804 for section A-A' and 1.919 for the final cover profile. Pseudo-static analysis was performed using the same configurations and material properties as the static analyses, but with the addition of the EPGA seismic load and various additional seismic loads used to determine the yield acceleration as discussed in Section 5.0. In all cases the vertical component of the seismic load was considered to be two-thirds of the horizontal acceleration (UBC, 1997). Table 4.1 summarizes the pertinent analyses including the seismic loads and resulting factors of safety for each simulation. XSTABL output files for Section A-A' are included in Attachment 3. Output files for the cover analysis are included in Attachment 4.

Table 4.1. Summary of Analyses and Results			
Critical Section	Horizontal Acceleration	Vertical Acceleration (2/3 PHA)	Factor of Safety
A-A'	Static	Static	1.919
	0.269g (EPGA)	0.184g	0.875
	0.220g (yield)	0.130g	0.999
Final Cover	Static	Static	1.919
	0.269g (EPGA)	0.184g	0.869
	0.217g (yield)	0.145g	1.002

### 5.0 DEFORMATION ANALYSIS

The stability analysis did not achieve a minimum dynamic factor of safety of 1.5 as mandated by 27 CCR Section 21750(f)(5)(c). As a result, a displacement analysis was performed in accordance with 27 CCR Section 21750(f)(5)(d). The deformation

analysis, commonly referred to as a Newmark displacement analysis, was performed based on methods described in Newmark (1965) and Makdisi and Seed (1978). In the deformation analysis, the yield acceleration ( $k_y$ ) is determined by performing a series of stability analyses while varying the seismic load. The yield acceleration represents the seismic load which results in a factor of safety of 1.0, indicating slope equilibrium conditions. The yield acceleration is then compared to the maximum acceleration [ $k_{max}$ , for the MPE in this case, based on 27 CCR 21750(f)(5)(c)(7)], and the ratio is plotted on an empirically derived chart of displacement versus  $k_y/k_{max}$  (Makdisi and Seed, 1978).

Figures 5 and 6 present displacement charts for the critical section and the final cover profile. To determine the range of possible displacements, maximum reported displacements for magnitude 6.5, 7.5, and 8.5 earthquakes are plotted on the chart. The maximum credible earthquake for the Pumice Valley Landfill has been estimated at  $M_w$  6.7 (Petersen et al., 1996) based on information presented in Table 3.1. Ground accelerations at the landfill resulting from an earthquake of this magnitude may generate slope displacements on the order of 1.4 to 10 centimeters for the critical section, or 1.5 to 10.5 centimeters along the GCL component of the final cover. According to GCL manufacturers, acceptable displacements are in the range of 1 foot or less. As such, the predicted slope and final cover displacements are considered acceptable within assumed parameters.

## 6.0 DISCUSSION

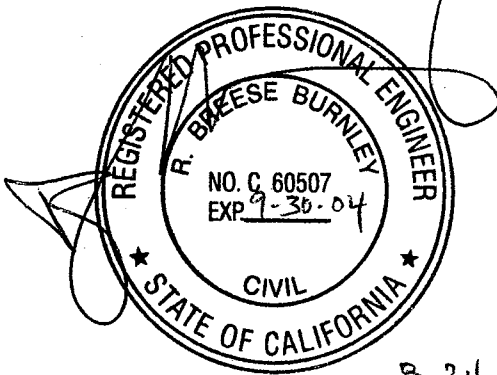
The stability analyses indicate the proposed landfill configuration is stable under static conditions. However, slope failure was predicted by the most conservative stability analyses utilizing the effective peak ground acceleration, necessitating the completion of a deformation analysis in accordance with the requirements of 27 CCR Section 21750(f)(5)(d). Detailed deformation analyses indicate acceptable displacement from the maximum earthquake expected for the region ( $M_w$  6.7).

In constructing the final cover, it is recommended that a reinforced geosynthetic clay liner be used. Un-reinforced GCLs are only recommended for slopes less than about 6 to 10 percent, and only when it can be guaranteed that the GCL will not be hydrated during installation. As previously mentioned, the parameters used to model the GCL component of the final cover have been estimated based on available information. Detailed interface and material testing are recommended during the final landfill closure process to ensure that the proposed final cover layer will satisfy applicable stability requirements.

## 7.0 CERTIFICATION

This stability analysis was prepared under the direct supervision of a Professional Engineer registered in the State of California, and in accordance with generally accepted civil and geotechnical engineering practices applicable at the time the report was prepared. Steffen Robertson and Kirsten (U.S.), Inc., make no other warranties, either express or implied, as to the professional recommendations provided under the terms of this agreement, and as described in this report. This report was prepared in general accordance with the requirements of Title 27 of the California Code of Regulations.

Steffen Robertson and Kirsten (U.S.), Inc.



**R. Breese Burnley, R.C.E. No. C60507**  
**Senior Engineer**

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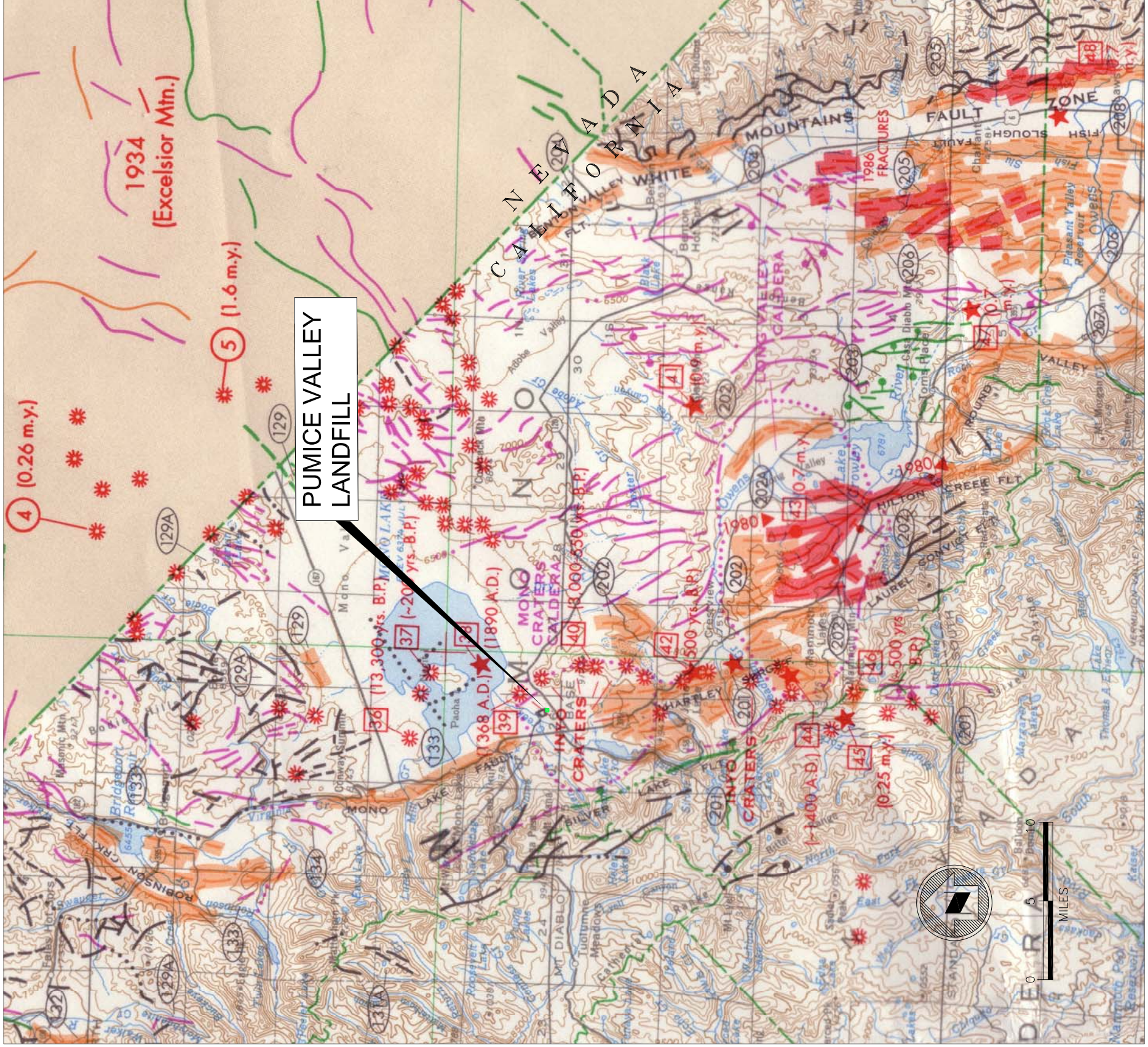
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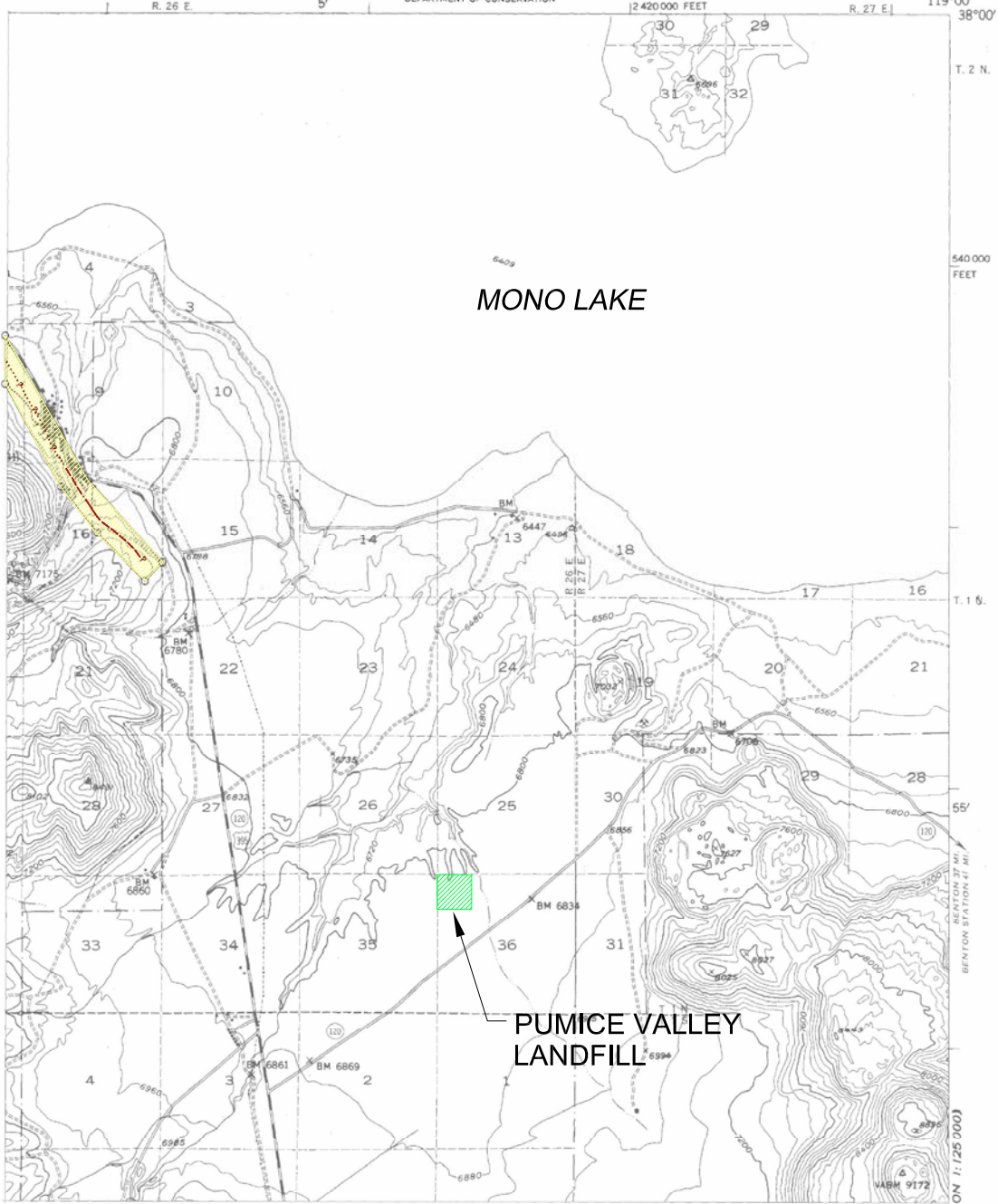
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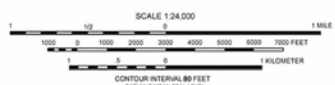
Base map modified after Fault Activity Map of California and Adjacent Areas, 1994 by Charles W. Jennings (CDMG-Map No. 5)

Geologic Time Scale	Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	
				ON LAND	OFFSHORE
Quaternary	Late Quaternary	[Symbol]	[Symbol]	Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
				Displacement during Holocene time: Fault offsets seafloor sediments or strata of Holocene age.	
Pleistocene	10,000	[Symbol]	[Symbol]	Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Pleistocene age.
				Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Pliocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary	1,600,000	[Symbol]	[Symbol]	Late Cenozoic faults within the Sierra Nevada, including parts of, but not restricted to, the Foothills fault system. These faults may have been active in Quaternary time.	
				Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.
Pre-Quaternary	4.5 billion (Age of earth)	[Symbol]	[Symbol]	Pre-Quaternary faults not shown in Nevada and Oregon.	

DESIGNED	RBB	8/04	<b>FIGURE 1</b> <b>REGIONAL FAULT MAP</b> <b>SLOPE STABILITY ANALYSIS</b> <b>FOR</b> <b>PUMICE VALLEY LANDFILL</b> <b>MONO COUNTY, CALIFORNIA</b>
DRAWN	draft	8/04	
CHECKED			
APPROVED			
NO. DESCRIPTION		DATE	
REVISIONS			PREPARED BY: <b>SRK Consulting</b> Engineers and Scientists SCALE: AS SHOWN JOB NO. 146901 DWG NAME 146901-PY201



TOPOGRAPHIC BASE MAP BY U.S. GEOLOGICAL SURVEY 1961  
ENLARGED FROM 1:62,500 SCALE



- MAP EXPLANATION**
- Potentially Active Faults**
- C — Faults considered to have been active during Miocene time and to have a relatively high potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; curly (f) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by creep or possible creep.
- Special Studies Zone Boundaries**
- — These are delineated as straight-line segments that connect encircled turning points so as to define special studies zone segments.
  - Seaward projection of zone boundary.

**STATE OF CALIFORNIA  
SPECIAL STUDIES ZONES**  
Delineated in compliance with  
Chapter 75, Division 2 of the California Public Resources Code  
(Adopted Final Special Studies Zone Act)

**NE 1/4 MONO CRATERS QUADRANGLE  
OFFICIAL MAP**  
Effective: January 1, 1985

*James F. Davis* State Geologist

- REFERENCES USED TO COMPILE FAULT DATA**
- Wright, W.L., 1964, *Map of the Mono Craters Quadrangle*, Mono County, California. California Division of Mines and Geology Fault Studies Report FBS-11 (unpublished).
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- Wright, W.L., 1970, *Seismic safety studies for the general plan, Inyo-NMono Association of Governments*. Riverside, Riverside Consulting Engineers for Civil and Mining Engineers, 128 p., 2 sheets, 4 sheets.
- Wright, W.L., 1980, *Geologic map of the Mono Craters Quadrangle, Mono and Inyo Counties, California*. U.S. Geological Survey Geologic Quadrangle Map G-10-601.
- IMPORTANT - PLEASE NOTE**
- This map may not show all faults that have the potential for surface fault rupture, either within the special studies zones or outside their boundaries.
  - Faults shown are the basis for establishing the boundaries of the special studies zones.
  - The identification and location of these faults are based on the best available data. However, the quality of data used is varied. Traces have been drawn as accurately as possible at this map scale.
  - Fault information on this map is not sufficient to serve as a substitute for the geologic site investigations (special studies) required under Chapter 75 of Division 2 of the California Public Resources Code.

DESIGNED	ENG	8/04	
	dftg	8/04	
	CHECKED		
APPROVED			
REVISIONS	No.	DESCRIPTION	DATE

**FIGURE 2**

**SPECIAL STUDIES ZONES  
FOR THE  
NE 1/4 MONO CRATERS QUADRANGLE**

**PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA**

PREPARED BY:

**SRK Consulting**  
Engineers and Scientists

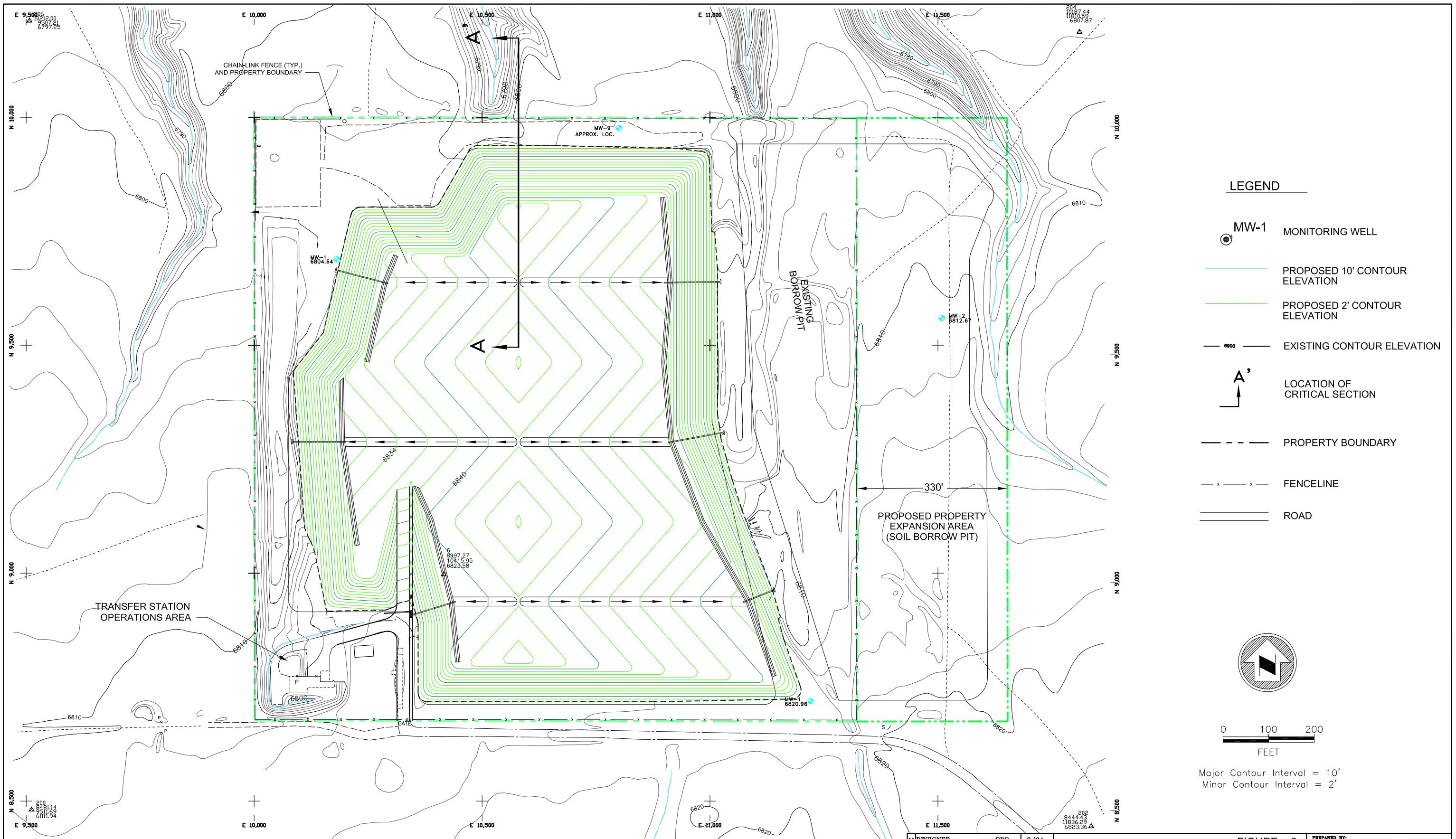
SCALE: AS SHOWN

JOB NO. 146901  
DWG NAME 146901-PV202

REVISION

A





Base topographic map prepared by North American Mapping (Sparks, NV) and Triad-Holmes Associates (Mammoth Lakes, CA). Date of photography: 5/10/03.

DESIGNED	RBB	8/04
DRAWN	draft	8/04
CHECKED		
APPROVED		
REVISIONS	No.	DESCRIPTION

**FIGURE 3**

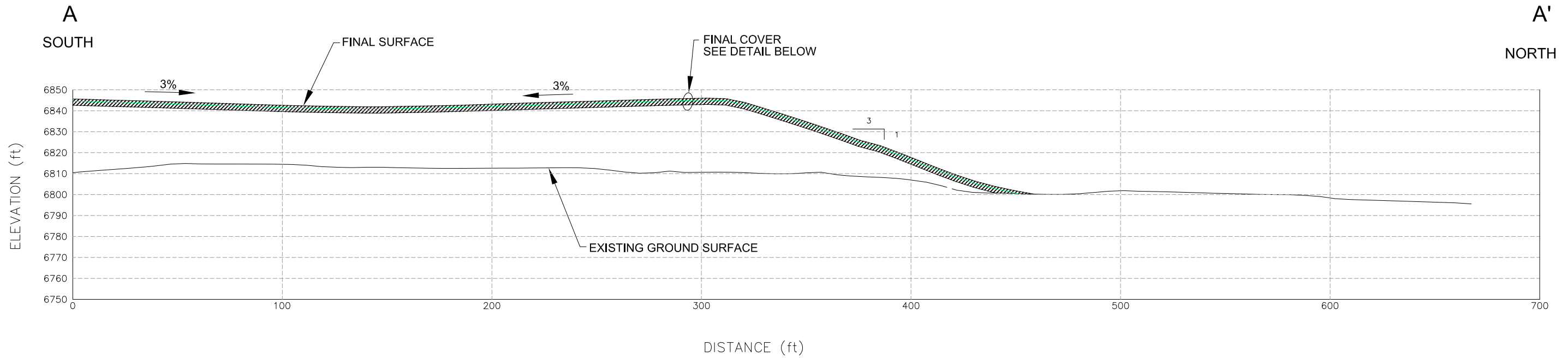
**SITE PLAN SHOWING  
LOCATION OF CRITICAL SECTION  
SLOPE STABILITY ANALYSIS FOR  
PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA**

PREPARED BY: **SRK Consulting**  
Engineers and Scientists

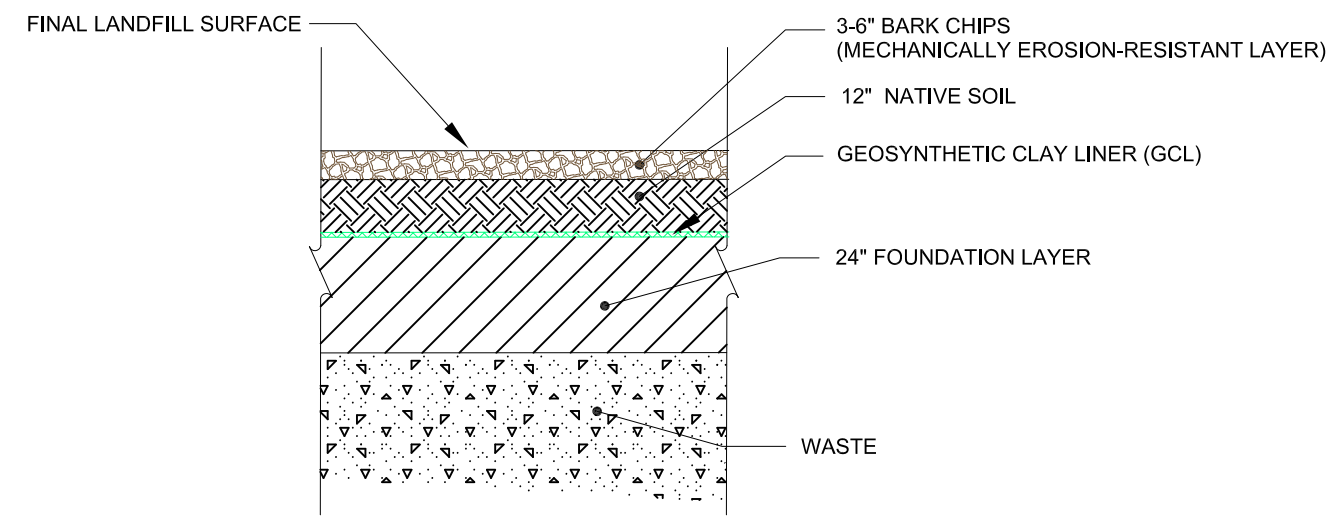
SCALE: 1" = 200'

JOB NO. 146901  
DWG NAME 146901-PV203

REVISION




**SECTION A - A'**  
1"=50'



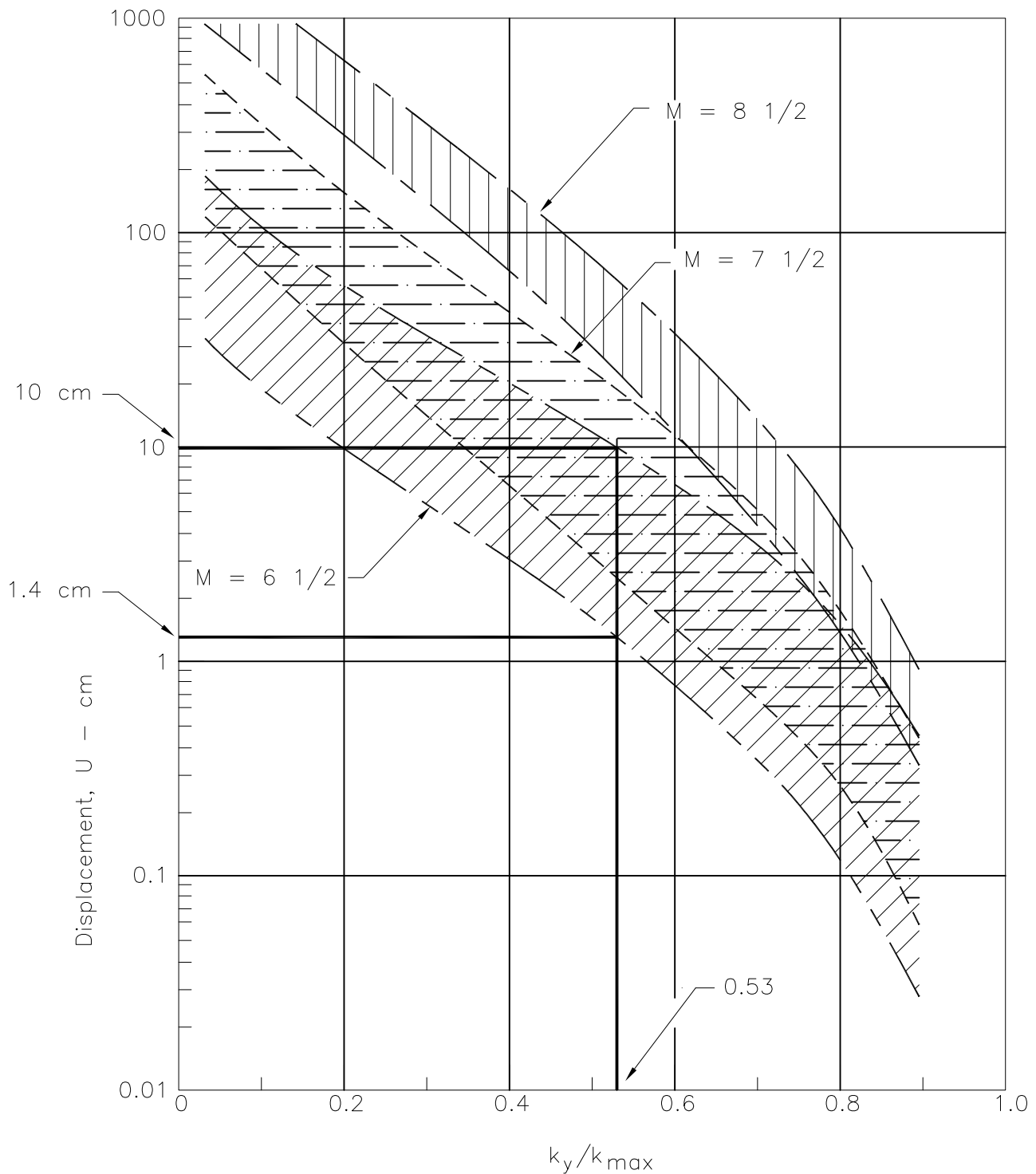
**FINAL COVER DETAIL**  
TYPICAL SECTION NTS

DESIGNED	RBB	8/04
DRAWN	dftg	8/04
CHECKED		
APPROVED		
No.	DESCRIPTION	BY DATE

FIGURE 4  
**CRITICAL CROSS-SECTION  
 and FINAL COVER PROFILE**  
 SLOPE STABILITY ANALYSIS FOR  
 PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

PREPARED BY:  
  
 SCALE: AS SHOWN  
 JOB NO. 146901  
 DWG NAME 1469901-PV204






Variation of Permanent Displacement with Yield Acceleration – Summary of all Data


Modified after Makdisi and Seed (1977)

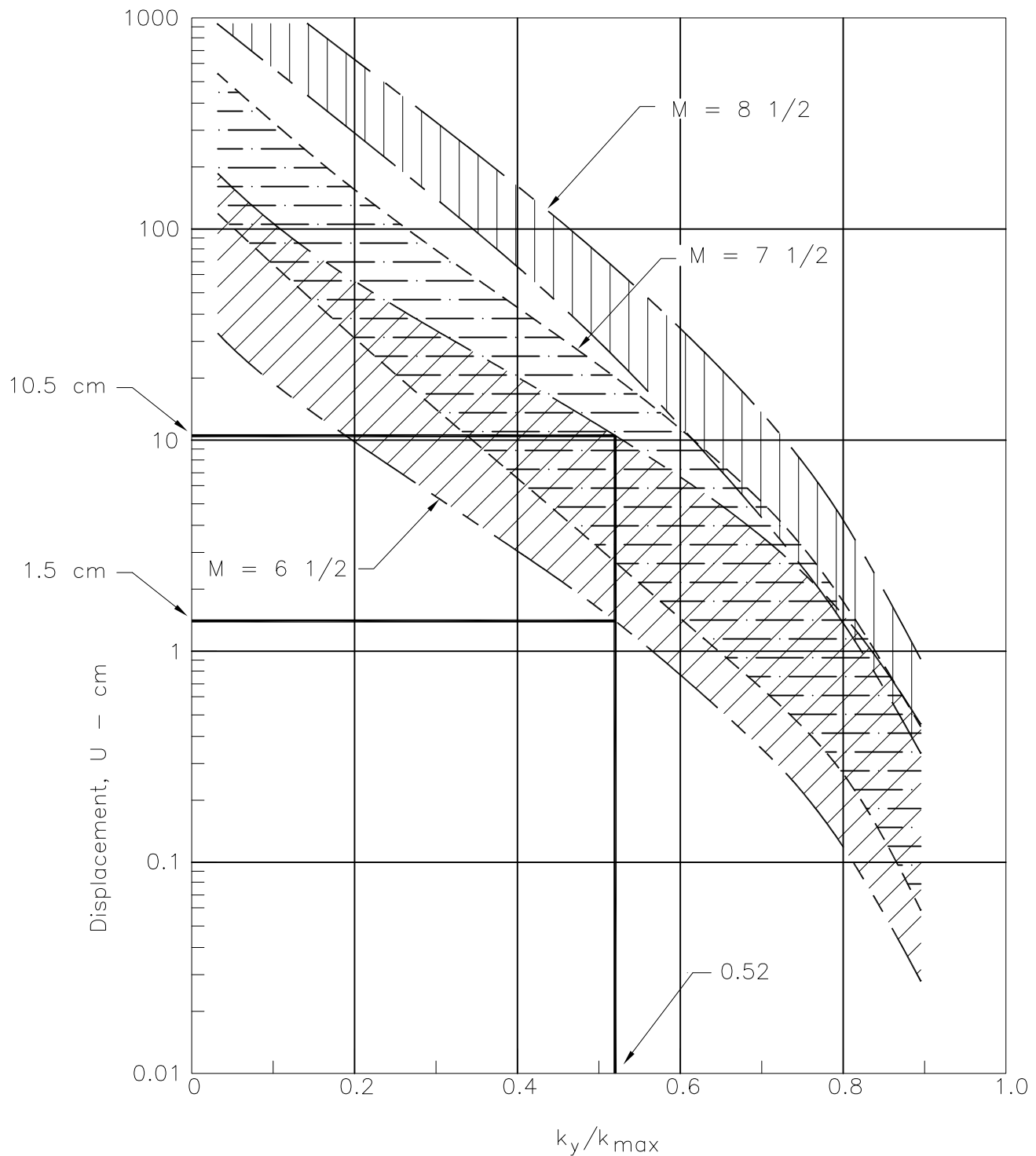
YIELD ACCELERATION  $k_y = 0.220g$   
 MAXIMUM PROBABLE ACCELERATION  $k_{max} = 0.414g$

DESIGNED	RBB	8/04
DRAWN	RBB	8/04
CHECKED		
APPROVED		
No.	DESCRIPTION	BY DATE

**FIGURE 5**  
 NEWMARK DISPLACEMENT ANALYSIS  
 CRITICAL CROSS SECTION A-A'  
 PUMICE VALLEY LANDFILL  
 FINAL GRADING PLAN

PREPARED BY:  **SRK Consulting**  
*Engineers and Scientists*

SCALE: NOT TO SCALE	REVISION
JOB NO. 146902 DWG NAME NEWSECA	



Variation of Permanent Displacement with Yield Acceleration – Summary of all Data

Modified after Makdisi and Seed (1977)

YIELD ACCELERATION  $k_y = 0.217g$   
 MAXIMUM PROBABLE ACCELERATION  $k_{max} = 0.414g$

DESIGNED	RBB	8/04
DRAWN	RBB	8/04
CHECKED		
APPROVED		
No.	DESCRIPTION	BY DATE

FIGURE 6

NEWMARK DISPLACEMENT ANALYSIS  
 FINAL COVER PROFILE  
 PUMICE VALLEY LANDFILL  
 FINAL GRADING PLAN

PREPARED BY:



SCALE: NOT TO SCALE

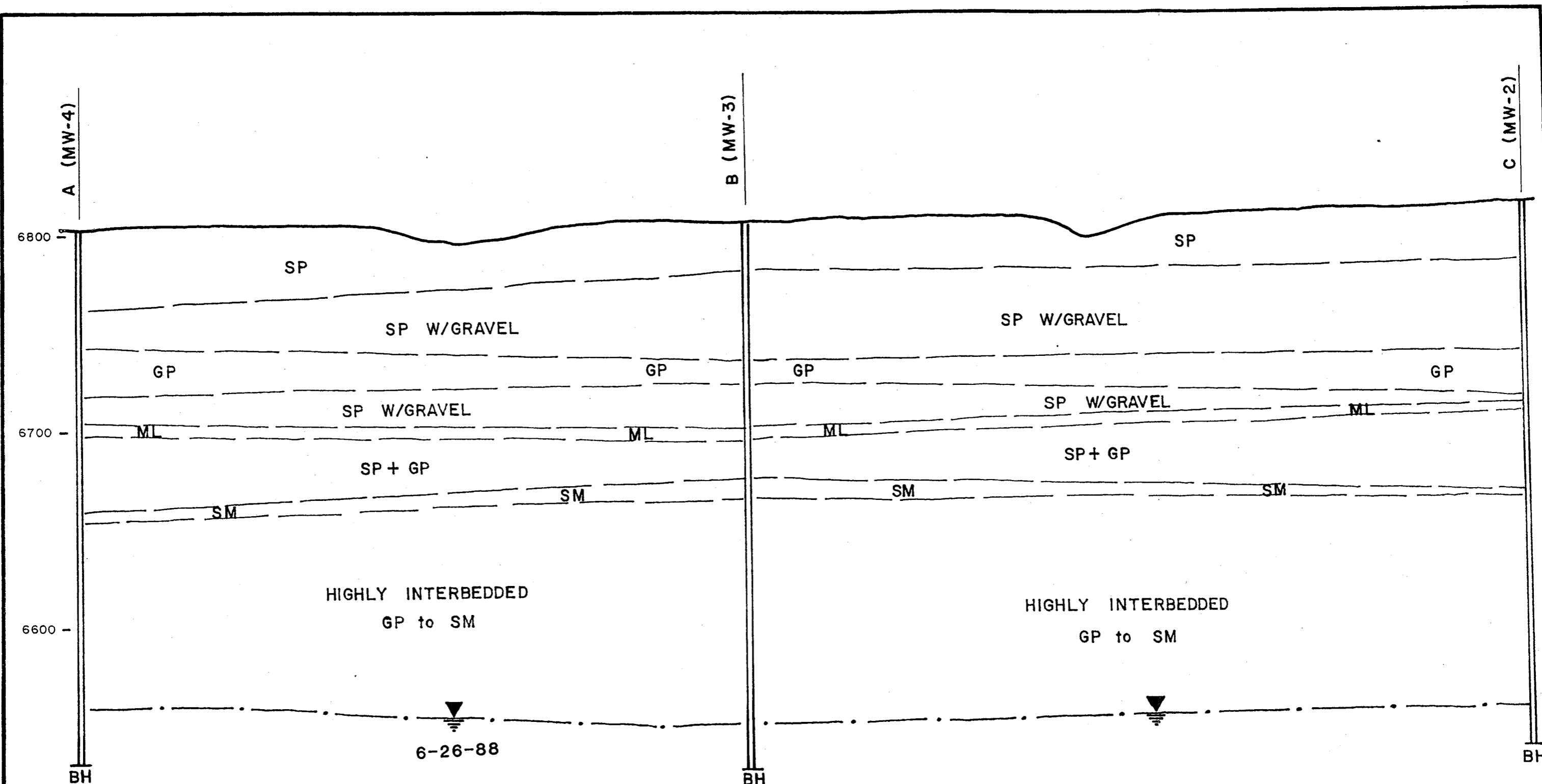
JOB NO. 146902  
 DWG NAME NEWCOVER

REVISION



**ATTACHMENT 1**  
**Well Installation Logs and Laboratory Test Results**

---



**LEGEND**

- ML: Sandy Silt
- SM: Silty Sand
- SP: Poorly Graded or Gravelly Sand
- GP: Sandy Gravel

**SCALE**  
 HORIZ : 1" = 100'  
 VERT : 1" = 50'

<b>KLEINFELDER</b>	<b>GEOLOGIC CROSS SECTION</b> PUMICE VALLEY LANDFILL MONO COUNTY, CALIFORNIA	PLATE <b>4.2.1</b>
	PROJECT NO. <b>30-1477-7</b>	

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				0				CP Surface Conditions: Weathered and reworked sands, gravels, and pyroclastic material. Pyroclastic material is comprised predominately of moderately sorted unconsolidated rhyolite ash with little subrounded lapilli pumice and trace amounts of black obsidian  SAND (SP), brown, moist, fine to coarse sand, trace lapilli pumice, poorly graded
				5				SP Volcanic ash deposit with rounded lapilli pumice, brown gray, moist to damp, little amount of fine to coarse sand, moderately graded  Sand with lapilli tuff, gray brown, moist, fine to coarse sand (pyroclastic) lapilli size tuff fragments (welded?), moderately graded
				15				as above
				20				Sand, black gray brown, moist to damp, medium to coarse sand, moderately graded
				25				

SURFACE ELEVATION: 6819.00 feet  
 TOTAL DEPTH: 300.0 feet  
 DATE DRILLED: 6-19-88

LOGGED BY: JJ  
 SUPERVISED BY: TJC  
 DIAMETER of BORING: 8.5  
 WATER ENCOUNTERED AT: 260.0 Feet



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-1

PLATE

3.1.2

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				25				
				30				Sands, dark brown, damp, some fine to coarse gravels, medium to coarse sand, poorly to moderately graded. Gravels are primarily angular
				35				
	#14066		50	40				as above
				45			GP	Sandy gravel (GP), Dark brown, damp, fine to coarse sand, moderately graded, (gravels are primarily angular)
			50				SP	Sand (SP), brown to dark brown, moist to damp, fine to coarse sand, trace gravel poorly graded
							SP	



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
 MW-1 (CONT.)

PLATE  
 3.1.2



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				55				Sand (SP), dark brown, wet, some gravels, fine to coarse sand, moderately graded
				60				As above, less gravel (little, medium to coarse sand, poor to medium grained)
				65				
				70				as above, slightly more gravel Drilling becoming more difficult
				75				Gravelly sand, dark brown, moist to damp, fine to coarse sand, fine and coarse gravel, moderately graded (gravels are subangular)
				80				

**KI** KLEINFELDER

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-1 (CONT.)

PLATE  
3.1.2


WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				85			SP	Sandy gravel (GP), brown to gray brown, moist, medium to coarse sand, fine gravel with trace coarse gravel moderately graded
				90				Gravel, gray brown to brown gray, dry to moist, some sand, medium to coarse, moderately to well graded. Subangular gravel. Drilling much coarser for approximately 2 feet.
				95			SP	Appear to be encountering minor beds of alternating gravelly sands and gravel (2 ft. to 4 ft. thick). Drilling becomes very hard then lightens up somewhat (80 ft. to 95 ft.). At 95 ft. encounter zone of sand, brown, moist to damp, fine to medium sand, poorly graded
				100			SM	Sand (SM), light brown to brown, moist, fine sand, poorly graded, silty
			105					Sand (SM), brown, damp to wet, some silt, fine sand
			110					

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-1 (CONT.)**

**PLATE  
3.1.2**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	INTERVAL	SAMPLE NUMBER	LITHOLOGY SYMBOL	U. S. C. S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD							
				115	X				Sand (SM), brown to dark brown, damp, fine to medium sand, trace silt
				120	X				Sand (SM), brown to dark brown, moist to damp, some gravel (fine), fine to coarse sand
				125	X				as above - gravels absent
				130	X				Sand (SM), brown to dark brown, moist to damp, trace of gravel
				135	X				as above, brown silts absent, fine to coarse sand  Drilling slightly harder



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-1 (CONT.)

PLATE

3.1.2

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				140				Sand, (SM), brown, moist to damp, trace to little amount fine gravel, trace to little silt, fine to medium sand
				145				As above, damp to wet, trace gravel, silt absent, fine to coarse sand, moderately graded
				150			ML	Silt (ML), brown to gray brown, wet, some clay, trace fine sand, low plasticity
				155				
				160			SM	Silty Sand (SM), brown, damp to wet, trace clay, fine to coarse sand
				165			SM	Sand (SM/SP), brown to dark brown, wet, trace silt and clay, trace to little fine gravel, medium to coarse sand, moderately to well graded.

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-1 (CONT.)

PLATE  
3.1.2

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				170				Gravelly sand (GP/SP), dark brown, damp to wet, medium to coarse sand, fine and coarse, subrounded to subangular gravel, moderately graded. Gravels increase in size and quantity with depth.
				175				As above, increase gravels (more coarse). Essentially granitics
				180				Sand (GP/SP), brown, moist to damp, some fine gravel, fine to coarse sand, moderately graded
				185				Gravelly sand (GP/SP), dark brown, damp to wet, fine and coarse gravel, fine to coarse sand, moderately graded
				190				As above, less fine sand.
				195				Gravelly sand (GP/SP), brown to dark brown, moist to damp, fine and coarse gravel, fine to coarse sand, moderately graded (angular gravel)

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-1 (CONT.)**

**PLATE  
3.1.2**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				200				Sand (GP/SP), light yellow brown, moist, little fine gravel, fine sand, skip graded (subrounded to subangular)
				205				As above, light brown, moist to damp, fine to medium sand, fine and coarse gravel
				210				Sand (GP/SP), brown, damp to wet, trace to little fine gravel, fine to coarse sand, moderately graded (subrounded gravel).
				215			SP	As above, trace fine gravel, medium to coarse sand
				220				As above, less fine gravel.

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
 MW-1 (CONT.)**

**PLATE  
 3.1.2**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				225				Sand (SP), light yellow brown to light brown, damp, trace fine gravel, fine to medium sand, poorly graded.
				230				Easy drilling, fewer gravels with depth.
				235				
				240				As above, gravels nearly absent
				245			SP	Sand (GP/SP), brown to dark brown, damp, trace to little fine subrounded gravel, slight trace silt, fine to medium sand, moderately graded
			250				As above, silt absent, medium to coarse sand	

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-1 (CONT.)**

**PLATE**

**3.1.2**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S. C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				255				Gravelly sand (GP/SP), light brown to brown, moist to damp, medium to coarse sand, fine subrounded gravel, moderately to poorly graded.
				260				Ground water encountered @ 260 ft. As above, fine to coarse sand
				265			GP	Sandy gravel (GP/SP), dark brown, wet, fine and coarse, subrounded to subangular gravel, fine to coarse sand, moderately graded.
				270				
				275			SP	Gravelly sand (GP/SP), dark brown, wet, fine to coarse gravel, fine to coarse sand, moderately graded
				280			GP	Drilling very rough, jerking Gravel (GP), dark brown, wet, little to some fine to coarse sand. Fine and coarse subrounded gravel, moderately graded.

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-1 (CONT.)**

**PLATE  
3.1.2**



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U. S. C. S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				285				Sandy Gravel (GP), brown to dark brown, wet, medium to coarse sand, fine subangular gravel, poorly to moderately graded.
				290				Cutting return - difficult due to moisture content. Bit tends to fragment gravels, becomes angular fragments.
				295				Sandy gravel (GP), brown to dark brown, wet, fine, trace and coarse gravel, medium to coarse sand, (may have trace fine sand/silts), moderately graded.
				300				As above, less medium sand and fines (difficult to blow larger gravels up).
				305		SP		Encounter large cobbles? Hard drilling. Then went right back into easy drilling Sand (SP), dark brown, damp to wet, some fine and coarse (trace) gravel, medium to coarse sand, trace silt, moderately graded



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
 MW-1 (CONT.)

PLATE  
 3.1.2

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				0		SP		
				5				SAND (SP), light brown grey, damp, loose, angular to subrounded, fine to medium grained, quartz, feldspar and hornblende composition with trace of hematitic staining
				10				Slightly more moist, increased maximum grain size to very coarse sand
				15				Decreased maximum grain size
				20				
				25				

#14067

SURFACE ELEVATION: 6811.50 feet  
TOTAL DEPTH: 281.0 feet  
DATE DRILLED: 6-15-88

LOGGED BY: GAJ  
SUPERVISED BY: TJC  
DIAMETER of BORING: 8.5  
WATER ENCOUNTERED AT: 255.3 Feet



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-2

PLATE  
3.1.3

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				25				
				30				Some fine grained gravel, light brown with rounded-angular obsidian and silicious metamorphic clasts, damp
				35				Sand becoming very fine with depth
				40			GP	GRAVELLY SAND, SANDY GRAVEL, (GP/SP), light medium brown, fine sand to medium gravel, damp, loose, poorly graded, granitic and metamorphic clasts  Very slow drilling
				45				
				50				



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-2 (CONT.)

PLATE  
3.1.3

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				55			SP	Gravelly sand (SP), light to medium brown, fine sand to fine gravel, damp, loose  Subrounded metamorphic and granitic clasts  At 68 ft. increase in gravels, increase in sand grain size to medium
				60			SP	GRAVELLY SAND, (SP/GP), light gray brown, medium sand to gravels, moist, loose, granitic clasts with rare red scoria  At 73 ft., increase in moisture Rig shaking still
				65			GP	SANDY GRAVEL, (GP), light gray brown, dry, subrounded, very dense, poorly graded  Slightly finer grained
				70				
				75				
				80				

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-2 (CONT.)**

**PLATE  
3.1.3**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	INTERVAL	SAMPLE		SOIL DESCRIPTION
	LABORATORY	FIELD				NUMBER	LITHOLOGY SYMBOL	
				85				
				90				Decrease in moisture
				95				Slight increase in moisture to damp
				100			SP	SAND, (SP), light brown, fine to very coarse, subrounded to subangular, moderately sorted, moist, loose, granitic and metamorphic clasts
				105			ML	CLAYEY SILT (ML), light brown, damp to moist
				110			SP	SAND, (SP), light brown, fine to medium grained, damp, loose; gradational to lower contact
							GP	SANDY GRAVEL/GRAVELLY SAND, (GP/SP), light brown, fine sand to fine gravel, damp, loose, subrounded to subangular

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-2 (CONT.)**

**PLATE  
3.1.3**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U. S. C. S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				115				At 114 ft., increase in gravels
				120				At 117 ft., drilling becomes easier, very slightly damp SAND (SP), light gray brown, fine to medium grained, dry, loose (caving in hole), poorly graded, some gravel and silts
				125				At 123 ft., becomes damp
				130				Becomes slightly finer grained
				135				At 133 ft., drilling becomes harder due to dense material
								At 136 ft, drilling becomes easier

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-2 (CONT.)

PLATE  
3.1.3

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				140				
				145				
				150		M		SILTY SAND, (SM), light brown, fine grained, damp, loose
				155		SP		SAND, (SP), light brown, fine to very fine grained, damp, loose, moderately poorly graded, minor gravels, increasing slightly with depth  A 157 ft., drilling becomes harder Increase in gravels
			160				Gradational contact to:	
			165			GP		SANDY GRAVEL/GRAVELLY SAND, (GP/SP), light brown, damp, loose, poorly graded, medium subangular gravels and becoming drier



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				170				
				175				Still tough drilling As above, dry
				180				Gradational contact to: SP SAND, (SP), light brown, slightly moist, loose, poorly graded, fine to coarse grained with trace fine gravels. Easier drilling
				185				Moist
							GP	SANDY GRAVEL (GP)
				190			SP	SAND, (SP), as above  At 193 ft., drilling rate increased abruptly
				195				

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-2 (CONT.)**

**PLATE  
3.1.3**



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				200				GRAVELLY SAND, (SP), light brown, fine sand to fine gravel, moist, loose, poorly graded, metamorphic and granitic clasts
				205				Sand as above with decreased gravel content
				210				As above
				215				As above but fine to medium grained, very damp, fast easy drilling
				220				As above but fine grained with much less gravel
								SAND, (SP), light brown, fine to very fine grain, slightly damp, loose, poorly graded

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-2 (CONT.)**

**PLATE  
3.1.3**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				225				As above, damp
				230			SM	SAND - SILTY SAND, (SM), very fine grained, damp, loose to dense, moderately to poorly graded, drilling fast and easy
				235			SP	SAND-SILTY SAND, (SP/SM), light brown, very fine to fine grained, trace medium grained, poorly graded, loose, drilling fast and easy with occasional shaking from gravelly lenses  At 243 ft., rig shaking slightly
				240				SAND, (SP), light brown, fine to coarse grain, trace fine gravels, damp, loose, poorly sorted, granitic and metamorphic clasts  At 247 ft., rig shaking more violently, slow drilling, gravelly and dense (?)
				245				SAND - SILTY SAND, (SP/SM), light grey brown, very fine to medium grain, dry, loose, poorly graded
				250			SP	SAND, (SP), possibly sandy gravel by way rig is shaking, dry, loose, poorly sorted  GRAVELLY SAND (SP), many broken angular clasts, light brown, fine sand to fine gravel, slightly damp



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-2 (CONT.)

PLATE

3.1.3

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	INTERVAL	SAMPLE		SOIL DESCRIPTION
	LABORATORY	FIELD				NUMBER	LITHOLOGY SYMBOL	
				255				<p>ground water encountered @ 255.3 ft.</p> <p>SAND, GRAVELLY SAND, (SP/GP), as above, added 1200 cfm compressor while blowing hole clear for connection, light grey brown, fine gravel with some sand, moist</p> <p>NOTE: Bit action and low air flows probably grinding gravels to sand size and drying out samples to some degree, especially gravels (shaking rig) which are not readily blown out of the hole</p>
				260			GP	<p>GRAVEL - SANDY GRAVEL, (GP), light grey, loose, wet, poorly sorted, dominantly medium sand to medium gravels, larges to about 2 inches</p>
				265				
				270			SP	<p>GRAVELLY SAND, (SP), medium coarse grained with fine gravels, wet, loose, granitic and metamorphic clasts</p> <p>As above/silty gravelly sands, heaving into hole</p> <p>Note: Centralizers are at:  60 ft.  120 ft.  180 ft.  235 ft.  255 ft.  275 ft.</p>
			275					
			280					

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-2 (CONT.)**

**PLATE  
3.1.3**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				0			SP	
				5				Drilling with air only  Easy drilling SAND, (SP), light gray brown, dry to moist, fine sand, trace ash and fine obsidian shards, poorly graded
				10				ASH, light white gray, dry to moist, trace lapilli shards, very loose, poorly graded, angular obsidian (medium sand size)
				15				As above. Drilled 15 ft. in approximately 90 seconds  Believe material is coherent as in a tuff
				20				As above, believe to be an ash/lapilli tuff, medium dense
				25			SP	Encounter fluvial deposits

SURFACE ELEVATION: 6803.00 feet  
TOTAL DEPTH: 280.0 feet  
DATE DRILLED: 6-20-88

LOGGED BY: TJC  
SUPERVISED BY: TJC  
DIAMETER of BORING: 8.5  
WATER ENCOUNTERED AT: 250.0 Feet

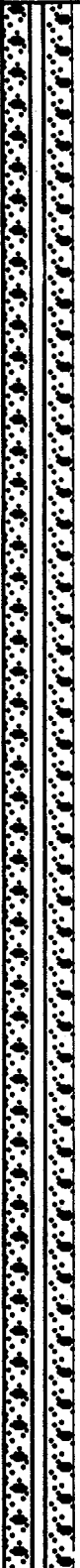


PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-3

PLATE  
3.1.4

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S. C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				25				SAND, (SP), yellow brown, moist, trace fine subrounded gravel, medium to coarse sand, poorly to moderately graded
				30				As above, gravels absent, fine to coarse sand
				35			SP	SAND, (SP), brown, moist, trace fine subrounded gravel, fine to coarse sand, poorly graded
	#14069			40				SAND, (SP), dark brown, trace fine subangular gravel, medium to coarse sand, poorly graded, medium dense. Sampler revealed trace coarse gravels subangular, moist to damp
				45			SP	Increase gravels, drilling harder Approximately 2 ft. gravel lense, damp SAND, (SP), light yellow brown, moist to damp, trace gravels, fine to medium sand, poorly graded
			50				As above, gravel absent	

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-3 (CONT.)**

**PLATE**

**3.1.4**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				55				SAND, (SP), dark brown, moist to damp, trace fine subrounded gravel, fine to coarse sand, (mostly medium to coarse), moderately to poorly graded
				60				As above, slightly coarser  Casing advancing easily
				65				SAND, (SP), brown to dark brown, moist to damp, fine to coarse subrounded gravel, fine to coarse sand, poorly graded
				70		SP		Harder drilling Encounter gravels which return angular, implying coarser gravel, metamorphic and granitic in comp. Cobbles?
				75		GP		GRAVELLY SAND, (GP/SP), dark brown to gray brown, moist to damp, fine to coarse subrounded to subangular gravel, fine to coarse sand, well graded to moderately graded. May have cobbles Hard drilling. Believe we're in coarse gravels and cobbles, trace coarse sand and fine gravel
				80		SP		Begain to get less gravels, no cobbles and more sand SAND, (SP), dark brown, damp to wet, trace fine gravel (subrounded) fine to coarse



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-3 (CONT.)

PLATE  
3.1.4

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U. S. C. S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				85				and, poorly to moderately graded  Easier drilling  As above, damp, poorly graded
				90				SAND, (SP), light yellow brown, moist to damp, slight trace fine gravel (subrounded to subangular), fine to coarse sand (subangular), poorly graded
				95				Sand, (SP), light yellow brown, moist, slight trace fine and coarse subrounded gravel, fine sand (trace medium sand)
				100				As above, gravels absent, light yellow gray brown
				105			ML	SILT, (ML), dark gray brown, damp, trace fine sands, trace clay
				110			SM	Encounter gravelly silty sands Harder drilling - believe gravels and sands increase

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-3 (CONT.)**

**PLATE**

**3.1.4**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				115				ILTY SAND, (SM), dark gray, brown, damp, some subrounded fine gravels, minor silt, sands appear subangular and subrounded
				120				SAND, (SM), orange brown, moist, fine and medium sand, trace coarse sand and fine gravel, slight trace silt, poorly graded
				125			SP	Harder drilling - encountering more gravel
				130			SM	Easier drilling SAND (SM), brown to dark brown, moist to damp, fine to medium sand, trace silt
				135			SP	Harder drilling As above, trace fine gravel, fine to coarse sand
							SP	Increasing gravels

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-3 (CONT.)**

**PLATE  
3.1.4**



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				140				Sand (SP), brown, moist, little subangular fine and coarse gravel, medium to coarse sand (trace fine), poorly graded
				145				
				150				As above, slight trace gravel, no cobbles, poorly graded  Easier drilling
				155				As above, moist to damp, gravels absent
				160			SM	SILTY SAND (SM), brown to dark brown, damp, trace silt, fine sand (trace medium)
				165				

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-3 (CONT.)

PLATE  
3.1.4

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				170				Relatively easy drilling SAND (SP), brown, moist to damp, trace to little fine subrounded gravel, fine to coarse sand, moderately graded (primarily fine sand)
				175				
				180				
				185				Sand, light brown, moist, trace silt, fine sand, poorly graded
				190				As above, fine to medium sand, slight trace gravel, moist to damp
				195				As above, primarily fine sand, trace fine gravel

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				200				As above, gravel absent, fine sand (trace medium & coarse)
				205			SP	SAND (SP), brown to dark brown, moist to damp, trace to little subrounded to subangular gravel (fine, trace coarse), fine to medium sand (trace coarse), poorly graded
				210				
				215				
				220				As above
							SM	Relatively easy drilling SILTY SAND (SM), dark brown, damp, trace fine gravel, minor silt, fine to coarse sand, (primarily fine and medium)



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-3 (CONT.)

PLATE

3.1.4

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				225				
				230				Drilling harder
				235				
				240				Silty Sand, brown to dark brown, damp to wet, slight trace fine gravel, trace silt, fine to coarse sand
				245				<p>Cutting may be hanging up on casing due to moisture, possible water</p> <p>Cuttings consist of subangular/angular coarse sand</p>
			250				<p>Sand, brown to dark brown, damp to wet, primarily coarse sand, slight trace fine gravel, angular, poorly graded-believe fines are not being discharged</p> <p>Ground water encountered @ 250 ft.</p>	

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-3 (CONT.)

PLATE

3.1.4

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				255				
				260			P	Sandy Gravel (GP), dark gray brown, wet, fine and coarse, subrounded to subangular gravel, trace to little coarse sand, moderately graded Had free water discharge at 264 ft.
				265				
				270			SP	Gravelly Sand (SP), dark gray brown, fine gravel, coarse sand, poorly to moderately graded, wet  Gravelly sand, dark gray brown, wet, fine gravel, coarse sand, poorly graded
				275				
				280				

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-3 (CONT.)**

**PLATE**

**3.1.4**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	INTERVAL	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD							
				0				SP	
				5					SAND (SP), fine to very fine grained, light brown moist, loose, airfall ash
				10				ML	Very fast drilling to 8 ft. SANDY SILT (ML), light brown, damp to very damp, firm, (lacustrine silts?)
				15				SP	SAND (SP), light gray brown, moist, loose, very fine to medium grained, poorly graded
			20						As above with increasing grain size to coarse
			25		32			SP	

SURFACE ELEVATION: 6803.00 feet  
TOTAL DEPTH: 275.0 feet  
DATE DRILLED: 6-21-88

LOGGED BY: GAJ  
SUPERVISED BY: TJC  
DIAMETER of BORING: 8.5  
WATER ENCOUNTERED AT: 240.0 Feet



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**PLATE  
3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				25				SAND (SP), light brown very fine to fine grained, loose, moist, medium grains
				30				
				35				No sample
				40				
	#14071			50			SP	SAND (SP), light brown, fine grained, moist, loose with interbedded sandy silt, light brown, mottled red-orange
				45				Gravelly silty sand, moist, loose
				50				Sand fine to medium grained, moist, loose



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
 MW-4 (CONT.)

PLATE  
 3.1.5

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				55				
			11	60				GRAVELLY SAND/SANDY GRAVEL (GP/SP), fine sand, medium gravel, loose, moist, granitic and metamorphic clasts, poorly graded
				65				GRAVEL (GP), medium brown, fine sand, medium gravel, loose, moist, very poorly graded, subrounded
				70				
				75				As above
				80				As above, some gravels to 2 or 3 inches, drilling rig often becoming stuck, casing driven with out hammering



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-4 (CONT.)**

**PLATE**

**3.1.5**



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U. S. C. S. DESIGNATION	SOIL DESCRIPTION	
	LABORATORY	FIELD							
				85			SM	SILTY SAND (SM), gray brown, very fine grained, loose, damp, moderately graded	
				90				As above, slightly coarser grained with depth	
				95					
				100				ML	SANDY SILT (ML), light gray brown loose, moist
				105				SP	SAND (SP), light brown, very fine to medium grained
			110				GP	SANDY GRAVELS (GP), light brown, medium grained gravels, loose, moist	

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
 MW-4 (CONT.)**

**PLATE  
 3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				115				As above, becoming drier
				120			SP	SAND (SP), light brown to reddish brown, fine grained, loose, moist, with cobbles
				130				Sand, light brown, fine to medium grained with trace fine gravels, loose and moist, subrounded gravel clasts
				135				



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
 MW-4 (CONT.)

PLATE  
 3.1.5

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				140				Sand, medium red brown, no gravels, loose, moist fine grained
				145			SM	SILTY SAND (SM), light gray brown very fine to fine grained
				150			SP	SAND (SP), with trace medium gravels, light brown, poorly graded, loose, moist, fine grained
				155				
				160				
				165			SP	SAND (SP), light brown fine to medium sand - fine gravel, poorly graded, subrounded, loose, moist



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**  
**MW-4 (CONT.)**

**PLATE**  
**3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				170				
				175		SM	SM	SILTY SAND (SM), light brown, very fine to fine grained, moderately sorted, loose, moist
						ML	ML	SILT (ML)
				180		SP	SP	SAND (SP), light gray brown, fine grained, poorly graded, loose, moist
				185		GP	GP	At 183 ft., tough drilling  SANDY GRAVELS (GP), light brown fine sand to fine gravels, poorly graded, loose, moist, subrounded clasts
				190		SM	SM	SILTY GRAVELLY SAND (SM), light brown, loose, moist
						GP	GP	GRAVELS (GP), many broken clasts, little sand, dry
				195		GP	GP	SANDY GRAVEL (GP), light brown, fine sand to medium gravels, poorly sorted, loose, moist

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-4 (CONT.)**

**PLATE**

**3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				200				SILTY SANDY GRAVEL (GP), light to medium brown gravels (approximately 1"), moist, loose
				205		SP		SAND (SP), light brown, medium to coarse grained, moderately to poorly sorted, subrounded, loose, moist
						GP		SANDY GRAVEL (GP)
						SP		SAND (SP), light brown, fine to medium grained, damp, loose, poorly to moderately sorted
				210		GM		Borehole caving during well completion from 203 - 213 ft  SILTY SANDY GRAVEL (GM), light brown, medium gravels, (approximately 1"), loose, moist, subrounded
				215		GP		SANDY GRAVELS (GP), dry, light gray
				220		GP		SANDY GRAVELS (GP), light brown, medium sand to medium gravels, poorly graded, moist, loose, many broken angular clasts, whole clasts subrounded  Drying out at 223 ft. Probably cobble size
						GM		SILTY SANDY GRAVEL (GM), light brown gravels to 1-1/2", moist, loose, poorly graded



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-4 (CONT.)**

**PLATE  
3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				225				
				230			P	SAND (SP), gravelly sand, light brown, fine to medium grained, 1-1/2" gravel, may be slow coming up hole. poorly graded, loose, moist
				235			GP	SANDY GRAVEL (GP), light brown gray, fine to medium gravels, poorly graded, subrounded, slightly moist, loose, grading to dry broken rock chips, ie. larger clast size of gravels, dry Ground water encountered @ 240 ft.
				240			SP	SANDY GRAVEL/GRAVELLY SAND (GP/SP), medium sand to medium gravel (approximately 1-1/2"), poorly graded, subrounded, subangular, loose, slightly moist
				245			SP	SAND (SP), light to medium brown, medium to coarse grained, subrounded, damp to wet, loose
							SP	GRAVELLY SAND (SP), gravel to 1-1/2 inches, wet
				250			GP	

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-4 (CONT.)**

**PLATE**

**3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOLS	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				255				SANDY GRAVEL/GRAVELLY SAND (GP), medium brown, medium sand to medium gravel (to approximately 1-1/2"), poorly sorted, subrounded, very damp to wet, loose
				260				Sandy gravel as above Blew free water out on the connection
				265				As above, slow drilling suggests cobbly gravel Very slow drilling
				270			SP	GRAVELLY SAND (SP), medium brown, medium sand to fine gravel, poorly graded, subrounded, very damp to wet, loose
				275			GM	SILTY SANDY GRAVEL (GM), medium brown, wet, gravels to 1 inch, subrounded to rounded
				280				SANDS (SP), medium brown, minor fines, fine to coarse grained sand with trace of little gravels to 3/4", subrounded, very damp to wet, loose
								Note: Centralizers at: 60 ft. 100 ft. 140 ft. 180 ft. 220 ft. 260 ft.



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-4 (CONT.)**

**PLATE  
3.1.5**

# UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		USCS	DESCRIPTION	
COARSE GRAINED SOILS	GRAVELS  MORE THAN HALF COARSE FRACTION IS LARGER THAN #4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	WELL GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES (GW)	
		GRAVELS WITH OVER 12% FINES	POORLY GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES (GP)	
		CLEAN SANDS WITH LITTLE OR NO FINES	SILTY GRAVEL-SAND-SILT MIXTURES (GM)	
		SANDS WITH OVER 12% FINES	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES (GC)	
	SANDS  MORE THAN HALF COARSE FRACTION IS SMALLER THAN #4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	WELL-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES (SW)	
		SANDS WITH OVER 12% FINES	POORLY-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES (SP)	
		SANDS WITH OVER 12% FINES	SILTY SANDS, SAND-SILT MIXTURES (SM)	
		SANDS WITH OVER 12% FINES	CLAYEY SANDS, SAND-CLAY MIXTURES (SC)	
		SILTS AND CLAYS  LIQUID LIMIT LESS THAN 50	SANDS WITH OVER 12% FINES	INORGANIC SILTS OR VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS (ML)
			SANDS WITH OVER 12% FINES	SANDY CLAYS, SILTY CLAYS, OR LEAN CLAYS (CL)
SANDS WITH OVER 12% FINES	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY (OL)			
SANDS WITH OVER 12% FINES	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS (MH)			
SILTS AND CLAYS  LIQUID LIMIT GREATER THAN 50	SANDS WITH OVER 12% FINES	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS (CH)		
	SANDS WITH OVER 12% FINES	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS (OH)		
	SANDS WITH OVER 12% FINES	PEAT OR OTHER HIGHLY ORGANIC SOILS (PT)		
HIGHLY ORGANIC SOILS				

**NOTES:**

NFWE = NO FREE WATER ENCOUNTERED



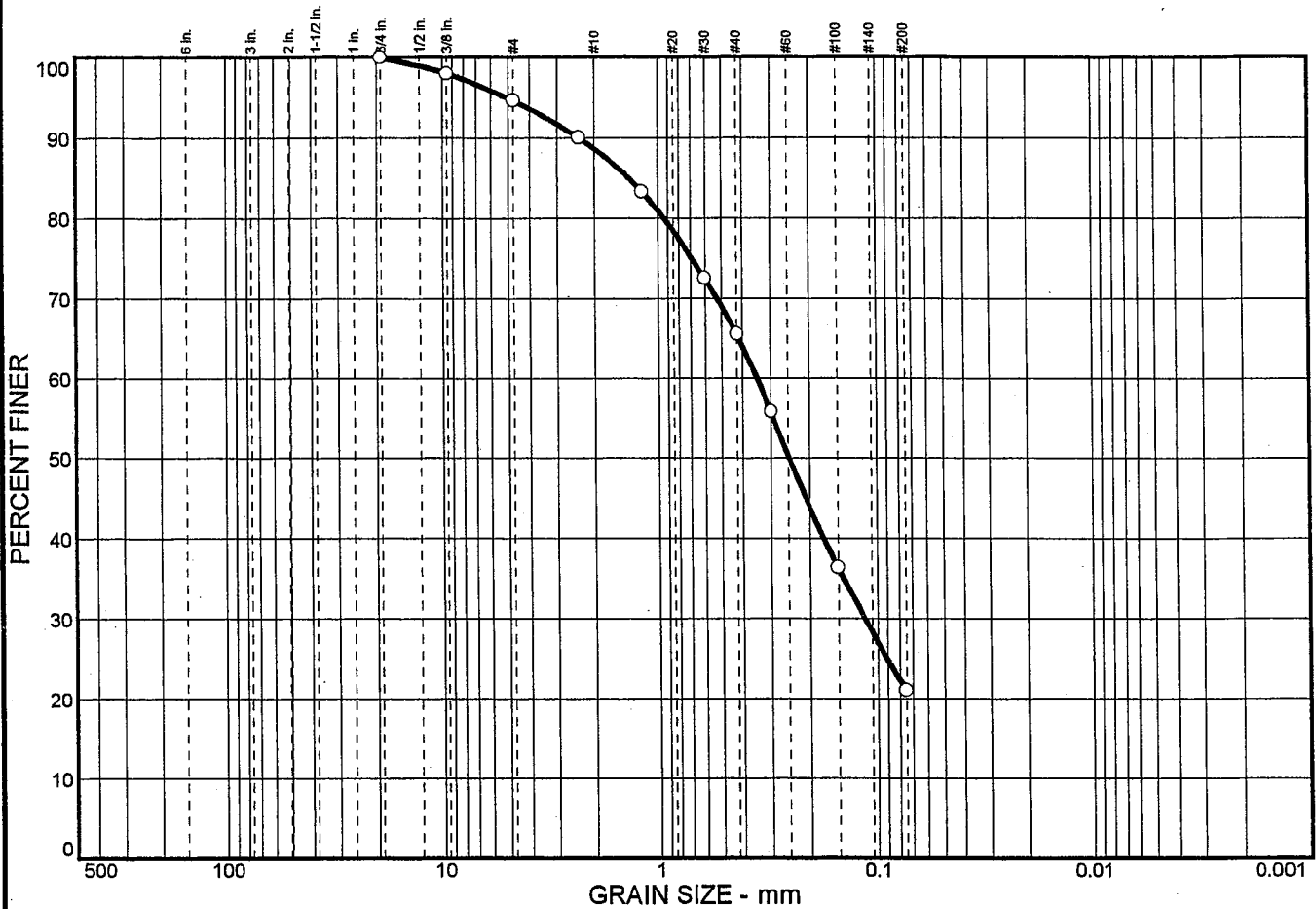
KEY TO UNIFIED SOIL  
CLASSIFICATION SYSTEM

PLATE  
3.1.1

PROJECT NO. 30-1477-07



# Particle Size Distribution Report



<b>% COBBLES</b>	<b>% GRAVEL</b>	<b>% SAND</b>	<b>% SILT</b>	<b>% CLAY</b>
0.0	5.4	73.5	21.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.375 in.	98.0		
#4	94.6		
#8	90.0		
#16	83.3		
#30	72.5		
#40	65.5		
#50	55.8		
#100	36.4		
#200	21.1		

**Soil Description**  
Silty sand

**Atterberg Limits**  
 PL= NP      LL=      PI= NP

**Coefficients**  
 D<sub>85</sub>= 1.36      D<sub>60</sub>= 0.346      D<sub>50</sub>= 0.246  
 D<sub>30</sub>= 0.114      D<sub>15</sub>=      D<sub>10</sub>=  
 C<sub>u</sub>=

**Classification**  
 USCS= SM      AASHTO=

**Remarks**  
 Sample is a blend of PV-1 and PV-2

\* (no specification provided)

Sample No.: 17-04E  
 Location:

Source of Sample: Sand

Date: 3-1-04  
 Elev./Depth:

## SRK Consulting

Client: B. Burnley  
 Project: Pumice Valley Landfill

Project No: P.O. 31179

Plate

# COMPACTION TEST REPORT

Curve No.: 1

Project No.: P.O. 31179  
Project: Pumice Valley Landfill

Date: 3-1-04

Location:  
Elev./Depth:  
Remarks:

## MATERIAL DESCRIPTION

Description: Silty sand

Classifications -

USCS: SM

AASHTO:

Nat. Moist. =

Sp.G. =

Liquid Limit = NP

Plasticity Index = NP

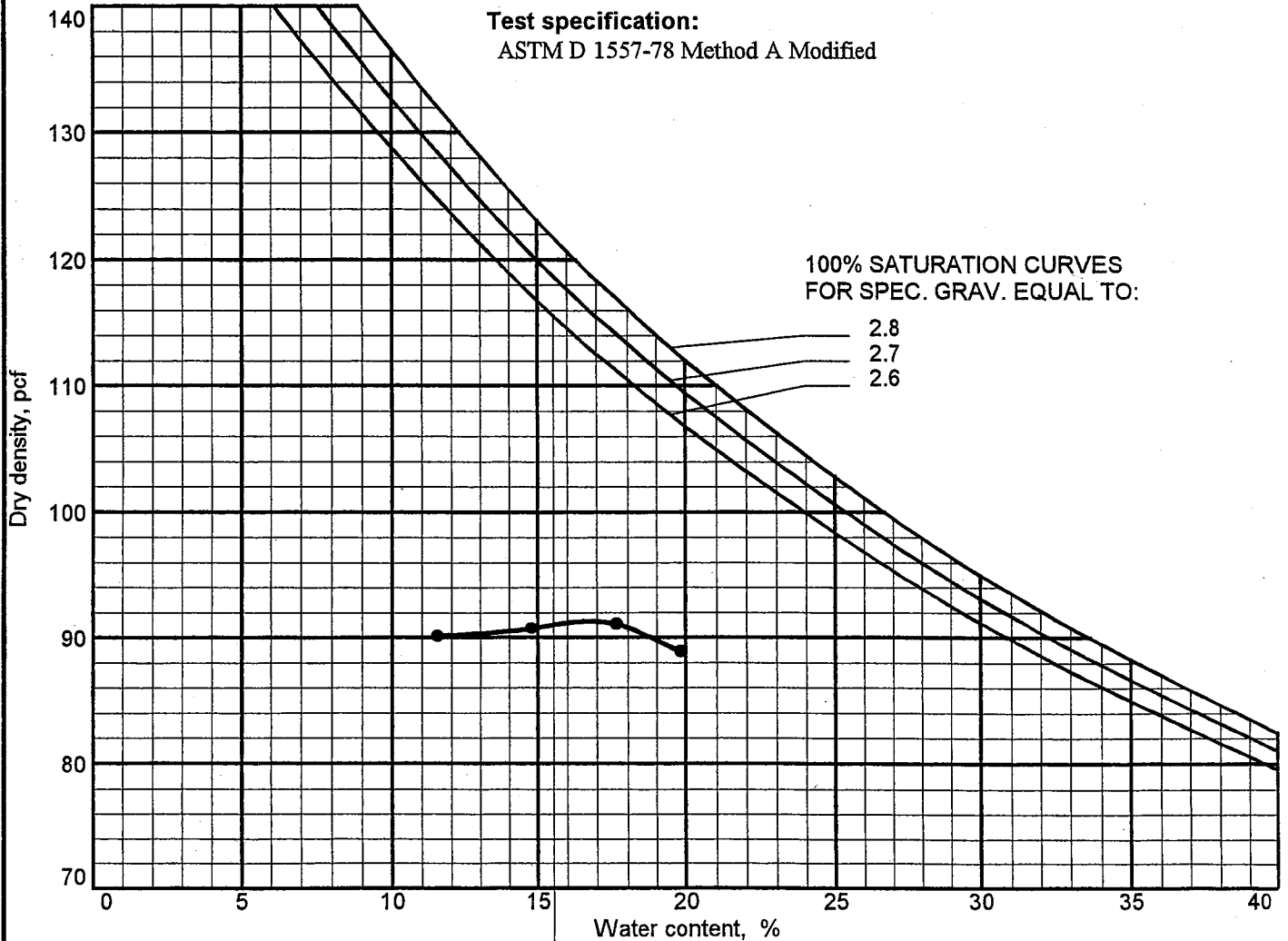
% > No.4 = 0.0 %

% < No.200 = 21.1 %

## TEST RESULTS

Maximum dry density = 91.3 pcf

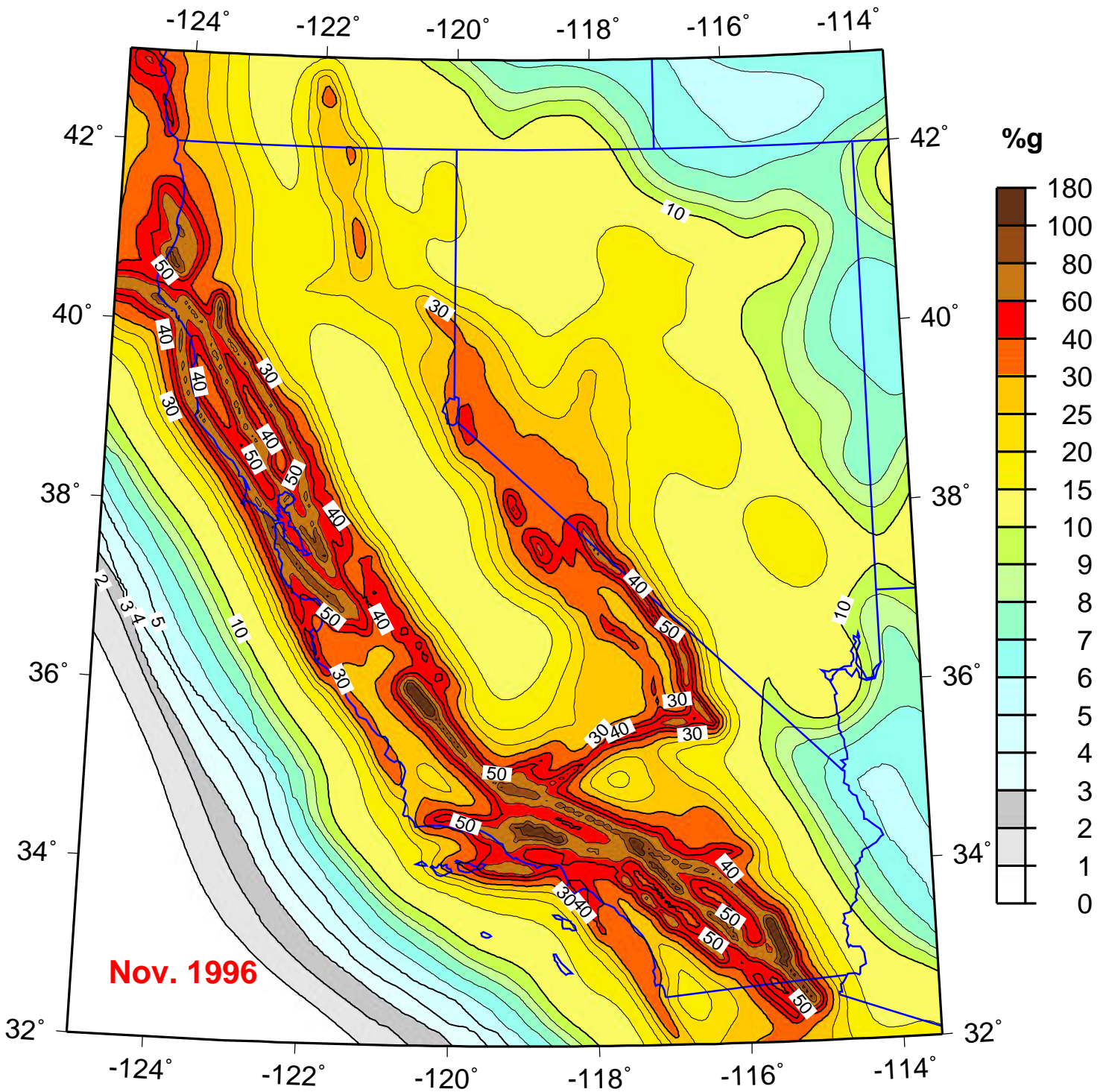
Optimum moisture = 16.8 %



**ATTACHMENT 2**  
**Seismic Information**

---

**Peak Acceleration (%g) with 10% Probability of Exceedance in 50 Years  
site: NEHRP B-C boundary**



**For California portion: U.S. Geological Survey - California Division of Mines and Geology**

**For Nevada and surrounding states: USGS**

**Earthquake Hazards Program**

LOCATION 37.90694 Lat. -119.06528 Long.  
The interpolated Probabilistic ground motion values, in %g,  
at the requested point are:

	10%PE in 50 yr	2%PE in 50 yr
PGA	41.41	74.40
0.2 sec SA	99.50	182.02
1.0 sec SA	31.94	62.89

-----

PROJECT INFO: [Home Page](#)

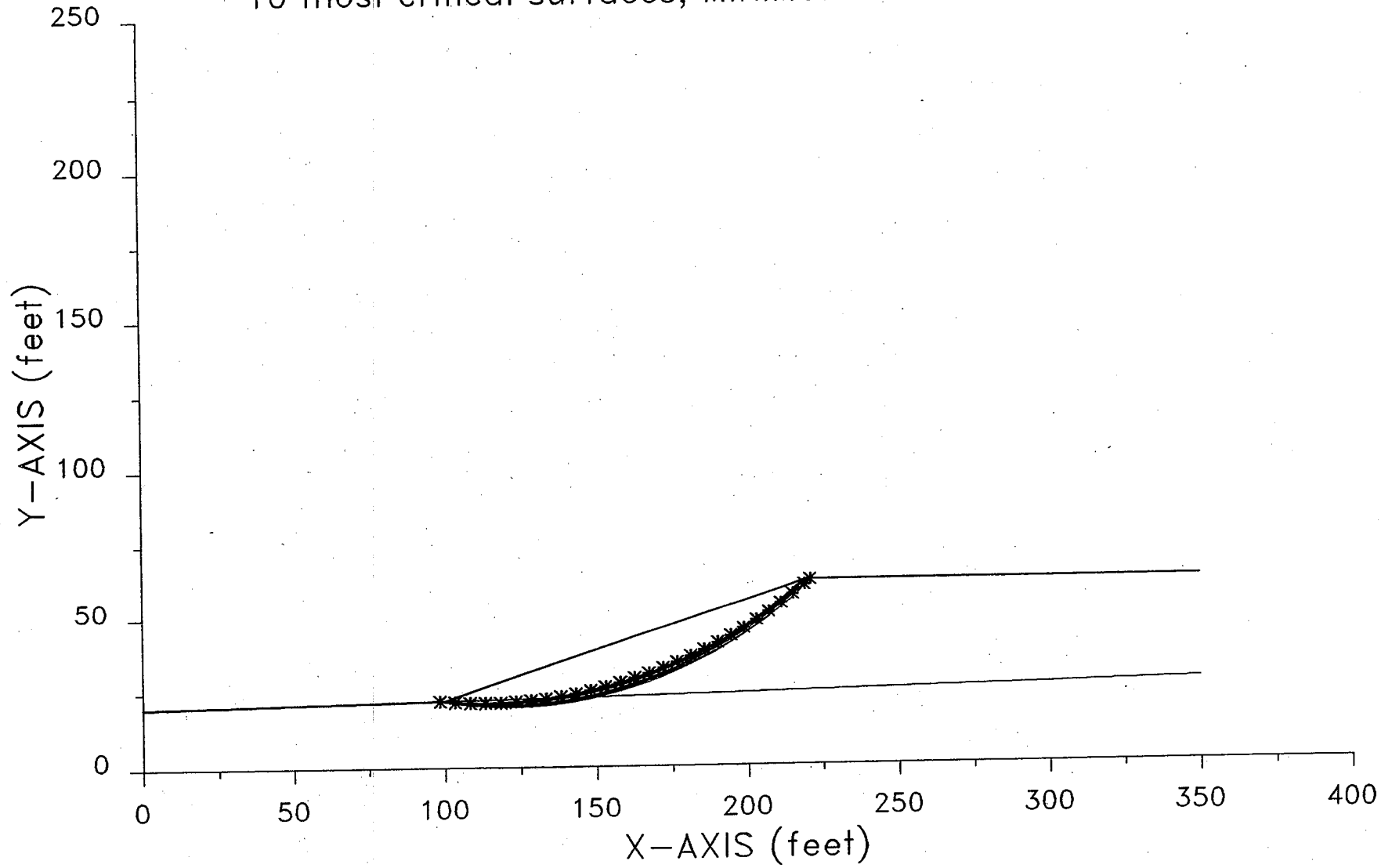
SEISMIC HAZARD: [Hazard by Lat/Lon, 2002](#)

**ATTACHMENT 3**  
**XSTABL Output – Critical Section A-A'**

---

### Pumice Valley Deep Failure CS 2 St

10 most critical surfaces, MINIMUM BISHOP FOS = 1.919



```

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*      Ver. 5.202                   96  1608 *
*****
    
```

Problem Description : Pumice Valley Deep Failure CS 2 St

-----  
 SEGMENT BOUNDARY COORDINATES  
 -----

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	20.0	100.0	22.0	1
2	100.0	22.0	220.0	62.0	2
3	220.0	62.0	350.0	62.0	2

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	100.0	22.0	350.0	27.0	1

-----  
 ISOTROPIC Soil Parameters  
 -----

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Constant (psf)	Water Surface No.
1	80.0	80.0	.0	32.00	.000	.0	0
2	53.6	53.6	.0	30.00	.000	.0	0



A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

200 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 98.0 ft and x = 100.0 ft

Each surface terminates between x = 218.0 ft and x = 222.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

\*\*\*\*\* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \*\*\*\*\*

5.0 ft line segments define each trial failure surface.

-----  
ANGULAR RESTRICTIONS  
-----

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees  
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

\*\*\*\*\* SIMPLIFIED BISHOP METHOD \*\*\*\*\*

The most critical circular failure surface is specified by 28 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	98.44	21.97
2	103.43	21.58
3	108.42	21.35
4	113.42	21.28
5	118.42	21.35

6	123.42	21.58
7	128.40	21.96
8	133.37	22.50
9	138.33	23.19
10	143.26	24.03
11	148.16	25.02
12	153.02	26.17
13	157.85	27.46
14	162.64	28.90
15	167.38	30.48
16	172.07	32.21
17	176.71	34.09
18	181.29	36.11
19	185.80	38.26
20	190.24	40.56
21	194.61	42.98
22	198.90	45.55
23	203.12	48.24
24	207.24	51.06
25	211.28	54.01
26	215.23	57.08
27	219.08	60.27
28	221.04	62.00

\*\*\*\* Simplified BISHOP FOS = 1.919 \*\*\*\*

The following is a summary of the TEN most critical surfaces

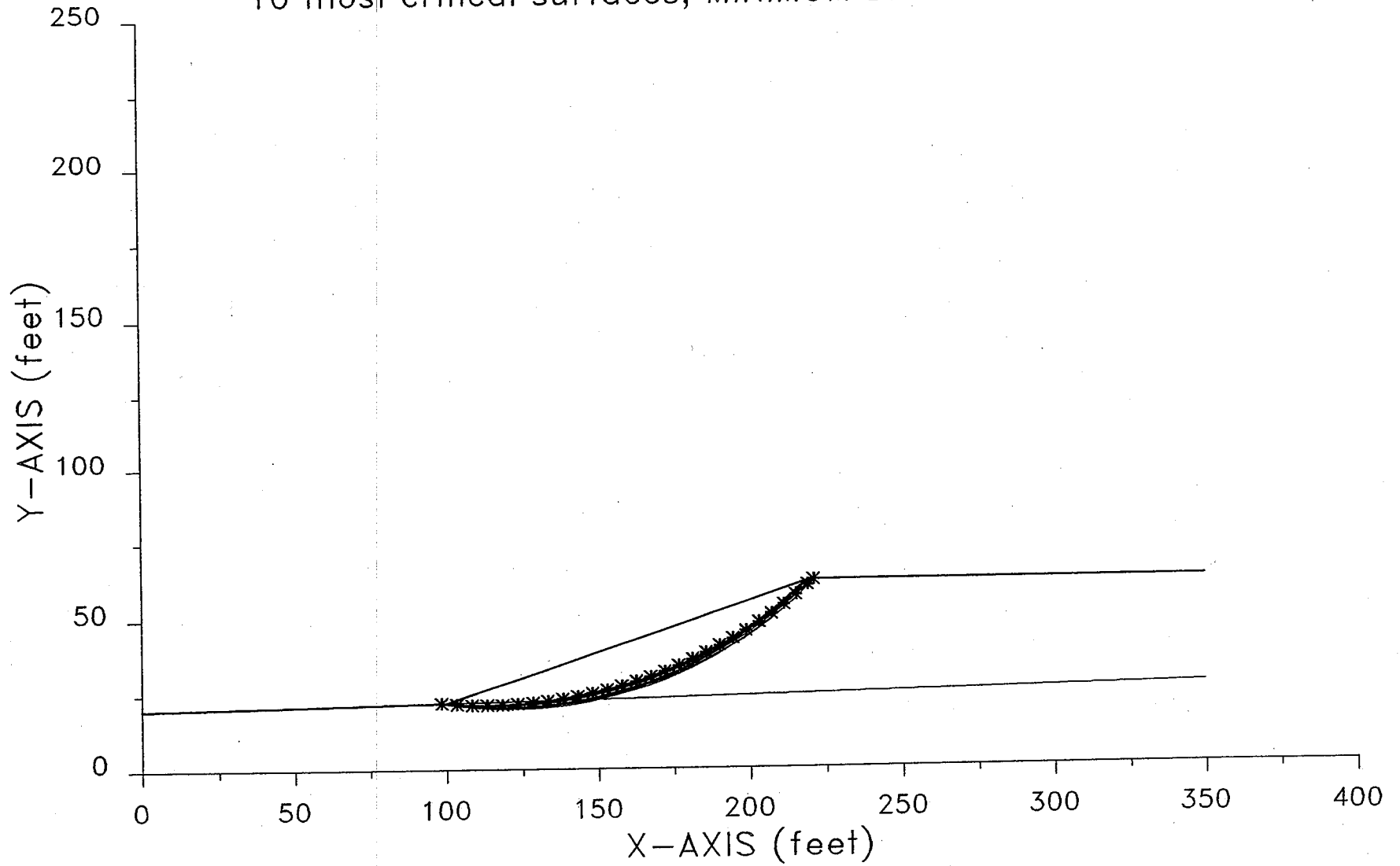
Problem Description : Pumice Valley Deep Failure CS 2 St

	FOS	Circle Center		Radius	Initial	Terminal	Resisting
	(BISHOP)	x-coord	y-coord		x-coord	x-coord	Moment
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft-lb)
1.	1.919	113.45	183.85	162.57	98.44	221.04	5.773E+06
2.	1.944	115.60	174.01	152.92	99.11	219.51	5.525E+06
3.	1.962	116.91	167.96	147.00	99.56	218.11	5.368E+06
4.	1.964	117.32	168.95	148.00	99.78	219.41	5.538E+06
5.	1.994	118.98	166.42	145.83	98.89	220.75	5.921E+06
6.	2.010	119.30	161.29	140.88	98.44	218.81	5.659E+06
7.	2.013	119.99	162.31	141.91	98.89	220.34	5.890E+06
8.	2.013	119.11	161.18	140.82	98.00	218.57	5.654E+06
9.	2.023	120.51	163.48	143.22	98.44	221.57	6.209E+06
10.	2.047	121.49	159.98	140.01	98.00	221.50	6.292E+06

\* \* \* END OF FILE \* \* \*

### Pumice Valley Deep Failure CS 2 PS

10 most critical surfaces, MINIMUM BISHOP FOS = .875



```

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*****
    
```

Problem Description : Pumice Valley Deep Failure CS 2 PS

-----  
 SEGMENT BOUNDARY COORDINATES  
 -----

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	20.0	100.0	22.0	1
2	100.0	22.0	220.0	62.0	2
3	220.0	62.0	350.0	62.0	2

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	100.0	22.0	350.0	27.0	1

-----  
 ISOTROPIC Soil Parameters  
 -----

2 Soil unit(s) specified

Soil Unit No.	Unit Weight (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Surface Constant (psf)	Water Surface No.
1	80.0	80.0	.0	32.00	.000	.0 0
2	53.6	53.6	.0	30.00	.000	.0 0

A horizontal earthquake loading coefficient  
of .269 has been assigned

A vertical earthquake loading coefficient  
of .179 has been assigned

A critical failure surface searching method, using a random  
technique for generating CIRCULAR surfaces has been specified.

200 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 10 points equally spaced  
along the ground surface between  $x = 98.0$  ft  
and  $x = 100.0$  ft

Each surface terminates between  $x = 218.0$  ft  
and  $x = 222.0$  ft

Unless further limitations were imposed, the minimum elevation  
at which a surface extends is  $y = .0$  ft

\*\*\*\*\* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \*\*\*\*\*

5.0 ft line segments define each trial failure surface.

-----  
ANGULAR RESTRICTIONS  
-----

The first segment of each failure surface will be inclined  
within the angular range defined by :

Lower angular limit := -45.0 degrees  
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

\*\*\*\*\* SIMPLIFIED BISHOP METHOD \*\*\*\*\*

The most critical circular failure surface  
is specified by 28 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	98.44	21.97
2	103.43	21.58
3	108.42	21.35
4	113.42	21.28
5	118.42	21.35
6	123.42	21.58
7	128.40	21.96
8	133.37	22.50
9	138.33	23.19
10	143.26	24.03
11	148.16	25.02
12	153.02	26.17
13	157.85	27.46
14	162.64	28.90
15	167.38	30.48
16	172.07	32.21
17	176.71	34.09
18	181.29	36.11
19	185.80	38.26
20	190.24	40.56
21	194.61	42.98
22	198.90	45.55
23	203.12	48.24
24	207.24	51.06
25	211.28	54.01
26	215.23	57.08
27	219.08	60.27
28	221.04	62.00

\*\*\*\* Simplified BISHOP FOS = .875 \*\*\*\*

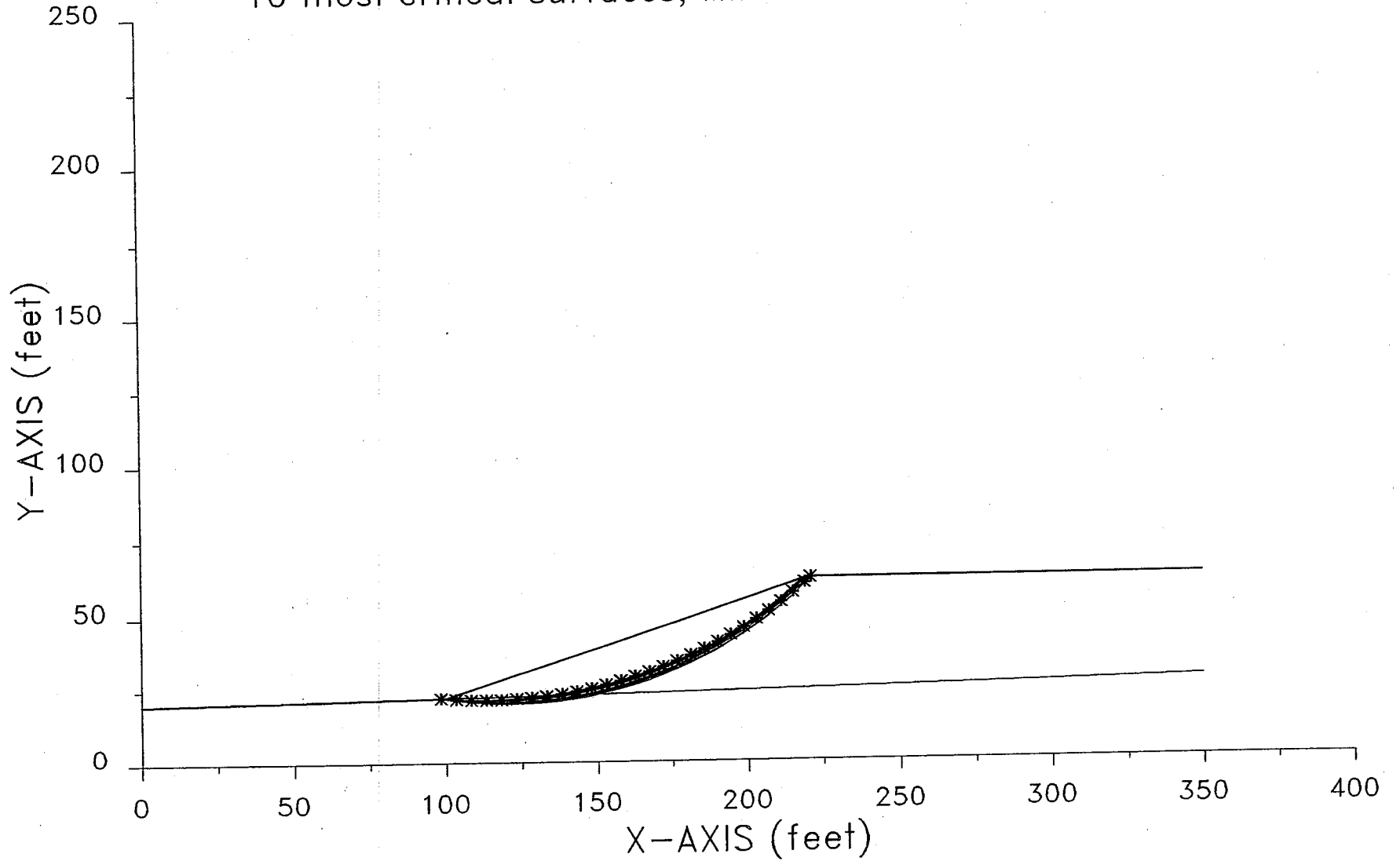
The following is a summary of the TEN most critical surfaces

Problem Description : Pumice Valley Deep Failure CS 2 PS

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	.875	113.45	183.85	162.57	98.44	221.04	4.308E+06
2.	.887	115.60	174.01	152.92	99.11	219.51	4.132E+06
3.	.895	116.91	167.96	147.00	99.56	218.11	4.019E+06
4.	.896	117.32	168.95	148.00	99.78	219.41	4.147E+06
5.	.909	118.98	166.42	145.83	98.89	220.75	4.443E+06
6.	.916	119.30	161.29	140.88	98.44	218.81	4.252E+06
7.	.917	119.11	161.18	140.82	98.00	218.57	4.248E+06
8.	.917	119.99	162.31	141.91	98.89	220.34	4.426E+06
9.	.921	120.51	163.48	143.22	98.44	221.57	4.668E+06
10.	.931	121.49	159.98	140.01	98.00	221.50	4.738E+06

\*\*\* END OF FILE \*\*\*

Pumice Valley Deep Failure CS 2 Yld  
10 most critical surfaces, MINIMUM BISHOP FOS = .999



```

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*      Ver. 5.202                    96 1608 *
*****
    
```

Problem Description : Pumice Valley Deep Failure CS 2 Yld

-----  
 SEGMENT BOUNDARY COORDINATES  
 -----

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	20.0	100.0	22.0	1
2	100.0	22.0	220.0	62.0	2
3	220.0	62.0	350.0	62.0	2

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	100.0	22.0	350.0	27.0	1

-----  
 ISOTROPIC Soil Parameters  
 -----

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	80.0	80.0	.0	32.00	.000	.0	0
2	53.6	53.6	.0	30.00	.000	.0	0



A horizontal earthquake loading coefficient  
of .220 has been assigned

A vertical earthquake loading coefficient  
of .147 has been assigned

A critical failure surface searching method, using a random  
technique for generating CIRCULAR surfaces has been specified.

200 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 10 points equally spaced  
along the ground surface between  $x = 98.0$  ft  
and  $x = 100.0$  ft

Each surface terminates between  $x = 218.0$  ft  
and  $x = 222.0$  ft

Unless further limitations were imposed, the minimum elevation  
at which a surface extends is  $y = .0$  ft

\*\*\*\*\* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \*\*\*\*\*

5.0 ft line segments define each trial failure surface.

-----  
ANGULAR RESTRICTIONS  
-----

The first segment of each failure surface will be inclined  
within the angular range defined by :

Lower angular limit := -45.0 degrees  
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

\*\*\*\*\* SIMPLIFIED BISHOP METHOD \*\*\*\*\*

The most critical circular failure surface  
is specified by 28 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	98.44	21.97
2	103.43	21.58
3	108.42	21.35
4	113.42	21.28
5	118.42	21.35
6	123.42	21.58
7	128.40	21.96
8	133.37	22.50
9	138.33	23.19
10	143.26	24.03
11	148.16	25.02
12	153.02	26.17
13	157.85	27.46
14	162.64	28.90
15	167.38	30.48
16	172.07	32.21
17	176.71	34.09
18	181.29	36.11
19	185.80	38.26
20	190.24	40.56
21	194.61	42.98
22	198.90	45.55
23	203.12	48.24
24	207.24	51.06
25	211.28	54.01
26	215.23	57.08
27	219.08	60.27
28	221.04	62.00

\*\*\*\* Simplified BISHOP FOS = .999 \*\*\*\*

The following is a summary of the TEN most critical surfaces

Problem-Description : Pumice Valley Deep Failure CS-2 Yld

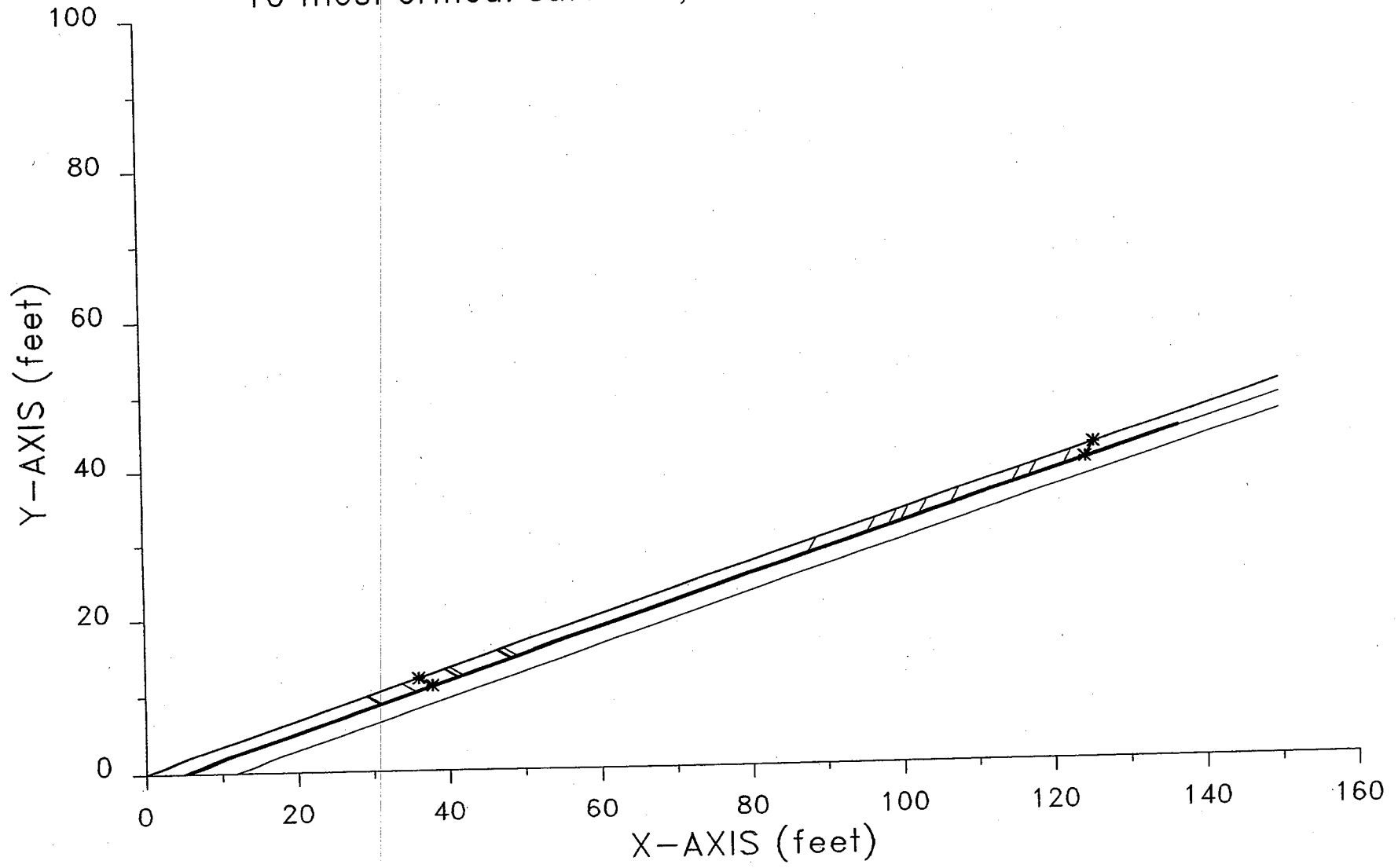
	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	.999	113.45	183.85	162.57	98.44	221.04	4.569E+06
2.	1.012	115.60	174.01	152.92	99.11	219.51	4.380E+06
3.	1.022	116.91	167.96	147.00	99.56	218.11	4.259E+06
4.	1.022	117.32	168.95	148.00	99.78	219.41	4.394E+06
5.	1.037	118.98	166.42	145.83	98.89	220.75	4.706E+06
6.	1.045	119.30	161.29	140.88	98.44	218.81	4.501E+06
7.	1.046	119.11	161.18	140.82	98.00	218.57	4.497E+06
8.	1.046	119.99	162.31	141.91	98.89	220.34	4.685E+06
9.	1.051	120.51	163.48	143.22	98.44	221.57	4.942E+06
10.	1.062	121.49	159.98	140.01	98.00	221.50	5.013E+06

\* \* \* END OF FILE \* \* \*

**ATTACHMENT 4**  
**XSTABL Output – Final Cover Profile**

---

Pumice Valley Cover Stability Static  
10 most critical surfaces, MINIMUM JANBU FOS = 1.919



```

*****
*           X S T A B L           *
*                               *
*      Slope Stability Analysis   *
*      using the                 *
*      Method of Slices         *
*                               *
*      Copyright (C) 1992  97    *
*      Interactive Software Designs, Inc. *
*      Moscow, ID 83843, U.S.A.  *
*                               *
*      All Rights Reserved      *
*                               *
*      Ver. 5.202                96 1608 *
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```

Problem Description : Pumice Valley Cover Stability Static

-----  
 SEGMENT BOUNDARY COORDINATES  
 -----

1 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	.0	150.0	50.0	1

3 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	4.7	.0	150.0	48.2	2
2	5.5	.0	150.0	48.2	3
3	11.9	.0	150.0	46.0	4

-----  
 ISOTROPIC Soil Parameters  
 -----

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	80.0	80.0	.0	32.00	.000	.0	0
2	100.0	100.0	500.0	.00	.000	.0	0
3	80.0	80.0	.0	32.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

1000 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

\*\*\*\*\* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \*\*\*\*\*

Length of line segments for active and passive portions of sliding block is 11.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	5.6	.1	51.1	15.3	.3
2	51.2	15.4	136.7	43.8	.3

\*\*\*\*\*  
 -- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)  
 \*\*\*\*\*  
 Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.  
 \*\*\*\*\*

-----  
 USER SELECTED option to discard surfaces with effective normal stresses less than zero  
 -----

ERROR #48: NEGATIVE effective stress calculated for at least 1 slice(s) out of 6 slices for surface # 26

The trial failure surface in question is defined by the following 8 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	16.56	5.52
2	18.35	4.53

1	29.27	9.76
2	31.08	8.76
3	87.65	27.60
4	88.75	29.58

\*\* Corrected JANBU FOS = 1.941 \*\* (Fo factor = 1.007)

Failure surface No.10 specified by 4 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	46.54	15.51
2	48.36	14.51
3	98.29	31.13
4	99.39	33.13

\*\* Corrected JANBU FOS = 1.950 \*\* (Fo factor = 1.008)

\*\*\*\*\*  
 \*\*  
 \*\* Out of the 1000 surfaces generated and analyzed by XSTABL, \*\*  
 \*\* 58 surfaces were found to have MISLEADING FOS values. \*\*  
 \*\*  
 \*\*\*\*\*

The following is a summary of the TEN most critical surfaces

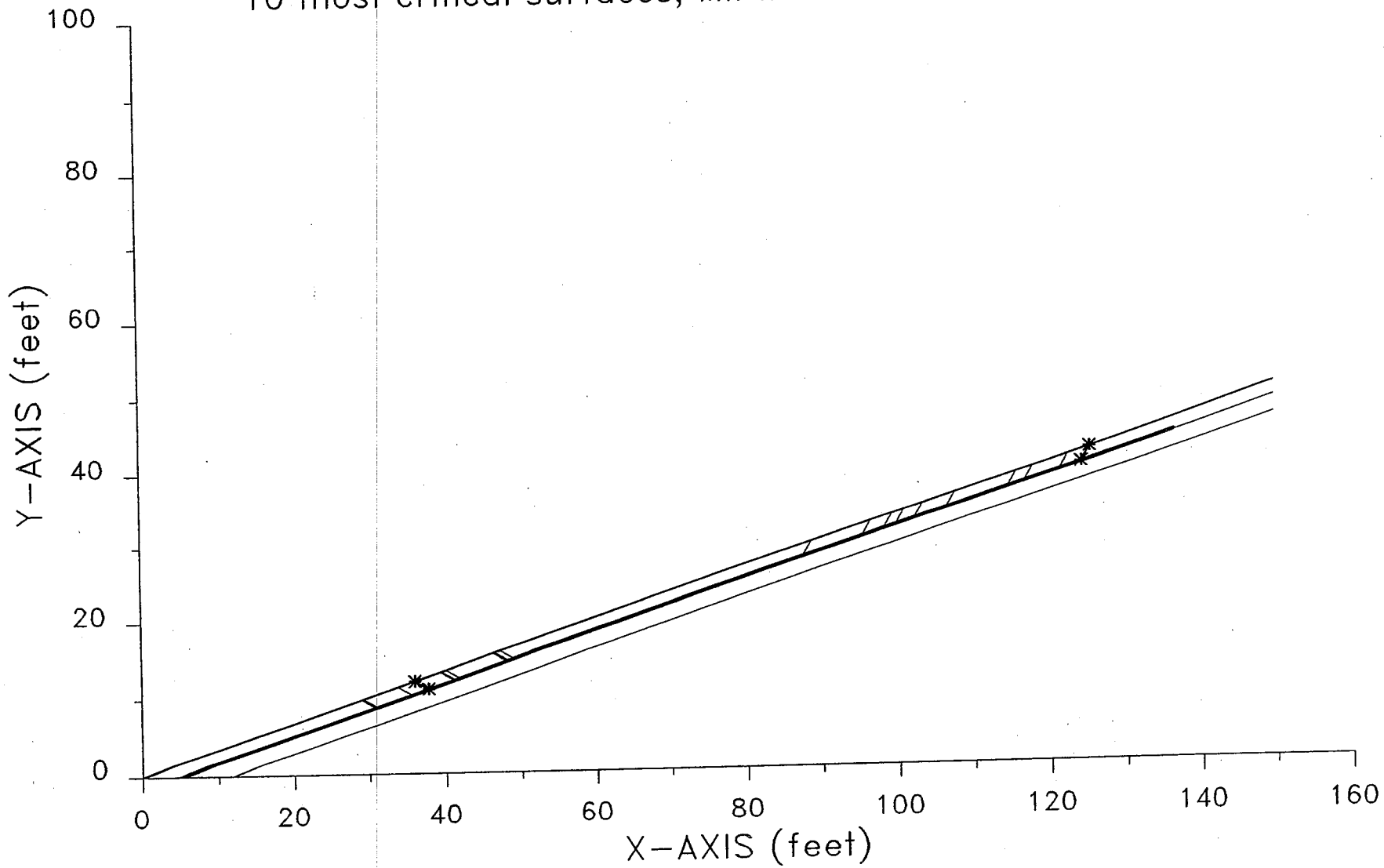
Problem Description : Pumice Valley Cover Stability Static

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	1.919	1.005	36.04	125.54	6.814E+03
2.	1.920	1.005	29.02	115.86	6.668E+03
3.	1.927	1.006	47.23	122.67	5.721E+03
4.	1.931	1.006	46.31	118.05	5.623E+03
5.	1.933	1.007	40.09	107.67	5.161E+03
6.	1.937	1.007	39.33	103.43	4.930E+03
7.	1.938	1.007	39.49	100.99	4.629E+03
8.	1.939	1.007	33.84	96.60	4.841E+03
9.	1.941	1.007	29.27	88.75	4.493E+03
10.	1.950	1.008	46.54	99.39	4.017E+03

\*\*\* END OF FILE \*\*\*

### Pumice Vally Cover Stab PStatic

10 most critical surfaces, MINIMUM JANBU FOS = .869





ERROR #48: NEGATIVE effective stress calculated for at least  
 1 slice(s) out of 7 slices for surface # 519

The trial  
 XSTABL File: PVCVPS 8-19-97 16:15

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*      using the                      *
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```

Problem Description : Pumice Vally Cover Stab PStatic

-----  
 SEGMENT BOUNDARY COORDINATES  
 -----

1 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	.0	150.0	50.0	1

3 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	4.7	.0	150.0	48.2	2
2	5.5	.0	150.0	48.2	3
3	11.9	.0	150.0	46.0	4

-----  
 ISOTROPIC Soil Parameters  
 -----

4 Soil unit(s) specified

Soil Unit No.	Unit Weight (pcf)	Cohesion Intercept (pcf)	Friction Angle (deg)	Pore Pressure Parameter Ru (psf)	Water Surface Constant (psf)	Water Surface No.

1	80.0	80.0	.0	32.00	.000	.0	0
2	100.0	100.0	500.0	.00	.000	.0	0
3	80.0	80.0	.0	32.00	.000	.0	0
4	53.6	53.6	.0	30.00	.000	.0	0

A horizontal earthquake loading coefficient of .269 has been assigned

A vertical earthquake loading coefficient of .179 has been assigned

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

1000 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

\*\*\*\*\* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \*\*\*\*\*

Length of line segments for active and passive portions of sliding block is 11.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	5.6	.1	51.1	15.3	.3
2	51.2	15.4	136.7	43.8	.3

\*\*\*\*\*  
 -- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)  
 \*\*\*\*\*  
 Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.  
 \*\*\*\*\*

-----  
 USER SELECTED option to discard surfaces with effective normal stresses less than zero  
 -----

Failure surface No. 8 specified by 4 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	39.49	13.16
2	41.31	12.16
3	99.90	31.70
4	100.99	33.66

\*\* Corrected JANBU FOS = .881 \*\* (Fo factor = 1.007)

Failure surface No. 9 specified by 4 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	29.27	9.76
2	31.08	8.76
3	87.65	27.60
4	88.75	29.58

\*\* Corrected JANBU FOS = .882 \*\* (Fo factor = 1.007)

Failure surface No.10 specified by 4 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	46.54	15.51
2	48.36	14.51
3	98.29	31.13
4	99.39	33.13

\*\* Corrected JANBU FOS = .888 \*\* (Fo factor = 1.008)

\*\*\*\*\*  
\*\*  
\*\* Out of the 1000 surfaces generated and analyzed by XSTABL, \*\*  
\*\* 117 surfaces were found to have MISLEADING FOS values. \*\*  
\*\*  
\*\*\*\*\*

The following is a summary of the TEN most critical surfaces

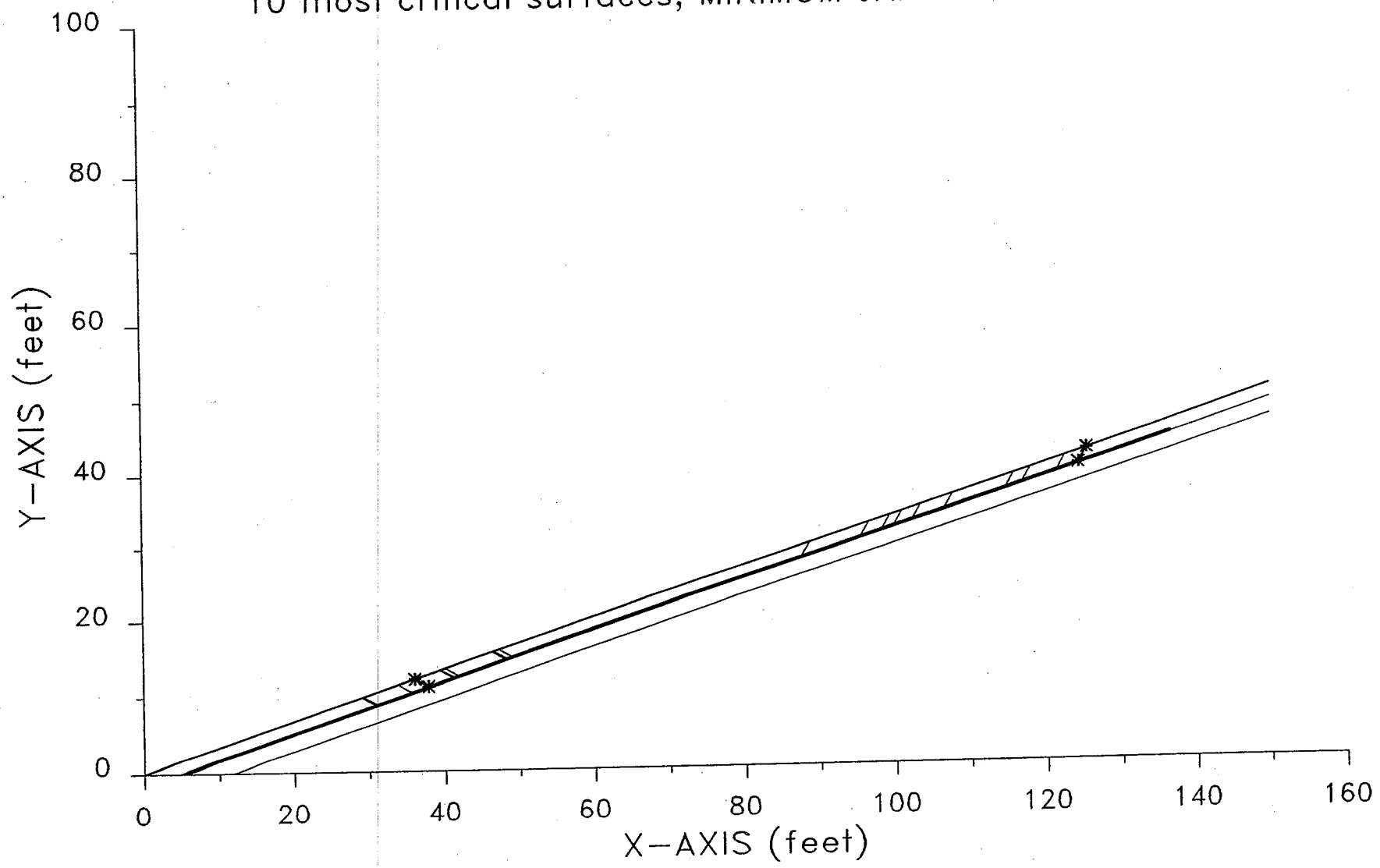
Problem Description : Pumice Vally Cover Stab PStatic

Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
--------------------	-------------------	----------------------	-----------------------	-------------------------

1.	.869	1.005	36.04	125.54	5.029E+03
2.	.870	1.005	29.02	115.86	4.923E+03
3.	.874	1.006	47.23	122.67	4.231E+03
4.	.876	1.006	46.31	118.05	4.160E+03
5.	.878	1.007	40.09	107.67	3.820E+03
6.	.880	1.007	39.33	103.43	3.652E+03
7.	.881	1.007	33.84	96.60	3.587E+03
8.	.881	1.007	39.49	100.99	3.431E+03
9.	.882	1.007	29.27	88.75	3.331E+03
10.	.888	1.008	46.54	99.39	2.983E+03

\* \* \* END OF FILE \* \* \*

Pumice Vally Cover Stab Yield  
10 most critical surfaces, MINIMUM JANBU FOS = 1.002



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```

Problem Description : Pumice Vally Cover Stab Yield

-----  
 SEGMENT BOUNDARY COORDINATES  
 -----

1 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	.0	150.0	50.0	1

3 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	4.7	.0	150.0	48.2	2
2	5.5	.0	150.0	48.2	3
3	11.9	.0	150.0	46.0	4

-----  
 ISOTROPIC Soil Parameters  
 -----

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Surface Constant (psf)	Water Surface No.
1	80.0	80.0	.0	32.00	.000	.0	0
2	100.0	100.0	500.0	.00	.000	.0	0
3	80.0	80.0	.0	32.00	.000	.0	0

A horizontal earthquake loading coefficient of .217 has been assigned

A vertical earthquake loading coefficient of .145 has been assigned

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

1000 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

\*\*\*\*\* DEFAULT SEGMENT LENGTH SELECTED BY XSTABL \*\*\*\*\*

Length of line segments for active and passive portions of sliding block is 11.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	5.6	.1	51.1	15.3	.3
2	51.2	15.4	136.7	43.8	.3

\*\*\*\*\*

-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)

\*\*\*\*\*

Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.

\*\*\*\*\*

-----  
USER SELECTED option to discard surfaces with effective normal stresses less than zero  
-----

2	41.31	12.16
3	99.90	31.70
4	100.99	33.66

\*\* Corrected JANBU FOS = 1.015 \*\* (Fo factor = 1.007)

Failure surface No. 9 specified by 4 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	29.27	9.76
2	31.08	8.76
3	87.65	27.60
4	88.75	29.58

\*\* Corrected JANBU FOS = 1.016 \*\* (Fo factor = 1.007)

Failure surface No.10 specified by 4 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	46.54	15.51
2	48.36	14.51
3	98.29	31.13
4	99.39	33.13

\*\* Corrected JANBU FOS = 1.022 \*\* (Fo factor = 1.008)

\*\*\*\*\*  
 \*\*  
 \*\* Out of the 1000 surfaces generated and analyzed by XSTABL, \*\*  
 \*\* 91 surfaces were found to have MISLEADING FOS values. \*\*  
 \*\*  
 \*\*\*\*\*

The following is a summary of the TEN most critical surfaces

Problem Description : Pumice Vally Cover Stab Yield

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	1.002	1.005	36.04	125.54	5.365E+03
2.	1.003	1.005	29.02	115.86	5.252E+03
3.	1.007	1.006	47.23	122.67	4.511E+03
4.	1.010	1.006	46.31	118.05	4.435E+03
5.	1.011	1.007	40.09	107.67	4.072E+03
6.	1.014	1.007	39.33	103.43	3.891E+03
7.	1.015	1.007	33.84	96.60	3.822E+03



8.	1.015	1.007	39.49	100.99	3.655E+03
9.	1.016	1.007	29.27	88.75	3.548E+03
10.	1.022	1.008	46.54	99.39	3.176E+03

\* \* \* END OF FILE \* \* \*

November 27, 2006  
SRK Project No. 146906

Mr. Scott Humpert  
California Integrated Waste Management Board  
Permitting and Enforcement Division  
Post Office Box 4025  
Sacramento, CA 95812-4025

Via: UPS Next Day Air

**SUBJECT: Response to Review Comments  
Preliminary Closure and Post-Closure Maintenance Plan  
Pumice Valley Landfill (26-AA-0003)  
Mono County, California**

Dear Mr. Humpert:

This correspondence has been prepared by SRK Consulting on behalf of the Mono County Department of Public Works and in response to your comments regarding the Preliminary Closure and Post-closure Maintenance Plan (PCPMP) for the Pumice Valley Landfill. For reference, your comments, contained in the May 5, 2005 correspondence to Mr. Evan Nikirk of the Mono County Department of Public Works, are reproduced below in italics, followed by Mono County's response to each comment. Revised versions of the relevant text sections and figures or drawings are included for insertion into your copies of the PCPMP.

**Comment 1, Part 1:** *As required by Title 27, California Code of Regulations (27CCR) Section 21090(a)(4), the preliminary postclosure maintenance plan "...shall incorporate a cover-integrity monitoring and maintenance program which includes at least the following components. The annualized postclosure maintenance cost analysis [of 21769(c)] shall include an itemized estimate of the annual cost of each component ..."* The "following components" are listed in 27CCR 21090(a)(4)(A) through (D).

**Response 1, Part 1:** Section 4.2 of the PCPMP has been modified to reflect the monitoring requirements of 27CCR Section 21090(a)(4). Due to the proposed use of wood chips as the final erosion layer, vegetation maintenance and repair has not been included in the proposed final cover inspection and maintenance plan.

**Comment 1, Part 2:** *Trickling may be an issue. According to 27CCR 21110, Pumice Valley Landfill waste flow is currently considered to be "trickling". During the period of years 1996 through 2000 the landfill received a significantly higher annual volume of waste than in previous of subsequent years. This has put the landfill in a "trickling" category. If sufficient justification for this significant change in volume is not provided, the landfill may be required to close.*

**Response 1, Part 2:** As described in Section 2.0 of the PCPMP, Mono County currently intends to site a new regional solid waste disposal facility to accommodate the County's disposal needs after closure of the Benton Crossing Landfill. The Pumice Valley Landfill is currently operated as a construction/demolition waste disposal site. All municipal waste received at the site is transferred via the on-site transfer station to the Benton Crossing Landfill. It is this diversion of municipal waste that has resulted in the referenced decrease in disposal rates (trickling). Despite the reduction in waste disposal volume, Mono County wishes to maintain the Pumice Valley Landfill as an "open" facility to ensure the capability and flexibility to manage solid waste within Mono County until a new regional landfill can be developed.

In accordance with 27CCR Section 21110(b)(3), Mono County requests that closure of the Pumice Valley Landfill, as may be mandated by 27CCR Section 21110(b)(2), be deferred until such time as Mono County has completed planning for a new regional disposal site and has determined the necessity of utilizing the remaining capacity of the Pumice Valley Landfill. In support of this request, Mono County makes the following declarative statements pursuant to 27CCR Section 21110(b)(3):

- The capacity of the Pumice Valley Landfill to accommodate additional waste has been demonstrated in the PCPMP;
- The Pumice Valley Landfill is likely to receive additional waste until such time as a new regional disposal site can be developed;
- The reduction in disposal tonnage at the site is a result of the temporary diversion of municipal waste to the Benton Crossing Landfill, and is not intended to avoid or delay site closure; and
- Mono County has taken, and will continue to take, all actions necessary to prevent threats to public health and safety and the environment from the continued operation of the landfill with its reduced waste stream.

Mono County proposes to revisit the issue and update CIWMB at least once every five years as to the County's disposal needs, the necessity of keeping the Pumice Valley Landfill open, and the progress on the development of a new regional landfill.

**Comment 2:** *CHAPTER 1.0, INTRODUCTION: This paragraph should also cite 27CCR 21790 and 21825.*

**Response 2:** Section 1.0 has been modified to include references to 27CCR 21790 and 21825.

**Comment 3:** *CHAPTER 2.0, SITE DESCRIPTION: Section 2.3, Surrounding and Postclosure Land Use; Page 4: This section should include a detailed description of the transfer station as a post-closure land use.*

**Response 3:** Section 2.3 has been modified to include the continued use of the on-site transfer station as a postclosure land use.

**Comment 4:** *CHAPTER 3.0, PRELIMINARY CLOSURE PLAN: Section 3.1, Site Security and Structure Removal; Page 4: This section states that “As part of closure construction activities, all site structures and facilities not needed during the post-closure period or for the remaining transfer station will be dismantled and removed from this site”. As required by 27CCR 20921 and 20931 a gas monitoring program for any structures that may remain should be included in the Plan.*

**Response 4:** Section 4.5 of the PCPMP describes postclosure gas monitoring within structures. Section 3.0 has been revised to reference the discussion in Section 4.5 to more clearly indicate Mono County’s intent to continue structure monitoring through the postclosure period.

**Comment 5:** *CHAPTER 3.0, PRELIMINARY CLOSURE PLAN: Section 3.2, Final Grading Plan and Final Cover Design; Page 5: This section indicates that the final cover will be covered by three to six inches of wood chips. A detailed description of the feedstock and the product should be provided. If this material is to be used to accommodate plant growth, the feedstock should be clean green material and result of processing should be a shredded product. If this material is to be only for erosion protection then feedstock can include clean construction materials and the feedstock may be chipped. In no case should painted, treated or any wood products that contain glues or adhesives be used as feedstock.*

*This section should indicate that interim cover to be used as part of the foundation layer will be constructed and tested according to foundation layer minimum standards. Additionally, foundation soil should be compacted in lifts no more than 8 inches thick.*

*This section should indicate the minimum standards for that part of the foundation layer that interfaces with the GCL (e.g., dimensions of rocks allowed, depth of interface, no sharp or objects, no woody objects, etc.)*

**Response 5:** Section 3.2 has been modified to include the recommended changes. Additional detail regarding final cover construction and specifications is contained in the *Construction Quality Assurance Manual* in Appendix F.

**Comment 6:** *CHAPTER 3.0, PRELIMINARY CLOSURE PLAN: Section 3.4, Landfill Gas Monitoring System; Page 7: A more detailed description of the current and proposed gas monitoring system should be included in the Plan.*

**Response 6:** The landfill gas monitoring system is described in detail in Section 4.5. A sentence directing the reader from Section 3.4 to Section 4.5 has been added. Additional detail has been added to Section 4.5 to more accurately reflect proposed monitoring practices.

**Comment 7:** *CHAPTER 3.0, PRELIMINARY CLOSURE PLAN: Section 3.6, Details of Closure and Preliminary Closure Schedule; Page 8: This section should indicate that when interim cover is to be used as part of the foundation layer, it will be compacted and tested to the meet the required standards and frequencies for foundation layer material.*

**Response 7:** Section 3.6 has been modified to include discussion of compaction requirements as suggested. Additional detail regarding final cover construction and specifications is contained in the *Construction Quality Assurance Manual* in Appendix F.

**Comment 8:** *CHAPTER 4.0, PRELIMINARY POSTCLOSURE MAINTENANCE PLAN: This section indicates that due to severe winter conditions, postclosure maintenance period inspections are proposed twice per year. Is the site inaccessible six months out of the year? If at all possible, minimum of three inspections per year should be scheduled.*

**Response 8:** Section 4.0 has been modified to include a mid-summer inspection, in addition to the proposed late-Spring and late-Autumn inspections. Due to typically heavy snow cover throughout the winter months, a winter inspection is not proposed.

**Comment 9:** *CHAPTER 4.0, PRELIMINARY POSTCLOSURE MAINTENANCE PLAN: Section 4.1, Maintenance of Site Security and Access Features; Page 10: Perimeter fences, locking gates, and access roads should be inspected at least three times a year.*

**Response 9:** Section 4.1 has been modified to include a mid-summer inspection, in addition to the proposed late-Spring and late-Autumn inspections.

**Comment 10:** *CHAPTER 4.0, PRELIMINARY POSTCLOSURE MAINTENANCE PLAN: Section 4.2, Final Cover Maintenance; Page 10: The final cover should be visually inspected at least three times a year.*

**Response 10:** Section 4.2 has been modified to include a mid-summer inspection, in addition to the proposed late-Spring and late-Autumn inspections.

**Comment 11:** *CHAPTER 4.0, PRELIMINARY POSTCLOSURE MAINTENANCE PLAN: Section 4.3, Drainage and Erosion Control System Maintenance; Page 10: The drainage control system should be inspected at least three times a year.*

**Response 11:** Section 4.3 has been modified to include a mid-summer inspection, in addition to the proposed late-Spring and late-Autumn inspections.

**Comment 12:** *CHAPTER 4.0, PRELIMINARY POSTCLOSURE MAINTENANCE PLAN: Section 4.5, Landfill Gas Monitoring; Page 11: Methane gas concentrations should be monitored at least three times a year.*

*A Health Gasurveyor Model 442 is proposed for use in monitoring methane gas concentrations in the perimeter gas monitoring wells. Please provide the gas concentration range(s) this instrument records (e.g., parts-per-million, percent of total volume, etc.)*

*The methane gas monitoring procedure for the perimeter probes should be provided. Gas monitoring wells should not be purged prior to recording gas concentrations. Board staff has found that purging a probe may not give a real picture of what the correct/true concentration of gas is at the time of monitoring. Board staff recommends monitoring until a steady state has been reached, at which time the concentrations of all gases (CO<sub>2</sub>, O<sub>2</sub> and CH<sub>4</sub>) do not fluctuate by significantly (within 0.5% or ppm ranges). Board staff also recommends recording the initial and the steady state gas concentrations.*

**Response 12:** Section 4.5 has been modified to include a mid-summer inspection, in addition to the proposed late-Spring and late-Autumn inspections.

The Gasurveyor Model 442 is capable of measuring methane concentrations from zero to 1,000 ppm and the lower explosive limit for methane from zero to 100 percent. Section 4.5 has been modified to include this information. A copy of the technical specifications for the Heath 500 Series Gasurveyor is included as Attachment 1 to this correspondence. According to Heath Consultants, manufacturer of the Gasurveyor, the Model 442 has the same capabilities as the Model 542 listed in the attached specifications.

Section 4.5 has been modified to more clearly indicate the landfill gas monitoring procedures to be employed during the postclosure period.

**Comment 13:** *Section 6.0, Financial Assurance Funding; Page 14: The demonstration of financial assurances should be updated.*

**Response 13:** Section 6.0 has been updated to reflect the most recent contributions to the financial assurance funding mechanism. The anniversary date for the fund is December 23, which is also the date that deposits are made to update the fund.

**Comment 14:** *APPENDIX A, FIGURES AND REDUCED DRAWING SET: Drawing 9, Details, Sheet 1 of 2: Detail Drawing H, Gas Monitoring Well, should indicate that the bentonite used to separate monitoring zones is a minimum of five feet thick.*

**Response 14:** Detail H on Drawing 7, *Details, Sheet 1 of 2*, has been modified as suggested. A replacement copy of Drawing 7 has been included for insertion into your copies of the PCPMP.

**Comment 15:** *APPENDIX D, SLOPE STABILTY ANALYSIS: Section 4.0, Stability Analysis; Page 3: The Slope Stability Analysis should provide the location of the critical slope and a cross section showing the significant failure surfaces.*

**Response 15:** The location of the critical slope is shown on Figure 3 in Appendix D of the PCPMP. The critical cross-section is shown on Figure 4 in Appendix D.

**Comment 16:** *Section 4.2, INPUT: Seismic Design Parameters; Page 5: This section indicates that the peak ground acceleration was adjusted using a factor of 0.65, from 0.414g to 0.269g. The application of a reduction factor is based on information by Seed and Idriss (1982) and Hynes and Franklin (1984). According to State Water Resources Control Board (SWRCB) staff, these methodologies are more applicable to dams and embankments rather than landfills. Additionally, SWRCB staff state that these methodologies are somewhat out-of date, and suggest using the following as an appropriate tool: Bray, J.D., Rathje, E.M., Augello, A.J., and Merry, S.M., 1998, "Simplified Seismic Design Procedure for Geosynthetic-Lined, Solid Waste Landfills", Geosynthetics International, Vol. 5, Nos. 1-2, pp. 203-235. This methodology is acceptable to the SWRCB. It provides for analysis of cover sliding, and also allows for estimation of permanent displacements.*

**Response 16:**

The referenced article by Bray et al. (1998) is included as Attachment 2 to this correspondence.

The methodology utilized by SRK in the stability analysis of the Pumice Valley Landfill included analysis of waste mass and final cover layer failure using the computer program XSTABL, followed by a Newmark displacement analysis based on Newmark (1965) and Makdisi and Seed (1978). The procedure proposed by Bray et al. (1998) is a calibration of the Newmark method, not a replacement. The first paragraph on page 217 of Bray et al. (1998) states:

“Simplified techniques, such as Makdisi and Seed (1978) are available to evaluate displacements that may occur due to sliding along a distinct, rigid, perfectly plastic slip surface. Hence Newmark (1965)-type deformation analyses constitute the basis for design of most MSWLF units. The assumptions involved in this approach (Newmark-type analyses) are actually more reasonable for slippage along a geosynthetic interface within a Subtitle D base/cover liner system than for the homogeneous earth embankment for which it was originally developed (Bray et al., 1995). Hence its use is judged to be reasonable for geosynthetically lined landfills.”

Because SRK’s analysis of the proposed final cover system considered a sliding block failure (Rankine block analysis) along the plane of the proposed geosynthetic clay liner, the use of the Newmark-type analysis is considered appropriate for evaluation of final cover stability against sliding failure. In addition, because seismic accelerations are reported for bedrock, the application of a reduction factor to account for dampening variations in soil and rock is widely accepted. In fact, the screening analysis described on pages 223 and 224 of Bray et al. (1998) uses a reduction factor of 0.75 to reduce the maximum horizontal acceleration.

We recognize that differential settlement resulting from failure within the waste mass is also a possible mode of final cover failure, and that failure of the waste mass along a rigid slip surface (as assumed by the Newmark method) is unlikely in a heterogeneous waste mass. Bray et al. (1998) state that because “...sliding is not likely to occur along a distinct shear plane” within the waste

mass due to heterogeneity, the use of the Newmark-type analysis for this type of failure requires calibration.

The Bray et al. (1998) calibration was accomplished using empirical observations at landfills and recorded acceleration data from recent earthquakes to develop equivalent yield accelerations. According to the last paragraph on page 217 in Bray et al. (1998), “Use of the equivalent acceleration allows for the seismic response of the deformable potential sliding mass to be represented in the Newmark rigid sliding block procedure (Makdisi and Seed, 1978).”

Equivalent accelerations were calculated based on the simplified procedure described in Section 3.3 (page 224) of Bray et al. (1998). Using the predicted yield accelerations from Janbu circular failure analysis on the waste mass and Rankine block failure analysis of the final cover, equivalent accelerations were calculated and entered into Figures 11 and 12 in Bray et al. (1998). Displacements were predicted for 16 percent and median probabilities, as summarized in Table 1. The highest predicted displacement of 81 centimeters occurs along the slope crest. All remaining predicted displacements, whether for planar failure within the final cover or mass failure of the waste mass, are within acceptable limits based on manufacturer’s recommendations of 30 cm or less.

**Table 1. Results from Bray et al. (1998) Analyses**

Waste Mass Yield Acceleration ( $k_y$ ):		0.22 g, based on Janbu circular failure analysis					
Final Cover Yield Acceleration ( $k_y$ ):		0.217 g, based on Rankine sliding block analysis					
$D_{5-95}$ :		10.8 seconds					
Location	Probability of Exceedence	Calculated Equivalent Acceleration ( $k_{max}$ , g)	$k_y/k_{max}$ (g)	$k_{max}D_{5-95}$	Value from Figure 11 $U/(k_{max}D_{5-95})$	Estimated Displacement $U$ at $M_w$ 6.6 (cm)	Figure from Bray et al. (1998)
<b>Base</b>	MHEA <sub>16</sub>	0.51	0.431	5.51	54	30	Figure 11
	MHEA <sub>med</sub>	0.39	0.56	4.21	7	3	
<b>Cover at Crest</b>	MHEA <sub>16</sub>	0.98	0.22	10.58		81	Figure 12
	MHEA <sub>med</sub>	0.78	0.28	8.42		20	
<b>Cover along slope</b>	MHEA <sub>16</sub>	0.51	0.43	5.51		16	Figure 12
	MHEA <sub>med</sub>	0.4	0.54	4.32		3	

The single predicted displacement outside acceptable limits (81 cm) must be reviewed with respect to the very conservative input parameters used throughout this analysis and the consequences of this type of predicted crest failure. In the cover analyses that were the basis of the highest predicted displacement, the geosynthetic clay liner (GCL) was modeled with a friction angle of zero and a cohesion of 500 pounds per square foot. The bentonite component of a GCL typically displays a friction angle of around 7 degrees. The use of a zero friction angle is a conservative assumption.

In addition, the consequence of the predicted displacement within the final cover layer along the slope crest would be the development of surface cracks and localized offset or tearing of the GCL.



This type of failure would be visible and relatively simple to repair. Although it is hard to predict where localized displacements may occur, a simple sliding offset of GCL edges may be prevented by placing an extra layer of GCL along and parallel to the slope crest.

Based on the previous and current analyses of waste mass and final cover stability, the predicted displacements are considered to be acceptable given the conservative nature of the analyses and the relatively minor anticipated consequences of displacement. As described in the Slope Stability Analysis in Appendix D of the Pumice Valley Landfill PCPMP, detailed interface and material testing is recommended during the final landfill closure process.

**Comment 17:** *APPENDIX F, CONSTRUCTION QUALITY ASSURANCE PLAN: The Construction Quality Assurance (CQA) Plan should include an acknowledgement that as required by 27CCR 21890, “Significant changes to the closure and postclosure maintenance plans, after approval of the final plan, shall upon concurrence with the EA be approved by the CWMB, and the RWQCB.” As required by 27CCR 20324(c)(1)(B), the QCA Plan should include “...a detailed description of the level of experience and training for the contractor, the work crew, and CQA inspectors for every major phase of construction in order to ensure that the installation methods and procedures required in the containment system design will be properly implemented.”*

**Response 17:** The recommended changes have been made to the Construction Quality Assurance Manual in Appendix F. Revised text is included with this correspondence for insertion into your copies of the PCPMP.

**Comment 18:** *APPENDIX F, CONSTRUCTION QUALITY ASSURANCE PLAN: Section 2.3, Control of Documents, Records, and Forms; Page 5: The documents should also be dated by the person signing the documents.*

**Response 18:** Section 2.3 has been modified to reflect the recommended changes.

**Comment 19:** *APPENDIX F, CONSTRUCTION QUALITY ASSURANCE PLAN: Section 2.4, Documentation and Control of Non-Conformance; Page 6: As required by 27CCR 20324(c)(1)(C)5. and 6. the CQA Plan should include “the pass/fail criteria for sampling and testing methods used to achieve containment system design, and a description of the corrective procedures in the event of test failure.”*

**Response 19:** The pass/fail criteria for sampling and testing methods are included in Sections 3, 4 and 5 of Appendix F. Section 2.4.4 of Appendix F also states that “For a simple or routine non-conformance, corrective measures will be determined by specification direction, or if none exists, the Construction Manager, CQA Manager and Contractor will discuss standard construction methods to correct the deficiency...”

**Comment 20:** *APPENDIX F, CONSTRUCTION QUALITY ASSURANCE PLAN: Table 3-2, Growth Media/Erosion Layer Material Acceptance Testing; Page 10: If the vegetative layer is to be vegetated, the minimum compaction may be reduced to 85% relative compaction. The water content should not exceed more than 2% of optimum water content.*

*As required by 27CCR 20324(h)(1)(A), “Four (4) field density tests shall be performed for each 1,000 cubic yards material placed, or at a minimum of four (4) tests per day...”*

**Response 20:** The recommended modifications have been made to Table 3-2.

**Comment 21:** *APPENDIX F, CONSTRUCTION QUALITY ASSURANCE PLAN: Table 3.3, Foundation Layer Acceptance Testing; Page 11: As required by 27CCR 20324(h)(1)(A), “Four (4) field density tests shall be performed for each 1,000 cubic yards of material placed, or at a minimum of four (4) tests per day...”*

**Response 21:** The recommended modifications have been made to Table 3-3.

**Comment 22:** *APPENDIX F, CONSTRUCTION QUALITY ASSURANCE PLAN: Section 3.4.3, General Earthfill; Page 13: This section should provide a statement indicating the maximum allowable thickness of an earthen fill lift is eight inches.*

**Response 22:** The recommended modification to Section 3.4.3 has been made.

**Comment 23:** *APPENDIX G, DRAINAGE REPORT: Table G-3, Summary of Open Channel Design: Channels D15 and D24 appear to have little freeboard at peak flow, about 2-1/4 inches out of a channel design depth of 24 inches. Considering the variability of rainfall intensity over short distances in this region, the design depth of the channel should be increased a minimum of three inches added insurance against overtopping.*

**Response 23:** The depths of the referenced channel segments have been changed to 30 inches to provide for additional freeboard as recommended. A revised Table G-3 has been included with this correspondence for insertion into your copies of the PCPMP.

**Comment 24:** *APPENDIX G, DRAINAGE REPORT: Precipitation Frequency Date Output: The Plan should include rainfall intensity/duration data for the period of record.*

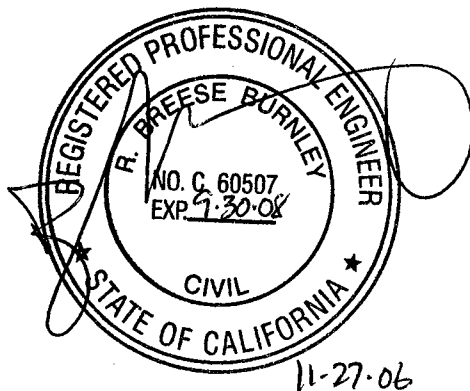
**Response 24:** The precipitation frequency data presented in the drainage report is based on interpolation of historical data between meteorological data stations. The data reported in the Drainage Report represents the best available estimate of rainfall depths for the Pumice Valley Landfill site and is based on a large volume of historical data evaluated by the National Oceanic and Atmospheric Administration. Intensity/duration hydrographs for each of the listed design storms have been prepared based on Type II (high intensity, short duration) storm distribution curves (characteristic of the region) and are included in the Drainage Report for reference.

**Comment 25:** *APPENDIX I, CLOSURE AND POSTCLOSURE COST ESTIMATES: The comment section often states that an item will be "...installed during the operational life of facility ...". The estimated third party cost for this item still needs to be provided in the cost estimates. When that item has been installed, at that point, the estimated cost of that item may then be eliminated.*

**Response 25:** The closure and postclosure cost estimates have been revised to more accurately reflect those facilities that currently exist and the requirements for construction or installation of facilities that will be required at closure. Copies of the revised cost estimates are included with this correspondence for insertion into your copies of the PCPMP.

If you have any questions or comments regarding the information presented herein, please do not hesitate to contact me at (775) 828-6800, or Mr. Evan Nikirk, P.E., Public Works Director for Mono County, at (760) 932-5448.

Sincerely,  
**Steffen Robertson and Kirsten (U.S.) Inc.**



R. Breese Burnley, P.E.  
Senior Engineer

enclosures

Attachments: 1. Heath Gasurveyor Series 500 Technical Specifications  
2. Bray et al. (1998)

cc: Evan Nikirk, Director, Mono County Department of Public Works  
Jim Goodloe, Mono County Solid Waste Local Enforcement Authority  
Douglas Feay, Lahontan Regional Water Quality Control Board

**ATTACHMENT 1**  
**Heath Gasurveyor Series 500 Technical Specifications**

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# Gasurveyor 500 Series

Heath Consultants Incorporated introduces the redesigned Gasurveyor. The Gasurveyor 500 series is the most flexible range of gas detectors available today. By simple selection of hardware and software options, the user can easily configure the product to suit the exact application.

The Gasurveyor 500 series measures flammable gases and vapors, searches PPM, LEL and Volume flammable ranges; measures oxygen and toxic gases. Simple operation, 2 and 4 button models, built-in sampling pump, large LCD with automatic backlighting, audio, visual and fault alarms, data logging and a wide variety of probes makes the Gasurveyor 500 series perfect for any of your gas detection needs. Some standard versions of the Gasurveyor 500 are available; details are available upon request. The Gasurveyor 500 series are highly accurate and reliable instruments in an extremely durable, anti-static case.

The two (2) button Gasurveyor 500 instruments are extremely easy to use and very cost effective for basic applications. The four (4) button instruments have data logging capabilities as well as other advanced alarm features.



## Gasurveyor Models

Sensors	2 button					4 button													
	PPM-500	3-500	6-500	11-500	511	512	521	522	523	524	525	526	531	532	533	534	541	542	First Responder
0-100% LEL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
0-100% Gas	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
1-1,000 PPM CH4	x					x	x			x		x			x			x	x
PPM Search	x																		
0-25% O <sub>2</sub>				x			x	x					x	x	x	x	x	x	
0-200 PPM H <sub>2</sub> S									x	x			x	x			x	x	
0-1,000 PPM CO		x									x	x			x	x	x	x	x
Alarms					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Data logging					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Semi-conductor 0-10,000 PPM																			x

### GASURVEYOR PART NUMBERS

Model PPM-500: 100228-0	Model 511: 100234-0	Model 523: 100236-0	Model 531: 100239-0	Model 541: 100230-0
Model 3-500: 100223-2	Model 512: 100226-0	Model 524: 100237-0	Model 532: 100240-0	Model 542: 100241-0
Model 6-500: 100227-0	Model 521: 100231-0	Model 525: 100238-0	Model 533: 100229-0	First Responder: 100220-1
Model 11-500: 100232-0	Model 522: 100235-0	Model 526: 100220-0	Model 534: 100224-0	

For rechargeable model, add "R" to end of part number.

# SPECIFICATIONS

## Size:

7.08" (180mm) x 3.74" (95mm) x 4.13" (105mm)

## Weight:

3.75 lbs (1.7kg) with alkaline batteries

## Display:

LCD containing analog display scale 0-10; 0-100; 0-1,000; 0-10,000  
 4 digit digital display  
 3 character range indication  
 Operational flags

## Operating Temperatures:

-4 °F to 122 °F (-20 °C to 50 °C)

## Humidity:

0-95% RH Non-Condensing

## Ranges

Ranges	Gas	Resolution
Search	flammable	-
0-1000 PPM	flammable	5 PPM
0-100% LEL	flammable	0.1% (0-9.9%) 1% (10 - 100%)
0 - 100% VOL	flammable	1%
0 - 25%	oxygen	0.1%
0 - 1000 PPM	carbon monoxide	1 PPM
0 - 200 PPM	H <sub>2</sub> S	+/- 2% full scale

## Construction/Protection Rating:

Molded polypropylene case protected to IP54

## Sampling System:

Integral pump with flow fail sensor; sample path protected by hydrophobic filter and auto pump switch off.

## Power Supply:

4 "D" size Alkaline Cells or Rechargeable Battery Pack optional

## Battery Life

- 15 hours with Alkaline
- 8 hours with Rechargeable

## Alarms

Highly visible flashing LED  
 Speaker: In excess of 80 dB(A), typically 85 dB(A)@1m

## Default Alarm Settings

LEL - 20 %  
 CO - 35 PPM  
 Oxygen - 19% Lo, 23% Hi

## Response Time (Typical)

LEL Flammable: 3 secs (t<sub>50</sub>); 5 secs (t<sub>50</sub>)  
 Oxygen: 7 secs (t<sub>50</sub>)  
 Toxics: 15 secs (t<sub>50</sub>)

(t<sub>50</sub>) = Time required to reach 50% of full value.

## Approvals

EEx iad IIC T4  
 UL Class 1 Groups A, B, C and D

## Standards:

EN50014 / EN50018 / EN50020 / UL 913

# ACCESSORIES

## Description

## Part No.

Simple Low Cost Charger (110V) with power supply 22113322

Smart Charger (110V) with data logging software 22113340

## Probes

## Part No.

Flue Analysis Probe (15") 8300150

Survey Bellows Probe 100014-0

Lexan Probe (36") 22212690

Bar Hole Probes (27.5") (15") 22212393  
22212480

Flexible Semi-Conductor Probe 100597-0

Flexible Probe 100539-0



*Heath Consultants Incorporated operates under a continual product improvement program and reserves the right to make improvements and/or changes without prior notification.*



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**ATTACHMENT 2**  
**Bray et al. (1998)**

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**Technical Paper by J.D. Bray, E.M. Rathje,  
A.J. Augello and S.M. Merry**

## **SIMPLIFIED SEISMIC DESIGN PROCEDURE FOR GEOSYNTHETIC-LINED, SOLID-WASTE LANDFILLS**

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**ABSTRACT:** This paper critically reviews seismic design practices in light of the observed performance of landfills during recent earthquakes. Developments in these areas are summarized as follows: earthquake ground motions, dynamic waste fill properties, dynamic responses of geomembranes and their interfaces, nonlinear dynamic response analysis, and seismic stability evaluation. A newly developed simplified seismic analysis procedure that requires the most critical factors be addressed during a seismic performance evaluation is presented. The underlying seismic analysis procedure has been validated against observed performance of landfills shaken by the 1989 Loma Prieta and 1994 Northridge, California earthquakes. The procedure is comprehensive in that it requires: (i) characterization of the design bedrock motions in terms of intensity, frequency content, and duration; (ii) estimation of the seismic loading at the base and cover of the landfill; (iii) evaluation of performance in terms of seismically induced permanent deformations; and (iv) appropriate engineering judgment.

**KEYWORDS:** Analysis, Case record, Design, Earthquake, Geomembrane, Municipal solid-waste landfill, Seismic response, Seismic performance, Waste containment system.

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**PUBLICATION:** *Geosynthetics International* is published by the Industrial Fabrics Association International, 1801 County Road B West, Roseville, Minnesota 55113-4061, USA, Telephone: 1/612-222-2508, Telefax: 1/612-631-9334. *Geosynthetics International* is registered under ISSN 1072-6349.

**DATES:** Original manuscript received 3 July 1997, revised version received 18 December 1997 and accepted 2 January 1998. Discussion open until 1 September 1998.

**REFERENCE:** Bray, J.D. Rathje, E.M., Augello, A.J. and Merry, S.M., 1998, "Simplified Seismic Design Procedure for Geosynthetic-Lined, Solid-Waste Landfills", *Geosynthetics International*, Vol. 5, Nos. 1-2, pp. 203-235.

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## 1 INTRODUCTION

Geosynthetics are a routine component of modern landfill design. The specification of geosynthetic components, such as geomembrane liners, in the waste containment system requires analysis of the overall response of the landfill. An important design consideration in seismic regions is the evaluation of the landfill's seismic performance. The current paper begins with a review of seismic design practice in light of observed landfill performance and, consequently, identifies issues relevant to the design of cover and base liner systems, which typically incorporate several layers of geosynthetics. The estimation of seismically induced deformations within these containment systems forms the basis of evaluating the likely performance of specific geosynthetic layers used in waste containment design. Hence, the current paper focuses on this issue.

The seismic performance of waste fills is typically evaluated using analytical methods developed for seismic stability evaluations of earth embankments, namely pseudo-static slope stability and seismically induced permanent deformation analyses. Although more sophisticated analytical procedures are available, such as coupled stick-slip finite element analysis (Gazetas and Uddin 1994), these procedures are not often utilized in current design due to the relative uncertainties of the inputs to an analysis (i.e. waste and liner properties and earthquake ground motions) compared to the limitations of commonly used analytical tools. Hence, much of the development in seismic design practices for municipal solid-waste landfills (MSWLFs) has been in the application of better understood analytical procedures, with attention to characterizing solid-waste and geosynthetic liner dynamic properties and evaluating the influence of earthquake ground motions on the likely seismic performance of MSWLFs.

Largely in response to U.S. Federal regulations (United States Environmental Protection Agency 1993, Subtitle D), seismic design procedures for MSWLFs in the United States have evolved rapidly over the past few years. In the current paper, recent developments are critically reviewed to summarize the current understanding of seismic design procedures for MSWLFs. Dynamic response and stability procedures are reexamined in light of recent observations of the seismic performance of solid-waste landfills during the 1994 Northridge, California, USA and the 1995 Hyogoken Nanbu (Kobe), Japan earthquakes. Specific improvements to current U.S. design procedures are proposed. A newly developed simplified seismic analysis procedure requiring that the most critical factors be addressed is presented. This procedure has been validated against the observed performance of landfills shaken by recent earthquakes. The use of this procedure is illustrated in the seismic evaluation of a typical MSWLF unit.

Although much progress has been made since the 1988 static failure of the Kettleman Hills Class I landfill in California, and a sound simplified seismic analysis procedure for MSWLFs can be proposed at this time, caution is warranted given the significant level of uncertainty remaining in this field. With additional investigations and possibly new lessons to be learned from future earthquakes, design practices will continue to evolve, and the issues explored in the current paper will require reevaluation.

## 2 DEVELOPMENTS IN SEISMIC DESIGN PRACTICES

### 2.1 General

The rapid evolution of seismic design practices for MSWLFs can be appreciated by reviewing previous state-of-the-art papers such as Seed and Bonaparte (1992), Bray et al. (1993), and Anderson and Kavazanjian (1995). All of the advancements resulting from previous investigations cannot be addressed in the current paper, but some of the key developments in seismic design practice, with an emphasis on those developed by the authors of the current paper, are discussed. This focused review also provides summary data required for the simplified design procedure presented in Section 3. Specifically, developments in these areas are summarized as follows: seismic landfill case histories, earthquake ground motions, dynamic waste fill properties, dynamic responses of geomembranes and their interfaces, nonlinear dynamic response analysis, and seismic stability evaluation.

### 2.2 Seismic Landfill Case Histories

Recent earthquake events have provided excellent opportunities to document the seismic performance of waste fills. The Northridge earthquake (moment magnitude,  $M_w = 6.7$ ) is a particularly important event, as 22 landfills were subjected to ground motions in excess of 0.05g, and eight of these landfills were lined with geosynthetics (Augello et al. 1995). Surficial cracking in the cover soil, primarily near the transitions between the waste fill and natural ground areas and at changes in landfill geometry, was the most commonly observed damage pattern at landfills. This pattern of damage is consistent with damage observed after the 1989 Loma Prieta earthquake in California (Buranek and Prasad 1991). The cracking can be attributed to the contrast in the dynamic response characteristics between the relatively soft waste material and the stiff adjacent native ground. Cracking of the relatively brittle cover soil overlying more ductile waste fill was also observed at many landfills. Cracks were typically 10 to 75 mm wide with 10 to 75 mm of vertical offset. However, larger cracks (up to 300 mm) were observed at some landfills (e.g. Sunshine Canyon landfill in California).

Cracking of the soil cover due to limited downslope movement (typically less than 200 mm) was observed at the Chiquita Canyon landfill in California, where localized tears in the high density polyethylene (HDPE) liner of two cells of the landfill were observed. Two other geosynthetic-lined landfills (Bradley Avenue and Lopez Canyon landfills in California) at similar distances from the zone of energy release suffered no apparent damage to their liner systems. However, these two landfills did suffer moderate damage evidenced by cracking in the cover soil at waste fill/native ground transitions.

A temporary shut down of the landfill gas extraction systems occurred at a number of landfills due to the loss of power as a result of the earthquake, and breaks in the landfill gas system headers and lines were reported at several landfills. The temporary loss of a waste landfill's gas extraction system is an important consideration because of the potential for a fire or an explosion.

A few solid-waste landfills located in the Kobe/Osaka area of Japan were surveyed following the 1995 Kobe earthquake (Akai et al. 1995). There were a number of waste fills setup to burn and dispose of construction debris being cleared from Kobe which

were located on reclaimed land that underwent significant liquefaction-induced lateral spreading. Two large permanent waste fills located on reclaimed islands at distances of 12 and 20 km from the zone of energy release were also surveyed. Several ground cracks, which were tens of meters long and a few centimeters wide, were identified near the edges of these islands. These cracks appeared to have resulted from lateral movements toward the island edges. A sand liquefaction boil with some garbage ejecta (Figure 1) was observed at one of the landfills. There was no evidence of any compromise of the containment of waste at these sites which are eventually underlain by thick clay deposits. Waste fill performance was dominated by the subsurface conditions at the surveyed landfills. These sites were reclaimed by dumping granular materials through standing water, and it is not surprising that they experienced ground cracking resulting from liquefaction-induced lateral spreading. These case records illustrate the potential problems associated with waste fills sited on ground susceptible to liquefaction.

### 2.3 Earthquake Ground Motions

The seismic response of a MSWLF depends greatly on the characteristics of the selected suite of input ground motions. Hence, the importance of a site-specific seismicity evaluation cannot be overemphasized. To assist this process in the United States, the U.S. Geological Survey (USGS) has developed improved maps that define the probability of ground motion parameters being exceeded for various levels of uncertainty in the continental United States. The Frankel et al. (1996) maps are available via the Internet (<http://geohazards.cr.usgs.gov/eq/>) and form the basis for several design codes, such as the 1997 National Earthquake Hazards Reduction Program Recommended Provisions for Seismic Regulations for New Buildings (BSSC, Building Seismic Safety Council 1997). Ground motion parameters, such as the maximum horizontal acceleration, *MHA*, are available at the 10% probability of exceedance in 250 years level (i.e. 2%



**Figure 1.** Sand liquefaction boil with some garbage ejecta (photograph courtesy of Dr. L. Harder).

in 50 years) cited in Subtitle D, as well as other levels such as the 10% exceedance in 50 years. The USGS maps provide a useful check to site-specific seismicity evaluations as well as reasonable values for some designs.

Although these map values may be appropriate for some designs, a site-specific seismicity study is often warranted. For example, the use of one ground motion parameter (e.g. *MHA*) as a design basis is overly simplistic. Subtitle D is potentially misleading, with its focus on *MHA* as describing the seismic hazard at a site, because the frequency content and duration of a ground motion are equally important.

The potential seismic hazard at a site typically results from several earthquake events, each with their particular characteristics and potential impact on the landfill. The hazard often consists of a near-field (< 10 to 20 km), high intensity ground motion with significant short period energy and a short duration of strong shaking and an intermediate-field (20 to 100 km), lower intensity ground motion (i.e. lower *MHA* value) with significant long period energy and long duration. The design of MSWLFs, which are typically longer period systems, will often be governed by a less intense motion with significant long period energy and a long duration of strong shaking.

In developing a suite of design ground motions that capture reasonable scenario earthquake events, empirical attenuation relations are helpful for characterizing ground motions with respect to magnitude, distance, site conditions, and fault type, as well as other factors. Many updated relations are available in the *Seismological Research Letters* (1997).

Although the most complete characterization of a ground motion is through its time history, it is often useful to characterize key aspects of a ground motion with simplified parameters. Probabilistic ground motion maps and attenuation relationships are useful for estimating *MHA* as a ground motion intensity parameter (Figure 2a). The frequency content may be characterized by using the mean period,  $T_m$ , which is a more stable parameter than the predominant period,  $T_p$ , with the relationship shown in Figure 2b (Rathje et al. 1998), and the significant duration,  $D_{5-95}$  (i.e. the time between 5 and 95% of the Arias Intensity of the acceleration-time history), may be estimated with the relationship shown in Figure 2c (Abrahamson and Silva 1996). A number of other ground motion issues may be important for a particular project, for example, near-field directivity effects at sites close to a major fault (e.g. Somerville et al. 1997). The reader may refer to the seismological literature for a discussion of these issues.

## 2.4 Dynamic Waste Fill Properties

Recent studies have increased the state of knowledge regarding shear wave velocities,  $V_s$ , of solid-waste fill. A large number of spectral analysis of surface waves (SASW) tests and one suspension logging test were performed at the Operating Industries, Inc. (OII) landfill as a part of its closure study (Idriss et al. 1995). Additionally, SASW tests were performed at five other landfills in Southern California (Kavazanjian et al. 1996). SASW measurements were taken at 43 profiles at these six sites. A weighting scheme was employed such that equal weighting was given to each landfill site. Figure 3 presents a median curve along with a recommended range for the shear wave velocity of solid-waste versus depth. This range of values is somewhat lower than the  $V_s$  profile recommended by Kavazanjian et al. (1995), but it is still significantly higher than the range of  $V_s$  values initially proposed (Singh and Murphy 1990).

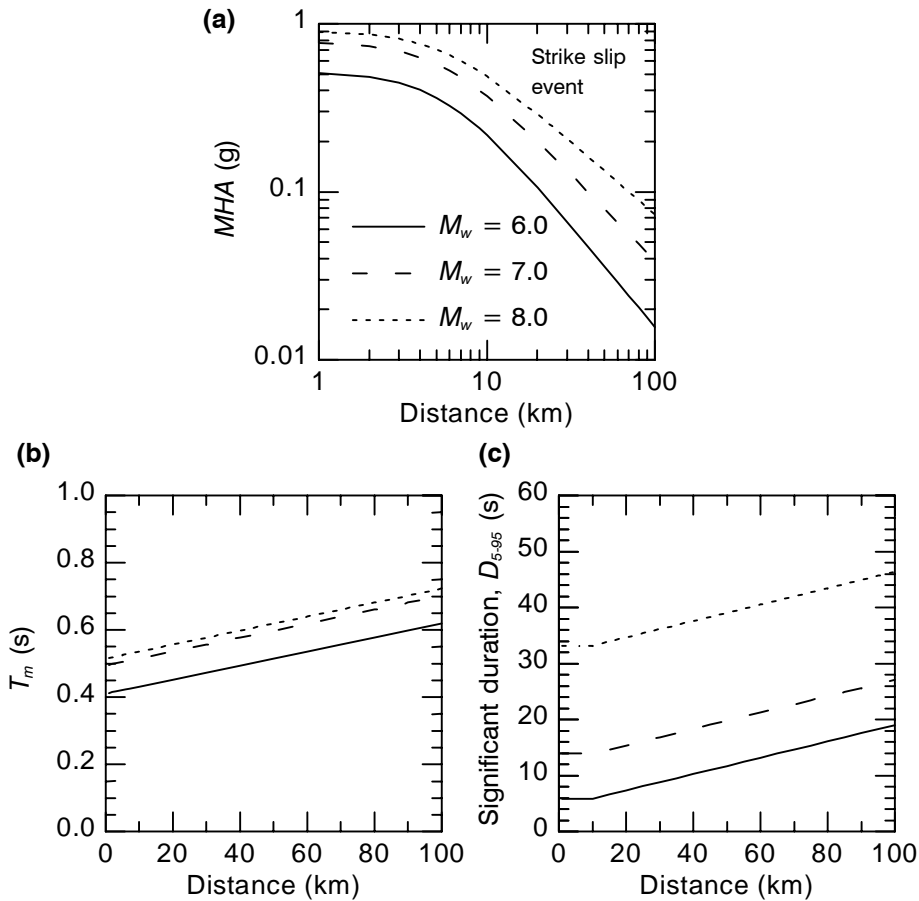
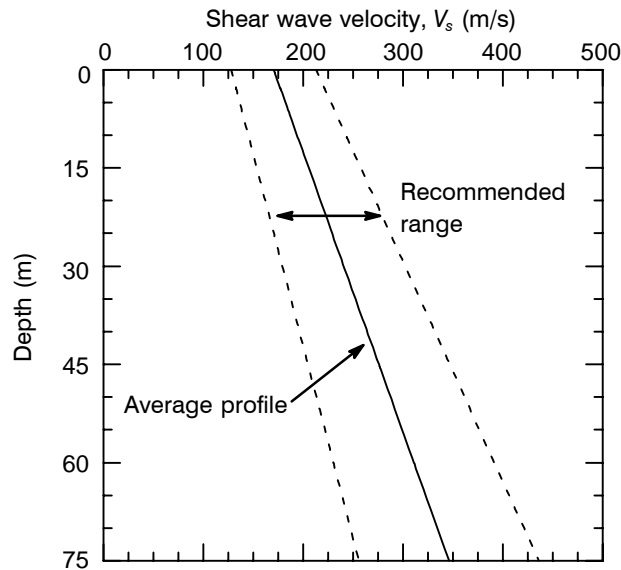


Figure 2. Simplified characterization of earthquake rock motions: (a) intensity,  $MHA$  for strike-slip faults (for reverse faults, use  $1.3 \times MHA$  for  $M_w \geq 6.4$  and  $1.64 \times MHA$  for  $M_w = 6.0$ , with linear interpolation for  $6.0 < M_w < 6.4$ ) (Abrahamson and Silva 1997); (b) frequency content,  $T_m$  (Rathje et al. 1998); (c) duration,  $D_{5-95}$  (Abrahamson and Silva 1996).

A unit weight profile based upon direct measurements of initial weight upon placement; in situ measurements from boreholes and test trenches; inferred values from SASW measurements based on a correlation between depth,  $V_s$ , and calibrated unit weights from borehole data; and one-dimensional (1-D) compression tests on large (754 mm) reconstituted samples was also recently developed (Augello et al. 1997). The unit weight profile is  $11 \text{ kN/m}^3$  at a depth of 0 m,  $14 \text{ kN/m}^3$  at 24 m, and  $15 \text{ kN/m}^3$  at and beyond 90 m.

The installation of a pair of accelerometers at the OII landfill in 1987 provided a unique opportunity to evaluate the shear modulus reduction and damping characteristics of solid-waste through back-analysis. Several investigators (e.g. Idriss et al. 1995;



**Figure 3.** Shear wave velocity profiles for municipal solid-waste (after Kavazanjian et al. 1996).

GeoSyntec Consultants 1996; Augello et al. 1998) have proposed shear modulus reduction and damping relationships based upon the OII landfill recordings. Figure 4 shows the various shear modulus reduction and damping curves proposed for municipal solid-waste. In general, analytical results are more sensitive to the choice of damping curves compared to the choice of shear modulus reduction curves. The Poisson's ratio of waste fill was found to be approximately 0.3. The dynamic strength of waste fill was back-calculated to be at least equal to the static strength recommended by Kavazanjian et al. (1995) (i.e. cohesion intercept,  $c = 24$  kPa and internal friction angle,  $\phi = 0^\circ$  for a total normal stress,  $\sigma_n < 30$  kPa; and  $c = 10$  kPa and  $\phi = 33^\circ$  for  $\sigma_n > 30$  kPa), and a reasonable back-calculated range of dynamic friction angles for the Southern California landfills is 33 to 38° (Augello et al. 1997).

## 2.5 Dynamic Responses of Geomembranes and Geomembrane Interfaces

Geomembranes made of HDPE, polypropylene (PP), and polyvinyl chloride (PVC) are often used as low-permeability layers within MSWLF units. The primary function of a geomembrane is to minimize the migration of leachate through the base liner or the infiltration of water through the cover system. Geomembranes, unlike geogrids, are rarely designed as structural members that carry loads. Rather, the desired response for a geomembrane is to deform without failure. To maintain system integrity, the ability of a geomembrane to elongate in response to the design loads, including additional seismic forces, without failure is of paramount importance. For design calculations, the stress-strain response of a geomembrane is often based on wide-strip tension tests performed at a specified strain rate of typically, 1%/minute.

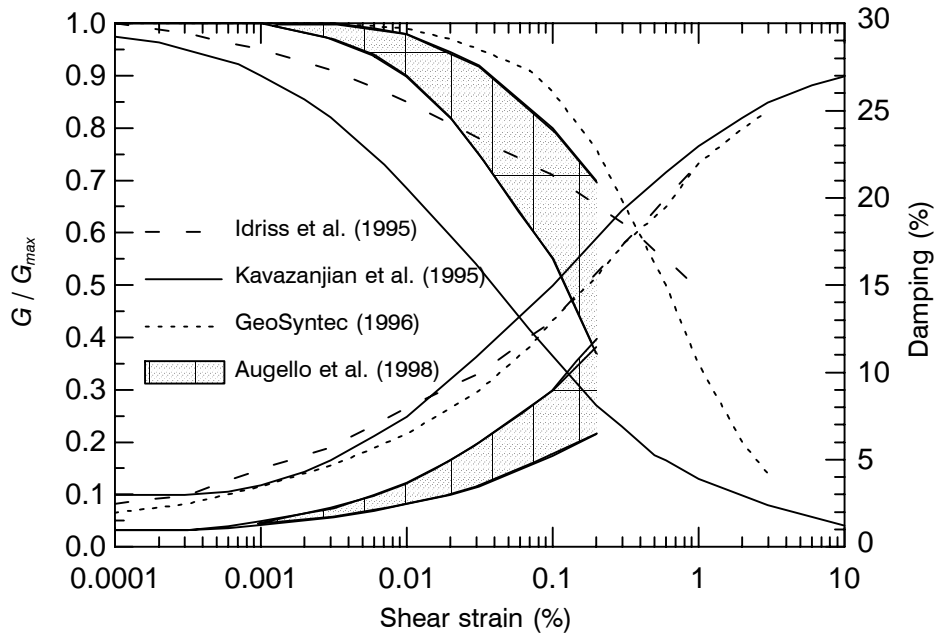


Figure 4. Strain dependent shear modulus reduction and damping curves for municipal solid-waste.

Several studies have been completed on the long-term static response of geomembranes (e.g. Giroud and Beech 1989; Koerner and Hwu 1991; Bourdeau et al. 1993; Merry and Bray 1997a,b). However, relatively little attention has been given to the performance of geosynthetic materials during dynamic loading. Hence, the ductility of these materials under rapid monotonic and cyclic loading requires characterization.

Strain-controlled multiaxial tension test results presented by Merry and Bray (1997a) over a strain rate range of 10 to 0.0004%/minute indicate that the visco-elastoplastic response of HDPE and PVC geomembranes follows a well-defined, tractable pattern (Figure 5a). Experimental results indicate that the secant Young's modulus softens, maximum stress at failure reduces, and failure strain (i.e. strain at maximum stress) increases as the strain rate decreases. A number of proposed numerical models, such as rate-dependent hyperbolic and  $n^{\text{th}}$ -order parabolic functions and an adaptation of the Singh and Mitchell (1968) creep model, have been shown to capture the stress-strain-time-temperature response of HDPE well over four orders of strain rate (e.g. Merry and Bray 1997a,b).

These numerical models, when used to extrapolate standard test results to higher strain rates, suggest that the failure strain of HDPE reduces significantly under rapid loadings. This potential increase in brittleness of HDPE at strain rates representative of those expected during seismic events warrants concern, and experimental data are required to verify this predicted response.

Multiaxial tests have been performed on 1.0 and 1.5 mm thick, smooth HDPE geomembrane specimens by inducing a static strain of 5% and then loading rapidly to fail-

ure (on the order of 5000%/minute or 5 Hz loading to 15% strain). These results indicate that the failure strain for commercially available, untextured HDPE geomembranes is at least 10% (Merry 1995). In addition, cyclic multiaxial tension test results indicate that HDPE geomembranes can undergo cyclic loadings at less than their peak strength without losing ductility and strength (Figure 5b).

Cyclic wide-strip uniaxial tests were also performed by the authors of the current paper, and these tests indicated that the failure strain for untextured HDPE geomembranes was at least 15%. Moreover, some HDPE geomembrane specimens were loaded between 5 and 20% strain at a frequency of 1 Hz for 500 cycles without rupturing; however, there was significant modulus degradation in these tests. Geomembranes may possess sufficient ductility to deform rapidly during an earthquake without failing, but additional experimental work is warranted to verify this finding.

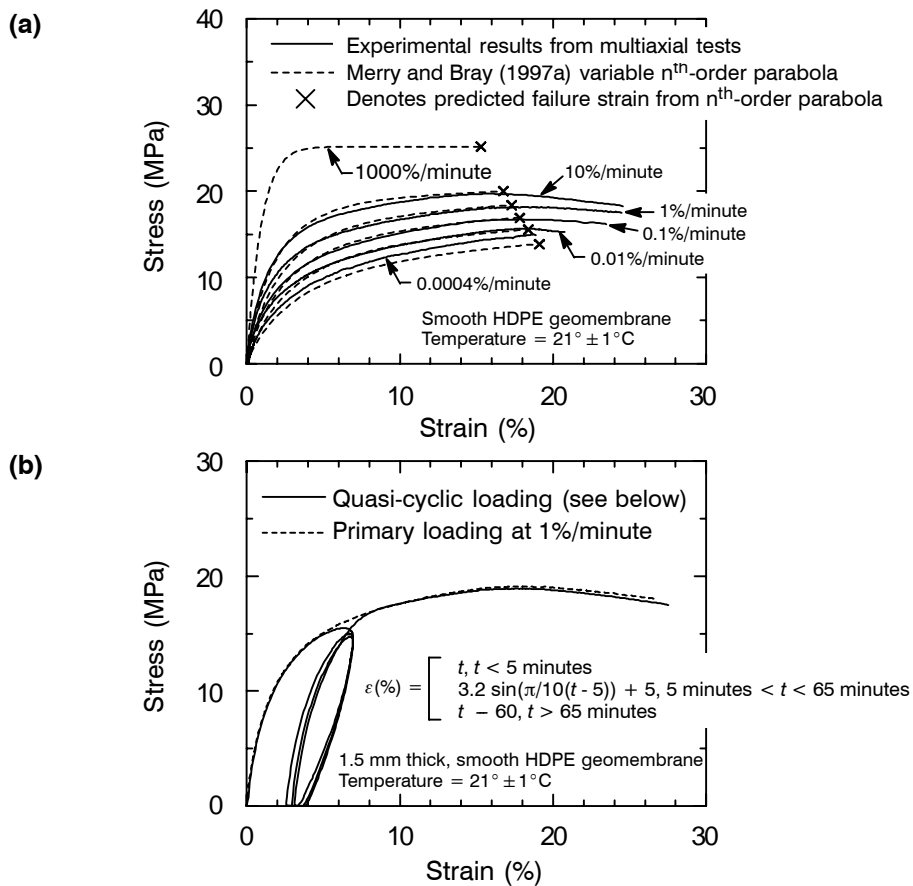


Figure 5. Stress-strain-time multiaxial response of a smooth HDPE geomembrane: (a) monotonic strain-controlled loading; (b) quasi-cyclic loading (adapted from Merry 1995).



This is an important issue, because two of the few MSWLF units that were lined with a HDPE geomembrane as required by Subtitle D were damaged as a result of strong shaking during the 1994 Northridge earthquake (Augello et al. 1995). Tears in the geomembrane liners at Canyons C and D of the Chiquita Canyon landfill both occurred at the top of the slope near the anchor trench, where the largest static, pre-seismic stresses in the liner would be expected due to side slope downdrag as the waste fill settled over time. Moreover, both 1.5 mm (60 mil) thick, smooth HDPE geomembrane liners were directly overlain with protective soil and waste, without the inclusion of a protective geotextile or slip layer, and the tear at Canyon C initiated at the location of an extrusion welded patch along a longitudinal seam where a sample was removed for destructive testing (EMCON Associates 1994).

From this experience, the incorporation of flexibility and ductility in the design of the containment system is judged to be crucial, even though a quantitative assessment of its merit is difficult with the available analytical tools. "Defects" and "inflexible anchor trenches" which may induce stress concentrations during static and seismic loadings should be avoided, and a slip layer should be placed above the base/side slope liner to accommodate slip in the system without undermining the integrity of the critical base liner.

The 1988 static failure of the Kettleman Hills Waste Landfill Unit B-19 (Mitchell et al. 1990) emphasized the importance of evaluating the interface strengths of the many different types of geosynthetics incorporated in waste containment designs. As with the response of geomembranes, most studies have investigated the static response of common interfaces (e.g. Negussey et al. 1989; O'Rourke et al. 1990; Byrne et al. 1992; Orman 1994; Gilbert et al. 1995). Pseudo-static stability analyses of geosynthetic-lined landfills during the Northridge earthquake resulted in back-calculated interface strengths for smooth and textured HDPE geomembranes that are consistent with those from laboratory test results for similar interfaces reported in the literature (Augello et al. 1995). Shaking table tests have provided important insights regarding the dynamic response of common geosynthetic interfaces. Yegian and Lahlaf (1992) found that the dynamic friction angles measured during instrumented shaking table tests are close to those measured in static friction tests. Hence, conventional, static interface friction tests are believed to provide reasonable estimates of the dynamic interface strengths.

The clay-smooth HDPE geomembrane interface has been found to be one of the most variable, which emphasizes the need for high-quality, project-specific interface testing. The clay-geomembrane interface strength is dependent on the compaction water content, compacted density, normal stress, soil type, and post-compaction changes in water content (Seed and Boulanger 1991; Stark and Poeppel 1994). Residual clay-geomembrane interface strengths as low as  $4^\circ$  have been measured. Peak strengths are higher, but peak strengths are often mobilized at shear displacements of only 2 to 4 mm, with the shear stress falling to close to residual strength at displacements of only 20 mm (Stark and Poeppel 1994). However, the clay-geomembrane interface is not necessarily the weakest interface. Stark and Poeppel (1994) show that under low normal stresses (up to approximately 150 to 300 kPa), geosynthetic-geosynthetic interfaces, such as geotextile-geomembrane, may be weaker. For higher normal stresses, the clay-geomembrane interface strength is likely lower. This suggests that in the case of a base liner system where normal stresses may be high, the use of a geotextile cushion as a sacrificial slip surface does not necessarily prevent stresses from becoming induced in the geomembrane.

The engineer must still decide if peak or residual (large displacement) interface strengths are appropriate. A sacrificial “slip layer” interface should be designed using residual strength, as some (and maybe significant) slippage is assumed to occur along this interface. Installation procedures, post-installation environmental changes, sequencing of layers within the base, cover and side slope liner systems, and the stress-deformation response of layered systems to placement of the waste all may contribute to relative displacement within specific interfaces. These contributing factors, and the fact that peak strengths are mobilized at small displacements, suggest that the use of large displacement (residual) strength values for seismic stability analyses is appropriate.

## 2.6 Nonlinear Dynamic Response Analysis

Parametric seismic response studies (Bray et al. 1995; Bray and Rathje 1998) have found that reasonable variations in waste fill dynamic properties, fill heights, foundation conditions, and input bedrock motions produce significant variations in the landfill response. Moreover, developing good characterizations of waste fill properties (dynamic strength, stiffness, and damping) remains a top priority, as the response of a MSWLF unit for a given suite of motions is largely a function of its dynamic response characteristics.

The seismic loading for a potential sliding mass within the waste fill can be represented by the horizontal equivalent acceleration as  $HEA = (\tau_h/\sigma_v)g$  (where  $\tau_h$  = horizontal shear stress and  $\sigma_v$  = total vertical stress at the depth of the sliding surface) which was originally conceived by Seed and Martin (1966) and defined for a 1-D system. The maximum seismic loading is designated  $MHEA$ . Using the 1-D equivalent-linear wave propagation program SHAKE91 (Idriss and Sun 1992), Bray et al. (1995) found that  $MHEA$  for the important base sliding case depends primarily on the dynamic properties and height of the waste fill (i.e. its fundamental period,  $T_s$ , as described by  $T_s = 4H/V_s$ , where  $H$  = height of waste fill, and  $V_s$  = average initial shear wave velocity of the waste fill) and the  $MHA$  and  $T_p$  of the input earthquake rock motion.

For cases where  $T_{s-FILL} > T_{p-EQ}$ , the normalized maximum horizontal equivalent acceleration,  $MHEA/MHA_{Rock}$ , was shown to be inversely proportional to the normalized fundamental period of the waste fill,  $T_{s-FILL}/T_{p-EQ}$ . This finding reemphasizes the importance of characterizing the dynamic stiffness of waste fill, which is in sharp contrast to the design practices of the early 1990s described in Seed and Bonaparte (1992) where a site response analysis at a project site without the waste fill in place was often used to estimate the seismic loading.

Using the fully nonlinear 1-D site response program D-MOD (Matasovic and Vucetic 1995), which is based on the established DESRA-2 program (Lee and Finn 1978), Bray and Rathje (1998) reexamined this normalization at higher levels of acceleration (up to 0.8g) with updated waste fill property characterizations. D-MOD and other DESRA-based codes have been shown to calculate seismic responses similar to the established SHAKE91 program at low acceleration levels, but calculate lower responses at high accelerations (Kavazanjian and Matasovic 1995), which is consistent with prevailing views (e.g. Seed et al. 1991; UBC, International Conference of Building Officials 1997).

To achieve a useful normalization, the nonlinear response factor ( $NRF = MHA_{Site} / MHA_{Rock}$ ) was developed to account for the nonlinear site response of materials, such as solid-waste, that exhibit strain-dependent shear modulus and damping characteristics. The nonlinear response factor for solid-waste is based on the site factor proposed

by Seed et al. (1991) for deep cohesionless and stiff cohesive soils, because the range in dynamic stiffness of this site category is close to that of waste fill. Additionally, the mean period,  $T_m$ , was used in lieu of the predominant period, because this parameter better represents the overall frequency content of a ground motion and can be estimated more reliably with empirical ground motion data (Rathje et al. 1998).

Incorporating these two improvements, a revised normalization was developed (Figure 6), with data from over 300 analyses of landfills at rock sites (Bray and Rathje 1998). The results follow a well-defined trend, except near the resonance condition which occurs at  $T_s/T_m < 1$ , which is due to degrading waste stiffness at higher strain levels. Results for landfills located at soil sites indicate that site conditions play a less significant role in the estimate of *MHEA*, with slightly lower *MHEA* values for soil sites. In an extreme case, *MHEA* values at deep, soft clay sites were about two-thirds of the *MHEA* values calculated at rock sites, but this apparent conservatism for soft sites is balanced by the larger displacements calculated at these sites, and the implications of these compensating errors will be discussed in Section 2.7.1. Figure 6 may be used as a guide in the selection of an appropriate seismic coefficient for simplified pseudo-static and deformation analyses, as this graph has been prepared with normalization parameters that may be estimated for most projects.

The use of a 1-D model to represent the seismic response of an earth/waste fill has been discussed in Vrymoed and Calzascia (1978), Elton et al. (1991), and Bray et al. (1996), and it has been found that dynamic shear stresses near the base of a two-dimensional (2-D) earth/waste fill can be approximated reasonably well with a 1-D analysis. This issue, as well as the reliability of capturing a landfill's cover response with a 1-D analysis, was investigated using the programs SHAKE91 and QUAD4M (Hudson et al 1994) to analyze five generic landfill configurations and five landfills shaken by the Northridge earthquake (Rathje 1997).

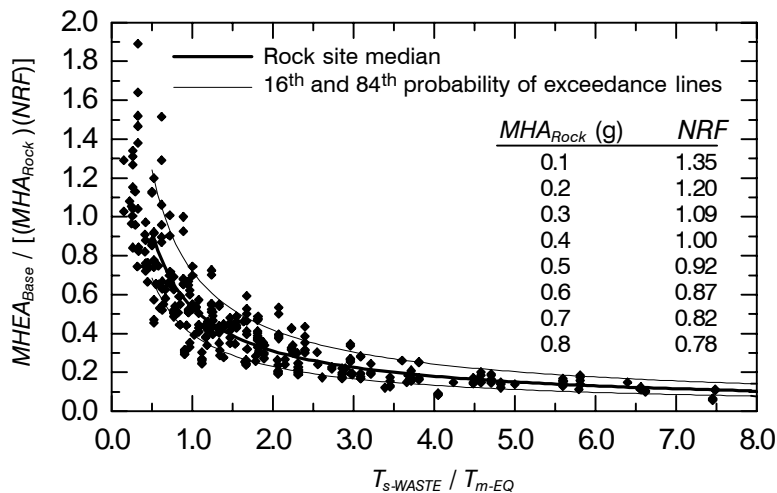


Figure 6. Normalized maximum horizontal equivalent acceleration for base sliding versus normalized fundamental period of waste fill (adapted from Bray and Rathje 1998).

In these comparisons, the *MHEA* or *MHA* from the 1-D analyses was calculated for several 1-D columns and weighted by their respective percentage of the total sliding mass. Results shown in Figure 7a indicate that the seismic loading predicted by 1-D analyses for deep sliding surfaces within the waste are generally conservative when compared to 2-D results. Therefore, the seismic coefficient estimated by a weighted 1-D analysis can be used in a simplified seismic stability evaluation of base sliding.

While a 1-D analysis also provides a rough estimate of the *MHA* acting along the top deck of a landfill, it tends to underestimate accelerations at points along the cover slope, especially at the crest, because of topographic amplification (Figure 7a). However, the *MHA* calculated at the crest of the cover slope need not be applied as the seismic loading

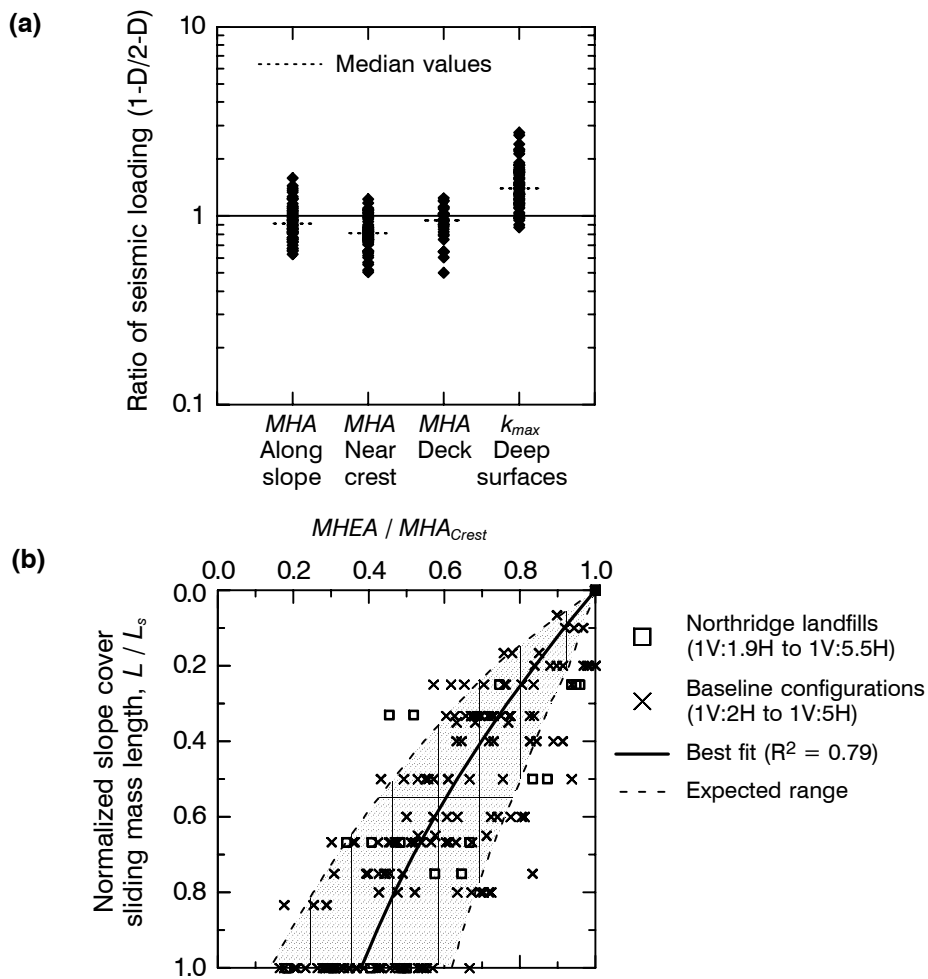


Figure 7. Results from SHAKE91 and QUAD4M: (a) comparison of seismic loading predicted by 1-D and 2-D analyses; (b) variation of *MHEA* along the cover system.

for the stability evaluation of the entire cover slope. As shown in Figure 7b, the equivalent acceleration acting on a potential cover sliding mass decreases as the normalized length of the slide mass increases, due to incoherence of the seismic response of the long cover slope.

One-dimensional nonlinear dynamic analyses were performed to identify factors affecting the seismic loading for cover systems. At low input rock accelerations ( $MHA_{Rock} < 0.2g$ ), the D-MOD results are consistent with accelerations recorded at the OII landfill and the scatter is small; however, at higher accelerations, the scatter increases and cover acceleration estimates are less reliable (Bray and Rathje 1998). This scatter is a result of different landfill heights and stiffnesses, and different input ground motions. The normalization used for  $MHEA_{Base}$  was applied to the  $MHA_{Top}$  results (Figure 8), and this normalization allows for a better estimate of the seismic loading at the top of a landfill.

## 2.7 Seismic Stability Evaluation

### 2.7.1 Seismically Induced Permanent Deformations

The seismic stability of a MSWLF unit can be best evaluated in terms of seismically induced deformations. Deformations should be expressed in terms of deviatoric and volumetric components. The overall response of a cover system will be a function of seismically induced fill settlement due to contractive volumetric strains and seismically induced fill bulging/lurching toward a slope-face due to deviatoric strains.

Simplified techniques, such as the Tokimatsu and Seed (1987) method for clean sand deposits, however, are not available for evaluating seismically induced settlements of MSWLFs. Hence, this analysis is not typically performed, although many of the surface cracks observed in landfill covers following the 1994 Northridge earthquake have been attributed to this mechanism (Augello et al. 1995). Simplified techniques, such as Mak-

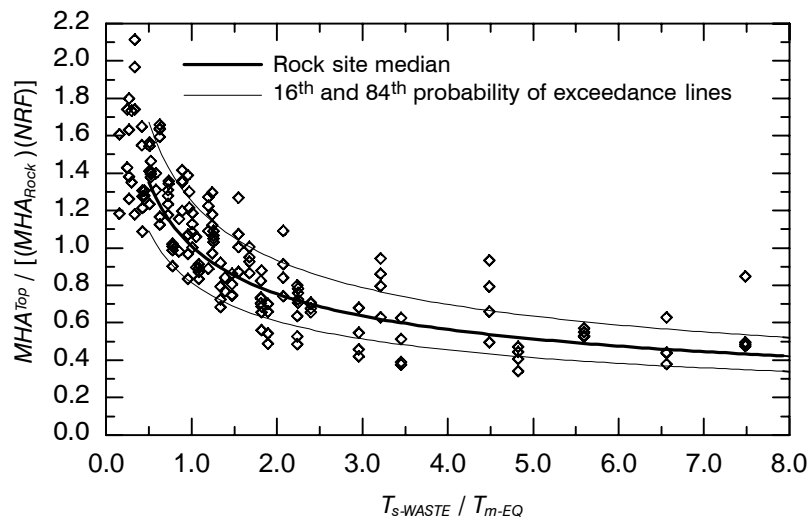


Figure 8. Normalized maximum horizontal acceleration at the top versus the normalized fundamental period of the waste fill (from Bray and Rathje 1998).

disi and Seed (1978), are available to evaluate displacements that may occur due to sliding along a distinct, rigid-perfectly plastic slip surface. Hence, Newmark (1965)-type deformation analyses constitute the basis for design of most MSWLF units. The assumptions involved in this approach are actually more reasonable for slippage along a geosynthetic interface within a Subtitle D base/cover liner system than for the homogeneous earth embankment for which it was originally developed (Bray et al. 1995). Hence, its use is judged to be reasonable for geosynthetically lined landfills. Although this procedure is also often used to evaluate sliding within the waste fill, sliding is not likely to occur along a distinct shear plane for this case, thus its use requires a calibration for this application. The results from a Newmark-type seismically induced permanent deformation analysis actually provides only an index of likely performance during an earthquake.

Seismically induced permanent displacements can be calculated using a procedure developed by Franklin and Chang (1977) requiring two inputs: (i) horizontal equivalent acceleration-time history based on the horizontal shear stress-time history computed at the depth of sliding from a dynamic response analysis; and (ii) yield acceleration coefficient,  $k_y$ , calculated as the seismic coefficient required to obtain a factor of safety of one in a pseudo-static slope stability analysis. The yield acceleration coefficient at the cover (infinite slope analysis, Equation 1) and base (adaptation from Shewbridge 1996, Equation 2) can be estimated for typical landfills (Figure 9) using the following formulas:

$$k_y = \tan(\phi - \beta) + \frac{c}{\gamma H \cos^2 \beta (1 + \tan \phi \tan \beta)} \quad (1)$$

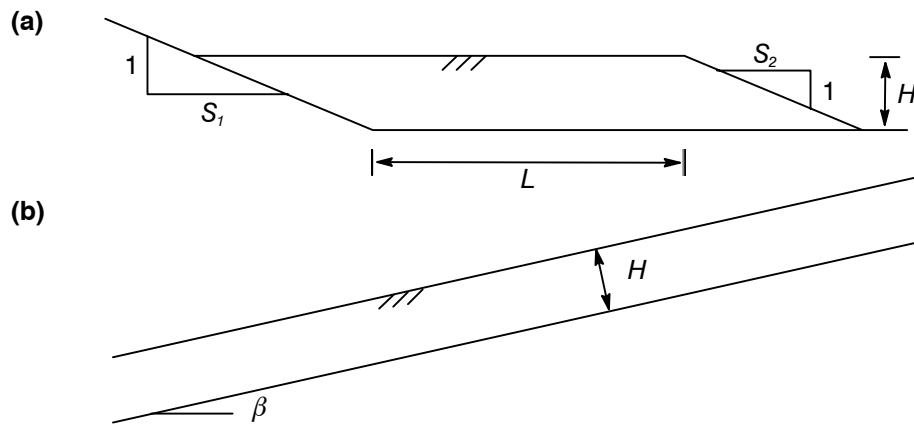
$$k_y = \frac{(FS_{static} - 1) \cos \theta_1 \sin \theta_1 S_1 H/2}{H(S_1 + S_2)/2 + L} \quad (2)$$

$$FS_{static} = \frac{\tan \phi (S_1 H/2 \cos^2 \theta_1 + L + S_2 H/2)}{\cos \theta_1 \sin \theta_1 S_1 H/2} \quad (3)$$

$$\theta_1 = \tan^{-1} (1/S_1) \quad (4)$$

where:  $\beta$  = slope angle of the cover measured from the horizontal;  $\gamma$  = total unit weight of the cover soil;  $c$  = soil cohesion;  $\phi$  = internal friction angle;  $FS_{static}$  = static factor of safety;  $\theta_1$  = back-slope geometry parameter;  $S_1$  = back-slope run to height ratio;  $S_2$  = front-slope run to height ratio; and  $L$  = length of the midsection of the landfill.

Use of the equivalent acceleration allows for the seismic response of the deformable potential sliding mass to be represented in the Newmark rigid sliding block procedure (Makdisi and Seed 1978). However, a potentially important limitation of this procedure is that the seismic response of the potential sliding mass is decoupled from the subsequent double integration of the computed equivalent acceleration-time history. A number of investigators have examined the limitations of this assumption (e.g. Lin and Whitman 1983; Chopra and Zhang 1991; Gazetas and Uddin 1994; Kramer and Smith 1997), and for the most part, have arrived at similar conclusions. For example, Lin and Whitman (1983) concluded that "the errors arising from the decoupled assumption are insignificant compared to other uncertainties involved in the use of the sliding block analogy."



**Figure 9. Yield acceleration coefficient for solid-waste landfills: (a) base sliding (after Shewbridge 1996); (b) cover sliding (infinite slope solution).**

Some investigators have noted that occasionally the decoupling assumption was not conservative. This was reexamined by the authors of the current paper. A decoupled analysis generally provides an estimate of the coupled sliding displacement within a factor of three (Bray and Rathje 1998). Conservative decoupled displacements are calculated for lower yield acceleration coefficient values (i.e.  $k_y/k_{max} < 0.6$ ) when the fundamental period of the sliding mass is less than twice the mean period of the input ground motion (Figure 10). For systems with larger values of  $k_y/k_{max}$  or large fundamental periods, a decoupled analysis may predict smaller displacements than a fully coupled analysis. However, in these cases, the displacements calculated from both analyses are generally small (i.e. less than a few centimeters), because of the relatively low  $k_{max}$  and high  $k_y/k_{max}$  values for these cases. As a seismic performance index, a decoupled analysis is judged to be reasonable for current design practice. Conversely, a rigid sliding block analysis (i.e. direct integration of the input acceleration-time history) can be significantly unconservative, and it should not be used (Figure 10).

Seismically induced permanent displacements,  $U$ , for the base sliding case for 19 landfill configurations sited on rock undergoing 33 input rock motions were calculated at  $k_y/k_{max}$  ratios of 0.2, 0.4, 0.6, and 0.8 (i.e. 309 values at each  $k_y/k_{max}$  ratio) with the conventional procedure discussed previously (Bray and Rathje 1998). As expected, there was considerable scatter both with respect to results from different input motions and results from different landfill configurations. For example, for a given input motion, significantly larger displacements are calculated for landfill configurations with stiffer response characteristics that more closely match the high frequency motions contained in most rock records. At a specified  $k_y/k_{max}$  ratio, the calculated displacement is roughly proportional to  $MHEA$ , indicating that those factors that have been shown to affect  $MHEA$ , also affect  $U$ .

Considerably less inter- and intra-earthquake scatter was produced by normalizing the calculated displacement,  $U$ , by the maximum seismic coefficient,  $k_{max}$  ( $= MHEA/g$ ) and the significant duration,  $D_{5.95}$ , of the input motion (Figure 11). Hence, an estimate

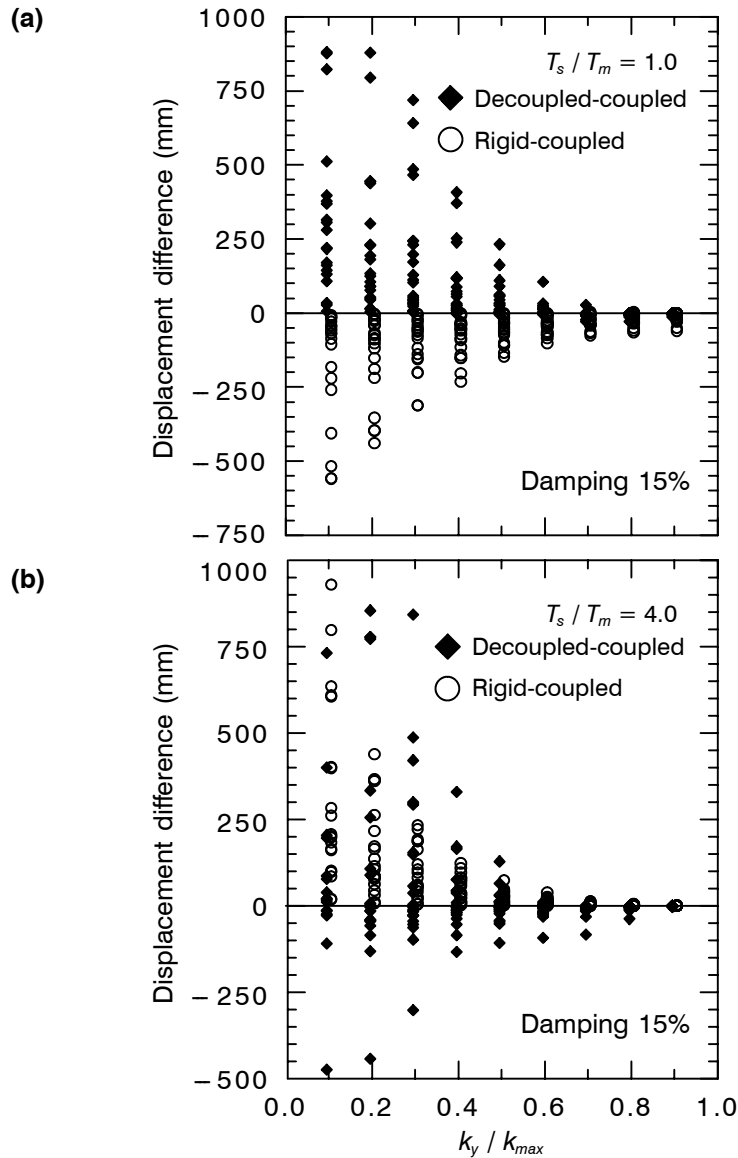


Figure 10. Seismic displacement differences (decoupled minus coupled and rigid minus coupled) using rigid and decoupled/fully coupled distributed mass sliding block analyses: (a)  $T_s / T_m = 1.0$ ; (b)  $T_s / T_m = 4.0$ .

of earthquake-induced displacement can be made given an estimate of the intensity,  $MHA$ , frequency content,  $T_m$ , and duration,  $D_{5.95}$ , of the design rock motion, and the dynamic response characteristics,  $T_s$ , and strength,  $k_y$ , of the landfill. The maximum



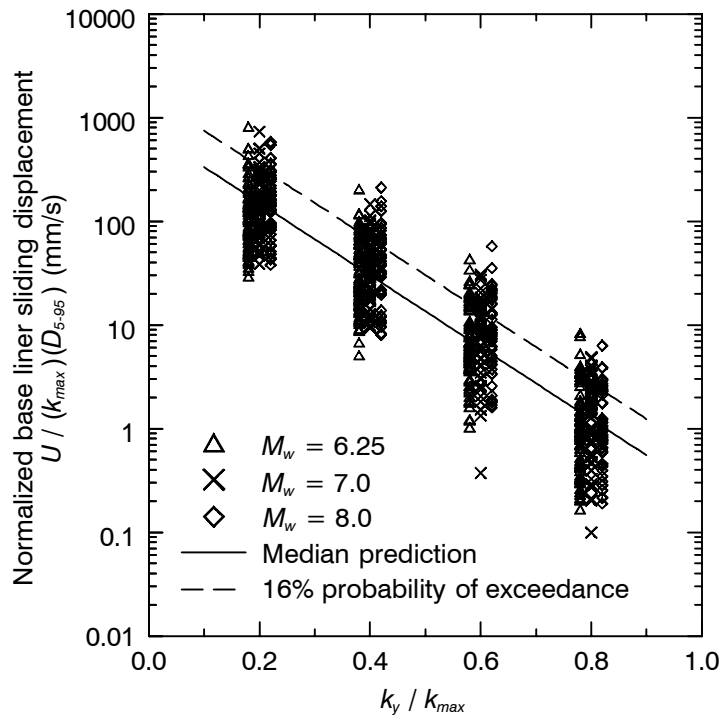


Figure 11. Normalized base liner sliding displacements (from Bray and Rathje 1998).

seismic coefficient,  $k_{max}$  (i.e.  $MHEA/g$ ) can be estimated using Figure 6, and the seismically induced displacement,  $U$ , can be estimated using Figure 11.

Calculated earthquake-induced cover displacements, grouped according to  $M_w$  values, are shown in Figure 12. The results exhibit considerable scatter, emphasizing the value of project-specific earthquake-induced deformation analysis of cover systems. In general, softer landfills have larger calculated cover displacements than stiffer landfills due to more long-period motion amplification in the softer waste fill. Cover displacements are significantly larger than those calculated for base sliding due to the higher seismic loading experienced at the cover of the landfill.

Seismically induced displacements were found to vary systematically with site conditions, with generally larger calculated displacements at deep, soft sites (Bray and Rathje 1998). However, the larger displacements calculated at soil sites at a specified  $k_y/k_{max}$  ratio are offset by the seismic loading results discussed previously which indicate that soil sites produce lower  $k_{max}$  values for identical rock motions and landfill configurations. As the seismic loading and seismic displacement calculations vary predictably with site conditions in opposite and nearly equal proportions, simplified analysis based on the rock site results presented in Figures 6, 11, and 12 can be used for all site conditions without introducing significant errors in the final displacement estimate.

Alternatively, a pseudo-static slope stability analysis may be performed with a seismic coefficient calibrated with the preceding seismically induced permanent displace-

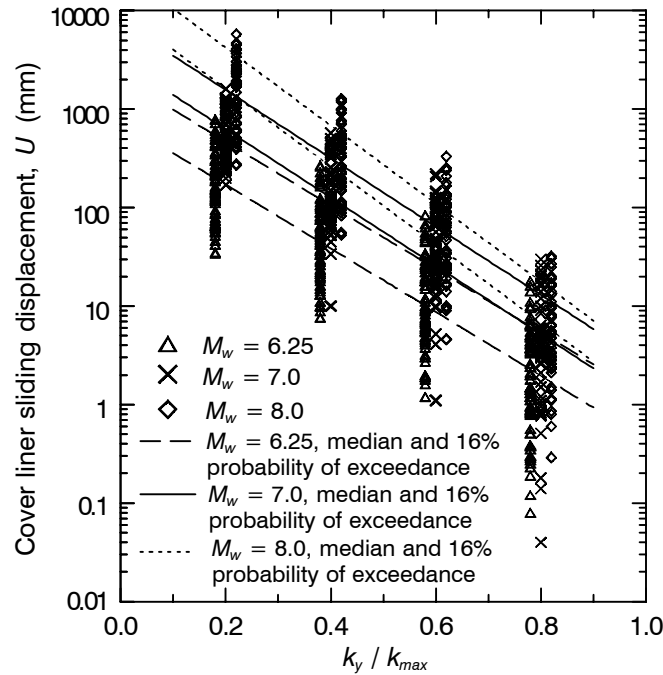


Figure 12. Cover liner sliding displacements.

ment results. Analytical results indicate that for a wide range of landfill heights, waste fill properties, and input rock motions, the calculated base sliding permanent displacements for the rock site case are less than approximately 150 mm (with about a 10% probability of exceedance) when the yield acceleration coefficient is 60% of  $k_{max}$  (Bray and Rathje 1998). Hence, 60% of  $k_{max}$  ( $= MHEA/g$ ) may be used as the seismic coefficient in pseudo-static analyses of base sliding in combination with conservative dynamic strength properties and a factor of safety of one. However, the engineer must decide whether 150 mm of permanent displacement along the landfill/liner interface is tolerable.

Geosynthetic and soil materials comprising the base liner and cover systems are susceptible to damage by seismically induced deformations that can produce tensile strains in the materials. Geosynthetic material performance can be evaluated in terms of its yield strain compared to induced tensile strains (e.g. Koerner 1998). In evaluating the induced tensile strain in a geosynthetic layer, the zone over which strains can accumulate may be small (Zornberg 1994). Hence, small deformations may damage or even rupture a geomembrane. The compacted clay liner's integrity can be assessed in terms of the potential for shear or tensile zones to develop within the layer (e.g. Singh 1992). Finally, transient stresses and deformations within the waste containment system may affect performance; however, validated analytical procedures to estimate these are not currently available.

## 2.7.2 Comparison of Analytical Results to Observed Performance

Analytical results presented in the current paper (e.g. Figures 6 and 11) were used to estimate the expected range of earthquake-induced permanent displacements for a number of California landfills that were shaken by the 1989 Loma Prieta and 1994 Northridge earthquakes (Bray and Rathje 1998). The calculations and observations are summarized in Table 1.

**Table 1. Back-analysis of seismic landfill performance (from Bray and Rathje 1998).**

Landfill	EQ	MHA (g)	$T_m$ (s)	$D_{5-95}$ (s)	$T_s$ (s)	$k_y$	$k_{max}$ ( $\mu / +1\sigma$ )	$U$ (mm)	Observed damage
Buena Vista	LP	0.40	0.6	13	0.64	0.26 <sup>1</sup>	0.17/0.23	None	No cracking <sup>1</sup>
Guadalupe	LP	0.45	0.6	13	0.64	0.20 <sup>1</sup>	0.24/0.32	3 to 40	Minor downslope movement <sup>1</sup>
Pacheco Pass	LP	0.30	0.6	14	0.76	0.30 <sup>1</sup>	0.16/0.21	None	No cracking <sup>1</sup>
Marina	LP	0.21	0.6	15	0.59	0.26 <sup>1</sup>	0.12/0.16	None	No cracking <sup>1</sup>
Zanker Road	LP	0.19	0.6	15	0.56	0.14 <sup>1</sup>	0.07/0.10	None	No cracking <sup>1</sup>
Lopez Canyon C-A	NR	0.42	0.5	11	0.64	0.27	0.18/0.25	None	No cracking <sup>2</sup>
Lopez Canyon C-B	NR	0.42	0.5	11	0.45	0.35	0.24/0.33	None	No cracking <sup>2</sup>
Chiquita Canyon C	NR	0.33	0.6	11	0.64	0.09	0.18/0.24	30 to 200	240 mm tear in HDPE <sup>2</sup>
Chiquita Canyon D	NR	0.33	0.6	11	0.64	0.10	0.18/0.24	20 to 150	300 mm tear in HDPE <sup>2</sup>
OII Section HH	NR	0.11	0.6	16	0.47	0.14	0.10/0.13	none	50 to 150 mm cover cracks <sup>2</sup>
OII Section HH <sup>3</sup>	--	--	--	--	0.81	0.08	0.13/0.16	20 to 250	50 to 150 mm cover cracks <sup>2</sup>
Sunshine Canyon	NR	0.46	0.5	11	0.77	0.31	0.17/0.23	none	20 to 300 mm cover cracks <sup>2</sup>
Sunshine Canyon <sup>3</sup>	--	--	--	--	1.3	0.25	0.30/0.37	2 to 50	20 to 300 mm cover cracks <sup>2</sup>

Notes: <sup>1</sup> Observations of damage and  $k_y$  values are from Buranek and Prasad (1991). <sup>2</sup> Observations of damage are from Augello et al. (1995). <sup>3</sup> Analyses performed for shallow sliding along the cover system using Figure 12. EQ = earthquake event; NR = Northridge; LP = Loma Prieta.  $\mu$  = median,  $\sigma$  = standard error.

The yield acceleration coefficient recommended by Buranek and Prasad (1991) was used for the Loma Prieta earthquake case records, and  $k_y$  was calculated with the 2-D limit equilibrium slope stability analysis program UTEXAS3 (Wright 1990) for the Northridge earthquake cases using the strength values recommended by Augello et al. (1995). The median and 16% probability of exceedance  $k_{max}$  values were estimated using Figure 6 based on the median estimates of  $T_s$ ,  $MHA_{Rock}$ , and  $T_m$  shown. The calculated displacements,  $U$ , were then estimated using the median and 16% probability of exceedance lines shown in Figure 11.

The calculated earthquake-induced displacements are consistent with the magnitude of permanent displacements observed at these landfills. Generally, no cracking was observed when the calculated displacement was zero, and some distress was observed for cases when the calculated displacement was nonzero. As the calculated earthquake-induced displacement should be viewed as merely an index of earthquake performance, the proposed procedure is judged to provide an index of expected seismic performance that correlates reasonably well with the actual seismic performance of these landfills.

### 3 SIMPLIFIED SEISMIC ANALYSIS PROCEDURE

#### 3.1 General

A two stage, simplified seismic analysis procedure is outlined in this section. This procedure is based on the analytical results discussed in Section 2 which have been validated against the observed performance of lined and unlined solid-waste landfill units shaken by the 1989 Loma Prieta and 1994 Northridge earthquakes. Although “simplified”, the procedure is comprehensive in that it requires that the most important factors be addressed during a seismic performance evaluation, namely: (a) characterization of the design bedrock motions in terms of intensity, frequency content, and duration; (b) estimation of the seismic loading at the base and cover of the landfill; (c) evaluation of performance in terms of seismically induced permanent deformations; and (d) application of appropriate engineering judgment. A straightforward, conservative screening analysis is incorporated as the first stage of the procedure, and situations that warrant more sophisticated analysis are identified. The screening analysis employs a reasonable level of conservatism by including the following: amplification factors in the range of 1.2 to 1.5 (see Figures 6 and 8 at  $T_s/T_m < 0.75$ ); a value of  $NRF = 1$  which is appropriate for the larger values in Figures 6 and 8; and a seismic coefficient calibrated using Figures 11 and 12 (i.e.  $k = 0.55k_{max}$ ) for calculated seismically induced displacements generally less than 150 and 300 mm for base and cover sliding, respectively (i.e. 10% probability of exceedance).

#### 3.2 Screening Analysis

Note that very deep, soft clay sites and sites susceptible to liquefaction (UBC Site Category  $S_F$ ) are not applicable to this screening analysis. Also, unstable geologic site conditions, such as native slope instability and surface faulting, should be assessed separately. The following is an outline of the screening analysis:

1. Estimate  $MHA_{Rock}$  from the applicable ground motion maps (e.g. Frankel et al. 1996 USGS maps for the continental USA) based on an appropriate probability level (generally 2% exceedance in 50 years for Subtitle D).
2. Use  $k = 0.75 (MHA_{Rock}/g)$  as the seismic coefficient for base and cover sliding.
3. Calculate  $k_y$  for the base and cover using conservative strengths (e.g. residual) with Equations 2 and 1, respectively.
4. If  $k_y \geq k$ , the calculated seismically induced displacements will generally be less than 150 and 300 mm for base and cover sliding, respectively. The engineer must decide if these commonly accepted displacement levels are tolerable.

### 3.3 Simplified Procedure

Unstable geologic conditions, such as liquefaction, soft clay instability, native slope instability, and surface faulting should be assessed first. This simplified procedure is not appropriate for landfills with potentially unstable foundations.

#### 3.3.1 Characterize Ground Motions

Estimate  $MHA$ ,  $T_m$ , and  $D_{5.95}$  for each design earthquake event.

- (a) Review the regional and site geology and seismicity, and identify potential earthquake sources.
- (b) Assign the earthquake magnitude and distance to each earthquake source. Select representative earthquakes: likely, a high-intensity, short-duration, near-field event (higher  $MHA$ , lower  $T_m$ , and lower  $D_{5.95}$ ), and a lower-intensity, long-duration, intermediate-field event (lower  $MHA$ , higher  $T_m$ , and higher  $D_{5.95}$ ).
- (c) Use rock relationships (Figure 2) to estimate  $MHA_{Rock}$ ,  $T_m$ , and  $D_{5.95}$  at the site. Check the design  $MHA$  values against the USGS maps for the 475 year and 2,375 year earthquake events (i.e. 10 and 2% exceedance in 50 years, respectively.)

#### 3.3.2 Develop Seismic Loading

Estimate  $MHEA$  of waste column for base sliding and  $MHA$  at top of landfill for cover stability assessment.

- (a) Estimate  $MHEA_{Base}$  of the waste column for base liner sliding using the plot of  $MHEA_{Base}/[(MHA_{Rock})(NRF)]$  versus  $T_s/T_m$  (Figure 6). Record the median and 16% probability of exceedance values. From Section 3.3.1,  $MHA_{Rock}$  and  $T_m$  have been estimated. Estimate  $NRF$  from Figure 6. Estimate  $T_s = 4H/V_s$ , where  $H$  = waste height, and  $V_s$  = weighted average initial shear wave velocity of waste. Estimates of  $V_s$  for solid-waste are available in Figure 3. Figure 6 may also be used to estimate  $MHEA$  at intermediate depths within the waste fill if  $T_s$  is calculated using the height and the average initial shear wave velocity of the potential sliding surface.
- (b) Estimate  $MHA_{Top}$  using the plot of  $MHA_{Top}/[(MHA_{Rock})(NRF)]$  versus  $T_s/T_m$  (Figure 8). Use the median and 16% probability of exceedance values. For localized cover sliding near the crest and along the slope of the landfill, use  $MHEA_{Cover} = 1.25$

$MHA_{Top}$  to account for 2-D effects. For seismic loading of the entire cover slope, use  $MHEA_{Cover} = 0.65 MHA_{Top}$  to account for incoherence.

### 3.3.3 Calculate Seismic Stability

Calculate Newmark seismic displacements (or calibrated pseudo-static FS).

(a) Seismically induced permanent deformation analysis:

1. Calculate the yield acceleration coefficient,  $k_y$ , for potential sliding masses (i.e. seismic coefficient that results in a pseudo-static  $FS = 1.0$ ). Estimate  $k_y$  at the cover and base for generalized landfill systems using Equation 1 and 2, respectively. Otherwise, use a limit equilibrium slope stability program which has a method that satisfies full equilibrium, such as Spencer, Morgenstern and Price, or Generalized Janbu. The unit weight and strength of the municipal solid-waste and geosynthetic interface strengths can be estimated using the summary data provided in Sections 2.4 and 2.5.
2. Base sliding: Estimate the displacements,  $U$ , at the base given the estimates of  $k_y/k_{max}$ ,  $k_{max}$ , and  $D_{5.95}$  (Figure 11). Note that  $k_{max} = MHEA_{Base}/g$  for base sliding. Use the median and 16% probability of exceedance lines.
3. Cover sliding: Estimate the displacements,  $U$ , at the cover given the estimate of  $k_y/k_{max}$  and  $M_w$  (Figure 12). Use  $k_{max} = MHEA_{Cover}/g$ , with the appropriate  $MHEA_{Cover}$  value for either localized cover sliding or sliding along the entire cover.
4. Other cases: Estimate range of displacements,  $U$ , from Figure 11, given the  $MHEA$  estimate from Figure 6 where  $H$  is equal to the depth of sliding.

(b) Alternative calibrated base and cover pseudo-static stability analyses:

Select the limiting displacement level with the corresponding reduction factor,  $R$ , for base and cover sliding, with  $R = k_y/k_{max}$  at the selected displacement. Use  $R_C = 0.6, 0.8, \text{ or } 1.0$  for the limiting cover displacements of  $< 300 \text{ mm}$ ,  $< 75 \text{ mm}$ , or  $< 20 \text{ mm}$ , respectively. Use  $R_B = 0.6, 0.8, \text{ or } 1.0$  for limiting base displacements of  $< 150 \text{ mm}$ ,  $< 50 \text{ mm}$ , or  $< 10 \text{ mm}$ , respectively. Apply  $(R_C)(MHEA_{Cover})/g$  as the seismic coefficient,  $k$ , to a shallow cover failure mass and calculate the pseudo-static  $FS$ . For base sliding, use  $k = (R_B)(MHEA_{Base})/g$ . If  $FS > 1$ , displacement is likely to be less than the corresponding limiting displacement value (i.e. there is a 10% probability of exceedance).

### 3.3.4 Evaluate Seismic Stability

Given the seismic displacement estimates (i.e. small ( $< 25$  to  $50 \text{ mm}$ ), moderate ( $< 150$  to  $300 \text{ mm}$ ), or large ( $> 0.3$  to  $1 \text{ m}$ ) displacements), evaluate the ability of sensitive landfill waste containment components to accommodate this level of deformation. Penetrations (e.g. vents and leachate sump risers) and changes in geometry (e.g. side liner to base liner transition) are potentially vulnerable. Cover systems are more easily repaired than base systems, and hence, they have a less stringent design level. The consequences of failure and conservatism of the hazard assessment and stability analysis are important design considerations. Defensive measures that “shield” critical components

from damage, such as a sacrificial low-friction slip surface to concentrate deformations away from critical components, are useful. Anderson and Kavazanjian (1995) and Bray et al. (1993) give guidance with regard to evaluating seismic stability, but considerable engineering judgment is still required.

This simplified approach is most appropriate when the waste fill dynamic response characteristics indicate that it will not be close to a resonance condition with the input motions (i.e.  $T_s > T_m$ ). When close to resonance, one would need to incorporate significant conservatism with the simplified approach, and this may not be economical. A site-specific dynamic analysis could be used to calculate the base and cover equivalent acceleration-time histories, and these time histories could be double integrated to calculate displacements,  $U$ , at selected values of  $k_y$  to construct a plot of  $U$  versus  $k_y$ . Such a plot is useful in evaluating a landfill's potential seismic performance.

### 3.3.5 Example

*Base sliding.* Analyze the base sliding stability for a 35 m high landfill founded on rock for a  $M_w = 7$  strike-slip earthquake at a distance of 12 km. Slope stability analyses indicate that the yield acceleration coefficient for sliding along the base liner is 0.15.

1. Estimate the median  $MHA$ ,  $T_m$ , and  $D_{5-95}$  values of the rock ground motion:

$$MHA_{Rock} = 0.33g \quad (\text{Figure 2a})$$

$$T_m = 0.52 \text{ s} \quad (\text{Figure 2b})$$

$$D_{5-95} = 14 \text{ s} \quad (\text{Figure 2c})$$

2. Calculate the seismic loading,  $MHEA_{Base}$ . An average  $V_s$  profile might be approximately 120 m/s at the waste surface, approximately 275 m/s at a depth of 30 m, and approximately 375 m/s at a depth of 60 m. Hence, a reasonable weighted average of  $V_s$  for a 35 m high waste fill would be approximately 200 m/s, with  $T_s = 4H/V_s = 0.7$  s, and  $T_s/T_m = 1.3$ :

$$MHEA_{Base}/[(MHA_{Rock})(NRF)] = 0.43 \text{ to } 0.58 \text{ (50\%/16\% exceedance)} \quad (\text{Figure 6})$$

$$NRF = 1.05 \text{ for } MHA_{Rock} = 0.33g \quad (\text{Figure 6})$$

$$MHEA_{Base} = (0.33g)(1.05)(0.43 \text{ to } 0.58) = 0.15g \text{ to } 0.20g$$

3. Estimate the seismically induced permanent displacements:

$$k_{max} = MHEA/g = 0.15 \text{ to } 0.20, \text{ and } k_y = 0.15 \text{ (given), so } k_y/k_{max} = 0.75 \text{ to } 1.0$$

$$U/k_{max} D_{5-95} = 0 \text{ to } 4 \text{ mm/s} \quad (\text{from Figure 11, using 50 and 16\% exceedance lines})$$

$$U = (0 \text{ to } 4 \text{ mm/s})(0.15)(14 \text{ s}) = 0 \text{ to } 8 \text{ mm (i.e. small displacements)}$$

*Cover sliding.* Analyze the landfill for localized cover sliding near the crest for the design earthquake. Slope stability analyses indicate that the yield acceleration coefficient for localized cover sliding is 0.16.

1. Calculate the seismic loading,  $MHEA_{Cover}$  :

$$MHA_{Rock} = 0.33g, NRF = 1.05, \text{ and } T_s/T_m = 1.3 \text{ from previous analysis}$$

$$MHA_{Top}/[(MHA_{Rock})(NRF)] = 0.9 \text{ to } 1.1 \text{ (50\% / 60\%)} \text{ (Figure 8)}$$

$$MHA_{Top} = (0.33g)(1.05)(0.9 \text{ to } 1.1) = 0.31g \text{ to } 0.38g$$

$$MHEA_{Cover} = (1.25)(0.31 \text{ to } 0.38g) = 0.39g \text{ to } 0.48g$$

2. Estimate the seismically induced permanent displacements:

$$k_{max} = MHEA_{Cover}/g = 0.39 \text{ to } 0.48, \text{ and } k_y = 0.16 \text{ (given), so } k_y/k_{max} = 0.33 \text{ to } 0.41$$

$$U = 100 \text{ to } 500 \text{ mm (from Figure 12, using 50 and 16\% exceedance for } M_w = 7)$$

#### 4 CONCLUSIONS

Landfill performance during recent earthquakes has been generally satisfactory. However, one geosynthetic-lined landfill experienced significant damage, with two tears observed in the HDPE geomembrane liner, and two unlined landfills were damaged due to liquefaction-induced lateral spreading. Several landfills have experienced moderate damage, evidenced by cracking in the interim soil cover at waste/natural ground interfaces, cracking and limited downslope movement in cover soils, breaking of gas extraction header lines, and a loss of power to the gas collection system. Back-analyses of landfill performance during the Northridge earthquake in California have provided exceptional opportunities to estimate the dynamic properties of solid-waste fill and geosynthetic interfaces. However, due to the importance of evaluating these properties, additional work is warranted.

Results from equivalent-linear and fully nonlinear seismic site response analyses indicate that the dynamic response of a MSWLF can vary significantly due to reasonable variations of dynamic waste properties, fill heights, site conditions, and input rock motions. However, for the base sliding case, the maximum seismic loading represented by  $MHEA$  follows a well-defined trend.  $MHEA$  depends largely on the initial fundamental period of the waste fill,  $T_s = 4H/V_s$ , and the mean period,  $T_m$ , and  $MHA$  of the input rock motion adjusted by the nonlinear response factor,  $NRF$ . Conversely, analytical results indicate that the  $MHA$  calculated at the top of a landfill can vary significantly for relatively modest variations in landfill configurations and input motions. Procedures that first require an estimate of the  $MHA$  at the top of a landfill to estimate the seismic loading at the base of the landfill are limited by the relatively large uncertainty in estimating  $MHA$  at the top of a landfill.

A rigid sliding block analysis can be significantly unconservative and should not be used. However, as a seismic performance index, a reasonable (and generally conserva-



tive) estimate of the seismically induced permanent displacement can be obtained using the decoupled approximation delineated in Makdisi and Seed (1978). The magnitude of earthquake-induced permanent displacements is intimately linked to the ratio of  $k_y/k_{max}$ , but it is also influenced significantly by the landfill's dynamic response characteristics,  $k_{max}$ , and duration of the ground motion,  $D_{5.95}$ .

The analytical results are consistent with observations from available case records. A simplified seismic analysis procedure that is based on these validated analytical results is presented. Although "simplified", the procedure is comprehensive in that it requires: (a) characterization of the design bedrock motions in terms of intensity, frequency content, and duration; (b) estimation of the seismic loading at the base and cover of the landfill; (c) evaluation of performance in terms of seismically induced displacements; and (d) the application of appropriate engineering judgment. Its use is illustrated in the seismic evaluation of a typical landfill. Seismically induced permanent displacement estimates for the cover and base liner form the basis of evaluating the likely seismic performance of the geosynthetics used in the waste containment systems.

#### ACKNOWLEDGEMENTS

Financial support was provided by the David and Lucile Packard Foundation and National Science Foundation under Grants BCS-9157083 and CMS-9416261. Dr. Seed of U.C. Berkeley, Dr. Abrahamson of PG&E, Drs. Kavazajian and Matasovic of GeoSyn-tec Consultants, and the late Dr. Leonards of Purdue University assisted the authors at various stages of their research. The authors would like to thank R. Anderson, J. Clin-kenbeard, and D. Petker of the California Integrated Waste Management Board, R. Nel-son of the California Regional Water Quality Control Board, P. Mundy of CDM Federal Programs, R. Herzig of the U.S. EPA, and C. Dowdell and J. Hower of the Los Angeles County Sanitation District, all of whom have provided field reconnaissance data.

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## NOTATIONS

Basic SI units are given in parentheses.

$c$	=	soil cohesion (Pa)
$D_{5-95}$	=	significant duration of acceleration-time history (s)
$FS$	=	factor of safety (dimensionless)
$FS_{static}$	=	static factor of safety (dimensionless)
$G$	=	shear modulus (Pa)
$G_{max}$	=	maximum shear modulus (Pa)
$g$	=	acceleration due to gravity ( $m/s^2$ )
$H$	=	height of landfill waste or cover thickness (m)
$HEA$	=	horizontal equivalent acceleration ( $m/s^2$ )

$k$	= seismic acceleration coefficient (dimensionless)
$k_{max}$	= maximum seismic acceleration coefficient = $MHEA/g$ (dimensionless)
$k_y$	= yield acceleration coefficient (dimensionless)
$L$	= length of midsection of landfill (m)
$L_s$	= length of cover slope mass (m)
$MHA$	= maximum horizontal ground acceleration ( $m/s^2$ )
$MHA_{Crest}$	= maximum horizontal ground acceleration at crest of landfill ( $m/s^2$ )
$MHA_{Rock}$	= maximum horizontal ground acceleration of rock ( $m/s^2$ )
$MHA_{Site}$	= maximum horizontal ground acceleration of site ( $m/s^2$ )
$MHA_{Top}$	= maximum horizontal ground acceleration at top of landfill ( $m/s^2$ )
$MHEA$	= maximum horizontal equivalent acceleration ( $m/s^2$ )
$MHEA_{Base}$	= maximum horizontal equivalent acceleration at base of landfill ( $m/s^2$ )
$MHEA_{Cover}$	= maximum horizontal equivalent acceleration of landfill cover sliding mass ( $m/s^2$ )
$M_w$	= moment magnitude of earthquake event (dimensionless)
$NRF$	= nonlinear response factor (dimensionless)
$R$	= seismic displacement reduction factor = $k_y / k_{max}$ at selected displacement (dimensionless)
$R_B$	= seismic displacement reduction factor = $k_y / k_{max}$ at selected base displacements (dimensionless)
$R_C$	= seismic displacement reduction factor = $k_y / k_{max}$ at selected cover displacements (dimensionless)
$S_1$	= back-slope run to height ratio (dimensionless)
$S_2$	= front-slope run to height ratio (dimensionless)
$T_m$	= mean period of acceleration-time history (s)
$T_{m-EQ}$	= mean period of earthquake (s)
$T_p$	= predominant period of ground motion (s)
$T_{p-EQ}$	= predominant period of earthquake (s)
$T_s$	= fundamental period of column of waste fill (s)
$T_{s-FILL}$	= fundamental period of fill material (s)
$T_{s-WASTE}$	= fundamental period of waste (s)
$t$	= time (s)
$U$	= seismically induced permanent displacement (mm)
$V_s$	= average shear wave velocity (m/s)
$\beta$	= slope angle of cover from horizontal ( $^\circ$ )
$\varepsilon$	= strain (dimensionless)
$\phi$	= internal friction angle ( $^\circ$ )
$\gamma$	= total unit weight ( $N/m^3$ )

$\theta_l$	=	back-slope geometry parameter (Figure 9) ( $^{\circ}$ )
$\tau_h$	=	horizontal shear stress (Pa)
$\sigma_n$	=	total normal stress (Pa)
$\sigma_v$	=	total vertical stress (Pa)

### ABBREVIATIONS

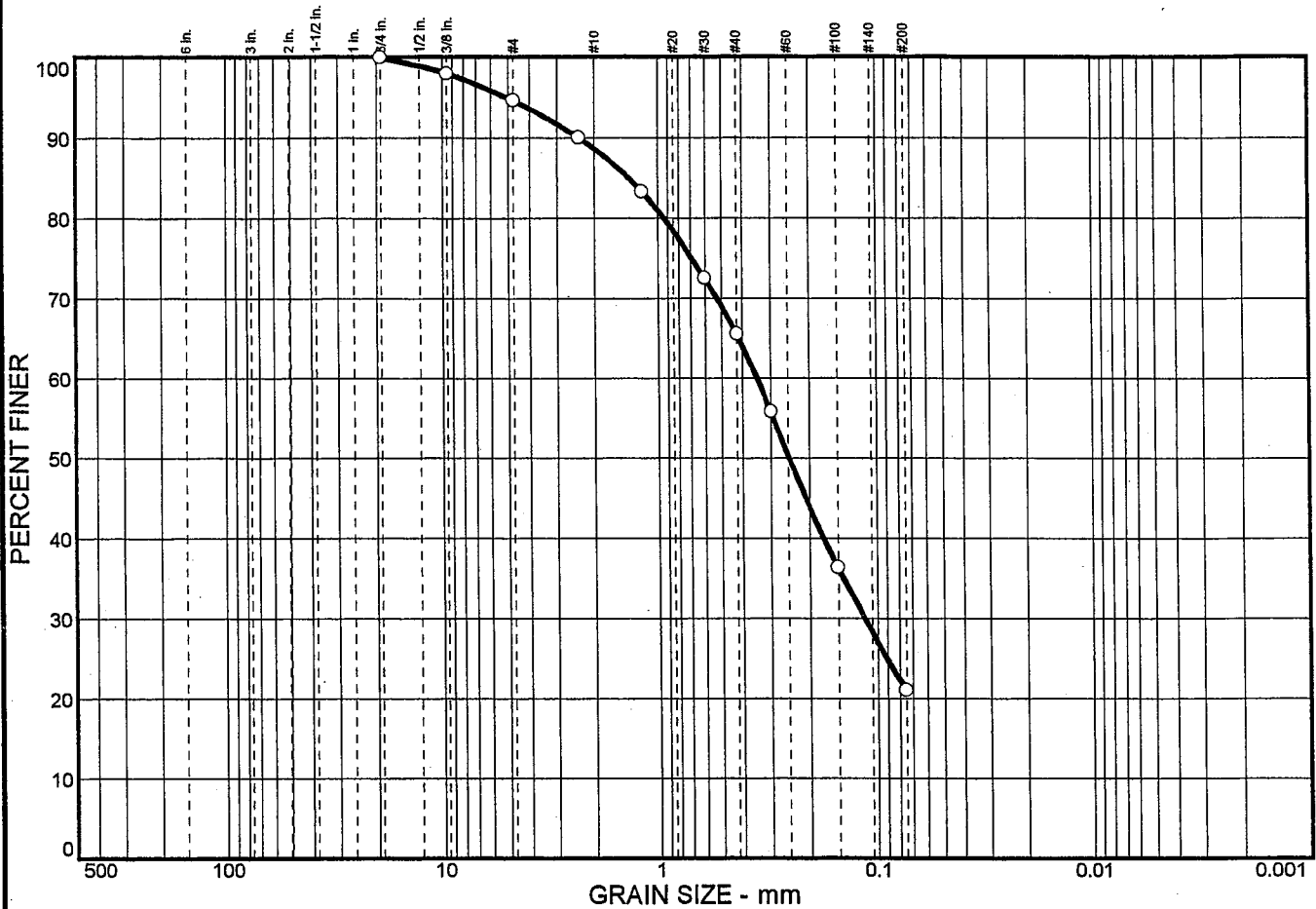
BSSC:	Building Seismic Safety Council
HDPE:	high density polyethylene
MSWLF:	municipal solid-waste landfill
NEHRP:	National Earthquake Hazards Reduction Program
OII:	Operating Industries, Inc.
PP:	polypropylene
PVC:	polyvinyl chloride
SASW:	spectral analysis of surface waves
UBC:	Uniform Building Code
USGS:	United States Geological Survey
1-D:	one-dimensional
2-D:	two-dimensional



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**Appendix E**  
**Laboratory Test Results for On-Site Borrow Soils**

# Particle Size Distribution Report



<b>% COBBLES</b>	<b>% GRAVEL</b>	<b>% SAND</b>	<b>% SILT</b>	<b>% CLAY</b>
0.0	5.4	73.5	21.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.375 in.	98.0		
#4	94.6		
#8	90.0		
#16	83.3		
#30	72.5		
#40	65.5		
#50	55.8		
#100	36.4		
#200	21.1		

**Soil Description**  
Silty sand

**Atterberg Limits**  
 PL= NP      LL=      PI= NP

**Coefficients**  
 D<sub>85</sub>= 1.36      D<sub>60</sub>= 0.346      D<sub>50</sub>= 0.246  
 D<sub>30</sub>= 0.114      D<sub>15</sub>=      D<sub>10</sub>=  
 C<sub>u</sub>=

**Classification**  
 USCS= SM      AASHTO=

**Remarks**  
 Sample is a blend of PV-1 and PV-2

\* (no specification provided)

**Sample No.:** 17-04E  
**Location:**

**Source of Sample:** Sand

**Date:** 3-1-04  
**Elev./Depth:**

## SRK Consulting

**Client:** B. Burnley  
**Project:** Pumice Valley Landfill

**Project No:** P.O. 31179

**Plate**

# COMPACTION TEST REPORT

Curve No.: 1

Project No.: P.O. 31179  
Project: Pumice Valley Landfill

Date: 3-1-04

Location:  
Elev./Depth:  
Remarks:

## MATERIAL DESCRIPTION

Description: Silty sand

Classifications -

USCS: SM

AASHTO:

Nat. Moist. =

Sp.G. =

Liquid Limit = NP

Plasticity Index = NP

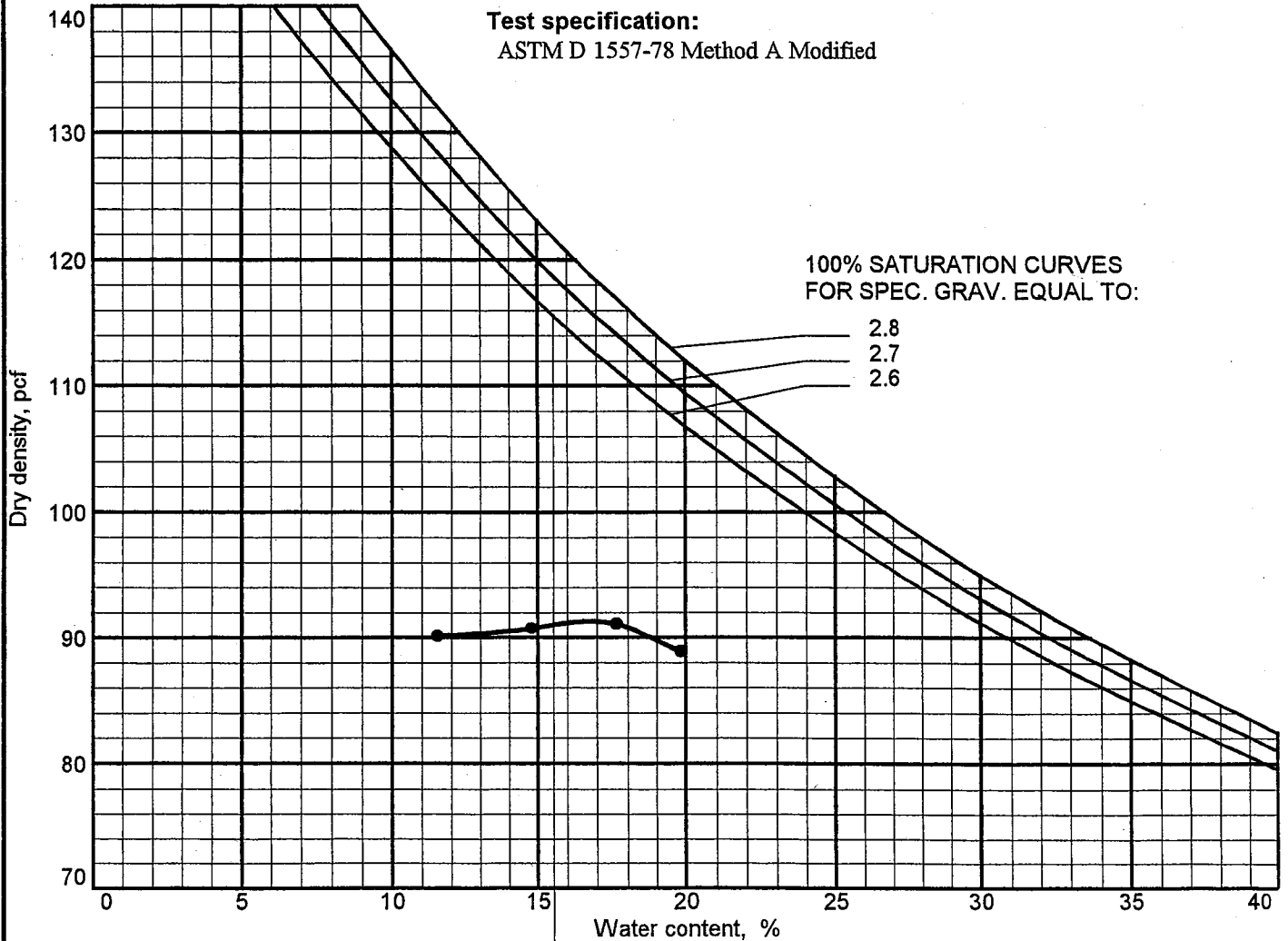
% > No.4 = 0.0 %

% < No.200 = 21.1 %

## TEST RESULTS

Maximum dry density = 91.3 pcf

Optimum moisture = 16.8 %



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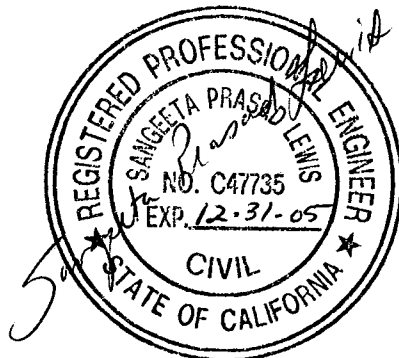
**Appendix F**  
**Construction Quality Assurance Manual**

*Prepared for:*

**County of Mono  
Department of Public Works**

P.O. Box 457  
Bridgeport, California 93517

**CONSTRUCTION QUALITY  
ASSURANCE (CQA) MANUAL  
FINAL COVER  
PUMICE VALLEY LANDFILL**



*Prepared by:*

**Lewis Engineering**

98 Ramona Ave.  
Piedmont, California 94611  
(510) 601-7223

August 2004

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**APPENDIX C** GEOSYNTHETICS DOCUMENTATION FORMS...(Provided by CQA Organization)

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# 1 INTRODUCTION

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## 1.1 Purpose

This Construction Quality Assurance (CQA) Manual has been prepared for the County of Mono, Department of Public Works (Mono County) by a Registered Civil Engineer in accordance with Title 27, California Code of Regulations (CCR), Division 2, Sections 20323 and 20324. This manual describes CQA procedures for construction of the final cover at the Pumice Valley Landfill. The CQA Manual outlines the specific field and laboratory testing and monitoring procedures required to demonstrate that the final cover is constructed in accordance with Title 27 requirements. Ultimately, this manual may be updated, if necessary, to reflect any change in material quantities following Final Closure Plan preparation. Significant changes to the closure and postclosure maintenance plans, after approval of the final plan, shall upon concurrence with the EA, be approved by the CIWMB, and the RWQCB as required by 27CCR 21890.”

As required by 27CCR 20324(c)(1)(B), the CQA Plan should include “...a detailed description of the level of experience and training for the contractor, the work crew, and CQA inspectors for every major phase of construction in order to ensure that the installation methods and procedures required in the containment system design will be properly implemented.”

Following the completion of the work, the CQA Consultant will prepare a Final CQA Report. The purpose of the Final CQA Report is to provide a detailed description of the level of experience and training for the contractor, the work crew, and CQA inspectors for every major phase of construction in order to ensure that the installation methods and procedures required in the containment system design will be properly implemented.

## 1.2 Project Description

The Pumice Valley Landfill is a Class III municipal solid waste landfill as defined by 27 CCR Section 20200, and is permitted under existing Solid Waste Facility Permit No. 26-AA-003, issued by the Mono County Health Department in 1978, and by Waste Discharge Requirements issued in 2001 by the Lahontan Regional Water Quality Control Board. The facility is a combined landfill and transfer station accepting non-hazardous solid waste and construction and demolition waste from a service area that includes the communities of Lee Vining, June Lake, Mono City, and surrounding unincorporated areas. The landfill is located at 200 Dross Road, approximately 1.8 miles east of the junction of State Highway 120(E) and U.S. Highway 395, south of the community of Lee Vining in central Mono County. According to the Public Land Survey System, the 40-acre site is situated within the NW<sup>1</sup>/<sub>4</sub>, NW<sup>1</sup>/<sub>4</sub>, Section 36, Township 1 North, Range 26 East, Mount Diablo Baseline and Meridian (MDB&M).

The Pumice Valley Landfill has been in operation as a municipal solid waste disposal site since 1972. Disposal operations occurred via trench and area-fill disposal methods until April 2001, at which time a temporary transfer station was installed to transfer residential and commercial wastes to Mono County’s regional Benton Crossing Landfill. A permanent transfer station was constructed in 2003. Although the site is permitted to accept any Class III non-hazardous municipal solid waste, on-site disposal is currently limited to inert debris and construction and demolition waste via above-grade area-fill disposal methods. Following diversion efforts, all residual household and commercial

waste received at the transfer station is consolidated and hauled to the County's Benton Crossing Landfill for disposal.

In 1973, Mono County entered into a lease agreement for the landfill property with the City of Los Angeles Department of Water and Power (LADWP). The lease was renewed in 1975 for a five-year term and has been renewed every five years since that time. Day-to-day activities of the transfer station are conducted by a contract operator under long-term agreement with the County. Landfill activities at the site are performed by County personnel.

The Pumice Valley Landfill is unlined and exterior surfaces are finished with an approximately one-foot thick intermediate cover layer. The intermediate cover will also serve as the bottom foot of the regulatory required two-foot foundation layer for the final cover. Final cover construction will consist of placement of an additional one-foot thick soil foundation layer overlain by a geosynthetic clay liner (GCL), and a growth media/erosion layer. The growth media/erosion layer consists of a 12-inch thick layer of soil and 3 to 6 inches of wood chips. Site soils consist primarily of Aeolian, fluvial, and lacustrine dense fine sands and silts containing ash pumice and interbedded with alluvial coarse sand and gravels.

The top deck of the final landfill surface will be graded at a minimum of three percent from the center out to the perimeter, where it will catch 3H:1V (horizontal to vertical) sideslopes. Drawing 3 of the *Preliminary Closure and Postclosure Maintenance Plan* illustrates the proposed final configuration of the Pumice Valley Landfill following closure construction, including final surface elevations for all disposal areas and existing and proposed soil borrow areas. The same drawing illustrates the general layout of the storm water drainage control system, together with all cut-slope, fill-slope, and channel grades and configurations.

The landfill design incorporates a sitewide drainage control system designed to satisfy the performance standards defined in 27 CCR Section 20365 and accommodate the predicted storm water flows generated by a 100-year, 24-hour precipitation event without significant site erosion or a washout of waste (see Drawing 3). The design of the drainage control system is detailed in the *Preliminary Closure and Postclosure Maintenance Plan* for the facility.

### 1.3 Reference Documents

The following reference documents provide background information and support this CQA manual:

- *Preliminary Closure and Postclosure Maintenance Plan for the Pumice Valley Landfill*, County of Mono, Department of Public Works, 2004.
- *American Society for Testing and Materials (ASTM) Annual Book of ASTM Standards. Section 4 Construction, Volume 04.02 Concrete and Aggregates.*
- *American Society for Testing and Materials (ASTM) Annual Book of ASTM Standards. Section 4 Construction, Volume 04.08 Soil and Rock; Dimension Stone; GEOSYNTHETICS.*
- *American Society for Testing and Materials (ASTM) Annual Book of ASTM Standards. Section 8 Plastics, Volumes 08.01 Plastics (I), 08.02 Plastics (II), and 08.03 Plastics (III).*
- *American Association of State Highway and Transportation Officials (AASHTO), Specifications and Volume II Tests.*



## 2 GENERAL REQUIREMENTS

---

### 2.1 Meetings

In order to facilitate construction, and to clearly define construction goals and activities, close coordination between the Owner, Design Engineer, CQA Consultant, and Contractor is essential. To meet this objective, pre-construction and progress meetings will be held.

#### 2.1.1 Pre-Construction Meeting

Following bid award, a pre-construction meeting will be held at the site. The purpose of this meeting, which will be attended by the Owner, Contractor, Design Engineer, CQA Consultant, and others designated by the Owner, will be to:

- Review the construction drawings, specifications, CQA Manual, work area security, health and safety procedures, and related issues.
- Provide all parties with relevant project documents.
- Review responsibilities and qualifications of each party.
- Define lines of communication and authority.
- Establish reporting and documenting procedures.
- Review procedures for handling submittals.
- Review testing equipment and procedures.
- Review procedures for field directives and change orders.
- Establish testing protocols and procedures for correcting and documenting construction or non-conformance.
- Establish weekly meeting schedule.
- Conduct a site inspection to discuss work areas, stockpile areas, lay down areas, access roads, haul roads, and related items.
- Review the project schedule and critical path items.
- Contractor's work plan.

The meeting will be documented by the Construction Manager. Copies of the minutes and relevant documents will be prepared and provided to all parties.

#### 2.1.2 Daily Progress Meeting

Informal progress meetings will be held each morning before the start of work. At a minimum, this meeting will be attended by the CQA Consultant and Contractor, and will address the following:

- Discuss problems and resolutions.
- Review test data.
- Discuss the Contractor's personnel and equipment assignments for the day.

- Review the previous day's activities and accomplishments.
- Resolve any outstanding problems or disputes.

### **2.1.3 Weekly Meeting**

Weekly scheduled meetings will be held. The Owner, Construction Manager, CQA Consultant, and Contractor will be present. The meetings will be held to discuss progress, problems, construction schedule, changes, test data, safety, environmental issues, and any other issues necessary. The Construction Manager will prepare the agenda for each meeting and prepare meeting minutes for distribution to all parties.

### **2.1.4 Other Meetings**

As required, special meetings will be held to discuss problems or non-conformance. This meeting will be attended by parties as directed by the Owner. If the problem requires a design modification and subsequent change order, the Design Engineer should also be present. The meeting will be documented as directed by the Construction Manager.

## **2.2 Responsibilities of Parties**

### **2.2.1 Responsibilities of the Construction Manager**

The Construction Manager is responsible for oversight of the Contractor. The Construction Manager will also monitor the progress of construction in relation to the Contractor's submitted schedule and will review the Contractor's applications for payment. Change Orders will be processed by the Construction Manager.

### **2.2.2 Responsibilities of the Contractor**

The Contractor is responsible for constructing the project in conformance with the Construction Drawings, Specifications, and this CQA Manual. The Contractor must allow and assist the CQA Consultant in performing the required monitoring. The Contractor will provide surveys and all necessary equipment required to complete the work in accordance with the Specifications. The Contractor must provide as-built drawings of geosynthetic panel layouts.

### **2.2.3 Responsibilities of the CQA Manager**

The CQA Manager monitors implementation of the CQA program. He shall have formal academic training in engineering, engineering geology, or a closely-related discipline and will be a registered civil engineer or certified engineering geologist in the State of California.

CQA procedures and reports must be reviewed by the CQA Manager for compliance with the project CQA Manual. The CQA Manager acts as an auditor to verify and document the proper and complete implementation of the CQA program. The CQA Manager has authority to identify deficiencies and implement corrective action to the CQA program. The CQA Manager collects, distributes, and addresses disposition of Contractor submittals approved by the Design Engineers. The CQA Manager coordinates testing with independent testing laboratories and maintains record drawings. The CQA Manager reports directly to the Construction Manager. The CQA Manager will be responsible for preparation of the Final CQA Report.

## **2.2.4 Responsibilities of the CQA Inspectors**

CQA inspection personnel will have formal training and practical experience in inspecting and testing construction work, including conducting and recording inspection activities, preparing daily reports, and performing field testing. In addition, knowledge of codes and regulations involving material handling, observation of testing procedure, equipment, and reporting procedures will be required.

CQA inspection personnel will perform various tests and observations during construction such as:

- Ensuring that all testing equipment is properly calibrated on a regular basis and that the calibration is documented.
- Accurately recording all test data and organizing them in a manner that allows easy reference.
- Evaluating the Contractor's construction quality control plan to ensure that it meets or exceeds the CQA Manual requirements.
- Reporting observations and test results as the work progresses.

The CQA inspection personnel will work under the supervision and guidance of the CQA Manager. Inspection personnel will perform onsite inspections of the construction and determine whether the work meets the requirements of the Construction Drawings and Specifications. Field tests and visual observations will be used to evaluate construction practices. If CQA inspection personnel observe poor construction practices, the CQA Manager will be notified immediately. CQA inspection personnel will be responsible for verifying that all testing is conducted in accordance with American Society for Testing Materials (ASTM) standards or other specified test methods and that the proper test equipment is used. The results of all inspections, including work that is unacceptable, will be reported to the CQA Manager.

## **2.2.5 Responsibilities of the Design Engineer**

The Design Engineer is responsible for site engineering services related to the design. Those services include reviewing Contractor submittals, resolving technical issues related to construction, providing interpretation of the Construction Drawings and Specifications and approving substantial design modifications and technical revisions.

## **2.3 Control of Documents, Records, and Forms**

### **2.3.1 Project Control of Contract Documents**

Contract documents, including Specifications, Construction Drawings, and change orders, are controlled by the Construction Manager. The Construction Manager maintains one or more copies of the most current set of contract documents for use by the CQA Consultant. Upon issuance of revisions, it is the responsibility of the Construction Manager to notify the Contractor of the revisions and provide signed and dated revised contract documents. The Construction Manager also provides the latest revised set of contract documents to the CQA Consultant.

### **2.3.2 Project Control of As-Built Information**

The CQA Manager controls as-built information generated by the Owner, Contractor and CQA Consultant. During the progress of the work, the CQA Manager obtains as-built information provided from the CQA Inspectors, Contractor, surveyors, or others. The as-built information shall be incorporated in the Final CQA Report.

### **2.3.3 Project Control of Forms**

Daily report forms, test report forms, and other project forms are signed and dated by the preparer and controlled by the CQA Manager, who maintains a master of each form for copies. Upon issuance of a new form, the CQA Manager must recall and remove all superseded copies along with the master, notify the CQA Inspectors, and provide new copies for their use.

### **2.3.4 Processing Daily Reports**

The CQA Inspectors write a daily record of work progress. The daily reports are reviewed by the CQA Manager for legibility, clarity, traceability, and completeness. The review must be evidenced by signature and date of review. A weekly summary construction report will be prepared by the CQA Consultant and submitted to the Construction Manager.

### **2.3.5 Processing Test Reports**

A test report must be completed by the CQA Inspectors whenever testing is performed. Each test report must be signed and dated by the CQA Inspector. The test reports must be reviewed by the CQA Manager. The review includes a check for mathematical accuracy, conformance to test requirements, conformance to specifications, and for clarity, legibility, traceability, and completeness. The review must be evidenced by a signature of the reviewer and the date of review. Test reports (or summaries) from independent testing laboratories will also be transmitted to the CQA Manager for review.

### **2.3.6 Processing Project Records**

Project records are completed as needed. Use of the project records is limited to the scope for which they are intended. The record must be completed by filling in all of the blanks provided on the form, followed by the signature of the individual completing the form and date of completion. All project records must be maintained at the site.

## **2.4 Documentation and Control of Non-Conformance**

### **2.4.1 Observation of Non-Conformance**

Whenever a non-conformance is discovered or observed in the construction process, product, job related materials, documentation, or elsewhere, the CQA Manager and CQA Inspectors should first notify the foreman or superintendent supervising the work in question. The CQA Manager should then notify the Construction Manager.

### **2.4.2 Determining Extent of Non-Conformance**

Whenever a non-conformance is discovered or observed in the construction process, product, job-related materials, documentation, or elsewhere, the CQA Consultant will determine the extent of the non-conformance. The extent of the deficiency may be determined by additional sampling, testing, observations, review of records, or any other means deemed appropriate.

### **2.4.3 Documenting Non-Conformance**

All non-conformance must be documented in writing on the daily records, logs, and elsewhere, as appropriate. The documentation must occur immediately upon determining the extent of the non-conformance. For those non-conformance that are considered serious or complex in nature, or which require an engineering evaluation, a Non-Conformance Report will be prepared and issued to the Construction Manager and Contractor.

### **2.4.4 Corrective Measures**

For a simple or routine non-conformance, corrective measures will be determined by specification direction, or if none exists, the Construction Manager, CQA Manager and Contractor will discuss standard construction methods to correct the deficiency. For Non-Conformance Reports which require an engineering evaluation, the Design Engineer must determine corrective measures. A copy of the Non-Conformance Report, with the Design Engineer's corrective measure determination, will be forwarded to the Construction Manager, CQA Manager, and Contractor for implementation of the corrective action.

### **2.4.5 Verification of Corrective Measures**

Upon notification by the Contractor that a corrective measure is complete, the CQA Manager will verify its completion. The verification must be accomplished by observations or retesting and documented with photographs. Written documentation of the corrective measures must be made by the CQA Manager on daily reports, logs, and forms, and, if applicable, the Non-Conformance Report. Verification of corrective measure will be reviewed by the Construction Manager. Corrective action measures requiring an engineering evaluation will be reviewed and verified by the Design Engineer.

## **2.5 Construction Monitoring**

### **2.5.1 Monitoring Priorities**

Before commencement of construction, the CQA Manager will establish a list of monitoring priorities. The list will address the various construction activities and the monitoring priority of those activities. The monitoring priorities may change during construction, based upon Contractor performance and Owner request. Changes in the monitoring priorities must be approved by the CQA Manager.

### **2.5.2 Discrepancies**

All CQA testing must be conducted in accordance with this CQA Manual. If discrepancies exist between the Specifications and the CQA Manual, the document that requires the most frequent tests or has more stringent test requirements will govern, unless otherwise specified by the Design Engineer.

## **2.6 Materials Quality Verification**

### **2.6.1 General**

Material sources will be identified and samples tested to determine if the material meets project specifications for specific work elements. Definitions and requirements of materials are provided in the Specifications. Test samples will be obtained in accordance with applicable ASTM standards. Archive samples and test results of the test samples will be maintained and stored at the project site. The CQA Inspectors will establish and maintain a materials quality verification list. The list will include material sources, sample locations, testing requirements, test results, and verification action items.

### **2.6.2 Materials Submittals**

Material submittals may be used by the CQA Consultant to establish the acceptability of materials. When sample submittals are required, they will be made available to the CQA Consultant by the Contractor. Acceptance and proper review of submittals are the responsibility of the CQA Manager.

### **2.6.3 Certificates of Compliance and Conformance**

Certificates of compliance and conformance may be used by the CQA Manager to establish the acceptability of materials. Those certificates generally state that the material is in compliance or conformance with a particular code, standard, or specification. The certificate may be used for acceptance of a product before or in lieu of testing, if allowed by the Specifications.

## **2.7 Equipment Control**

### **2.7.1 Equipment List**

Before the start of construction, the CQA Manager will complete a list of all measuring, sampling, and testing equipment being used at the site. As new equipment becomes available during the course of the project, it must be added to the list. When more than one type of equipment is available, a unique number will be affixed to each piece to maintain identity. The equipment list shall be maintained in the project files and contain the following information:

- Type of equipment
- Serial number or identifying number
- Date item received at site
- Use of the equipment
- Date removed from service

### **2.7.2 Calibration of Equipment and Materials**

Before placing a piece of testing equipment into service, its accuracy must be established and calibrated by the CQA Manager. Types of equipment requiring calibration include: nuclear gauges, sand cone devices, sand to be used in sand cones, and scales. The calibration procedures and frequencies must be as per manufacturer's instructions or ASTM standards. Whenever the equipment is suspect or is producing questionable results, it must be removed from service immediately and re-calibrated.

# 3 CONSTRUCTION QUALITY ASSURANCE FOR EARTHWORK

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## 3.1 Introduction

This section describes CQA procedures for earthwork operations. The scope of earthwork and related construction quality assurance includes the following elements:

- Stockpiling and Soil Management
- Excavation
- General Earthfill
- Foundation Layer
- Subgrade Preparation
- Growth Media / Erosion Layer
- Rip-Rap

## 3.2 Earthwork Construction Testing

### 3.2.1 Test Standards

The following test standards apply as called out in this manual or the technical specifications:

<u>Standard</u>	<u>Test Description</u>
ASTM C-136	Standard Method for Particle-Size Analysis of Fine & Coarse Aggregates.
ASTM D-698	Moisture-density relations of soils and soil-aggregate mixtures, using 52-pound rammer and 12-inch-drop (standard Proctor)
ASTM D-1556	Density of soil in-place by the sand-cone method
ASTM D-1557	Moisture-density relations of soils and soil-aggregate mixtures, using 10-pound rammer and 18-inch-drop (modified Proctor)
ASTM D-422	Particle size analysis of soils
ASTM D-2922	Density of soil and soil-aggregate in-place by nuclear methods
ASTM D-3017	Moisture content of soil and soil-aggregate-in-place by nuclear methods
ASTM D-2216	Laboratory determination of water (moisture) content of soil, rock, and soil-aggregate mixtures
ASTM D-2434	Test method for permeability of porous granular material
ASTM D-4318	Atterberg Limits
ASTM D-1140	Amount of material in soils finer than the No. 200 sieve
ASTM D-2487	Classification of soils for engineering purposes
ASTM D-2488	Description and identification of soils (visual-manual procedure)

ASTM D-2937	Density of soils by drive cylinder method
ASTM D-5321	Direct Shear Testing of Soil to Geosynthetics

### 3.2.2 Test Frequencies

The testing program is divided into material control and acceptance tests. Material control tests are performed before construction to check that the materials proposed for use will comply with the Specifications. Control tests are performed by the Contractor for material to be supplied by the Contractor. Acceptance tests are performed and/or supervised by the CQA Consultant throughout construction to verify that the components are constructed in compliance with the Construction Drawings and Specifications.

Tables 3-1 through 3-5 establish the minimum test frequencies for control and acceptance of earthwork. Extra testing must be conducted when work or materials are suspect, marginal, or of poor quality. Extra testing may also be performed to provide additional data for engineering evaluation. Any re-tests performed as a result of a failing test do not contribute to the total number of tests performed in satisfying the minimum test frequency.

**Table 3-1**

General Earthfill Material Acceptance Testing

Test	ASTM Method	Frequency	Criteria / Specification
Density and Water Content	Nuclear Gage D2922	1,000 cy	Min. 90% of relative compaction
Water Content	Oven D2216 (with corr. to D2922)	2,500 cy	Within 4% of optimum water content
Particle Size	Visual Observation	As Needed	3" max. particle size
Compaction Curve	Modified Proctor D1557	5,000 cy	n/a

**Table 3-2**

Growth Media / Erosion Layer Material Acceptance Testing

Test	ASTM Method	Frequency	Criteria / Specification
Density and Water Content	Nuclear Gage D2922	250 cy/4 tests per day	Min. 85% relative compaction at within 2% of optimum water content <sup>a</sup>
Water Content	Oven D2216 (with corr. to D2922)	5,000 cy	Within 2% of optimum water content
Particle Size	D422, D1140	5,000 cy	3" max. particle size; ½" max. at surface
Compaction Curve	Modified Proctor D1557	5,000 cy or change in material	n/a

<sup>a</sup> ASTM D1557 Modified Proctor.



**Table 3-3**

## Foundation Layer Acceptance Testing

Test	ASTM Method	Frequency	Criteria / Specification
Density and Water Content	Nuclear Gage D2922	250 cy/4 tests per day	Min. 90% relative compaction at within 2% of optimum water content <sup>a</sup>
Density	Sand Cone D1556	10,000 cy	Min. 90% relative compaction <sup>a</sup>
Water Content	Oven D2216 (with corr. to D2922)	2,500 cy (1/ac/ft. thickness)	Within 2% of optimum water content
Particle Size	D422, D1140	5,000 cy (1/ac/ft. thickness)	3/8-inch max. at top surface (to protect underlying GCL)
Compaction Curve	Modified Proctor D1557	5,000 cy or change in material	n/a
Foundation Layer Thickness	Survey Measurement	Min. 100-ft. on-center	Tolerance +0.2 foot vertical

<sup>a</sup> ASTM D1557 Modified Proctor.

**Table 3-4**

## Rip-Rap Material Control Testing

Test	ASTM Method	Frequency <sup>a</sup>	Criteria / Specification
Particle Size	D422, D1140	1,000 cy	See Final Specifications

<sup>a</sup> The proposed frequency corresponds to each material from each source. All sources will be tested at this frequency.

**Table 3-5**

## Rip-Rap Material Acceptance Testing

Test	ASTM Method	Frequency	Criteria / Specification
Particle Size	D422, D1140	500 cy	See Final Specifications

**3.2.3 Soil Sample Numbering**

The CQA Inspectors maintain soil sample numbers in a master log maintained at the site. Sample numbers begin with (001) and proceed upward. No sample number can be repeated, and re-tests of a failing sample are given the original number with a letter suffix (i.e., re-tests for a failing sample 021 would be: 021A, 021B, etc.). Information contained in the master log of test samples includes:

- Sample number
- Test(s) to be performed

- Date sampled
- Inspector obtaining sample
- Location sampled
- Location to testing (on-site vs. off-site)
- Date sample sent off site
- Date test results received
- Site testing Inspector
- Date testing completed at site
- Test results and remarks

### **3.2.4 Soil Sample Tagging**

The CQA Inspector is responsible for maintaining sample identification for all soil samples while on site, from time of sampling through completion of testing. The CQA Inspector must place a sample tag on the soil sample container immediately upon sampling. The tag must remain with the soil sample throughout processing. The tag contains the following information:

- Sample number
- Material type
- Project name and project number
- Sampling inspector
- Date sampled
- Test(s) to be performed

### **3.2.5 Soil Sample Processing**

The CQA Inspector is responsible for the timely processing of soil test samples. The CQA Manager determines which samples are tested on site and which are tested off site. The determination is made based on manpower available, equipment available, complexity of test, and time available for results. For expediency, samples to be tested off site should be shipped the same day as they are obtained.

## **3.3 Field Density Tests**

### **3.3.1 Test Numbering**

The CQA Inspector is responsible for maintaining test numbers and results for field density tests performed by the nuclear moisture density method (ASTM D2922). All other testing is identified through the sample number (Section 3.2.3). The CQA Inspectors will maintain field books that identify soil segments, data tested, CQA Inspector performing the test, and sequential test number. Each soil segment will have a unique series of numbers (i.e., 1000-series for foundation layer, 2000-series for growth media/erosion layer). No test number can be repeated for a given soil segment, and re-tests of failing tests must be given a letter suffix along with the original test number (i.e., re-tests for a failing Test #1201 would be: 1201A, 1201B, etc.). Test data and results must be filled out on the field density test form.

### **3.3.2 Test Locations**

The intent of the CQA program is to provide confidence that the earthwork materials and work conform to the technical specifications. To meet this intent, the CQA Inspector will perform density tests of soils used during construction. Density tests must be located at various elevations and uniformly dispersed throughout the entire plan dimensions of the fill. Density test locations must be chosen without bias; however, additional testing can be performed in any areas that are suspect, marginal, or appear to be of poor quality. During the progress of the work, density test locations will be plotted on a drawing by the CQA Inspector to verify that no significant areas are untested. The drawing becomes part of the CQA report.

## **3.4 Monitoring and Testing Requirements**

Earthwork components of the construction are summarized in Paragraph 3.1 of this section. Each component has specific construction requirements that must be monitored. The following sections list monitoring requirements for each type of earthwork.

### **3.4.1 Stockpiling and Soil Management**

- Review Contractor's approved work plan submittal. Verify stockpile locations, stockpile dimensions, haul routes, material segregation procedures, and erosion, sediment and drainage control measures. Determine and note corrective action items, if applicable.
- During excavation, hauling, and stockpiling operations, continually identify and verify material classifications in accordance with ASTM D2478 and ASTM D2488 as necessary to characterize material stockpile designations. Work closely with Contractor's quality control personnel to classify materials using the rapid field tests described in ASTM D2488.
- Verify that stockpiles are constructed with slopes no greater than two horizontal to one vertical and that the top surface maintains a minimum 5 percent grade. Verify slopes and grades using hand held levels and inclinometers, range poles, and measuring tapes.

### **3.4.2 Excavations**

- Verify that construction staking is performed before work and that survey benchmarks with elevations are secured outside the work area.
- Verify that excavated materials are segregated into proper stockpiles.
- Coordinate with the Contractor and Owner to perform excavation verification surveys upon completion of excavation operations. Verify corrective action measures as determined by verification surveys. Verification surveys will also be used to determine limits of excavation for measurements and payment applications. Submit copy of verification surveys to the Construction Manager.

### **3.4.3 General Earthfill**

- Verify that construction staking is performed before work and that survey benchmarks with elevations are secured outside the work area.

- Perform visual and manual soil classifications (ASTM D2488) to verify that material source is suitable for earthfills. Verify that the material is free of organic and oversized materials. Perform classifications continually during excavation of borrow materials.
- Perform moisture-density relationship testing (ASTM D1557) to determine the maximum dry density and optimum moisture content of earthfill materials. Perform tests at frequencies specified in Section 3.2.2.
- Verify that each lift is less than 8-inches thick prior to compaction.
- Verify that earthfill materials are placed and compacted in accordance with the Specifications. If a sheepsfoot compactor is not used, verify that the top of each compacted lift is scarified before placing the subsequent lift.
- Perform nuclear density-moisture tests (ASTM D2922 and ASTM D3017) to verify that each lift is compacted as required per Specifications. Perform tests at frequencies specified in Section 3.2.2.
- Verify that soil materials that are too wet for proper compaction per Specifications are properly aerated and processed to bring the moisture content of the material into the acceptable range of the optimum moisture content.
- Verify that earthfill soils that are too dry for proper compaction per Specifications are properly moisture conditioned and processed to bring the moisture content into the acceptable range of the optimum moisture content.
- Verify that desiccated earthfills are properly repaired or removed before placing subsequent lifts.
- Verify that final earthfill surfaces are free of ruts, gouges, and other features that might contribute to erosion and sediment run-off.
- During earthfill operations field verify lines, grades, and dimensions using hand-held levels and inclinometers, range poles and measuring tapes.
- Coordinate with the Contractor and Owner to perform verification surveys at the completion of earthfill operations. Verify corrective action measures as determined by verification surveys. Verification surveys will also be used to determine the limits of earthfills for measurement and payment applications. Submit copy of verification surveys to the Construction Manager.

#### **3.4.4 Foundation Layer**

- Perform visual and manual soil classifications (ASTM D2488) to verify that material source is suitable for foundation layer. Perform classifications continually during excavation of borrow materials.
- Perform moisture-density relationship testing (ASTM D1557) to determine the maximum dry density and optimum moisture content of foundation layer materials. Perform tests at frequencies specified in Section 3.2.2.
- Verify that foundation layer materials are placed and compacted in accordance with the Specifications.

- Perform nuclear density-moisture tests (ASTM D2922 and ASTM D3017) to verify that each lift is compacted as required by the Specifications. Perform tests at frequencies specified in Section 3.2.2.
- Verify that soil materials that are too wet for proper compaction per Specifications are properly aerated and processed to bring the moisture content of the material into the acceptable range of the optimum moisture content.
- Verify that foundation layer soils that are too dry for proper compaction per Specifications are properly moisture conditioned and processed to bring the moisture content into the acceptable range of the optimum moisture content.
- Verify that acceptable moisture is maintained to reduce desiccation of the foundation layer surface.
- Verify that the foundation layer surface is free of ruts, gouges, and other features that might damage overlying geosynthetics.
- Coordinate with the Contractor and Owner to perform verification surveys at the completion of foundation layer operations. Verify corrective action measures as determined by verification surveys. Verification surveys will also be used to determine the limits of foundation layer for measurement and payment applications. Submit copy of verification surveys to the Construction Manager.

#### **3.4.5 Subgrade Preparation**

- Verify that grade control construction staking is performed prior to work.
- Verify that angular or sharp rocks, and other debris that could damage the GCL are removed from the surface of the subgrade. Verify that the subgrade is free of irregularities and is steel drum rolled smooth prior to geosynthetic placement.
- Verify that the final surface provides continuous and intimate contact with the overlying geosynthetic.
- Coordinate with the Contractor and Owner to perform subgrade verification surveys upon completion of the subgrade preparation. Verify corrective action measures as determined by the verification surveys. Verification surveys will also be used to determine the limits of the subgrade preparation for measurement and payment applications. Submit copy of verification surveys to the Construction Manager.

#### **3.4.6 Growth Media / Erosion Layer**

- Verify that material source is suitable for the growth media/erosion layer as described in the Specifications.
- Verify that grade control construction staking is performed before work.
- Verify that the growth media/erosion layer is placed in accordance with the Specifications at the locations and elevations shown on the drawings and that placement operations do not damage underlying geosynthetic installations.
- Verify that the growth media/erosion layer is surfaced in accordance with the drawings and Specifications.

- Coordinate with the Contractor and Owner to perform growth media/erosion layer verification surveys upon completion of placement operations. Verify corrective action measures as determined by the verification surveys. Verification surveys will also be used to determine the limits of the growth media/erosion layer for measurement and payment applications. Submit copy of verification surveys to the Construction Manager.

### **3.4.7 Rip-Rap**

- Review the Contractor's approved work plan of proposed methods to place rip-rap material. Determine and note corrective action items if applicable.
- Perform soil tests or obtain certifications to verify that the rip-rap is in compliance with the material gradation requirements of the Specifications. Perform tests at frequencies specified in Section 3.2.2.
- Monitor placement operations to verify that adjacent installations are not damaged during placement operations.
- Verify and record material thickness during placement operations.

# 4 CONSTRUCTION QUALITY ASSURANCE FOR GEOSYNTHETICS

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## 4.1 General

The objectives of the geosynthetics CQA program are to: (i) assure that proper construction techniques and procedures are used; and, (ii) that the project is completed in accordance with the Construction Drawings and Specifications. The intent of the CQA program is to: (i) to identify and define problems that may occur during construction; and, (ii) to verify that these problems are corrected before construction is complete.

This section describes CQA procedures for the installation of the Geosynthetic Clay Liner (GCL). CQA for the GCL will be performed to verify that it is installed in accordance with the design. Construction must be conducted in accordance with the Construction Drawings and Specifications. To monitor compliance, the CQA Inspector will (i) review the Contractor's quality control submittals; (ii) perform material acceptance testing; (iii) monitor seaming; and, (iv) monitor installations.

Control testing will be performed by the material manufacturer. The manufacturer will submit a quality control program prior to construction for the CQA Consultant to review and approve. The manufacturer's testing shall comply with the standards and frequencies as contained in the Specifications. Acceptance criteria are defined in the Specifications.

All CQA testing will be conducted in accordance with this CQA manual and the Specifications. If a discrepancy exists in the testing requirements, the document that requires the most stringent testing will govern.

## 4.2 Geosynthetic Clay Liner (GCL)

### 4.2.1 Delivery

During delivery of GCL, the CQA Inspector will:

- Verify that equipment used to unload the rolls will not damage the GCL.
- Verify that care is used to unload the rolls.
- Verify that all documentation required by the Specifications has been received.
- Verify that each roll is marked or tagged with the following information: manufacturer's name; project identification; lot number; roll number; and, roll dimensions. This information should be logged on the geosynthetic receipt form.
- Verify that the geosynthetic receipt form is completed.
- Verify that materials are stored in a location that will protect the rolls from ultraviolet light exposure, precipitation, mud, dirt, dust, puncture, cutting, or any other damaging or deleterious conditions.

Any damaged rolls may be rejected. Verify that rejected material is removed from the site or stored at a location separate from accepted rolls. GCL rolls that do not have proper manufacturer's documentation must also be stored at a separate location, until all documentation has been received and approved.

#### 4.2.2 Acceptance Testing

**Tests.** The CQA Consultant will ensure that samples are removed and forwarded to the Geosynthetic CQA Laboratory for testing at a frequency of one sample per lot or one per 100,000 sq. ft., whichever is more stringent, to ensure conformance to both the Specifications and the Manufacturers list of guaranteed properties. The material will be sampled at the site by the CQA Inspectors or at the manufacturing plant by an independent third party under the direction of the CQA Consultant. As a minimum, the following will be established:

- Bentonite mass per unit area per ASTM D5993;
- Peel strength of GCLs per ASTM D4632; and,
- Hydraulic conductivity of GCLs per ASTM D5084.

**Direct Shear Testing (ASTM D5321).** The CQA Consultant shall perform direct shear tests (minimum one test per material type) between the project specific GCL and the adjacent soils per ASTM D5321 and as described in the Specifications. The CQA Manager will review all acceptance test results and report any non-conformance to the Construction Manager and Contractor.

**Sampling Procedures.** Samples will be taken across the entire width of the roll. Unless otherwise specified, samples will be three feet (1 m) long by the roll width. The CQA Consultant will mark the machine direction on the samples with an arrow.

**Test Results.** The CQA Consultant will examine all results from laboratory acceptance testing and will report any nonconformance to the Construction Manager.

**Acceptance Test Failure.** If a GCL acceptance sample does not comply with the minimum requirements of the Specifications, the GCL roll from which the sample was taken will be failed by the CQA Consultant, and replaced by the GCL Manufacturer at no additional cost to the Owner.

#### 4.2.3 GCL Installation

The Geosynthetics Contractor will handle all GCLs in such a manner as to ensure that they are not damaged in any way, and will comply with the following:

- In the presence of wind, all GCLs will be sufficiently weighted with sandbags to prevent their movement. Such sandbags will be installed during placement and will remain until replaced with the overlying layer.
- GCLs will be cut using a utility knife in a manner approved by the CQA Inspector. Care should be taken to prevent damage to any underlying liner system components during cutting.



- During placement, care will be taken not to entrap stones or moisture under the GCL. Care will be taken not to drag equipment across the exposed GCL.
- Any GCL damaged by stones or other foreign objects, or installation activities, will be replaced at no additional cost to the Owner.
- The GCL will not be installed on a saturated subgrade or on standing water. The GCL will be installed in a way that prevents hydration of the mat prior to completion of construction of the liner system.
- The GCL will not be installed during precipitation or other conditions that may cause hydration of the GCL.
- The GCL will be installed with the woven geotextile up, or as otherwise indicated by the GCL Manufacturer or Design Engineer.
- Growth media/erosion layer soil overlying the liner system components shall immediately follow the installation of the GCL. If areas cannot be covered immediately due to steepness of slopes, visqueen or equivalent shall be placed over any exposed GCL. The GCL shall be removed and replaced if it becomes hydrated before the growth media/erosion layer soil is placed.
- All hydrated GCL will be removed and replaced by the Contractor at no additional cost to the Owner.
- On slopes steeper than 10 horizontal to 1 vertical, all GCLs shall be continuous down the slope; that is, no horizontal seam shall be allowed in the slope.
- All GCLs will be overlapped. Along the length of the mat, the overlap will be 12 inches (300 mm). Along the width of the mat, the overlap will be 12 inches (300 mm). Additional manufacturers recommendations regarding overlaps will be adhered to if more stringent than the specified requirements.
- The overlaps will not be nailed or stapled to the subgrade.

The CQA Consultant will note any non-compliance and report it to the Construction Manager.

#### **4.2.4 Repair**

Any holes or tears in the GCL will be repaired by placing a GCL patch over the hole; the patch will overlap the edges of the hole or tear by two feet (0.6 m) in all directions. If deemed necessary by the Design Engineer, the patch will be secured with a water-based adhesive approved by the Geosynthetics Manufacturer. Care will be taken to remove any soil or other material that may have penetrated the torn GCL. All repairs will be made at no additional cost to the Owner. The patch will not be nailed or stapled. The CQA Consultant will observe any repair, note any non-compliance with the above requirements and report them to the Construction Manager.

#### **4.2.5 Materials in Contact with GCL**

Equipment used for placing growth media/erosion layer will not be driven directly on the GCL. Unless otherwise specified by the Design Engineer, all equipment operating on soil material overlying the GCL shall comply with the Specifications. Installation of the GCL in appurtenant

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areas, and connection of the GCL to appurtenances will be made according to the drawings. The Contractor will ensure that the GCL is not damaged while working around appurtenances.

# 5 CONSTRUCTION QUALITY ASSURANCE FOR PIPE

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## 5.1 Introduction

This section describes CQA procedures for corrugated metal pipe (CMP) installations. CMP pipe will be utilized to construct the storm drainage systems.

CQA for the CMP pipe installations will be performed to verify that the pipe systems are installed in accordance with the design. Construction must be conducted in accordance with the Construction Drawings and Specifications. To monitor compliance, the CQA program will (1) review the Contractor's quality control submittals; and, (2) monitor installations.

All construction testing will be conducted in accordance with the Specifications.

## 5.2 Construction Monitoring

The following sections list monitoring requirements during CMP pipe operations.

### 5.2.1 Delivery, Handling, and Storage

- Verify that the pipe is not damaged during handling operations and that damaged pipe is separated from accepted pipe.
- Verify that pipe out-of-roundness will not occur due to excessive stacking heights when the pipe is stored at the site.
- Verify that the pipe is not damaged by sharp rocks or excessive abrasion when the pipe is pulled into place during installation operations.

### 5.2.2 Installation and Joints

- Verify that pipe is installed at the locations shown on the drawings and in accordance with the Specifications.
- Verify that pipe joints are constructed in accordance with the Specifications.
- Verify that inside and outside of pipe ends are cleaned to remove dirt, water, grease, and other foreign material.
- Verify that pipe ends are squarely faced.
- Verify that flanges are securely bolted.

# 6 DOCUMENTATION

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The quality assurance plan depends on thorough monitoring and documentation of all construction activities. Therefore, the CQA Manager will document that all quality assurance requirements have been addressed and satisfied. Documentation will consist of daily record-keeping, testing and installation reports, non-conformance reports (if necessary), progress reports, photographic records, design and specification revisions, and a construction report. Report forms are to be provided by the CQA Consultant.

## 6.1 Daily Record-Keeping

At a minimum, daily records will consist of a daily record of construction progress, daily construction report, observation and test data sheets, and, as needed, non-conformance/corrective measure reports. All forms will have peer review.

### 6.1.1 Daily Record of Construction Progress

The daily field report will summarize ongoing construction and discussions with the Contractor and will be prepared by the CQA Manager and CQA Inspectors. At a minimum, the report will include the following:

- Date, project name, project number, and location.
- A unique number for cross-referencing and document control.
- Weather data.
- A description of all ongoing construction for the day.
- An inventory of equipment utilized by the Contractor.
- Items of discussion and names of parties involved in discussions.
- A brief description of tests and observations, identified as passing or failing, or, in the event of failure, a retest.
- Areas of non-conformance/corrective actions, if any, (non-conformance/corrective action form to be attached).
- Summary of materials received and quality documentation.
- Follow-up information on previously reported problems or deficiencies.
- Record of any site visitors.
- Signature of CQA Manager or CQA Inspector.
- Signature of the peer reviewer.

### 6.1.2 Observation and Test Data Sheets

Observation and test data sheets should include the following information as is appropriate for the form being used:

- Date, project name, and location.
- A unique number for cross-referencing and document control.
- Weather data, as applicable.
- A reduced scale site plan showing sample and test locations.
- Test equipment calibrations, if applicable.
- A summary of test results identified as passing, failing, or, in the event of a failed test, retest.
- Completed calculations.
- Signature of the CQA Manager or CQA Inspector.
- Signature of the peer reviewer.

### **6.1.3 Non-Conformance Reports**

In the event of a non-conformance event, a non-conformance verification report form will be included with the daily report. Procedures for implementing and resolving any non-conformities to the contract are outlined in Section 2.4 of this CQA manual.

## **6.2 Weekly Progress Reports**

The CQA Manager will prepare weekly progress reports summarizing construction and quality assurance activities. The reports will contain, at a minimum, the following information:

- The date, project name, and location.
- A summary of work activities completed in the preceding week, and those expected to be performed in the upcoming week.
- A summary of deficiencies and/or defects, and resolutions.
- Ongoing summary of changed and/or change orders to the work.
- The signature of the CQA Manager.
- On fourth week of each month the report will include a summary of on-site and third party laboratory test results.

## **6.3 Photographs**

Construction activities will be photographed. Photographs will include any significant problems encountered and corrective actions as well as document construction progress. The photographs will be identified by number, location, time, date, and photographer. The photographer should document the subject or the photograph, either on the back of the picture, or in a photograph log. One copy of the photographs and the negatives will be given to the Owner.

## 6.4 Design and Specification Changes

Design and specification changes may be required during construction. Design and specification changes will only be made with written agreement of the Design Engineer and Owner. These changes will be made by change order to the contract. When change orders are issued, they will be prepared by the Construction Manager. The Construction Manager will distribute change orders for signature and execution to the required parties.

## 6.5 Final CQA Report

At the completion of the project, the CQA Manager will submit a Final CQA Report. This report will document that the work has been performed in compliance with the Construction Drawings and Specifications. At a minimum, the report will contain:

- A summary of all construction activities.
- A summary of all laboratory and field test results.
- Sampling and testing location drawings.
- A description of significant construction problems and the resolution of these problems.
- A list of changes from the Construction Drawings and Specifications and the justifications for these changes.
- As-built record drawings.
- A statement that the interface shear strength meet or exceed the specified requirements. If the interface shear strength results do not meet or exceed the specified requirements, contact the Design Engineer and append a revised stability analysis, prepared by the Design Engineer.
- A statement of compliance with the construction contract documents and design intent signed and stamped by the CQA Manager, a professional engineer registered in the state of California.

The as-built record drawings will accurately locate the constructed location of all work items, including the location of piping, anchor trenches, etc. All surveying and base maps required for the development of the record drawings will be prepared by the Contractor. The CQA Manager must review and verify that as-built drawings are correct. As-built record drawings will be included in the Final CQA Report.

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**Appendix G**  
**Drainage Facility Design Report**

# Drainage Facility Design Report for the Pumice Valley Landfill



Report Prepared for

**Mono County**  
**Department of Public Works**



Report Prepared by



SRK Consulting (U.S.), Inc.

146900.160

February 15, 2013



# **Drainage Facility Design Report for the Pumice Valley Landfill**

## **Mono County Department of Public Works**

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**SRK Project Number 146900.160**

**February 2013**

**Author:**  
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Principal Consultant

**Peer Reviewed by:**  
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Principal Consultant

## Certification Statement

This *Drainage Facility Design Report for the Pumice Valley Landfill* was prepared in support of the *Preliminary Closure and Postclosure Maintenance Plan for the Pumice Valley Landfill* and pursuant to the requirements of Title 27 of the California Code of Regulations. This document was prepared by SRK Consulting (U.S.), Inc., under the direct supervision of the undersigned registered professional engineer. All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed, and the professional services have been performed, findings determined, and recommendations prepared in accordance with standard engineering principles and practices generally accepted at the time of document preparation.



02.15.13

Evan Nikirk, PE  
Principal Consultant

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## Attachments

- Attachment 1: Summary Design Tables
- Attachment 2: Figure 1 and Data Charts
- Attachment 3: TR-55 Hydrologic Analyses
- Attachment 4: FlowMaster Hydraulic Analyses

## Disclaimer

The project conditions and specifications presented in this document have been based on the information supplied to SRK Consulting (U.S.), Inc. (SRK) by the Mono County Department of Public Works (Mono County). This Plan is provided in response to a specific request from Mono County to do so, and is subject to the contractual terms between SRK and Mono County. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Plan.

## 1.0 Background

This drainage facility design report has been prepared as supporting documentation to the *Preliminary Closure and Postclosure Maintenance Plan* (PCPMP) for the Pumice Valley Landfill and to document compliance with sections 20820, 20365, and 21090(b), *et seq.*, of Title 27, California Code of Regulations (27 CCR), at the Pumice Valley Landfill in Mono County, California. This report, which is included as Appendix G to the PCPMP, has been prepared to meet current State of California solid waste permitting requirements and to achieve the general standards of care for civil engineering practice. The purpose of this drainage report is to present the methods used to determine the appropriate drainage configurations necessary to collect and control surface water run-off resulting from a 100-year, 24-hour storm event at the Pumice Valley Landfill. The drainage system design described in the following sections addresses facilities that will either be constructed during the operational life of the facility and, thus, in-place at the time of landfill closure, or those that are proposed to be constructed during closure activities.

Drainage facilities expected to be in place following site closure and maintained throughout the postclosure period are presented on **Figure 1** enclosed in **Attachment 2** of this report and on SRK Drawing 146900.160-03 and -06 in Appendix A (reduced plan set) and Appendix L (full-size) of the PCPMP. Hydrologic sub-areas and structure designations used in the drainage calculations addressed in this report are also shown on **Figure 1** in **Attachment 2** and on SRK Drawing 146900.160-06 in the PCPMP. Design and construction details of drainage facilities are presented on SRK Drawing 146900.160-08, also enclosed in appendices A and L of the PCPMP. The drawing showing drainage facility details has been reproduced in **Attachment 2** to this report.

## 2.0 Methodology

Drainage analyses were performed using the grading plan and drainage system depicted on **Figure 1**, enclosed in **Attachment 2**. The final site configuration was divided into drainage sub-areas based on the final destination of surface water run-off in a particular area. The site was divided into seven drainage areas, which were further divided into 15 sub-areas based on the proposed site design. The drainage sub-areas are illustrated on **Figure 1**. To aid in drainage structure identification and comparison of results, the open channels and culverts that comprise the proposed drainage system are labeled individually on **Figure 1**. The channel and culvert designations correspond to those presented in the summary tables enclosed in **Attachment 1** of this report.

The United States Department of Agriculture, Natural Resources Conservation Service WinTR-55 methodology (USDA, 2009) was used to calculate peak flood hydrographs for each drainage area. The rainfall distribution in eastern California is synthetically approximated by the Natural Resources Conservation Service (NRCS) as a Type II distribution, which represents an intense, short-duration storm event. Rainfall depth data used in the hydrologic analyses were obtained from the National Oceanic and Atmospheric Administration (NOAA), Precipitation Frequency Data Server, which utilizes NOAA Atlas 14 precipitation frequency data (NOAA, 2011). Point precipitation data for the 100-year, 24-hour storm depth used in the analyses was 5.48 inches. The two-year, 24-hour storm depth of 2.14 inches was used as an input for determination of time of concentration for sheet flow segments. A printout of the point precipitation frequency estimates for the Pumice Valley Landfill used to determine the above precipitation data is enclosed in **Attachment 2**.

Surface conditions for each sub-area were analyzed individually, and a curve number was developed based on the type of ground cover and surface soil. Landfilled areas receiving final cover were assigned hydrologic soil group "D," corresponding to a shallow cover layer underlain by an impervious layer, which is representative of the final cover design. Based on the surrounding native vegetation, landfill surfaces were modeled as the TR-55 land use category of "sagebrush with a

grass understory” with “fair” vegetative cover. As a result, a curve number of 70 was assigned to all sub-areas.

As part of the WinTR-55 methodology, a time of concentration ( $T_c$ ) was developed for each drainage area to determine the estimated time for surface flows to reach the outlet of each system. Relatively short channel reaches were modeled with a time of concentration of 0.10 hours (six minutes), the minimum time for which the simulation can be performed.

The predicted peak flows determined by the hydrologic analyses were then used in conjunction with the FlowMaster computer program (Bentley, 2009) to design and size the open channels and downdrains necessary to route surface flows off the closed landfill surface and into retention basins located at the east and west perimeters of the site.

As discussed in Section 3, all drainage channels constructed on both final cover and at the perimeter toe have been designed with rip-rap lining overlying filter fabric due to the highly erodible site soils, despite low flow velocities. Information presented in Section 39 of the *Standards and Specifications for Soil Erosion and Sediment Control in Developing Areas* (USDA, 1975) was used to determine the appropriate rip-rap size ( $D_{50}$ ) for each lined channel reach, depending upon its flow rate, slope, and geometry. Rip-rap sizing calculations for each open channel are presented in **Table G-3**, enclosed in **Attachment 1**.

Channel sections receiving concentrated flows with high velocities from overside drain outlets have been designed with asphalt lining to eliminate the potential for scouring and channel erosion. All channels were initially given a Manning's value of 0.035, based on a variety of sources. All culverts were analyzed with a Manning's value of 0.010 for corrugated polyethylene pipe (CPEP) storm drains. Input data for the TR-55 hydrologic analyses are summarized in **Table G-1** in **Attachment 1**.

### 3.0 System Design

The drainage control system described in this report has been designed to route stormwater run-off away from the landfill to eliminate any potential impact to site facilities, to preserve the integrity of the final cover, and to minimize the erosion of surface soils. Surface water generated on-site will be routed via a combination of open channels, berms, inlets, and culverts to existing soil borrow pits that also function as on-site retention basins. The design intention is for the basins to retain surface flows generated by all anticipated storm depths. The depth and area of the soil borrow pits and the fast-draining nature of site soils will provide sufficient storage capacity for all expected storm volumes.

The system of perimeter drainage channels will be developed throughout the operating life of the landfill and will be augmented by a network of interior channels constructed adjacent to site roads and on the waste fill. Due to its location atop a geographic high with natural grades sloping away from the landfill, off-site flows will not impact the site as run-on. Therefore, management of stormwater run-on was not considered in the analysis of collection facilities.

The final site plan delineating watersheds and drainage facilities is shown on **Figure 1**, Hydrologic Sub-Area Layout, in **Attachment 2** and on SRK Drawing No. 146900.110-106, enclosed in appendices A and L of the PCPMP. Existing and proposed open channels are designed as v-ditches, swales, berms, and trapezoidal channels.

Although the perimeter trapezoidal channels and road crossing swales will be constructed on the relatively flat terrain around the perimeter of the waste mass, they will be lined with 1" drain rock to protect channel integrity. Site soils consist of poorly-graded silty sand (i.e., highly-erodible soil) throughout the property. All perimeter trapezoidal channels will be 12 inches deep with a two-foot-wide base width and sideslopes configured at a ratio of two-and-one-half-to-one (2.5:1), horizontal to vertical (H:V). Swales installed to convey storm flows across the perimeter access road and into the

retention basins will have sideslopes configured at a ratio of 10H:1V, and a depth of 12 inches. Refer to **Figure 1** for channel locations and **Table G-2** in **Attachment 1** and **SRK Drawing 146900.160-08** in **Attachment 2** for detailed design information.

Rip-rap lined headwall berms, top deck swales, and a roadside v-ditch proposed on the final cover will be installed during closure construction. The v-ditch will have a geometry consisting of sideslopes configured at a 3H:1V ratio and a design depth of 12 inches. Each drainage swale will collect run-off from the landfill top deck and direct it to a headwall berm where it will be concentrated into a downdrain culvert (or, overside drain), then discharged into a swale road crossing at the toe. Top deck swales will be 12 inches in depth with sideslopes configured at a 10H:1V ratio. Channels and downdrains will be sloped as defined in the enclosed tables and the attached calculation sheets.

Headwall berms, top deck swales, and the v-ditch constructed on the final cover surface are designed with rip-rap lining to maintain the integrity of the final cover. Rip-rap will be underlain by a geotextile or filter fabric at all rip-rap locations to minimize scouring. Detailed rip-rap sizing calculations for open channels are presented in **Table G-3** in **Attachment 1**.

Culverts will be installed at six locations on the crest and sideslopes of the final landfill surface to direct run-off collected from the top deck into perimeter drainage channels and retention basins. The inlet of each culvert will be fitted with a flared end section roughly conforming to the slope of the headwall berms; these inlets will be protected by rip-rap to minimize scouring. Culverts will be constructed from corrugated polyethylene pipe (CPEP), as indicated on details presented on **SRK Drawing 146900.160-08**, a copy of which is included in **Attachment 2**. A summary of culvert design and flow results is provided in **Table G-4**, enclosed in **Attachment 1**.

The final destination of surface flows collected from the site will be stormwater retention basins located on the eastern and western perimeters of the property. Outlet structures are not proposed for the retention basins since there is sufficient capacity to manage run-off volumes generated by the contributing drainage areas, particularly with fast-draining soils present throughout. As a result, discharge channels or outlet structures are not warranted.

## 4.0 Results

The TR-55 computer program output files enclosed in **Attachment 3** illustrate the results of the hydrologic analyses for the proposed site design. An analysis of the proposed facility configuration, using the input parameters described above, resulted in storm flow hydrographs for the seven drainage sub-areas. **Table G-1**, attached, summarizes the hydrologic parameters for each sub-area and the estimated peak discharge that is generated. This information was subsequently used in the hydraulic design of site facilities based on its contribution to each channel and downdrain.

Drainage channels and culverts were sized using the FlowMaster computer program (Bentley, 2009). The resulting flow depths and velocities in each open channel, as determined by the hydraulic analysis, are summarized in the attached **Table G-2**; hydraulic design results for culverts are summarized in **Table G-4**. In addition, these tables present design information, including lengths, slopes, and the depths and diameters of channels and culverts, respectively. Detailed output from the FlowMaster analyses are included in **Attachment 4**.

The drainage control system was designed to collect and control the peak flows resulting from a 100-year, 24-hour storm event. WinTR-55 calculations predict that a maximum surface flow of 10 cubic feet per second (cfs) will develop in any single drainage sub-area which could directly impact the final cover. The maximum combined flow that any site channel will be required to collect and handle is 16 cfs, occurring in the drainage swale routing run-off across the perimeter access road at the southeast corner of the waste mass. The maximum combined flow that any culvert will be required to convey is 10 cfs, occurring in the downdrain at the southeast corner of the top deck.

All culverts were conservatively sized with a minimum diameter of 18 inches to allow for convenient maintenance. In addition, to ensure a rapid flow transition with minimal headwater depth developed at the inlet of culverts located at headwall berms, the portion of each overside drain located on the top deck has been designed with a 24-inch diameter culvert fitted with a flared-end section. An inlet design chart was prepared to ensure that sufficient head water depth is available at each culvert inlet. This chart, while specific for CMP culverts under inlet control conditions, is included in **Attachment 2**.

Constructed in native silty sand, it is anticipated that storm flows collected in the retention basins will quickly percolate into the underlying soil.

## 5.0 Conclusions

The results of the FlowMaster calculations attached with this report indicate that the proposed channels and culverts have been appropriately sized to collect and control surface water run-off resulting from a 100-year, 24-hour storm event. Based on the predicted flow velocities from the FlowMaster output files, and given the shallow slopes for most channel reaches, one-inch drain rock or three-inch rip-rap lining is sufficient protection from the low-velocity flow in all on-site channels. Rip-rap protection should also be installed completely around each downdrain inlet to a distance of 10 feet on each side of the channel centerline.



## 6.0 References

Bentley, 2009, *FlowMaster I*: Haestad Methods, Inc., Waterbury, Connecticut.

NOAA, 2011, *NOAA Atlas 14, Precipitation-Frequency Atlas of the United States – Volume 6, Version 2.0: California*: United States Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Silver Spring, Maryland.

USDA, 1975, *Standards and Specifications for Soil Erosion and Sediment Control in Developing Areas*: U.S. Department of Agriculture, Soil Conservation Service, College Park, July 1975.

USDA, 1986, *Urban Hydrology for Small Watersheds*: U.S. Department of Agriculture, Soil Conservation Service, Engineering Division, Technical Release 55, second edition, College Park, Maryland, June 1986.

**Prepared by**



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**Reviewed by**



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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

## **Attachment 1: Summary Design Tables**

**Table G-1**  
**SUMMARY OF HYDROLOGIC ANALYSES<sup>1</sup>**

Storm Event: 100-Year, 24-Hour  
Precipitation: 5.48 inches

Rainfall Distribution: Type II  
Runoff Curve No.: 70

Sub-Area <sup>2</sup>	Area (acres)	Sheet Flow		Shallow Conc. 1		Shallow Conc. 2		Sub-Area Peak Flow (cfs)	Destination	Peak Flow at Outlet <sup>3</sup> (cfs)
		Length (ft)	Slope (ft / ft)	Length (ft)	Slope (ft / ft)	Length (ft)	Slope (ft / ft)			
1	2.778	100	0.333	30	0.333	n/a	n/a	9.47	D1	9.47
2A	2.351	100	0.040	115	0.040	n/a	n/a	7.72	D3	14.10
2B	0.844	95	0.333	40	0.050	n/a	n/a	3.08	D4	
2C	1.053	100	0.333	25	0.333	n/a	n/a	3.82	D5	
3A	2.658	100	0.040	155	0.040	n/a	n/a	8.73	D7	12.39
3B	1.107	60	0.333	n/a	n/a	n/a	n/a	4.07	D8	
4A	3.145	100	0.040	60	0.040	n/a	n/a	10.19	D10	15.66
4B	1.651	95	0.333	n/a	n/a	n/a	n/a	5.51	D11	
5A	1.037	100	0.040	90	0.040	110	0.018	3.29	D13	11.94
5B	0.899	100	0.333	5	0.333	n/a	n/a	3.07	D14	
5C	0.653	100	0.040	15	0.040	n/a	n/a	2.07	D15	
5D	0.502	35	0.040	45	0.333	90	0.052	1.83	D17	
6	2.830	100	0.040	160	0.040	n/a	n/a	9.22	D18	9.22
7A	1.672	100	0.040	155	0.040	n/a	n/a	5.44	D19	6.79
7B	0.406	100	0.333	15	0.333	n/a	n/a	1.51	D20	

Notes:

1. See attached TR-55 data sheets for complete input and output details.
2. See Figure 1 (or Drawing 146900.160-06), Hydrologic Sub-Area Layout, for sub-area and channel designations.
3. The peak flow at the outlet will not necessarily equal the sum of peak flows in individual sub-areas due to time of concentration.

**Table G-2**  
**SUMMARY OF OPEN CHANNEL DESIGN**

Channel No. <sup>1</sup>	Channel Status at Closure	Description	Contributing Sub-Areas <sup>1</sup>	Avg. Flowline Slope	Channel Length (feet)	Design Depth (feet)	Peak Flow <sup>2</sup> (cfs)	Flow Depth <sup>3</sup> (feet)	Velocity <sup>3</sup> (fps)	Froude No. <sup>3,4</sup>
D1	Exist.	Trapezoidal Channel	1	0.5%	835	1.0	9.47	0.90	2.46	0.57
D2	Exist.	Swale Road Crossing	1	0.5%	115	1.0	9.47	0.70	1.93	0.57
D3	New	Top Deck Swale	2A	3.0%	290	1.0	7.72	0.53	2.78	0.95
D4	Exist.	Trapezoidal Channel	2B	0.5%	260	1.0	3.08	0.50	1.91	0.56
D5	Exist.	Trapezoidal Channel	2C	0.5%	300	1.0	3.82	0.55	2.03	0.57
D6	Exist.	Swale Road Crossing	2A - 2C	1.0%	30	1.0	14.10	0.76	2.43	0.69
D7	New	Top Deck Swale	3A	3.0%	295	1.0	8.73	0.55	2.86	0.96
D8	Exist.	Trapezoidal Channel	3B	0.5%	375	1.0	4.07	0.57	2.07	0.57
D9	Exist.	Swale Road Crossing	3A, 3B	1.0%	30	1.0	12.39	0.72	2.41	0.71
D10	New	Top Deck Swale	4A	3.0%	430	1.0	10.19	0.59	2.98	0.97
D11	Exist.	Trapezoidal Channel	4B	0.5%	815	1.0	5.51	0.68	2.19	0.56
D12	Exist.	Swale Road Crossing	4A, 4B	1.0%	30	1.0	15.66	0.79	2.50	0.70
D13	New	Top Deck Swale	5A	3.0%	115	1.0	3.29	0.38	2.34	0.95
D14	Exist.	Trapezoidal Channel	5B	0.5%	400	1.0	3.07	0.50	1.91	0.56
D15	New	V-Ditch	5C	8.0%	280	1.0	2.07	0.45	3.35	<b>1.24</b>
D16	Exist.	Swale Road Crossing	5A - 5C	1.0%	40	1.0	8.43	0.62	2.19	0.69
D17	Exist.	Trapezoidal Channel	5A - 5D	1.8%	250	1.0	9.98	0.76	3.34	0.82
D18	New	Top Deck Swale	6	3.0%	355	1.0	9.22	0.56	2.90	0.96
D19	New	Top Deck Swale	7A	3.0%	260	1.0	5.44	0.46	2.59	0.96
D20	Exist.	Trapezoidal Channel	7A, 7B	0.5%	140	1.0	6.79	0.73	2.44	0.61

Notes:

1. Refer to Figure 1 (or SRK Drawing No. 146900.160-06) for channel and sub-area designations and locations.
2. See attached Table G-1 for summary of peak flows and TR-55 data sheets for detailed calculations.
3. See attached FlowMaster data sheets for detailed channel flow results.
4. A Froude number of 1.0 (dimensionless) or greater indicates critical / supercritical flow velocity.

**Table G-3  
Manning's Coefficient and Rip-Rap Size Calculation**

**100-Year, 24-Hour Storm Event**

Channel No.	MANUALLY INPUT DATA (from FlowMaster calculations)						CALCULATED VALUES				Channel Description / Comment
	Q	V	A	P	R	S <sub>b</sub>	D <sub>50</sub>	Manning's Coefficient			
	Flow Rate (cfs)	Velocity (fps)	Flow Area	Wetted Perimeter	Hydraulic Radius	Channel Slope	(in.) (SCS)	SCS (Ref. 2)	SCS (Ref. 3)	Avg. n	
D1	9.32	2.13	4.37	7.28	0.60	0.005	0.7	0.038	0.021	0.029	Trap. Channel - 1 ft. deep, 2.5:1 sideslopes, n <sub>i</sub> = 0.035
D1	9.47	2.46	3.85	6.86	0.56	0.005	0.7	0.038	0.021	0.029	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D2	9.47	1.59	5.97	15.53	0.38	0.005	0.5	0.035	0.019	0.027	Swale Road Crossing - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D2	9.47	1.93	4.91	14.09	0.35	0.005	0.5	0.035	0.019	0.027	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D3	7.72	2.95	2.61	10.28	0.25	0.030	2.0	0.044	0.031	0.038	Top Deck Swale - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D3	7.72	2.78	2.78	10.60	0.26	0.030	2.0	0.044	0.031	0.038	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D4	3.08	1.59	1.94	5.06	0.38	0.005	0.5	0.035	0.019	0.027	Trap. Channel - 1 ft. deep, 2.5:1 sideslopes, n <sub>i</sub> = 0.035
D4	3.08	1.91	1.61	4.67	0.34	0.005	0.5	0.035	0.019	0.027	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D5	3.76	1.68	2.24	5.38	0.42	0.005	0.5	0.035	0.019	0.027	Trap. Channel - 1 ft. deep, 2.5:1 sideslopes, n <sub>i</sub> = 0.035
D5	3.82	2.03	1.88	4.99	0.38	0.005	0.5	0.035	0.019	0.027	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D6	14.10	2.27	6.20	15.83	0.39	0.010	1.0	0.039	0.024	0.032	Swale Road Crossing - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D6	14.10	2.43	5.80	15.31	0.38	0.010	1.0	0.039	0.024	0.032	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D7	8.74	3.05	2.87	10.77	0.27	0.030	2.1	0.045	0.031	0.038	Top Deck Swale - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D7	8.73	2.86	3.05	11.10	0.27	0.030	2.1	0.045	0.031	0.038	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D8	4.07	1.71	2.38	5.52	0.43	0.005	0.5	0.035	0.020	0.027	Trap. Channel - 1 ft. deep, 2.5:1 sideslopes, n <sub>i</sub> = 0.035
D8	4.07	2.07	1.97	5.09	0.39	0.005	0.5	0.035	0.020	0.027	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D9	12.40	2.20	5.63	15.08	0.37	0.010	0.9	0.039	0.024	0.031	Swale Road Crossing - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D9	12.39	2.41	5.14	14.41	0.36	0.010	0.9	0.039	0.024	0.031	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D10	10.19	3.16	3.22	11.41	0.28	0.030	2.2	0.045	0.032	0.038	Top Deck Swale - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D10	10.19	2.98	3.42	11.76	0.29	0.030	2.2	0.045	0.032	0.038	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D11	5.50	1.86	2.96	6.09	0.49	0.005	0.6	0.036	0.020	0.028	Trap. Channel - 1 ft. deep, 2.5:1 sideslopes, n <sub>i</sub> = 0.035
D11	5.51	2.19	2.52	5.67	0.44	0.005	0.6	0.036	0.020	0.028	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D12	15.65	2.33	6.71	16.46	0.41	0.010	1.0	0.040	0.024	0.032	Swale Road Crossing - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D12	15.66	2.50	6.28	15.92	0.39	0.010	1.0	0.040	0.024	0.032	Reiteration of channel and D <sub>50</sub> calculations with new "n"

Channel No.	MANUALLY INPUT DATA (from FlowMaster calculations)						CALCULATED VALUES				Channel Description / Comment
	Q	V	A	P	R	S <sub>b</sub>	D <sub>50</sub>	Manning's Coefficient			
	Flow Rate (cfs)	Velocity (fps)	Flow Area	Wetted Perimeter	Hydraulic Radius	Channel Slope	(in.) (SCS)	SCS (Ref. 2)	SCS (Ref. 3)	Avg. n	
D13	3.35	2.40	1.40	7.52	0.19	0.030	1.4	0.042	0.030	0.036	Top Deck Swale - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D13	3.29	2.34	1.41	7.54	0.19	0.030	1.4	0.042	0.030	0.036	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D14	3.08	1.59	1.94	5.06	0.38	0.005	0.5	0.035	0.019	0.027	Trap. Channel - 1 ft. deep, 2.5:1 sideslopes, n <sub>i</sub> = 0.035
D14	3.07	1.91	1.61	4.67	0.34	0.005	0.5	0.035	0.019	0.027	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D15	2.11	4.07	0.52	2.63	0.20	0.080	4.4	0.050	0.040	0.045	Roadside V-Ditch - 1 ft. deep, 3:1 sideslopes, n <sub>i</sub> = 0.035
D15	2.07	3.35	0.62	2.87	0.22	0.080	4.3	0.050	0.040	0.045	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D16	8.54	2.01	4.26	13.11	0.32	0.010	0.8	0.038	0.023	0.031	Swale Road Crossing - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D16	8.43	2.19	3.85	12.47	0.31	0.010	0.8	0.038	0.023	0.031	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D17	10.13	3.49	2.90	6.03	0.48	0.018	2.3	0.045	0.029	0.037	Trap. Channel - 1 ft. deep, 2.5:1 sideslopes, n <sub>i</sub> = 0.035
D17	9.98	3.34	2.99	6.11	0.49	0.018	2.3	0.045	0.029	0.037	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D18	9.18	3.08	2.98	10.97	0.27	0.030	2.1	0.045	0.031	0.038	Top Deck Swale - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D18	9.22	2.90	3.18	11.33	0.28	0.030	2.1	0.045	0.031	0.038	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D19	5.40	2.70	2.00	8.99	0.22	0.030	1.7	0.043	0.030	0.037	Top Deck Swale - 1 ft. deep, 10:1 sideslopes, n <sub>i</sub> = 0.035
D19	5.44	2.59	2.10	9.20	0.23	0.030	1.7	0.043	0.030	0.037	Reiteration of channel and D <sub>50</sub> calculations with new "n"
D20	1.51	1.30	1.17	4.11	0.28	0.005	0.3	0.033	0.018	0.026	Trap. Channel - 1 ft. deep, 2.5:1 sideslopes, n <sub>i</sub> = 0.035
D20	1.51	1.60	0.94	3.79	0.25	0.005	0.3	0.033	0.018	0.026	Reiteration of channel and D <sub>50</sub> calculations with new "n"

### Manning's Roughness Coefficient (n)

USDA-SCS (Ref. 2)  
 $n = 0.0395(D_{50})^{0.1667}$

USDA (Ref. 3)  
 $n = 0.047(D_{50} * S)^{0.147}$

### Rip-Rap Specification (Ref. 1)

D <sub>50</sub> = 3		D <sub>50</sub> = 6		D <sub>50</sub> = 12	
Size (in)	% Smaller	Size (in)	% Smaller	Size (in)	% Smaller
5	100	10	100	20	100
4	85	8	85	16	85
3	50	6	50	12	50
2	15	3	15	6	15

### References

- American Association of State Highway and Transportation Officials (AASHTO), 1991, Model Highway Drainage Manual, Washington D.C.
- United States Department of Agriculture, Soil Conservation Service (USDA-SCS), 1975, Standards and specifications for soil erosion and sediment control in developing areas, College Park, Maryland.
- United States Department of Agriculture, Natural Resources Conservation Service, Conservation Practice Standard CODE 468

**Table G-4**  
**SUMMARY OF CULVERT DESIGN**

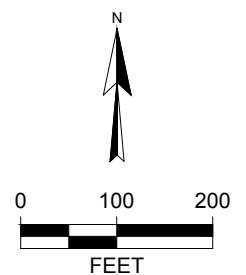
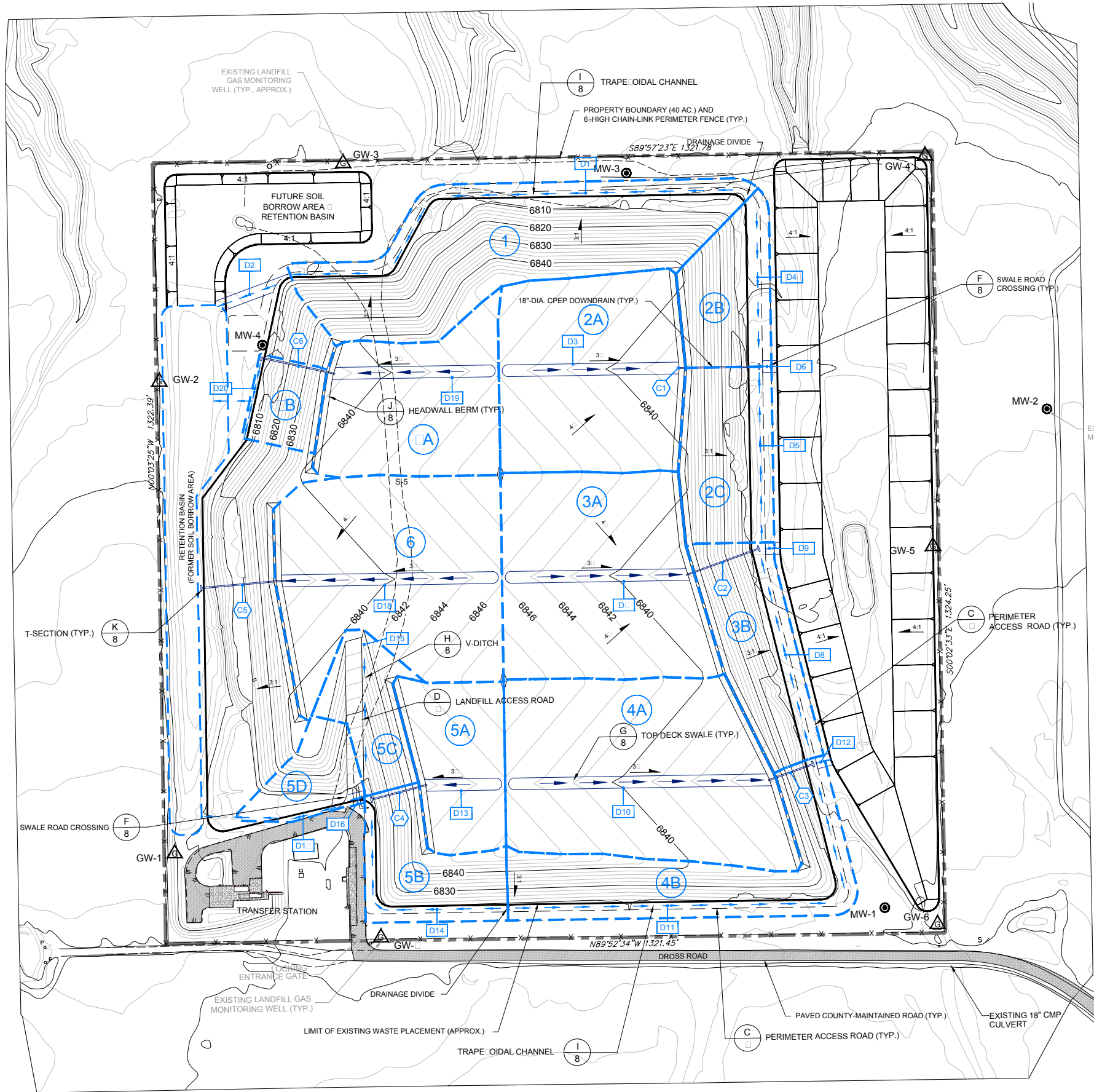
Culvert Number	Location <sup>1</sup>	Culvert Status at Closure	Contributing Flows			Pipe Design Data			Inlet Type <sup>3</sup>	Headwater Depth <sup>4</sup> (feet)	Flow Results		Outlet Type
			Channel	Sub-Area	Peak <sup>2</sup> (cfs)	Diameter (feet)	Length (feet)	Flowline Slope			Depth (feet)	Velocity (fps)	
C1A	Headwall Berm	New	D3	2A	7.72	2.0	20	3.0%	FES	1.6	0.53	11.7	n/a
C1B	Sideslope	New				1.5	116	33.3%	n/a	n/a	0.32	28.4	T-Section
C2A	Headwall Berm	New	D7	3A	8.73	2.5	20	3.0%	FES	1.6	0.56	12.1	n/a
C2B	Sideslope	New				1.5	108	33.3%	n/a	n/a	0.34	29.4	T-Section
C3A	Headwall Berm	New	D10	4A	10.19	2.5	20	3.0%	FES	1.7	0.61	12.7	n/a
C3B	Sideslope	New				1.5	56	33.3%	n/a	n/a	0.36	30.7	T-Section
C4A	Headwall Berm	New	D13	5A	3.29	2.5	20	3.0%	FES	1.0	0.34	9.1	n/a
C4B	Sideslope	New				1.5	74	33.3%	n/a	n/a	0.21	22.0	T-Section
C5A	Headwall Berm	New	D18	6	9.22	2.0	20	3.0%	FES	1.4	0.58	12.3	n/a
C5B	Sideslope	New				1.5	118	33.3%	n/a	n/a	0.35	29.9	T-Section
C6A	Headwall Berm	New	D19	7A	5.44	2.0	20	3.0%	FES	1.2	0.44	10.6	n/a
C6B	Sideslope	New				1.5	105	33.3%	n/a	n/a	0.27	25.6	L-Section

**Notes:**

1. Refer to Figure 1 (or SRK Drawing No. 146900.160-06) for culvert designations and locations.
2. See attached TR-55 data sheets and summary Table G-1 for peak flow data. Refer to Table G-2 for channel flow preceding culverts.
3. FES = flared end section.
4. Resulting headwater depth requirements for given flows and culvert diameter under inlet control. See attached inlet control data sheet for details.
5. All culverts are corrugated polyethylene pipe (CPEP, or CPT).



**Attachment 2: Figure 1 and Data Charts**



**LEGEND**

- MW-2 EXISTING GROUND WATER MONITORING WELL
- GW-□ PROPOSED LF GAS MONITORING WELL
- WASTE FOOTPRINT
- DRAINAGE CHANNEL
- HYDROLOGIC SUB-AREA DESIGNATION
- CULVERT DESIGNATION
- CHANNEL DESIGNATION
- OVERSIDE DRAIN W/ T-SECTION

NOTE: SEE DRAINAGE REPORT IN THE "PRELIMINARY CLOSURE AND POSTCLOSURE MAINTENANCE PLAN" FOR HYDROLOGIC ANALYSES.

SUMMARY OF OPEN CHANNEL DESIGN			
Channel No.	Description	Refer to Detail	Avg. Flowline Slope
D1	Trapezoidal Channel	I	0.5%
D2	Swale Road Crossing	F	0.5%
D3	Top Deck Swale	G	3.0%
D4	Trapezoidal Channel	I	0.5%
D5	Trapezoidal Channel	I	0.5%
D6	Swale Road Crossing	F	1.0%
D7	Top Deck Swale	G	3.0%
D8	Trapezoidal Channel	I	0.5%
D9	Swale Road Crossing	F	1.0%
D10	Top Deck Swale	G	3.0%
D11	Trapezoidal Channel	I	0.5%
D12	Swale Road Crossing	F	1.0%
D13	Top Deck Swale	G	3.0%
D14	Trapezoidal Channel	I	0.5%
D15	V-Ditch	H	8.0%
D16	Swale Road Crossing	F	1.0%
D17	Trapezoidal Channel	I	1.8%
D18	Top Deck Swale	G	3.0%
D19	Top Deck Swale	G	3.0%
D20	Trapezoidal Channel	I	0.5%

**srk consulting**

PREPARED BY: **srk consulting**

PROJECT: DRAINAGE FACILITY DESIGN REPORT  
PRELIMINARY CLOSURE / POSTCLOSURE PLAN  
PUMICE VALLEY LAND FILL

DRAWING TITLE: HYDROLOGIC SUB-AREA LAYOUT

FIGURE 1

DATE: 02/15/2013

SRK JOB NO.: 146900.160

REV. NO. **A**

DESIGN: EN

DRAWN: BCH

REVIEWED: -

CHECKED: EN

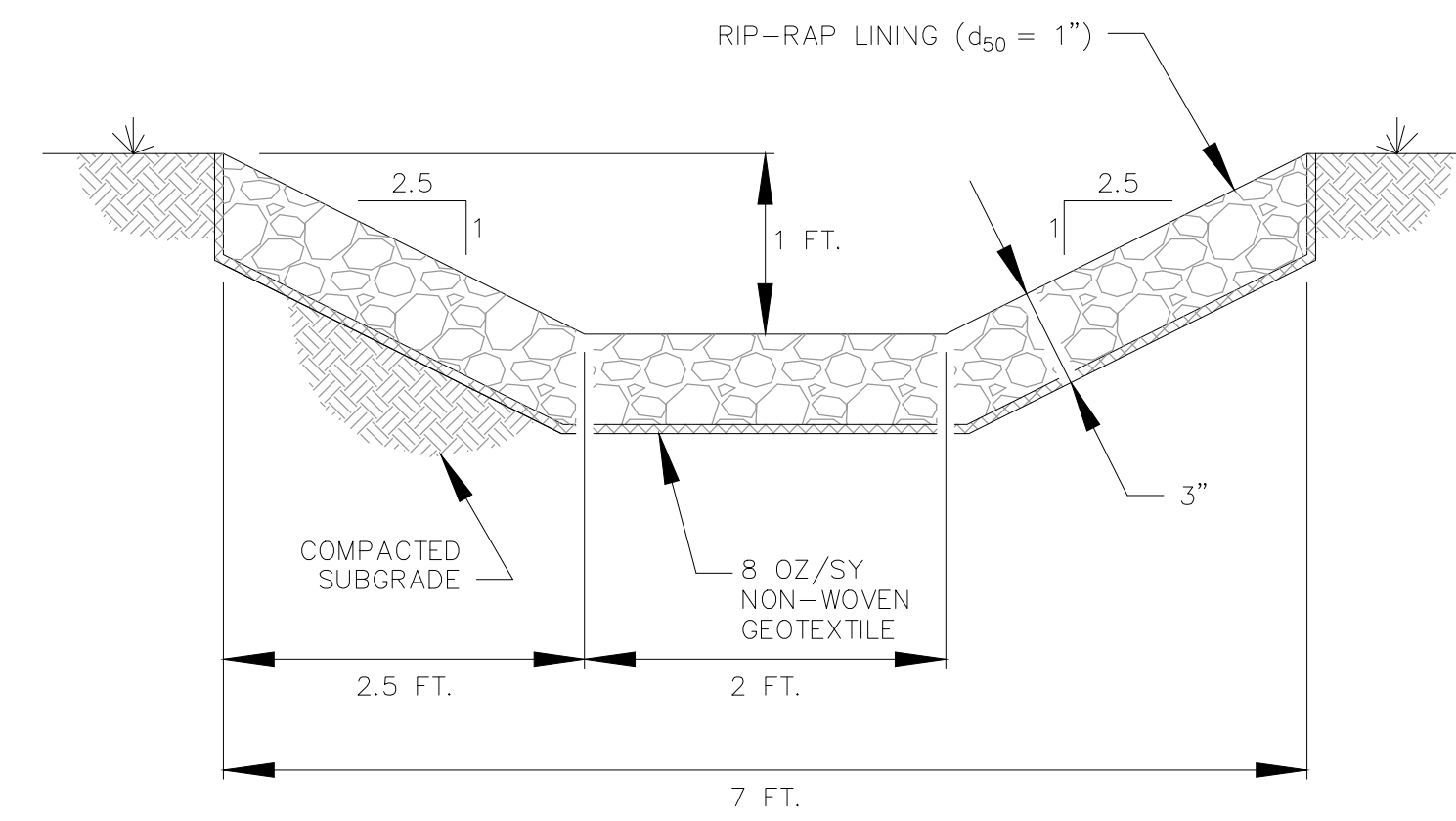
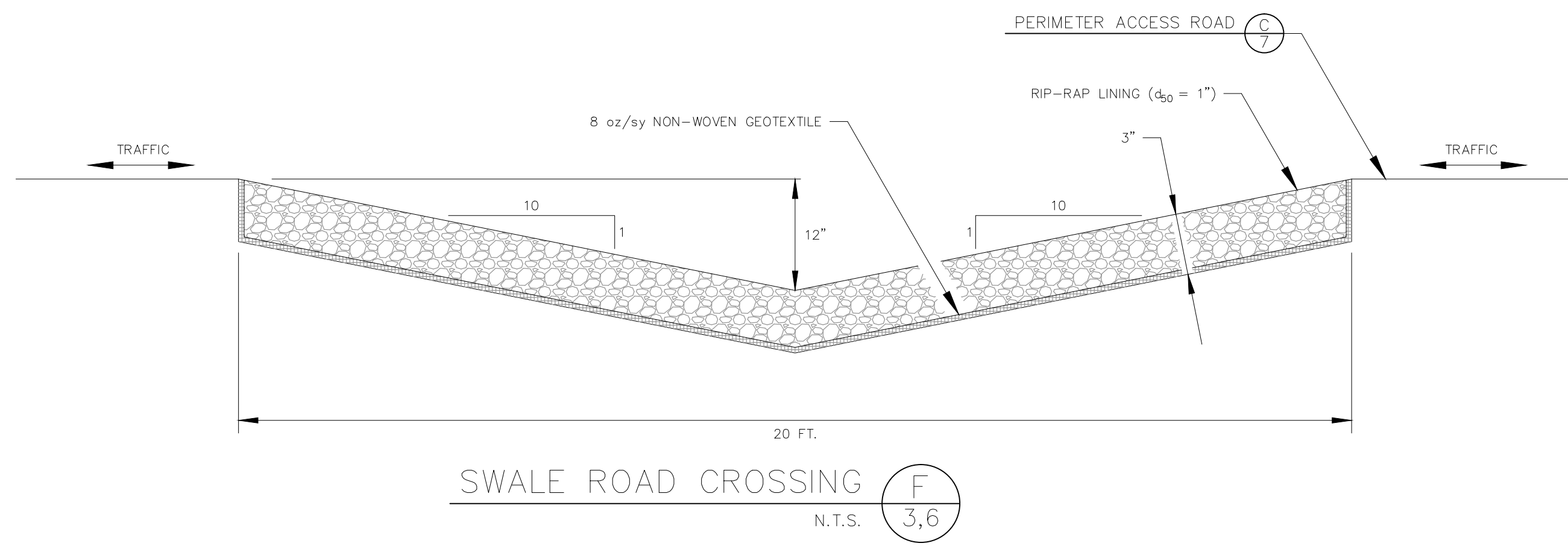
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REVISIONS

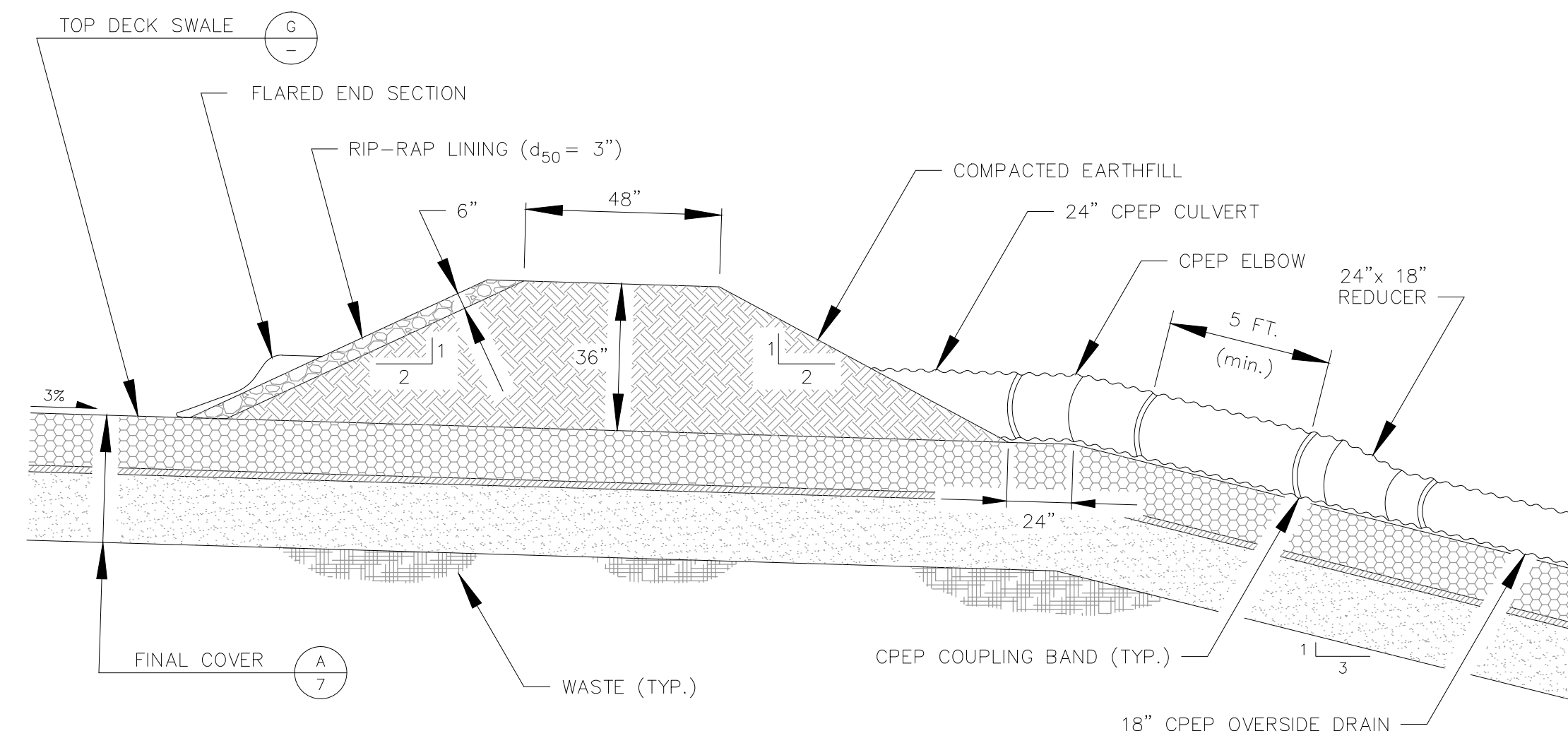
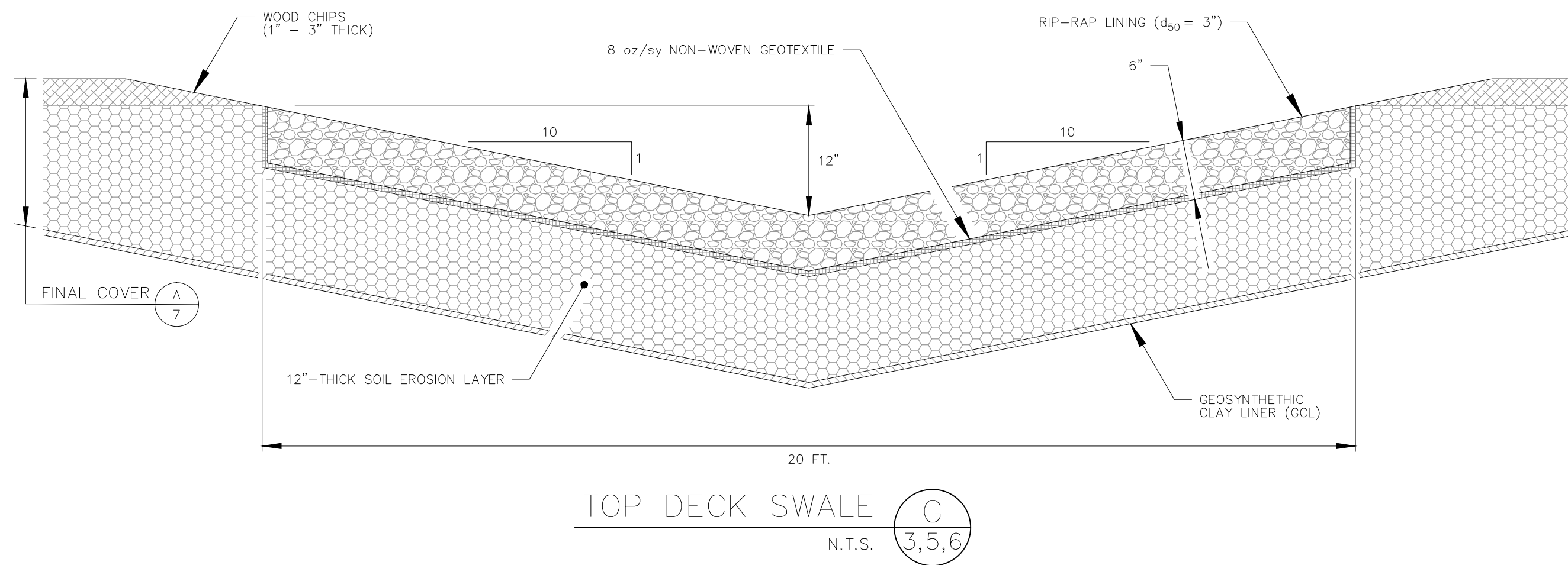
REV.	DESCRIPTION	DATE
A	REGULATORY REVIEW	02/15/13

FILE NAME: 146900.FIGURE1.dwg

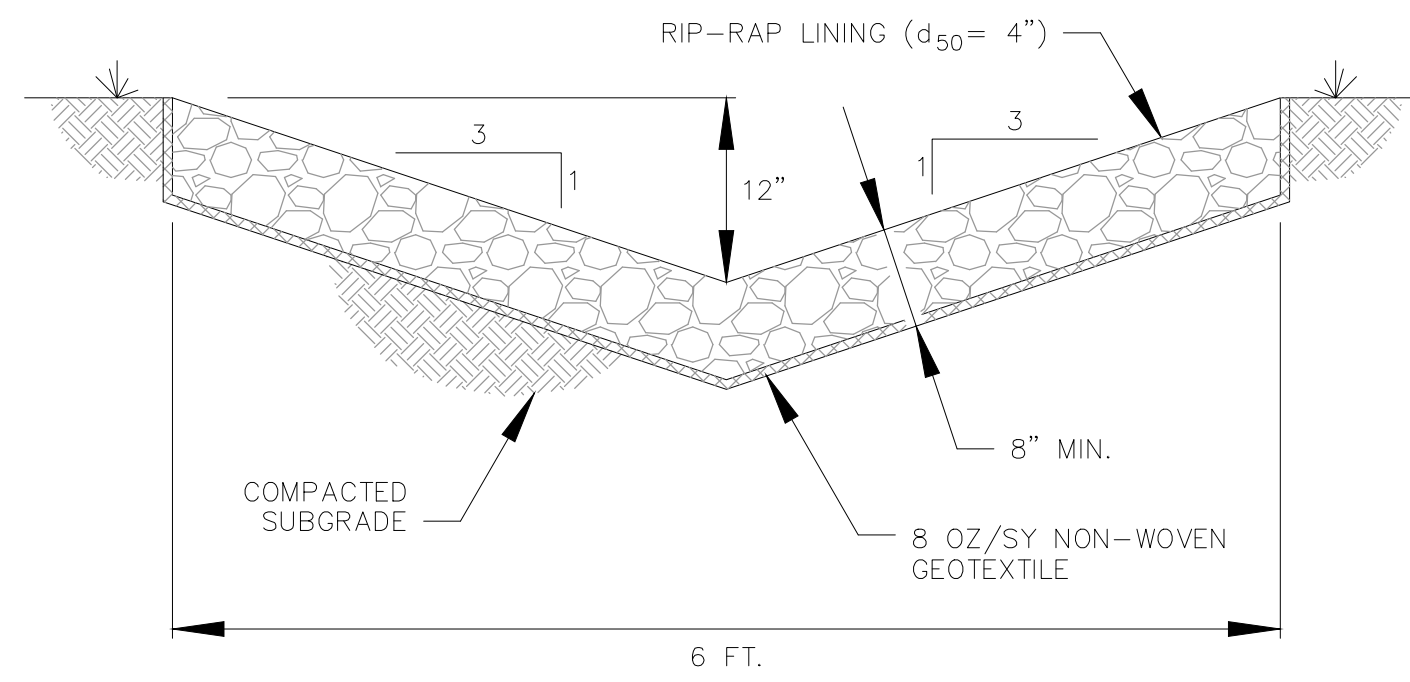
IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED



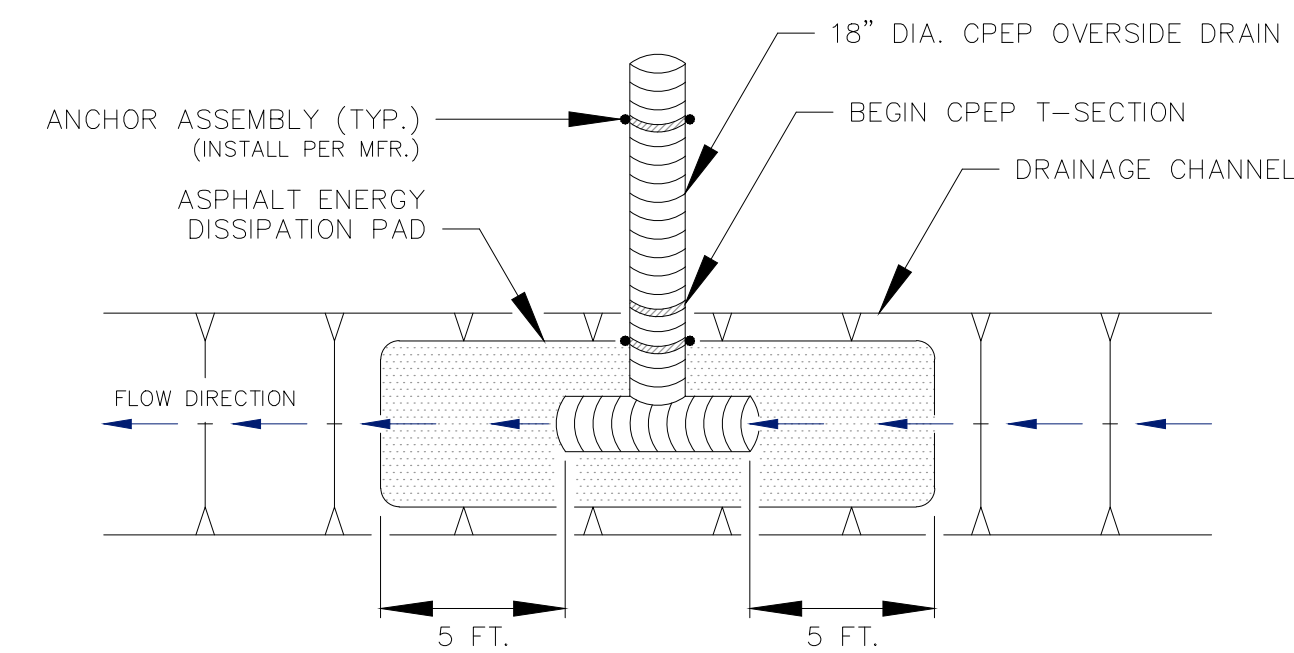
TRAPEZOIDAL CHANNEL (I)  
N.T.S. (3,6)



HEADWALL BERM (J)  
N.T.S. (3,5,6)



V-DITCH (H)  
N.T.S. (3,6)



T-SECTION (K)  
N.T.S. (3,6)

REVISIONS		DATE
REV.	DESCRIPTION	02/15/2013
A	SUBMITTED FOR REGULATORY REVIEW	

DESIGN: EN	FILE NAME: 146900_110DET02.dwg
DRAWN: TMM	
REVIEWED: RBB	
CHECKED: EN	
APPROVED: EN	
SHEET: 08 OF 08	

PREPARED BY:	srk consulting
PREPARED FOR:	MONO COUNTY OF PUBLIC WORKS SOLID WASTE DIVISION

DRAWING TITLE:	DETAILS, SHEET 2 OF 2
PROJECT:	PUMICE VALLEY LANDFILL JOINT TECHNICAL DOCUMENT
DATE: 02/15/2013	DRAWING NO. 146900.160-08
SRK JOB NO.: 146900.160	REV. NO. A



**NOAA Atlas 14, Volume 6, Version 2**  
**Location name: California, US\***  
**Coordinates: 37.9076, -119.0665**  
**Elevation: 6827ft\***  
\* source: Google Maps



**POINT PRECIPITATION FREQUENCY ESTIMATES**

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

**PF tabular**

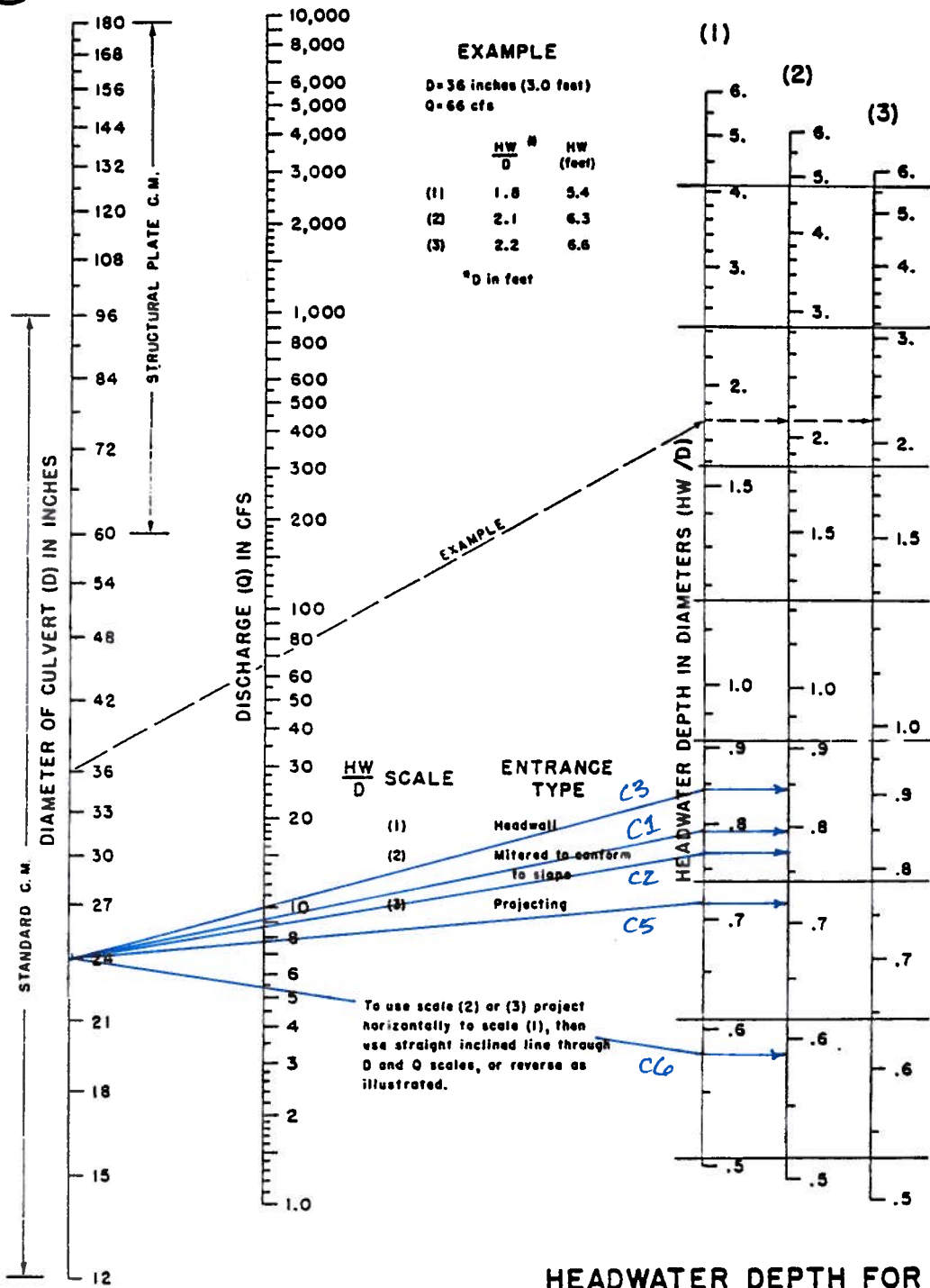
<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.105 (0.092-0.121)	0.141 (0.123-0.162)	0.190 (0.166-0.220)	0.233 (0.201-0.272)	0.295 (0.244-0.361)	0.346 (0.278-0.436)	0.402 (0.312-0.522)	0.463 (0.346-0.624)	0.552 (0.391-0.786)	0.627 (0.425-0.934)
10-min	0.151 (0.132-0.173)	0.202 (0.177-0.232)	0.273 (0.238-0.315)	0.334 (0.288-0.390)	0.423 (0.349-0.517)	0.496 (0.398-0.625)	0.576 (0.447-0.749)	0.663 (0.496-0.895)	0.791 (0.561-1.13)	0.899 (0.609-1.34)
15-min	0.182 (0.160-0.210)	0.244 (0.214-0.281)	0.330 (0.288-0.381)	0.404 (0.349-0.472)	0.511 (0.422-0.626)	0.600 (0.482-0.755)	0.696 (0.541-0.905)	0.802 (0.600-1.08)	0.956 (0.678-1.36)	1.09 (0.737-1.62)
30-min	0.246 (0.216-0.283)	0.329 (0.289-0.379)	0.445 (0.389-0.515)	0.545 (0.471-0.637)	0.690 (0.570-0.845)	0.810 (0.650-1.02)	0.940 (0.730-1.22)	1.08 (0.810-1.46)	1.29 (0.915-1.84)	1.47 (0.994-2.19)
60-min	0.334 (0.293-0.384)	0.447 (0.392-0.515)	0.604 (0.528-0.698)	0.739 (0.639-0.865)	0.936 (0.773-1.15)	1.10 (0.882-1.38)	1.28 (0.990-1.66)	1.47 (1.10-1.98)	1.75 (1.24-2.50)	1.99 (1.35-2.97)
2-hr	0.471 (0.413-0.541)	0.615 (0.539-0.708)	0.816 (0.713-0.943)	0.989 (0.854-1.16)	1.24 (1.02-1.52)	1.44 (1.16-1.82)	1.66 (1.29-2.16)	1.90 (1.42-2.57)	2.25 (1.59-3.20)	2.53 (1.72-3.77)
3-hr	0.576 (0.506-0.663)	0.746 (0.655-0.860)	0.982 (0.858-1.14)	1.18 (1.02-1.38)	1.47 (1.22-1.80)	1.71 (1.37-2.15)	1.96 (1.52-2.55)	2.23 (1.67-3.01)	2.62 (1.86-3.73)	2.94 (1.99-4.37)
6-hr	0.822 (0.722-0.945)	1.06 (0.925-1.22)	1.37 (1.20-1.59)	1.64 (1.42-1.92)	2.03 (1.67-2.48)	2.34 (1.88-2.94)	2.66 (2.07-3.46)	3.01 (2.25-4.06)	3.50 (2.48-4.98)	3.89 (2.64-5.80)
12-hr	1.16 (1.02-1.34)	1.51 (1.33-1.74)	1.98 (1.73-2.29)	2.38 (2.06-2.78)	2.93 (2.42-3.59)	3.37 (2.70-4.24)	3.82 (2.97-4.97)	4.30 (3.22-5.81)	4.97 (3.52-7.08)	5.50 (3.73-8.20)
24-hr	1.62 (1.44-1.86)	2.14 (1.90-2.46)	2.84 (2.51-3.27)	3.41 (3.00-3.97)	4.21 (3.57-5.07)	4.84 (4.02-5.94)	5.48 (4.44-6.91)	6.16 (4.84-7.98)	7.09 (5.34-9.59)	7.82 (5.69-11.0)
2-day	2.06 (1.83-2.36)	2.70 (2.40-3.11)	3.57 (3.16-4.11)	4.28 (3.76-4.97)	5.26 (4.47-6.33)	6.03 (5.01-7.41)	6.83 (5.53-8.60)	7.66 (6.03-9.93)	8.80 (6.64-11.9)	9.70 (7.06-13.6)
3-day	2.29 (2.03-2.62)	3.00 (2.66-3.45)	3.96 (3.50-4.56)	4.74 (4.17-5.51)	5.83 (4.95-7.01)	6.68 (5.55-8.21)	7.56 (6.12-9.52)	8.47 (6.66-11.0)	9.72 (7.33-13.2)	10.7 (7.80-15.0)
4-day	2.47 (2.20-2.83)	3.24 (2.88-3.72)	4.27 (3.78-4.92)	5.12 (4.50-5.95)	6.30 (5.34-7.57)	7.21 (5.99-8.86)	8.15 (6.60-10.3)	9.13 (7.19-11.8)	10.5 (7.91-14.2)	11.5 (8.40-16.2)
7-day	2.82 (2.50-3.23)	3.71 (3.29-4.26)	4.90 (4.34-5.65)	5.89 (5.17-6.85)	7.25 (6.15-8.72)	8.30 (6.90-10.2)	9.38 (7.60-11.8)	10.5 (8.26-13.6)	12.0 (9.08-16.3)	13.2 (9.63-18.5)
10-day	3.00 (2.66-3.44)	3.97 (3.52-4.56)	5.27 (4.67-6.07)	6.34 (5.57-7.37)	7.82 (6.63-9.40)	8.96 (7.44-11.0)	10.1 (8.19-12.7)	11.3 (8.91-14.7)	13.0 (9.77-17.5)	14.2 (10.3-19.9)
20-day	3.76 (3.35-4.32)	5.04 (4.47-5.79)	6.73 (5.96-7.76)	8.12 (7.13-9.43)	10.0 (8.49-12.0)	11.5 (9.52-14.1)	12.9 (10.5-16.3)	14.4 (11.4-18.7)	16.4 (12.4-22.2)	18.0 (13.1-25.2)
30-day	4.34 (3.86-4.98)	5.83 (5.18-6.70)	7.82 (6.92-9.01)	9.43 (8.28-11.0)	11.6 (9.87-14.0)	13.3 (11.0-16.3)	15.0 (12.1-18.9)	16.6 (13.1-21.6)	18.9 (14.2-25.5)	20.5 (14.9-28.8)
45-day	5.23 (4.65-6.01)	7.06 (6.27-8.11)	9.44 (8.36-10.9)	11.4 (9.98-13.2)	14.0 (11.9-16.8)	15.9 (13.2-19.6)	17.9 (14.5-22.5)	19.8 (15.6-25.7)	22.4 (16.9-30.3)	24.2 (17.6-33.9)
60-day	6.00 (5.33-6.88)	8.08 (7.18-9.29)	10.8 (9.56-12.4)	13.0 (11.4-15.1)	15.9 (13.5-19.1)	18.1 (15.0-22.2)	20.3 (16.4-25.5)	22.4 (17.6-29.0)	25.1 (18.9-34.0)	27.1 (19.7-38.0)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

**PF graphical**

**CHART 2**



**HEADWATER DEPTH FOR C. M. PIPE CULVERTS WITH INLET CONTROL**



**TYPICAL INLET CONTROL CONDITIONS**

## **Attachment 3: TR-55 Hydrologic Analyses**

WinTR-55 Current Data Description

--- Identification Data ---

User: E.Nikirk Date: 2/15/2013  
 Project: Pumice Valley Landfill PCPMP Units: English  
 SubTitle: Sub-Area 1 at Closure (100-Year Storm) Areal Units: Acres  
 State: California  
 County: Mono  
 Filename: H:\Mono County\146900.160\_PV LF JTD Update\020\_Project Data\Stormwater\PVLF\_PCPMP\_TR55\_Subareal\_1469

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
1A	North Sideslope	Outlet	2.78	70	.145

Total area: 2.78 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	500-Yr (in)
2.14	2.84	3.41	4.21	4.84	5.48	.0

Storm Data Source: User-provided custom storm data  
 Rainfall Distribution Type: Type II  
 Dimensionless Unit Hydrograph: <standard>

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Pumice Valley Landfill PCPMP  
Sub-Area 1 at Closure (100-Year Storm)  
Mono County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
1A	Sagebrush (w/ grass understory)	(fair)	D	2.778	70
Total Area / Weighted Curve Number				2.78	70
				====	==





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Pumice Valley Landfill PCPMP  
Sub-Area 1 at Closure (100-Year Storm)  
Mono County, California

Hydrograph Peak/Peak Time Table

Sub-Area Peak Flow and Peak Time (hr) by Rainfall Return Period  
or Reach ANALYSIS:  
Identifier (cfs)  
(hr)

-----  
SUBAREAS

1A 9.47  
11.98

REACHES

OUTLET 9.47

WinTR-55 Current Data Description

--- Identification Data ---

User: E.Nikirk Date: 2/15/2013  
 Project: Pumice Valley Landfill PCPMP Units: English  
 SubTitle: Sub-Area 2 at Closure (100-Year Storm) Areal Units: Acres  
 State: California  
 County: Mono  
 Filename: H:\Mono County\146900.160\_PV LF JTD Update\020\_Project Data\Stormwater\TR55\PVLF\_PCPMP\_TR55\_Subarea2

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
2A	Top Deck, NE Crnr	Outlet	2.35	70	.175
2B	Sideslope, NE Crnr	Outlet	0.84	70	0.1
2C	Sideslope, E-Central	Outlet	1.05	70	.106

Total area: 4.24 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	500-Yr (in)
2.14	2.84	3.41	4.21	4.84	5.48	.0

Storm Data Source: User-provided custom storm data  
 Rainfall Distribution Type: Type II  
 Dimensionless Unit Hydrograph: <standard>

Pumice Valley Landfill PCPMP  
 Sub-Area 2 at Closure (100-Year Storm)  
 Mono County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
2A	Sagebrush (w/ grass understory)	(fair)	D	2.351	70
	Total Area / Weighted Curve Number			2.35	70
				====	==
2B	Sagebrush (w/ grass understory)	(fair)	D	.844	70
	Total Area / Weighted Curve Number			.84	70
				===	==
2C	Sagebrush (w/ grass understory)	(fair)	D	1.053	70
	Total Area / Weighted Curve Number			1.05	70
				====	==

Pumice Valley Landfill PCPMP  
 Sub-Area 2 at Closure (100-Year Storm)  
 Mono County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
-----							
2A							
SHEET	100	0.0400	0.150				0.151
SHALLOW	115	0.0400	0.050				0.010
CHANNEL	135	0.0300	0.038	2.78	10.60	2.885	0.013
CHANNEL	145	0.3333	0.010	0.26	1.41	40.278	0.001
							Time of Concentration
							.175
							=====
2B							
SHEET	95	0.3333	0.150				0.062
SHALLOW	40	0.0500	0.050				0.003
CHANNEL	155	0.0050	0.027	1.61	4.67	1.957	0.022
							Time of Concentration
							0.1
							=====
2C							
SHEET	100	0.3333	0.150				0.065
SHALLOW	25	0.3333	0.050				0.001
CHANNEL	290	0.0050	0.027	1.88	4.99	2.014	0.040
							Time of Concentration
							.106
							=====

Pumice Valley Landfill PCPMP  
Sub-Area 2 at Closure (100-Year Storm)  
Mono County, California

Hydrograph Peak/Peak Time Table

Sub-Area Peak Flow and Peak Time (hr) by Rainfall Return Period  
or Reach ANALYSIS:  
Identifier (cfs)  
(hr)

-----  
SUBAREAS

2A 7.72  
12.00

2B 3.08  
11.93

2C 3.82  
11.94

REACHES

OUTLET 14.10

WinTR-55 Current Data Description

--- Identification Data ---

User: E.Nikirk Date: 2/15/2013  
 Project: Pumice Valley Landfill PCPMP Units: English  
 SubTitle: Sub-Area 2 at Closure (100-Year Storm) Areal Units: Acres  
 State: California  
 County: Mono  
 Filename: H:\Mono County\146900.160\_PV LF JTD Update\020\_Project Data\Stormwater\TR55\PVLF\_PCPMP\_TR55\_Subarea3

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
3A	Top Deck, East-Central	Outlet	2.66	70	.177
3B	Sideslope, SE Crnr	Outlet	1.11	70	0.1

Total area: 3.77 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	500-Yr (in)
2.14	2.84	3.41	4.21	4.84	5.48	.0

Storm Data Source: User-provided custom storm data  
 Rainfall Distribution Type: Type II  
 Dimensionless Unit Hydrograph: <standard>

Pumice Valley Landfill PCPMP  
 Sub-Area 2 at Closure (100-Year Storm)  
 Mono County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
3A	Sagebrush (w/ grass understory)	(fair)	D	2.658	70
	Total Area / Weighted Curve Number			2.66	70
				====	==
3B	Sagebrush (w/ grass understory)	(fair)	D	1.107	70
	Total Area / Weighted Curve Number			1.11	70
				====	==





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Pumice Valley Landfill PCPMP  
Sub-Area 2 at Closure (100-Year Storm)  
Mono County, California

Hydrograph Peak/Peak Time Table

Sub-Area Peak Flow and Peak Time (hr) by Rainfall Return Period  
or Reach ANALYSIS:  
Identifier (cfs)  
(hr)

-----  
SUBAREAS

3A 8.73  
12.01

3B 4.07  
11.93

REACHES

OUTLET 12.39

WinTR-55 Current Data Description

--- Identification Data ---

User: E.Nikirk Date: 2/15/2013  
 Project: Pumice Valley Landfill PCPMP Units: English  
 SubTitle: Sub-Area 4 at Closure (100-Year Storm) Areal Units: Acres  
 State: California  
 County: Mono  
 Filename: H:\Mono County\146900.160\_PV LF JTD Update\020\_Project Data\Stormwater\TR55\PVLF\_PCPMP\_TR55\_Subarea4

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
4A	Top Deck	Outlet	3.15	70	.188
4B	Sideslope, SE Crnr	Outlet	1.65	70	.162

Total area: 4.80 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	500-Yr (in)
2.14	2.84	3.41	4.21	4.84	5.48	.0

Storm Data Source: User-provided custom storm data  
 Rainfall Distribution Type: Type II  
 Dimensionless Unit Hydrograph: <standard>

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Pumice Valley Landfill PCPMP  
Sub-Area 4 at Closure (100-Year Storm)  
Mono County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
4A	Sagebrush (w/ grass understory)	(fair)	D	3.145	70
	Total Area / Weighted Curve Number			3.15	70
				====	==
4B	Sagebrush (w/ grass understory)	(fair)	D	1.651	70
	Total Area / Weighted Curve Number			1.65	70
				====	==

Pumice Valley Landfill PCPMP  
 Sub-Area 4 at Closure (100-Year Storm)  
 Mono County, California

## Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
-----							
4A							
SHEET	100	0.0400	0.150				0.151
SHALLOW	60	0.0400	0.050				0.005
CHANNEL	330	0.0300	0.038	3.42	11.76	2.957	0.031
CHANNEL	85	0.3333	0.010	0.25	1.49	23.611	0.001
					Time of Concentration		.188
							=====
4B							
SHEET	95	0.3333	0.150				0.062
CHANNEL	785	0.0050	0.028	2.52	5.67	2.181	0.100
					Time of Concentration		.162
							=====

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Pumice Valley Landfill PCPMP  
Sub-Area 4 at Closure (100-Year Storm)  
Mono County, California

Hydrograph Peak/Peak Time Table

Sub-Area Peak Flow and Peak Time (hr) by Rainfall Return Period  
or Reach ANALYSIS:  
Identifier (cfs)  
(hr)

-----  
SUBAREAS

4A 10.19  
12.01

4B 5.51  
12.00

REACHES

OUTLET 15.66

WinTR-55 Current Data Description

--- Identification Data ---

User: E.Nikirk Date: 2/15/2013  
 Project: Pumice Valley Landfill PCPMP Units: English  
 SubTitle: Sub-Area 5 at Closure (100-Year Storm) Areal Units: Acres  
 State: California  
 County: Mono  
 Filename: H:\Mono County\146900.160\_PV LF JTD Update\020\_Project Data\Stormwater\TR55\PVLF\_PCPMP\_TR55\_Subarea5

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
5A	Top Deck, SW Crnr	Outlet	1.04	70	.208
5B	Sideslope, SW Crnr	Outlet	0.9	70	.146
5C	Top Deck Access Road	Outlet	0.65	70	.203
5D	Sideslope, SW Crnr	Outlet	0.5	70	.102

Total area: 3.09 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	500-Yr (in)
2.14	2.84	3.41	4.21	4.84	5.48	.0

Storm Data Source: User-provided custom storm data  
 Rainfall Distribution Type: Type II  
 Dimensionless Unit Hydrograph: <standard>

Pumice Valley Landfill PCPMP  
 Sub-Area 5 at Closure (100-Year Storm)  
 Mono County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
5A	Sagebrush (w/ grass understory)	(fair)	D	1.037	70
	Total Area / Weighted Curve Number			1.04	70
				====	==
5B	Sagebrush (w/ grass understory)	(fair)	D	.899	70
	Total Area / Weighted Curve Number			.9	70
				==	==
5C	Sagebrush (w/ grass understory)	(fair)	D	.653	70
	Total Area / Weighted Curve Number			.65	70
				===	==
5D	Sagebrush (w/ grass understory)	(fair)	D	.502	70
	Total Area / Weighted Curve Number			.5	70
				==	==



Pumice Valley Landfill PCPMP  
 Sub-Area 5 at Closure (100-Year Storm)  
 Mono County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
<b>5A</b>							
SHEET	100	0.0400	0.150				0.151
SHALLOW	90	0.0400	0.050				0.008
SHALLOW	110	0.0180	0.050				0.014
CHANNEL	100	0.3333	0.010	0.45	1.75	27.778	0.001
CHANNEL	220	0.0180	0.036	1.41	7.54	1.797	0.034
							Time of Concentration .208
							=====
<b>5B</b>							
SHEET	100	0.3333	0.150				0.065
SHALLOW	5	0.3333	0.050				0.000
CHANNEL	390	0.0050	0.027	1.61	4.67	1.935	0.056
CHANNEL	220	0.0180	0.037	1.27	4.25	2.444	0.025
							Time of Concentration .146
							=====
<b>5C</b>							
SHEET	100	0.0400	0.150				0.151
SHALLOW	15	0.0400	0.050				0.001
CHANNEL	280	0.0800	0.045	0.62	2.87	3.382	0.023
CHANNEL	220	0.0180	0.037	0.96	3.82	2.183	0.028
							Time of Concentration .203
							=====
<b>5D</b>							
SHEET	35	0.0400	0.150				0.065
SHALLOW	45	0.3333	0.050				0.001
SHALLOW	90	0.0520	0.050				0.007
CHANNEL	220	0.0180	0.037	0.88	3.70	2.107	0.029
							Time of Concentration .102
							=====

Pumice Valley Landfill PCPMP  
Sub-Area 5 at Closure (100-Year Storm)  
Mono County, California

Hydrograph Peak/Peak Time Table

Sub-Area Peak Flow and Peak Time (hr) by Rainfall Return Period  
or Reach ANALYSIS:  
Identifier (cfs)  
(hr)

-----  
SUBAREAS

5A 3.29  
12.03

5B 3.07  
11.98

5C 2.07  
12.03

5D 1.83  
11.94

REACHES

OUTLET 9.98

WinTR-55 Current Data Description

--- Identification Data ---

User: E.Nikirk Date: 2/15/2013  
 Project: Pumice Valley Landfill PCPMP Units: English  
 SubTitle: Sub-Area 6 at Closure (100-Year Storm) Areal Units: Acres  
 State: California  
 County: Mono  
 Filename: H:\Mono County\146900.160\_PV LF JTD Update\020\_Project Data\Stormwater\TR55\PVLF\_PCPMP\_TR55\_Subarea6

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
6A	Top Deck, W-Central	Outlet	2.83	70	.182

Total area: 2.83 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	500-Yr (in)
2.14	2.84	3.41	4.21	4.84	5.48	.0

Storm Data Source: User-provided custom storm data  
 Rainfall Distribution Type: Type II  
 Dimensionless Unit Hydrograph: <standard>

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Pumice Valley Landfill PCPMP  
Sub-Area 6 at Closure (100-Year Storm)  
Mono County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
6A	Sagebrush (w/ grass understory)	(fair) D	2.83	70
Total Area / Weighted Curve Number			2.83	70
			====	==

Pumice Valley Landfill PCPMP  
 Sub-Area 6 at Closure (100-Year Storm)  
 Mono County, California

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
-----							
6A							
SHEET	100	0.0400	0.150				0.151
SHALLOW	160	0.0400	0.050				0.014
CHANNEL	175	0.0300	0.038	3.18	11.33	2.859	0.017
Time of Concentration							.182
							=====

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Pumice Valley Landfill PCPMP  
Sub-Area 6 at Closure (100-Year Storm)  
Mono County, California

Hydrograph Peak/Peak Time Table

Sub-Area Peak Flow and Peak Time (hr) by Rainfall Return Period  
or Reach ANALYSIS:  
Identifier (cfs)  
(hr)

-----  
SUBAREAS

6A 9.22  
12.01

REACHES

OUTLET 9.22

WinTR-55 Current Data Description

--- Identification Data ---

User: E.Nikirk Date: 2/15/2013  
 Project: Pumice Valley Landfill PCPMP Units: English  
 SubTitle: Sub-Area 7 at Closure (100-Year Storm) Areal Units: Acres  
 State: California  
 County: Mono  
 Filename: H:\Mono County\146900.160\_PV LF JTD Update\020\_Project Data\Stormwater\TR55\PVLF\_PCPMP\_TR55\_Subarea7

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
7A	Top Deck, NW Crnr	Outlet	1.67	70	.182
7B	Sideslope, NW Crnr	Outlet	0.41	70	0.1

Total area: 2.08 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	500-Yr (in)
2.14	2.84	3.41	4.21	4.84	5.48	.0

Storm Data Source: User-provided custom storm data  
 Rainfall Distribution Type: Type II  
 Dimensionless Unit Hydrograph: <standard>

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Pumice Valley Landfill PCPMP  
Sub-Area 7 at Closure (100-Year Storm)  
Mono County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
7A	Sagebrush (w/ grass understory)	(fair)	D	1.672	70
	Total Area / Weighted Curve Number			1.67	70
				====	==
7B	Sagebrush (w/ grass understory)	(fair)	D	.406	70
	Total Area / Weighted Curve Number			.41	70
				===	==





Pumice Valley Landfill PCPMP  
Sub-Area 7 at Closure (100-Year Storm)  
Mono County, California

Hydrograph Peak/Peak Time Table

Sub-Area Peak Flow and Peak Time (hr) by Rainfall Return Period  
or Reach ANALYSIS:  
Identifier (cfs)  
(hr)

-----  
SUBAREAS

7A 5.44  
12.01

7B 1.51  
11.93

REACHES

OUTLET 6.79

## **Attachment 4: FlowMaster Hydraulic Analyses**

---

## Channel D1 - Perimeter Trap. Channel (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.029	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.50	ft/ft (H:V)
Right Side Slope	2.50	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	9.47	ft <sup>3</sup> /s

### Results

Normal Depth	0.90	ft
Flow Area	3.85	ft <sup>2</sup>
Wetted Perimeter	6.86	ft
Hydraulic Radius	0.56	ft
Top Width	6.52	ft
Critical Depth	0.67	ft
Critical Slope	0.01690	ft/ft
Velocity	2.46	ft/s
Velocity Head	0.09	ft
Specific Energy	1.00	ft
Froude Number	0.57	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.90	ft
Critical Depth	0.67	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01690	ft/ft

---

## Channel D2 - Swale Road Crossing (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.027	
Channel Slope	0.00500	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	9.47	ft <sup>3</sup> /s

### Results

Normal Depth	0.70	ft
Flow Area	4.91	ft <sup>2</sup>
Wetted Perimeter	14.09	ft
Hydraulic Radius	0.35	ft
Top Width	14.02	ft
Critical Depth	0.56	ft
Critical Slope	0.01633	ft/ft
Velocity	1.93	ft/s
Velocity Head	0.06	ft
Specific Energy	0.76	ft
Froude Number	0.57	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.70	ft
Critical Depth	0.56	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01633	ft/ft

---

## Channel D3 - Top Deck Swale (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.038	
Channel Slope	0.03000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	7.72	ft <sup>3</sup> /s

### Results

Normal Depth	0.53	ft
Flow Area	2.78	ft <sup>2</sup>
Wetted Perimeter	10.60	ft
Hydraulic Radius	0.26	ft
Top Width	10.55	ft
Critical Depth	0.52	ft
Critical Slope	0.03324	ft/ft
Velocity	2.78	ft/s
Velocity Head	0.12	ft
Specific Energy	0.65	ft
Froude Number	0.95	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.53	ft
Critical Depth	0.52	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.03324	ft/ft

---

## Channel D4 - Perimeter Trap. Channel (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.027	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.50	ft/ft (H:V)
Right Side Slope	2.50	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	3.08	ft <sup>3</sup> /s

### Results

Normal Depth	0.50	ft
Flow Area	1.61	ft <sup>2</sup>
Wetted Perimeter	4.67	ft
Hydraulic Radius	0.34	ft
Top Width	4.48	ft
Critical Depth	0.36	ft
Critical Slope	0.01716	ft/ft
Velocity	1.91	ft/s
Velocity Head	0.06	ft
Specific Energy	0.55	ft
Froude Number	0.56	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.36	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01716	ft/ft

---

## Channel D5 - Perimeter Trap. Channel (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.027	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.50	ft/ft (H:V)
Right Side Slope	2.50	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	3.82	ft <sup>3</sup> /s

### Results

Normal Depth	0.55	ft
Flow Area	1.88	ft <sup>2</sup>
Wetted Perimeter	4.99	ft
Hydraulic Radius	0.38	ft
Top Width	4.77	ft
Critical Depth	0.41	ft
Critical Slope	0.01663	ft/ft
Velocity	2.03	ft/s
Velocity Head	0.06	ft
Specific Energy	0.62	ft
Froude Number	0.57	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.41	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01663	ft/ft



---

## Channel D6 - Swale Road Crossing (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.032	
Channel Slope	0.01000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	14.10	ft <sup>3</sup> /s

### Results

Normal Depth	0.76	ft
Flow Area	5.80	ft <sup>2</sup>
Wetted Perimeter	15.31	ft
Hydraulic Radius	0.38	ft
Top Width	15.23	ft
Critical Depth	0.66	ft
Critical Slope	0.02176	ft/ft
Velocity	2.43	ft/s
Velocity Head	0.09	ft
Specific Energy	0.85	ft
Froude Number	0.69	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.76	ft
Critical Depth	0.66	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.02176	ft/ft

---

## Channel D7 - Top Deck Swale (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.038	
Channel Slope	0.03000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	8.73	ft <sup>3</sup> /s

### Results

Normal Depth	0.55	ft
Flow Area	3.05	ft <sup>2</sup>
Wetted Perimeter	11.10	ft
Hydraulic Radius	0.27	ft
Top Width	11.04	ft
Critical Depth	0.54	ft
Critical Slope	0.03270	ft/ft
Velocity	2.86	ft/s
Velocity Head	0.13	ft
Specific Energy	0.68	ft
Froude Number	0.96	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.54	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.03270	ft/ft

---

## Channel D8 - Perimeter Trap. Channel (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.027	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.50	ft/ft (H:V)
Right Side Slope	2.50	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	4.07	ft <sup>3</sup> /s

### Results

Normal Depth	0.57	ft
Flow Area	1.97	ft <sup>2</sup>
Wetted Perimeter	5.09	ft
Hydraulic Radius	0.39	ft
Top Width	4.87	ft
Critical Depth	0.42	ft
Critical Slope	0.01648	ft/ft
Velocity	2.07	ft/s
Velocity Head	0.07	ft
Specific Energy	0.64	ft
Froude Number	0.57	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.57	ft
Critical Depth	0.42	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01648	ft/ft

---

## Channel D9 - Swale Road Crossing (PV LF PCPMP)

---

### Project Description

Friction Method                      Manning Formula  
Solve For                                Normal Depth

### Input Data

Roughness Coefficient	0.031	
Channel Slope	0.01000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	12.39	ft <sup>3</sup> /s

### Results

Normal Depth	0.72	ft
Flow Area	5.14	ft <sup>2</sup>
Wetted Perimeter	14.41	ft
Hydraulic Radius	0.36	ft
Top Width	14.34	ft
Critical Depth	0.63	ft
Critical Slope	0.02077	ft/ft
Velocity	2.41	ft/s
Velocity Head	0.09	ft
Specific Energy	0.81	ft
Froude Number	0.71	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.72	ft
Critical Depth	0.63	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.02077	ft/ft

---

## Channel D10 - Top Deck Swale (PV LF PCPMP)

---

### Project Description

Friction Method                      Manning Formula  
Solve For                                Normal Depth

### Input Data

Roughness Coefficient	0.038	
Channel Slope	0.03000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	10.19	ft <sup>3</sup> /s

### Results

Normal Depth	0.59	ft
Flow Area	3.42	ft <sup>2</sup>
Wetted Perimeter	11.76	ft
Hydraulic Radius	0.29	ft
Top Width	11.70	ft
Critical Depth	0.58	ft
Critical Slope	0.03204	ft/ft
Velocity	2.98	ft/s
Velocity Head	0.14	ft
Specific Energy	0.72	ft
Froude Number	0.97	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.59	ft
Critical Depth	0.58	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.03204	ft/ft

---

## Channel D11 - Perimeter Trap. Channel (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.028	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.50	ft/ft (H:V)
Right Side Slope	2.50	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	5.51	ft <sup>3</sup> /s

### Results

Normal Depth	0.68	ft
Flow Area	2.52	ft <sup>2</sup>
Wetted Perimeter	5.67	ft
Hydraulic Radius	0.44	ft
Top Width	5.40	ft
Critical Depth	0.50	ft
Critical Slope	0.01698	ft/ft
Velocity	2.19	ft/s
Velocity Head	0.07	ft
Specific Energy	0.76	ft
Froude Number	0.56	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.68	ft
Critical Depth	0.50	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01698	ft/ft

---

## Channel D12 - Swale Road Crossing (PV LF PCPMP)

---

### Project Description

Friction Method                      Manning Formula  
Solve For                                Normal Depth

### Input Data

Roughness Coefficient	0.032	
Channel Slope	0.01000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	15.66	ft <sup>3</sup> /s

### Results

Normal Depth	0.79	ft
Flow Area	6.28	ft <sup>2</sup>
Wetted Perimeter	15.92	ft
Hydraulic Radius	0.39	ft
Top Width	15.84	ft
Critical Depth	0.69	ft
Critical Slope	0.02145	ft/ft
Velocity	2.50	ft/s
Velocity Head	0.10	ft
Specific Energy	0.89	ft
Froude Number	0.70	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.79	ft
Critical Depth	0.69	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.02145	ft/ft

---

## Channel D13 - Top Deck Swale (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.036	
Channel Slope	0.03000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	3.29	ft <sup>3</sup> /s

### Results

Normal Depth	0.38	ft
Flow Area	1.41	ft <sup>2</sup>
Wetted Perimeter	7.54	ft
Hydraulic Radius	0.19	ft
Top Width	7.51	ft
Critical Depth	0.37	ft
Critical Slope	0.03343	ft/ft
Velocity	2.34	ft/s
Velocity Head	0.08	ft
Specific Energy	0.46	ft
Froude Number	0.95	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.38	ft
Critical Depth	0.37	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.03343	ft/ft



---

## Channel D14 - Perimeter Trap. Channel (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.027	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.50	ft/ft (H:V)
Right Side Slope	2.50	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	3.07	ft <sup>3</sup> /s

### Results

Normal Depth	0.50	ft
Flow Area	1.61	ft <sup>2</sup>
Wetted Perimeter	4.67	ft
Hydraulic Radius	0.34	ft
Top Width	4.48	ft
Critical Depth	0.36	ft
Critical Slope	0.01717	ft/ft
Velocity	1.91	ft/s
Velocity Head	0.06	ft
Specific Energy	0.55	ft
Froude Number	0.56	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.36	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01717	ft/ft

---

## Channel D15 - Roadside V-Ditch (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.045	
Channel Slope	0.08000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	2.07	ft <sup>3</sup> /s

### Results

Normal Depth	0.45	ft
Flow Area	0.62	ft <sup>2</sup>
Wetted Perimeter	2.87	ft
Hydraulic Radius	0.22	ft
Top Width	2.72	ft
Critical Depth	0.49	ft
Critical Slope	0.05043	ft/ft
Velocity	3.35	ft/s
Velocity Head	0.17	ft
Specific Energy	0.63	ft
Froude Number	1.24	
Flow Type	Supercritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.45	ft
Critical Depth	0.49	ft
Channel Slope	0.08000	ft/ft
Critical Slope	0.05043	ft/ft

---

## Channel D16 - Swale Road Crossing (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.031	
Channel Slope	0.01000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	8.43	ft <sup>3</sup> /s

### Results

Normal Depth	0.62	ft
Flow Area	3.85	ft <sup>2</sup>
Wetted Perimeter	12.47	ft
Hydraulic Radius	0.31	ft
Top Width	12.41	ft
Critical Depth	0.54	ft
Critical Slope	0.02187	ft/ft
Velocity	2.19	ft/s
Velocity Head	0.07	ft
Specific Energy	0.70	ft
Froude Number	0.69	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.62	ft
Critical Depth	0.54	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.02187	ft/ft

---

## Channel D17 - Perimeter Trap. Channel (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.037	
Channel Slope	0.01800	ft/ft
Left Side Slope	2.50	ft/ft (H:V)
Right Side Slope	2.50	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	9.98	ft <sup>3</sup> /s

### Results

Normal Depth	0.76	ft
Flow Area	2.99	ft <sup>2</sup>
Wetted Perimeter	6.11	ft
Hydraulic Radius	0.49	ft
Top Width	5.82	ft
Critical Depth	0.69	ft
Critical Slope	0.02732	ft/ft
Velocity	3.34	ft/s
Velocity Head	0.17	ft
Specific Energy	0.94	ft
Froude Number	0.82	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.76	ft
Critical Depth	0.69	ft
Channel Slope	0.01800	ft/ft
Critical Slope	0.02732	ft/ft

---

## Channel D18 - Top Deck Swale (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.038	
Channel Slope	0.03000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	9.22	ft <sup>3</sup> /s

### Results

Normal Depth	0.56	ft
Flow Area	3.18	ft <sup>2</sup>
Wetted Perimeter	11.33	ft
Hydraulic Radius	0.28	ft
Top Width	11.27	ft
Critical Depth	0.56	ft
Critical Slope	0.03247	ft/ft
Velocity	2.90	ft/s
Velocity Head	0.13	ft
Specific Energy	0.69	ft
Froude Number	0.96	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.56	ft
Critical Depth	0.56	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.03247	ft/ft

---

## Channel D19 - Top Deck Swale (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.037	
Channel Slope	0.03000	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Discharge	5.44	ft <sup>3</sup> /s

### Results

Normal Depth	0.46	ft
Flow Area	2.10	ft <sup>2</sup>
Wetted Perimeter	9.20	ft
Hydraulic Radius	0.23	ft
Top Width	9.16	ft
Critical Depth	0.45	ft
Critical Slope	0.03302	ft/ft
Velocity	2.59	ft/s
Velocity Head	0.10	ft
Specific Energy	0.56	ft
Froude Number	0.96	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.46	ft
Critical Depth	0.45	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.03302	ft/ft

---

## Channel D20 - Perimeter Trap. Channel (PV LF PCPMP)

---

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.026	
Channel Slope	0.00500	ft/ft
Left Side Slope	2.50	ft/ft (H:V)
Right Side Slope	2.50	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	6.79	ft <sup>3</sup> /s

### Results

Normal Depth	0.73	ft
Flow Area	2.78	ft <sup>2</sup>
Wetted Perimeter	5.92	ft
Hydraulic Radius	0.47	ft
Top Width	5.64	ft
Critical Depth	0.56	ft
Critical Slope	0.01422	ft/ft
Velocity	2.44	ft/s
Velocity Head	0.09	ft
Specific Energy	0.82	ft
Froude Number	0.61	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.73	ft
Critical Depth	0.56	ft
Channel Slope	0.00500	ft/ft
Critical Slope	0.01422	ft/ft

---

## Overside Drain C1A (PV LF PCPMP)

---

### Project Description

Friction Method                      Manning Formula  
Solve For                                Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.03000	ft/ft
Diameter	2.00	ft
Discharge	7.72	ft <sup>3</sup> /s

### Results

Normal Depth	0.53	ft
Flow Area	0.66	ft <sup>2</sup>
Wetted Perimeter	2.15	ft
Hydraulic Radius	0.31	ft
Top Width	1.76	ft
Critical Depth	0.99	ft
Percent Full	26.3	%
Critical Slope	0.00287	ft/ft
Velocity	11.70	ft/s
Velocity Head	2.13	ft
Specific Energy	2.65	ft
Froude Number	3.37	
Maximum Discharge	54.79	ft <sup>3</sup> /s
Discharge Full	50.94	ft <sup>3</sup> /s
Slope Full	0.00069	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	26.31	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.53	ft
Critical Depth	0.99	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.00287	ft/ft



## Overside Drain C1B (PV LF PCPMP)

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.33333	ft/ft
Diameter	1.50	ft
Discharge	7.72	ft <sup>3</sup> /s

### Results

Normal Depth	0.32	ft
Flow Area	0.27	ft <sup>2</sup>
Wetted Perimeter	1.43	ft
Hydraulic Radius	0.19	ft
Top Width	1.22	ft
Critical Depth	1.08	ft
Percent Full	21.1	%
Critical Slope	0.00428	ft/ft
Velocity	28.35	ft/s
Velocity Head	12.49	ft
Specific Energy	12.81	ft
Froude Number	10.60	
Maximum Discharge	84.80	ft <sup>3</sup> /s
Discharge Full	78.84	ft <sup>3</sup> /s
Slope Full	0.00320	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	21.14	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.32	ft
Critical Depth	1.08	ft
Channel Slope	0.33333	ft/ft
Critical Slope	0.00428	ft/ft

---

## Overside Drain C2A (PV LF PCPMP)

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### Project Description

Friction Method                      Manning Formula  
Solve For                                Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.03000	ft/ft
Diameter	2.00	ft
Discharge	8.73	ft <sup>3</sup> /s

### Results

Normal Depth	0.56	ft
Flow Area	0.72	ft <sup>2</sup>
Wetted Perimeter	2.23	ft
Hydraulic Radius	0.32	ft
Top Width	1.80	ft
Critical Depth	1.05	ft
Percent Full	28.0	%
Critical Slope	0.00296	ft/ft
Velocity	12.12	ft/s
Velocity Head	2.28	ft
Specific Energy	2.84	ft
Froude Number	3.37	
Maximum Discharge	54.79	ft <sup>3</sup> /s
Discharge Full	50.94	ft <sup>3</sup> /s
Slope Full	0.00088	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	28.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.56	ft
Critical Depth	1.05	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.00296	ft/ft

## Overside Drain C2B (PV LF PCPMP)

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.33333	ft/ft
Diameter	1.50	ft
Discharge	8.73	ft <sup>3</sup> /s

### Results

Normal Depth	0.34	ft
Flow Area	0.30	ft <sup>2</sup>
Wetted Perimeter	1.48	ft
Hydraulic Radius	0.20	ft
Top Width	1.25	ft
Critical Depth	1.14	ft
Percent Full	22.5	%
Critical Slope	0.00473	ft/ft
Velocity	29.39	ft/s
Velocity Head	13.42	ft
Specific Energy	13.76	ft
Froude Number	10.64	
Maximum Discharge	84.80	ft <sup>3</sup> /s
Discharge Full	78.84	ft <sup>3</sup> /s
Slope Full	0.00409	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	22.47	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.34	ft
Critical Depth	1.14	ft
Channel Slope	0.33333	ft/ft
Critical Slope	0.00473	ft/ft

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## Overside Drain C3A (PV LF PCPMP)

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### Project Description

Friction Method                      Manning Formula  
Solve For                                Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.03000	ft/ft
Diameter	2.00	ft
Discharge	10.19	ft <sup>3</sup> /s

### Results

Normal Depth	0.61	ft
Flow Area	0.80	ft <sup>2</sup>
Wetted Perimeter	2.33	ft
Hydraulic Radius	0.34	ft
Top Width	1.84	ft
Critical Depth	1.14	ft
Percent Full	30.3	%
Critical Slope	0.00310	ft/ft
Velocity	12.66	ft/s
Velocity Head	2.49	ft
Specific Energy	3.10	ft
Froude Number	3.37	
Maximum Discharge	54.79	ft <sup>3</sup> /s
Discharge Full	50.94	ft <sup>3</sup> /s
Slope Full	0.00120	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	30.33	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.61	ft
Critical Depth	1.14	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.00310	ft/ft

## Overside Drain C3B (PV LF PCPMP)

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.33333	ft/ft
Diameter	1.50	ft
Discharge	10.19	ft <sup>3</sup> /s

### Results

Normal Depth	0.36	ft
Flow Area	0.33	ft <sup>2</sup>
Wetted Perimeter	1.55	ft
Hydraulic Radius	0.21	ft
Top Width	1.29	ft
Critical Depth	1.23	ft
Percent Full	24.3	%
Critical Slope	0.00557	ft/ft
Velocity	30.74	ft/s
Velocity Head	14.68	ft
Specific Energy	15.05	ft
Froude Number	10.67	
Maximum Discharge	84.80	ft <sup>3</sup> /s
Discharge Full	78.84	ft <sup>3</sup> /s
Slope Full	0.00557	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	24.28	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.36	ft
Critical Depth	1.23	ft
Channel Slope	0.33333	ft/ft
Critical Slope	0.00557	ft/ft

## Overside Drain C4A (PV LF PCPMP)

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.03000	ft/ft
Diameter	2.00	ft
Discharge	3.29	ft <sup>3</sup> /s

### Results

Normal Depth	0.34	ft
Flow Area	0.36	ft <sup>2</sup>
Wetted Perimeter	1.71	ft
Hydraulic Radius	0.21	ft
Top Width	1.51	ft
Critical Depth	0.63	ft
Percent Full	17.2	%
Critical Slope	0.00264	ft/ft
Velocity	9.12	ft/s
Velocity Head	1.29	ft
Specific Energy	1.64	ft
Froude Number	3.29	
Maximum Discharge	54.79	ft <sup>3</sup> /s
Discharge Full	50.94	ft <sup>3</sup> /s
Slope Full	0.00013	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	17.22	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.34	ft
Critical Depth	0.63	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.00264	ft/ft

## Overside Drain C4B (PV LF PCPMP)

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.33333	ft/ft
Diameter	1.50	ft
Discharge	3.29	ft <sup>3</sup> /s

### Results

Normal Depth	0.21	ft
Flow Area	0.15	ft <sup>2</sup>
Wetted Perimeter	1.15	ft
Hydraulic Radius	0.13	ft
Top Width	1.04	ft
Critical Depth	0.69	ft
Percent Full	13.9	%
Critical Slope	0.00308	ft/ft
Velocity	22.02	ft/s
Velocity Head	7.53	ft
Specific Energy	7.74	ft
Froude Number	10.24	
Maximum Discharge	84.80	ft <sup>3</sup> /s
Discharge Full	78.84	ft <sup>3</sup> /s
Slope Full	0.00058	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	13.94	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.21	ft
Critical Depth	0.69	ft
Channel Slope	0.33333	ft/ft
Critical Slope	0.00308	ft/ft

## Overside Drain C5A (PV LF PCPMP)

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.03000	ft/ft
Diameter	2.00	ft
Discharge	9.22	ft <sup>3</sup> /s

### Results

Normal Depth	0.58	ft
Flow Area	0.75	ft <sup>2</sup>
Wetted Perimeter	2.27	ft
Hydraulic Radius	0.33	ft
Top Width	1.81	ft
Critical Depth	1.08	ft
Percent Full	28.8	%
Critical Slope	0.00300	ft/ft
Velocity	12.31	ft/s
Velocity Head	2.35	ft
Specific Energy	2.93	ft
Froude Number	3.37	
Maximum Discharge	54.79	ft <sup>3</sup> /s
Discharge Full	50.94	ft <sup>3</sup> /s
Slope Full	0.00098	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	28.81	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.58	ft
Critical Depth	1.08	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.00300	ft/ft



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## Overside Drain C5B (PV LF PCPMP)

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### Project Description

Friction Method                      Manning Formula  
Solve For                                Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.33333	ft/ft
Diameter	1.50	ft
Discharge	9.22	ft <sup>3</sup> /s

### Results

Normal Depth	0.35	ft
Flow Area	0.31	ft <sup>2</sup>
Wetted Perimeter	1.50	ft
Hydraulic Radius	0.21	ft
Top Width	1.26	ft
Critical Depth	1.17	ft
Percent Full	23.1	%
Critical Slope	0.00499	ft/ft
Velocity	29.86	ft/s
Velocity Head	13.86	ft
Specific Energy	14.20	ft
Froude Number	10.65	
Maximum Discharge	84.80	ft <sup>3</sup> /s
Discharge Full	78.84	ft <sup>3</sup> /s
Slope Full	0.00456	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	23.09	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.35	ft
Critical Depth	1.17	ft
Channel Slope	0.33333	ft/ft
Critical Slope	0.00499	ft/ft

## Overside Drain C6A (PV LF PCPMP)

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.03000	ft/ft
Diameter	2.00	ft
Discharge	5.44	ft <sup>3</sup> /s

### Results

Normal Depth	0.44	ft
Flow Area	0.51	ft <sup>2</sup>
Wetted Perimeter	1.96	ft
Hydraulic Radius	0.26	ft
Top Width	1.66	ft
Critical Depth	0.82	ft
Percent Full	22.1	%
Critical Slope	0.00272	ft/ft
Velocity	10.57	ft/s
Velocity Head	1.74	ft
Specific Energy	2.18	ft
Froude Number	3.35	
Maximum Discharge	54.79	ft <sup>3</sup> /s
Discharge Full	50.94	ft <sup>3</sup> /s
Slope Full	0.00034	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	22.07	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.44	ft
Critical Depth	0.82	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.00272	ft/ft

## Overside Drain C6B (PV LF PCPMP)

### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.010	
Channel Slope	0.33333	ft/ft
Diameter	1.50	ft
Discharge	5.44	ft <sup>3</sup> /s

### Results

Normal Depth	0.27	ft
Flow Area	0.21	ft <sup>2</sup>
Wetted Perimeter	1.31	ft
Hydraulic Radius	0.16	ft
Top Width	1.15	ft
Critical Depth	0.90	ft
Percent Full	17.8	%
Critical Slope	0.00353	ft/ft
Velocity	25.59	ft/s
Velocity Head	10.17	ft
Specific Energy	10.44	ft
Froude Number	10.48	
Maximum Discharge	84.80	ft <sup>3</sup> /s
Discharge Full	78.84	ft <sup>3</sup> /s
Slope Full	0.00159	ft/ft
Flow Type	SuperCritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	17.79	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.27	ft
Critical Depth	0.90	ft
Channel Slope	0.33333	ft/ft
Critical Slope	0.00353	ft/ft

## SRK Report Distribution Record

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SRK Reno Library	SRK Consulting	9	02.15.13	E.Nikirk

Approval Signature:



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**Appendix H**  
**Landfill Gas Monitoring and Control Program**

# Landfill Gas Monitoring and Control Program for the Pumice Valley Landfill

Report Prepared for



**Mono County**  
**Department of Public Works**  
**Solid Waste Division**



Report Prepared by



SRK Consulting (U.S.), Inc.

146900.160

Revised February 15, 2013

# **Landfill Gas Monitoring and Control Program for the Pumice Valley Landfill**

## **Mono County Department of Public Works Solid Waste Division**

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**SRK Project Number 146900.160**

**February 2013**

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Principal Consultant

**Peer Reviewed by:**  
Breese Burnley, PE  
Principal Consultant

## Certification Statement

This *Landfill Gas Monitoring and Control Program for the Pumice Valley Landfill* in Mono County, California was prepared pursuant to the requirement of Title 27 of the California Code of Regulations. This document was prepared by SRK Consulting (U.S.), Inc., under the direct supervision of the undersigned registered professional engineer. All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed, and the professional services have been performed, findings determined, and recommendations prepared in accordance with standard engineering principles and practices generally accepted at the time of document preparation.



02.15.13

Evan Nikirk, PE  
Principal Consultant



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## Attachments

Attachment 1: Figures

Attachment 2: Landfill Gas Monitoring Well Completion Details and Logs

Attachment 3: Landfill Gas Monitoring Well Construction Photographs

## Disclaimer

The project conditions and specifications presented in this document have been based on the information supplied to SRK Consulting (U.S.), Inc. (SRK) by the Mono County Department of Public Works, Solid Waste Division (Public Works). This Plan is provided in response to a specific request from Public Works to do so, and is subject to the contractual terms between SRK and Mono County. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Plan.

## 1.0 Introduction

The purpose of this *Landfill Gas Monitoring and Control Program* is to document compliance with Title 27, California Code of Regulations (27 CCR), Sections 20921 – 20939 at the Pumice Valley Landfill in Mono County, California. **Figure 1** in **Attachment 1** illustrates the location of the facility within the context of state and county boundaries. The Mono County Department of Public Works, Solid Waste Division (Division), currently monitors for the presence of methane in ambient air in structures at the Pumice Valley Landfill and Transfer Station in accordance with 27 CCR Section 20931, and performs perimeter soil-gas monitoring for the presence of methane in the subsurface in accordance with 27 CCR Section 20925.

In general, this report describes the following:

1. facility overview, including site setting and past disposal practices (Section 2.0);
2. local geology and hydrogeology (Section 3.0);
3. surrounding land uses (Section 4.0);
4. the nature of the waste received at the site and its gas generation potential (Section 5.0);
5. the physical configuration of the existing landfill gas monitoring well network (Section 6.0); and,
6. the current landfill gas monitoring program for the Pumice Valley Landfill (Section 7.0).

This report provides an update to the original *Landfill Gas Monitoring and Control Program* (SRK, 2009) and describes conditions at the Pumice Valley Landfill and Transfer Station following the October 2011 installation of the perimeter network of subsurface monitoring wells.

## 2.0 Facility Overview

The Pumice Valley Landfill and Transfer Station is located in the Pumice Flats region of central Mono County at 200 Dross Road, approximately 1.8 miles east of the junction of State Highway 120(E) and U.S. Highway 395, south of the community of Lee Vining in central California. Dross Road is a paved County-maintained two-lane road off State Highway 120(E). As defined by the Public Land Survey System, the site occupies the NW¼ NW¼, Section 36, Township 1 North, Range 26 East, Mount Diablo Baseline and Meridian (MDB&M). The facility location in the context of state and county boundaries is presented on **Figure 1 (Attachment 1)**.

The Pumice Valley Landfill is a Class III municipal solid waste landfill as defined by 27 CCR Section 20200 and operates under existing Solid Waste Facility Permit number 26-AA-0003 issued by the Mono County Health Department. The Pumice Valley Landfill also operates pursuant to approved Waste Discharge Requirements per California Regional Water Quality Control Board Order 6-01-56.

The landfill has been operated at its present location since 1972 and is situated on a 40.0-acre parcel leased from the City of Los Angeles, Department of Water and Power (LADWP). The Mono County Department of Public Works, Solid Waste Division, is responsible for the day-to-day operation of the landfill and on-site transfer station; a gate attendant is provided through a long-term agreement with the transfer station operations contractor.

Disposal operations occurred by area-fill disposal method until April 2001, when on-site burial of putrescible waste ceased and a temporary transfer station was installed to transfer residential and commercial municipal waste to Mono County's regional landfill, the Benton Crossing Landfill. A permanent transfer station was subsequently constructed and has been operational since August 2004. Construction and demolition wastes continue to be buried on-site utilizing the area-fill method of disposal. Existing topography and the location of structures, stockpiles, and disposal areas at the Pumice Valley Landfill and Transfer Station are presented on **Figure 2** in **Attachment 1**.

### 3.0 Local Geology and Hydrogeology

The Pumice Valley Landfill lies east of the Sierra Nevada mountain range along the southwestern margin of the Mono Basin, approximately two miles south of Mono Lake and four miles northwest of Crater Mountain, the highest point within the Mono Craters volcanic complex. This region marks the western rim of the Basin and Range province of North America, and is associated with extensional tectonism. Panum Crater is the closest volcanic feature to the Pumice Valley Landfill and is located approximately 2 miles to the northeast. Panum Crater, the youngest extrusive volcanic feature in the Mono Basin, formed in an eruption that occurred at the northern end of the Mono Craters chain. This crater consists of a small dome of rhyolite and a tephra ring, which has a maximum rim-to-rim diameter of 4,000 feet and is comprised of pumice ash and lapilli, and obsidian fragments.

The landfill is located on an alluvial plain that slopes toward Rush Creek northwest of the site. Soils in the vicinity of the landfill have formed by several depositional processes, including alluvial deposition from surrounding mountain slopes, lacustrine deposition from Mono Lake and Pleistocene Lake Russell (the predecessor of Mono Lake), and ash cinders and volcanic debris deposited during volcanic events associated with the Mono Craters volcanic chain.

Subsurface sediments within the landfill area are described by Kleinfelder (1989) from drillholes advanced in excess of 200 feet during ground water monitoring well installation. The sediments mainly consist of unconsolidated interbedded aeolian, fluvial and lacustrine deposits. Near the surface (5-10 feet below ground surface, bgs) the sediments are generally comprised of loose, unconsolidated sand derived from weathered volcanic parent rock. Lacustrine deposits that occur below these sediments (at approximately 30 feet bgs) are characterized as dense, fine sand and silt containing volcanic ash and pumice. These lacustrine sediments are underlain by interbedded coarse sands and gravels likely deposited in alluvial outwash channels. The larger particles of gravel are subangular to subrounded and consist of granitic and metamorphic material indicating these particles were transported by fluvial processes from the surrounding hills to the west and south prior to deposition (Kleinfelder, 1989).

Groundwater was encountered during drilling between 240 and 260 feet below ground surface (bgs) in unconsolidated alluvial deposits consisting of gravelly sand to sandy gravel. Current ground water monitoring data indicate static groundwater levels between 248 and 268 feet bgs. Due to the similarity between the original depth to ground water encountered during drilling and ground water elevations measured in the ground water wells during subsequent monitoring events, it is likely the aquifer beneath the site exists under unconfined conditions. Based on the most recent monitoring data, the ground water flow direction is generally slightly north of east, which is consistent with regional ground water flow northeast toward Mono Lake, and at a gradient of 0.0046 feet per foot, as described in the *2012 Semi-Annual Report, Detection Monitoring Program* for the Pumice Valley Landfill (SRK, 2012).

### 4.0 Surrounding Land Uses

The property surrounding the Pumice Valley Landfill and Transfer Station is either owned by the LADWP, or owned by the public and administered by the United States Department of Interior, Bureau of Land Management, Bishop Field Office (BLM), or the United States Department of Agriculture, Inyo National Forest (INF). There are no residences or structures within 1,000 feet of the facility property boundary. City of Los Angeles lands in the vicinity are zoned as "OS – Open Space." Lands in the area managed by BLM and INF are assigned a zoning designation of "RM – Resource Management" and are primarily used for grazing, recreation, and open space. The landfill property is designated in the Land Use Element of the County General Plan as "PF" for public facilities, which explicitly allows for use as a solid waste landfill. Land uses in the surrounding area are shown on **Figure 3** in **Attachment 1**.

## 5.0 Nature of Waste and Gas Generation Potential

The current lease boundary for the Pumice Valley Landfill and Transfer Station encompasses 40 acres, approximately 23.6 acres of which constitutes the final waste footprint at closure and the largest area requiring closure at any given time during the life of the landfill.

In accordance with 27 CCR Section 20220, the Pumice Valley Landfill is permitted to accept, and has historically accepted, all putrescible and non-putrescible solid and semi-solid waste, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, construction and demolition wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semi-solid wastes and other discarded wastes, provided that such wastes do not contain waste which must be managed as a hazardous waste, wastes which contain soluble pollutants in concentrations that exceed applicable water pollution control objectives, or wastes that could cause degradation of waters of the state (designated waste). However, under operational practices in effect since April, 2001, these types of wastes have not been buried on-site but have been processed through the on-site transfer station and shipped off-site for disposal. Since that time, the only wastes buried in the landfill portion of the site have been construction and demolition wastes. The Pumice Valley Landfill and Transfer Station currently diverts waste loads containing certified non-friable asbestos-containing waste (ACW) to the Benton Crossing Landfill.

In addition to typical non-hazardous municipal solid waste as described above, the Pumice Valley Transfer Station accepts the following types of source-separated waste for management through its waste diversion program:

- Wood waste;
- Scrap metal;
- White goods and appliances;
- Waste tires;
- CRTs and CEDs; and,
- Household hazardous waste, universal waste, used motor oil, and oil filters.

Although the putrescible portion of the waste stream previously accepted and contained at the Pumice Valley Landfill does have the potential to generate methane, ambient air monitoring has not indicated the presence of methane at the ground surface.

## 6.0 Existing Landfill Gas Monitoring Network

Prior to late 2011, landfill gas monitoring at the Pumice Valley Landfill and Transfer Station consisted of sampling ambient air for the presence of methane in site structures and at the property boundary. Seven landfill gas monitoring wells (GW-1 through GW-7) were installed around the perimeter of the property in October 2011 to complete the monitoring network required by 27 CCR Section 20921. These wells form the compliance boundary in accordance with 27 CCR Section 20925, which states, in part, that:

1. Perimeter subsurface monitoring wells shall be installed around the waste disposal footprint, but not within refuse;
2. Perimeter monitoring wells shall be located at or near the permitted facility boundary;
3. The lateral spacing between adjacent monitoring wells shall not exceed 1,000 feet; and,
4. The spacing of monitoring wells shall be determined based upon, but not limited to, the nature of the structure to be protected and its proximity to the refuse.

The existing perimeter landfill gas monitoring network satisfies these criteria; their locations are illustrated on **Figure 2** in **Attachment 1**.

## 6.1 2011 Well Installations

To complete the proposed landfill gas monitoring well installations in the approved *Landfill Gas Monitoring and Control Program* (SRK, 2009), a *Project Plans and Specifications for Landfill Gas Monitoring Well Installations at Mono County Landfills* (SRK, 2011a) was prepared for bidding and completing the work at Pumice Valley Landfill and three other Mono County landfills. The wells were designed by a California-registered professional engineer (C. Evan Nikirk, RCE No. C46777) and in accordance with the requirements of 27 CCR 20925. Well and probe construction requirements as defined in 27 CCR 20925 are detailed in the typical well configuration shown on **Figure 4 (Attachment 1)**.

Drilling activities and monitoring well construction were completed at the Pumice Valley Landfill and Transfer Station on October 6 and 7, 2011 by a California-licensed driller, ABC Liovin Drilling, Inc. (California Contractor's C57 License 422904). Drill holes were advanced using a truck-mounted 8-inch hollow-stem auger rig. The final depth of each drill hole was established based on the lowest elevation of waste within 1,000 feet, which is estimated to be at elevation 6,790 feet above mean sea level (amsl). Completed well depths varied between 13 feet bgs (GW-1) and 35 feet bgs (GW-4). Soils encountered at each location varied over the full depth bored but were primarily classified as fine sandy silt ("SM" under the Unified Soil Classification System) with traces of pebbles and gravel appearing increasingly with depth. No ground water was encountered within the depth drilled. Drilling and well construction were performed under the supervision of a field engineer working under the direction of a California-licensed civil engineer (C. Evan Nikirk, RCE No. C46777). An as-built report documenting well construction, *As-Built Report for Landfill Gas Monitoring Well Installations – Bridgeport, Pumice Valley, and Walker Landfills* (SRK, 2011b), was subsequently prepared and submitted to the Local Enforcement Agency (LEA).

Seven wells containing a total of 12 probes and a total well depth of 197 feet were installed at the Pumice Valley Landfill and Transfer Station. Six wells were constructed with two probes each, while one well (GW-1) required only a single probe. Each probe was constructed with ¾-inch diameter, schedule 40 PVC pipe with one five-foot-long, 0.020-inch machine-slotted screened interval. One gas probe was installed in each well between approximately 5 and 10 feet bgs and, for the six locations with two probes, the screened interval in the second gas probe was set at an average depth of approximately 25 to 30 feet bgs. Each pipe section was constructed with flush-joint, machine-threaded ends – glue was not used. The annular space between the slotted screen section and borehole walls was backfilled with clean 3/8-inch pea gravel to 12 inches above the screened interval.

A bentonite seal was placed on top of each pea gravel layer and hydrated. The remaining annular space above the uppermost bentonite seal was filled with bentonite grout followed by a surface plug and pad of neat cement. Wellhead protection was installed in the form of a locking steel surface casing set into a 30-inch by 30-inch concrete pad. The top of each monitoring probe was equipped with a cap fitted with a sampling port consisting of a ¼-inch plastic valve and ¼-inch plastic barb.

Landfill gas monitoring well locations are illustrated on **Figure 2 in Attachment 1**. Landfill gas monitoring well construction and completion details are summarized in **Table B-1 in Attachment 2**. Well construction logs are also included in **Attachment 2**. Photographs of the construction equipment, methods, and materials and the completed wells are included in **Attachment 3**.

## 7.0 Monitoring Activities

The following sections describe the methods implemented by Public Works to monitor structures, ambient air, and the subsurface for presence of landfill gas at the Pumice Valley Landfill, and actions to be taken in the event explosive levels of methane are detected.

## 7.1 Structure and Boundary Monitoring (27 CCR 20921)

Section 20921 of 27 CCR requires all municipal solid waste landfill operators to ensure that the concentration of methane gas generated by waste management units does not exceed 1.25 percent by volume in air (25 percent of the lower explosive limit, or LEL) in on-site structures or five percent by volume in air (100 percent of the LEL) migrating from the landfill at the property boundary. Accordingly, personnel from the Mono County Department of Public Works, Solid Waste Division, monitor methane concentrations in ambient air at the property boundary of the Pumice Valley Landfill, in site structures, and in the perimeter network of subsurface landfill gas monitoring wells on a quarterly basis.

Structure monitoring is accomplished using an RKI Eagle portable multi-gas detector. **Figure 2** illustrates the locations of all on-site structures and the facility's existing and proposed property boundaries. The RKI Eagle samples ambient air continuously and electronically records results in an internal memory that can be downloaded to a personal computer. The unit is capable of measuring methane concentrations from zero to 1,000 ppm and the lower explosive limit (LEL) for methane from zero to 100 percent. For structure monitoring, the RKI Eagle sampling tube is slowly moved throughout the interior of each structure at both the floor and ceiling height. Monitored locations include all areas where gas may potentially accumulate, including corners, crawl spaces, sumps, cabinets, and floor seams or cracks. Structures currently monitored at the Pumice Valley Landfill include the modular office/storage building, scalehouse, and the household hazardous waste storage lockers (refer to **Figure 2**). The base of each of these structures is elevated above the surrounding grade either due to a skid-mounted frame (scalehouse and storage lockers) or by pedestals (modular office/storage building), which allows the free circulation of air between the floor frame and ground surface. To date, methane has not been detected in ambient air at the site. Should there be any additional structures constructed or installed at the site, they will be added to the inventory of monitoring locations.

Landfill gas is monitored and sampled at the compliance boundary by collecting samples from the network of landfill gas wells described in Section 6.0. To obtain a sample, the sampling pump inlet tube on the RKI Eagle is connected to the valve at the top of each gas probe and the sampling pump and monitor are set to continuous monitoring mode. The variation of gas concentrations over time are recorded until the concentrations of all gases (CO<sub>2</sub>, O<sub>2</sub> and CH<sub>4</sub>) do not fluctuate more than 0.5 percent. In between wells during landfill perimeter monitoring, the technician holds the RKI Eagle sampling tube at waist height and continuously samples ambient air while walking the landfill perimeter. To date, no methane has been detected in ambient air at the site boundary.

Landfill gas monitoring will continue to be performed during the postclosure maintenance period in accordance with 27 CCR Section 20921, as described in detail in the *Preliminary Closure and Postclosure Maintenance Plan* (SRK, 2013). Sampling from the network of perimeter landfill gas monitoring wells will be performed, and ambient air in structures (those remaining after site closure construction, such as the scalehouse and household hazardous waste storage locker associated with the transfer station) and at the property boundary will be sampled as described above.

## 7.2 Reporting

The results of sampling for the presence of methane in monitoring wells and in ambient air at facility structures and at the property boundary are presented in quarterly reports submitted to the LEA (i.e., the Mono County Environmental Health Department) within 90 days of sampling. Quarterly monitoring reports include:

- the concentration of methane measured at each monitoring location;
- date, time, barometric pressure, atmospheric temperature, and weather conditions;

- the name(s) of sampling personnel, equipment utilized, and a brief description of the methods used; and,
- a numbering system to correlate monitoring results to a corresponding probe location.

### 7.3 Landfill Gas Discovery and Control

If methane is discovered in facility structures at concentrations in excess of 1.25 percent by volume in air, Public Works personnel will immediately take steps necessary to protect human health and to eliminate any threat of explosion, including barring access to the structure, posting warning signs, opening entry ways (and windows, if applicable) to introduce and circulate fresh air, and other courses of action that may be appropriate.

If methane is discovered at the property boundary at concentrations in excess of 5 percent by volume in air, the affected area will be closed off to customers and mechanized equipment, warning signs will be posted, and other steps will be taken as appropriate to protect human health and eliminate the potential for explosion.

In addition to the above, the LEA will be notified by telephone or email as soon as practicable after learning that compliance levels have been exceeded. LEA notification will include a description of the actions taken or proposed to be taken to resolve the problem.

Within seven calendar days of detection above compliance levels, Public Works will verify the validity of the results by reviewing the readings and determining the influence of potential factors such as liquid interference, control well influence, and barometric pressure. At that time Public Works will submit correspondence to the LEA, with a copy to the operating record, presenting the readings and describing the nature and extent of the problem and any immediate corrective actions taken to protect public health and safety and the environment. In its correspondence, Public Works will also describe any short-term actions that will be taken to protect public health and safety and the environment prior to the development of a remediation plan.

If the nature of the problem requires the development of a remediation plan and landfill gas control system, a plan and control system design will be prepared in accordance with 27 CCR Section 20937(a)(3) and (4). Approval will be obtained from the LEA prior to plan implementation. Following approval, Public Works will enter the plan in the facility's operating record, implement the plan within 60 days (or as otherwise specified by the LEA), and notify the LEA when the plan has been implemented.

### 7.4 Health and Safety

Public Works maintains a site-specific *Injury and Illness Prevention Program* and an *Emergency Response Plan* for the Pumice Valley Landfill. The methods and procedures described in these plans will be adhered to when performing landfill gas monitoring activities.

Because there is a potential for landfill gas to exist in the subsurface at the landfill, all excavations shall be tested for the presence of methane prior to entry by personnel or equipment. All personnel and contractors shall be notified of the potential presence of methane or other landfill gases in surface and subsurface utility boxes and trenches. All site-specific policies with regard to smoking shall be strictly adhered to. All landfill equipment shall be fitted with spark arrestors.



## 8.0 References

Kleinfelder, 1989: *Final Report – Calderon Water Quality Solid Waste Assessment Test (SWAT) at Pumice Valley Landfill – Mono County, California*, unpublished report prepared for Mono County by Kleinfelder, Inc., December 28, 1989.

SRK, 2009, *Landfill Gas Monitoring and Control Program, Pumice Valley Landfill*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting (U.S.), Inc., Reno, Nevada; September 21, 2009.

SRK, 2011a, *Project Plans and Specifications for Landfill Gas Monitoring Well Installations at Mono County Landfills*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting (U.S.), Inc., Reno, Nevada; July 28, 2011.

SRK, 2011b, *As-Built Report for Landfill Gas Monitoring Well Installations – Bridgeport, Pumice Valley, and Walker Landfills*; unpublished letter report prepared for the Mono County Department of Public Works, SRK Consulting (U.S.), Inc., Reno, Nevada; November 23, 2011.

SRK, 2012, *2012 Semi-Annual Report, Detection Monitoring Program – Pumice Valley Landfill*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting (U.S.), Inc., Reno, Nevada; December 4, 2012.

SRK, 2013: *Preliminary Closure and Postclosure Maintenance Plan for the Pumice Valley Landfill*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting (U.S.), Inc., Reno, Nevada; February 15, 2013.

**Prepared by**



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Evan Nikirk, PE  
Principal Consultant

**Reviewed by**

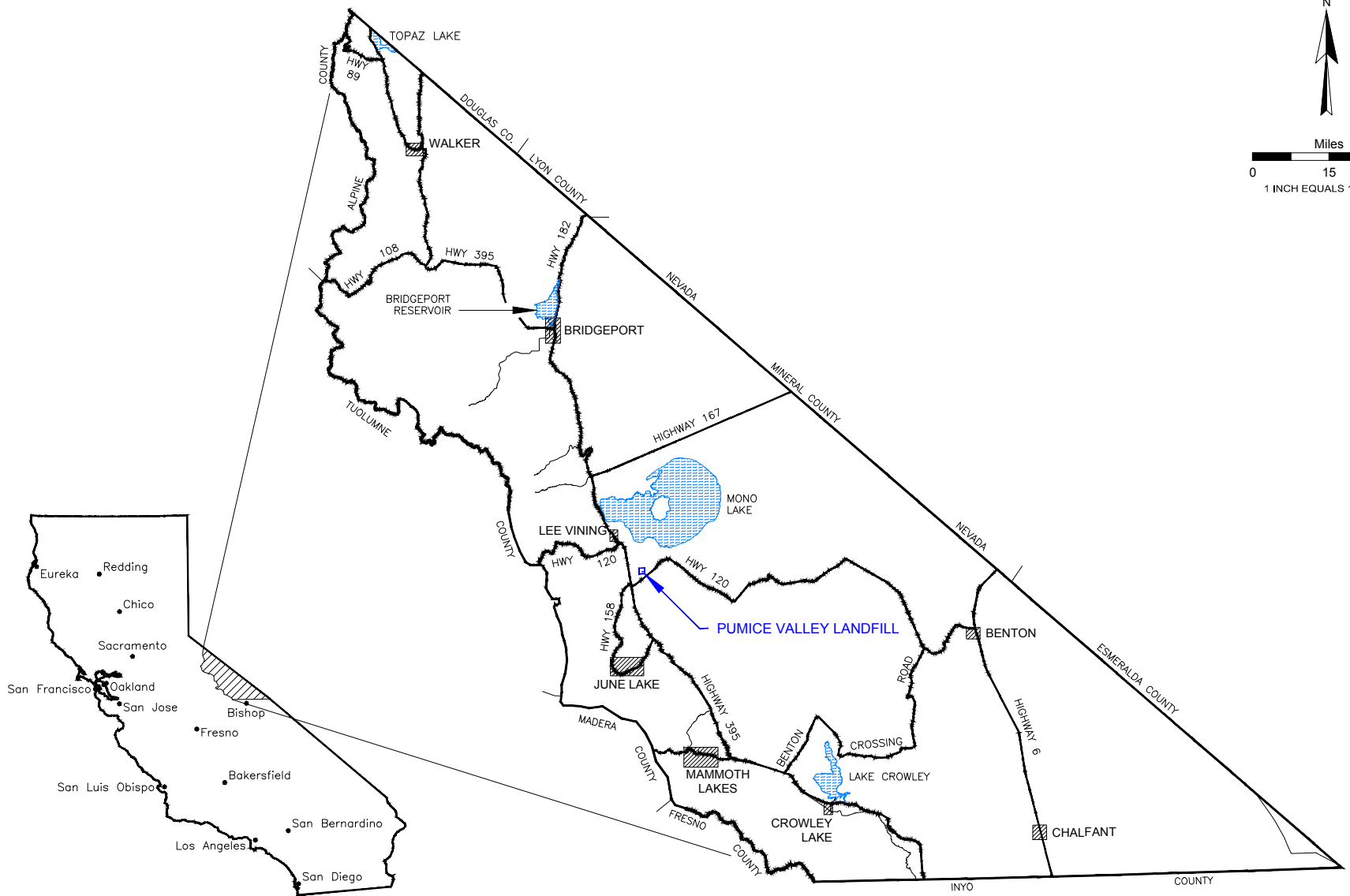
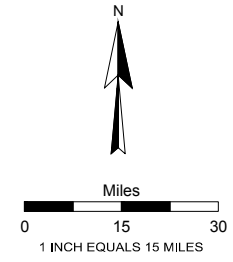



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Breese Burnley, PE  
Principal Consultant


All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

## **Attachment 1: Figures**




DESIGN: EN	
DRAWN: TWW	
REVIEWED: ---	
CHECKED: EN	
APPROVED: EN	
 <p>IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED</p>	

PREPARED BY:

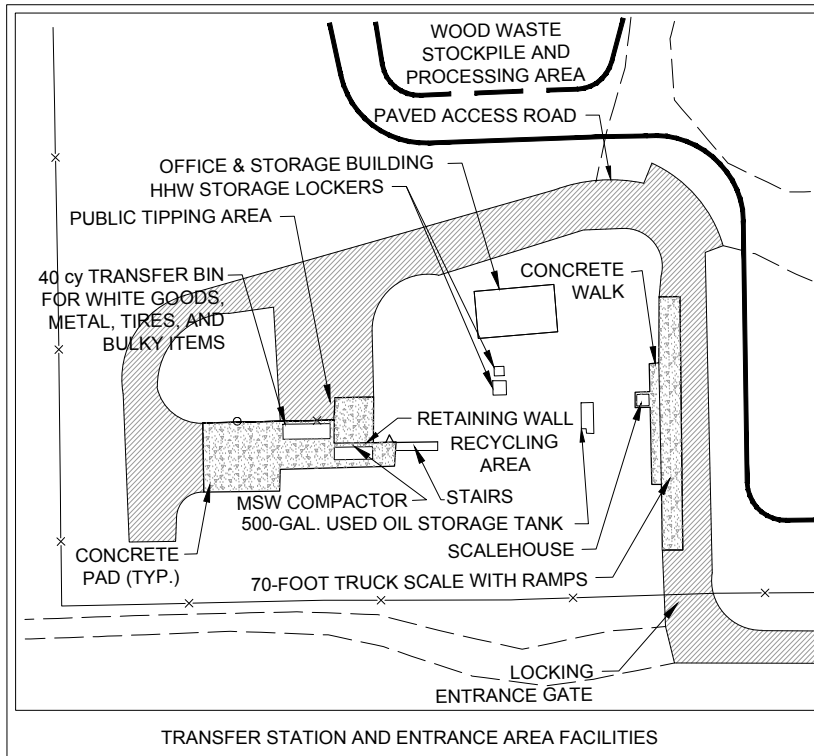
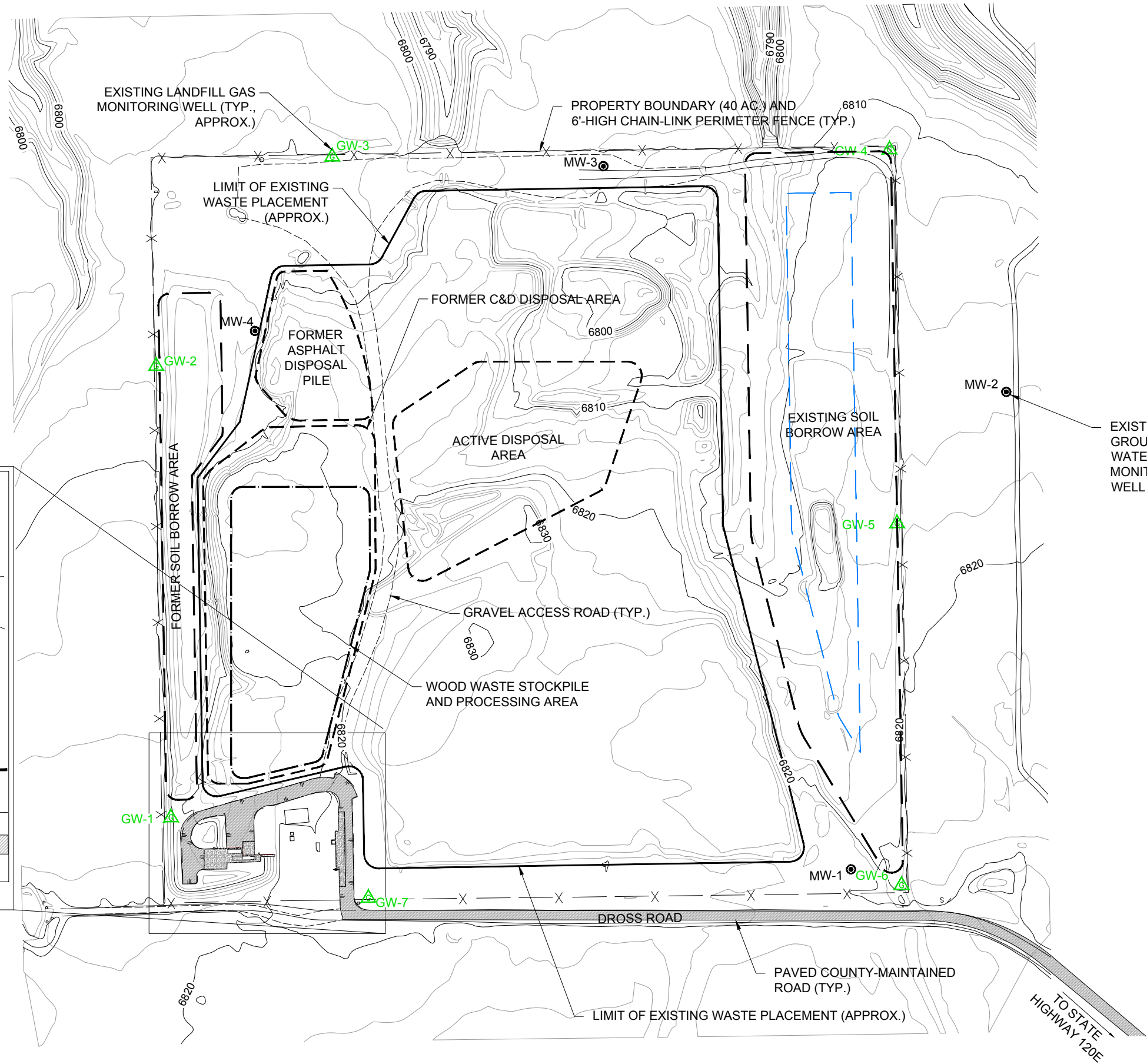
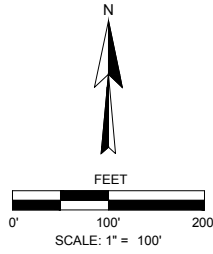


PROJECT:



LANDFILL GAS MONITORING & CONTROL PROGRAM  
PUMICE VALLEY LANDFILL  
MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
MONO COUNTY, CALIFORNIA

DRAWING TITLE:	
SITE LOCATION MAP	
DRAWING NO.:	REV. NO.
FIGURE 1	A
DATE:	
SRK JOB NO.:	
02.15.2013	
146900.160	



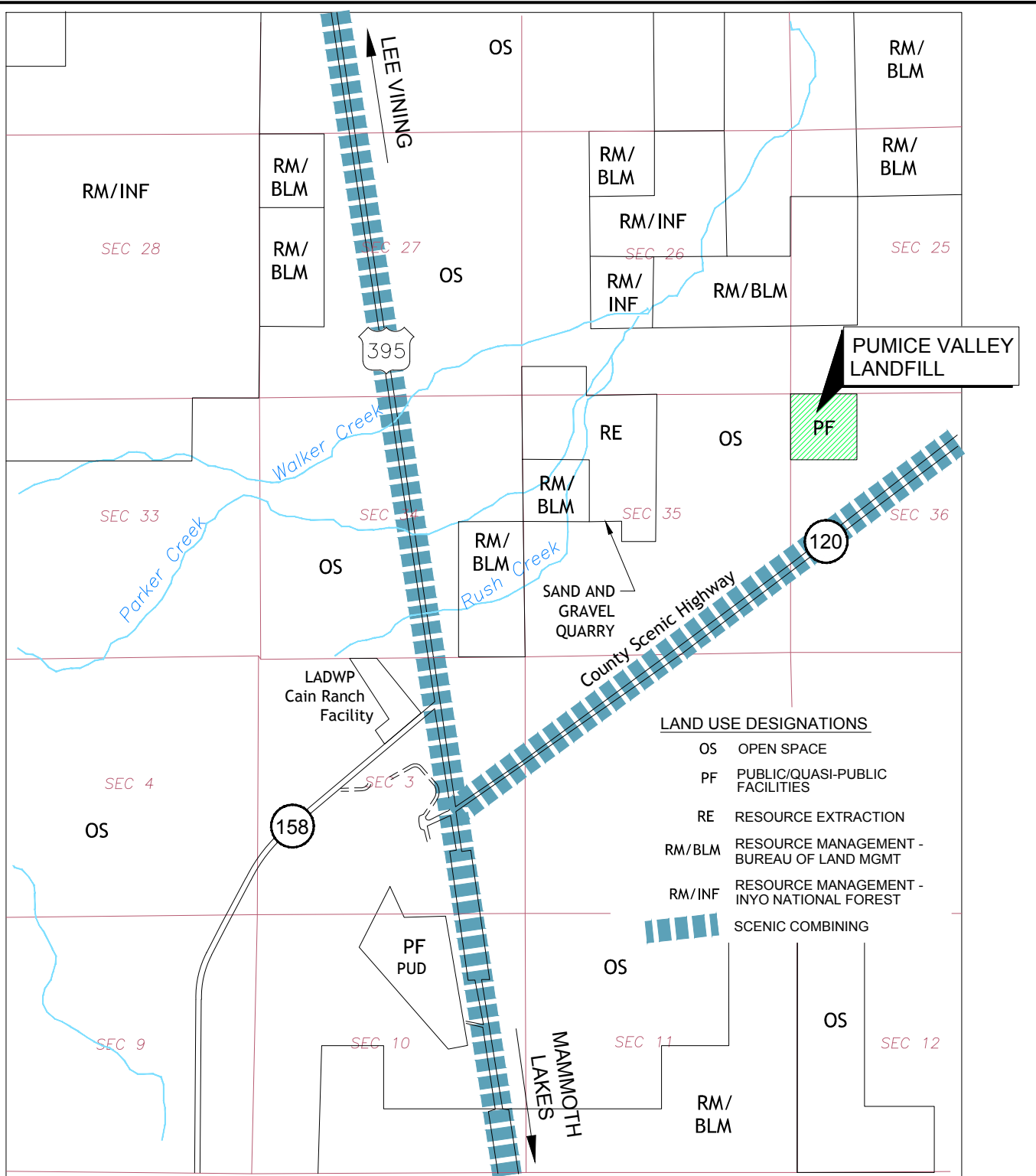
REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013

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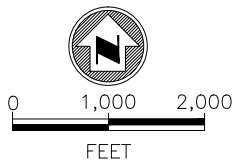

  
 PREPARED BY:
   
 PROJECT:
 
 LANDFILL GAS MONITORING & CONTROL PROGRAM
   
 PUMICE VALLEY LANDFILL
   
 MONO COUNTY DEPARTMENT OF PUBLIC WORKS
   
 MONO COUNTY, CALIFORNIA

DRAWING TITLE:	DRAWING NO.:	DATE:	SRK JOB NO.:
EXISTING TOPOGRAPHY AND FACILITIES	FIGURE 2	02.15.2013	146900.160

REV. NO. **A**
  
 IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED



Modified from Figure 63,  
Mono County General  
Plan (November, 2000).



DESIGN: EN  
DRAWN: TWW  
REVIEWED: ---  
CHECKED: EN  
APPROVED: EN

PREPARED BY:  
**srk consulting**

PROJECT:  
LANDFILL GAS MONITORING & CONTROL PROGRAM  
PUMICE VALLEY LANDFILL  
MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
MONO COUNTY, CALIFORNIA

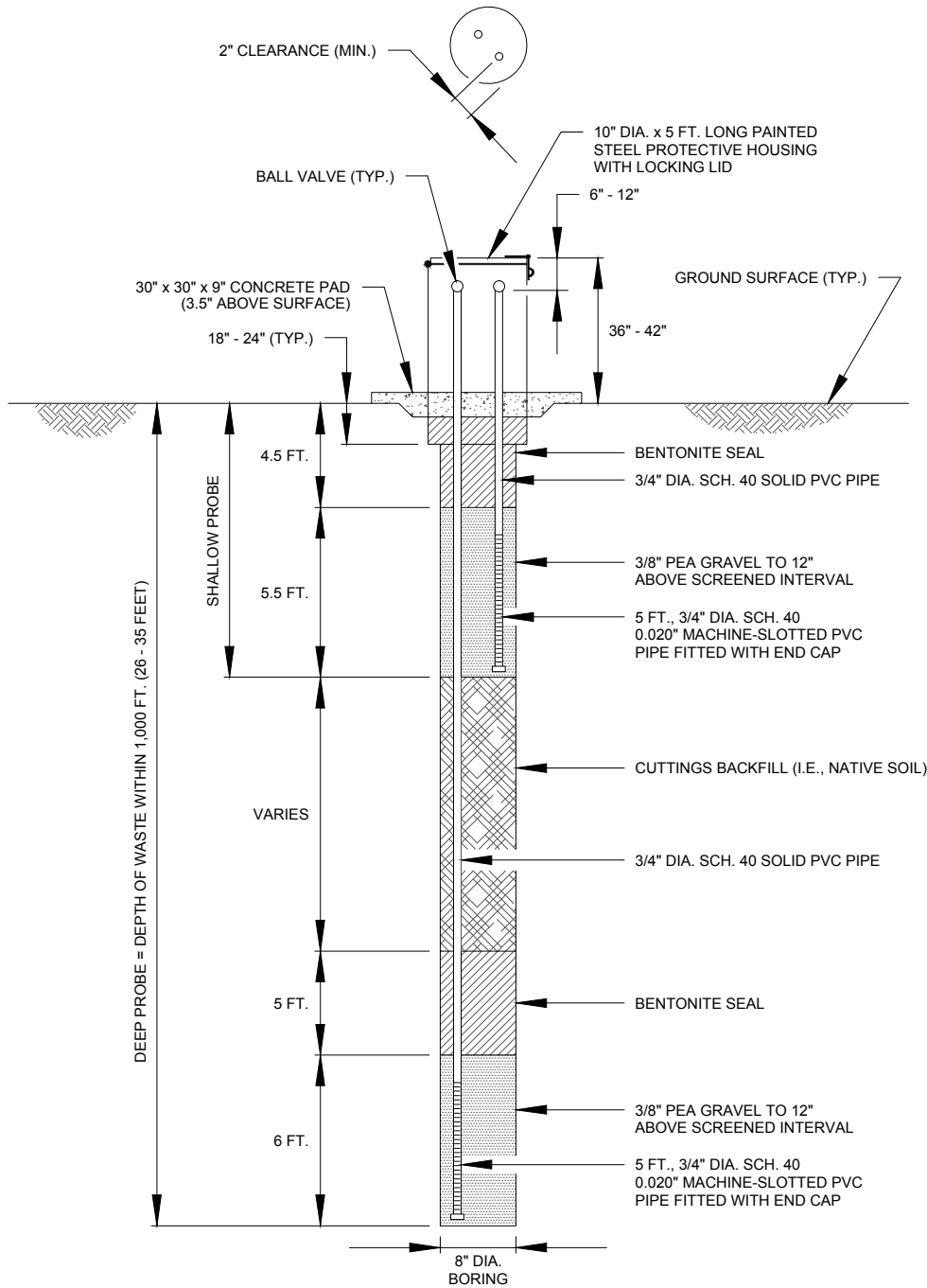
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LAND USE MAP

DRAWING NO.:  
FIGURE 3

DATE:  
02.15.2013

SRK JOB NO.:  
146900.160

REV. NO.  
**A**



**NOTES:**

1. THE VALVE ON EACH PROBE IS LABELED TO INDICATE PROBE NUMBER CORRESPONDING TO SCREENED INTERVAL DEPTH (1 - SHALLOWEST, 3 - DEEPEST).
2. ALL JOINTS ARE FLUSH-THREADED. PVC GLUE OR ADHESIVES WERE NOT USED.

DESIGN: EN  
 DRAWN: TWW  
 REVIEWED: ---  
 CHECKED: EN  
 APPROVED: EN

PREPARED BY:



PROJECT:



LANDFILL GAS MONITORING & CONTROL PROGRAM  
 PUMICE VALLEY LANDFILL  
 MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
 MONO COUNTY, CALIFORNIA

DRAWING TITLE:  
**TYPICAL AS-BUILT LANDFILL GAS MONITORING WELL CONSTRUCTION**

DRAWING NO.:  
**FIGURE 4**

DATE:  
**02.15.2013**

SRK JOB NO.:  
**146900.160**

REV. NO.  
**A**

IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

**Attachment 2: Landfill Gas Monitoring Well  
Completion Details and Logs**



**TABLE B-1. As-Built Landfill Gas Monitoring Well Construction**  
*Pumice Valley Landfill*

WELL / PROBE	GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7
<b>Well Construction</b> <sup>1</sup>							
Northing (hddd.dddd deg) <sup>2</sup>	37.90629	37.90848	37.90951	37.90949	37.90766	37.9059	37.90588
Easting (hddd.dddd deg) <sup>2</sup>	119.06879	119.06885	119.06774	119.06432	119.06432	119.06432	119.06759
Ground Elevation (est., ft amsl) <sup>2,3</sup>	6,803	6,817	6,824	6,825	6,822	6,825	6,820
Lowest Waste Elevation (est., ft amsl) <sup>4</sup>	6,790	6,790	6,790	6,790	6,790	6,790	6,790
Well Depth (ft bgs)	13	27	34	35	32	26	30
Well Depth (elev, ft amsl)	6,790	6,790	6,790	6,790	6,790	6,799	6,790
<b>Probe 1</b>							
Sealing Zone from (ft bgs)	0	0	0	0	0	0	0
Sealing Zone to (ft bgs)	7	4.5	4.5	4.5	4.5	4.5	4.5
Screened from (ft bgs)	8	5	5	5	5	5	5
Screened to (ft bgs)	13	10	10	10	10	10	10
Screened from (elev., ft amsl)	6,795	6,812	6,819	6,820	6,817	6,820	6,815
Screened to (elev., ft amsl)	6,790	6,807	6,814	6,815	6,812	6,815	6,810
<b>Probe 2</b>							
Sealing Zone from (ft bgs)	--	16	23	24	21	15	19
Sealing Zone to (ft bgs)	--	21	28	29	26	20	24
Screened from (ft bgs)	--	22	29	30	27	21	25
Screened to (ft bgs)	--	27	34	35	32	26	30
Screened from (elev., ft amsl)	--	6,795	6,795	6,795	6,795	6,804	6,795
Screened to (elev., ft amsl)	--	6,790	6,790	6,790	6,790	6,799	6,790
NOTES:							
<ol style="list-style-type: none"> <li>1. Wells were installed on October 6 and 7, 2011.</li> <li>2. Well location and elevation data estimated from GPS readings in the field (NAD 1983 UTM Zone 15N).</li> <li>3. Estimated ground elevations are the GPS field measurement less 4 feet, because measurements were made at chest height.</li> <li>4. Estimated base elevation of former waste disposal trenches within 1,000 feet, based on former disposal practices.</li> </ol>							

LOGGED BY Brian Bass

GROUND CONDITION

COORDINATES OF LOCATION

DATE 10.07.11

Native Ground

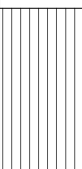
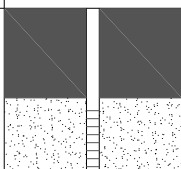
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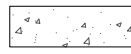

EQUIPMENT 8" Hollow-stem Auger

GROUND ELEVATION

DRILLER ABC Liovin Drilling, Inc.

6,803 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Fine sandy SILT (ML) with trace pebbles; brown; loose; damp; non-plastic
5				Grayish-brown @ 6'
10				Light gray; no pebbles @ 11'
15				
20				

GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC SYMBOL:  8 - 13 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL:  0 - 8 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL:  n/a
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL:  7 - 13 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL: 	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 13 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL: 	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL:  0 - 7 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)

LOGGED BY Brian Bass

GROUND CONDITION  
Native Ground

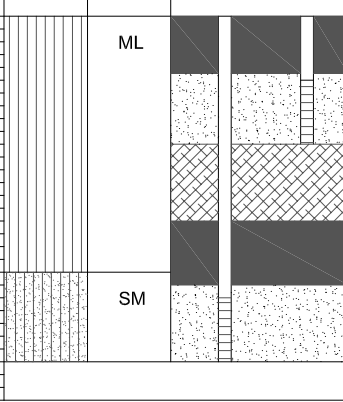
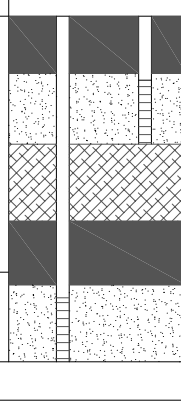
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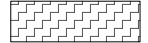
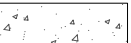

DATE 10.06.11

EQUIPMENT 8" Hollow-stem Auger

GROUND ELEVATION  
6,817 ft amsl (est. by GPS)

DRILLER ABC Liovin Drilling, Inc.

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Fine SILT (ML); light pinkish-gray; loose; dry; non-plastic
5				Light gray with little pebbles @ 13'
20				Silty SAND (SM) with pebbles and some gravel; gray; loose; moist; non-plastic
25		SM		
30				

GROUND WATER ENCOUNTERED: n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC 0.020" machine slots SYMBOL:  5 - 10 ft bgs 22 - 27 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL:  0 - 5 ft bgs 0 - 22 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL:  10 - 16 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL:  4.5 - 10 ft bgs 21 - 27 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL: 	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 27 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL: 	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL:  0 - 4.5 ft bgs 16 - 21 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground
Feet (ft) below ground surface (bgs)			

LOGGED BY Brian Bass

GROUND CONDITION

COORDINATES OF LOCATION

DATE 10.06.11

Native Ground

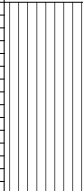
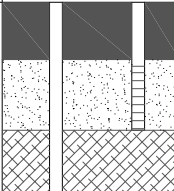
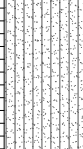
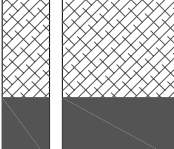

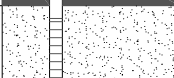
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EQUIPMENT 8" Hollow-stem Auger

GROUND ELEVATION

DRILLER ABC Liovin Drilling, Inc.

6,824 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Poorly-graded fine sandy SILT (ML) with trace pebbles; light gray; loose; dry; non-plastic
5				Grayish-brown @ 7'
10				No pebbles and no gravel @ 10'
15		SM		Poorly-graded silty fine SAND (SM) with some coarse sand; little pebbles and trace gravel; gray; loose; damp; non-plastic
20				
25		ML		Poorly-graded fine sandy SILT (ML) with some coarse sand and trace pebbles; gray; loose; dry; non-plastic
30				
35				

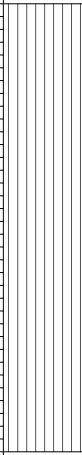
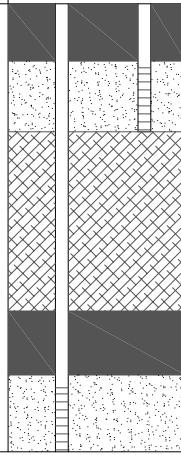
GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC SYMBOL:  5 - 10 ft bgs 29 - 34 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL:  0 - 5 ft bgs 0 - 29 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL:  10 - 23 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL:  4.5 - 10 ft bgs 28 - 34 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL: 	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 34 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL: 	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL:  0 - 4.5 ft bgs 23 - 28 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground





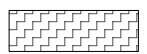
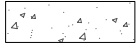

Feet (ft) below ground surface (bgs)

LOGGED BY Brian Bass  
 DATE 10.06.11  
 EQUIPMENT 8" Hollow-stem Auger  
 DRILLER ABC Liovin Drilling, Inc.

GROUND CONDITION  
Native Ground

COORDINATES OF LOCATION  
37.9095°N, 119.0643°E  
 GROUND ELEVATION  
6,825 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Poorly-graded fine sandy SILT (ML) with some coarse sand and little pebbles; light gray; loose; dry; non-plastic
5				With trace gravel; brown @ 6'
10				Damp @ 10'
15				No sand, no pebbles, and no gravel; very light gray; dry @ 16'
20				With very fine sand and trace pebbles; brown; damp @ 21'
25				With some coarse sand, some pebbles, and some gravel @ 26'
30				
35				
40				

GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC 0.020" machine slots SYMBOL:  5 - 10 ft bgs 30 - 35 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL:  0 - 5 ft bgs 0 - 30 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL:  10 - 24 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL:  4.5 - 10 ft bgs 29 - 35 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL: 	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 35 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL: 	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL:  0 - 4.5 ft bgs 24 - 29 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)

LOGGED BY Brian Bass

GROUND CONDITION

COORDINATES OF LOCATION

DATE 10.06.11

Native Ground

37.9077°N, 119.0643°E

EQUIPMENT 8" Hollow-stem Auger

GROUND ELEVATION

DRILLER ABC Liovin Drilling, Inc.

6,822 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Poorly-graded fine sandy SILT (ML) with trace pebbles; brown; loose; damp; non-plastic
5				Light gray; no pebbles @ 5'
10				Little pebbles and trace gravel @ 12'
15		SP		Poorly-graded fine SAND (SP) with silt and some gravel; grayish-brown; loose; damp; non-plastic
20				
25		SW		Well-graded fine to coarse SAND (SW) with some pebbles and some gravel; grayish-brown; loose; damp; non-plastic
30				
35				

GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC 0.020" machine slots SYMBOL: 5 - 10 ft bgs 27 - 32 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL: 0 - 5 ft bgs 0 - 27 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL: 10 - 21 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL: 4.5 - 10 ft bgs 26 - 32 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL:	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 32 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL:	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL: 0 - 4.5 ft bgs 21 - 26 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)

LOGGED BY Brian Bass

GROUND CONDITION Native Ground

COORDINATES OF LOCATION 37.9059°N, 119.0643°E

DATE 10.06.11

EQUIPMENT 8" Hollow-stem Auger

DRILLER ABC Liovin Drilling, Inc.

GROUND ELEVATION 6,825 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL	
0		ML		Poorly-graded fine sandy SILT (ML) with some pebbles; gray; loose; dry; non-plastic	
5					
10					Light gray @ 14'
15					
20				Trace pebbles and trace gravel @ 22'	
25				Little pebbles and little gravel @ 25'	
30					

GROUND WATER ENCOUNTERED: n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC 0.020" machine slots SYMBOL: 5 - 10 ft bgs 21 - 26 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL: 0 - 5 ft bgs 0 - 21 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL: 10 - 15 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL: 4.5 - 10 ft bgs 20 - 26 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL: n/a	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 26 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL: n/a	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL: 0 - 4.5 ft bgs 15 - 20 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)

LOGGED BY Brian Bass

GROUND CONDITION

COORDINATES OF LOCATION

DATE 10.07.11

Native Ground

37.9059°N, 119.0676°E

EQUIPMENT 8" Hollow-stem Auger

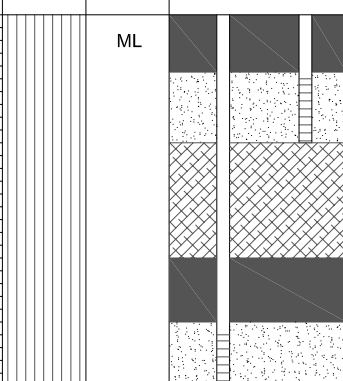
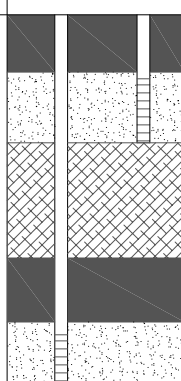

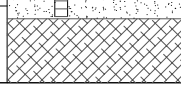
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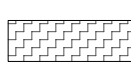


GROUND ELEVATION

DRILLER ABC Liovin Drilling, Inc.

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6,820 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Poorly-graded fine sandy SILT (ML) with trace pebbles and trace gravel; brown; loose; damp; non-plastic
5				Light brownish-gray @ 12'
10				Dry @ 18'
15				With little pebbles and little gravel; light gray @ 21'
20		ML/GP		Dark gray; moist @ 28'
25				Poorly-graded fine sandy SILT and GRAVEL (ML/GP); gray; loose; dry; non-plastic
30				Inadvertantly overdrilled from 30 - 35', then backfilled.
35				

GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC 0.020" machine slots SYMBOL:  5 - 10 ft bgs 25 - 30 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL:  0 - 5 ft bgs 0 - 25 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL:  10 - 19 ft bgs 30 - 35 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL:  4.5 - 10 ft bgs 24 - 30 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL: 	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 35 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL: 	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL:  0 - 4.5 ft bgs 19 - 24 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)



**Attachment 3: Landfill Gas Monitoring Well  
Construction Photographs**

**ATTACHMENT C – TYPICAL CONSTRUCTION METHODS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

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Plate C-1. Truck-mounted hollow-stem auger rig over borehole (GW-1, view west).



Plate C-2. Support trucks and equipment for drill rig (GW-1, view west).

**ATTACHMENT C – TYPICAL CONSTRUCTION METHODS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

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Plate C-3. Truck-mounted hollow-stem auger rig over borehole (Walker Landfill GW-1).



Plate C-4. Typical five-foot long painted steel surface completion monument with locking cap.

**ATTACHMENT C – TYPICAL CONSTRUCTION METHODS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

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Plate C-5. Close-up of typical locking cap on painted steel surface completion monument.

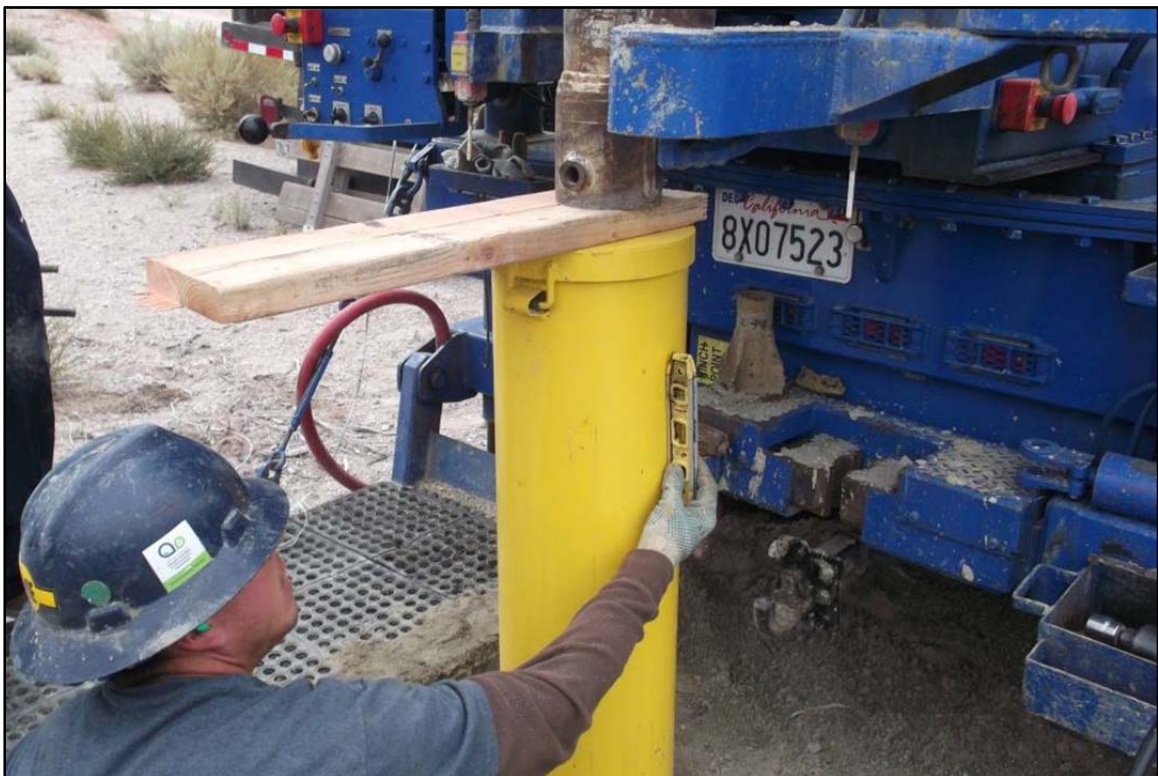


Plate C-6. Balancing of surface completion monument with locking cap.

**ATTACHMENT C – TYPICAL CONSTRUCTION METHODS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

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Plate C-7. Formwork and dug out base for surface completion concrete pad.



Plate C-8. Typical ball valve landfill gas monitoring port inside protective casing.

**ATTACHMENT C – WELL COMPLETION PHOTOGRAPHS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

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**Plate C-9.** Landfill gas monitoring well GW-1 (view west).



**Plate C-10.** LFG monitoring well GW-2 from ground water monitoring well MW-4 (view west).

**ATTACHMENT C – WELL COMPLETION PHOTOGRAPHS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

---



**Plate C-11.** Landfill gas monitoring well GW-3 (view east).



**Plate C-12.** Landfill gas monitoring well GW-4 (view north).

**ATTACHMENT C – WELL COMPLETION PHOTOGRAPHS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

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**Plate C-13.** Landfill gas monitoring well GW-5 (view north).



**Plate C-14.** LFG monitoring well GW-6 at ground water monitoring well MW-1 (view southeast).



**ATTACHMENT C – WELL COMPLETION PHOTOGRAPHS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

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**Plate C-15.** Landfill gas monitoring well GW-7 at site entrance (view west).

## SRK Report Distribution Record

Copy No.

Name / Title	Company	Copy	Date	Authorized by
Tony Dublino SW Superintendent	Mono County Dept. of Public Works Solid Waste Division	1	02.15.13	E.Nikirk
Tony Dublino SW Superintendent	Mono County Dept. of Public Works Solid Waste Division	2	02.15.13	E.Nikirk
Jill Kearney Env. Health Specialist	Mono County Health Department Local Enforcement Agency	3	02.15.13	E.Nikirk
Christine Karl IWM Specialist	CalRecycle Permitting & Assistance Branch	4	02.15.13	E.Nikirk
Michael Wochnick Supervisor	CalRecycle Engineering Support Branch	5	02.15.13	E.Nikirk
Don McGhie Sr. Real Estate Officer	Los Angeles Department of Water and Power – Bishop office	6	02.15.13	E.Nikirk
Josephine Gonzalez Environmental Affairs Mgr.	Los Angeles Department of Water and Power – LA office	7	02.15.13	E.Nikirk
SRK Reno Library	SRK Consulting	8	02.15.13	E.Nikirk

Approval Signature:



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**Appendix I**  
**Ground Water Monitoring Well Construction Logs**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				0				CP Surface Conditions: Weathered and reworked sands, gravels, and pyroclastic material. Pyroclastic material is comprised predominately of moderately sorted unconsolidated rhyolite ash with little subrounded lapilli pumice and trace amounts of black obsidian  SAND (SP), brown, moist, fine to coarse sand, trace lapilli pumice, poorly graded
				5				SP Volcanic ash deposit with rounded lapilli pumice, brown gray, moist to damp, little amount of fine to coarse sand, moderately graded  Sand with lapilli tuff, gray brown, moist, fine to coarse sand (pyroclastic) lapilli size tuff fragments (welded?), moderately graded
				15				as above
				20				Sand, black gray brown, moist to damp, medium to coarse sand, moderately graded
				25				

SURFACE ELEVATION: 6819.00 feet  
 TOTAL DEPTH: 300.0 feet  
 DATE DRILLED: 6-19-88

LOGGED BY: JJ  
 SUPERVISED BY: TJC  
 DIAMETER of BORING: 8.5  
 WATER ENCOUNTERED AT: 260.0 Feet



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-1

PLATE

3.1.2

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				25				
				30				Sands, dark brown, damp, some fine to coarse gravels, medium to coarse sand, poorly to moderately graded. Gravels are primarily angular
				35				
	#14066		50	40				as above
				45			GP	Sandy gravel (GP), Dark brown, damp, fine to coarse sand, moderately graded, (gravels are primarily angular)
			50				SP	Sand (SP), brown to dark brown, moist to damp, fine to coarse sand, trace gravel poorly graded
							SP	



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
 MW-1 (CONT.)

PLATE  
 3.1.2

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				55				Sand (SP), dark brown, wet, some gravels, fine to coarse sand, moderately graded
				60				As above, less gravel (little, medium to coarse sand, poor to medium grained)
				65				
				70				as above, slightly more gravel Drilling becoming more difficult
				75				Gravelly sand, dark brown, moist to damp, fine to coarse sand, fine and coarse gravel, moderately graded (gravels are subangular)
				80				

**KI** KLEINFELDER

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-1 (CONT.)

PLATE  
3.1.2


WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				85			SP	Sandy gravel (GP), brown to gray brown, moist, medium to coarse sand, fine gravel with trace coarse gravel moderately graded
				90				Gravel, gray brown to brown gray, dry to moist, some sand, medium to coarse, moderately to well graded. Subangular gravel. Drilling much coarser for approximately 2 feet.
				95			SP	Appear to be encountering minor beds of alternating gravelly sands and gravel (2 ft. to 4 ft. thick). Drilling becomes very hard then lightens up somewhat (80 ft. to 95 ft.). At 95 ft. encounter zone of sand, brown, moist to damp, fine to medium sand, poorly graded
				100				Sand (SM), light brown to brown, moist, fine sand, poorly graded, silty
				105			SM	Sand (SM), brown, damp to wet, some silt, fine sand
			110					

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
 MW-1 (CONT.)**

**PLATE  
 3.1.2**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	INTERVAL	SAMPLE NUMBER	LITHOLOGY SYMBOL	U. S. C. S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD							
				115	X				Sand (SM), brown to dark brown, damp, fine to medium sand, trace silt
				120	X				Sand (SM), brown to dark brown, moist to damp, some gravel (fine), fine to coarse sand
				125	X				as above - gravels absent
				130	X				Sand (SM), brown to dark brown, moist to damp, trace of gravel
				135	X				as above, brown silts absent, fine to coarse sand  Drilling slightly harder



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-1 (CONT.)

PLATE

3.1.2



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				140				Sand, (SM), brown, moist to damp, trace to little amount fine gravel, trace to little silt, fine to medium sand
				145				As above, damp to wet, trace gravel, silt absent, fine to coarse sand, moderately graded
				150			ML	Silt (ML), brown to gray brown, wet, some clay, trace fine sand, low plasticity
				155				
				160			SM	Silty Sand (SM), brown, damp to wet, trace clay, fine to coarse sand
				165			SM	Sand (SM/SP), brown to dark brown, wet, trace silt and clay, trace to little fine gravel, medium to coarse sand, moderately to well graded.

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-1 (CONT.)

PLATE  
3.1.2

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				170				Gravelly sand (GP/SP), dark brown, damp to wet, medium to coarse sand, fine and coarse, subrounded to subangular gravel, moderately graded. Gravels increase in size and quantity with depth.
				175				As above, increase gravels (more coarse). Essentially granitics
				180				Sand (GP/SP), brown, moist to damp, some fine gravel, fine to coarse sand, moderately graded
				185				Gravelly sand (GP/SP), dark brown, damp to wet, fine and coarse gravel, fine to coarse sand, moderately graded
				190				As above, less fine sand.
				195				Gravelly sand (GP/SP), brown to dark brown, moist to damp, fine and coarse gravel, fine to coarse sand, moderately graded (angular gravel)

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-1 (CONT.)**

**PLATE  
3.1.2**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				200				Sand (GP/SP), light yellow brown, moist, little fine gravel, fine sand, skip graded (subrounded to subangular)
				205				As above, light brown, moist to damp, fine to medium sand, fine and coarse gravel
				210				Sand (GP/SP), brown, damp to wet, trace to little fine gravel, fine to coarse sand, moderately graded (subrounded gravel).
				215			SP	As above, trace fine gravel, medium to coarse sand
				220				As above, less fine gravel.

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-1 (CONT.)**

**PLATE  
3.1.2**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				225				<p>Sand (SP), light yellow brown to light brown, damp, trace fine gravel, fine to medium sand, poorly graded.</p> <p>Easy drilling, fewer gravels with depth.</p>
				230				<p>As above, gravels nearly absent</p>
				235				
				240				
				245				
				250				<p>Sand (GP/SP), brown to dark brown, damp, trace to little fine subrounded gravel, slight trace silt, fine to medium sand, moderately graded.</p> <p>As above, silt absent, medium to coarse sand.</p>

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-1 (CONT.)**

**PLATE**

**3.1.2**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S. C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				255				Gravelly sand (GP/SP), light brown to brown, moist to damp, medium to coarse sand, fine subrounded gravel, moderately to poorly graded.
				260				Ground water encountered @ 260 ft. As above, fine to coarse sand
				265			GP	Sandy gravel (GP/SP), dark brown, wet, fine and coarse, subrounded to subangular gravel, fine to coarse sand, moderately graded.
				270				
				275			SP	Gravelly sand (GP/SP), dark brown, wet, fine to coarse gravel, fine to coarse sand, moderately graded
				280			GP	Drilling very rough, jerking Gravel (GP), dark brown, wet, little to some fine to coarse sand. Fine and coarse subrounded gravel, moderately graded.

**KH KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-1 (CONT.)**

**PLATE  
3.1.2**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U. S. C. S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				285				Sandy Gravel (GP), brown to dark brown, wet, medium to coarse sand, fine subangular gravel, poorly to moderately graded.
				290				Cutting return - difficult due to moisture content. Bit tends to fragment gravels, becomes angular fragments.
				295				Sandy gravel (GP), brown to dark brown, wet, fine, trace and coarse gravel, medium to coarse sand, (may have trace fine sand/silts), moderately graded.
				300				As above, less medium sand and fines (difficult to blow larger gravels up).
				305		SP		Encounter large cobbles? Hard drilling. Then went right back into easy drilling Sand (SP), dark brown, damp to wet, some fine and coarse (trace) gravel, medium to coarse sand, trace silt, moderately graded

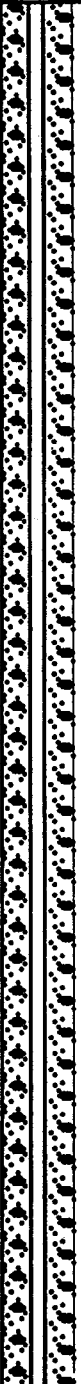
310



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
 MW-1 (CONT.)

PLATE  
 3.1.2

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S. C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				0		SP		
				5				SAND (SP), light brown grey, damp, loose, angular to subrounded, fine to medium grained, quartz, feldspar and hornblende composition with trace of hematitic staining
				10				Slightly more moist, increased maximum grain size to very coarse sand
				15				Decreased maximum grain size
				20				
				25				

#14067

SURFACE ELEVATION: 6811.50 feet  
TOTAL DEPTH: 281.0 feet  
DATE DRILLED: 6-15-88

LOGGED BY: GAJ  
SUPERVISED BY: TJC  
DIAMETER of BORING: 8.5  
WATER ENCOUNTERED AT: 255.3 Feet



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-2

PLATE  
3.1.3

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				25				
				30				Some fine grained gravel, light brown with rounded-angular obsidian and silicious metamorphic clasts, damp
				35				Sand becoming very fine with depth
				40			GP	GRAVELLY SAND, SANDY GRAVEL, (GP/SP), light medium brown, fine sand to medium gravel, damp, loose, poorly graded, granitic and metamorphic clasts  Very slow drilling
				45				
				50				



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

PLATE

LOG OF MONITORING WELL

3.1.3

MW-2 (CONT.)



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				55			SP	Gravelly sand (SP), light to medium brown, fine sand to fine gravel, damp, loose  Subrounded metamorphic and granitic clasts  At 68 ft. increase in gravels, increase in sand grain size to medium
				60			SP	GRAVELLY SAND, (SP/GP), light gray brown, medium sand to gravels, moist, loose, granitic clasts with rare red scoria  At 73 ft., increase in moisture Rig shaking still
				65			GP	SANDY GRAVEL, (GP), light gray brown, dry, subrounded, very dense, poorly graded  Slightly finer grained
				70				
				75				
				80				

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-2 (CONT.)**

**PLATE  
3.1.3**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	INTERVAL	SAMPLE		SOIL DESCRIPTION
	LABORATORY	FIELD				NUMBER	LITHOLOGY SYMBOL	
				85				
				90				Decrease in moisture
				95				Slight increase in moisture to damp
				100			SP	SAND, (SP), light brown, fine to very coarse, subrounded to subangular, moderately sorted, moist, loose, granitic and metamorphic clasts
				105			ML	CLAYEY SILT (ML), light brown, damp to moist
							SP	SAND, (SP), light brown, fine to medium grained, damp, loose; gradational to lower contact
				110			GP	SANDY GRAVEL/GRAVELLY SAND, (GP/SP), light brown, fine sand to fine gravel, damp, loose, subrounded to subangular

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-2 (CONT.)**

**PLATE  
3.1.3**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U. S. C. S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
								At 114 ft., increase in gravels
				115			SP	
								At 117 ft., drilling becomes easier, very slightly damp SAND (SP), light gray brown, fine to medium grained, dry, loose (caving in hole), poorly graded, some gravel and silts
				120				
								At 123 ft., becomes damp
				125				
								Becomes slightly finer grained
				130				
								At 133 ft., drilling becomes harder due to dense material
				135				
								At 136 ft, drilling becomes easier

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-2 (CONT.)

PLATE  
3.1.3

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				140				
				145				
				150		M		SILTY SAND, (SM), light brown, fine grained, damp, loose
				155		SP		SAND, (SP), light brown, fine to very fine grained, damp, loose, moderately poorly graded, minor gravels, increasing slightly with depth
			160				A 157 ft., drilling becomes harder Increase in gravels	
			165			GP		Gradational contact to: SANDY GRAVEL/GRAVELLY SAND, (GP/SP), light brown, damp, loose, poorly graded, medium subangular gravels and becoming drier



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				170				
				175				Still tough drilling As above, dry
				180				Gradational contact to: SP SAND, (SP), light brown, slightly moist, loose, poorly graded, fine to coarse grained with trace fine gravels. Easier drilling
				185				Moist
							GP	SANDY GRAVEL (GP)
				190			SP	SAND, (SP), as above  At 193 ft., drilling rate increased abruptly
				195				

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-2 (CONT.)**

**PLATE  
3.1.3**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				200				GRAVELLY SAND, (SP), light brown, fine sand to fine gravel, moist, loose, poorly graded, metamorphic and granitic clasts
				205				Sand as above with decreased gravel content
				210				As above
				215				As above but fine to medium grained, very damp, fast easy drilling
				220				As above but fine grained with much less gravel
								SAND, (SP), light brown, fine to very fine grain, slightly damp, loose, poorly graded

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-2 (CONT.)**

**PLATE  
3.1.3**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				225				As above, damp
				230			SM	SAND - SILTY SAND, (SM), very fine grained, damp, loose to dense, moderately to poorly graded, drilling fast and easy
				235			SP	SAND-SILTY SAND, (SP/SM), light brown, very fine to fine grained, trace medium grained, poorly graded, loose, drilling fast and easy with occasional shaking from gravelly lenses  At 243 ft., rig shaking slightly
				240				SAND, (SP), light brown, fine to coarse grain, trace fine gravels, damp, loose, poorly sorted, granitic and metamorphic clasts  At 247 ft., rig shaking more violently, slow drilling, gravelly and dense (?)
				245				SAND - SILTY SAND, (SP/SM), light grey brown, very fine to medium grain, dry, loose, poorly graded
				250			SP	SAND, (SP), possibly sandy gravel by way rig is shaking, dry, loose, poorly sorted  GRAVELLY SAND (SP), many broken angular clasts, light brown, fine sand to fine gravel, slightly damp



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-2 (CONT.)

PLATE

3.1.3

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	INTERVAL	SAMPLE		SOIL DESCRIPTION
	LABORATORY	FIELD				NUMBER	LITHOLOGY SYMBOL	
				255				<p>ground water encountered @ 255.3 ft.</p> <p>SAND, GRAVELLY SAND, (SP/GP), as above, added 1200 cfm compressor while blowing hole clear for connection, light grey brown, fine gravel with some sand, moist</p> <p>NOTE: Bit action and low air flows probably grinding gravels to sand size and drying out samples to some degree, especially gravels (shaking rig) which are not readily blown out of the hole</p>
				260			GP	<p>GRAVEL - SANDY GRAVEL, (GP), light grey, loose, wet, poorly sorted, dominantly medium sand to medium gravels, larges to about 2 inches</p>
				265				
				270			SP	<p>GRAVELLY SAND, (SP), medium coarse grained with fine gravels, wet, loose, granitic and metamorphic clasts</p> <p>As above/silty gravelly sands, heaving into hole</p> <p>Note: Centralizers are at:  60 ft.  120 ft.  180 ft.  235 ft.  255 ft.  275 ft.</p>
			275					
			280					

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-2 (CONT.)**

**PLATE  
3.1.3**



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				0			SP	
				5				Drilling with air only  Easy drilling SAND, (SP), light gray brown, dry to moist, fine sand, trace ash and fine obsidian shards, poorly graded
				10				ASH, light white gray, dry to moist, trace lapilli shards, very loose, poorly graded, angular obsidian (medium sand size)
				15				As above. Drilled 15 ft. in approximately 90 seconds  Believe material is coherent as in a tuff
				20				As above, believe to be an ash/lapilli tuff, medium dense
				25			SP	Encounter fluvial deposits

SURFACE ELEVATION: 6803.00 feet  
TOTAL DEPTH: 280.0 feet  
DATE DRILLED: 6-20-88

LOGGED BY: TJC  
SUPERVISED BY: TJC  
DIAMETER of BORING: 8.5  
WATER ENCOUNTERED AT: 250.0 Feet

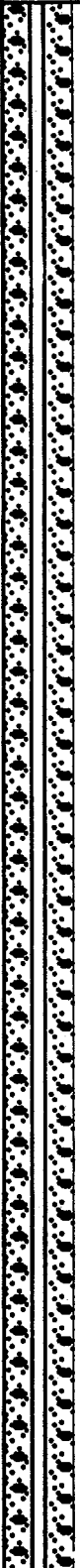


PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-3

PLATE  
3.1.4

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S. C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				25				SAND, (SP), yellow brown, moist, trace fine subrounded gravel, medium to coarse sand, poorly to moderately graded
				30				As above, gravels absent, fine to coarse sand
				35			SP	SAND, (SP), brown, moist, trace fine subrounded gravel, fine to coarse sand, poorly graded
	#14069			40				SAND, (SP), dark brown, trace fine subangular gravel, medium to coarse sand, poorly graded, medium dense. Sampler revealed trace coarse gravels subangular, moist to damp
				45			SP	Increase gravels, drilling harder Approximately 2 ft. gravel lense, damp SAND, (SP), light yellow brown, moist to damp, trace gravels, fine to medium sand, poorly graded
			50				As above, gravel absent	

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-3 (CONT.)**

**PLATE  
3.1.4**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				55				SAND, (SP), dark brown, moist to damp, trace fine subrounded gravel, fine to coarse sand, (mostly medium to coarse), moderately to poorly graded
				60				As above, slightly coarser  Casing advancing easily
				65				SAND, (SP), brown to dark brown, moist to damp, fine to coarse subrounded gravel, fine to coarse sand, poorly graded
				70		SP		Harder drilling Encounter gravels which return angular, implying coarser gravel, metamorphic and granitic in comp. Cobbles?
				75		GP		GRAVELLY SAND, (GP/SP), dark brown to gray brown, moist to damp, fine to coarse subrounded to subangular gravel, fine to coarse sand, well graded to moderately graded. May have cobbles Hard drilling. Believe we're in coarse gravels and cobbles, trace coarse sand and fine gravel
				80		SP		SANDY GRAVEL, (GP), dark gray brown to brown, moist, coarse subrounded to subangular gravel and cobbles, trace coarse sand and fine gravel, slight trace fine gravel and coarse sand absent, very hard drilling, poorly graded
								Begain to get less gravels, no cobbles and more sand SAND, (SP), dark brown, damp to wet, trace fine gravel (subrounded) fine to coarse



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-3 (CONT.)

PLATE  
3.1.4

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U. S. C. S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				85				and, poorly to moderately graded  Easier drilling  As above, damp, poorly graded
				90				SAND, (SP), light yellow brown, moist to damp, slight trace fine gravel (subrounded to subangular), fine to coarse sand (subangular), poorly graded
				95				Sand, (SP), light yellow brown, moist, slight trace fine and coarse subrounded gravel, fine sand (trace medium sand)
				100				As above, gravels absent, light yellow gray brown
				105			ML	SILT, (ML), dark gray brown, damp, trace fine sands, trace clay
				110			SM	Encounter gravelly silty sands Harder drilling - believe gravels and sands increase

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-3 (CONT.)**

**PLATE**

**3.1.4**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				115				ILTY SAND, (SM), dark gray, brown, damp, some subrounded fine gravels, minor silt, sands appear subangular and subrounded
				120				SAND, (SM), orange brown, moist, fine and medium sand, trace coarse sand and fine gravel, slight trace silt, poorly graded
				125			SP	Harder drilling - encountering more gravel
				130			SM	Easier drilling SAND (SM), brown to dark brown, moist to damp, fine to medium sand, trace silt
				135			SP	Harder drilling As above, trace fine gravel, fine to coarse sand
							SP	Increasing gravels

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-3 (CONT.)**

**PLATE  
3.1.4**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				140				Sand (SP), brown, moist, little subangular fine and coarse gravel, medium to coarse sand (trace fine), poorly graded
				145				
				150				As above, slight trace gravel, no cobbles, poorly graded  Easier drilling
				155				As above, moist to damp, gravels absent
				160			SM	SILTY SAND (SM), brown to dark brown, damp, trace silt, fine sand (trace medium)
				165				

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-3 (CONT.)

PLATE  
3.1.4

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				170				Relatively easy drilling SAND (SP), brown, moist to damp, trace to little fine subrounded gravel, fine to coarse sand, moderately graded (primarily fine sand)
				175				
				180				
				185				Sand, light brown, moist, trace silt, fine sand, poorly graded
				190				As above, fine to medium sand, slight trace gravel, moist to damp
				195				As above, primarily fine sand, trace fine gravel

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				200				As above, gravel absent, fine sand (trace medium & coarse)
				205			SP	SAND (SP), brown to dark brown, moist to damp, trace to little subrounded to subangular gravel (fine, trace coarse), fine to medium sand (trace coarse), poorly graded
				210				
				215				
				220				As above
							SM	Relatively easy drilling SILTY SAND (SM), dark brown, damp, trace fine gravel, minor silt, fine to coarse sand, (primarily fine and medium)



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-3 (CONT.)

PLATE

3.1.4



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				225				
				230				Drilling harder
				235				
				240				Silty Sand, brown to dark brown, damp to wet, slight trace fine gravel, trace silt, fine to coarse sand
				245				<p>Cutting may be hanging up on casing due to moisture, possible water</p> <p>Cuttings consist of subangular/angular coarse sand</p>
			250				<p>Sand, brown to dark brown, damp to wet, primarily coarse sand, slight trace fine gravel, angular, poorly graded-believe fines are not being discharged</p> <p>Ground water encountered @ 250 ft.</p>	

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL

MW-3 (CONT.)

PLATE

3.1.4

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				255				
				260				
				265			P	Sandy Gravel (GP), dark gray brown, wet, fine and coarse, subrounded to subangular gravel, trace to little coarse sand, moderately graded Had free water discharge at 264 ft.
				270			SP	Gravelly Sand (SP), dark gray brown, fine gravel, coarse sand, poorly to moderately graded, wet  Gravelly sand, dark gray brown, wet, fine gravel, coarse sand, poorly graded
			275					
				280				

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-3 (CONT.)**

**PLATE**

**3.1.4**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	INTERVAL	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD							
				0			SP		
				5					SAND (SP), fine to very fine grained, light brown moist, loose, airfall ash
				10				ML	Very fast drilling to 8 ft. SANDY SILT (ML), light brown, damp to very damp, firm, (lacustrine silts?)
				15				SP	SAND (SP), light gray brown, moist, loose, very fine to medium grained, poorly graded
			20						As above with increasing grain size to coarse
			25		32			SP	

SURFACE ELEVATION: 6803.00 feet  
TOTAL DEPTH: 275.0 feet  
DATE DRILLED: 6-21-88

LOGGED BY: GAJ  
SUPERVISED BY: TJC  
DIAMETER of BORING: 8.5  
WATER ENCOUNTERED AT: 240.0 Feet



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**PLATE  
3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				25				SAND (SP), light brown very fine to fine grained, loose, moist, medium grains
				30				
				35				No sample
				40				
	#14071			50			SP	SAND (SP), light brown, fine grained, moist, loose with interbedded sandy silt, light brown, mottled red-orange
				45				Gravelly silty sand, moist, loose
				50				Sand fine to medium grained, moist, loose



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
 MW-4 (CONT.)

PLATE  
 3.1.5

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				55				
			11	60				GRAVELLY SAND/SANDY GRAVEL (GP/SP), fine sand, medium gravel, loose, moist, granitic and metamorphic clasts, poorly graded
				65				GRAVEL (GP), medium brown, fine sand, medium gravel, loose, moist, very poorly graded, subrounded
				70				
				75				As above
				80				As above, some gravels to 2 or 3 inches, drilling rig often becoming stuck, casing driven with out hammering

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-4 (CONT.)**

**PLATE**

**3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U. S. C. S. DESIGNATION	SOIL DESCRIPTION	
	LABORATORY	FIELD							
				85			SM	SILTY SAND (SM), gray brown, very fine grained, loose, damp, moderately graded	
				90				As above, slightly coarser grained with depth	
				95					
				100				ML	SANDY SILT (ML), light gray brown loose, moist
				105				SP	SAND (SP), light brown, very fine to medium grained
			110				GP	SANDY GRAVELS (GP), light brown, medium grained gravels, loose, moist	

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
 MW-4 (CONT.)**

**PLATE  
 3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				115				As above, becoming drier
				120			SP	SAND (SP), light brown to reddish brown, fine grained, loose, moist, with cobbles
				130				Sand, light brown, fine to medium grained with trace fine gravels, loose and moist, subrounded gravel clasts
				135				

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
 MW-4 (CONT.)**

**PLATE  
 3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				140				Sand, medium red brown, no gravels, loose, moist fine grained
				145			SM	SILTY SAND (SM), light gray brown very fine to fine grained
				150			SP	SAND (SP), with trace medium gravels, light brown, poorly graded, loose, moist, fine grained
				155				
				160				
				165			SP	SAND (SP), light brown fine to medium sand - fine gravel, poorly graded, subrounded, loose, moist



PUMICE VALLEY LANDFILL  
 MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
 MW-4 (CONT.)

PLATE  
 3.1.5



WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				170				
				175		SM	SM	SILTY SAND (SM), light brown, very fine to fine grained, moderately sorted, loose, moist
						ML	ML	SILT (ML)
				180		SP	SP	SAND (SP), light gray brown, fine grained, poorly graded, loose, moist
				185		GP	GP	At 183 ft., tough drilling  SANDY GRAVELS (GP), light brown fine sand to fine gravels, poorly graded, loose, moist, subrounded clasts
				190		SM	SM	SILTY GRAVELLY SAND (SM), light brown, loose, moist
						GP	GP	GRAVELS (GP), many broken clasts, little sand, dry
				195		GP	GP	SANDY GRAVEL (GP), light brown, fine sand to medium gravels, poorly sorted, loose, moist

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL**

**MW-4 (CONT.)**

**PLATE**

**3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SUBSTRATUM	SAMPLE		SOIL DESCRIPTION
	LABORATORY	FIELD				NUMBER	LITHOLOGY SYMBOL	
				200				SILTY SANDY GRAVEL (GP), light to medium brown gravels (approximately 1"), moist, loose
				205			SP GP	SAND (SP), light brown, medium to coarse grained, moderately to poorly sorted, subrounded, loose, moist SANDY GRAVEL (GP)
							SP	SAND (SP), light brown, fine to medium grained, damp, loose, poorly to moderately sorted
				210			GM	Borehole caving during well completion from 203 - 213 ft  SILTY SANDY GRAVEL (GM), light brown, medium gravels, (approximately 1"), loose, moist, subrounded
				215			GP	SANDY GRAVELS (GP), dry, light gray
				220			GP	SANDY GRAVELS (GP), light brown, medium sand to medium gravels, poorly graded, moist, loose, many broken angular clasts, whole clasts subrounded  Drying out at 223 ft. Probably cobble size
							GM	SILTY SANDY GRAVEL (GM), light brown gravels to 1-1/2", moist, loose, poorly graded



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

LOG OF MONITORING WELL  
MW-4 (CONT.)

PLATE  
3.1.5

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				225				
				230			P	SAND (SP), gravelly sand, light brown, fine to medium grained, 1-1/2" gravel, may be slow coming up hole. poorly graded, loose, moist
				235			GP	SANDY GRAVEL (GP), light brown gray, fine to medium gravels, poorly graded, subrounded, slightly moist, loose, grading to dry broken rock chips, ie. larger clast size of gravels, dry Ground water encountered @ 240 ft.
				240			SP	SANDY GRAVEL/GRAVELLY SAND (GP/SP), medium sand to medium gravel (approximately 1-1/2"), poorly graded, subrounded, subangular, loose, slightly moist
				245			SP	SAND (SP), light to medium brown, medium to coarse grained, subrounded, damp to wet, loose
							SP	GRAVELLY SAND (SP), gravel to 1-1/2 inches, wet
				250			GP	

**KLEINFELDER**

PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-4 (CONT.)**

**PLATE  
3.1.5**

WELL CONSTRUCTION	CHEMICAL ANALYSES		BLOW COUNT	DEPTH (feet)	SAMPLE NUMBER	LITHOLOGY SYMBOL	U.S.C.S. DESIGNATION	SOIL DESCRIPTION
	LABORATORY	FIELD						
				255				SANDY GRAVEL/GRAVELLY SAND (GP), medium brown, medium sand to medium gravel (to approximately 1-1/2"), poorly sorted, subrounded, very damp to wet, loose
				260				Sandy gravel as above Blew free water out on the connection
				265				As above, slow drilling suggests cobbly gravel Very slow drilling
				270			SP	GRAVELLY SAND (SP), medium brown, medium sand to fine gravel, poorly graded, subrounded, very damp to wet, loose
				275			GM	SILTY SANDY GRAVEL (GM), medium brown, wet, gravels to 1 inch, subrounded to rounded
								SANDS (SP), medium brown, minor fines, fine to coarse grained sand with trace of little gravels to 3/4", subrounded, very damp to wet, loose
				280				Note: Centralizers at: 60 ft. 100 ft. 140 ft. 180 ft. 220 ft. 260 ft.



PUMICE VALLEY LANDFILL  
MONO COUNTY, CALIFORNIA

**LOG OF MONITORING WELL  
MW-4 (CONT.)**

**PLATE  
3.1.5**

**UNIFIED SOIL CLASSIFICATION SYSTEM**

MAJOR DIVISIONS		USCS	DESCRIPTION	
COARSE GRAINED SOILS	GRAVELS  MORE THAN HALF COARSE FRACTION IS LARGER THAN #4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	WELL GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES (GW)	
			POORLY GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES (GP)	
		GRAVELS WITH OVER 12% FINES	SILTY GRAVEL-SAND-SILT MIXTURES (GM)	
			CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES (GC)	
	SANDS  MORE THAN HALF COARSE FRACTION IS SMALLER THAN #4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	WELL-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES (SW)	
			POORLY-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES (SP)	
		SANDS WITH OVER 12% FINES	SILTY SANDS, SAND-SILT MIXTURES (SM)	
			CLAYEY SANDS, SAND-CLAY MIXTURES (SC)	
		FINE GRAINED SOILS	SILTS AND CLAYS  LIQUID LIMIT LESS THAN 50	INORGANIC SILTS OR VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS (ML)
				SANDY CLAYS, SILTY CLAYS, OR LEAN CLAYS (CL)
ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY (OL)				
SILTS AND CLAYS  LIQUID LIMIT GREATER THAN 50	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS (MH)			
	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS (CH)			
	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS (OH)			
HIGHLY ORGANIC SOILS			PEAT OR OTHER HIGHLY ORGANIC SOILS (PT)	

**NOTES:**

NFWE = NO FREE WATER ENCOUNTERED



KEY TO UNIFIED SOIL CLASSIFICATION SYSTEM

PLATE  
3.1.1

PROJECT NO. 30-1477-07

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**Appendix J**  
**Closure and Postclosure Cost Estimates**

## CLOSURE AND POSTCLOSURE COST ESTIMATES

### PART I - SITE INFORMATION

#### General Site Information

A. Name of Solid Waste Landfill: Pumice Valley Landfill  
 B. Solid Waste Facilities Permit: 26-AA-0003  
 C. Facility Operator: Mono County Department of Public Works  
 D. Site Owner: County of Mono  
 E. Site Location: Acquired March 2016 from LADWP  
 NW¼ NW¼, Sec. 36, T1N, R26E, MDB&M  
 Lat. 37°54'28"N, Long. 119°03'53"W  
 F. Site Address: 200 Dross Road, Lee Vining, CA 93541  
 G. State WRCB Classification: WDID No. 6B260300011 (Oct. 10, 2001)  
 H. Landfill Classification: Class III  
 I. Anticipated Closure Date: Mid-2048  
 J. Type of Fill: Area Fill

#### Waste Volume Information

K. Estimated In-Place Waste Vol. (cy): 87,640 (1989 - 2015)  
 L. Total Remaining Waste Capacity (cy): 363,850 (Jan 2016)  
 M. Total Site Design Capacity (K+L, cy): 451,490  
 N. Minimum Thickness of Waste (ft): 20  
 O. Maximum Thickness of Waste (ft): 62  
 P. Average Thickness of Waste (ft): 41  
 Q. Avg. Height Above Adjacent Terrain (ft): 28  
 R. Typical Sideslope Inclination: 3:1  
 S. Avg. Loading Rate (tons/day, 2007-2015): 6.2 (received)  
 T. Waste Disposal Area (acres): 23.62  
 U. Current Waste Stream Description:

<u>Transfer Station</u>	17.1%
Transferred Off-Site:	5.4%
Diverted Waste:	11.7%
<u>Landfill</u>	82.9%
Buried On-Site	51.8%
Diverted Waste:	31.1%

#### Site Geology and Ground Water Data

V. Underlying Geology: Alluvial and lacustrine sediments  
 W. Nearest Major Fault: Mono Lake Fault / Hartley Springs Fault  
 X. Distance to Nearest Major Fault (mi.): 3.0  
 Y. Depth to Ground Water (range, in ft.): 246 to 271 feet below ground surface  
 Z. Highest and Lowest Recorded Levels:

	Well No.	Date Recorded	Depth (ft.bgs)
Deepest	MW-1	May 2010	274.2
Shallowest	MW-4	Nov. 2006	245.1

#### Direction and Gradient of Ground Water Flow:

Gradient (ft/ft): 0.0046  
 Direction: N 58 E

**CLOSURE AND POSTCLOSURE  
 COST ESTIMATES**

**PART II - CLOSURE / POSTCLOSURE COST SUMMARY**

<u>CLOSURE CONSTRUCTION COSTS FOR LARGEST CLOSURE AREA</u>		<u>Comments</u>
1.0 SITE ROADS AND SECURITY	\$84,400	The largest area which will require closure construction is the full extent of waste placement (see drawings -02 & -03).
1.1 Entrance Gate	\$0	
1.2 Perimeter Fencing	\$0	
1.3 Perimeter Access Roads	\$0	
1.4 Top Deck Access Roads	\$70,300	
1.5 Contingency	\$14,100	
2.0 ENVIRONMENTAL CONTROL SYSTEMS	\$237,800	Installed / implemented during operational life. Installed during operational life of facility. Installed during operational life of facility.
2.1 Landfill Gas Monitoring System	\$15,100	
2.2 Ground Water Monitoring System	\$0	
2.3 Stormwater Run-On Diversion Channel	\$0	
2.4 Stormwater Retention Basins	\$0	
2.5 Stormwater Run-Off Collection System	\$183,100	
2.6 Contingency	\$39,600	
3.0 FINAL COVER CONSTRUCTION	\$1,572,800	Final cover construction footprint = 23.62 ac. GCL proposed in place of low perm. soil. Assumed 12 weeks to construct final cover.
3.1 Final Cover Construction Costs	\$1,154,700	
3.2 Construction Monitoring & Eng. Costs	\$155,990	
3.3 Contingency	\$262,100	
<b>TOTAL CLOSURE CONSTRUCTION COSTS</b>	<b><u><u>\$1,895,000</u></u></b>	
<b><u>POSTCLOSURE MAINTENANCE COSTS</u></b>		
1.0 ANNUAL SITE ROADS AND SECURITY	\$5,450	Access roads, entr. gate, perimeter fencing.
2.0 ANNUAL ENVIRONMENTAL CONTROL SYSTEMS	\$33,500	LFG and GW monitoring, drainage facilities.
3.0 ANNUAL FINAL COVER SYSTEM	\$17,200	Cover repair, settlement monument survey.
TOTAL ANNUAL MAINTENANCE COSTS	\$56,150	Inspection, repairs, reporting, contingency.
<b>TOTAL POSTCLOSURE MAINTENANCE COSTS (30 years)</b>	<b><u><u>\$1,684,508</u></u></b>	



## CLOSURE AND POSTCLOSURE COST ESTIMATES

### PART III - CLOSURE CONSTRUCTION COSTS

#### 1.0 SITE ROADS AND SECURITY

	Quantity	Units /event	Price per Unit	total
1.1 Entrance Gate	0	NA		\$0
1.2 Perimeter Fencing	0	NA		\$0
1.3 Perimeter Access Roads	0	NA		\$0
1.4 Top Deck and Perimeter Access Roads	0	NA		
1.4.1 Access Road Design Parameters				
Length of 28'-Wide Entry Road =	310	FT		
Length of 15'-Wide Perim. Rd. =	3,000	FT		
Thickness of Surfacing =	0.5	FT		
Surface Material Required =	990	CY		
1.4.2 Road Construction Costs				
Mob./ Demob.	\$10,000	LS		\$10,000
Clearing and Grubbing	0	NA		\$0
Grade / Compact Subgrade	0	NA		\$0
28'-Wide Road Surfacing	\$26.00	LF		\$8,100
15'-Wide Road Surfacing	\$16.50	LF		\$49,500
Subtotal, Access Road Construction				\$67,600
1.4.3 Road Construction Monitoring Costs				
Project Management	4	HR	125	\$500
CQA Technician	20	HR	85	\$1,700
Mob./ Demob.	1	LS	350	\$350
Direct Expenses	1	LS	120	\$120
Initial Survey Staking	0	NA		\$0
As-Built Survey	0	NA		\$0
Subtotal, Access Road Construction Monitoring				\$2,670
Subtotal, Top Deck and Perimeter Access Roads				\$70,300
Subtotal, Site Roads and Security				\$70,300
1.5 Contingency @ 20%				\$14,100
<b>TOTAL, SITE ROADS AND SECURITY</b>				<b>\$84,400</b>

#### 2.0 ENVIRONMENTAL CONTROL SYSTEMS

##### 2.1 Landfill Gas Monitoring and Control System

	Quantity	Units /event	Price per Unit	total
2.1.1 Landfill Gas Monitoring System Design Parameters (A complete perimeter monitoring system exists as follows)				
Number of LFG Wells:	7	EA		
Number of Probes / Well:	1 to 2	EA		
Depth of Probes:	10 / 30	FT		
Number of Cover Vents:	15	EA		
2.1.2 Landfill Gas Monitoring & Control Program	0	NA		\$0
2.1.3 Landfill Gas System and Well Design	0	NA		\$0
2.1.4 Landfill Gas Monitoring Well Installation	0	NA		\$0
2.1.5 Landfill Gas Vent Installation in Final Cap	1	LS	15100	\$15,100
Subtotal, LFG Monitoring System				\$15,100

**CLOSURE AND POSTCLOSURE  
 COST ESTIMATES**

**2.0 ENVIRONMENTAL CONTROL SYSTEMS, continued ...**

2.2 Ground Water Monitoring System

2.2.1 GW Monitoring System Design Parameters

No. of Upgradient Wells:	1		
No. of Cross-gradient Wells:	1		
No. of Down-gradient Wells:	2		

2.2.2 Ground Water Monitoring Plan	0	NA	\$0
2.2.3 GW Monitoring Well Installation	0	NA	\$0
2.2.4 Well Casing Survey	0	NA	\$0

Subtotal, GW Monitoring System \$0

2.3 Stormwater Run-On Diversion Channel

2.3.1 Channel Construction Costs

Mob./ Demob.	0	NA	\$0
Clearing and Grubbing	0	NA	\$0
Rough Excavation	0	NA	\$0
Finish Grading	0	NA	\$0
Water Truck	0	NA	\$0
Erosion Control	0	NA	\$0

Subtotal, Channel Construction \$0

2.3.2 Channel Construction Monitoring Costs

Project Management	0	NA	\$0
CQA Technician	0	NA	\$0
Mob./ Demob.	0	NA	\$0
Direct Expenses	0	NA	\$0
Initial Survey Staking	0	NA	\$0
As-Built Survey	0	NA	\$0

Subtotal, Construction Monitoring \$0

Subtotal, Stormwater Diversion Channel \$0

2.4 Stormwater Retention Basins

2.4.1 Basin Construction Costs

Mob./ Demob.	0	NA	\$0
Clearing and Grubbing	0	NA	\$0
Rough Excavation	0	NA	\$0
Finish Grading	0	NA	\$0
Water Truck	0	NA	\$0
Erosion Control	0	NA	\$0

Subtotal, Basin Construction \$0

2.4.2 Basin Construction Monitoring Costs

Project Management	0	NA	\$0
CQA Technician	0	NA	\$0
Mob./ Demob.	0	NA	\$0
Direct Expenses	0	NA	\$0
Initial Survey Staking	0	NA	\$0
As-Built Survey	0	NA	\$0

Subtotal, Basin Construction Monitoring \$0

Subtotal, Stormwater Retention Basins \$0

**CLOSURE AND POSTCLOSURE  
 COST ESTIMATES**

**2.0 ENVIRONMENTAL CONTROL SYSTEMS, continued ...**

	Quantity	Units	Price per Unit	total
<b>2.5 Stormwater Run-Off Collection System</b>				
<b>2.5.1 Collection System</b>				
Mob./ Demob.	1	ls	\$10,000	\$10,000
18" CPEP Overside Drains:	700	ft	\$54	\$37,800
18" Overside Drain Anchors:	64	ea	\$340	\$21,760
24" CPEP at Headwall Berms:	120	ft	\$72	\$8,640
24" CPEP Flared End Sections:	6	ea	\$360	\$2,160
CPEP 22.5-Deg. Elbows:	6	ea	\$630	\$3,780
18" CPEP Reducers:	6	ea	\$650	\$3,900
18" CPEP T- and L-Sections:	6	ea	\$820	\$4,920
Paved Overside Drain Discharge:	6	ea	\$520	\$3,120
Perimeter Channel Trimming:	3,323	ft	\$1.25	\$4,150
Swale Fine Grading:	1,750	ft	\$5.00	\$8,750
Ditch Fine Grading:	282	ft	\$5.00	\$1,410
New Swale Rip-Rap Lining:	651	CY	\$75	\$48,850
New V-Ditch Rip-Rap Lining:	33	CY	\$100	\$3,300
Geotextile Under Rip-Rap:	13,300	sf	\$1.00	\$13,300
Subtotal, Collection System Construction				\$175,840
<b>2.5.2 Collection System Construction Monitoring Costs</b>				
Project Management	8	hr	125	\$1,000
CQA Technician	50	hr	85	\$4,250
Mob./ Demob.	1	LS	1730	\$1,730
Direct Expenses	1	LS	300	\$300
Initial Survey Staking	0	NA		\$0
As-Built Survey	0	NA		\$0
Subtotal, Construction Monitoring				\$7,280
Subtotal, Stormwater Run-Off Collection System				\$183,100
Subtotal, Environmental Control Systems				\$198,200
2.6 Contingency @ 20%				\$39,600
<b>TOTAL, ENVIRONMENTAL CONTROL SYSTEMS</b>				<b>\$237,800</b>

**CLOSURE AND POSTCLOSURE  
 COST ESTIMATES**

**3.0 FINAL COVER CONSTRUCTION**

3.1 Final Cover Design Parameters

Mob./Demob.	1	LS	\$10,000	\$10,000
Foundation Layer Const. Thickness:	1.0	FT		
Low Perm. Layer Thickness:	0.0	FT		
Erosion Layer Thickness:	1.0	FT		
Wood Chip Layer Thickness:	0.25	FT		
Total Final Cover Area:	1,046,800	SF		
Interim Surface Clearing & Grubbing	1,046,800	SF	\$0.06	\$62,800
GCL Installation	1,046,800	SF	\$0.50	\$523,400
Interim Surface Preparation	24.03	acres	\$1,130	\$27,200
	24.03	acres	\$1,500	\$36,000
Total Constructed Final Cover Vol.:	77,540	CY		
Total Length of Anchor Trench:	4,235	FT	\$10	\$42,400
Total Foundation Soil Required (onsite resource):	42,650	CY	\$5.10	\$217,500
Total Low Perm Material Required:	0	CY		
Total Erosion Soil Required (onsite resource):	42,650	CY	\$5.10	\$217,500
Total Length of Headwall Berms:	1,895	FT	\$5.90	\$12,400
Rip-Rap Lining at Berm Face Inlet:	20	CY	\$60	\$1,200
No. Settlement Monuments:	17	EA	\$250	\$4,300

Subtotal, Final Cover Construction \$1,154,700

3.2 Final Cover Construction Monitoring & Engineering Costs

Construction Management	96	HR	125	\$12,000
Construction Manager Site Visits	1	LS	\$4,500	\$4,500
CQA Technician	720	HR	85	\$61,200
Clerical / Lab Manager	1	LS	\$3,120	\$3,120
Mob./ Demob.	1	LS	\$350	\$350
Equipment	1	LS	\$4,500	\$4,500
Direct Expenses	1	LS	\$14,820	\$14,820
Initial Survey Staking	1	LS	\$5,500	\$5,500
Final Closure/PC Plan & Design	1	LS	\$20,000	\$20,000
Closure CQA Manual & Specs	1	LS	\$6,000	\$6,000
Prepare Emergency Response Plan	1	LS	\$7,500	\$7,500
As-Built Survey	1	LS	\$8,000	\$8,000
Final Certification Report	1	LS	\$8,500	\$8,500

Subtotal, Final Cover Monitoring \$155,990

Subtotal, Final Cover Construction \$1,310,700

3.3 Contingency @ 20% \$262,100

**TOTAL, FINAL COVER CONSTRUCTION \$1,572,800**

## CLOSURE AND POSTCLOSURE COST ESTIMATES

### PART IV - ANNUAL POSTCLOSURE MAINTENANCE COSTS

#### 1.0 SITE ROADS AND SECURITY

	Quantity	Units	Price per Unit		total
1.1 Entrance Gate Repair (not required)	0			n/a	\$0
Perimeter Fence Repair (10% per					
1.2 year of 5290 foot fence	529	ft	\$2		\$1,190
1.3 Perimeter Access Rd Repair	2	days	\$1,120		\$2,240
1.4 Top Deck Access Rd Repair	1	days	\$1,120		\$1,120
Subtotal, Access Road Construction					\$4,550
1.5 Contingency @ 20% (rounded)					\$900
<b>TOTAL, SITE SECURITY AND APPURTENANCES</b>					<b>\$5,450</b>

#### 2.0 ENVIRONMENTAL CONTROL SYSTEMS

	Quantity	Units /event	Price per Unit	\$ per event	events	total
2.1 Landfill Gas Monitoring (quarterly monitoring of 7 wells)						
Gas Probe Sampling	11	hr	85	\$935	4	\$3,740
Direct Expenses (per diem, equip, shipping)				\$315	4	\$1,260
Report Preparation	4	hr	85	\$340	4	\$1,360
Project Management & QC	2	hr	125	\$250	4	\$1,000
Subtotal, Landfill Gas Monitoring						\$7,360
2.2 Ground Water Monitoring (semi-annual monitoring of 4 gw well)						
Monitoring Well Sampling	12	hr	85	\$1,020	2	\$2,040
Direct Expenses				\$3,200	2	\$6,400
Semi-Annual Report Prep.	16	hr	85	\$1,360	2	\$2,720
Project Management	6	hr	125	\$750	2	\$1,500
Subtotal, Ground Water Monitoring						\$12,660
2.3 Leachate Collection System Monitoring (none)						\$0
2.4 Stormwater Run-On Diversion Channel (none)						\$0
2.5 Stormwater Retention Basins						
Basin Repairs	2	days	\$1,120			\$2,240
2.6 Stormwater Run-Off Collection System						
System Repairs	5	days	\$1,120			\$5,600
Subtotal, Environmental Control Systems						\$27,900
2.7 Contingency @ 20%						\$5,600
<b>TOTAL, ENVIRONMENTAL CONTROL SYSTEMS</b>						<b>\$33,500</b>

#### 3.0 FINAL COVER SYSTEM

	Quantity	Units /event	Price per Unit	\$ per event	events	total
Qtrly Cover Inspection / Reporting	16	hr	85	\$1,360	4	\$5,440
Final Cover Repairs	3	days	\$1,120			\$3,360
Settlement Survey / Reporting				\$1,640	1	\$1,640
5-Yr Iso-Settlement Aerial Topo				\$8,000	0.2	\$1,600
Wood Chip Erosion Repair	2	days	\$1,120			\$2,240
Subtotal, Final Cover System						\$14,300
Contingency @				20%		\$2,900
<b>TOTAL, FINAL COVER SYSTEM</b>						<b>\$17,200</b>

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**Appendix K**  
**Financial Assurance Documentation**

**FUND DEPOSIT CALCULATIONS**  
**CLOSURE / POST-CLOSURE FINANCIAL ASSURANCE**  
**Pumice Valley Landfill (SWIS #26-AA-0003)**  
*Mono County, California*

Description	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016
Inflation Factor (Prior Year)	1.012	1.010	1.021	1.018	1.015	1.015	1.010
Total Permitted Site Capacity (C <sub>t</sub> ), cy	347,112	347,112	347,112	347,112	347,112	347,112	347,112
Disposal Capacity Filled This Year (C <sub>t</sub> ), cy	1,643	705	543	2,660	2,144	1,122	1,064
Remaining Permitted Capacity (C <sub>r</sub> ), cy	239,011	238,306	237,763	235,103	232,959	231,837	230,773
Permitted Capacity Used to Date, pct.	31.14%	31.35%	31.50%	32.27%	32.89%	33.21%	33.52%
Pre-93 Disposal Consumption Ratio, C <sub>f</sub> /C <sub>t</sub>	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Post-93 Disposal Consumption Ratio, C <sub>f</sub> /C <sub>r</sub>	0.006874	0.002958	0.002284	0.011314	0.009203	0.0048396	0.0046106
Closure Cost Estimate	\$ 1,222,327	\$ 1,234,550	\$ 1,260,476	\$ 1,283,165	\$ 1,302,412	\$ 1,321,948	\$ 1,335,167
Post-Closure Cost Estimate	\$ 1,422,683	\$ 1,436,910	\$ 1,467,085	\$ 1,493,493	\$ 1,515,895	\$ 1,538,633	\$ 1,554,019
Total Cost Estimate (E)	\$ 2,645,010	\$ 2,671,460	\$ 2,727,561	\$ 2,776,658	\$ 2,818,307	\$ 2,860,581	\$ 2,889,186
Minimum Fund Balance Prior to Deposit	\$ 317,096	\$ 329,139	\$ 331,742	\$ 333,782	\$ 343,076	\$ 352,354	\$ 355,314
Min. Calculated Remaining Cost Estimate (E <sub>r</sub> )	\$ 905,231	\$ 905,411	\$ 928,734	\$ 949,383	\$ 959,336	\$ 969,594	\$ 979,853
Pre-93 Minimum Fund Deposit, (C <sub>f</sub> /C <sub>t</sub> ) x E	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Post-93 Minimum Fund Deposit, (C <sub>f</sub> /C <sub>r</sub> ) x E <sub>r</sub>	\$ 6,223	\$ 2,679	\$ 2,121	\$ 10,741	\$ 8,829	\$ 4,692	\$ 4,518
<b>Required Annual Fund Deposit</b>	<b>\$ 6,223</b>	<b>\$ 2,679</b>	<b>\$ 2,121</b>	<b>\$ 10,741</b>	<b>\$ 8,829</b>	<b>\$ 4,692</b>	<b>\$ 4,518</b>
<b>Required Fund Balance After Deposit</b>	<b>\$ 323,319</b>	<b>\$ 331,818</b>	<b>\$ 333,863</b>	<b>\$ 344,523</b>	<b>\$ 351,905</b>	<b>\$ 357,046</b>	<b>\$ 359,832</b>
<b>Actual Fund Balance</b>	\$ 329,139	\$ 331,742	\$ 333,782	\$ 333,783	\$ 343,076	\$ 352,354	\$ 355,314
<b>Discrepancy</b>	<b>-\$ 5,820</b>	<b>\$ 76</b>	<b>\$ 81</b>	<b>\$ 10,740</b>	<b>\$ 8,829</b>	<b>\$ 4,692</b>	<b>\$ 4,518</b>

**Notes:**

Restricted Fund Balance of \$131,209 as of June 30, 2012  
244,627 and subsequent capacity figures based on audit conducted August 2012  
Low Capacity Calcs for FY 11/12 are due to change in anniversary date  
Anniversary date was changed to FY of July-June as of September 2012  
2005/2006 Closure Cost Estimate and Post Closure Cost Estimate based on 2004 PCPMP, and discussion with CalRecycle FA unit re: approved closure costs on record  
Mono County has established a Pledge of Revenue agreement as a financial assurance mechanism for the postclosure maintenance costs and corrective action.



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**RESOLUTION NO. 97-67**  
**BOARD OF SUPERVISORS, COUNTY OF MONO**

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**RESOLUTION OF THE BOARD OF SUPERVISORS,  
COUNTY OF MONO, STATE OF CALIFORNIA, ESTABLISHING  
FINANCIAL ASSURANCE FOR POSTCLOSURE MAINTENANCE  
OF BENTON, CHALFANT, BENTON CROSSING, PUMICE VALLEY,  
BRIDGEPORT AND WALKER LANDFILLS**

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**WHEREAS**, Public Resources Code sections 43500 through 43610.1 and sections of Title 27,  
California Code of Regulations (Regulations), Division 2, Subdivision 1, Chapter 6, require operators of  
solid waste landfills to demonstrate the availability of financial resources to conduct closure and  
postclosure maintenance activities; and

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**WHEREAS**, sections 22228 and 22245 of the Regulations specify a Pledge of Revenue as an  
acceptable mechanism to demonstrate financial responsibility for financing postclosure maintenance  
costs of a solid waste landfill.

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22  
**NOW, THEREFORE, BE IT RESOLVED** by the Board of Supervisors of the County of  
Mono that:

- 23  
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26  
27  
28  
1. The County of Mono operates the following solid waste landfills in conformance with the  
findings, conditions, prohibitions and requirements contained in Solid Waste Facilities  
Permit issued by, Mono County Health Department, serving as Local Enforcement  
Agency for the California Integrated Waste Management Board (CIWMB)

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<u>Solid Waste Landfill</u>	<u>Facility Permit No.</u>
Walker Sanitary Landfill	26-AA-0001
Bridgeport Sanitary Landfill	26-AA-0002
Pumice Valley Sanitary Landfill	26-AA-0003
Benton Crossing Sanitary Landfill	26-AA-0004
Chalfant Sanitary Landfill	26-AA-0005
Benton Sanitary Landfill	26-AA-0006

; and

2. The County of Mono Public Works Director and County Counsel shall establish a Pledge of Revenue Agreement utilizing revenue available from County of Mono Board of Supervisors Ordinance No. 97-03. The Pledge of Revenue Agreement will demonstrate financial responsibility for postclosure maintenance of the solid waste landfills identified in 1., above, in accordance with sections 22228 and 22245 of the Regulations.

3. On behalf of Mono County, the Public Works Director is hereby authorized to execute the Pledge of Revenue Agreement and other related documentation, if any.

4. Disbursement of funds for postclosure maintenance shall be in accordance with the individual final plans, as approved by the CIWMB.

5. In the event the CIWMB determines that the County of Mono has failed, or is failing, to perform postclosure maintenance as required by law, the CIWMB may direct the Treasurer-Tax Collector to pay to the Public Works Director from the pledged revenues sufficient funds to ensure postclosure maintenance, who then shall be obligated to use such funds for postclosure maintenance in accordance with the directives of the CIWMB.

///

6. The Public Works Director is directed to produce an annual report for transmittal to the CIWMB, containing, as appropriate, a revised postclosure maintenance cost estimate, prepared as specified by section 21840 of the Regulations concerning each of the Mono County sanitary landfills.

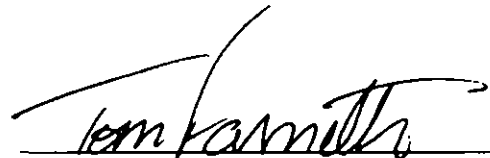
**Approved and Adopted** this 16th day of December, 1997, by the following vote of said board:

**AYES:** Supervisors Farnetti, Inwood, Lawrence, Ronci, Rowan.

**NOES:** None.

**ABSENT:** None.

**ABSTAIN:** None.



**TOM FARNETTI, CHAIRMAN  
BOARD OF SUPERVISORS  
COUNTY OF MONO**

ATTEST:

APPROVED AS TO FORM

NANCY WELLS



BY ROBERTA REED, DEPUTY



MARSHALL S. RUDOLPH  
COUNTY COUNSEL

1                                   **PLEDGE OF REVENUE AGREEMENT BETWEEN THE CALIFORNIA**  
2                                   **INTEGRATED WASTE MANAGEMENT BOARD AND MONO COUNTY**  
3                                   **ESTABLISHING FINANCIAL ASSURANCE FOR POSTCLOSURE**  
4                                   **MAINTENANCE OF BENTON, CHALFANT, BENTON CROSSING,**  
5                                   **PUMICE VALLEY, BRIDGEPORT AND WALKER LANDFILLS**  
6

7                                   This agreement establishes a Pledge of Revenue to assure that adequate funds are available  
8                                   to carry out the Postclosure Maintenance of the following Mono County Sanitary Landfills:  
9

<u>Solid Waste Landfill</u>	<u>Facility Permit No.</u>
Walker Sanitary Landfill	26-AA-0001
Bridgeport Sanitary Landfill	26-AA-0002
Pumice Valley Sanitary Landfill	26-AA-0003
Benton Crossing Sanitary Landfill	26-AA-0004
Chalfant Sanitary Landfill	26-AA-0005
Benton Sanitary Landfill	26-AA-0006

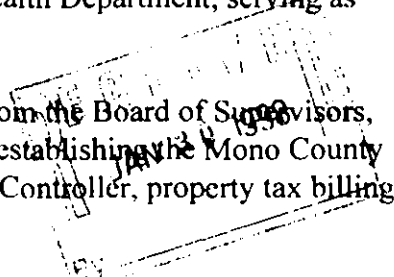
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18                                   This Agreement shall become effective immediately, and is made and entered into by and  
19                                   between the County of Mono and the California Integrated Waste Management Board  
20                                   (CIWMB).  
21

22  
23                                   **WHEREAS**, Public Resources Code, sections 43500 through 43610.1 and sections of Title  
24                                   27, California Code of Regulations (Regulations), Division 2, Subdivision 1, Chapter 6,  
25                                   require operators of solid waste landfills to demonstrate the availability of financial  
26                                   resources to conduct closure and postclosure maintenance; and  
27

28                                   **WHEREAS**, sections 22228 and 22245 of the Regulations specify a Pledge of Revenue as  
29                                   an acceptable mechanism to demonstrate financial responsibility for postclosure  
30                                   maintenance of a solid waste landfill; and  
31

32                                   **WHEREAS**, the County of Mono operates the solid waste landfills identified above, in  
33                                   conformance with the findings, conditions, prohibitions and requirements contained in  
34                                   Solid Waste Facilities Permits issued by Mono County Health Department, serving as  
35                                   Local Enforcement Agency, for the CIWMB; and  
36

37                                   **WHEREAS**, the County of Mono is pledging revenues from the Board of Supervisors,  
38                                   County of Mono, Ordinance No. 97-03, extending and re-establishing the Mono County  
39                                   Solid Waste Fee Program and deposited with the Auditor-Controller, property tax billing  
40                                   system; and  
41

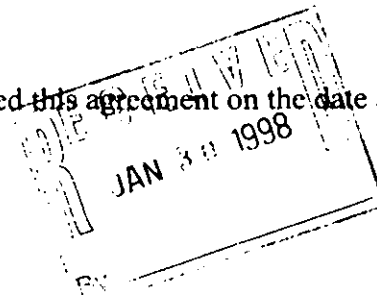


1 **WHEREAS**, the County of Mono has determined that projected net revenues from the  
2 Mono County Solid Waste Fee Program during the thirty (30) year period of postclosure  
3 maintenance, shall, during each year of this period, be greater than the yearly monitoring  
4 and postclosure maintenance costs contained in the most recent Cost Estimates for the total  
5 of the Mono County solid waste landfills identified, which have been submitted to the  
6 CIWMB in accordance with-section 21840 the Regulations.  
7

8 **NOW THEREFORE**, the County of Mono and the CIWMB do agree as follows;  
9

- 10 1. The County of Mono hereby establishes a "Pledge of Revenue" to demonstrate  
11 financial responsibility for postclosure maintenance of the Mono County solid  
12 waste landfills identified above in accordance with sections 22228 and 22245 of the  
13 Regulations.  
14
- 15 2. The County of Mono agrees to pledge net revenues from the Mono County Solid  
16 Waste Fee Program as described herein.  
17
- 18 3. The amount of the pledged revenue shall be equal to \$ 139,912.00 per year for the  
19 30 year period of postclosure maintenance, representing the total of the most recent  
20 monitoring and postclosure maintenance cost estimates for each of the identified  
21 Mono County solid waste landfills. It is agreed that the amount of this pledge may  
22 increase or decrease to match any adjustment to the identified cost estimates which  
23 are mutually agreed to by the County of Mono and the CIWMB.  
24
- 25 4. If the County of Mono ceases at any time to retain control of its ability to allocate  
26 the pledged revenue as identified herein to pay postclosure maintenance costs, the  
27 County of Mono shall notify the CIWMB and the local enforcement agency and  
28 shall obtain alternate coverage within sixty (60) days after the control of funds  
29 lapses, pursuant to section 22245 of the Regulations.  
30
- 31 5. In the event that the CIWMB determines that the County of Mono has failed, or is  
32 failing, to perform postclosure maintenance as required by law, the CIWMB may  
33 direct the Auditor Controller to pay to the Public Works Director from the pledged  
34 revenues sufficient funds to ensure postclosure maintenance, who shall then be  
35 obligated to use such funds for postclosure maintenance in accordance with the  
36 directives of the CIWMB.  
37

38  
39 IN WITNESS HEREOF, the parties have executed this agreement on the date as set  
40 forth below.  
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By County of Mono this 26 day of January, 1998

By CIWMB this 6 day of February, 1998

STATE OF CALIFORNIA  
California Integrated  
Waste Management Board

COUNTY OF MONO

By: Dorothy Rice 2/5/98  
Authorized Officer of the CIWMB

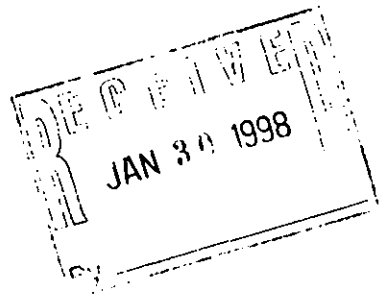
By: Richard Boardman 1/26/98  
Richard Boardman  
Director of Public Works

APPROVED AS TO FORM  
AND PROCEDURE:

APPROVED AS TO FORM

By: Kathryn J. Ober 2/6/98  
Authorized Counsel of the CIWMB

By: Marshall Rudolph  
Marshall Rudolph  
County Counsel





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3                   **RESOLUTION NO. R15-69**

4                   **A RESOLUTION OF THE MONO COUNTY**  
5                   **BOARD OF SUPERVISORS APPROVING**  
6                   **PLEDGE OF REVENUE AGREEMENT ESTABLISHING**  
7                   **FINANCIAL ASSURANCE FOR CORRECTIVE ACTION**  
8                   **FOR THE BENTON, CHALFANT, PUMICE VALLEY,**  
9                   **BRIDGEPORT AND WALKER LANDFILLS**

10           **WHEREAS**, Public Resources Code sections 43500 through 43610.1 and Title 27, California  
11 Code of Regulations (Regulations), Division 2, Subdivision 1, Chapter 6, require operators of solid  
12 waste landfills to demonstrate the availability of financial resources to conduct corrective action  
13 activities; and

14           **WHEREAS**, sections 22228 and 22245 of the Regulations specify a Pledge of Revenue as an  
15 acceptable mechanism to demonstrate financial responsibility for financing corrective action costs of a  
16 solid waste landfill.

17           **NOW, THEREFORE, THE BOARD OF SUPERVISORS OF THE COUNTY OF MONO**  
18 **RESOLVES** that:


- 19           1.     The County of Mono operated the Benton, Chalfant and Bridgeport Landfills (now  
20 closed), and operates the Pumice Valley and Walker solid waste landfills, in  
21 conformance with the findings, conditions, prohibitions and requirements contained in  
22 Solid Waste Facilities Permits No. 26-AA-0001, 26-AA-0002, 26-AA-0003, 26-AA-  
23 0005 and 26-AA-0006 issued by Mono County serving as Local Enforcement Agency  
24 for the California Department of Resources Recycling and Recovery (CalRecycle).
- 25           2.     The County of Mono approves the attached Pledge of Revenue Agreement for  
26 Corrective Actions and County of Mono shall establish a Pledge of Revenue to  
27 demonstrate financial responsibility for corrective action of the Benton, Chalfant,  
28 Bridgeport, Pumice Valley and Walker Landfill in accordance with sections 22228 and  
29 22245 of the Regulations.
- 30           3.     Disbursement of funds for corrective action shall be in accordance with the final  
31 corrective action plan, as approved by CalRecycle.
- 32           4.     In the event CalRecycle determines that the County of Mono has failed, or is failing, to  
33 perform corrective action as required by law, CalRecycle may direct the Auditor-  
34 Controller to pay to the Public Works Director from the pledged revenues sufficient  
35 funds to ensure corrective action, who then shall be obligated to use such funds for  
36 corrective action in accordance with the directives of CalRecycle.
- 37           5.     The Public Works Director, or his designee, is directed to produce an Annual

1 Certification Report (form CalRecycle 114) as required by Section 22234(b)(4)(B) of  
2 the Regulations to demonstrate that the pledged revenue continues to be available when  
3 needed and will cover the cost estimates identified in the updated Annual Inflation  
4 Report required by Section 22236 of the Regulations. It is understood that copies of the  
Resolution and Pledge of Revenue Agreement are not required annually, unless  
amended.


- 5 6. That the County Administrative Officer is hereby authorized and directed to execute  
6 said Agreement hereto attached on behalf of Mono County.

7 **PASSED, APPROVED and ADOPTED** this 6th day of October, 2015, by the  
8 following vote, to wit:

9 **AYES: Supervisors Alpers, Corless, Fesko, Johnston and Stump.**  
10 **NOES: None.**  
11 **ABSENT: None.**  
12 **ABSTAIN: None.**

13   
\_\_\_\_\_  
Timothy E. Fesko, Chair  
Mono County Board of Supervisors

14 ATTEST:  
15   
16 **Asst.** Clerk of the Board

17 APPROVED AS TO FORM:  
18   
19 \_\_\_\_\_  
20 County Counsel

**PLEDGE OF REVENUE AGREEMENT FOR  
CORRECTIVE ACTION AT THE BENTON,  
CHALFANT, PUMICE VALLEY,  
BRIDGEPORT AND WALKER LANDFILLS  
IN MONO COUNTY**

This agreement establishes a Pledge of Revenue to assure that adequate funds are available to carry out Corrective Action at the Benton, Chalfant, Pumice Valley, Bridgeport and Walker Landfills within Mono County.

This Agreement shall become effective immediately, and is made and entered into by and between the County of Mono and the California Department of Resources Recycling and Recovery (CalRecycle).

**WHEREAS**, Public Resources Code, sections 43500 through 43610.1 and Title 27, California Code of Regulations (Regulations), Division 2, Subdivision I, Chapter 6, require operators of solid waste landfills to demonstrate the availability of financial resources to conduct corrective action activities; and

**WHEREAS**, sections 22228 and 22245 of the Regulations specify a Pledge of Revenue as an acceptable mechanism to demonstrate financial responsibility corrective action costs of a solid waste landfill; and

**WHEREAS**, the County of Mono operates the above landfills in conformance with the findings, conditions, prohibitions and requirements contained in Solid Waste Facilities Permits No. 26-AA-0001, 26-AA-0002, 26-AA-0003, 26-AA-0005 and 26-AA-0006 issued by Mono County serving as Local Enforcement Agency for CalRecycle; and

**WHEREAS**, the County of Mono is pledging revenues from the Mono County Solid Waste Fee Program and deposited into the Mono County Solid Waste Enterprise Fund; and

**WHEREAS**, the County of Mono has determined that projected net revenues of the Mono County Solid Waste Fee Program during the corrective action period shall, during each year of this period, be greater than the yearly corrective action costs contained in the most recent Cost Estimates for the above landfills, which have been submitted to CalRecycle in accordance with sections 22100 - 22103 of the Regulations.

**NOW THEREFORE**, the County of Mono and CalRecycle do agree as follows;

1. The County of Mono hereby establishes a pledge of revenue to demonstrate financial responsibility for corrective action costs of the Benton, Chalfant, Pumice Valley, Bridgeport and Walker Landfills in accordance with sections 22228 and 22245 of the Regulations.
2. The County of Mono agrees to pledge net revenues Mono County Solid Waste Fee Program as described herein.



3. The amount of the pledged revenue shall be equal to \$54,809 per year for the 30 year estimated length of the corrective action period, representing the most recent corrective action cost estimate for the sites. It is agreed that the amount of this pledge may increase or decrease to match any adjustment to the identified cost estimate, which is mutually agreed to by the County of Mono and CalRecycle.

4. The Public Works Director or his designee is directed to produce an Annual Certification Report (form Cal Recycle 114) as required by Section 22234(b)(4)(B) of the Regulations to demonstrate that the pledged revenue continues to be available when needed and will cover the cost estimates identified in the updated Annual Inflation Report required by Section 22236 of the Regulations. It is understood that copies of the Resolution and Pledge of Revenue Agreement are not required annually, unless amended.

5. If the County of Mono ceases at any time to retain control of its ability to allocate the pledged revenue as identified herein to pay corrective action costs, the County of Mono shall notify CalRecycle and the local enforcement agency and shall obtain alternate coverage within sixty (60) days after the control of funds lapses, pursuant to section 22245 of the Regulations.

6. In the event that CalRecycle, RWQCB, or LEA staff determine that the County of Mono has failed, or is failing, to perform corrective actions as required by law, CalRecycle, RWQCB and/or LEA staff shall confer with the County of Mono and attempt to resolve the alleged violation. If no agreement is reached, the matter shall be presented to CalRecycle which shall give reasonable notice, hold a public hearing, and consider the testimony and documentation submitted by CalRecycle and/or LEA staff. The County of Mono, and any interested parties, prior to making a determination in the matter. In the event CalRecycle then determines that the County of Mono has failed, or is failing, to perform corrective action as required by law, CalRecycle may direct the Auditor-Controller to pay the Public Works Director from the pledged revenues sufficient funds to ensure corrective action. who then shall be obligated to use such funds for corrective action in accordance with the directives of CalRecycle and RWQCB.


IN WITNESS HEREOF, the parties have executed this agreement on the date as set forth below.

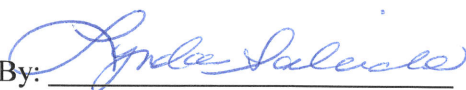
By County this 6<sup>th</sup> day of October, 2015

By CalRecycle this 4<sup>th</sup> day of November, 2015

STATE OF CALIFORNIA  
California Department of Resources  
Recycling and Recovery (CalRecycle)

COUNTY OF MONO

By: 

By: 

Authorized Officer of the CalRecycle

Lynda Salcido, Interim CAO

APPROVED AS TO FORM  
AND PROCEDURE:

By: Edward W. Blah

Authorized Counsel of the CalRecycle

APPROVED AS TO FORM  
AND PROCEDURE:

By: [Signature]

County Counsel



September 17, 2019  
AS19.1071

Mono County Department of Public Works  
Solid Waste Division  
PO Box 457  
Bridgeport, California 93517

Attention: Justin Nalder, Solid Waste Superintendent

**Pumice Valley Landfill Preliminary Closure and Post-closure Maintenance Plan  
Response to Comments  
Mono County, California**

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## **INTRODUCTION**

Geo-Logic Associates (GLA) was contracted by Mono County Department of Public Works, Solid Waste Division (Mono County) to update the preliminary closure and post-closure maintenance plan (PCPMP) for the Pumice Valley Landfill (PVLf). Mono County submitted an updated PCPMP on November 2, 2016 to the Engineering Support Branch (ESB) Closure and Technical Support Unit of the State of California Environmental Protection Agency (Cal EPA). ESB reviewed and provided comments to Mono County in a letter dated December 22, 2016. The purpose of this letter is to address and provide responses to the comments in that letter. Each comment is listed below in italics followed by our response.

### **Response to comments**

GLA's will provide response to the two questions from the Pumice Valley Landfill, Mono County Preliminary Closure and Post Closure Maintenance Plans Review Comments, dated December 22, 2016 (reiterated below):

- 1. Final Closure Design: The County prepared soil loss calculations to estimate the expected amount of intermediate cover to be available at final closure. Although CalRecycle understands that it is possible that some intermediate cover may be available and usable as a portion of the final cover design, nevertheless, since it is unknown (only estimated) what the quantity and quality of the material will be at final closure, for cost estimate purposes, no amount of estimated intermediate cover may be presumed for use in preliminary closure cost estimates. As stated in our previous comments, at the time of final closure design and implementation,*

*the suitability of any existing intermediate cover could be investigated at that time and the closure cost estimate could be adjusted accordingly.*

*The closure cost estimate must be revised to include the cost for the assumed in-place intermediate cover material.*

Response:

Appendix J of the PCPMP includes the closure and post-closure cost estimates. Section 3.0 Final Cover Construction includes details related to the final cover construction costs. Specifically within this section the total final cover area is listed at 1,046,800 square feet. The total foundation soil requirement is listed at 42,650 cubic yards. This volume equates to 1-foot of material over the total final cover area with a 10% loss for compaction.

According to the drawings in Appendix A of the PCPMP, The permitted closure cap for the PVLFF consists of the following layers, from bottom top:

- 24" foundation layer
- Geosynthetic clay liner (GCL)
- 12" erosion layer
- 1" – 3" wood chips

The first 12" of the foundation layer is identified as intermediate cover. According to the ESB comment, for cost estimate purposes, any foundation/intermediate cover material in place at the time of closure cannot be counted for use in the closure cap. Therefore, Section 3.0 of the closure cost estimate should be updated to account for 2-feet of foundation soil over the total final cover area. When taking into account a 10% loss for compaction, the revised foundation soil requirement is 81,420 cubic yards. This value has been updated Section 3.0 of the closure and post-closure cost estimates.

2. *Postclosure Maintenance Costs: The postclosure maintenance cost estimate was revised to include replacement cost of monitoring wells (at one per every ten years per County history). However, the estimate did not include the replacement cost of all wells at least during the initial minimum 30-year postclosure maintenance period.*

*The postclosure maintenance cost estimate must be revised to include replacement cost of all wells at least once during the initial 30-year postclosure maintenance period.*

Response:

Section 2.0 Environmental Control Systems has been updated to include abandonment and replacement costs of groundwater monitoring wells MW-1, MW-2, MW-3, MW-4. The cost estimate was obtained from Resilient Drilling of Mesa, Arizona. Details of the cost estimate are attached.

## CLOSING

If you have any questions regarding the information provided, please feel free to contact me at your convenience. My phone number is (530) 798-9006 and email is [cmiller@geo-logic.com](mailto:cmiller@geo-logic.com). We look forward to continuing our relationship with the Mono County Public Works Department.

Sincerely;  
Geo-Logic Associates, Inc.



Caleb Miller, P.E.  
Project Engineer



Robert B. Valceschini, P.E.  
Principal Engineer

Attachments:                      Revised Closure and Post-Closure Cost Estimates  
    Groundwater Monitoring Removal/Replacement Cost Estimate

**CLOSURE AND POSTCLOSURE  
 COST ESTIMATES**

**PART III - CLOSURE CONSTRUCTION COSTS**

**1.0 SITE ROADS AND SECURITY**

	Quantity	Units /event	Price per Unit	total
1.1 Entrance Gate	0	NA		\$0
1.2 Perimeter Fencing	0	NA		\$0
1.3 Perimeter Access Roads	0	NA		\$0
1.4 Top Deck and Perimeter Access Roads	0	NA		
1.4.1 Access Road Design Parameters				
Length of 28'-Wide Entry Road =	310	FT		
Length of 15'-Wide Perim. Rd. =	3,000	FT		
Thickness of Surfacing =	0.5	FT		
Surface Material Required =	990	CY		
1.4.2 Road Construction Costs				
Mob./ Demob.	1	LS	\$2,175	\$2,175
Clearing and Grubbing	0	NA		\$0
Grade / Compact Subgrade	0	NA		\$0
28'-Wide Road grading	161	CY	\$18.10	\$2,914
28'-wide road agg surfacing	70	CY	\$45.00	\$3,150
15'-Wide Road grading	1556	CY	\$18.10	\$28,164
28'-wide road agg surfacing	650	CY	\$45.00	\$29,250
Subtotal, Access Road Construction				\$65,653
1.4.3 Road Construction Monitoring Costs				
Project Management	4	HR	125	\$500
CQA Technician	20	HR	85	\$1,700
Mob./ Demob.	1	LS	350	\$350
Direct Expenses	1	LS	120	\$120
Initial Survey Staking	0	NA		\$0
As-Built Survey	0	NA		\$0
Subtotal, Access Road Construction Monitoring				\$2,670
Subtotal, Top Deck and Perimeter Access Roads				\$68,300
Subtotal, Site Roads and Security				\$68,300
1.5 Contingency @ 20%				\$13,700
<b>TOTAL, SITE ROADS AND SECURITY</b>				<b>\$82,000</b>

**Comments**

Not included; installed during operations.  
 Not included; installed during operations.  
 Not included; installed during operations.

Landfill access road to top deck on final cover.  
 Established during operations.

Class 2 aggregate base

Estimated at ~7% of work

Dirt Road - Assume equivalent to 6" deep of Roadway Ex plus 2.5 inches Agg Base

Assume 4 hrs @ \$125/hr  
 Estimate 2 days at 10 hrs/day, \$85/hr

Vehicle @ \$0.60/mi. and travel time for 75 mi.  
 Includes per diem and supplies.  
 Performed as part of final cover installation.  
 Performed as part of final cover installation.

section 1.4  
 Total of section 1.0

**2.0 ENVIRONMENTAL CONTROL SYSTEMS**

**2.1 Landfill Gas Monitoring and Control System**

	Quantity	Units /event	Price per Unit	total
2.1.1 Landfill Gas Monitoring System Design Parameters (A complete perimeter monitoring system exists as follows)				
Number of LFG Wells:	7	EA	0	\$0
Number of Probes / Well:	1 to 2	EA	0	\$0
Depth of Probes:	10 / 30	FT	0	\$0
Number of Cover Vents:	15	EA	0	\$0
2.1.2 Landfill Gas Monitoring & Control Program	0	NA		\$0
2.1.3 Landfill Gas System and Well Design	0	NA		\$0
2.1.4 Landfill Gas Monitoring Well Installation	0	NA		\$0
2.1.5 Landfill Gas Vent Installation in Final Cap	1	LS	15100	\$15,100
Subtotal, LFG Monitoring System				\$15,100

A complete perimeter monitoring system exists  
 GW-1 to GW-7. See Dwgs. -02 & -03.  
 Site trenches are approx. 20 ft. deep.  
 See LFGMCP in Appendix H, PCPMP.  
 See Drawing -03 and Detail A, Drawing -07.

An approved LFGMCP is already in place.

A complete perimeter monitoring system exists

A complete perimeter monitoring system exists  
 Admin. - \$2,000; Mat'l's / Install'n - \$870 ea.

**CLOSURE AND POSTCLOSURE  
 COST ESTIMATES**

**2.0 ENVIRONMENTAL CONTROL SYSTEMS, continued ...**

2.2 Ground Water Monitoring System

2.2.1 GW Monitoring System Design Parameters

No. of Upgradient Wells:	1		
No. of Cross-gradient Wells:	1		
No. of Down-gradient Wells:	2		
2.2.2 Ground Water Monitoring Plan	0	NA	\$0
2.2.3 GW Monitoring Well Installation	0	NA	\$0
2.2.4 Well Casing Survey	0	NA	\$0

Subtotal, GW Monitoring System \$0

2.3 Stormwater Run-On Diversion Channel

2.3.1 Channel Construction Costs

Mob./ Demob.	0	NA	\$0
Clearing and Grubbing	0	NA	\$0
Rough Excavation	0	NA	\$0
Finish Grading	0	NA	\$0
Water Truck	0	NA	\$0
Erosion Control	0	NA	\$0

Subtotal, Channel Construction \$0

2.3.2 Channel Construction Monitoring Costs

Project Management	0	NA	\$0
CQA Technician	0	NA	\$0
Mob./ Demob.	0	NA	\$0
Direct Expenses	0	NA	\$0
Initial Survey Staking	0	NA	\$0
As-Built Survey	0	NA	\$0

Subtotal, Construction Monitoring \$0

Subtotal, Stormwater Diversion Channel \$0

2.4 Stormwater Retention Basins

2.4.1 Basin Construction Costs

Mob./ Demob.	0	NA	\$0
Clearing and Grubbing	0	NA	\$0
Rough Excavation	0	NA	\$0
Finish Grading	0	NA	\$0
Water Truck	0	NA	\$0
Erosion Control	0	NA	\$0

Subtotal, Basin Construction \$0

2.4.2 Basin Construction Monitoring Costs

Project Management	0	NA	\$0
CQA Technician	0	NA	\$0
Mob./ Demob.	0	NA	\$0
Direct Expenses	0	NA	\$0
Initial Survey Staking	0	NA	\$0
As-Built Survey	0	NA	\$0

Subtotal, Basin Construction Monitoring \$0

Subtotal, Stormwater Retention Basins \$0

*Not applicable. An approved ground water monitoring system is already in place*

*MW-4; see Drawings -02 and -03.*

*MW-1; depth only; see Drawings -02 and -03.*

*MW-2 & MW-3; see Drawings -02 and -03.*

*Developed & implemented during site life.*

*A complete system is already in place.*

*Already completed for existing system.*

*Not applicable. Drainage diversion channels will not be required since the site sits atop a geographic high - run-on is not anticipated*

*Not applicable. Drainage diversion channels will not be required since the site sits atop a geographic high - run-on is not anticipated*

*Soil borrow pits will be developed as on-site soil is utilized during operations and closure. Borrow pits will be excavated in accordance with retention basin needs and design. The costs of excavation the basin(s) are imbedded in the cost of operations prior to closure, and within the foundation layer and erosion layer soil costs during closure, as indicated in section 3.1 below.*

*Not applicable. The existing soil borrow pits also serve as storm water retention basins and no additional work or facilities are needed for postclosure.*



**CLOSURE AND POSTCLOSURE  
 COST ESTIMATES**

**2.0 ENVIRONMENTAL CONTROL SYSTEMS, continued ...**

	Quantity	Units	Price per Unit	total
<b>2.5 Stormwater Run-Off Collection System</b>				
<b>2.5.1 Collection System</b>				
Mob./ Demob.	1	ls	\$10,000	\$10,000
18" CPEP Overside Drains:	700	ft	\$100	\$70,000
18" Overside Drain Anchors:	64	ea	\$340	\$21,760
24" CPEP at Headwall Berms:	120	ft	\$72	\$8,640
24" CPEP Flared End Sections:	6	ea	\$600	\$3,600
CPEP 22.5-Deg. Elbows:	6	ea	\$630	\$3,780
18" CPEP Reducers:	6	ea	\$650	\$3,900
18" CPEP T- and L-Sections:	6	ea	\$820	\$4,920
Paved Overside Drain Discharge:	6	ea	\$520	\$3,120
Perimeter Channel Trimming:	3,323	ft	\$1.25	\$4,150
Swale Fine Grading:	1,750	ft	\$5.00	\$8,750
Ditch Fine Grading:	282	ft	\$5.00	\$1,410
New Swale Rip-Rap Lining:	651	CY	\$75	\$48,850
New V-Ditch Rip-Rap Lining:	33	CY	\$100	\$3,300
Geotextile Under Rip-Rap:	13,300	sf	\$1.00	\$13,300
Subtotal, Collection System Construction				\$209,480
<b>2.5.2 Collection System Construction Monitoring Costs</b>				
Project Management	8	hr	125	\$1,000
CQA Technician	50	hr	85	\$4,250
Mob./ Demob.	1	LS	1730	\$1,730
Direct Expenses	1	LS	300	\$300
Initial Survey Staking	0	NA		\$0
As-Built Survey	0	NA		\$0
Subtotal, Construction Monitoring				\$7,280
Subtotal, Stormwater Run-Off Collection System				\$216,800
Subtotal, Environmental Control Systems				\$231,900
2.6 Contingency @ 20%				\$46,400
<b>TOTAL, ENVIRONMENTAL CONTROL SYSTEMS</b>				<b>\$278,300</b>

*Slope-adjusted length of culverts on sideslopes.  
 Installed at top, bottom, and approx. 10' o.c.  
 Culverts through headwalls on top deck, 6 ea.  
 Installed on headwall culvert inlets.  
 Transition at headwall berms. See Detail J / 08.  
 Transition at headwall berms. See Detail J / 08.  
 Base of overside drains. See Detail K / -08.  
 Install at jcts of perim. ditch / overside drain.  
 Clean existing ditches after cover placement.  
 Install swales on top deck final cover  
 Install ditch on entry road final cover.*

*Specified for all new rip-rap lined reaches.*

*Assume 8 hrs  
 Assume 5 days at 10 hrs/day  
 Vehicle @ \$0.60/mi. and travel time for 75 mi.  
 Includes per diem and supplies.  
 Performed as part of final cover installation.  
 Performed as part of final cover installation.*

**CLOSURE AND POSTCLOSURE  
COST ESTIMATES**

**3.0 FINAL COVER CONSTRUCTION**

3.1 Final Cover Design Parameters

Mob./Demob.	1	LS	\$10,000	\$10,000
Foundation Layer Const. Thickness:	1.0	FT		
Wind Loss Quantity	3130	CY		
RUSLE (rain loss)	3550	CY		
Low Perm. Layer Thickness:	0.0	FT		
Erosion Layer Thickness:	1.0	FT		
Wood Chip Layer Thickness:	0.25	FT		
Total Final Cover Area:	1,046,800	SF		
Interim Surface Clearing & Grubbing	24	SF	\$2,000.00	\$48,000
GCL Installation	24	SF	\$0.50	\$523,400
Interim Surface Preparation	24.03	acres	\$1,130	\$27,200
Total Constructed Final Cover Vol.:	77,540	CY		
Total Length of Anchor Trench:	4,235	FT	\$10	\$42,400
<b>Total Foundation Soil Required (onsite resource):</b>	<b>81,420</b>	<b>CY</b>	<b>\$4.50</b>	<b>\$366,400</b>
Total Low Perm Material Required:	0	CY		
Total Erosion Soil Required (onsite resource):	42,650	CY	\$4.50	\$191,900
Total Length of Headwall Berms:	1,895	FT	\$5.90	\$12,400
Rip-Rap Lining at Berm Face Inlet:	20	CY	\$60	\$1,200
No. Settlement Monuments:	17	EA	\$250	\$4,300
Place Wood Chips on Final Layer	24	AC	\$1,500	\$36,000

3.15 restoration due to erosion

Total Intermediate Cover Replacement	42650	CY	\$4.50	\$192,000
--------------------------------------	-------	----	--------	-----------

**Subtotal, Final Cover Construction**

**\$1,455,200**

3.2 Final Cover Construction Monitoring & Engineering Costs

Construction Management	96	HR	125	\$12,000
Construction Manager Site Visits	1	LS	\$4,500	\$4,500
CQA Technician	720	HR	85	\$61,200
Clerical / Lab Manager	1	LS	\$3,120	\$3,120
Mob./ Demob.	1	LS	\$350	\$350
Equipment	1	LS	\$4,500	\$4,500
Direct Expenses	1	LS	\$14,820	\$14,820
Initial Survey Staking	1	LS	\$5,500	\$5,500
Final Closure/PC Plan & Design	1	LS	\$20,000	\$20,000
Closure CQA Manual & Specs	1	LS	\$6,000	\$6,000
Prepare Emergency Response Plan	1	LS	\$7,500	\$7,500
As-Built Survey	1	LS	\$8,000	\$8,000
Final Certification Report	1	LS	\$8,500	\$8,500

Subtotal, Final Cover Monitoring

\$155,990

Subtotal, Final Cover Construction

\$1,611,200

3.3 Contingency @ 20%

\$322,200

**TOTAL, FINAL COVER CONSTRUCTION**

**\$1,933,400**

One foot of layer placed during operations.
WEQ for wind loss(see Appendix M)
Rusle for rain erosion (see Appendix M)
GCL proposed in place of low perm material
On-site soils; add'l for erosion and GCL.
Wood chips applied from on-site stockpile.
Total slope-adjusted (i.e., 3D) area.
Surface grading and clearing of interim layer.
Purchase, delivery, and installation.
Finish grading, moisture-condition, compaction.
Total cover volume, rounded to nearest 10 cy.
GCL anchor trench around perimeter.
relatively flat construction Use of Scraper for earthwork, (max 400 CY per hour, but average 200 CY/hr cost=400 +200 labor (operator and spotter)+overhead of 100 +profit 100). Quantity assumes 2-ft thick and includes 10% loss for compaction. Final Rate =\$4.50 per CY
On-site borrow, place, grade, and compact.
Purchase, delivery, and installation.
Mat's & install'n only; as-built survey below.
Haul and place from on-site stockpiles.

A wind loss of 3600CY was calculated. A rain loss of 4090CY was calculated. But conservatively, this estimate proposes to replace the entire interim Erosion Control Layer of 42,650 CY.
--

Since the headwall berm is protected by Rip-rap there is no expected loss in 30 years
---

Estimate 12 weeks at 8 hrs/wk
Assume 3 site visits; incl. hourly rate & exp.
12 wks at 10 hrs/day, 6 days/wk, \$85/hr.
12 wks at 2 hr/wk, \$85/hr; 2 hr/wk, \$45/hr.
Vehicle @ \$.60/mi. and travel time for 75 mi.
On-site testing equipment & trailer for 3 mo.
Includes vehicle, per diem, motel, shipping.
Prep. & establish grid on interim surface.

Postclosure ERP per 27 CCR 21130
Aerial topo map per 27 CCR 21090(e)(1)

Rounded to nearest \$100.
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Rounded to nearest \$100.
---------------------------



**RESILIENT**  
DRILLING

**Mr. Marvin Glotfelty, R.G.**  
Clear Creek Associates  
6155 E. Indian School Rd., Ste. 200  
Scottsdale, Arizona 85251

**September 16, 2019**

**Pumice Valley Landfill – Auger Drill/Sample/Install & Abandon 4” Monitor Wells  
200 Dross Road – Lee Vining, California**

Dear Mr. Glotfelty,

Resilient Drilling Services, LLC (Resilient) is pleased to provide this cost estimate to perform environmental well drilling and abandonments at the above-mentioned project site.

**Project Scope**

Auger drill, four (4) wellbores to 300-lineal feet.  
Install 4-inch Sch 40 PVC well with 60-feet of screen and proper annular material.  
Cuttings will be stockpiled or spread adjacent to wellbore.  
Abandon four (4) existing 4” wells to 300-lineal feet.

**Cost Estimate**

QUANTITY	UNITS	DESCRIPTION	UNIT RATE	TOTAL
1	Each	Job Prep/Mobilization/Demob	\$24000.00/each	\$ 24000.00
36	Days	Daily/interim Travel	\$375.00/days	\$ 13500.00
1200	L.F.	Auger Drill/Limited Sampling (4/300')	\$32.00/l.f.	\$ 38400.00
1200	L.F.	Install 4” Monitor Wells	\$42.00/l.f.	\$ 50400.00
4	Each	Wellhead Completion – Monument	\$575.00/each	\$ 1900.00
36	Hours	Access/Move/Develop (est.)	\$350.00/hour	\$ 12600.00
36	Days	Support Trucks/Decon/Demo Equip.	\$775.00/day	\$ 27900.00
1200	L.F.	Well Abandonment	\$9.50/l.f.	\$ 11400.00
4	Each	Wellhead Removals/Overdrill 20'	\$750.00/each	\$ 3000.00
36	Days	Crew Expenses (3-men)	\$420.00/day	\$ 15120.00
4	Each	Permitting – Wells (est.)	\$500.00/each	\$ 2000.00
<b>TOTAL</b>				<b>\$ 200,220.00</b>

Thanks again, Greg Jones

1248 E. Gary Circle, Mesa, AZ 85203  
Office: 602-218-8848 | Fax: 844-265-4426

[www.resilientdrilling.com](http://www.resilientdrilling.com)

AROC: 302712 | ADWR: 855



# Report of Disposal Site Information for the Pumice Valley Landfill



Report Prepared by and for:

**Mono County**  
**Department of Public Works**  
**Solid Waste Division**



Report Update Prepared by:



**Mono County - Department of Public Works**

Prepared Date: June 1, 2016

*This document is an update to the report of disposal site information prepared for Mono County Public works by SRK Consulting (U.S.), Inc. dated: February 15, 2013*

# Report of Disposal Site Information for the Pumice Valley Landfill

## Mono County Department of Public Works Solid Waste Division

Post Office Box 457  
Bridgeport, California 93517  
760.932.5440

### Certification Statement

This *Report of Disposal Site Information for the Pumice Valley Landfill* was prepared pursuant to Title 27 of the California Code of Regulations as one component of the Joint Technical Document for the facility. This document was prepared by Mono County Public Works, under the direct supervision of the undersigned registered professional engineer. All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed, and the professional services have been performed, findings determined, and recommendations prepared in accordance with standard engineering principles and practices generally accepted at the time of document preparation. I certify that I have been authorized by Mono County to prepare this document on its behalf and that the information contained in this report is, to the best of my knowledge, true and correct.



**Mono County - Department of Public Works**

Paul E. Roten, P.E. 56891 – Date: June 1, 2016



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- Appendix B: Materials [Salvaging Program](#)
- Appendix C: Summary of Waste Received, 2007 – 2012
- Appendix D: Load-Checking Program
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- Appendix F: Landfill Gas Monitoring and Control Program
- Appendix G: Record-Keeping Forms
- Appendix H: Emergency Response Plan
- Appendix I: Injury and Illness Prevention Plan
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- Appendix K: Traffic Volume Charts, 2007 – 2012

# 1) General Information

This *Report of Disposal Site Information* (RDSI) and the *Preliminary Closure and Postclosure Maintenance Plan* (PCPMP) together form the Joint Technical Document (JTD) for Mono County's Pumice Valley Landfill. The JTD has been prepared in accordance with Section 21585, Article 2, Subchapter 3, Chapter 4 of Title 27 of the California Code of Regulations (CCR). This RDSI conforms to the requirements specified in CCR Title 27, Section 21600, and describes the disposal site design, operations, and controls at the Pumice Valley Landfill.

The Pumice Valley Landfill is a Class III municipal solid waste landfill as defined by 27 CCR Section 20200 and is permitted under existing Solid Waste Facility Permit No. 26-AA-0003, issued by the Mono County Health Department (as the Local Enforcement Agency, or LEA) in 1978. The site is also authorized to operate as a municipal solid waste landfill by the Lahontan Regional Water Quality Control Board under Waste Discharge Requirements WDID No. 6B260300011, issued in October 2001.

The facility accepts non-hazardous solid waste and construction and demolition waste for disposal from a service area that includes the communities of Lee Vining, June Lake, Mono City, and surrounding unincorporated areas.

## (A) Facility Overview

The landfill is located at 200 Dross Road, approximately 1.8 miles east of the junction of State Highway 120(E) and U.S. Highway 395, south of the community of Lee Vining in central Mono County. According to the Public Land Survey System, the 50-acre site is situated within the NW¼ NW¼, Section 36, Township 1 North, Range 26 East, Mount Diablo Baseline and Meridian (MDB&M). The location of the site in the context of state and county boundaries is illustrated on **Drawing 1**, Title Sheet, which is enclosed in reduced format in **Appendix A**.

The Pumice Valley Landfill has been in operation as a municipal solid waste disposal site since 1972. In 1973, Mono County entered into a lease agreement for the landfill property with the City of Los Angeles, Department of Water and Power (LADWP). The lease was renewed in 1975 for a five-year term and was renewed every five years until 2007 when the lease expired and the County operated under a "hold-over" occupancy status until March 2016 when the County acquired the property from LADWP and now operates the facility as both owner and operator. .

Disposal operations occurred via trench and area-fill disposal methods until April 2001, at which time a temporary transfer station was installed to transfer residential and commercial municipal waste to Mono County's regional Benton Crossing Landfill. A permanent transfer station was subsequently constructed and has been operational since August 2004. The Transfer Station is a separate operation from the landfill, operating under a separate EA notification (26-AA-0017). The transfer station is currently operated under contract with D&S Waste Removal, Inc. (Yerington, Nevada), which is responsible for providing facility personnel, mobile equipment and rolling stock (e.g., transfer truck, compaction bins, debris boxes), litter control, and other facility support. Sanitary facilities are provided through a separate contract administered by the County. The transfer station includes a 70-foot truck scale, a solid waste compactor equipped with a generator and an enclosed 40-cubic-yard compaction bin, and a 40-cubic-yard debris box for scrap metal, appliances (white goods), waste tires, and bulky items.

The Pumice Valley Landfill is permitted to accept any Class III non-hazardous municipal solid waste in accordance with 27 CCR Section 20260. With household and commercial waste managed through the transfer station, on-site disposal is currently limited to inert debris and construction and demolition waste via above-grade area-fill disposal. However, loads of commercial and residential waste may be disposed of on-site in the event that transfer operations are temporarily discontinued due to equipment break-down, impassible road conditions, or for other unforeseen circumstances. In

such an event, the Local Enforcement Agency will be notified and daily cover operations will be implemented in accordance with regulatory requirements.

In addition to the preceding, provisions have been made in the design and planning for the Pumice Valley Landfill should the site be needed to provide disposal capacity for unincorporated Mono County, following closure of the Benton Crossing Landfill. For the purposes of this plan and the site life calculations presented in **Appendix E**, it is assumed that the Pumice Valley Landfill will receive waste from unincorporated Mono County following closure of Benton Crossing Landfill for approximately 25 years from 2023 through mid-2048. Although the site life estimate reflects this scenario, if and when this increased waste stream comes to Pumice Valley, this RDSI would require amendment to reflect necessary operational changes such as hours of operation, the specific location of stockpiles and processing facilities, and other related changes. This RDSI reflects operations as they exist today and will exist in the absence of such a change. This planning approach is based on the best information currently available as to the future of the countywide solid waste system.

Mono County is actively planning for the future management of the countywide waste stream, which includes discussions of a material recovery facility to reduce the waste stream, a long-haul transfer station to export the waste, the siting of a new regional landfill, as well as conversion technologies. The implementation of any of these alternatives will affect the need for disposal capacity and operational capacity at the Pumice Valley Landfill.

The Mono County Department of Public Works, Solid Waste Division (Division), is responsible for landfill operations, including providing personnel and equipment necessary for disposal and cover activities. Following diversion efforts, all residual household and commercial waste received at the transfer station is consolidated and hauled to the Benton Crossing Landfill for disposal. Contact information for the landfill and transfer station owner and operators are detailed below.

Property Owner and Landfill Operator

Mono County Department of Public Works  
Solid Waste Division  
Post Office Box 457  
Bridgeport, California 93517  
Phone: 760.932.5440

Transfer Station Operator

D&S Waste Removal, Inc.  
Post Office Box 834  
3 Highway 95 East  
Yerington, Nevada 89447  
Phone: 775.463.3090

The Division has compiled a detailed record of waste received from 2011 through 2015. From that data, presented in a summary table and several spreadsheets in **Appendix C**, the site receives an average of average of 11.68 tons of waste per day (TPD, based on a 104-day annual average for the period) for diversion and disposal. Approximately 56 percent (or, 6.59 TPD) is accepted for disposal, while 44 percent (or, 5.08 TPD) is accepted and diverted through various diversion programs. Landfilled waste is comprised of inert waste and construction and demolition debris.

The types of waste received at the Pumice Valley Landfill are further discussed in Section 2.4 of this plan. Waste handling and processing procedures are specific to each type of waste accepted at the landfill and are presented in detail in Section 4.12. All incoming waste is subject to hazardous waste screening and random physical inspections in accordance with the provisions detailed in the *Load-Checking Program* enclosed in **Appendix D**.

## (B) Site Plans

Site plans are presented in **Appendix A** to illustrate the following information with respect to the Pumice Valley Landfill:

- Property boundaries with ownership (**Drawing 2**);
- Buffer zones (**Drawing 1**);
- Permitted acreage (**Drawing 2**);
- Disposal area acreage (**Drawing 2**);
- Existing topography (**Drawing 2**);
- Proposed final topography (**Drawing 3**);
- Vertical limits (**Drawing 3 and 5**);
- Fill sequencing and excavation plans (**Drawing 4**);
- Stormwater control system design (**Drawing 6**); and,
- Final closure design details (**Drawing 7 and 8**).

## (C) Hours of Operation

The Pumice Valley Landfill is open to the public eight hours per day, two days per week according to the schedule presented in **Table 2.1**. In addition, landfill personnel may be on-site both before and after the facility opens to the public to perform routine operations activities, including compacting and covering waste, hauling cover soil, managing material stockpiles, processing diverted materials, and completing other maintenance tasks.

**Table 1C Landfill Operating Hours**

Open to	Days	Hours
General Public, Commercial Haulers, and Transfer Station Personnel	Wednesday	7:30 am – 3:30 pm
	Saturday	7:30 am – 3:30 pm
Public Works Personnel	Monday – Friday	6:30 am – 5:00 pm

The site observes four holidays per year, consisting of New Year's Day (January 1), Independence Day (July 4), Thanksgiving Day, and Christmas Day (December 25), resulting in an operating schedule of approximately 104 days per year (depending on when holidays fall). Nobody is authorized to access the site on landfill holidays.

## 2) Waste Types

The Pumice Valley Landfill accepts the following general types of waste for disposal or management:

- Non-hazardous solid waste in accordance with 27 CCR Section 20220.
- Non-friable asbestos-containing wastes (ACW) in accordance with Section 25143.7 of the California Health and Safety Code;

The following waste types are not accepted for disposal:

- Hazardous waste as defined in 22 CCR Division 4.5, Chapter 11, Article 1;
- Designated waste as defined in 27 CCR Section 20210;
- Friable asbestos-containing waste; and,
- Liquid or semi-solid waste with a solids content of less than 50 percent by weight.

Business in Mono County is primarily driven by a tourist-based economy, largely consisting of hotels, motels, resorts, campgrounds, restaurants, retail shops, and markets catering to those who visit for skiing, fishing, camping, hiking, and biking. As a result, waste accepted at the Pumice Valley Landfill and Transfer Station generally consists of residential and commercial municipal solid waste and construction and demolition waste; there is virtually no industrial waste generated in unincorporated Mono County or Mammoth Lakes, and the minimal amount generated is by light industry. Commercially-collected residential and commercial municipal solid waste is currently transported directly to Mono County's regional Benton Crossing Landfill, which is also the ultimate destination of self-haul waste received at the Pumice Valley Transfer Station. For planning purposes, however, it is recognized that the Pumice Valley Landfill may at some point receive the unincorporated Mono County waste stream should the Benton Crossing Landfill be closed. The current and predicted waste stream for the Pumice Valley Landfill is discussed in further detail in the site life calculations presented in Section 2.6.3 and in **Appendix E**.

Incoming waste loads are screened in accordance with the *Load-Checking Program* enclosed in **Appendix D**. The types of waste received at the landfill are discussed in further detail in the following sections. Waste handling practices are discussed in detail in Section 4.12.5.

## **(A) Non-Hazardous Solid Waste**

In accordance with 27 CCR Section 20220, the Pumice Valley Landfill and Transfer Station accepts all putrescible and non-putrescible solid and semi-solid waste including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, construction and demolition wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semi-solid wastes and other discarded wastes, provided that such wastes do not contain waste which must be managed as a hazardous waste, wastes which contain soluble pollutants in concentrations that exceed applicable water pollution control objectives, or wastes that could cause degradation of waters of the state (designated waste). In addition to typical non-hazardous municipal solid waste as described above, the Pumice Valley Landfill and Transfer Station accepts the following types of source-separated waste for management through its waste diversion program:

- Wood waste;
- Scrap metal;
- White goods and appliances;
- Waste tires; and,
- CRTs / CEDs / household hazardous waste / used motor oil and filters.

## **(B) Asbestos Containing Waste (ACW)**

The Pumice Valley Landfill currently diverts waste loads containing certified non-friable asbestos-containing waste (ACW) to the Benton Crossing Landfill. Upon closure of Benton Crossing Landfill, the Division will accept non-friable asbestos at Pumice Valley Landfill, with appropriate testing, and

prior notification of incoming asbestos-containing waste loads to facilitate direct burial. Friable ACW is not accepted for disposal.

**(C) Hazardous Waste**

The Pumice Valley Landfill does not accept for disposal any hazardous wastes as defined in 22 CCR Division 4.5. Small quantities of household hazardous waste are, however, accepted or otherwise removed from the waste stream, stored in on-site hazardous waste storage lockers, and periodically transported to the Benton Crossing Landfill for proper packaging and ultimate removal by a licensed hazardous waste hauler. Waste management activities are further discussed in Section 4.12.

**(D) Liquid or Semi-Solid Wastes**

The Pumice Valley Landfill does not accept for disposal any liquid wastes or any semi-solid wastes containing less than 50 percent (by weight) solids.

**(E) Special Wastes**

The Pumice Valley Landfill does not accept for disposal any special wastes as defined in 22 CCR Sections 66260.10, 66261.122, or 66261.124.

**(F) Designated Waste**

The Pumice Valley Landfill does not accept for disposal any designated wastes as defined in the California Water Code, Section 13173, or 27 CCR Section 20210.

**(G) Waste Volumes**

Over the five year period between January 2011 and December 2015, the Pumice Valley Landfill received an annual average of 1214 tons per year, of which approximately 56% (685 tons) was construction and demolition (C&D) and other inert waste landfilled on-site, and 44% (529 tons) was diverted through landfill diversion programs. As described in Section 2.1, the Division has compiled a record of waste received from 2011 through 2012; this data is presented in **Appendix C**. Analysis of the data yielded the daily waste stream characteristics described in the following sections.

**(H) Estimated Average Daily and Peak Daily Waste**

For the purposes of summarizing daily waste averages, the waste stream received at the Pumice Valley Landfill has been separated into landfilled and diverted waste, as presented in **Table 2.2**. Average daily and average annual waste quantities received in each category are summarized based on site activities from 2011 through 2015.

**Table 2H Average Daily and Annual Waste Managed, 2011 – 2015**

Waste Type	Average Daily <sup>1</sup> (tons per day)	Annual Average (tons)
<b>Total Waste Received<sup>2</sup></b>	<b>11.68</b>	<b>1,214</b>
<b>Landfilled<sup>2</sup></b>		
Construction / Demolition (on-site)	6.59	685
<b>Diverted<sup>2</sup></b>		

Diverted at Landfill	5.08	529
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Notes:

1. Based on an average of 104 operating days per year during the period.
2. Based on gate receipts for waste received from January 2011 through December 2015.

Although the data presented in **Table 2.2** provide a general understanding of annual waste activities, actual daily loading is highly dependent upon season and the nature of construction projects being performed within the service area of the Pumice Valley disposal site. For example, periodic spikes in the quarterly waste quantities presented in Appendix C are typically due to individual construction projects in summer months. For example, a sidewalk demolition and reconstruction project in June Lake resulted in an eight-fold increase in the September 2012 waste stream. In fact, waste landfilled in that month alone accounted for 60 percent of all waste buried at the site in 2012. The peak landfill day from 2011 through 2015 occurred in September 2012, when 544.06 tons was received.

### (I) Estimated Five-Year Projected Waste Flow

Short-term waste flow projections were calculated based on detailed records of waste received in 2012, and population growth projections for Mono County. Annual population growth projections for Mono County are available from the State of California, Department of Finance, Demographic Research Unit, in Report P-3, *State and County Total Population Projections by Race/Ethnicity and Detailed Age 2010–2060* (January 31, 2013). These annual growth rate projections were applied to determine waste receipt projections in the site life calculations presented in Section 2.6.3 and **Appendix E**. Five-year projections for waste stream growth are detailed in **Table 2.3**.

**Table 2I Five-Year Projected Annual Waste Receipts**

Waste Type	2016 (tons)	2017 (tons)	2018 (tons)	2019 (tons)	2020 (tons)
<b>Projected Growth Rate</b>	1.14%	0.59%	1.27%	1.18%	-1.50%
<b>Total Waste Received at Site</b>	<b>1,228</b>	<b>1,236</b>	<b>1,252</b>	<b>1,266</b>	<b>1,247</b>
	(11.8 TPD)	(11.8 TPD)	(12 TPD)	(12.1 TPD)	(11.9 TPD)
<b>Landfilled</b>					
Construction / Demolition	693	697	707	715	704
<b>Diverted</b>					
Diverted at Landfill	535	538	545	551	543

Note: Calculations were carried through each successive year; as a result, some round-off error may occur in the data presented. Daily tonnage per day assumes an average of 104 days of operation per year.

## 3) Waste Management Unit Classification and Siting

The following sections address waste management unit classification for the Pumice Valley Landfill in accordance with Section 27 CCR 21600(b)(3) and the requirements of 27 CCR Section 21750 for specific siting elements with regard to a Report of Waste Discharge (ROWD).

### (A) Airport Safety

The Pumice Valley Landfill is not located within 10,000 feet of a runway used by turbojet aircraft or within 5,000 feet of a runway used by piston-type aircraft. The nearest airport to the landfill is the

Lee Vining Airport, which is a County-operated landing strip located adjacent to Highway 395, approximately 3.5 miles northwest of the landfill. The location of the airport relative to the landfill is identified on the location map presented on **Drawing 1**. Based on this, the Pumice Valley Landfill satisfies the location requirements with respect to proximity to airports as defined in 27 CCR Section 20270.

## (B) Volumetric Capacity

The volumetric capacity of the Pumice Valley Landfill is summarized in **Table 2.4**. For purposes of annual closure fund calculations, the total disposal capacity is based on estimates of waste and cover soil placed since 1989, together with the calculated remaining capacity of the proposed final landfill configuration presented in **Drawing 3**. Records of waste placement prior to 1989 are considered very approximate at best, and as such, are not addressed in this discussion since they are not pertinent to closure fund calculations. Remaining capacity calculations are based on a January 1, 2016 start date. The existing waste footprint is unlined and capacity is therefore not attributed to a bottom liner or leachate collection and removal system. The calculation of quarterly and intermediate cover volume is based on estimated waste-to-soil ratios for quarterly cover soil, as shown in **Table E-1** and **Table E-2** enclosed in **Appendix E**. These are also the values that have been used in annual financial assurance deposit calculations. The volumetric capacity attributed to final cover volume is based on the final cover design presented on **Drawing 3** and **7**.

**Table 3B Site Volumetric Capacity**

Item	In-Place Volume (cy) <sup>1</sup>	Remaining Volume (cy) <sup>2</sup>	Total Volume (cy)
Total Capacity for Liner System	0	0	0
Total Capacity for Daily and Interim Cover	28,570	144,990	173,560
Total Capacity for Final Cover	n/a	n/a	116,310
Total Capacity for Waste Disposal	87,640	363,850	451,490
Total Design Capacity	116,210	508,840	741,360
Notes:			
1. In-place volume from June 3, 2011 base topographic survey through December 31, 2015.			
2. As of January 1, 2013; based on site design presented in Dwg. 146900.160-03 and calculations in Appendix E.			

## (C) Site Life Estimate

As previously discussed, the Pumice Valley Landfill may replace the Benton Crossing Landfill as the County's regional landfill after the Benton Crossing Landfill is closed, which would result in a significant increase in waste stream volume at the Pumice Valley Landfill. For purposes of this plan and the site life estimate, it is assumed that the Pumice Valley Landfill will receive the predicted waste stream from unincorporated Mono County (not the Town of Mammoth Lakes) for approximately 25 years from 2023 through mid-2048.

With this taken into consideration, an estimate of the remaining site life was completed in the calculations presented in **Appendix E**. The total remaining capacity from **Table 2.4**, above, was identified as the target volume for the calculations to include waste and daily, interim, and final cover volumes. Annual population growth rates, which are the basis for waste stream projections, are addressed in Section 2.5.2, above, and in **Appendix E**. The waste-to-soil ratio was estimated based on standard covering practices and in-place density of construction and demolition waste. The in-place density for municipal waste that may be received between 2023 and 2048 was obtained from the results of a compaction survey conducted by the Division in May, 2003 at the Benton Crossing Landfill. The average waste volume from 2011 through 2015 was utilized as the starting point for the



calculations (diverted waste was not considered). The projected growth rate for the service area was then applied to the landfilled tonnages to predict the total waste disposal and cover material volumes through the end of the site life. The enclosed drawing set illustrates existing and proposed final site configurations.

Based on the site life calculations, the remaining capacity of the Pumice Valley Landfill should accommodate the waste disposal requirements of the service area through June 2048.

## (D) Site Location

The Pumice Valley Landfill is located at 200 Dross Road, approximately 1.8 miles east of the junction of State Highway 120(E) and U.S. Highway 395, south of the community of Lee Vining in central Mono County. According to the Public Land Survey System, the 50-acre site is situated within the NW¼ NW¼, Section 36, Township 1 North, Range 26 East, Mount Diablo Baseline and Meridian (MDB&M). The location of the site in the context of state and county boundaries is illustrated on **Drawing 1**, enclosed in **Appendix A**. In a broader context, the center of the site is positioned at latitude 37°54'28" North and longitude 119°03'53" West.

The 10 acres along the eastern boundary of the property will be sufficient to accommodate an expansion of the existing soil borrow pit and provide the cover soil volume necessary for the remainder of the facility's operating life and for final cover construction. This area encompasses the W½ W½ NE¼ NW¼ of Section 36, and is illustrated on **Drawing 2** and **3**.

### 1. Topography

The landfill is situated on a broad alluvial plain that slopes gently north toward Mono Lake. A series of ephemeral drainages incise the alluvial plain with increasing depth progressing north from the landfill site. The elevation at the landfill ranges from approximately 6800 feet above mean sea level (amsl) on the northwest corner to 6820 feet amsl on the southeast corner of the landfill property. The existing topography of the landfill and its immediate vicinity is illustrated on **Drawing 2** in **Appendix A**.

### 2. Floodplains

The landfill is located approximately 800 feet northwest of State Highway 120, which effectively intercepts and either stores or diverts stormwater generated in the upgradient catchment. As a result, the surface area potentially affecting the landfill property (with respect to stormwater generation) is limited to the gently sloping and heavily vegetated land between the landfill and the highway.

Historic disposal operations appear to have been sited at the upstream end of an ephemeral drainage, now completely filled up to the northern property boundary. A second ephemeral drainage originates just southeast of the southeast property corner and flows through an existing 18-inch culvert under Dross Road and then through the borrow pit and then rejoins the natural drainage north of the landfill. The waste disposal area is situated on a relative high point between ephemeral drainages and is therefore not located in a floodplain and cannot restrict the flow of flood waters or reduce the storage capacity of a floodplain. The existing topography of the landfill and its immediate vicinity is illustrated on **Drawing 2** in **Appendix A**.

### 3. Climate

The meteorological data station closest to the landfill with a continuous data record is in Lee Vining, located approximately four miles north of the landfill. The Lee Vining station is situated at a similar elevation at 6800 feet above mean sea level (amsl). Data from the Western Regional Climate Center (WRCC) indicate an average annual precipitation for Lee Vining of 13.01 inches for the period of record. Approximately 75 percent of annual precipitation falls during the months of November through March. Average monthly temperatures for the same period range from a low of 29.7°F in January to a high of 67.9°F in July. The closest, and probably most representative,

location for available evaporation data is that compiled by the WRCC from a collection site at Topaz Lake, located roughly 75 miles north of the landfill. At 5000 feet (amsl), however, the Topaz Lake station is lower in elevation than the landfill. Average annual climate data is summarized by month in **Table 2.5**. Copies of monthly and annual precipitation and temperature data from each weather station are provided in **Appendix A**.

The design storm for Class III landfills is the 100-year 24-hour event. According to the NOAA publication entitled *Precipitation Frequency Atlas for the Western United States, Atlas 14, Volume 6, Version 2*, the 100-year, 24-hour storm depth for the landfill vicinity is estimated to be 5.48 inches.

The prevailing wind direction is from the southwest, based on data collected at the Crestview, California meteorological data station and obtained from the WRCC website. The Crestview station is located approximately 12 miles south of the landfill. A wind rose representing the 2003 all-day average data from the station's automated weather observation station is included as **Figure 2** in **Appendix A**. Local winds are calm (less than one mile per hour) approximately 43 percent of the time.

#### 4. Geology

The landfill lies east of the Sierra Nevada mountain range along the southwestern margin of the Mono Basin, approximately two miles south of Mono Lake and four miles northwest of Crater Mountain, the highest point within the Mono Craters volcanic complex. This region marks the western rim of the Basin and Range province of North America, and is associated with extensional tectonism. The Mono Craters volcanic complex consists of a young volcanic chain of plug dome volcanoes arranged along a concave arc south of the Mono Basin. These volcanoes are part of a larger structure that includes the Long Valley Caldera and Inyo Craters to the south and the volcanoes of Mono Lake to the north. Together, these volcanoes form a 40-km-long chain of Late Pleistocene and Holocene craters, domes, and flows. Rhyolite flows erupted from the Mono Craters volcanic chain approximately 40,000 years ago, with eruptive episodes continuing until about 600 years ago (Wood, 1977). The rocks associated with the Mono Craters are typically rhyolitic in composition and consist of pumice, obsidian, and ash deposits.

**Table 3D4 Average Monthly and Annual Climate**

Month	Mean Precipitation <sup>1</sup> (inches)	Mean Temperature <sup>1</sup> (°F)	Evaporation <sup>2</sup> (inches)
January	2.30	29.8	0.00
February	2.83	32.8	0.00
March	1.88	38.9	0.00
April	0.64	45.1	7.15
May	0.62	53.1	9.11
June	0.33	61.6	10.94
July	0.44	68.6	12.68
August	0.50	67.2	11.56
September	0.33	60.0	8.80
October	1.04	50.3	5.95
November	2.09	40.1	2.79
December	2.67	31.3	0.00

Total	15.67	48.3	68.98
Notes:			
<sup>1</sup> Monthly normals for 1981-2010 from WRCC for Lee Vining (Sta. 044881, Elev. 6797', Lat. 37.9567°N, Lat. 119.1194°W). <sup>2</sup> From WRCC for Topaz Lake (Sta. 268186, Elev. 5105', Lat. 38.7319°N, Lat. 119.51°W) for the period of record from 1957-2005.			

Panum Crater, the youngest extrusive volcanic feature in the Mono Basin, was formed in an eruption that occurred at the northern end of the Mono Craters chain. This crater consists of a small dome of rhyolite and a tephra ring, which has a maximum rim-to-rim diameter of 4,000 feet and is comprised of pumice ash and lapilli, and obsidian fragments. The Panum Crater is the closest volcanic feature to the Pumice Valley Landfill and is located approximately two miles to the northeast.

The Pumice Valley Landfill is located on an alluvial plain that slopes toward Rush Creek northwest of the site. Soils in the vicinity of the landfill have formed by several depositional processes including alluvial deposition from surrounding mountain slopes, lacustrine deposition from Mono Lake and Pleistocene Lake Russell (the predecessor of Mono Lake), and ash cinders and volcanic debris deposited during volcanic events associated with the Mono Craters volcanic chain.

Subsurface sediments within the landfill area are described by Kleinfelder (1989) from drillholes advanced in excess of 200 feet during ground water monitoring well installation. The sediments mainly consist of unconsolidated interbedded aeolian, fluvial and lacustrine deposits. Near the surface (i.e., 5-10 feet below ground surface, bgs) the sediments are generally comprised of loose, unconsolidated sand derived from weathered volcanic parent rock. Lacustrine deposits that occur below these sediments (i.e., at approximately 30 feet bgs) are characterized as dense, fine sand and silt containing volcanic ash and pumice. These lacustrine sediments are underlain by interbedded coarse sands and gravels likely deposited in alluvial outwash channels (Kleinfelder, 1989). The larger particles of gravel are subangular to subrounded and consist of granitic and metamorphic material indicating these particles were transported by fluvial processes from the surrounding hills to the west and south prior to deposition (Kleinfelder, 1989).

## 5. Hydrogeology

The Pumice Valley Landfill is situated within the Mono Lake Valley Ground Water Basin (Department of Water Resources Hydrologic Unit No. 6-09). Identified beneficial uses of ground water within the basin include domestic supply, agriculture, industrial service, and freshwater replenishment.

Ground water conditions beneath the site are evaluated based on data from sampling and analysis of four ground water monitoring wells (MW-1 through 4). Ground water monitoring well construction logs are included in Appendix H of the *Preliminary Closure and Postclosure Maintenance Plan*. Unconfined ground water typically occurs in unconsolidated alluvial and fluvial deposits between 248 and 270 feet bgs. Based on data collected in June 2012, ground water flows N58E at a gradient of 0.0046 feet per foot. The current detection monitoring program is described in detail in the *Preliminary Closure and Postclosure Maintenance Plan*. Ground water chemistry and the history of the monitoring program are discussed in detail in the report entitled *2016 Semi-Annual Report: Detection Monitoring Program for the Pumice Valley Landfill* (TEAM Engineering, January 2016).

The closest major surface water feature is Mono Lake, located approximately 2.5 miles north of the landfill. Rush Creek passes within approximately 0.75 miles of the northwest corner of the site on its way to Mono Lake.

## (E) Surrounding Land Use and Zoning

The property surrounding the Pumice Valley Landfill and Transfer Station is either owned by the LADWP, or owned by the public and administered by the United States Department of Interior, Bureau of Land Management, Bishop Field Office (BLM), or the United States Department of Agriculture, Inyo National Forest (INF). There are no residences or structures within 1,000 feet of

the facility property boundary. City of Los Angeles lands in the vicinity are zoned as “OS – Open Space.” Lands in the area managed by BLM and INF are assigned a zoning designation of “RM – Resource Management” and are primarily used for grazing, recreation, and open space. The landfill property is designated in the Land Use Element of the County General Plan as “PF” for public facilities, which explicitly allows for use as a solid waste landfill. Land uses in the surrounding area are depicted on **Drawing 1** in **Appendix A**.

## (F) Ancillary Facilities

**Drawing 2** illustrates the location of all site structures and facilities, including:

- Site access road and entrance gate;
- Scalehouse and an office / storage building;
- Equipment storage areas;
- Hazardous materials storage lockers and used oil storage tank;
- Landfill gas monitoring wells; and,
- Ground water monitoring wells.

## 4) DESIGN AND CONSTRUCTION STANDARDS

The following sections describe how the Pumice Valley Landfill complies with design and construction standards for all sites as required by 27 CCR Section 21590(b)(4). **Drawing 2** shows the existing topography and configuration of the landfill site and **Drawing 3** shows the proposed final configuration of the landfill.

### (A) General Design Parameters

The landfill serves the residents and businesses of Lee Vining, June Lake, Mono City and outlying unincorporated areas of Mono County. Commercial collection services are available in most communities within the county, but many people still self-haul their waste to the local transfer station. The Division operates transfer stations in the communities of Benton, Bridgeport, Chalfant, Lee Vining (Pumice Valley), Paradise, and Walker.

The Pumice Valley Landfill is easily accessible from U.S. Highway 395 and State Highway 120(E) via a paved road (Dross Road) maintained by the County. The site is situated in the Pumice Flats region south of Mono Lake and east of the eastern Sierra Nevada Mountains at an elevation of approximately 6800 feet amsl. Site soils consist primarily of alluvial, fluvial, and lacustrine sediments including gravels, sands, and silts. Depth to static ground water varies across the site from approximately 248 to 270 feet below ground surface (bgs).

The proposed landfill design includes a vertical area fill over the existing waste footprint. The landfill is unlined, and will be covered at closure by a final cover comprised of a geosynthetic clay liner (GCL) overlain by a growth media / erosion layer.

The landfill is designed to provide sufficient disposal capacity for the existing and projected service area population through the middle of 2048. A waste management unit for construction and demolition waste disposal is maintained at the site, in addition to the on-site transfer station for residential and commercial waste. Haulers are directed by the gate attendant and via signs to the proper disposal area. The transfer station includes an asphalt-paved ramp, a cast-in-place concrete retaining wall, a waste compactor with hopper and enclosed 40-cubic-yard bin, and a 40-cubic yard debris box for white goods, tires, scrap metal, and bulky items. Waste from the transfer station

(including the 40-cubic yard debris box) is transferred to the Benton Crossing Landfill for management or disposal.

The landfill design incorporates a sitewide drainage control system designed to satisfy the performance standards defined in 27 CCR Section 20365 and accommodate the predicted stormwater flows generated by a 100-year, 24-hour precipitation event without significant site erosion or a washout of waste. The design of the drainage control system is detailed in the *Preliminary Closure and Postclosure Maintenance Plan*.

## **(B) Design Responsibility**

The final configuration of the Pumice Valley Landfill has been revised by Mono County Public Works, Paul Roten, P.E. C56891.

This report is a revision of the original report prepared by Mr. Evan Nikirk, P.E., C46777 of SRK Consulting (U.S.), Inc., in Reno, Nevada.

The facility design is presented in enclosed **Drawing 1** through **8** and as described in the *Preliminary Closure and Postclosure Maintenance Plan* (SRK, 2013) for the facility.

## **(C) Construction Sequencing Plan**

Future waste placement at the Pumice Valley Landfill will be constructed as an area fill over the existing waste footprint in lifts approximately 10 feet high. Once the currently-active area of the construction and demolition disposal cell completes its progression east toward the soil borrow pit, the active working face will move north to the existing below-grade disposal cell at the northeastern footprint boundary; this area will be brought up to grade and will be filled against the northern slope of the adjacent lift. The fill area will then step to the next level above the existing above-grade lift, and progress west-to-east along the northern boundary of the waste mass. Waste disposal operations will continue from the northern portion of the waste footprint and progress west-to-east with individual cells, but moving in an overall southerly direction, as illustrated on **Drawing 4**.

## **(D) Grading Plan**

The final surface of the landfill top deck will be graded at three and four percent to the east and west through a series of ridges and swales designed to minimize stormwater travel distance. Landfill sideslopes will be configured at 3H:1V (horizontal to vertical). The average design height of exterior slopes at final build-out is approximately 28 feet above surrounding grade, with a peak height of 42 feet at the northwest corner and a low height of 12 feet at the southeast corner. **Drawing 3** illustrates the proposed final configuration of the Pumice Valley Landfill, including final elevations for all disposal areas and proposed soil borrow areas. **Drawing 5** provides three cross-sectional views of existing and proposed final grades; cross-section locations are illustrated in plan view on **Drawing 3**. **Drawing 3** and **6** present the general configuration of the stormwater collection system, including all proposed channels, downdrains, culverts, and swales.

## **(E) Landfill Gas Management Plan**

The Division currently monitors for the presence of landfill gas in the subsurface and ambient air at the landfill perimeter and in all site structures in accordance with the *Landfill Gas Monitoring and Control Program*, a copy of which is enclosed in **Appendix F**. Landfill gas monitoring will be

performed during the postclosure maintenance period in accordance with 27 CCR Section 20921, as described in detail in the *Preliminary Closure and Postclosure Maintenance Plan*.

## 5) OPERATING CRITERIA

As required by 27 CCR Section 21590(b)(5), this section describes the operating criteria employed at the Pumice Valley Landfill.

### (A) Maintenance of Accurate Disposal Site Records

Disposal site records are maintained for the Pumice Valley Landfill in accordance with 27 CCR Section 20510 and 20515. All records are maintained at the Bridgeport office of the Department of Public Works and are available for review during normal business hours. Records documenting recent site activities, such as the Daily Activity Log, Visitor Log, Used Oil Acceptance Log, Load Inspection Report, and daily cash reconciliation forms, are either forwarded to the Bridgeport office on a weekly basis or are maintained at the landfill scalehouse until complete. Equipment inspection forms are maintained in the records at Public Works' Fleet Maintenance shop in Bridgeport.

Information for each individual load arriving at the site, including weight and waste type(s), are recorded by the gate attendant on a gate receipt, which is then forwarded on a weekly basis to the Public Works office, where it is entered by administrative staff into a computer database. This database generates monthly information concerning waste disposal and diversion activities for inclusion in regular reports to five state and local agencies.

A Daily Activity Log is maintained to document weather conditions, the completion of routine daily activities, and the occurrence of notable events or incidences such as illegal dumping, injuries, accidents, vandalism, or earthquakes. A load inspection report is completed for every random physical load inspection that is performed by site personnel. Copies of several sample record-keeping forms are included in **Appendix G**. Copies of waste data received from 2011 through 2015 are included in **Appendix C**.

The Division has posted in the scalehouse a detailed list of telephone numbers and personnel to be contacted in the event of an emergency at the facility. A copy of this list is included as an attachment to the *Emergency Response Plan* in **Appendix H**. In addition, the Division has provided copies of the *Emergency Response Plan* and emergency contact list to the LEA, the Sheriff's Department Emergency Services Coordinator, the Mono County Risk Manager, and the local fire agencies. Further, the contact list has been furnished to the Sheriff's dispatch office, which manages 911 calls for emergency assistance. The contact list includes the name and telephone numbers (home, office, cellular telephone) of the Solid Waste Superintendent, the Solid Waste Facility Supervisor, the transfer station operations contractor, all Road District supervisors, and potential responding agencies.

A record of personnel training is also maintained by the Division in accordance with 27 CCR Section 20610. Personnel training includes weekly tailgate safety meetings for all landfill employees, in addition to load checking, site supervisor, hazardous waste site operations, and first aid training for select employees based on job description. Training records are maintained in each employee's personnel file and in the landfill operations record maintained at the Department of Public Works office in Bridgeport.

The following landfill unit records and information are: 1) in the landfill operating record as part of this document; 2) retained in the landfill operating record as a stand-alone document; or, 3) entered into the operating record as appropriate.

- Location restriction demonstrations per 27 CCR Section 20270 (refer to Section 2.6 of this document).

- Inspection records and training and notification procedures pursuant to 27 CCR Section 20870 (refer to Section 4.8 of this document).
- Gas monitoring results and remediation plans in accordance with 27 CCR Section 20919.
- Preliminary Closure and Postclosure Maintenance Plans as required by 27 CCR Section 21780, in addition to the following related requirements:
  - Notice of intent to close the landfill per 27 CCR Section 21135;
  - Notice of certification of closure per 27 CCR Section 21880;
  - Deed notation for landfill property per 27 CCR Section 21170;
  - Demonstration of release from postclosure requirements per 27 CCR Section 21180; and,
  - Monitoring, testing, and analytical data as required by Title 40 of the Code of Federal Regulations (40 CFR) Section 258.61.
- Cost estimates and financial assurance documentation per 27 CCR Sections 22221, 22226, 21820, and 21840 (refer to the *Preliminary Closure and Postclosure Maintenance Plan*).
- Any information demonstrating compliance with the small community exemption in accordance with 40 CFR Section 258.1(f)(2).

The Division will notify the LEA when any of the documentation listed above is modified or entered into the facility's operating record.

## **(B) Site Security**

The landfill is enclosed by a six-foot-high chain-link fence with a locking main entrance gate. The entrance gate serves as the only point of entry to the landfill and is locked during non-business hours. In addition, all buildings and sheds are locked when not in use. Keys are available only to Department of Public Works administrative staff and landfill and transfer station personnel, including the transfer station operations contractor.

## **(C) Sanitary Facilities**

The office building is equipped with bottled drinking water, and a portable toilet provided under contract with the County is located on-site. Restroom facilities and drinking water are intended to be available to site personnel only, but are made available to the public if absolutely necessary.

## **(D) Communications Systems**

Cellular telephones are assigned to the Solid Waste Superintendent, the landfill supervisor and landfill personnel, and to each Road District supervisor. The transfer station operations contractor also furnishes its gate attendants and manager with cellular telephones. In addition, two-way radios operated on the County's communications system are installed in Division vehicles and all heavy equipment. All two-way radios furnished in Public Works' vehicles have the ability to switch between County frequencies as necessary, including that for the Benton Crossing Landfill, those for Public Works' four other channels, and those for emergency response agencies.

Emergency communications procedures are established in the *Emergency Response Plan*; copies of the plan have been issued to the Pumice Valley Landfill scalehouse, to the office of Road District 3 (Lee Vining), and, in the event personnel are temporarily assigned to Pumice Valley, to the Benton Crossing Landfill scalehouse. The first call in an emergency depends upon the nature of the emergency. Generally, the first call is made to the Sheriff's Department or the local fire department, as applicable, via either cellular phone or the County radio system. The second call is made to the landfill supervisor or Road District supervisor, if not already on site, followed by a third call to the Solid Waste Superintendent or the administrative office of the Department of Public Works.

## (E) Lighting

The landfill is operated only during daylight hours. Portable emergency lighting is available through Public Works with the use of a portable generator. Although the office building and scalehouse are not equipped with lighting, the truck scale, scale indicator, and printer are powered by a permanent electrical supply consisting of solar panels and back-up storage batteries.

## (F) Safety Equipment

Landfill personnel are required to wear Level D personal protective equipment, including steel-toed and steel-shanked boots, work gloves, eye protection, hearing protection (where necessary or required), and landfill uniforms (long pants, yellow shirt, orange safety vest). Landfill personnel are also provided with hardhats, dust masks, and air-purifying respirators, depending on the particular task being performed at a given time.

Division vehicles, landfill equipment, and the scalehouse are equipped with fire extinguishers and first aid kits. In addition, a portable eye wash station is maintained in the scalehouse. All Solid Waste Division personnel are trained in accordance with the details of the *Injury and Illness Prevention Plan* (IIPP) included in **Appendix I**.

## (G) Personnel Requirements

The landfill is currently staffed with a gate attendant (provided under contract with D&S Waste Removal) and Division employees from the Benton Crossing Landfill are available as necessary to perform landfill operations tasks. Personnel from the Benton Crossing Landfill are used on an as-needed basis for stockpile management, materials processing, waste compaction and covering, and maintenance at the Pumice Valley Landfill. In addition, personnel from Public Works' Road District 3 (Lee Vining) and the Parks and Facilities Division are available to perform maintenance projects. A specific project may be performed by up to four employees depending upon the extent of the work to be completed, but routine waste compaction and covering activities are typically limited to two equipment operators. Minimum qualifications for each personnel classification in the Solid Waste Division are included in **Appendix J**.

If necessary to fill in for absent landfill personnel, to complete site tasks, or to satisfy other operational requirements, personnel from any of the five Road Districts within the Department of Public Works are also available for temporary assignment on an as-needed basis.

## (H) Personnel Training

Landfill personnel are trained in accordance with 27 CCR Section 20610 through a variety of means, including the following:

- The landfill supervisor (i.e., Solid Waste Facility Supervisor) or Solid Waste Superintendent or his designee conducts a monthly training meeting at the Benton Crossing Landfill, addressing landfill-specific topics such as proper equipment operation, traffic safety, handling difficult loads, working in dusty conditions, or responding to a landfill fire. The initial monthly session is followed up with three weekly tailgate meetings conducted by the landfill supervisor on similar topics within the same subject;
- The landfill supervisor holds a weekly tailgate safety meeting for all Division employees at the Benton Crossing Landfill to address a pre-selected weekly topic (above) and any site-specific concerns. This meeting addresses any injuries, accidents, damage, or near-misses since the last meeting, and includes a discussion of safety issues related to upcoming tasks or projects;



- All personnel are trained in the details of site-specific plans, including the *Injury and Illness Prevention Program (IIPP)*, the *Emergency Response Plan*, and the *Load-Checking Program*, copies of which are included in appendices to this RDSI.
- All site personnel and applicable Road District employees are trained in load inspection and hazardous waste site management;
- The landfill supervisor completes the California-specific version of the Management of Landfill Operations (MOLO) course offered by the Solid Waste Association of North America (SWANA), including annual refresher training;
- The landfill supervisor is responsible for training subordinates in site-specific operations; and,
- Landfill personnel attend, when possible, other County training events (such as first aid, defensive driving, traffic control, first-responder, or hazardous waste operations training) to minimize overall program costs.

Documentation of personnel training is maintained in the operating record for the site at the Mono County Department of Public Works office in Bridgeport.

## (I) Supervisory Structure

Daily landfill operations and long-term facility care are the direct responsibility of the Mono County Department of Public Works, Solid Waste Division. Mr. Tony Dublino, Solid Waste Superintendent, administers the solid waste program for Mono County. Mr. Tom Music oversees daily landfill operations, including personnel issues, record-keeping, and coordination of resources. The on-site transfer station is manned by employees of D&S Waste Removal, Inc., under General Manager Kevin Brown. An organizational flowchart presented in **Appendix J** illustrates the supervisory structure for the overall solid waste program, including the Pumice Valley Landfill and Transfer Station. A copy of the flowchart with appropriate contact information has been provided to the LEA.

## (J) Spreading and Compaction

During quarterly waste compaction (current operations), solid waste is spread in loose and relatively thin layers and compacted using three to five passes with a Caterpillar D-6 dozer, a Komatsu D85 dozer, or equivalent machinery. During emergencies and if the Benton Crossing Landfill waste stream is diverted to the Pumice Valley Landfill, solid waste will be spread in loose layers approximately 24 inches thick and compacted using three to five passes of either a Caterpillar 816 landfill compactor or a D8 dozer. The layers to be compacted are spread to a slope of 3H:1V for dozer compaction and 4H:1V, or flatter, for the landfill compactor to take advantage of the compactor's improved performance on flatter slopes. The working face is built up in compacted layers to a total lift height of approximately 10 feet.

## 6) Cover

Material used to cover waste is obtained from on-site borrow pits or derived from waste delivered to the landfill. Because only C&D and other inert waste is currently accepted at the working face, and the presence of other factors pursuant to 27 CCR 20680(f), the C&D working face is covered on a quarterly basis. The following sections describe in detail the cover practices employed at the site.

## (A) Cover Materials

The source for landfill cover soil is a borrow pit located immediately east of the disposal area, as delineated on **Drawing 3**. In addition, the landfill accepts soil, gravel, road grindings, and similar material generated by road construction and other local projects; this material is stockpiled near the working face as it becomes available and is used as necessary for cover.

Although not used for current inert and C&D waste disposal activities, alternative daily covers (ADCs) meeting the requirements of 27 CCR Section 20690 may be used in the event of emergency municipal waste disposal operations. They will also be used if the Benton Crossing Landfill waste stream is diverted to Pumice Valley. In accordance with 27 CCR Section 20690, ADCs may include tarps, geosynthetics, foam, processed green material, sludge or sludge-derived material, compost material, processed C&D waste, shredded tires, or spray-applied cementitious products. ADCs implemented at the Benton Crossing Landfill (and potentially used at the Pumice Valley Landfill in the future) include synthetic tarps, processed green waste, and the Posi-Shell® Cover System (Landfill Service Corporation) meeting the requirements of 27 CCR Section 20690(b)(11).

Annual cover soil requirements based on an estimated waste-to-soil ratio are predicted in the site life calculations presented in **Appendix E**. Where applicable, the types, tonnages, and origin of wastes utilized as alternative daily cover materials at the landfill are tracked and reported as diverted waste pursuant to 27 CCR Section 20690.

## (B) Cover Frequency

Inert debris and construction and demolition waste deposited in the active disposal cell is stockpiled for a period not exceeding 90 days, at which time it is spread, compacted, and covered with a minimum compacted soil thickness of 12 inches. Although Title 27 regulations allow for a compacted soil cover thickness of six inches, the Division applies a thicker cover due to the time period between applications and the potential for wind erosion during that period. Further, the thickness applied on the disposal area will remain as intermediate cover. Practically speaking, the working face is covered on a more frequent basis during times of heavy use (e.g., summer months). At a minimum, however, cover soil is applied and compacted at least once during each of the first week of February, May, August, and November, in accordance with the *Authorization for Alternative Frequencies for Daily Cover and/or Explosive Gas Monitoring* issued by the LEA (dated August 24, 2004).

During acceptance of municipal waste for disposal on-site, ADC will be applied over the active MSW disposal face at the end of each operating day, approximately six days per week. A minimum of six inches of compacted earthen material will be applied to the full active face on the seventh day of the week, or more frequently if necessary because of weather conditions, size of working face, or other factors. Typically, the working face will be narrowed to a two-tarp width (roughly 45 to 50 feet) at the end of the operating day by applying and compacting a sufficient column of cover soil, then the remainder will be covered with the synthetic tarps. Regardless of the type of alternative cover used, daily cover meeting the requirements of 27 CCR Section 20690(b)(2) will be applied at the end of each operating day.

## (C) Intermediate Cover

A minimum of 12 inches of earthen material is applied and compacted as intermediate cover over filled areas not expected to receive additional waste disposal for more than 180 days. The top of each waste lift is covered by intermediate cover when full lift height is achieved and as the active face progresses according to the fill sequencing plan (**Drawing 4**). In addition to the 12-inch cover layer, an approximate one- to three-inch thick layer of wood chips generated through an on-site wood waste diversion program may be applied to intermediate surfaces to prevent erosion of cover material.

## 7) Material Handling

The following sections describe the management of various types of waste at the Pumice Valley Landfill.

### (A) Public Health Design Parameters

The Pumice Valley Landfill is designed and operated in such a way as to minimize the propagation and harborage of vectors or the creation of a public nuisance simply as a result of landfill operation. The landfill is continuously manned during operating hours to ensure that operational practices discussed in this plan (such as traffic control, load inspection, waste segregation, cover placement, and site cleanup) are effectively implemented preventing vectors and nuisances. In addition, the site is operated in compliance with the requirements of 27 CCR, as described in this report.

### (B) Salvaging Activities

Portions of the waste stream are diverted from disposal either to comply with solid waste regulations or to meet State-mandated diversion goals. Materials either delivered source-separated by customers or removed through salvaging activities performed on-site are managed in accordance with the procedures described below.

- Customers delivering **scrap metal** as source-separated waste are directed by the gate attendant to deposit their material into the 40-cubic-yard debris box at the transfer station (refer to **Drawing 2**) for ultimate transport and management at the Benton Crossing Landfill. A permanent sign posted adjacent to the storage bin location identifies what materials are allowed in the bin. Scrap metal transported to the Benton Crossing Landfill is temporarily stored in a designated stockpile until it is baled and hauled to a recycler by the Division's contract vendor.

Large pieces of recoverable scrap metal commingled with other waste at the landfill working face are also removed by site personnel when customer traffic and disposal activities permit it to be done safely. Recovered metal is hauled to the transfer station storage bin with site equipment. The transfer truck driver monitors the debris box and schedules removal as necessary.

- Customers delivering **appliances** are also directed by the gate attendant to deposit their load into the 40-cubic-yard debris box at the transfer station (refer to **Drawing 2**). This material is transported to the Benton Crossing Landfill for management and processing, similar to the process for scrap metal. At the Benton Crossing Landfill, however, **appliances** are segregated into "refrigerated" and "non-refrigerated" categories in designated stockpiles. A licensed vendor contracted by the Division is periodically scheduled to remove Freon, motor oil, capacitors, mercury switches, and any other hazardous materials. Once hazardous materials have been removed, the appliances are combined with the scrap metal stockpile by site personnel using heavy equipment; this material is then baled and removed from the site by the contract scrap metal salvager as described above.
- **Auto bodies, mobile homes, and campers** are not currently accepted at the Pumice Valley Landfill. Customers wishing to dispose of these items are directed to the Benton Crossing Landfill, where these items are temporarily stockpiled in a designated area and periodically processed.
- **Wood waste** is delivered by customers to a designated area north of the transfer station (**Drawing 2**), where it is stockpiled for periodic chipping with a horizontal shredder. In addition to the primary processing area identified on **Drawing 2**, the stockpile and processing area may also be temporarily re-located to address a specific area where wood chips are to be applied to site surfaces; by doing so, this method reduces or eliminates the need for loading and hauling chips to their point of application. Portable signs are posted in the active stockpile area to define unloading boundaries for the customer, to discourage scavenging, and to specify that other

wastes are not to be disposed in the area. The stockpile is chipped as staff availability and weather conditions permit and as the stockpile volume warrants. Generally, stockpile processing and chipping takes place two to three times per year, with the effort requiring up to five days over a one week period. Two crew members from the Benton Crossing Landfill are typically assigned to operate the wood shredder and to operate the wheel loader used to transport wood waste to the shredder and manage the end product. Wood chips may be used for protecting intermediate cover as a deterrent to wind erosion, as an alternative cover, as erosion protection for final cover, or they may be made available to the public or other public agencies.

- **Tires** of all shapes and sizes received at the Pumice Valley Landfill, including those still on rims, are directed to the 40-cubic-yard debris box at the transfer station (refer to **Drawing 2**) for ultimate transport and management at the Benton Crossing Landfill. If whole tires are found inappropriately disposed at the landfill working face or at the wood waste stockpile, they are collected by site personnel and removed to the transfer station debris box.

At least once per week at the Benton Crossing Landfill, tires are counted and placed in a box trailer stationed at the site by the Division's contract tire hauler. When the trailer has reached capacity, the contract hauler is scheduled to remove the trailer and replace it with an empty.

- **Household hazardous waste** is accepted from local residents and stored in one of two pre-fabricated hazardous waste lockers located west of the scalehouse (**Drawing 2**). Each metal storage building is constructed with all-welded seams and has secondary containment shelving and a floor sump to prevent the discharge of pollutants. Properly trained personnel from the Benton Crossing Landfill periodically collect the stored material and transport it to the Division's permanent household hazardous waste facility (PHHWF) at the Benton Crossing Landfill for consolidation, storage, and ultimate management. When a sufficient volume is collected to warrant retrieval from the PHHWF, a licensed hazardous waste hauler is contracted to perform final bulking and packaging, and the load is manifested and removed from the site for delivery to a permitted hazardous waste recycling, treatment, or disposal facility, as appropriate.
- **Lead-acid batteries, anti-freeze, and universal wastes** are collected and temporarily stored with the household hazardous waste and are subject to the same standards of care and removal.
- **Used motor oil and oil filters** are collected from customers and temporarily stored on-site prior to removal for recycling by a licensed transporter. Customers delivering used motor oil and/or filters are required to furnish basic contact information on a Used Oil Acceptance Log, a copy of which is included in **Appendix G**. The contents of a container ostensibly containing used motor oil are evaluated for contaminants by site personnel before being emptied into the on-site 500-gallon storage tank. Motor oil considered to potentially have contaminants is emptied into a 55-gallon drum stored in the on-site household hazardous waste lockers.

Used oil filters are also temporarily stored in a 55-gallon drum in one of the on-site household hazardous waste lockers until a sufficient quantity has accumulated, at which time Division personnel are scheduled to remove and transport them to the PHHWF for consolidation and temporary storage until ultimate removal by the Division's contract waste oil hauler or hazardous waste hauler.

- Televisions and computer monitors containing **cathode ray tubes** (CRTs) are removed from the waste stream and temporarily stockpiled in the storage building. When available, Division personnel transport the CRT units to the PHHWF where they are placed into boxes and once a full tractor-trailer load is reached (typically 24 boxes), they are scheduled for transport by a licensed hauler to a permitted processing and recycling facility.
- **Consumer electronic devices** (CEDs) are collected from customers and temporarily stockpiled in the storage building. When available, Division personnel transport the CEDs to the Benton Crossing Landfill where they are either placed in the scrap metal stockpile for baling by the

Division's contract scrap metal salvager or stored loose in containers such as Gaylord boxes, and periodically removed by a licensed hauler for transportation to a permitted processing and recycling facility; if possible, this is accomplished at the same time, and on the same load, as CRT removal.

- **Materials Salvaging Program** In addition to the above, the County has developed a Materials Salvaging Program (Appendix B) that provides for the orderly removal and reclamation of salvageable items. The program provides Re-Use Areas to be established on site, with re-usable items placed into those areas by Landfill and Transfer Station staff, as appropriate.

In general, the periodic removal of salvageable materials from the site is coordinated at a frequency specific to each material such that the risk of fire and the potential for impact to public health and safety is minimized.

### (C) Volume Reduction Activities

Mono County does not currently employ or plan to employ any incineration, baling, shredding, composting, pyrolysis, or energy recovery operations to accomplish volume reduction at the Pumice Valley Landfill. Mono County's efforts are currently directed toward maximizing diversion as described above to extend the landfill life. Should the County wish to implement any of these options, the appropriate plans and environmental review documents will be prepared and necessary regulatory approvals will be obtained.

### (D) Equipment

Equipment utilized for compaction and covering, grading, wood chipping, or completion of other projects at the Pumice Valley Landfill is transported to the site on an as-needed basis by Road District personnel. Equipment available for on-site waste management is summarized in **Table 4.1**. Emergency reserve equipment is available from any of Public Works' five Road Districts and from the Parks & Facilities Division within the Department of Public Works. Heavy equipment available from these divisions include bulldozers, wheel loaders, motor graders, water trucks, dump trucks, belly-dumps, low-boy trailers, backhoes, and road sweepers. If necessary, personnel are available from the Road Districts to operate the heavy equipment. Small tools and other equipment are also available from these divisions or the fleet maintenance shop in Bridgeport, including welders, generators, compressors, pressure washers, chain saws, and hand tools.

Heavy equipment can be rented from a number of suppliers in Reno or Carson City, Nevada; hand tools and smaller equipment are available for rent from vendors in Mammoth Lakes, Bishop, and in Gardnerville, Nevada. Cashman Equipment in Reno, which also has a parts and maintenance office in Mammoth Lakes, is the most likely option for rental of heavy equipment.

Public Works' mechanics perform all routine and preventative maintenance of landfill equipment either at the landfill or at Public Works' fleet maintenance shop in Bridgeport. Minor repairs and parts replacements are also performed on-site by Public Works mechanics or vendors. A sample of Public Works' proactive preventative maintenance worksheet (PPMW) is included in **Appendix G**; this worksheet describes the maintenance tasks that are performed at each level of service. On-road vehicles (e.g., pick-up trucks) undergo a standardized maintenance program (Groups A through D on the PPMW in **Appendix G**) every 6,000 miles. Off-road landfill equipment maintenance is performed on a cumulative schedule as detailed in **Table 4.2**. Major repairs are typically performed by Public Works mechanics at the Bridgeport fleet maintenance shop or, if necessary, by vendors in Reno, Nevada. If major repairs are required, the equipment is hauled by tractor-trailer by Road District or fleet maintenance personnel to its destination.

**Table 7D.1 Landfill Heavy Equipment and Vehicles**

Location / Make	Model	Year
Benton Crossing Landfill		
Caterpillar	816F Compactor	2002
Caterpillar	D8R Bulldozer	2001
Caterpillar	613C Scraper	2001
Caterpillar	IT38G Tool Carrier (Wheel Loader)	2001
Caterpillar	950 Wheel Loader	1979
Caterpillar	120G Motor Grader	1979
Chevrolet	4,000-gal. C8500 Water Truck	1998
Ford	F700 Dump Truck	1979
Bandit Industries	2680 Wood Shredder	2002
Road District 3		
Caterpillar	950 Wheel Loader	1999
Caterpillar	936 Wheel Loader	1991
Caterpillar	140HP Motor Grader	1999
Caterpillar	140G Motor Grader	1991
International	Dump Truck	1988
International	Dump Truck	1991
International	Dump Truck	2009
Other Road Districts		
Caterpillar	D6H Bulldozer	1991

Equipment Type	Group A	Group B	Group C	Group D	BIT
On-Road	6,000 miles	6,000 miles	6,000 miles	6,000 miles	3 mos.
Off-Road	250 hrs	500 hrs	750 hrs	1,000 hrs	3 mos.

**Table 7D.2 Equipment Maintenance Schedule**

**(E) Waste Handling**

Under current operations, customers arriving at the Pumice Valley Landfill are stopped at the scalehouse, where the gate attendant inquires as to the nature of the load origin and performs a visual inspection to determine the presence of prohibited or hazardous wastes. All incoming loads are weighed both inbound and outbound on a 70-foot truck scale to determine the net weight of waste delivered to the site, regardless of the type or quantity. Detailed load information, including date and time of transaction, type and quantity of waste, origin of waste, and type of hauler, is entered onto a gate receipt. A copy of the gate receipt form with descriptions for proper completion (used as a guide for gate attendants) is included in **Appendix G**. Further, all loads are subjected to the procedures described in the *Load Checking Program* in **Appendix D**.

Approved loads are directed by the gate attendant as follows:

- Residential and commercial waste goes to the compactor hopper at the transfer station west of the scalehouse;
- Scrap metal, tires, appliances, and bulky items go to the 40-cubic-yard debris box located next to the compactor; and,
- Inert debris and construction and demolition waste go to the active working face of the landfill.

Haulers are directed to dump in a designated area delineated by portable signs and traffic cones at the active face. At least once per quarter, solid waste is spread out and compacted using several passes of a Caterpillar D6. Compacted waste density (without cover soil) is estimated to be approximately 1,200 pounds per cubic yard. Prior to spreading and compacting waste, the equipment operator visually inspects the disposal area for prohibited waste; this material is set aside by the operator until it can be re-located to its proper storage area at the completion of compaction and cover activities.

Division personnel maintain site roads and waste unloading areas with heavy equipment and materials to ensure the safe and comfortable operation of customer vehicles and to reduce puncture hazards. The unloading area is constructed to accommodate the anticipated traffic load without creating traffic, personnel, or safety hazards. The size of the working face is limited to as small an area as practicable depending upon site circumstances at that time, but is generally in the range of 50 feet wide by 50 feet long.

In addition to non-hazardous municipal waste and construction and demolition waste, the following wastes are received at the landfill for disposal or diversion and are managed according to specific waste types as described below.

- **NON-FRIABLE ASBESTOS-CONTAINING WASTE (ACW)** – This waste is currently not accepted for disposal at the Pumice Valley Landfill and is diverted to the Benton Crossing Landfill
- **ASH** – Ash generated by residential fireplaces and wood stoves is directed to the designated ash bin at the transfer station. Once cooled to ambient temperatures, it is worked into the cover material placed over the disposal area on a quarterly basis.
- **MEDICAL WASTE** – Though not commonly received at Pumice Valley, treated medical waste that has been deemed solid waste in accordance with the Medical Waste Management Act (Division 104 of the California Health and Safety Code) is accepted for disposal with the municipal solid waste stream at the transfer station. This waste is then hauled to the Benton Crossing Landfill for burial. Untreated medical waste is not accepted.
- **INERT WASTE** – Inert waste is segregated from municipal waste and deposited in the landfill's active disposal area (see **Drawing 2**).
- **HAZARDOUS WASTE** – Hazardous waste is not accepted for disposal at either the Pumice Valley Landfill or the Benton Crossing Landfill. Special procedures designed to detect the presence of hazardous waste in incoming waste loads, and to manage the waste if discovered, are described in Section 4.13.10 and in the *Load-Checking Program* in **Appendix D**.

Upon closure of Benton Crossing Landfill, if Pumice Valley Landfill is utilized for additional landfilling activities, commercial vehicles, including garbage trucks, construction contractors, and public agencies, would be directed to a designated dumping area adjacent to the working face.

Unloaded waste would be spread onto the working face with a loader, bulldozer, or landfill compactor. While doing so, the equipment operator would visually inspect the waste for prohibited or salvageable wastes prior to compaction.

Site roads and waste unloading areas are maintained by site equipment and available materials to ensure the safe and comfortable operation of customer vehicles in all weather conditions and to eliminate puncture hazards. The unloading area is constructed to accommodate the anticipated

traffic load without creating traffic, personnel, or safety hazards. The size of the working face is limited to as small an area as practicable depending upon site circumstances at that time, but would be in the range of 50 feet wide by 50 feet long.

In addition to non-hazardous municipal waste and construction and demolition waste, the following wastes would be received at the landfill for disposal or diversion and would be managed according to specific waste types as described below.

- **NON-FRIABLE ASBESTOS-CONTAINING WASTE (ACW)** – This would be accepted for disposal when appropriate testing results are provided, and with prior notification to facilitate direct burial.
- **SLUDGE** – Dried sewage sludge may be accepted from Public Utility Districts within the County, in accordance with state minimum standards. In the event this occurs, revisions to the WDR for the site may be required.
- **DEAD ANIMALS** – Customers with dead animals would be directed to the base of the active working face. The gate attendant will notify by radio the equipment operator assigned to compact the working face; once the carcass is deposited, it is immediately covered with soil, garbage, or C&D waste.
- **TREE STUMPS** – Customers with large tree stumps (i.e., greater than 18” diameter root ball) would be directed to the working face material would be covered by waste. Smaller tree stumps can be sent to the wood waste processing area and stockpiled prior to chipping.
- **HAZARDOUS WASTE** – Hazardous waste is not accepted for disposal at the Benton Crossing Landfill. Special procedures designed to detect the presence of hazardous waste in incoming waste loads, and manage the waste if discovered, are described in Section 4.13.10 and in the *Load Checking Program* in **Appendix D**.

## 8) Controls

The following sections describe the controls employed at the Pumice Valley Landfill to provide for the protection of human health and the environment and the organized and efficient operation of the site.

### (A) Nuisances

Because the landfill does not currently bury municipal solid waste on-site, there is little about the inert and C&D waste that attracts vectors. In addition, quarterly waste compaction and covering removes the potential for vector harborage. Because there are no nearby residences or campgrounds, noise from the operation has not proven to be a problem. As potential public nuisances are identified, the Division will develop and implement mitigating procedures as necessary to prevent public nuisances.

### (B) Fire

The Pumice Valley Landfill employs several measures designed to prevent landfill fires. A stockpile of cover soil is maintained in the vicinity of the working face and fire extinguishers are installed in Division vehicles, heavy equipment, and in structures. Smoking and open burning are expressly prohibited. The Division has developed an *Emergency Response Plan* for the Pumice Valley Landfill to be implemented in the event of an emergency at the facility. A copy of the plan is included in **Appendix H** of this report.

Training materials addressing fire prevention and suppression activities are included in the routine landfill training program. As a result, landfill and Road District personnel are prepared to provide



immediate fire suppression activities in the event of a structure fire or a fire at the active disposal face. The gate attendant, landfill personnel, and Road District personnel are assigned cellular telephones and all landfill and Road District vehicles are equipped with two-way radios. These devices provide communication with the Sheriff's dispatcher and the Public Works office in Bridgeport and with the Solid Waste Superintendent, the landfill supervisor, and other Road District offices and personnel. In the event of a fire that is too large to handle with on-site resources, landfill personnel will immediately call 911, which will in turn contact the first responder.

If a fire breaks out at the active face or within the waste mass, a bulldozer, loader, or other heavy equipment will be used to push, load, and/or dump nearby stockpiled soil onto the smoldering or burning area. Water will be applied to waste fires as a last resort only. Access to the critical area will be restricted until danger to public health and property has been eliminated.

### **(C) Leachate**

The landfill does not include a base liner or a leachate collection and recovery system. In addition, generation of contact water is minimized through the application of cover soil and grading practices that direct storm flows away from the active disposal area. Because of these measures, there is little chance for the public to come into contact with landfill leachate.

### **(D) Dust Control**

The surface of Dross Road and the landfill entrance road are paved to a point approximately 100 feet north of the truck scale and through the entirety of the transfer station area. Internal landfill access roads are constructed from compacted asphalt grindings generated by local road reconstruction projects. Fugitive dust generation from the main access road and internal site roads is minimal. Internal access roads are watered as necessary to prevent excessive generation of fugitive dust. Where problem areas exist, a layer of wood chips approximately three inches in thickness is applied. This method has proven successful in preventing wind erosion of cover soil.

### **(E) Vectors**

The Division employs several operational procedures designed to control vector generation and propagation at the landfill. Inert debris and construction and demolition waste deposited at the active face is compacted on a quarterly basis and covered with approximately 12 inches of soil (if MSW disposal occurs, daily cover is applied with either an approved alternative cover or six inches of earthen material). Compaction and cover reduces vector access into, and harborage in, the waste mass. In addition, proper surface grading to promote drainage and prevent ponding minimizes the presence of standing water and potential insect breeding areas. Potential breeding areas or conditions will be addressed when discovered.

### **(F) Drainage and Erosion**

The stormwater control system for the Pumice Valley Landfill is illustrated on **Drawing 3** and **6** and described in detail in the Drainage Facility Design Report, included as Appendix G to the *Preliminary Closure and Postclosure Maintenance Plan*. In general, the landfill design includes perimeter and internal run-off control facilities designed to collect and control precipitation and storm flows resulting from the 100-year, 24-hour storm event. Due to the topographic location of the landfill atop localized higher ground between ephemeral drainages, the danger of run-on flows impacting the landfill and resulting in a washout or exposure of waste is minimal. Run-off from within the landfill boundary and the active disposal areas is generally directed into one of two existing soil borrow pits on the eastern and western landfill perimeter that serve as retention basins. These basins are designed to retain design flows. Construction of the stormwater control system will develop throughout the operational

life of the landfill. As waste placement progresses as delineated on **Drawing 4**, internal drainage channels will divert run-off into previously-constructed perimeter control channels and retention basins.

**(G) Litter**

Wind-blown litter is picked by the gate attendant on a daily basis, typically occurring in the morning hours before the afternoon winds pick up. Litter-picking duties are included in all Solid Waste Division job descriptions, copies of which are enclosed in **Appendix J**. Additional litter control options include utilizing crews from the Cal Fire camp in Bishop, hiring day-laborers, or assigning welfare recipients, individuals required by the court to perform community service, or trustees from the Mono County Jail in Bridgeport.

During MSW disposal operations, a portable, but semi-permanent, five-foot-high wire mesh fence will be installed around the working face using post-installation equipment available from Public Works’ Road Division. The fence will be moved as necessary to encompass the downwind boundary of the active working face and to minimize the escape of blowing litter.

**(H) Noise**

The landfill is located in a very remote area and does not have neighbors. However, the landfill is only operated during daylight hours and each piece of Public Works’ heavy equipment is fitted with a muffler to minimize the noise of daily operations.

**(I) Traffic**

The Solid Waste Division compiles daily and monthly traffic data in the solid waste database described above to track gate receipts. An analysis of traffic data compiled for the period from January 2011 through December 2015 was performed to determine average and peak daily traffic for each month of the year. The data from that period, summarized in **Table 4.3**, provides a general understanding of daily traffic patterns to both the landfill and transfer station at the Pumice Valley disposal site.

The projected increase in average daily traffic (ADT) for 2013 is due to the shorter operating schedule (i.e., two days per week rather than four days per week in the preceding period) applied to the estimated growth of annual customer loads in 2012.

The annual variation of total traffic to each facility from 2011 through 2015 is graphically presented in **Chart K-1**, included in **Appendix K**. The average daily traffic accessing the landfill (by month) over the same period is presented in **Chart K-2**, and a similar representation of the peak daily traffic in each month is presented in **Chart K-3**. The corresponding traffic data is summarized in **Table C-1**, enclosed in **Appendix C**. Monthly details for each year are provided in **Table C-3** through **Table C-8**, also included in **Appendix C**. As would be expected for a construction and demolition waste stream, **Chart K-2** and **Chart K-3** show that average and peak daily traffic remain very low in the winter months, then increase to highs in the summer months of July through October. As noted in the waste volume discussion above, it has been observed that a relatively large local construction project can dramatically impact site traffic patterns over a very short period of time.

**Table 8I Summary of Existing and Projected Landfill Traffic Rates**

Facility	2011 – 2015	Projected
Landfill		

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Annual Average Daily Traffic:.....	7.4 loads/day	.....	8 loads/day
Peak Daily Traffic: .....	18.8 loads/day	.....	19 loads/day

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Although an analysis has not been performed to determine the number of commercial vehicles versus private self-haul vehicles, general observations and a review of gate receipts suggest that the vast majority of vehicles are from private self-haulers and small contractors. During a relatively large local construction project, however, contractor or public agency vehicles may predominate.

The landfill maintains a detailed traffic control plan facilitated by the use of a number of directional and informational signs throughout the facility. As the preceding information indicates, the Pumice Valley Landfill does not have the traffic volume to justify, nor the manpower to support, the position of a full-time traffic spotter at the working face. However, the gate attendant plays a very active role in controlling and routing traffic through direct interaction with, and monitoring of, the customers. With the relatively low traffic volume and a large percentage of that comprised of repeat local customers, personal relationships are developed, which results in a knowledgeable customer base and greatly aids in the control of traffic and disposal areas. A brief discussion of traffic routing practices and location of disposal areas is included in Section 4.12.5, above.

**(J) Hazardous Waste**

Procedures employed at the Pumice Valley Landfill to prevent the receipt and disposal of hazardous wastes at the site are described in detail in the *Load-Checking Program*, enclosed in **Appendix D**.

**9) Approvals**

The Pumice Valley Landfill operates under existing Solid Waste Facility Permit number 26-AA-0003 issued by the Mono County Health Department. The Pumice Valley Landfill also operates pursuant to approved Waste Discharge Requirements issued by the Lahontan Regional Water Quality Control Board through Board Order No. 6-01-56.

Alternative cover frequencies for inert construction and demolition wastes are employed in accordance with an *Authorization for Alternative Frequencies for Daily Cover and/or Explosive Gas Monitoring* issued by the LEA, dated August 24, 2004.

Since calculations for generation of Non-Methane Organic Compounds indicate that the Pumice Valley Landfill falls below the threshold for monitoring, reporting, and installation of an active collection system, the Great Basin Unified Air Pollution Control District has declined to issue an operations permit.

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SRK Consulting, 2012, *2012 Semi-Annual Report: Detection Monitoring Program for the Pumice Valley Landfill*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting, Reno, Nevada, December 4, 2012.

SRK Consulting, 2013, *Preliminary Closure and Postclosure Maintenance Plan for the Pumice Valley Landfill*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting, Reno, Nevada, February 15, 2013.

SRK Consulting, 2013, *Report of Disposal Site Information for the Pumice Valley Landfill*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting, Reno, Nevada, February 15, 2013.

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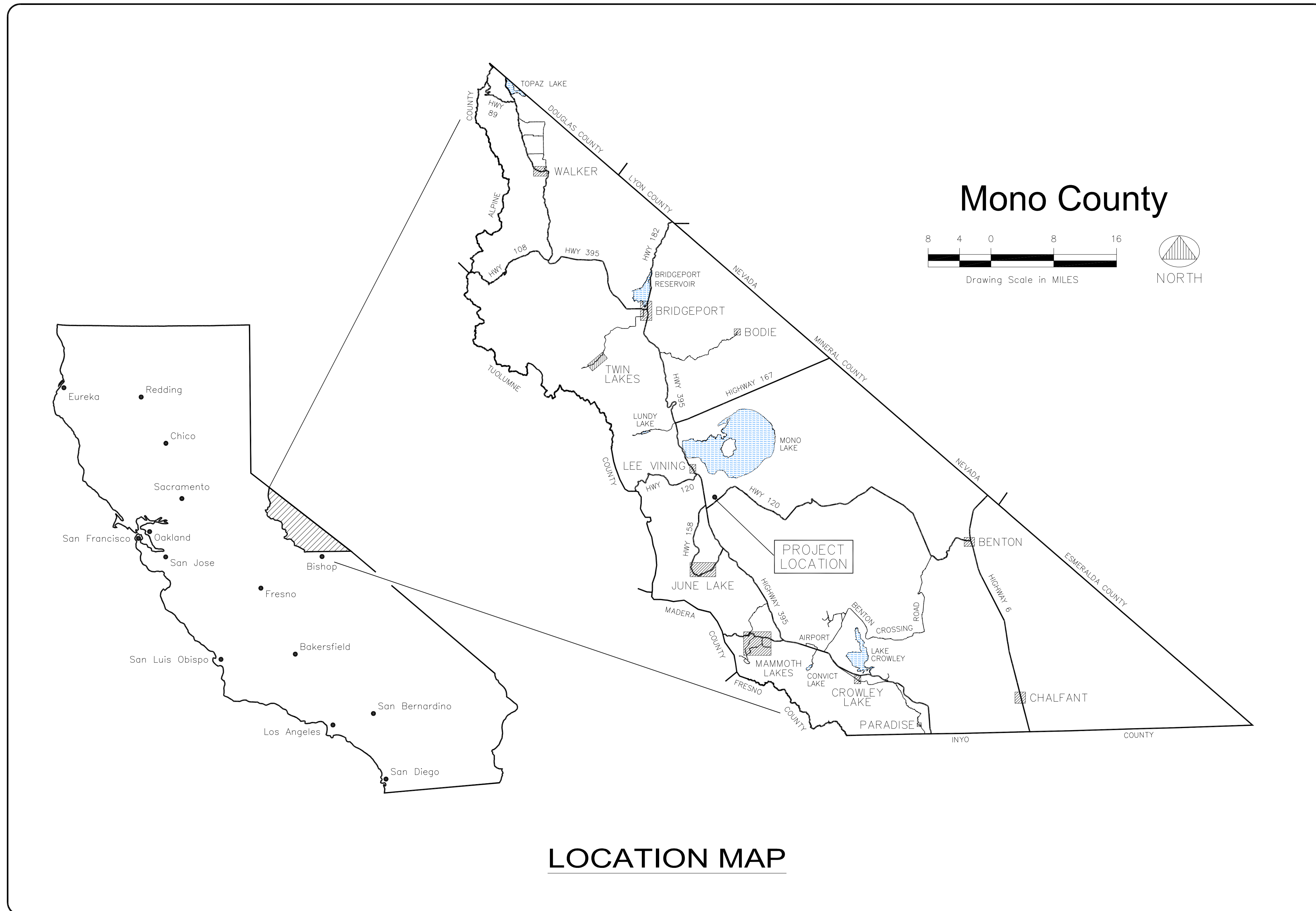
**Appendix A**  
**Figures**  
**Climate Data**  
**and Reduced Drawing Set**

# JOINT TECHNICAL DOCUMENT

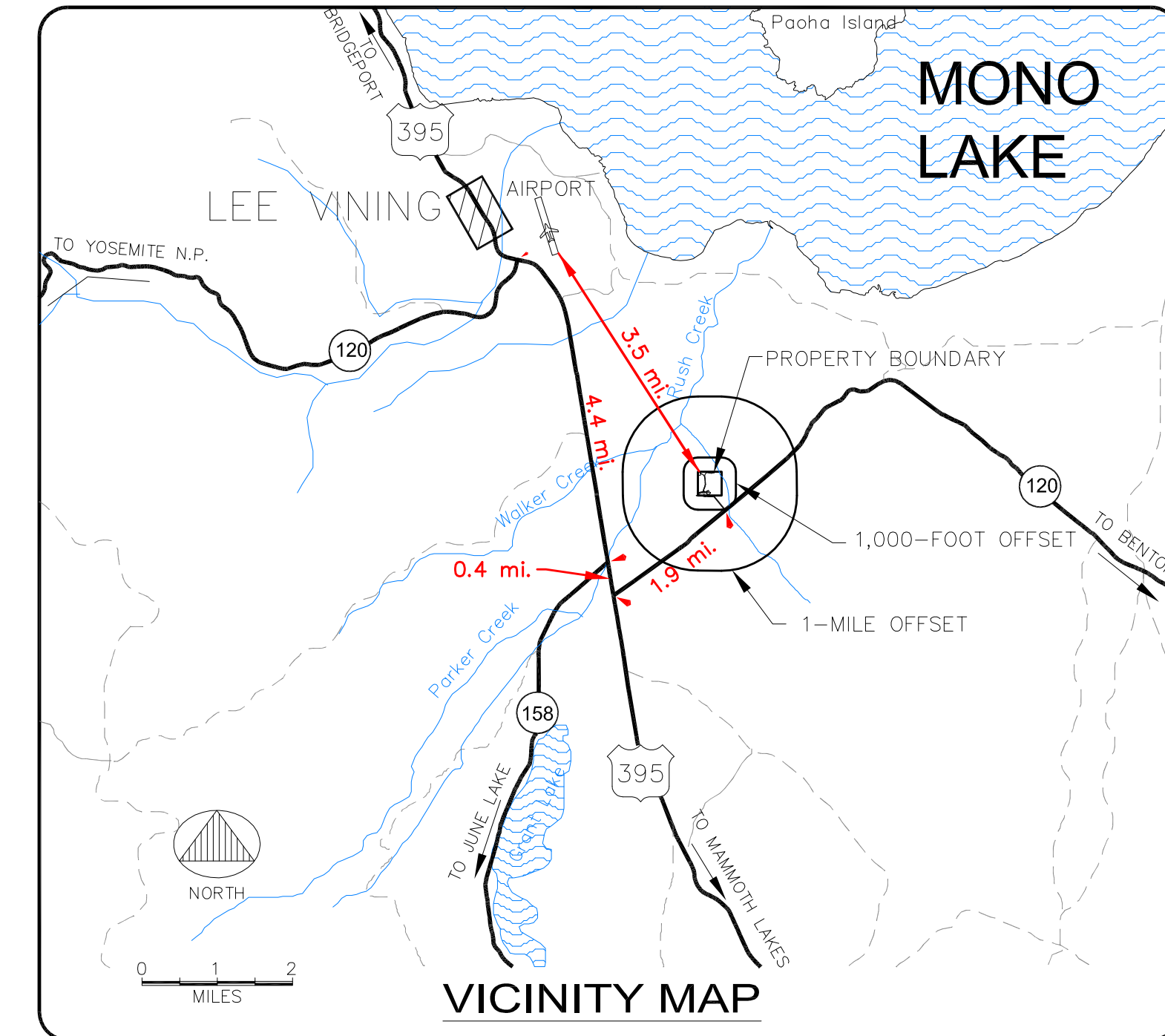
## FOR THE

# PUMICE VALLEY LANDFILL

## MONO COUNTY, CALIFORNIA



LOCATION MAP



VICINITY MAP

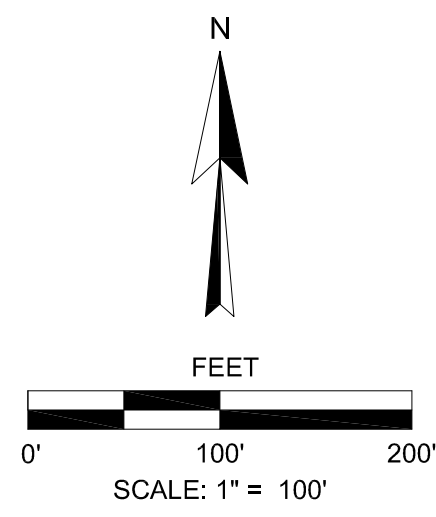
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NO.	DRAWING NAME
1	TITLE SHEET & LOCATION MAP
2	EXISTING TOPOGRAPHY AND FACILITIES
3	FINAL GRADING PLAN
4A	FILL SEQUENCING PLAN A
4B	FILL SEQUENCING PLAN B
5	CROSS-SECTIONS
6	HYDROLOGIC SUB-AREA LAYOUT
7	DETAILS, SHEET 1 OF 2
8	DETAILS, SHEET 2 OF 2

### SYMBOLS

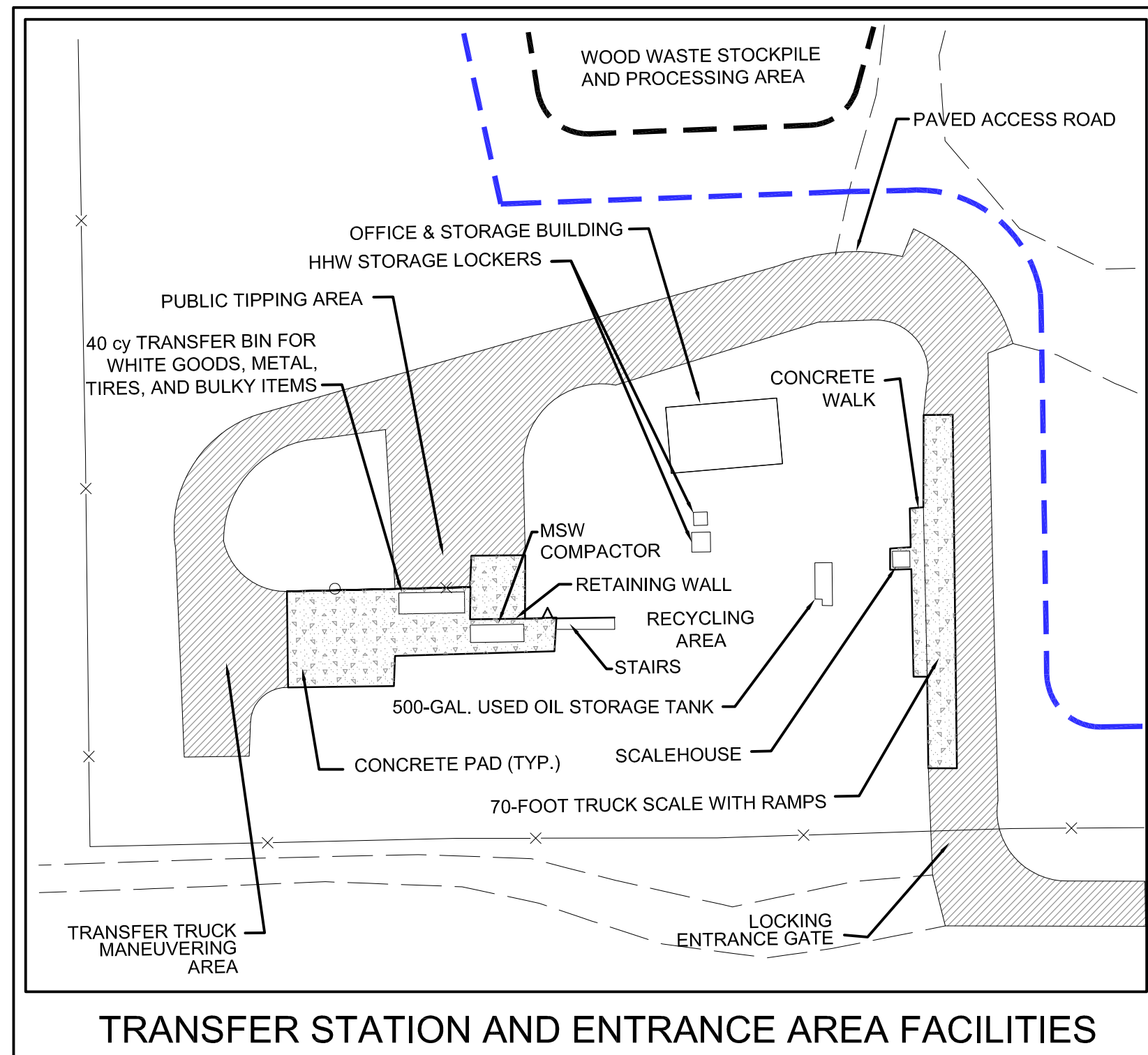
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	PROPOSED LANDFILL GAS VENT
	EXISTING LANDFILL GAS MONITORING WELL
	EXISTING SURFACE ELEVATION
	EXISTING 2' CONTOUR GRADE
	EXISTING 10' CONTOUR GRADE
	PROPOSED FINAL GRADE 2' CONTOUR
	PROPOSED FINAL GRADE 10' CONTOUR
	FINAL SURFACE SLOPE
	PROPOSED DRAINAGE CHANNEL
	EXISTING FENCELINE
	GRAVEL ROAD / SITE ACCESS ROAD
	LIMITS OF DISPOSAL AREA OR STOCKPILE
	EXISTING PROPERTY BOUNDARY
	"SUBTITLE D" WASTE FOOTPRINT
	TRANSFER STATION FACILITIES
	DETAIL DESIGNATION
	REFERENCE PAGE
	CROSS-SECTION LOCATION

DATE: 02/15/2013	DATE: 02/15/2013	DATE: 05/27/2016
SRK JOB NO.: 146900.160	PROJECT: PUMICE VALLEY LANDFILL JOINT TECHNICAL DOCUMENT	FILE NAME: 01 title sheet 146900.1100V001.dwg
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REV. B	DESCRIPTION: 2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	DATE: 05/27/2016
DESIGN: EN	DESIGN: EN	DESIGN: EN
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REVIEWED: RBB	REVIEWED: RBB	REVIEWED: RBB
CHECKED: EN	CHECKED: EN	CHECKED: EN
APPROVED: EN	APPROVED: EN	APPROVED: EN
SHEET: 01 OF 08	SHEET: 01 OF 08	SHEET: 01 OF 08
<p>2016 UPDATE PREPARED BY MONO COUNTY PUBLIC WORKS</p> <p>ORIGINAL DRAWINGS BY:  st consulting</p> <p>PREPARED FOR: MONO COUNTY OF PUBLIC WORKS SOLID WASTE DIVISION</p> <p>IF THE ABOVE SCALES ARE NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED</p>		

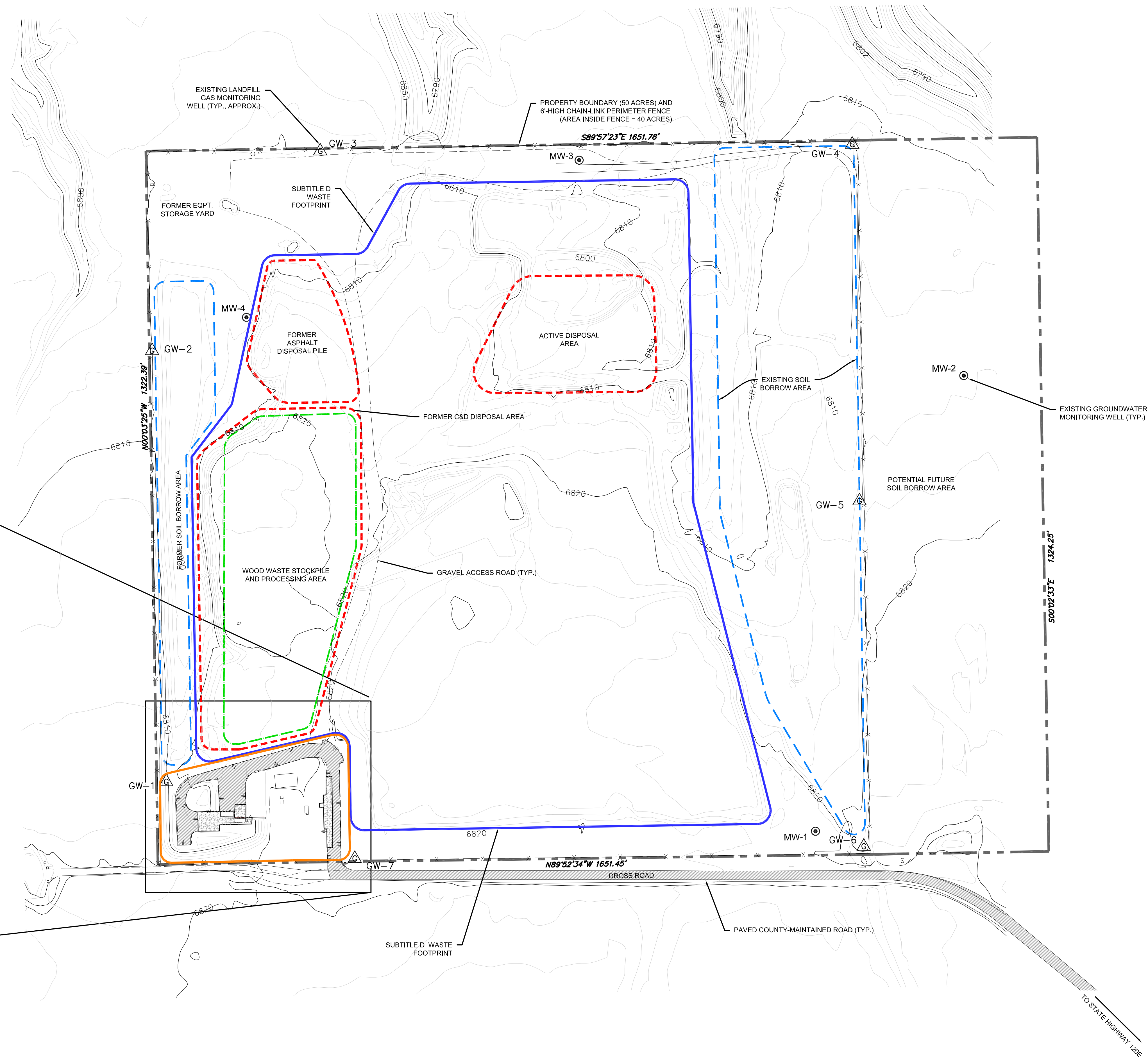


**PUMICE VALLEY LANDFILL AND TRANSFER STATION SUMMARY:**

LANDFILL	48.4 ACRES
SUBTITLE D WASTE FOOTPRINT	23.6 ACRES
TRANSFER STATION	1.6 ACRES

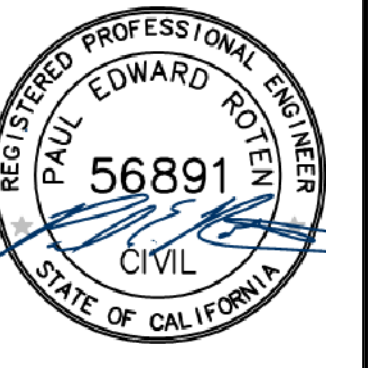


**TRANSFER STATION AND ENTRANCE AREA FACILITIES**



NOTE:  
BASE TOPOGRAPHIC MAP PREPARED BY SPENCER B.  
GROSS, INC.(RENO, NV). DATE OF PHOTOGRAPHY: 06.03.2011

REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016



DESIGNED: \_\_\_\_\_  
DRAWN: TWW  
REVIEWED: RBB  
CHECKED: EN  
APPROVED: EN  
SHEET: 02 OF 08

IF THE ABOVE BAR SCALES ARE NOT SCALE  
1 INCH, THE DRAWING SCALE IS ALTERED

2016 UPDATE PREPARED BY  
**MONO COUNTY PUBLIC WORKS**

ORIGINAL DRAWINGS BY: **st consulting**

PREPARED FOR:  
**MONO COUNTY  
DEPARTMENT OF  
PUBLIC WORKS  
SOLID WASTE DIVISION**

DRAWING TITLE  
**EXISTING TOPOGRAPHY AND FACILITIES**

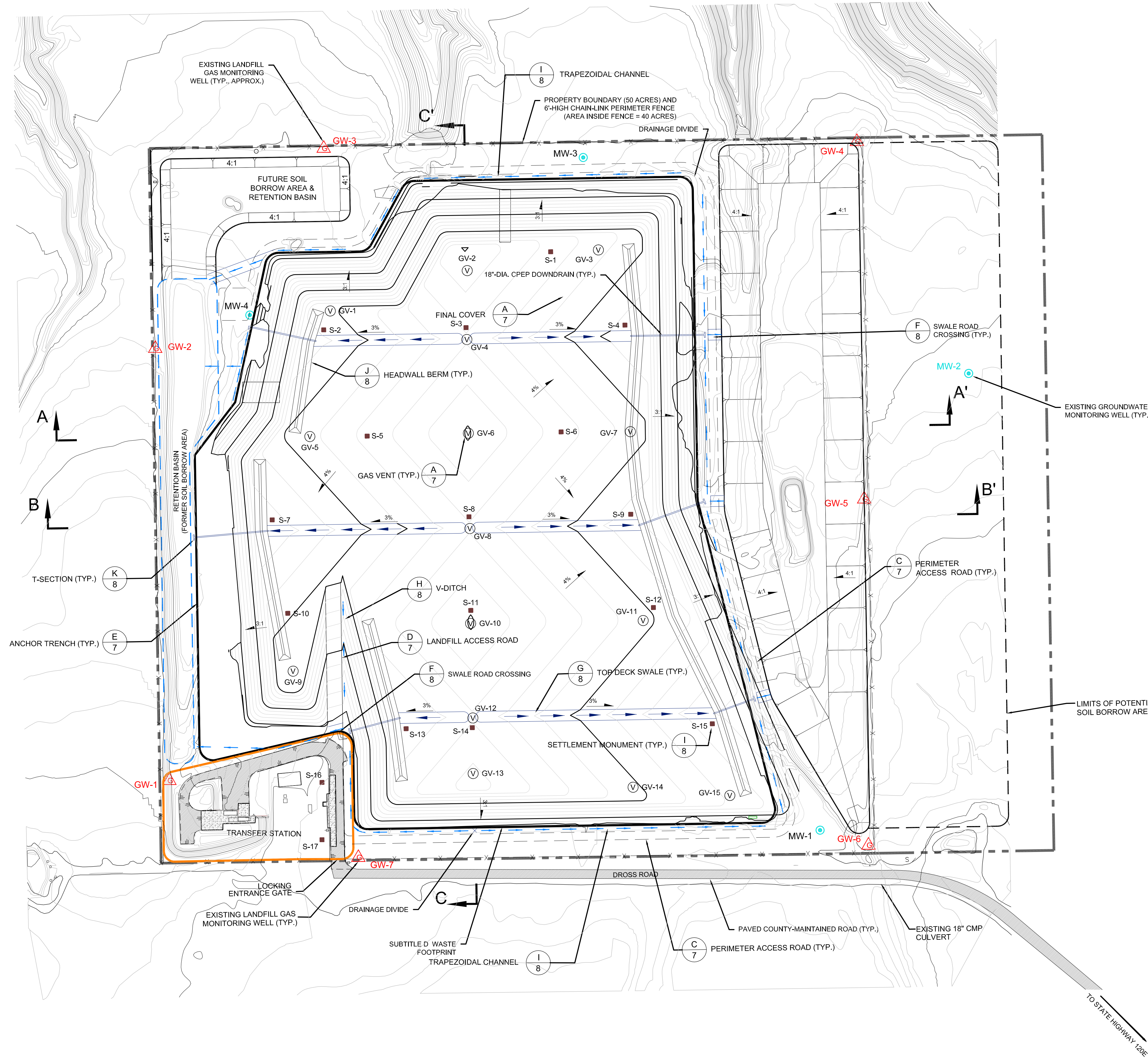
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**PUMICE VALLEY LANDFILL  
JOINT TECHNICAL DOCUMENT**

DATE: 02/15/2013  
SRK JOB NO.: 146900.160

REV. NO.  
A

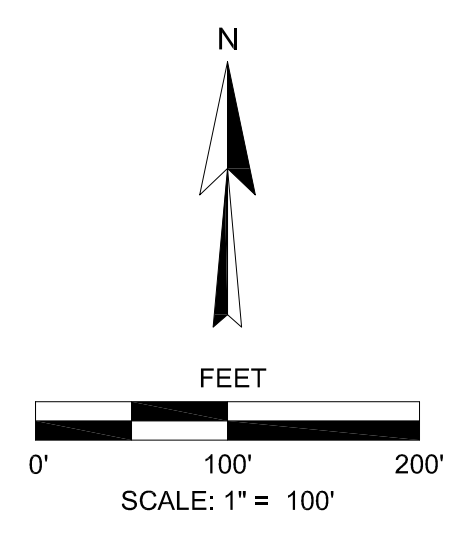
DRAWING NO.  
C 02

FILE NAME: 02\_146900\_10SPN01.dwg



**LEGEND**

- MW-2 EXISTING GROUNDWATER MONITORING WELL
- GV-15 PROPOSED LANDFILL GAS VENT
- GW-7 EXISTING LANDFILL GAS MONITORING WELL
- S-1 PROPOSED SETTLEMENT MONUMENT
- WASTE FOOTPRINT (APPROX.)
- DRAINAGE CHANNEL

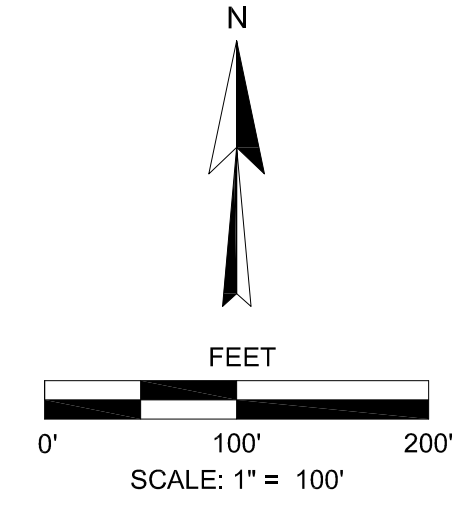


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SRK JOB NO.: 146900.160 DATE: 02/15/2013 X:\COMMON\PROJECTS\WASTE\TECHNICALS\AND TRANSFER\SRK\146900.160\2016\03\146900.160\DWG\146900.160\146900.160.dwg		ORIGINAL DRAWINGS BY: <b>st consulting</b> REGISTERED PROFESSIONAL ENGINEER PAUL EDWARD ROTEN 56891 CIVIL STATE OF CALIFORNIA		FILE NAME: 03 146900.160\DWG



**FIRST LEVEL**

- (C1)** C&D WASTE CELL (TO ELEV. 6810')
- (C2)** C&D WASTE CELL (TO ELEV. 6810')
- (M1)** MSW CELL (TO ELEV. 6825')
- (M2)** MSW CELL (TO ELEV. 6825')
- (M3)** MSW CELL (TO ELEV. 6825')
- (M4)** MSW CELL (TO ELEV. 6825')



REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016



DESIGN: EN  
 DRAWN: TWW  
 REVIEWED: RBB  
 CHECKED: EN  
 APPROVED: EN  
 SHEET: 04 OF 08

IF THE ABOVE BAR SCALES ARE NOT SCALE  
 1 INCH, THE DRAWING SCALE IS ALTERED

2016 UPDATE PREPARED BY  
**MONO COUNTY PUBLIC WORKS**

ORIGINAL DRAWINGS BY: **st consulting**

PREPARED FOR:  
**MONO COUNTY OF  
 PUBLIC WORKS  
 SOLID WASTE DIVISION**

DRAWING TITLE  
**FILL SEQUENCING PLAN**

PROJECT  
**PUMICE VALLEY LANDFILL  
 JOINT TECHNICAL DOCUMENT**

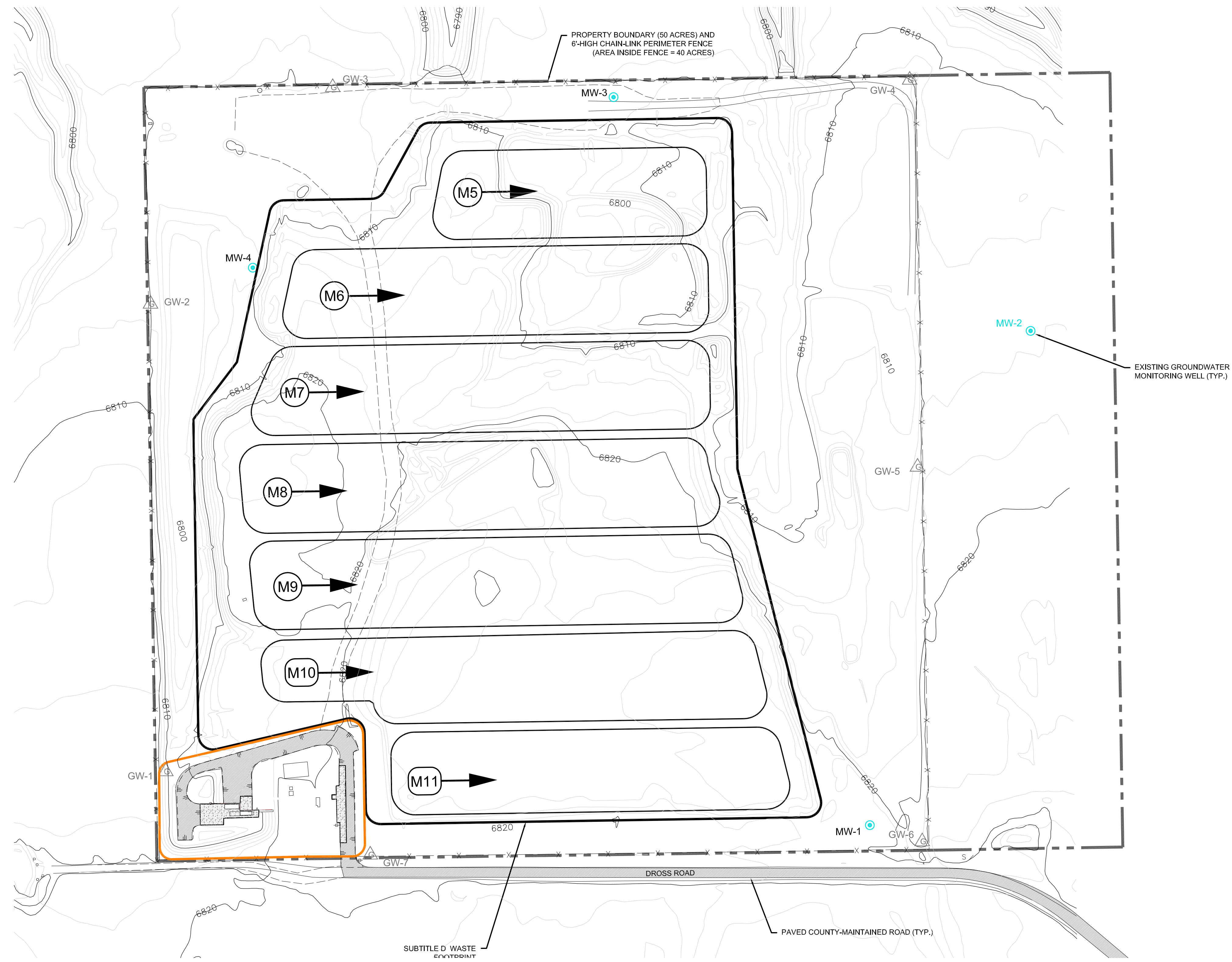
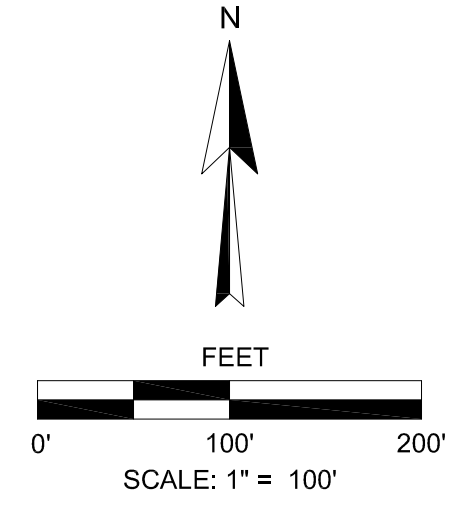
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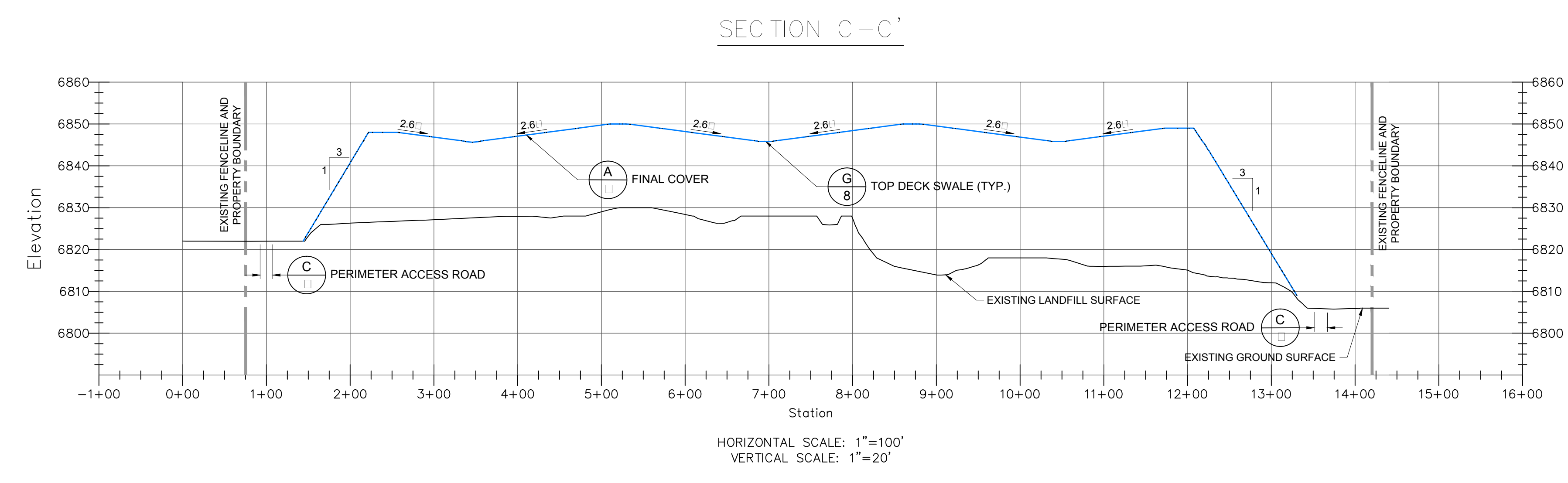
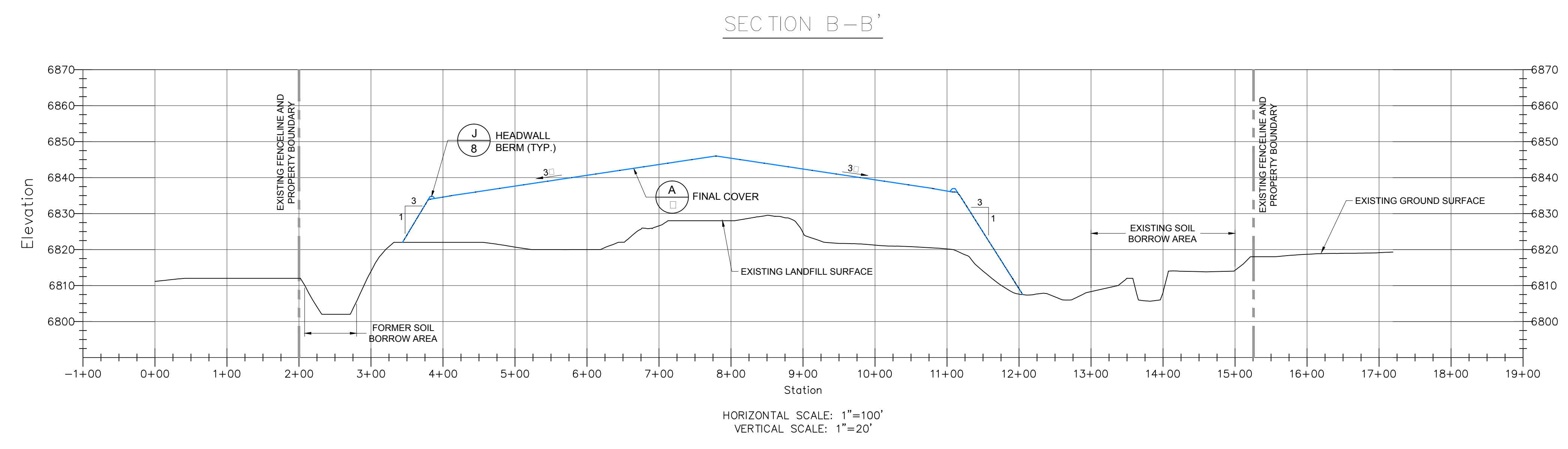
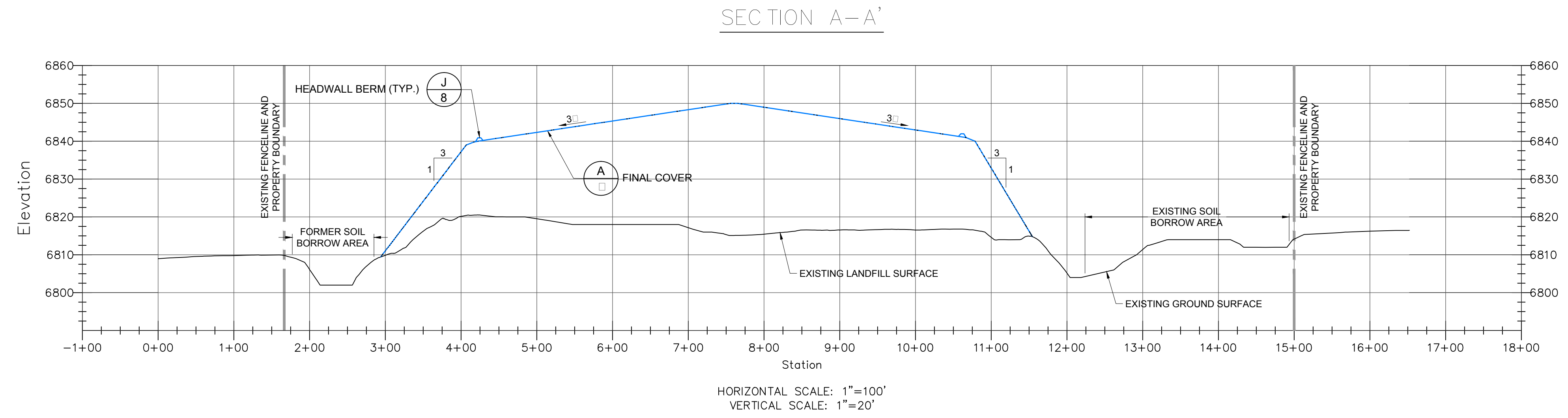
REV. NO.  
**A**

**SECOND LEVEL**

- (M5) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M6) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M7) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M8) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M9) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M10) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE
- (M11) MSW CELL (TO MAX ELEV. 6846)  
SEE C6 FOR FINAL FINISHED GRADE

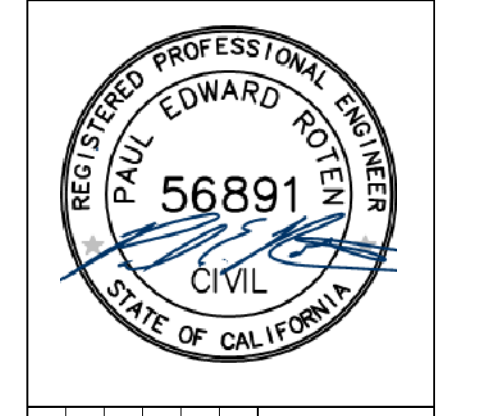


<p><b>DESIGNER:</b> DRAWN: TWW  <b>REVIEWED:</b> RBB  <b>CHECKED:</b> EN  <b>APPROVED:</b> EN          SHEET: 04 OF 08</p>	<p><b>2016 UPDATE PREPARED BY:</b>  <b>MONO COUNTY PUBLIC WORKS</b></p> <p><b>ORIGINAL DRAWINGS BY:</b> <b>st consulting</b></p> <p><b>PREPARED FOR:</b>  <b>MONO COUNTY OF PUBLIC WORKS</b>  <b>SOLID WASTE DIVISION</b></p>	<p><b>REVISIONS</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV.</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>SUBMITTED FOR REGULATORY REVIEW</td> <td>02/15/2013</td> </tr> <tr> <td>B</td> <td>2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891</td> <td>05/27/2016</td> </tr> </tbody> </table> <p>FILE NAME: 04_146900_110SEC001.dwg</p>	REV.	DESCRIPTION	DATE	A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013	B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016
REV.	DESCRIPTION	DATE									
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B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016									
<p><b>REGISTERED PROFESSIONAL ENGINEER</b>    <b>PAUL EDWARD ROTEN</b>          56891          CIVIL          STATE OF CALIFORNIA</p>											
<p>IF THE ABOVE SIZES DO NOT SCALE          1 INCH, THE DRAWING SCALE IS ALTERED</p>											
<p><b>DRAWING TITLE:</b>          FILL SEQUENCING PLAN</p>	<p><b>PROJECT:</b>          PUMICE VALLEY LANDFILL          JOINT TECHNICAL DOCUMENT</p>										
<p><b>DATE:</b> 02/15/2013  <b>SRK JOB NO.:</b> 146900.160</p>	<p><b>DRAWING NO.:</b>          C-04B</p>	<p><b>REV. NO.:</b>          A</p>									



REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016

FILE NAME: 05 146900 110PROCF01.dwg



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 APPROVED/EN: [Redacted]  
 SHEET: 05 OF 08

IF THE ABOVE BAR CODES ARE NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

2016 UPDATE PREPARED BY  
**MONO COUNTY PUBLIC WORKS**

ORIGINAL DRAWINGS BY: **stc consulting**

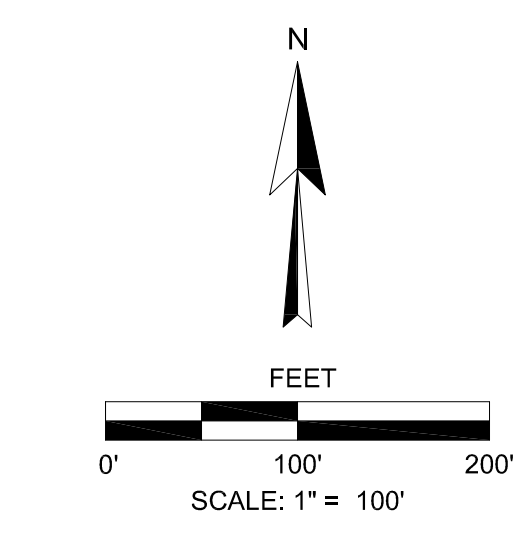
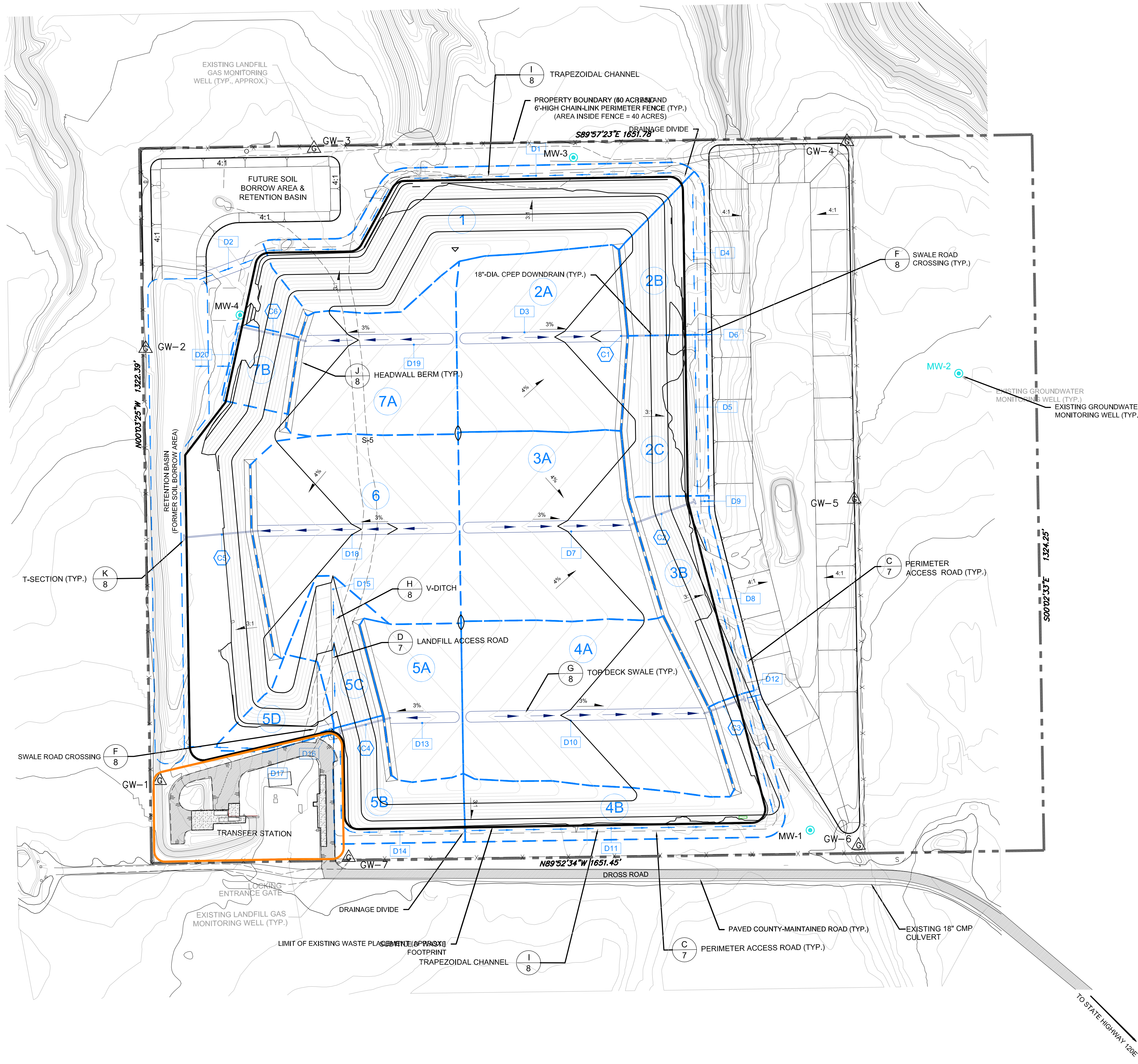
PREPARED FOR:  
**MONO COUNTY OF PUBLIC WORKS**  
**SOLID WASTE DIVISION**

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PROJECT: **PUMICE VALLEY LANDFILL JOINT TECHNICAL DOCUMENT**

DATE: 02/15/2013  
 SRK JOB NO.: 146900.160

REV. NO.: **A**  
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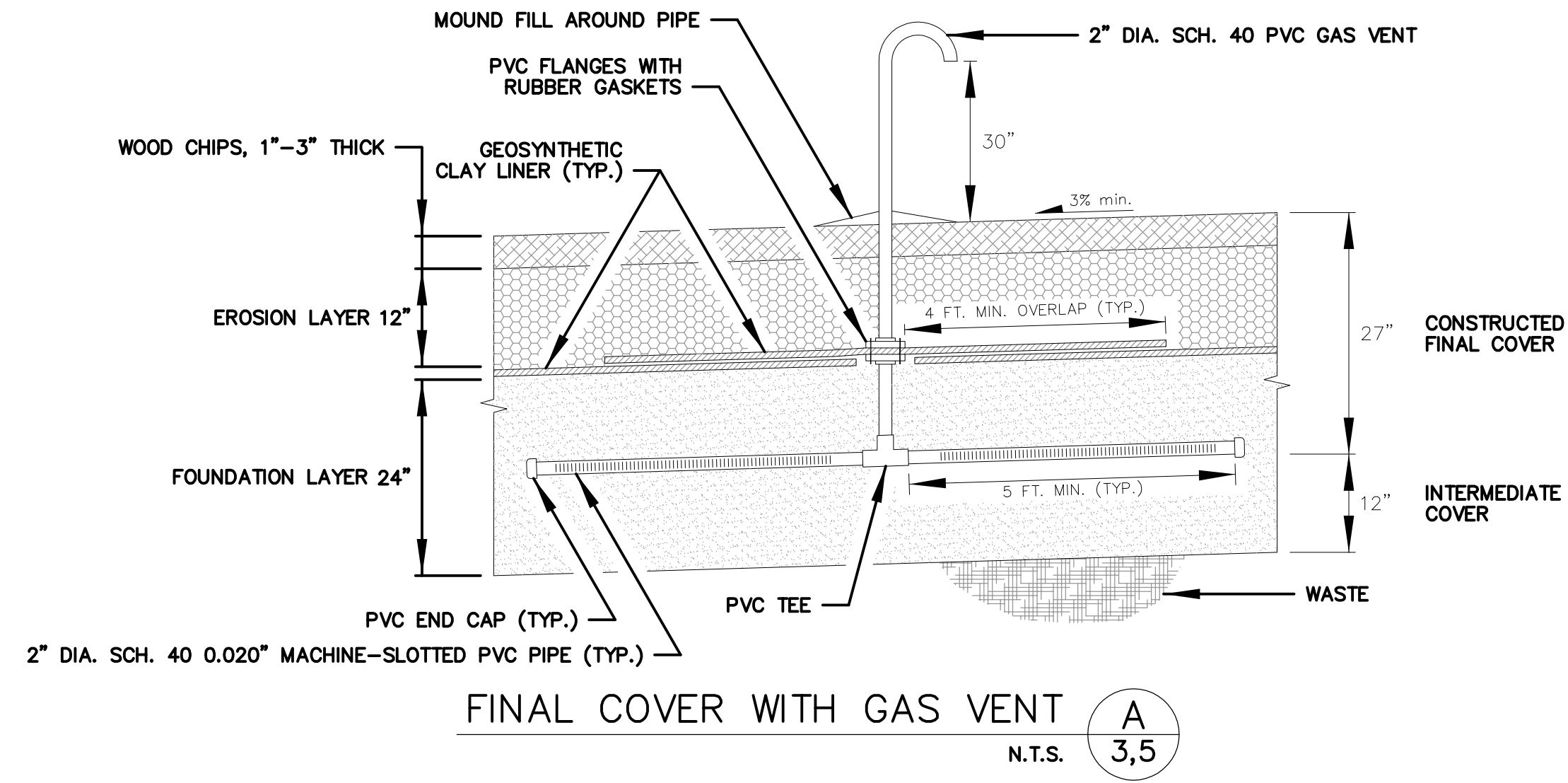
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- MW-2 EXISTING GROUND WATER MONITORING WELL
- GW-7 PROPOSED LF GAS MONITORING WELL
- WASTE FOOTPRINT
- DRAINAGE CHANNEL
- 3A HYDROLOGIC SUB-AREA DESIGNATION
- C6 CULVERT DESIGNATION
- D9 CHANNEL DESIGNATION
- OVERSIDE DRAIN W/ T-SECTION

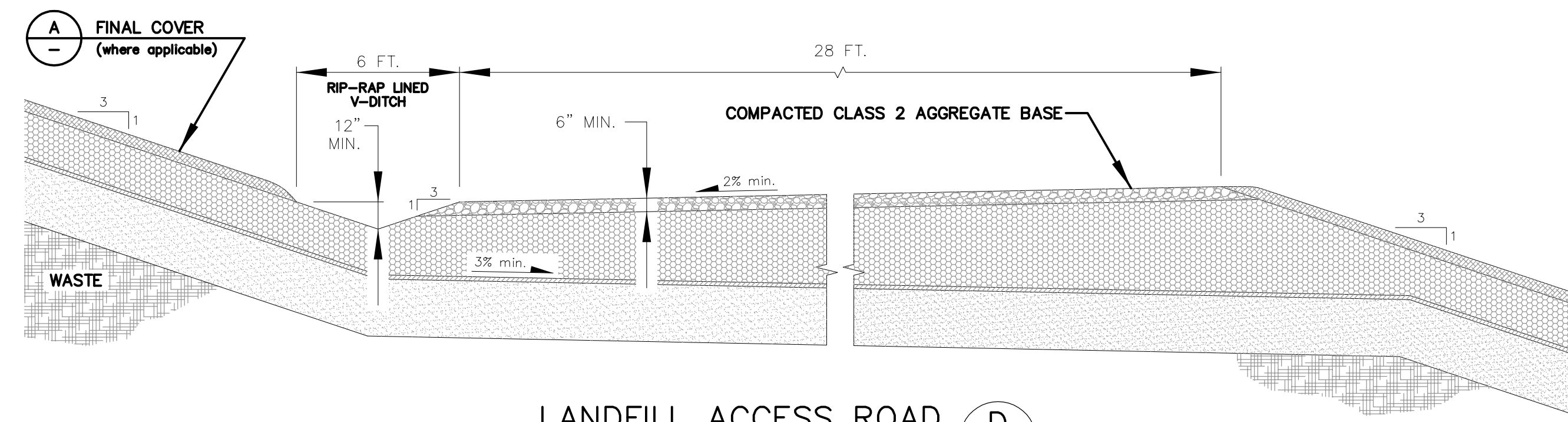
NOTE: SEE DRAINAGE REPORT IN THE "PRELIMINARY CLOSURE AND POSTCLOSURE MAINTENANCE PLAN" FOR HYDROLOGIC ANALYSES.

Channel No.	Description	Refer to Detail	Avg Flowline Slope
D1	Trapezoidal Channel	I	0.5%
D2	Swale Road Crossing	F	0.5%
D3	Top Deck Swale	G	3.0%
D4	Trapezoidal Channel	I	0.5%
D5	Trapezoidal Channel	I	0.5%
D6	Swale Road Crossing	F	1.0%
D7	Top Deck Swale	G	3.0%
D8	Trapezoidal Channel	I	0.5%
D9	Swale Road Crossing	F	1.0%
D10	Top Deck Swale	G	3.0%
D11	Trapezoidal Channel	I	0.5%
D12	Swale Road Crossing	F	1.0%
D13	Top Deck Swale	G	3.0%
D14	Trapezoidal Channel	I	0.5%
D15	V-Ditch	H	8.0%
D16	Swale Road Crossing	F	1.0%
D17	Trapezoidal Channel	I	1.8%
D18	Top Deck Swale	G	3.0%
D19	Top Deck Swale	G	3.0%
D20	Trapezoidal Channel	I	0.5%

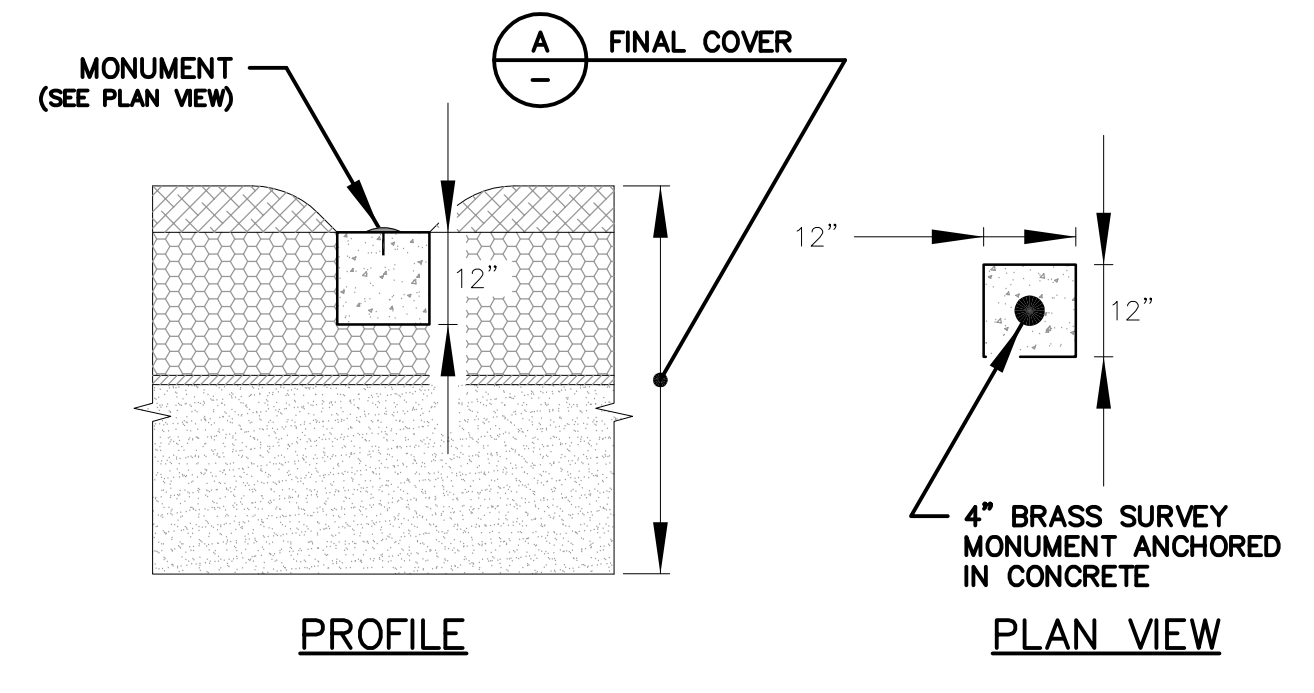
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A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013											
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2016 UPDATE PREPARED BY <b>MONO COUNTY PUBLIC WORKS</b>		ORIGINAL DRAWINGS BY: <b>st consulting</b>		PREPARED FOR: <b>MONO COUNTY OF          PUBLIC WORKS          SOLID WASTE DIVISION</b>									
REGISTERED PROFESSIONAL ENGINEER <b>PAUL EDWARD ROTEN</b> 56891 CIVIL STATE OF CALIFORNIA		IF THE ABOVE SCALES ARE NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED											
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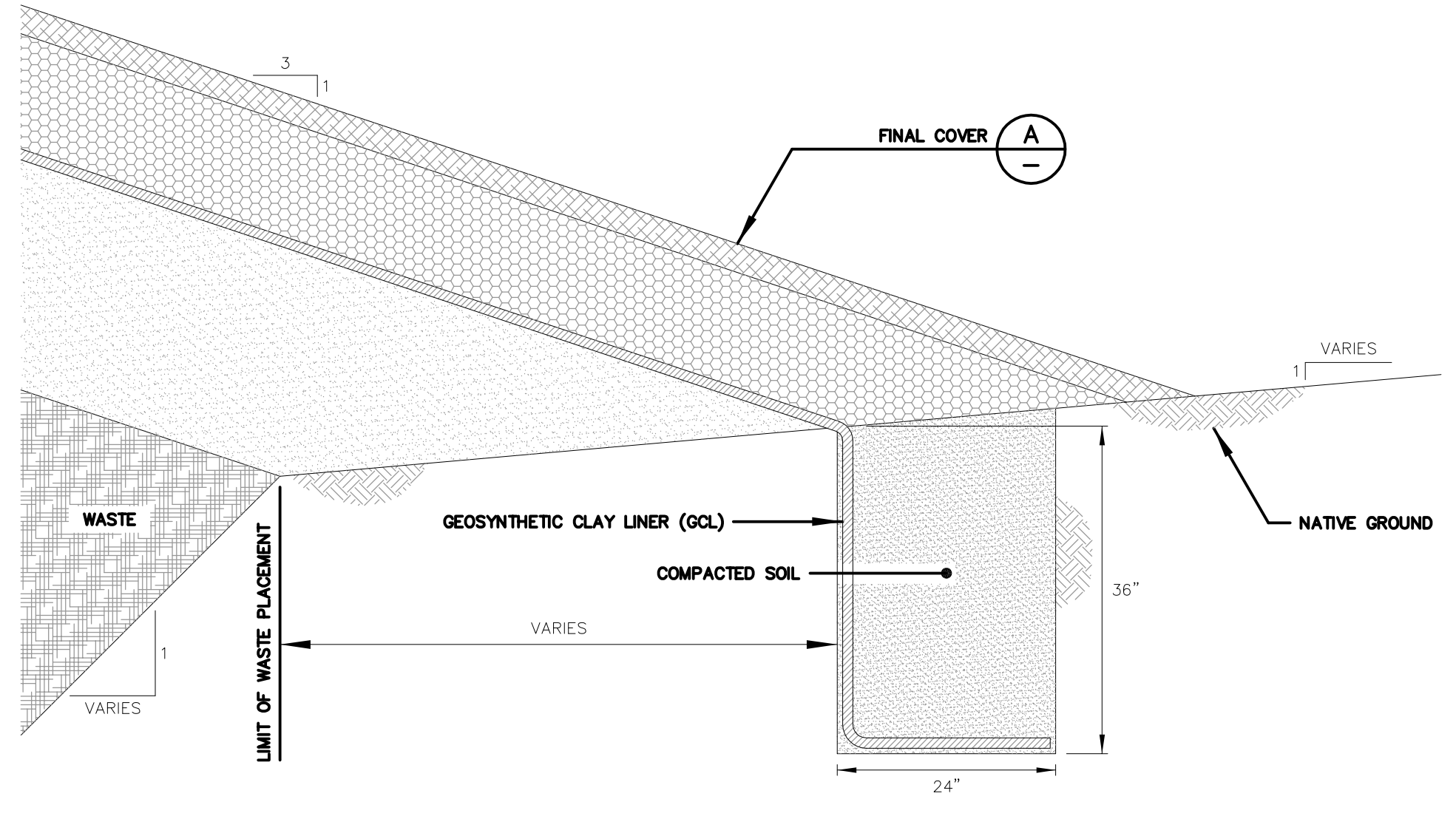
FINAL COVER WITH GAS VENT **A**  
N.T.S. **3,5**



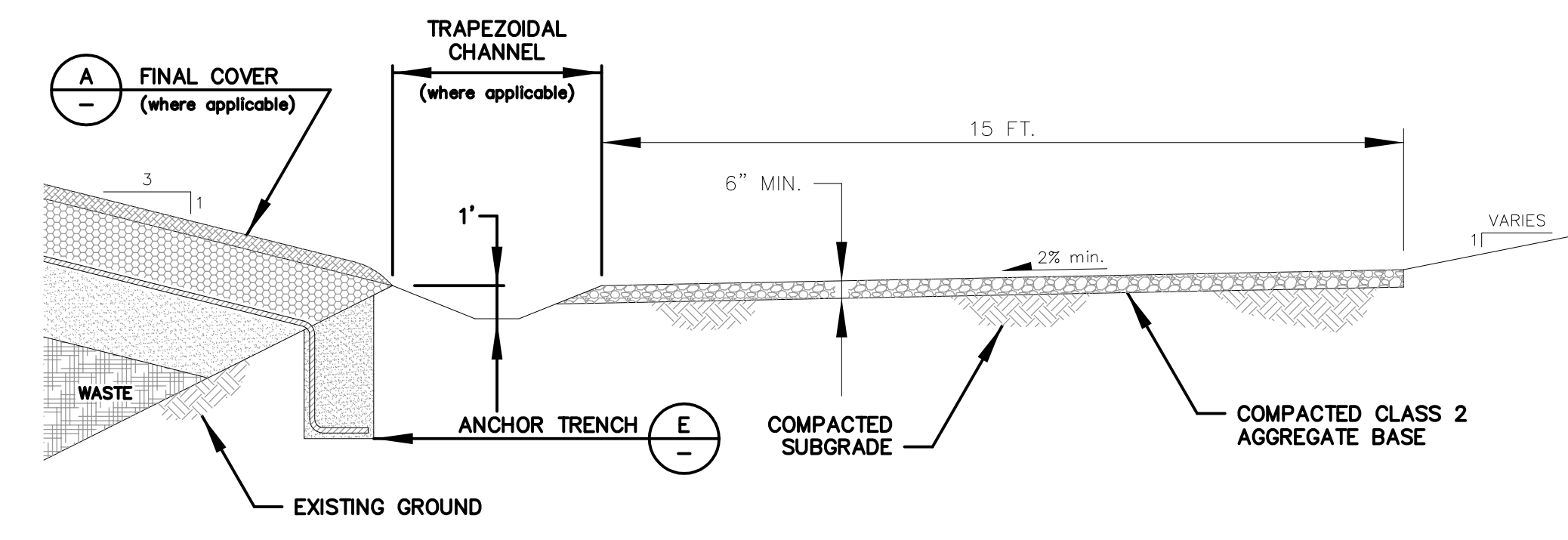
LANDFILL ACCESS ROAD **D**  
N.T.S. **3,6**



PROFILE  
SETTLEMENT MONUMENT **B**  
N.T.S. **3**



ANCHOR TRENCH **E**  
N.T.S. **3,5**



PERIMETER ACCESS ROAD **C**  
N.T.S. **3,5,6**

REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016



DESIGNER: TWW  
DRAWN: TWW  
REVIEWED: RB  
CHECKED: EN  
APPROVED: EN  
SHEET: 07 OF 08

IF THE ABOVE BAR SCALES NOT SCALE  
1 INCH THE DRAWING SCALE IS ALTERED

2016 UPDATE PREPARED BY  
MONO COUNTY PUBLIC WORKS

ORIGINAL DRAWINGS BY: **st consulting**

PREPARED FOR:  
**MONO COUNTY  
DEPARTMENT OF  
PUBLIC WORKS  
SOLID WASTE DIVISION**

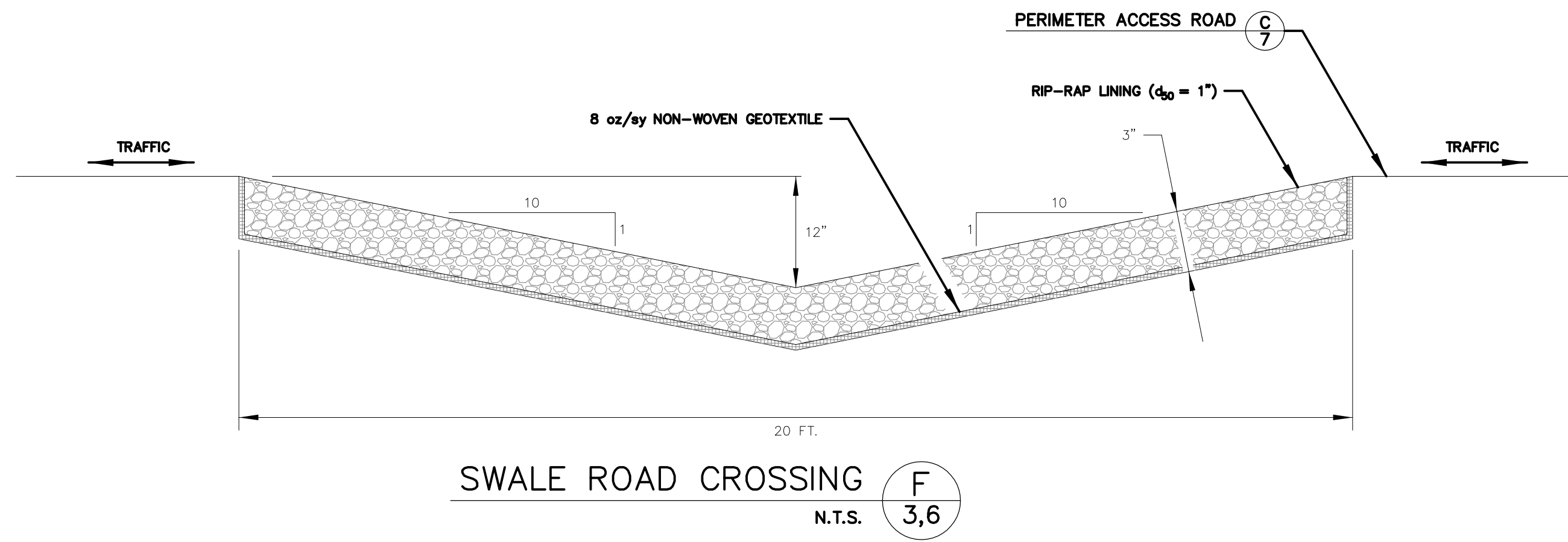
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PROJECT: **PUMICE VALLEY LANDFILL  
JOINT TECHNICAL DOCUMENT**

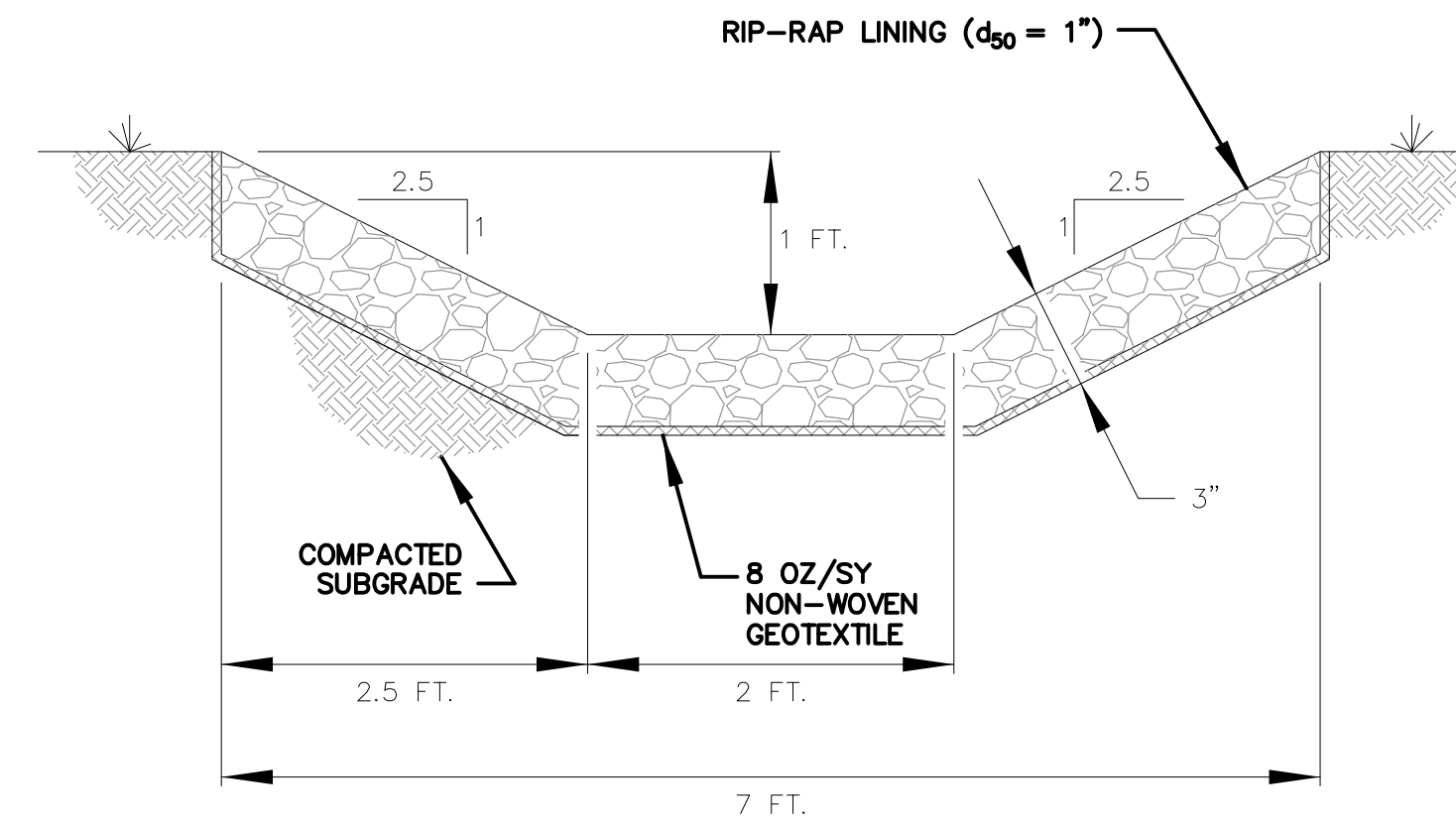
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SRK JOB NO.: 146900.160

REV. NO. **B**  
DRAWING NO. **C 07**

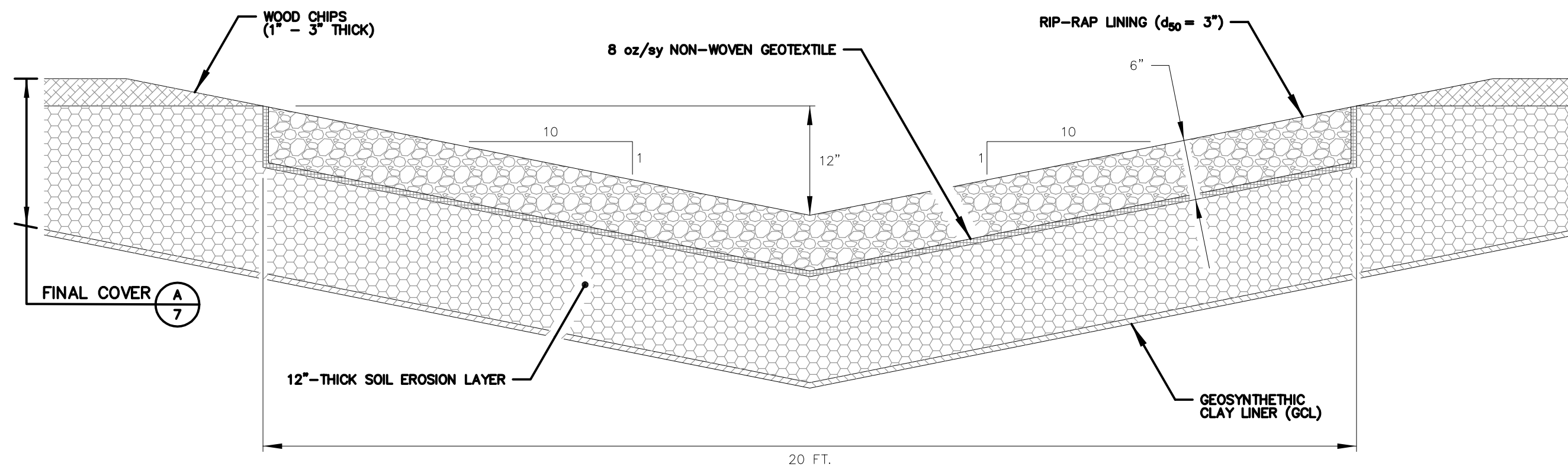
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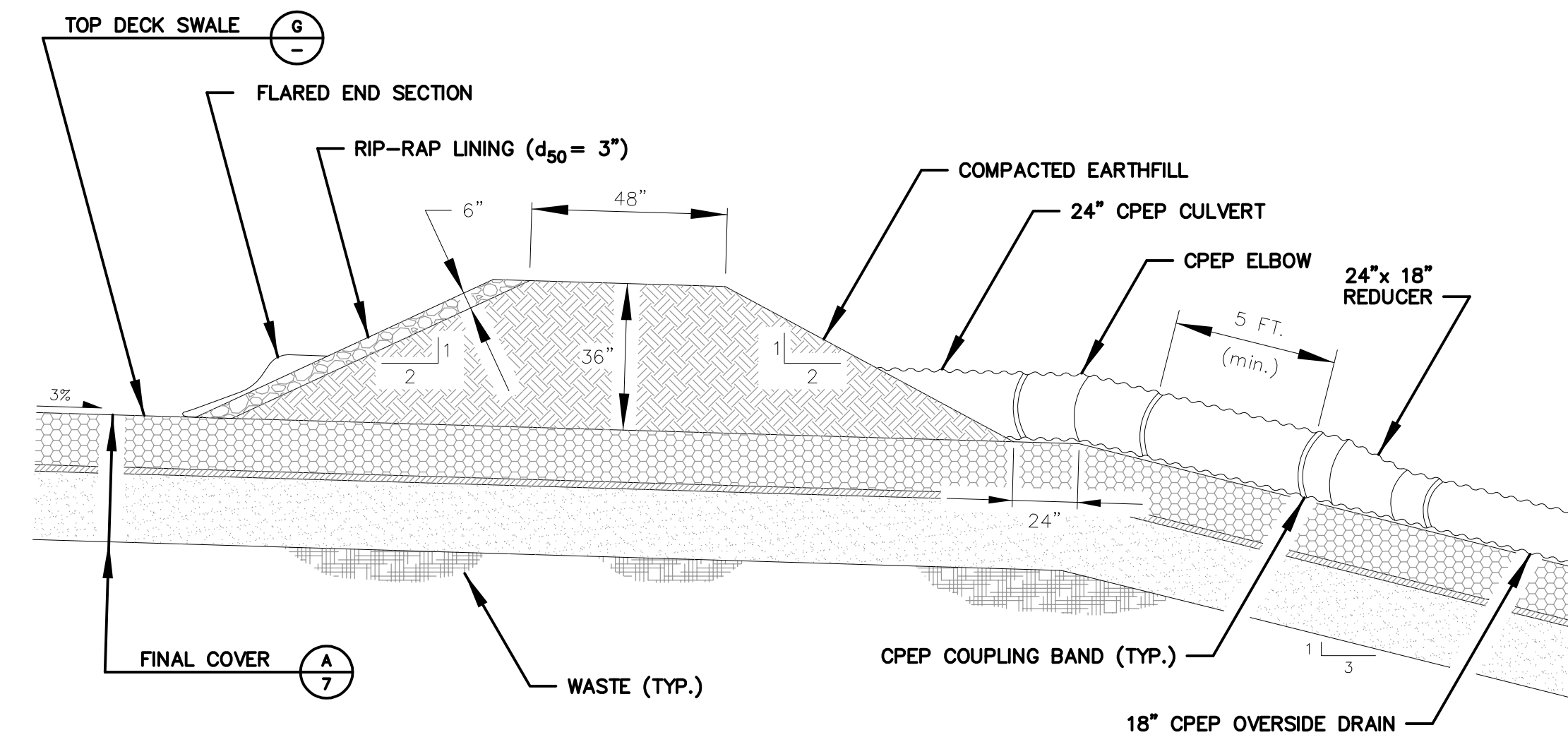
SWALE ROAD CROSSING **F**  
N.T.S. 3,6



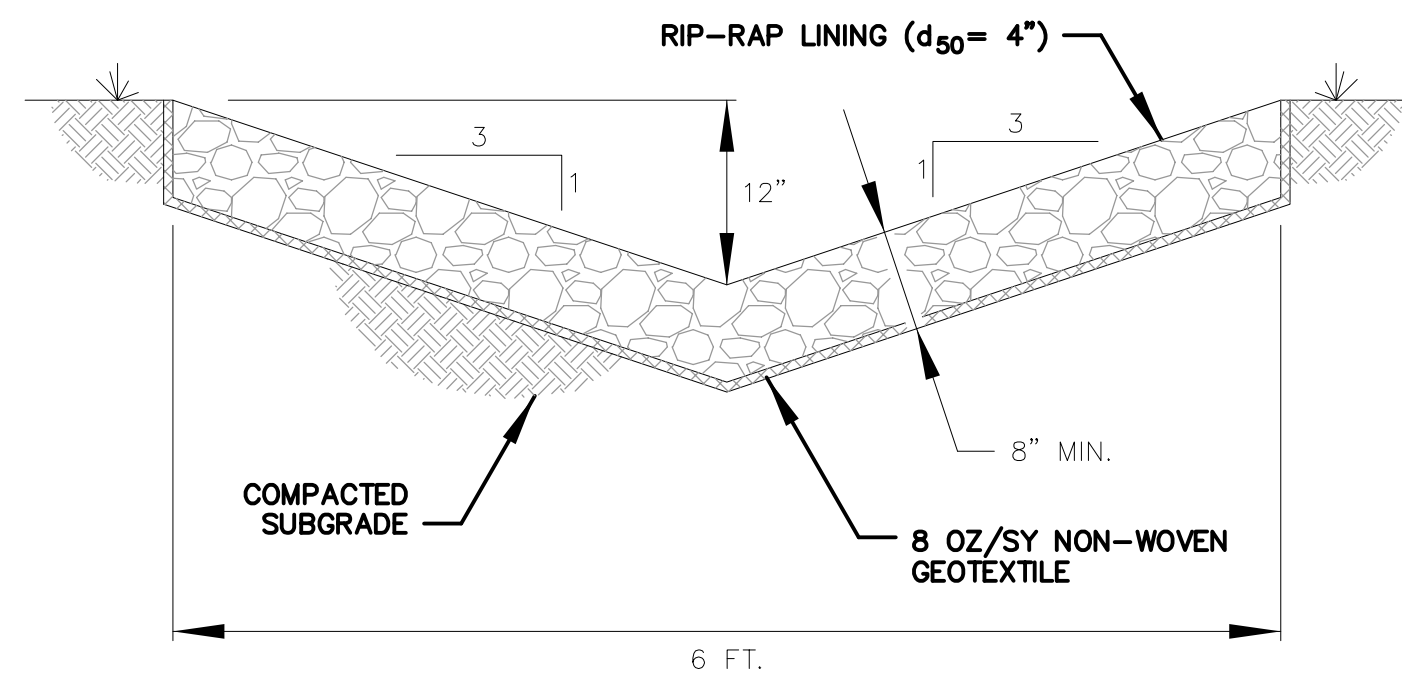
TRAPEZOIDAL CHANNEL **I**  
N.T.S. 3,6



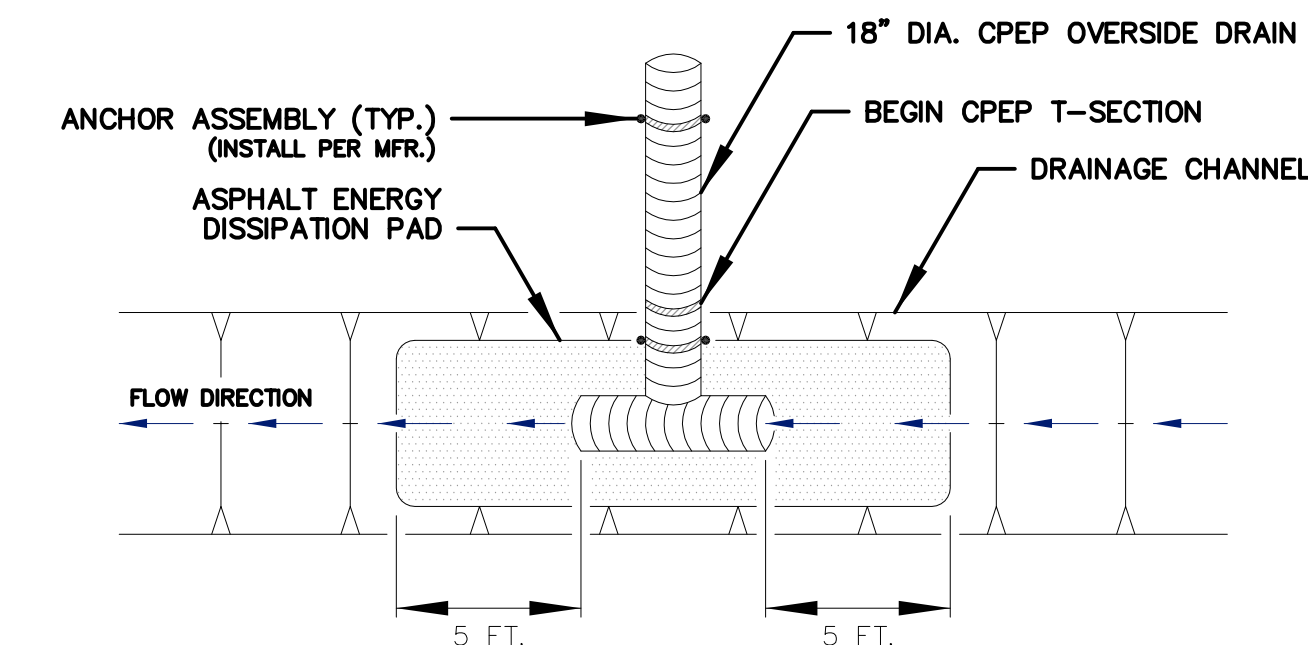
TOP DECK SWALE **G**  
N.T.S. 3,5,6



HEADWALL BERM **J**  
N.T.S. 3,5,6

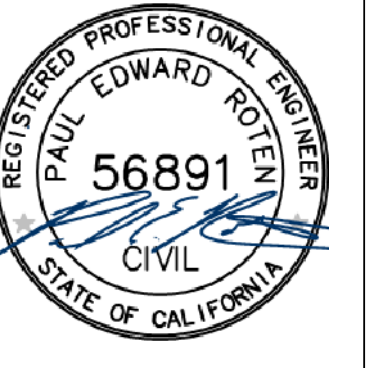


V-DITCH **H**  
N.T.S. 3,6



T-SECTION **K**  
N.T.S. 3,6

REV.	DESCRIPTION	DATE
A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013
B	2016 UPDATE - PREPARED BY MONO COUNTY PW - PAUL ROTEN, PE 56891	05/27/2016



DESIGNER: DRAWN/TW: REVIEWED/RB: CHECKED/EN: APPROVED/EN: SHEET: 08 OF 08  
 IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

2016 UPDATE PREPARED BY MONO COUNTY PUBLIC WORKS  
 ORIGINAL DRAWINGS BY: **st consulting**  
 MONO COUNTY DEPARTMENT OF PUBLIC WORKS SOLID WASTE DIVISION  
 PREPARED FOR:

DRAWING TITLE: DETAILS, SHEET 2 OF 2  
 PROJECT: PUMICE VALLEY LANDFILL JOINT TECHNICAL DOCUMENT  
 DATE: 02/15/2013  
 SRK JOB NO.: 146900.160  
 DRAWING NO.: C 08  
 REV. NO.: B

FILE NAME: 08\_146900\_110DET02.dwg

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**Appendix B**  
**Materials Salvaging Program**



## **Materials Salvaging Program**

### **Purpose**

The County of Mono recognizes the importance of reducing the volume of material disposed of in landfills. The County also recognizes the desire of its citizens to utilize certain materials that might otherwise be landfilled, and believes that this activity can be carried out in organized safe and efficient manner, in accordance with state law. To achieve environmental benefits and to benefit those citizens who wish to re-use salvaged materials, the County hereby establishes a Materials Salvaging Program (MSP). The purpose of the MSP is to allow customer access to designated re-use areas at two specific sites, the Benton Crossing Landfill and the Pumice Valley Landfill/Transfer Station, for the purpose of salvaging useful items and wood chips.

### **Authority over Program**

The Solid Waste Superintendent is responsible for the MSP. The Superintendent reserves the right to terminate the program, in part or in full, if continuation is believed to be detrimental to the County or to public health, safety, or welfare.

### **Salvage Privileges**

Any person wishing to salvage materials from designated areas at Benton Crossing Landfill and/or Pumice Valley Landfill/Transfer Station, or any person assisting another person to do so, must read and sign the "ASSUMPTION OF RISK AND RELEASE OF LIABILITY FOR SALVAGE AND USE OF DISPOSED ITEMS AND WOOD CHIPS FROM THE MONO COUNTY SOLID WASTE PROGRAM."

Salvaging at the County's landfills and transfer stations is a privilege. Abuse of the program, violation of salvage rules, or unsafe salvage practices will result in this privilege being revoked. The Solid Waste Superintendent has the right to revoke an individual's salvaging privileges at any time. Individuals whose privileges have been revoked may appeal such revocation, in writing, to the Director of Public Works within 30 days of revocation. Any determination made by the Director of Public Works shall be final and non-appealable.

### **Safety and Conduct**

All salvage operations must be performed in a safe manner. Only disposed items that have been placed in the designated re-use areas are available for salvage. The following activities are examples of prohibited activities that are cause for revocation of salvaging privileges:

- Collecting materials outside of the re-use areas.
- Relocating materials to the re-use areas.
- Operating power tools, cutting torches or heavy equipment to remove materials.



- Being under the influence of alcohol or drugs while salvaging.

### **Check In/Check Out**

Individuals seeking to salvage disposed items or wood chips must check in at the gatehouse, weigh their vehicle, and sign the Assumption of Risk and Release of Liability form (if not already on file). Individuals removing salvaged items or wood chips from the landfill/transfer station must also check out through the gatehouse to obtain a “salvaged material” weight when leaving.

### **Maintaining an Orderly Landfill**

Persons participating in the MSP must take care to not disturb the organization of materials within the re-use areas. Any items that are handled (and not taken) should be re-placed as they were found (for example, it is acceptable to move lumber to look through a stack, but the stack must be returned to its initial organization) A minimum of one half hour of labor will be charged to any person disrupting the organization of the re-use area, for clean-up performed by transfer station or landfill staff.

### **Re-Use Areas**

#### **Miscellaneous Household Items Salvage**

A re-use area will be established near the primary disposal area. Items that have been identified by the gate attendant or by the person delivering the item (with concurrence of the gate attendant) may be left in the re-use area for later salvage. The acceptance of an item into a re-use area does not entitle the person delivering the item to a discount on the cost of disposal, as it is understood that the item, if not salvaged, will at some point require disposal.

#### **Construction Materials Salvage**

Dimensional lumber, burnable wood waste, plumbing fixtures, windows and other items may be salvaged from the re-use area. If one of the above items is spotted by a customer in the waste pile, the gate attendant should be notified. Landfill staff can attempt to segregate the item during normal landfilling activities, and will notify the customer when it has been safely removed and placed in the re-use area.

### **Prohibited Areas/Materials**

Drugs, cosmetics, foods, beverages, hazardous chemicals/wastes, poisons, medical wastes, syringes, needles, pesticides, and other similar materials capable of impairing public health shall not be salvaged, or placed within a re-use area. Propane and gas appliances shall not be salvaged, or placed in a re-use area.

### **Hours of Salvage**

Salvage is permitted only during normal operating hours of the landfill or transfer station.

### **Weather Suspension**

The program may be suspended during winter months, and from time to time during foul weather. The suspension of the program during these times is at the discretion of the gate attendant.

### **Assumption of Risk and Release of Liability**

All items taken from the re-use areas are taken **AS IS**. Once an item is removed from the re-use area, that item becomes the sole responsibility and property of the person removing it, who assumes all liability associated with the salvaged item. This includes any injury or damage that can be attributed to

the item, as well as any fees that may be incurred should the person later decide to dispose of the item. All persons wishing to salvage from a re-use area must sign the aforementioned "ASSUMPTION OF RISK AND RELEASE OF LIABILITY."

**Community Responsibility**

It is not the intention of the County for this program to facilitate the creation of nuisances in the community. Citizens should endeavor to use all of the salvaged items from the landfill. Public nuisances created by storing excess salvage in a haphazard manner should be avoided at all times. Storage of material salvaged from the landfill must meet all applicable land use ordinances and requirements.

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**Appendix C**  
**Summary of Waste Received, 2007 – 2012**

## Pumice Valley Landfill Waste Data

*All Data Based on Daily Gate Receipts*

<b>2011</b>	Landfilled C&D		Landfill Diversion		Total	daily average
Q12011	3.37		2.78		6.15	0.2
Q22011	160.54		147.38		307.92	11.8
Q32011	163		95.42		258.42	9.9
Q42011	36.3		31.84		68.14	2.6
total		363.21		277.42		
by%		57%		43%		
2011		640.63				

<b>2012</b>	Landfilled C&D		Landfill Diversion		Total	daily average
Q12012	45		10.71		55.71	2.1
Q22012	119.19		73.49		192.68	7.4
Q32012	746.26		121.05		867.31	33.4
Q42012	218.95		81.63		300.58	11.6
total		1129.4		286.88		
by%		80%		20%		
2012		1416.28				

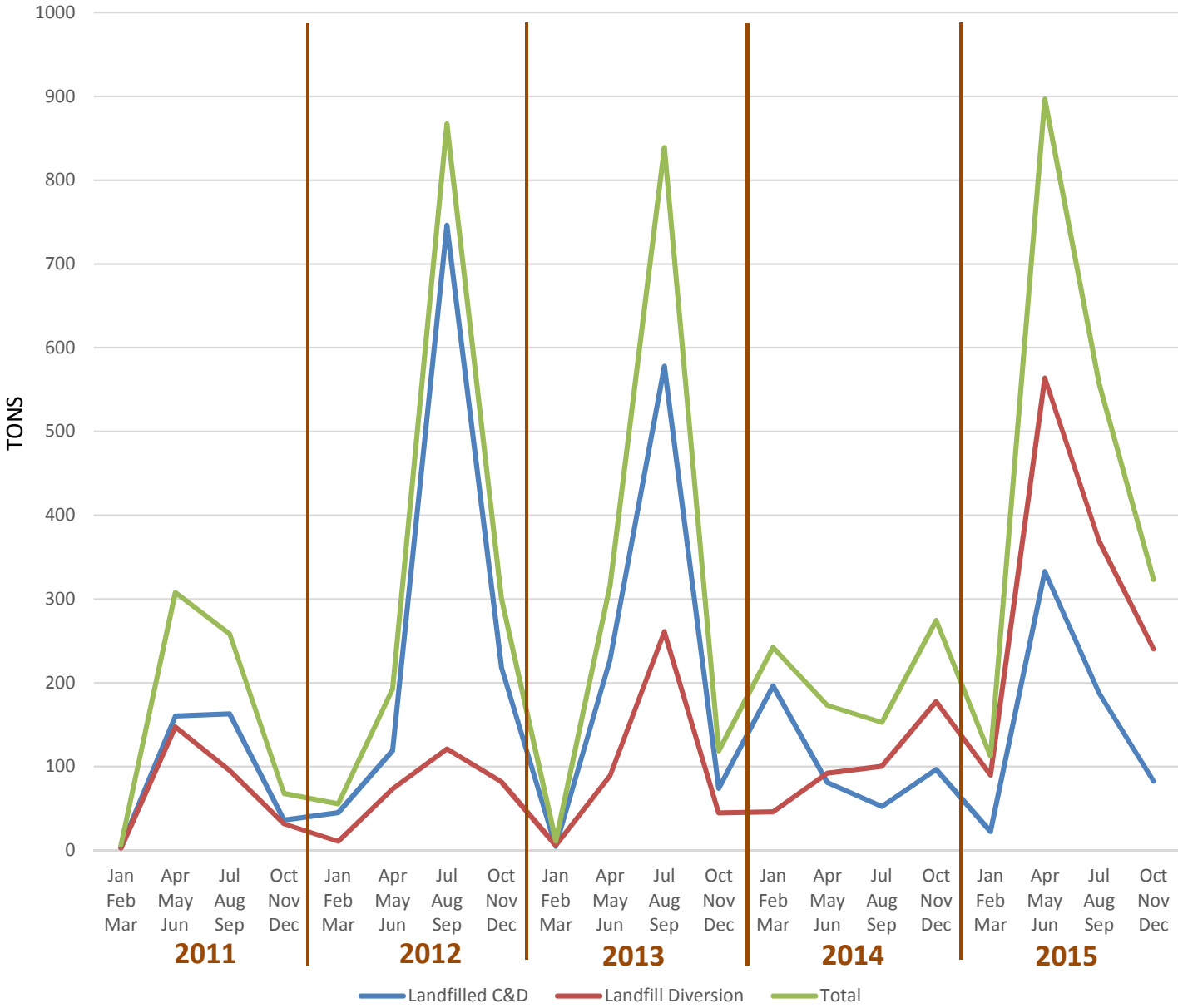
<b>2013</b>	Landfilled C&D		Landfill Diversion		Total	daily average
Q12013	4.91		6.21		11.12	0.4
Q22013	227.05		89.25		316.3	12.2
Q32013	577.8		261.16		838.96	32.3
Q42013	73.97		44.88		118.85	4.6
total		883.73		401.5		
by%		69%		31%		
2013		1285.23				

<b>2014</b>	Landfilled C&D		Landfill Diversion		Total	daily average
Q12014	196.44		45.95		242.39	9.3
Q22014	81.14		92.01		173.15	6.7
Q32014	52.29		100.44		152.73	5.9
Q42014	96.72		177.74		274.46	10.6
total		426.59		416.14		
by%		51%		49%		
2014		842.73				

<b>2015</b>	Landfilled C&D		Landfill Diversion		Total	daily average
Q12015	22.54		89.97		112.51	4.3
Q22015	332.99		563.83		896.82	34.5
Q32015	187.85		369.31		557.16	21.4
Q42015	82.7		240.59		323.29	12.4
total		626.08		1263.7		
by%		33%		67%		
2015		1889.78				

5yr AVG per QTR	171.4505		132.282			
5yr AVG per yr	1214.93		529.128			
	3429.01		2645.64			
5yr total	6074.65					
5yr%	56%		44%			
	685.802		529.128			

Pumice Valley Quarterly Landfill Volumes





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**Appendix D**  
**Load-Checking Program**



MONO COUNTY  
DEPARTMENT OF PUBLIC WORKS  
SOLID WASTE DIVISION

# LOAD-CHECKING PROGRAM

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***PUMICE VALLEY LANDFILL***

***SWIS# 26-AA-0003***

***WDID# 6B260300011***

***Mono County, California***

Prepared by:



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Revised February 15, 2013



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## 1.0 INTRODUCTION

The Mono County Department of Public Works, Solid Waste Division (Division), has implemented this Load-Checking Program at the Pumice Valley Landfill in accordance with Title 27, California Code of Regulations (27 CCR), Section 20870, which requires that all municipal solid waste landfills institute a program for detecting and preventing the disposal of regulated hazardous waste and polychlorinated biphenyl (PCB) wastes. This program includes the following elements:

- Routine visual inspections of all incoming loads;
- Periodic physical inspections of random incoming loads;
- Records of inspections;
- Training of facility personnel to recognize and properly manage hazardous and PCB wastes; and,
- Notification requirements in the event that hazardous or PCB wastes are identified at the facility.

The following sections present information necessary for the proper implementation of this Load-Checking Program.

## 2.0 ACCEPTED WASTES

**Table 2.1** presents a detailed summary of the types of waste accepted for disposal or management at the landfill and transfer station operating at the Pumice Valley disposal site. In general, they are non-hazardous solid waste in accordance with 27 CCR Section 20220, including:

- Inert debris and construction and demolition (C&D) waste;
- Wood and green waste;
- Scrap metal and large household appliances (white goods);
- Waste tires; and,
- Treated medical waste rendered into solid waste pursuant to the Medical Waste Management Act (Division 104, California Health and Safety Code);

**Table 2.1. List of Acceptable Wastes**

Category	Waste Material
<p>Municipal Solid Waste, Construction and Demolition (C&amp;D) Waste</p>	<ul style="list-style-type: none"> <li>• Food and food products</li> <li>• Paper (newspaper, office paper, paper products)</li> <li>• Cardboard, boxboard</li> <li>• Tin, sheet metal</li> <li>• Dried empty paint cans</li> <li>• Rubber products</li> <li>• Dirt, concrete, asphalt, construction rebar, rocks</li> <li>• Roofing paper, shingles (non-asbestos)</li> <li>• Plant residues of agricultural origin</li> <li>• Styrofoam</li> <li>• Fabric, clothing, textiles</li> <li>• Glass, porcelain, ceramics</li> <li>• Yard trimmings, wood waste, scrap lumber</li> <li>• Sheetrock, drywall</li> <li>• Furniture, carpet</li> <li>• PVC plastic, plastic</li> <li>• Empty containers</li> </ul>
<p>Other Wastes</p>	<ul style="list-style-type: none"> <li>• Tires (diverted whole, must be sliced or sheared for burial)</li> <li>• Any containers used for liquid or dry chemicals must be empty, dry, and have been processed by rinsing and draining, or decontaminated by other LEA-approved methods.</li> <li>• Triple-rinsed empty pesticide containers.</li> <li>• Treated medical wastes (if rendered non-infectious via autoclave or other LEA-approved treatment method). No red bags, sharp medical instruments, or containers allowed without evidence of effective treatment.</li> <li>• Dirt and other construction wastes may not be contaminated with petroleum products or other hazardous material or hazardous wastes.</li> <li>• Empty containers (i.e., aerosol cans, paint cans) or containers with dry materials (i.e., solid paint).</li> </ul>

### 3.0 PROHIBITED WASTES

The following waste types are not accepted for disposal at the Pumice Valley Landfill:

- Hazardous waste as defined in 22 CCR, Division 4.5, Chapter 11, Article 1;
- Designated waste as defined in 27 CCR Section 20210;
- Friable and non-friable asbestos-containing waste;
- Untreated medical waste (including sharps or containers without evidence of treatment); and,
- Liquid or semi-solid waste with a solids content of less than 50 percent by weight.

**Table 3.1** presents a detailed summary of typical wastes prohibited from disposal. These wastes are removed from the waste stream by either the customer or the gate attendant and temporarily stored by the gate attendant in the on-site household hazardous waste (HHW) storage lockers.

**Table 3.1. List of Typical Prohibited Wastes**

Category	Waste Material
Automotive Supplies	<ul style="list-style-type: none"> <li>• Antifreeze</li> <li>• Air-conditioning refrigerant</li> <li>• Fuel additives and starter fluid</li> <li>• Grease and rust solvents</li> <li>• Transmission and brake fluid</li> <li>• Used motor oil and oil filters</li> <li>• Lead-acid batteries, battery acid, corrosive battery fluid</li> <li>• Car wax and polish</li> <li>• Lubricating oil</li> <li>• Automotive cleaners (carburetor cleaner, chrome polish)</li> <li>• Gasoline, diesel fuel, fuel wastes</li> <li>• Kerosene, lamp oil</li> <li>• Auto body filler</li> </ul>

continued...

**Table 3.1 (cont.), List of Typical Prohibited Wastes**

Category	Waste Material
<p>Building and                      Wood-Working Supplies,                      Surface Treatments</p>	<ul style="list-style-type: none"> <li>• Liquid enamel, latex, acrylic, and water-based paints (dried solids are acceptable)</li> <li>• Paint thinner, turpentine, mineral spirits</li> <li>• Paint or varnish remover, strippers</li> <li>• Wood preservatives (creosote, penta-chlorophenol)</li> <li>• Stains, polyurethanes, finishers</li> <li>• Glue, cement</li> <li>• Rust paints, metal primers</li> <li>• Friable and non-friable asbestos</li> <li>• Fluorescent lamp tubes and ballasts</li> </ul>
<p>Household Cleaners,                      Hobby Supplies</p>	<ul style="list-style-type: none"> <li>• Aerosol cans containing any pressure or fluid</li> <li>• Abrasive cleaners and powders, detergent</li> <li>• Adhesives, glues, cements</li> <li>• Butane lighters</li> <li>• Chemistry sets</li> <li>• Oven cleaner</li> <li>• Toilet cleaner</li> <li>• Bleach cleaners</li> <li>• Ammonia-based cleaners</li> <li>• Rug and upholstery cleaners</li> <li>• Resins, fiberglass, epoxy (dried solids are acceptable)</li> <li>• Mothballs and flakes</li> <li>• Pharmaceuticals (chemotherapy drugs)</li> <li>• Broken thermometers with mercury</li> <li>• Disinfectants</li> <li>• Photographic chemicals and solutions</li> <li>• Rubber cement thinner</li> <li>• Shoe dye, polish and paste</li> <li>• Spot removers</li> <li>• Nail polish, polish remover, cuticle remover</li> <li>• Furniture and floor polish</li> <li>• Hair permanent, colorant, and straightener solutions</li> <li>• Clothing and chemical dyes</li> <li>• Printer ink</li> <li>• Pool chemicals</li> <li>• Model glue and paint</li> <li>• Cleaning solvents or acids</li> <li>• Any solvents or acids, other than water</li> </ul>

continued...

**Table 3.1 (cont.), List of Typical Prohibited Wastes**

Category	Waste Material
Garden and Pet Supplies	<ul style="list-style-type: none"> <li>• Chemical fertilizers</li> <li>• Fungicides, Herbicides</li> <li>• Pesticides, Insecticides</li> <li>• Ant and roach killers</li> <li>• Pet care products (flea powder, tick powder, shampoo)</li> <li>• Rat, mouse, and gopher poisons</li> <li>• Snail and slug poisons</li> <li>• Soil fumigants</li> </ul>
Other Wastes	<ul style="list-style-type: none"> <li>• CRTs and other electronic wastes</li> <li>• Caustic sludge and wastewater</li> <li>• Acid sludge</li> <li>• Alkaline, caustic liquids</li> <li>• Fly ash</li> <li>• Lime and sulfur sludge</li> <li>• Soda ash</li> <li>• Used chemical solutions (cyanide, used acids)</li> <li>• Chemical toilet and septic tank pumpings</li> <li>• Pickling liquor</li> <li>• Air-reactive or water-reactive solids or liquids</li> <li>• Flammable gases, liquids, or solids</li> <li>• Freon gas and fluids from appliances</li> <li>• Compressed gases (flammable or non-flammable)</li> <li>• Corrosives</li> <li>• Oxidizers, organic peroxides</li> <li>• Poison gases</li> <li>• Radioactive wastes</li> <li>• Mercury</li> <li>• Ammunition, gun powder</li> <li>• Explosives</li> <li>• Liquids</li> </ul>

#### **4.0 PROHIBITED WASTE EXCLUSION PROGRAM**

Signs posted at the landfill entrance describe the general types of waste that are accepted for disposal and those that are prohibited. However, because of the rural nature of the county and the potential for illegal disposal that it presents, Mono County has adopted a policy of accepting hazardous wastes that are source-separated and delivered by residential customers and small quantity generators. This material is

periodically transferred to the County's permanent HHW facility (PHHWF) at the Benton Crossing Landfill for proper management, including consolidation.

By conducting both routine visual load inspections and random physical load inspections, the prohibited waste exclusion program effectively educates customers as to what types of waste should be separated and set aside prior to arrival at the landfill. The gate attendant asks all incoming contractors and self-haul customers what type of waste they are hauling and whether it contains any liquids, paints, batteries, televisions, motor oil, or other prohibited waste. All open-top loads are visually inspected at the scalehouse for the presence of hazardous or prohibited materials.

A minimum of one customer load, including self-haulers, contractors, dump trucks, and roll-off trucks, is randomly selected every two weeks for a thorough physical inspection. At the landfill, a selected load is carefully dumped and spread in a windrow adjacent to the working face and away from traffic lanes, then inspected for the presence of hazardous or prohibited wastes. Selected loads at the transfer station are physically inspected at the tipping pad. Basic information about the customer is obtained (e.g., waste source, vehicle make, model, and license, contact telephone number), and the customer is asked to wait while the inspection is performed. In addition to meeting compliance with State solid waste regulations, the process is used as a means to educate the customer. Manageable quantities of prohibited materials discovered in a load are set aside until completion of the inspection, then transferred to the on-site HHW storage lockers for management. Loads suspected of containing hazardous waste are treated as such until a determination can be made.

If waste found in private or commercial haul vehicles is determined to be acceptable, it is transferred to either the municipal waste compactor at the transfer station or the construction and demolition working face for burial. If prohibited waste is discovered in a load, the hauler is informed as to what has been found, instructed to set similar waste aside in the future for proper management at the facility, and furnished with a list of common wastes that are prohibited. Due to the low traffic volume and because detailed records are kept, suspect or prohibited wastes discharged at the site can usually be traced back to the hauler. A waste source that has had prohibited waste discovered in its load will typically be targeted for a follow-up physical load inspection in the near future to ensure that the customer recognizes the importance of removing prohibited materials from the waste stream.

When compacting the working face, loads are carefully spread for observation using a dozer. Containers with contents that are not easily identifiable, such as unmarked 55-gallon drums, are separated if a visual inspection determines that such movement will not cause the container to rupture, and will be opened and inspected only by properly-trained personnel.

Tests for hazardous characteristics are performed to classify unknown waste removed through the load-checking program. Classification methods typically consist of using pH paper followed by tests for corrosiveness, flammability, and reactivity. If prohibited waste discovered at the site is outside the scope of the HHW program and beyond the capabilities and training of site personnel, Division staff will call 911, implement the facility's *Emergency Response Plan*, and complete required notifications in accordance with Section 5.0 of this plan. Site personnel will immediately take any necessary steps to protect public health and safety and the environment, but will only participate in response activities as directed by properly-trained First Responders.

Hazardous wastes temporarily stored on-site are periodically removed by Division personnel and hauled to the PHHWF at the Benton Crossing Landfill for proper management and storage, where it is:

- Properly stored at the PHHWF in accordance with permit conditions;
- Properly manifested;
- Removed by a licensed transporter; and,
- Disposed or recycled at a permitted treatment, storage, or disposal (TSD) facility.

## 5.0 NOTIFICATION

In the event prohibited waste discovered at the site is outside the scope of the HHW program and beyond the capabilities and training of site personnel, the Solid Waste Superintendent will be contacted, who will then notify the following regulatory agencies within seven days:

- Local Enforcement Agency (Mono County Health Department);
- California Department of Toxic Substances Control; and,
- Lahontan Regional Water Quality Control Board.

## 6.0 TRAINING

All Pumice Valley Landfill personnel (including gate attendants provided by the transfer station operations contractor) are routinely trained and certified in load-checking procedures through an on-going process of on-the-job, in-house, and external course



training. Load-check training addresses hazardous waste identification, proper waste handling and storage methods, safety precautions, and record-keeping requirements detailed in this plan and in the *Emergency Response Plan*. Training is performed both by qualified in-house instructors and by experienced contractors, and typically includes published materials, audio/visual resources, hands-on classification testing, and field work as teaching aids. Training documentation for each employee is entered into the operating record for the facility; minimum personnel qualifications for each landfill employee category are described in the *Report of Disposal Site Information (RDSI)*. Given their potential exposure to hazardous substances, landfill personnel may also receive 40-hour certification training in *Hazardous Waste Operations and Emergency Response (HAZWOPER)* standards, consistent with Title 29, Part 1910.120 of the Code of Federal Regulations (29 CFR 1910.120). Those that have received HAZWOPER training are also provided with annual 8-hour refresher training in appropriate subject matters to keep their certification current.

## 7.0 RECORD-KEEPING AND REPORTING

Inspection records are completed by site personnel performing random physical load inspections. These records, which are compiled for every physical load inspection, will include the following data:

- date and time the load was inspected;
- name(s) of inspector(s);
- a description of the contents of the load;
- load origin, including company contact information (if applicable);
- vehicle driver's name and telephone number;
- vehicle make, model, and license plate number;
- observations made by the inspector;
- description and quantity of rejected material(s), if any; and,
- additional relevant comments.

Copies of the forms, *Load Inspection Report* and *Daily Activity Log*, used at the Pumice Valley Landfill are included in **Attachment 1**. Inspection records and documentation of notifications in accordance with Section 5.0 will be placed in the operating record for the facility at the administrative office of the Mono County Department of Public Works.

## **8.0 HEALTH AND SAFETY**

Mono County maintains a site-specific *Injury and Illness Prevention Program* and an *Emergency Response Plan* for the Pumice Valley Landfill. The details of these plans, including the use of proper personal protective equipment, shall be adhered to when performing random load inspections and handling suspected or identified hazardous waste.

## **Attachment 1: Record-Keeping Forms**

# DAILY ACTIVITY LOG

## Mono County Solid Waste Program

Facility Location:  BT  BX  BP  CH  PR  PV  WK

Date: \_\_\_ / \_\_\_ / \_\_\_  Mon.  Tue.  Wed.  Thu.  Fri.  Sat.  Sun.

Staff: \_\_\_\_\_ Open: \_\_\_\_\_ a.m. Closed: \_\_\_\_\_ p.m.

### START OF DAY CHECK:

Gate Security:  Okay  See Notes      Illegal Dumping:  None  See Notes  
Perimeter Fencing:  Okay  See Notes      Vandalism:  None  See Notes  
Equipment Check:  Okay  See Notes      Posted Signs:  Okay  See Notes

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Weather (a.m.):  Hot  Warm  Cool  Cold  Breezy  Windy  
 Sunny  Overcast  Rain  Snow  Other: \_\_\_\_\_  
Weather (p.m.):  Hot  Warm  Cool  Cold  Breezy  Windy  
 Sunny  Overcast  Rain  Snow  Other: \_\_\_\_\_

### SUMMARY OF DAILY ACTIVITIES:

Litter: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Load-Checking:  Routine Visual at Gate  Physical Inspection  Prohibited Waste Found  
\_\_\_\_\_  
\_\_\_\_\_

SPECIAL EVENT / INJURY / ACCIDENT / INCIDENT REPORT: (Describe Event, Damage, Outcome)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# LOAD INSPECTION REPORT

*Mono County Solid Waste Program*

---

Landfill:             BX             PV             WK  
Transfer Station:  BT             BP             CH             PR             PV             WK

---

Date: \_\_\_ / \_\_\_ / \_\_\_    Time: \_\_\_\_\_    Inspector: \_\_\_\_\_

WASTE HAULER INFORMATION:

Driver's Name: \_\_\_\_\_    Phone: \_\_\_\_\_    Inspection:  Visual     Physical  
Company Name: \_\_\_\_\_    Phone: \_\_\_\_\_    Contact: \_\_\_\_\_  
Vehicle Lic. No.: \_\_\_\_\_    Make: \_\_\_\_\_    Model: \_\_\_\_\_

WASTE SOURCE INFORMATION:

Company Name: \_\_\_\_\_    Phone: \_\_\_\_\_    Contact: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_    City: \_\_\_\_\_    Title: \_\_\_\_\_

DISPOSITION OF WASTE LOAD:

- Waste Deemed Acceptable – Relocated to Proper Disposal Area
- Prohibited Waste Suspected – Isolated Pending Determination
- Prohibited Waste Detected – Commercial Source – Hauler Contacted for Removal
- Prohibited Waste Detected – Residential Source – Relocated to Storage:    ID#: \_\_\_\_\_    Tub #: \_\_\_\_\_
- Other: \_\_\_\_\_

DESCRIPTION OF PROHIBITED WASTE FOUND:

<u>Solid</u>	<u>Liquid</u>	<u>Gas</u>	<u>Product Name / Chemical / Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Comment</u>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____

ADDITIONAL COMMENTS OR FOLLOW-UP: (Attach Photos or Other Documentation)

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# COMMON HOUSEHOLD HAZARDOUS WASTES

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## CORROSIVES (ACIDS)

Boric Acid  
Car Battery Acid  
Copper Cleaners  
Etching Solutions  
Ferric Chloride  
Fertilizers \*  
Hydrochloric Acid  
Hydrofluoric Acid  
Metal Cleaners  
Muriatic Acid  
Navel Jelly  
Phosphoric Acid  
Pool Acid  
Sheep Dip  
Sodium Bisulfate  
Sulfuric Acid  
Toilet Bowl Cleaners \*

## CORROSIVES (BASES)

Ammonia  
Ammonia-Based Cleaners  
Battery Terminal Cleaner  
Caustic Soda  
Cess Pool Cleaners \*  
Drain Cleaners \*  
Household Cleaners  
Lime  
Lye  
Oven Cleaners \*  
Sodium Hydroxide  
Window Cleaners

## OXIDIZERS

Ammonium Nitrate  
Bleach  
Calcium Hypochlorite  
Chlorates  
Fertilizers \*  
Fluorine  
Hair Coloring  
Hydrogen Peroxide  
Iodine  
Nitric Acid  
Plant Food  
Potassium Permanganate  
Sodium Hypochlorite  
Toilet Bowl Cleaner w/Bleach

## ORGANIC PEROXIDE

Adhesive Catalysts  
Auto Body Filler (Bondo) Catalyst  
Tree Root / Stump Killer

## EXPLOSIVES

Ammunition  
Fireworks  
Flares

## RADIOACTIVE MATERIALS

Luminescent Dial Watches  
Smoke Alarms

\*Check ingredients to be sure.

## FLAMMABLES & COMBUSTIBLES

Acetone  
Adhesives \*  
Aerosols  
Air Freshener  
Alcohols  
Ashphalt Driveway Topping  
Auto Body Filler (Bondo)  
Automotive Oils  
Automotive Waxes  
BBQ Lighter Fluid  
Benzene  
Brake Fluid  
Camphor  
Chrome-Silver Polishes \*  
Cutting Oil  
Dap \*  
Denatured Alcohol  
Diesel Fuel  
Disinfectants  
Duplicator Fluid  
Enamel Paint (unsolidified)  
Enamel / Oil Base Paint  
Epoxy Paint (unsolidified)  
Ethanol  
Ether  
Ethylene Glycol  
Fiberglass Resins (unsolidified)  
Fingernail Polish & Remover  
Floor / Furniture Polish  
Formaldehyde Solution  
Gasoline  
Glues \*  
Grease  
Household Waxes  
Isopropyl Alcohol  
Kerosene  
Lacquer Thinner  
Lacquer Paint (unsolidified)  
Linseed Oil  
Liquid Waxes \*  
Liquid Sandpaper \*  
Liquid Butane  
Methanol  
Methylene Chloride  
Naphtha  
Oils (Petroleum)  
Organic Solvents  
Paint Thinners  
Paint Strippers \*  
Paraffin Oil  
Pentachlorophenol  
Perfume  
Petroleum Distillates  
Plastic Model Cement  
Polyurethane Paint (unsolidified)  
Polyurethane Cement (unsolidified)  
Power Steering Fluid  
Primers  
Roofing Cement  
Rug / Upholstery Cleaner  
Sealers  
Shellac Thinner  
Silicone Sprays

## FLAMMABLES, continued...

Spot Remover / Dry Clean Fluid  
Tile Cement  
Tire Black  
Toluene / Toluol  
Transmission Fluid / Oil  
Turpentine  
Varnish  
Wallpaper Cement  
Windshield Washer Fluid  
WD-40  
White Gas  
Wood Filler / Putty  
Wood Stain  
Xylene / Xylol

## POISONS

Ant and Roach Killer  
Antifreeze  
Arsenic Compounds  
Automotive Cleaners  
Bacterial Pipe Cleaners  
Black Flag  
Bordeaux Mix  
Boric Acid  
Bug Remover  
Chlordane  
Chrome-Silver Polishes \*  
Chromium  
Copper Sulfate  
DDT  
Diazinon  
Dimethylamine Salts  
Disinfectants \*  
Dog Repellent  
Ethylene Glycol  
Fertilizers  
Flea Spray / Powder  
Fungicides \*  
Gopher / Mole Killer  
Insect Sprays  
Latex / Water-Based Paints  
Lead Compounds  
Lice Powder  
Lindane  
Malathion  
Mercury  
Moth Chrystals  
OFF Insect Spray  
Pentachlorophenol  
Pesticides  
Pharmaceuticals  
Plant Food  
Pruning Paint  
Raid  
Rat Poison  
Rose Dust  
Round-Up  
Seven Dust / Spray  
Snail / Slug Killer  
Strychnine  
Tar Remover  
Weed / Grass Killer  
Windshield Washer Fluid

# CRT ACCEPTANCE LOG

## *Mono County Solid Waste Program*

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Location:    BT    BX    BP    CH    PR    PV    WK

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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# USED OIL ACCEPTANCE LOG

## *Mono County Solid Waste Program*

Location:  BT  BX  BP  CH  PR  PV  WK

Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal. Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea. Phone: \_\_\_\_\_

Reason(s) If Rejected:  Odor  Color  Layered  Viscosity  Other: \_\_\_\_\_

Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal. Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea. Phone: \_\_\_\_\_

Reason(s) If Rejected:  Odor  Color  Layered  Viscosity  Other: \_\_\_\_\_

Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal. Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea. Phone: \_\_\_\_\_

Reason(s) If Rejected:  Odor  Color  Layered  Viscosity  Other: \_\_\_\_\_

Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal. Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea. Phone: \_\_\_\_\_

Reason(s) If Rejected:  Odor  Color  Layered  Viscosity  Other: \_\_\_\_\_

Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal. Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea. Phone: \_\_\_\_\_

Reason(s) If Rejected:  Odor  Color  Layered  Viscosity  Other: \_\_\_\_\_

Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal. Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea. Phone: \_\_\_\_\_

Reason(s) If Rejected:  Odor  Color  Layered  Viscosity  Other: \_\_\_\_\_

### Acceptable Fluids:

Motor Oils  
Gear Box Oils  
Transmission Fluids

### Unacceptable Fluids:

Solvents	Brake Fluid	Paint & Lacquer Thinners
Gasoline	Anti-Freeze	Household Chemicals
Water	Paints & Varnishes	Pesticides & Insecticides



# TRAINING / SAFETY MEETING RECORD

## Mono County Solid Waste Program

Facility Location:  BT  BX  BP  CH  PR  PV  WK

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Conducted By: \_\_\_\_\_

### MEETING ATTENDEES

Print or Type Name	Signature
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____

### TOPICS OF DISCUSSION

- |   |   |
|---|---|
| 1. _____  | 4. <u>Property Damage Since Last Safety Meeting</u> |
| 2. <u>Safety Hazards Identified Since Last Mtg.</u> | 5. <u>Close Calls Since Last Safety Meeting</u>     |
| 3. <u>Injuries Since Last Safety Meeting</u>        | 6. <u>Safety Issues Related to Upcoming Tasks</u>   |

### RESOURCES USED (i.e., video, handouts – attach copy)

- |          |          |
|----------|----------|
| 1. _____ | 3. _____ |
| 2. _____ | 4. _____ |

### SUMMARY OF DISCUSSION

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# HOUSEHOLD HAZARDOUS WASTE TRANSFER FORM

*Mono County Solid Waste Program*

Hauled From:  BT  BX  BP  CH  PR  PV  WK By (initial): \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Delivered To:  BX or, \_\_\_\_\_

## PAINTS & STAINS

Pints: \_\_\_\_\_ 5 Gallon: \_\_\_\_\_  
Quarts: \_\_\_\_\_ Aerosol Cans: \_\_\_\_\_  
1 Gallon: \_\_\_\_\_ Other: \_\_\_\_\_

## CRTs / BATTERIES / OTHER

CRTs: \_\_\_\_\_ Auto Batteries: \_\_\_\_\_  
Oil Filters: \_\_\_\_\_ NiCad Batteries: \_\_\_\_\_  
Fluor. Tubes: \_\_\_\_\_ Alk. Batteries: \_\_\_\_\_

## ACID CORROSIVES & OXIDIZERS

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## BASE CORROSIVES & OXIDIZERS

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## POISONS & PESTICIDES

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## FLAMMABLES

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## NEUTRALS

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**Appendix E**  
**Site Life Calculations**

**Table B-1**  
**SITE LIFE / LOADING RATE CALCULATIONS**  
 (2016 -2048)

*Pumice Valley Landfill*

**Operational Assumptions & Parameters through 2022**

Projected 2016 Disposal Qty <sup>1</sup> :	693 tons	No. Days of Landfill Operation <sup>3</sup> :	104 days / year
In-Place Waste Density <sup>2</sup> :	1,200 lb/cy	<b>Remaining Disposal Capacity (see Table B-2):</b>	<b>508,840 cu. yds.</b>
Waste-to-Soil Ratio <sup>2</sup> :	3 : 1		

**Operational Assumptions & Parameters 2023 - 2029**

In-Place Waste Density <sup>4</sup> :	1,000 lb/cy	No. Days of Landfill Operation <sup>3</sup> :	208 days / year
Waste-to-Soil Ratio <sup>5</sup> :	2.5 : 1		

Year Ending	Years of Operation	Projected Annual Growth Rate <sup>6</sup>	WASTE DISPOSAL						COVER SOIL		TOTAL FILL	
			PV LF Total <sup>1</sup> (tons/yr)	Uninc. Mono To PV LF Total <sup>1</sup> (tons/yr)	TOTAL (tons/yr)	Disposal Rate <sup>3</sup> (tons/day)	In-Place Volume <sup>2,4</sup> (cy)	Cumulative Volume (cy)	In-Place Volume <sup>2,5</sup> (cy/yr)	Cumulative Volume (cy)	Annual Volume (cy/yr)	Cumulative Volume (cy)
2016	1	1.14%	693	0	693	6.7	1,160	1,160	390	390	1,550	1,550
2017	2	0.59%	697	0	697	6.7	1,160	2,320	390	780	1,550	3,100
2018	3	1.27%	706	0	706	6.8	1,180	3,500	390	1,170	1,570	4,670
2019	4	1.18%	714	0	714	6.9	1,190	4,690	400	1,570	1,590	6,260
2020	5	-1.50%	703	0	703	6.8	1,170	5,860	390	1,960	1,560	7,820
2021	6	0.79%	709	0	709	6.8	1,180	7,040	390	2,350	1,570	9,390
2022	7	0.82%	715	0	715	6.9	1,190	8,230	400	2,750	1,590	10,980
<b>JANUARY 1, 2023 - BENTON CROSSING LANDFILL CLOSES - MONO COUNTY WASTE REDIRECTED TO PUMICE VALLEY LANDFILL</b>												
2023	8	0.78%	720	5,599	6,319	30.4	12,640	20,870	5,060	7,810	17,700	28,680
2024	9	0.76%	726	5,641	6,367	30.6	12,730	33,600	5,090	12,900	17,820	46,500
2025	10	0.77%	731	5,685	6,416	30.8	12,830	46,430	5,130	18,030	17,960	64,460
2026	11	0.77%	737	5,728	6,465	31.1	12,930	59,360	5,170	23,200	18,100	82,560
2027	12	0.77%	743	5,773	6,515	31.3	13,030	72,390	5,210	28,410	18,240	100,800
2028	13	0.77%	748	5,817	6,565	31.6	13,130	85,520	5,250	33,660	18,380	119,180
2029	14	0.81%	754	5,864	6,618	31.8	13,240	98,760	5,300	38,960	18,540	137,720
2030	15	0.81%	761	5,912	6,672	32.1	13,340	112,100	5,340	44,300	18,680	156,400
2031	16	0.81%	767	5,959	6,726	32.3	13,450	125,550	5,380	49,680	18,830	175,230
2032	17	0.81%	773	6,008	6,781	32.6	13,560	139,110	5,420	55,100	18,980	194,210
2033	18	0.81%	779	6,056	6,835	32.9	13,670	152,780	5,470	60,570	19,140	213,350
2034	19	0.81%	785	6,105	6,891	33.1	13,780	166,560	5,510	66,080	19,290	232,640
2035	20	0.81%	792	6,155	6,946	33.4	13,890	180,450	5,560	71,640	19,450	252,090
2036	21	0.81%	798	6,204	7,003	33.7	14,010	194,460	5,600	77,240	19,610	271,700
2037	22	0.81%	805	6,255	7,059	33.9	14,120	208,580	5,650	82,890	19,770	291,470
2038	23	0.81%	811	6,305	7,116	34.2	14,230	222,810	5,690	88,580	19,920	311,390
2039	24	0.81%	818	6,356	7,174	34.5	14,350	237,160	5,740	94,320	20,090	331,480
2040	25	0.81%	824	6,408	7,232	34.8	14,460	251,620	5,780	100,100	20,240	351,720
2041	26	0.81%	831	6,460	7,291	35.1	14,580	266,200	5,830	105,930	20,410	372,130
2042	27	0.81%	838	6,512	7,349	35.3	14,700	280,900	5,880	111,810	20,580	392,710
2043	28	0.81%	844	6,564	7,409	35.6	14,820	295,720	5,930	117,740	20,750	413,460
2044	29	0.81%	851	6,618	7,469	35.9	14,940	310,660	5,980	123,720	20,920	434,380
2045	30	0.81%	858	6,671	7,529	36.2	15,060	325,720	6,020	129,740	21,080	455,460
2046	31	0.81%	865	6,725	7,590	36.5	15,180	340,900	6,070	135,810	21,250	476,710
2047	32	0.81%	872	6,779	7,652	36.8	15,300	356,200	6,120	141,930	21,420	498,130
2048	33	0.81%	879	6,834	3,820	18.4	7,650	363,850	3,060	144,990	10,710	508,840

**JULY 2048, PUMICE VALLEY LANDFILL REACHES CAPACITY OF 508,840 CUBIC YARDS OF COMBINED WASTE AND SOIL**

**Notes:**

1. Projected from Pumice Valley waste volumes 2012-2016. 2023 quantities projected from current Unincorporated Mono County landfilled at Benton Crossing.
2. Initial estimate (to end of 2023) based on quarterly burial of C&D waste. Also, density and waste-to-soil ratio used in annual financial assurance deposit calculations.
3. Annual operation of 2 days per week through 2023, then 4 days per week for the Unincorporated Mono County waste in 2024 through 2029.
4. Based on waste compaction survey completed in May 2003.
5. Computed ratio based on operational practices using daily cover soil and synthetic tarps, as calculated in Benton Crossing Landfill JTD (August 2012).
6. Determined from Report P-3, *State and County Total Population Projections by Race/Ethnicity and Detailed Age, 2010-2060* (Calif. Dept. of Finance, Jan. 31, 2013).

**Table B-2**  
**REMAINING SITE CAPACITY CALCULATIONS**  
*Pumice Valley Landfill*

**2011-2016 DISPOSAL CAPACITY CONSUMPTION (06.03.11 Base Topography)**

C&D In-Place Waste Density <sup>1</sup> = 1,200 lb/cy      Waste-to-Soil Ratio <sup>1</sup> = 3 : 1

Time Period	C&D Landfilled <sup>2</sup> (tons)	Airspace Consumed <sup>3</sup>		
		Waste (cy)	Soil (cy)	Total (cy)
June, 2011	131.21	220	70	290
3rd Quarter 2011	163.00	270	90	360
4th Quarter 2011	36.30	60	20	80
1st Quarter 2012	45.00	80	30	110
2nd Quarter 2012	119.19	200	70	270
3rd Quarter 2012	746.26	1,240	410	1,650
4th Quarter 2012	218.95	360	120	480
1st Quarter 2013	4.91	10	0	10
2nd Quarter 2013	227.05	380	130	510
3rd Quarter 2013	577.80	960	320	1,280
4th Quarter 2013	73.97	120	40	160
1st Quarter 2014	196.44	330	110	440
2nd Quarter 2014	81.14	140	50	190
3rd Quarter 2014	52.29	90	30	120
4th Quarter 2014	96.72	160	50	210
1st Quarter 2015	22.54	40	10	50
2nd Quarter 2015	332.99	550	180	730
3rd Quarter 2015	187.85	310	100	410
4th Quarter 2015	82.70	140	50	190
<b>TOTALS =</b>	<b>3,396</b>	<b>5,660</b>	<b>1,880</b>	<b>7,540</b>

Notes:

1. Estimated from typical values observed in industry (used in annual financial assurance calculations).
2. Disposal data from site records.
3. Calculated values rounded to nearest 10 cubic yards (cy).

**REMAINING DISPOSAL CAPACITY CALCULATIONS**

Available Airspace, June 3, 2011 Topography vs. Final Grades:	632,690 cu. yds.
Airspace Capacity Consumed, June 2011 through January 1, 2016:	7,540 cu. yds.
Volume Required for Final Cover Construction (Final Grading Plan, Dwg. -03):	
Footprint (2D) Requiring Final Cover Construction =	1,028,700 sq. ft., or 23.62 acres
Slope-Adjusted (3D) Final Cover Surface Area =	1,046,800 sq. ft., or 24.03 acres
Total Design Thickness of Final Cover =	3.0 feet
Volume Required for Final Cover Design =	116,310 cu. yds.
Total Thickness of <u>Constructed</u> Final Cover =	2.0 feet
Total <u>Constructed</u> Final Cover Volume (cy) =	77,540 cu. yds.
<b>TOTAL REMAINING DISPOSAL CAPACITY, AS OF JANUARY 1, 2016 =</b>	<b>508,840 cu. yds.</b>

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**Appendix F**  
**Landfill Gas Monitoring and Control Program**

# Landfill Gas Monitoring and Control Program for the Pumice Valley Landfill

Report Prepared for



**Mono County**  
**Department of Public Works**  
**Solid Waste Division**



Report Prepared by



SRK Consulting (U.S.), Inc.

146900.160

Revised February 15, 2013

# **Landfill Gas Monitoring and Control Program for the Pumice Valley Landfill**

## **Mono County Department of Public Works Solid Waste Division**

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Bridgeport, California 93517  
760.932.5440

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website: [www.srk.com](http://www.srk.com)

Tel: 775.828.6800  
Fax: 775.828.6820

**SRK Project Number 146900.160**

**February 2013**

**Author:**  
Evan Nikirk, PE  
Principal Consultant

**Peer Reviewed by:**  
Breese Burnley, PE  
Principal Consultant



## Certification Statement

This *Landfill Gas Monitoring and Control Program for the Pumice Valley Landfill* in Mono County, California was prepared pursuant to the requirement of Title 27 of the California Code of Regulations. This document was prepared by SRK Consulting (U.S.), Inc., under the direct supervision of the undersigned registered professional engineer. All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed, and the professional services have been performed, findings determined, and recommendations prepared in accordance with standard engineering principles and practices generally accepted at the time of document preparation.



02.15.13

Evan Nikirk, PE  
Principal Consultant

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<b>4.0 Surrounding Land Uses .....</b>	<b>2</b>
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## Attachments

Attachment 1: Figures

Attachment 2: Landfill Gas Monitoring Well Completion Details and Logs

Attachment 3: Landfill Gas Monitoring Well Construction Photographs

## Disclaimer

The project conditions and specifications presented in this document have been based on the information supplied to SRK Consulting (U.S.), Inc. (SRK) by the Mono County Department of Public Works, Solid Waste Division (Public Works). This Plan is provided in response to a specific request from Public Works to do so, and is subject to the contractual terms between SRK and Mono County. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Plan.

## 1.0 Introduction

The purpose of this *Landfill Gas Monitoring and Control Program* is to document compliance with Title 27, California Code of Regulations (27 CCR), Sections 20921 – 20939 at the Pumice Valley Landfill in Mono County, California. **Figure 1** in **Attachment 1** illustrates the location of the facility within the context of state and county boundaries. The Mono County Department of Public Works, Solid Waste Division (Division), currently monitors for the presence of methane in ambient air in structures at the Pumice Valley Landfill and Transfer Station in accordance with 27 CCR Section 20931, and performs perimeter soil-gas monitoring for the presence of methane in the subsurface in accordance with 27 CCR Section 20925.

In general, this report describes the following:

1. facility overview, including site setting and past disposal practices (Section 2.0);
2. local geology and hydrogeology (Section 3.0);
3. surrounding land uses (Section 4.0);
4. the nature of the waste received at the site and its gas generation potential (Section 5.0);
5. the physical configuration of the existing landfill gas monitoring well network (Section 6.0); and,
6. the current landfill gas monitoring program for the Pumice Valley Landfill (Section 7.0).

This report provides an update to the original *Landfill Gas Monitoring and Control Program* (SRK, 2009) and describes conditions at the Pumice Valley Landfill and Transfer Station following the October 2011 installation of the perimeter network of subsurface monitoring wells.

## 2.0 Facility Overview

The Pumice Valley Landfill and Transfer Station is located in the Pumice Flats region of central Mono County at 200 Dross Road, approximately 1.8 miles east of the junction of State Highway 120(E) and U.S. Highway 395, south of the community of Lee Vining in central California. Dross Road is a paved County-maintained two-lane road off State Highway 120(E). As defined by the Public Land Survey System, the site occupies the NW¼ NW¼, Section 36, Township 1 North, Range 26 East, Mount Diablo Baseline and Meridian (MDB&M). The facility location in the context of state and county boundaries is presented on **Figure 1 (Attachment 1)**.

The Pumice Valley Landfill is a Class III municipal solid waste landfill as defined by 27 CCR Section 20200 and operates under existing Solid Waste Facility Permit number 26-AA-0003 issued by the Mono County Health Department. The Pumice Valley Landfill also operates pursuant to approved Waste Discharge Requirements per California Regional Water Quality Control Board Order 6-01-56.

The landfill has been operated at its present location since 1972 and is situated on a 40.0-acre parcel leased from the City of Los Angeles, Department of Water and Power (LADWP). The Mono County Department of Public Works, Solid Waste Division, is responsible for the day-to-day operation of the landfill and on-site transfer station; a gate attendant is provided through a long-term agreement with the transfer station operations contractor.

Disposal operations occurred by area-fill disposal method until April 2001, when on-site burial of putrescible waste ceased and a temporary transfer station was installed to transfer residential and commercial municipal waste to Mono County's regional landfill, the Benton Crossing Landfill. A permanent transfer station was subsequently constructed and has been operational since August 2004. Construction and demolition wastes continue to be buried on-site utilizing the area-fill method of disposal. Existing topography and the location of structures, stockpiles, and disposal areas at the Pumice Valley Landfill and Transfer Station are presented on **Figure 2** in **Attachment 1**.

### 3.0 Local Geology and Hydrogeology

The Pumice Valley Landfill lies east of the Sierra Nevada mountain range along the southwestern margin of the Mono Basin, approximately two miles south of Mono Lake and four miles northwest of Crater Mountain, the highest point within the Mono Craters volcanic complex. This region marks the western rim of the Basin and Range province of North America, and is associated with extensional tectonism. Panum Crater is the closest volcanic feature to the Pumice Valley Landfill and is located approximately 2 miles to the northeast. Panum Crater, the youngest extrusive volcanic feature in the Mono Basin, formed in an eruption that occurred at the northern end of the Mono Craters chain. This crater consists of a small dome of rhyolite and a tephra ring, which has a maximum rim-to-rim diameter of 4,000 feet and is comprised of pumice ash and lapilli, and obsidian fragments.

The landfill is located on an alluvial plain that slopes toward Rush Creek northwest of the site. Soils in the vicinity of the landfill have formed by several depositional processes, including alluvial deposition from surrounding mountain slopes, lacustrine deposition from Mono Lake and Pleistocene Lake Russell (the predecessor of Mono Lake), and ash cinders and volcanic debris deposited during volcanic events associated with the Mono Craters volcanic chain.

Subsurface sediments within the landfill area are described by Kleinfelder (1989) from drillholes advanced in excess of 200 feet during ground water monitoring well installation. The sediments mainly consist of unconsolidated interbedded aeolian, fluvial and lacustrine deposits. Near the surface (5-10 feet below ground surface, bgs) the sediments are generally comprised of loose, unconsolidated sand derived from weathered volcanic parent rock. Lacustrine deposits that occur below these sediments (at approximately 30 feet bgs) are characterized as dense, fine sand and silt containing volcanic ash and pumice. These lacustrine sediments are underlain by interbedded coarse sands and gravels likely deposited in alluvial outwash channels. The larger particles of gravel are subangular to subrounded and consist of granitic and metamorphic material indicating these particles were transported by fluvial processes from the surrounding hills to the west and south prior to deposition (Kleinfelder, 1989).

Groundwater was encountered during drilling between 240 and 260 feet below ground surface (bgs) in unconsolidated alluvial deposits consisting of gravelly sand to sandy gravel. Current ground water monitoring data indicate static groundwater levels between 248 and 268 feet bgs. Due to the similarity between the original depth to ground water encountered during drilling and ground water elevations measured in the ground water wells during subsequent monitoring events, it is likely the aquifer beneath the site exists under unconfined conditions. Based on the most recent monitoring data, the ground water flow direction is generally slightly north of east, which is consistent with regional ground water flow northeast toward Mono Lake, and at a gradient of 0.0046 feet per foot, as described in the *2012 Semi-Annual Report, Detection Monitoring Program* for the Pumice Valley Landfill (SRK, 2012).

### 4.0 Surrounding Land Uses

The property surrounding the Pumice Valley Landfill and Transfer Station is either owned by the LADWP, or owned by the public and administered by the United States Department of Interior, Bureau of Land Management, Bishop Field Office (BLM), or the United States Department of Agriculture, Inyo National Forest (INF). There are no residences or structures within 1,000 feet of the facility property boundary. City of Los Angeles lands in the vicinity are zoned as "OS – Open Space." Lands in the area managed by BLM and INF are assigned a zoning designation of "RM – Resource Management" and are primarily used for grazing, recreation, and open space. The landfill property is designated in the Land Use Element of the County General Plan as "PF" for public facilities, which explicitly allows for use as a solid waste landfill. Land uses in the surrounding area are shown on **Figure 3** in **Attachment 1**.

## 5.0 Nature of Waste and Gas Generation Potential

The current lease boundary for the Pumice Valley Landfill and Transfer Station encompasses 40 acres, approximately 23.6 acres of which constitutes the final waste footprint at closure and the largest area requiring closure at any given time during the life of the landfill.

In accordance with 27 CCR Section 20220, the Pumice Valley Landfill is permitted to accept, and has historically accepted, all putrescible and non-putrescible solid and semi-solid waste, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, construction and demolition wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semi-solid wastes and other discarded wastes, provided that such wastes do not contain waste which must be managed as a hazardous waste, wastes which contain soluble pollutants in concentrations that exceed applicable water pollution control objectives, or wastes that could cause degradation of waters of the state (designated waste). However, under operational practices in effect since April, 2001, these types of wastes have not been buried on-site but have been processed through the on-site transfer station and shipped off-site for disposal. Since that time, the only wastes buried in the landfill portion of the site have been construction and demolition wastes. The Pumice Valley Landfill and Transfer Station currently diverts waste loads containing certified non-friable asbestos-containing waste (ACW) to the Benton Crossing Landfill.

In addition to typical non-hazardous municipal solid waste as described above, the Pumice Valley Transfer Station accepts the following types of source-separated waste for management through its waste diversion program:

- Wood waste;
- Scrap metal;
- White goods and appliances;
- Waste tires;
- CRTs and CEDs; and,
- Household hazardous waste, universal waste, used motor oil, and oil filters.

Although the putrescible portion of the waste stream previously accepted and contained at the Pumice Valley Landfill does have the potential to generate methane, ambient air monitoring has not indicated the presence of methane at the ground surface.

## 6.0 Existing Landfill Gas Monitoring Network

Prior to late 2011, landfill gas monitoring at the Pumice Valley Landfill and Transfer Station consisted of sampling ambient air for the presence of methane in site structures and at the property boundary. Seven landfill gas monitoring wells (GW-1 through GW-7) were installed around the perimeter of the property in October 2011 to complete the monitoring network required by 27 CCR Section 20921. These wells form the compliance boundary in accordance with 27 CCR Section 20925, which states, in part, that:

1. Perimeter subsurface monitoring wells shall be installed around the waste disposal footprint, but not within refuse;
2. Perimeter monitoring wells shall be located at or near the permitted facility boundary;
3. The lateral spacing between adjacent monitoring wells shall not exceed 1,000 feet; and,
4. The spacing of monitoring wells shall be determined based upon, but not limited to, the nature of the structure to be protected and its proximity to the refuse.

The existing perimeter landfill gas monitoring network satisfies these criteria; their locations are illustrated on **Figure 2** in **Attachment 1**.

## 6.1 2011 Well Installations

To complete the proposed landfill gas monitoring well installations in the approved *Landfill Gas Monitoring and Control Program* (SRK, 2009), a *Project Plans and Specifications for Landfill Gas Monitoring Well Installations at Mono County Landfills* (SRK, 2011a) was prepared for bidding and completing the work at Pumice Valley Landfill and three other Mono County landfills. The wells were designed by a California-registered professional engineer (C. Evan Nikirk, RCE No. C46777) and in accordance with the requirements of 27 CCR 20925. Well and probe construction requirements as defined in 27 CCR 20925 are detailed in the typical well configuration shown on **Figure 4 (Attachment 1)**.

Drilling activities and monitoring well construction were completed at the Pumice Valley Landfill and Transfer Station on October 6 and 7, 2011 by a California-licensed driller, ABC Liovin Drilling, Inc. (California Contractor's C57 License 422904). Drill holes were advanced using a truck-mounted 8-inch hollow-stem auger rig. The final depth of each drill hole was established based on the lowest elevation of waste within 1,000 feet, which is estimated to be at elevation 6,790 feet above mean sea level (amsl). Completed well depths varied between 13 feet bgs (GW-1) and 35 feet bgs (GW-4). Soils encountered at each location varied over the full depth bored but were primarily classified as fine sandy silt ("SM" under the Unified Soil Classification System) with traces of pebbles and gravel appearing increasingly with depth. No ground water was encountered within the depth drilled. Drilling and well construction were performed under the supervision of a field engineer working under the direction of a California-licensed civil engineer (C. Evan Nikirk, RCE No. C46777). An as-built report documenting well construction, *As-Built Report for Landfill Gas Monitoring Well Installations – Bridgeport, Pumice Valley, and Walker Landfills* (SRK, 2011b), was subsequently prepared and submitted to the Local Enforcement Agency (LEA).

Seven wells containing a total of 12 probes and a total well depth of 197 feet were installed at the Pumice Valley Landfill and Transfer Station. Six wells were constructed with two probes each, while one well (GW-1) required only a single probe. Each probe was constructed with ¾-inch diameter, schedule 40 PVC pipe with one five-foot-long, 0.020-inch machine-slotted screened interval. One gas probe was installed in each well between approximately 5 and 10 feet bgs and, for the six locations with two probes, the screened interval in the second gas probe was set at an average depth of approximately 25 to 30 feet bgs. Each pipe section was constructed with flush-joint, machine-threaded ends – glue was not used. The annular space between the slotted screen section and borehole walls was backfilled with clean 3/8-inch pea gravel to 12 inches above the screened interval.

A bentonite seal was placed on top of each pea gravel layer and hydrated. The remaining annular space above the uppermost bentonite seal was filled with bentonite grout followed by a surface plug and pad of neat cement. Wellhead protection was installed in the form of a locking steel surface casing set into a 30-inch by 30-inch concrete pad. The top of each monitoring probe was equipped with a cap fitted with a sampling port consisting of a ¼-inch plastic valve and ¼-inch plastic barb.

Landfill gas monitoring well locations are illustrated on **Figure 2 in Attachment 1**. Landfill gas monitoring well construction and completion details are summarized in **Table B-1 in Attachment 2**. Well construction logs are also included in **Attachment 2**. Photographs of the construction equipment, methods, and materials and the completed wells are included in **Attachment 3**.

## 7.0 Monitoring Activities

The following sections describe the methods implemented by Public Works to monitor structures, ambient air, and the subsurface for presence of landfill gas at the Pumice Valley Landfill, and actions to be taken in the event explosive levels of methane are detected.

## 7.1 Structure and Boundary Monitoring (27 CCR 20921)

Section 20921 of 27 CCR requires all municipal solid waste landfill operators to ensure that the concentration of methane gas generated by waste management units does not exceed 1.25 percent by volume in air (25 percent of the lower explosive limit, or LEL) in on-site structures or five percent by volume in air (100 percent of the LEL) migrating from the landfill at the property boundary. Accordingly, personnel from the Mono County Department of Public Works, Solid Waste Division, monitor methane concentrations in ambient air at the property boundary of the Pumice Valley Landfill, in site structures, and in the perimeter network of subsurface landfill gas monitoring wells on a quarterly basis.

Structure monitoring is accomplished using an RKI Eagle portable multi-gas detector. **Figure 2** illustrates the locations of all on-site structures and the facility's existing and proposed property boundaries. The RKI Eagle samples ambient air continuously and electronically records results in an internal memory that can be downloaded to a personal computer. The unit is capable of measuring methane concentrations from zero to 1,000 ppm and the lower explosive limit (LEL) for methane from zero to 100 percent. For structure monitoring, the RKI Eagle sampling tube is slowly moved throughout the interior of each structure at both the floor and ceiling height. Monitored locations include all areas where gas may potentially accumulate, including corners, crawl spaces, sumps, cabinets, and floor seams or cracks. Structures currently monitored at the Pumice Valley Landfill include the modular office/storage building, scalehouse, and the household hazardous waste storage lockers (refer to **Figure 2**). The base of each of these structures is elevated above the surrounding grade either due to a skid-mounted frame (scalehouse and storage lockers) or by pedestals (modular office/storage building), which allows the free circulation of air between the floor frame and ground surface. To date, methane has not been detected in ambient air at the site. Should there be any additional structures constructed or installed at the site, they will be added to the inventory of monitoring locations.

Landfill gas is monitored and sampled at the compliance boundary by collecting samples from the network of landfill gas wells described in Section 6.0. To obtain a sample, the sampling pump inlet tube on the RKI Eagle is connected to the valve at the top of each gas probe and the sampling pump and monitor are set to continuous monitoring mode. The variation of gas concentrations over time are recorded until the concentrations of all gases (CO<sub>2</sub>, O<sub>2</sub> and CH<sub>4</sub>) do not fluctuate more than 0.5 percent. In between wells during landfill perimeter monitoring, the technician holds the RKI Eagle sampling tube at waist height and continuously samples ambient air while walking the landfill perimeter. To date, no methane has been detected in ambient air at the site boundary.

Landfill gas monitoring will continue to be performed during the postclosure maintenance period in accordance with 27 CCR Section 20921, as described in detail in the *Preliminary Closure and Postclosure Maintenance Plan* (SRK, 2013). Sampling from the network of perimeter landfill gas monitoring wells will be performed, and ambient air in structures (those remaining after site closure construction, such as the scalehouse and household hazardous waste storage locker associated with the transfer station) and at the property boundary will be sampled as described above.

## 7.2 Reporting

The results of sampling for the presence of methane in monitoring wells and in ambient air at facility structures and at the property boundary are presented in quarterly reports submitted to the LEA (i.e., the Mono County Environmental Health Department) within 90 days of sampling. Quarterly monitoring reports include:

- the concentration of methane measured at each monitoring location;
- date, time, barometric pressure, atmospheric temperature, and weather conditions;



- the name(s) of sampling personnel, equipment utilized, and a brief description of the methods used; and,
- a numbering system to correlate monitoring results to a corresponding probe location.

### 7.3 Landfill Gas Discovery and Control

If methane is discovered in facility structures at concentrations in excess of 1.25 percent by volume in air, Public Works personnel will immediately take steps necessary to protect human health and to eliminate any threat of explosion, including barring access to the structure, posting warning signs, opening entry ways (and windows, if applicable) to introduce and circulate fresh air, and other courses of action that may be appropriate.

If methane is discovered at the property boundary at concentrations in excess of 5 percent by volume in air, the affected area will be closed off to customers and mechanized equipment, warning signs will be posted, and other steps will be taken as appropriate to protect human health and eliminate the potential for explosion.

In addition to the above, the LEA will be notified by telephone or email as soon as practicable after learning that compliance levels have been exceeded. LEA notification will include a description of the actions taken or proposed to be taken to resolve the problem.

Within seven calendar days of detection above compliance levels, Public Works will verify the validity of the results by reviewing the readings and determining the influence of potential factors such as liquid interference, control well influence, and barometric pressure. At that time Public Works will submit correspondence to the LEA, with a copy to the operating record, presenting the readings and describing the nature and extent of the problem and any immediate corrective actions taken to protect public health and safety and the environment. In its correspondence, Public Works will also describe any short-term actions that will be taken to protect public health and safety and the environment prior to the development of a remediation plan.

If the nature of the problem requires the development of a remediation plan and landfill gas control system, a plan and control system design will be prepared in accordance with 27 CCR Section 20937(a)(3) and (4). Approval will be obtained from the LEA prior to plan implementation. Following approval, Public Works will enter the plan in the facility's operating record, implement the plan within 60 days (or as otherwise specified by the LEA), and notify the LEA when the plan has been implemented.

### 7.4 Health and Safety

Public Works maintains a site-specific *Injury and Illness Prevention Program* and an *Emergency Response Plan* for the Pumice Valley Landfill. The methods and procedures described in these plans will be adhered to when performing landfill gas monitoring activities.

Because there is a potential for landfill gas to exist in the subsurface at the landfill, all excavations shall be tested for the presence of methane prior to entry by personnel or equipment. All personnel and contractors shall be notified of the potential presence of methane or other landfill gases in surface and subsurface utility boxes and trenches. All site-specific policies with regard to smoking shall be strictly adhered to. All landfill equipment shall be fitted with spark arrestors.

## 8.0 References

Kleinfelder, 1989: *Final Report – Calderon Water Quality Solid Waste Assessment Test (SWAT) at Pumice Valley Landfill – Mono County, California*, unpublished report prepared for Mono County by Kleinfelder, Inc., December 28, 1989.

SRK, 2009, *Landfill Gas Monitoring and Control Program, Pumice Valley Landfill*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting (U.S.), Inc., Reno, Nevada; September 21, 2009.

SRK, 2011a, *Project Plans and Specifications for Landfill Gas Monitoring Well Installations at Mono County Landfills*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting (U.S.), Inc., Reno, Nevada; July 28, 2011.

SRK, 2011b, *As-Built Report for Landfill Gas Monitoring Well Installations – Bridgeport, Pumice Valley, and Walker Landfills*; unpublished letter report prepared for the Mono County Department of Public Works, SRK Consulting (U.S.), Inc., Reno, Nevada; November 23, 2011.

SRK, 2012, *2012 Semi-Annual Report, Detection Monitoring Program – Pumice Valley Landfill*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting (U.S.), Inc., Reno, Nevada; December 4, 2012.

SRK, 2013: *Preliminary Closure and Postclosure Maintenance Plan for the Pumice Valley Landfill*; unpublished report prepared for the Mono County Department of Public Works, SRK Consulting (U.S.), Inc., Reno, Nevada; February 15, 2013.

**Prepared by**



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Evan Nikirk, PE  
Principal Consultant

**Reviewed by**

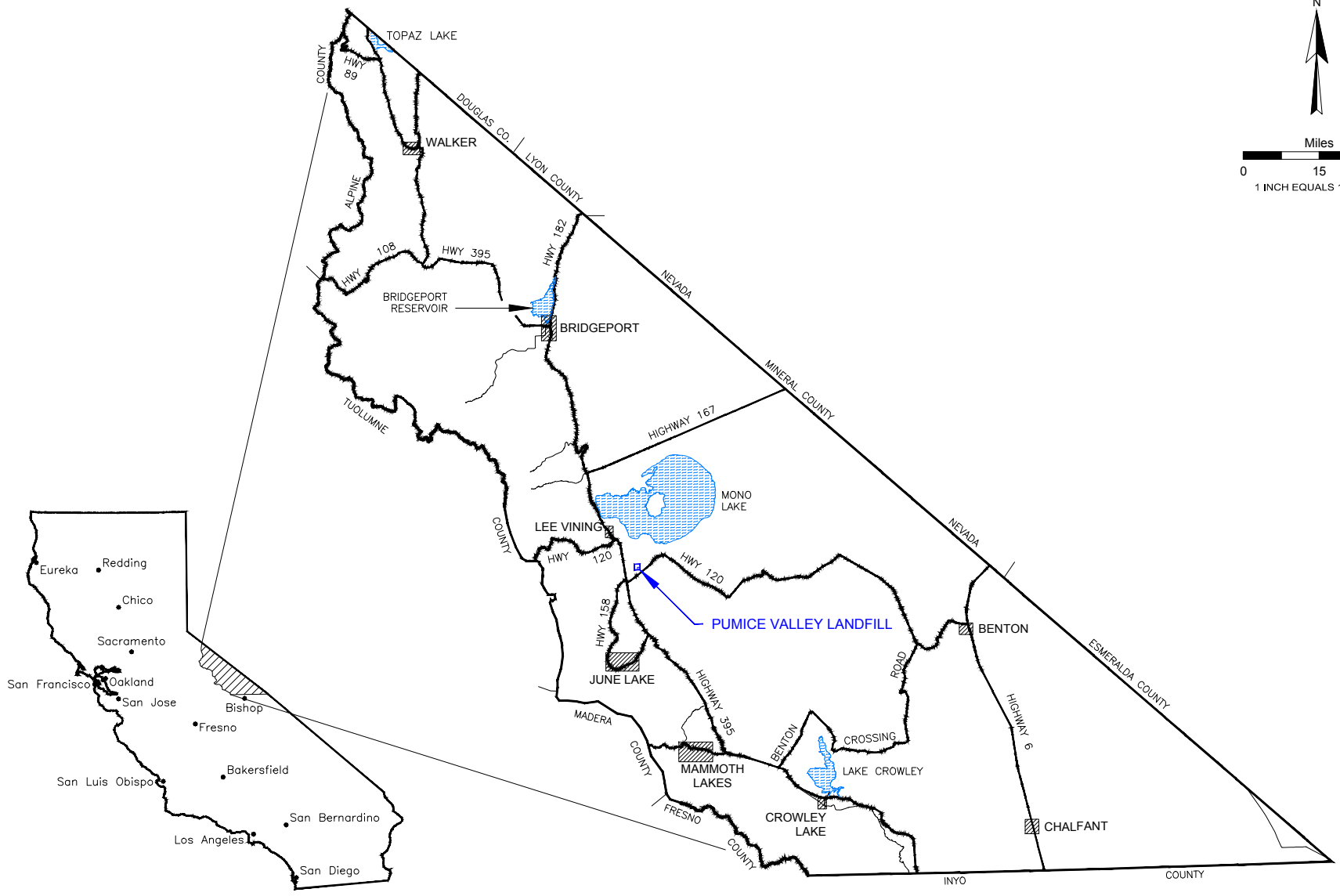
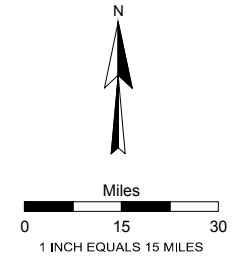



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Breese Burnley, PE  
Principal Consultant


All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

## **Attachment 1: Figures**




DESIGN: EN	
DRAWN: TWW	
REVIEWED: ---	
CHECKED: EN	
APPROVED: EN	
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PREPARED BY:

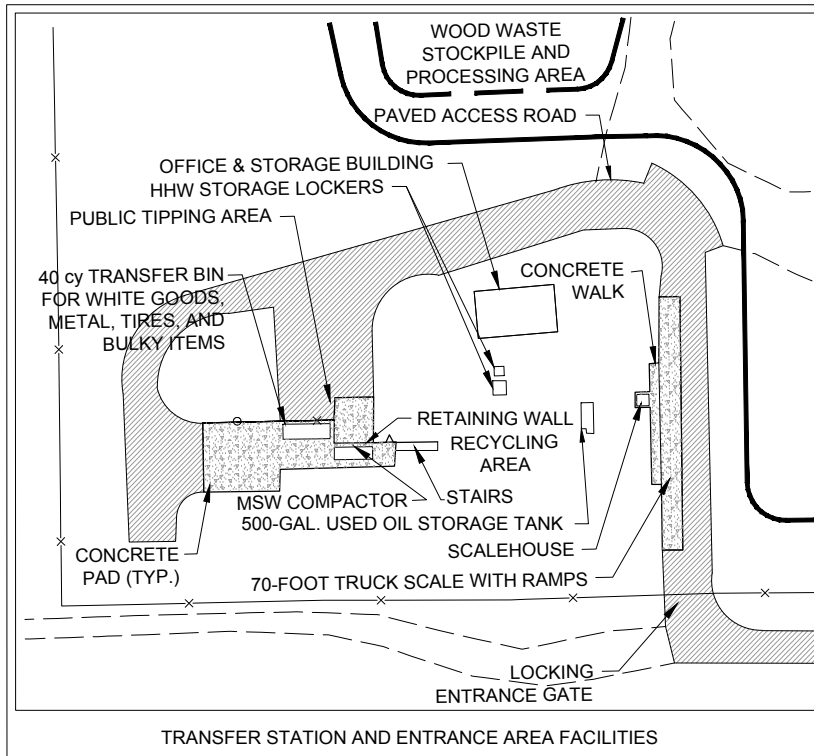
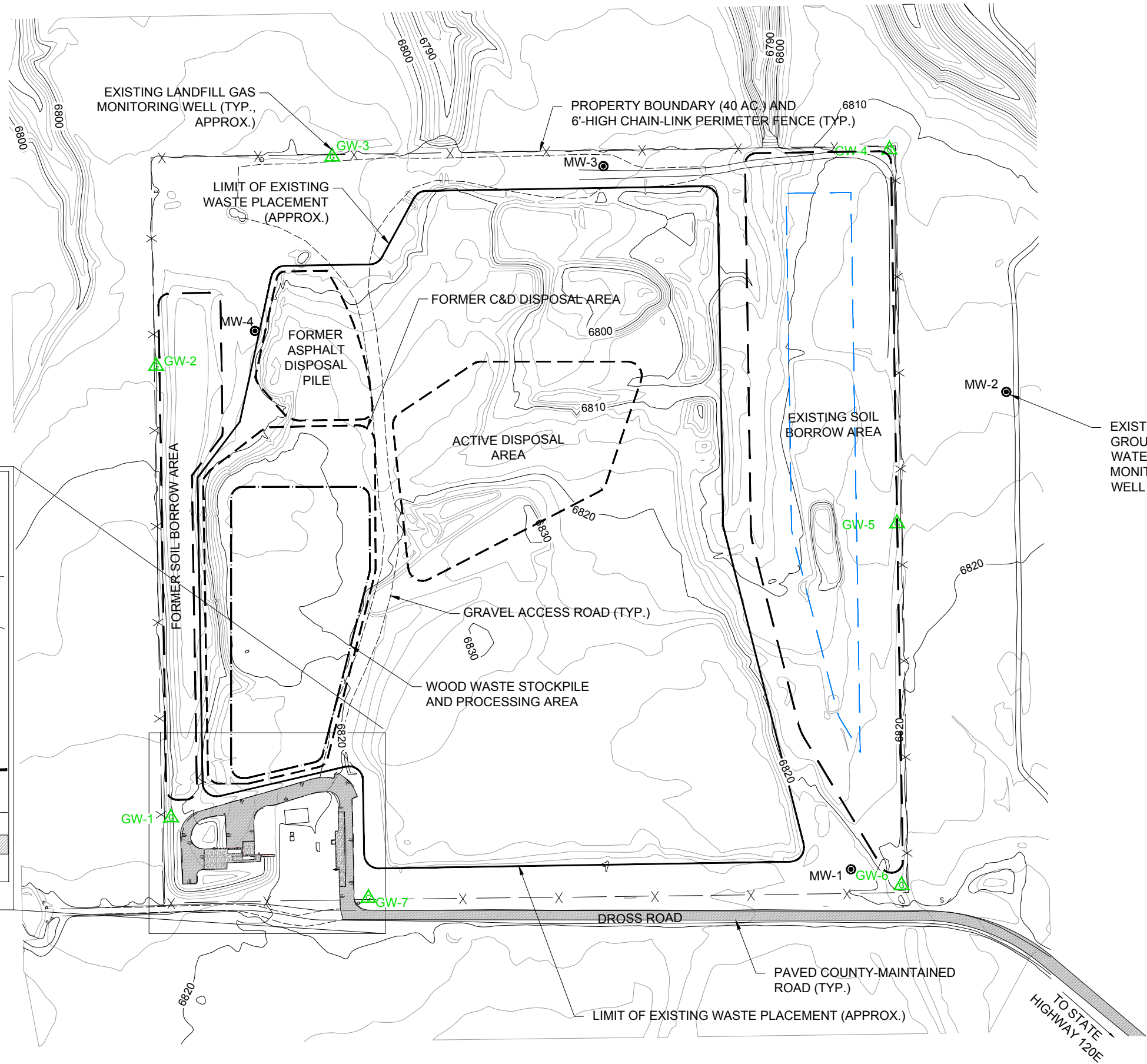
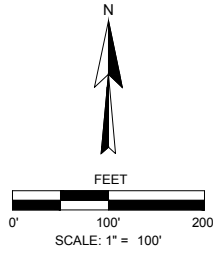


PROJECT:



LANDFILL GAS MONITORING & CONTROL PROGRAM  
 PUMICE VALLEY LANDFILL  
 MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
 MONO COUNTY, CALIFORNIA

DRAWING TITLE: <b>SITE LOCATION MAP</b>	
DRAWING NO.:	REV. NO.
<b>FIGURE 1</b>	<b>A</b>
DATE:	
<b>02.15.2013</b>	
SRK JOB NO.:	
<b>146900.160</b>	



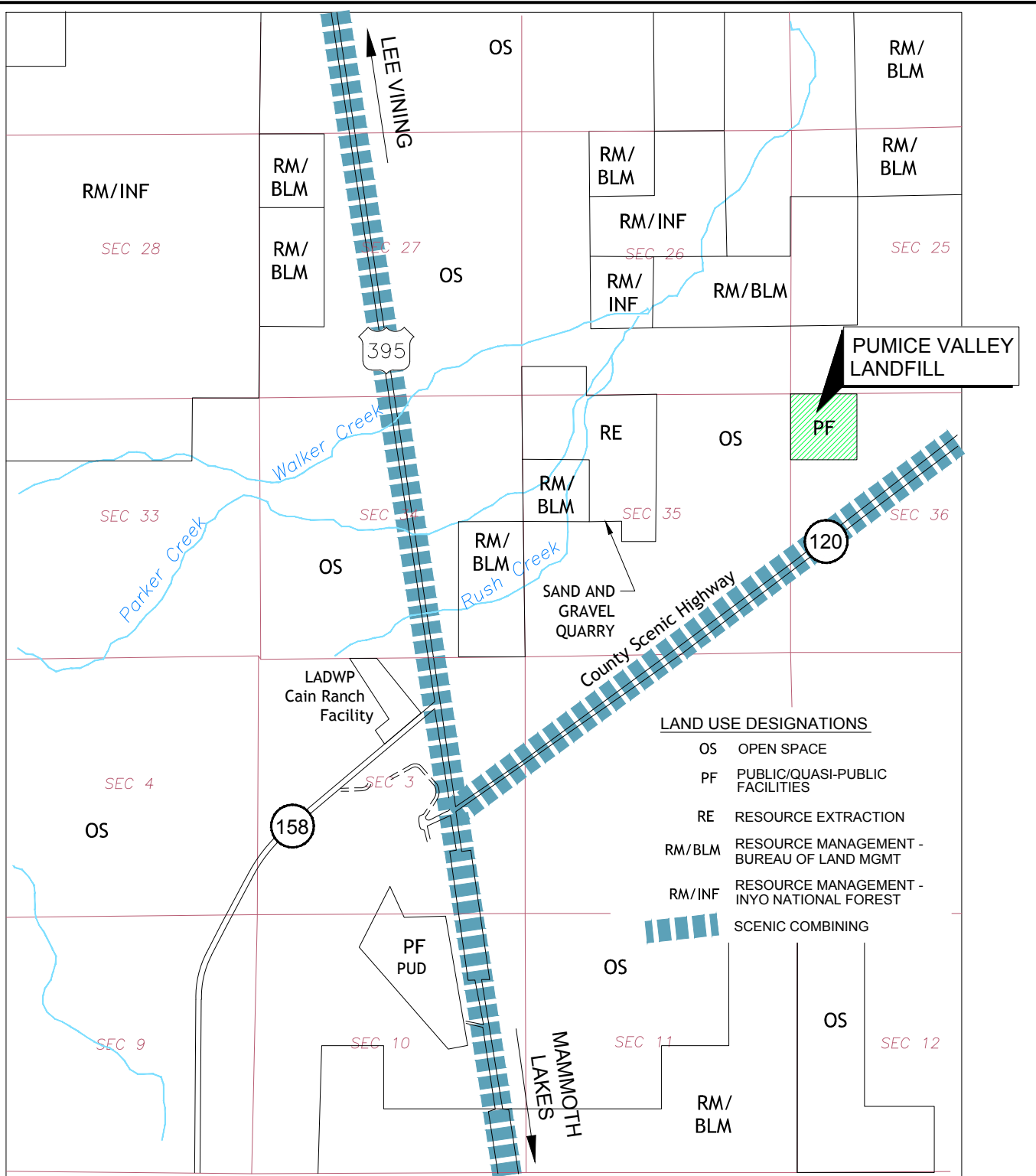
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A	SUBMITTED FOR REGULATORY REVIEW	02/15/2013

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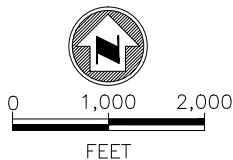

  
 PREPARED BY: srk consulting
   
 PROJECT: LANDFILL GAS MONITORING & CONTROL PROGRAM
   
 PUMICE VALLEY LANDFILL
   
 MONO COUNTY DEPARTMENT OF PUBLIC WORKS
   
 MONO COUNTY, CALIFORNIA

DRAWING TITLE:	DRAWING NO.:	DATE:	SRK JOB NO.:
EXISTING TOPOGRAPHY AND FACILITIES	FIGURE 2	02.15.2013	146900.160

REV. NO. **A**



Modified from Figure 63,  
Mono County General  
Plan (November, 2000).



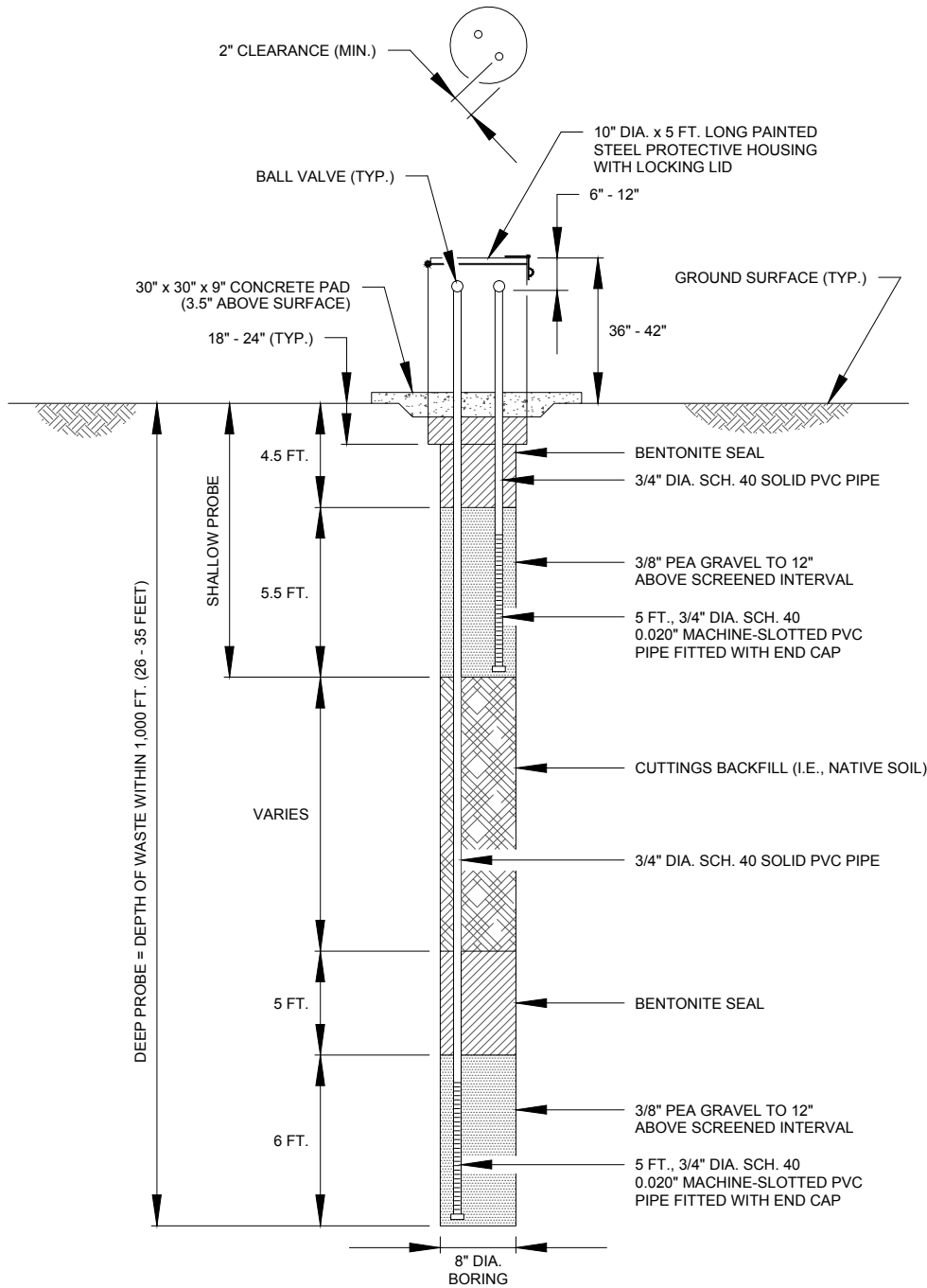
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PREPARED BY:

PROJECT:

LANDFILL GAS MONITORING & CONTROL PROGRAM  
PUMICE VALLEY LANDFILL  
MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
MONO COUNTY, CALIFORNIA

DRAWING TITLE: LAND USE MAP	
DRAWING NO.: FIGURE 3	REV. NO. A
DATE: 02.15.2013	
SRK JOB NO.: 146900.160	



**NOTES:**

1. THE VALVE ON EACH PROBE IS LABELED TO INDICATE PROBE NUMBER CORRESPONDING TO SCREENED INTERVAL DEPTH (1 - SHALLOWEST, 3 - DEEPEST).
2. ALL JOINTS ARE FLUSH-THREADED. PVC GLUE OR ADHESIVES WERE NOT USED.

DESIGN: EN  
 DRAWN: TWW  
 REVIEWED: ---  
 CHECKED: EN  
 APPROVED: EN

PREPARED BY:



PROJECT:



LANDFILL GAS MONITORING & CONTROL PROGRAM  
 PUMICE VALLEY LANDFILL  
 MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
 MONO COUNTY, CALIFORNIA

DRAWING TITLE:  
**TYPICAL AS-BUILT LANDFILL GAS MONITORING WELL CONSTRUCTION**

DRAWING NO.:  
**FIGURE 4**

DATE:  
**02.15.2013**

SRK JOB NO.:  
**146900.160**

REV. NO.  
**A**

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**Attachment 2: Landfill Gas Monitoring Well  
Completion Details and Logs**

**TABLE B-1. As-Built Landfill Gas Monitoring Well Construction**  
*Pumice Valley Landfill*

<b>WELL / PROBE</b>	<b>GW-1</b>	<b>GW-2</b>	<b>GW-3</b>	<b>GW-4</b>	<b>GW-5</b>	<b>GW-6</b>	<b>GW-7</b>
<b><u>Well Construction</u><sup>1</sup></b>							
Northing (hddd.ddddd deg) <sup>2</sup>	37.90629	37.90848	37.90951	37.90949	37.90766	37.9059	37.90588
Easting (hddd.ddddd deg) <sup>2</sup>	119.06879	119.06885	119.06774	119.06432	119.06432	119.06432	119.06759
Ground Elevation (est., ft amsl) <sup>2,3</sup>	6,803	6,817	6,824	6,825	6,822	6,825	6,820
Lowest Waste Elevation (est., ft amsl) <sup>4</sup>	6,790	6,790	6,790	6,790	6,790	6,790	6,790
Well Depth (ft bgs)	13	27	34	35	32	26	30
Well Depth (elev, ft amsl)	6,790	6,790	6,790	6,790	6,790	6,799	6,790
<b><u>Probe 1</u></b>							
Sealing Zone from (ft bgs)	0	0	0	0	0	0	0
Sealing Zone to (ft bgs)	7	4.5	4.5	4.5	4.5	4.5	4.5
Screened from (ft bgs)	8	5	5	5	5	5	5
Screened to (ft bgs)	13	10	10	10	10	10	10
Screened from (elev., ft amsl)	6,795	6,812	6,819	6,820	6,817	6,820	6,815
Screened to (elev., ft amsl)	6,790	6,807	6,814	6,815	6,812	6,815	6,810
<b><u>Probe 2</u></b>							
Sealing Zone from (ft bgs)	--	16	23	24	21	15	19
Sealing Zone to (ft bgs)	--	21	28	29	26	20	24
Screened from (ft bgs)	--	22	29	30	27	21	25
Screened to (ft bgs)	--	27	34	35	32	26	30
Screened from (elev., ft amsl)	--	6,795	6,795	6,795	6,795	6,804	6,795
Screened to (elev., ft amsl)	--	6,790	6,790	6,790	6,790	6,799	6,790

NOTES:

1. Wells were installed on October 6 and 7, 2011.
2. Well location and elevation data estimated from GPS readings in the field (NAD 1983 UTM Zone 15N).
3. Estimated ground elevations are the GPS field measurement less 4 feet, because measurements were made at chest height.
4. Estimated base elevation of former waste disposal trenches within 1,000 feet, based on former disposal practices.

LOGGED BY Brian Bass

GROUND CONDITION

COORDINATES OF LOCATION

DATE 10.07.11

Native Ground

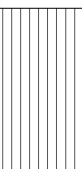
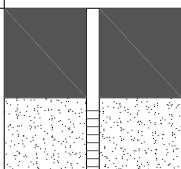
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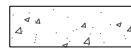

EQUIPMENT 8" Hollow-stem Auger

GROUND ELEVATION

DRILLER ABC Liovin Drilling, Inc.

6,803 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Fine sandy SILT (ML) with trace pebbles; brown; loose; damp; non-plastic
5				Grayish-brown @ 6'
10				Light gray; no pebbles @ 11'
15				
20				

GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC SYMBOL:  8 - 13 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL:  0 - 8 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL:  n/a
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL:  7 - 13 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL: 	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 13 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL: 	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL:  0 - 7 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)

LOGGED BY Brian Bass

GROUND CONDITION  
Native Ground

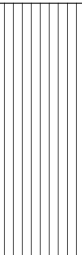
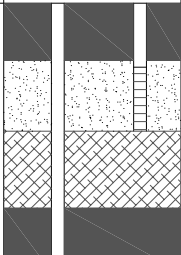

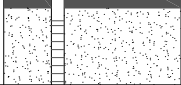
COORDINATES OF LOCATION  
37.9085°N, 119.0689°E





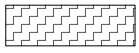
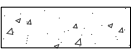

DATE 10.06.11

EQUIPMENT 8" Hollow-stem Auger

GROUND ELEVATION  
6,817 ft amsl (est. by GPS)

DRILLER ABC Liovin Drilling, Inc.

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Fine SILT (ML); light pinkish-gray; loose; dry; non-plastic
5				
10				
15				Light gray with little pebbles @ 13'
20				
25		SM		Silty SAND (SM) with pebbles and some gravel; gray; loose; moist; non-plastic
30				

GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC 0.020" machine slots SYMBOL:  5 - 10 ft bgs 22 - 27 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL:  0 - 5 ft bgs 0 - 22 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL:  10 - 16 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL:  4.5 - 10 ft bgs 21 - 27 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL: 	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 27 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL: 	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL:  0 - 4.5 ft bgs 16 - 21 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground
Feet (ft) below ground surface (bgs)			

PROJECT Landfill Gas Well Construction - PumiceValley LF

PROJECT NO. 146900.100

TOTAL DEPTH: 34'

LOGGED BY Brian Bass

GROUND CONDITION

COORDINATES OF LOCATION

DATE 10.06.11

Native Ground

37.9095°N, 119.0677°E

EQUIPMENT 8" Hollow-stem Auger

GROUND ELEVATION

DRILLER ABC Liovin Drilling, Inc.

6,824 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Poorly-graded fine sandy SILT (ML) with trace pebbles; light gray; loose; dry; non-plastic
5				Grayish-brown @ 7'
10				No pebbles and no gravel @ 10'
15		SM		Poorly-graded silty fine SAND (SM) with some coarse sand; little pebbles and trace gravel; gray; loose; damp; non-plastic
20				
25		ML		Poorly-graded fine sandy SILT (ML) with some coarse sand and trace pebbles; gray; loose; dry; non-plastic
30				
35				

GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC SYMBOL: 5 - 10 ft bgs 29 - 34 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL: 0 - 5 ft bgs 0 - 29 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL: 10 - 23 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL: 4.5 - 10 ft bgs 28 - 34 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL:	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 34 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL:	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL: 0 - 4.5 ft bgs 23 - 28 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)

LOGGED BY Brian Bass  
 DATE 10.06.11  
 EQUIPMENT 8" Hollow-stem Auger  
 DRILLER ABC Liovin Drilling, Inc.

GROUND CONDITION  
Native Ground

COORDINATES OF LOCATION  
37.9095°N, 119.0643°E  
 GROUND ELEVATION  
6,825 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Poorly-graded fine sandy SILT (ML) with some coarse sand and little pebbles; light gray; loose; dry; non-plastic
5				With trace gravel; brown @ 6'
10				Damp @ 10'
15				No sand, no pebbles, and no gravel; very light gray; dry @ 16'
20				With very fine sand and trace pebbles; brown; damp @ 21'
25				With some coarse sand, some pebbles, and some gravel @ 26'
30				
35				
40				

GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC 0.020" machine slots SYMBOL: 5 - 10 ft bgs 30 - 35 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL: 0 - 5 ft bgs 0 - 30 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL: 10 - 24 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL: 4.5 - 10 ft bgs 29 - 35 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL:	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 35 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL:	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL: 0 - 4.5 ft bgs 24 - 29 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)

LOGGED BY Brian Bass

GROUND CONDITION

COORDINATES OF LOCATION

DATE 10.06.11

Native Ground

37.9077°N, 119.0643°E

EQUIPMENT 8" Hollow-stem Auger

GROUND ELEVATION

DRILLER ABC Liovin Drilling, Inc.

6,822 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Poorly-graded fine sandy SILT (ML) with trace pebbles; brown; loose; damp; non-plastic
5				Light gray; no pebbles @ 5'
10				Little pebbles and trace gravel @ 12'
15		SP		Poorly-graded fine SAND (SP) with silt and some gravel; grayish-brown; loose; damp; non-plastic
20				
25		SW		Well-graded fine to coarse SAND (SW) with some pebbles and some gravel; grayish-brown; loose; damp; non-plastic
30				
35				

GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC 0.020" machine slots SYMBOL: 5 - 10 ft bgs 27 - 32 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL: 0 - 5 ft bgs 0 - 27 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL: 10 - 21 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL: 4.5 - 10 ft bgs 26 - 32 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL:	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 32 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL:	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL: 0 - 4.5 ft bgs 21 - 26 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)

LOGGED BY Brian Bass

GROUND CONDITION Native Ground

COORDINATES OF LOCATION 37.9059°N, 119.0643°E

DATE 10.06.11

EQUIPMENT 8" Hollow-stem Auger

DRILLER ABC Liovin Drilling, Inc.

GROUND ELEVATION 6,825 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL	
0		ML		Poorly-graded fine sandy SILT (ML) with some pebbles; gray; loose; dry; non-plastic	
5					
10					Light gray @ 14'
15					
20				Trace pebbles and trace gravel @ 22'	
25				Little pebbles and little gravel @ 25'	
30					

GROUND WATER ENCOUNTERED: n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC 0.020" machine slots SYMBOL: 5 - 10 ft bgs 21 - 26 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL: 0 - 5 ft bgs 0 - 21 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL: 10 - 15 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL: 4.5 - 10 ft bgs 20 - 26 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL:	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 26 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL:	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL: 0 - 4.5 ft bgs 15 - 20 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)



LOGGED BY Brian Bass

GROUND CONDITION

COORDINATES OF LOCATION

DATE 10.07.11

Native Ground

37.9059°N, 119.0676°E

EQUIPMENT 8" Hollow-stem Auger

\_\_\_\_\_

GROUND ELEVATION

DRILLER ABC Liovin Drilling, Inc.

\_\_\_\_\_

6,820 ft amsl (est. by GPS)

DEPTH (FEET)	GRAPHIC LOG	USCS SOIL CLASS	WELL COMPLETION	DESCRIPTION OF MATERIAL
0		ML		Poorly-graded fine sandy SILT (ML) with trace pebbles and trace gravel; brown; loose; damp; non-plastic
5				Light brownish-gray @ 12'
10				Dry @ 18'
15				With little pebbles and little gravel; light gray @ 21'
20				Dark gray; moist @ 28'
25				
30		ML/GP		Poorly-graded fine sandy SILT and GRAVEL (ML/GP); gray; loose; dry; non-plastic
35				Inadvertantly overdrilled from 30 - 35', then backfilled.

GROUND WATER ENCOUNTERED:  n/a	<b>SCREEN</b> MATERIAL: 3/4" Sch. 40 PVC 0.020" machine slots SYMBOL:  5 - 10 ft bgs 25 - 30 ft bgs	<b>WELL CONSTRUCTION</b> MATERIAL: Blank PVC SYMBOL:  0 - 5 ft bgs 0 - 25 ft bgs	<b>BACKFILL</b> MATERIAL: Cuttings SYMBOL:  10 - 19 ft bgs 30 - 35 ft bgs
GROUND WATER STATIC: n/a	<b>FILTER</b> MATERIAL: 3/8" rock SYMBOL:  4.5 - 10 ft bgs 24 - 30 ft bgs	<b>GROUT</b> MATERIAL: n/a SYMBOL:	<b>WELL HEAD PROTECTION</b> MATERIAL: 10" dia. steel monument HEIGHT: n/a
TOTAL DEPTH DRILLED: 35 ft bgs	<b>SURFACE PLUG</b> MATERIAL: n/a SYMBOL:	<b>SEAL</b> MATERIAL: Bentonite chips SYMBOL:  0 - 4.5 ft bgs 19 - 24 ft bgs	<b>WELL CASING DETAILS</b> MATERIAL: PVC HEIGHT: 24" - 36" above ground

Feet (ft) below ground surface (bgs)

**Attachment 3: Landfill Gas Monitoring Well  
Construction Photographs**

**ATTACHMENT C – TYPICAL CONSTRUCTION METHODS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

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Plate C-1. Truck-mounted hollow-stem auger rig over borehole (GW-1, view west).



Plate C-2. Support trucks and equipment for drill rig (GW-1, view west).

**ATTACHMENT C – TYPICAL CONSTRUCTION METHODS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

---



Plate C-3. Truck-mounted hollow-stem auger rig over borehole (Walker Landfill GW-1).



Plate C-4. Typical five-foot long painted steel surface completion monument with locking cap.

**ATTACHMENT C – TYPICAL CONSTRUCTION METHODS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

---



Plate C-5. Close-up of typical locking cap on painted steel surface completion monument.



Plate C-6. Balancing of surface completion monument with locking cap.

**ATTACHMENT C – TYPICAL CONSTRUCTION METHODS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

---



Plate C-7. Formwork and dug out base for surface completion concrete pad.



Plate C-8. Typical ball valve landfill gas monitoring port inside protective casing.

**ATTACHMENT C – WELL COMPLETION PHOTOGRAPHS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

---



**Plate C-9.** Landfill gas monitoring well GW-1 (view west).



**Plate C-10.** LFG monitoring well GW-2 from ground water monitoring well MW-4 (view west).

**ATTACHMENT C – WELL COMPLETION PHOTOGRAPHS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

---



**Plate C-11.** Landfill gas monitoring well GW-3 (view east).



**Plate C-12.** Landfill gas monitoring well GW-4 (view north).



**ATTACHMENT C – WELL COMPLETION PHOTOGRAPHS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

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**Plate C-13.** Landfill gas monitoring well GW-5 (view north).



**Plate C-14.** LFG monitoring well GW-6 at ground water monitoring well MW-1 (view southeast).

**ATTACHMENT C – WELL COMPLETION PHOTOGRAPHS**  
*Landfill Gas Monitoring and Control Program – Pumice Valley Landfill*

---




**Plate C-15.** Landfill gas monitoring well GW-7 at site entrance (view west).

## SRK Report Distribution Record

Copy No.

Name / Title	Company	Copy	Date	Authorized by
Tony Dublino SW Superintendent	Mono County Dept. of Public Works Solid Waste Division	1	02.15.13	E.Nikirk
Tony Dublino SW Superintendent	Mono County Dept. of Public Works Solid Waste Division	2	02.15.13	E.Nikirk
Jill Kearney Env. Health Specialist	Mono County Health Department Local Enforcement Agency	3	02.15.13	E.Nikirk
Christine Karl IWM Specialist	CalRecycle Permitting & Assistance Branch	4	02.15.13	E.Nikirk
Michael Wochnick Supervisor	CalRecycle Engineering Support Branch	5	02.15.13	E.Nikirk
Don McGhie Sr. Real Estate Officer	Los Angeles Department of Water and Power – Bishop office	6	02.15.13	E.Nikirk
Josephine Gonzalez Environmental Affairs Mgr.	Los Angeles Department of Water and Power – LA office	7	02.15.13	E.Nikirk
SRK Reno Library	SRK Consulting	8	02.15.13	E.Nikirk

Approval Signature:



---

**Appendix G**  
**Record-Keeping Forms**

# COUNTY OF MONO

## DECLINATION OF MEDICAL TREATMENT INSTRUCTIONS

This packet is for use ONLY if the Employee DECLINES medical treatment at time of injury.

If the Employee will go to either a physician, nearest hospital or urgent care facility the Initial Injury-Workers' Compensation Packet (DWC 1 and 5020 forms) must be completed instead of this packet.

DO NOT USE PENCIL TO COMPLETE THE PACKET.

### Employee:

- Complete and sign the top portion of the ***Incident Report***.
- Complete and sign the ***Declination of Medical Treatment*** form.

### Supervisor and/or Department Safety Representative:

- Review and sign the ***Declination of Medical Treatment*** form.
- Complete and sign the bottom portion of the ***Incident Report***
- Complete any applicable standard Safety procedures including, but not limited to, filing an Incident/Hazard Report Form.
- Send all completed 'original' forms to Rita Sherman, Risk Management in a confidential routing envelope within 24 hours.
- No further action is necessary at this time.

### ***If the Employee needs or requests medical treatment in the future:***

- Have the Employee and Supervisor complete an Initial Injury Packet
- Notify Rita Sherman, Risk Management immediately

# COUNTY OF MONO

## INCIDENT REPORT:

## Declined Medical Treatment

(Employee & Supervisor complete)

This form should be completed **ONLY** if the Employee does not need (or request) medical treatment. If the Employee will go to either the nearest hospital, urgent care facility or physician, the Initial Injury Workers' Compensation Packet **must be completed** instead of the Declination of Medical Treatment Packet.

"Any person who makes or causes to be made any knowingly false or fraudulent material statement or material representation for the purpose of obtaining or denying workers compensation is guilty of a felony." This notice has been approved by the Administrative Director of the Division of Workers' Compensation (California Labor Code Section 5401.7)

### EMPLOYEE COMPLETE TOP PORTION:

EMPLOYEE NAME:		Gender: M    F	<input type="checkbox"/> Full Time <input type="checkbox"/> Part time
JOB TITLE:		DATE OF HIRE:	
HOME TELEPHONE:		DATE OF BIRTH:	
HOME ADDRESS:		ENTITY:	
		DEPARTMENT:	
INCIDENT DATE:	TIME OF INCIDENT:	LOCATION:	
DATE REPORTED:	TIME BEGAN WORK:	INCIDENT REPORTED TO:	
NATURE OF INJURY (e.g., puncture, strain, cut, fracture, burn, etc.):			
BODY PART INJURED (e.g., right wrist, left knee, head, lower back, etc.):			
INJURY SOURCE (e.g., wet pavement, jack hammer, keyboard, etc.):			
HOW INJURY OCCURRED (struck by ..., fell from ..., exposed to ..., etc.):			
DESCRIBE ANY PREVIOUS CONDITIONS/INJURIES TO BODY PART CURRENTLY INJURED:			
EMPLOYEE'S STATEMENT OF WHAT OCCURRED			
(Include as much detail as possible such as activity being performed, objects carried, equipment used, hazardous conditions, etc.):			
WHO WITNESSED THE INCIDENT?			
<input type="checkbox"/> The above information is true and correct to the best of my knowledge. <input type="checkbox"/> I understand that I am <b>not filing a Workers' Compensation claim</b> at this time. I do not choose to complete the DWC Form 1 "Employee's Claim for Workers' Compensation Benefits" at this time.			
<u>If I am in need of medical treatment in the future related to this incident, I will immediately inform my Supervisor and complete an Initial Injury Packet including the DWC Form 1 and 5020 form.</u>			
EMPLOYEE'S SIGNATURE:			DATE:

### SUPERVISOR COMPLETE BOTTOM PORTION:

<b>MEDICAL TREATMENT</b> (NOTE: If the Employee needs/requests medical treatment from a physician, complete the Initial Injury Packet)		
<input type="checkbox"/> EMPLOYEE DECLINED MEDICAL TREATMENT <input type="checkbox"/> EMPLOYEE RECEIVED MINOR FIRST AID CARE ON-SITE. Describe:		
SUPERVISOR:		TITLE:
SIGNATURE:	DATE:	TELEPHONE:

# COUNTY OF MONO

## Declination of Medical Treatment

This form should be completed ONLY if the Employee **DECLINES** medical treatment. If the Employee will go to either a physician, an Urgent Care facility or nearest hospital the **Initial Injury-Workers' Compensation Packet must be** completed instead of the Declination of Medical Treatment Packet.

**EMPLOYEE:** Check all that apply. Print name, sign and date.

---

In my opinion, I am not in need of any medical treatment at this time.

**OR**

In my opinion, I have received sufficient on-site first aid care.

**I am fully capable of performing my Usual & Customary position. At this time I decline medical care. If I am in need of medical care related to this incident in the future, I will notify my Supervisor immediately and complete an Initial Injury Packet including the DWC Form 1 "Employee's Claim for Workers' Compensation Benefits.**

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**SUPERVISOR:** Print, sign and date.

---

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

*Note: California Labor Code Section 5401(a) defines a First Aid injury as any one-time treatment, and any follow-up visit for the purpose of observation of minor scratches, cuts, burns, splinters, or other minor industrial injury, which does not ordinarily require medical care" and states that any injury that "results in lost time beyond the employee's work shift at the time of injury or which results in medical treatment beyond first aid" must be filed as a claim. All of the treatments detailed above fall under the First Aid category; therefore, unless further treatment is necessary, a workers' compensation claim does not need to be filed.*

INTERNAL USE ONLY!

(COUNTY) Mono

# INCIDENT/HAZARD REPORT

<b>SECTION A</b>	<input type="checkbox"/> <b>INJURY INCIDENT</b>	<input type="checkbox"/> <b>INCIDENT/NEAR MISS</b>	<input type="checkbox"/> <b>HAZARD</b>
------------------	---	--	--

DATE & TIME OF INCIDENT:	LOCATION:	DATE REPORTED:
REPORTED TO:	REPORTED BY: (Optional)	DEPARTMENT:

<b>SECTION B</b>	<b>DESCRIPTION OF INCIDENT - INJURY, INCIDENT/NEAR MISS, HAZARD</b>

<b>SECTION C</b>	<b>CAUSES</b>

<b>SECTION D</b>	<b>SUGGESTED CORRECTIONS</b>

INVESTIGATED BY:	TITLE:	DATE:
------------------	--------	-------

<b>SECTION E</b>	<b>CORRECTIVE ACTION</b>	<b>DATE</b>

<u>Department Safety Representative Signature:</u>	Date:	<u>Department Head Signature:</u>	Date:
--	-------	-----------------------------------	-------

Please send completed original form to Risk Management, Rita Sherman



# INSTRUCTION SHEET

## INCIDENT/HAZARD REPORT FORM

Fill out the form as completely as possible, and then give it to you department head for signature. Make sure you complete the sections for "Suggestion Corrections" and the "Corrective Action" that was taken. Make a photocopy to keep for your files. Send the original form to Risk Management, Rita Sherman. Please do this within three working days after completing the form.

This form may also be turned in confidentially, without signature, to Risk Management.

Risk Management  
P.O. Box 696  
Bridgeport, CA 93517

Rita Sherman	T (760) 932-5415	F (760) 932-5411	<a href="mailto:rsherman@mono.ca.gov">rsherman@mono.ca.gov</a>
Sarah Messerlian	T(760) 932-5405	F(760) 932-5411	<a href="mailto:smesserlian@mono.ca.gov">smesserlian@mono.ca.gov</a>

Trindel Insurance Fund			
Gene Herndon	T(530) 594-2027	F (530) 894-2732	<a href="mailto:tifsfty@trindel.org">tifsfty@trindel.org</a>

**IF YOU HAVE ANY QUESTIONS PLEASE CONTACT RITA SHERMAN AT THE RISK MANAGEMENT OFFICE**

**INTERNAL USE ONLY!**

**INCIDENT/HAZARD REPORT**

(COUNTY) Mono

<b>SECTION A</b>	<input type="checkbox"/> <b>INJURY INCIDENT</b>	<input type="checkbox"/> <b>INCIDENT/NEAR MISS</b>	<input type="checkbox"/> <b>HAZARD</b>
DATE & TIME OF INCIDENT:	LOCATION:	DATE REPORTED:	
REPORTED TO:	REPORTED BY: (Optional)	DEPARTMENT:	

<b>SECTION B</b>	<b>DESCRIPTION OF INCIDENT - INJURY, INCIDENT/NEAR MISS, HAZARD</b>

<b>SECTION C</b>	<b>CAUSES</b>

<b>SECTION D</b>	<b>SUGGESTED CORRECTIONS</b>

INVESTIGATED BY:	TITLE:	DATE:
------------------	--------	-------

<b>SECTION E</b>	<b>CORRECTIVE ACTION</b>	<b>DATE</b>

<u>Department Safety Representative Signature:</u>	Date:	<u>Department Head Signature:</u>	Date:
--	-------	-----------------------------------	-------

Please send completed original form to Risk Management, Rita Sherman

# CRT ACCEPTANCE LOG

## *Mono County Solid Waste Program*

---

Location:    BT    BX    BP    CH    PR    PV    WK

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

---

# GATE RECEIPT DESCRIPTION – SCALE SITES

No. W 12345

## MONO COUNTY DEPARTMENT OF PUBLIC WORKS

P.O. Box 457 • Bridgeport, CA 93517 • (760) 932-5440

## Comment or Description of Usage:

SITE:     BX         BP         PV         WK  
DAY:     MON.     TUE.     WED.     THU.  
           FRI.     SAT.     SUN.  
HAULER:  SELF-HAUL         COMMERCIAL  
           CONTRACTOR        TRANSFER  
ORIGIN:  MAM.LK.  COUNTY  O/C: \_\_\_\_\_  
\_\_\_\_\_

Line 1 – BX = Benton Xing; BP = Bport; PV = Pumice; WK = Walker.

Line 2 – Check box for day of week that transaction took place.

Line 3 – Who brought the load? "Self-Haul" is John Q. Public;

"Commercial" is a refuse company such as Mammoth Disposal.

Line 4 – Where is waste from? "Mam.Lk." is Mammoth Lakes; your local town is "County;" "O/C" is out of county – where? enter permit!

TRASH:  PACKER  ROLLOFF  OTHER \$\_\_\_\_\_

Line 5 – Check box ONLY if charge is for plain ol' mixed garbage.

INERTS:  N/C         CLEAN     MIXED \$\_\_\_\_\_

Line 6 – "N/C" is no charge; all categories depend on material size.

MIXED BLDG. C&D                                    \$\_\_\_\_\_

Line 7 – Mixed construction waste (roofing, drywall, etc.)

WOOD:  N/C         CLEAN                                    \$\_\_\_\_\_

Line 8 – "N/C" is no charge; "Clean" is wood diverted for chipping.

STUMP: \_\_\_\_\_ SM.    \_\_\_\_\_ MED.    \_\_\_\_\_ LG.    \$\_\_\_\_\_

Line 9 – BX Only; enter number of stumps for each size in load.

METAL: \_\_\_\_\_ REFRIG. (EA.)    \_\_\_\_\_ SCRAP    \$\_\_\_\_\_

Line 10 – Qty of scrap metal, refrigerated ('fridge, freezer, A/C) and non-refrigerated (stove, washer, dryer, water htr, etc.) appliances.

\_\_\_\_\_ NON-REFRIG. APPLIANCE (EA.) \$\_\_\_\_\_

TIRES: \_\_\_\_\_ < 25 in. (EA.)    \_\_\_\_\_ RIM (EA.)    \$\_\_\_\_\_

Line 11 – Quantity of tires, by size, and quantity of rims on tire.

\_\_\_\_\_ ≥ 25 in./ TRACTOR (EA.)                    \$\_\_\_\_\_

If rim is already pulled off tire, charge it above as scrap metal.

CRTs: \_\_\_\_\_ TV / MONITOR (EA.)                    \$\_\_\_\_\_

Line 12 – Quantity of televisions, computer monitors; pull & set aside.

OTHER: \_\_\_\_\_ \$\_\_\_\_\_

Line 13 – Anything else?

DIRECT:  BURY     DIVERT     TRANSFER

Line 14 – Where did the load end up? "Divert" is stockpiled or stored.

TONS: \_\_\_\_\_                    **FEE: \$** \_\_\_\_\_

Line 15 – Total tonnage charged and fees assessed on lines 5-13.

Reserve spare area for scale printer and comments (if nec.)

Line 16 – Indicate payment method. Write check no. or account no.

PAID BY:

CASH

CHECK NO: \_\_\_\_\_

ACCT. NO: \_\_\_\_\_

ACCOUNT NAME: \_\_\_\_\_

Line 17 – For account holders only, write name of charge account.

SIGNATURE: \_\_\_\_\_

Line 18 – For account holders only, have driver sign for a charge.

PRINT NAME: \_\_\_\_\_

Line 19 – For account holders only, have driver print name.

ATTENDANT'S INITIALS: \_\_\_\_\_

Line 20 – Last, but not least, be sure to initial your ticket!

WHITE – COUNTY

CANARY – COUNTY

PINK - CUSTOMER

# HOUSEHOLD HAZARDOUS WASTE TRANSFER FORM

*Mono County Solid Waste Program*

Hauled From:  BT  BX  BP  CH  PR  PV  WK By (initial): \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Delivered To:  BX or, \_\_\_\_\_

## PAINTS & STAINS

Pints: \_\_\_\_\_ 5 Gallon: \_\_\_\_\_  
Quarts: \_\_\_\_\_ Aerosol Cans: \_\_\_\_\_  
1 Gallon: \_\_\_\_\_ Other: \_\_\_\_\_

## CRTs / BATTERIES / OTHER

CRTs: \_\_\_\_\_ Auto Batteries: \_\_\_\_\_  
Oil Filters: \_\_\_\_\_ NiCad Batteries: \_\_\_\_\_  
Fluor. Tubes: \_\_\_\_\_ Alk. Batteries: \_\_\_\_\_

## ACID CORROSIVES & OXIDIZERS

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## BASE CORROSIVES & OXIDIZERS

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## POISONS & PESTICIDES

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## FLAMMABLES

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## NEUTRALS

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# COMMON HOUSEHOLD HAZARDOUS WASTES

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## CORROSIVES (ACIDS)

Boric Acid  
Car Battery Acid  
Copper Cleaners  
Etching Solutions  
Ferric Chloride  
Fertilizers \*  
Hydrochloric Acid  
Hydrofluoric Acid  
Metal Cleaners  
Muriatic Acid  
Navel Jelly  
Phosphoric Acid  
Pool Acid  
Sheep Dip  
Sodium Bisulfate  
Sulfuric Acid  
Toilet Bowl Cleaners \*

## CORROSIVES (BASES)

Ammonia  
Ammonia-Based Cleaners  
Battery Terminal Cleaner  
Caustic Soda  
Cess Pool Cleaners \*  
Drain Cleaners \*  
Household Cleaners  
Lime  
Lye  
Oven Cleaners \*  
Sodium Hydroxide  
Window Cleaners

## OXIDIZERS

Ammonium Nitrate  
Bleach  
Calcium Hypochlorite  
Chlorates  
Fertilizers \*  
Fluorine  
Hair Coloring  
Hydrogen Peroxide  
Iodine  
Nitric Acid  
Plant Food  
Potassium Permanganate  
Sodium Hypochlorite  
Toilet Bowl Cleaner w/Bleach

## ORGANIC PEROXIDE

Adhesive Catalysts  
Auto Body Filler (Bondo) Catalyst  
Tree Root / Stump Killer

## EXPLOSIVES

Ammunition  
Fireworks  
Flares

## RADIOACTIVE MATERIALS

Luminescent Dial Watches  
Smoke Alarms

\*Check ingredients to be sure.

## FLAMMABLES & COMBUSTIBLES

Acetone  
Adhesives \*  
Aerosols  
Air Freshener  
Alcohols  
Ashphalt Driveway Topping  
Auto Body Filler (Bondo)  
Automotive Oils  
Automotive Waxes  
BBQ Lighter Fluid  
Benzene  
Brake Fluid  
Camphor  
Chrome-Silver Polishes \*  
Cutting Oil  
Dap \*  
Denatured Alcohol  
Diesel Fuel  
Disinfectants  
Duplicator Fluid  
Enamel Paint (unsolidified)  
Enamel / Oil Base Paint  
Epoxy Paint (unsolidified)  
Ethanol  
Ether  
Ethylene Glycol  
Fiberglass Resins (unsolidified)  
Fingernail Polish & Remover  
Floor / Furniture Polish  
Formaldehyde Solution  
Gasoline  
Glues \*  
Grease  
Household Waxes  
Isopropyl Alcohol  
Kerosene  
Lacquer Thinner  
Lacquer Paint (unsolidified)  
Linseed Oil  
Liquid Waxes \*  
Liquid Sandpaper \*  
Liquid Butane  
Methanol  
Methylene Chloride  
Naphtha  
Oils (Petroleum)  
Organic Solvents  
Paint Thinners  
Paint Strippers \*  
Paraffin Oil  
Pentachlorophenol  
Perfume  
Petroleum Distillates  
Plastic Model Cement  
Polyurethane Paint (unsolidified)  
Polyurethane Cement (unsolidified)  
Power Steering Fluid  
Primers  
Roofing Cement  
Rug / Upholstery Cleaner  
Sealers  
Shellac Thinner  
Silicone Sprays

## FLAMMABLES, continued...

Spot Remover / Dry Clean Fluid  
Tile Cement  
Tire Black  
Toluene / Toluol  
Transmission Fluid / Oil  
Turpentine  
Varnish  
Wallpaper Cement  
Windshield Washer Fluid  
WD-40  
White Gas  
Wood Filler / Putty  
Wood Stain  
Xylene / Xylol

## POISONS

Ant and Roach Killer  
Antifreeze  
Arsenic Compounds  
Automotive Cleaners  
Bacterial Pipe Cleaners  
Black Flag  
Bordeaux Mix  
Boric Acid  
Bug Remover  
Chlordane  
Chrome-Silver Polishes \*  
Chromium  
Copper Sulfate  
DDT  
Diazinon  
Dimethylamine Salts  
Disinfectants \*  
Dog Repellent  
Ethylene Glycol  
Fertilizers  
Flea Spray / Powder  
Fungicides \*  
Gopher / Mole Killer  
Insect Sprays  
Latex / Water-Based Paints  
Lead Compounds  
Lice Powder  
Lindane  
Malathion  
Mercury  
Moth Chrystals  
OFF Insect Spray  
Pentachlorophenol  
Pesticides  
Pharmaceuticals  
Plant Food  
Pruning Paint  
Raid  
Rat Poison  
Rose Dust  
Round-Up  
Seven Dust / Spray  
Snail / Slug Killer  
Strychnine  
Tar Remover  
Weed / Grass Killer  
Windshield Washer Fluid

# LOAD INSPECTION REPORT

*Mono County Solid Waste Program*

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Landfill:             BX             PV             WK  
Transfer Station:    BT             BP             CH             PR             PV             WK

---

Date: \_\_\_ / \_\_\_ / \_\_\_    Time: \_\_\_\_\_    Inspector: \_\_\_\_\_

WASTE HAULER INFORMATION:

Driver's Name: \_\_\_\_\_    Phone: \_\_\_\_\_    Inspection:  Visual     Physical  
Company Name: \_\_\_\_\_    Phone: \_\_\_\_\_    Contact: \_\_\_\_\_  
Vehicle Lic. No.: \_\_\_\_\_    Make: \_\_\_\_\_    Model: \_\_\_\_\_

WASTE SOURCE INFORMATION:

Company Name: \_\_\_\_\_    Phone: \_\_\_\_\_    Contact: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_    City: \_\_\_\_\_    Title: \_\_\_\_\_

DISPOSITION OF WASTE LOAD:

- Waste Deemed Acceptable – Relocated to Proper Disposal Area
- Prohibited Waste Suspected – Isolated Pending Determination
- Prohibited Waste Detected – Commercial Source – Hauler Contacted for Removal
- Prohibited Waste Detected – Residential Source – Relocated to Storage:    ID#: \_\_\_\_\_    Tub #: \_\_\_\_\_
- Other: \_\_\_\_\_

DESCRIPTION OF PROHIBITED WASTE FOUND:

<u>Solid</u>	<u>Liquid</u>	<u>Gas</u>	<u>Product Name / Chemical / Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Comment</u>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____

ADDITIONAL COMMENTS OR FOLLOW-UP: (Attach Photos or Other Documentation)

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# DAILY PERFORMANCE LOG

## POSI-SHELL ALTERNATIVE DAILY COVER

*Benton Crossing Landfill – Mono County, California*

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### COVER APPLICATION INFORMATION

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Date: \_\_\_ / \_\_\_ / \_\_\_ Operator: \_\_\_\_\_ Start/End Time: \_\_\_\_\_

#### WEATHER CONDITIONS:

Currently:  Hot  Warm  Cool  Cold  Breezy  Windy  
 Sunny  Overcast  Lt. Rain  Heavy Rain  Lt. Snow  Heavy Snow  
Predicted:  Sunny  Overcast  Lt. Rain  Heavy Rain  Lt. Snow  Heavy Snow

#### MATERIAL QUANTITIES:

Posi-Paks = \_\_\_\_\_ ea. Binder = \_\_\_\_\_ tons Water = \_\_\_\_\_ gallons

#### APPLICATION AREA:

New Area = \_\_\_\_\_ ft. x \_\_\_\_\_ ft. Area Sub-Total = \_\_\_\_\_ square feet  
Re-Spray = \_\_\_\_\_ ft. x \_\_\_\_\_ ft. Area Sub-Total = \_\_\_\_\_ square feet  
Other Area = \_\_\_\_\_ ft. x \_\_\_\_\_ ft. Area Sub-Total = \_\_\_\_\_ square feet  
Other Location: \_\_\_\_\_ Total Area = \_\_\_\_\_ square feet

#### NOTES:

\_\_\_\_\_  
\_\_\_\_\_

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### COVER INSPECTION & EVALUATION

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#### EVALUATION OF PREVIOUS DAY:

Condition:  Poor  Good Application \_\_\_\_\_  Litter \_\_\_\_\_  
 Erosion (Wind/Rain) \_\_\_\_\_  Vectors \_\_\_\_\_  
 Desiccation Cracks \_\_\_\_\_  Other \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

#### EVALUATION OF OTHER COVER STILL EXPOSED:

Location(s): \_\_\_\_\_ Exposure: \_\_\_\_\_ days

Condition: \_\_\_\_\_  
\_\_\_\_\_



# DAILY ACTIVITY LOG

## Mono County Solid Waste Program

Facility Location:  BT  BX  BP  CH  PR  PV  WK

Date: \_\_\_ / \_\_\_ / \_\_\_  Mon.  Tue.  Wed.  Thu.  Fri.  Sat.  Sun.

Staff: \_\_\_\_\_ Open: \_\_\_\_\_ a.m. Closed: \_\_\_\_\_ p.m.

### START OF DAY CHECK:

Gate Security:  Okay  See Notes      Illegal Dumping:  None  See Notes

Perimeter Fencing:  Okay  See Notes      Vandalism:  None  See Notes

Equipment Check:  Okay  See Notes      Posted Signs:  Okay  See Notes

Notes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Weather (a.m.):  Hot  Warm  Cool  Cold  Breezy  Windy

Sunny  Overcast  Rain  Snow  Other: \_\_\_\_\_

Weather (p.m.):  Hot  Warm  Cool  Cold  Breezy  Windy

Sunny  Overcast  Rain  Snow  Other: \_\_\_\_\_

### SUMMARY OF DAILY ACTIVITIES:

Litter: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Load-Checking:  Routine Visual at Gate  Physical Inspection  Prohibited Waste Found

\_\_\_\_\_

\_\_\_\_\_

SPECIAL EVENT / INJURY / ACCIDENT / INCIDENT REPORT: (Describe Event, Damage, Outcome)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# GATE RECEIPT DESCRIPTION – SCALE SITES

No. W 12345

## MONO COUNTY DEPARTMENT OF PUBLIC WORKS

P.O. Box 457 • Bridgeport, CA 93517 • (760) 932-5440

SITE:  BX     BP     PV     WK  
DAY:  MON.    TUE.    WED.    THU.  
       FRI.     SAT.     SUN.  
HAULER:  SELF-HAUL         COMMERCIAL  
           CONTRACTOR        TRANSFER  
ORIGIN:  MAM.LK.  COUNTY  O/C: \_\_\_\_\_  
\_\_\_\_\_

TRASH:  PACKER  ROLLOFF  OTHER \$ \_\_\_\_\_

INERTS:  N/C     CLEAN     MIXED \$ \_\_\_\_\_  
           MIXED BLDG. C&D                            \$ \_\_\_\_\_

WOOD:  N/C     CLEAN                            \$ \_\_\_\_\_

STUMP: \_\_\_\_\_ SM.   \_\_\_\_\_ MED.   \_\_\_\_\_ LG.    \$ \_\_\_\_\_

METAL: \_\_\_\_\_ REFRIG. (EA.)   \_\_\_\_\_ SCRAP    \$ \_\_\_\_\_  
          \_\_\_\_\_ NON-REFRIG. APPLIANCE (EA.) \$ \_\_\_\_\_

TIRES: \_\_\_\_\_ < 25 in. (EA.)   \_\_\_\_\_ RIM (EA.)   \$ \_\_\_\_\_  
          \_\_\_\_\_ ≥ 25 in./ TRACTOR (EA.)                            \$ \_\_\_\_\_

CRTs: \_\_\_\_\_ TV / MONITOR (EA.)                            \$ \_\_\_\_\_

OTHER: \_\_\_\_\_ \$ \_\_\_\_\_

DIRECT:  BURY     DIVERT     TRANSFER

TONS: \_\_\_\_\_                            **FEE: \$** \_\_\_\_\_

PAID BY:

CASH

CHECK NO: \_\_\_\_\_

ACCT. NO: \_\_\_\_\_

ACCOUNT NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

PRINT NAME: \_\_\_\_\_

ATTENDANT'S INITIALS: \_\_\_\_\_

WHITE – COUNTY

CANARY – COUNTY

PINK - CUSTOMER

## Comment or Description of Usage:

Line 1 – BX = Benton Xing; BP = Bport; PV = Pumice; WK = Walker.

Line 2 – Check box for day of week that transaction took place.

Line 3 – Who brought the load? "Self-Haul" is John Q. Public;

"Commercial" is a refuse company such as Mammoth Disposal.

Line 4 – Where is waste from? "Mam.Lk." is Mammoth Lakes; your local town is "County;" "O/C" is out of county – where? enter permit!

Line 5 – Check box ONLY if charge is for plain ol' mixed garbage.

Line 6 – "N/C" is no charge; all categories depend on material size.

Line 7 – Mixed construction waste (roofing, drywall, etc.)

Line 8 – "N/C" is no charge; "Clean" is wood diverted for chipping.

Line 9 – BX Only; enter number of stumps for each size in load.

Line 10 – Qty of scrap metal, refrigerated ('fridge, freezer, A/C) and non-refrigerated (stove, washer, dryer, water htr, etc.) appliances.

Line 11 – Quantity of tires, by size, and quantity of rims on tire.

If rim is already pulled off tire, charge it above as scrap metal.

Line 12 – Quantity of televisions, computer monitors; pull & set aside.

Line 13 – Anything else?

Line 14 – Where did the load end up? "Divert" is stockpiled or stored.

Line 15 – Total tonnage charged and fees assessed on lines 5-13.

Reserve spare area for scale printer and comments (if nec.)

Line 16 – Indicate payment method. Write check no. or account no.

Line 17 – For account holders only, write name of charge account.

Line 18 – For account holders only, have driver sign for a charge.

Line 19 – For account holders only, have driver print name.

Line 20 – Last, but not least, be sure to initial your ticket!

# LOAD INSPECTION REPORT

*Mono County Solid Waste Program*

---

Landfill:             BX             PV             WK  
Transfer Station:  BT             BP             CH             PR             PV             WK

---

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_    Time: \_\_\_\_\_    Inspector: \_\_\_\_\_

WASTE HAULER INFORMATION:

Driver's Name: \_\_\_\_\_    Phone: \_\_\_\_\_    Inspection:  Visual     Physical  
Company Name: \_\_\_\_\_    Phone: \_\_\_\_\_    Contact: \_\_\_\_\_  
Vehicle Lic. No.: \_\_\_\_\_    Make: \_\_\_\_\_    Model: \_\_\_\_\_

WASTE SOURCE INFORMATION:

Company Name: \_\_\_\_\_    Phone: \_\_\_\_\_    Contact: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_    City: \_\_\_\_\_    Title: \_\_\_\_\_

DISPOSITION OF WASTE LOAD:

- Waste Deemed Acceptable – Relocated to Proper Disposal Area
- Prohibited Waste Suspected – Isolated Pending Determination
- Prohibited Waste Detected – Commercial Source – Hauler Contacted for Removal
- Prohibited Waste Detected – Residential Source – Relocated to Storage:    ID#: \_\_\_\_\_    Tub #: \_\_\_\_\_
- Other: \_\_\_\_\_

DESCRIPTION OF PROHIBITED WASTE FOUND:

<u>Solid</u>	<u>Liquid</u>	<u>Gas</u>	<u>Product Name / Chemical / Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Comment</u>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____	_____	_____	_____

ADDITIONAL COMMENTS OR FOLLOW-UP: (Attach Photos or Other Documentation)

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# COMMON HOUSEHOLD HAZARDOUS WASTES

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## CORROSIVES (ACIDS)

Boric Acid  
Car Battery Acid  
Copper Cleaners  
Etching Solutions  
Ferric Chloride  
Fertilizers \*  
Hydrochloric Acid  
Hydrofluoric Acid  
Metal Cleaners  
Muriatic Acid  
Navel Jelly  
Phosphoric Acid  
Pool Acid  
Sheep Dip  
Sodium Bisulfate  
Sulfuric Acid  
Toilet Bowl Cleaners \*

## CORROSIVES (BASES)

Ammonia  
Ammonia-Based Cleaners  
Battery Terminal Cleaner  
Caustic Soda  
Cess Pool Cleaners \*  
Drain Cleaners \*  
Household Cleaners  
Lime  
Lye  
Oven Cleaners \*  
Sodium Hydroxide  
Window Cleaners

## OXIDIZERS

Ammonium Nitrate  
Bleach  
Calcium Hypochlorite  
Chlorates  
Fertilizers \*  
Fluorine  
Hair Coloring  
Hydrogen Peroxide  
Iodine  
Nitric Acid  
Plant Food  
Potassium Permanganate  
Sodium Hypochlorite  
Toilet Bowl Cleaner w/Bleach

## ORGANIC PEROXIDE

Adhesive Catalysts  
Auto Body Filler (Bondo) Catalyst  
Tree Root / Stump Killer

## EXPLOSIVES

Ammunition  
Fireworks  
Flares

## RADIOACTIVE MATERIALS

Luminescent Dial Watches  
Smoke Alarms

\*Check ingredients to be sure.

## FLAMMABLES & COMBUSTIBLES

Acetone  
Adhesives \*  
Aerosols  
Air Freshener  
Alcohols  
Ashphalt Driveway Topping  
Auto Body Filler (Bondo)  
Automotive Oils  
Automotive Waxes  
BBQ Lighter Fluid  
Benzene  
Brake Fluid  
Camphor  
Chrome-Silver Polishes \*  
Cutting Oil  
Dap \*  
Denatured Alcohol  
Diesel Fuel  
Disinfectants  
Duplicator Fluid  
Enamel Paint (unsolidified)  
Enamel / Oil Base Paint  
Epoxy Paint (unsolidified)  
Ethanol  
Ether  
Ethylene Glycol  
Fiberglass Resins (unsolidified)  
Fingernail Polish & Remover  
Floor / Furniture Polish  
Formaldehyde Solution  
Gasoline  
Glues \*  
Grease  
Household Waxes  
Isopropyl Alcohol  
Kerosene  
Lacquer Thinner  
Lacquer Paint (unsolidified)  
Linseed Oil  
Liquid Waxes \*  
Liquid Sandpaper \*  
Liquid Butane  
Methanol  
Methylene Chloride  
Naphtha  
Oils (Petroleum)  
Organic Solvents  
Paint Thinners  
Paint Strippers \*  
Paraffin Oil  
Pentachlorophenol  
Perfume  
Petroleum Distillates  
Plastic Model Cement  
Polyurethane Paint (unsolidified)  
Polyurethane Cement (unsolidified)  
Power Steering Fluid  
Primers  
Roofing Cement  
Rug / Upholstery Cleaner  
Sealers  
Shellac Thinner  
Silicone Sprays

## FLAMMABLES, continued...

Spot Remover / Dry Clean Fluid  
Tile Cement  
Tire Black  
Toluene / Toluol  
Transmission Fluid / Oil  
Turpentine  
Varnish  
Wallpaper Cement  
Windshield Washer Fluid  
WD-40  
White Gas  
Wood Filler / Putty  
Wood Stain  
Xylene / Xylol

## POISONS

Ant and Roach Killer  
Antifreeze  
Arsenic Compounds  
Automotive Cleaners  
Bacterial Pipe Cleaners  
Black Flag  
Bordeaux Mix  
Boric Acid  
Bug Remover  
Chlordane  
Chrome-Silver Polishes \*  
Chromium  
Copper Sulfate  
DDT  
Diazinon  
Dimethylamine Salts  
Disinfectants \*  
Dog Repellent  
Ethylene Glycol  
Fertilizers  
Flea Spray / Powder  
Fungicides \*  
Gopher / Mole Killer  
Insect Sprays  
Latex / Water-Based Paints  
Lead Compounds  
Lice Powder  
Lindane  
Malathion  
Mercury  
Moth Chrystals  
OFF Insect Spray  
Pentachlorophenol  
Pesticides  
Pharmaceuticals  
Plant Food  
Pruning Paint  
Raid  
Rat Poison  
Rose Dust  
Round-Up  
Seven Dust / Spray  
Snail / Slug Killer  
Strychnine  
Tar Remover  
Weed / Grass Killer  
Windshield Washer Fluid

# CRT ACCEPTANCE LOG

## *Mono County Solid Waste Program*

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Location:    BT    BX    BP    CH    PR    PV    WK

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

---

Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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Date: \_\_\_\_\_ No. of CRTs: \_\_\_\_\_ Customer Name: \_\_\_\_\_

Phys. Address: \_\_\_\_\_ Town: \_\_\_\_\_ Zip: \_\_\_\_\_

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# USED OIL ACCEPTANCE LOG

## *Mono County Solid Waste Program*

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Location:    BT    BX    BP    CH    PR    PV    WK

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

---

Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Acceptable Fluids:

Motor Oils  
Gear Box Oils  
Transmission Fluids

Unacceptable Fluids:

Solvents	Brake Fluid	Paint & Lacquer Thinners
Gasoline	Anti-Freeze	Household Chemicals
Water	Paints & Varnishes	Pesticides & Insecticides

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# HOUSEHOLD HAZARDOUS WASTE TRANSFER FORM

*Mono County Solid Waste Program*

Hauled From:  BT  BX  BP  CH  PR  PV  WK By (initial): \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Delivered To:  BX or, \_\_\_\_\_

## PAINTS & STAINS

Pints: \_\_\_\_\_ 5 Gallon: \_\_\_\_\_  
Quarts: \_\_\_\_\_ Aerosol Cans: \_\_\_\_\_  
1 Gallon: \_\_\_\_\_ Other: \_\_\_\_\_

## CRTs / BATTERIES / OTHER

CRTs: \_\_\_\_\_ Auto Batteries: \_\_\_\_\_  
Oil Filters: \_\_\_\_\_ NiCad Batteries: \_\_\_\_\_  
Fluor. Tubes: \_\_\_\_\_ Alk. Batteries: \_\_\_\_\_

## ACID CORROSIVES & OXIDIZERS

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## BASE CORROSIVES & OXIDIZERS

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## POISONS & PESTICIDES

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## FLAMMABLES

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## NEUTRALS

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# FACILITY VISITOR'S LOG

## Mono County Solid Waste Program

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Location:    BT    BX    BP    CH    PR    PV    WK

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Date: \_\_\_ / \_\_\_ / \_\_\_   Time In: \_\_\_\_\_   Visitor(s): \_\_\_\_\_  
Time Exit: \_\_\_\_\_   Company: \_\_\_\_\_  
Phone: \_\_\_\_\_   Purpose: \_\_\_\_\_

---

Date: \_\_\_ / \_\_\_ / \_\_\_   Time In: \_\_\_\_\_   Visitor(s): \_\_\_\_\_  
Time Exit: \_\_\_\_\_   Company: \_\_\_\_\_  
Phone: \_\_\_\_\_   Purpose: \_\_\_\_\_

---

Date: \_\_\_ / \_\_\_ / \_\_\_   Time In: \_\_\_\_\_   Visitor(s): \_\_\_\_\_  
Time Exit: \_\_\_\_\_   Company: \_\_\_\_\_  
Phone: \_\_\_\_\_   Purpose: \_\_\_\_\_

---

Date: \_\_\_ / \_\_\_ / \_\_\_   Time In: \_\_\_\_\_   Visitor(s): \_\_\_\_\_  
Time Exit: \_\_\_\_\_   Company: \_\_\_\_\_  
Phone: \_\_\_\_\_   Purpose: \_\_\_\_\_

---

Date: \_\_\_ / \_\_\_ / \_\_\_   Time In: \_\_\_\_\_   Visitor(s): \_\_\_\_\_  
Time Exit: \_\_\_\_\_   Company: \_\_\_\_\_  
Phone: \_\_\_\_\_   Purpose: \_\_\_\_\_

---

Date: \_\_\_ / \_\_\_ / \_\_\_   Time In: \_\_\_\_\_   Visitor(s): \_\_\_\_\_  
Time Exit: \_\_\_\_\_   Company: \_\_\_\_\_  
Phone: \_\_\_\_\_   Purpose: \_\_\_\_\_

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Date: \_\_\_ / \_\_\_ / \_\_\_   Time In: \_\_\_\_\_   Visitor(s): \_\_\_\_\_  
Time Exit: \_\_\_\_\_   Company: \_\_\_\_\_  
Phone: \_\_\_\_\_   Purpose: \_\_\_\_\_

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# TRAINING / SAFETY MEETING RECORD

## *Mono County Solid Waste Program*

Facility Location:  BT  BX  BP  CH  PR  PV  WK

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Conducted By: \_\_\_\_\_

### MEETING ATTENDEES

Print or Type Name	Signature
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____

### TOPICS OF DISCUSSION

- |   |   |
|---|---|
| 1. _____  | 4. <u>Property Damage Since Last Safety Meeting</u> |
| 2. <u>Safety Hazards Identified Since Last Mtg.</u> | 5. <u>Close Calls Since Last Safety Meeting</u>     |
| 3. <u>Injuries Since Last Safety Meeting</u>        | 6. <u>Safety Issues Related to Upcoming Tasks</u>   |

### RESOURCES USED (i.e., video, handouts – attach copy)

- |          |          |
|----------|----------|
| 1. _____ | 3. _____ |
| 2. _____ | 4. _____ |

### SUMMARY OF DISCUSSION

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# MONO COUNTY PUBLIC WORKS

## PROGRESSIVE PREVENTATIVE MAINTENANCE WORKSHEET

No. 3239

PM: A B C D                      EQUIPMENT NO. \_\_\_\_\_                      DISTRICT NO. \_\_\_\_\_  
 PM: A-1 B-1 C-1 D-1  
 DATE: \_\_\_\_\_                      LAST PM DATE \_\_\_\_\_  
 MILEAGE / HRS.: \_\_\_\_\_                      LAST PM MILEAGE / HRS.: \_\_\_\_\_  
 DATE COMPLETED: \_\_\_\_\_ BY WHOM: \_\_\_\_\_ HOURS: \_\_\_\_\_  
 INSPECTION CODE:                      OK =                       WORK COMPLETED = X                      FOLLOW-UP = 0

A & C PM SERVICE	CODE
TEST/CHECK/INSPECT:	
HORN/LIGHTS/WIPERS	
BELTS/COOLING SYSTEM	
BATTERIES - CHECK & LOAD TEST	
EXHAUST SYSTEM	
PLUMBING FOR LEAKS	
INSTRUMENT/GAUGE/ALARM	
TAILGATE/BOTTOM DUMP SEAL	
MUD FLAP GUARDS & SHIELD	
BRAKE SYSTEM/COMPONENTS	
CHECK AIR INTAKE SYSTEM	

BIT INSPECTION	CODE
TEST SAFETY DEVICES	
TEST AIR INTAKE/CHECK VALVES	
TEST PARKING BRAKE	
CHECK BRAKE FLUID LEVEL	
CHECK AIR COMP. 85/MIN. 130/MAX.	
CHECK AIR LOSS	
CHECK FRAME & CROSSMEMBER	
INSPECT DRUMS & LINING	
ADJUST BRAKES	
STEERING SYSTEM	
SUSPENSION SYSTEM	
TIRES/WHEELS/LUG NUTS	
TIRE PRESSURE	
VEHICLE CONNECT DEVICE	

B SERVICE (INCLUDES A SERVICE)	CODE
PERFORM MAJ. SERV. OPERATIONS	
DRIVE TRAIN	
CHANGE ENGINE OIL	
CHECK GEAR BOX OIL LEVELS	
TRANS FILTER - D6H ONLY	
CHANGE AIR COMPRESSOR FILTER	
CHANGE FUEL FILTERS	
DRAW OIL SAMPLE ENGINE	

PARTS		
ST/DIST	PART #	TOTAL

D SERVICE (INCL. B & C SERVICE)	CODE
CHANGE COOLANT FILTER	
CHANGE TRANS. OIL/FILTER	
CHANGE OIL IN GEAR BOXES	
PACK WHEEL BEARING	
SERVICE AIR DRYER	
CHANGE HYDRAULIC OIL/FILTER	
DRAW OIL SAMPLE ALL COMP.	
CHECK ASD SYSTEMS	

OIL		
ST/DIST	TYPE	TOTAL
	15/40	
	50 WT	
	10 WT	
	80/90 WT	
	30 WT	
	TRACTOR HYD.	
	AW 46	

**COMMENTS:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

MECHANIC: \_\_\_\_\_ INSPECTED BY: \_\_\_\_\_

MONO COUNTY ROAD DEPARTMENT

VEHICLE SERVICE CHECKLIST

VEHICLE NO. \_\_\_\_\_ DATE \_\_\_\_\_

VEHICLE MILEAGE \_\_\_\_\_ DEPARTMENT \_\_\_\_\_

WORK REQUESTED BY \_\_\_\_\_

STANDARD LUBE/CHECKS

- \_\_\_\_\_ LUBE CHASSIS
- \_\_\_\_\_ CHANGE OIL
- \_\_\_\_\_ CHANGE FILTERS

SAFETY CHECKS

- \_\_\_\_\_ STEERING
- \_\_\_\_\_ SUSPENSION

FLUID LEVEL CHECK

- \_\_\_\_\_ BRAKE
- \_\_\_\_\_ COOLANT
- \_\_\_\_\_ POWER STEERING
- \_\_\_\_\_ TRANSMISSION
- \_\_\_\_\_ BATTERY WATER
- \_\_\_\_\_ DIFFERENTIAL/GEAR BOXES
- \_\_\_\_\_ WINDSHIELDS

\_\_\_\_\_ U-JOINT/DRIVELINE

TIRES

\_\_\_\_\_ TIRE ROTATION

SAFETY CHECKS

- \_\_\_\_\_ WINDSHIELD WIPER BLADES
- \_\_\_\_\_ BELTS
- \_\_\_\_\_ HOSES
- \_\_\_\_\_ LIGHTS/LAMPS
- \_\_\_\_\_ HORN
- \_\_\_\_\_ SEAT BELTS
- \_\_\_\_\_ GLASS
  
- \_\_\_\_\_ TURNING SIGNALS
- \_\_\_\_\_ MIRRORS
- \_\_\_\_\_ JACK IN TRUNK
  
- \_\_\_\_\_ SPARE TIRE INFLATION
- \_\_\_\_\_ BRAKE SHOE INSPECTION

NOTES \_\_\_\_\_

MECHANIC \_\_\_\_\_

**MONO COUNTY PUBLIC WORKS**

**PRE/POST OPERATION CHECKLIST**

**REPAIR REQUEST**

UNIT NO. \_\_\_\_\_ DISTRICT \_\_\_\_\_

TROUBLE SYMPTONS: \_\_\_\_\_

HRS./MI. \_\_\_\_\_

CODE: INSPECTED AND OK ( )

REPAIR NEEDED (R)

- \_\_\_\_\_ OIL
- \_\_\_\_\_ WATER
- \_\_\_\_\_ ENGINE COMPARTMENT (Battery, loose items, leaks, belts, etc.)
- \_\_\_\_\_ CLEAN CAB INTERIOR-no loose items
- \_\_\_\_\_ START ENGINE-OBSERVE GAGES
- \_\_\_\_\_ WINDOWS, MIRRORS, WIPERS, HORN
- \_\_\_\_\_ LIGHTS-AMBER, BRAKE, SIGNAL, ETC.
- \_\_\_\_\_ TIRES-(LUG NUTS 1-Ton and above)
- \_\_\_\_\_ GENERAL EXTERIOR CONDITION (Body damage, flaps, missing bolts, etc.)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- \_\_\_\_\_ CUTTING EDGES, BLADES, TEETH, SHOES
- \_\_\_\_\_ SERVICE & PARKING BRAKE, DRAIN TANKS
- \_\_\_\_\_ BACK ALARM
- \_\_\_\_\_ SEAT BELTS
- \_\_\_\_\_ STEAM CLEAN-WEEKLY

OPERATE "AS IS" UNTIL \_\_\_\_\_

I have made the above inspections.  
OPERATOR: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

Supervisor

REPAIRED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

RETURNED TO SERVICE: \_\_\_\_\_

INTERNAL USE ONLY!

(COUNTY) Mono

# INCIDENT/HAZARD REPORT

<b>SECTION A</b>	<input type="checkbox"/> <b>INJURY INCIDENT</b>	<input type="checkbox"/> <b>INCIDENT/NEAR MISS</b>	<input type="checkbox"/> <b>HAZARD</b>
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DATE & TIME OF INCIDENT:	LOCATION:	DATE REPORTED:
REPORTED TO:	REPORTED BY: (Optional)	DEPARTMENT:

<b>SECTION B</b>	<b>DESCRIPTION OF INCIDENT - INJURY, INCIDENT/NEAR MISS, HAZARD</b>

<b>SECTION C</b>	<b>CAUSES</b>

<b>SECTION D</b>	<b>SUGGESTED CORRECTIONS</b>

INVESTIGATED BY:	TITLE:	DATE:
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<b>SECTION E</b>	<b>CORRECTIVE ACTION</b>	<b>DATE</b>

<u>Department Safety Representative Signature:</u>	Date:	<u>Department Head Signature:</u>	Date:
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Please send completed original form to Risk Management, Rita Sherman



**EMPLOYEE'S CLAIM FOR  
WORKERS' COMPENSATION BENEFITS**

**PETICION DEL EMPLEADO PARA BENEFICIOS  
DE COMPENSACIÓN DEL TRABAJADOR**

If you are injured or become ill because of your job, you may be entitled to workers' compensation benefits.

Si Ud. se ha lesionado o se ha enfermado a causa de su trabajo, Ud. tiene derecho a recibir beneficios de compensación al trabajador.

Complete the "Employee" section and give the form to your employer. Keep the copy marked "Employee's Temporary Receipt" until you receive the dated copy from your employer. You may call the Division of Workers' Compensation at 1-800-736-7401 if you need help in filling out this form or in obtaining your benefits. An explanation of workers' compensation benefits is included on the back of this form.

Complete la sección "Empleado" y entregue la forma a su empleador. Quédese con la copia designada "Recibo Temporal del Empleado" hasta que Ud. reciba la copia fechada de su empleador. Si Ud. necesita ayuda para completar esta forma o para obtener sus beneficios, Ud. puede hablar con la Division de Compensación al Trabajador llamando al 1-800-736-7401. En la parte de atrás de esta forma se encuentra una explicación de los beneficios de compensación al trabajador.

You should also have received a pamphlet from your employer describing workers' compensation benefits and the procedures to obtain them.

Ud. también debería haber recibido de su empleador un folleto describiendo los beneficios de compensación al trabajador lesionado y los procedimientos para obtenerlos.

Any person who makes or causes to be made any knowingly false or fraudulent material statement or material representation for the purpose of obtaining or denying workers' compensation benefits or payments is guilty of a felony.

Toda aquella persona que a propósito haga o cause que se produzca cualquier declaración o representación material falsa o fraudulenta con el fin de obtener o negar beneficios o pagos de compensación a trabajadores lesionados es culpable de un crimen mayor "felonia".

**Employee: Empleado:**

1. Name. *Nombre.* \_\_\_\_\_ Today's Date. *Fecha de Hoy.* \_\_\_\_\_
2. Home address. *Dirección Residencial.* \_\_\_\_\_
3. City. *Ciudad.* \_\_\_\_\_ State. *Estado.* \_\_\_\_\_ Zip. *Código Postal.* \_\_\_\_\_
4. Date of Injury. *Fecha de la lesión (accidente).* \_\_\_\_\_ Time of injury. *Hora en que ocurrió* \_\_\_\_\_ a.m. \_\_\_\_\_ p.m.
5. Address and description of where injury happened. *Dirección/lugar dónde ocurrió el accidente.* \_\_\_\_\_
6. Describe injury and part of body affected. *Describe la lesión y parte del cuerpo afectada.* \_\_\_\_\_
7. Social Security Number. *Número de Seguro Social del Empleado* \_\_\_\_\_
8. Signature of employee. *Firma del empleado.* \_\_\_\_\_

**Employer - complete this section and give the employee a copy immediately as a receipt.  
Empleador - complete esta sección y déle inmediatamente una copia al empleado como recibo.**

9. Name of employer. *Nombre del empleador.* \_\_\_\_\_
10. Address. *Dirección.* \_\_\_\_\_
11. Date employer first knew of injury. *Fecha en que el empleador supo por primera vez de la lesión o accidente.* \_\_\_\_\_
12. Date claim form was provided to employee. *Fecha en que se le entregó al empleado la petición.* \_\_\_\_\_
13. Date employer received claim form. *Fecha en que el empleado devolvió la petición al empleador.* \_\_\_\_\_
14. Name and address of insurance carrier or adjusting agency. *Nombre y dirección de la compañía de seguros o agencia administradora de seguros.* **CLAIMS MANAGEMENT SERVICE** \_\_\_\_\_
15. Insurance Policy Number. *El número de la póliza del Seguro.* \_\_\_\_\_
16. Signature of employer representative. *Firma del representante del empleador.* \_\_\_\_\_
17. Title. *Título.* \_\_\_\_\_
18. Date. *Fecha.* \_\_\_\_\_
19. Telephone. *Teléfono.* \_\_\_\_\_

**Employer:** You are required to date this form and provide copies to your insurer or claims administrator and to the employee, dependent or representative who filed the claim within **one working day** of receipt of the form from the employee.

**Empleador:** Se requiere que Ud. feche esta forma y que provéa copias a su compañía de seguros, administrador de reclamos, o dependiente/representante de reclamos y al empleado que hayan presentado esta petición dentro del plazo de **un día hábil** desde el momento de haber sido recibida la forma del empleado.

# COUNTY OF MONO

## DECLINATION OF MEDICAL TREATMENT INSTRUCTIONS

This packet is for use ONLY if the Employee DECLINES medical treatment at time of injury.

If the Employee will go to either a physician, nearest hospital or urgent care facility the Initial Injury-Workers' Compensation Packet (DWC 1 and 5020 forms) must be completed instead of this packet.

DO NOT USE PENCIL TO COMPLETE THE PACKET.

### Employee:

- Complete and sign the top portion of the ***Incident Report***.
- Complete and sign the ***Declination of Medical Treatment*** form.

### Supervisor and/or Department Safety Representative:

- Review and sign the ***Declination of Medical Treatment*** form.
- Complete and sign the bottom portion of the ***Incident Report***
- Complete any applicable standard Safety procedures including, but not limited to, filing an Incident/Hazard Report Form.
- Send all completed 'original' forms to Rita Sherman, Risk Management in a confidential routing envelope within 24 hours.
- No further action is necessary at this time.

### ***If the Employee needs or requests medical treatment in the future:***

- Have the Employee and Supervisor complete an Initial Injury Packet
- Notify Rita Sherman, Risk Management immediately

# COUNTY OF MONO

## INCIDENT REPORT:

## Declined Medical Treatment

(Employee & Supervisor complete)

This form should be completed **ONLY** if the Employee does not need (or request) medical treatment. If the Employee will go to either the nearest hospital, urgent care facility or physician, the Initial Injury Workers' Compensation Packet **must be completed** instead of the Declination of Medical Treatment Packet.

"Any person who makes or causes to be made any knowingly false or fraudulent material statement or material representation for the purpose of obtaining or denying workers compensation is guilty of a felony." This notice has been approved by the Administrative Director of the Division of Workers' Compensation (California Labor Code Section 5401.7)

### EMPLOYEE COMPLETE TOP PORTION:

EMPLOYEE NAME:		Gender: M    F	<input type="checkbox"/> Full Time <input type="checkbox"/> Part time
JOB TITLE:		DATE OF HIRE:	
HOME TELEPHONE:		DATE OF BIRTH:	
HOME ADDRESS:		ENTITY:	
		DEPARTMENT:	
INCIDENT DATE:	TIME OF INCIDENT:	LOCATION:	
DATE REPORTED:	TIME BEGAN WORK:	INCIDENT REPORTED TO:	
NATURE OF INJURY (e.g., puncture, strain, cut, fracture, burn, etc.):			
BODY PART INJURED (e.g., right wrist, left knee, head, lower back, etc.):			
INJURY SOURCE (e.g., wet pavement, jack hammer, keyboard, etc.):			
HOW INJURY OCCURRED (struck by ..., fell from ..., exposed to ..., etc.):			
DESCRIBE ANY PREVIOUS CONDITIONS/INJURIES TO BODY PART CURRENTLY INJURED:			
EMPLOYEE'S STATEMENT OF WHAT OCCURRED			
(Include as much detail as possible such as activity being performed, objects carried, equipment used, hazardous conditions, etc.):			
WHO WITNESSED THE INCIDENT?			
<input type="checkbox"/> The above information is true and correct to the best of my knowledge. <input type="checkbox"/> I understand that I am <b>not filing a Workers' Compensation claim</b> at this time. I do not choose to complete the DWC Form 1 "Employee's Claim for Workers' Compensation Benefits" at this time.			
<u>If I am in need of medical treatment in the future related to this incident, I will immediately inform my Supervisor and complete an Initial Injury Packet including the DWC Form 1 and 5020 form.</u>			
EMPLOYEE'S SIGNATURE:			DATE:

### SUPERVISOR COMPLETE BOTTOM PORTION:

<b>MEDICAL TREATMENT</b> (NOTE: If the Employee needs/requests medical treatment from a physician, complete the Initial Injury Packet)		
<input type="checkbox"/> EMPLOYEE DECLINED MEDICAL TREATMENT <input type="checkbox"/> EMPLOYEE RECEIVED MINOR FIRST AID CARE ON-SITE. Describe:		
SUPERVISOR:		TITLE:
SIGNATURE:	DATE:	TELEPHONE:



# COUNTY OF MONO

## Declination of Medical Treatment

This form should be completed ONLY if the Employee **DECLINES** medical treatment. If the Employee will go to either a physician, an Urgent Care facility or nearest hospital the **Initial Injury-Workers' Compensation Packet must be** completed instead of the Declination of Medical Treatment Packet.

**EMPLOYEE:** Check all that apply. Print name, sign and date.

---

In my opinion, I am not in need of any medical treatment at this time.

**OR**

In my opinion, I have received sufficient on-site first aid care.

**I am fully capable of performing my Usual & Customary position. At this time I decline medical care. If I am in need of medical care related to this incident in the future, I will notify my Supervisor immediately and complete an Initial Injury Packet including the DWC Form 1 "Employee's Claim for Workers' Compensation Benefits.**

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**SUPERVISOR:** Print, sign and date.

---

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

*Note: California Labor Code Section 5401(a) defines a First Aid injury as any one-time treatment, and any follow-up visit for the purpose of observation of minor scratches, cuts, burns, splinters, or other minor industrial injury, which does not ordinarily require medical care" and states that any injury that "results in lost time beyond the employee's work shift at the time of injury or which results in medical treatment beyond first aid" must be filed as a claim. All of the treatments detailed above fall under the First Aid category; therefore, unless further treatment is necessary, a workers' compensation claim does not need to be filed.*

# DAILY ACTIVITY LOG

## Mono County Solid Waste Program

Facility Location:  BT  BX  BP  CH  PR  PV  WK

Date: \_\_\_ / \_\_\_ / \_\_\_  Mon.  Tue.  Wed.  Thu.  Fri.  Sat.  Sun.

Staff: \_\_\_\_\_ Open: \_\_\_\_\_ a.m. Closed: \_\_\_\_\_ p.m.

### START OF DAY CHECK:

Gate Security:  Okay  See Notes      Illegal Dumping:  None  See Notes

Perimeter Fencing:  Okay  See Notes      Vandalism:  None  See Notes

Equipment Check:  Okay  See Notes      Posted Signs:  Okay  See Notes

Notes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Weather (a.m.):  Hot  Warm  Cool  Cold  Breezy  Windy

Sunny  Overcast  Rain  Snow  Other: \_\_\_\_\_

Weather (p.m.):  Hot  Warm  Cool  Cold  Breezy  Windy

Sunny  Overcast  Rain  Snow  Other: \_\_\_\_\_

### SUMMARY OF DAILY ACTIVITIES:

Litter: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Load-Checking:  Routine Visual at Gate  Physical Inspection  Prohibited Waste Found

\_\_\_\_\_

\_\_\_\_\_

SPECIAL EVENT / INJURY / ACCIDENT / INCIDENT REPORT: (Describe Event, Damage, Outcome)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# FACILITY VISITOR'S LOG

## *Mono County Solid Waste Program*

---

Location:    BT    BX    BP    CH    PR    PV    WK

---

Date: \_\_\_ / \_\_\_ / \_\_\_    Time In: \_\_\_\_\_    Visitor(s): \_\_\_\_\_  
Time Exit: \_\_\_\_\_    Company: \_\_\_\_\_  
Phone: \_\_\_\_\_    Purpose: \_\_\_\_\_

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Date: \_\_\_ / \_\_\_ / \_\_\_    Time In: \_\_\_\_\_    Visitor(s): \_\_\_\_\_  
Time Exit: \_\_\_\_\_    Company: \_\_\_\_\_  
Phone: \_\_\_\_\_    Purpose: \_\_\_\_\_

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Time Exit: \_\_\_\_\_    Company: \_\_\_\_\_  
Phone: \_\_\_\_\_    Purpose: \_\_\_\_\_

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# TRAINING / SAFETY MEETING RECORD

## *Mono County Solid Waste Program*

Facility Location:  BT  BX  BP  CH  PR  PV  WK

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Conducted By: \_\_\_\_\_

### MEETING ATTENDEES

Print or Type Name	Signature
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____

### TOPICS OF DISCUSSION

- |   |   |
|---|---|
| 1. _____  | 4. <u>Property Damage Since Last Safety Meeting</u> |
| 2. <u>Safety Hazards Identified Since Last Mtg.</u> | 5. <u>Close Calls Since Last Safety Meeting</u>     |
| 3. <u>Injuries Since Last Safety Meeting</u>        | 6. <u>Safety Issues Related to Upcoming Tasks</u>   |

### RESOURCES USED (i.e., video, handouts – attach copy)

- |          |          |
|----------|----------|
| 1. _____ | 3. _____ |
| 2. _____ | 4. _____ |

### SUMMARY OF DISCUSSION

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# USED OIL ACCEPTANCE LOG

## *Mono County Solid Waste Program*

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Location:    BT    BX    BP    CH    PR    PV    WK

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Date: \_\_\_\_\_ Vol. Oil: \_\_\_\_\_ gal.   Name: \_\_\_\_\_

Initials: \_\_\_\_\_ Filters: \_\_\_\_\_ ea.   Phone: \_\_\_\_\_

Reason(s) If Rejected:    Odor    Color    Layered    Viscosity    Other: \_\_\_\_\_

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Acceptable Fluids:

Motor Oils  
Gear Box Oils  
Transmission Fluids

Unacceptable Fluids:

Solvents	Brake Fluid	Paint & Lacquer Thinners
Gasoline	Anti-Freeze	Household Chemicals
Water	Paints & Varnishes	Pesticides & Insecticides

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**Appendix H**  
**Emergency Response Plan**

# Emergency Response Plan for the Pumice Valley Landfill and Transfer Station

Report Prepared for



**Mono County**  
**Department of Public Works**  
**Solid Waste Division**



Report Prepared by



SRK Consulting (U.S.), Inc.

146900.160

Updated February 15, 2013

# **Emergency Response Plan for the Pumice Valley Landfill and Transfer Station**

## **Mono County Department of Public Works Solid Waste Division**

Post Office Box 457  
Bridgeport, California 93517  
760.932.5440

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Fax: 775.828.6820

**SRK Project Number 146900.160**

**February 2013**

**Author:**  
Evan Nikirk, PE  
Principal Consultant

**Peer Reviewed by:**  
Breese Burnley, PE  
Principal Consultant




**Pumice Valley Landfill and Transfer Station  
 EMERGENCY RESPONSE PLAN  
 County of Mono – Department of Public Works, Solid Waste Division**

**Distribution Record**

Copy No.

Name / Title	Company	Copy	Date	Area of Responsibility
Tony Dublino SW Superintendent	Mono County Dept. of Public Works Solid Waste Division	1	02.15.13	Solid Waste Program Manager
Tom Music Solid Waste Supervisor	Benton Crossing Landfill Mono County Solid Waste Division	2	02.15.13	SW Facility Supervisor
Gatehouse	Pumice Valley Landfill and Transfer Station	3	02.15.13	Site Operations
Jill Kearney Env. Health Specialist	Mono County Health Department	4	02.15.13	Local Enforcement Agency
Jeff Walters Director of Road Ops	Mono County Dept. of Public Works Road Division	5	02.15.13	County Road Maintenance
< Vacant > Deputy CAO	Mono County Administrative Office	6	02.15.13	County Risk Manager
Sgt. Jeff Beard	Mono County Sheriff's Department	7	02.15.13	Emergency Services Coordinator
Chief Michael Smith	CalFire – Owens Valley Division	8	02.15.13	Potential Responding Agency
Chief Tom Strazdins	Lee Vining Fire Protection District	9	02.15.13	Potential Responding Agency
Don McGhie Sr. Real Estate Officer	Los Angeles Dept. of Water & Power Bishop Office, Real Estate	10	02.15.13	Property Owner
Christine Karl IWM Specialist	CalRecycle Permitting & Assistance Branch	11	02.15.13	State Regulatory Agency
SRK Reno Library	SRK Consulting	12	02.15.13	Plan Preparer

Approval Signature: 

**DOCUMENT RECORD OF CHANGES**

Rev. No.	Date	Section(s)	Approved By
1.	02.15.13	1.1 (facility personnel); 1.2.2 (waste data)	E. Nikirk
2.			
3.			
4.			

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ATTACHMENT 2. Detailed Response Activities .....	attached
ATTACHMENT 3. Incident Reporting Forms .....	attached
ATTACHMENT 4. Emergency Notification List .....	attached

## Certification Statement

This Emergency Response Plan for the Pumice Valley Landfill and Transfer Station in Mono County, California was prepared by SRK Consulting (U.S.), Inc., under the direct supervision of the undersigned registered professional engineer. All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed, and the professional services have been performed, findings determined, and recommendations prepared in accordance with standard engineering principles and practices generally accepted at the time of document preparation.



02.15.13

Evan Nikirk, PE  
Principal Consultant

## Disclaimer

The project conditions and specifications presented in this document have been based on the information supplied to SRK Consulting (U.S.), Inc. (SRK) by the Mono County Department of Public Works, Solid Waste Division (County). This Plan is provided in response to a specific request from Mono County to do so, and is subject to the contractual terms between SRK and Mono County. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Plan.

# 1.0 Introduction

The purpose of this plan is to establish responsibilities and guidelines for actions to be taken by County and operations contractor personnel in the event of an emergency at the Pumice Valley Landfill and Transfer Station. These guidelines are intended to assist site personnel and responsible parties in making timely decisions and taking positive actions toward a successful resolution of the problem. This plan will be updated as necessary to reflect operating conditions, policies, and practices, and is assigned to site personnel and to the Distribution List, above.

## 1.1 Organization and Personnel

The Pumice Valley Landfill and Transfer Station are operated by the Mono County Department of Public Works, Solid Waste Division (Division), in accordance with Title 27 of the California Code of Regulations (CCR). Administration of Mono County’s solid waste program, including the operation of the Pumice Valley Landfill and Transfer Station, is the responsibility of Mr. Tony Dublino. The facility is manned by one gate attendant for each day of operation. The gate attendant and transfer station operations are provided under contract with D&S Waste Removal, Inc., of Yerington, Nevada. Depending upon project requirements and staff availability from the County’s regional Benton Crossing Landfill or from Public Works’ five Road Districts, laborers and equipment operators are assigned on an as-needed basis. Site personnel and their respective classifications are summarized in **Table 1.1**, below.

**TABLE 1.1. Facility Personnel Summary**

Personnel Classification	Name
Solid Waste Facility Supervisor	Tom Music
Gate Attendant (Contractor)	Pauline Moran
Equipment Operator	Benton Crossing Landfill Personnel or Road District Personnel
Maintenance Worker	Benton Crossing Landfill Personnel or Road District or Parks & Facilities Division Personnel
Supervisor, Road District 3	Jason Small

## 1.2 Facility Overview

The Pumice Valley Landfill is a Class III municipal solid waste landfill as defined by 27 CCR Section 20200 and is permitted under existing Solid Waste Facility Permit No. 26-AA-0003 and Waste Discharge Requirements 6B260300011. The landfill has been operated at its present location since 1972 and is situated on a 40.0-acre parcel leased from the City of Los Angeles, Department of Water and Power (LADWP). The Mono County Department of Public Works, Solid Waste Division, is responsible for the day-to-day operation of the landfill and transfer station; a gate attendant is provided through a long-term agreement with the transfer station operations contractor. Addresses for the property owner and operators are as follows:

Property Owner

Los Angeles Department of Water & Power  
300 Mandich Street  
Bishop, California 93514-3449  
Phone: 760.872.1104

Landfill Operator

Mono County Department of Public Works  
Solid Waste Division  
Post Office Box 457  
Bridgeport, California 93517  
Phone: 760.932.5440

Transfer Station Operator

D&S Waste Removal, Inc.  
Post Office Box 834  
3 Highway 95 East  
Yerington, Nevada 89447  
Phone: 775.463.3090

### 1.2.1 Site Location and Surrounding Land Use

The facility is located in the Pumice Flats region of central Mono County at 200 Dross Road, approximately 1.8 miles east of the junction of State Highway 120(E) and U.S. Highway 395, south of the community of Lee Vining. The 40-acre site, as defined by the Public Land Survey System, is situated within the NW¼ NW¼, Section 36, Township 1 North, Range 26 East, Mount Diablo Baseline and Meridian (MDB&M). Location of the site in the context of state and county boundaries is illustrated on **Figure 1**, enclosed in **Attachment 1**. Existing topography and the location of structures, facilities, stockpiles, and disposal areas at the Pumice Valley Landfill and Transfer Station are presented on **Figure 2** in **Attachment 1**.

The property surrounding the Pumice Valley Landfill and Transfer Station is either owned by the LADWP, or owned by the public and administered by the United States Department of Interior, Bureau of Land Management, Bishop Field Office (BLM), or the United States Department of Agriculture, Inyo National Forest (INF). There are no residences or structures within 1,000 feet of the facility property boundary. City of Los Angeles lands in the vicinity are zoned as "OS – Open Space." Lands in the area managed by BLM and INF are assigned a zoning designation of "RM – Resource Management" and are primarily used for grazing and recreation. Land uses in the surrounding area are shown on **Figure 3** in **Attachment 1**.

### 1.2.2 Waste Characterization

Based on a 176.5-day annual average for the period of 2007 through 2012, the site receives an average of 7.4 tons of waste per day (TPD) for management or disposal. Approximately 83 percent (or, 6.16 TPD) of the total waste received is managed at the landfill, while 17 percent (or, 1.27 TPD) is processed through the on-site transfer station. Of the waste received by the landfill, approximately 38 percent (2.31 TPD) is diverted and 62 percent (3.85 TPD) is landfilled. Approximately 31 percent (0.40 TPD) of the waste processed through the transfer station is transferred off site, while 69 percent (0.87 TPD) is diverted. Landfilled waste is comprised of inert waste and construction and demolition debris. Waste diverted from the transfer station is comprised of 79.3 percent wood, with lesser amounts of scrap metal (9.6 percent), white goods (7.8 percent), and waste tires, cardboard, used motor oil, and CRTs (3.3 percent).

Waste handling and processing procedures are specific to each type of waste accepted at the transfer station or landfill. All incoming waste is subject to hazardous waste screening and random physical inspections in accordance with the provisions detailed in the *Load-Checking Program* implemented by the Division. There is no heavy industry and there are few (if any) manufacturing businesses located within the site's service area. The waste stream is nearly entirely comprised of residential waste and commercial waste consisting of retail stores, motels, restaurants, and public agencies (e.g., schools, INF visitor's center).

Customers with waste tires, scrap metal, appliances, and bulky objects (e.g., furniture) are directed to a 40 cubic yard debris box located at the transfer station. When the debris box is full, it is transported to the Benton Crossing Landfill for management. Wood waste is stockpiled adjacent to the transfer station and periodically chipped and either used on-site for erosion control or alternative daily cover, or made available to the public and public agencies for erosion control, decorative mulch, or as surface material for pedestrian walks or playgrounds.

### **1.3 Emergency Response Plan Review**

This *Emergency Response Plan* will be reviewed by the Division prior to March 31 of each year, or more frequently if necessitated by significant changes in site operation. Modifications to this plan will be issued to all plan-holders and recorded in the revision block.

## **2.0 Emergency Equipment and Preparedness**

The following sections describe the resources available to respond to an emergency at the Pumice Valley Landfill and Transfer Station and the measures taken to minimize the potential for a fire or other emergency.

### **2.1 Personal Protective Equipment**

Landfill personnel are required to wear Level D personal protective equipment, including steel-toed and steel-shanked boots, leather gloves, eye protection, hearing protection (where necessary or required), and landfill uniforms (long pants, yellow shirt, orange safety vest). Landfill personnel are also provided with chemical-resistant gloves, face shields, hard hats, dust masks and air purifying respirators, depending on the task being performed at a given time.

### **2.2 First Aid**

A first aid kit is maintained in the scalehouse. All Public Works personnel are trained and certified in CPR and basic first aid on a bi-annual basis.

### **2.3 Fire Extinguishers**

Fire extinguishers have been installed in the scalehouse, in Division vehicles, and in Public Works' heavy equipment. Fire extinguishers are of the type required to address a reasonably anticipated class of fire at a given location. All fire extinguishers are serviced regularly to ensure their proper functioning. The location and proper use of fire extinguishers are reviewed with site personnel on an annual basis, at a minimum, and upon site assignment for any new personnel.

### **2.4 Waste-Specific Fire Suppression Measures**

It is anticipated that the most likely cause of a trash fire will be hot ashes in an arriving load, and to a lesser degree, incompatible materials coming into contact with one another. A large, welded-seam metal container (e.g., a 4 cubic yard "dumpster") is stored on the tipping pad at the transfer station where customers are directed to unload their hot ashes, should they have any. A soil stockpile is maintained near the active working face of the landfill for immediate use in the event

of a fire within the waste mass. The soil can be directly applied with heavy equipment available on-site or brought on-site by Public Works personnel, including a wheel loader or a bulldozer.

In addition to the above, a fire extinguisher may be used to suppress small fires, and a water truck may be made available to supplement soil for larger fires. The inert nature of the majority of waste buried at the landfill and the restricted size of the working face should limit any fire to a manageable size and prevent it from spreading to surrounding areas.

Wood waste is temporarily stockpiled on-site in the designated area shown on **Figure 2 (Attachment 1)**, then subsequently sorted and processed through a wood shredder to produce wood chips. Wood waste and wood chip stockpiles are limited in size to a 50-foot by 50-foot base area and 20-foot height. In order to reduce the potential spread of fire between wood waste and/or wood chip stockpiles, a minimum clear aisle width of 50 feet is maintained.

Waste tires are diverted through the transfer station for processing at the Benton Crossing Landfill. The mixing of incompatible household or other hazardous waste within incoming waste loads or at the working face is discouraged by implementation of a rigorous load-checking program. Household hazardous waste received or discovered at the landfill or transfer station is temporarily stored in two hazardous waste storage lockers located near the landfill entrance, where shown on **Figure 2**. Wastes are separated by type and stored in designated areas within the storage lockers. Household hazardous wastes stored on-site are periodically removed by Division personnel and hauled to the Permanent Household Hazardous Waste Facility (PHHWF) at the Benton Crossing Landfill for management and storage; this typically occurs on a monthly basis.

## 2.5 Additional Fire Suppression Measures

A water truck available from the Benton Crossing Landfill or one of Public Works' Road Districts is brought to the site as needed for dust control, but is also available for fire suppression. Further, the Division maintains a brush-free zone around the perimeter of the landfill property to protect against possible impacts from range fires.

## 2.6 Hazardous Spill Prevention Measures

An above-ground 500-gallon storage tank is installed at the Pumice Valley Landfill and Transfer Station for used motor oil recycling by facility customers. The storage tank, which is located at the site entrance area, is provided with internal secondary containment systems. Gasoline, motor oil, hydraulic fluids, and other lubricants routinely used by heavy equipment for landfill operation is stored off-site.

Household hazardous waste received at the landfill or transfer station and any other hazardous material discovered at the site are temporarily stored in two hazardous waste storage lockers located near the site entrance (refer to **Figure 2**). Wastes are separated by type and stored in designated areas within the storage lockers. The lockers are constructed from all-welded steel and fitted with explosion vents. Materials are stored either in their original containers or in storage tubs, or both, and placed on secondary containment shelves. Coated steel grates provide a floor surface that sits above a containment sump, resulting in three stages of containment.

## 3.0 Potential Emergencies and Response Activities

The Division has identified a number of potential emergencies or incidents that could be reasonably expected to occur at the Pumice Valley Landfill and Transfer Station. A series of appropriate actions to be taken by Division and contractor personnel in the event of an identified emergency has been developed for each type of incident. **Table 3.1** presents the list of potential emergencies and a summary of response activities. The response to each identified potential emergency is addressed in greater detail in **Attachment 2** of this plan. Suggested evacuation locations and emergency response routes are indicated on **Figure 2** in **Attachment 1**.

### 3.1 Specific Areas of Concern

The most probable emergency or incident at the Pumice Valley Landfill and Transfer Station will involve either an injury/medical emergency or a vehicle/equipment accident. Mono County has established policies and protocol for reacting to incidents of this nature, and they are addressed in detail in the County's agency-wide *Occupational Injury & Illness Prevention Program* (IIPP) and in the program-specific IIPP developed by the Division.

Of a lesser likelihood or potential frequency, but well within the realm of reasonable expectation, are emergencies related to fire, an environmental release, a hazardous substance discovery or spill, or a propane gas leak. Fire could occur due to a variety of causes and in a variety of locations, including any of the following:

- site structures (i.e., scalehouse, office/storage building);
- vehicles or heavy equipment (including within a customer's load);
- compactor bin or waste mass (i.e., working face);
- stockpiles (i.e., wood waste stockpile, wood chip stockpile); or,
- household hazardous waste (HHW) storage lockers.

These locations are identified on **Figure 2** in **Attachment 1**. The remaining identified potential emergencies are considered less likely to occur, though they still require sufficient preparation.

### 3.2 Incident Reporting

Once a particular emergency or incident has stabilized, a detailed incident report will be completed (in consultation with site personnel) by one of the following, depending on who responded to the emergency: 1) the Solid Waste Superintendent; 2) the Solid Waste Facility Supervisor; or, 3) the Road District Supervisor. Upon completion the report will be forwarded to Public Works' administrative office in Bridgeport for further action and/or filing. Reports will be made on a Daily Activity Log and on incident reporting forms made available by Mono County's insurance provider. The former will be entered into the facility operating record in Public Works' office, whereas the latter will be filed with Mono County's Risk Manager. Copies of incident reporting forms are included in **Attachment 3**; these are available to site personnel at the scalehouse, at the Public Works office, or from the Risk Manager.



**TABLE 3.1. Summary of Emergency Response Actions for Identified Potential Incidents  
 (see Attachment 2 for detailed instructions)**

<b>Emergency</b>	<b>Action</b>
Armed Intruder	<ol style="list-style-type: none"> <li>1. Call 911</li> <li>2. Evacuate and isolate area</li> <li>3. Notify Solid Waste Superintendent or Public Works office</li> </ol>
Distraught Person	<ol style="list-style-type: none"> <li>1. Call 911</li> <li>2. Evacuate and isolate area</li> <li>3. Notify Solid Waste Superintendent or Public Works office</li> </ol>
Earthquake (Moderate to Large Magnitude)	<ol style="list-style-type: none"> <li>1. Duck, cover, and hold</li> <li>2. Evacuate structures</li> <li>3. Assemble in safe area away from buildings and slopes</li> <li>4. Call 911 if serious injury occurred or imminent threat present</li> <li>5. Notify Solid Waste Superintendent or Public Works office and, if appropriate, Health Department</li> <li>6. Complete post-earthquake inspection of containment systems</li> </ol>
Fire	<ol style="list-style-type: none"> <li>1. Call 911 and Cal Fire dispatch at <b>909.881.6916</b></li> <li>2. Evacuate and isolate area</li> <li>3. Vehicle or structure: If safe and manageable, suppress with fire extinguisher and/or water truck</li> <li>4. Waste or stockpile: If safe and manageable, suppress with soil, fire extinguisher, and/or water truck. Break apart stockpile, if safe to do so</li> <li>5. Notify Solid Waste Superintendent (or Public Works) and Health Department office</li> </ol>
Hazardous Substance Discovery or Spill (Petroleum / Chemical)	<ol style="list-style-type: none"> <li>1. Stop and/or contain release if safe and knowledgeable</li> <li>2. Detain and question customer as to nature of load, if applicable</li> <li>3. Evacuate area and block access if necessary</li> <li>4. Call 911 if serious injury occurred or imminent threat present</li> <li>5. Notify Solid Waste Superintendent or Public Works and Health Department offices</li> </ol>
Injury or Medical Emergency	<ol style="list-style-type: none"> <li>1. Call 911 if serious injury(ies) occurred</li> <li>2. Stay with person if safe</li> <li>3. Administer First Aid and/or CPR if knowledgeable</li> <li>4. Notify Solid Waste Superintendent or Public Works office</li> </ol>
Propane Gas Leak	<ol style="list-style-type: none"> <li>1. Close valve at tank, if safe to do so</li> <li>2. Evacuate area</li> <li>3. Call Amerigas at: 934-2213 or 934-6333</li> <li>4. Call 911 if serious injury occurred; call Cal Fire for fire response</li> <li>5. Notify Solid Waste Superintendent or Public Works office</li> </ol>
Slope Failure	<ol style="list-style-type: none"> <li>1. Evacuate and isolate area</li> <li>2. Call 911 if serious injury occurred</li> <li>3. Notify Solid Waste Superintendent and Health Department office</li> </ol>
Vehicle / Equipment Accident	<ol style="list-style-type: none"> <li>1. Call 911 if serious injury occurred</li> <li>2. Stay with person(s) if safe</li> <li>3. Notify Solid Waste Superintendent or Public Works office</li> </ol>

Reportable incidents should be documented with the following minimum information:

- Date, time, and conditions at incident location at the time it occurred or was discovered;
- Description of how incident occurred (e.g., cause of fire, how discovered, etc.);
- Description of actions taken and equipment used to address the incident;
- Description of any injuries, illnesses, damage, and how they were responded to;
- The effect of the incident on transfer station and landfill operations; and,
- Name and, for non-County personnel, telephone number and/or address of any witnesses. For a vehicular accident or hazardous spill involving a customer, obtain name, address, driver's license number, vehicle description and license plate number, and insurance information.

If additional sheets are necessary to compile a thorough incident report, they should be attached to the primary reporting form. Further, any statements made by witnesses should be documented in writing and attached to the incident report.

## 4.0 Emergency Services and Contact Information

Depending on the nature of the emergency, County or contractor personnel responding at the site will first contact emergency services or the Public Works office via cellular telephone or by contacting Benton Crossing Landfill or Road District 3 (Lee Vining) personnel via cellular telephone or two-way radios installed in site vehicles and heavy equipment. Landfill or Road District personnel may also be contacted directly if additional equipment and personnel are required to address a situation. Once the immediate threat has been stabilized, the Solid Waste Supervisor (or his designee) is responsible for contacting the Mono County Health Department (as the Local Enforcement Agency) and other regulatory agencies if required.

Although fire response is within the jurisdictional boundaries of the United States Forest Service (USFS), their mutual aid agreement with the California Department of Forestry, Owens Valley Division (CDF), means that the CDF would be a responder to a 911 dispatch. However, since the landfill is located within the "sphere of influence" defined for the Lee Vining Fire Protection District by an informal agreement with the County's Emergency Services, first response would be provided by the Lee Vining Volunteer Fire Department located in Lee Vining, approximately four miles northwest of the site.

The Mammoth Hospital is the regional medical center for the Southern Mono Health Care District. The facility has an emergency room and other facilities adequate to handle most emergencies that are likely to occur. Located approximately 25 miles southwest of the landfill, the Mammoth Hospital is the medical center closest to the site.

Emergency contact personnel and telephone numbers are included in **Attachment 4**. A laminated copy of the information is posted at the facility in the scalehouse and a copy has been provided to the LEA. The emergency services described above can be reached as follows:

Mammoth Hospital  
85 Sierra Park Road  
Mammoth Lakes, California 93546  
(760) 924-4100 (administration)  
**(760) 934-3311 (emergency room)**

CDF – Owens Valley Division  
2781 South Round Valley Road  
Bishop, California 93514  
(760) 387-2565 (administration)  
**(909) 881-6916 (Command Center)**

## 5.0 Notifications

All environmental incidents will be reported to the appropriate agencies by the Division within 72 hours of incident stabilization. Any emergency involving a release to the environment must be reported in writing to the Mono County Health Department, the California Department of Toxic Substances Control, the California Integrated Waste Management Board, and the Lahontan Regional Water Quality Control Board. The Division will also be responsible for obtaining special authority for any emergency operations where equipment, personnel, or materials are required for the containment of spills or removal of hazardous material.

## 6.0 Training

All employees will be trained in the details of this plan and that of the Division's *Injury and Illness Prevention Plan* at least annually. Training records shall be retained in employee personnel files and in the facility operating record.

**Prepared by**



---

Evan Nikirk, PE  
Principal Consultant

**Reviewed by**

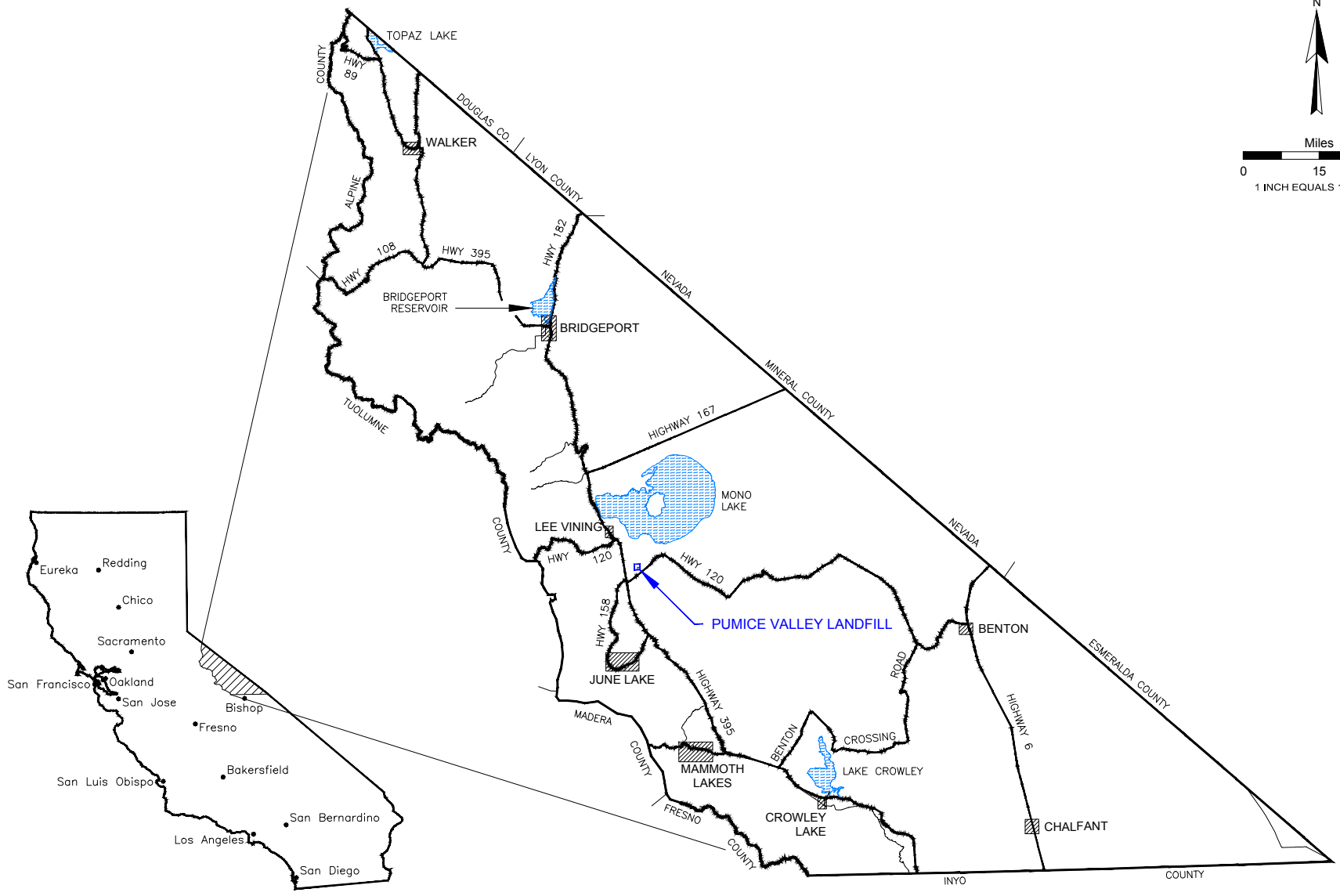
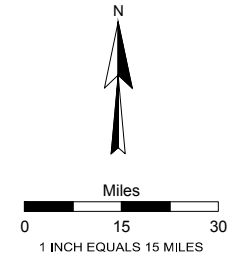



---

Breese Burnley, PE  
Principal Consultant


All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

## **Attachment 1: Figures**




DESIGN: EN
DRAWN: TWW
REVIEWED: ---
CHECKED: EN
APPROVED: EN

IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

PREPARED BY:

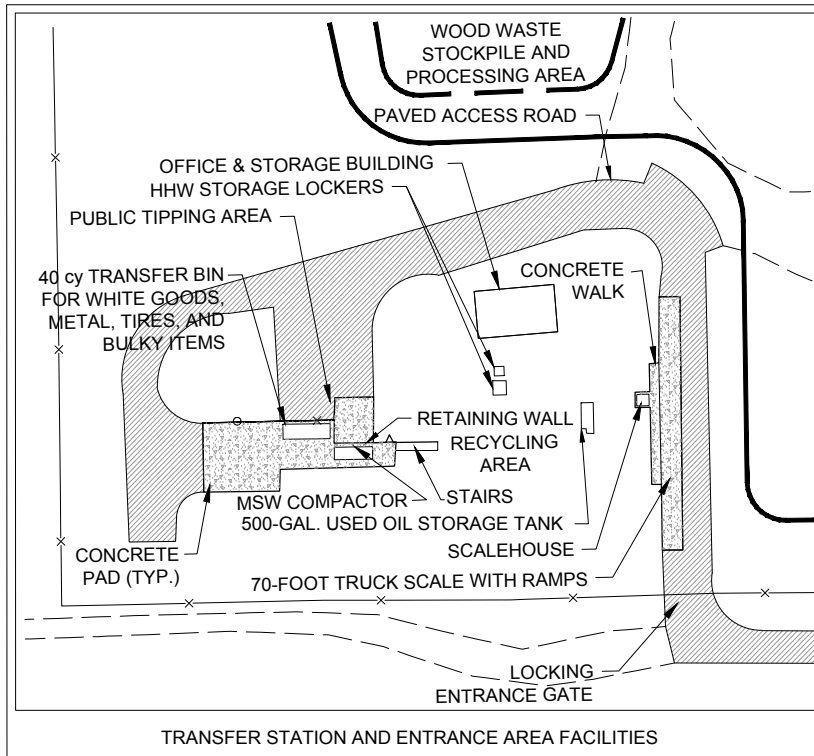
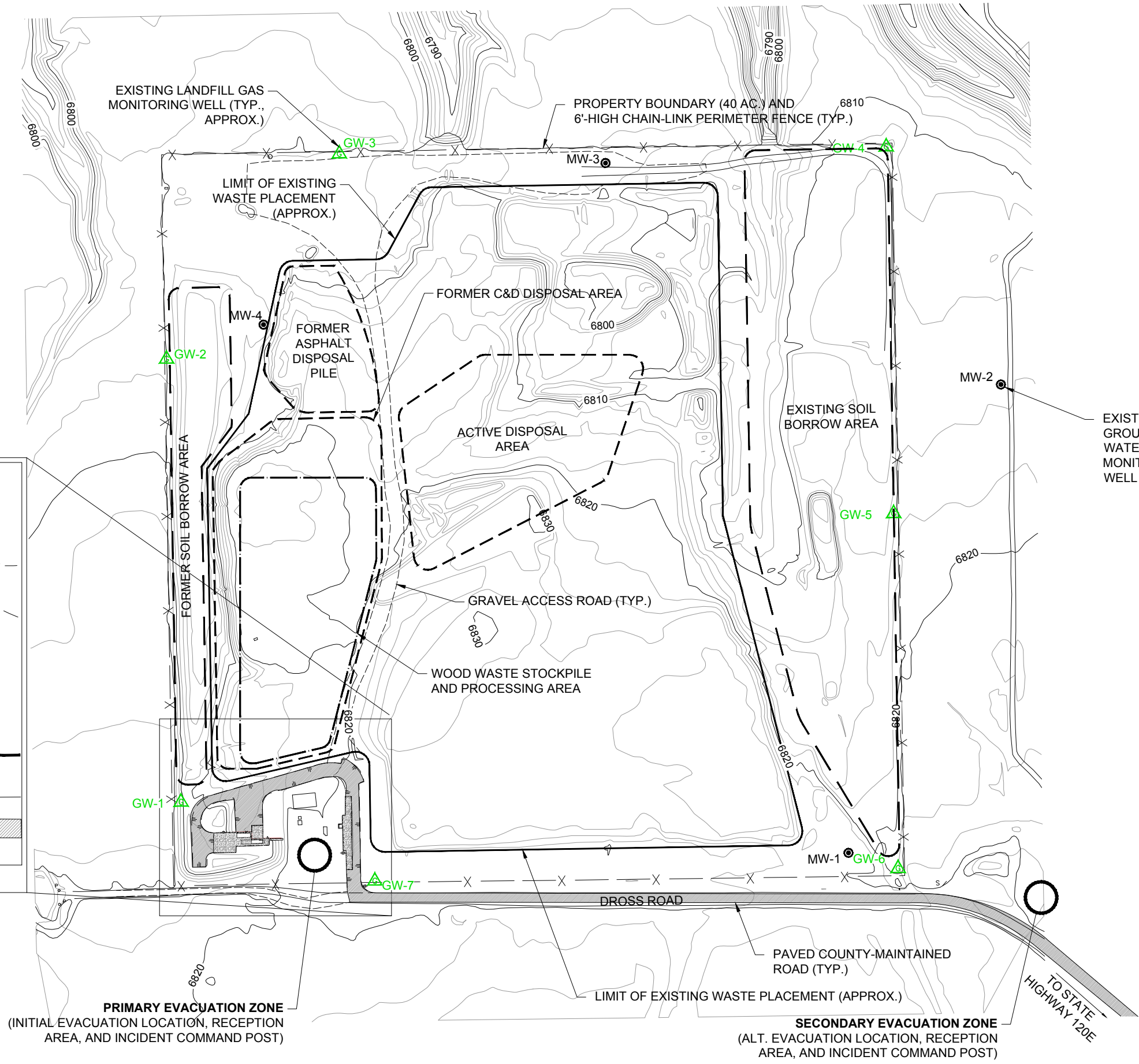
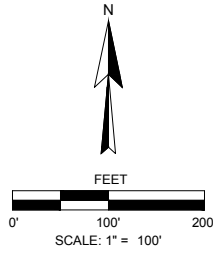


PROJECT:



EMERGENCY RESPONSE PLAN  
PUMICE VALLEY LANDFILL  
MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
MONO COUNTY, CALIFORNIA

DRAWING TITLE: SITE LOCATION MAP	
DRAWING NO.: FIGURE 1	REV. NO.
DATE: 02.15.2013	A
SRK JOB NO.: 146900.160	



**PRIMARY EVACUATION ZONE**  
(INITIAL EVACUATION LOCATION, RECEPTION AREA, AND INCIDENT COMMAND POST)

**SECONDARY EVACUATION ZONE**  
(ALT. EVACUATION LOCATION, RECEPTION AREA, AND INCIDENT COMMAND POST)

REV.	DESCRIPTION	DATE
A	ISSUED FOR PLAN-HOLDER DISTRIBUTION	02/15/2013

DESIGN: EN	DRAWN: TWW	REVIEWED: ---	CHECKED: EN	APPROVED: EN

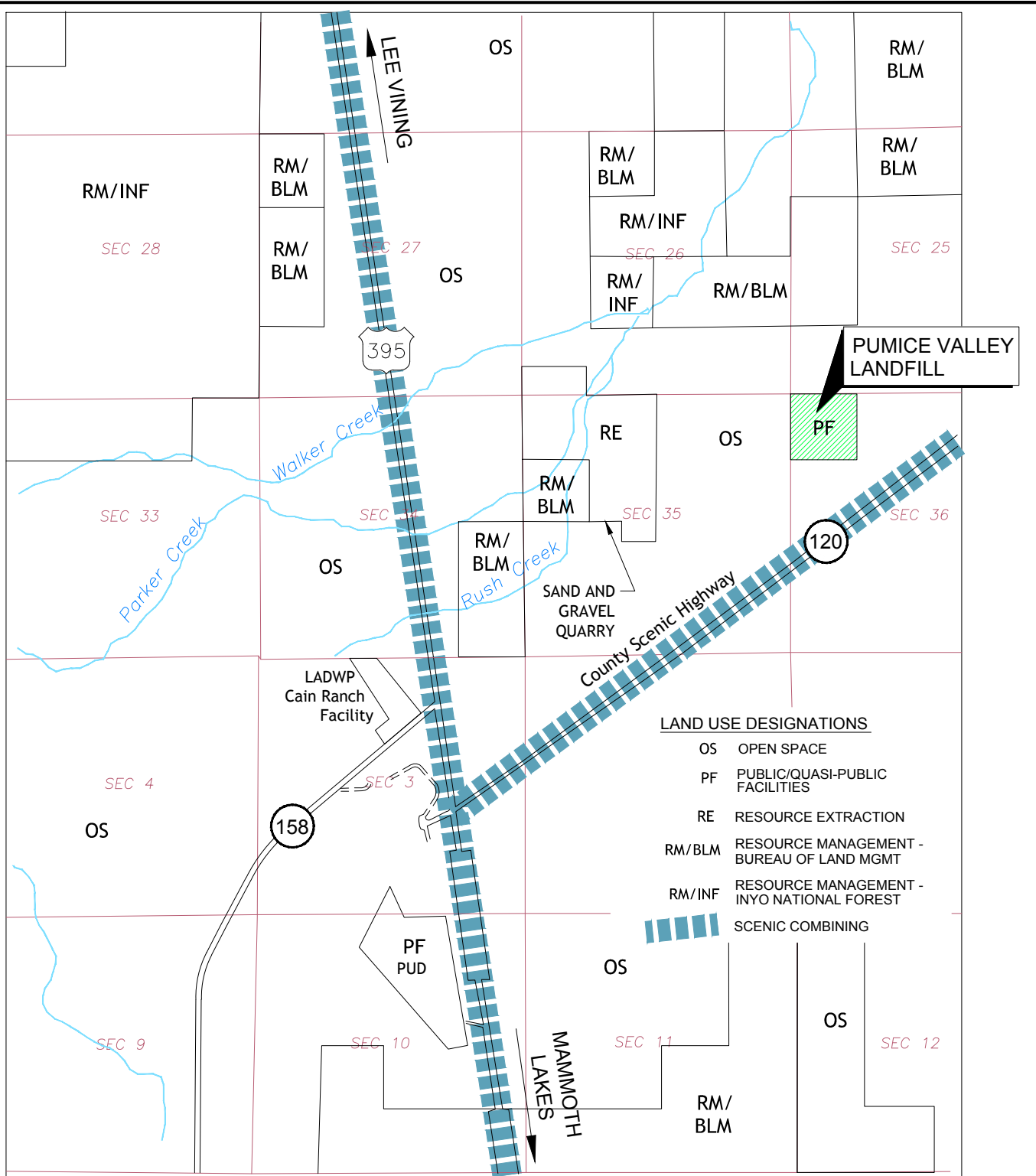
IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

PREPARED BY: **srk consulting**

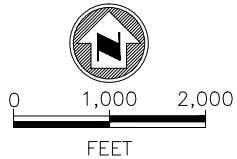
PROJECT: EMERGENCY RESPONSE PLAN  
PUMICE VALLEY LANDFILL  
MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
MONO COUNTY, CALIFORNIA

DRAWING TITLE:	DRAWING NO.:	DATE:	SRK JOB NO.:
EXISTING TOPOGRAPHY AND FACILITIES	FIGURE 2	02.15.2013	146900.160

REV. NO. **A**



Modified from Figure 63,  
Mono County General  
Plan (November, 2000).



DESIGN: EN
DRAWN: TWW
REVIEWED: ---
CHECKED: EN
APPROVED: EN
IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

PREPARED BY:

PROJECT:

EMERGENCY RESPONSE PLAN  
PUMICE VALLEY LANDFILL  
MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
MONO COUNTY, CALIFORNIA

DRAWING TITLE: LAND USE MAP	
DRAWING NO.: FIGURE 3	REV. NO. A
DATE: 02.15.2013	
SRK JOB NO.: 146900.160	



## **Attachment 2: Detailed Response Activities**

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## ARMED INTRUDER

### ACTION CHECKLIST:

#### Actions By The First Person Involved:

- \_\_\_\_\_ Do not make any sudden movements.
- \_\_\_\_\_ Remain calm (breathe deeply).
- \_\_\_\_\_ Be cooperative with the intruder. Do not try to resist. **Do not be a hero.**
- \_\_\_\_\_ **Call 911** or contact County dispatch as soon as possible.
- \_\_\_\_\_ In case of any shooting, immediately get down on the floor or ground and stay there.

#### Actions by Other Personnel:

- \_\_\_\_\_ Evaluate the situation. Margarita
- \_\_\_\_\_ Immediately **call 911**, then notify the Solid Waste Superintendent or Public Works' administrative office.
- \_\_\_\_\_ Arrange reception for arriving off-site emergency services. Refer to **Figure 2**.
- \_\_\_\_\_ Do not attempt to interact with the intruder. **Do not be a hero.**
- \_\_\_\_\_ Quietly evacuate employees, customers, and contractors from the affected area to a secure area. Refer to **Figure 2**. Prevent additional customers from accessing the site, but **DO NOT** lock entrance gate.
- \_\_\_\_\_ Contact site personnel and verify that all areas are secure.
- \_\_\_\_\_ In case anyone is injured, qualified and willing individuals should administer First Aid and/or CPR when it is safe to do so, then assist emergency medical professionals when they arrive.
- \_\_\_\_\_ Follow the instructions of local law enforcement when they arrive.
- \_\_\_\_\_ The responding supervisor (i.e., Solid Waste Superintendent, Solid Waste Facility Supervisor, or Road District Supervisor) is to complete and file an incident report with the Risk Manager within 72 hours of stabilization of the situation. A copy shall be entered into the site operating record.
- \_\_\_\_\_ If necessary or appropriate, the Solid Waste Superintendent or his designee will notify the LEA and other regulatory agencies in writing within 72 hours of incident stabilization as to the nature and final disposition of the incident.

## DANGER POSED BY A DISTRAUGHT PERSON

### ACTION CHECKLIST:

#### Actions By First Person Involved:

- \_\_\_\_\_ Stay away from any commotion and **call 911** or otherwise contact local law enforcement.
- \_\_\_\_\_ If you are unable to avoid the situation or call for help, talk calmly to the person and try to keep him or her as calm as possible.

#### Actions by Other Personnel:

- \_\_\_\_\_ Isolate the site and evacuate as many people as possible. Refer to **Figure 2**.
- \_\_\_\_\_ Contact local law enforcement for assistance. Tell them whether the distraught person is armed, how many people are involved in the situation, and if anyone is injured.
- \_\_\_\_\_ Arrange reception for arriving off-site emergency services. Refer to **Figure 2**.
- \_\_\_\_\_ Notify the Solid Waste Superintendent or Public Works' administrative office.
- \_\_\_\_\_ Implement plans for immediate response to injury caused by distraught person. Respond only when it is safe to do so.
- \_\_\_\_\_ The responding supervisor (i.e., Solid Waste Superintendent, Solid Waste Facility Supervisor, or Road District Supervisor) is to complete and file an incident report with the Risk Manager within 72 hours of stabilization of the situation. A copy shall be entered into the site operating record.
- \_\_\_\_\_ If necessary or appropriate, the Solid Waste Superintendent or his designee will notify the LEA and other regulatory agencies in writing within 72 hours of incident stabilization as to the nature and final disposition of the incident.

## EARTHQUAKE

### (Moderate to Large Magnitude)

NOTE: Overhead power lines and telephone lines are not present on-site, so references commonly made to actions related to them are not made in this Plan.

#### ACTION CHECKLIST:

- \_\_\_\_\_ Remain calm.
- \_\_\_\_\_ In any earthquake, immediately “Duck, Cover and Hold.” If indoors, get under a sturdy desk, table, or doorway. Hold onto something so you can stay under cover while things are shaking. Move away from windows and avoid falling debris, such as light fixtures, heavy objects on office shelves, computers, etc.
- \_\_\_\_\_ If in a building, do not attempt to leave the floor. If outside, move away from slopes and embankments and equipment or facilities that may topple.
- \_\_\_\_\_ After the initial shaking has subsided, if in a building and able to do so, evacuate to a safe place outside away from buildings, windows, slopes, embankments, and equipment that may topple. Refer to **Figure 2**.
- \_\_\_\_\_ If unable to evacuate a building, move to an area of relative security on the floor and be prepared for aftershocks.
- \_\_\_\_\_ If qualified, treat injuries with First Aid and/or CPR as needed. Do not move injured people unless they are in danger remaining where they are.
- \_\_\_\_\_ Extinguish any small fires.
- \_\_\_\_\_ Close valves or otherwise isolate lines (being careful not to cause any sparks) to fuel and propane storage tanks until it can be verified that they are operating properly. If it is safe to do so, turn off the power generator if it is on. In the vicinity where fumes may be ignited, do not allow any open flames or the use of anything that may create a spark, such as matches, cigarette lighters, candles, or electrical switches. Do not use flashlights, battery-operated radios, or anything electrical, unless the item is safe to use in a hazardous situation.
- \_\_\_\_\_ Avoid areas where the building may be damaged. Wait in a safe place for instructions; you could be there for several hours.
- \_\_\_\_\_ After the earthquake, wait for instructions from the Site Supervisor or a responding agency.
- \_\_\_\_\_ If the earthquake was serious, off-site emergency responders may be delayed for long periods of time because of blocked roads, communications failures, and/or an overload of requests for their services. If qualified, administer First Aid and/or

CPR to any injured until they can be attended by trained medical professionals or transported to a hospital for treatment.

- \_\_\_\_\_ Try to account for all employees, customers, contractors, visitors, etc., who are thought to have been at the site at the time of the earthquake.
- \_\_\_\_\_ Arrange reception for arriving off-site emergency services. Refer to **Figure 2**.
- \_\_\_\_\_ Notify the Solid Waste Superintendent or Public Works' administrative office and the Health Department.
- \_\_\_\_\_ Implement plans for immediate response to injury caused by earthquake. Respond only when it is safe to do so.
- \_\_\_\_\_ Coordinate communication with the Solid Waste Superintendent, Public Works' administrative office, and Road Districts, as needed.
- \_\_\_\_\_ When the situation has been stabilized, complete a detailed inspection of containment structures at the site to determine the effects of the earthquake on the integrity of the landfill, the landfill cover, and secondary containment structures. Repair as necessary to prevent a release of solid waste or contaminants to the environment.
- \_\_\_\_\_ The responding supervisor (i.e., Solid Waste Superintendent, Solid Waste Facility Supervisor, or Road District Supervisor) is to complete and file an incident report with the Risk Manager within 72 hours of stabilization of the situation. A copy shall be entered into the site operating record.
- \_\_\_\_\_ If necessary or appropriate, the Solid Waste Superintendent or his designee will notify the LEA and other regulatory agencies in writing within 72 hours of incident stabilization as to the nature and final disposition of the incident.

## FIRE (VEHICLE OR STRUCTURE)

NOTE: All fires, no matter how small, must be reported immediately upon discovery.  
Many small fires get out of control because of a delayed alarm.

### ACTION CHECKLIST:

- \_\_\_\_\_ Assess the situation. Call the Cal Fire dispatch at **(909) 881-6916** and report the location, type and size of fire.
- \_\_\_\_\_ Fire suppression is the responsibility of off-site fire departments. However, all buildings and vehicles are equipped with hand-held fire extinguishers for first-response use on small fires. Before attempting to extinguish a fire, make certain that you or someone else has done the following:
  1. Transmit a fire alarm to site personnel via radio, telephone, or bullhorn.
  2. Call Cal Fire dispatch.
  3. Evacuate the fire area.
  4. Isolate all power, gas, or electrical lines to the area.
- \_\_\_\_\_ Arrange reception for arriving off-site emergency services. Refer to **Figure 2**. Contact Cal Fire dispatch if fire is suppressed prior to arrival of response crew.
- \_\_\_\_\_ Implement plans for immediate response to injury caused by incident.
- \_\_\_\_\_ Notify the Solid Waste Superintendent or Public Works' administrative office.
- \_\_\_\_\_ The responding supervisor (i.e., Solid Waste Superintendent, Solid Waste Facility Supervisor, or Road District Supervisor) is to complete and file an incident report with the Risk Manager within 72 hours of stabilization of the situation. A copy shall be entered into the site operating record.
- \_\_\_\_\_ If necessary or appropriate, the Solid Waste Superintendent or his designee will notify the LEA and other regulatory agencies in writing within 72 hours of incident stabilization as to the nature and final disposition of the incident.

### TIPS ON EXTINGUISHING A FIRE

1. Stand 5 to 7 feet from fire when attempting to extinguish (8 to 10 feet if dealing with flammable liquids).
2. Locate an escape route before attempting to extinguish fire (keep back to an exit).
3. Hold extinguisher in upright position.
4. Remove pin.
5. Squeeze lever together with carrying handle.
6. Direct discharge at base of flames near edge of fire.
7. Discharge with side-to-side to sweep flames off burning surface; gradually progress forward.
8. Continue to extinguish for several moments after flames appear to be extinguished to avoid a refresh off a hot surface.

## FIRE (WASTE OR STOCKPILE)

NOTE: All fires, no matter how small, must be reported immediately upon discovery.  
Many small fires get out of control because of a delayed alarm.

### ACTION CHECKLIST:

- \_\_\_\_\_ Assess the situation. Call the Cal Fire dispatch at **(909) 881-6916** and report the location, type and size of fire.
- \_\_\_\_\_ For **trash fires**, if personnel safety can be assured and there is no risk of an explosion:
  1. Carefully cover burning or smoldering waste with loads of cover soil to remove oxygen supply to fire.
  2. Begin by dumping soil at closest edge of fire and progressively dumping loads across burning or smoldering area such that the equipment used to spread soil does not at any time come into contact with burning waste.
  3. For fire within the waste mass, do not drive equipment over smoldering or burning waste due to the possibility of subsidence within the waste mass.
  4. Use fire extinguisher or water truck as supplemental suppression methods.
- \_\_\_\_\_ For **stockpile fires**, and ONLY if personnel safety can be assured and if adequate personnel and heavy equipment are available:
  1. Carefully remove stockpiled materials from the area opposite the fire and move it a safe distance away such that will reduce the potential spread of fire.
- \_\_\_\_\_ Arrange reception for arriving off-site emergency services. Refer to **Figure 2**. Contact Cal Fire dispatch if fire is suppressed prior to arrival of response crew.
- \_\_\_\_\_ Implement plans for immediate response to injury caused by incident.
- \_\_\_\_\_ Notify the Solid Waste Superintendent or Public Works' administrative office.
- \_\_\_\_\_ The responding supervisor (i.e., Solid Waste Superintendent, Solid Waste Facility Supervisor, or Road District Supervisor) is to complete and file an incident report with the Risk Manager within 72 hours of stabilization of the situation. A copy shall be entered into the site operating record.
- \_\_\_\_\_ If necessary or appropriate, the Solid Waste Superintendent or his designee will notify the LEA and other regulatory agencies in writing within 72 hours of incident stabilization as to the nature and final disposition of the incident.



## HAZARDOUS SUBSTANCE DISCOVERY OR SPILL (Petroleum and Chemical)

NOTE: Although water does dilute many chemicals, it can create a greater volume of hazardous waste.

### ACTION CHECKLIST:

- \_\_\_\_\_ Assess the situation. If trained as a first responder operations level, and if it is safe to do so, stop any on-going spill or leak by shutting valves or righting drums.
- \_\_\_\_\_ Make sure no one is smoking or has an open flame in the affected area.
- \_\_\_\_\_ If spill or incident is the result of a customer's load, detain the customer (if available) and question as to the nature and source of the load's contents. Try to ascertain the name and quantity of the material causing the incident.
- \_\_\_\_\_ If there is any danger of fire or explosion, evacuate everyone from the area and restrict access into the area. Refer to **Figure 2**.
- \_\_\_\_\_ If you know an explosive or toxic chemical is involved, or if you are not sure, evacuate everyone from the area and block all entries to the area. Move to a safe vantage point. Refer to **Figure 2**.
- \_\_\_\_\_ For spills, and ONLY if it is safe to do so, use what equipment is available to build soil berms to contain it from spreading and attempt to stop the leak; use spill response materials such as "socks" and "pads" from the on-site spill kit.
- \_\_\_\_\_ Contact and coordinate communication with the Solid Waste Superintendent, Public Works' administrative office, Road Districts, and the Health Department, as needed. Call 911 if necessary.
- \_\_\_\_\_ If a chemical is involved, determine its name(s) and report to responding agency.
- \_\_\_\_\_ Arrange reception for arriving off-site emergency services. Refer to **Figure 2**.
- \_\_\_\_\_ Implement plans for immediate response to fires or injury resulting from incident.
- \_\_\_\_\_ The responding supervisor (i.e., Solid Waste Superintendent, Solid Waste Facility Supervisor, or Road District Supervisor) is to complete and file an incident report with the Risk Manager within 72 hours of stabilization of the situation. A copy shall be entered into the site operating record.
- \_\_\_\_\_ If necessary or appropriate, the Solid Waste Superintendent or his designee will notify the LEA and other regulatory agencies in writing within 72 hours of incident stabilization as to the nature and final disposition of the incident.

## INJURY OR MEDICAL EMERGENCY

NOTE: Information should be available in the employee personnel file as to blood type and special medical conditions.

### ACTION CHECKLIST:

- Assess the scene to ensure it is safe to assist the injured or downed person.
- DO NOT ASSIST if unidentified chemicals or gases are observed or suspected or there is evidence of electrocution.
- If qualified, assess the person for consciousness, airway, breathing, and circulation.
- If unable to assist person, and for serious injury, call 911 immediately.
- If possible, do not leave patient but have someone call 911. If you are alone, leave the person while calling 911.
- Stay with person until more qualified help arrives and releases you from the location.
- Arrange reception for arriving off-site emergency services. Post somebody to direct rescuers to the correct location.
- Ensure that no continuing dangers exist.
- Notify the Solid Waste Superintendent or Public Works' administrative office.
- The responding supervisor (i.e., Solid Waste Superintendent, Solid Waste Facility Supervisor, or Road District Supervisor) is to complete and file an incident report with the Risk Manager within 72 hours of stabilization of the situation. A copy shall be entered into the site operating record.
- If necessary or appropriate, the Solid Waste Superintendent or his designee will notify the LEA and other regulatory agencies in writing within 72 hours of incident stabilization as to the nature and final disposition of the incident.

If there are any fatalities:

Notification of any fatalities will be the responsibility of the Solid Waste Superintendent or his designee.

## PROPANE GAS LEAK

### ACTION CHECKLIST:

#### First on Scene Actions:

- \_\_\_\_\_ If safe to do so, and if you are knowledgeable, shut off supply valve. **DO NOT ATTEMPT TO PUT OUT ANY FIRE UNTIL THE SUPPLY IS SHUT OFF.**
- \_\_\_\_\_ Immediately call Amerigas at: **(760) 934-2213 or (760) 934-6333.**
- \_\_\_\_\_ Evacuate area until declared safe to re-enter. Refer to **Figure 2.**
- \_\_\_\_\_ If propane leak is stopped, have qualified person check the area to ensure it is safe for employees to return to area.
- \_\_\_\_\_ If propane leak has not stopped, evacuate any area where propane gas can travel, shut off all ignition sources.
- \_\_\_\_\_ Implement plans for immediate response to fires or injury caused by incident.
- \_\_\_\_\_ Arrange reception for arriving off-site responders, provide them with all relevant details and follow their instructions.
- \_\_\_\_\_ Notify the Solid Waste Superintendent or Public Works' administrative office.
- \_\_\_\_\_ The responding supervisor (i.e., Solid Waste Superintendent, Solid Waste Facility Supervisor, or Road District Supervisor) is to complete and file an incident report with the Risk Manager within 72 hours of stabilization of the situation. A copy shall be entered into the site operating record.
- \_\_\_\_\_ If necessary or appropriate, the Solid Waste Superintendent or his designee will notify the LEA and other regulatory agencies in writing within 72 hours of incident stabilization as to the nature and final disposition of the incident.

## SLOPE FAILURE

### ACTION CHECKLIST:

- \_\_\_\_\_ Stop all operations in the area until it is safe to resume. Large equipment should only be used if it does not endanger anyone. Evacuate the affected area.
- \_\_\_\_\_ Have a knowledgeable employee assess the situation.
- \_\_\_\_\_ Have all personnel, customer, contractors, or visitors working in the area assemble at a safe location.
- \_\_\_\_\_ If individuals are missing, call 911 for an off-site rescue team.
- \_\_\_\_\_ Do not endanger rescuers. Beware of possible additional movement of material. A qualified individual must make a careful inspection of the area prior rescue team entry.
- \_\_\_\_\_ If the approximate location of possible victims is known, have the area marked by spreading ribbon flagging, so that the area may be easily identified if additional material falls.
- \_\_\_\_\_ Have road blocks established on all roads leading to the top and bottom of the failure area. Make sure to block off any unstable slopes that have not yet fallen.
- \_\_\_\_\_ Notify the Solid Waste Superintendent or Public Works' administrative office and the Health Department.
- \_\_\_\_\_ Summon other specialists to the scene as required by the circumstances.
- \_\_\_\_\_ Arrange reception for arriving off-site emergency services. Refer to **Figure 2**.
- \_\_\_\_\_ Implement plans for immediate response to fires or injury resulting from incident.
- \_\_\_\_\_ The responding supervisor (i.e., Solid Waste Superintendent, Solid Waste Facility Supervisor, or Road District Supervisor) is to complete and file an incident report with the Risk Manager within 72 hours of stabilization of the situation. A copy shall be entered into the site operating record.
- \_\_\_\_\_ If necessary or appropriate, the Solid Waste Superintendent or his designee will notify the LEA and other regulatory agencies in writing within 72 hours of incident stabilization as to the nature and final disposition of the incident.

## VEHICLE OR EQUIPMENT ACCIDENT

### ACTION CHECKLIST:

- \_\_\_\_\_ If safe to do so and, if qualified, assist injured persons, perform First Aid and/or CPR.
- \_\_\_\_\_ Notify the Solid Waste Superintendent or Public Works' administrative office and, if serious injury occurred, call 911.
- \_\_\_\_\_ Have someone block access to involved vehicles to all except emergency personnel.
- \_\_\_\_\_ Remain at location until authorized to leave by responding agency.
- \_\_\_\_\_ Arrange reception for arriving off-site emergency services. Refer to **Figure 2**.
- \_\_\_\_\_ Implement plans for immediate response to fires or injury resulting from incident.
- \_\_\_\_\_ Ensure that a designated employee accompanies the injured to the hospital.
- \_\_\_\_\_ The responding supervisor (i.e., Solid Waste Superintendent, Solid Waste Facility Supervisor, or Road District Supervisor) is to complete and file an incident report with the Risk Manager within 72 hours of stabilization of the situation. A copy shall be entered into the site operating record.
- \_\_\_\_\_ If necessary or appropriate, the Solid Waste Superintendent or his designee will notify the LEA and other regulatory agencies in writing within 72 hours of incident stabilization as to the nature and final disposition of the incident.

## **Attachment 3: Incident Reporting Forms**

# DAILY ACTIVITY LOG

## Mono County Solid Waste Program

Facility Location:  BT  BX  BP  CH  PR  PV  WK

Date: \_\_\_ / \_\_\_ / \_\_\_  Mon.  Tue.  Wed.  Thu.  Fri.  Sat.  Sun.

Staff: \_\_\_\_\_ Open: \_\_\_\_\_ a.m. Closed: \_\_\_\_\_ p.m.

### START OF DAY CHECK:

Gate Security:  Okay  See Notes      Illegal Dumping:  None  See Notes

Perimeter Fencing:  Okay  See Notes      Vandalism:  None  See Notes

Equipment Check:  Okay  See Notes      Posted Signs:  Okay  See Notes

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Weather (a.m.):  Hot  Warm  Cool  Cold  Breezy  Windy  
 Sunny  Overcast  Rain  Snow  Other: \_\_\_\_\_

Weather (p.m.):  Hot  Warm  Cool  Cold  Breezy  Windy  
 Sunny  Overcast  Rain  Snow  Other: \_\_\_\_\_

### SUMMARY OF DAILY ACTIVITIES:

Litter: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Load-Checking:  Routine Visual at Gate  Physical Inspection  Prohibited Waste Found

\_\_\_\_\_  
\_\_\_\_\_

SPECIAL EVENT / INJURY / ACCIDENT / INCIDENT REPORT: (Describe Event, Damage, Outcome)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# INSTRUCTION SHEET

## INCIDENT/HAZARD REPORT FORM

Fill out the form as completely as possible, and then give it to you department head for signature. Make sure you complete the sections for "Suggestion Corrections" and the "Corrective Action" that was taken. Make a photocopy to keep for your files. Send the original form to Risk Management, Rita Sherman. Please do this within three working days after completing the form.

This form may also be turned in confidentially, without signature, to Risk Management.

Risk Management  
P.O. Box 696  
Bridgeport, CA 93517

Rita Sherman	T (760) 932-5415	F (760) 932-5411	<a href="mailto:rsherman@mono.ca.gov">rsherman@mono.ca.gov</a>
Sarah Messerlian	T(760) 932-5405	F(760) 932-5411	<a href="mailto:smesserlian@mono.ca.gov">smesserlian@mono.ca.gov</a>

Trindel Insurance Fund			
Gene Herndon	T(530) 594-2027	F (530) 894-2732	<a href="mailto:tifsfty@trindel.org">tifsfty@trindel.org</a>

**IF YOU HAVE ANY QUESTIONS PLEASE CONTACT RITA SHERMAN AT THE RISK MANAGEMENT OFFICE**



**INTERNAL USE ONLY!**

**INCIDENT/HAZARD REPORT**

(COUNTY) Mono

<b>SECTION A</b>	<input type="checkbox"/> <b>INJURY INCIDENT</b>	<input type="checkbox"/> <b>INCIDENT/NEAR MISS</b>	<input type="checkbox"/> <b>HAZARD</b>
DATE & TIME OF INCIDENT:	LOCATION:	DATE REPORTED:	
REPORTED TO:	REPORTED BY: (Optional)	DEPARTMENT:	

<b>SECTION B</b>	<b>DESCRIPTION OF INCIDENT - INJURY, INCIDENT/NEAR MISS, HAZARD</b>

<b>SECTION C</b>	<b>CAUSES</b>

<b>SECTION D</b>	<b>SUGGESTED CORRECTIONS</b>

INVESTIGATED BY:	TITLE:	DATE:
------------------	--------	-------

<b>SECTION E</b>	<b>CORRECTIVE ACTION</b>	<b>DATE</b>

<u>Department Safety Representative Signature:</u>	Date:	<u>Department Head Signature:</u>	Date:
--	-------	-----------------------------------	-------

Please send completed original form to Risk Management, Rita Sherman



**EMPLOYEE'S CLAIM FOR  
WORKERS' COMPENSATION BENEFITS**

**PETICION DEL EMPLEADO PARA BENEFICIOS  
DE COMPENSACIÓN DEL TRABAJADOR**

If you are injured or become ill because of your job, you may be entitled to workers' compensation benefits.

Si Ud. se ha lesionado o se ha enfermado a causa de su trabajo, Ud. tiene derecho a recibir beneficios de compensación al trabajador.

Complete the "Employee" section and give the form to your employer. Keep the copy marked "Employee's Temporary Receipt" until you receive the dated copy from your employer. You may call the Division of Workers' Compensation at 1-800-736-7401 if you need help in filling out this form or in obtaining your benefits. An explanation of workers' compensation benefits is included on the back of this form.

Complete la sección "Empleado" y entregue la forma a su empleador. Quédese con la copia designada "Recibo Temporal del Empleado" hasta que Ud. reciba la copia fechada de su empleador. Si Ud. necesita ayuda para completar esta forma o para obtener sus beneficios, Ud. puede hablar con la Division de Compensación al Trabajador llamando al 1-800-736-7401. En la parte de atrás de esta forma se encuentra una explicación de los beneficios de compensación al trabajador.

You should also have received a pamphlet from your employer describing workers' compensation benefits and the procedures to obtain them.

Ud. también debería haber recibido de su empleador un folleto describiendo los beneficios de compensación al trabajador lesionado y los procedimientos para obtenerlos.

Any person who makes or causes to be made any knowingly false or fraudulent material statement or material representation for the purpose of obtaining or denying workers' compensation benefits or payments is guilty of a felony.

Toda aquella persona que a propósito haga o cause que se produzca cualquier declaración o representación material falsa o fraudulenta con el fin de obtener o negar beneficios o pagos de compensación a trabajadores lesionados es culpable de un crimen mayor "felonia".

**Employee: Empleado:**

1. Name. *Nombre.* \_\_\_\_\_ Today's Date. *Fecha de Hoy.* \_\_\_\_\_
2. Home address. *Dirección Residencial.* \_\_\_\_\_
3. City. *Ciudad.* \_\_\_\_\_ State. *Estado.* \_\_\_\_\_ Zip. *Código Postal.* \_\_\_\_\_
4. Date of Injury. *Fecha de la lesión (accidente).* \_\_\_\_\_ Time of injury. *Hora en que ocurrió* \_\_\_\_\_ a.m. \_\_\_\_\_ p.m.
5. Address and description of where injury happened. *Dirección/lugar dónde ocurrió el accidente.* \_\_\_\_\_
6. Describe injury and part of body affected. *Describe la lesión y parte del cuerpo afectada.* \_\_\_\_\_
7. Social Security Number. *Número de Seguro Social del Empleado* \_\_\_\_\_
8. Signature of employee. *Firma del empleado.* \_\_\_\_\_

**Employer - complete this section and give the employee a copy immediately as a receipt.  
Empleador - complete esta sección y déle inmediatamente una copia al empleado como recibo.**

9. Name of employer. *Nombre del empleador.* \_\_\_\_\_
10. Address. *Dirección.* \_\_\_\_\_
11. Date employer first knew of injury. *Fecha en que el empleador supo por primera vez de la lesión o accidente.* \_\_\_\_\_
12. Date claim form was provided to employee. *Fecha en que se le entregó al empleado la petición.* \_\_\_\_\_
13. Date employer received claim form. *Fecha en que el empleado devolvió la petición al empleador.* \_\_\_\_\_
14. Name and address of insurance carrier or adjusting agency. *Nombre y dirección de la compañía de seguros o agencia administradora de seguros.* **CLAIMS MANAGEMENT SERVICE** \_\_\_\_\_
15. Insurance Policy Number. *El número de la póliza del Seguro.* \_\_\_\_\_
16. Signature of employer representative. *Firma del representante del empleador.* \_\_\_\_\_
17. Title. *Título.* \_\_\_\_\_
18. Date. *Fecha.* \_\_\_\_\_
19. Telephone. *Teléfono.* \_\_\_\_\_

**Employer:** You are required to date this form and provide copies to your insurer or claims administrator and to the employee, dependent or representative who filed the claim within **one working day** of receipt of the form from the employee.

**Empleador:** Se requiere que Ud. feche esta forma y que provéa copias a su compañía de seguros, administrador de reclamos, o dependiente/representante de reclamos y al empleado que hayan presentado esta petición dentro del plazo de **un día hábil** desde el momento de haber sido recibida la forma del empleado.

# COUNTY OF MONO

## DECLINATION OF MEDICAL TREATMENT INSTRUCTIONS

This packet is for use ONLY if the Employee DECLINES medical treatment at time of injury.

If the Employee will go to either a physician, nearest hospital or urgent care facility the Initial Injury-Workers' Compensation Packet (DWC 1 and 5020 forms) must be completed instead of this packet.

DO NOT USE PENCIL TO COMPLETE THE PACKET.

### Employee:

- Complete and sign the top portion of the ***Incident Report***.
- Complete and sign the ***Declination of Medical Treatment*** form.

### Supervisor and/or Department Safety Representative:

- Review and sign the ***Declination of Medical Treatment*** form.
- Complete and sign the bottom portion of the ***Incident Report***
- Complete any applicable standard Safety procedures including, but not limited to, filing an Incident/Hazard Report Form.
- Send all completed 'original' forms to Rita Sherman, Risk Management in a confidential routing envelope within 24 hours.
- No further action is necessary at this time.

### ***If the Employee needs or requests medical treatment in the future:***

- Have the Employee and Supervisor complete an Initial Injury Packet
- Notify Rita Sherman, Risk Management immediately

# COUNTY OF MONO

## INCIDENT REPORT:

## Declined Medical Treatment

(Employee & Supervisor complete)

This form should be completed **ONLY** if the Employee does not need (or request) medical treatment. If the Employee will go to either the nearest hospital, urgent care facility or physician, the Initial Injury Workers' Compensation Packet **must be completed** instead of the Declination of Medical Treatment Packet.

"Any person who makes or causes to be made any knowingly false or fraudulent material statement or material representation for the purpose of obtaining or denying workers compensation is guilty of a felony." This notice has been approved by the Administrative Director of the Division of Workers' Compensation (California Labor Code Section 5401.7)

### EMPLOYEE COMPLETE TOP PORTION:

EMPLOYEE NAME:		Gender: M    F	<input type="checkbox"/> Full Time <input type="checkbox"/> Part time
JOB TITLE:		DATE OF HIRE:	
HOME TELEPHONE:		DATE OF BIRTH:	
HOME ADDRESS:		ENTITY:	
		DEPARTMENT:	
INCIDENT DATE:	TIME OF INCIDENT:	LOCATION:	
DATE REPORTED:	TIME BEGAN WORK:	INCIDENT REPORTED TO:	
NATURE OF INJURY (e.g., puncture, strain, cut, fracture, burn, etc.):			
BODY PART INJURED (e.g., right wrist, left knee, head, lower back, etc.):			
INJURY SOURCE (e.g., wet pavement, jack hammer, keyboard, etc.):			
HOW INJURY OCCURRED (struck by ..., fell from ..., exposed to ..., etc.):			
DESCRIBE ANY PREVIOUS CONDITIONS/INJURIES TO BODY PART CURRENTLY INJURED:			
EMPLOYEE'S STATEMENT OF WHAT OCCURRED			
(Include as much detail as possible such as activity being performed, objects carried, equipment used, hazardous conditions, etc.):			
WHO WITNESSED THE INCIDENT?			
<input type="checkbox"/> The above information is true and correct to the best of my knowledge. <input type="checkbox"/> I understand that I am <b>not filing a Workers' Compensation claim</b> at this time. I do not choose to complete the DWC Form 1 "Employee's Claim for Workers' Compensation Benefits" at this time.			
<u>If I am in need of medical treatment in the future related to this incident, I will immediately inform my Supervisor and complete an Initial Injury Packet including the DWC Form 1 and 5020 form.</u>			
EMPLOYEE'S SIGNATURE:			DATE:

### SUPERVISOR COMPLETE BOTTOM PORTION:

<b>MEDICAL TREATMENT</b> (NOTE: If the Employee needs/requests medical treatment from a physician, complete the Initial Injury Packet)		
<input type="checkbox"/> EMPLOYEE DECLINED MEDICAL TREATMENT <input type="checkbox"/> EMPLOYEE RECEIVED MINOR FIRST AID CARE ON-SITE. Describe:		
SUPERVISOR:		TITLE:
SIGNATURE:	DATE:	TELEPHONE:

# COUNTY OF MONO

## Declination of Medical Treatment

This form should be completed ONLY if the Employee **DECLINES** medical treatment. If the Employee will go to either a physician, an Urgent Care facility or nearest hospital the **Initial Injury-Workers' Compensation Packet must be** completed instead of the Declination of Medical Treatment Packet.

**EMPLOYEE:** Check all that apply. Print name, sign and date.

---

In my opinion, I am not in need of any medical treatment at this time.

**OR**

In my opinion, I have received sufficient on-site first aid care.

**I am fully capable of performing my Usual & Customary position. At this time I decline medical care. If I am in need of medical care related to this incident in the future, I will notify my Supervisor immediately and complete an Initial Injury Packet including the DWC Form 1 "Employee's Claim for Workers' Compensation Benefits.**

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**SUPERVISOR:** Print, sign and date.

---

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

*Note: California Labor Code Section 5401(a) defines a First Aid injury as any one-time treatment, and any follow-up visit for the purpose of observation of minor scratches, cuts, burns, splinters, or other minor industrial injury, which does not ordinarily require medical care" and states that any injury that "results in lost time beyond the employee's work shift at the time of injury or which results in medical treatment beyond first aid" must be filed as a claim. All of the treatments detailed above fall under the First Aid category; therefore, unless further treatment is necessary, a workers' compensation claim does not need to be filed.*

## **Attachment 4: Emergency Notification List**

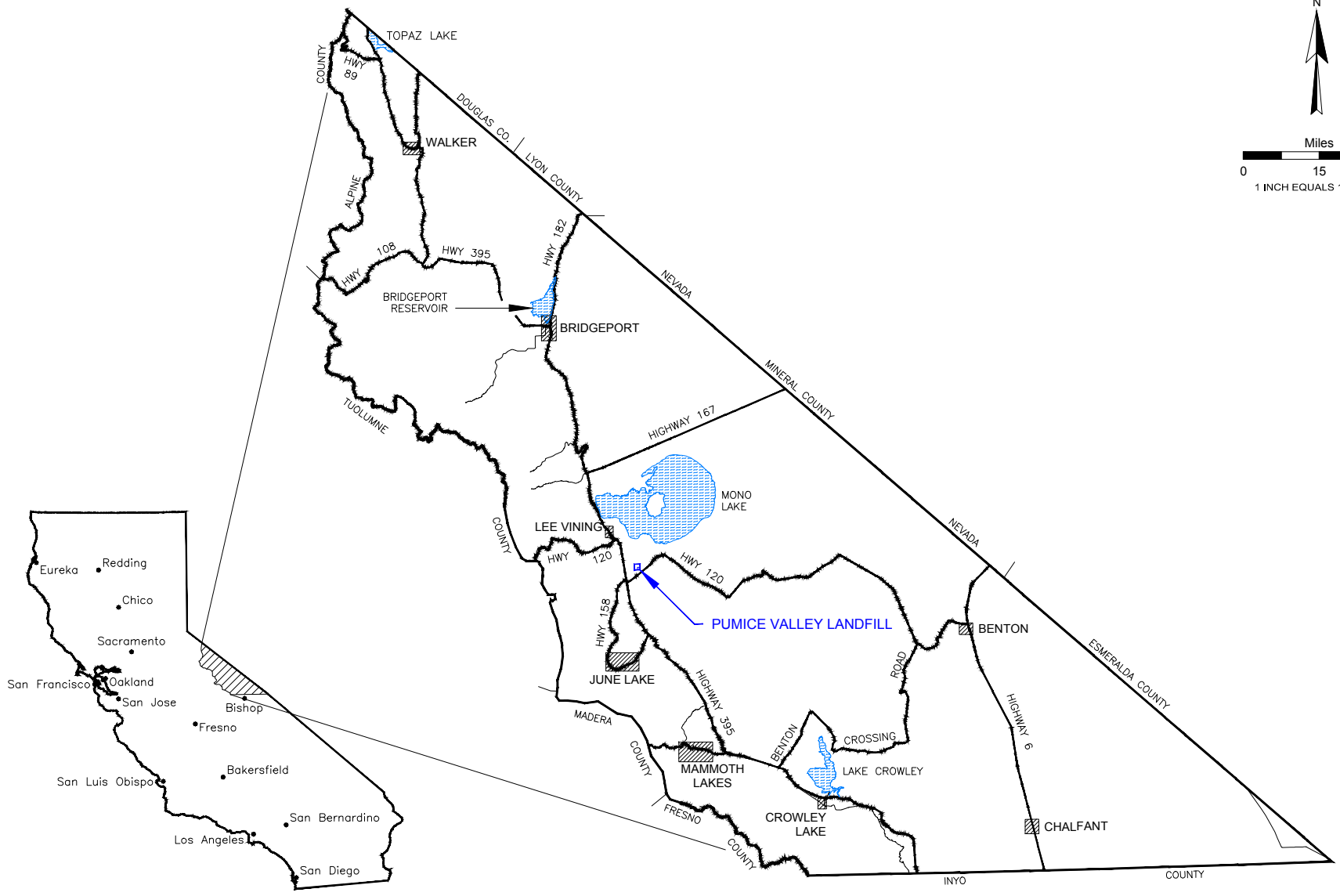
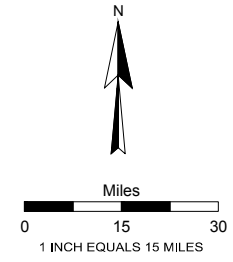
# EMERGENCY NOTIFICATION LIST


## Mono County Solid Waste Program

<u>Title / Responsibility</u>	<u>Name</u>	<u>Office Phone</u>	<u>Cellular Phone</u>	<u>Home Phone</u>
<b>Solid Waste Facilities</b>				
Benton Crossing Landfill .....	Office .....	n/a.....	(760) 937-2192.....	n/a
Site Supervisor .....	Tom Music .....	n/a.....	(760) 937-2659.....	n/a
Benton TS – Gate Attendant.....	Sunny Kelly .....	n/a.....	(760) 937-6208.....	n/a
Bridgeport TS – Gate Attendant.....	Aaron Crist .....	n/a.....	(775) 247-6018.....	n/a
Chalfant TS – Gate Attendant.....	Rudy Madera .....	n/a.....	(760) 920-7277.....	n/a
Paradise TS – Gate Attendant.....	Rudy Madera .....	n/a.....	(760) 920-7277.....	n/a
Pumice Valley TS – Gate Attendant .....	Pauline Moran .....	n/a.....	(760) 937-3208.....	n/a
Walker TS – Gate Attendant.....	Aaron Crist .....	n/a.....	(775) 247-6018.....	n/a
<b>Solid Waste Administration</b>				
Solid Waste Superintendent .....	Tony Dublino .....	(760) 932-5453.....	(760) 616-0613.....	n/a
Equipment Maintenance .....	Jerry Vande Brake .....	(760) 932-5462.....	(530) 208-6422.....	n/a
Public Works Administration .....	.....	(760) 932-5440.....	n/a.....	n/a
<b>D&amp;S Waste Removal (Contract Transfer Station Operator)</b>				
General Manager .....	Darrol Brown .....	(775) 463-3090 / (866) 463-3090.....	(775) 277-0175.....	n/a
Supervisor .....	Kevin Brown.....	(775) 463-3090 / (866) 463-3090.....	(775) 277-0143.....	n/a
Transfer Truck Driver .....	Darrol or Kevin .....	see above.....	see above.....	n/a
<b>Mono County Environmental Health Department</b>				
LEA Program.....	Jill Kearney.....	(760) 924-1846 / (760) 932-5580.....	(530) 304-3911 .....	n/a
Director.....	Louis Molina.....	(760) 924-1845 / (760) 932-5588.....	(760) 937-7246.....	n/a
<b>Road Districts</b>				
Road Operations Manager.....	Jeff Walters .....	(760) 932-5459.....	(775) 309-3343.....	n/a
District 1 (Crowley).....	Josh Rhodes .....	(760) 935-4347.....	(760) 937-1894.....	n/a
District 2 (Benton) .....	Harry Bryan .....	(760) 933-2311.....	(760) 937-1436.....	n/a
District 3 (Lee Vining).....	Jason Small .....	(760) 647-6336.....	(760) 937-1896.....	n/a
District 4.5 (Bridgeport & Walker) .....	Bob McCullough.....	(760) 932-5288.....	(760) 920-1849.....	n/a
Walker Road Shop .....	.....	(530) 495-2202.....	n/a.....	n/a
<b>Mono County Risk Manager</b>				
Deputy CAO – Risk Manager.....	< Vacant > .....	(760) 932-5410.....	< Vacant > .....	n/a

<u>Emergency Response</u>	<u>Location</u>	<u>Office Phone</u>
Sheriff's Department (911) .....	Bridgeport.....	(760) 932-7549
Sgt. Jeff Beard, Emergency Services .....	Bridgeport.....	(760) 932-7549 ext. 114
California Highway Patrol (911).....	Bridgeport.....	(760) 932-7995
.....	Bishop.....	(760) 873-3531
Fire Districts.....	.....	911
Cal Fire – Owens Valley (office) .....	Bishop.....	(760) 387-2565
Cal Fire – Owens Valley (dispatch) .....	.....	(909) 881-6916
BLM / USFS Fire Response (dispatch).....	Bishop.....	(760) 873-2488
Paramedics.....	.....	911
Hospitals / Clinics		
Mammoth Emergency Room .....	Mammoth Lakes .....	(760) 934-3311 ext. 2234
Bridgeport Clinic.....	Bridgeport.....	(760) 932-7011
Northern Inyo .....	Bishop.....	(760) 873-5811
Carson Valley Urgent Care.....	Gardnerville, NV .....	(775) 782-1600
<b><u>Other Offices / Agencies</u></b>		
California Dept. of Transportation (Caltrans) .....	Bishop.....	(760) 872-0601
Eastern Sierra Oil (Diesel Fuel).....	Bishop.....	(760) 872-4645
Propane Gas Companies		
Amerigas .....	Bishop.....	(760) 873-6371
.....	Bridgeport.....	(760) 932-7961
.....	Mammoth Lakes .....	(760) 934-2213 or, 934-6333
.....	Walker.....	(530) 495-2324
Eastern Sierra Propane .....	Bishop.....	(760) 872-2955
Turner Propane.....	Mammoth Lakes .....	(760) 934-6811
.....	Bishop.....	(760) 872-1314
Waste Collection Companies		
Mammoth Disposal .....	Mammoth Lakes .....	(760) 934-2201
D&S Waste Removal .....	Yerington, NV .....	(775) 463-3090

Note: home telephone numbers are not published on the emergency contact list distributed as an attachment to permit documents.




DESIGN: EN	
DRAWN: TWW	
REVIEWED: ---	
CHECKED: EN	
APPROVED: EN	
 IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED	

PREPARED BY:



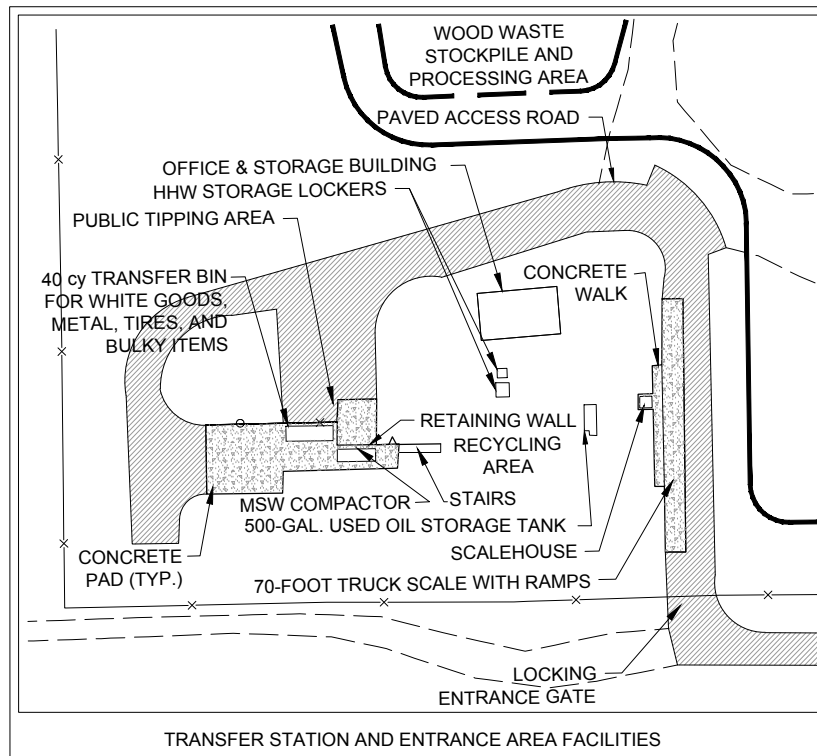
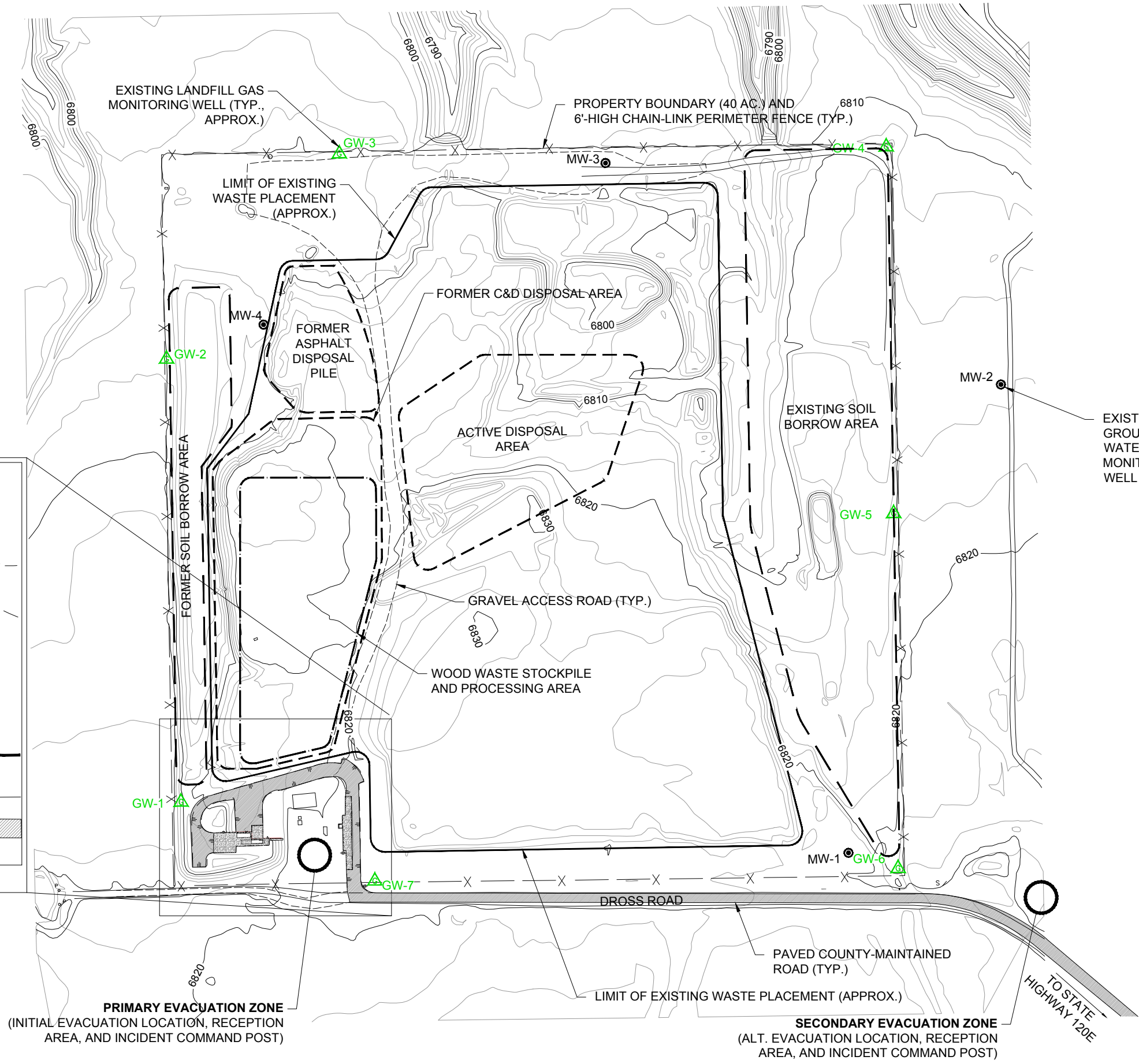
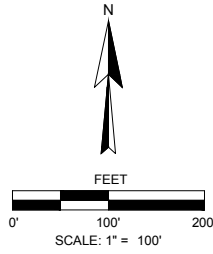
PROJECT:



EMERGENCY RESPONSE PLAN  
 PUMICE VALLEY LANDFILL  
 MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
 MONO COUNTY, CALIFORNIA

DRAWING TITLE:	
SITE LOCATION MAP	
DRAWING NO.:	REV. NO.
FIGURE 1	A
DATE:	
02.15.2013	
SRK JOB NO.:	
146900.160	





**PRIMARY EVACUATION ZONE**  
(INITIAL EVACUATION LOCATION, RECEPTION AREA, AND INCIDENT COMMAND POST)

**SECONDARY EVACUATION ZONE**  
(ALT. EVACUATION LOCATION, RECEPTION AREA, AND INCIDENT COMMAND POST)

REV.	DESCRIPTION	DATE
A	ISSUED FOR PLAN-HOLDER DISTRIBUTION	02/15/2013

DESIGN: EN	DRAWN: TWW	REVIEWED: ---	CHECKED: EN	APPROVED: EN

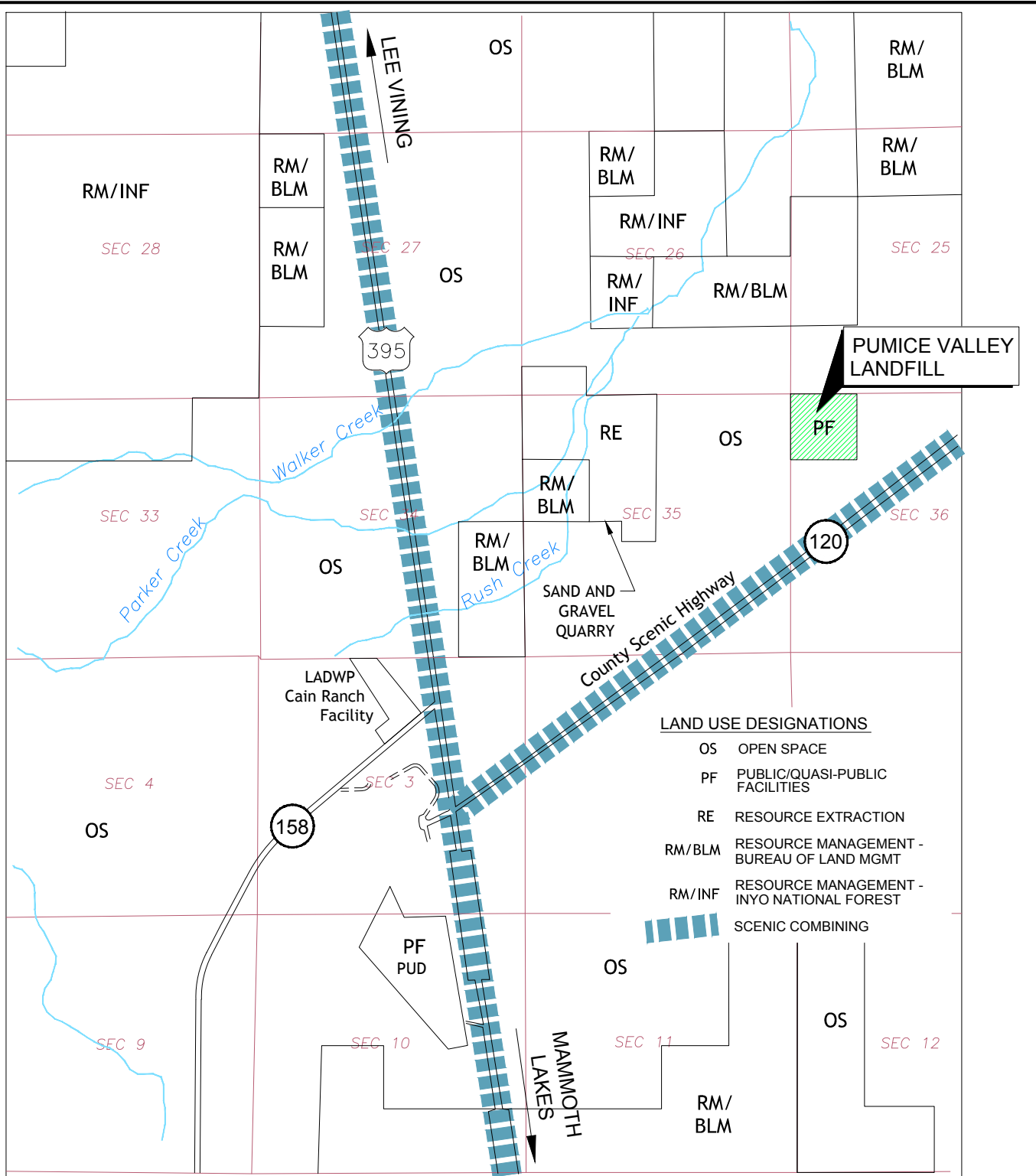
IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

PREPARED BY: **srk consulting**

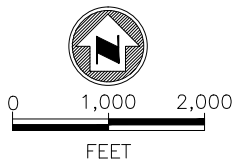
PROJECT: EMERGENCY RESPONSE PLAN  
PUMICE VALLEY LANDFILL  
MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
MONO COUNTY, CALIFORNIA

DRAWING TITLE:	DRAWING NO.:	DATE:	SRK JOB NO.:
EXISTING TOPOGRAPHY AND FACILITIES	FIGURE 2	02.15.2013	146900.160

REV. NO. **A**



Modified from Figure 63,  
Mono County General  
Plan (November, 2000).



Note:  
Development along County Scenic  
Highways are subject to Scenic  
Combining Visual Standards.

DESIGN: EN  
DRAWN: TWW  
REVIEWED: ---  
CHECKED: EN  
APPROVED: EN

PREPARED BY:



PROJECT:



EMERGENCY RESPONSE PLAN  
PUMICE VALLEY LANDFILL  
MONO COUNTY DEPARTMENT OF PUBLIC WORKS  
MONO COUNTY, CALIFORNIA

DRAWING TITLE: LAND USE MAP	
DRAWING NO.: FIGURE 3	REV. NO.
DATE: 02.15.2013	A
SRK JOB NO.: 146900.160	

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**Appendix I**  
**Injury and Illness Prevention Plan**



MONO COUNTY  
DEPARTMENT OF PUBLIC WORKS  
SOLID WASTE DIVISION

# INJURY & ILLNESS PREVENTION PROGRAM

---

## *MONO COUNTY SOLID WASTE PROGRAM*

*Mono County, California*

Prepared by:



5250 Neil Road, Suite 300  
Reno, Nevada 89502  
775.828.6800

and

Mono County Department of Public Works  
Post Office Box 457  
Bridgeport, California 93517  
760.932.5440

Revised February 15, 2013

# **INJURY & ILLNESS PREVENTION PROGRAM MONO COUNTY SOLID WASTE PROGRAM**

## **Mono County Department of Public Works Solid Waste Division**

Post Office Box 457  
Bridgeport, California 93517  
760.932.5440

**SRK Consulting (U.S.), Inc.**  
5250 Neil Road, Suite 300  
Reno, Nevada 89502

e-mail: [reno@srk.com](mailto:reno@srk.com)  
website: [www.srk.com](http://www.srk.com)

Tel: 775.828.6800  
Fax: 775.828.6820

**SRK Project Number 146900.160**

**February 2013**

**Author:**  
Evan Nikirk, PE  
Principal Consultant

**Peer Reviewed by:**  
Breese Burnley, PE  
Principal Consultant


**INJURY & ILLNESS PREVENTION PROGRAM**  
**Mono County Department of Public Works, Solid Waste Division**

**Distribution Record**

Copy No.

Name / Title	Company	Copy	Date	Area of Responsibility
Tony Dublino SW Superintendent	Mono County Dept. of Public Works Solid Waste Division	1	02.15.13	Solid Waste Program Manager
Tom Music SW Facility Supervisor	Benton Crossing Landfill Mono County Solid Waste Division	2	02.15.13	Solid Waste Facility Supervisor
Jill Kearney Env. Health Specialist	Mono County Health Department	3	02.15.13	Local Enforcement Agency
< Vacant > Deputy CAO	Mono County Administrative Office	4	02.15.13	County Risk Manager
Jeff Walters Director of Road Ops	Mono County Dept. of Public Works Road Division	5	02.15.13	County Road Maintenance
Don McGhie Sr. Real Estate Officer	Los Angeles Dept. of Water & Power Bishop Office, Real Estate	6	02.15.13	BX LF & PV LF Property Owner
Christine Karl IWM Specialist	CalRecycle Permitting & Assistance Branch	7	02.15.13	State Regulatory Agency
SRK Reno Library	SRK Consulting	8	02.15.13	Plan Preparer

Approval Signature:



**DOCUMENT RECORD OF CHANGES**

Rev. No.	Date	Section(s)	Approved By
1.	02.15.13	All (formatting, organization, minor clarifications)	E. Nikirk
2.			
3.			
4.			

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## 1.0 Program Overview

In accordance with Title 8, California Code of Regulations, Section 3203, every employer shall establish, implement, and maintain an effective *Injury and Illness Prevention Program* (IIPP). This IIPP provides the guidance necessary for the establishment and maintenance of an effective safety program applicable to all activities associated with Mono County's solid waste program and the Solid Waste Division (Division). This document is intended to complement the existing agency-wide *Mono County Occupational Injury and Illness Prevention Program* (Countywide IIPP). Some information presented in the Countywide IIPP is repeated here, while other information is exclusive to either the Countywide or Division IIPP. Both IIPPs are relevant to Division operations and should be reviewed regularly by all Division employees and by Department of Public Works staff temporarily assigned to Division duties or tasks.

This IIPP has been developed as a "living document" intended to be periodically updated and modified as changes in operation or regulatory requirements dictate. The Division will review this document at least annually and update as appropriate. Changes to this plan will be recorded and distributed to all document-holders. Copies of this plan will be made available for review to all Division employees and to Public Works staff temporarily assigned to Division duties or tasks.

Division employees perform a wide range of work activities in significantly different work environments. This physical separation and task diversity increases the challenge of implementing a successful safety program. Several Division policies, procedures, and training programs apply to all employees, but other specialized programs are only relevant to certain groups of Division workers. Although specific circumstances may vary from one location to another, cooperative implementation of the procedures outlined in this manual by supervisors and employees is essential to the maintenance of safe work environments within the Division. The details of this IIPP for the Solid Waste Division are organized into two sections, described as follows:

<u>Section</u>	<u>Description</u>
2.0	Safety-related issues, policies, and procedures that apply to all Solid Waste Division employees or Public Works employees temporarily assigned to work on projects at solid waste facilities administered by the Division.
3.0	Safety-related issues, policies, and procedures that apply specifically to Division employees involved in the operation of County landfills. This includes the acceptance and management of solid waste, salvaging and recycling operations, cover soil excavation and application, landfill and equipment maintenance, and environmental monitoring and sampling activities involving landfill gases. Also included are waste screening protocols, procedures outlining the management of unacceptable waste, and the removal of hazardous materials from white goods.

As previously described, reference is made where appropriate to the Countywide IIPP developed by the County of Mono for application to all County employees.

### 1.1 Division Work Activities and Locations

The Mono County Solid Waste Division work areas and activities with associated safety concerns are as follows:

- Daily operations of County landfills, including: scalehouse operation; solid waste disposal; cover soil excavation, hauling and application; materials salvaging, processing, and storage; household hazardous waste (HHW) and "Universal Waste" management, bulking and storage; tool and equipment maintenance and repair; and, landfill gas monitoring.

- Periodic maintenance tasks at the County's three permanently closed landfills (Benton, Bridgeport, and Chalfant).
- Periodic management of wood waste stockpiles at County landfills and transfer stations, including stockpile consolidation; loading, unloading, and transportation of the Division's wood shredder; and, sorting, processing, and shredding wood waste.
- Periodic management of HHW and "Universal Waste" removed from the waste stream at County landfills and transfer stations, including the transportation, sorting, characterization, bulking, storage, and documentation of used motor oil, oil filters, paints and stains, cathode ray tubes (CRTs), consumer electronic devices (CEDs), batteries, and other related wastes.
- Periodic management of recyclables removed from the waste stream at County landfills and transfer stations, including the loading, unloading, transportation, storage, and documentation of beverage containers, cardboard, scrap metals, white goods, tires, and related wastes.
- Periodic maintenance or repair of buildings, signs, roads, and other facilities at County landfills and transfer stations.
- Staff at the Department of Public Works' administrative office, located at 74 North School Street in Bridgeport, manages the Division's budget, personnel and payroll requirements, accounting, administrative policies and procedures, and engineering and technical support.

## 1.2 Responsibilities of Division Employees

The following sections detail the responsibilities of Division employees in the implementation of this IIPP. In addition to the responsibilities described below, each employee is encouraged to report any unsafe or unhealthy condition in the workplace, and to make suggestions to improve the safety of working conditions. No employee shall be retaliated against for reporting hazards or potential hazards, or for making suggestions related to safety. Notification by employees about workplace hazards may be made anonymously to the Public Works Safety Officer or to the County Risk Manager.

### 1.2.1 Program Manager

The Solid Waste Superintendent is responsible for administration of the County's solid waste program, for managing the Solid Waste Division, and for ensuring compliance with the Division's IIPP and associated safety policies. The Solid Waste Facility Supervisor is responsible for the daily monitoring and implementation of the Division's safety programs as they are applied to field personnel.

Administration of the Division's Safety Program includes the following elements:

- Ensuring compliance with the Mono County Occupational IIPP and the responsibilities identified therein;
- Ensuring that safety meetings are routinely scheduled and conducted, including summarizing topics under discussion, completing an attendance record and ensuring that adequate materials are available with which to conduct safety meetings;
- Ensuring that appropriate personal protective equipment (PPE) is always available on the job site;
- Providing *Injury and Illness Prevention Program* (IIPP) orientation to new Division employees and to Public Works employees temporarily assigned to Division tasks;
- Ensuring regular facility, vehicle, and equipment inspections;
- Ensuring that Division employee driver's license and medical records are properly maintained;
- Compiling and reporting accident/incident/injury data, including recommended corrective actions;
- Ensuring that accident/incident/injury reports and Worker's Compensation Claims are processed in accordance with County policies and procedures;

- Coordinating and, in some cases, administering the following training programs:
  - Emergency response
  - Fire extinguisher operation
  - First aid and CPR
  - Load-checking and hazardous materials awareness
  - Hazard communications and hazardous materials management
  - Respiratory protection
  - Back injury prevention
  - Commercial driving and heavy equipment operation
  - Lock-out / Tag-out procedures
  - Hearing conservation, and,
- Record-keeping.

### 1.2.2 Supervisors

The Solid Waste Facility Supervisor and, for projects performed by Road Division personnel on behalf of the Division, the supervisor in each Road District, are responsible for the full implementation of the Division's *Injury and Illness Prevention Program*. They each must establish a safe work environment for their employees and insist on compliance with Division safety and operational policies and procedures. Supervisors should also promote a high level of safety awareness and ensure that their employee's safety concerns are quickly evaluated and, when necessary, acted upon. The Solid Waste Facility Supervisor and Road District supervisors are the facilitators for routine safety meetings with their respective crews and are responsible for the regular review and reinforcement of countywide, departmental, and Division safety procedures. They are also responsible for notifying the Solid Waste Superintendent whenever areas of the IIPP require update or modification.

All personnel who perform supervisory tasks have the responsibility for the safety of their assigned personnel. Each supervisor shall:

- Ensure compliance with the Countywide IIPP and the responsibilities identified therein;
- Promote and enforce County of Mono safety policies, objectives, and programs;
- Set a good example by practicing high levels of safety awareness while performing day-to-day duties and by incorporating safety awareness in all discussions concerning workplace activities;
- Ensure that employees receive appropriate initial and refresher training for all assigned tasks;
- Encourage the active participation of employees in safety meetings and other associated areas of the safety program;
- Take immediate steps to correct unsafe work conditions and unsafe work practices;
- Encourage and give timely consideration to suggestions that will improve the safety of the job and the workplace;
- Continually monitor workplace activities for compliance with safe work procedures;
- Encourage the reporting of all incidents, including near-misses, and ensure that any subsequent investigations are completed in a timely and satisfactory manner; and,
- Ensure that all necessary personal protective equipment is provided, maintained, and properly used.

### **1.2.3 Employees**

Each employee has perhaps the most important safety responsibility. Employees shall be continually alert, report unsafe conditions, and avoid improper work habits that may lead to personal injury. Each employee shall:

- Know and comply with all safety rules, policies, and operating procedures;
- Maintain their immediate work area and equipment in a clean and orderly condition;
- Report all unsafe conditions when observed (including when observing fellow employees engaging in unsafe work activities, call the situation to their attention, and if necessary, immediately notify a supervisor);
- Promote a "buddy system" attitude at the workplace;
- Report all injuries, accidents, and other incidents, including near-misses;
- Submit constructive suggestions that will improve safety of the job and workplace; and,
- Be an active participant at safety meetings.

As addressed above, no employee shall be retaliated against for reporting hazards or potential hazards, or for making suggestions related to safety. Notification by employees about workplace hazards may be made anonymously to the Public Works Safety Officer or to the County Risk Manager.

### **1.2.4 Customers and General Public (via Division Staff)**

A continual challenge is to ensure compliance with Division safety rules and procedures by the various customers, vendors, and contractors that access the County's disposal facilities. While the enforcement of these rules is important, employees must take appropriate steps to tactfully make customers and vendor and contractor personnel aware when they are engaging in unsafe action(s). Maintaining a safe environment for customers, vendors, contractors, and County employees shall be the top priority. When there is a dispute concerning an issue for which a clear rule or policy does not exist, safety considerations will always be paramount in any subsequent resolution. Supervisors shall immediately investigate any report of unsafe activities at County waste management facilities. Whenever possible, supervisors shall contact the customer, vendor, or contractor and provide a follow-up report concerning the resolution of the situation in question.

## **1.3 Distribution of the Solid Waste IIPP**

All Solid Waste Division employees, including part-time or temporary workers, or temporarily-assigned Road Division or Facilities Division employees, will receive a copy of this IIPP. New Solid Waste Division employees will receive a copy of this IIPP and a review of the contents during their orientation training. The Solid Waste Facility Supervisor and Road District supervisors will receive and maintain a copy of this IIPP, including any modifications or other updates issued by the Division, in their respective offices. This copy will be available to Public Works employees for review.

## **2.0 Division-wide Policies and Programs**

This section outlines safety issues, policies, procedures, and training programs that apply to all employees within the Solid Waste Division. Specific safety issues, policies, procedures and training programs that apply only to certain job classifications within the Division are discussed as appropriate in Section 3.0 of this IIPP.

## **2.1 Solid Waste Division Safety Policy**

It is Division policy to provide a workplace free from recognized hazards and with the safest working conditions possible for all employees. The Division's goal is to minimize the potential for injuries to personnel and the loss of property by eliminating incidents through effective training, supervision, and the use of appropriate equipment. It is the Division's desire to promote and provide a safe working environment compliant with all federal, state, and local safety regulations in an atmosphere that promotes the health and safety of its employees and customers.

In order to avoid accidents and injuries, Division employees shall perform their assigned jobs in accordance with safe work practices consistent with the policies and procedures outlined or described in this IIPP. In turn, Division management shall provide the necessary job training, safety equipment, and communication programs to create a safe working environment. The Solid Waste Superintendent shall also ensure that stated policies and procedures are strictly enforced. Division operational procedures and work environments shall meet or exceed applicable State or Federal OSHA regulations.

## **2.2 Elements of a Workplace Safety Program**

The following elements have been integrated into this IIPP to provide an effective safety program for Division employees:

- Management leadership and active involvement;
- Clear assignment of responsibility for work activities;
- Early identification and control of hazards or potentially unsafe conditions;
- Employee and supervisor training;
- Safety record-keeping requirements;
- Available first aid and medical assistance;
- Employee awareness, acceptance, and participation of safe work procedures;
- Effective incident/accident investigation; and,
- Appropriate safety and personal protective equipment.

## **2.3 Central Safety Rules**

These rules represent a minimum standard and apply equally to all Division employees and contractors authorized to conduct business at Division facilities. Each site administered by the Division may have more specific or stringent rules or procedures governing worker activity that supersede these general safety rules.

### **2.3.1 Safety Awareness**

- Be aware of the surrounding work environment;
- Inform all individuals in your area, who are not familiar with the area, of potential hazards;
- Plan activities and tasks in advance;
- Periodically re-evaluate each work situation;
- Evaluate and mentally rehearse "what if" situations; and,
- Consider the consequences of actions prior to execution.

### 2.3.2 Safe Work Practices

- Follow standard operating procedures. Learn safe practices for your job. If you do not know, ask your supervisor or lead worker.
- Work purposefully and as a team. Do not hurry unnecessarily. If you work alone, ensure that someone knows where you are and what time you expect to be finished.
- Report all incidents or violations of known operational or safety procedures to the Solid Waste Facility Supervisor, Solid Waste Superintendent, the Public Works administrative office, the Public Works Safety Officer, or County Risk Manager as soon as practicable.
- Equipment shall only be operated by authorized, properly-trained employees in accordance with approved and manufacturer-recommended practices.
- Equipment shall not be operated without required safeguards in place.
- The use of narcotics, hallucinatory drugs, and alcohol are not permitted on County property, nor shall County employees be under the influence of such substances during work hours.
- Willful acts of horseplay, fighting, sabotage, vandalism, theft, etc., are not tolerated.
- Firearms and other weapons are not allowed at County facilities or work areas (including inside an employee's personal vehicle while at work).
- All Division employees shall wear seat belts and obey all traffic laws while operating County vehicles.

### 2.3.3 Office Safety

- Keep corridors and aisles free of material that may cause slips. Clean up all spills or have them cleaned up promptly.
- Arrange furniture and equipment such that entering and exiting the room is easy and access to emergency equipment is not blocked.
- Keep all file drawers and cabinet doors closed when not in use.
- Repair or replace defective chairs or desks. Check the backs of chairs to make sure they are secure.
- Ensure that electrical cords do not cross access routes or otherwise create a trip hazard. Report any utility problems such as electrical, plumbing, lighting, or ventilation to the facilities manager.
- Avoid overloading electrical circuits and do not use gang plugs. All electrical equipment should be grounded.
- Avoid standing next to closed doors. Open doors slowly when entering.
- Space heaters should not be left unattended.

### 2.3.4 Facility Emergencies

- In the event of an emergency at the Benton Crossing Landfill, refer to the *Emergency Response Plan* prepared specifically for that site for detailed response instructions.
- In the event of an emergency at the Pumice Valley Landfill, refer to the *Emergency Response Plan* prepared specifically for that site for detailed response instructions.
- Refer to Section 3.5 of this plan for emergency contact information.

## 2.4 On-Site Injuries or Illnesses to County Workers or the Public

The following sections describe the minimum basic actions to be taken by Division staff in the event of a personal injury to County personnel, a customer at a County disposal site, or to vendor, contractor, or regulatory personnel authorized to conduct business at a County disposal site.

### 2.4.1 Personal Injuries

If you are injured or become ill while on the job, immediately contact your supervisor. State the nature of your injury or illness and whether medical assistance is required. Complete a **Trindel Incident / Hazard Report Form** and a **Worker's Compensation Form** (if applicable), which are available at the Benton Crossing Landfill scalehouse, Road District offices, Public Works' administrative office, or from the County Risk Manager. Copies of standard accident and incident forms are enclosed in **Attachment 1**.

- If medical care is required, see a physician immediately. If your personal doctor is not available, go to an emergency room or urgent care facility.
- Obtain a doctor's release that clearly states the nature of your injury or illness, whether you are subject to any work restrictions, and when you can return to work.

### 2.4.2 Injuries to Others

If you encounter an injured or ill employee, customer, or vendor, contractor, or regulatory personnel, evaluate their condition and consider calling 911 immediately. Contact your supervisor. If qualified, render first aid until professional help arrives. Unless there is an immediate threat from the surrounding area, do not move the injured or ill person.

- For bleeding injuries, wear protective gloves (e.g., nitrile) and attempt to stop the bleeding by direct pressure or other means.
- If a fracture is suspected, immobilize the victim and treat for shock by elevating their feet and covering with a blanket. The victim should not be furnished with any food or drink until the threat of shock has passed. Wait for professional help to arrive.
- For burns, apply large amounts of cold water or other cold liquids such as a soft drink, cold tea, or milk. Do not apply any greasy substances.
- If the victim shows signs of heat exhaustion or heat stroke, move the person to a shady area and apply cold liquids. Encourage the victim to drink as many cold liquids as possible. In extreme cases, try to immerse the victim in icy or cold water.
- For heart attack, render cardio-pulmonary resuscitation (CPR), if trained.
- If the victim has been electrocuted, care should be taken to locate the source of the electricity prior to approaching the victim. If the individual is still in contact with the electrical source, attempt to knock him/her free using wood, rubber, or another non-conductive material. Do not grab the victim with your hands until well clear of the electrical source. If trained, render CPR.
- If the victim has been poisoned, get professional help immediately. Attempt to identify the toxic agent involved.

## 2.5 Safety Communication System

Safety communication will conform to the details of the Countywide IIPP. Safety information issued in accordance with the Countywide IIPP will be disseminated, together with Division-specific safety information, to all Division personnel through routine safety meetings.

The Division Safety Committee shall meet semi-annually, or more frequently if circumstances dictate. The Division Safety Committee, which shall be chaired by the Solid Waste Superintendent, is responsible for establishing and periodically reviewing overall Division safety policies and procedures, and addresses all safety issues that cannot be resolved by the site supervisor at the Benton Crossing Landfill.

**Division Safety Committee Members.** The following individuals are appointed members:

- Solid Waste Superintendent;
- Solid Waste Facility Supervisor;
- Public Works Safety Officer; and,
- County Risk Manager.

**Safety Committee Duties.** The Division Safety Committee shall:

- Review investigations of occupational accidents and causes of incidents resulting in occupational injury, occupational illness, or exposure to hazardous substances and, when necessary, take action(s) to manage for the prevention of future incidents;
- Review investigations of alleged hazardous conditions brought to the attention of any committee member;
- Develop changes and/or improvements to this IIPP in response to employee safety suggestions; and,
- When necessary, verify that corrective action has been taken to abate or mitigate hazardous or unsafe working conditions.

**Field Safety Meetings.** The Solid Waste Facility Supervisor shall conduct a minimum of one safety meeting each week with Benton Crossing Landfill personnel. The subject matter of each meeting should be related to safety as it pertains to solid waste activities, landfill and transfer station conditions, and tasks commonly assigned at the landfills and transfer stations. Subjects may include, but are not limited to, the following:

- Review of upcoming activities and tasks and the potential hazards that may be encountered.
- Review of previous accidents, incidents, and near-misses;
- Safety rules;
- Equipment operation and inspection;
- Proper use of personal protective equipment, including respirators;
- Proper use of fire extinguishers;
- Safe driving practices;
- Back injury prevention; and,
- Operational plans prepared and implemented by the Division, including the Division IIPP, the Emergency Response Plan, the Load-Checking Program, and other plans as they become available.

Other operational issues may also be discussed after the safety portion of the meeting has been concluded. The site supervisor should schedule weekly safety meetings at a time that will maximize the attendance of site personnel. Unless expressly excused by the site supervisor, each employee is required to attend the weekly safety meetings and encouraged to actively participate in the discussion. If staff is unable to attend a safety meeting, the site supervisor shall review the discussion individually with that employee when time permits.



The Division office shall furnish the Solid Waste Facility Supervisor with a form with which to document the safety meeting, including the date and time of the meeting, a summary of issue(s) discussed, problems identified, suggestions for improvement or correction, and an area for the signatures of all employees attending the meeting. The completed form shall be returned to the Division office for retention.

Prior to assigning personnel to perform a project on behalf of the Division, either the Solid Waste Facility Supervisor, the Solid Waste Superintendent, the supervisor in the affected Road District, or the Public Works Safety Officer will conduct a safety meeting with the assigned staff to review issues that may arise during the course of the project.

## **2.6 Division-Wide Safety and Health Training Programs**

Training for a wide range of divisional and agency-wide safety policies and procedures is made available to Division personnel. Staff are expected to actively participate in these programs. As training is completed, documentation will be maintained in the Division's records and, when appropriate, entered into the employee's personnel file.

### **2.6.1 New Employee Orientation**

Each new Division employee is required to attend orientation training that covers Division policies and procedures. This requirement also applies to employees transferring to the Division from other divisions within the Department of Public Works or from other County departments. The agenda for orientation training typically consists of the following subjects:

- Departmental and Division organization;
- Countywide *Occupational Injury and Illness Prevention Program*;
- Division *Injury and Illness Prevention Program*;
- County, Departmental, and Division policies;
- Seat Belt Policy;
- Drug and Alcohol Policy;
- Driver's License and Medical Certificate Policy;
- Hearing Conservation Program;
- Eye Wear Protection Policy;
- Safety Footwear Policy;
- Collision reporting procedures; and,
- Other personnel programs and policies.

### **2.6.2 Other Division-Wide Training Programs**

In addition to periodic refresher training on the safety practices, policies, procedures described in this IIPP, Division employees may also receive training on the following subjects:

- Defensive driving;
- Sexual harassment;
- Workplace violence prevention; and,
- Employee supervision (supervisors only).

### **2.6.3 Work Area Specific Training Programs**

Other training programs that address issues specific to certain work areas are described in that module of this IIPP dedicated to the work area in question.

## **2.7 Employee Compliance**

Supervisory personnel and workers are expected to comply with all practices, procedures, and policies necessary to maintain a safe work environment. Non-compliance with any procedure that leads to or could potentially result in worker injury or illness, or equipment damage may result in disciplinary action.

Examples of unsafe habits include, but are not limited to, the following:

- Failure to properly use personal protective equipment, as determined by task;
- Failure to wear a seat belt when operating County equipment or vehicles;
- Failure to fully complete the vehicle or equipment start-up inspection; and,
- Operating the vehicle that results in a traffic citation.

## **2.8 Hazard Assessment and Control - Inspection Programs**

Inspections are conducted by the Solid Waste Facility Supervisor or Solid Waste Superintendent to identify potential or actual hazardous conditions, initiate timely corrective action, and to document what action was taken to rectify the targeted situation or condition. Maintaining an open reporting environment that primarily seeks to identify and address safety issues, rather than assign blame and penalties, is critical to a successful safety program.

### **2.8.1 Facility Inspections**

The Solid Waste Facility Supervisor, or his designated representative, shall conduct an informal site inspection on a daily basis. Such an inspection should focus on poor housekeeping and maintenance situations or conditions that could lead to an unsafe working environment, as well as identifying employees engaging in unsafe activities. These frequent informal inspections will effectively keep the philosophy of a safe working environment in the forefront, which is essential to safe, efficient, and effective operations.

Formal inspections of each Division facility shall be performed annually by, at a minimum, members of the Division Safety Committee and a representative from the Trindel Insurance Fund. Unsafe conditions shall be noted and scheduled for correction. A Detailed Inspection Checklist shall be used at each facility to ensure that the inspection is comprehensive. A sample Detailed Inspection Checklist is included in **Attachment 2** of this plan. Facility inspection checklists shall be kept on file in the Division office along with records documenting that corrective actions have been completed.

### **2.8.2 Equipment Inspections**

The Department of Public Works has implemented a routine preventative maintenance program for all trucks, heavy equipment, and other equipment used in the operation of County solid waste management facilities.

All trucks and heavy equipment shall be inspected daily before being used by each operator. Immediate supervisors shall inspect each piece of equipment under his/her responsibility at a minimum frequency of twice per month.

### 2.8.3 Special Inspections

Federal or State OSHA compliance officers may conduct an inspection targeting a Division facility or activity. These inspections are usually the result of a serious incident or from an employee complaint. In all cases, the Solid Waste Superintendent and the Mono County Risk Manager shall be notified. The Solid Waste Superintendent or his designee and, if applicable, the Benton Crossing Landfill site supervisor shall accompany the OSHA compliance officer during such inspections.

Officials from state or county regulatory agencies schedule periodic inspections to evaluate environmental or waste management conditions and compliance with permit conditions. Since these inspections can overlap into safety and industrial hygiene subjects, either the Solid Waste Superintendent or Benton Crossing Landfill site supervisor should accompany the inspector.

## 2.9 Accident / Incident Investigations and Reporting

Refer to the Countywide IIPP for detailed information on accident and incident investigations and reporting. In general, any accident or incident must be reported in writing on a **Trindel Incident / Hazard Report Form** and, if involving an injury to County personnel, a **Worker's Compensation Form**. These forms must be turned in to the Solid Waste Superintendent or the Public Works Safety Officer, and to the County Risk Manager.

All environmental incidents will be reported to the appropriate agencies by Division administration within 72 hours of incident stabilization. Any emergency involving a release to the environment must be reported in writing or by email to the Mono County Health Department, to CalRecycle, the Lahontan Regional Water Quality Control Board, and, where applicable, the California Department of Toxic Substances Control. The Solid Waste Superintendent is also responsible for obtaining special authority for any emergency operations where equipment, personnel, or materials are required for the containment of spills or removal of hazardous material.

## 2.10 Personal Protective Equipment

The goal of the County and the Division is to provide a safe working environment for all Division employees through the effective implementation of this program. To that end, the Division requires that all personnel wear the appropriate type of personal protective equipment (PPE) for the particular task being performed. However, PPE is considered only a supplementary form of protection and is typically necessary when hazards have not been controlled through other means, such as administrative or engineering controls. Employees must be aware that PPE alone does not eliminate a particular hazard. Employees and supervisors must work together to determine the appropriate level of PPE that is necessary for a particular task. If the employee feels that there is a better PPE product available than that supplied by the Division, or if a certain type of PPE is not furnished by the Division but may be necessary, the employee should bring this to the attention of the Solid Waste Superintendent and the County Risk Manager.

Certain types of protective gear or equipment are furnished to Division field personnel pursuant to a Memorandum of Understanding between the County and the employee's union. This safety and weather protection equipment includes polarized sunglasses, summer and cold weather work gloves, cold weather jackets and boots, rain jackets and pants, and uniforms. In addition, due to the nature of the work performed by Division field personnel, the following types of PPE are also provided by the Division:

- Eye Protection (used at the employee's discretion unless specifically required by the work task procedures or otherwise directed): Safety glasses with side shields are available in clear or colored

lenses. These glasses are used mainly for protection against flying particles. Division employees who wear prescription lens are encouraged to wear plastic lenses. The County will provide safety prescription glasses only when the County requires that such glasses be worn. Chemical goggles made from soft vinyl or rubber are the best protection against dust and hazardous liquids. Prescription glasses may be worn under this type of goggle. (Note: contact lenses are not advisable in dusty or windy conditions unless goggles are also worn).

- Ear Protection (mandated use in some areas and for some equipment, used at employee's discretion unless otherwise directed): Ear protection includes soft sponge rubber types, plastic ear plugs, or ear muffs.
- Head Protection (mandated use in areas where falling objects or projectiles may be present): Hard hats conforming to American National Standards Institute (ANSI) standards are issued to all Division field personnel for use where appropriate or required.
- Hand Protection (mandated use for some activities): General types of leather, vinyl, nitrile, or fabric gloves are available to Division employees when work tasks require hand protection.
- Foot Protection (mandated for all activities): Division employees involved in field operations are given an annual allowance towards the purchase of high-top leather work boots equipped with steel toes and soles. Employees receiving this allowance are required to wear the prescribed boots whenever on duty or be subject to disciplinary action. Supervisors are required to monitor the condition and use of employee's boots. Rubber work boots are issued to each Division field employee who may be assigned to duties involving the handling of HHW.
- Respiratory Protection (used at employee's discretion unless otherwise directed; mandated use for some activities): Approved paper-type dust masks are available to all Division employees. Air-purifying respirators are required and provided for specific tasks such as bulking some types of HHW. Staff are provided with respirator training and are required to undergo background and annual medical screenings. Respirators will be fit-tested regularly in accordance with manufacturer's specifications.
- Protective Clothing / Uniforms (mandated for all activities): Protective clothing is generally not required for Division personnel. However, all Division field employees are required to wear a County-issued uniform when on the job and, when working in areas with vehicular traffic or heavy equipment, orange vests are required. As indicated above, rain and snow gear is provided for inclement weather. Division personnel assigned to duties involving the handling of HHW are issued aprons and/or Tyvek suits for use when handling certain types of waste at Division HHW facilities.

## 2.11 Driver's License and Medical Card Verification

The County retains copies of each employees' driver's license and, if applicable, their medical card. Maintenance of an appropriate driver's license and medical card is the responsibility of the employee. The County and Public Works require that both documents are updated as necessary and that current records are provided to Public Works by the employee. If a driver's license or medical card is not renewed by the employee before the expiration date, the employee's supervisor shall take immediate and appropriate action to ensure that the employee is not allowed to work until the required documents are renewed.

## 2.12 Policy Regarding Violence in the Workplace

It is the policy of Mono County to maintain a safe and healthy work environment where employees and customers are free from the threat of violence, whether verbal, physical, or written. Mono County prohibits any employee from engaging in any act that:

- threatens the safety or health of an employee or customer;
- adversely affects the health, life, or well-being of an employee or customer; or,
- results in damage to County, employee, or customer property.

## **2.13 Drug and Alcohol Use Policy**

It is the policy of Mono County to provide a work place free from the effects of alcohol and drugs. Mono County prohibits the unlawful manufacture, distribution, dispensing, possession, or use of controlled substances in the workplace. The County Drug and Alcohol Use Policy is covered as part of the new employee orientation training.

## **2.14 Ergonomics Program**

Ergonomics is the science of designing and adjusting the work environment to fit employees to their tasks, tools, and equipment. It is Mono County's policy to work directly with employees to reduce or prevent their exposure to work-related musculoskeletal disorders caused or aggravated by occupational exposure to ergonomic risk factors. The Solid Waste Superintendent or Public Works Safety Officer will work directly with employees to identify work-related ergonomic risk factors and develop or implement mitigating measures to ensure a safe and healthy work environment. Employees with concerns regarding workplace ergonomics are encouraged to notify their supervisor to initiate an evaluation of ergonomic risk factors.

## **2.15 Physical Examinations**

All employees hired by Mono County are required to have a standard physical examination before reporting to work. Further, all Division field personnel are required to undergo initial and random follow-up drug and alcohol testing. Division employees who are required to perform activities that may result in their exposure to hazardous materials or hazardous waste must complete annual medical screening as described in the HAZWOPER Standard (29 CFR 1910).

## **2.16 Outside Contractors and Vendors**

It shall be the responsibility of the Solid Waste Superintendent when administering a contract to inform contractors and vendors of Division safety rules and regulations and to monitor and enforce those rules and regulations set forth in the contract. Division workers and supervisors should always be aware of contractor and vendor personnel working at Division facilities and report any unsafe work practices or conduct to the Solid Waste Superintendent or County Risk Manager.

## **2.17 Record-Keeping**

The need to document and retain records is inherent to a successful safety program. The Division and/or County Administrative Office will retain the following records:

- Accident / incident investigation reports;
- All work-related injury and illness reports and Workers' Compensation claims;
- Division driver's license and medical card documentation;
- Cal/OSHA Log and Summary of Occupational Injuries and Illnesses (Form 200);
- Hearing test results for each employee;
- Records of attendance, agenda, and minutes of safety meetings;
- Record of any job-specific training;
- Vehicle inspection reports;

- Medical screening as required for commercial driver's licenses, respiratory protection, and for personnel under the HAZWOPER Standard;
- Claims submitted for reimbursement due to damage inflicted by Division equipment or personnel; and,
- Records of attendance, agenda, and minutes of Division Safety Committee meetings.

## 3.0 Landfill Policies and Programs

This module outlines safety issues, policies, procedures and training programs that apply to Division field employees involved in the operation and maintenance of County landfills and transfer stations.

### 3.1 Landfill Activities and Location

The operational scope of County landfills and transfer stations includes the following elements.

- Acceptance, management, compaction, and covering of municipal solid waste (MSW) and construction and demolition (C&D) waste.
- Acceptance and management of recyclable or reusable material, including wood waste, tires, scrap metal, and white goods. These activities also include salvaging recoverable materials from disposal areas when performed in a controlled manner and in accordance with an approved plan.
- Acceptance and management of HHW and universal wastes, including lead-acid batteries, used motor oil, oil filters, cathode ray tubes (CRTs), consumer electronic devices (CEDs), paints, stains, herbicides, and similar materials.
- On-going engineering design, monitoring, and maintenance of the landfill, including surveying, landfill gas sampling, and ground water sampling.

### 3.2 General Safety Rules

- No one is allowed to operate a piece of equipment or vehicle without proper training and/or certification, and authorization from their supervisor.
- Operating a County vehicle with a suspended license or expired medical certificate is against the law and strictly forbidden.
- It is mandatory for each driver or operator to complete and document an inspection of equipment or vehicle prior to use.
- All traffic rules must be obeyed when operating any County vehicle. Under no circumstances shall the posted speed limit be exceeded on any road, including landfill access roads.
- Drive defensively. Always exhibit courtesy to other vehicles and pedestrians.
- Seat belts shall be worn at all times when driving any County vehicle or operating heavy equipment.
- All employees working near disposal areas shall wear a high-visibility safety vest.
- Gloves and work boots shall be worn when working in or around refuse or equipment. Work boots must conform to Division and County specifications and shall be worn at all times during work hours. Tennis shoes, sneakers, or sandals are prohibited.

### 3.3 Landfill Operations Safety Concerns

The following sections describe minimum practices and procedures necessary to promote a safe work environment and issues to be aware of to reduce the potential for accidents or incidents when performing routine tasks at County disposal sites.

### 3.3.1 Spotter's Duties and Responsibilities

During periods of heavy landfill traffic, Division personnel may be assigned to be on duty as a spotter at the MSW working face. Restricted unloading space, coupled with traffic volume, makes it crucial that personnel aggressively control traffic both entering and leaving the tipping pad. Due to the wide variety of vehicles and range of driver experience, this area offers a high potential for collision. Site speed limits must be strictly enforced, especially for vehicles leaving the area. The spotter's duties and responsibilities include the following:

- Always wear a highly visible safety vest while on the tipping pad. Stand to the driver's side of the vehicle and establish eye contact with the driver prior to motioning a vehicle forward.
- Use standard hand signals to manage traffic.
- Anticipate the movements of the dozer or compactor and direct vehicles accordingly.
- Make sure drivers stay near their vehicles. Do not allow drivers to walk on refuse or across the tipping area. Do not allow pets to leave the vehicle.
- Do not allow smoking outside a vehicle.
- Be alert for unloading of prohibited materials and enforce load-checking rules.

### 3.3.2 Scraper Operations

Because of their size, this equipment has reduced maneuverability, large "blind spots," is slow to accelerate, and requires significant stopping distance. As a result, it is essential for operators to "think ahead" of the machine and attempt to anticipate changing ground and soil conditions and the movement of other vehicles. Scraper operators should use the appropriate safety equipment when driving, including gloves, ear plugs, safety glasses, and dust mask. Other safety concerns associated with scraper operation include the following:

- During the walk-around inspection, look for loose bolts, fluid leaks, broken mirrors or windows, and damaged parts. Ensure that foreign objects such as wire are not wrapped around moving parts.
- Use caution and always maintain a three-point contact when mounting or dismounting from the equipment. Make sure access to the fuel tank and cab are not covered with mud or another slippery substance. Never jump off from any piece of equipment.
- Check the fire extinguisher mounted in the equipment and make sure that it is charged and the inspection date is current.
- ALWAYS buckle the seat belt prior to moving the equipment from any parked location.
- ALWAYS perform a brake check and monitor the brake air pressure gauge before moving equipment.
- Check the horn and back-up alarm prior to moving.

CAUTION: If the back-up alarm is not working properly, do not operate the equipment until the problem has been corrected.

- Check mirrors and turn cab to eliminate blind spots before moving the scraper.
- Adjust speed according to current road and visibility conditions.

CAUTION: Always reduce speed at traffic intersections. Many customers are not familiar with landfill operations and usually underestimate the speed of scraper equipment. In case of an emergency stop, drop the bowl / teeth into the road. Whether transporting soil or running empty, carry the bowl six to 12 inches above the ground.

- Prior to replacing cutting teeth, always park on level ground, set the parking brake and turn off the engine. Use safety stands to keep the bowl elevated.

CAUTION: Keep arms and legs from underneath the bowl while changing the teeth.

### 3.3.3 Dozer Operations

Operators must use the appropriate safety equipment, including gloves, ear plugs, safety glasses, and dust mask. Other safety concerns associated with dozer operations include the following:

- During your walk-around inspection, look for loose bolts, fluid leaks, broken windows or mirrors, and damaged parts. Ensure that foreign objects such as wire are not wrapped around moving parts.
- Use caution and always maintain a three-point contact when mounting or dismounting from the equipment. Make sure access to the fuel tank and cab are not covered with mud or another slippery substance. Never jump off from any piece of equipment.
- Check the fire extinguisher mounted in the equipment and make sure that it is charged and the inspection date is current.
- ALWAYS buckle the seat belt prior to moving the equipment from any parked location.
- ALWAYS perform a brake check and monitor the brake air pressure gauge before moving equipment.
- Check the horn and back-up alarm prior to moving.

CAUTION: If the back-up alarm is not working properly, do not operate the equipment until the problem has been corrected.

- Use caution when operating near the working face. Because they frequently operate near customer vehicles dumping their load, dozer operators must be aware of any vehicle backing into their immediate area. Since customers may not be familiar with the landfill, the noise and dust may be distracting. For this reason, operators must anticipate sudden movements from these individuals and avoid working too close to their location. Be aware of where the spotter is directing incoming traffic. Do not move your equipment without first checking for people or nearby objects.

CAUTION: Always maintain a minimum width of one dozer blade between a vehicle that is unloading and the refuse that the dozer is pushing to minimize the potential for debris from falling on customers or their vehicles.

- Avoid compacting waste horizontal to the working face. This method is not efficient and can significantly increase the potential for rollover.
- If you feel you are losing control of your equipment, drop the blade immediately to the ground and decelerate.

### 3.3.4 Compactor Operations

Compactor operators must use the appropriate safety equipment, including gloves, ear plugs, safety glasses, and dust mask. Other safety concerns associated with compactor operations include the following:

- During your walk-around inspection, look for loose bolts, fluid leaks, broken windows or mirrors, and damaged parts. Ensure that foreign objects such as wire are not wrapped around moving parts.
- Use caution and always maintain a three-point contact when mounting or dismounting from the equipment. Make sure access to the fuel tank and cab are not covered with mud or another slippery substance. Never jump off from any piece of equipment.
- Check the fire extinguisher mounted in the equipment and make sure that it is charged and the inspection date is current.
- ALWAYS buckle the seat belt prior to moving the equipment from any parked location.
- ALWAYS perform a brake check and monitor the brake air pressure gauge before moving equipment.
- Check the horn and back-up alarm prior to moving.

CAUTION: If the back-up alarm is not working properly, do not operate the equipment until the problem has been corrected.



- Use caution when operating near the working face. Because they frequently operate near customer vehicles dumping their load, dozer operators must be aware of any vehicle backing into their immediate area. Since customers may not be familiar with the landfill, the noise and dust may be distracting. For this reason, operators must anticipate sudden movements from these individuals and avoid working too close to their location. Be aware of where the spotter is directing incoming traffic. Do not move your equipment without first checking for people or nearby objects.

CAUTION: Always maintain a minimum width of one dozer blade between a vehicle that is unloading and the refuse that the dozer is pushing to minimize the potential for debris from falling on customers or their vehicles.

- Avoid compacting waste horizontal to the working face. This method is not efficient and can significantly increase the potential for rollover.
- If you feel you are losing control of your equipment, drop the blade immediately to the ground and decelerate.

### 3.3.5 Water Truck Operations

When operating the water truck, landfill personnel must use the appropriate safety equipment, including gloves, ear plugs, safety glasses, and dust mask. Other safety concerns associated with water truck operations include the following:

- During your walk-around inspection, look for loose bolts, fluid leaks, broken windows or mirrors, and damaged parts. Ensure that foreign objects such as wire are not wrapped around moving parts.
- Use caution and always maintain a three-point contact when mounting or dismounting from the equipment. Make sure access to the fuel tank and cab are not covered with mud or another slippery substance. Never jump off from any piece of equipment.
- Check the fire extinguisher mounted in the equipment and make sure that it is charged and the inspection date is current.
- ALWAYS buckle the seat belt prior to moving the equipment from any parked location.
- ALWAYS perform a brake check and monitor the brake air pressure gauge before moving equipment.
- Check the horn and back-up alarm prior to moving.

CAUTION: If the back-up alarm is not working properly, do not operate the equipment until the problem has been corrected.

- Under normal conditions, only use the Stage 1 spray function. Stage 2 will usually apply excessive amounts of water to roads and create a slippery and potentially unsafe condition.
- When watering on a grade, try to spray from top to bottom. If this is not possible, cycle the sprayers off and on as you proceed up the hill.
- Avoid excessive watering on curves.
- ALWAYS apply water in the same direction as the scraper equipment is traveling. If possible, follow behind the scrapers when watering the haul roads. ALWAYS be aware of where the scraper is operating and yield the right-of-way.
- Use caution when operating near the working face. Because they frequently operate near customer vehicles dumping their load, water truck operators must be aware of any vehicle backing into their immediate area. Since customers may not be familiar with the landfill, the noise and dust may be distracting. For this reason, operators must anticipate sudden movements from these individuals and avoid working too close to their location. Be aware of where the spotter is directing incoming traffic. When operating near the working face, do not move your equipment or initiate spraying activities without first checking for people or nearby objects.

### 3.3.6 Motor Grader Operations

Motor grader operators must use the appropriate safety equipment, including gloves, ear plugs, safety glasses, and dust mask. Other safety concerns associated with grader operations include the following:

- During your walk-around inspection, look for loose bolts, fluid leaks, broken windows or mirrors, and damaged parts. Ensure that foreign objects such as wire are not wrapped around moving parts.
- Use caution and always maintain a three-point contact when mounting or dismounting from the equipment. Make sure access to the fuel tank and cab are not covered with mud or another slippery substance. Never jump off from any piece of equipment.
- Check the fire extinguisher mounted in the equipment and make sure that it is charged and the inspection date is current.
- ALWAYS buckle the seat belt prior to moving the equipment from any parked location.
- ALWAYS perform a brake check and monitor the brake air pressure gauge before moving equipment.
- Check the horn and back-up alarm prior to moving.

CAUTION: If the back-up alarm is not working properly, do not operate the equipment until the problem has been corrected.

- NEVER leave windrows, large rocks, or cobbles on access roads. This could create an unsafe road condition for the traveling public or other equipment operators.
- ALWAYS grade in the same traffic direction as used by the scraper.

CAUTION: Never position the grader on slopes that are steeper than a ratio of 3 (horizontal) to 1 (vertical). Steep slopes can significantly increase the potential of a rollover.

- Use caution when operating near the working face. Because they frequently operate near customer vehicles dumping their load, grader operators must be aware of any vehicle backing into their immediate area. Since customers may not be familiar with the landfill, the noise and dust may be distracting. For this reason, operators must anticipate sudden movements from these individuals and avoid working too close to their location. Be aware of where the spotter is directing incoming traffic. When operating near the working face, do not move your equipment without first checking for people or nearby objects.

### 3.3.7 Dump Truck Operations

Dump truck operators must use the appropriate safety equipment, including gloves, ear plugs, safety glasses, and dust mask. Other safety concerns associated with dump truck operations include the following:

- During your walk-around inspection, look for loose bolts, fluid leaks, broken windows or mirrors, and damaged parts. Ensure that foreign objects such as wire are not wrapped around moving parts.
- Use caution and always maintain a three-point contact when mounting or dismounting from the equipment. Make sure access to the fuel tank and cab are not covered with mud or another slippery substance. Never jump off from any piece of equipment.
- Check the fire extinguisher mounted in the equipment and make sure that it is charged and the inspection date is current.
- ALWAYS buckle the seat belt prior to moving the equipment from any parked location.
- ALWAYS perform a brake check and monitor the brake air pressure gauge before moving equipment.
- Check the horn and back-up alarm prior to moving.

CAUTION: If the back-up alarm is not working properly, do not operate the equipment until the problem has been corrected.

- Adjust the truck's travel speed to suit road conditions, visibility, and the load being carried.

- Avoid operating the truck on steep slopes with the dump body raised. This condition significantly increases the potential for a rollover. Do not raise the dump body or dump loads while the vehicle is moving backwards.

CAUTION: Do not allow any personnel to walk under the dump body when it is raised unless it is secured with a dump body lock and the tipping lever is locked.

### 3.3.8 Wheel Loader / Tool Carrier Operations

Wheel loader operators must use the appropriate safety equipment, including gloves, ear plugs, safety glasses, and dust mask. Other safety concerns associated with loader operations include the following:

- During your walk-around inspection, look for loose bolts, fluid leaks, broken windows or mirrors, and damaged parts. Ensure that foreign objects such as wire are not wrapped around moving parts.
- Use caution and always maintain a three-point contact when mounting or dismounting from the equipment. Make sure access to the fuel tank and cab are not covered with mud or another slippery substance. Never jump off from any piece of equipment.
- Check the fire extinguisher mounted in the equipment and make sure that it is charged and the inspection date is current.
- ALWAYS buckle the seat belt prior to moving the equipment from any parked location.
- ALWAYS perform a brake check and monitor the brake air pressure gauge before moving equipment.
- Check the horn and back-up alarm prior to moving.

CAUTION: If the back-up alarm is not working properly, do not operate the equipment until the problem has been corrected.

- Use caution when operating near the working face. Because they frequently operate near customer vehicles dumping their load, truck operators must be aware of any vehicle backing into their immediate area. Since customers may not be familiar with the landfill, the noise and dust may be distracting. For this reason, operators must anticipate sudden movements from these individuals and avoid working too close to their location. Be aware of where the spotter is directing incoming traffic. Do not move your equipment without first checking for people or nearby objects.
- Whether transporting material or running empty, carry the bucket two feet above the ground.
- When loading from a pile, NEVER climb the pile to pull down material. This could result in rollover damage to the equipment or driver injury due to falling dirt or rocks.
- NEVER assist customers by using the loader to off-load waste from vehicles or loading material onto a customer's vehicle.
- When pulling a stuck vehicle, it is the customer's responsibility to attach the towing chain to the vehicle requiring assistance.

CAUTION: Make sure that all personnel are clear of the towing chain prior to moving the loader.

### 3.3.9 Trenching and Excavation Operations

Any trenching or digging activities at a County landfill must be approved by the Solid Waste Superintendent. In addition to potentially affecting permit conditions or site planning, trenching or digging at these sites can potentially expose the equipment operator and nearby workers to both environmental and physical hazards. These hazards may include, but not be limited to, the following:

- Cave-ins;
- Dusty conditions that could affect eyesight;
- Uneven terrain;

- Explosive conditions or gases; and,
- Hazardous breathing conditions (e.g., hydrogen sulfide gas or lack of oxygen).

### 3.3.10 Landfill Gas Monitoring Operations

All landfill gas sampling will be conducted by trained Division personnel, Public Works engineering staff, or a contractor in accordance with the site-specific *Landfill Gas Monitoring and Control Program*, a copy of which is on file at the Division administration office and at the Benton Crossing Landfill. Personnel involved with landfill gas monitoring at County landfills must review the applicable *Landfill Gas Monitoring and Control Program* and undergo training for monitoring procedures prior to initiating any soil gas monitoring activities.

Performing landfill gas monitoring can potentially expose personnel to both environmental and physical hazards. These hazards may include, but are not limited to, the following:

- Explosive gases;
- Potentially hazardous breathing conditions;
- Vehicular and heavy equipment traffic;
- Exposure to wildlife and insects; and,
- Exposure to the elements.

### 3.3.11 Appliance Management

The Division currently engages a contractor to remove refrigerants, motor oils, mercury switches, capacitors, and other hazardous materials from large household appliances, or white goods. However, Division staff remove thermo-couplers from gas water heaters and capacitors from air conditioners. When managing these materials, workers must use the appropriate safety equipment, including gloves and safety glasses. Other safety concerns associated with appliance management include:

- If power tools are used, make sure that all electrical cords are in good condition prior to use. Frayed or exposed cords could result in a serious injury.
- Use good lifting techniques prior to moving appliances and use mechanical devices for assistance to the greatest extent possible. Make sure that your grip will not slip on an oily surface of the unit. Avoid any twisting or turning motions when carrying or moving an appliance.

### 3.3.12 Waste Screening Program

The Division has adopted waste acceptance criteria and implemented a *Load-Checking Program* to be used by disposal site personnel to screen material brought in for disposal. A copy of this plan is on file at the Division administration office and at the Benton Crossing Landfill. The objectives of the waste screening program are as follows:

- Safeguard the health and safety of County employees, contracted personnel, and the general public who are exposed to the disposal of any material;
- Safeguard the health of the environment surrounding and underlying County disposal sites;
- Comply with permit requirements and California water quality objectives as they apply to County disposal sites; and,
- Maximize service to landfill customers as legal and safety constraints permit.

### 3.3.13 Hazardous Materials

If hazardous material is dumped or left at the public tipping area, cordon or cone off or barricade the immediate area and keep the general public at a safe distance. Attempt to isolate the hazardous material from the rest of the material and follow these precautions:

- CAUTION: USE EXTREME CARE. Do not handle or approach the material unless it can be identified and is determined not to be a human health hazard.
- CAUTION: If a container is bulging or appears to be under pressure, immediately evacuate the nearby area and **call 911**. Gloves and eye protection must be worn at all times when in the vicinity of the material. If the hazardous material is unknown and appears to be a threat to human health, immediately contact the Solid Waste Superintendent or the Division office and the County Health Department. If there is an imminent threat to worker or public safety, **call 911** immediately.
- CAUTION: DO NOT move the hazardous material unless a greater hazard exists by leaving it in its original location.
- If the load is still on a vehicle, DO NOT eject the load unless instructed to do so by your supervisor or the responding agency.
- If the hazardous material can be isolated and is not a threat to human health, contact the Division office and the County Health Department for assistance in arranging proper disposal.
- If the hazardous material cannot be isolated, but is not a threat to human health and has a minimal impact on the rest of the unloaded material, contact the site supervisor, Solid Waste Superintendent, or Division office and the County Health Department for a determination as to whether the entire load can be allowed to be dumped at the landfill or transfer station.

### 3.3.14 Medical or Infectious Waste

All medical waste brought to County landfills and transfer stations must have already been treated and rendered non-infectious to be accepted for disposal. If untreated medical or infectious waste (including sharps, needles, or syringes) is dumped or left at the working face, attempt to cordon or cone off or barricade the immediate area and keep the general public at a safe distance. If the customer delivering the waste is still available, it is the hauler's responsibility to remove the material.

- CAUTION: USE EXTREME CARE. Do not handle or approach the material unless it can be identified and is determined not to be a human health hazard. Avoid mixing the material with other waste. Contact the Solid Waste Facility Supervisor, Solid Waste Superintendent, or Division office and the County Health Department for assistance and disposal.

### 3.3.15 Hazardous Materials Storage

Prohibited materials classified as hazardous waste should be removed from the tipping area as soon as practicable and relocated to the on-site HHW storage facility. Division waste management specialists are responsible for documenting the acceptance of hazardous material and its proper storage.

- CAUTION: USE EXTREME CARE. Do not handle or approach the material unless it can be identified and is determined not to be a human health hazard.
- CAUTION: If a container is bulging or appears to be under pressure, immediately evacuate the nearby area and call 911. Gloves and eye protection must be worn at all times when in the vicinity of the material

### 3.4 Emergency Procedures

Refer to the applicable *Emergency Response Plan* for detailed emergency procedures established for the Benton Crossing Landfill and the Pumice Valley Landfill. Depending on the nature of the emergency, County personnel responding at the site will first contact emergency services or Public Works' administrative office either via cellular phone to 911 or Public Works personnel via two-way radios installed in site vehicles and heavy equipment. Road District personnel may also be contacted via two-way radio if additional equipment and personnel are required to address a situation. Once the immediate threat has been stabilized, the Solid Waste Superintendent is responsible for contacting the Mono County Health Department (as the Local Enforcement Agency, or LEA) and additional regulatory agencies as required.

Although fire response in unincorporated Mono County is within the jurisdictional boundaries of the United States Forest Service (USFS), their mutual aid agreement with the California Department of Forestry and Fire Protection, Owens Valley Division (Cal Fire), means that the Cal Fire dispatcher should be first contacted to respond. If necessary, additional response may also be provided by the local volunteer fire department.

The Mammoth Hospital is the regional medical center for the Southern Mono Health Care District. The facility has an emergency room and other facilities adequate to handle most emergencies that are likely to occur. Located approximately 12 miles northeast of the Benton Crossing Landfill, the hospital is the medical center closest to that site.

Emergency contact personnel and telephone numbers are included in **Attachment 3**. A poster version of the same information is posted in the gatehouse at each County landfill and transfer station and has been provided to the LEA. The emergency services described above can be reached as follows:

Mammoth Hospital 85 Sierra Park Road Mammoth Lakes, California 93546	Cal Fire, Owens Valley Division 2781 South Round Valley Road Bishop, California 93514
760.924.4100 (administration)	760.387.2565 (administration)
760.934.3311 (emergency room)	909.881.6916 (emergency dispatch)

#### 3.4.1 Vehicle or Heavy Equipment Accidents

If an accident involving a Division vehicle or heavy equipment occurs, the following procedures should be observed:

- Contact your supervisor immediately;
- When serious personal injury is involved, call 911. While some injuries may appear be minor and not require emergency care, it is best to have a qualified medical technician examine each victim;
- If a vehicle is on fire and/or fuel is leaking, keep well clear and prevent the general public from entering the immediate area;
- Obtain the driver's name of other vehicles involved and names of any witnesses; and,
- Refer to the site *Emergency Response Plan* for detailed instructions.

#### 3.4.2 Hydraulic Spills

Because of their size, landfill equipment contains large amounts of hydraulic oil. This is also true of County trucks, private collection trucks, or contractor trucks frequently on-site. If discharged from any large vehicle or equipment, this oil can pose an environmental threat or result in an unsafe road condition. Operators shall

continually check for leaks by performing periodic visual inspections of their equipment. Hydraulic leaks should be dealt with as soon as safety permits. When a leak is detected, immediately bring the vehicle to a stop away from the flow of traffic. If necessary, continue to an area where the leak can be safely handled. If a hydraulic line ruptures or begins to leak the following procedures shall be followed:

- If possible, position the vehicle to minimize any discharges into a ditch or water body;
- Immediately disengage the PTO and turn the engine off;
- Immediately notify the site supervisor or lead worker;
- Do not leave the incident scene unless instructed to do so by a supervisor;
- Place road markers out if necessary and direct traffic around the spill;
- For small spills, use absorbent to collect the oil. For larger spills that have significantly impacted soils or surface water, contact the Solid Waste Superintendent or Division office. Personnel shall use whatever means are at their disposal to contain the spill until help arrives. Direct the Division office to contact the County Health Department.
- If an emergency exists in the judgment of the driver or site supervisor, contact 911 and request assistance.
- The supervisor should ensure that the spill or leak has been completely contained and, if possible, removed prior to leaving the scene.
- Prepare a report of the incident using Division and County forms once the situation has been resolved or stabilized.

### **3.4.3 Vehicle Breakdowns**

The following procedures shall be followed in the event of vehicle breakdown:

- Assess the severity of the problem - shut vehicle down, if necessary. Notify the site supervisor or lead worker as soon as possible. Describe problem as best as you can.
- If the vehicle cannot be moved and is blocking traffic, set out road markers and direct traffic around vehicle.
- In the event of any brake-related problem, stop immediately. Notify the site supervisor or lead worker as soon as possible. Do not move the vehicle until the problem is corrected.
- Do not leave vehicle unattended or leave the scene of the incident unless instructed to do so by the site supervisor or lead worker.

### **3.4.4 Vehicle Hot Loads**

If in doubt about a "hot load" situation, have the customer eject the load immediately in an area separate from the working face and away from combustible materials. The primary concern should be to protect site equipment and the safety of site personnel and the public and to prevent the spread of fire. Assess the situation and follow the procedures listed below.

- If smoke is visible:
  - Do not open the tailgate unless flames become visible or severe paint blistering is apparent.
  - Attempt to cool or extinguish the "hot load" with fire extinguisher or water hose, if available.
- If flames are visible:
  - Contact 911 immediately for fire response and notify the site supervisor of the problem and location.

- Monitor the situation until the fire department arrives. Do not dump the load UNLESS flames become visible or if instructed to do so by the site supervisor or the responding fire department.
- Set road markers out, prevent customers from accessing the area, and direct traffic as necessary.
- If the water truck is nearby, attempt to extinguish or contain fire until help arrives.
- Prepare a report of the incident using Division and County forms once the situation has been resolved or stabilized.



## **Attachment 1 – Incident Reporting Forms**

# DAILY ACTIVITY LOG

## Mono County Solid Waste Program

Facility Location:  BT  BX  BP  CH  PR  PV  WK

Date: \_\_\_ / \_\_\_ / \_\_\_  Mon.  Tue.  Wed.  Thu.  Fri.  Sat.  Sun.

Staff: \_\_\_\_\_ Open: \_\_\_\_\_ a.m. Closed: \_\_\_\_\_ p.m.

### START OF DAY CHECK:

Gate Security:  Okay  See Notes      Illegal Dumping:  None  See Notes

Perimeter Fencing:  Okay  See Notes      Vandalism:  None  See Notes

Equipment Check:  Okay  See Notes      Posted Signs:  Okay  See Notes

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Weather (a.m.):  Hot  Warm  Cool  Cold  Breezy  Windy  
 Sunny  Overcast  Rain  Snow  Other: \_\_\_\_\_

Weather (p.m.):  Hot  Warm  Cool  Cold  Breezy  Windy  
 Sunny  Overcast  Rain  Snow  Other: \_\_\_\_\_

### SUMMARY OF DAILY ACTIVITIES:

Litter: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Load-Checking:  Routine Visual at Gate  Physical Inspection  Prohibited Waste Found

\_\_\_\_\_  
\_\_\_\_\_

SPECIAL EVENT / INJURY / ACCIDENT / INCIDENT REPORT: (Describe Event, Damage, Outcome)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# DAILY ACTIVITY LOG – BENTON CROSSING LANDFILL

## Mono County Solid Waste Program

Date: \_\_\_ / \_\_\_ / \_\_\_     Mon.    Tue.    Wed.    Thu.    Fri.    Sat.    Sun.

Staff: \_\_\_\_\_    Open: \_\_\_\_\_ a.m.    Closed: \_\_\_\_\_ p.m.

### START OF DAY CHECK:

Gate Security:	<input type="checkbox"/> Okay	<input type="checkbox"/> See Notes	Illegal Dumping:	<input type="checkbox"/> None	<input type="checkbox"/> See Notes
Perimeter Fencing:	<input type="checkbox"/> Okay	<input type="checkbox"/> See Notes	Vandalism:	<input type="checkbox"/> None	<input type="checkbox"/> See Notes
Equipment Check:	<input type="checkbox"/> Okay	<input type="checkbox"/> See Notes	Posted Signs:	<input type="checkbox"/> Okay	<input type="checkbox"/> See Notes

Notes: \_\_\_\_\_  
\_\_\_\_\_

Weather (a.m.):     Hot     Warm     Cool     Cold     Wind: \_\_\_\_\_  
                          Sunny     Overcast     Rain     Snow     Other: \_\_\_\_\_

Weather (p.m.):     Hot     Warm     Cool     Cold     Wind: \_\_\_\_\_  
                          Sunny     Overcast     Rain     Snow     Other: \_\_\_\_\_

### SUMMARY OF DAILY ACTIVITIES:

Litter: \_\_\_\_\_  
\_\_\_\_\_

Diversion: \_\_\_\_\_  
\_\_\_\_\_

Load-Checking:     Routine Visual at Gate     Physical Inspection     Prohibited Waste Found

MSW Cover:     Soil     Tarps     Chips     Organics     Other: \_\_\_\_\_

C&D Cover:     Soil     Tarps     Inerts     Sludge Mix     Other: \_\_\_\_\_

SPECIAL EVENT / INJURY / ACCIDENT / INCIDENT REPORT:    (Describe Event, Damage, Outcome)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# INSTRUCTION SHEET

## INCIDENT/HAZARD REPORT FORM

Fill out the form as completely as possible, and then give it to you department head for signature. Make sure you complete the sections for "Suggestion Corrections" and the "Corrective Action" that was taken. Make a photocopy to keep for your files. Send the original form to Risk Management, Rita Sherman. Please do this within three working days after completing the form.

This form may also be turned in confidentially, without signature, to Risk Management.

Risk Management  
P.O. Box 696  
Bridgeport, CA 93517

Rita Sherman	T (760) 932-5415	F (760) 932-5411	<a href="mailto:rsherman@mono.ca.gov">rsherman@mono.ca.gov</a>
Sarah Messerlian	T(760) 932-5405	F(760) 932-5411	<a href="mailto:smesserlian@mono.ca.gov">smesserlian@mono.ca.gov</a>

Trindel Insurance Fund			
Gene Herndon	T(530) 594-2027	F (530) 894-2732	<a href="mailto:tifsfty@trindel.org">tifsfty@trindel.org</a>

**IF YOU HAVE ANY QUESTIONS PLEASE CONTACT RITA SHERMAN AT THE RISK MANAGEMENT OFFICE**

**INTERNAL USE ONLY!**

**INCIDENT/HAZARD REPORT**

(COUNTY) Mono

<b>SECTION A</b>	<input type="checkbox"/> <b>INJURY INCIDENT</b>	<input type="checkbox"/> <b>INCIDENT/NEAR MISS</b>	<input type="checkbox"/> <b>HAZARD</b>
DATE & TIME OF INCIDENT:	LOCATION:	DATE REPORTED:	
REPORTED TO:	REPORTED BY: (Optional)	DEPARTMENT:	

<b>SECTION B</b>	<b>DESCRIPTION OF INCIDENT - INJURY, INCIDENT/NEAR MISS, HAZARD</b>

<b>SECTION C</b>	<b>CAUSES</b>

<b>SECTION D</b>	<b>SUGGESTED CORRECTIONS</b>

INVESTIGATED BY:	TITLE:	DATE:
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<b>SECTION E</b>	<b>CORRECTIVE ACTION</b>	<b>DATE</b>

<u>Department Safety Representative Signature:</u>	Date:	<u>Department Head Signature:</u>	Date:
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Please send completed original form to Risk Management, Rita Sherman



**EMPLOYEE'S CLAIM FOR  
WORKERS' COMPENSATION BENEFITS**

**PETICION DEL EMPLEADO PARA BENEFICIOS  
DE COMPENSACIÓN DEL TRABAJADOR**

If you are injured or become ill because of your job, you may be entitled to workers' compensation benefits.

Si Ud. se ha lesionado o se ha enfermado a causa de su trabajo, Ud. tiene derecho a recibir beneficios de compensación al trabajador.

Complete the "Employee" section and give the form to your employer. Keep the copy marked "Employee's Temporary Receipt" until you receive the dated copy from your employer. You may call the Division of Workers' Compensation at 1-800-736-7401 if you need help in filling out this form or in obtaining your benefits. An explanation of workers' compensation benefits is included on the back of this form.

Complete la sección "Empleado" y entregue la forma a su empleador. Quédese con la copia designada "Recibo Temporal del Empleado" hasta que Ud. reciba la copia fechada de su empleador. Si Ud. necesita ayuda para completar esta forma o para obtener sus beneficios, Ud. puede hablar con la Division de Compensación al Trabajador llamando al 1-800-736-7401. En la parte de atrás de esta forma se encuentra una explicación de los beneficios de compensación al trabajador.

You should also have received a pamphlet from your employer describing workers' compensation benefits and the procedures to obtain them.

Ud. también debería haber recibido de su empleador un folleto describiendo los beneficios de compensación al trabajador lesionado y los procedimientos para obtenerlos.

Any person who makes or causes to be made any knowingly false or fraudulent material statement or material representation for the purpose of obtaining or denying workers' compensation benefits or payments is guilty of a felony.

Toda aquella persona que a propósito haga o cause que se produzca cualquier declaración o representación material falsa o fraudulenta con el fin de obtener o negar beneficios o pagos de compensación a trabajadores lesionados es culpable de un crimen mayor "felonia".

**Employee: Empleado:**

1. Name. *Nombre.* \_\_\_\_\_ Today's Date. *Fecha de Hoy.* \_\_\_\_\_

2. Home address. *Dirección Residencial.* \_\_\_\_\_

3. City. *Ciudad.* \_\_\_\_\_ State. *Estado.* \_\_\_\_\_ Zip. *Código Postal.* \_\_\_\_\_

4. Date of Injury. *Fecha de la lesión (accidente).* \_\_\_\_\_ Time of injury. *Hora en que ocurrió* \_\_\_\_\_ a.m. \_\_\_\_\_ p.m.

5. Address and description of where injury happened. *Dirección/lugar dónde ocurrió el accidente.* \_\_\_\_\_

6. Describe injury and part of body affected. *Describe la lesión y parte del cuerpo afectada.* \_\_\_\_\_

7. Social Security Number. *Número de Seguro Social del Empleado* \_\_\_\_\_

8. Signature of employee. *Firma del empleado.* \_\_\_\_\_

**Employer - complete this section and give the employee a copy immediately as a receipt.  
Empleador - complete esta sección y déle inmediatamente una copia al empleado como recibo.**

9. Name of employer. *Nombre del empleador.* \_\_\_\_\_

10. Address. *Dirección.* \_\_\_\_\_

11. Date employer first knew of injury. *Fecha en que el empleador supo por primera vez de la lesión o accidente.* \_\_\_\_\_

12. Date claim form was provided to employee. *Fecha en que se le entregó al empleado la petición.* \_\_\_\_\_

13. Date employer received claim form. *Fecha en que el empleado devolvió la petición al empleador.* \_\_\_\_\_

14. Name and address of insurance carrier or adjusting agency. *Nombre y dirección de la compañía de seguros o agencia administradora de seguros.* **CLAIMS MANAGEMENT SERVICE** \_\_\_\_\_

15. Insurance Policy Number. *El número de la póliza del Seguro.* \_\_\_\_\_

16. Signature of employer representative. *Firma del representante del empleador.* \_\_\_\_\_

17. Title. *Título.* \_\_\_\_\_ 18. Date. *Fecha.* \_\_\_\_\_ 19. Telephone. *Teléfono.* \_\_\_\_\_

**Employer:** You are required to date this form and provide copies to your insurer or claims administrator and to the employee, dependent or representative who filed the claim within **one working day** of receipt of the form from the employee.

**Empleador:** Se requiere que Ud. feche esta forma y que provéa copias a su compañía de seguros, administrador de reclamos, o dependiente/representante de reclamos y al empleado que hayan presentado esta petición dentro del plazo de **un día hábil** desde el momento de haber sido recibida la forma del empleado.

# COUNTY OF MONO

## DECLINATION OF MEDICAL TREATMENT INSTRUCTIONS

This packet is for use ONLY if the Employee DECLINES medical treatment at time of injury.

If the Employee will go to either a physician, nearest hospital or urgent care facility the Initial Injury-Workers' Compensation Packet (DWC 1 and 5020 forms) must be completed instead of this packet.

DO NOT USE PENCIL TO COMPLETE THE PACKET.

### Employee:

- Complete and sign the top portion of the ***Incident Report***.
- Complete and sign the ***Declination of Medical Treatment*** form.

### Supervisor and/or Department Safety Representative:

- Review and sign the ***Declination of Medical Treatment*** form.
- Complete and sign the bottom portion of the ***Incident Report***
- Complete any applicable standard Safety procedures including, but not limited to, filing an Incident/Hazard Report Form.
- Send all completed 'original' forms to Rita Sherman, Risk Management in a confidential routing envelope within 24 hours.
- No further action is necessary at this time.

### ***If the Employee needs or requests medical treatment in the future:***

- Have the Employee and Supervisor complete an Initial Injury Packet
- Notify Rita Sherman, Risk Management immediately

# COUNTY OF MONO

## INCIDENT REPORT:

## Declined Medical Treatment

(Employee & Supervisor complete)

This form should be completed **ONLY** if the Employee does not need (or request) medical treatment. If the Employee will go to either the nearest hospital, urgent care facility or physician, the Initial Injury Workers' Compensation Packet **must be completed** instead of the Declination of Medical Treatment Packet.

"Any person who makes or causes to be made any knowingly false or fraudulent material statement or material representation for the purpose of obtaining or denying workers compensation is guilty of a felony." This notice has been approved by the Administrative Director of the Division of Workers' Compensation (California Labor Code Section 5401.7)

### EMPLOYEE COMPLETE TOP PORTION:

EMPLOYEE NAME:		Gender: M    F	<input type="checkbox"/> Full Time <input type="checkbox"/> Part time
JOB TITLE:		DATE OF HIRE:	
HOME TELEPHONE:		DATE OF BIRTH:	
HOME ADDRESS:		ENTITY:	
		DEPARTMENT:	
INCIDENT DATE:	TIME OF INCIDENT:	LOCATION:	
DATE REPORTED:	TIME BEGAN WORK:	INCIDENT REPORTED TO:	
NATURE OF INJURY (e.g., puncture, strain, cut, fracture, burn, etc.):			
BODY PART INJURED (e.g., right wrist, left knee, head, lower back, etc.):			
INJURY SOURCE (e.g., wet pavement, jack hammer, keyboard, etc.):			
HOW INJURY OCCURRED (struck by ..., fell from ..., exposed to ..., etc.):			
DESCRIBE ANY PREVIOUS CONDITIONS/INJURIES TO BODY PART CURRENTLY INJURED:			
EMPLOYEE'S STATEMENT OF WHAT OCCURRED			
(Include as much detail as possible such as activity being performed, objects carried, equipment used, hazardous conditions, etc.):			
WHO WITNESSED THE INCIDENT?			
<input type="checkbox"/> The above information is true and correct to the best of my knowledge. <input type="checkbox"/> I understand that I am <b>not filing a Workers' Compensation claim</b> at this time. I do not choose to complete the DWC Form 1 "Employee's Claim for Workers' Compensation Benefits" at this time.			
<u>If I am in need of medical treatment in the future related to this incident, I will immediately inform my Supervisor and complete an Initial Injury Packet including the DWC Form 1 and 5020 form.</u>			
EMPLOYEE'S SIGNATURE:			DATE:

### SUPERVISOR COMPLETE BOTTOM PORTION:

<b>MEDICAL TREATMENT</b> (NOTE: If the Employee needs/requests medical treatment from a physician, complete the Initial Injury Packet)		
<input type="checkbox"/> EMPLOYEE DECLINED MEDICAL TREATMENT <input type="checkbox"/> EMPLOYEE RECEIVED MINOR FIRST AID CARE ON-SITE. Describe:		
SUPERVISOR:		TITLE:
SIGNATURE:	DATE:	TELEPHONE:



# COUNTY OF MONO

## Declination of Medical Treatment

This form should be completed ONLY if the Employee **DECLINES** medical treatment. If the Employee will go to either a physician, an Urgent Care facility or nearest hospital the **Initial Injury-Workers' Compensation Packet must be** completed instead of the Declination of Medical Treatment Packet.

**EMPLOYEE:** Check all that apply. Print name, sign and date.

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In my opinion, I am not in need of any medical treatment at this time.

**OR**

In my opinion, I have received sufficient on-site first aid care.

**I am fully capable of performing my Usual & Customary position. At this time I decline medical care. If I am in need of medical care related to this incident in the future, I will notify my Supervisor immediately and complete an Initial Injury Packet including the DWC Form 1 "Employee's Claim for Workers' Compensation Benefits.**

Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**SUPERVISOR:** Print, sign and date.

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Print Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

*Note: California Labor Code Section 5401(a) defines a First Aid injury as any one-time treatment, and any follow-up visit for the purpose of observation of minor scratches, cuts, burns, splinters, or other minor industrial injury, which does not ordinarily require medical care" and states that any injury that "results in lost time beyond the employee's work shift at the time of injury or which results in medical treatment beyond first aid" must be filed as a claim. All of the treatments detailed above fall under the First Aid category; therefore, unless further treatment is necessary, a workers' compensation claim does not need to be filed.*

## **Attachment 2 – Detailed Inspection Checklist**

## HAZARD ASSESSMENT CHECKLIST

### GENERAL WORK ENVIRONMENT

n/a	Yes	No		Notes
			Are all work areas clean and orderly?	
			Are work surfaces kept dry or appropriate means taken to assure the surfaces are slip-resistant?	
			Are all spilled materials or liquids cleaned up immediately?	
			Is combustible scrap, debris and waste stored safely and removed from the worksite promptly?	
			Is accumulated combustible dust routinely removed from elevated surfaces, including the overhead structure of buildings?	
			Is combustible dust cleaned up with a vacuum system to prevent the dust going into suspension?	
			Is metallic or conductive dust prevented from entering or accumulation on or around electrical enclosures or equipment?	
			Are covered metal waste cans used for oily and paint-soaked waste?	
			Are all oil and gas fired devices equipped with flame failure controls that will prevent flow of fuel if pilots or main burners are not working?	
			Are paint spray booths, dip tanks and the like cleaned regularly?	
			Are the minimum number of toilets and washing facilities provided?	
			Are all toilets and washing facilities clean and sanitary?	
			Are all work areas adequately illuminated?	
			Are pits and floor openings covered or otherwise guarded?	

## HAZARD ASSESSMENT CHECKLIST

### PERSONAL PROTECTIVE EQUIPMENT & CLOTHING

n/a	Yes	No		Notes
			Are protective goggles or face shields provided and worn where there is any danger of flying particles or corrosive materials?	
			Are approved safety glasses required to be worn at all times in areas where there is a risk of eye injuries such as punctures, abrasions, contusions or burns?	
			Are employees who need corrective lenses (glasses or contacts lenses) in working environments with harmful exposures, required to wear only approved safety glasses, protective goggles, or use other medically approved precautionary procedures?	
			Are protective gloves, aprons, shields, or other means provided against cuts, corrosive liquids and chemicals?	
			Are hard hats provided and worn where danger of falling objects exists?	
			Are hard hats inspected periodically for damage to the shell and suspension system?	
			Is appropriate foot protection required where there is the risk of foot injuries from hot, corrosive, poisonous substances, falling objects, crushing or penetrating actions?	
			Are approved respirators provided for regular or emergency use where needed?	
			Is all protective equipment maintained in a sanitary condition and ready for use?	
			Do you have eye wash facilities and a quick drench shower within the work area where employees are exposed to injurious corrosive materials?	
			Where special equipment is needed for electrical workers, is it available?	
			When lunches are eaten on the premises, are they eaten in areas where there is no exposure to toxic materials or other health hazards?	
			Is protection against the effects of occupational noise exposure provided when sound levels exceed those of the Cal-OSHA noise standard?	

## HAZARD ASSESSMENT CHECKLIST

### WALKWAYS

n/a	Yes	No		Notes
			Are aisles and passageways kept clear?	
			Are aisles and walkways marked as appropriate?	
			Are wet surfaces covered with non-slip materials?	
			Are holes in the floor, sidewalk or other walking surface repaired properly, covered or otherwise made safe?	
			Is there safe clearance for walking in aisles where motorized or mechanical handling equipment is operating.	
			Are spilled materials cleaned up immediately?	
			Are materials or equipment stored in such a way that sharp projectiles will not interfere with the walkway?	
			Are changes of direction or elevations readily identifiable?	
			Are aisles or walkways that pass near moving or operating machinery, welding operations or similar operations arranged so employees will not be subjected to potential hazards?	
			Is adequate headroom provided for the entire length of any aisle or walkway?	
			Are standard guardrails provided wherever aisle or walkway surfaces are elevated more than 30 inches above any adjacent floor or the ground?	
			Are bridges provided over conveyors and similar hazards?	

## HAZARD ASSESSMENT CHECKLIST

### FLOOR & WALL OPENINGS

n/a	Yes	No		Notes
			Are floor openings guarded by a cover, guardrail, or equivalent on all sides (except at entrance to stairways or ladders)?	
			Are toeboards installed around the edges of a permanent floor opening (where persons may pass below the opening)?	
			Are skylight screens of such construction and mounting that they will withstand a load of at least 200 pounds?	
			Is the glass in windows, doors, glass walls that are subject to human impact, of sufficient thickness and type for the condition of use?	
			Are grates or similar type covers over floor openings such as floor drains, of such design that foot traffic or rolling equipment will not be affected by the grate spacing?	
			Are unused portions of service pits and pits not actually in use either covered or protected by guardrails or equivalent?	
			Are manhole covers, trench covers and similar covers, plus their supports, designed to carry a truck rear axle load of at least 20,000 pounds when located in roadways and subject to vehicle traffic?	
			Are floor or wall openings in fire resistive construction provided with doors or covers compatible with the fire rating of the structure and provided with self-closing feature when appropriate?	

## HAZARD ASSESSMENT CHECKLIST

### STAIRS & STAIRWAYS

n/a	Yes	No		Notes
			Are standard stair rails or handrails on all stairways having four or more risers?	
			Are all stairways at least 22 inches wide?	
			Do stairs have at least a 6'6" overhead clearance?	
			Do stairs angle no more than 50 and no less than 30 degrees?	
			Are stairs of hollow-pan type treads and landings filled to noising level with solid material?	
			Are step risers on stairs uniform from top to bottom, with no riser spacing greater than 7-1/2 inches?	
			Are steps on stairs and stairways designed or provided with a surface that renders them slip resistant?	
			Are stairway handrails located between 30 and 34 inches above the leading edge of stair treads?	
			Do stairway handrails have a least 1-1/2 inches of clearance between the handrails and the wall or surface they are mounted on?	
			Are stairway handrails capable of withstanding a load of 200 pounds, applied in any direction?	
			Where stairs or stairways exit directly into any area where vehicles may be operated, are adequate barriers and warnings provided to prevent employees stepping into the path of traffic?	
			Do stairway landings have a dimension measured in the direction of travel, at least equal to width of the stairway?	
			Is the vertical distance between stairway landings limited to 12 feet or less?	

## HAZARD ASSESSMENT CHECKLIST

### ELEVATED SURFACES

n/a	Yes	No		Notes
			Are signs posted, when appropriate, showing the elevated surface load capacity?	
			Are surfaces elevated more than 30 inches above the floor or ground provided with standard guardrails?	
			Are all elevated surfaces (beneath which people or machinery could be exposed to falling objects) provided with standard 4-inch toeboards?	
			Is a permanent means of access and egress provided to elevated storage and work surfaces?	
			Is required headroom provided where necessary?	
			Is material on elevated surfaces piled, stacked or racked in a manner to prevent it from tipping, falling, collapsing, rolling or spreading?	
			Are dock boards or bridge plates used when transferring materials between docks and trucks or rail cars?	



## HAZARD ASSESSMENT CHECKLIST

### EXITING OR EGRESS

n/a	Yes	No		Notes
			Are all exits marked with an exit sign and illuminated by a reliable light source?	
			Are the directions to exits, when not immediately apparent, marked with visible signs?	
			Are doors, passageways or stairways, that are neither exits nor access to exits and which could be mistaken for exits, appropriately marked "NOT AN EXIT", "TO BASEMENT", "STOREROOM", and the like?	
			Are exit signs provided with the word "EXIT" in lettering at least 5 inches high and the stroke of the lettering at least 1/2 inch wide?	
			Are exit doors side-hinged?	
			Are all exits kept free of obstructions?	
			Are at least two means of egress provided from elevated platforms, pits or rooms where the absence of a second exit would increase the risk of injury from hot, poisonous, corrosive, suffocating, flammable, or explosive substances?	
			Are there sufficient exits to permit prompt escape in case of emergency?	
			Are special precautions taken to protect employees during construction and repair operations?	
			Is the number of exits from each floor of a building, and the number of exits from the building itself, appropriate for the building occupancy load?	
			Are exit stairways which are required to be separated from other parts of a building enclosed by at least two hour fire-resistive construction in buildings more than four stories in height, and not less than one-hour fire resistive construction elsewhere?	
			When ramps are used as part of required exiting from a building, is the ramp slope limited to 1- foot vertical and 12 feet horizontal?	
			Where exiting will be through frameless glass doors, glass exit doors, storm doors, and such are the doors fully tempered and meet the safety requirements for human impact?	

## HAZARD ASSESSMENT CHECKLIST

### EXIT DOORS

n/a	Yes	No		Notes
			Are doors that are required to serve as exits designed and constructed so that the way of exit travel is obvious and direct?	
			Are windows that could be mistaken for exit doors, made inaccessible by means of barriers or railings?	
			Are exit doors openable from the direction of exit travel without the use of a key or any special knowledge or effort, when the building is occupied?	
			Is a revolving, sliding or overhead door prohibited from serving as a required exit door?	
			Where panic hardware is installed on a required exit door, will it allow the door to open by applying a force of 15 pounds or less in the direction of the exit traffic?	
			Are doors on cold storage rooms provided with an inside release mechanism that will release the latch and open the door even if it's padlocked or otherwise locked on the outside?	
			Where exit doors open directly onto any street, alley or other area where vehicles may be operated, are adequate barriers and warnings provided to prevent employees stepping into the path of traffic?	
			Are doors that swing in both directions and are located between rooms where there is frequent traffic, provided with viewing panels in each door?	

## HAZARD ASSESSMENT CHECKLIST

### PORTABLE LADDERS

n/a	Yes	No		Notes
			Are all ladders maintained in good condition, joints between steps and side rails tight, all hardware and fittings securely attached, and moveable parts operating freely without binding or undue play?	
			Are non-slip safety feet provided on each ladder?	
			Are non-slip safety feet provided on each metal or rung ladder?	
			Are ladder rungs and steps free of grease and oil?	
			Is it prohibited to place a ladder in front of doors opening toward the ladder except when the door is blocked open, locked or guarded?	
			Is it prohibited to place ladders on boxes, barrels, or other unstable bases to obtain additional height?	
			Are employees instructed to face the ladder when ascending or descending?	
			Are employees prohibited from using ladders that are broken, missing steps, rungs, or cleats, broken side rails or other faulty equipment?	
			Are employees instructed not to use the top 2 steps of ordinary stepladders as a step?	
			When portable rung ladders are used to gain access to elevated platforms, roofs, and the like does the ladder always extend at least 3 feet above the elevated surface?	
			Is it required that when portable rung or cleat type ladders are used the base is so placed that slipping will not occur, or it is lashed or otherwise held in place?	
			Are portable metal ladders legibly marked with signs reading "CAUTION" "Do Not Use Around Electrical Equipment" or equivalent wording?	
			Are employees prohibited from using ladders as guys, braces, skids, gin poles, or for other than their intended purposes?	
			Are employees instructed to only adjust extension ladders while standing at a base (not while standing on the ladder or from a position above the ladder)?	
			Are metal ladders inspected for damage?	
			Are the rungs of ladders uniformly spaced at 12 inches, center to center?	

## HAZARD ASSESSMENT CHECKLIST

### HAND TOOLS & EQUIPMENT

n/a	Yes	No		Notes
			Are all tools and equipment (both, company and employee-owned) used by employees at their workplace in good condition?	
			Are hand tools such as chisels, punches, which develop mushroomed heads during use, reconditioned or replaced as necessary?	
			Are broken or fractured handles on hammers, axes and similar equipment replaced promptly?	
			Are worn or bent wrenches replaced regularly?	
			Are appropriate handles used on files and similar tools?	
			Are employees made aware of the hazards caused by faulty or improperly used hand tools?	
			Are appropriate safety glasses, face shields, and similar equipment used while using hand tools or equipment that might produce flying materials or be subject to breakage?	
			Are jacks checked periodically to assure they are in good operating condition?	
			Are tool handles wedged tightly in the head of all tools?	
			Are tool cutting edges kept sharp so the tool will move smoothly without binding or skipping?	
			Are tools stored in dry, secure location where they won't be tampered with?	
			Is eye and face protection used when driving hardened or tempered spuds or nails?	

## HAZARD ASSESSMENT CHECKLIST

### PORTABLE (POWER OPERATED) TOOLS & EQUIPMENT

n/a	Yes	No		Notes
			Are grinders, saws, and similar equipment provided with appropriate safety guards?	
			Are power tools used with the correct shield, guard or attachment recommended by the manufacturer?	
			Are portable circular saws equipped with guards above and below the base shoe?	
			Are circular saw guards checked to assure they are not wedged up, thus leaving the lower portion of the blade unguarded?	
			Are rotating or moving parts of equipment guarded to prevent physical contact?	
			Are all cord-connected, electrically operated tools and equipment effectively grounded or of the approved double insulated type?	
			Are effective guards in place over belts, pulleys, chains, and sprockets, on equipment such as concrete mixers, air compressors, and the like?	
			Are portable fans provided with full guards or screens having openings 1/2 inch or less?	
			Is hoisting equipment available and used for lifting heavy objects, and are hoist ratings and characteristics appropriate for the task?	
			Are ground-fault circuit interrupters provided on all temporary electrical 15 and 20 ampere circuits, used during periods of construction?	
			Are pneumatic and hydraulic hoses on power-operated tools checked regularly for deterioration or damage?	

## HAZARD ASSESSMENT CHECKLIST

### ABRASIVE WHEEL EQUIPMENT GRINDERS

n/a	Yes	No		Notes
			Is the work rest used and kept adjusted to within 1/8 inch of the wheel?	
			Is the adjustable tongue on the top side of the grinder used and kept adjusted to within 1/4 inch of the wheel?	
			Do side guards cover the spindle, nut, and flange and 75 percent of the wheel diameter?	
			Are bench and pedestal grinders permanently mounted?	
			Are goggles or face shields always worn when grinding?	
			Is the maximum RPM rating of each abrasive wheel compatible with the RPM rating of the grinder motor?	
			Are fixed or permanently mounted grinders connected to their electrical supply system with metallic conduit or other permanent wiring method?	
			Does each grinder have an individual on and off control switch?	
			Is each electrically operated grinder effectively grounded?	
			Before new abrasive wheels are mounted, are they visually inspected and ring tested?	
			Are dust collectors and powered exhausts provided on grinders used in operations that produce large amounts of dust?	
			Are splashguards mounted on grinders that use coolant, to prevent the coolant reaching employees?	
			Is cleanliness maintained around grinder?	

## HAZARD ASSESSMENT CHECKLIST

### POWDER ACTUATED TOOLS

n/a	Yes	No		Notes
			Are employees who operate powder-actuated tools trained in their use and carry a valid operator's card?	
			Do the powder-actuated tools being used have written approval of the Division of Occupational Safety and Health?	
			Is each powder-actuated tool stored in its own locked container when not being used?	
			Is a sign at least 7" by 10" with bold type reading "POWDER-ACTUATED TOOL IN USE" conspicuously posted when the tool is being used?	
			Are powder-actuated tools left unloaded until they are actually ready to be used?	
			Are powder-actuated tools inspected for obstructions or defects each day before use?	
			Do powder-actuated tools operators have and use appropriate personal protective equipment such as hard hats, safety goggles, safety shoes and ear protectors?	

## HAZARD ASSESSMENT CHECKLIST

### MACHINE GUARDING

n/a	Yes	No		Notes
			Is there a training program to instruct employees on safe methods of machine operation?	
			Is there adequate supervision to ensure that employees are following safe machine operating procedures?	
			Is there a regular program of safety inspection of machinery and equipment?	
			Is all machinery and equipment kept clean and properly maintained?	
			Is sufficient clearance provided around and between machines to allow for safe operations, set up and servicing, material handling and waste removal?	
			Is equipment and machinery securely placed and anchored, when necessary to prevent tipping or other movement that could result in personal injury?	
			Is there a power shut-off switch within reach of the operator's position at each machine?	
			Can electric power to each machine be locked out for maintenance, repair, or security?	
			Are the noncurrent-carrying metal parts of electrically operated machines bonded and grounded?	
			Are foot-operated switches guarded or arranged to prevent accidental actuation by personnel or falling objects?	
			Are manually operated valves and switches controlling the operation of equipment and machines clearly identified and readily accessible?	
			Are all emergency stop buttons colored red?	
			Are all pulleys and belts that are within 7 feet of the floor or working level properly guarded?	
			Are all moving chains and gears properly guarded?	
			Are splashguards mounted on machines that use coolant, to prevent the coolant from reaching employees?	
			Are methods provided to protect the operator and other employees in the machine area from hazards created at the point of operation, ingoing nip points, rotating parts, flying chips, and sparks?	
			Are machinery guards secure and so arranged that they do not offer a hazard in their use?	
			If special hand tools are used for placing and removing material, do they protect the operator's hands?	
			Are revolving drums, barrels, and containers required to be guarded by an enclosure that is interlocked with the drive mechanism, so that revolution cannot occur unless the guard enclosure is in place, so guarded?	



## HAZARD ASSESSMENT CHECKLIST

### MACHINE GUARDING (cont.)

n/a	Yes	No		Notes
			Do arbors and mandrels have firm and secure bearings and are they free from play?	
			Are provisions made to prevent machines from automatically starting when power is restored after a power failure or shutdown?	
			Are machines constructed so as to be free from excessive vibration when the largest size tool is mounted and run at full speed?	
			If machinery is cleaned with compressed air, is air pressure controlled and personal protective equipment or other safeguards used to protect operators and other workers from eye and body injury?	
			Are fan blades protected with a guard having openings no larger than 1/2 inch, when operating within 7 feet of the floor?	
			Are saws used for ripping, equipped with anti-kick back devices and spreaders?	
			Are radial arm saws so arranged that the cutting head will gently return to the back of the table when released?	

## HAZARD ASSESSMENT CHECKLIST

### LOCKOUT / BLOCKOUT PROCEDURES

n/a	Yes	No		Notes
			Is all machinery or equipment capable of movement, required to be de-energized or disengaged and blocked or locked out during cleaning, servicing, adjusting or setting up operations, whenever required?	
			Is the locking-out of control circuits in lieu of locking-out main power disconnects prohibited?	
			Are all equipment control valve handles provided with a means for locking-out?	
			Does the lockout procedure require that stored energy (i.e. mechanical, hydraulic, air,) be released or blocked before equipment is locked-out for repairs?	
			Are appropriate employees provided with individually keyed personal safety locks?	
			Are employees required to keep personal control of their key(s) while they have safety locks in use?	
			Is it required that employees check the safety of the lock out by attempting a start up after making sure no one is exposed?	
			Where the power disconnecting means for equipment does not also disconnect the electrical control circuit:	
			Are the appropriate electrical enclosures identified?	
			Is means provide to assure the control circuit can also be disconnected and locked out?	

## HAZARD ASSESSMENT CHECKLIST

### WELDING, CUTTING & BRAZING

n/a	Yes	No		Notes
			Are only authorized and trained personnel permitted to use welding, cutting or brazing equipment?	
			Do all operator have a copy of the appropriate operating instructions and are they directed to follow them?	
			Are compressed gas cylinders regularly examined for obvious signs of defects, deep rusting, or leakage?	
			Is care used in handling and storage of cylinders, safety valves, relief valves, and the like, to prevent damage?	
			Are precautions taken to prevent the mixture of air or oxygen with flammable gases, except at a burner or in a standard torch?	
			Are only approved apparatus (torches, regulators, pressure-reducing valves, acetylene generators, manifolds) used?	
			Are cylinders kept away from sources of heat?	
			Is it prohibited to use cylinders as rollers or supports?	
			Are empty cylinders appropriately marked their valves closed and valve-protection caps on?	
			Are signs reading: DANGER NO-SMOKING, MATCHES, OR OPEN LIGHTS, or the equivalent posted?	
			Are cylinders, cylinder valves, couplings, regulators, hoses, and apparatus keep free of oily or greasy substances?	
			Is care taken not to drop or strike cylinders?	
			Unless secured on special trucks, are regulators removed and valve-protection caps put in place before moving cylinders?	
			Do cylinders without fixed hand wheels have keys, handles, or non-adjustable wrenches on stem valves when in service?	
			Are liquefied gases stored and shipped valve-end up with valve covers in place?	
			Are employees instructed to never crack a fuel-gas cylinder valve near sources of ignition?	
			Before a regulator is removed, is the valve closed and gas released form the regulator?	
			Is red used to identify the acetylene (and other fuel-gas) hose, green for oxygen hose, and black for inert gas and air hose?	
			Are pressure-reducing regulators used only for the gas and pressures for which they are intended?	

## HAZARD ASSESSMENT CHECKLIST

### WELDING, CUTTING & BRAZING (cont.)

n/a	Yes	No		Notes
			Is open circuit (No Load) voltage of arc welding and cutting machines as low as possible and not in excess of the recommended limits?	
			Under wet conditions, are automatic controls for reducing no-load voltage used?	
			Is grounding of the machine frame and safety ground connections of portable machines checked periodically?	
			Are electrodes removed from the holders when not in use?	
			Is it required that electric power to the welder be shut off when no one is in attendance?	
			Is suitable fire extinguishing equipment available for immediate use?	
			Is the welder forbidden to coil or loop welding electrode cable around his body?	
			Are wet machines thoroughly dried and tested before being used?	
			Are work and electrode lead cables frequently inspected for wear and damage, and replaced when needed?	
			Do means for connecting cables' lengths have adequate insulation?	
			When the object to be welded cannot be moved and fire hazards cannot be removed, are shields used to confine heat, sparks, and slag?	
			Are firewatchers assigned when welding or cutting is performed, in locations where a serious fire might develop?	
			Are combustible floors kept wet, covered by damp sand, or protected by fire-resistant shields?	
			When floors are wet down, are personnel protected from possible electrical shock?	
			When welding is done on metal walls, are precautions taken to protect combustibles on the other side?	
			Before hot work is begun, are used drums, barrels, tanks, and other containers so thoroughly cleaned that no substances remain that could explode, ignite, or produce toxic vapors?	
			Is it required that eye protection helmets, hand shields and goggles meet appropriate standards?	
			Are employees exposed to the hazards created by welding, cutting, or bracing operations protected with personal protective equipment and clothing?	
			Is a check made for adequate ventilation in and where welding or cutting is performed?	
			When working in confined places are environmental monitoring tests taken and means provided for quick removal of welders in case of an emergency?	

## HAZARD ASSESSMENT CHECKLIST

### COMPRESSORS & COMPRESSED AIR

n/a	Yes	No		Notes
			Are compressors equipped with pressure relief valves, and pressure gauges?	
			Are compressor air intakes installed and equipped to ensure that only clean uncontaminated air enters the compressor?	
			Are air filters installed on the compressor intake?	
			Are compressors operated and lubricated in accordance with the manufacturer's recommendations?	
			Are safety devices on compressed air systems checked frequently?	
			Before any repair work is done on the pressure system of a compressor, is the pressure bled off and the system locked-out?	
			Are signs posted to warn of the automatic starting feature of the compressors?	
			Is the belt drive system totally enclosed to provide protection for the front, back, top, and sides?	
			Is it strictly prohibited to direct compressed air towards a person?	
			Are employees prohibited from using highly compressed air for cleaning purposes?	
			If compressed air is used for cleaning off clothing, is the pressure reduced to less than 10 psi?	
			When using compressed air for cleaning, do employees use personal protective equipment?	
			Are safety chains or other suitable locking devices used at couplings of high pressure hose lines where a connection failure would create a hazard?	
			Before compressed air is used to empty containers of liquid, is the safe working pressure of the container checked?	
			When compressed air is used with abrasive blast cleaning equipment, is the operating valve a type that must be held open manually?	
			When compressed air is used to inflate auto tires, is a clip-on chuck and an inline regulator preset to 40 psi required?	
			Is it prohibited to use compressed air to clean up or move combustible dust if such action could cause the dust to be suspended in the air and cause a fire or explosion hazard?	

## HAZARD ASSESSMENT CHECKLIST

### COMPRESSED AIR RECEIVERS

n/a	Yes	No		Notes
			Is every receiver equipped with a pressure gauge and with one or more automatic, spring-loaded safety valves?	
			Is the total relieving capacity of the safety valve capable of preventing pressure in the receiver from exceeding the maximum allowable working pressure of the receiver by more than 10 percent?	
			Is every air receiver provided with a drainpipe and valve at the lowest point for the removal of accumulated oil and water?	
			Are compressed air receivers periodically drained of moisture and oil?	
			Are all safety valves tested frequently and at regular intervals to determine whether they are in good operating condition?	
			Is there a current operating permit issued by the Division of Occupational Safety and Health?	
			Is the inlet of air receivers and piping systems kept free of accumulated oil and carbonaceous materials?	

## HAZARD ASSESSMENT CHECKLIST

### COMPRESSED GAS & CYLINDERS

n/a	Yes	No		Notes
			Are cylinders with a water weight capacity over 30 pounds equipped with means for connecting a valve protector device, or with a collar or recess to protect the valve?	
			Are cylinders legibly marked to clearly identify the gas contained?	
			Are compressed gas cylinders stored in areas which are protected from external heat sources such as flame impingement, intense radiant heat, electric arcs, or high temperature lines?	
			Are cylinders located or stored in areas where they will not be damaged by passing or falling objects, or subject to tampering by unauthorized persons?	
			Are cylinders stored or transported in a manner to prevent them creating a hazard by tipping, falling or rolling?	
			Are cylinders containing liquefied fuel gas, stored or transported in a position so that the safety relief device is always in direct contact with the vapor space in the cylinder?	
			Are valve protectors always placed on cylinders when the cylinders are not in use or connected for use?	
			Are all valves closed off before a cylinder is moved, when the cylinder is empty, and at the completion of each job?	
			Are low pressure fuel-gas cylinders checked periodically for corrosion, general distortion, cracks, or any other defect that might indicate a weakness or render it unfit for service?	
			Does the periodic check of low pressure fuel-gas cylinders include a close inspection of the cylinders' bottom?	

## HAZARD ASSESSMENT CHECKLIST

### HOIST & AUXILIARY EQUIPMENT

n/a	Yes	No		Notes
			Is each overhead electric hoist equipped with a limit device to stop the hook travel at its highest and lowest point of safe travel?	
			Will each hoist automatically stop and hold any load up to 125 percent of its rated load, if its actuating force is removed?	
			Is the rated load of each hoist legibly marked and visible to the operator?	
			Are stops provided at the safe limits of travel for trolley hoist?	
			Are the controls of hoists plainly marked to indicate the direction of travel or motion?	
			Is each cage-controlled hoist equipped with an effective warning device?	
			Are close-fitting guards or other suitable devices installed on hoist to assure hoist ropes will be maintained in the sheave groves?	
			Are all hoist chains or ropes of sufficient length to handle the full range of movement for the application while still maintaining two full wraps on the drum at all times?	
			Are nip points or contact points between hoist ropes and sheaves which are permanently located within 7 feet of the floor, ground or working platform, guarded?	
			Is it prohibited to use chains or rope slings that are kinked or twisted?	
			Is it prohibited to use the hoist rope or chain wrapped around the load as a substitute, for a sling?	
			Is the operator instructed to avoid carrying loads over people?	
			Are only employees who have been trained in the proper use of hoists allowed to operate them?	



## HAZARD ASSESSMENT CHECKLIST

### INDUSTRIAL TRUCKS - FORKLIFTS

n/a	Yes	No		Notes
			Are only trained personnel allowed to operate industrial trucks?	
			Is substantial overhead protective equipment provided on high lift rider equipment?	
			Are the required lift truck operating rules posted and enforced?	
			Is directional lighting provided on each industrial truck that operates in an area with less than 2 foot candles per square foot of general lighting?	
			Does each industrial truck have a warning horn, whistle, gong or other device which can be clearly heard above the normal noise in the areas where operated?	
			Are the brakes on each industrial truck capable of bringing the vehicle to a complete and safe stop when fully loaded?	
			Will the industrial truck's parking brake effectively prevent the vehicle from moving when unattended?	
			Are industrial trucks operating in areas where flammable gases or vapors, or combustible dust or ignitable fibers may be present in the atmosphere, approved for such locations?	
			Are motorized hand and hand/rider trucks so designed that the brakes are applied, and power to the drive motor shuts off when the operator releases his/her grip on the device that controls the travel?	
			Are industrial trucks with internal combustion engine operated in buildings or enclosed areas, carefully checked to ensure such operations do not cause harmful concentration of dangerous gases or fumes?	

## HAZARD ASSESSMENT CHECKLIST

### SPRAYING OPERATIONS

n/a	Yes	No		Notes
			Is adequate ventilation assured before spray operations are started?	
			Is mechanical ventilation provided when spraying operation is done in enclosed areas?	
			When mechanical ventilation is provided during spraying operations, is it so arranged that it will not circulate the contaminated air?	
			Is the spray area free of hot surfaces?	
			Is the spray area at least 20 feet from flames, sparks, operating electrical motors and other ignition sources?	
			Are portable lamps used to illuminate spray areas suitable for use in a hazardous location?	
			Is approved respiratory equipment provided and used when appropriate during spraying operations?	
			Do solvents used for cleaning have a flash point of 100° F or more?	
			Are fire control sprinkler heads kept clean?	
			Are "NO SMOKING" signs posted in spray areas, paint rooms, paint booths, and paint storage areas?	
			Is the spray area kept clean of combustible residue?	
			Are spray booths constructed of metal, masonry, or other substantial noncombustible material?	
			Are spray booth floors and baffles noncombustible and easily cleaned?	
			Is infrared drying apparatus kept out of the spray area during spraying operations?	
			Is the spray booth completely ventilated before using the drying apparatus?	
			Is the electric drying apparatus properly grounded?	
			Are lighting fixtures for spray booths located outside of the booth and the interior lighted through sealed clear panels?	
			Are the electric motors for exhaust fans placed outside booths or ducts?	
			Are belts and pulleys inside the booth fully enclosed?	
			Do ducts have access doors to allow cleaning?	
			Do all drying spaces have adequate ventilation?	

## HAZARD ASSESSMENT CHECKLIST

### ENTERING CONFINED SPACES

n/a	Yes	No		Notes
			Are confined spaces thoroughly emptied of any corrosive or hazardous substances, such as acids or caustics, before entry?	
			Before entry, are all lines to a confined space, containing inert, toxic, flammable, or corrosive materials valved off and blanked or disconnected and separated?	
			Is it required that all impellers, agitators, or other moving equipment inside confined spaces be locked-out if they present a hazard?	
			Is either natural or mechanical ventilation provided prior to confined space entry?	
			Before entry, are appropriate atmospheric tests performed to check for oxygen deficiency, toxic substance and explosive concentrations in the confined space before entry?	
			Is adequate illumination provided for the work to be performed in the confined space?	
			Is the atmosphere inside the confined space frequently tested or continuously monitor during conduct of work?	
			Is there an assigned safety standby employee outside of the confined space, whose sole responsibility is to watch the work in progress, sound an alarm if necessary, and render assistance?	
			Is the standby employee or other employees prohibited from entering the confined space without lifelines and respiratory equipment if there is any questions as to the cause of an emergency?	
			In addition to the standby employee, is there at least one other trained rescuer in the vicinity?	
			Are all rescuers appropriately trained and using approved, recently inspected equipment?	
			Does all rescue equipment allow for lifting employees vertically from a top opening?	
			Are there trained personnel in First Aid and CPR immediately available?	
			Is there an effective communication system in place whenever respiratory equipment is used and the employee in the confined space is out of sight of the standby person?	
			Is approved respiratory equipment required if the atmosphere inside the confined space cannot be made acceptable?	
			Is all portable electrical equipment used inside confined spaces either grounded and insulated, or equipped with ground fault protection?	

## HAZARD ASSESSMENT CHECKLIST

### ENTERING CONFINED SPACES (cont.)

n/a	Yes	No		Notes
			Before gas welding or burning is started in a confined space, are hoses checked for leaks, compressed gas bottles forbidden inside of the confined space, torches lighted only outside of the confined area and the confined area tested for an explosive atmosphere each time before a lighted torch is to be taken into the confined space?	
			If employees will be using oxygen-consuming equipment such as salamanders, torches, furnaces, in a confined space, is sufficient air provided to assure combustion without reducing the oxygen concentration of the atmosphere below 19.5 percent by volume?	
			Whenever combustion-type equipment is used in confined space, are provisions made to ensure the exhaust gases are vented outside of the enclosure?	
			Is each confined space checked for decaying vegetation or animal matter, which may produce methane?	
			Is the confined space checked for possible industrial waste, which could contain toxic properties?	
			If the confined space is below the ground and near areas where motor vehicles will be operating, is it possible for vehicle exhaust or carbon monoxide to enter the space?	

## HAZARD ASSESSMENT CHECKLIST

### ENVIRONMENTAL CONTROLS

n/a	Yes	No		Notes
			Are all work areas properly illuminated?	
			Are employees instructed in proper first aid and other emergency procedures?	
			Are hazardous substances identified which may cause harm by inhalation, ingestion, skin absorption or contact?	
			Are employees aware of the hazards involved with the various chemicals they may be exposed to in their work environment, such as ammonia, chlorine, epoxies, and caustics?	
			Is employee exposure to chemicals in the workplace kept within acceptable levels?	
			Can a less harmful method or product be used?	
			Is the work area's ventilation system appropriate for the work being performed?	
			Are spray painting operations done in spray rooms or booths equipped with an appropriate exhaust system?	
			Is employee exposure to welding fumes controlled by ventilation, use of respirators, exposure time, or other means?	
			Are welders and other workers nearby provided with flash shields during welding operations?	
			If forklifts and other vehicles are used in buildings or other enclosed areas, are the carbon monoxide levels kept below maximum acceptable concentration?	
			Has there been a determination that noise levels in the facilities are within acceptable levels?	
			Are steps being taken to use engineering controls to reduce excessive noise levels?	
			Are proper precautions being taken when handling asbestos and other fibrous materials?	
			Are caution labels and signs used to warn of asbestos?	
			Are wet methods used, when practicable, to prevent the emission of airborne asbestos fibers, silica dust and similar hazardous materials?	
			Is vacuuming with appropriate equipment used whenever possible rather than blowing or sweeping dust?	
			Are grinders, saws, and other machines that produce respirable dusts vented to an industrial collector or central exhaust system?	
			Are all local exhaust ventilation systems designed and operating properly such as airflow and volume necessary for the application? Are the ducts free of obstructions or the belts slipping?	
			Is personal protective equipment provided, used and maintained wherever required?	

## HAZARD ASSESSMENT CHECKLIST

### ENVIRONMENTAL CONTROLS (cont.)

n/a	Yes	No		Notes
			Are there written standard operating procedures for the selection and use of respirators where needed?	
			Are restrooms and washrooms kept clean and sanitary?	
			Is all water provided for drinking, washing, and cooking potable?	
			Are all outlets for water not suitable for drinking clearly identified?	
			Are employees' physical capacities assessed before being assigned to jobs requiring heavy work?	
			Are employees instructed in the proper manner of lifting heavy objects?	
			Where heat is a problem, have all fixed work areas been provided with spot cooling or air conditioning?	
			Are employees screened before assignment to areas of high heat to determine if their health condition might make them more susceptible to having an adverse reaction?	
			Are employees working on streets and roadways where they are exposed to the hazards of traffic, required to wear bright colored (traffic orange) warning vest?	
			Are exhaust stacks and air intakes located that contaminated air will not be recirculated within a building or other enclosed area?	
			Is equipment producing ultra-violet radiation properly shielded?	

## HAZARD ASSESSMENT CHECKLIST

### FLAMMABLE & COMBUSTIBLE MATERIALS

n/a	Yes	No		Notes
			Are combustible scrap, debris and waste materials (i.e. oily rags) stored in covered metal receptacles and removed from the worksite promptly?	
			Is proper storage practiced to minimize the risk of fire including spontaneous combustion?	
			Are approved containers and tanks used for the storage and handling of flammable and combustible liquids?	
			Are all connections on drums and combustible liquid piping, vapor and liquid tight?	
			Are all flammable liquids kept in closed containers when not in use (e.g., parts cleaning tanks, pans)?	
			Are bulk drums of flammable liquids grounded and bonded to containers during dispensing?	
			Do storage rooms for flammable and combustible liquids have explosion-proof lights?	
			Do storage rooms for flammable and combustible liquids have mechanical or gravity ventilation?	
			Is liquefied petroleum gas stored, handled, and used in accordance with safe practices and standards?	
			Are liquefied petroleum storage tanks guarded to prevent damage from vehicles?	
			Are all solvent wastes and flammable liquids kept in fire-resistant covered containers until they are removed from the worksite?	
			Is vacuuming used whenever possible rather than blowing or sweeping combustible dust?	
			Are fire separators placed between containers of combustibles or flammables, when stacked one upon another, to assure their support and stability?	
			Are fuel gas cylinders and oxygen cylinders separated by distance, fire resistant barriers or other means while in storage?	
			Are fire extinguishers selected and provided for the types of materials in areas where they are to be used?	
			Class A: Ordinary combustible material fires.	
			Class B: Flammable liquid, gas or grease fires.	
			Class C: Energized-electrical equipment fires.	
			If a Halon 1301 fire extinguisher is used, can employees evacuate within the specified time for that extinguisher?	
			Are appropriate fire extinguishers mounted within 75 feet of outside areas containing flammable liquids, and within 10 feet of any inside storage area for such materials?	

## HAZARD ASSESSMENT CHECKLIST

### FLAMMABLE & COMBUSTIBLE MATERIALS (cont.)

n/a	Yes	No		Notes
			Is the transfer/withdrawal of flammable or combustible liquids performed by trained personnel?	
			Are fire extinguishers mounted so that employees do not have to travel more than 75 feet for a class "A" fire or 50 feet for a class "B" fire?	
			Are employees trained in the use of fire extinguishers?	
			Are extinguishers free from obstructions or blockage?	
			Are all extinguishers serviced, maintained and tagged at intervals not to exceed one year?	
			Are all extinguishers fully charged and in their designated places?	
			Is a record maintained of required monthly checks of extinguishers?	
			Where sprinkler systems are permanently installed, are the nozzle heads directed or arranged so that water will not be sprayed into operating electrical switchboards and equipment?	
			Are "NO SMOKING" signs posted where appropriate in areas where flammable or combustible materials are used or stored?	
			Are "NO SMOKING" signs posted on liquefied petroleum gas tanks?	
			Are "NO SMOKING" rules enforced in areas involving storage and use of flammable materials?	
			Are safety cans used for dispensing flammable or combustible liquids at a point of use?	
			Are all spills of flammable or combustible liquids cleaned up promptly?	
			Are storage tanks adequately vented to prevent the development of excessive vacuum or pressure as a result of filling, emptying, or atmosphere temperature changes?	
			Are storage tanks equipped with emergency venting that will relieve excessive internal pressure caused by fire exposure?	
			Are spare portable or butane tanks, which are used by industrial trucks stored in accord with regulations?	



## HAZARD ASSESSMENT CHECKLIST

### FIRE PROTECTION

n/a	Yes	No		Notes
			Do you have a fire prevention plan?	
			Does your plan describe the type of fire protection equipment and/or systems?	
			Have you established practices and procedures to control potential fire hazards and ignition sources?	
			Are employees aware of the fire hazards of the material and processes to which they are exposed?	
			Is your local fire department well acquainted with your facilities, location and specific hazards?	
			If you have a fire alarm system, is it tested at least annually?	
			If you have a fire alarm system, is it certified as required?	
			If you have interior standpipes and valves, are they inspected regularly?	
			If you have outside private fire hydrants, are they flushed at least once a year and on a routine preventive maintenance schedule?	
			Are fire doors and shutters in good operating condition?	
			Are fire doors and shutters unobstructed and protected against obstructions, including their counterweights?	
			Are fire door and shutter fusible links in place?	
			Are automatic sprinkler system water control valves, air and water pressures checked weekly / periodically as required?	
			Is maintenance of automatic sprinkler system assigned to responsible persons or to a sprinkler contractor?	
			Are sprinkler heads protected by metal guards, when exposed to physical damage?	
			Is proper clearance maintained below sprinkler heads?	
			Are portable fire extinguishers provided in adequate number and type?	
			Are fire extinguishers mounted in readily accessible locations?	
			Are fire extinguishers recharged regularly and noted on the inspection tag?	
			Are employees periodically instructed in the use of extinguishers and fire protection procedures?	

## HAZARD ASSESSMENT CHECKLIST

### HAZARDOUS CHEMICAL EXPOSURES

n/a	Yes	No		Notes
			Are employees trained in the safe handling practices of hazardous chemicals such as acids, caustics, and the like?	
			Are employees aware of the potential hazards involving various chemicals stored or used in the workplace, such as acids, bases, caustics, epoxies, and phenols?	
			Is employee exposure to chemicals kept within acceptable levels?	
			Are eye wash fountains and safety showers provided in areas where corrosive chemicals are handled?	
			Are all containers, such as vats and storage tanks labeled as to their contents - e.g., "CAUSTICS"?	
			Are all employees required to use personal protective clothing and equipment when handling chemicals (i.e. gloves, eye protection, and respirators)?	
			Are flammable or toxic chemicals kept in closed containers when not in use?	
			Are chemical piping systems clearly marked as to their content?	
			Where corrosive liquids are frequently handled in open containers or drawn from storage vessels or pipelines, is adequate means readily available for neutralizing or disposing of spills or overflows properly and safely?	
			Have standard operating procedures been established and are they being followed when cleaning up chemical spills?	
			Where needed for emergency use, are respirators stored in a convenient, clean and sanitary location?	
			Are respirators intended for emergency use adequate for the various uses for which they may be needed?	
			Are employees prohibited from eating in areas where hazardous chemicals are present?	
			Is personal protective equipment provided, used and maintained whenever necessary?	
			Are there written standard operating procedures for the selection and use of respirators where needed?	
			If you have a respirator protection program, are your employees instructed on the correct usage and limitations of the respirators?	
			Are the respirators NIOSH approved for this particular application?	
			Are they regularly inspected and cleaned sanitized and maintained?	

## HAZARD ASSESSMENT CHECKLIST

### HAZARDOUS CHEMICAL EXPOSURES (cont.)

n/a	Yes	No		Notes
			If hazardous substances are used in your processes, do you have a medical or biological monitoring system in operation?	
			Are you familiar with the Threshold Limit Values or Permissible Exposure Limits of airborne contaminants and physical agents used in your workplace?	
			Have control procedures been instituted for hazardous materials, where appropriate, such as respirators, ventilation systems, handling practices, and the like?	
			Whenever possible, are hazardous substances handled in properly designed and exhausted booths or similar locations?	
			Do you use general dilution or local exhaust ventilation systems to control dusts, vapors, gases, fumes, smoke, solvents or mists which may be generated in your workplace?	
			Is ventilation equipment provided for removal of contaminants from such operations as production grinding, buffing, spray painting, and/or vapor decreasing, and is it operating properly?	
			Do employees complain about dizziness, headaches, nausea, irritation, or other factors of discomfort when they use solvents or other chemicals?	
			Is there a dermatitis problem -- do employees complain about skin dryness, irritation, or sensitization?	
			Have you considered the use of an industrial hygienist or environmental health specialist to evaluate your operation?	
			If internal combustion engines are used, is carbon monoxide kept within acceptable levels?	
			Is vacuuming used, rather than blowing or sweeping dusts whenever possible for clean up?	
			Are materials, which give off toxic asphyxiant, suffocating or anesthetic fumes, stored in remote or isolated locations when not in use?	

## HAZARD ASSESSMENT CHECKLIST

### HAZARDOUS SUBSTANCES COMMUNICATION

n/a	Yes	No		Notes
			Is there a list of hazardous substances used in your workplace?	
			Is there a written hazard communication program dealing with Material Safety Data Sheets (MSDS) labeling, and employee training?	
			Who is responsible for MSDSs, container labeling, employee training?	
			Is each container for a hazardous substance (i.e., vats, bottles, storage tanks,) labeled with product identity and a hazard warning (communication of the specific health hazards and physical hazards)?	
			Is there a Material Safety Data Sheet readily available for each hazardous substance used?	
			How will you inform other employers whose employees share the same work area where the hazardous substances are used?	
			Is there an employee training program for hazardous substances?	
			Does this program include:	
			An explanation of what an MSDS is and how to use and obtain one?	
			MSDS contents for each hazardous substance or class of substances?	
			Explanation of "Right to Know"?	
			Identification of where employees can see the employer's written hazard communication program and where hazardous substances are present in their work area?	
			The physical and health hazards of substances in the work area, how to detect their presence, and specific protective measures to be used?	
			Details of the hazard communication program, including how to use the labeling system and MSDSs?	
			How employees will be informed of hazards of non-routine tasks, and hazards of unlabeled pipes?	

## HAZARD ASSESSMENT CHECKLIST

### ELECTRICAL

n/a	Yes	No		Notes
			Are your workplace electricians familiar with the Cal/OSHA Electrical Safety Orders?	
			Do you specify compliance with Cal/OSHA for all contract electrical work?	
			Are all employees required to report as soon as practicable any obvious hazard to life or property observed in connection with electrical equipment or lines?	
			Are employees instructed to make preliminary inspections and/or appropriate tests to determine what conditions exist before starting work on electrical equipment or lines?	
			When electrical equipment or lines are to be serviced, maintained or adjusted, are necessary switches opened, locked-out and tagged whenever possible?	
			Are portable electrical tools and equipment grounded or of the double insulated type?	
			Are electrical appliances such as vacuum cleaners, polishers, vending machines grounded?	
			Do extension cords being used have a grounding conductor?	
			Are multiple plug adapters prohibited?	
			Are ground-fault circuit interrupters installed on each temporary 15 or 20 ampere, 120 volt AC circuit at locations where construction, demolition, modifications, alterations or excavations are being performed?	
			Are all temporary circuits protected by suitable disconnecting switches or plug connectors at the junction with permanent wiring?	
			Is exposed wiring and cords with frayed or deteriorated insulation repaired or replaced promptly?	
			Are flexible cords and cables free of splices or taps?	
			Are clamps or other securing means provided on flexible cords or cables at plugs, receptacles, tools, and equipment and is the cord jacket securely held in place?	
			Are all cord, cable and raceway connections intact and secure?	
			In wet or damp locations, are electrical tools and equipment appropriate for the use or location or otherwise protected?	
			Is the location of electrical power lines and cables (overhead, underground, underfloor, other side of walls) determined before digging, drilling or similar work is begun?	
			Are metal measuring tapes, ropes, handlines or similar devices with metallic thread woven into the fabric prohibited where they could come in contact with energized parts of equipment or circuit conductors?	

## HAZARD ASSESSMENT CHECKLIST

### ELECTRICAL (cont.)

n/a	Yes	No		Notes
			Is the use of metal ladders prohibited in area where the ladder or the person using the ladder could come in contact with energized parts of equipment, fixtures or circuit conductors?	
			Are all disconnecting switches and circuit breakers labeled to indicate their use or equipment served?	
			Are disconnecting means always opened before fuses are replaced?	
			Do all interior wiring systems include provisions for grounding metal parts of electrical raceways, equipment and enclosures?	
			Are all electrical raceways and enclosures securely fastened in place?	
			Are all energized parts of electrical circuits and equipment guarded against accidental contact by approved cabinets or enclosures?	
			Is sufficient access and working space provided and maintained about all electrical equipment to permit ready and safe operations and maintenance?	
			Are all unused openings (including conduit knockouts) in electrical enclosures and fittings closed with appropriate covers, plugs or plates?	
			Are electrical enclosures such as switches, receptacles, junction boxes, etc., provided with tight-fitting covers or plates?	
			Are disconnecting switches for electrical motors in excess of two horsepower, capable of opening the circuit when the motor is in a stalled condition, without exploding? (Switches must be horsepower rated equal to or in excess of the motor hp rating).	
			Is low voltage protection provided in the control device of motors driving machines or equipment, which could cause probably injury from inadvertent starting?	
			Is each motor disconnecting switch or circuit breaker located within sight of the motor control device?	
			Is each motor located within sight of its controller or the controller disconnecting means capable of being locked in the open position or is a separate disconnecting means installed in the circuit within sight of the motor?	
			Is the controller for each motor in excess of two horsepower, rated in horsepower equal to or in excess of the rating of the motor it serves?	
			Are employees who regularly work on or around energized electrical equipment or lines instructed in the cardiopulmonary resuscitation (CPR) methods?	
			Are employees prohibited from working alone on energized lines or equipment over 600 volts?	

## HAZARD ASSESSMENT CHECKLIST

### NOISE

n/a	Yes	No		Notes
			Are there areas in the workplace where continuous noise levels exceed 85 dBA? (To determine maximum allowable levels for intermittent or impact noise, see Title 8, Section 5097.)	
			Are noise levels being measured using a sound level meter or an octave band analyzer and records being kept?	
			Have you tried isolating noisy machinery from the rest of your operation?	
			Have engineering controls been used to reduce excessive noise levels?	
			Where engineering controls are determined not feasible, are administrative controls (i.e. worker rotation) being used to minimize individual employee exposure to noise?	
			Is there an ongoing preventive health program to educate employees in safe levels of noise and exposure, effects of noise on their health, and use of personal protection?	
			Is the training repeated annually for employees exposed to continuous noise above 85 dBA?	
			Have work areas where noise levels make voice communication between employees difficult been identified and posted?	
			Is approved hearing protective equipment (noise attenuating devices) available to every employee working in areas where continuous noise levels exceed 85 dBA?	
			If you use ear protectors, are employees properly fitted and instructed in their use and care?	
			Are employees exposed to continuous noise above 85 dBA given periodic audiometric testing to ensure that you have an effective hearing protection system?	

## HAZARD ASSESSMENT CHECKLIST

### FUELING

n/a	Yes	No		Notes
			Is it prohibited to fuel an internal combustion engine with a flammable liquid while the engine is running?	
			Are fueling operations done in such a manner that likelihood of spillage will be minimal?	
			When spillage occurs during fueling operations, is the spilled fuel cleaned up completely, evaporated, or other measures taken to control vapors before restarting the engine?	
			Are fuel tank caps replaced and secured before starting the engine?	
			In fueling operations is there always metal contact between the container and fuel tank?	
			Are fueling hoses of a type designed to handle the specific type of fuel?	
			Is it prohibited to handle or transfer gasoline in open containers?	
			Are open lights, open flames, or sparking or arcing equipment prohibited near fueling or transfer of fuel operations?	
			Is smoking prohibited in the vicinity of fueling operations?	
			Are fueling operations prohibited in building or other enclosed areas that are not specifically ventilated for this purpose?	
			Where fueling or transfer of fuel is done through a gravity flow system, are the nozzles of the self-closing type?	



## HAZARD ASSESSMENT CHECKLIST

### IDENTIFICATION OF PIPING SYSTEMS

n/a	Yes	No		Notes
			When nonpotable water is piped through a facility, are outlets or taps posted to alert employees that it is unsafe and not to be used for drinking, washing or other personal use?	
			When hazardous substances are transported through above ground piping, is each pipeline identified at points where confusion could introduce hazards to employees?	
			When pipelines are identified by color painting, are all visible parts of the line so identified?	
			When pipelines are identified by color painted bands or tapes, are the bands or tapes located at reasonable intervals and at each outlet, valve or connection?	
			When pipelines are identified by color, is the color code posted at all locations where confusion could introduce hazards to employees?	
			When the contents of pipelines are identified by name or name abbreviation, is the information readily visible on the pipe near each valve or outlet?	
			When pipelines carrying hazardous substances are identified by tags, are the tags constructed of durable materials, the message carried clearly and permanently distinguishable and are tags installed at each valve or outlet?	
			When pipelines are heated by electricity, steam or other external source, are suitable warning signs or tags placed at unions, valves, or other serviceable parts of the system?	

## HAZARD ASSESSMENT CHECKLIST

### MATERIAL HANDLING

n/a	Yes	No		Notes
			Is there safe clearance for equipment through aisles and doorways?	
			Are aisleways designated, permanently marked, and kept clear to allow unhindered passage?	
			Are motorized vehicles and mechanized equipment inspected daily or prior to use?	
			Are vehicles shut off and brakes set prior to loading or unloading?	
			Are containers or combustibles or flammables, when stacked while being moved, always separated by dunnage sufficient to provide stability?	
			Are dock boards (bridge plates) used when loading or unloading operations are taking place between vehicles and docks?	
			Are trucks and trailers secured from movement during loading and unloading operations?	
			Are dock plates and loading ramps constructed and maintained with sufficient strength to support imposed loading?	
			Are hand trucks maintained in safe operating condition?	
			Are chutes equipped with sideboards of sufficient height to prevent the materials being handled from falling off?	
			Are chutes and gravity roller sections firmly placed or secured to prevent displacement?	
			At the delivery end of rollers or chutes, are provisions made to brake the movement of the handled materials.	
			Are pallets usually inspected before being loaded or moved?	
			Are hooks with safety latches or other arrangements used when hoisting materials so that slings or load attachments won't accidentally slip off the hoist hooks?	
			Are securing chains, ropes, chockers or slings adequate for the job to be performed?	
			When hoisting material or equipment, are provisions made to assure no one will be passing under the suspended loads?	
			Are Material Safety Data Sheets available to employees handling hazardous substances?	

## HAZARD ASSESSMENT CHECKLIST

### TRANSPORTING EMPLOYEES & MATERIALS

n/a	Yes	No		Notes
			Do employees who operate vehicles on public thoroughfares have valid operator's licenses?	
			When seven or more employees are regularly transported in a van, bus or truck, is the operator's license appropriate for the class of vehicle being driven?	
			Is each van, bus or truck used regularly to transport employees, equipped with an adequate number of seats?	
			When employees are transported by truck, are provision provided to prevent their falling from the vehicle?	
			Are vehicles used to transport employees, equipped with lamps, brakes, horns, mirrors, windshields and turn signals in good repair?	
			Are transport vehicles provided with handrails, steps, stirrups or similar devices, so placed and arranged that employees can safely mount or dismount?	
			Are employee transport vehicles equipped at all times with at least two reflective type flares?	
			Is a full charged fire extinguisher, in good condition, with at least 4 B:C rating maintained in each employee transport vehicle?	
			When cutting tools with sharp edges are carried in passenger compartments of employee transport vehicles, are they placed in closed boxes or containers which are secured in place?	
			Are employees prohibited from riding on top of any load, which can shift, topple, or otherwise become unstable?	

## HAZARD ASSESSMENT CHECKLIST

### CONTROL OF HARMFUL SUBSTANCES BY VENTILATION

n/a	Yes	No		Notes
			Is the volume and velocity of air in each exhaust system sufficient to gather the dusts, fumes, mists, vapors or gases to be controlled, and to convey them to a suitable point of disposal?	
			Are exhaust inlets, ducts and plenums designed, constructed, and supported to prevent collapse or failure of any part of the system?	
			Are clean-out ports or doors provided at intervals not to exceed 12 feet in all horizontal runs of exhaust ducts?	
			Where two or more different type of operations are being controlled through the same exhaust system, will the combination of substances being controlled, constitute a fire, explosion or chemical reaction hazard in the duct?	
			Is adequate makeup air provided to areas where exhaust systems are operating?	
			Is the intake for makeup air located so that only clean, fresh air, which is free of contaminants, will enter the work environment?	
			Where two or more ventilation systems are serving a work area, is their operation such that one will not offset the functions of the other?	

## HAZARD ASSESSMENT CHECKLIST

### SANITIZING EQUIPMENT & CLOTHING

n/a	Yes	No		Notes
			Is personal protective clothing or equipment, that employees are required to wear or use, of a type capable of being easily cleaned and disinfected?	
			Are employees prohibited from interchanging personal protective clothing or equipment, unless it has been properly cleaned?	
			Are machines and equipment, which processes, handle or apply materials that could be injurious to employees, cleaned and/or decontaminated before being overhauled or placed in storage?	
			Are employees prohibited from smoking or eating in any area where contaminants are present that could be injurious if ingested?	
			When employees are required to change from street clothing into protective clothing, is a clean changeroom with separate storage facility for street and protective clothing provided?	
			Are employees required to shower and wash their hair as soon as possible after a known contact has occurred with a carcinogen?	
			When equipment, materials, or other items are taken into or removed from a carcinogen regulated area, is it done in a manner that will not contaminate non-regulated areas or the external environment?	

## HAZARD ASSESSMENT CHECKLIST

### TIRE INFLATION

n/a	Yes	No		Notes
			Where tires are mounted and/or inflated on drop center wheels is a safe practice procedure posted and enforced?	
			Where tires are mounted and/or inflated on wheels with split rims and/or retainer rings is a safe practice procedure posted and enforced?	
			Does each tire inflation hose have a clip-on chuck with at least 24 inches of hose between the chuck and an in-line hand valve and gauge?	
			Does the tire inflation control valve automatically shut off the airflow when the valve is released?	
			Is a tire restraining device such as a cage, rack or other effective means used while inflating tires mounted on split rims, or rims using retainer rings?	
			Are employees strictly forbidden from taking a position directly over or in front of a tire while it's being inflated?	

## HAZARD ASSESSMENT CHECKLIST

### EMERGENCY ACTION PLAN

n/a	Yes	No		Notes
			Are you required to have an emergency action plan?	
			Does the emergency action plan comply with requirements of T8CCR 3220(a)?	
			Have emergency escape procedures and routes been developed and communicated to all employees?	
			Do employees, who remain to operate critical plant operations before they evacuate, know the proper procedures?	
			Is the employee alarm system that provides a warning for emergency action recognizable and perceptible above ambient conditions?	
			Are alarm systems properly maintained and tested regularly?	
			Is the emergency action plan reviewed and revised periodically?	
			Do employees know their responsibilities:	
			For reporting emergencies?	
			During an emergency?	
			For conducting rescue and medical duties?	

## HAZARD ASSESSMENT CHECKLIST

### INFECTION CONTROL

n/a	Yes	No		Notes
			Are employees potentially exposed to infectious agents in body fluids?	
			Have occasions of potential occupational exposure been identified and documented?	
			Has a training and information program been provided for employees exposed to or potentially exposed to blood and/or body fluids?	
			Have infection control procedures been instituted where appropriate, such as ventilation, universal precautions, workplace practices, and personal protective equipment?	
			Are employees aware of specific workplace practices to follow when appropriate? (Hand washing, handling sharp instruments, handling of laundry, disposal of contaminated materials, reusable equipment.)	
			Is personal protective equipment provided to employees, and in all appropriate locations?	
			Is the necessary equipment (i.e. mouthpieces, resuscitation bags, and other ventilation devices) provided for administering mouth-to-mouth resuscitation on potentially infected patients?	
			Are facilities/equipment to comply with workplace practices available, such as hand-washing sinks, biohazard tags and labels, needle containers, detergents/disinfectants to clean up spills?	
			Are all equipment and environmental and working surfaces cleaned and disinfected after contact with blood or potentially infectious materials?	
			Is infectious waste placed in closable, leak proof containers, bags or puncture-resistant holders with proper labels?	
			Has medical surveillance including HBV evaluation, antibody testing and vaccination been made available to potentially exposed employees?	
			Training on universal precautions?	
			Training on personal protective equipment?	
			Training on workplace practices, which should include blood drawing, room cleaning, laundry handling, clean up of blood spills?	
			Training on needlestick exposure / management?	
			Hepatitis B vaccinations?	



## HAZARD ASSESSMENT CHECKLIST

### ERGONOMICS

n/a	Yes	No		Notes
			Can the work be performed without eyestrain or glare to the employees?	
			Does the task require prolonged raising of the arms?	
			Do the neck and shoulders have to be stooped to view the task?	
			Are there pressure points on any parts of the body (wrists, forearms, back of thighs)?	
			Can the work be done using the larger muscles of the body?	
			Can the work be done without twisting or overly bending the lower back?	
			Are there sufficient rest breaks, in addition to the regular rest breaks, to relieve stress from repetitive-motion tasks?	
			Are tools, instruments and machinery shaped, positioned and handled so that tasks can be performed comfortably?	
			Are all pieces of furniture adjusted, positioned and arranged to minimize strain on all parts of the body?	

## HAZARD ASSESSMENT CHECKLIST

### VENTILATION FOR INDOOR AIR QUALITY

n/a	Yes	No		Notes
			Does your HVAC system provide at least the quantity of outdoor air required by the State Building Standards Code, Title 24, Part 2 at the time the building was constructed?	
			Is the HVAC system inspected at least annually, and problems corrected?	
			Are inspection records retained for at least 5 years?	

## HAZARD ASSESSMENT CHECKLIST

### CRANE CHECKLIST

n/a	Yes	No		Notes
			Are the cranes visually inspected for defective components prior to the beginning of any work shift?	
			Are all electrically operated cranes effectively grounded?	
			Is a crane preventive maintenance program established?	
			Is the load chart clearly visible to the operator?	
			Are operating controls clearly identified?	
			Is a fire extinguisher provided at the operator's station?	
			Is the rated capacity visibly marked on each crane?	
			Is an audible warning device mounted on each crane?	
			Is sufficient illumination provided for the operator to perform the work safely?	
			Are cranes of such design, that the boom could fall over backward, equipped with boomstops?	
			Does each crane have a certificate indicating that required testing and examinations have been performed?	
			Are crane inspection and maintenance records maintained and available for inspection?	

## **Attachment 3 – Emergency Notification List**

# EMERGENCY NOTIFICATION LIST

## Mono County Solid Waste Program

<u>Title / Responsibility</u>	<u>Name</u>	<u>Office Phone</u>	<u>Cellular Phone</u>	<u>Home Phone</u>
<b>Solid Waste Facilities</b>				
Benton Crossing Landfill .....	Gate Attendant .....	n/a.....	(760) 937-2192.....	n/a
Site Supervisor .....	Tom Music .....	n/a.....	(760) 937-2659.....	n/a
Benton TS – Gate Attendant.....	Pauline Moran .....	n/a.....	(760) 937-6208.....	n/a
Bridgeport TS – Gate Attendant.....	Robert Gilman .....	n/a.....	(775) 247-6018.....	n/a
Chalfant TS – Gate Attendant.....	Sean Scoggins .....	n/a.....	(760) 920-7277.....	n/a
Paradise TS – Gate Attendant.....	Sean Scoggins.....	n/a.....	(760) 920-7277.....	n/a
Pumice Valley TS – Gate Attendant .....	Robert Gilman .....	n/a.....	(760) 937-3208.....	n/a
Walker TS – Gate Attendant.....	Don Rupp.....	n/a.....	(775) 247-6018.....	n/a
<b>Solid Waste Administration</b>				
Solid Waste Superintendent .....	Tony Dublino .....	(760) 932-5453.....	(760) 616-0613.....	n/a
Equipment Maintenance .....	Jerry Vandebrake.....	(760) 932-5462.....	(530) 208-6422.....	n/a
Public Works Administration .....	.....	(760) 932-5440.....	n/a.....	n/a
<b>D&amp;S Waste Removal (Contract Transfer Station Operator)</b>				
General Manager .....	Darrol Brown .....	(775) 463-3090 / (866) 463-3090.....	(775) 277-0175.....	n/a
Supervisor .....	Kevin Brown.....	(775) 463-3090 / (866) 463-3090.....	(775) 277-0143.....	n/a
Transfer Truck Driver .....	Darrol or Kevin .....	see above.....	see above.....	n/a
<b>Mono County Environmental Health Department</b>				
LEA Program.....	Jill Kearney.....	(760) 924-1846 / (760) 932-5580.....	(530) 304-3911 .....	n/a
Director.....	Louis Molina.....	(760) 924-1845 / (760) 932-5588.....	(760) 937-7246.....	n/a
<b>Road Districts</b>				
Public Works Director.....	Jeff Walters .....	(760) 932-5459.....	(775) 309-3343.....	n/a
Road Operations Supervisor.....	Brett McCurry.....	(760) 932-5449.....	(760) 937-2204.....	n/a
District 1 (Crowley).....	Steve Reeves.....	(760) 935-4347.....	(760) 920-7768.....	n/a
District 2 (Benton) .....	Josh Rhodes .....	(760) 933-2311.....	(760) 937-1894.....	n/a
District 3 (Lee Vining).....	Jason Small .....	(760) 647-6336.....	(760) 937-1896.....	n/a
District 4.5 (Bridgeport & Walker) .....	Cory Gonzales .....	(760) 932-5470.....	(775) 721-2837.....	n/a
Walker Road Shop .....	.....	(530) 495-2202.....	n/a.....	n/a
<b>Mono County Risk Manager</b>				
Risk Manager .....	Margaret White.....	(760) 932-5405.....	< Vacant > .....	n/a

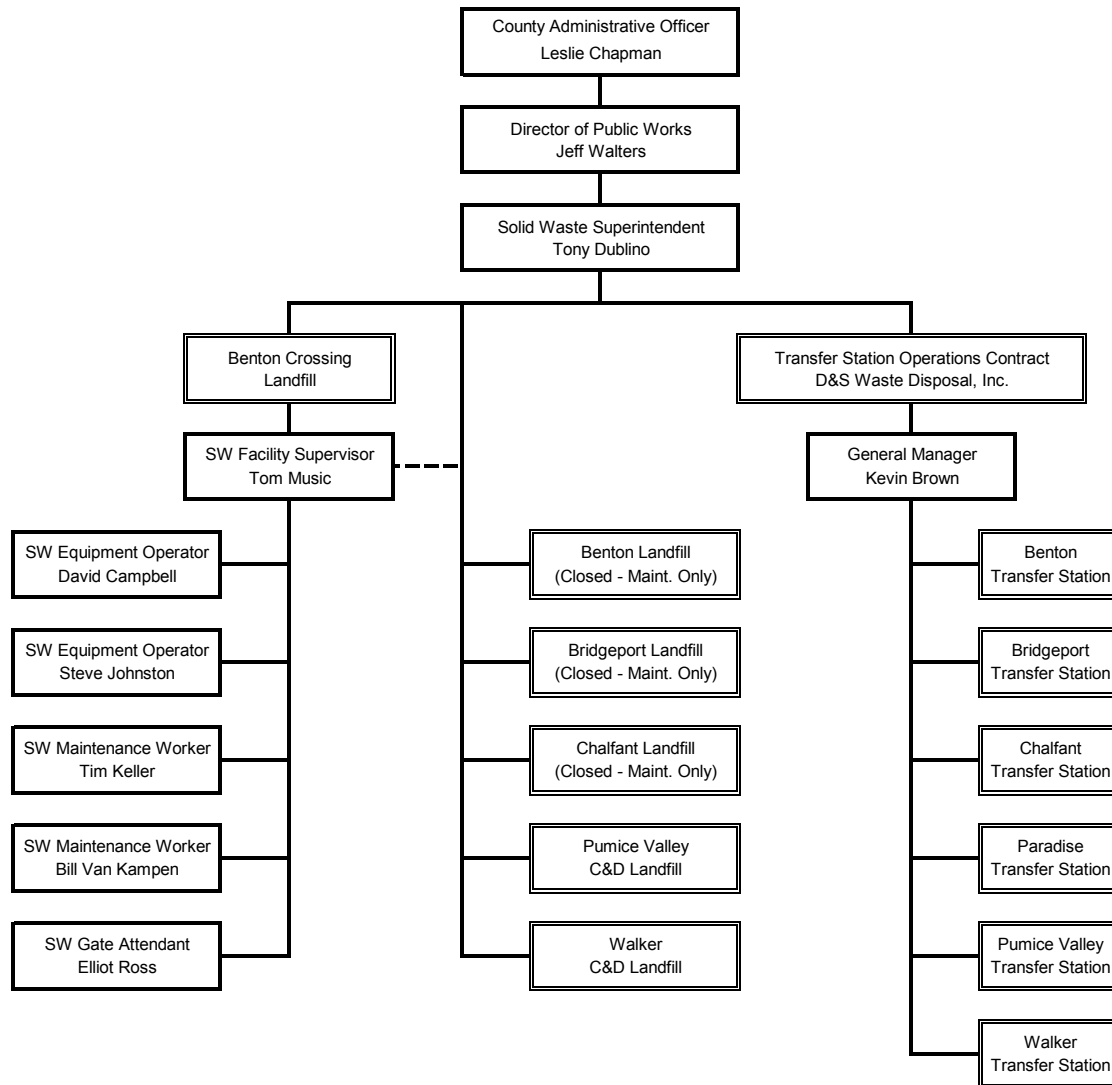
<u>Emergency Response</u>	<u>Location</u>	<u>Office Phone</u>
Sheriff's Department (911).....	Bridgeport .....	(760) 932-7549
Sgt. Jeff Beard, Emergency Services .....	Bridgeport .....	(760) 932-7549 ext. 114
California Highway Patrol (911) .....	Bridgeport .....	(760) 932-7995
.....	Bishop .....	(760) 873-3531
Fire Districts.....	.....	911
Cal Fire – Owens Valley (office) .....	Bishop .....	(760) 387-2565
Cal Fire – Owens Valley (dispatch) .....	.....	(909) 881-6916
BLM / USFS Fire Response (dispatch).....	Bishop .....	(760) 873-2488
Paramedics.....	.....	911
Hospitals / Clinics		
Mammoth Emergency Room .....	Mammoth Lakes .....	(760) 934-3311 ext. 2234
Bridgeport Clinic .....	Bridgeport .....	(760) 932-7011
Northern Inyo.....	Bishop .....	(760) 873-5811
Carson Valley Urgent Care.....	Gardnerville, NV .....	(775) 782-1600
<u>Other Offices / Agencies</u>		
California Dept. of Transportation (Caltrans) .....	Bishop .....	(760) 872-0601
Eastern Sierra Oil (Diesel Fuel) .....	Bishop .....	(760) 872-4645
Propane Gas Companies		
Amerigas .....	Bishop .....	(760) 873-6371
.....	Bridgeport .....	(760) 932-7961
.....	Mammoth Lakes .....	(760) 934-2213 or, 934-6333
.....	Walker.....	(530) 495-2324
Eastern Sierra Propane .....	Bishop .....	(760) 872-2955
Turner Propane .....	Mammoth Lakes .....	(760) 934-6811
.....	Bishop .....	(760) 872-1314
Waste Collection Companies		
Mammoth Disposal.....	Mammoth Lakes .....	(760) 934-2201
D&S Waste Removal.....	Yerington, NV .....	(775) 463-3090

Note: home telephone numbers are not published on the emergency contact list distributed as an attachment to permit documents.

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**Appendix J**  
**Supervisory Structure**

### ORGANIZATIONAL CHART MONO COUNTY SOLID WASTE OPERATIONS



## **SOLID WASTE SUPERINTENDENT**

### DEFINITION

Under general direction, to plan, organize, manage, and coordinate the services, functions, and activities of Solid Waste Division of the Public Works Department, and to do related work as assigned.

### DISTINGUISHING CHARACTERISTICS

This is a single position classification for a management position which provides direction and supervision for the County Solid Waste Facilities. Responsibilities include project development, contract administration, compliance monitoring, and staff supervision, assignment, and scheduling.

### REPORTS TO

Public Works Director, Assistant Public Works Director, or designee.

### CLASSIFICATIONS SUPERVISED

Solid Waste Supervisor, Solid Waste Equipment Operator, Solid Waste Maintenance Worker, Fiscal and Technical Specialist.

### EXAMPLES OF IMPORTANT AND ESSENTIAL DUTIES *(The following is used as a partial description and is not restrictive as to duties required.)*

- Develops and implements short- and long-term division goals, objectives, policies and procedures; develops long-range plans for major County solid waste facility improvement and maintenance projects;
- Directs, oversees and coordinates the scheduling and performance of work by Division staff;
- Prepares the division budget and individual project budgets, identifying needs, estimated expenses, and projected funds available;
- Manages the divisional budget assuring that funded projects are completed and budgetary and legal and regulatory constraints are followed;
- Ensures compliance with regulatory requirements;
- Develops and administers the County's recycling program and household hazardous waste program;
- Compiles, maintains, and performs quality control for program data and records and prepares required reports;
- Maintains current awareness of legislation and issues regarding solid waste facility operation and permitting, recycling program operation, and hazardous waste management and disposal;
- Responds to inquiries, suggestions, and complaints from the public and County representatives;
- Develops and implements solutions to complex and sensitive situations impacting the public and ensuring the safety and quality of work;
- Meets with community groups and civic organizations to educate and discuss issues relating to solid waste facilities and the County's solid waste program;
- Ensures that safety standards are observed;



- Meets with fire, safety, and regulatory inspectors to discuss possible hazards, operational deficiencies, and corrections;
- Develops project plans and specifications for improvement projects, develops contract documents and bid packages for bidding purposes, and manages, inspects, and certifies completion of projects;
- Meets with contractors and consultants to provide and obtain information on matters involving the division;
- Provides project management for contract projects;
- Inspects, manages, and provides input to contractors working at County disposal facilities;
- Supervises, trains, and evaluates assigned staff;
- Represents the County at public meetings;
- Assigns and reviews the investigation and reporting of industrial and equipment accidents;
- Works cooperatively with Public Works' Fleet Operations Division to ensure the repair, maintenance, and procurement of equipment;
- Obtains facts, analyzes evidence, and makes decisions or takes actions to correct problems;
- Integrates new programs into existing operations;
- Prioritizes workload for prompt completion of emergency and unscheduled work requests;
- Coordinates functions of the Solid Waste Local Task Force, including meeting schedules, agendas, and minutes, and task force membership;
- Performs required environmental monitoring, including sampling and reporting, and/or manages contracts required to comply with sampling, analysis, and reporting requirements;
- Develops, maintains, monitors, and updates operating permits;
- Administers waste collection franchise agreements and manages and works cooperatively with franchise haulers and their customers;
- Administers, monitors, renews, and updates program revenue sources, including gate fees and the solid waste fee program.

#### TYPICAL PHYSICAL REQUIREMENTS

Sit for extended periods; frequently stand and walk; ability to walk in uneven terrain and on slippery surfaces; normal manual dexterity and eye-hand coordination; ability to crawl through various areas requiring movement on hands and knees; ability to climb, stoop, crouch, and kneel; lift and move objects weighing up to 50 lbs.; perform sustained physical work; corrected hearing and vision to normal range; verbal communication; use of office equipment, including computer, telephone, calculator, copiers, and fax; operate an automobile and two-way radio.

#### TYPICAL WORKING CONDITIONS

Work is performed in building and outdoor environments; work is performed in varying temperatures; exposure to dust, chemicals, and gases; continuous contact with other staff.

#### DESIRABLE QUALIFICATIONS

##### Knowledge of:

- Principles, practices and planning techniques for operation and permitting of solid waste facilities.
- Laws regulating solid waste facilities.
- Principles of personnel administration, including training, supervision, performance evaluation, and discipline.
- Budget and cost estimating principles.
- Legal and safety requirements, occupational hazards and safety standards.
- Precautions as they relate to solid waste management and operations.

- Equipment, materials, and methods used in the operations of solid waste facilities.
- Principles and practices of contract administration.
- Principles, practices, and planning techniques for public education.
- Development and administration of contracts.

Ability to:

- Work cooperatively and effectively with County personnel, contractors, consultants, and the public.
- Communicate professionally and effectively both orally and in writing.
- Provide positive, professional, and responsive customer service.
- Identify needs, recognize problems, and develop solutions regarding solid waste facilities.
- Perform inspections, identify deficiencies, and implement corrective action.
- Establish work priorities and/or make operational changes.
- Plan, organize, schedule, and direct the maintenance and repair of assigned County facilities and associated equipment and personnel.
- Provide supervision, training, and performance evaluation for assigned staff.
- Estimate time and materials requirements for maintenance and repair projects.
- Read and interpret project plans and specifications.
- Develop project scopes of work, solicit bids, and negotiate and administer contracts.
- Prepare budget recommendations and monitor expenditures within budget authorizations.
- Make mathematical calculations quickly and accurately.
- Prepare clear, concise, and accurate reports.
- Represent the County facilities functions with other County management.
- Establish and maintain cooperative working relationships.
- Lead Solid Waste Local Task Force meetings.

Training and Experience:

Any combination of training and experience which would likely provide the required knowledge and abilities is qualifying. A typical way to obtain the required knowledge and abilities would be:

Six years of increasing responsibility in solid waste management, including at least two years of supervisory experience,

AND

A bachelor's degree in civil engineering, geology, physics, chemistry, or in a similar field in the environmental or physical sciences. Alternatively, a bachelor's degree in business management with a minor or coursework in environment or physical sciences.

Special Requirements:

Possession of a driver's license valid in California.

***The contents of this class specification shall not be construed to constitute any expressed or implied warranty or guarantee, nor shall it constitute a contract of employment. The County of Mono assumes no responsibility beyond the general accuracy of the document, nor does it assume responsibility for any errors or omissions in the information contained herein. The contents of this specification may be modified or revoked without notice. Terms and conditions of employment are determined through a "meet and confer" and/or individual employment contract process and are subject to the Memorandum of Understanding or employment contract currently in effect.***

## **SOLID WASTE SUPERVISOR**

### **DEFINITION**

Under general supervision, to direct, oversee, and supervise, the operations, activities, and personnel involved in equipment operation, recycling functions, and maintenance activities at County Solid Waste facilities; and to do related work as required.

### **DISTINGUISHING CHARACTERISTICS**

This is a full supervisory level in the Solid Waste Equipment Operator/Supervisor class series. The incumbent is responsible for supervising staff and planning and scheduling operations for the County's Solid Waste facilities. In addition, the incumbent oversees and supervises equipment operation and maintenance activities at the County's Solid Waste sites.

### **REPORTS TO**

Solid Waste Superintendent

### **CLASSIFICATIONS SUPERVISED**

Solid Waste Equipment Operator, Solid Waste Gate Attendant, and Solid Waste Maintenance Attendant.

### **EXAMPLES OF IMPORTANT AND ESSENTIAL DUTIES** *(The following is used as a partial description and is not restrictive as to duties required.)*

Plans, organizes, and supervises operations, staff, and maintenance at County Landfill facilities; supervises, trains and evaluate the work of assigned staff; provides safety training to staff; performs transfer site inspections; deals with customer complaints regarding Landfill operations and services; participates in the development and administration of the County Recycling Program; develops and administers landfill and transfer station contracts; directs the development and develops required reports and records; maintains current awareness legislation and issues which effect hazardous materials and hazardous waste disposal; oversees equipment operation and maintenance functions at the County's Solid Waste sites and transfer stations; operates various collection vehicles and heavy equipment as needed.

### **TYPICAL PHYSICAL REQUIREMENTS**

Sit for extended periods; frequently stand and walk; ability to walk on slippery and uneven surfaces; normal manual dexterity and eye-hand coordination; ability to crawl through various areas requiring movement on hands and knees; ability to climb, stoop, crouch, and kneel; lift and move objects weighing up to 50 lbs.; perform sustained physical work; corrected hearing and vision to normal range; verbal communication; use of office equipment, including computer, telephone, calculator, copiers, and FAX; use hand tools and power equipment.

## **SOLID WASTE SUPERVISOR - 2**

### **TYPICAL WORKING CONDITIONS**

Work is performed in a building and outdoor environment; work is performed in varying temperatures; exposure to grease, solvents, chemicals, and pesticides; continuous contact with other staff and the public.

### **DESIRABLE QUALIFICATIONS**

#### **Knowledge of:**

Basic knowledge of laws, rules, regulations, and policies affecting solid waste operations and facility development.

Principles and practices of solid waste management control.

Operation and maintenance of a solid waste sites and transfer facilities.

Operation and maintenance requirements of collection/transfer vehicles and heavy equipment, including state and federal inspections programs.

Safety work practices and regulations,

Computers and software used in solid waste management and administrative work.

Principles of staff supervision, employee training, and work evaluation.

#### **Ability to:**

Plan, organize, supervise, and coordinate County Landfill site operation, equipment operations, and maintenance functions.

Provide supervision, training, and work evaluation for assigned staff.

Assist with studies and project development for Landfill facilities operations, maintenance, and site improvement.

Read and interpret laws, ordinances, regulations, and guidelines related to solid waste services and facility operations and maintenance.

Operate a computer and use appropriate software in the performance of solid waste administrative work.

Effectively represent the Public Works Department and the Solid Waste Program in responding to inquires, providing assistance, and dealing with public.

Establish and maintain cooperative working relationships.

#### **Training and Experience:**

Any combination of training and experience which would likely provide the required knowledge and abilities is qualifying. A typical way to obtain the required knowledge and abilities would be:

Five (5) years of increasingly responsible work experience in solid waste equipment operation, site maintenance, and site operations. Previous lead/supervisory experience is highly desirable.

## SOLID WASTE SUPERVISOR - 3

### DESIRABLE QUALIFICATIONS (continued)

#### Special Requirements:

Possession of, or ability to obtain, a valid, current, and appropriate class of California Driver=s License required to perform the majority of regular job assignments.

Some job assignments may require a special Class of California Driver's license and endorsements.

*The contents of this class specification shall not be construed to constitute any expressed or implied warranty or guarantee, nor shall it constitute a contract of employment. The County of Mono assumes no responsibility beyond the general accuracy of the document, nor does it assume responsibility for any errors or omissions in the information contained herein. The contents of this specification may be modified or revoked without notice. Terms and conditions of employment are determined through a "meet and confer" process and are subject to the Memorandum of Understanding or "At-Will" Contract currently in effect.*

# SOLID WASTE FACILITY EQUIPMENT OPERATOR

## **DEFINITION**

Under direction, to perform the full range of assignments and duties involved in the maintenance, repair, and construction of roads, landfill waste cells and cover systems, drainage systems, and other structures at County solid waste facilities; to operate, maintain, and perform general repairs of all tools and equipment; to monitor and inspect incoming waste loads; to control and direct traffic; to maintain storage and stockpile areas; to perform routine grounds maintenance duties of County solid waste facilities; to explain and enforce rules, regulations, policies, and procedures in a tactful and courteous manner; and to perform other job related work as required.

## **DISTINGUISHING CHARACTERISTICS**

This is the advanced journey level in the Solid Waste Facility Worker Class series. Incumbents in this series will be assigned primarily to landfill work, but may be cross-trained in and assigned to waste transfer operations or Road Division or Facilities Division work within the Department of Public Works. Incumbents perform the full range of tasks with minimal supervision. Incumbents may also provide lead direction and training to subordinate staff.

## **REPORTS TO**

Site Supervisor or Operations Manager

## **CLASSIFICATIONS DIRECTLY SUPERVISED**

May provide lead direction and training to gate attendants and laborers.

## **EXAMPLES OF DUTIES**

Duties may include but are not limited to the following:

Perform duties specified in written operating procedures established for County solid waste facilities and apply rules and regulations developed for such facilities.

Perform the full range of duties in the maintenance, construction, and repair of on-site roads, landfill cover, drainage systems, and other systems at County solid waste facilities.

Operate a variety of heavy construction and landfill disposal equipment, including bulldozers, landfill compactors, scrapers, wheel loaders, skid steer loaders, motor graders, dump trucks, water trucks, and tilt-frame trucks.

Operate a variety of smaller equipment, including generators, stationary compactors, steam cleaners, fork lifts, welding equipment, cutting torches, air compressors, pumps, hand tools, and power tools.

Push and compact solid waste; excavate, haul, place, and compact soil to cover solid waste; and, maintain daily, intermediate, and final cover.

Routinely monitor and inspect incoming waste loads for prohibited material and remove and properly store such materials.

Assist with the operation and maintenance of facility stockpiles and storage areas.

Perform scalehouse operation duties in accordance with the specifications of the job description for the Solid Waste Facility Gate Attendant / Laborer class.

Perform laborer duties in accordance with the specifications of the job description for the Solid Waste Facility Gate Attendant / Laborer class.

Assist in the performance of routine grounds maintenance tasks.

Assist with minor construction and repair of site facilities.

Maintain traffic control and assist with the installation, maintenance, and repair of traffic control devices and warning signs as required.

Assist with the installation, maintenance, and repair of litter control devices as required.

Assist with placement of synthetic tarps or other mechanisms used as alternative daily cover over the active working face of the landfill.

Perform random physical load inspections, record findings, handle hazardous and other prohibited waste detected in the load in accordance with the County's Load Checking Program.

May drive vehicles to transport materials, tools, and equipment.

Operate, clean, and care for hand tools and equipment.

Perform general maintenance, adjustments, and repair tasks on landfill equipment and tools, including assisting mechanics with routine preventative maintenance programs.

Assist with inspections of site facilities and reports on deficiencies.

Perform emergency response measures according to established procedures in the event of fire or other emergency conditions.

Perform related duties as assigned.

### **TYPICAL PHYSICAL REQUIREMENTS**

Sit for extended periods; frequently stand, walk, stoop, kneel, and crouch; physical ability to lift and carry objects weighing up to 50 pounds unassisted and greater than 50 pounds with assistance; normal manual dexterity and hand-eye coordination; corrected hearing and vision to normal range; verbal communication; use of equipment including hand and power tools, hydraulic equipment, computers, printers, and telephones.

### **TYPICAL WORKING CONDITIONS**

Work is performed outdoors in varying temperature, severe weather, and humidity condition; work is performed in environment with constant noise; exposure to fumes, dust, grease, and oils; exposure to moving equipment; exposure to electrical current; exposure to controlled and hazardous substances, pesticides, herbicides, paints, and chemicals; frequent contact with staff and the public. Incumbents are subject to working after hours, evenings, weekends, holidays, and call-outs.

## **DESIRABLE QUALIFICATIONS**

### Knowledge of:

- Operation of maintenance and construction tools and equipment.
- Materials, methods, practices, and equipment used in the construction, maintenance, and repair of roads, drainage systems, landfill waste cells and cover systems, and other features used in the proper operation of solid waste facilities.
- Vehicle classifications, capabilities, and capacities.
- Methods and practices followed in the maintenance, care, repair, and minor adjustments of tools, machinery, and equipment.
- Snow removal methods, procedures, and equipment.
- Traffic laws, rules, and ordinances involved in truck and heavy equipment operations; traffic control practices and regulations.
- Principles of lead direction and training.
- General clerical procedures, including cash transactions and basic record-keeping.
- Basic arithmetic.
- Occupational hazards and safe work practices.

### Ability and willingness to:

- Learn, interpret, understand, and apply pertinent laws, codes, regulations, policies, and procedures.
- Explain and enforce rules, regulations, policies, and procedures in a tactful and courteous manner.
- Follow established safe work rules, practices, policies, and procedures.
- Perform a variety of unskilled and semi-skilled tasks in the maintenance and operation of County landfills and transfer stations.
- Perform heavy physical labor.
- Operate all required equipment, tools, and vehicles.
- Clean, maintain, and make basic repairs to equipment and tools.
- Recognize and identify conditions that require maintenance and repair work.
- Identify hazardous wastes and apply established procedures for their proper handling.
- Identify recyclable and salvageable materials and apply established procedures for their proper handling.
- Collect and count money, make change and issue receipts, use a cash box or register.
- Reconcile cash against receipts and prepare bank deposits.
- Perform required mathematical computations with accuracy.



- Prepare and maintain accurate and complete records and reports in a legible manner and according to prescribed procedures.
- Communicate clearly and concisely, both orally and in writing.
- Establish and maintain cooperative working relationships.
- Understand and accurately follow oral and written directions.
- Work effectively in the absence of supervision.
- Work effectively in emergency and stressful situations.
- Maintain confidentiality.

Training and Experience:

Any combination of training and experience that would provide the required knowledge and abilities is qualifying. A typical way to obtain the knowledge and abilities would be:

Two years of increasingly responsible work experience in road, landfill, or other earth-moving construction and maintenance work, including at least one year operating heavy power-driven construction equipment such as bulldozers, landfill compactors, scrapers, wheel loaders, and/or dump trucks; experience in performing teller or cashier activities; some experience or training in entrance gate or retail store operation desirable; high school diploma or GED equivalent.

Special Requirements:

Possession of a valid California driver's license. Possession of a Class A license, or the ability to obtain a Class A license within six months of hire, may be required depending on assignment.

This job specification should not be construed to imply that these requirements are the exclusive standards of the position. Not all duties are necessarily performed by each incumbent. Additionally, incumbents will be required to follow instructions and to perform other job related duties as may be required.

## **SOLID WASTE MAINTENANCE WORKER**

### **DEFINITION**

Under supervision, to perform a variety of assignments and duties involved in the operation of County solid waste facilities; to monitor and inspect incoming waste loads; to control entrance facilities; to control and direct traffic; to operate, maintain, and perform minor repairs to and maintenance of assigned tools and equipment; to maintain storage and stockpile areas; to operate wood chipper, wheel loader, forklift, and other equipment necessary for the management of wastes requiring special handling; to identify, classify, and manage hazardous and universal wastes; to assist in the application of alternative daily cover; to prepare and maintain routine records of solid waste disposal activities; to perform routine grounds maintenance duties at County solid waste facilities; to explain and enforce rules, regulations, policies, and procedures in a tactful and courteous manner; and, to perform other job related work as required.

### **DISTINGUISHING CHARACTERISTICS**

Incumbents in this classification are responsible for the assessment and collection of gate fees and for the operation of weigh scales. They must also have the ability to control the waste stream as it enters the facility, direct traffic within the facility, and to communicate with the public in a friendly, tactful, and courteous manner. Incumbents maintain records, control litter, and perform routine daily operation and maintenance of the equipment, stockpiles, and structures located at their assigned solid waste site(s).

### **REPORTS TO**

Site Supervisor or Operations Manager.

### **CLASSIFICATIONS DIRECTLY SUPERVISED**

None.

### **EXAMPLES OF DUTIES**

Duties may include, but are not limited to, the following:

Scalehouse Operation:

Prepare entrance area for business each day.

Provide accurate information to the public related to facility operations and the County's solid waste program in a prompt, courteous, and tactful manner.

Ask customers questions related to load content and origin; check each load for hazardous and other prohibited waste and handle any such waste in accordance with the County's Load Checking Program.

Assess each load as to type and weight or volume of solid waste material, calculate fees, perform cash and account transactions, and complete written receipts.

Maintain security of cash and receipts, reconcile cash and account records against receipts and prepare deposits.

Operate a weigh scale and/or large trash compactors in conformance with applicable state and local regulations and manufacturer's guidelines.

Prepare and maintain routine records of solid waste disposal activities.

Receive, record, and respond to inquiries and complaints from customers and the general public.

**Maintenance Tasks:**

Perform daily litter control and routine grounds maintenance tasks.

Assist with minor construction and repair of site facilities.

Install, maintain, and repair traffic control devices and warning signs as directed.

Install, maintain, and repair litter control devices as directed.

Remove and properly dispose of litter and windblown debris throughout the facility and around site perimeters, including areas extending beyond property boundaries.

Assist with placement of synthetic tarps or other mechanisms used as alternative daily cover over the active working face of the landfill.

Remove salvageable material from working face(s) and relocate to appropriate stockpile.

Provide routine cleaning and maintenance of the weigh scale and/or trash compactors, including snow removal.

Operate, clean, and care for hand tools and equipment.

Perform routine maintenance and repair tasks on equipment.

**Both Functions:**

Perform duties specified in written operating procedures established for County solid waste facilities and apply rules and regulations developed for such facilities.

Unlock and open the entrance gate at the beginning of each operating day.

Close and lock the entrance gate at the end of each operating day.

Control the flow of traffic entering, exiting, and operating within the facility.

Provide instruction and direct customers to the appropriate unloading area(s).

Operate and maintain facility stockpiles and storage areas, including tires, appliances, scrap metal, wood, recyclables, used motor oil, hazardous wastes, universal wastes, and other items as directed.

Operate equipment necessary for the management and maintenance of stockpiles and wastes requiring special handling, including tires, appliances, scrap metal, wood, recyclables, used motor oil, and hazardous and universal wastes.

May be required to drive vehicles to transport materials or to operate construction equipment, such as loaders or backhoes.

Travel to County disposal sites to collect, transport, and manage wastes requiring special handling.

Inspect incoming loads and remove and manage salvageable or prohibited items as directed.

- Identify, classify, store, consolidate, and manage hazardous wastes and universal wastes.
- Perform random physical load inspections, record findings, handle hazardous and other prohibited waste detected in the load in accordance with the County's Load Checking Program.
- Assist with inspections of site facilities and reports on deficiencies.
- Report on status of supplies.
- Perform emergency response measures according to established procedures in the event of fire or other emergency conditions.
- Perform related duties as assigned.

### **TYPICAL PHYSICAL REQUIREMENTS**

Sit for extended periods; frequently stand, walk, stoop, kneel, and crouch; physical ability to lift and carry objects weighing up to 50 pounds unassisted and greater than 50 pounds with assistance; normal manual dexterity and hand-eye coordination; corrected hearing and vision to normal range; verbal communication; use of equipment including hand and power tools, hydraulic equipment, computers, printers, and telephones.

### **TYPICAL WORKING CONDITIONS**

Work is performed outdoors in varying temperature, severe weather, and humidity condition; work is performed in environment with constant noise; exposure to fumes, dust, grease, and oils; exposure to moving equipment; exposure to electrical current; exposure to controlled and hazardous substances, pesticides, herbicides, paints, and chemicals; frequent contact with staff and the public. Incumbents are subject to working after hours, evenings, weekends, holidays, and call-outs.

### **DESIRABLE QUALIFICATIONS**

#### Knowledge of:

- General clerical procedures, including handling cash transactions and basic record-keeping.
- Vehicle classifications and load capacities.
- Basic arithmetic.
- Occupational hazards and safe work practices.

#### Ability and willingness to:

- Learn, interpret, understand, and apply pertinent laws, codes, regulations, policies, and procedures.
- Explain and enforce rules, regulations, policies, and procedures in a tactful and courteous manner.
- Follow established safe work rules, practices, policies, and procedures.
- Perform a variety of unskilled and semi-skilled tasks in the maintenance and operation of County landfills and transfer stations.

- Perform heavy physical labor.
- Operate all required equipment, tools, and vehicles.
- Clean, maintain, and make basic repairs to equipment and tools.
- Recognize and locate conditions that require maintenance and repair work.
- Identify hazardous wastes and apply established procedures for their proper handling.
- Identify recyclable and salvageable materials and apply established procedures for their proper handling.
- Collect and count money, make change and issue receipts, use a cash box or register.
- Reconcile cash against receipts and prepare bank deposits.
- Perform required mathematical computations with accuracy.
- Prepare and maintain accurate and complete records and reports in a legible manner and according to prescribed procedures.
- Communicate clearly and concisely, both orally and in writing.
- Establish and maintain cooperative working relationships.
- Understand and accurately follow oral and written directions.
- Work effectively in the absence of supervision.
- Maintain confidentiality.

Training and Experience:

Any combination of training and experience that would provide the required knowledge and abilities is qualifying. A typical way to obtain the knowledge and abilities would be:

Prior experience as a landfill gate attendant or one year of experience operating light equipment such as forklifts or backhoes or two years' experience in retail sales performing teller or cashier activities.

Special Requirements:

High school diploma or GED equivalent.

Possession of a valid California driver's license.

Ability to obtain certification in a 40-hour HAZWOPER training course within 12 months of hire and maintain that certification with annual refresher training.

Salary Range: 52

<p>This job specification should not be construed to imply that these requirements are the exclusive standards of the position. Not all duties are necessarily performed by each incumbent. Additionally, incumbents will be required to follow instructions and to perform other job related duties as may be required.</p>
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**MONO COUNTY  
BARGAINING UNIT: MCPEA**

**SOLID WASTE GATE ATTENDANT**

**DEFINITION**

Under direct supervision, to perform a variety of assignments and duties involved in the daily operation and maintenance of the County's solid waste facilities; to assist with the monitoring and inspection of incoming waste loads; to operate, maintain, and perform minor repairs to assigned tools and equipment; to maintain storage and stockpile areas; to assist the public in a prompt, tactful and courteous manner; to perform routine litter control and grounds maintenance duties; and, to perform other job related work as required.

**DISTINGUISHING CHARACTERISTICS**

This is the entry level in the Solid Waste Facility Worker Class series. Incumbents in this classification are responsible for the daily grounds maintenance and litter control activities associated with a County solid waste facility.

**REPORTS TO**

Site supervisor or Operations Manager

**CLASSIFICATIONS DIRECTLY SUPERVISED**

None

**EXAMPLES OF DUTIES**

Duties may include but are not limited to the following:

- Perform daily litter control and routine grounds maintenance tasks.
- Assist with minor construction and repair of site facilities.
- Install, maintain, and repair traffic control devices and warning signs as directed.
- Install, maintain, and repair litter control devices as directed.
- Remove and properly dispose of litter and windblown debris throughout the facility and around sit perimeters, including areas extending beyond property boundaries.
- Assist with placement of synthetic tarps or other mechanisms used as alternative daily cover over the active working face of the landfill.
- Inspect incoming loads and remove and manage salvage items as directed, including waste tires and white goods.
- Perform random physical load inspections, record findings, handle hazardous and other prohibited waste detected in the load in accordance with the County's Load Checking Program.
- Unlock and open the entrance gate at the beginning of each operating day.
- Close and lock the entrance gate at the end of each operating day.
- Assist with the control of traffic entering, exiting, and operating within the facility.
- Provide instruction and direct customers to the appropriate unloading area(s).
- Maintain facility stockpiles and storage areas, including tires, white goods, scrap metals, hazardous waste, recyclables, used motor oil, and other items as directed.
- Provide routine cleaning and maintenance of the weight scale and/or trash compactors.
- Operate, clean, and care for hand tools and landfill equipment.

## **Solid Waste Gate Attendant**

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- Perform routine maintenance and repair tasks on equipment.
- Report on status of supplies.
- Perform emergency response measure according to established procedures in the event of fire or other emergency conditions.
- Perform related duties as assigned.

### **TYPICAL PHYSICAL REQUIREMENTS**

Sit for extended periods; frequently stand, walk, stoop, kneel, and crouch; physical ability to lift and carry objects weighing up to 50 pounds unassisted and greater than 50 pounds with assistance, normal manual dexterity and hand-eye coordination; corrected hearing and vision to normal range; verbal communication; use of equipment including hand and power tools, hydraulic equipment, and telephones.

### **TYPICAL WORKING CONDITIONS**

Work is performed outdoors in varying temperature, severe weather, and humidity condition; work is performed in environment with constant noise; exposure to fumes, dust, grease, and oils, exposure to moving equipment; exposure to electrical current; exposure to controlled and hazardous substances, pesticides; herbicides, paints, and chemicals; frequent contact with staff and the public. Incumbents are subject to working after hours, evenings, weekends, holidays, and call-outs.

### **DESIRABLE QUALIFICATIONS**

#### **Knowledge of:**

- Vehicle classification and load capacities.
- Basic arithmetic.
- Occupational hazards and safe work practices.

#### **Ability and willingness to:**

- Learn, interpret, understand, and apply pertinent laws, codes, regulations, policies, and procedures.
- Explain and enforce rules, regulations, policies, and procedures in a tactful and courteous manner.
- Follow established safe work rules, practices, policies, and procedures.
- Perform a variety of unskilled and semi-skilled tasks in the maintenance and operation of County landfills and transfer stations.
- Perform heavy physical labor.
- Operate all required equipment, tools, and vehicles;
- Clean, maintain, and make basic repairs to equipment and tools.
- Recognize and locate conditions that require maintenance and repair work.
- Identify hazardous wastes and apply established procedures for their proper handling.
- Identify recyclable and salvageable materials and apply established procedures for their proper handling.
- Communicate clearly and concisely, both orally and in writing.
- Establish and maintain cooperative working relationships.
- Understand and accurately follow oral and written directions.

## **Solid Waste Gate Attendant**

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### **Training and Experience:**

Any combination of training and experience that would provide the required knowledge and abilities is qualifying. A typical way to obtain the knowledge and abilities would be:

Prior experience as a landfill laborer or in the construction trades as a laborer.

### **Special Requirements:**

High school diploma or GED equivalent.

Possession of a valid California driver's license.

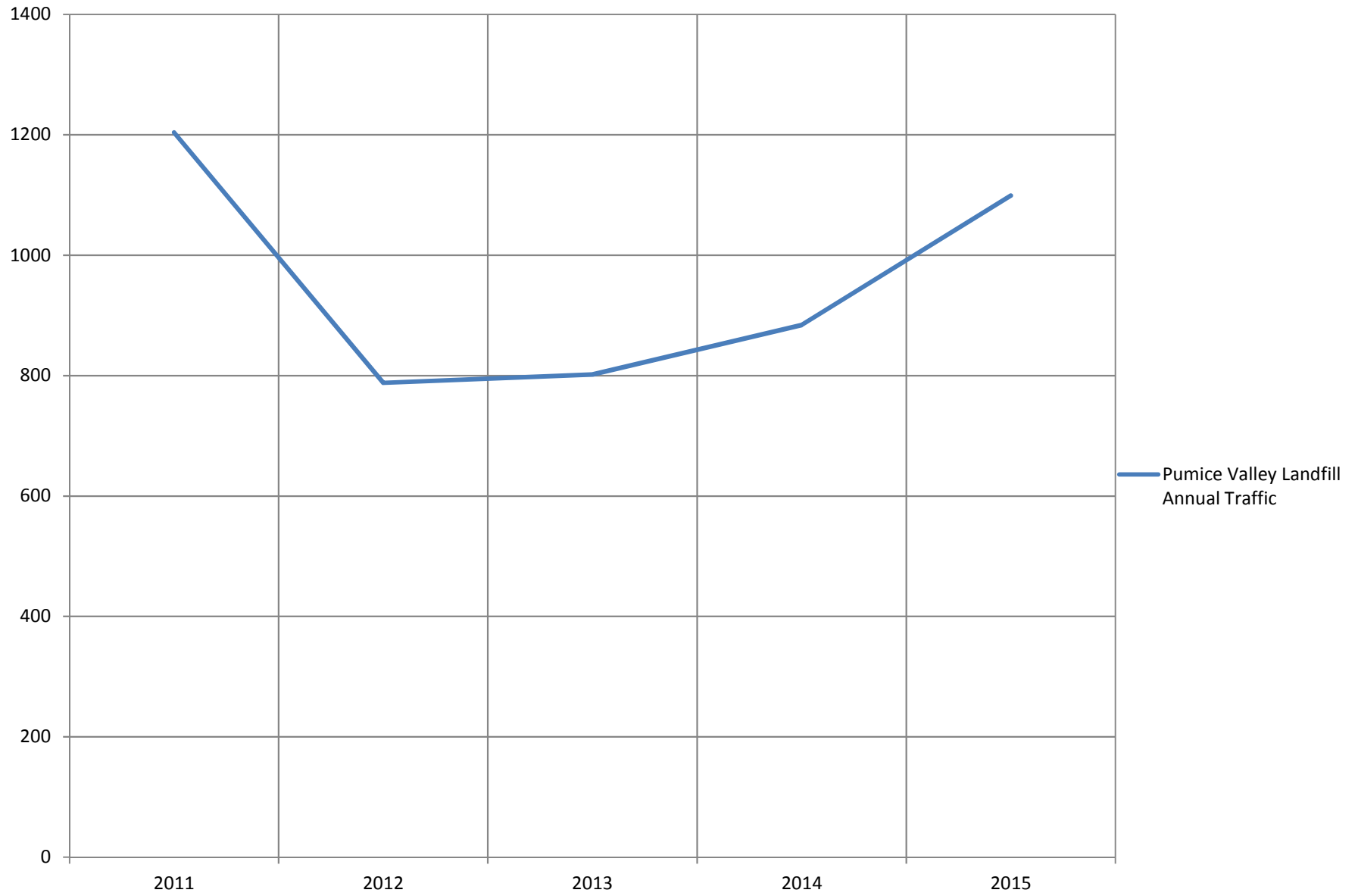
*This job specification should not be construed to imply that these requirements are the exclusive standards of the position. Not all duties are necessarily performed by each incumbent. Additionally, incumbents will be required to follow instructions and to perform other job related duties as may be required.*



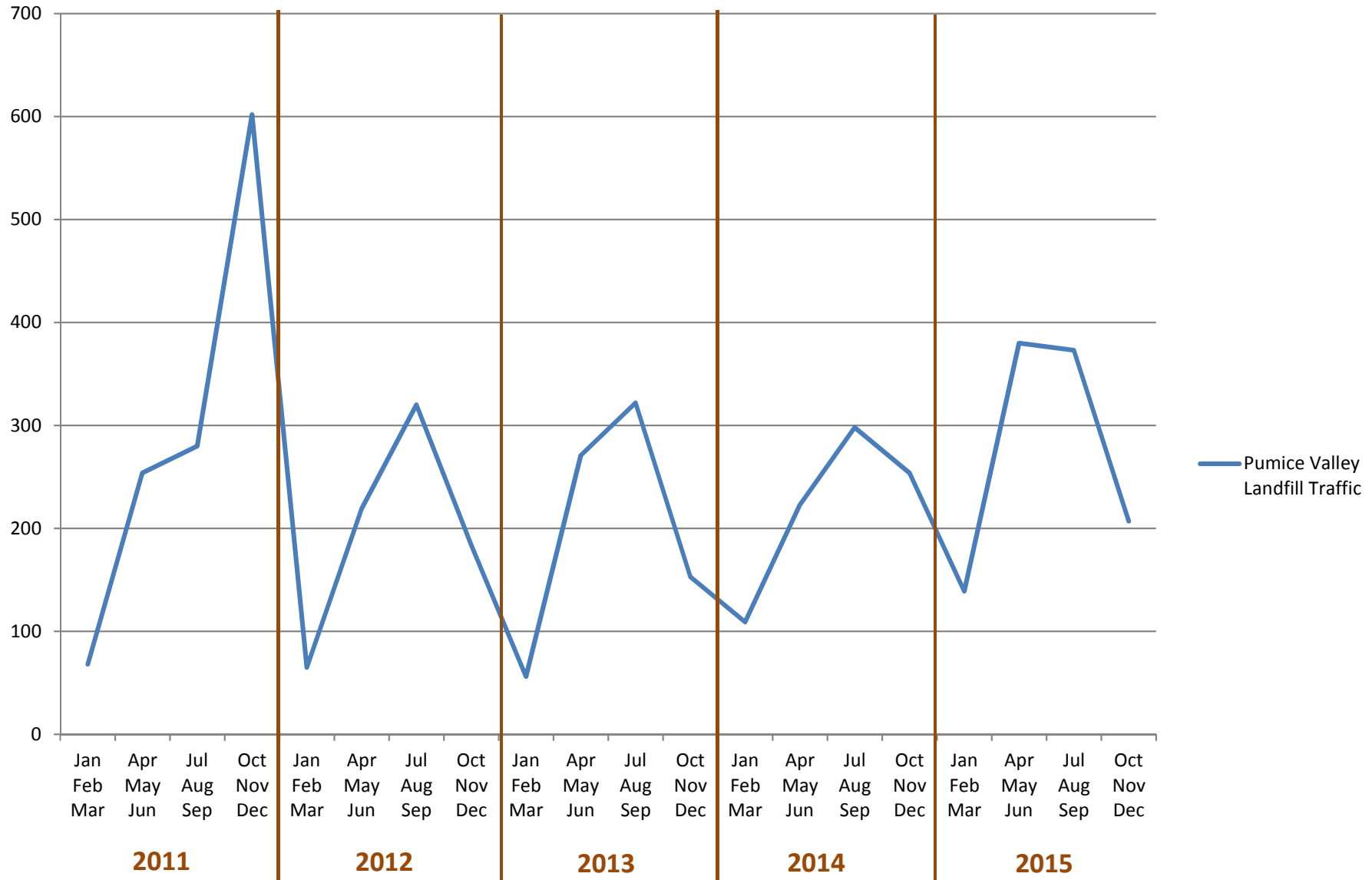
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**Appendix K**  
**Traffic Volume Charts, 2007 – 2012**

# Pumice Valley Landfill Annual Traffic



# Pumice Valley Quarterly Landfill Traffic



## Pumice Valley Landfill Peak Daily Traffic

