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UTAH DIVISION OF
SOLID & HAZARDOUS WASTE

2009.03277

PERMIT RENEWAL
for the
WASATCH REGIONAL LANDFILL
Tooele, Utah

Prepared for:

*Wasatch Regional Landfill
8833 North Rowley Road
North Skull Valley, UT 84029
(801) 924-8540*

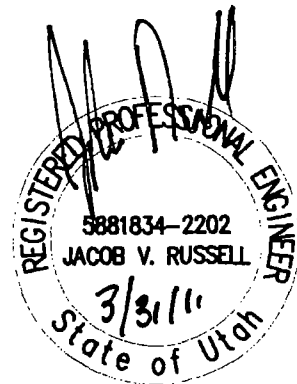
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*Project No. 061204.17
October 2009*





Utah Class I and V Landfill Permit Application Form
Utah Division of Solid and Hazardous Waste
Solid Waste Management Program

Mailing Address
P.O. Box 144880
Salt Lake City, Utah 84114-4880

Office Location
288 North 1460 West
Salt Lake City, Utah 84116

Phone (801) 538-6170
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APPLICATION FOR A PERMIT TO OPERATE A CLASS I OR CLASS V LANDFILL

Please read the instructions that are found in the document, INSTRUCTIONS FOR APPLICATION FOR A PERMIT TO OPERATE A CLASS I OR CLASS V LANDFILL. This application form shall be used for all Class I or V solid waste disposal facility permits and modifications. Part I GENERAL INFORMATION must accompany a permit application. Part II, APPLICATION CHECKLIST, is provided to assist applicants and, if included with the application, will assist review. Part II is provided to assist in preparation and review of a permit application, it is not rule. The text of the rule governs all permit application contents and should be consulted when questions arise.

Please note the version date of this form found on the lower right of the page; if you have received this form more than six months after this date it is recommended you contact our office at (801) 538-6170 to determine if this form is still current. When completed, please return this form and support documents, forms, drawings, and maps to:

Dennis R. Downs, Director
Division of Solid and Hazardous Waste
Utah Department of Environmental Quality
PO Box 144880
Salt Lake City, Utah 84114-4880

(Note: When the application is determined to be complete, submittal of two copies of the complete application will be required.)

Downs
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Utah Class I and V Landfill Permit Application Form

UTAH DIVISION OF
SOLID & HAZARDOUS WASTE

2009.03277

| | | | | | |
|---|---|---|---|---|---------------------------------------|
| Part I General Information APPLICANT: PLEASE COMPLETE ALL SECTIONS. | | | | | |
| I. Landfill Type | | II. Application Type | | III. Facility Name and Location | |
| <input type="checkbox"/> Class I | <input checked="" type="checkbox"/> Class V | <input type="checkbox"/> New Application | <input checked="" type="checkbox"/> Renewal Application | <input type="checkbox"/> Facility Expansion | <input type="checkbox"/> Modification |
| For Renewal Applications, Facility Expansion Applications and Modifications Enter Current Permit Number <u>0501M2</u> | | | | | |
| Legal Name of Facility <u>Wasatch Regional Landfill, Inc.</u> | | | | | |
| Site Address (street or directions to site) <u>8833 N. Rowley Rd.</u> | | | | County <u>Tooele</u> | |
| City <u>North Skull Valley</u> | | State <u>UT</u> | Zip Code <u>84029</u> | Telephone <u>801 924 8540</u> | |
| Township 1-2 <u>N</u> | Range <u>8</u> W | Section(s) <u>3, 4; 32-34</u> | | Quarter/Quarter Section <u>see doc</u> | Quarter Section <u>see doc</u> |
| Main Gate Latitude degrees <u>40</u> minutes <u>50</u> seconds <u>28</u> | | Longitude degrees <u>112</u> minutes <u>44</u> seconds <u>0</u> | | | |
| IV. Facility Owner(s) Information | | | | | |
| Legal Name of Facility Owner <u>Wasatch Regional Landfill, Inc. attn: Kirk Treece</u> | | | | | |
| Address (mailing) <u>675 South Gladiola</u> | | | | | |
| City <u>Salt Lake City</u> | | State <u>UT</u> | Zip Code <u>84104</u> | Telephone <u>801 924 8500</u> | |
| V. Facility Operator(s) Information | | | | | |
| Legal Name of Facility Operator <u>Wasatch Regional Landfill Inc. attn: Lester Lemmon</u> | | | | | |
| Address (mailing) <u>8833 North Rowley Road</u> | | | | | |
| City <u>North Skull Valley</u> | | State <u>UT</u> | Zip Code <u>84029</u> | Telephone <u>801 924 8540</u> | |
| VI. Property Owner(s) Information | | | | | |
| Legal Name of Property Owner <u>State of Utah School and Institutional Lands Administration</u> | | | | | |
| Address (mailing) <u>675 East 500 South Suite 500</u> | | | | | |
| City <u>Salt Lake City</u> | | State <u>UT</u> | Zip Code <u>84102</u> | Telephone <u>801 538 5100</u> | |
| VII. Contact Information | | | | | |
| Owner Contact <u>Kirk Treece</u> | | | Title <u>Regional Manager</u> | | |
| Address (mailing) <u>675 South Gladiola</u> | | | | | |
| City <u>Salt Lake City</u> | | State <u>UT</u> | Zip Code <u>84104</u> | Telephone <u>801 924 8500</u> | |
| Email Address | | | Alternative Telephone (cell or other) | | |
| Operator Contact <u>Lester Lemmon</u> | | | Title <u>Site Manager</u> | | |
| Address (mailing) <u>8833 North Rowley Road</u> | | | | | |
| City <u>North Skull Valley</u> | | State <u>UT</u> | Zip Code <u>84029</u> | Telephone <u>801 924 8540</u> | |
| Email Address <u>lester.lemmon@awin.com</u> | | | Alternative Telephone (cell or other) | | |
| Property Owner Contact <u>Kevin Carter</u> | | | Title | | |
| Address (mailing) <u>675 East 500 South Suite 500</u> | | | | | |
| City <u>Salt Lake City</u> | | State <u>UT</u> | Zip Code <u>84102</u> | Telephone <u>801 538 5100</u> | |
| Email Address | | | Alternative Telephone (cell or other) | | |

Utah Class I and V Landfill Permit Application Form

Part I General Information (Continued)

VIII. Waste Types (check all that apply)

| | | |
|---|--------------------------|--------------------------|
| <input checked="" type="checkbox"/> All non-hazardous solid waste (see R315-315-7(3) for PCB special requirements) OR the following specific waste types: | | |
| Waste Type | Combined Disposal Unit | Monofill Unit |
| <input type="checkbox"/> Municipal Waste | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Construction & Demolition | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Incinerator Ash | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Animals | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Asbestos | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> PCB's (R315-315-7(3) only) | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> Other _____ | <input type="checkbox"/> | <input type="checkbox"/> |

IX. Facility Area

| | | |
|--------------------|-------------|---------|
| Facility Area..... | <u>1969</u> | acres |
| Disposal Area..... | <u>804</u> | acres |
| Design Capacity | | |
| Years..... | <u>280</u> | |
| Cubic Yards..... | <u>223</u> | million |
| Tons..... | <u>172</u> | million |

X. Fee and Application Documents

| | | |
|--|--|---|
| Indicate Documents Attached To This Application | <input checked="" type="checkbox"/> Application Fee: Amount \$ 100 | Class V Special Requirements |
| <input checked="" type="checkbox"/> Facility Map or Maps | <input checked="" type="checkbox"/> Facility Legal Description | <input type="checkbox"/> Documents required by UCA 19-6-108(9) and (10) |
| <input checked="" type="checkbox"/> Ground Water Report | <input checked="" type="checkbox"/> Closure Design | |
| <input checked="" type="checkbox"/> Plan of Operation | <input checked="" type="checkbox"/> Cost Estimates | |
| <input checked="" type="checkbox"/> Waste Description | <input checked="" type="checkbox"/> Financial Assurance | |

I HEREBY CERTIFY THAT THIS INFORMATION AND ALL ATTACHED PAGES ARE CORRECT AND COMPLETE.

| | | |
|---|--------------------|-------------------|
| Signature of Authorized Owner Representative _____ Name typed or printed | Title _____ | Date _____ |
| Signature of Authorized Land Owner Representative (if applicable) _____ Name typed or printed | Title _____ | Date _____ |
| Signature of Authorized Operator Representative (if applicable) _____ Name typed or printed | Title _____ | Date _____ |

Utah Class I and V Permit Application Checklist

Important Note: The following checklist is for the permit application and addresses only the requirements of the Division of Solid and Hazardous Waste. Other federal, state, or local agencies may have requirements that the facility must meet. The applicant is responsible to be informed of, and meet, any applicable requirements. Examples of these requirements may include obtaining a conditional use permit, a business license, or a storm water permit. The applicant is reminded that obtaining a permit under the *Solid Waste Permitting and Management Rules* does not exempt the facility from these other requirements.

An application for a permit to construct and operate a landfill is the documentation that the landfill will be located, designed, constructed, operated, and closed in compliance with the requirements of Rules R315-302, R315-303, R315-308, R315-309, and R315-315 of the *Utah Solid Waste Permitting and Management Rules* and the *Utah Solid and Hazardous Waste Act* (UCA 19-6-101 through 123). The application should be written to be understandable by regulatory agencies, landfill operators, and the general public. The application should also be written so that the landfill operator, after reading it, will be able to operate the landfill according to the requirements with a minimum of additional training.

Copies of the *Solid Waste Permitting and Management Rules*, the *Utah Solid and Hazardous Waste Act*, along with many other useful guidance documents can be obtained by contacting the Division of Solid and Hazardous Waste at 801-538-6170. Most of these documents are available on the Division's web page at www.hazardouswaste.utah.gov. Guidance documents can be found at the solid waste section portion of the web page.

When the application is determined to be complete, the original complete application and one copy of the complete application are required along with an electronic copy.

Part II Application Checklist

| I. Facility General Information | |
|---|----------------------|
| Description of Item | Location In Document |
| Ia. Information Required - All Class I and V Landfills | |
| Completed Part I General information Form (See form above) | |
| General description of the facility (R315-310-3(1)(b)) | S 2.1 |
| Legal description of property (R315-310-3(1)(c)) | S 2.2.1 |
| Proof of ownership, lease agreement, or other mechanism (R315-310-3(1)(c)) | S 2.2.2, A 2.1, 2.2 |
| Area served by the facility including population (R315-310-3(1)(d)) | S 2.3 |
| If the permit application is for a class I landfill a demonstration that the landfill is not a commercial facility | NA |
| Waste type and anticipated daily volume (R315-310-3(1)(d)) | S 2.4 |
| Ib. Information Required - All New Or Laterally Expanding Class I and V Landfills | |
| Intended schedule of construction (R315-302-2(2)(a)) | NA |
| Name and address of all property owners within 1000 feet of the facility boundary (R315-310-3(2)(i)) | NA |
| Documentation that a notice of intent to apply for a permit has been sent to all property owners listed above (R315-310-3(2)(ii)) | NA |
| Name of the local government with jurisdiction over the facility site (R315-310-3(2)(iii)) | NA |

Utah Class I and V Permit Application Checklist

| I. Facility General Information | |
|---|----------------------|
| Description of Item | Location in Document |
| Ic. Location Standards - All New Or Laterally Expanding Class I and V Landfills (R315-302-1) | |
| Documentation that the facility has meet the historical survey requirement of R315-302-1(2)(f) | S 3.2 |
| Land use compatibility | |
| Maps showing the existing land use, topography, residences, parks, monuments, recreation areas or wilderness areas within 1000 feet of the site boundary | S 3.3 |
| Certifications that no ecologically or scientifically significant areas or endangered species are present in site area | S 3.4 |
| List of airports within five miles of facility and distance to each | S 3.5 |
| Geology | |
| Geologic maps showing significant geologic features, faults, and unstable areas | S 3.6, 4.1, A 3.3 |
| Maps showing site soils | S 3.6, 4.1, A 3.3 |
| Surface water | |
| Magnitude of 24 hour 25 year and 100 year storm events | S 3.7, 4.2 |
| Average annual rainfall | S 3.7, 4.2 |
| Maximum elevation of flood waters proximate to the facility | S 3.7, 4.2 |
| Maximum elevation of flood water from 100 year flood for waters proximate to the facility | S 3.7, 4.6 |
| Wetlands | S 3.8 |
| Ground water | S 4.3, 5.0 |
| Id. Plan of Operations Requirements - All Class I And V Landfills (R315-310-3(1)(e) and R315-302-2(2)) | |
| Forms and other information as required in R315-302-2(3) including a description of on-site waste handling procedures and an example of the form that will be used to record the weights or volumes of waste received (R315-302-2(2)(b) And R315-310-3(1)(f)) | S 13.6 |
| Schedule for conducting inspections and monitoring, and examples of the forms that will be used to record the results of the inspections and monitoring (R315-302-2(2)(c), R315-302-2(5)(a), and R315-310-3(1)(g)) | S 13.6 |
| Contingency plans in the event of a fire or explosion (R315-302-2(2)(d)) | S 13.7.1 |
| Corrective action programs to be initiated if ground water is contaminated (R315-302-2(2)(e)) | S 13.7.6 |
| Contingency plans for other releases, e.g. explosive gases or failure of run-off collection system (R315-302-2(2)(f)) | S 13.7 |
| Plan to control fugitive dust generated from roads, construction, general operations, and covering the waste (R315-302-2(2)(g)) | S 13.9.4 |

Utah Class I and V Permit Application Checklist

| I. Facility General Information | |
|--|----------------------|
| Description of Item | Location In Document |
| Plan for letter control and collection (R315-302-2(2)(h)) | S 13.9.3 |
| Description of maintenance of installed equipment (R315-302-2(2)(i)) | S 13.8 |
| Procedures for excluding the receipt of prohibited hazardous or PCB containing wastes (R315-302-2(2)(j)) | S 13.6.1 |
| Procedures for controlling disease vectors (R315-302-2(2)(k)) | s 13.5 |
| A plan for alternative waste handling (R315-302-2(2)(l)) | S 13.7.5 |
| A general training and safety plan for site operations (R315-302-2(2)(o)) | S 13.10 |
| Any recycling programs planned at the facility (R315-303-4(6)) | S 13.5 |
| Closure and post-closure care Plan (R315-302-2(2)(m)) | App 13.9 |
| Procedures for the handling of special wastes (R315-315) | S 13.5 |
| Plans and operation procedures to minimize liquids (R315-303-3(1)(a) and (b)) | S 13.5 |
| Plans and procedures to address the requirements of R315-303-3(7)(c) through (i) and R315-303-4 | S 13 |
| Any other site specific information pertaining to the plan of operation required by the Executive Secretary (R315-302-2(2)(p)) | S 13 |
| Ie. Special Requirements - New Or Laterally Expanding Class V Landfill (R315-310-3(2)) | |
| Submit information required by the <i>Utah Solid and Hazardous Waste Act</i> Subsections 19-6-108(9) and 19-6-108(10) (R315-310-3(2)(a)) | NA |
| Approval from the local government within which the solid waste facility sits | NA |

| II Facility Technical Information | |
|--|----------------------|
| Description of Item | Location In Document |
| IIa. Maps - All Class I and V Landfills | |
| Topographic map drawn to the required scale with contours showing the boundaries of the landfill unit, ground water monitoring well locations, gas monitoring points, and the borrow and fill areas (R315-310-4(2)(a)(i)) | Figs. 3.4-3.8 |
| Most recent U.S. Geological Survey topographic map, 7-1/2 minute series, showing the waste facility boundary; the property boundary; surface drainage channels; any existing utilities and structures within one-fourth mile of the site; and the direction of the prevailing winds (R315-310-4(2)(a)(ii)) | Fig. 3.9, 3.10 |
| IIb. Geohydrological Assessment - All Class I and V Landfills (R315-310-4(2)(b)) | |
| Local and regional geology and hydrology including faults, unstable slopes and subsidence areas on site (R315-310-4(2)(b)(i)) | Sec. 4 |
| Evaluation of bedrock and soil types and properties including permeability rates (R315-310-4(2)(b)(ii)) | Sec. 5 |

Utah Class I and V Permit Application Checklist

| // Facility Technical Information | |
|---|-----------------------------|
| Description of Item | Location In Document |
| Depth to ground water (R315-310-4(2)(b)(iii)) | Sec. 3.9, 4.3, 5.9 |
| Direction and flow rate of ground water (R315-310-4(2)(b)(iv)) | Sec. 5 |
| Quantity, location, and construction of any private or public wells on-site or within 2,000 feet of the facility boundary (R315-310-4(2)(b)(v)) | Sec. 4.4 |
| Tabulation of all water rights for ground water and surface water on-site and within 2,000 feet of the facility boundary (R315-310-4(2)(b)(vi)) | Sec. 4.5 |
| Identification and description of all surface waters on-site and within one mile of the facility boundary (R315-310-4(2)(b)(vii)) | Sec. 4.6 |
| Background ground water and surface water quality assessment and, for an existing facility, identification of impacts upon the ground water and surface water from leachate discharges (R315-310-4(2)(b)(viii)) | Sec. 4.7 |
| Ground Water Monitoring (R315-303-3(7)(b) and R315-308) | App. 4.7 |
| Statistical method to be used (R315-308-2(7)) | App. 4.7 |
| Calculation of site water balance (R315-310-4(2)(b)(ix)) | Sec. 6, 7 |
| //c. Engineering Report - Plans, Specifications, And Calculations - All Class I and V Landfills | |
| Documentation that the facility will meet all of the performance standards of R315-303-2 | Sec. 10, App. 4.7, App 12.1 |
| Engineering reports required to meet the location standards of R315-302-1 including documentation of any demonstration or exemption made for any location standard (R315-310-4(2)(c)(i)) | Sec. 3.0 |
| Anticipated facility life and the basis for calculating the facility's life (R315-310-4(2)(c)(ii)) | Sec. 7.0 |
| Cell design to include liner design, cover design, fill methods, elevation of final cover including plans and drawings signed and sealed by a professional engineer registered in the State of Utah (R315-303-3(3), R315-303-3(6) and (7)(a), R315-310-3(1)(b) and R315-310-4(2)(c)(iii)) | Sec. 6, 7 |
| Leachate collection system design and calculations showing system meets the requirements of R315-303-3(2) | Sec. 6.5 |
| Equipment requirements and availability (R315-310-4(2)(c)(iii)) | App 13.1 |
| Identification of borrow sources for daily and final cover and for soil liners (R315-310-4(2)(c)(iv)) | Sec. 11 |
| Run-On and run-off diversion designs (R315-303-3(1)(c), (d) and (e)) | Sec. 10 |
| Leachate collection, treatment, and disposal and documentation to show that any treatment system is being or has been reviewed by the Division of Water Quality (R315-310-4(2)(c)(v) and R315-310-3(1)(i)) | Sec. 9 |

Utah Class I and V Permit Application Checklist

| II Facility Technical Information | |
|---|----------------------|
| Description of Item | Location In Document |
| Ground water monitoring plan that meets the requirements of Rule R315-308 including well locations, design, and construction (R315-310-4(2)(b)(x) and R315-310-4(2)(c)(vi)) | App. 4.7 |
| Landfill gas monitoring and control plan that meets the requirements of Subsection R315-303-3(5) (R315-310-4(2)(c)(vii)) | App. 12.1 |
| Slope stability analysis for static and under the anticipated seismic event for the facility (R315-310-4(2)(b)(i) and R315-302-1(2)(b)(ii)) | Sec. 7.0 |
| Design and location of run-on and run-off control systems (R315-310-4(2)(c)(viii)) | Sec. 10 |
| IId. Closure Plan - All Class I and V Landfills (R315-310-3(1)(h)) | |
| Closure Plan (R315-302-3(2) and (3)) | Sec. 12 |
| Closure schedule (R315-310-4(2)(d)(i)) | Sec. 12 |
| Design of final cover (R315-303-3(4) and R315-310-4(2)(c)(iii)) | Sec. 11 |
| Capacity of site in volume and tonnage (R315-310-4(2)(d)(ii)) | Sec. 7 |
| Final inspection by regulatory agencies (R315-310-4(2)(d)(iii)) | |
| IIf. Post-Closure Care Plan - All Class I and V Landfills (R315-310-3(1)(h)) | |
| Post-Closure Plan (R315-302-3(5) and (6)) | Sec. 12 |
| Site monitoring of landfill gases, ground water, and surface water, if required (R315-310-4(2)(e)(i)) | Sec. 7, 9, 10 |
| Changes to record of title, land use, and zoning restrictions (R315-310-4(2)(e)(ii)) | NA |
| Maintenance activities to maintain cover and run-on/run-off control systems (R315-310-4(2)(e)(iii)) | Sec. 12.3 |
| List the name, address, and telephone number of the person or office to contact about the facility during the post-closure care period (R315-310-4(2)(e)(vi)) | Sec. 12 |
| IIIf. Financial Assurance - All Class I and V Landfills (R315-310-3(1)(j)) | |
| Identification of closure costs including cost calculations (R315-310-4(2)(d)(iv)) and (R315-302-2(2)(n)) | App. 13.1 |
| Identification of post-closure care costs including cost calculations (R315-310-4(2)(e)(iv)) | App. 13.1 |
| Identification of the financial assurance mechanism that meets the requirements of Rule R315-309 and the date that the mechanism will become effective (R315-309-1(1)) | App. 13.1 |

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TABLE OF CONTENTS

1.0 INTRODUCTION..... 1

2.0 GENERAL INFORMATION (PSOMAS) 2

 2.1 General Facility Description 2

 2.2 Legal Descriptions and Ownership 2

 2.2.1 Legal Description of Location 3

 2.2.2 Ownership and Leasing 3

 2.3 Service Area and Population 3

 2.4 Waste Type and Volume 4

 2.5 Schedule of Construction 5

 2.6 Zoning and Land Use 6

 2.7 Current Permit 7

 2.8 Current Landfill Configuration 7

3.0 FACILITY LOCATION STANDARDS (PSOMAS) 9

 3.1 Introduction 9

 3.2 Archeological/Cultural Features 9

 3.3 Site Buffer 9

 3.4 Threatened/Endangered Species 10

 3.5 Airports 11

 3.6 Geology 11

 3.7 Surface Water 11

 3.8 Wetlands 12

 3.9 Groundwater 13

 3.10 Farmland 14

 3.11 Existing Residences 14

 3.12 Maps 14

4.0 GEOHYDROLOGICAL ASSESSMENT (PSOMAS) 16

 4.1 General Geology 16

 4.2 General Hydrology 16

 4.3 Groundwater 16

 4.4 Wells 18

 4.5 Water Rights 19

 4.5.1 Water Right 16-553 20

 4.5.2 Water Rights 16-696, 16-697, 16-698 20

 4.6 Surface Waters 21

 4.6.1 Streams and Drainages 21

| | | |
|------------|---|-----------|
| 4.6.2 | Lakes and Impoundments | 22 |
| 4.6.3 | Wetlands..... | 22 |
| 4.7 | Water Quality Assessment..... | 22 |
| 4.8 | Statistical Method | 23 |
| 4.9 | Site Water Balance | 23 |
| 4.9.1 | General..... | 23 |
| 4.9.2 | Water Balance..... | 25 |
| 4.10 | References | 26 |
| 5.0 | <i>GROUNDWATER MODEL (HANSEN ALLEN & LUCE)</i> | 28 |
| 5.1 | Projected Future Groundwater Conditions | 28 |
| 5.2 | Study Area and Model Discretization..... | 29 |
| 5.3 | Boundary Conditions..... | 29 |
| 5.4 | Layer Elevations..... | 30 |
| 5.5 | Great Salt Lake Elevations (Fixed-Head Boundary)..... | 30 |
| 5.6 | Evapotranspiration..... | 31 |
| 5.7 | Recharge Estimates..... | 31 |
| 5.8 | Hydraulic Conductivity and Model Calibration | 33 |
| 5.9 | Projected Maximum Groundwater Levels | 34 |
| 5.10 | Drain Trench..... | 35 |
| 6.0 | <i>LANDFILL DESIGN</i> | 37 |
| 6.1 | General Layout and Design..... | 37 |
| 6.2 | Floor Elevation and Slopes..... | 40 |
| 6.3 | Embankments..... | 41 |
| 6.4 | Lining System | 42 |
| 6.4.1 | Geosynthetic Clay Liner (GCL)..... | 43 |
| 6.4.2 | GCL Hydraulic Equivalency..... | 43 |
| 6.4.3 | GCL Groundwater and Leachate Compatibility | 44 |
| 6.4.4 | HDPE Geomembrane Liner..... | 45 |
| 6.5 | Leachate Collection and Removal System (LCRS)..... | 45 |
| 6.5.1 | HELP Model..... | 46 |
| 6.5.2 | Geonet..... | 47 |
| 6.5.3 | Geotextile Filter Fabric | 49 |
| 6.5.4 | Leachate Conveyance Pipes..... | 49 |
| 6.5.5 | Landfill Leachate Withdrawal Pipes | 50 |
| 6.5.6 | Leachate Ponds | 50 |
| 6.6 | Runoff Containment | 51 |
| 6.7 | Ground Water Monitoring Wells..... | 53 |

| | | |
|-------------|--|-----------|
| 6.8 | Geotechnical Investigation..... | 53 |
| 7.0 | <i>FACILITY MODIFICATIONS (VECTOR)</i> | 55 |
| 7.1 | Vertical Expansion | 55 |
| 7.1.1 | Configuration | 55 |
| 7.1.2 | Liner | 56 |
| 7.1.3 | Leachate Collection and Removal System | 56 |
| 7.1.4 | Stormwater Control | 56 |
| 7.1.5 | Monitoring Facilities..... | 57 |
| 7.2 | Class VI Cell | 57 |
| 7.2.1 | Configuration | 57 |
| 7.2.2 | Liner | 57 |
| 7.2.3 | Leachate Collection and Removal System | 57 |
| 7.2.4 | Stormwater Control | 58 |
| 7.2.5 | Final Cover..... | 58 |
| 8.0 | <i>LANDFILL CLOSURE DESIGN</i> | 59 |
| 8.1 | General Layout and Design..... | 59 |
| 8.1.1 | Closure slopes..... | 59 |
| 8.2 | Storm Water Management..... | 60 |
| 8.3 | Stability..... | 61 |
| 9.0 | <i>STORM WATER MANAGEMENT (HANSEN ALLEN & LUCE)</i> | 62 |
| 9.1 | Hydrology | 62 |
| 9.1.1 | Off-Site Run-On Storm Water | 62 |
| 9.1.2 | Peak Design Flows..... | 64 |
| 9.2 | On-Site Run-Off Storm Water..... | 64 |
| 9.2.1 | Methodology | 64 |
| 9.2.2 | Peak Design Flows..... | 65 |
| 9.3 | Hydraulic Design of Channels | 65 |
| 9.4 | Downspout Design | 67 |
| 9.5 | Erosion Protection | 67 |
| 9.6 | Detention..... | 68 |
| 9.7 | References | 68 |
| 10.0 | <i>EVAPOTRANSPIRATIVE FINAL COVER (VECTOR)</i> | 71 |
| 10.1 | Equivalency Criteria | 71 |
| 10.2 | Site Investigations and Soils Testing | 71 |
| 10.3 | Cover Performance Comparison | 72 |
| 10.4 | ET Cover Soil Classification..... | 72 |

| | | |
|-------------|---|-----------|
| 10.5 | Erosion Control..... | 73 |
| 10.6 | Surface Water Hydraulic Considerations..... | 73 |
| 10.7 | Cover Construction Plan | 74 |
| 11.0 | CLOSURE AND POST-CLOSURE CARE PLAN (REPUBLIC) | 75 |
| 12.0 | COST ESTIMATES FOR CLOSURE & POST-CLOSURE (VECTOR).. | 76 |
| 13.0 | PLAN OF OPERATIONS (REPUBLIC)..... | 77 |

LIST OF APPENDICES

| | |
|--------------|---|
| Appendix 2.1 | SITLA Support Letter |
| Appendix 2.2 | Lease Agreement/Proof of Ownership |
| Appendix 2.3 | Current Permit |
| Appendix 2.4 | Property Ownership |
| Appendix 2.5 | Needs Assessment Report (UCA 19-6-108-(10)) |
| Appendix 3.1 | Dykman Letter |
| Appendix 3.2 | Endangered / Threatened Species DWR Letter |
| Appendix 3.3 | Kleinfelder 2004 Geotechnical Report |
| Appendix 3.4 | Wet Area Determination |
| Appendix 3.5 | Utah NRCS Farmland Data |
| Appendix 4.1 | Federal Register Search Results – Sole Source Aquifers |
| Appendix 4.2 | Groundwater Flow and Velocity Calculations |
| Appendix 4.3 | Well Log Information Listing |
| Appendix 4.4 | Water Rights Memorandum |
| Appendix 4.5 | Water Rights Data |
| Appendix 4.6 | Water Right Approval Letter |
| Appendix 4.7 | Carel Corporation Ground Water Sampling and Analysis Plan |
| Appendix 4.8 | HELP Model Output |
| Appendix 4.9 | Hydraulic Calculations |
| Appendix 5.1 | Modflow Groundwater Model Data |
| Appendix 5.2 | Groundwater Levels and Elevations |
| Appendix 6.1 | HAL Design Drawings |
| | Sheet 1 Cover Sheet |
| | Sheet 2 Existing Site Topography |
| | Sheet 3 Cell LCRS and Support Facilities Plan |
| | Sheet 4 See Figure 7.1 |
| | Sheet 5 See Figure 7.2 |

| | |
|---------------|---|
| Sheet 6 | Phase 1A Plan and Sections |
| Sheet 7 | Sump Plan and Sections |
| Sheet 8 | Leachate Withdrawal Pipe Sections |
| Sheet 9 | Leachate Withdrawal System Details |
| Sheet 10 | Typical Liner System Sections and Details |
| Sheet 11 | Closure Cap Details (superseded by Vector 2006, 2009) |
| Sheet 12 | Downspout Plan and Profile |
| Sheet 13 | Groundwater Interceptor & Stormwater Basin Sections |
| Sheet 14 | Groundwater Interceptor & Stormwater Outlet Basin Sections |
| Appendix 6.2 | AGEC Geotech Report |
| Appendix 6.3 | Landfill Design Calculations |
| Appendix 7.1 | Permit Modification for the Wasatch Regional Landfill, Tooele, Utah (Vector 2009) |
| Appendix 10.1 | Evapotranspirative (ET) Final Cover Permitting Report for the Wasatch Regional Landfill (Vector 2006) |
| Appendix 12.1 | 2009 Closure and Post-Closure Cost Estimate |
| Appendix 13.1 | Waste Handling Procedure Overview |
| Appendix 13.2 | Regular Inspection Form |
| Appendix 13.3 | Daily Operating Record |
| Appendix 13.4 | Training and Safety Plan |
| Appendix 13.5 | Litter Control Plan |
| Appendix 13.6 | Fugitive Dust Control Plan |
| Appendix 13.7 | Groundwater Monitoring Plan |
| Appendix 13.8 | Landfill Gas Monitoring and Control Plan |
| Appendix 13.9 | Closure and Post-Closure Plans |

LIST OF FIGURES

| | |
|------------|-------------------------------|
| Figure 2.1 | General Site Location |
| Figure 2.2 | Site Location and Trust Lands |
| Figure 2.3 | Zoning Districts |
| Figure 2.4 | Existing Site Conditions |
| Figure 2.5 | Final Waste Grades |
| Figure 2.6 | Phasing Plan |
| Figure 3.1 | 1000 Foot Buffer |
| Figure 3.2 | General Geologic Features |

| | |
|-------------|---|
| Figure 3.3 | Geologic Cross Section |
| Figure 3.4 | 200 Scale Map Index |
| Figure 3.5 | 200 Scale Map SE |
| Figure 3.6 | 200 Scale Map SW |
| Figure 3.7 | 200 Scale Map NE |
| Figure 3.8 | 200 Scale Map NW |
| Figure 3.9 | 1:100,000 Scale USGS Map |
| Figure 3.10 | Wind Rose Diagram for Deseret Chemical Depot, Tooele, Utah |
| Figure 4.1 | Groundwater Contours |
| Figure 4.2 | DWR Well Log Locations |
| Figure 4.3 | Water Rights Locations |
| Figure 4.4 | Ephemeral Drainages |
| Figure 4.5 | Drainages and Watersheds |
| Figure 4.6 | Shoreline Elevations for the Great Salt Lake |
| Figure 5.1 | Model Grid |
| Figure 5.2 | Recharge Areas |
| Figure 5.3 | Calibrated Hydraulic Conductivity Zones and Values |
| Figure 5.4 | Calibrated Groundwater Levels with Observation Points |
| Figure 5.5 | Computed Maximum Groundwater Levels |
| Figure 5.6 | Computed Maximum Groundwater Levels with Drain Trench (6-2005) |
| Figure 5.7 | Computed Maximum Groundwater Levels with Phase 1 Drain Trench (6-2005) |
| Figure 7.1 | Final Waste Grades |
| Figure 7.2 | Cross Sections |
| Figure 7.3 | C & D Facility Subgrade Plan |
| Figure 7.4 | C & D Facility Final Cover Grade |
| Figure 7.5 | Cover Bench Detail |
| Figure 9.1 | Tributary Subbasins |
| Figure 9.2 | SCS Type II Storm Distribution Curve |
| Figure 9.3 | Peak Design Flows |
| Figure 9.4 | Subbasin Delineation |
| Figure 9.5 | Subbasin Peak Design Flows |

1.0 INTRODUCTION

Wasatch Regional Landfill Inc. (WRL) is seeking to renew the permit to operate a Class V and Class VI Sanitary Landfill as per Utah Administrative Code (UAC) R315-310-9.

This document consolidates the permit documents submitted to date. PSOMAS consulting engineers of Salt Lake City, Utah wrote the original permit document, entitled *Permit Application Class V Municipal Solid Waste Disposal Facility Wasatch Regional Solid Waste Facility (2004)*. Hansen, Allen & Luce consulting engineers wrote the first permit modification, entitled *Municipal Solid Waste Landfill Permit Modification Design Engineering Report (2004)*. Vector Engineering, of Grass Valley, California, submitted a permit modification entitled *Evapotranspirative (ET) Final Cover Permitting Report for the Wasatch Regional Landfill (2006)* to permit an alternative cover. Vector wrote another permit modification entitled *Permit Modification Request for the Wasatch Regional Landfill, Toole, Utah (2009)*, which increased the height of the final landfill configuration and included a design for Class VI Construction and Demolition cell at the landfill.

This document is intended to comply with the State of Utah Solid Waste Permitting and Management Rules R315-301 through 320.

2.0 GENERAL INFORMATION (PSOMAS)

2.1 General Facility Description

As per regulation 315-310-3(1)(b), each application shall contain a general description of the facility accompanied by facility plans and drawings.

The general site location, shown in Figure 2.1, is roughly 6 miles north of Interstate 80 in Tooele County in an unpopulated section of the county, north/northwest of Grantsville and south of Rowley.

There are no residences within several miles of the WRL site and the adjacent parcels are all vacant and undeveloped. A rail spur and County Road 128 on the east side of the parcel are the only uses adjacent to the site. The site is approximately 1,969 acres in size, which is sufficient to handle incoming waste projected over several decades. An additional 640 acres of adjacent Utah State School and Institutional Trust Lands Administration (SITLA) property is planned to accommodate the long-term build out scenario for the landfill. The initial permitting process for the landfill site will cover the 1,969 acres under a ground lease with SITLA. Permitting of the adjacent property is scheduled when the public sector demand for expansion occurs at the WRL site.

2.2 Legal Descriptions and Ownership

As per Section R315-310-3(1)(c), legal descriptions, proof of ownership, lease agreement(s), or other mechanisms approved by the Executive Secretary of the proposed site are required. In addition, latitude and longitude map coordinates of the facility's front gate and maps of the proposed facility site including land use and zoning of the surrounding area are also required.

2.2.1 Legal Description of Location

The WRL, shown in more detail in Figure 2.2, is located in Sections 3 and 4 of Township 1 North, Range 8 West; and Sections 32, 33, and 34 of Township 2 North, Range 8 West Salt Lake Base & Meridian. The site covers approximately 1,968.73 acres, more or less. The legal description of the site is as follows:

All of Section 33, the west ½ of Section 34, and the east ½ east ½ of Section 32 of Township 2 North, Range 8 West, Salt Lake Base & Meridian. Lots 3 and 4, the south ½ northwest ¼ and southwest ¼ of Section 3, and Lots 1, 2, and 3, southeast ¼ northwest ¼, east ½ southwest ¼, southeast ¼, south ½ of northeast ¼ of Section 4, Township 1 North, Range 8 West, Salt Lake Base & Meridian.

The location of the site entrance area is 40° 50' 28" north latitude, 112° 44' 0" west longitude, North American Datum of 1927 (NAD27).

2.2.2 Ownership and Leasing

The Utah State School and Institutional Lands Administration (SITLA) currently owns the site and will maintain a ground lease agreement with the WRL to operate the landfill site. The land will be transferred to the WRL for landfill construction in accordance with the lease agreement. A letter of support/consent from SITLA was obtained and is included as Appendix 2.1. Appendix 2.2 contains Proof of Ownership and the Lease Agreement.

2.3 Service Area and Population

As per regulation 315-310-3-(1)(d), a description of the area serviced by the facility, including population, is required.

The area served by the proposed landfill includes the Wasatch Front Counties and the cities and towns within these counties - the "Salt Lake Metropolitan Area".

According to the Wasatch Front Regional Council and the U.S. Bureau of Census, the population in the Wasatch Front Region as of 2005 is projected to be 1,427,643 persons. It is estimated that this number will increase to 2,176,651 in the following 25 years (Table 2.1).

**TABLE 2.1
PROJECTED POPULATION NUMBERS FOR THE WASATCH FRONT**

| COUNTY | YEAR | | | | | |
|--------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| Davis | 261,297 | 292,173 | 322,395 | 346,203 | 396,640 | 392,003 |
| Morgan | 7,856 | 8,829 | 9,810 | 10,659 | 11,552 | 12,423 |
| Salt Lake | 914,190 | 1,028,508 | 1,136,706 | 1,223,218 | 1,308,787 | 1,383,907 |
| Tooele | 42,450 | 50,333 | 58,487 | 65,852 | 73,413 | 80,938 |
| Weber | 201,850 | 227,032 | 251,782 | 271,369 | 290,204 | 307,350 |
| TOTAL | 1,427,643 | 1,606,875 | 1,779,180 | 1,917,369 | 2,053,596 | 2,176,651 |

2.4 Waste Type and Volume

As per regulation 315-310-3-(1)(d), a description of the types of waste to be handled at the facility is required, along with anticipated volumes.

A detailed description of accepted and unacceptable waste types is contained in the Plan of Operations, published separately.

The waste stream received at the WRL was 2,195 tons per day (tpd) in 2006, and has been consistently just under 2,000 tpd since then (see Table 2.2). This amount will likely increase over time.

TABLE 2.2
QUANTITIES OF WASTE ACCEPTED AT THE WRL

| YEAR | TONS/YEAR | TONS/DAY (312 OPERATING DAYS/YEAR) |
|------------------|-----------|------------------------------------|
| 2006 | 684,811 | 2,195 |
| 2007 | 601,510 | 1,928 |
| 2008 | 610,725 | 1,957 |
| 2009 (estimated) | 610,000 | 1,955 |

WRL also plans to construct a separate Construction and Demolition (C&D) waste cell for its municipal customers who process such waste. Application for the Class IV cell has been approved (see Appendix 2.3, Current Permit), and is covered in Section 7.2.

2.5 Schedule of Construction

As per regulation (315-302-2(2)(a)), a description of the intended schedule of construction is required. The construction and operation of the landfill facility will proceed in a phased fashion during each permit period of 5 years (10 years after the first permit renewal). For the first permit period, approximately 58.4 acres of area has been lined. The amount of liner construction depends upon the rate at which waste arrives at the facility. At current waste acceptance rates approximately 5 acres of lined area is constructed every year. The filling of the landfill will proceed in a manner consistent with the drawings and concepts presented in this permit application. Figure 2.6 illustrates the manner in which waste would be filled during the next several years of landfill operation, and it is noted that at an assumed 3,000 tons per day, with a 1,400 lbs MSW/net cy capacity utilization factor, and operating 312 days per year, 5 years would produce an average depth of approximately 50 feet. Run-on and runoff diversion ditches and other necessary components, as indicated on Figure 2.6, or on subsequent plans, would be modified and/or constructed as necessary to prevent run-on or leachate from leaving the lined

areas. Liners will be joined as appropriate, consistent with a CQA/CQC plan and liner construction standards. Temporary earthen or manufactured berms will be used at the unbermed boundaries of each lining phase to contain leachate. Additional detail of each of the aforementioned components will be provided during design.

The WRL has built cells 1-A, 1-B, 1-C, 2-A and 2-B. Cell 2-C is under construction. These cells can be seen on Figure 2.4.

2.6 Zoning and Land Use

The site is zoned Manufacturing-General (MG), according to the Tooele County zoning ordinance and zoning exhibit. This zoning condition, as a conditional use, allows for:

“Garbage, refuse maintenance or disposal site of materials classified as solid waste under Section 26-14-2(9) of the Utah Solid and Hazardous Waste Act, and located at least 300 feet from any district boundary.”

The purposes of Manufacturing General zoning districts are to provide areas in appropriate locations where heavy industrial processes necessary to the economy may be conducted. The regulations of this district are designated to protect environmental quality of the district and the adjacent areas. The Manufacturing General zoning district requires a Conditional Use Permit for use of the land as a non-hazardous solid waste landfill. The zoning districts are presented on Figure 2.3.

2.7 Current Permit

The WRL currently operates under permit #0501M2 issued by the Utah Division of Solid and Hazardous Waste, and this permit is included in Appendix 2.3. The current permit was issued in association with the following permit documents:

- *Permit Application- Class V Municipal Solid Waste Disposal Facility- Wasatch Regional Landfill*, prepared by PSOMAS, January 2005;
- *Wasatch Regional Landfill- Municipal Solid Waste Landfill Permit Modification Design Engineering Report*, prepared by Hansen, Allen and Luce, December 2004 and June 2005;
- *Evapotranspirative (ET) Final Cover Permitting Report for the Wasatch Regional Landfill*, prepared by Vector Engineering, Inc., June 2006;
- *Permit Modification for the Class V Municipal Solid Waste Disposal Facility- Wasatch Regional Landfill* prepared by Vector Engineering, Inc., March 9, 2009.

It is the intent of this permit renewal to consolidate all permit documents into one permit application.

2.8 Current Landfill Configuration

The current constructed configuration of the WRL is shown on Figure 2.4. The ultimate configuration (master plan) for the WRL is shown on Figure 2.5. The final waste slopes are designed at 4H:1V. The WRL was initially permitted for eleven phases covering approximately 793 acres with an ultimate gross airspace of approximately 160 million cubic yards. The current permit, with modifications, is for the original 793 acres plus a 100' higher waste mound, containing approximately 223.2 million cubic yards. A separate C&D cell has also been permitted, with an area of 11.2 acres and a total airspace of 779,524 cubic yards.

The existing liner system consists of (from the bottom up):

- Prepared subgrade;
- Geosynthetic clay liner (GCL) (non-reinforced on the floor and reinforced on the sideslopes);

- 60-mil HDPE geomembrane (smooth on the floor and textured on the sideslopes);
- Leachate collection and recovery system (LCRS) consisting of geonet overlain with non-woven geotextile filter fabric (on floor only); and
- Protective soil cover layer.

Existing stormwater control consists of a series of channels, benches, and down drains which control run-on, from areas outside the landfill footprint and run-off, from areas within the landfill footprint. All stormwater from the site is diverted into the existing groundwater cutoff trench located to the east of the landfill. Stormwater controls are designed and constructed as the landfill expansion progresses.

3.0 FACILITY LOCATION STANDARDS (PSOMAS)

3.1 Introduction

The Utah Administrative Code Rules identify the Location Standards for Disposal Facilities. UAC R315-302-1.2a specifies that new landfill facilities may not be located:

- Within 1,000' of a national, county or state park, monument, or recreation area; designated wilderness or a wilderness study area; or a wild and scenic river area.
- In any ecologically or scientifically significant natural area, such as a wildlife management area or endangered or threatened species habitat.
- In farmland classified as "prime", "unique" or of "statewide importance" as defined by the USDA SCS's Prime Farmland Protection Act.
- Within ¼-mile of existing residences or other incompatible structures such as schools or churches.
- Within ¼-mile of historic structures or properties listed or eligible to be listed on the State or National Register of Historic Places.
- Within 10,000' of any airport runway accommodating turbojet aircraft, or within 5,000' of any airport runway using only piston-type aircraft.
- Within any area containing important archeological sites.

3.2 Archeological/Cultural Features

In compliance with R315-310-1(2)(f), a signed letter from Jim Dykmann, State Deputy Historic Officer, is included in Appendix 3.1. It certifies that no important archeological or historical sites are located within the site boundary.

3.3 Site Buffer

Figure 3.1 demonstrates that the WRL site boundary does not contain parks, monuments, or recreation areas (United States Geological Survey 7.5-minute quadrangles); nor does it contain designated wilderness or wilderness study areas (Utah Automated Geographic Reference Center GIS data). There are no rivers on

the site, so there are no wild and scenic river areas in the area either. It should be noted that the Great Salt Lake is considered a Western Hemisphere Shorebird Reserve, and as such is a designated recreation area. The shorelines of the Great Salt Lake are several thousand feet away and therefore outside of the 1,000-buffer area.

3.4 Threatened/Endangered Species

GIS information available from the Utah Division of Wildlife Resources (DWR) and from the Utah Automated Geographic Reference Center (AGRC) provides both generalized and specific information on the location of threatened, endangered, and other sensitive species, as well as information on at-risk essential wildlife habitat. The information indicates that the site does not contain any at-risk essential wildlife habitat or habitat for any other species listed as threatened or endangered under the Endangered Species Act of 1982.

According to data from AGRC and DWR, the peregrine falcon (*falco peregrinus*) has had habitat in the general area of the landfill. The peregrine falcon, however, typically nests on cliffs near riparian wetlands and habitat, which is not in evidence in the site itself. This falcon had been listed in past years as an endangered species. In August 1999, the peregrine falcon was delisted from its status as an endangered species. Currently, the peregrine falcon is not listed federally or in Utah as endangered, threatened, or even as a "wildlife species of special concern". The DWR has issued a signed letter confirming that no threatened, endangered, or sensitive species are known to exist within the site boundary. Additional details, support, and the letter from DWR can be found in Appendix 3.2. The landfill is not located in a wildlife management area.

3.5 Airports

The nearest airports are not within 10,000' of the site boundary; in fact, the nearest aircraft facilities are at Grantsville, 22 statute miles southeast; Wendover, 36 statute miles northwest; and Tooele, 30 statute miles southeast (Utah Automated Geographic Reference Center).

3.6 Geology

UAC R315-302-1.2b states that no new landfill shall be located in areas:

- Of subsidence;
- Of potential dam failure and flood;
- Over underground mines;
- Over salt domes or salt beds;
- With geologic features that could compromise structure stability;
- Within 200' of a Holocene fault;
- With seismic impact zones (unless containment systems are designed to withstand the impact of a seismic event);
- That are unstable.

The geotechnical report found in Appendix 3.3 (Kleinfelder 2004) indicates that there are no areas of subsidence, potential dam failure, underground mines, salt domes, salt beds, or nearby Holocene faults. The site is located in a seismic impact zone, and all containment structures and surface water control systems will be constructed to resist seismic impact. Figure 3.2 illustrates the general geologic features in the site vicinity, and Figure 3.3 shows the geologic cross section for the WRL site. See Section 4 Geohydrological Assessment for a more detailed discussion of site geology.

3.7 Surface Water

UAC R315-302-1.2c states that no new landfill will be located in:

- Watersheds used for collection of municipal drinking water;

- A location where contamination could occur at a lake, reservoir or pond;
- Designated floodplains.

The WRL is not in an area used for collection of drinking water. At this time, the site has not been mapped by the Federal Emergency Management Agency, and so the official floodplain designation is not known. It is not likely that the site is located in a floodplain. The only significant water body nearby is the Great Salt Lake, which is several miles away. Additional detail regarding the elevations of the Great Salt Lake is given in Section 5. The magnitude of the 24-hour 25-year storm event is 2.08 inches. The magnitude of the 24-hour 100-year storm event is 2.55 inches. The average annual precipitation for the area is 12.5 inches (USDA NRCS, Utah Annual Precipitation Map). See Section 4 Geohydrological Assessment for additional discussion of site hydrology.

3.8 Wetlands

UAC R315-302-1.2d states that no new landfill will be located in wetlands, unless the following exceptions apply:

- There is no practicable alternative that does not involve wetlands;
- No state water quality regulations are violated;
- Section 307 of the Clean Water Act is not violated;
- Endangered or threatened species will not be jeopardized, nor their habitat destroyed;
- Other wetlands will not be degraded;
- No net loss of wetlands will occur.

A manmade wet area has been created on the WRL site that is approximately 0.10 acres in size. The exact location of the wet area in respect to the property boundary is shown in Figure 1 of Appendix 3.4. The water is used for stock drinking water, and due to the overflow onto the land, surface hydrology is present. Groundwater in the area is most likely not associated with this wetland. The soil for the area is a

Timpie Series, which consists of very deep, well-drained, moderately slowly permeable soils on the lake terraces and fan remnants. The soils here are typically found in areas having 6 to 8 inches of average annual precipitation. The soils are also high in alkaline as a result from the historic Lake Bonneville that once covered the area. The Timpie Series is not a Hydric Soil, which is identified by the Army Corps of Engineers (Corps) as a soil that is formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions.

The surrounding landscape is dry and predominately covered with greasewood and cheatgrass; both of which are common species that tolerate high levels of alkaline soils and dry conditions. Since the hydrology that currently sustains the wet area is manmade for the purposes of cattle drinking, the wetland will most likely not be considered a jurisdictional wetland by the Corps. It does not occur naturally, and the manmade structure can be removed which would dry the soil and eliminate the artificial habitat.

In addition to this, an Environmental Planner and an independent Professional Wetland Scientist (PWS) conducted a field inventory on the wet area site in April 2004. This inventory, in accordance with the 1987 Wetland Delineation Manual by the US Army Corps of Engineers, determined the site not to be a wetland. This was due to several factors, including the fact that the hydrologic and soil conditions for wetland designation are not satisfied. The full report and field data sheets are included as Appendix 3.4 Wet Area Determination.

3.9 Groundwater

UAC R315-302-1-2-e states that in areas where the groundwater has a TDS level over 10,000 mg/L, a landfill with a composite liner may be constructed within 5' of the historical high level of groundwater. According to the geotechnical study

(Kleinfelder 2004), the groundwater level (where found) is 15.1' to 39.5' below the surface. As per UAC R315-302-1-2(e)(iii), "no new facility shall be located over groundwater classed as 1B under Section R317-6-3.3. Furthermore, as per UAC R315-302-1-2(e)(ii), "no new facility shall be located over a sole source aquifer as designated in 40 CFR 149." See Section 4 Geohydrological Report and Section 5 Groundwater Modeling for more detailed discussions of groundwater issues as they relate to siting criteria and location standards.

3.10 Farmland

Appendix 3.5 includes printouts from the Utah office of the Natural Resources Conservation Service (NRCS) regarding "prime farmland" in selected areas around the state. As demonstrated by the printouts, the Tooele area does not contain any "prime farmland" designation. In contrast, the Box Elder County and Salt Lake area data sets indicate several soils identified as "prime farmland", including the Kearns, Parleys, Timpanogos, and Millville soil formations. Soils at the proposed landfill site are Tooele, Timpie, Hiko Peak, Playas, Skumpah, and Rock Outcrop. These soils are not identified as "prime farmland" in any of the available soil surveys. According to the Utah NRCS, "unique" farmland in Utah generally means orchards, and farmlands of "statewide importance" are soils which produce high sustainable yields and which nearly qualify as prime farmland. None of these elements are in existence at the site.

3.11 Existing Residences

There are no existing residences, schools or churches within ¼-mile of the site; in fact, the location is relatively remote.

3.12 Maps

Figures 3.4 through 3.8 are a topographic map at 1" = 200' showing the boundaries of the landfill unit, groundwater monitoring well locations, gas monitoring

locations, and the borrow and fill areas. This map is intended to comply with R315-310-4(2)(a)(i).

Figure 3.9 is USGS 1:100,000 topographic map, with the waste facility boundary, the property boundary, surface drainage channels, and any existing utilities and structures within one fourth mile of the site. This map is intended to comply with 315-310-4(2)(a)(ii). Figure 3.10 is a wind rose diagram from the Deseret Chemical Depot, near Tooele, Utah, indicating the direction of the prevailing winds.

4.0 GEOHYDROLOGICAL ASSESSMENT (PSOMAS)

4.1 General Geology

As per regulation 315-302-1(2)(b), no new facility or lateral expansion of an existing facility shall be located in a subsidence area, a dam failure flood area, above an underground mine, above a salt dome, above a salt bed, or on or adjacent to geologic features which could compromise the structural integrity of the facility including Holocene Fault Areas, Seismic Impact Zones, Unstable Areas. The geotechnical report prepared by Kleinfelder (2004) in Appendix 3.3 covers issues related to geology, seismicity, faults, liquefaction, subsidence, unstable slopes, bedrock, soil properties, groundwater depths/quality, etc. Some additional discussion of several of these items can also be found in the Geology, Surface Water, Wetlands, and Ground Water sections of Section 3 (Facility Location Standards) of this permit application.

4.2 General Hydrology

Annual precipitation in the area is approximately 12.5 inches (USDA/NRCS). The Callister Ranch weather station located approximately 31 miles south/southeast and at an elevation of 4,260 feet records 12.83 inches of annual precipitation (Ashcroft 28). Storm events corresponding to a 24-hour duration produce 2.08 and 2.55 inches for the 25- and 100-year return periods respectively for this area (NOAA/NWS). Potential evapotranspiration for the area is estimated at about 40 to 50 inches annually (US Department of Commerce, Kohler et al).

4.3 Groundwater

As per Rule 315-310-4(2) b (iii), the groundwater conditions in the area are to be addressed.

The geotechnical study by Kleinfelder (2004) reports that groundwater, where observed in the borings, was at depths of 15.1 to 39.5 feet below existing grade.

Numerous factors contribute to groundwater fluctuations. Groundwater levels at the site may vary depending on the season or during periods of high precipitation, runoff, or snowmelt. Historic high levels of groundwater are estimated and addressed in Kleinfelder (2004).

The majority of the groundwater within the site boundary is, by definition, Class IV (Saline Groundwater). As per UAC R317-6-3.7, Class IV groundwater exists in areas where TDS levels exceed 10,000 mg/L (considered saline by many other standards as well). Kleinfelder (2004) indicates that TDS levels vary, both in terms of location and time, from 3,500 to over 31,000 mg/L on the site. Areas which are less than 10,000 mg/L TDS may not be classified as Class IV. These areas are known not to be a "source of water for a community public drinking water system for which no reliable supply of comparable quality and quantity is available because of economic or institutional constraints" (UAC R317-6-3.3). As a result, the groundwater is not classified as Class 1B (Irreplaceable Groundwater).

The site is not located over a sole source aquifer (SSA). Sole source aquifers are those which are a sole or principal source of water for a given aquifer service area. That is, aquifers which supply 50 percent or more of the drinking water for an area for which there are no reasonably available alternative sources should the aquifer become contaminated. As designated in 40 CFR 149, sole source aquifers are designated as such under section 1424(e) of the Safe Drinking Water Act (SDWA). The SDWA designates SSA's in the Federal Register. A search of the Federal Register indicates that, at most, three SSA's exist in Utah. The search results from the Federal Register, as well as documentation from 40 CFR 149 and Section 1424(e) of the SDWA, are contained in Appendix 4.1. These documents show that SSA's may have been designated in the Moab, Oakley, and Castle Valley areas.

A hydraulic gradient was constructed from the boreholes that encountered existing groundwater, and is shown in Figure 4.1. The groundwater flow direction is generally northeast, with an average hydraulic gradient (i) in the “steeper” areas of approximately 0.52 percent.

As per Kleinfelder (2004), an equivalent hydraulic conductivity in the direction of groundwater flow is approximately 1×10^{-4} cm/s, typical of some of the sands in the area through which the water flows. As a result, Darcian groundwater velocities are estimated at approximately 5.2×10^{-7} cm/s (1.4 cm/month). Considering porosity, however, the actual seepage velocity is estimated at 2.1×10^{-6} cm/s (5.4 cm/month, or about 2.2 ft/yr) assuming an estimated porosity (n) of 0.25 (see calculations in Appendix 4.2). Additional detail regarding groundwater properties and quality can be found in Kleinfelder (2004), and in Section 5, Groundwater Model.

4.4 Wells

As per R315-310-4(2)(b)(viii), any public or private wells onsite and within a 2,000 foot buffer surrounding the site are to be listed along with associated quantity, location, and construction information.

Well locations were determined using the following four methods/data sources:

- USGS 1:100,000 scale quadrangle maps were inspected;
- site visits and/or surveys;
- well drilling database at the DWR;
- water rights query by location at the Utah State Division of Water Rights (DWR).

One well showing up near the northern border of the site boundary was noted on the USGS quad map as shown in Figure 4.3. This well did not show up as being a well with water rights nor was it listed in the well drilling database. It is assumed at this time that this well is no longer in existence, functioning, and/or used.

The well drilling database maintained by the Utah State DWR contains data reported by well drillers during the construction of water wells. Records received after 1995 are entered in the State's database as they are drilled. Records prior to 1995 are entered into the database by area and on a selective basis. The database currently holds about 20,000 entries. Only one well log showed up in a search of the surrounding area, although very little information was available from the DWR for this well. The location of this well based on State data is shown in Figure 4.2, and the well log information listing can be found in Appendix 4.3. The owner of this well is Bingham Environmental, Inc. in Salt Lake City, Utah.

Finally, two locations within the 2,000 foot buffer associated with Water Right 16-533 (see Water Rights section) have been identified as 12" diameter wells. The locations of these two wells are shown in Figure 4.3, and it should be noted that the water rights associated with these two wells are null and void (see Water Rights section for additional detail).

4.5 Water Rights

As per R315-310-4(2)(b)(vi), all surface and ground water rights are to be tabulated for the site itself as well as within a 2,000 foot buffer surrounding the site boundary. A memorandum, included as Appendix 4.4, was prepared in June 2003 regarding the water rights on and near the site. The water rights memo includes full printouts, letters, and other documentation from the Utah State Division of Water Rights. Additionally, information on the applicable water rights were again researched in September 2003 and can be found in Appendix 4.5 of this section.

Water right numbers inside the 2,000 foot site buffer are shown in Figure 4.3, and are covered in Appendix 4.5 are as follows:

Water Right 16-533

Water Right 16-696

Water Right 16-697

Water Right 16-698

The following is a brief description of each water right, and was taken from the June 2003 memo referenced above.

4.5.1 Water Right 16-553

After a review of the files and a meeting with the Regional Engineer, it was determined that Water Right 16-533 had been rejected and is no longer valid. Actual hard copies of the files have been destroyed by the Division of Water Rights. Therefore, this water right is considered null and void and has no current standing with the State of Utah.

4.5.2 Water Rights 16-696, 16-697, 16-698

These water rights are owned by the United States of America, Bureau of Land Management (BLM). Applications to appropriate water (A58905, A58906, A58907 respectively) were filed with the Utah State Engineer on June 2, 1983. Apparently, all of the required information was not submitted at the time of filing. When the appropriate information and documentation was submitted to the State Engineer's office in its entirety, the priority date was changed to March 22, 1984 (the date of the amended and complete submittal). After the review and evaluation process by the State Engineer's office, these applications were approved on August 3, 1984.

The applications called for the construction of 5, 6, and 8 foot dams to create three 0.1 acre-feet storage reservoir/earthen impoundments, and which collect surface runoff as a source. The purpose and use of these reservoirs is for the stock watering of animals belonging to BLM permittees on a year-round basis. In this case, 600 head of cattle of the "Lakeside Allotment" were using the water.

The WRL currently operates under water right 16-854, approved on February 2, 2005. A copy of the approval letter is presented in Appendix 4.6.

4.6 Surface Waters

As per regulation R315-310-4(2)(b)(viii), surface waters within 1 mile of the site boundary are to be identified and described.

4.6.1 Streams and Drainages

No perennial streams or drainages are known to exist on the site or in the near vicinity. Some relatively minor drainages, shown in Figure 4.4 and Figure 4.5, exist in the foothill gullies to the west. These drainages collect flow from associated watersheds and the Right Fork of Carter Canyon during storms only and therefore are believed to be ephemeral in nature. The topography of the site itself follows a relatively planar slope towards the east and no well-defined drainages exist. As a result, storm runoff from the west foothills most likely spreads and sheet flows into the site, evaporates, and/or infiltrates into the ground. Three culverts were located in the northeast section of the site boundary which allows drainage to pass eastward under Amex road and/or the Union Pacific railroad line if necessary.

Although the site is not likely located in a floodplain area, the nearby drainages have not been officially mapped or designated by the Federal Emergency Management Agency (FEMA). Surface waters are described in additional detail in Section 2 (Facility Location Standards) of this report. It should also be noted that Section 2 of this report and the Water Balance portion of this section contain additional discussion of local and regional hydrology, as well as Section 5 Groundwater and Section 9 Stormwater.

4.6.2 Lakes and Impoundments

The only significant water body nearby is the Great Salt Lake, which is several miles away. The historic high water elevation for the Great Salt Lake is 4,218 feet above mean sea level and the average elevation of the Great Salt Lake is approximately 4,200 feet (AGRC). Figure 4.6 shows some additional shoreline elevations for the Great Salt Lake. The selection and delineation of these elevations were based on data obtained from the USGS and the Utah AGRC. It should be noted that the shorelines shown in Figure 4.6 only illustrate the western most extent of the resulting shoreline, and not interior islands eastward. The 4,218 feet elevation shoreline is approximately 0.8 miles from the site. However, after the flood years in the early 1980's, a pumping system was constructed and installed to help prevent flooding from the Great Salt Lake. The elevation of 4,212 feet was established in January 1999 by the Utah Department of Natural Resources as the new high water level for planning purposes, and is a considerable distance away from the site (i.e., over 1 mile away). Should flooding occur again, the pumps will begin operation and the Great Salt Lake will most likely not rise to its historic high water levels.

As mentioned previously, some relatively small-capacity impoundments (e.g., 0.1 acre-feet) were reportedly constructed on or near the site by the BLM to contain surface runoff when available.

4.6.3 Wetlands

One wet area exists inside the site boundary. More detailed discussion of this area is covered in Appendix 3.4 Wet Area Determination.

4.7 Water Quality Assessment

As per regulation R315-310-4(2)(b)(viii), a background ground and surface water quality assessment is required. The geotechnical report (Kleinfelder 2004,

Appendix 3.3) contains testing and laboratory results on groundwater quality specific to the area studied.

4.8 Statistical Method

As per regulation R315-308-2(7), the owner or operator shall use a statistical method for determining whether a significant change has occurred as compared to background water quality conditions. This method is discussed in the Ground Water Sampling and Analysis Plan (Carel Corp., 2005), included as Appendix 4.7.

4.9 Site Water Balance

4.9.1 General

As per Section R315-310-4(2)(b)(ix) of the Solid Waste Rules, a site water balance was calculated and determined. This mass balance for the site considered waters entering and leaving the balance boundary, as well as the change in storage. When the terms of a water budget are expressed in volume or depth (e.g., acre-ft or inches), a specified time period applies. In this case, an annual cycle was used. In general, a typical water budget is shown in equation form as Equation 1. A general and separate discussion for the equation terms follows.

Equation 1
$$\Delta S = P + R + B - F - RO - ET$$

where,

ΔS = change in storage

P = onsite precipitation

R = run-on, or offsite rainfall excess

B = groundwater/subsurface flow

F = infiltration

RO = onsite runoff

ET = evapotranspiration

Version 3.07 of the Hydrologic Evaluation of Landfill Performance (HELP) unsaturated flow model was used to calculate the water balance for the landfill. Two scenarios were considered in the model. These were (1) an active landfill

scenario with the cell open and being used for landfill operations, and (2) a closed landfill scenario with a cell capped with final cover.

Vector Engineering subsequently performed additional analysis for designing an evapotranspirative cover, so the following is pertinent to the active landfill areas. For the ET cover information, see Section 10.

Precipitation and Evapotranspiration

Annual precipitation in the area is approximately 12.5 inches (USDA/NRCS). The Callister Ranch weather station located approximately 31 miles south/southeast and at an elevation of 4,260 feet records 12.83 inches of annual precipitation (Ashcroft 28).

Evapotranspiration is the combination of evaporation and transpiration from plants and vegetation. Published evaporation maps list lake evaporation. Lake evaporation is considered to be the amount of evaporation occurring from lakes, ponds, and other impoundments that hold sufficient water to supply evaporation processes. These maps estimate evaporation in this area between 40 and 50 inches annually, significantly greater than the long-term average annual precipitation (US Department of Commerce, Kohler et al). Potential evapotranspiration (ET), evapotranspiration not limited by the water source itself, depends on crop or vegetation type, season, and geographic location. The amount of annual ET would exceed that from evaporation alone.

Surface Drainages, Run-on, and Runoff

As described previously, some surface drainages are located in the foothills west of the site. Undisturbed-area runoff from these benched areas that would otherwise be run-on into the site is diverted around or away from the site. Therefore, water from these areas does not enter into the water budget boundary. Other areas

within the site would produce runoff that would need to be diverted and/or contained as well, but would not enter into the cell to become leachate.

For the cells being actively landfilled, runoff enters into the cell and becomes leachate. This non-evaporated portion of this leachate would then be collected in the leachate drainage layer at the bottom of each cell and ultimately stored in evaporation ponds. Infiltration into the native soils below the landfill would be minimal if not nonexistent.

For capped cells with final covers in place, infiltration into the cell producing additional leachate would be minimal if not nonexistent.

In addition to the items included in Equation 1, additional water and/or leachate dispersed onto active cell areas must be considered. The recirculation of leachate from the evaporation ponds and water spread for fugitive dust control are examples of this.

Groundwater Flows and Infiltration

Flows that infiltrate from cells into the groundwater (or that may exfiltrate out of the ground under artesian pressure) are considered in the water balance.

4.9.2 Water Balance

For the water balance, the boundary is taken to be one cell.

Default or synthetic parameters were generally used based on Salt Lake City data already contained in the HELP model for temperature, solar radiation, and evapotranspiration. The default monthly precipitation values for Salt Lake City were proportionally scaled to match the 12.5 inches of annual rainfall in the area. For evapotranspiration, the Leaf Area Index (LAI) was assumed 1.0, the

evaporative depth was set to 32 inches, and the initial moisture content conditions were initialized by the model. For the closed cell condition, 100 percent of the area was assumed to produce runoff at a Composite Curve Number (CCN) of 75 (AMC/ARC II conditions). Drainage lengths for the lateral drainage layers were set at 250 feet at a 2 percent slope. For the active/open-cell conditions, it was assumed that 75 percent of the discharged leachate is recirculated into the landfill. For the geomembranes, a pinhole density of 1 per acre, installation defects of 1 per acre, and geomembrane placement quality level "2" (i.e., excellent contact) were assumed. Model output can be found in Appendix 4.8.

The simulation was run for 50 years with output on an annual basis.

Based on the results, the current planned cover configuration is adequate to practically eliminate infiltration through the cover, and in both cases, infiltration through the bottom liner.

4.10 References

Ashcroft, Gaylen L., Jensen, Donald T., Brown, Jeffrey L. Utah Climate. 1992, Utah Climate Center, Utah State University.

Kleinfelder, Preliminary Geotechnical Report, Wasatch Regional Solid Waste Landfill, Tooele County, Utah, October 2003, Salt Lake City.

Kohler, M.A., Nordenson, T.J., Fox, W.E. Evaporation Maps for the United States, US Weather Bureau Technical Paper 37, 1959, Washington D.C.

National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS), NOAA Atlas 14, Precipitation Frequency Data Server. <http://www.nws.noaa.gov/ohd/hdsc/>

United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) Utah Annual Precipitation, 1961 to 1990.

United States Department of Commerce, Climatic Atlas of the United States, Environmental Data Service, 1968, Washington D.C.

Utah State Automated Geographic Reference Center (AGRC),
<http://agrc.its.state.ut.us>.

5.0 GROUNDWATER MODEL (HANSEN ALLEN & LUCE)

5.1 Projected Future Groundwater Conditions

Due to the lack of historical groundwater level measurements (2004), a groundwater model of the unconsolidated aquifer in the vicinity of the WRL was created in order to estimate maximum future groundwater conditions. MODFLOW, a modular, three dimensional, finite difference groundwater model developed by the US Geological Survey (McDonald and Harbaugh, 1988), was used to simulate groundwater conditions in the area of the landfill. MODFLOW uses a block centered grid to define the aquifer on a node by node basis. Information required by MODFLOW includes aquifer top and bottom elevations, aquifer properties such as hydraulic conductivity, aerial sources and sinks such as recharge and evapotranspiration, point sources and sinks such as wells and drains, and other boundary conditions such as general head or fixed head boundaries.

Using a steady state simulation, the model was calibrated to measured groundwater levels below the landfill site (obtained in 2003 from borehole investigations performed by Kleinfelder) by adjusting hydraulic conductivity values across the model. Precipitation and Great Salt Lake elevation data from 2000 to 2003 also were used for the calibration. Estimation of the maximum anticipated groundwater levels was accomplished by entering maximum precipitation data from 1980 to 1983 and the maximum historical Great Salt Lake elevation from 1985 into the calibrated model and running a steady state simulation. The steady state assumption in MODFLOW results in predicted groundwater levels that assume input conditions remain constant until the model inflow and outflow are balanced. Therefore, inputting the maximum Great Salt Lake levels and maximum precipitation in a steady state model results in computed groundwater levels assuming these conditions last forever. Development of the MODFLOW model is described below and is included in Appendix 5.1.

5.2 Study Area and Model Discretization

The WRL site is located west of the railroad and at the base of the Lakeside Mountains in Sections 33 and 34, Township 2 North, Range 8 West and in Sections 3 and 4, Township 1 North, Range 8 West, Salt Lake Base and Meridian (SLB&M). In order to define the MODFLOW model, a coordinate system was established running parallel with section lines, with the northeast corner of Section 28, Township 2 North, Range 8 West, SLB&M coinciding with the point $x=5,000$ feet and $y=23,000$ feet in the coordinate system. The x-axis increases to the east and the y-axis increases to the north. The model grid contains 46 rows and 74 columns consisting of square cells with 500 feet per side. The west edge of column 1 coincides with the coordinate $x=0$ feet and the north edge of row 1 coincides with $y=23,000$ feet. The active cells in the model grid are shown on Figure 5.1, with row and column numbers labeled. The western boundary of active cells in the model corresponds to where the unconsolidated deposits meet the bedrock of the Lakeside Mountains. The eastern boundary corresponds to the approximate normal pool elevation of the Great Salt Lake. The northern and southern boundaries of the model were chosen at least 1 mile north and south of the landfill site to avoid boundary effects on the target area to be modeled. The groundwater aquifer is modeled as a single layer.

5.3 Boundary Conditions

The western boundary is modeled as a specified flux boundary using positive flow rate (injection) wells to simulate recharge to the unconsolidated aquifer from the bedrock and from runoff in the mountain streams of the Lakeside Mountains. The streams or drainages associated with the Lakeside Mountains are ephemeral providing runoff only during precipitation events. The eastern boundary is modeled as a specified (fixed) head boundary simulating the influence of the Great Salt Lake on the aquifer. Under existing conditions used for calibration of the model with the lake elevation at 4,195 feet, the lake boundary is at approximately $x=37,000$ feet

(column 74) using the model coordinates. Under projected future high lake level conditions (estimated at 4,212 feet), the lake boundary is at about x=16,000 feet (column 32). The northern and southern model boundaries are modeled as no-flow boundaries simulating the west to east flow of groundwater as indicated in Technical Publication No. 42 (Stephens, 1974) published by the U.S. Geological Survey (USGS).

5.4 Layer Elevations

Top elevations of the model were determined using topographic contours from the Badger Island NW, Craner Peak, Delle, and Poverty Point USGS 7-1/2 minute quadrangles. Borings performed by Kleinfelder in 2003 indicate that the thickness of the unconsolidated deposits beneath the landfill site is at least greater than 52 feet. Additional borings completed by Applied Geotechnical Engineering Consultants in October 2004 indicate the thickness of the unconsolidated deposits to be 140 feet in the valley area of the Lakeside Mountains west of the landfill area. The bottom elevations of the model are assumed to be 100 feet below the top elevations on the west side of the model and are assumed to transition to 400 feet below the top elevations on the east of the model. The thickness of the unconsolidated aquifer is almost certainly greater than 400 feet on the east. However, the aquifer properties were modeled using hydraulic conductivity. Therefore, water levels computed by the model will be controlled mainly by the hydraulic conductivity, and the bottom elevation should not have a significant impact on model results.

5.5 Great Salt Lake Elevations (Fixed-Head Boundary)

Elevations for the Great Salt Lake were obtained from the USGS Water Resources for Utah website (ut.water.usgs.gov). Near the end of 2003 when groundwater elevations below the landfill site were obtained, the elevation of the Great Salt Lake was about 4,195 feet. The historical high level of the Great Salt Lake of about 4,212

feet occurred twice in the historical record. The first time was between 1870 and 1875 and the second time was after the high precipitation years of 1980 to 1983. Based on this information, the maximum Great Salt Lake level is assumed to be 4,212 feet.

5.6 *Evapotranspiration*

Because of the arid conditions on the west side of the Great Salt Lake, a significant amount of groundwater is removed through evapotranspiration. Based on the presence of mud flats and other surface features, it was assumed that evapotranspiration occurs throughout the model east of the landfill site. The rate of evapotranspiration was estimated to be about 12 inches/year with a maximum evapotranspiration depth of about 5 feet below ground surface. The rate of evapotranspiration was obtained from data generated in EPA's HELP model which uses local temperature and solar radiation type climatological data, vegetative cover and soil types in generating the rate of evapotranspiration.

5.7 *Recharge Estimates*

The principal source of groundwater recharge to the unconsolidated aquifer was assumed to be the Lakeside Mountains to the west in the form of infiltration from runoff in mountain streams, and movement of groundwater from the bedrock into the unconsolidated aquifer. Stephens (1974) indicated in Technical Publication No. 42 (TP-42) that the average percent of precipitation contributing to groundwater recharge for the periphery of the Northern Great Salt Lake Desert, which includes the Lakeside Mountains, is 3%. Specific recharge was not addressed for the Lakeside Mountains in TP-42 and a recharge rate of 5% of precipitation for this area was assumed in the model to be conservative. Copies of the relevant portions of TP-42 are included in the model portions in Appendix 5.1.

Precipitation data were obtained from the Western Regional Climate Center website maintained by the Desert Research Institute (www.wrcc.dri.edu]. Using the four closest precipitation stations, the annual precipitation from 2000 to 2003 was about 6.7 inches and the annual precipitation from 1980 to 1983 was about 15.9 inches. Table 5.1 summarizes the precipitation data for these two time periods.

**TABLE 5.1
PRECIPITATION DATA SUMMARY**

| YEAR | ANNUAL PRECIPITATION (INCHES) BY STATION | | | | ESTIMATED PRECIPITATION (INCHES) |
|---------|--|-------------|--------------|-----------------|----------------------------------|
| | CALLISTER RANCH | GRANTSVILLE | KNOLLS 10 NE | UTAH TEST RANGE | |
| 1980 | 15.73 | 12.67 | X | X | 15.9 |
| 1981 | 13.07 | 13.06 | X | X | |
| 1982 | 16.55 | 18.45 | X | X | |
| 1983 | 16.50 | 20.78 | X | X | |
| Average | 15.5 | 16.2 | X | X | |
| 2000 | X | 11.85 | 3.78 | ** | 6.7 |
| 2001 | X | ** | ** | 6.09 | |
| 2002 | X | 7.08 | ** | 6.96 | |
| 2003 | X | 6.92 | 5.0 | 8.24 | |
| Average | X | 8.6 | 4.4 | 7.1 | |
| X | Station period of record does not include this year | | | | |
| ** | Data was missing for 1 or more months during this year | | | | |

Recharge from the mountains was divided into three recharge areas as shown on Figure 5.2. The North Recharge Area consists of the Carter Canyon Drainage. The Central Recharge Area consists of the eastern drainages of the Lakeside Mountains south of Carter Canyon and north of Dead Cow Point. The South Recharge Area includes the drainage area of the Lakeside Mountains south of Dead Cow Point to the limits of the study area.

Five percent of the precipitation was multiplied by the area of each recharge area to determine the total recharge volume to the study area. This resulted in a total recharge volume of 163 acre-feet/year for calibration (2000 to 2003 precipitation data) and a total recharge volume of 385 acre-feet/year for estimation of maximum groundwater levels (1980 to 1983 precipitation data). This recharge was inserted in the form of injection wells across the west side of the model with the distribution of recharge rates based on location of canyon mouths and the recharge area tributary to the canyon mouths.

5.8 Hydraulic Conductivity and Model Calibration

The hydraulic conductivity was assumed to vary in the model by location based on influences from mountain drainages, mud flats, or the Great Salt Lake. An initial hydraulic conductivity was assumed based on typical values for the soil types provided in the Kleinfelder geotechnical report. The soils consist primarily of sands, silts and clays with some gravels mixed with silts and sands. "*Hydrology - Water Quantity and Quality Control*" presents a typical range of hydraulic conductivity values for sands, silts and clays between 0.3 feet/day and 30 feet/day. During calibration, an initial value of 7 feet/day was assumed (which is on the low side of the middle of the range of values) and the hydraulic conductivity in each zone was adjusted until the computed groundwater levels in the model approximately matched the measured groundwater levels from the 2003 Kleinfelder borehole data. Precipitation data from 2000 to 2003 and Great Salt Lake elevation data from 2003 were used during calibration. The hydraulic conductivity zones and calibrated hydraulic conductivities are shown on Figure 5.3.

Figure 5.4 shows the calibrated groundwater levels with the locations of groundwater observations from the boreholes drilled in 2003 by Kleinfelder. Also shown on Figure 5.4 are the observed groundwater levels, computed groundwater levels, and the residual between the computed and observed groundwater levels.

Computed water levels were within 2 feet of the target value in seven of the eleven observation points and were within 3 feet of the observed value in all but one observation point.

Since the south half of the landfill will be constructed first, the strength of the calibration in this area is of most importance. The computed groundwater levels were less than 2 feet above the observed levels in three of the six observation points within the southern half of the facility. The computed levels were less than 2.2 feet below the observed levels at the other three southern observation points. Therefore, the computed groundwater levels in the southern half of the facility are considered to be a reasonable representation of actual groundwater elevations.

There are five observation points in the northern half of the facility. Computed groundwater elevations in two of these were below the observed levels by 1.2 and 2.6 feet. The computed groundwater levels were 1.4, 2.6, and 4.5 feet above the observed values in the other three. The computed groundwater levels in the northern half of the facility are also considered to reasonably represent actual conditions, but the calibration may not be as close as for the southern half of the facility.

5.9 *Projected Maximum Groundwater Levels*

Maximum groundwater levels were computed by inserting the recharge data from 1980 to 1983 and Great Salt Lake elevation of 4212 from the year 1985 into the calibrated model and then running the model under steady state conditions. Using the highest level of the Great Salt Lake and recharge from the highest observed precipitation values in a steady state model would represent the historical worst case scenario for the landfill area. The computed maximum groundwater levels are shown on Figure 5.5.

5.10 Drain Trench

The computed contours shown on Figure 5.5 indicate that maximum groundwater levels will be very close to the ground surface in the eastern half of the landfill site. To control the groundwater levels under maximum conditions, a drain trench has been constructed east of the landfill. The drain trench has a bottom width of 10 feet or more with 3H:1V (horizontal to vertical) or flatter side slopes and has a bottom elevation of 4,227 feet or lower. This bottom elevation was chosen to provide a minimum separation of 5 feet between the bottom of the landfill and the maximum groundwater level at all locations. Current practice at the landfill is to monitor the water levels in the trench, and maintain the proper water level elevation by pumping or continued excavation. The trench area is also the borrow area for the landfill. Water level measurements for both groundwater monitoring wells are presented in Appendix 5.2.

The trench was modeled as a drain in the MODFLOW model in column 8 rows 12-16, column 9 rows 16-20, column 10 rows 20-25, column 11 rows 25-29, and column 12 rows 29-32 of the model grid. The maximum computed groundwater levels with the drain trench in place are shown on Figure 5.6. The model demonstrates that construction of the drain trench will maintain lower groundwater levels even under projected maximum conditions.

Because the entire landfill would not be constructed at one time, the construction of the drain trench can be staged to coincide with landfill construction and operation. The first stage of drain trench construction may extend from the south end of the trench to the location of the drain outlet located east of the first phases of landfill construction. This location of the trench is in column 14 and rows 24 through 32 in the MODFLOW model. The computed maximum groundwater levels, with the first stage of the drain trench in place (shown on Figure 5.7), demonstrate that during construction of the southern portion of the landfill, the first stage of the drain

trench will maintain the lower groundwater levels used for the first phases of landfill design. The first stage of drain trench construction is expected to occur during construction and operation of the first landfill area presented in Section 6. Construction of the drain trench will continue as construction fill materials and daily cover materials are needed.

Additional borrow materials for construction and daily cover for the entire landfill area will be obtained from the borrow area presented on the drawings to be an extension of the drain trench. This large borrow area will provide additional groundwater drainage and a larger evaporation zone for groundwater that will result in a decrease in groundwater levels below the levels projected by the MODFLOW model. Although excavation of the drain trench will occur as materials are needed for construction and operation, construction of the outlet will not be necessary until groundwater levels rise to the level of the bottom of the trench or until precipitation runoff begins to accumulate in the trench.

6.0 LANDFILL DESIGN

This section presents the general layout and design concept for the landfill and also presents more specific design information for the floor layout, leachate collection and removal system components and interior runoff containment. Reference should be made to the design drawings in Appendix 6.1, the AGECE 2004 geotechnical report in Appendix 6.2, and calculations provided in Appendices 6.3 and 6.4 throughout this section.

6.1 General Layout and Design

The facility consists of a landfill area formed by raised embankments along the east, north and south sides and the hill slopes along the west side of the facility. Berms are provided at a spacing of 950 feet extending from the east embankment to the west through the landfill area. These berms separate the cell into eleven individual phases or leachate management areas designated as Phase 1 through Phase 11 (Phase 1 being the southernmost area and Phase 11 the northernmost area). The sump and floor areas of each phase are designed with identical sump sizes, elevations, and floor configurations. Approximate operational areas provided by each phase are provided in Table 6.1.

TABLE 6.1
LANDFILL PHASE OPERATIONAL AREAS

| PHASE | OPERATIONAL AREA (ACRES) | PHASE | OPERATIONAL AREA (ACRES) |
|-------|--------------------------|------------|--------------------------|
| 1 | 67.2 | 8 | 92.3 |
| 2 | 74.1 | 9 | 130.3 |
| 3 | 79.6 | 10 | 41.1 |
| 4 | 54.6 | 11 | 44.6 |
| 5 | 55.7 | C & D cell | 11.2 |
| 6 | 60.2 | | |
| 7 | 93.4 | TOTAL | 804.3 |

The overall landfill capacity (waste mound) above the protective soil cover material placed above the lining system is 223.2 million cubic yards. Assuming a daily cover quantity of 18 percent of the landfill capacity, this design provides for 183.1 million cubic yards of net waste capacity and a daily cover requirement of 40.2 million cubic yards. A summary of cut and fill estimated quantities are provided in Table 6.2.

TABLE 6.2 CUT/FILL MATERIAL QUANTITY ESTIMATES

| DESCRIPTION | MATERIAL QUANTITIES (millions of cubic yards) |
|--|--|
| AVAILABLE CUT | |
| <i>Cell Area</i> | |
| From Construction | 20.1 |
| Clearing & Grubbing | 0.7 |
| Net Usable Cut From Cell Area | 19.4 |
| BORROW | |
| Total Cut | 18.7 |
| Clearing & Grubbing | 0.5 |
| Net Usable Cut From Borrow | 18.2 |
| Total Available Cut | 37.6 |
| REQUIRED FILL | |
| Embankment and Subgrade Construction | 4.3 |
| For Protective Soil Cover | 2.7 |
| Daily Cover | 40.2 |
| For Closure | 3.0 |
| Total Required Fill | 50.2 |
| Net Cut/Fill Balance (additional cut needed, potential import) | 12.6 |

Design of the landfill area allows for phased construction within each of the designated leachate management phases to meet ongoing capacity demands for the facility and to minimize capital expenditures based on cell capacity needs. As of

September 2009, Phases 1-A, 1-B, 1-C, and Phases 2-A and 2-B have been constructed. Phase 2-C is currently in construction, and when completed this will result in a total constructed landfill area of 58.4 acres.

The WRL completes an assessment of remaining constructed landfill volume on an annual basis. This assessment is based on survey data collected annually, and the volume difference between the surveyed surface and the design surface represents the volume remaining for the current constructed cells. Table 6.3 indicates the consumed and the remaining volume for the current constructed cells.

Subsequent construction sub-phases will extend toward the west as extensions of existing leachate management phases or toward the north into additional leachate management phases. The first sub-phase of construction for each leachate management phase will occur at the eastern end of the phase (at the sump location) to provide a system for leachate collection and removal. Details showing the concept of how construction sub-phases may end and how the tie-in for subsequent sub-phases may occur are presented in Appendix 6.1 Design Drawings. These details present the concept only and it is expected that construction sub-phases and subsequent tie-ins will vary as ideas for tie-ins change. The important components for ending construction sub-phases are to provide for runoff containment and a continuous liner and leachate collection system.

TABLE 6.3
VOLUME CALCULATION RESULTS

| CALCULATION | FILL (CY) | CUT (CY) |
|---|--------------------|----------|
| 2008 Aerial Survey vs. 2009 Survey (Consumed Airspace) | 882,470 (waste) | 0 |
| 2009 Aerial Survey vs Ultimate Constructed Remaining Fill Plan (Constructed Remaining Fill) | 1,933,278 | 0 |

6.2 Floor Elevation and Slopes

Projected future groundwater elevations presented in Section 5 and estimated settlement values presented by Kleinfelder (2004) provided the basis for setting the lowest points (sumps) for the leachate management phases. Projected future groundwater elevations using a drain trench were used for design purposes. Estimated settlement values were also used to estimate differential settlement that may occur along the floor in establishing design slopes. Settlement projections from deeper borings provided in the Geotechnical Investigation by Applied Geotechnical Engineering Consultants (AGEC), included in Appendix 6.2, are less than those provided by Kleinfelder (2004). Settlement projections provided by AGEC were received after the cell design was nearly complete. Therefore, the projections provided by Kleinfelder were used for setting floor elevations and slopes resulting in a more conservative design. Floor elevation data are included in Appendix 6.3.

The low point for each leachate management phase was established to provide a minimum separation between the liner system and the modeled projected future ground water surface of 5 feet after accounting for potential settlement. Kleinfelder projected the future settlement to be 2% to 3% of the fill height above the existing ground surface in the eastern portions of the facility and 1% to 2% of the fill height above the existing ground surface in the western portions of the facility. There will be an estimated fill height of about 20 feet to 30 feet above the existing ground

surface at the location of the low point (or sump area) for each phase. Therefore, the projected settlement at these locations is 1 foot or less. A minimum separation of 9.9 feet between the liner system and the projected groundwater surface has been provided to account for settlement, and the margin of accuracy in the groundwater model.

Minimum slopes used for design after accounting for potential differential settlement are: 1) Two percent minimum for the planar floor surfaces; and 2) One percent along leachate conveyance pipes. Differential settlement was estimated by determining the projected settlement resulting from an increase in fill height progressing up gradient along the width of the planar floor surfaces and up gradient along the leachate conveyance pipes. Slopes were then increased to account for the calculated potential differential settlement. The resulting design slopes are:

- 2.75 percent for planar floor surfaces sloping downward toward the leachate collection pipes.
- 1.0 percent for leachate conveyance pipes along the toe of inside 2H:1V slope of the east embankment sloping downward toward the sumps. These pipes parallel the contours of the fill such that there negligible change in fill height along the length of the pipes.
- 1.7 percent downward toward the sumps for leachate conveyance pipes located below the 4H:1V closure cap slopes and extending to the west along the valleys created by the planar floor surfaces.
- 1.2 percent downward toward the sumps for leachate conveyance pipes located below the 5 percent closure cap slopes and extending to the west along the valleys created by the planar floor surfaces

6.3 Embankments

The east embankment will have a peak and valley configuration to enhance drainage. The direction of the slopes for each phase will alternate between north and south flow directions. The elevation of the embankment will be 4274 feet at the peaks and 4266 feet in the valleys. The WRL reserves the right to build the eastern embankment with a flat top. The north and south embankments join with the east

embankment at the northeast and southeast corners of the landfill area and extend west toward the west mountain area (Lakeside Mountains). An upward gradient of 1.3 percent was provided for the north embankment and upward gradients of 1.5 percent and 5 percent were provided for the south embankment (changing slope about half way along the embankment) toward the Lakeside Mountains. A top width of 25 feet has been provided for the raised embankments with 2H:1V interior slopes and 3H:1V exterior slopes.

The western boundary of the landfill area is formed by the eastern slopes of the Lakeside Mountains. Embankment fill material will be placed on the existing mountain slopes to provide an appropriate subgrade surface for placement of the lining materials. A horizontal width of about 25 feet will be provided at the top surface of the embankment fill to provide the needed width for construction (including placement of the synthetic lining materials), access around the west side of the landfill during operation, and for storm water management of precipitation run-on from the eastern slopes of the mountains and runoff from the west slopes for the closure cap. A 2H:1V slope will be provided for the west inside slope along the western boundary of the landfill area.

6.4 Lining System

A composite liner system is proposed for the landfill cell disposal area consisting of a Geosynthetic Clay Liner (GCL) overlain by a 60-mil HDPE geomembrane liner. The GCL is proposed in place of two feet of compacted clay liner (CCL) with permeability no more than 1×10^{-7} cm/sec.

An extra GCL and 60-mil HDPE geomembrane are proposed for placement in the sump areas directly above the GCL and HDPE geomembrane placed across the rest of the cell area. This extra GCL and geomembrane provides added protection against leakage in the sump areas. Geosynthetic materials placed on the interior

slopes of the cell will consist of needle punch (or equivalently reinforced) GCL and textured geomembrane. Geosynthetic materials placed across the cell floor may be non-reinforced GCL's and smooth geomembrane.

6.4.1 Geosynthetic Clay Liner (GCL)

Hydraulic equivalency calculations were completed to provide a comparison between the performance of a GCL compared to two feet of a compacted clay liner (CCL). Permeability testing for the GCL materials was also completed using ground water obtained from a piezometer at the site and using permeant generated from leaching water through soils obtained from various locations of the site.

6.4.2 GCL Hydraulic Equivalency

Equivalency calculations were completed using comparisons between the permeability values and bentonite thickness data for the GCL as compared to two feet of CCL with a permeability of 1×10^{-7} cm/sec. Procedures used for this evaluation are based on a technical paper published by R.M. Koerner entitled "Technical Equivalency Assessment of GCL's to CCL's." Table 6.4 provides a comparative tabulation of required permeability and hydrated thickness values required for the GCL materials to show equivalency with two feet of CCL at a permeability of 1×10^{-7} cm/sec. GCL materials used for construction should be tested and certified to demonstrate a combination of thickness and permeability characteristics presented in the table.

An equivalency evaluation was also made using the Hydrologic Evaluation of Landfill Performance (HELP) computer model developed by the U.S. Environmental Protection Agency. Results from the HELP model show a leakage rate through the bottom lining system of 0.375 cubic feet per year using CCL material meeting minimum regulatory requirements and 0.169 cubic feet per year using a GCL of equivalent hydraulic characteristics to the CCL material.

TABLE 6.4
COMPARATIVE VALUES FOR GCL'S
FOR HYDRAULIC EQUIVALENCY WITH CCL'S

| PERMEABILITY (CM/SEC) | THICKNESS | | |
|--------------------------|-----------|------|----------|
| | (MM) | (CM) | (INCHES) |
| 1.9x10 ⁻⁹ | 4.0 | 0.40 | 0.157 |
| 2.4x10 ⁻⁹ | 5.0 | 0.50 | 0.197 |
| 2.9x10 ⁻⁹ | 6.0 | 0.60 | 0.236 |
| 3.4x10 ⁻⁹ | 7.0 | 0.70 | 0.276 |
| 3.8x10 ⁻⁹ | 8.0 | 0.80 | 0.315 |
| 4.3x10 ⁻⁹ | 9.0 | 0.90 | 0.354 |
| 4.8x10 ⁻⁹ | 10.0 | 1.00 | 0.394 |
| 5.2x10 ⁻⁹ | 11.0 | 1.10 | 0.433 |
| 5.7x10 ⁻⁹ | 12.0 | 1.20 | 0.472 |
| 6.1x10 ⁻⁹ | 13.0 | 1.30 | 0.512 |
| 6.6x10 ⁻⁹ | 14.0 | 1.40 | 0.551 |

6.4.3 GCL Groundwater and Leachate Compatibility

Compatibility tests were conducted by an independent laboratory for CETCO (a manufacturer and supplier of GCL materials) and by AGECE using ground water obtained from below the site and using leachate generated using soils obtained from the site. The compatibility tests were conducted to determine if the sodium content in the ground water and in the soils to be used for construction will reduce the integrity of the GCL.

Leachate generated from soils obtained at the site was used to conduct a 30-day permeability test by the independent laboratory for CETCO. The test results show a permeability of about 5×10^{-10} cm/sec.

Tests were also conducted by AGECE to determine the compatibility of GCL materials with the groundwater at the site and with soils that will potentially be used for construction. Atterberg limits were first obtained to determine the plasticity of the bentonite material obtained from GCL samples of two suppliers. Atterberg limits were determined using distilled water, a sample of groundwater obtained from a piezometer at the site, and from leachate water obtained from four soil samples at the site. A permeability test was then conducted on the GCL material that appeared to be impacted the most by the groundwater and water leachates and using leachate from the soil sample showing the greatest impact on the GCL material. This was done to obtain worst case results from the available material and water samples. Leachate from AGECE's soil sample A had the greatest impact on the Atterberg limits. A permeability of 1.5×10^{-9} cm/sec. was obtained from the permeability test conducted which is a better value than the values listed in the table. This is also a lower value than the GCL permeability specification of 5×10^{-9} cm/sec published by the two suppliers. Test results are provided in the AGECE (2004) geotechnical investigation report included as Appendix 6.2.

6.4.4 HDPE Geomembrane Liner

HDPE geomembrane is proposed for use as the synthetic liner system above the geosynthetic clay liner. The floor area will consist of 60-mil smooth HDPE geomembrane and the interior slopes and phase division berms inside the landfill area will consist of 60-mil textured HDPE geomembrane to increase slope stability for materials placed on the side slopes above the HDPE geomembrane.

6.5 Leachate Collection and Removal System (LCRS)

A leachate collection and removal system (LCRS) will be constructed consisting of geonet placed directly over the HDPE geomembrane liner system overlain by non-woven geotextile filter fabric. Perforated leachate conveyance pipes will be placed in the valley areas formed by the planar surfaces of the floor area. These leachate

conveyance pipes will collect and convey leachate from the cell floor to the sumps for removal. EPA's computer HELP model was used to obtain leachate quantities for design of the LCRS.

6.5.1 HELP Model

EPA's Hydrologic Evaluation of Landfill Performance (HELP) model is a quasi-two-dimensional hydrologic computer model used for conducting water balance analyses of landfills, cover systems and other solid waste containment systems. The model accepts weather, soil and design data, and uses solution techniques that account for the effects of surface storage, snowmelt, runoff, infiltration, evapotranspiration, vegetative growth, soil moisture storage, lateral subsurface drainage, leachate recirculation, unsaturated vertical drainage, and leakage through soil, geomembrane and/or composite liners.

Climatologic data (precipitation, evaporation, solar radiation, and temperatures) for the modeling effort were obtained from default data contained within the HELP model software corresponding to the Salt Lake area. Climate data used were compared with average temperature and precipitation data reported for Dugway and the Saltair Salt Plant in the Western Regional Climate Center database. In general, the comparison of data showed the model generated data to be slightly conservative, but compared closely with data from Dugway and the Saltair Salt Plant. This result is a conservative, but reasonable, projection of leachate rates for design of the LCRS.

Six layers were defined in the help model corresponding to municipal waste material, soil cover, non-woven geotextile, geonet, HDPE geomembrane and GCL to represent the open cell area. An additional three layers were added above the waste consisting of HDPE geomembrane, soil cover material, and the erosion protective layer to represent closed portions of the landfill. Model default data were used to

define the physical properties of the individual design layers. Leachate quantities were generated for the landfill assuming no waste, and waste thicknesses of 10 feet, 50 feet, 100 feet, and 200 feet to simulate various stages of landfill operation. Table 6.5 provides the leachate quantity values generated by the HELP model that were used for LCRS design.

**TABLE 6.5
HELP MODEL GENERATED LEACHATE RATES**

| WASTE HEIGHT (FEET) | PEAK DAILY LEACHATE | | ANNUAL AVERAGE LEACHATE | |
|---------------------|---------------------|-------------|-------------------------|-------------|
| | (INCH) | (GAL./ACRE) | (INCHES) | (GAL./ACRE) |
| No waste | 0.139 | 3,774 | 1.613 | 43,797 |
| 10 | 0.215 | 5,838 | 2.702 | 73,366 |
| 50 | 0.209 | 5,675 | 2.702 | 73,366 |
| 100 | 0.242 | 6,571 | 2.702 | 73,366 |
| 200 | 0.222 | 6,028 | 2.702 | 73,366 |

6.5.2 Geonet

Geonet will be placed on the planar surfaces of the cell floor to collect and convey leachate from the floor area to leachate conveyance pipes that convey the leachate to the sumps for removal. The peak daily leachate rate of 0.242 inches was used to determine the required geonet capacity. Designing the geonet assuming a one-foot wide section of geonet extending from the leachate conveyance pipe to the upper end of the widest planar surface will provide the longest flow path and a typical design that can be applied to all areas of the floor.

The longest flow path in the geonet is between 130 and 140 linear feet which is the floor surface adjacent to the leachate conveyance pipe extending west of the center of the sumps. Using the 140 feet of flow path length and a one-foot width gives a

leachate area of 140 square feet. Applying the leachate rate of 0.242 inch to the leachate area gives a project leachate flow through the geonet of 2.82 ft³/ft-day.

Designing with Geosynthetics, by Robert Koerner, suggests several safety factors that will be applied to the leachate rate to obtain a design capacity for the geonet. These safety factors include: a safety factor for intrusion of adjacent geosynthetics into the geonet ($SF_{in}=1.5$); a safety for creep deformation of the geonet ($SF_{cr}=1.5$); and a safety factor for biological and chemical clogging ($SF_{bcc}=2.0$). Koerner also recommends a safety factor for the design-by-function concept ($SF_{in}=1.5$) to be included as an additional safety factor to obtain a resulting safety factor ($SF_{res} = 1.5 \times 1.5 \times 2.0 \times 1.5 = 6.75$) to be used for design of the geonet. Applying this resulting safety factor to the leachate rate gives a design leachate rate of 19.03 ft³/ft-day. A required geonet transmissivity of 1.023×10^{-3} m²/sec was obtained using the design leachate rate.

The overburden loading, hydraulic gradient, and the boundary conditions for the geonet have a large influence on the transmissivity. Estimated overburden loadings vary from about 2,500 pounds per square foot (psf) above the sump to about 10,000 psf at the break line of the closure cap from the 4H:1V slopes to the 5% slope, to about 20,000 psf along portions of the west side of the closure cap. There is a variety of manufacturers, thickness, and types of geonets with different structural and transmissivity characteristics. Geonets installed as part of the LCRS should be tested prior to installation and laboratory results should be provided by manufactures to demonstrate that transmissivity values are equal to or greater than 1.023×10^{-3} m²/sec at the estimated loading, boundary, and hydraulic gradient conditions for each construction phase of the landfill.

6.5.3 Geotextile Filter Fabric

Criteria published in the *Geotextile Engineering Manual* by the U.S. Department of Transportation and in *Designing with Geosynthetics* by Robert M. Koerner were used to determine geotextile filter fabric design for filtering on-site soils from the LCRS. Gradation properties used for the calculations were obtained from Kleinfelder's geotechnical report of the site. A filter material consisting of non-woven geotextile filter fabric will be placed above the LCRS and around the leachate conveyance piping on the cell floor to provide a filter layer between the soil cover material and the LCRS. Physical properties required for the geotextiles are summarized in Table 6.6. Physical properties provided in Table 6.5 are available typically with 8 oz. and 10 oz. non-woven geotextiles.

**TABLE 6.6
REQUIRED PROPERTIES FOR GEOTEXTILE FILTER FABRIC**

| PROPERTY | STANDARD |
|-----------------------|--|
| Equivalent Opening | ≤0.2 mm (#80 Sieve) |
| Permeability | ≥10 ⁻² cm/sec |
| Grab Tensile Strength | ≥200 lbs. (up to 200 feet of waste pile, 16,700 pcf) ≥246 lbs. (up to 250 feet of waste pile, 20,000 pcf) |
| Burst Strength | ≥350 psi |

6.5.4 Leachate Conveyance Pipes

Leachate conveyance pipes are designed along the valleys of the cell floor that are formed by the intersection of the planar surfaces on the floor. These leachate collection pipes receive leachate from the geonet component of the leachate collection system and convey the leachate to the sumps for removal.

A maximum leachate rate to the pipes was determined using the maximum width of floor area where leachate will be collected in the geonet and conveyed to the pipes. The maximum width is 280 feet consisting of 140 feet to the north and 140 to the

south of the center pipe which extends to the west from the center of each sump. Using the design leachate rate of 0.242 inch/day applied over an area of 280 ft² gives a rate of leachate entering the conveyance pipes of 0.029 gpm per foot of pipe length.

Eighty percent of the maximum flow capacity was assumed for the actual capacity of the pipes calculated using Manning's equation and a Manning n roughness value of 0.016. Flow capacity in an 8-inch diameter pipe is 127 gpm which is sufficient capacity to receive leachate for up to 4,400 feet of pipe length. Flow capacity in a 6-inch diameter pipe is 59 gpm which is sufficient capacity to receive leachate for up to 2,000 feet of pipe length. Therefore, for each cell phase or leachate management area, 6-inch diameter or larger perforated pipe can be used for the western most 2,000 feet of pipe length. None of the cell phases has a length greater than 4,400 feet, therefore, 8-inch diameter or larger perforated pipe may be used to extend from the sumps to the east end of the 6-inch diameter (or larger) pipes.

6.5.5 Landfill Leachate Withdrawal Pipes

Leachate withdrawal pipes were evaluated for wall crushing, wall buckling, and ring deflection using procedures published in *Design and Engineering Guide for Polyethylene Piping* by Rinker Materials and *Plexco/Spirolite Engineering Manual 2. System Design*, by Chevron Chemical Co. Overburden loadings were determined based on the loading over the low point (sump) of the leachate management phases of the landfill. The leachate withdrawal pipes with a Standard Dimension Ratio (SDR) of 15.5 provide sufficient strength to resist wall crushing, wall buckling, and will not experience excessive ring deflection.

6.5.6 Leachate Ponds

Leachate will generally be contained and managed within the landfill and pumped from closed phases or phases nearing closure to phases where capacity is provided for containment of leachate. When the distance is too great for leachate to be moved

from closed phases to open phases of the landfill, double lined leachate ponds will be constructed. Leachate can be contained and evaporated or stored for re-circulation, compaction or dust control in the landfill.

The proposed leachate pond has top dimensions of 100 feet square, 3H:1V side slopes, and is approximately 10 feet deep. This provides a storage capacity of 351,300 gallons (1.08 acre-feet) with one-foot of freeboard and a total capacity of 433,800 gallons (1.33 acre-feet) to the top. Results from the HELP model predict a peak day leachate volume from a closed cell of 225 gallons per acre. Based on predicted peak-day leachate volumes generated by the HELP model for a closed cell, each pond has capacity to contain leachate from 1,560 acres and maintain one-foot of freeboard.

Leachate pond lining systems will include a composite secondary (bottom) lining system constructed of GCL overlain by a 60-mil HDPE geomembrane. A leak detection and removal system consisting of a geonet, a sump, and a leachate withdrawal pipe will be placed above the secondary lining system. A primary (upper) lining system consisting of 60-mil HDPE geomembrane will be placed above the leak detection system above which the leachate will be stored.

6.6 Runoff Containment

Precipitation runoff that has been in contact with the waste material in open areas of the landfill will be contained and managed within the landfill. Containment areas will be formed on waste surfaces and/or by maintaining waste set-back areas where runoff water will be contained between phase berms and the waste material. Sufficient capacity will be maintained in these areas to contain runoff from the 25-year 24-hour precipitation event as required by the regulations. Runoff from areas with final or interim cover will be directed off of the landfill and into stormwater collection ponds (see Section 9).

The required containment capacity is determined by obtaining a precipitation runoff depth using the SCS curve number methodology and applying that runoff depth to the open area of the landfill. A 25-year 24-hour precipitation depth of 2.06 inches was obtained from NOAA Atlas 14. A curve number of 82 was selected to represent conditions within the landfill representative of the daily soil cover material using on-site soils. On site soils are within the hydrologic soil group "type B" soils. Surface conditions were assumed to represent that of a dirt road (including right-of-way) provided in table 2-2a of U.S. Department of Agriculture Technical Release 55. A curve number of 82 should be representative, but slightly conservative, since daily cover materials are typically placed with dozers and landfill compactors that provide individual depressions across the surface that increases interception storage.

Calculations show a required runoff containment capacity of 0.06 acre foot (2,613 cf) per acre of open cell area. Therefore, for the first phase of construction the containment capacity for approximately 20 acres is 1.2 acre-feet (52,272 cf). This containment capacity may be provided in a number of ways including:

1. Maintaining a waste set-back from the inside slope of the cell;
2. Creating a pond area on the waste surface;
3. Maintaining ditches between the waste and the interior slope of the cells;
4. Providing separate lined runoff containment storage areas outside the landfill operating area;
5. A combination of the above or any other method that will provide the required containment capacity.

We recommend that facility operators provide a minimum freeboard of two feet within the containment areas. Runoff water collected in the containment areas may be re-circulated in the landfill by using the water for dust control and compaction.

6.7 Ground Water Monitoring Wells

Monitoring wells are planned along the eastern side of the landfill to monitor ground water quality during the operational life and closure/post closure period of the landfill. Currently, eighteen monitoring wells are planned consisting of eleven monitoring wells down-gradient from each of the eleven sumps and seven monitoring wells on the range front up-gradient. One monitoring well up-gradient from the Phase 1 area and the monitoring wells down-gradient from Phases 1 and 2 have been installed. The up gradient well that was installed did not reach groundwater, and has been deemed inadequate for groundwater monitoring. Locations of the two down gradient wells, as well as the proposed wells, can be seen on Figures 3.4-3.8. Updated information on the groundwater monitoring at the site can be found in Appendix 4.7 Ground Water Sampling and Analysis Plan.

Monitoring well locations were selected to provide approximately 950 feet of spacing between the wells to allow for ground water monitoring within 475 feet of any point along a line parallel to the cell embankment and liner system. The monitoring wells are also located approximately 75 feet away from the bottom exterior toe of the cell embankment to allow for construction, maintenance and other equipment to access the embankment and slopes without risking potential damage to the monitoring wells.

6.8 Geotechnical Investigation

Applied Geotechnical Engineering Consultants (AGEC 2004) completed a geotechnical investigation for the initial design. The complete geotechnical investigation report is provided in Appendix 6.2. Conclusions presented in the report indicate:

1. The natural soil and bedrock at the site are suitable for support of the proposed landfill disposal facility.

2. Exterior slopes of 3H:1V and interior cut and fill slopes of 2H:1V may be used for the base of the landfill facility.
3. The natural soil is suitable to use in construction of the proposed embankment.
4. A geosynthetic clay liner (GCL) will provide appropriate stability along with the other synthetic materials for the interior of the landfill.
5. Permeability tests conducted on the GCL, using worst case conditions from GCL and permeant samples obtained and generated, resulted in a permeability of 1.5×10^{-9} cm/sec.
6. The subsurface soil investigated under the landfill area during the study by AGECE (2004) and from information presented by Kleinfelder (2004) was found to not be susceptible to liquefaction at an acceleration with a 5% probability of exceedance within 50 years.

7.0 FACILITY MODIFICATIONS (VECTOR)

Two modifications have been approved by the UDSHW since the 2009 permit revision was submitted:

1. Increasing the maximum landfill elevation by approximately 100 feet, and
2. Adding a Class VI cell within the existing landfill property for construction and demolition (C&D) disposal.

This section summarizes the modifications and presents the results of engineering analyses performed to support the modifications. The complete design report is included as Appendix 7.1, *Permit Modification for the Wasatch Regional Landfill, Tooele, Utah* (Vector 2009).

7.1 Vertical Expansion

The currently permitted maximum elevation of the WRL will be increased approximately 100 feet across the landfill footprint. This height increase will raise the maximum landfill elevation to approximately 4,620 feet. No associated horizontal expansion is proposed.

7.1.1 Configuration

The final waste grading plan is shown on Figure 7.1. Typical sections are shown on Figure 7.2. The drainage benches will be built into the final cover as shown in Figure 7.5. These modifications increased the landfill airspace from 160 million cubic yards to 223.2 million cubic yards.

The stability of the proposed configuration was analyzed using site specific soils and geosynthetic data obtained as part of project-specific laboratory testing programs performed for the last three expansions at the site. The methodology and results are also presented in Appendix 7.1, Attachment 1, *Waste Fill Stability Evaluation of the Wasatch Regional Landfill, Utah* (Vector 2008). The results of the stability

analyses indicate that for static conditions the proposed landfill design is stable using the current liner system ($FS = 1.7$). The factor of safety for the pseudo-static condition was below 1.0 so a displacement analysis was performed. This analysis indicates displacements less than 1 inch for both liner options, which is also within acceptable industry standards for displacement during a seismic event. The static and seismic stability analysis and displacement analysis are discussed in detail in Appendix 7.1 Attachment 1.

An infinite slope analysis was performed to check the stability of the final cover. Results and methods of this analysis are presented in detail in Appendix 7.1 Attachment 1. The results of the analysis indicate the static factor of safety between 2.8 and 3.0 and pseudo-static factors of safety between 1.7 and 1.8.

7.1.2 Liner

The slope stability analyses performed were based on the current liner configuration. Based on the results of the stability analyses, the proposed landfill height increase will result in no changes to the liner system for the landfill.

7.1.3 Leachate Collection and Removal System

The proposed modification will require no changes to the leachate collection and removal system (LCRS) for the landfill.

7.1.4 Stormwater Control

The proposed modification will result in no changes to the overall drainage area or site hydrology. The existing stormwater control facilities and drainage flow patterns will, at a conceptual level, remain the same. Detailed design for the drainage control facilities will be conducted as build-out of the landfill progresses taking into account the revised final configuration of the landfill.

7.1.5 Monitoring Facilities

The proposed modification will result in no changes to the existing monitoring facilities.

7.2 Class VI Cell

A new, hydraulically-separated cell will be constructed adjacent to the existing landfill for the disposal of construction and demolition material. The cell has been permitted as a Class VI cell in accordance with the State of Utah Solid Waste Permitting and Management Rules R315-301-2(12). The Class VI cell is adjacent to the existing landfill and thus the site characteristics associated with the new cell are consistent with those for the landfill.

7.2.1 Configuration

The Class VI cell bottom grading plan is shown on Figure 7.3. The sideslopes will be graded at 2H:1V and the bottom will be graded flat. The maximum depth of the excavation will be approximately 34 feet. The final grading plan is shown on Figure 7.4. The maximum height of the fill will be approximately 100 feet, with 3H:1V slopes and no intermediate benches and a top deck slope of 5%. The cell will have a footprint area of approximately 488,000 square feet (11.2 acres) and an estimated gross capacity of 780,000 cubic yards. A 30 foot wide perimeter road will be designed around the Class VI cell and between the Class VI cell and the existing Class V landfill.

7.2.2 Liner

The Class VI cell will be unlined.

7.2.3 Leachate Collection and Removal System

The Class VI cell will not have a leachate collection and removal system.

7.2.4 Stormwater Control

Drainage and collection structures for surface runoff will be designed to contain a 25-year storm. The design will also include elements to prevent surface water runoff from a 25-year storm.

7.2.5 Final Cover

The Class VI cell will use the evapotranspirative final cover described in the report entitled *Evapotranspirative (ET) Final Cover Permitting Report for the Wasatch Regional Landfill*, Vector Engineering, June 2004, included as Appendix 7.2.

8.0 LANDFILL CLOSURE DESIGN

This section presents the general layout and design concept for the landfill closure system and also presents more specific information regarding stability of the closure system. Storm water management and erosion protection are presented in detail in Section 10. Reference should be made to the design drawings in Appendix 6.1, geotechnical report (AGEC 2004) in Appendix 6.2, calculations provided in Appendices 6.3 Landfill Design Calculations, and Section 10 Stormwater Design Calculations throughout this section.

8.1 General Layout and Design

The final waste mound with the overlying daily cover material provides the subgrade to the closure cap system. A final cover system consisting of an evapotranspirative cover described in Section 11 will be used. A discussion of the erosion protection measures is provided in Section 10. The final landfill configuration can be seen on Figure 2.5.

8.1.1 Closure slopes

Waste mounding and the overlying closure cap extends up on a 4H:1V slope from the top of the embankments around the perimeter of the landfill area. The waste mound extends up from the top inside edges of the embankments, and the two and a half feet of cover will be placed above this waste mound. Intermediate benches (24-foot wide) will be built into the 4H:1V final cover slopes to provide for intermediate storm water collection and conveyance necessary for erosion protection on the slopes. A detail of these benches is presented in Figure 7.5. The waste mound rises to an elevation of 4620, or a maximum of 354 feet (with the closure cover an elevation of 4622.5 feet or a maximum of 357.5 feet) above the valleys of the east embankment, which are at an elevation of 4266 feet. The waste mound and closure cap then break grade to a five percent slope extending toward the west.

The north, south, and west slopes extend upward on 4H:1V slopes from the top of the embankments to intersect with the top surface as it extends west on the five percent slope. Intermediate benches are also placed in the 4H:1V slopes where slopes are of sufficient length that the intermediate benches are required for erosion protection.

8.2 Storm Water Management

The storm water management system consists of a 5 percent slope at the top of the landfill that directs precipitation runoff from the top surface of the closure cap toward the east. Runoff water is then collected and directed to storm water down drains (or downspouts) consisting of inlet boxes and parallel 24-inch diameter pipes. The downspouts convey the stormwater from the top of the closure cap to the exterior toe of the embankment where a drainage channel, connecting storm drainage pipes, or a combination of drainage channel and storm drainage pipes will convey the runoff to the storm water basin.

Intermediate benches are located on the 4H:1V perimeter slopes of the closure cap primarily to shorten the length of the 4H:1V slopes for erosion control purposes. These intermediated benches also provide storm water conveyance ditches that convey storm water runoff collected in the ditches to inlet boxes and to 15-inch diameter downspout pipes located at low points along the benches. Storm water is then conveyed to the exterior toe of the embankment slopes and conveyed to the storm water pond in the storm drainage channels and pipes provided for drainage from the top of the closure cap.

The storm water management system associated with the closure cap is designed for the 100-year 24-hour precipitation event. Design of the storm water management system, including the hydrology, hydraulic design of the downspout

pipes and erosion control associated with the closure cap is presented in detail in Section 10.

8.3 Stability

A stability study for the current design was conducted by Vector in 2008. This study encompassed the additional height and the ET cover. This analysis indicates that the closed landfill will meet regulated stability requirements. Details of this report can be found in Appendix 7.1, Attachment 1, *Waste Fill Stability Evaluation of the Wasatch Regional Landfill, Utah*, Vector Engineering, July 2008.

9.0 STORM WATER MANAGEMENT (HANSEN ALLEN & LUCE)

Channels will be constructed to manage storm water from the Lakeside Mountains west of the facility. Berms on the closure cap will convey storm water to downspouts that will take the water off the landfill closure cap. A hydrologic analysis was completed in order to determine peak flow rates to use for the design of the channels, downspouts and erosion control.

9.1 Hydrology

Hydrologic calculations were completed for the tributary area to the landfill and the closure cap to determine peak runoff for the design. The SCS (Soil Conservation Service) curve number methodology was used in conjunction with the Army Corps of Engineers HEC-1 hydrology computer model to predict peak flows from the closure cap. The methodology for predicting peak flows requires a delineation of the sub-basins generating runoff, determination of a curve number to be used, a precipitation rate, a storm distribution, and a calculation of the time of concentration and lag time.

9.1.1 Off-Site Run-On Storm Water

Storm water that originates from outside the landfill facility will need to be diverted in order to prevent water from entering the facility or from eroding the closure cap.

Methodology

Storm drainage channels extending to the north and to the south will collect and direct storm flows from the Lakeside Mountains around the landfill facility. Tributary areas to these channels were delineated based on USGS topographical maps. The tributary areas were then divided into sub-basins as shown in Figure 9.1 in order to allow for a progressive design instead of designing the entire channel for the entire flow from all combined sub-basins.

Curve numbers were determined based on the hydrologic soil type and soil vegetation cover as shown. The hydrologic soil type is a general indication of the soil's infiltration capacity. Soils are assigned a hydrologic type of A, B, C, or D by the Natural Resource Conservation Service (NRCS). Soils of hydrologic soil type A have the highest infiltration rate, and therefore produce the least amount of runoff. Soils of hydrologic soil type D have the lowest infiltration rate, and therefore produce the highest amount of runoff. Most of the soils within the tributary area are hydrologic soil type D with some type B soils. The soil vegetation cover and conditions were assumed based on information given in the NRCS study "Soil Survey of Tooele Area, Utah" and verified by a field visit on October 26, 2004. The cover conditions were combined with the hydrologic soil type to produce a curve number based on Table 2-2d of Technical Release 55. Because some sub-basins contained several different soil types and covers, an area-weighted curve number was applied to each sub-basin.

The lag times (T_L), defined as the time to the hydrograph peak, were calculated by using the time of concentration (T_C) and the equation $T_L = 0.6T_C$. The time of concentration (the time it takes for runoff to travel to a point of interest from the hydraulically most distant point) was calculated using the criteria found in Worksheet 3 in TR-55 "Urban Hydrology of Small Watersheds".

The SCS Type II Distribution was used to model a 24-hour 100-year storm. Part 258 of the Code of Federal Regulations Title 40 Chapter 1 entitled "Criteria for Municipal Solid Waste Landfills" states that the landfill must contain "a run-on control system to prevent flow onto the active portion of the landfill during the peak discharge from a 25-year storm". Although the requirement is only a 25-year storm, a 100-year storm event was used in order to provide a more capable design that will provide better storm water management and protection of the landfill and its closure cap. The SCS Type II Distributions shown in Figure 9.2. The rainfall

amount was taken for the higher elevations associated with the east slopes of the Lakeside mountains from the "Point Precipitation Frequency Estimates from NOAA Atlas 4k". The value for a 100 year - 24 hour event was 2.61 inches.

The magnitude of the area tributary to the landfill site is large enough to warrant the use of a reduction of the precipitation values because the likelihood of the full amount hitting the whole region decreases with an increase of tributary area. The factor was based on the Salt Lake City Hydrology Manual. According to the manual, a 24-hour event has an Areal Reduction Factor of:

$$ARF = 0.01 * (100 - 2 * \text{Area}^{0.46}) \text{ where the Area} = 3.68 \text{ mi}^2$$

$$ARF = 0.96$$

This reduction factor was applied to each sub-basin's precipitation value.

9.1.2 Peak Design Flows

Hydrologic calculations presented above were used to generate peak design flows for each of the sub-basins and at various confluence points along the channels. Peak design flows are provided on Figure 9.3.

9.2 On-Site Run-Off Storm Water

Storm water will be conveyed off the landfill facility in order to protect the integrity of the closure cap.

9.2.1 Methodology

Delineation of the sub-basins, shown in Figure 9.4, was based on the cell closure cap design. Each basin will drain into a channel which will convey the runoff to a down spout.

A curve number was determined based on the hydrologic soil type, Type B, found at the facility because native soils are going to be used for cover. The cover type was assumed to be similar to a dirt road. The cover conditions were combined with the hydrologic soil type to produce a curve number based on Table 2-2a of Technical Release 55. A curve number of 82 was applied to all on-site sub-basins.

The lag times, defined as the time to the hydrograph peak, were calculated by using the time of concentration and the equation $I = 0.6Th$. The time of concentration was calculated using the criteria found in Worksheet 3 in TR-55 "*Urban Hydrology of Small Watersheds*".

The SCS Type II Distribution was used with the 100-year 24-hour storm. The rainfall amount was taken from the "Point Precipitation Frequency Estimates from NOAA Atlas 14" associated with the facility elevation which is lower than the elevation used for the precipitation amount from the Lakeside Mountains. The value for a 100 year - 24 hour event for the facility is 2.52 inches.

9.2.2 Peak Design Flows

The hydrologic analysis presented above was used to generate peak design flows for each of the sub-basins for the closure cap and for the downspout piping located at points along the east side of the closure cap as shown in Figure 9.5.

9.3 Hydraulic Design of Channels

The design peak flows for the channel segments provided in Table 9.1 were used to design the drainage channels. The channels were designed with a 2.5H:1V side slope using the slope of the mountainside for the western side of the channel away from the closure cap) and a 4H:1V slope resulting from the closure cap slope.

A drainage channel with a bottom width of 15 feet will be constructed along the western perimeter of the closure cap to collect and convey storm water around the facility. Because the channel slopes vary from 0.25% to 15% and the flows vary from 86 cfs to 521 cfs, the depth requirement and riprap design will vary along the channel reaches. Riprap D₅₀ requirements for each segment are summarized in Table 9.1. The minimum depth requirements include 1 foot of freeboard.

The landfill cells will be opened up gradually from the east to the west, therefore, construction of the drainage channels will not be required until landfill construction extends to the Lakeside Mountains forming the west side of the landfill. Temporary run-on diversion berms will be constructed along the west side of constructed portions of the landfill until the landfill area ties into the Lakeside Mountains and construction of the drainage channels becomes necessary. These berms will prevent run-on water from the Lakeside Mountains and the west area of the facility from entering open landfill areas.

**TABLE 9.1
RIPRAP DESIGN**

| CHANNEL SEGMENT | SLOPE | PEAK DESIGN FLOW | RIP RAP D ₅₀ SIZE | | MIN DEPTH |
|-----------------|--------|------------------|------------------------------|------|-----------|
| | | | (CFS) | (FT) | |
| Channel 1-A | 0.25% | 303 | 0.33 | 4 | 4.2 |
| Channel 1-B | 1.00% | 303 | 1.0 | 12 | 4.0 |
| Channel 1-C | 5.00% | 368 | 2.5 | 30 | 4.0 |
| Channel 1-D | 2.00% | 368 | 1.75 | 21 | 4.2 |
| Channel 1-E | 0.25% | 379 | 0.33 | 4 | 4.7 |
| Channel 1-F | 5.00% | 551 | 2.75 | 33 | 4.8 |
| Channel 1-G | 1.00% | 551 | 1.17 | 14 | 5.2 |
| Channel 2-A | 0.25% | 63 | 0.25 | 3 | 2.5 |
| Channel 2-B | 2.00% | 86 | 1.0 | 12 | 2.6 |
| Channel 2-C | 5.00% | 86 | 1.75 | 21 | 2.5 |
| Channel 2-D | 15.00% | 86 | 2.5 | 30 | 2.4 |
| Channel 2-E | 1.50% | 86 | 0.75 | 9 | 2.6 |

9.4 Downspout Design

Hydrologic calculations presented above were used to generate the combined peak design flows. To maintain consistency in design and construction, the highest combined peak flows were used for design of the downspouts. Design is based on a combined peak flow of 12 cfs from the benches along the south 4H:1V slopes of the cap, 43 cfs from each drainage area on top of the cap, and 6 cfs for the benches along the eastern 4H:1V slopes.

Downspout pipe sizes were determined using inlet control conditions and selecting the size and head water depth requirement from "Hydraulic Charts for the Selection of Highway Culverts" published by the U.S. Department of Transportation. Inlet control conditions were assumed because critical flow will always exist in the piping on the 4H:1V slopes and the elevation differences between the inlet and outlet ends of the downspout pipes will not allow for outlet conditions to control.

Downspout pipe sizes and head water depth requirements for the south benches, top of cap and eastern benches are:

- South benches require 24-inch diameter pipe with 2 feet of headwater depth;
- Downspout pipes from the top of the cap require two 24-inch diameter pipes in parallel with 3 feet of headwater depth;
- East benches require 15-inch diameter pipe with 2 feet of headwater depth.

The headwater depth requirements are provided with the inlet boxes below the grating with the additional depth and freeboard provided by the grating and the ditches and berm heights above the grating.

9.5 Erosion Protection

Long term options to provide erosion protection generally consist of establishing

vegetation, or by placing stone mulch, or a combination of both. Procedures presented in "Erosion and Sedimentation in Utah - A Guide for Control" published by the Utah Water Research Laboratory were used to determine requirements for vegetative and stone mulch erosion control measures. Calculations show that the density of the vegetative cover should be 93 percent and the minimum thickness of the stone mulch is 3 inches. Stone mulch generally consists of a well graded stone or gravel with the largest size being approximately equal to the required stone mulch thickness.

9.6 Detention

All stormwater will be routed into the borrow excavation area of the property directly east of the landfill site that will also be used for storm water management. The off-site runoff will continue in open channels and pipes (primarily under facility roads and for the inlet to the detention area) to the detention area. Flow from the downspout pipes will either continue to be conveyed to the detention area in pipes, open channels, or a combination of both. Upon completion, this excavation will be approximately 20 feet deep or more with a surface area of approximately 600 acres. A 24-inch diameter storm drain pipe will be placed under the railroad and road at the eastern end of the excavation with an inlet flow line elevation of 4220 to provide an outlet for storm water from the detention basin. Using the Army Corps of Engineers HEC-I model to simulate routing of storm water through the basin shows a maximum headwater depth on the storm drainage pipe of about 3 feet. This headwater depth will be temporary as the outlet to the basin will allow the ponded water to drain and empty the basin to the flow line elevation of the outlet.

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10.0 EVAPOTRANSPIRATIVE FINAL COVER (VECTOR)

The WRL is permitted for the use of an engineered monolithic evapotranspirative (ET) cover as an alternative to the prescriptive low-permeability barrier cover for final closure of the WRL.

This report summarizes the engineering analyses performed in support of permitting an ET cover for closure at the WRL. The analyses included modeling the water balance of four ET cover sections; (1) a 2-foot thick monolithic ET cover, (2) a 2.5-foot thick monolithic ET cover, (3) a 3-foot thick monolithic ET cover, and (4) a 4-foot thick monolithic ET cover. In addition, water balance modeling was performed for the previously proposed geomembrane barrier cover (Hansen, 2004) as well as the prescriptive cover described in Utah State Regulations R315-303-3(4)(a) for comparison purposes. Detailed closure design and analyses will be completed prior to final closure. The entire design report pertaining to the ET cover is included in Appendix 10.1, *Evapotranspirative (ET) Final Cover Permitting Report for the Wasatch Regional Landfill (Vector 2006)*.

10.1 Equivalency Criteria

The WRL proposed, and has been approved for the use of an ET cover. An alternative final cover is permissible under Federal and Utah regulations, R315-303-3 (4)(b), provided equivalent or better performance can be demonstrated with respect to percolation through the cover and wind and water erosion. Based on previous ET cover reports in the State of Utah (SCS Engineers, 2005), the equivalency criteria set forth by the Utah Department of Environmental Quality (UDEQ) is 3 mm/yr of cumulative percolation.

10.2 Site Investigations and Soils Testing

Previous geotechnical investigations for the WRL were conducted by AGECE (2004), (2005) and Kleinfelder (2004). Results of previous investigations indicate that

materials from the potential borrow area consist of soils that will be suitable for an ET cover.

The borrow investigation conducted by Vector consisted of logging and sampling four soils from test pits in the proposed borrow area. The final cover options considered were a standard prescriptive cover, an alternative geomembrane cover, and the alternative ET cover.

10.3 Cover Performance Comparison

Alternative ET covers are designed to meet equivalent performance with respect to estimated percolation (i.e., drainage into the waste) of a prescribed (barrier) cover for a particular application and region. The estimated annual percolation of a prescriptive barrier cover at the WRL was 83.35 mm based on HELP model simulations. However, in previous ET cover reports, the UDEQ established an equivalency criterion of 3 mm/yr of cumulative percolation. Water balance simulations using UNSAT-H resulted in less than 3 mm/yr of percolation with a 2.5-foot thick ET cover comprised of Soil No. 2 and a 4-foot thick ET cover comprised of Soil No. 1 at the WRL. Vector's recommendation is a 2.5-foot thick ET cover comprised of soils that are consistent with Soil No. 2 in this report.

10.4 ET Cover Soil Classification

For a 2.5-foot ET cover to be constructed at the WRL, soils shall meet the following criteria:

- $LL \leq 35$;
- $7 \leq PI \leq 16$;
- 35 % passing the No. 200 sieve;
- Permeability $\leq 5.8 \times 10^{-6}$ cm/s.

Based on previous boring logs and geotechnical investigations at the WRL (AGEC, 2004, 2005 and Kleinfelder, 2004), the recommended soils are believed to be present

in the potential borrow area primarily near the surface and up to depths of 14 feet below the ground surface. Vector also recognizes the abundance of soil types located in the proposed borrow area at the WRL, and if soils that are to be used as ET cover material do not meet the above stated criteria, then further hydraulic property testing and unsaturated flow modeling shall be conducted to determine suitability of that material.

10.5 Erosion Control

Due to the soil types that will be used for closure construction, erosion of the landfill surface may occur. Soil loss analyses should be performed for the WRL using the Universal Soil Loss Equation developed by the United States Department of Agriculture (1965) or other suitable method. Erosion will be minimized by placing riprap or other suitable erosion control materials within all the channels and at other concentrated flow locations. The topsoil surface should also be seeded with an approved native grass mix with maximum potential for transpiration to promote vegetative growth and water removal from the cover. The seed mix shall be specified by an approved plant specialist. The cover system should be closely monitored during the post-closure period for the presence of excessive erosion. Erosion gullies should be regraded and additional fill placed as necessary to ensure that the integrity of the cover is not compromised.

10.6 Surface Water Hydraulic Considerations

The WRL final cover drainage structures should be designed to collect the run-off from a 100-year, 24-hour storm event. At closure, the top surface should be sloped a minimum 3%. Sheet flow off of the top should be collected by soil berms placed at the crest of the top slope.

The benches should drain to main collection points where water will be transported down to the perimeter ditches using corrugated metal or HDPE downdrains.

Channels should be constructed along the inside of each berm. Each of these channels should be graded to drain at a minimum of 0.5% slope to specified downdrains located at various locations around each unit. The channels should be lined with riprap, cobble, gravel, or other suitable materials to minimize erosion along these lines of concentrated flow. Due to the large amount of energy that is generated in the downdrains, a tee section or other energy dissipater should be installed at the bottom of each downdrain where water is discharged into the perimeter channels.

In addition, an apron of riprap or other approved material should be placed at the discharge end of the culverts located throughout the site to dissipate energy and minimize erosion immediately downstream of their outlets.

10.7 Cover Construction Plan

Construction of the cover system should be performed in accordance with the final construction drawings, specifications and other contract documents. Construction quality assurance (CQA) should be performed throughout construction to ensure that the cover system and related facilities are installed in accordance with the plans and specifications.

During placement of the cover, the Contractor should be required to place the soils to the required thickness and grades provided on the design drawings. A field survey should be performed to ensure that adequate materials and the minimum grading requirements are established. Once the cover materials are placed in a given area, the Contractor should install the drainage facilities. The Contractor should take extreme care not to damage the cover layer or other structures. The drainage facilities construction should be monitored on full-time basis so that any damages are recorded and repaired in a timely manner.

11.0 CLOSURE AND POST-CLOSURE CARE PLAN (REPUBLIC)

A Post-Closure Plan has been developed in accordance with UAC R315-302-3, and provides for post-closure care and maintenance of the WRL. All post-closure maintenance and monitoring will be performed in accordance with this plan. WRL Management can be contacted at the following address during the period of post-closure regarding issues that concern the landfill.

Wasatch Regional Landfill, Inc.
675 South Gladiola
Salt Lake City, Utah 84104

The Closure and Post Closure Plan is included in the Plan of Operations, as Appendix 13.9.

12.0 COST ESTIMATES FOR CLOSURE & POST-CLOSURE (VECTOR)

Costs associated with the closure and post-closure period are calculated annually. The cost estimates have been based on the most expensive cost to close the largest area of the disposal facility requiring closure during the permit term (approximately 55 acres of lined area as of January 2009). These estimates are based on current (2009) dollars. The estimated closure and post-closure maintenance costs are presented in Appendix 12.1. The approved financial assurance instrument is also included in Appendix 12.1

The specific quantities of materials used in calculating the closure/post-closure costs were measured from design plans and as built drawings. Unit costs were based on data from the WRL, means, or from the Utah Division of Solid and Hazardous Waste Guidance Document: Preparation of Solid Waste Facility Closure and Post-Closure Cost Estimates. The projected post-closure costs were calculated on the assumption that the integrity of the final cover would be inspected annually, landfill gas would be monitored quarterly, ground water would be monitored semiannually, and that general facility maintenance would be ongoing. Final closure and post-closure costs will be adjusted annually for inflation or facility modifications, beginning the first year after permit approval. These estimates may change as a result of permit modifications, regulatory changes, operational changes, or changes in the closure total acreage. If corrective action is anticipated during the post-closure period, additional closure estimates and financial assurance will be provided. Projected fund withdrawals for post-closure maintenance have been discussed in the financial assurance document.

13.0 PLAN OF OPERATIONS (REPUBLIC)

A Plan of Operation (the Plan) has been submitted for the WRL. This Plan of Operation is an integral part of the application for a permit to operate a Class V facility as set forth in Utah Administrative Code (UAC) R315-302-2 and includes the following:

- Plan of Operation;
- Hours of operation;
- On-site solid waste handling procedures;
- Inspections and monitoring schedule;
- Emergency and contingency plans;
- Disease vector control;
- Equipment and facility maintenance plan;
- Training and safety plan.

This Plan is presented in the following document.

WASATCH REGIONAL
LANDFILL, INC.

PLAN OF OPERATIONS

OCTOBER 2009

| | |
|---|-------------|
| SECTION 13 - PLAN OF OPERATIONS | 1300 |
| 13.1 INTRODUCTION | 1300 |
| 13.2 PLAN OF OPERATION | 1300 |
| 13.3 HOURS OF OPERATION | 1300 |
| 13.4 CONSTRUCTION PHASING | 1301 |
| 13.5 WASTE HANDLING PROCEDURES | 1301 |
| 13.5.1 ACCEPTED WASTE..... | 1301 |
| Garbage | 1302 |
| Trash..... | 1302 |
| Noncombustible Rubbish | 1302 |
| Green Waste | 1302 |
| Construction/Demolition (C&D) Waste..... | 1302 |
| Other Types of Waste..... | 1303 |
| 13.5.2 SPECIAL WASTE HANDLING PROCEDURES | 1303 |
| Asbestos..... | 1303 |
| Ash | 1304 |
| Dead Animals..... | 1304 |
| Sludge..... | 1304 |
| Bulky Waste | 1305 |
| Waste Asphalt..... | 1305 |
| Tires..... | 1305 |
| Petroleum Contaminated Soils | 1305 |
| PCB Containing Waste..... | 1305 |
| Medical and Infectious Waste | 1306 |
| 13.5.3 PROHIBITED WASTE | 1307 |
| 13.5.4 SCAVENGING | 1308 |
| 13.6 REPORTING, RECORDS, AND INSPECTIONS | 1308 |
| 13.6.1 PROHIBITED WASTE EXCLUSION PROGRAM | 1308 |
| Liquid Waste | 1308 |
| Random Inspection of Incoming Loads | 1309 |
| Waste Inspection Procedures..... | 1309 |
| 13.6.2 REGULAR INSPECTIONS..... | 1310 |
| 13.6.3 INSPECTION RECORDS | 1311 |
| 13.6.4 DAILY OPERATING RECORDS | 1311 |
| 13.6.5 OTHER RECORDS | 1311 |
| 13.6.6 ANNUAL REPORT..... | 1311 |
| 13.7 CONTINGENCY PLANS | 1312 |
| 13.7.1 FIRE AND/OR EXPLOSIONS | 1313 |
| Controlled..... | 1313 |
| Uncontrolled..... | 1313 |
| 13.7.2 RELEASES OF TOXIC/HAZARDOUS MATERIAL..... | 1313 |
| 13.7.3 FAILURE OF RUN-ON-OFF CONTAINMENT SYSTEMS..... | 1314 |
| 13.7.4 EQUIPMENT BREAKDOWN..... | 1314 |
| 13.7.5 ALTERNATIVE WASTE HANDLING | 1314 |

13.7.6 GROUNDWATER MONITORING 1314

13.7.7 DISEASE VECTOR CONTROL..... 1314

13.8 EQUIPMENT AND EQUIPMENT MAINTENANCE 1315

13.8.1 EQUIPMENT 1315

13.8.2 EQUIPMENT MAINTENANCE..... 1315

 Groundwater Monitoring System 1315

 Heavy Equipment 1315

 Fire Extinguishers..... 1316

 Personal Protection Equipment (PPE) and First Aid Kit(s)/Supplies..... 1316

 Landfill Gas Monitoring and Control Systems..... 1316

 Landfill Leachate Equipment 1316

13.9 FACILITY MAINTENANCE..... 1316

13.9.1 SIGNS..... 1316

13.9.2 BOUNDARY POSTS/FENCING 1316

13.9.3 LITTER CONTROL 1317

13.9.4 FUGITIVE DUST CONTROL..... 1317

13.9.5 ROADS AND TRAFFIC CONTROLS 1317

13.10 TRAINING AND SAFETY PLAN 1317

13.11 CLOSURE AND POST-CLOSURE CARE PLANS..... 1317

Appendices

- Appendix 13.1 – Waste Handling Procedure Overview
- Appendix 13.2 – Regular Inspection Form
- Appendix 13.3 – Daily Operating Record
- Appendix 13.4 – Training and Safety Plan
- Appendix 13.5 – Litter Control Plan
- Appendix 13.6 – Fugitive Dust Control Plan
- Appendix 13.7 – Groundwater Monitoring Plan
- Appendix 13.8 – Landfill Gas Monitoring and Control Plan
- Appendix 13.9 – Closure and Post-Closure Plans

Section 13 - Plan of Operations

13.1 Introduction

Wasatch Regional Landfill (WRL) is submitting a revised Plan of Operation (the Plan) for the landfill. This Plan of Operation is submitted as an integral part of the application for a permit to operate a Class V facility as set forth in Utah Administrative Code (UAC) R315-302-2 and including the following.

- Plan of Operation
- Hours of operation
- On-site solid waste handling procedures
- Inspections and monitoring schedule
- Emergency and contingency plans
- Disease vector control
- Equipment and facility maintenance plan
- Training and safety plan

13.2 Plan of Operation

The Plan shall be retained at the landfill office of and will be provided to Utah Department of Environmental Quality and the Tooele County Health Department upon request, for review. The responsibility for compliance with the Plan shall be that of the Site Manager. Employee training will be provided and the Plan will be available for review by employees involved in the daily operations of the facility and to other parties and regulatory agencies, as requested.

If modifications to the operational procedures described in the Plan become necessary, regulatory requirements shall be assessed to ensure that new or modified procedures satisfy compliance criteria. Prior to implementation, a description of revised waste management practices will be submitted to Utah DEQ for review.

13.3 Hours of Operation

The anticipated hours of operation at WRL will be Monday through Saturday, 7:00 a.m. to 5:00 p.m. and shall be posted at the landfill entrance. Periodically the landfill will operate outside of these hours to accommodate tonnage fluctuations at the transfer stations. There shall be at least two landfill attendants on-site at all times during operating hours. The entry gate will be locked when site operators are not present.

13.4 Construction Phasing

The construction and operation of the landfill facility will proceed in a phased fashion. The landfill design has 11 phases, each with its own leachate collection system. Currently 5 cells have been constructed in phases 1 and 2. It is anticipated that future cell construction will be required every year or every other year. As additional airspace is needed, the current landfill configuration will be carefully studied to determine the appropriate expansion size and location. The area of each additional construction phase will be determined by the rate at which waste arrives at the facility. Liners will be joined appropriately.

Run-on and run-off diversion ditches and other necessary design components will be incorporated into the design as indicated in the permit mod application. For each construction event, design drawings and a CQA/CQC plan will be submitted to the Executive Secretary of Solid and Hazardous Waste for approval prior to construction.

13.5 Waste Handling Procedures

The on-site waste handling procedures have been developed and implemented to meet the General Facility Requirements, (UAC R315-302-2 (2)), for the active life of the landfill. Currently, the landfill does not provide access or facilities for waste disposal by the general public. A waste handling procedure overview flowchart is provided in Appendix 13.1.

All incoming wastes shipments will be required to pass across the scale. The scale operation will document the following:

- 1) Date and time waste loads were received
- 2) Generator and type of waste disposed of.
- 3) Driver's organization and signature
- 4) Load gross and net weight

Landfill personnel will direct haulers to discharge their loads in the active working face. The waste is then spread in layers, usually not more than 2 feet thickness, and compacted using multiple passes of a steel-wheeled compactor. By the end of each workday, the waste is to be covered with a minimum of six inches of soil (or other acceptable Alternative Daily Cover, ADC, as allowed in R315-303-4(4)(b) through (c). ADC will not be used in areas of the landfill where: preceding a day the landfill will be closed and on an area of the landfill that will not be covered with waste or an intermediate cover with two days.

The landfill operating record will clearly document the days when ADC or soil is used.

13.5.1 Accepted Waste

Forms of solid waste and refuse that will be accepted into the landfill are those defined by RCRA Subtitle D as non-hazardous solid waste, and include

trash, garbage, rubbish, and other types of refuse listed and discussed as follows. Some of the accepted waste types may require special handling procedures as per State rules and regulations. Special handling procedures, when applicable, are discussed in a following section.

Garbage

Garbage, composed mostly of putrescible organic matter and moisture resulting from the handling, preparation, cooking, and serving of food, is mostly animal or vegetable waste. This type of waste is produced primarily in residential homes, restaurants, restaurants, hotels, or markets, and does not typically include garbage produced in canneries, slaughterhouses, packing plants, etc.

Trash

Trash, or combustible rubbish, is composed largely of inorganic materials or non-food items. These materials include non-durable goods (newspapers, books, magazines, paperboard), other papers, cartons, boxes, barrels, wood, tree branches, yard trimmings, wood furniture, bedding, clothing, paper towels, containers, plastics, textiles, rubber, leather, alkaline batteries, diapers, etc.

Noncombustible Rubbish

Noncombustible rubbish includes non-food durable goods/items such as metals, tin cans, metal furniture, dirt, glass, crockery, minerals, electronics, tires, refrigerators, ranges, water heaters, and other appliances.

Green Waste

Green waste consists of material such as yard trimmings and vegetative matter from landscaping and maintenance activities.

Construction/Demolition (C&D) Waste

Solid waste generated from building materials, packaging, and rubble resulting from construction, remodeling, repair, abatement, rehabilitation, renovation, and demolition operations on pavements, houses, commercial buildings, and other structures, including waste from conditionally exempt small generator of hazardous waste will be accepted into the landfill. Demolition wastes may include untreated wood and tree stumps, pipes, brick, masonry, concrete, soil, rock, rebar and waste asphalt. Inert materials, those which are "noncombustible, non-hazardous solid wastes that retain their physical and chemical structure under expected conditions of disposal, including resistance to biological or chemical attack", are typically present in C&D waste. In essence, inert materials include rock, brick, and concrete. Construction/Demolition waste does not include: C&D waste may be disposed of in the permitted C&D cell located west of Phase 1.

- Asbestos
- Wood treated with creosote or related compounds, Arsenic, Chromium, Copper, or other chemicals or materials used to minimize attack or degradation by insects or microorganisms
- Contaminated soils or tanks resulting from remediation or clean-up at any release or spill.

Other Types of Waste

Other types of waste that will be accepted into the landfill will include combustion ash, infectious waste, dead animal carcasses, asbestos, liquids (solidified) petroleum contaminated soils, non-hazardous sludge (not containing free liquids), household-sized containerized liquids, and non-hazardous industrial wastes. Non-hazardous sludges include those from municipal, commercial, or industrial treatment plants, water supply treatment plants, car wash facilities, and air pollution control facilities. Non-hazardous industrial wastes include those generated by manufacturing or industrial processes.

13.5.2 Special Waste Handling Procedures

Asbestos

Asbestos waste may be accepted at WRL. If asbestos waste is accepted at the landfill it will be handled, transported, and disposed in a manner that will not permit release of asbestos fibers into the air. Before accepting asbestos waste facility operators will inspect all loads to ensure that the asbestos waste is adequately wetted and contained/bagged. Asbestos waste is adequately wetted when its moisture content prevents fiber release. All asbestos waste must be containerized in double plastic bags of 6 mil or thicker and sealed to be leak-proof and air-tight. In case that the asbestos waste slurries are too heavy for the plastic bag containers, the asbestos waste slurries must be packaged in leak-proof and air-tight rigid containers. In addition, all of the asbestos waste must be labeled with the name of the waste generator, the location where the waste was generated, and tagged with a warning label indicating that the containers hold asbestos.

If all of the conditions for accepting asbestos waste are met, the facility operator will verify quantities received, sign off on the waste shipment record, and send a copy of the waste shipment record to the generator within 30 days. Upon the receipt of the asbestos waste the facility operator will require that all vehicles that have transported asbestos waste be marked with warning signs as specified in 40 CFR Part 61.149. Received asbestos waste containers will be placed at the bottom of the active face or in a dedicated area of the landfill and covered daily. A daily cover log will be maintained at the site. Asbestos waste containers will be handled with sufficient care to avoid any damage or breaking of the containers and will not be compacted until a minimum of 6 inches of soil is applied. In addition, access to the

asbestos disposal area will be limited until the waste has been covered with 6 inches of soil.

If the landfill operator believes the asbestos waste is in a condition that may cause significant fiber release during disposal, the operator will notify the local health department and the Executive Secretary. In the unlikely case that the landfill operator accepts asbestos waste that is not properly contained, the operator will thoroughly soak the asbestos material with a water spray prior to unloading, dispose of the waste near the bottom of the active face, and immediately cover the waste with a minimum of 6 inches of soil or other non-waste material to prevent fiber release.

The facility operators will provide adequate barriers in the vicinity of the asbestos disposal area to control public access. If necessary, the facility operators will place warning signs that comply with the requirements of 40 CFR Part 61.154(b).

Ash

WRL will accept ash waste. In order to prevent leakage or the release of fugitive dust, all waste loads containing ash will be covered. All vehicles transporting ash waste will be required to keep their loads covered as they proceed to the active cell of the landfill. Ash will be handled and disposed at the landfill in a manner to prevent fugitive dust emissions. Prior to unloading of ash waste, landfill operators will ensure that the ash waste is properly wetted using a water spray. If necessary, water sprays/sprinklers will be used during unloading of the ash waste in order to prevent ash release into the air.

Dead Animals

Dead animals accepted at WRL will be managed and disposed in a manner that minimizes odors and the attraction, harborage, or propagation of insects, rodents, birds, or other animals. Upon receipt, all dead animal bodies will be disposed at the working face of the landfill. The carcasses will be placed at the bottom or as near to the bottom as possible of the active cell and immediately covered with a minimum of 24 inches of soil or other waste. If a separate trench is constructed for disposal of dead animals, the carcasses will be immediately and completely covered with at least 6 inches of soil. As per R315-301-2(10)(d) dead animals may be disposed in a separate Construction/Demolition cell (if constructed) provided that all the conditions stated above are met.

Sludge

Water treatment plant sludge, digested wastewater treatment plant sludge, or septic containing no free liquids will be accepted at WRL. Sludge containing no free liquids will be disposed at or near the bottom of the active landfill cell and covered with other solid waste or cover soil. In addition, WRL will accept liquid-filled containers that are a part of the household waste stream, small

and similar in size to a container that would normally be found in household waste (five gallons or less).

Bulky Waste

Bulky waste such as automobile bodies, furniture, and appliances will be accepted at WRL. All bulky waste will be disposed in the working face of the landfill cell such that the integrity of the liner system is not compromised.

Waste Asphalt

The preferred management of waste asphalt is recycling. WRL will be able to receive and dispose of waste asphalt if it needs to be disposed. The waste asphalt will be disposed in the C&D cell (if and when constructed) or in the working face of a lined cell.

Tires

WRL will dispose of waste tires of the following types:

- waste tires "of household waste" delivered to a landfill (no more than four whole tires at one time) by an individual or a waste tire transporter
- waste tires from devices moved exclusively by human power
- waste tires with a rim diameter greater than 24.5 inches

WRL will not have separate cells, designed and constructed, for the disposal and subsequent retrieval and recycling of waste tires or waste tires materials. Waste tires received at WRL will be disposed at the bottom or near the bottom of the working face.

Petroleum Contaminated Soils

Soils that have been contaminated with either diesel or gasoline or both and that are not a hazardous waste will be accepted for disposal. Waste loads containing petroleum-contaminated soils will be directed into the landfill and may be used for daily cover on inside slopes only.

PCB Containing Waste

WRL may accept PCB-containing waste provided all R315-315-7 conditions are met. All acceptable PCB-containing waste will be disposed in the active face of the lined cell as part of the waste stream.

Medical and Infectious Waste

Definitions and Characteristics

WRL may accept medical waste. The purpose of this plan is to define the operational procedures that will be followed during the receipt and disposal of medical waste.

Medical waste is defined as any solid waste that is generated in the diagnosis, treatment, or immunization of human beings or animals, in research, or in the production or testing of biologicals. Types of medical waste include but are not limited to:

- soiled or blood soaked bandages
- culture dishes and other glassware
- discarded surgical gloves
- discarded surgical instruments
- laboratory wastes such as tissues, blood specimens, excreta, and secretions from patients and lab animals
- sharps-any discarded or contaminated article or instrument from a health facility that may cause cuts or puncture (needles, syringes, blades, needles with attached tubing, pipettes, pasteurers, broken glass, and blood vials.
- stocks and swabs used to inoculate cultures
- removed body organs-tonsils, appendices, limbs, etc.

Transportation and Receiving

All parties transporting medical waste to the facility will be required to notify the landfill operator that the waste load contains medical waste. The landfill operator will inspect the waste load. All medical waste generators and or transporters will be required to appropriately storage and contain all medical waste. Sharps shall be contained for transportation and disposed in leak-proof, rigid, puncture resistant containers, which are taped, closed, or tightly lidded to prevent the loss of contents. All other medical waste shall be contained in plastic bags or rigid containers. The bags shall be securely tied and the containers securely sealed to prevent leakage or the expulsion of solid or liquid wastes during transportation and disposal. All containers used for storage and containment of medical waste shall be red or orange, or if the containers are not red and orange, shall be clearly identified with the international biohazard sign and one of the following labels: "INFECTIOUS WASTE", "BIOMEDICAL WASTE", or "BIOHAZARD". If the inspection of the medical waste load discovers that the medical waste is not properly stored and contained, the waste will not be accepted, and the landfill operator will notify the local health department with the information about the generator and transporter of the medical waste. If the inspection of the medical load waste discovers any leaks, expulsions and/or spills within the transport vehicle, the waste will not be accepted and the local health department will be notified. Any medical waste consisting of recognizable human anatomical remains including human fetal remains will not be accepted at the landfill. Any deliveries of unauthorized waste will be recorded and reported to the local health department.

Disposal

If inspection of the medical waste indicates that the waste is acceptable, the waste load will be directed to the working face of the lined cell. All persons manually unloading medical waste will:

- be trained in the proper use of protective equipment
- have puncture resistant gloves and shoes, shatterproof glasses and coveralls
- use face shields and respirators if deemed necessary by the medical waste transporter or generator

If the protective gear becomes soiled, it will be immediately disposed of as infectious medical waste.

All of the medical waste containers will be placed at the bottom of the working face with sufficient care to avoid breaking them. The medical waste will be immediately covered with at least 12 inches of soil or waste material that contains no infectious waste. The landfill operators will not compact medical waste until this cover is fully applied across the medical waste.

13.5.3 Prohibited Waste

Waste types that are prohibited and will not be accepted into the landfill include hazardous wastes and free liquids or any waste containing free liquids larger than household size.

Hazardous waste types are those that because of their quantity, concentration, physical, chemical, or infectious character, may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness or may pose a substantial present or potential hazard to human health or the environment when improperly transported, disposed of, stored, treated, or otherwise managed (40 CFR 261 Subtitle C). In general, hazardous wastes are those that:

- are explicitly listed on EPA-developed lists as being hazardous;
- are a mixture of any one of the components of a hazardous waste;
- are derived from the treatment, storage, or disposal of a hazardous waste;
- exhibit any one of four hazardous waste characteristics, which are (1) ignitability, (2) corrosivity, (3) reactivity, and (4) toxicity. Each of the items has a specific definition as it relates to hazardous waste.

Household hazardous waste, however, is exempted from federal and state regulations, and will be accepted into the facility. These are leftover household products and chemicals that contain corrosive, toxic, ignitable, or reactive ingredients. Examples of household hazardous waste include paints, cleaners, oils, unused fuels, fertilizers, antifreeze, poisons, and some pesticides.

Non-containerized liquids, containerized liquids larger than household size, sludge containing free liquids, and liquids not ready for solidification are prohibited and will not be accepted into the landfill.

PCB containing waste with concentrations of 50 ppm or higher are not accepted into the landfill.

Other examples of impermissible hazardous waste types prohibited at the landfill include explosives, solvents, electroplating baths, heavy ends, light ends, bottom tars, side-cuts from distillation processes, arsenic acid, cyanides, benzene, toluene, phenols, remediation tanks, sealers, adhesives, car batteries, lead acid batteries, and used oils.

13.5.4 Scavenging

As per Utah Code Rule R315-303-4(2)(d) scavenging will be prohibited at WRL.

13.6 Reporting, Records, and Inspections

The Utah Administrative Code requires the landfill operator to conduct periodic landfill maintenance and waste load inspections as described below and note findings on an inspection form (see Appendix 13.2).

13.6.1 Prohibited Waste Exclusion Program

WRL will not knowingly dispose of, treat, store, or handle any prohibited waste.

All landfill staff will be trained to recognize prohibited waste. In addition, at the facility entrance a sign will warn against the disposal of prohibited waste. In case that a landfill staff member observes prohibited waste in the waste load prior or during the waste disposal the load will be rejected and the Waste Inspection Report (see Appendix 13.2) will be completed. In addition, the landfill staff will notify the DEQ and/or the local health department. If the waste is suspected to be hazardous or containing PCBs in concentrations higher than 50 ppm, the procedures outlined above will be followed. Also, if prohibited liquid waste is observed, the landfill staff will implement procedures appropriate for prohibited liquid wastes as described.

Liquid Waste

Liquid waste may be accepted by the landfill. However, all liquid waste will be solidified prior to disposal. All landfill staff will be trained to recognize liquid-filled containers that may require segregation, further inspection or solidification. In the event that a suspect container is observed, it will be determined whether or not the container is empty. Only empty containers, which do not contain any hazardous materials, will be accepted for disposal.

If a liquid-filled container is discovered, the container will be stored in a designated area until trained personnel can make a determination if the landfill can accept the material. If the contents are determined to be acceptable, the liquids will be solidified and disposed of on-site. If the contents are determined to be unacceptable, the landfill operator will make arrangements to remove the material from the landfill premises. Notations will be made in the Waste Inspection Report and the Daily Operating Record, which will include a description of actions taken.

Random Inspection of Incoming Loads

At least one out of every hundred vehicles will be chosen for a more detailed inspection as described below. The landfill attendant will stop vehicles to be inspected and the load will be inspected to determine if unacceptable wastes are present. A Waste Inspection Report (see Appendix 13.2) will be completed and will include:

- Date and time waste loads were received and inspected
- Name of the waste generator
- Vehicle license number
- Driver's name, organization, and signature
- Load inspector's name
- Observations made during the inspection
- Description of rejected loads and rationale for rejection

Waste Inspection Procedures

Waste loads chosen for a random inspection will be inspected to determine the presence or absence of hazardous wastes or waste containing polychlorinated biphenyls (PCBs) and other waste not accepted at WRL. The inspections will be conducted by landfill operators who are trained and qualified to identify hazardous, PCB, and other waste not accepted at the landfill. All inspections will be conducted according to the following procedures:

- All personnel conducting waste inspections will receive training to identify unacceptable wastes.
- All personnel conducting waste inspections will receive training on safety equipment and personal protective equipment. Both will be available at all times for waste inspections.
- The waste will be unloaded in area near but not immediately next to the active face
- The waste will be carefully spread for observation.
- Any container with contents not easily identifiable (unmarked drums, containers, bags) will be separated, if a visual inspection determines that such movement will not cause the drum to rupture and will be opened and inspected only by trained personnel
- If the waste is determined to be acceptable, it may be transferred to the working face for disposal.

Wastes that are suspected of being unacceptable will be handled and stored in a designated area and managed appropriately. In the event that hazardous or PCB wastes are identified, landfill personnel will reject the loads and contact the Executive Secretary, the hauler, and the generator within 24 hours (if unacceptable medical waste is identified local health department will be contacted). If wastes temporarily stored at the site are determined to be hazardous, and the origin of the waste is unknown, the operator will immediately contact the Tooele County Emergency Management Agency who will act as first responder for hazardous materials and will implement their emergency response plan. In addition, the Utah Division of Environmental Quality will be contacted to provide guidance and instructions for removal and disposal of hazardous waste. All hazardous waste will be removed from the facility by a licensed transporter and disposed at a permitted treatment, storage, or disposal facility.

13.6.2 Regular Inspections

The Operator will perform regular walk-through inspections of the entire landfill property to look for, at a minimum, the following:

- defects in the run-on/run-off control systems;
- scattered litter potentially missed during weekly pickup (see Appendix 13.5 for Litter Control Plan);
- breaches in the integrity of closed and covered fill areas;
- and any circumstances which may pose threats to public health and safety and the environment.
- Wastes are sufficiently compacted
- A minimum of six inches of soil or ADC is applied appropriately.
- Interim cover is being applied and graded appropriately
- Fences and signs are maintained and in functional and clean condition
- Landfill area is free of wind blown debris
- Suspect vehicles and periodic loads are checked to ensure no hazardous waste is placed in the Landfill
- Appropriate waste handling procedures are followed according to the Plan
- Dust control activities are performed as appropriate (watering, reseeding, and soil amendments)
- Roads are constructed and maintained for use during all types of weather
- Run-on/run-off control prevents water from entering or leaving active trench areas
- Site operations minimize the size of the unloading area
- Boundary posts are clearly visible
- Landfill sign provides correct hours of operation, a list of materials that are not accepted at the Landfill, and a current emergency phone number

Any conditions, which do not meet with the approval of the inspector, will be presented to the Landfill Operator. It will then be the responsibility of the Landfill Operator to correct the unsatisfactory conditions.

13.6.3 Inspection Records

Records of regular inspections will be maintained by the Site Manager with the Plan of Operation.

13.6.4 Daily Operating Records

As per Utah Administrative Code R315-302-2(3)(a), WRL will maintain and keep on-site a daily operating record (see Appendix 13.3). The daily operating record will be comprised of multiple reports and documents. The Site Manager will be responsible to accumulate and document the various reports and documents. At a minimum the daily operating record will include the following:

- the weights, in tons, or volumes, in cubic yards, of solid waste received each day, number of vehicles entering, and if possible, the type(s) of wastes received each day
- deviations from the approved plan of operation
- training events
- results of ground water and gas monitoring
- inspection log or summary

13.6.5 Other Records

In addition to daily operating and inspection records, WRL will maintain and keep on site:

- documentation of any demonstration made with respect to any location standard or exemption
- any design documentation for the placement or re-circulation of leachate gas or condensate into the landfill as allowed by Subsection R315-309-2(3)
- closure and post-closure care plans (see appendix 12.1)
- cost estimates and financial assurance documentation (see appendix 12.1)
- Other information pertaining to operation, maintenance, monitoring, or inspections as may be required by the Executive Secretary.

13.6.6 Annual Report

As per Utah Administrative Code R315-302-2(4) WRL management will prepare an annual report to be placed in the facility's operating record. A copy of the annual report will be submitted to the Executive Secretary by

March 1 of each year for the most recent calendar year or fiscal year of facility operation. The annual report will cover facility activities during the previous year and will include the following information:

- name and address of the facility
- calendar year covered by the report
- annual quantity, in tons, of solid waste received
- estimated in-place density in pounds per cubic yard of solid waste handled for each type of treatment, storage, or disposal facility
- annual update of required financial assurances
- results of ground water and gas monitoring
- training programs and/or procedures completed

The amount of waste received must be reported in tons. In the unlikely case that the received waste is not weighed on scales, the following conversion factors will be used:

- for municipal solid waste:
 - un-compacted waste – 0.15 tons per cubic yard
 - compacted waste (delivered in a compaction vehicle) – 0.30 tons per cubic yard
- construction/demolition waste – 0.50 tons per cubic yard
- municipal incinerator ash – 0.75 tons per cubic yard
- other ash – 1.10 tons per cubic yard
- industrial waste (non-hazardous) – a reasonable conversion factor, based on site specific data, developed by the operator of the facility

All conversion factors developed and based on the site specific data will be approved by the Executive Secretary prior to their use.

13.7 Contingency Plans

The following details contingency plans developed in accordance to UAC R315-302-2 and implemented in the event of an emergency at the landfill. The plans described below contain organized, coordinated and technically/financially feasible courses of action for response to:

- Fire and/or explosions
 - Controlled
 - Uncontrolled
- Releases of toxic/hazardous material
- Landfill gas release
- Failure of run-on/-off containment systems
- Equipment breakdown
- Alternative waste handling
- Groundwater monitoring
- Vector control

13.7.1 Fire and/or Explosions

Controlled

Landfill personnel are prepared and equipped to provide immediate fire suppression in the event of a controlled fire/explosion situation at the landfill. In a controlled fire situation, the landfill operator (discoverer) will:

- Notify any on-site personnel and the Landfill office
- Utilize fire extinguishers (located on all landfill equipment/vehicles and in the gatehouse) or stockpiled soil to extinguish the fire
- Record a written account of the incident in the daily operating record

Uncontrolled

In an uncontrolled fire/explosion situation, the landfill operator (discoverer) will:

- Notify any on-site personnel and the Landfill office
- Immediately contact the Tooele County Emergency Management Agency
- Restrict access to the critical area (evacuates, if necessary) until informed by the proper authorities that the danger has been eliminated
- Record a written account of the incident in the daily operating record (see Appendix 3.3)

13.7.2 Releases of Toxic/Hazardous Material

In the event of a toxic/hazardous material release, the landfill operator will:

- Notify any on-site personnel and the Landfill office
- Immediately contact the Tooele County Emergency Management Agency
- Shut down all landfill operations, if appropriate
- Restrict access to the critical area (evacuates, if necessary) until informed by the proper authorities that the danger has been eliminated
- Record a written account of the incident in the daily operating record (see Appendix 13.3)

Once at the site, the Tooele County Emergency Management Agency will implement their emergency response plan and assumes all responsibility for handling containment and transport off-site of the discharged material. *Unqualified Landfill personnel will not handle hazardous materials spills.* The Landfill Operator will serve as the landfill staff liaison with the Tooele Emergency Management Agency and will ensure the safe evacuation of all employees. It is the responsibility of the Landfill Operator to define

emergency escape routes and to regularly inform the landfill personnel of the established primary and secondary escape routes.

13.7.3 Failure of Run-on-off Containment Systems

Any breach in the integrity of the run-on/off containment system will be repaired as soon as practical. The mechanism of failure, and the extent of damage will be identified and corrective actions will be developed and implemented. If repairs are delayed, temporary berms will be constructed to divert surface water away from the active disposal area. A written account of the incident will be recorded in the daily operating record (see Appendix 3.3). All corrective actions taken will be recorded in the daily operating report.

13.7.4 Equipment Breakdown

The on-site landfill staff is prepared to perform repairs of equipment. Some major repairs may be performed off site. Additional equipment may be leased, if necessary.

13.7.5 Alternative Waste Handling

In the unlikely event of an emergency which forces the temporary closure of the landfill, waste collection could be temporarily suspended (provided the duration of the emergency is short); waste could be stockpiled on other County property (with approval); or, for events of longer duration, waste could be transferred to other landfills in the area. In an emergency event such that the landfill must cease normal operation for a time, all waste will be stored in an area designated for such emergencies. The waste stored under these conditions may be piled for up to six days. After seven days the piled waste will be properly disposed within a lined cell. In the unlikely event that normal operations cannot continue after periods longer than seven days all waste streams will be diverted and directed to a different disposal facility. The waste pile generated during emergency operations will be loaded onto haul trucks, covered and transported to a different disposal facility.

13.7.6 Groundwater Monitoring

For a detailed Groundwater Monitoring Plan and Corrective Action, see Appendix 4.7.

13.7.7 Disease Vector Control

Disease vector control at the landfill consists of operating procedures for compaction, grading and soil cover. The active face will be compacted and graded on a daily basis and covered daily with six inches of soil or other approved Alternative Daily Cover (ADC). This will prevent vector access into, and harborage in, the waste mass. The application of daily cover soil also eliminates entry spaces, food sources, and nesting areas.

In addition, dead animals will be covered immediately. Surface water control measures and liquid waste restrictions will minimize the presence of standing water which will, in turn, assist with decreasing insect breeding areas. If insect infestations occur, in spite of these measures, approved insecticides will be used but only applied by a State of Utah certified Pest Control Officer.

13.8 Equipment and Equipment Maintenance

13.8.1 Equipment

The following equipment may be required for facility operation at WRL:

- Utility trucks for use by landfill operator(s) that are able to navigate site in inclement weather and pull smaller trailer-mounted equipment when necessary
- Articulated dump trucks
- Excavators for moving loose waste and soil cover.
- Compactors for loose-fill waste compaction
- Crawler-dozers, for moving cover material to the waste cells and spreading cover over the working face of each cell
- Water trucks and road graders

13.8.2 Equipment Maintenance

The landfill operator is responsible for maintaining the following equipment:

- Groundwater monitoring system
- Heavy equipment
- Fire extinguishers
- Personal protective equipment (PPE) and first aid kit(s)/supplies
- LFG equipment (Landfill Gas monitoring and control systems)
- Leachate equipment

Groundwater Monitoring System

The landfill operator inspects the landfill monitoring well locks (including lubricating or replacing locks, if necessary); repairs and replaces the landfill monitoring well protective casings, covers, hinges and any other exposed parts (as necessary); redevelops wells in accordance with instructions in the *WRL Groundwater Monitoring Plan* (see Appendix 4.1).

Heavy Equipment

The Landfill Operator maintains operating instruction books for on-site heavy equipment and ensures standard equipment maintenance occurs for heavy

operating machinery. The Operator takes the equipment to get it repaired in the event of equipment breakdown. The landfill operator will follow the manufacturer recommendations for heavy equipment maintenance schedule.

Fire Extinguishers

The landfill operator performs quarterly inspections to ensure fire extinguishers are charged and in proper working order.

Personal Protection Equipment (PPE) and First Aid Kit(s)/Supplies

On a quarterly basis, the landfill operator ensures that the PPE (ex. hard hats, ear plugs, face masks, safety glasses, etc.) are fully stocked and in proper working order.

Landfill Gas Monitoring and Control Systems

The maintenance of landfill gas monitoring and control systems will be conducted according to the procedures outlined in the Landfill Gas Monitoring and Control Plan (see Appendix 11.1).

Landfill Leachate Equipment

The maintenance of landfill leachate system will occur as needed. Pumps hoses and fittings will be inspected and replaced as necessary.

13.9 Facility Maintenance

The landfill operator is responsible for maintaining the landfill

- signs
- boundary posts/fencing
- surface areas

13.9.1 Signs

The landfill operator ensures that the landfill entrance sign shall provide the landfill name, permit #, hours of operation, address, a warning against the disposal of prohibited materials, and emergency contact information.

13.9.2 Boundary Posts/Fencing

The landfill operator ensures that the boundary posts remain clearly visible and that the fences surrounding operation and temporarily closed areas of the landfill are maintained in a functional and clean condition.

13.9.3 Litter Control

A comprehensive Litter Control Plan can be found in Appendix 13.5.

13.9.4 Fugitive Dust Control

A comprehensive Fugitive Dust Control and Mitigation Plan can be found in Appendix 13.6. This plan has been reviewed and accepted by the Compliance Section of the State Division of Air Quality, Department of Environmental Quality.

13.9.5 Roads and Traffic Controls

The main access road to WRL is a paved, all-weather road. WRL will maintain all paved roads and keep them accessible throughout the year. In addition, traffic control measures will be implemented in order to direct incoming and outgoing traffic. The landfill operators will ensure that all traffic control measures are operational, and properly maintained.

13.10 Training and Safety Plan

A comprehensive Training and Safety Plan can be found in Appendix 13.4

13.11 Closure and Post-Closure Care Plans

Closure and Post-Closure Care Plans can be found in Appendix 13.9.

FIGURE 2.1
General Site Location

FIGURE 2.2
Site Location and Trust Lands

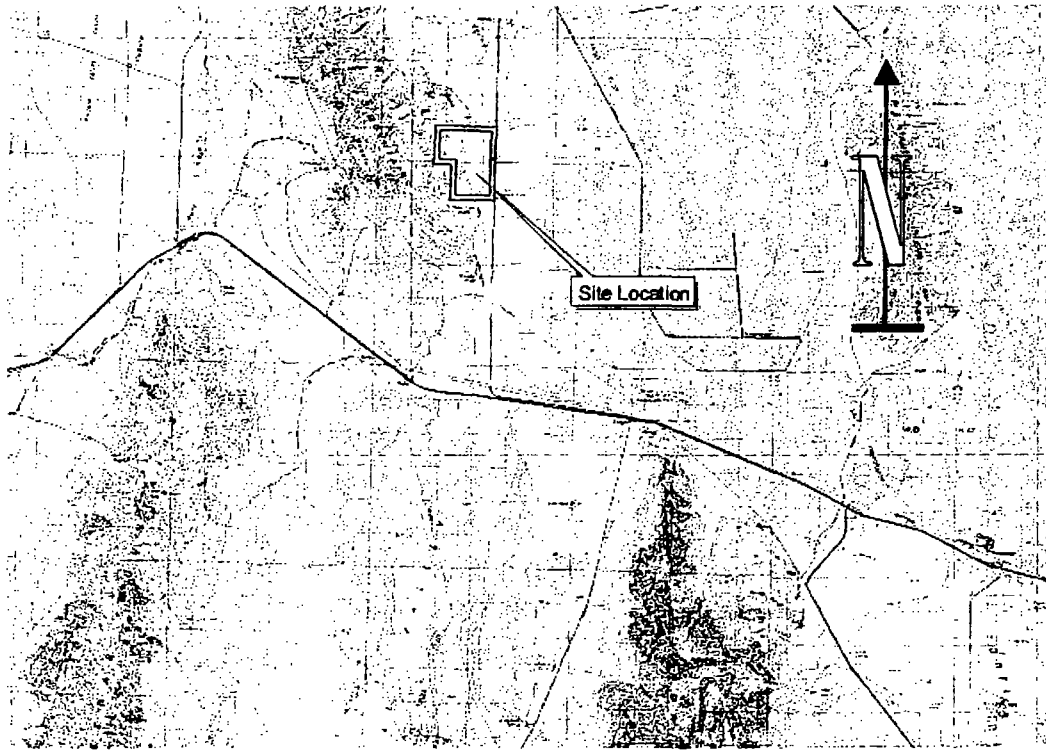


Figure 2.1. General site location.

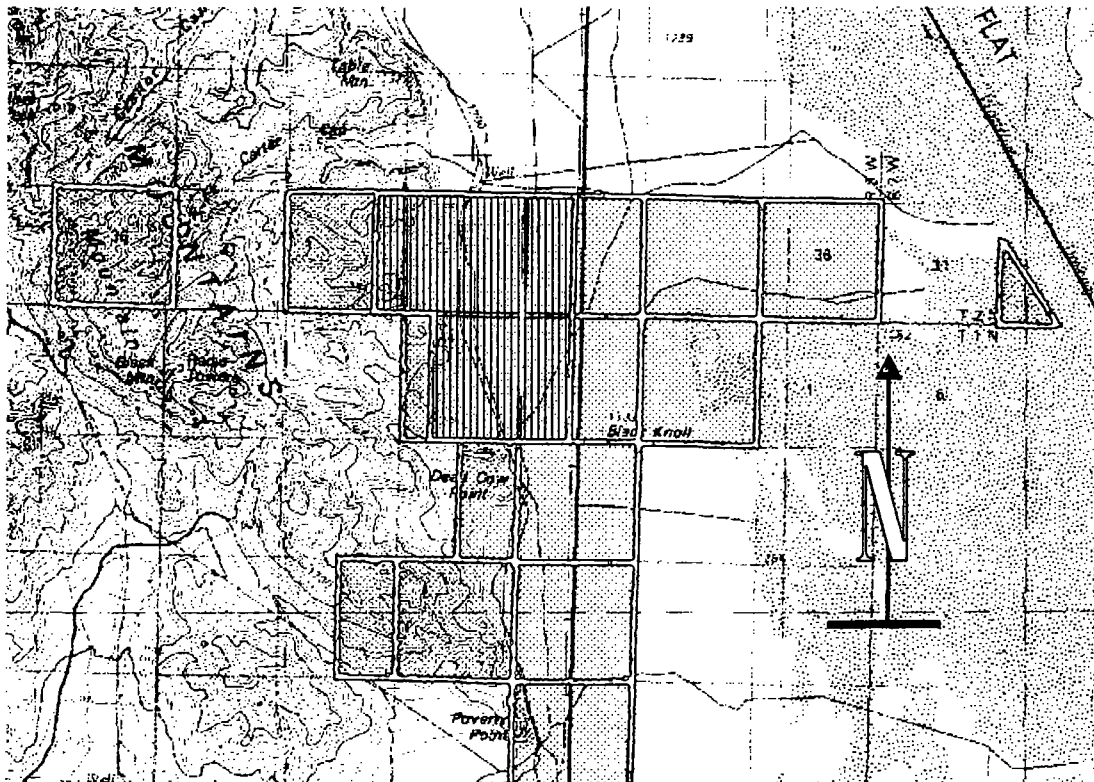


Figure 2.2. Site location relative to adjacent trust lands.

FIGURE 2.3
Zoning Districts

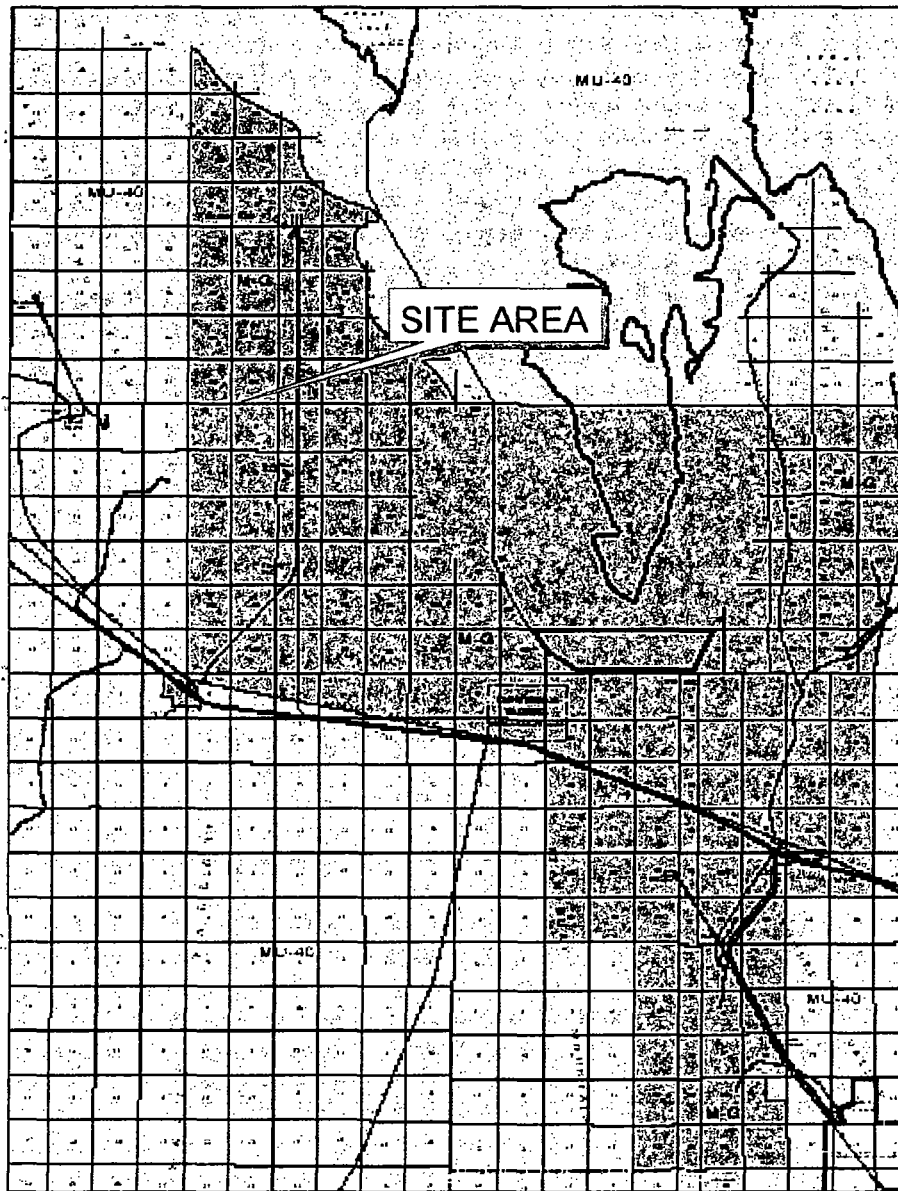
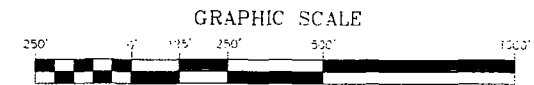


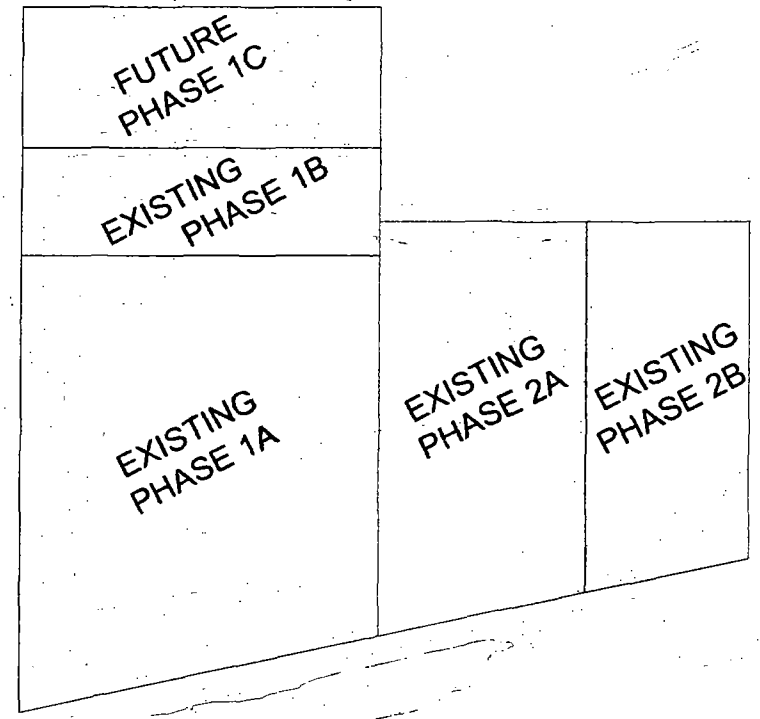
Figure 2.3. Zoning districts within the Delle USGS quadrangle. Zone MU-40 (shown in light blue) surrounds most of zone MG (shown in dark purple).

FIGURE 2.4
Existing Site Conditions



LEGEND

- EXISTING 10 FT. CONTOUR
- EXISTING 2 FT. CONTOUR
- EXISTING 25 FT. CONTOUR
- EXISTING 5 FT. CONTOUR
- EXTENTS OF PHASE



NOTES
EXISTING TOPOGRAPHY BASED ON AERIAL SURVEY PERFORMED BY
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LANDFILL, INC.**

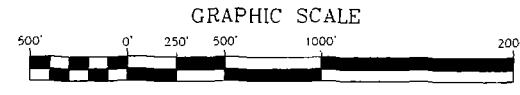
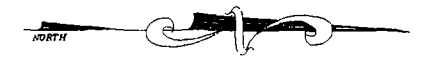
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TOOELE COUNTY, UTAH
EXISTING SITE CONDITIONS

FIGURE NO.
1
PROJECT NO.
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FIGURE 2.5
Final Waste Grades

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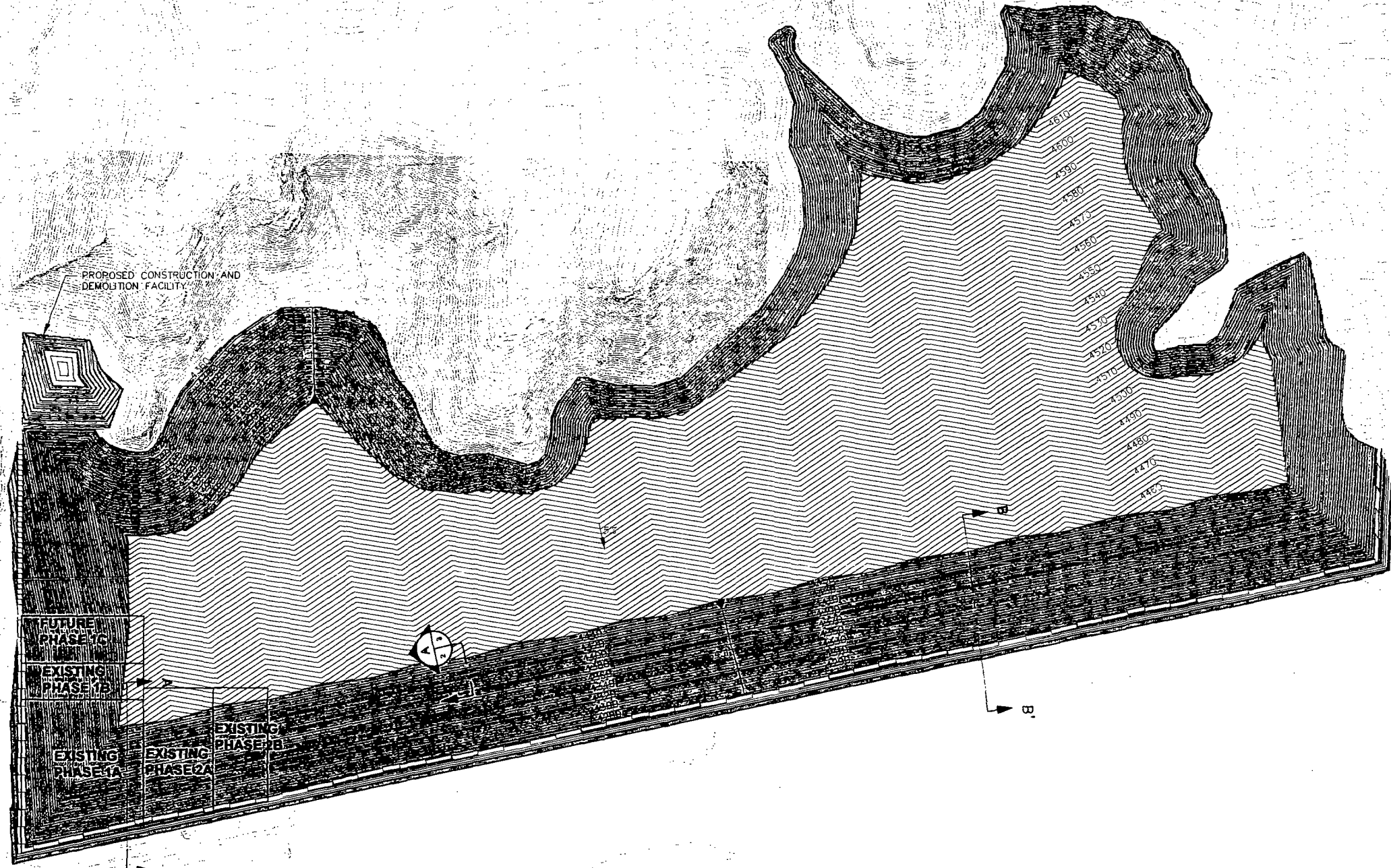


LEGEND

- EXISTING 10 FT CONTOUR
- EXISTING 2 FT CONTOUR
- 1000— 10 FT FINAL WASTE CONTOUR
- 2 FT FINAL WASTE CONTOUR
- CONSTRUCTION AND DEMOLITION FACILITY LIMITS
- 10 FT FINAL TOE DRAINAGE BERM CONTOUR
- 2 FT FINAL TOE DRAINAGE BERM CONTOUR

QUANTITIES

LANDFILL AIRSPACE = 223,240,000 CY
 C&D AIRSPACE = 779,524 CY
 LANDFILL AREA = 793 ACRES
 C&D AREA = 11.2 ACRES



NOTES:
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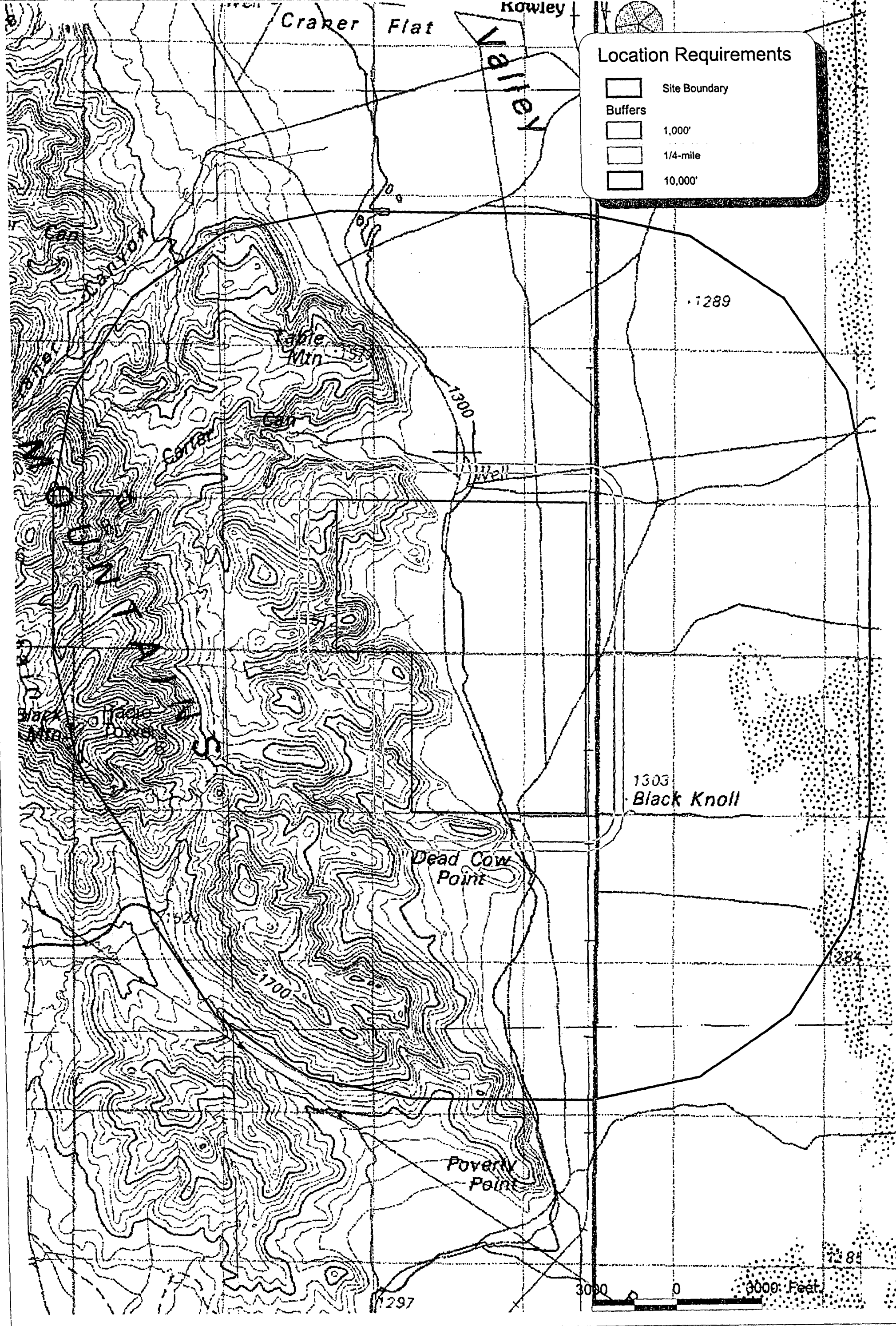
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 TOOELE COUNTY, UTAH
FINAL WASTE GRADE

FIGURE NO.
2
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FIGURE 2.6
Phasing Plan

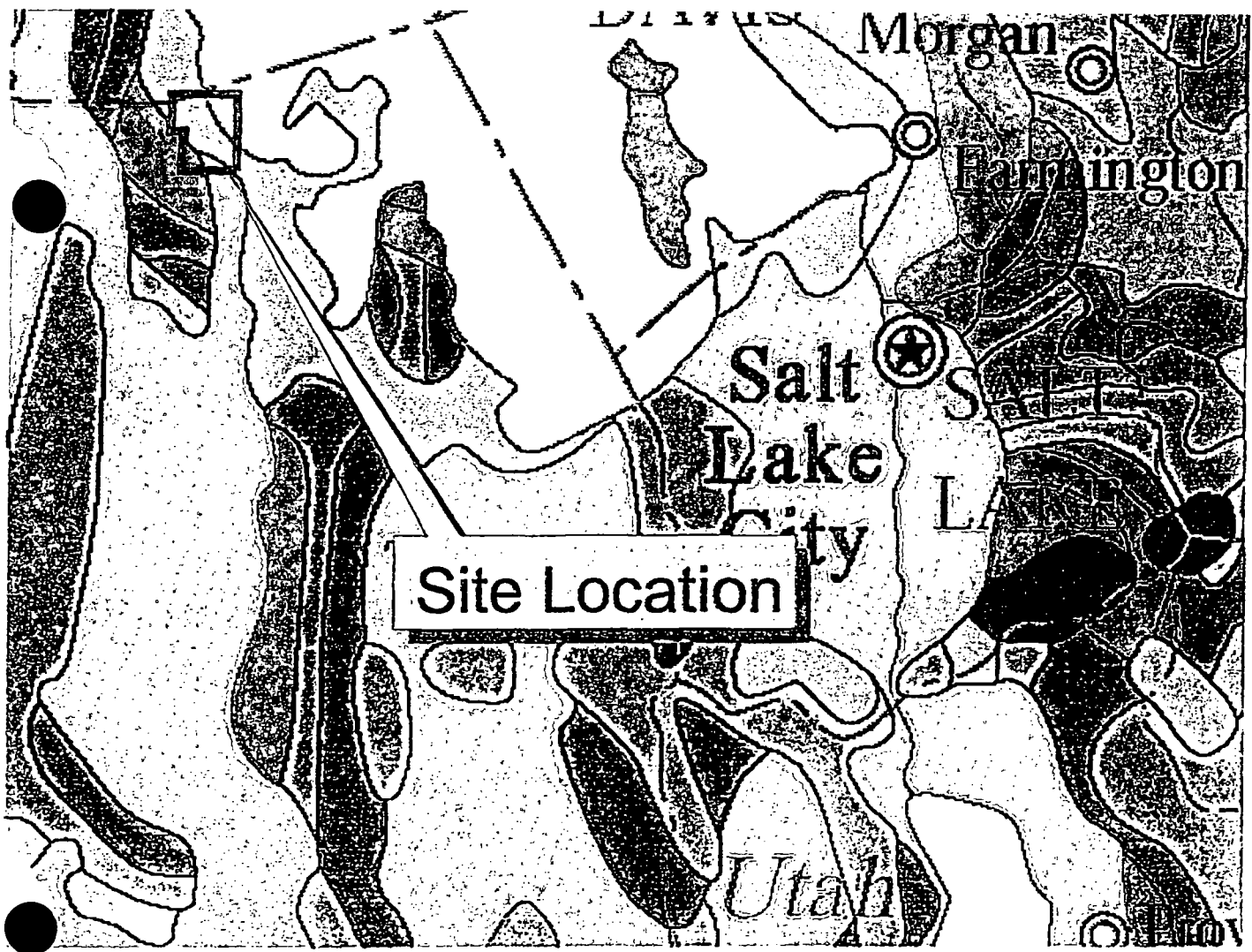
FIGURE 3.1
1,000 Foot Buffer



PSOMAS

Figure 1
Site Vicinity Map

FIGURE 3.2
General Geologic Features



LEGEND

| | | | | | |
|--|----------------------|--|----------------------|--|------------------------------|
| | Quaternary mud flats | | Tertiary (older) | | Mississippian |
| | Quaternary | | Cretaceous | | Ordovician-Silurian-Devonian |
| | Basalt | | Jurassic | | Cambrian |
| | Tertiary volcanics | | Triassic | | Precambrian |
| | Tertiary (younger) | | Pennsylvania-Permian | | Intrusive rocks |

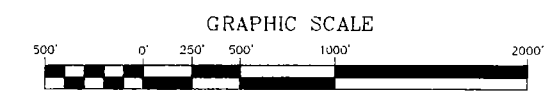


P S O M A S

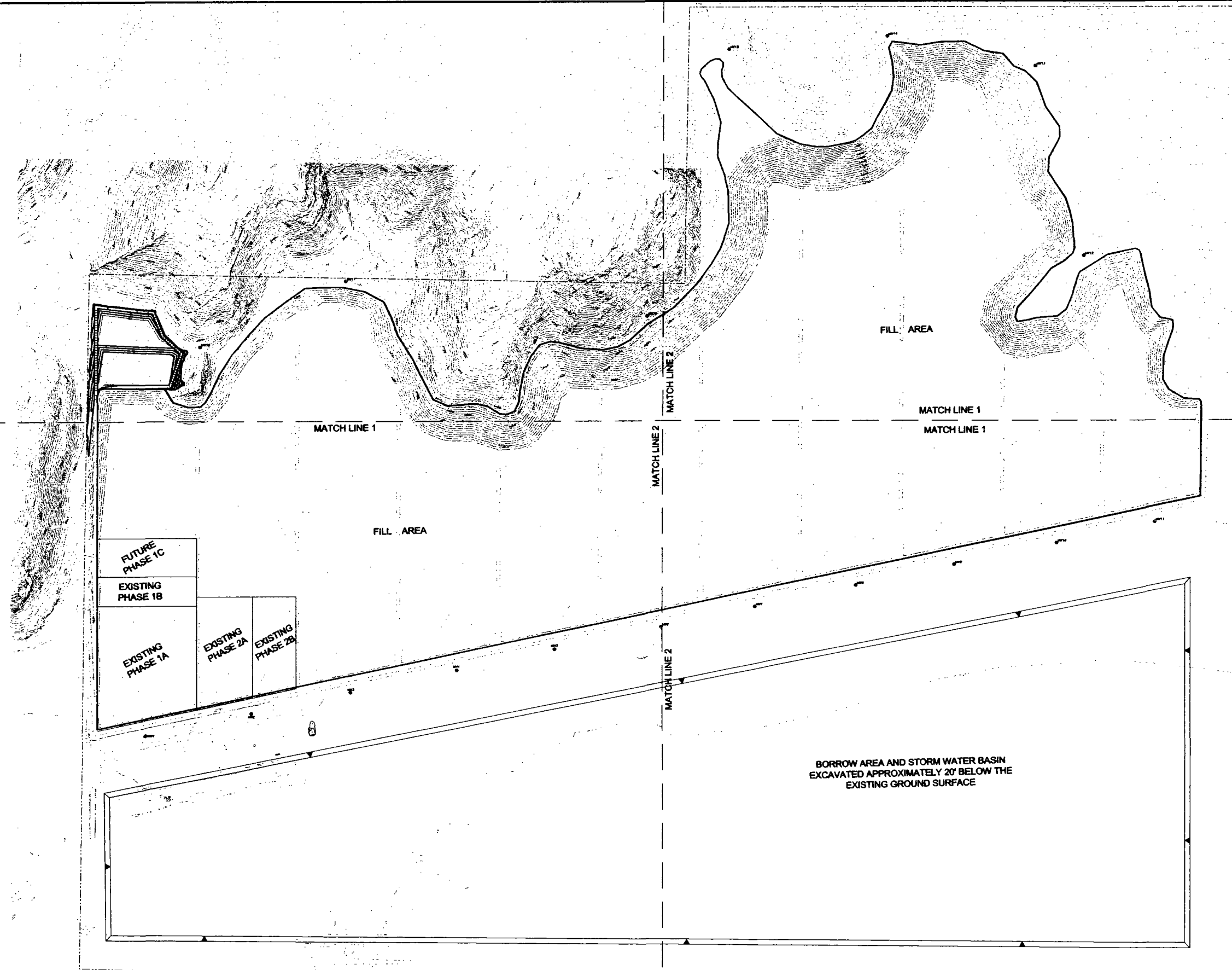
Figure 2
Base Geology Map

FIGURE 3.3
Geologic Cross Sections

FIGURE 3.4
200 Scale Map Index



- LEGEND**
- 10 FT CONTOUR
 - 2 FT CONTOUR
 - 25 FT CONTOUR
 - 5 FT CONTOUR
 - PROPERTY LINE
 - MATCH LINES
 - DESIGN 10 FT CONTOUR
 - LINER LIMITS
 - APPROXIMATE LINER BOUNDARY/FILL AREA
 - STORM WATER BASIN/BORROW AREA
 - ▲ EXISTING GROUNDWATER MONITORING WELLS
 - PROPOSED GROUNDWATER MONITORING WELLS



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 MATCH LINE INDEX

FIGURE NO.
3.4
 PROJECT NO.
 061204.11

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FIGURE 3.5
200 Scale Map SE

MATCH LINE 1

MATCH LINE 2

FILL AREA

FUTURE
PHASE 1C

EXISTING
PHASE 1B

EXISTING
PHASE 1A

EXISTING
PHASE 2A

EXISTING
PHASE 2B



- LEGEND**
- 10 FT CONTOUR
 - 2 FT CONTOUR
 - BANK LINE
 - PROPERTY LINE
 - TERMINUS OF PHASE
 - APPROXIMATE LEGE BOUNDARY
 - STORM WATER BASIN/BORROW AREA
 - EXISTING MONITORING WELLS
 - PROPOSED MONITORING WELLS

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 SOUTHEAST SECTION

FIGURE NO.
3.5
 PROJECT NO.
 06120111

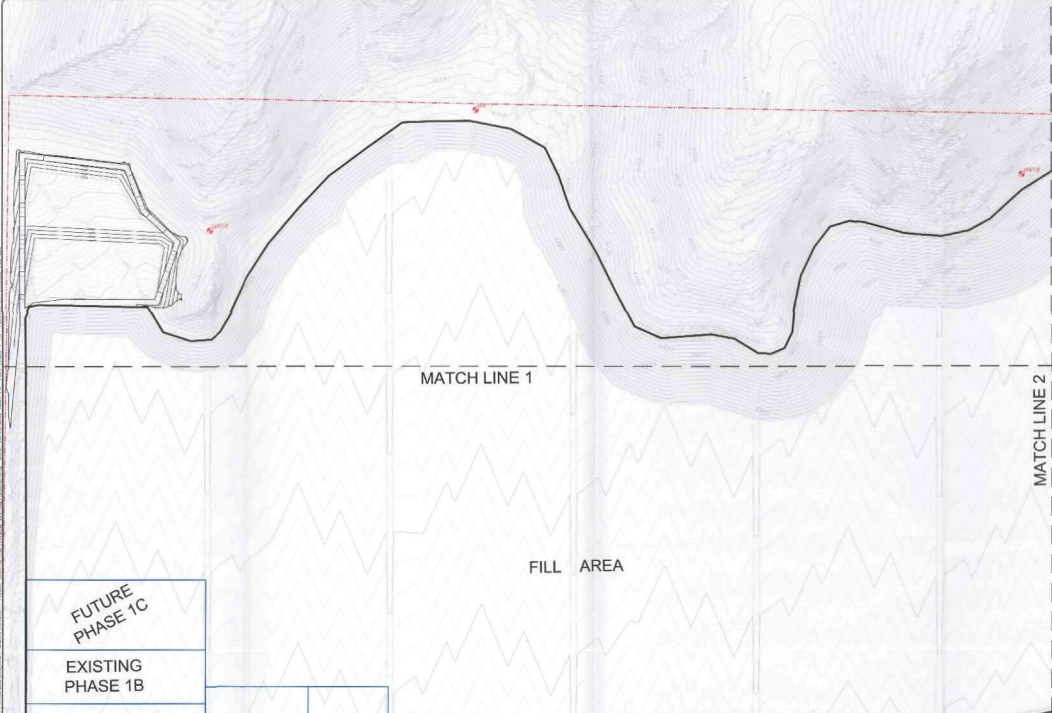
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FIGURE 3.6
200 Scale Map SW



- LEGEND
- TO FT CONTOUR
 - 2 FT CONTOUR
 - PROPERTY LOT
 - MATCH LINES
 - EXISTING PERMITS TO FT CONTOUR
 - EXISTING PERMITS 2 FT CONTOUR
 - LINES LINES
 - APPROXIMATE UNDER GROUND



MATCH LINE 1

MATCH LINE 2

FILL AREA

FUTURE PHASE 1C

EXISTING PHASE 1B

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SOUTHWEST SECTION

FIGURE NO.
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PROJECT NO.
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FIGURE 3.7
200 Scale Map NE

MATCH LINE 1

MATCH LINE 2



LEGEND

- 10 FT CONTOUR
- 2 FT CONTOUR
- 25 FT CONTOUR
- 3 FT CONTOUR
- REGULATORY LINE
- WELP 1 LINE
- IMPROVED LEAD LINES
- AUTOMATED GROUNDWATER MONITORING SYSTEM
- WEL

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FIGURE NO:
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 PROJECT NO:
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FIGURE 3.8
200 Scale Map NW

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 DRAWING: WASATCH REGIONAL LANDFILL PERMIT RENEWAL NORTHWEST SECTION
 DATE: 03/20/2020

MATCH LINE 2

MATCH LINE 1



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 PERMIT RENEWAL
 TOOELE COUNTY, UTAH
 NORTHWEST SECTION**

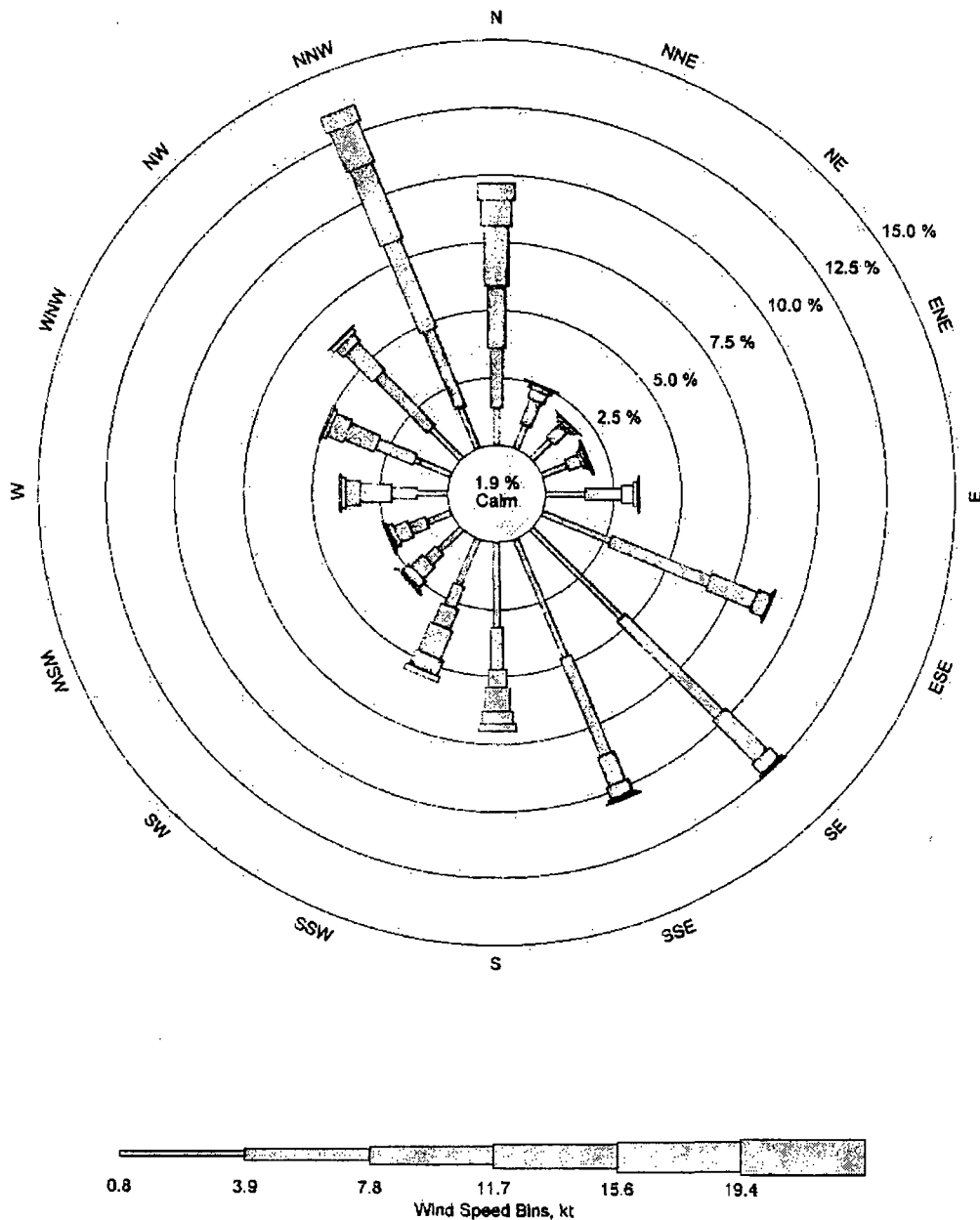
FIGURE NO.
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FIGURE 3.9
1:100,000 Scale USGS Map

Figure 3.10
Wind Rose Diagram for Deseret Chemical Depot, Tooele, Utah

Figure 6-4: Wind Rose



Windrose: Based on DCD weather data from Tower 9 (central to installation) for period 1/101 through 12/31/01.

FIGURE 4.1
Groundwater Contours

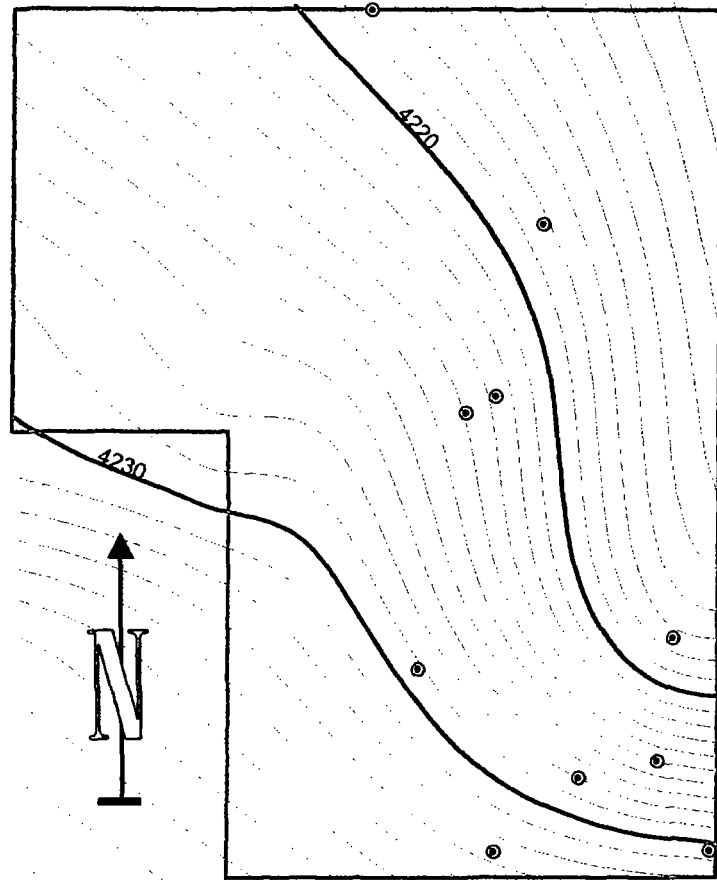


Figure 4.1 Groundwater contours indicating direction and gradient, along with borehole locations which encountered groundwater (red dots). Contour elevations in feet, with a 1-ft interval.

FIGURE 4.2
DWR Well Log Locations

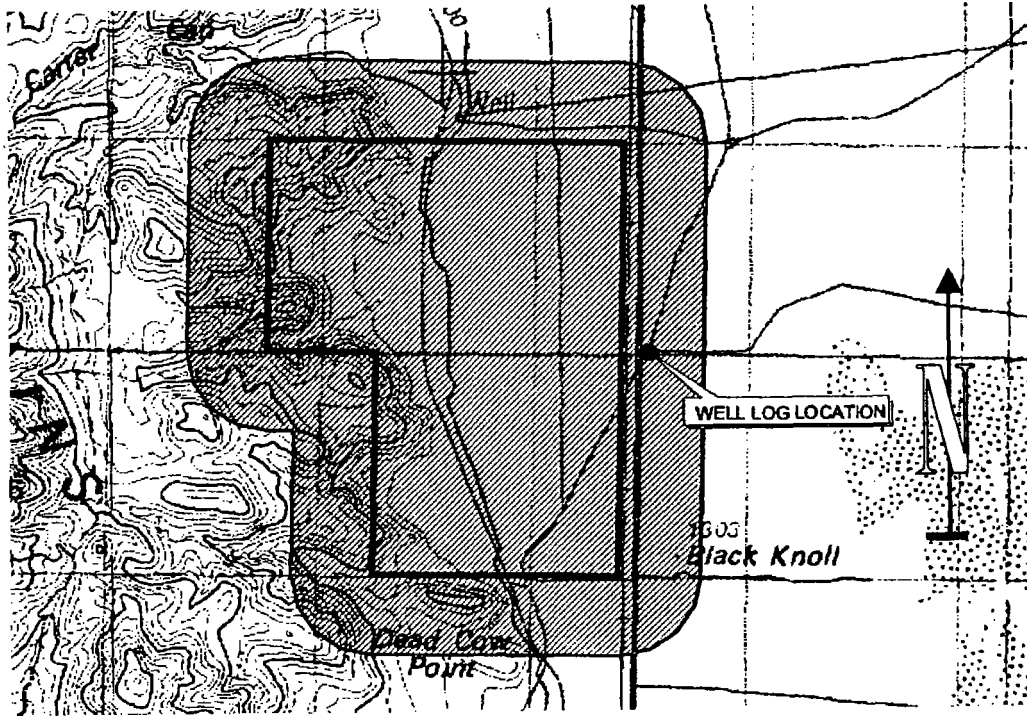


Figure 4.2. Well log location from the DWR well log database. Red hatched areas represent a 2,000 f buffer zone surrounding the site.

FIGURE 4.3
Water Rights Locations

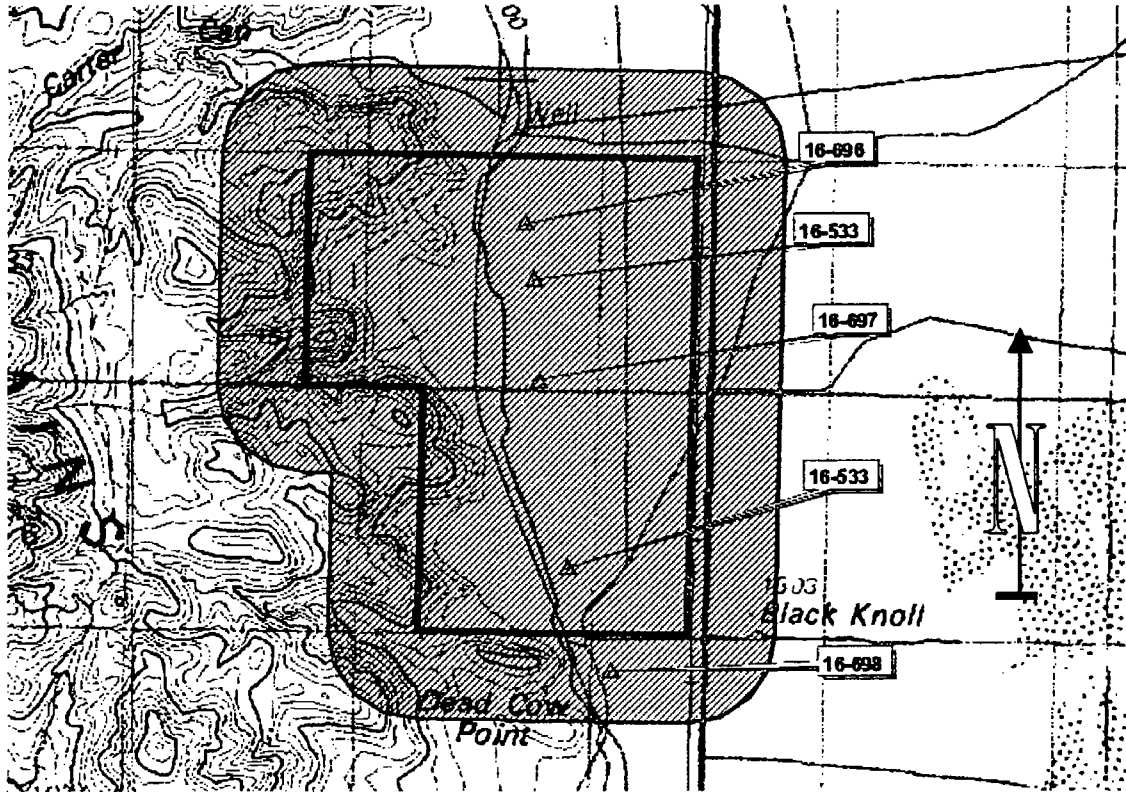


Figure 4.3. Water right numbers on record for the site area (blue line) including a 2,000 foot buffer surrounding in (red hatched area).

FIGURE 4.4
Ephemeral Drainages

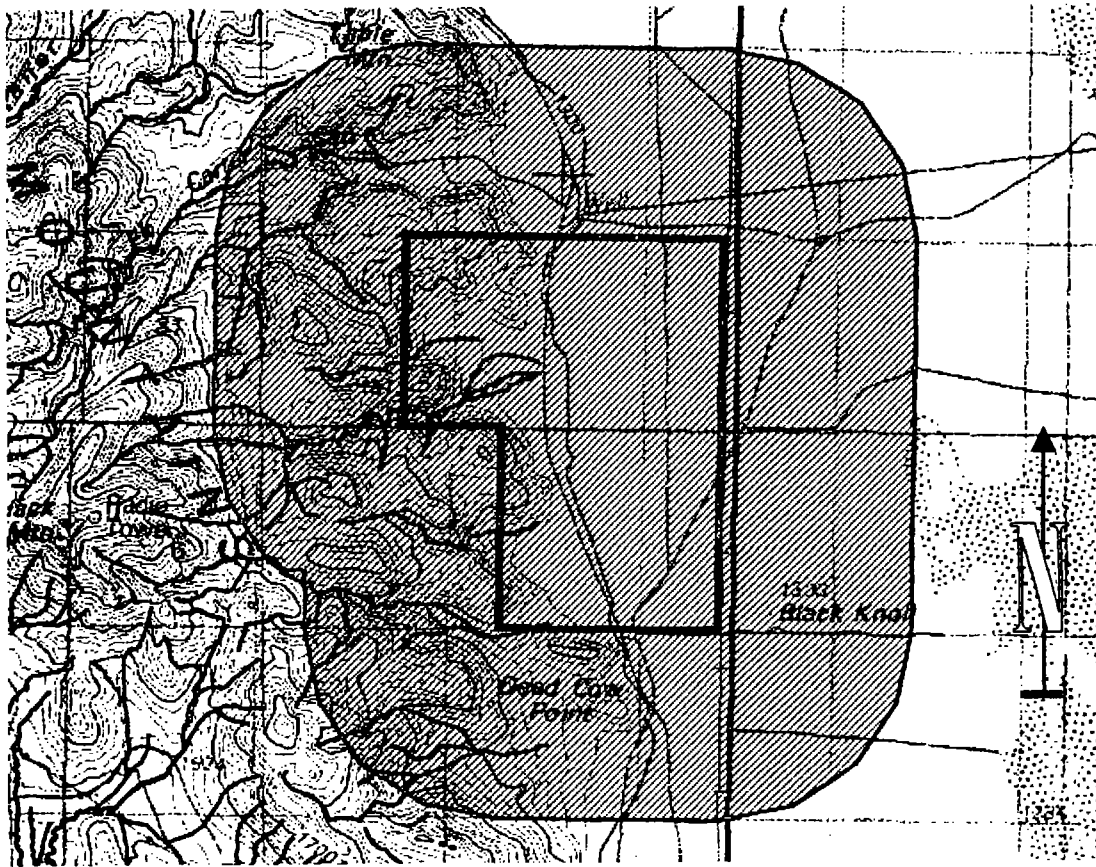


Figure 4.4 Ephemeral drainages west of the project site and 1-mile buffer (shown in red hatch).

FIGURE 4.5
Drainages and Watersheds

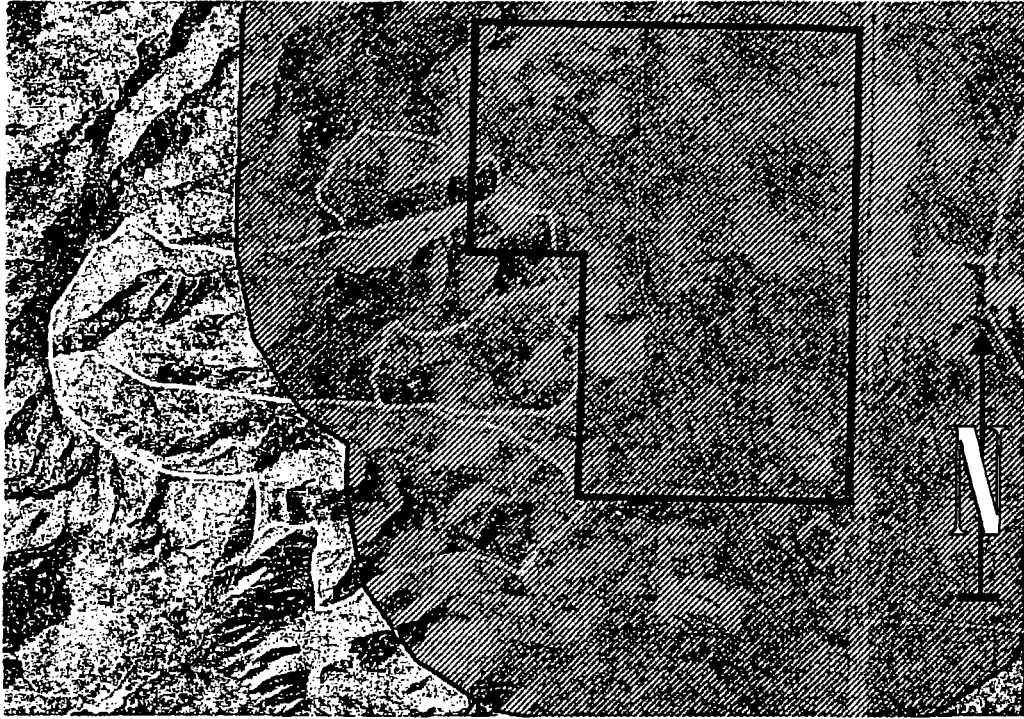


Figure 4.5 Drainages and associated watersheds for the foothills west of the site boundary (shown in blue), along with a 1-mile buffer (shown in red hatch).

FIGURE 4.6
Shoreline Elevations

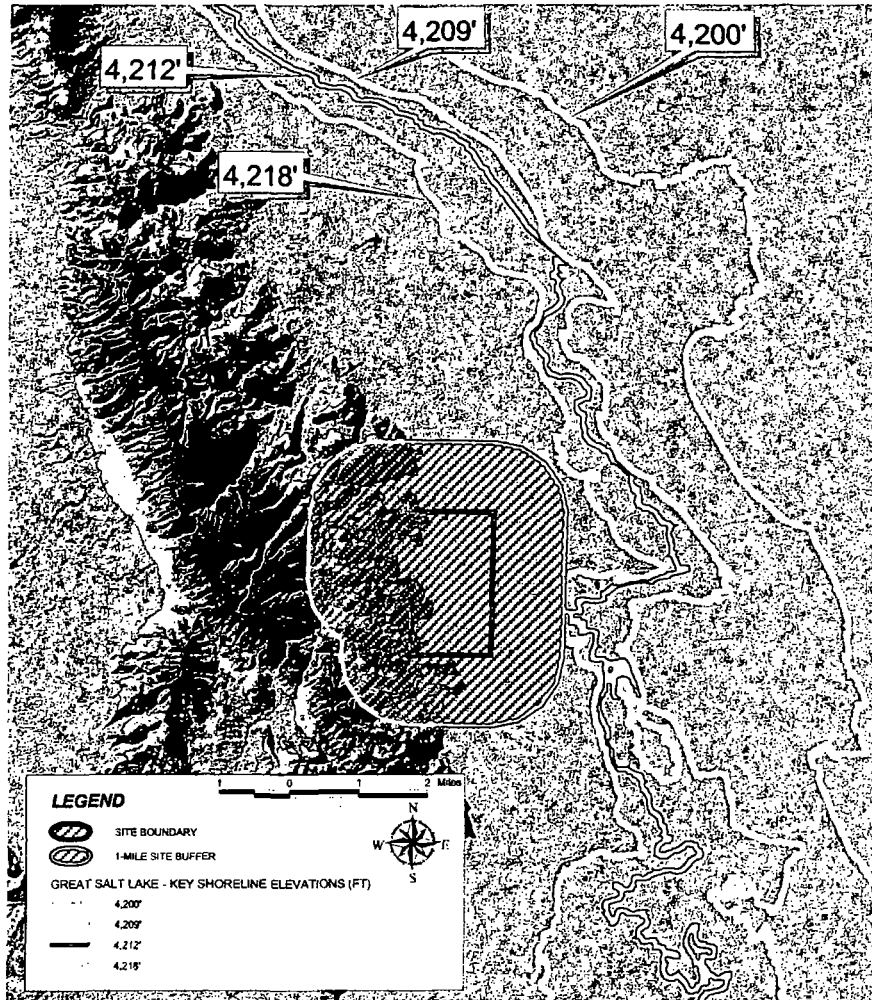


Figure 4.6. Key shoreline elevations of the Great Salt Lake, adapted from USGS DEM and AGRC data.

FIGURE 5.1
Model Grid

Figure 5.1 Model Grid

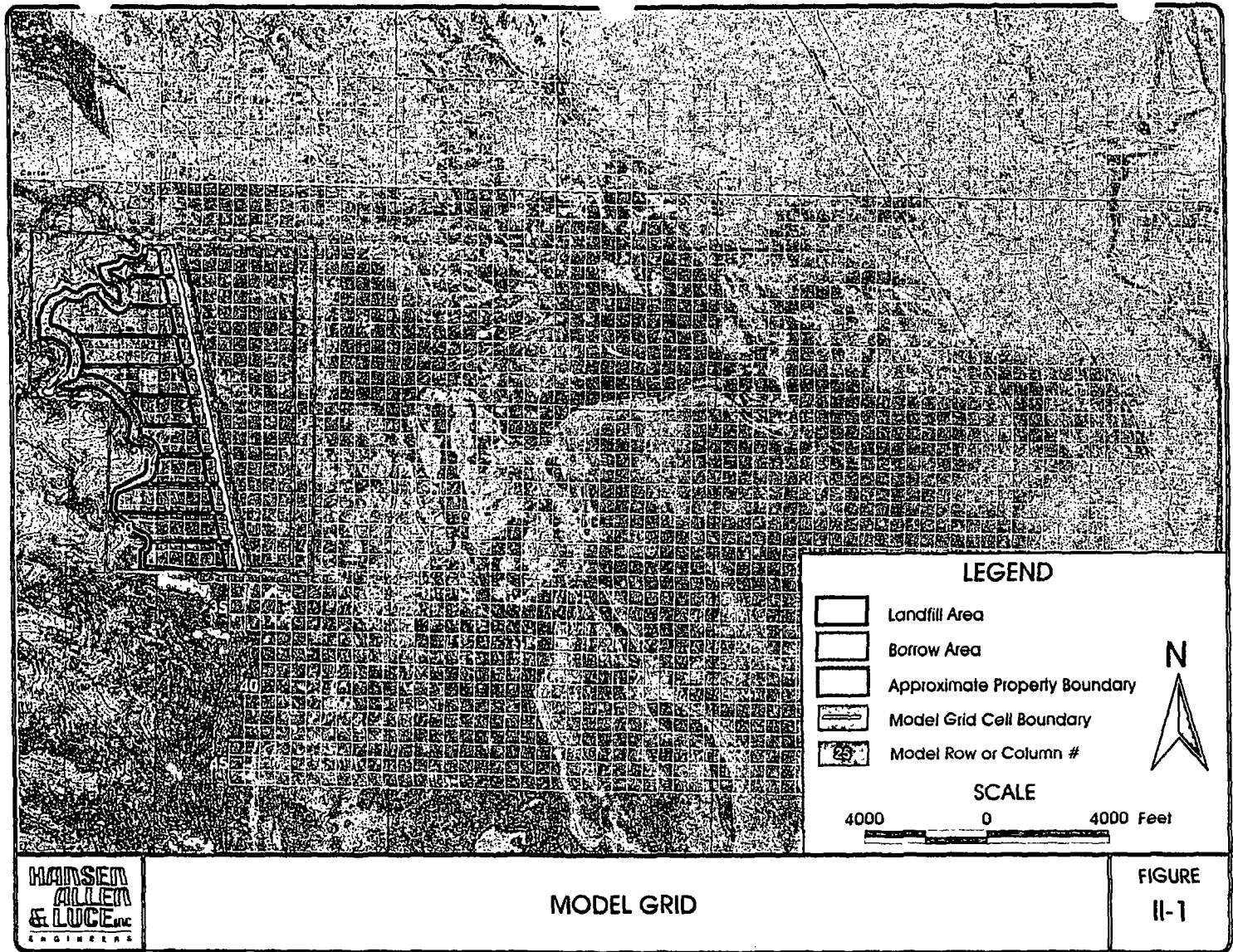


FIGURE 5.2
Recharge Areas

Figure 5.2 Recharge Areas

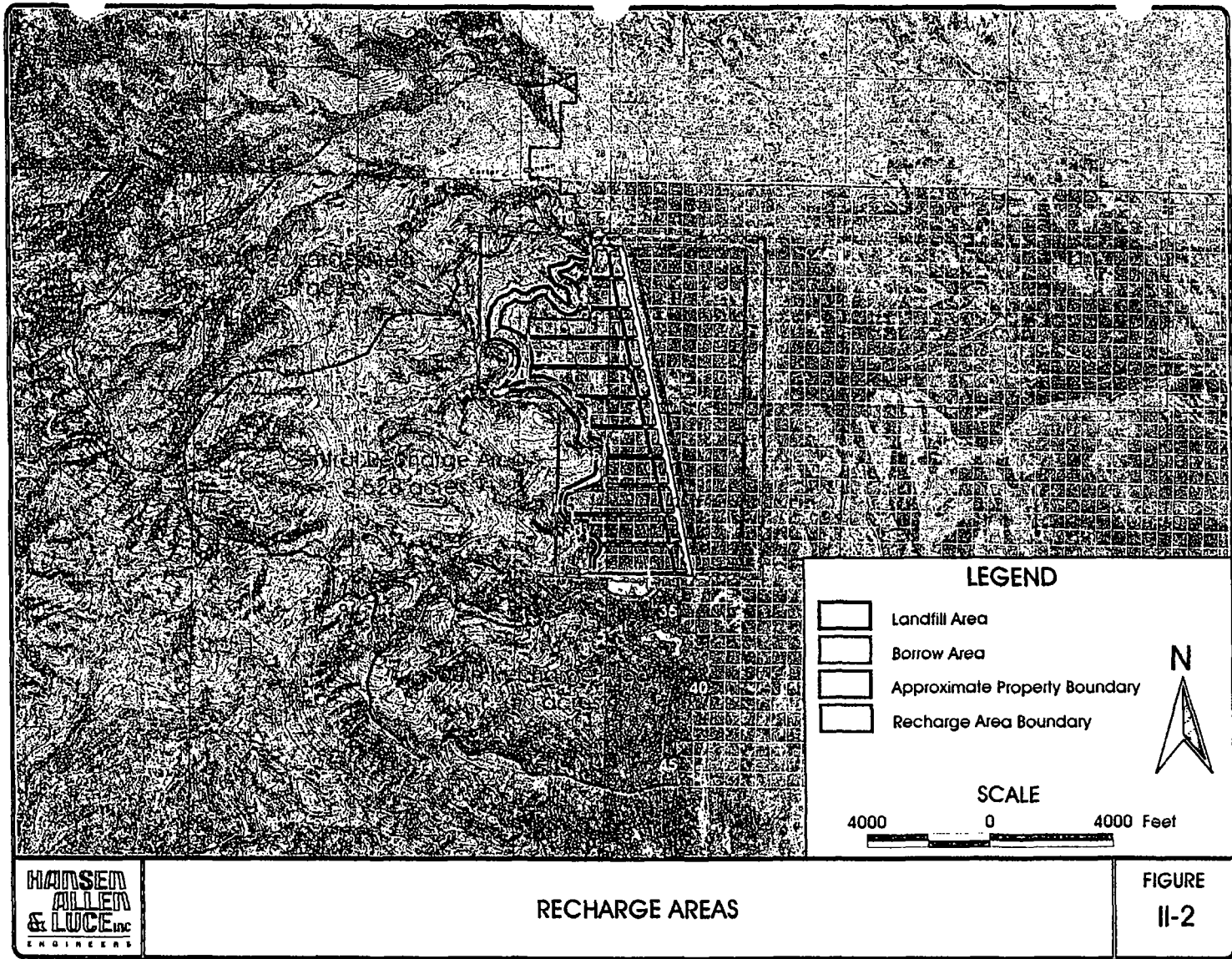
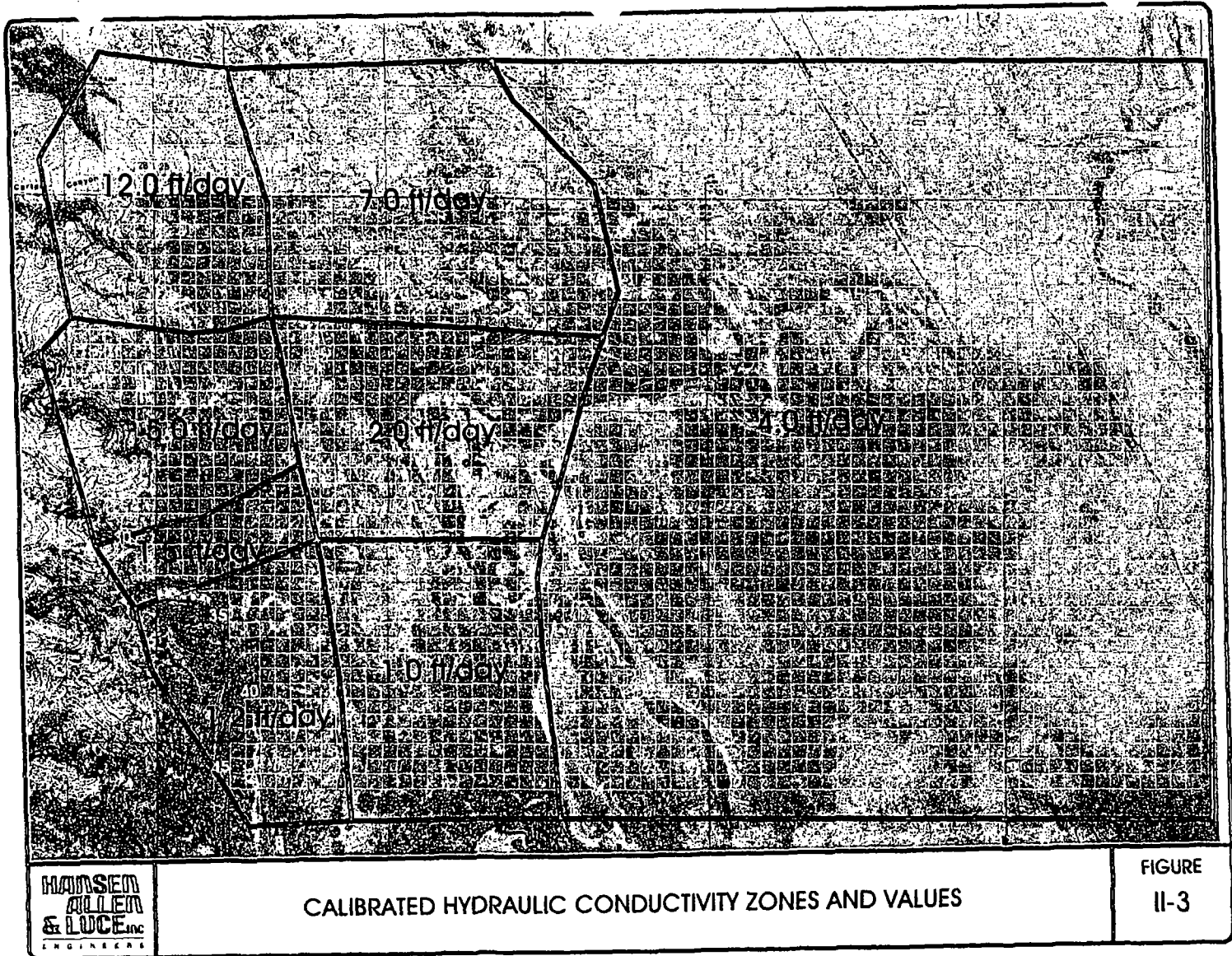


FIGURE 5.3
Calibrated Hydraulic Conductivity Zones and Values

Figure 5.3 Calibrated Hydraulic Conductivity Zones



HANSEN
ALLEN
& LUCE, INC.
ENGINEERS

CALIBRATED HYDRAULIC CONDUCTIVITY ZONES AND VALUES

FIGURE
II-3

FIGURE 5.4
Calibrated Groundwater Levels with Observation Points

Figure 5.4 Calibrated Groundwater Levels

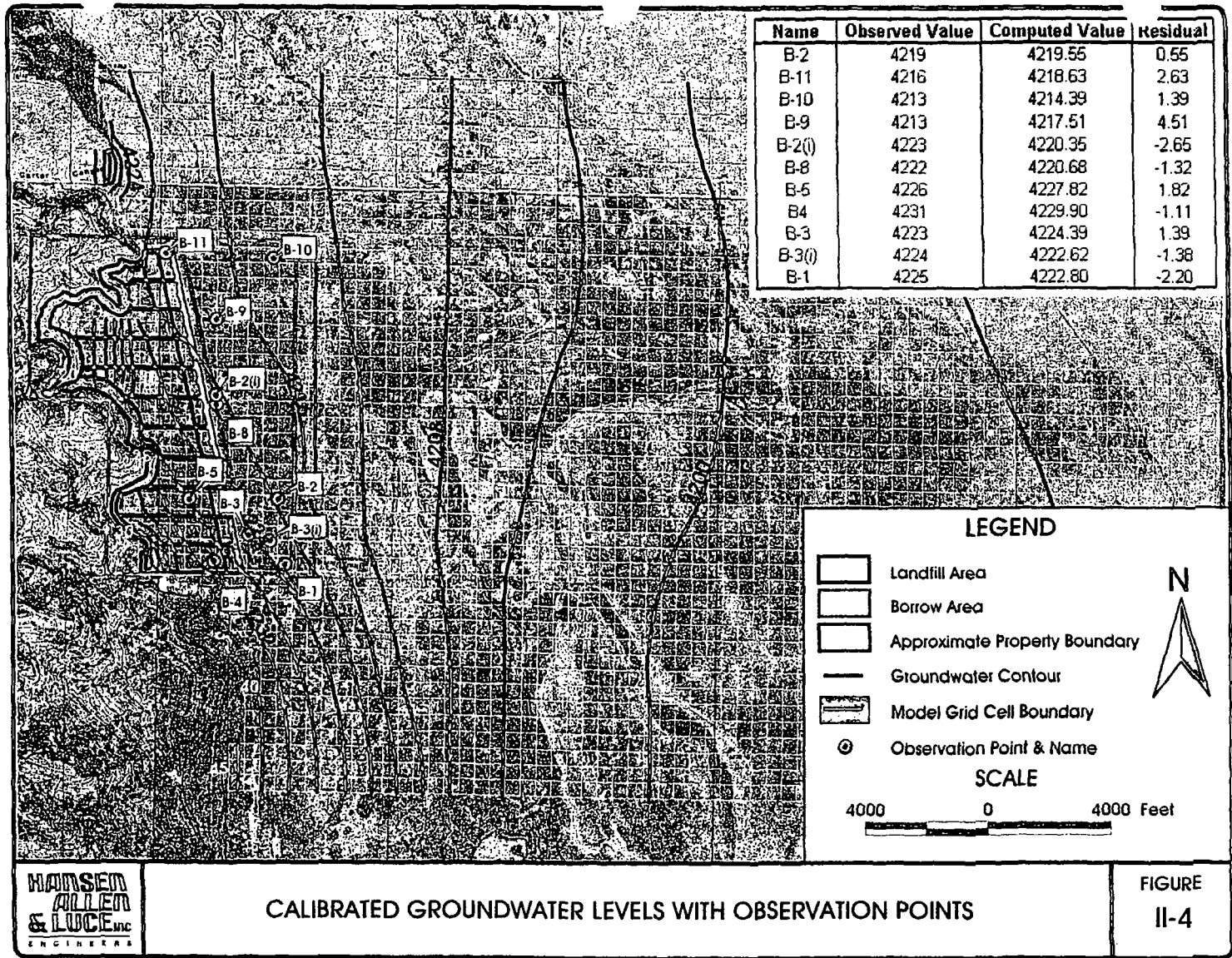


FIGURE 5.5
Computed Maximum Groundwater Levels

Figure 5.5 Computed Maximum Groundwater Levels

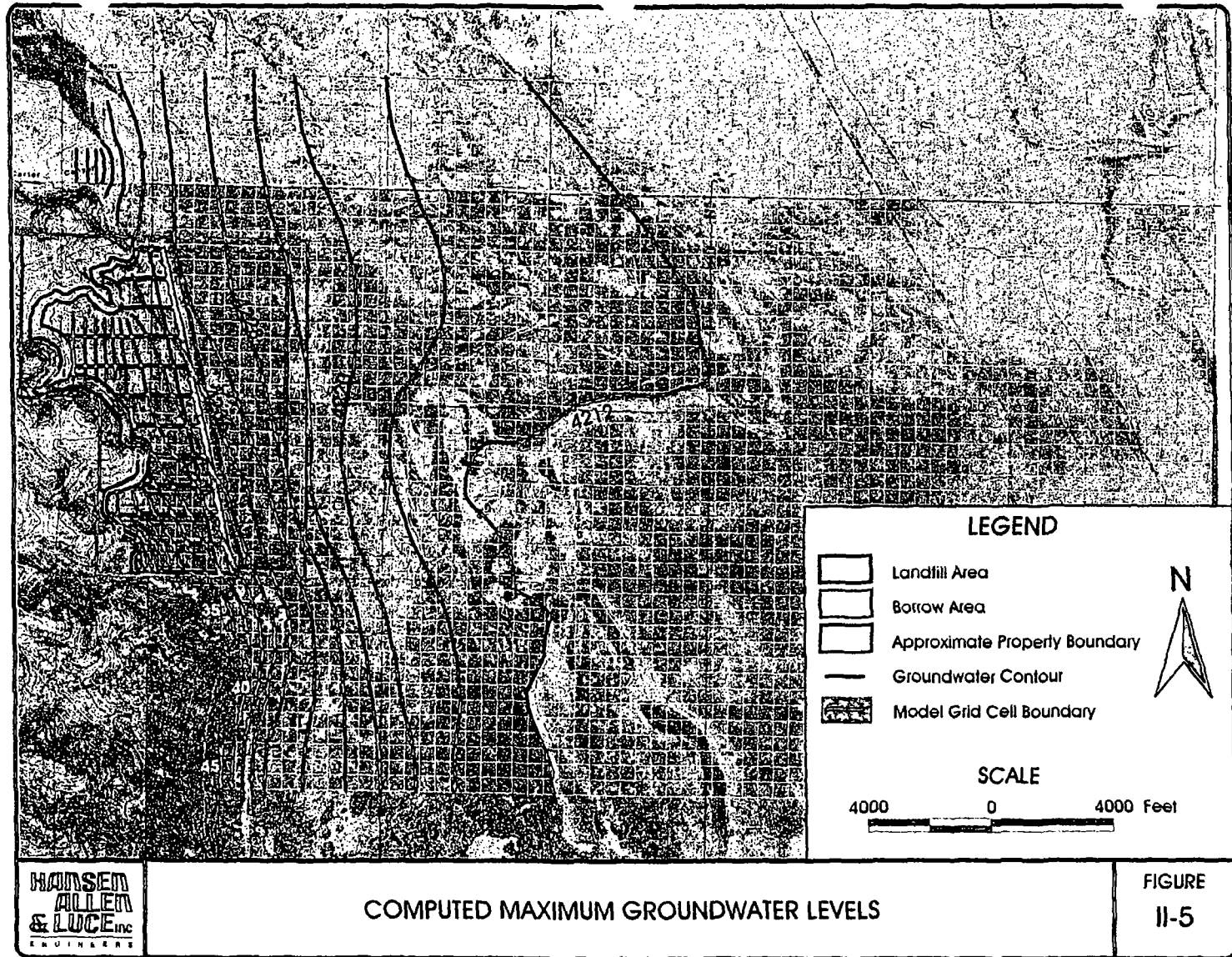


FIGURE 5.6
Computed Maximum Groundwater Levels with Drain Trench (6-2005)

Figure 5.6 Computed Maximum Groundwater Levels with Drain Trench revised
2005

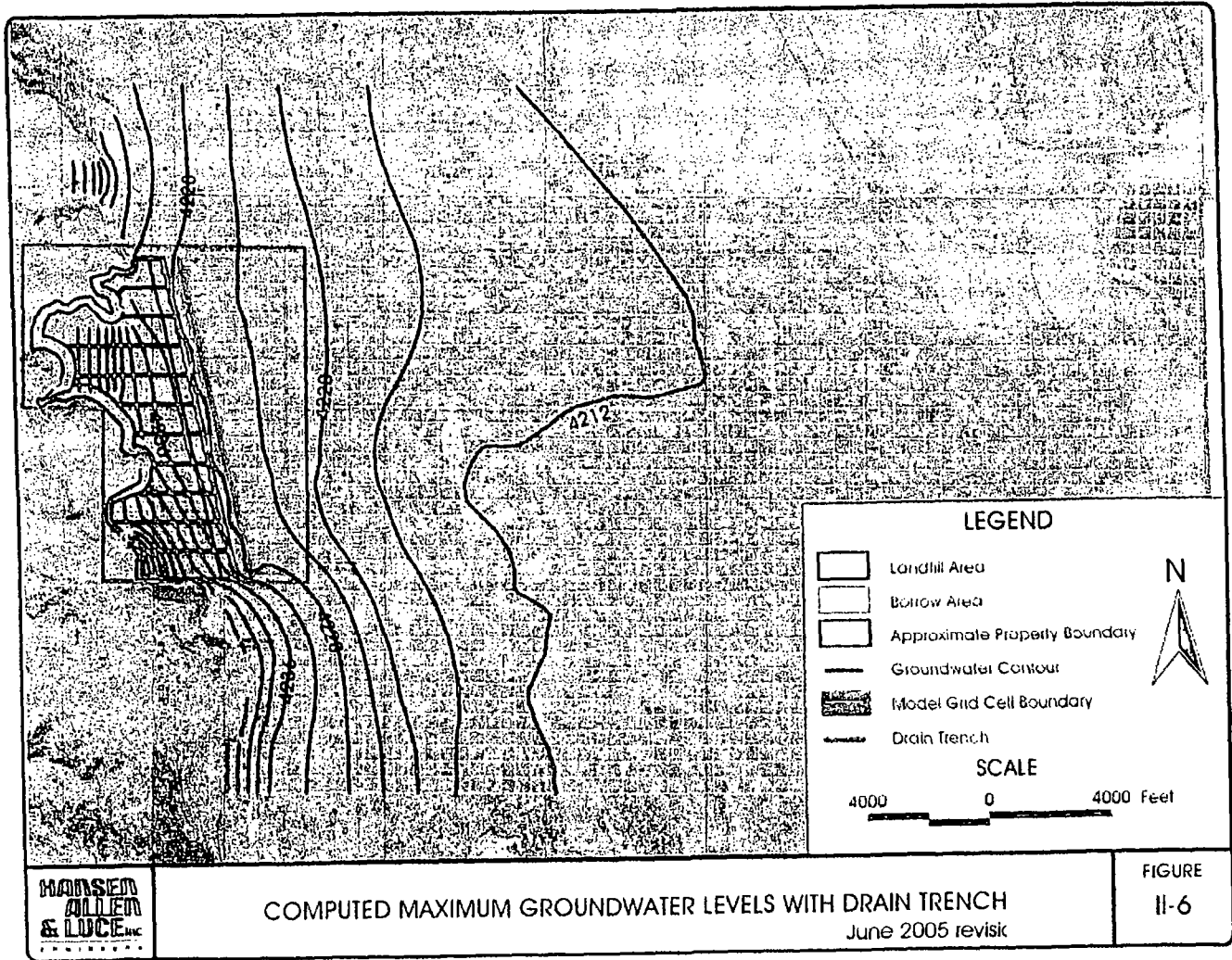


FIGURE 5.7
Computed Maximum Groundwater Levels
with Phase 1 Drain Trench (6-2005)

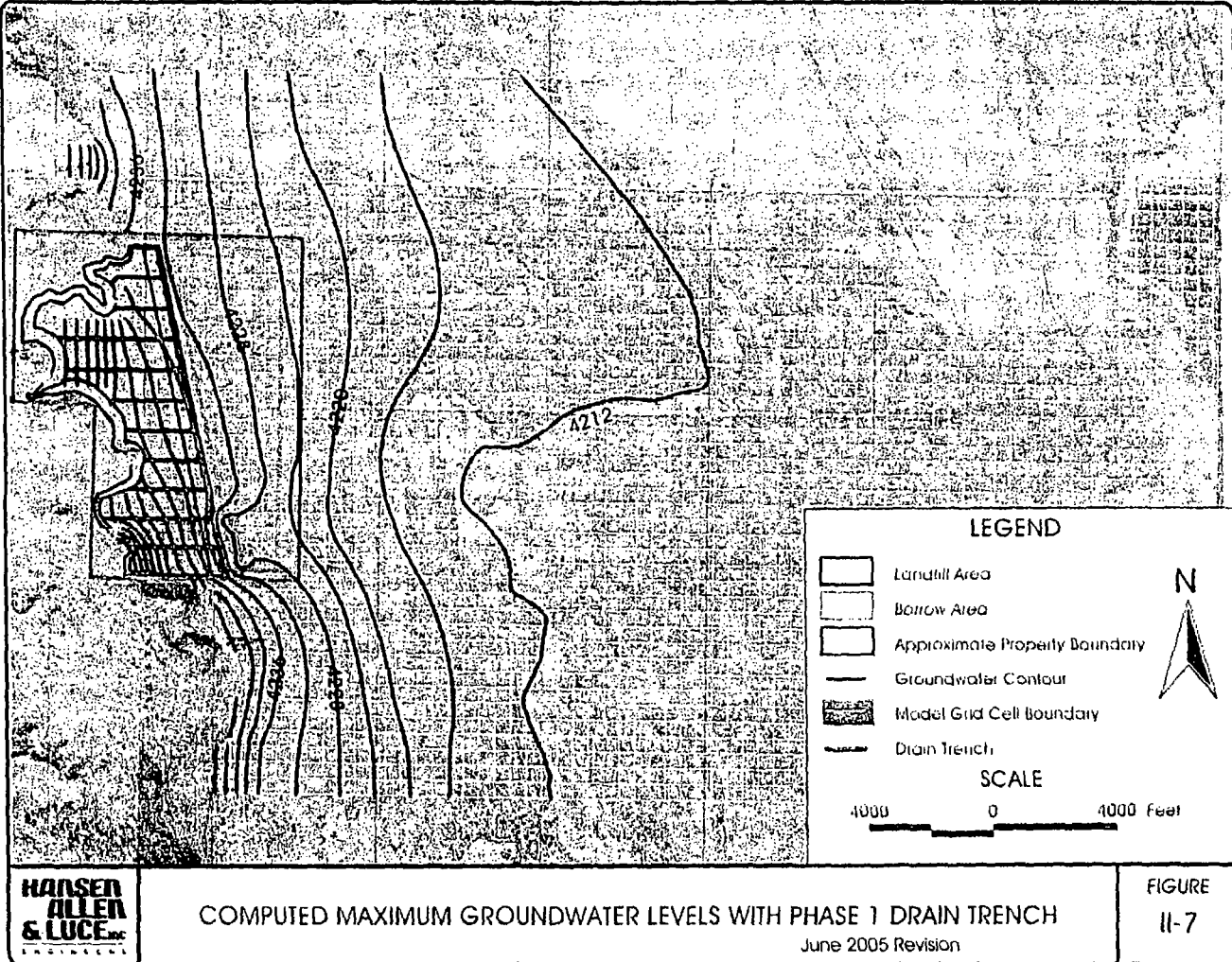
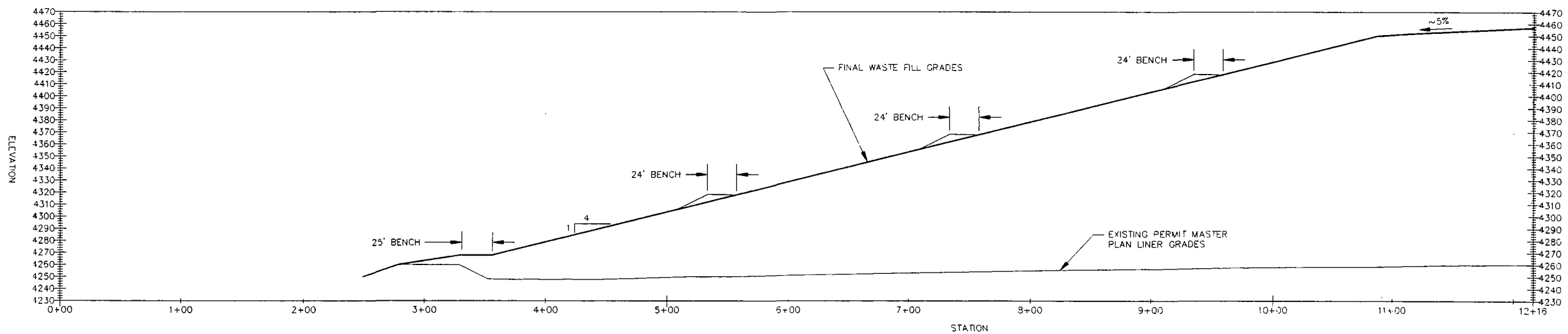
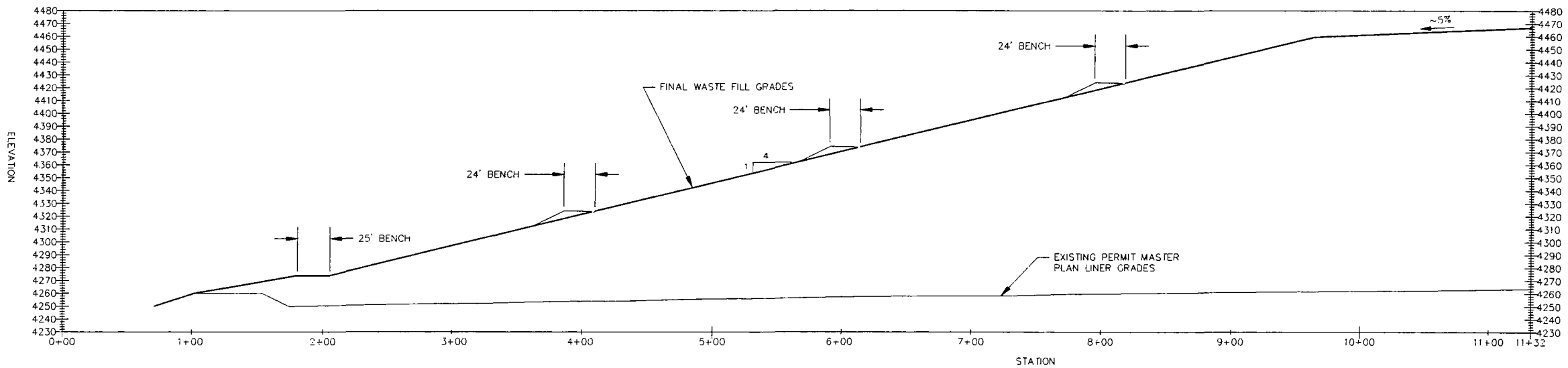


Figure 5.7 Computed Maximum Groundwater Levels with Phase 1 Drain Trench
revised 2005

FIGURE 7.1
Final Waste Grades

FIGURE 7.2
Cross Sections



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FIGURE NO.
4
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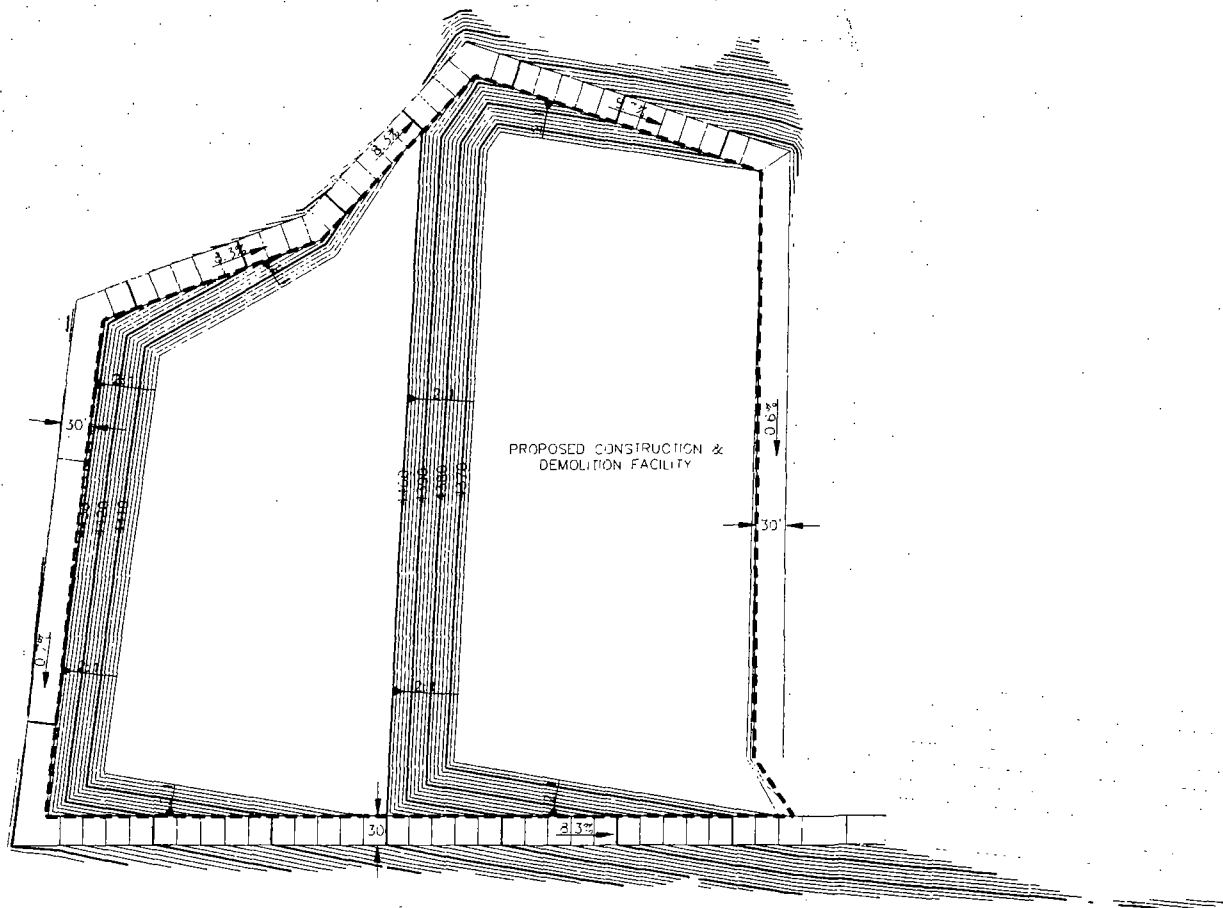
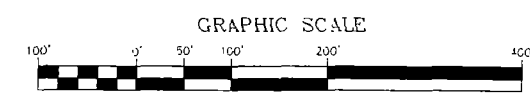
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FIGURE 7.3
C&D Facility Subgrade Plan

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FUTURE MSW
LANDFILL
SUBGRADE

- LEGEND**
- EXISTING 10 FT CONTOUR
 - EXISTING 2 FT CONTOUR
 - FUTURE 10 FT SUBGRADE CONTOUR
 - FUTURE 2 FT SUBGRADE CONTOUR
 - x-x- EXISTING FENCE
 - C&D FACILITY LIMITS

QUANTITIES

C&D FACILITY
 EXCAVATION = 234,508 CY
 ENGINEERED FILL = 9,662 CY
 FACILITY FLOOR AREA = 487,500 SF

NOTES:
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 LANDFILL, INC.**

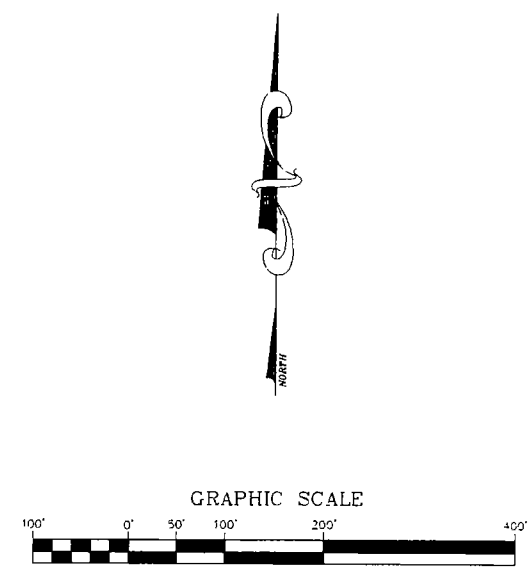
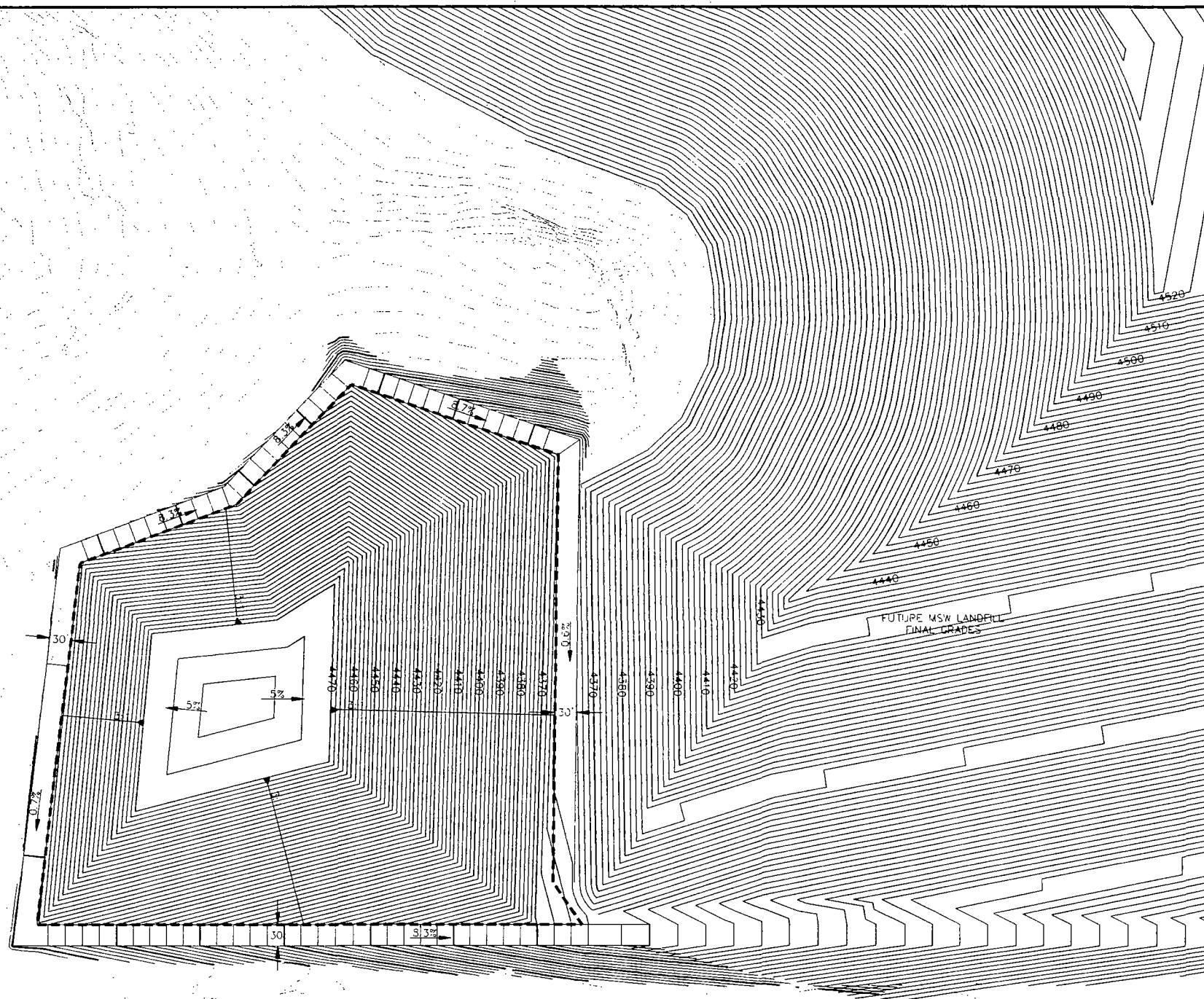
WASATCH REGIONAL LANDFILL
 PERMIT REVISION
 TOOELE COUNTY, UTAH
C&D FACILITY SUBGRADE PLAN

FIGURE NO.
5
 PROJECT NO.
 061204.11

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FIGURE 7.4
C&D Facility Final Cover Grade

V:\DATA\vector\data\Projects\Wasatch\Wasatch CAD Working Drawings\DESIGN.dwg DATE: 10/1/2008 10:47 AM PLOT SCALE = 1:2 PLOTTED BY: RICHARD PEYERS



- LEGEND**
- EXISTING 10 FT CONTOUR
 - EXISTING 2 FT CONTOUR
 - 2860— FUTURE FINAL 10 FT COVER CONTOUR
 - FUTURE FINAL 2 FT COVER CONTOUR
 - 2330— FUTURE 10 FT C&D ROAD GRADING CONTOUR
 - FUTURE 2 FT C&D ROAD GRADING CONTOUR
 - x-x- EXISTING FENCE
 - - - - C&D FACILITY LIMITS

QUANTITIES

C&D FACILITY
 CAPACITY = 773,524 CY
 COVER SURFACE AREA = 464,370 SF
 COVER SOIL VOLUME = 45,371 CY²

- NOTES**
- EXISTING TOPOGRAPHY BASED ON AERIAL SURVEY PERFORMED BY OLYMPUS AERIAL SURVEYS, INC. ON MARCH 3, 2008.
 - BASED ON 2.5' OF PROTECTIVE SOIL COVER.

| REV. NO. | DATE | DESCRIPTION | DRAWN BY | DESIGNED BY | CHECKED BY | APPROVED BY |
|----------|------|-------------|----------|-------------|------------|-------------|
| | | | | | | |

DATE OF ISSUE: 07/30/2008
 DESIGNED BY: JVR
 DRAWN BY: RPB
 CHECKED BY: JVR
 APPROVED BY: JVR

VECTOR
 ENGINEERING, INC.
 An Ausenco Group Company
 143E Spring Hill Drive, Grass Valley, CA 95945 +1-530-272-2448 +1-530-272-8533 fax
 THE AMERICAS • ASIA • AUSTRALIA

**WASATCH REGIONAL
 LANDFILL, INC.**

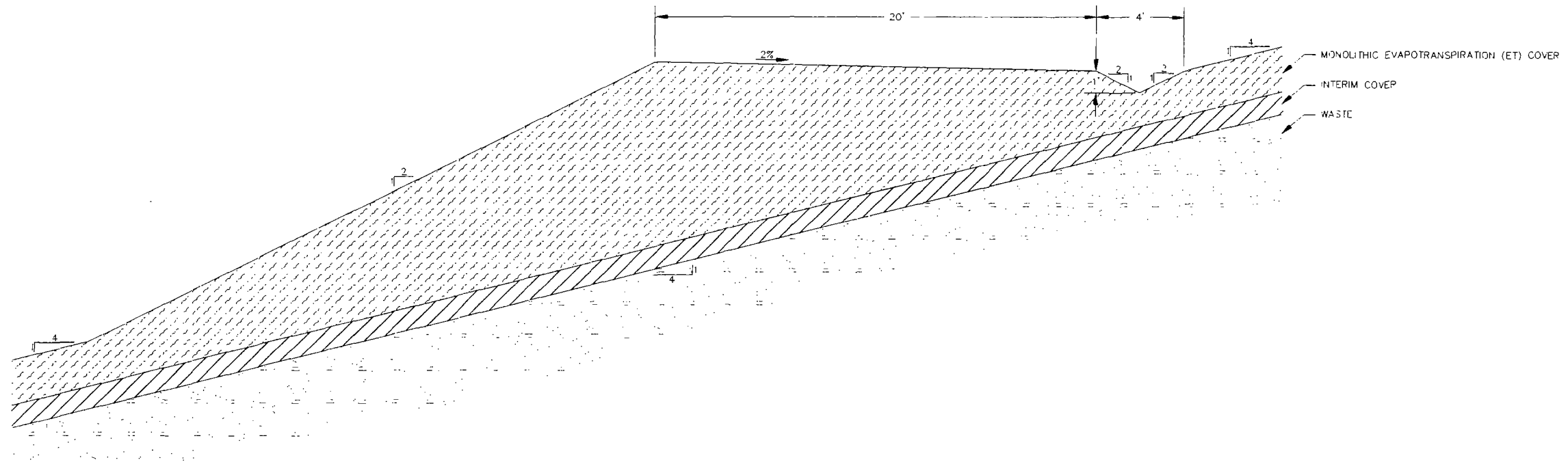
WASATCH REGIONAL LANDFILL
 PERMIT REVISION
 TOOELE COUNTY, UTAH
C&D FACILITY FINAL COVER GRADE

FIGURE NO.
6
 PROJECT NO.
 061204.11

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FIGURE 7.5
Final Cover Bench Detail

LOCATION: V:\Projects\081204\081204_13-00\DWG\EXPANSION\FIGURES.dwg DATE: 10/14/2009 2:05 PM PLOT SCALE = 1:2 PLOTTED BY: RICHARD PEYERS



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| REV. NO. | DATE | DESCRIPTION | DRAWN BY | DESIGNED BY | CHECKED BY | APPROVED BY | DATE OF ISSUE: 10/14/2009 | VECTOR ENGINEERING, INC. An Ausenco group company THE AMERICAS • ASIA • AUSTRALIA 143E Spring Hill Drive, Grass Valley, CA 95945 +1-530-272-2448 +1-530-272-8333 fax | WASATCH REGIONAL LANDFILL, INC. | WASATCH REGIONAL LANDFILL PERMIT RENEWAL TOOELE COUNTY, UTAH | FIGURE NO. 3 | |
| | | | | | | | | | | | PROJECT NO. 081204.13 | |
| | | | | | | | | | | | DETAILS | |
| | | | | | | | | | | | | |

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ISSUED FOR PERMITTING

FIGURE 9.1
Tributary Sections

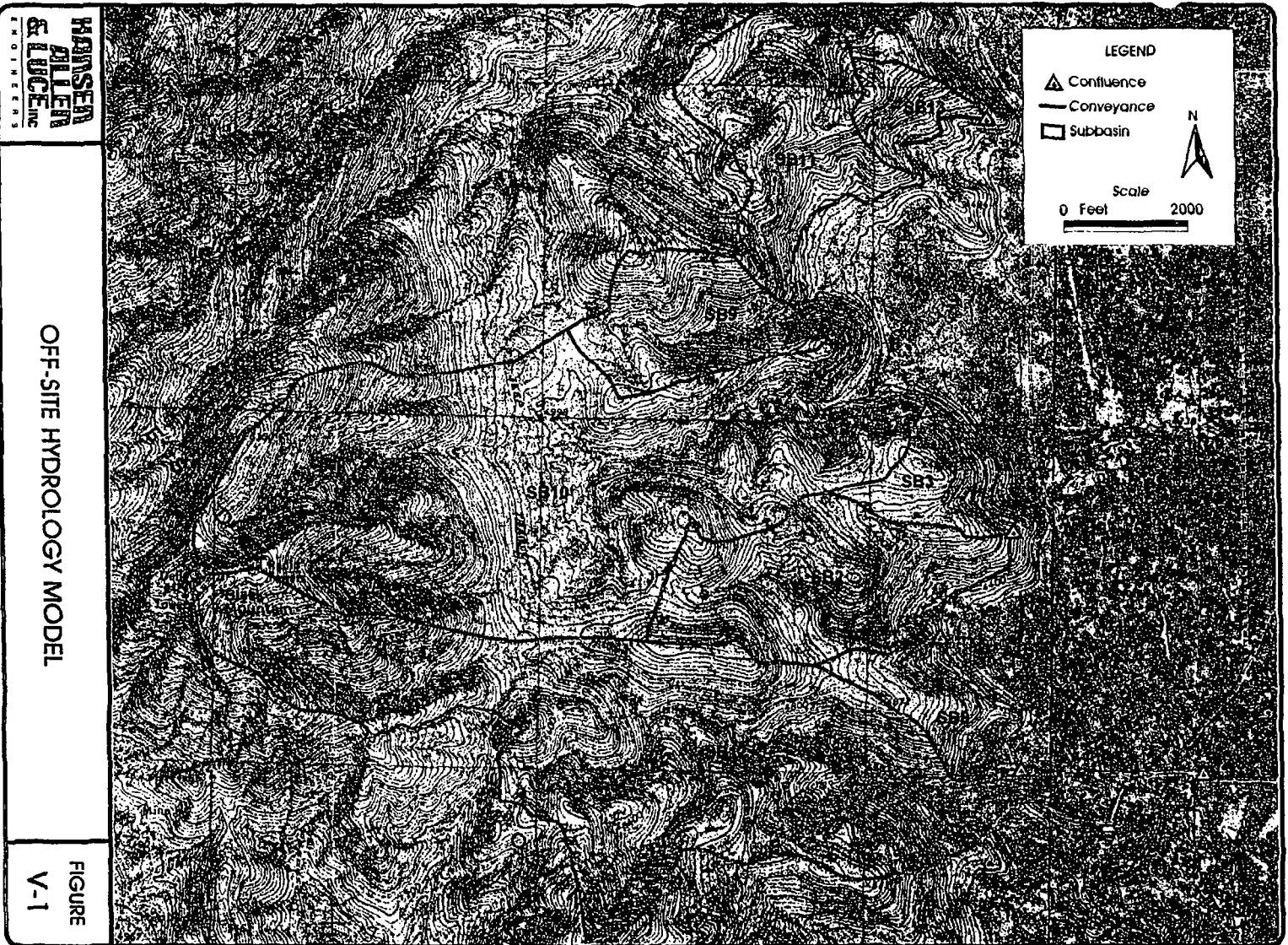


Figure 9.1 Tributary Subbasins

FIGURE 9.2
SCS Type II Storm Distribution Curve

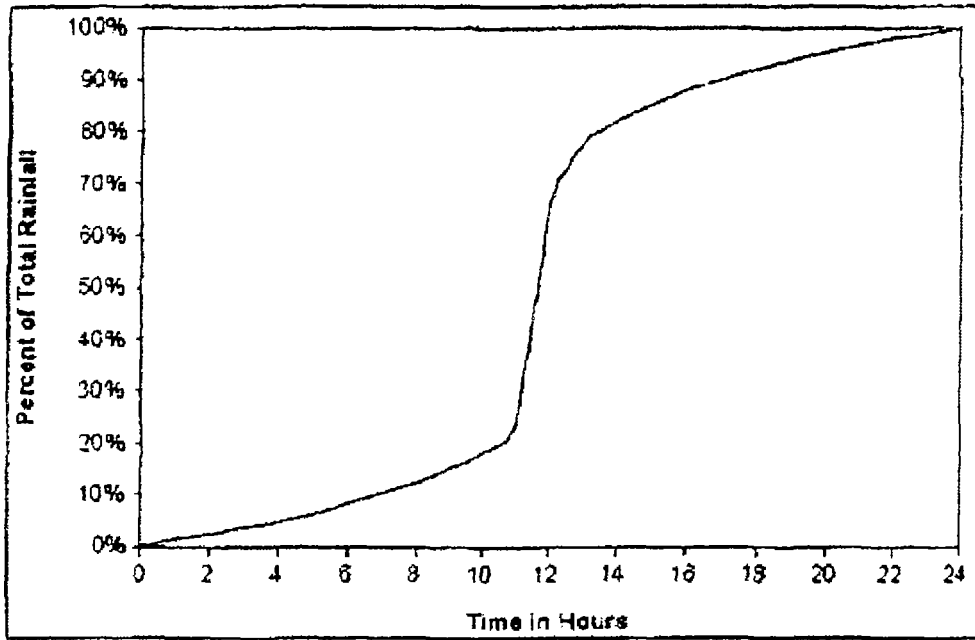


FIGURE 9.2 SCS Type II Storm Distribution Curve

FIGURE 9.3
Peak Design Flows

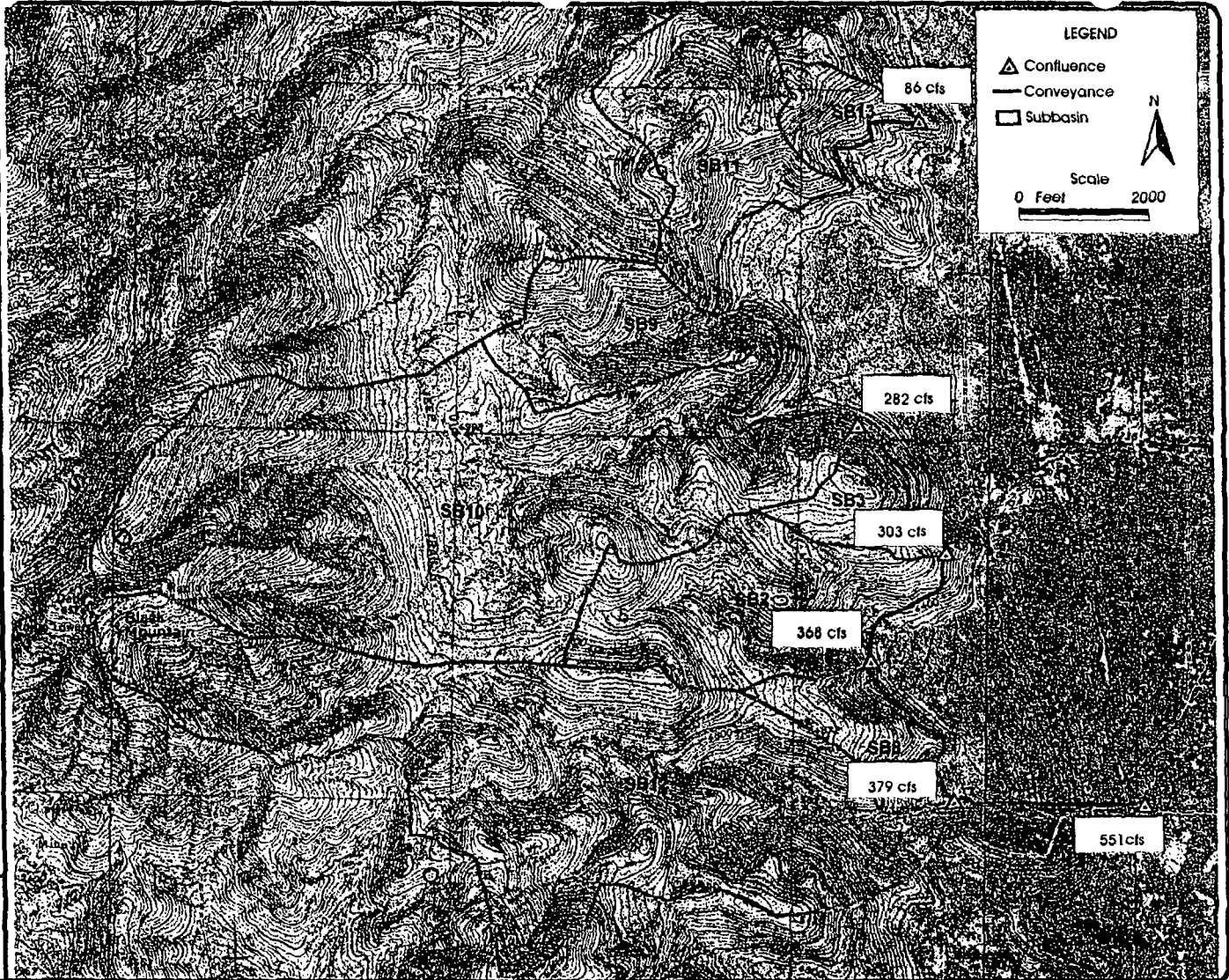


Figure 9.3 Peak Design Flows

FIGURE 9.4
Subbasin Delineation

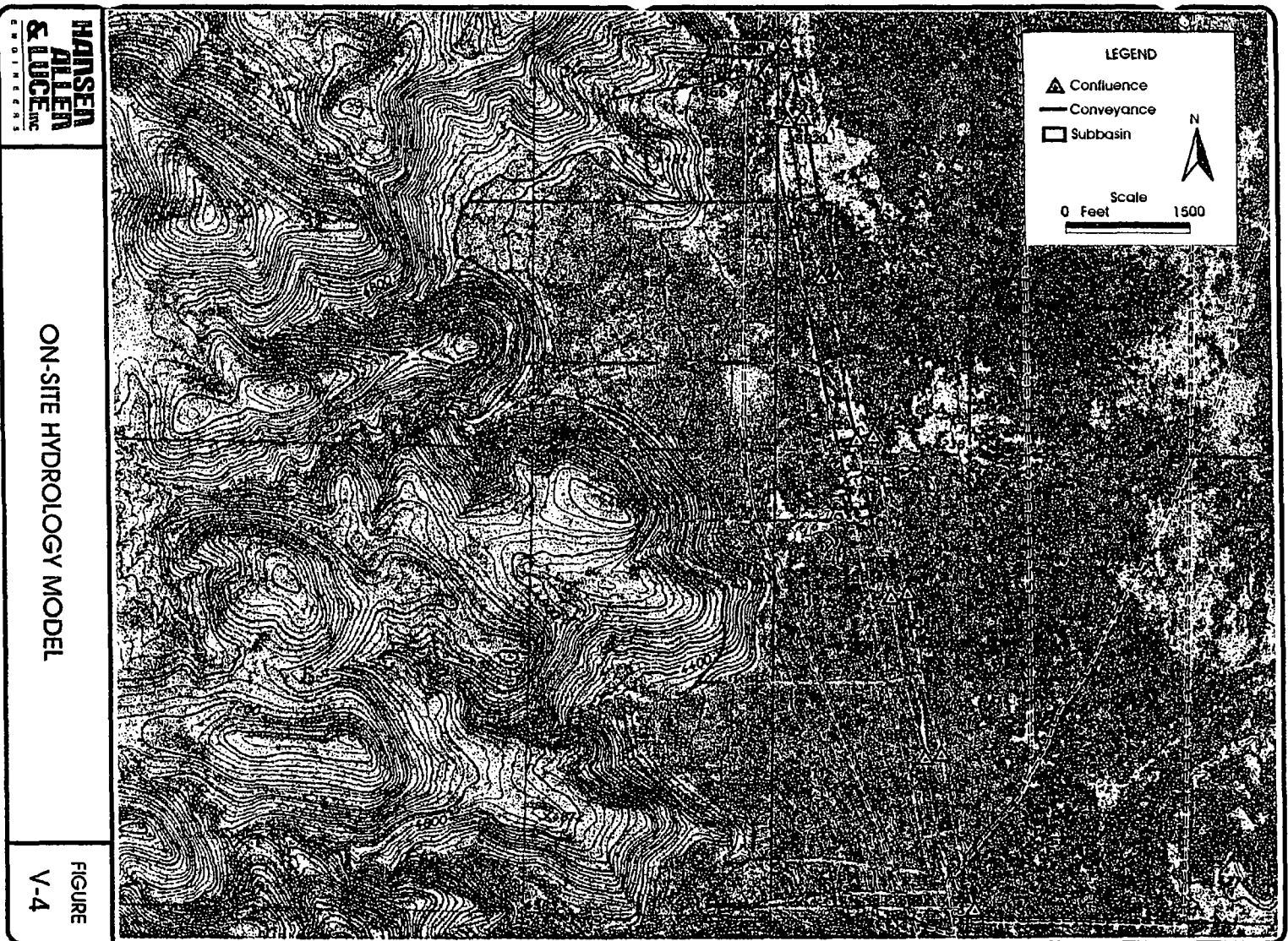


Figure 9.4 Subbasin Delineation

FIGURE 9.5
Subbasin Peak Design Flows

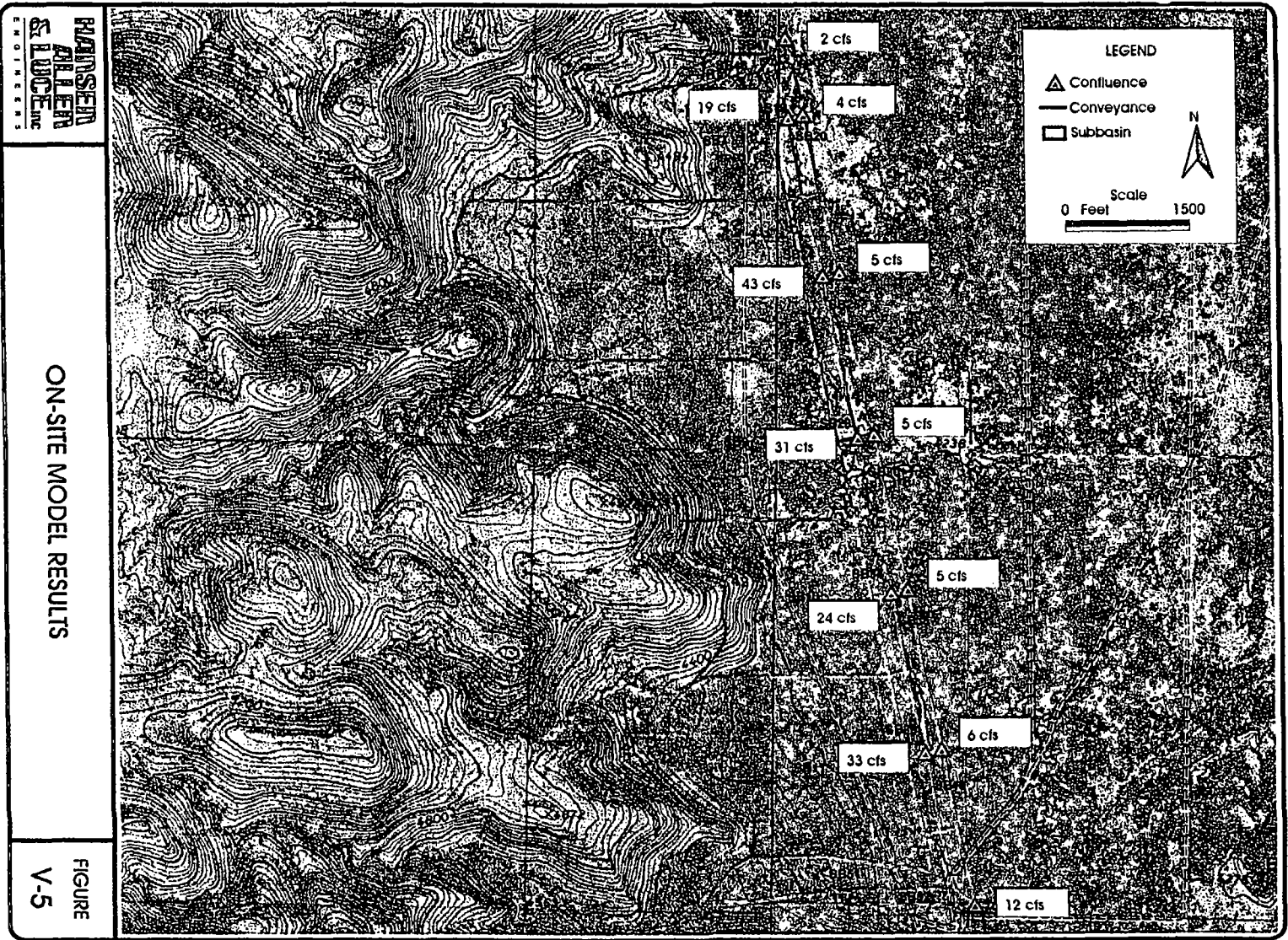


Figure 9.5 Subbasin Peak Design Flows

APPENDIX 2
GENERAL INFORMATION (PSOMAS)



State of Utah

School and Institutional
TRUST LANDS ADMINISTRATION

Michael O. Leavitt
Governor

Kevin S. Carter
Director

675 East 500 South, Suite 500
Salt Lake City, Utah 84102-2818
801-538-5100
801-355-0922 (Fax)
<http://www.trustlands.com>

July 14, 2003

Ms. Nicole Cline, AICP
Division Manager
Tooele County Planning Department
47 South Main Street
Tooele, Utah 84074

Re: Wasatch Regional Solid Waste Management Corp./ Conditional Use Permit
Application for Proposed Landfill

Dear Ms. Cline:

This letter is intended to express the support and consent of the Utah School and Institutional Trust Lands Administration (the "Trust Lands Administration") to the conditional use permit application submitted by Wasatch Regional Solid Waste Management Corporation ("Wasatch") for a municipal solid waste landfill to be located on state school trust lands west of the Rowley Road in Tooele County.

The Trust Lands Administration and Wasatch entered into a detailed letter of intent on July 1, 2003, setting forth agreed terms for the development of the proposed landfill site. The Trust Lands Administration's Board of Trustees has also approved the transaction on the basis of these terms. The Trust Lands Administration and Wasatch are now in the final stages of incorporating the terms of the letter of intent into a definitive agreement, and we anticipate that this agreement will be executed in the next few weeks.

The transaction will be structured as a long-term ground lease from the Trust Lands Administration to Wasatch, with Wasatch purchasing individual waste cells as necessary from time to time, and ultimately purchasing the entire property. Wasatch will have sole operational control of the property and landfill operations thereon.

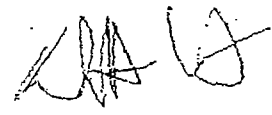
We have enclosed Tooele County's Agent Authorization Form, together with a legal description of the lands included in the transaction. If you have any questions or comments, please feel free to contact me or John Andrews, our agency's Associate Director, at (801) 538-5100. Thank you for your consideration of this proposal.

Utah!

Utah Trust Lands Administration

Ms. Nicole Cline, AICP
Tooele County Planning Dept.
July 14, 2003
Page -2-

Sincerely,



Kevin S. Carter
Director

Enclosures

- cc: Jodi Hoffman, WRSWMC
- John W. Andrews
- Kim Christy
- Kay Burton

Jul 13 03 11:31p Hoffman Law

435.940.1092

p. 2

07/10/03 15:41 FAX SOL 270 5782

PSOKAS AND ASSOCIATES

@ 104/004

AGENT AUTHORIZATION

State of Utah, School & Institutional Trust Lands Administrator,
 I (we), _____,
 the owner(s) of the real property located as follows,
See Exhibit A _____, and further
 described in the attached application, do authorize as my (our) agent(s)
Wasatch Regional Solid Waste Mgt. Corp. to represent me (us) regarding the attached
 application and to appear on my (our) behalf before any administrative or legislative body in the County
 considering this application and to act in all respects as our agent in matters pertaining to the attached
 application.

[Signature]

 Director (Property Owner)

 (Property Owner)

 (Property Owner)

 (Property Owner)

Dated this _____ day of July, 13 2003, personally appeared before me

the signer(s) of the above agent authorization who duly acknowledged to me that they executed the same.

[Signature]
 _____ (Notary)

Residing in: [Signature]

My commission expires: 6/1/2005

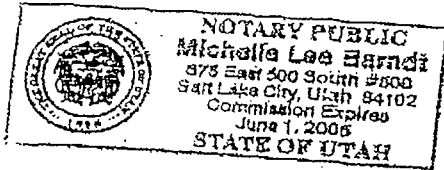


Exhibit A

School Trust Lands Within Conditional Use Permit Application

Wasatch Regional Solid Waste Management Corporation

Initial Landfill Area:

Township 1 North, Range 8 West, SLB&M

Section 3: Lots 3 & 4, S2NW4, SW4

Section 4: Lots 1, 2, & 3, SE4NW4, E2SW4, SE4, S2NE4

Township 2 North, Range 8 West, SLB&M

Section 32: E2E2

Section 33: All

Section 34: W2

Acreage: 1,968.73 acres m/l

APPENDIX 2.2
Lease Agreement/Proof of Ownership

OPTION AGREEMENT

Between

THE STATE OF UTAH, acting through
the SCHOOL AND INSTITUTIONAL
TRUST LANDS ADMINISTRATION

and

WASATCH REGIONAL SOLID WASTE
MANAGEMENT CORPORATION,
a Utah corporation

Dated January 26 2004

TABLE OF CONTENTS

Page

| | | |
|-----------|--|----|
| ARTICLE 1 | OPTION AGREEMENT | 1 |
| 1.1 | Option..... | 1 |
| 1.2 | Initial Option Payment | 1 |
| 1.3 | Option Commencement and Termination; Extensions..... | 1 |
| 1.4 | Option Payment Provisions | 2 |
| 1.5 | Exercising the Option..... | 2 |
| 1.6 | Interests of SITLA in the Subject Property | 3 |
| ARTICLE 2 | SALES PRICE..... | 4 |
| 2.1 | Sales Price | 4 |
| 2.2 | Disbursements | 4 |
| ARTICLE 3 | DUE DILIGENCE MATTERS; AS IS NATURE OF TRANSACTION | 4 |
| 3.1 | Information to be Provided by SITLA | 4 |
| 3.2 | Cooperation..... | 4 |
| 3.3 | Wasatch Due Diligence..... | 5 |
| 3.4 | As Is Nature of Transaction; Release | 6 |
| 3.5 | Non-Exercise of Option or Failure to Close..... | 6 |
| ARTICLE 4 | ESCROW..... | 7 |
| 4.1 | Escrow..... | 7 |
| 4.2 | Acceptance of Escrow | 7 |
| 4.3 | Escrow Cancellation Charges..... | 7 |
| 4.4 | IRS Reporting at Closing | 7 |
| ARTICLE 5 | CLOSING | 7 |
| 5.1 | Closing Date..... | 7 |
| 5.2 | Closing Statements | 7 |
| 5.3 | Closing Obligations of SITLA | 8 |
| 5.4 | Closing Obligations of Wasatch..... | 9 |
| 5.5 | Closing Costs..... | 9 |
| 5.6 | Payments and Disbursements to Be Handled through the Escrow..... | 9 |
| 5.7 | Closing the Transaction..... | 10 |
| 5.8 | Special Reimbursement to SITLA..... | 10 |
| ARTICLE 6 | ADDITIONAL COVENANTS | 10 |
| 6.1 | Risk of Loss..... | 10 |
| 6.2 | No Further Title Encumbrances | 10 |
| 6.3 | The Mineral Estate | 10 |

TABLE OF CONTENTS
(continued)

| | Page |
|--|------|
| 6.4 Water Rights..... | 11 |
| 6.5 Brokerage..... | 11 |
| 6.6 Duty to Defend..... | 11 |
| ARTICLE 7 REMEDIES..... | 11 |
| 7.1 Remedies of SITLA..... | 11 |
| 7.2 Remedies of Wasatch..... | 11 |
| ARTICLE 8 GENERAL PROVISIONS..... | 12 |
| 8.1 Assignment..... | 12 |
| 8.2 Request for Consent..... | 12 |
| 8.3 Conditions to Consent..... | 13 |
| 8.4 Effect of Consent..... | 13 |
| 8.5 No Release; Improper Assignment or Sublease Void..... | 13 |
| 8.6 Transferee Obligations..... | 13 |
| 8.7 Licensees..... | 14 |
| 8.8 Expenses..... | 14 |
| 8.9 Indirect Transfers..... | 14 |
| 8.10 Special Provision for Early Term Assignments and Subleases..... | 14 |
| 8.11 Binding Effect..... | 14 |
| 8.12 Attorneys' Fees..... | 15 |
| 8.13 Waivers..... | 15 |
| 8.14 Construction and Counterparts..... | 15 |
| 8.15 Time..... | 15 |
| 8.16 Notices..... | 15 |
| 8.17 Further Documentation..... | 15 |
| 8.18 Time Periods..... | 15 |
| 8.19 No Joint Venture..... | 15 |
| 8.20 Entire Agreement..... | 15 |

OPTION AGREEMENT

This OPTION AGREEMENT (the "Agreement") is made and entered into as of _____, 2004, by and between the STATE OF UTAH, acting through the SCHOOL AND INSTITUTIONAL TRUST LANDS ADMINISTRATION ("SITLA"), whose address is 675 East 500 North, Suite 500, Salt Lake City, Utah 84102, and WASATCH REGIONAL SOLID WASTE MANAGEMENT CORPORATION, a Utah corporation ("Wasatch"), whose address is P. O. Box 68133, Park City, Utah 84060.

RECITALS:

A. SITLA owns the state school trust lands located in Tooele County, Utah that are more particularly described on Exhibit A (the "Subject Property") which the parties believe to be suitable for development as a municipal landfill.

B. SITLA desires that Wasatch initially acquire approximately 25 acres of the Subject Property to ensure that landfill operations are conducted on lands owned in fee simple by Wasatch, and that Wasatch enter into a lease for the balance of the Subject Property, which lease would include obligations to purchase the balance of the Subject Property as landfill operations progress, on the terms and conditions specified in the lease.

NOW, THEREFORE, in consideration of the mutual promises set forth in this Agreement and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

ARTICLE 1 OPTION AGREEMENT

1.1 Option. Subject to and in accordance with the terms and conditions of this Agreement, SITLA grants to Wasatch the option (the "Option") to enter into a lease agreement with respect to all of the Subject Property except the initial 25 acres of the Subject Property (the "Initial Sale Parcel") (the "Lease Parcel"), such lease agreement to be in the form of the Lease and Agreement to Purchase attached as Exhibit B (the "Lease"). The obligations of Wasatch pursuant to the Lease shall be secured by a deed of trust in the form of Exhibit C (the "Deed of Trust"). The Deed of Trust will encumber the assets of Wasatch described in that document.

1.2 Initial Option Payment. In consideration for the grant of the Option, Wasatch agrees pre execution of this Agreement to (i) pay SITLA the sum of \$10,000, and (ii) provide the certification described in Section 1.5(b)(4) hereof. The date that this Agreement is executed by both of the parties and Wasatch makes the \$10,000 payment to SITLA is referred to in this Agreement as the "Opening Date."

1.3 Option Commencement and Termination; Extensions.

(a) Commencement and Termination. The term of the Option (the "Option Term") will commence upon the Opening Date and will expire at 5:00 p.m. (local Salt Lake City time) on the first anniversary of the Opening Date.

(b) First Extension of Option Term. Wasatch shall have the right to extend the Option Term for an additional 180-day period by delivering the following to SITLA at least five days prior to expiration of the initial Option Term:

(i) Written notice electing to extend the Option Term as permitted by this Section 1.3(b);

(ii) The sum of \$5,000 as an additional option payment for the six-month extension term; and

(iii) Written evidence reasonably satisfactory to SITLA that the First Benchmark Requirements described on Exhibit E have been satisfied by Wasatch.

(c) Second Extension of Option Term. Provided that Wasatch has properly exercised its option to extend the initial Option Term pursuant to Section 1.3(b), Wasatch shall have the further right to extend the Option Term for an additional 180-day period by delivering the following to SITLA at least five days prior to expiration of the Option Term as extended pursuant to Section 1.3(b):

(i) Written notice electing to extend the Option Term as permitted by this Section 1.3(c);

(ii) The sum of \$5,000 as an additional option payment for the second six-month extension term; and

(iii) Written evidence reasonably satisfactory to SITLA that the Second Benchmark Requirements described on Exhibit E have been satisfied by Wasatch.

(d) Certain Restrictions. Notwithstanding the foregoing, Wasatch shall not be entitled to exercise its right to extend the Option Term under either Section 1.3(b) or 1.3(c) if, at the time of exercise or at the time the renewal term is to commence Wasatch is in material default under the terms of this Agreement or an event or circumstance exists and is continuing that, with the giving of notice or the passage of time, or both, would constitute a material default by Wasatch under this Agreement.

1.4 Option Payment Provisions. All option payments pursuant to either Section 1.2 or 1.3 shall be made by wire transfer of ready funds directly to SITLA, outside of escrow, at an account to be designated by SITLA in writing. Wasatch acknowledges and agrees that the Option payments provided for in Sections 1.2 and 1.3 are and will be made in consideration, in part, for the grant of the Option and the taking of the Subject Property off of the market by SITLA during the Option Term and the contractual right of Wasatch to analyze the Subject Property and perform its Due Diligence Review and other activities pursuant to Section 3.3 during the Option Term. Accordingly, such payments are deemed fully earned by SITLA when made by Wasatch, are non-refundable, and are acknowledged by Wasatch and SITLA to constitute fair and adequate consideration for the rights and obligations of Wasatch and SITLA under this Agreement.

1.5 Exercising the Option.

(a) Procedures. The Option may be exercised at any time during the Option Term following satisfaction by Wasatch of the Exercise Conditions set forth below (the period of time during which the Option may be exercised being referred to as the "Option Exercise Period"). In order to exercise the Option, Wasatch shall give written notice of exercise to SITLA within the Option Exercise Period (the "Option Exercise Notice"), such Option Exercise Notice to be accompanied by the following:

(i) Written evidence reasonably satisfactory to SITLA that each of the Exercise Conditions has been met; and

(ii) A legal description of the proposed Initial Sale Parcel initially required to be purchased pursuant to the Lease, together with a boundary survey of the Initial Sale Parcel and a certified calculation by the engineer preparing the boundary survey of the gross number of acres included within the boundary of the Initial Sale Parcel. The Initial Sale Parcel shall be either a square or rectangle in configuration.

An Option Exercise Notice constitutes the binding agreement of Wasatch to purchase the Initial Sale Parcel and to enter into the Lease.

(b) Exercise Conditions. The "Exercise Conditions" that must be satisfied before Wasatch becomes entitled to exercise the Option are as follows:

(i) Wasatch has obtained all federal, state and local permits and entitlements, including all land use entitlements and siting agreements from Tooele County, necessary for the construction and operation of a Class 1 municipal solid waste landfill on the Subject Property, having a design capacity of at least 50 million cubic yards, with no daily volume cap or waste generation restrictions for volumes from within the State of Utah.

(ii) Wasatch has provided SITLA with documentation indicating, to the reasonable satisfaction of SITLA, that Wasatch has firm commitments for debt and/or equity financing sufficient to construct and operate the landfill in accordance with applicable permits and the required design capacity and to provide appropriate financial assurances that Wasatch can meet its environmental, closure and post-closure obligations.

(iii) Wasatch has provided SITLA with certification from an independent public accounting firm acceptable to SITLA setting forth all equity ownership interests in and debt obligations of Wasatch as of the date of exercise of the Option. If any equity ownership interest in Wasatch is held by a non-public entity, the certification shall further detail all equity ownerships in such entity.

(iv) Wasatch has obtained binding long-term disposal contracts, reasonably acceptable to SITLA with municipalities or other political subdivisions in the State of Utah for delivery to the landfill of at least 1,000 tons per day (in the aggregate for all such contracts) of Class 1 municipal waste.

1.6 Interests of SITLA in the Subject Property. Subject only to the provisions of Section 3.3 and the rights of Wasatch pursuant to this Agreement, SITLA will retain ownership of, as well as all rights of ownership relating to, the Subject Property until the Option is exercised and the closing of the Initial Sale Parcel purchase and entry into the Lease occurs (such closing of the Initial Sale Parcel purchase and entry into the Lease being referred to as the "Closing"). If Wasatch terminates the Agreement and Option, does not exercise the Option within the Option Term or if Wasatch exercises the Option but the Closing does not occur for any reason other than a default by SITLA, Wasatch shall have no further right, title or interest of any nature or description whatsoever in the Subject Property.

ARTICLE 2
SALES PRICE

2.1 Sales Price. The sales price for the Initial Sale Parcel shall be the amount determined by multiplying the gross acreage of the Initial Sale Parcel, as determined by the survey to be provided by Wasatch pursuant to Section 1.5(a)(ii) multiplied by \$1,000, payable in cash to Escrow Agent or by wire transfer of ready funds to the account of Escrow Agent on or before the Closing. The amounts paid pursuant to Sections 1.2 and 1.3 shall not be credited against the sales price.

2.2 Disbursements. Upon the Closing, all amounts paid according to Section 2.1, less any closing costs payable by SITLA, shall be disbursed to SITLA.

ARTICLE 3
DUE DILIGENCE MATTERS; AS IS NATURE OF TRANSACTION

3.1 Information to be Provided by SITLA.

(a) Boundary Survey. Within 90 days following the Opening Date, SITLA shall provide to Wasatch, at the sole cost of SITLA, a boundary survey of the Subject Property which shall also include a survey of the real property to a width of 10 feet on either side of the boundary line of the Subject Property (the "Survey"). The Survey shall be certified accurate and correct to Wasatch.

(b) Cultural Resources Analysis. Promptly following written request by Wasatch, which request Wasatch may make at any time during the Option Term, SITLA shall cause to be undertaken and shall provide to Wasatch, at the sole cost of SITLA (but subject to reimbursement as provided below), a cultural resources and archeological analysis and study (the "Cultural Resources Analysis") with respect to such portion of the Subject Property as is required by applicable governmental authority in connection with obtaining the permits contemplated in Section 1.5(b)(i). If for any reason (other than a default by SITLA) Wasatch fails to purchase the Initial Sale Parcel and enter into the Lease, Wasatch shall reimburse SITLA for the cost of such analysis with respect to such parcel, such reimbursement to be made within 10 days of written demand by SITLA to Wasatch, accompanied by written evidence of the costs incurred by SITLA for the Cultural Resources Analysis. Prior to the completion of the Cultural Resources Analysis, Wasatch shall give reasonable advance notice to SITLA of any entry on the Subject Property pursuant to Section 3.3 and shall coordinate any such entry and any activities of Wasatch or its agents or contractors on the Subject Property with SITLA so as not to compromise the integrity of the Cultural Resources Analysis.

(c) Phase I Environmental Assessment. Prior to entering into this Agreement, SITLA provided Wasatch with a phase I environmental assessment with respect to the Subject Property. SITLA has no obligation to update or supplement such environmental assessment.

3.2 Cooperation. During the Option Term, SITLA shall cooperate and consult with Wasatch and with the state and county permitting and hosting entities with respect to the transactions contemplated by this Agreement and the Lease, as reasonably requested by Wasatch from time to time; *provided, however,* that SITLA shall not be required to incur any third-party expenses in connection therewith.

3.3 Wasatch Due Diligence.

(a) Use of Subject Property During Option Term. SITLA hereby grants Wasatch a license to enter and investigate the Subject Property during the Option Term for the purposes of conducting its Due Diligence Review of the Subject Property.

(b) Limitation on Construction Activities. Wasatch may not commence construction of the landfill or any ancillary facilities on any of the Subject Property prior to the Closing; *provided, however*, that Wasatch may install permanent water monitoring wells on the Subject Property during the Option term, subject to the provisions of Section 3.1(b). However, if Wasatch does not exercise the Option or, having exercised the Option, the Closing does not occur for any reason other than a default by SITLA, such facilities shall automatically become the property of SITLA without any reimbursement to Wasatch therefor.

(c) Indemnity. Wasatch shall indemnify, defend, and hold harmless the SITLA Indemnified Parties from any and all Claims, including mechanics' and materialmen's liens, arising as a result of the activities of Wasatch and its agents, employees, and contractors pursuant to the license to enter and investigate granted in this Section 3.3. The provisions of this subsection (c) shall survive the Closing or the cancellation or termination of the Agreement and Option for any reason.

(d) Diligent Activity; Right to Terminate. During the Option Term, Wasatch shall proceed with reasonable and due diligence to (i) conduct its Due Diligence Review and (ii) satisfy each of the Exercise Conditions; *provided, however*, if Wasatch, during the Option Term, is dissatisfied with the results of its Due Diligence Review or any other matter with respect to the Subject Property or the proposed landfill on the Subject Property, Wasatch may terminate the Option and Agreement by written notice to SITLA.

(e) Certain Definitions. As used in this Agreement, the following terms have the following meanings:

(i) "Claims" means any and all obligations, debts, costs, and liabilities and any and all demands, causes of action, and claims, of every type, kind, nature or character, direct or indirect, known or unknown, absolute or contingent, determined or speculative, at law, in equity or otherwise, including reasonable attorneys' fees and litigation and court costs.

(ii) "Due Diligence Review" means the review by Wasatch of all aspects of the Subject Property and this transaction, including, without limitation, (a) the materials described in Section 3.1, (b) physical access to the Subject Property; (c) availability and adequacy of utilities to the Subject Property; (d) the status of title to the Subject Property and all matters of record that affect the Subject Property; (e) matters that would be disclosed by an accurate survey or physical inspection of the Subject Property; (f) the status and availability of all governmental entitlements relating to the Subject Property and necessary for the proposed operation on the Subject Property of a municipal landfill meeting the criteria specified in Section 1.5(b)(i) and the obligations of Wasatch with respect thereto, including, without limitation, all zoning matters, site plan approvals, general plan amendments, parcel maps, development agreements, siting and hosting agreements, covenants, conditions, and restrictions, easements; (g) the environmental condition of the Subject Property, including, without limitation the presence in the soil, air, improvements, or surface and subsurface waters of materials or substances that have

been or may in the future be determined to be toxic, hazardous, undesirable or subject to regulation and that may need to be specially treated, handled and/or removed from the Subject Property under current or future federal, state and local laws and regulations; (h) insurability of the Subject Property and the operations of Wasatch on the Subject Property; (i) the value of the Subject Property; and (j) the condition and utility of the Subject Property as may be disclosed by topographical surveys, boundary surveys, groundwater and soils analyses, cultural and archeological surveys, engineering studies, feasibility studies and any and all other investigational activities undertaken by Wasatch with respect to the Subject Property.

(iii) "SITLA Indemnified Parties" means and includes SITLA and the State of Utah and their respective officers, directors, elected and appointed officials, employees, and agents.

(f) Disclaimer. SITLA shall incur no liability or expense in connection with the activities of Wasatch pursuant to Section 3.3. Wasatch agrees that any expenditure, commitment or other action taken by it pursuant to this Agreement, or otherwise in contemplation of the Closing, is taken at its own risk, and that no such expenditure, commitment or action of Wasatch shall obligate SITLA to incur any liability to Wasatch or any third party, against which liability Wasatch expressly indemnifies the SITLA Indemnified Parties.

3.4 As Is Nature of Transaction; Release. SITLA is hereby released from all responsibility and liability regarding the operation, condition, valuation or utility of the Subject Property, its suitability for any purpose whatsoever, or any matter within the scope of the Due Diligence Review, including, without limitation, any responsibility or liability with respect to the presence in the soil, air, structures, and surface and subsurface waters, of materials or substances that have been or may in the future be determined to be toxic, hazardous, undesirable or subject to regulation and that may need to be specially treated, handled and/or removed from the Subject Property under current or future federal, state and local laws and regulations. Wasatch expressly acknowledges and agrees that Wasatch has not relied on any warranties, promises, understandings or representations, express or implied, oral or written, of SITLA or of any agent of SITLA, relating to the Subject Property, and that the Subject Property will be sold (as to the Initial Sale Parcel and any portion of the Lease Parcel subsequently purchased by Wasatch) and leased (as to the Lease Parcel) in its present condition and state of repair, "AS IS" and "WHERE IS", with all defects and liabilities, latent or apparent. Wasatch acknowledges that any information of any type which Wasatch has received or may receive from SITLA or any agent of SITLA is furnished on the express condition that Wasatch shall make an independent verification of the accuracy of such information, all such information being furnished without any representation or warranty whatsoever. The non-cancellation of the Agreement and Option pursuant to Section 3.3(d) and the subsequent exercise of the Option by Wasatch shall evidence conclusively that Wasatch has inspected and investigated the Subject Property to its complete satisfaction and has observed its physical characteristics and existing conditions and all matters within the scope of the Due Diligence Review and that Wasatch waives any and all objections to, complaints about, or claims regarding the Subject Property.

3.5 Non-Exercise of Option or Failure to Close. If Wasatch terminates the Option and Agreement, does not exercise the Option within the Option Term or if Wasatch exercises the Option but the Closing does not occur for any reason other than a default by SITLA, Wasatch shall promptly and at no cost to SITLA: (a) restore the Subject Property to its condition prior to entry into the Agreement, to the extent reasonably practicable; (b) return to SITLA any and all data and other information provided by SITLA to Wasatch with respect to the Subject Property, including, without limitation, the items described in Section 3.1; (c) provide to SITLA copies of all studies, data, plats, plans, and other documents of any nature whatsoever with respect to the Subject Property generated by or on behalf of Wasatch in the course

of its Due Diligence Review and permitting activities; and (d) assign to SITLA, the rights of Wasatch in any and all permits, licenses, or entitlements, or applications therefor, filed or obtained with respect to the Subject Property.

ARTICLE 4 ESCROW

4.1 Escrow. An escrow for this transaction shall be established with First American () ("Escrow Agent"), and Escrow Agent is hereby engaged to administer the escrow. This Agreement constitutes escrow instructions to the Escrow Agent and, promptly following execution of this Agreement by both parties, SITLA shall provide a copy of this Agreement to Escrow Agent for this purpose.

JK
Title Insurance Company

4.2 Acceptance of Escrow. By accepting this escrow, Escrow Agent agrees to the terms of this Agreement as they relate to the duties of Escrow Agent.

4.3 Escrow Cancellation Charges. If this transaction fails to close because of a default by SITLA, SITLA shall be liable for all customary escrow cancellation charges. If this transaction fails to close because of a default by Wasatch, Wasatch shall be liable for all customary escrow cancellation charges. If this transaction fails to close for any other reason, SITLA and Wasatch shall each be liable for one-half (1/2) of all customary escrow cancellation charges.

4.4 IRS Reporting at Closing. Escrow Agent agrees to be the designated "reporting person" under §6045(e) of the U.S. Internal Revenue Code of 1986 (the "Code") with respect to the real estate transactions described in this Agreement and to prepare, file and deliver such information, returns and statements as the Internal Revenue Service may require by regulations or forms in connection therewith, including Form 1099-B.

ARTICLE 5 CLOSING

5.1 Closing Date. The Closing shall take place at the offices of SITLA on or before the twentieth (20th) day following the date the Option Exercise Notice is given.

5.2 Closing Statements. Prior to Closing, Escrow Agent will prepare separate closing settlement statements for SITLA and Wasatch, reflecting the various charges and credits applicable to such party, as provided in this Agreement, and provide SITLA with a copy of its closing settlement statement and Wasatch with a copy of its closing settlement statement. Prior to Closing, SITLA shall have the right to review and approve its closing settlement statement to insure that such settlement statement conforms to the terms of this Agreement, and the settlement statement for SITLA, as approved by SITLA, is referred to in this Agreement as the "SITLA Closing Settlement Statement." Prior to Closing, Wasatch shall have the right to review and approve its closing settlement statement to insure that such settlement statement conforms to the terms of this Agreement, and the settlement statement for Wasatch, as approved by Wasatch, is referred to in this Agreement as the "Wasatch Closing Settlement Statement."

5.3 Closing Obligations of SITLA. At Closing, SITLA shall do the following:

(a) Patent for the Initial Sale Parcel. Deliver to Escrow Agent a fully executed and acknowledged patent (the "Patent") conveying fee simple title to the Initial Sale Parcel to Wasatch, subject to the Permitted Exceptions. At Closing, SITLA will, at the sole cost and expense of SITLA, remove all monetary liens and encumbrances from the Property, and such liens and encumbrances are not Permitted Exceptions. As used in this Agreement, "Permitted Exceptions" means all patent reservations including the mineral reservation described in Section 6.3), easements, rights-of-way, covenants, conditions, restrictions, mining claims, mineral leases, obligations, and liabilities of record as of the Closing and all matters which an accurate survey or a physical inspection of the Subject Property would disclose.

(b) Lease. Deliver to Escrow Agent two copies of the Lease, duly executed and acknowledged by SITLA.

(c) Memorandum of Lease. Deliver to Escrow Agent a copy of the Memorandum of Lease which is attached to this Agreement as Exhibit F, duly executed and acknowledged by SITLA (the "Memorandum of Lease").

(d) Deed of Trust. Deliver to Escrow Agent a copy of the Deed of Trust duly executed and acknowledged by SITLA.

(e) UCC-1 Financing Statement. Deliver to Escrow Agent two copies of a UCC-1 Financing Statement prepared by SITLA with respect to the collateral subject to the Deed of Trust (the "Financing Statements").

(f) Title Insurance. Cause Escrow Agent to be unconditionally prepared to issue to Wasatch, at Closing, the following:

(i) A standard coverage owner's policy of title insurance in the full amount of the sales price for the Initial Sale Parcel, insuring fee simple title to the Initial Sale Parcel to be vested in Wasatch (or its assignee), subject only to the Permitted Exceptions and the standard printed exclusions in such form of title policy. If Wasatch desires an ALTA extended owners policy or any special endorsements to the Title Policy, such additional coverage and endorsements shall be at the sole expense of Wasatch and the obtaining of such additional coverage and endorsements shall not be a condition to the obligations of Wasatch at Closing.

(ii) A standard coverage leasehold policy of title insurance in the amount of \$, insuring the leasehold interest of Wasatch in the Lease Parcel to be vested in Wasatch, subject only to the Permitted Exceptions, the terms of the Lease, and the standard printed exclusions in such form of title policy. If Wasatch desires an ALTA extended coverage policy or any special endorsements to the Title Policy, such additional coverage and endorsements shall be at the sole expense of Wasatch and the obtaining of such additional coverage and endorsements shall not be a condition to the obligations of Wasatch at Closing.

(g) Possession. Deliver possession of the Subject Property to Wasatch.

(h) Non-Foreign Affidavit. Deliver to Escrow Agent a fully executed certificate of non-foreign status in accordance with Section 1445 of the Code (the "FIRPTA Affidavit").

5/2
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(i) Additional Documents. Execute, acknowledge as appropriate, and deliver to Wasatch such other documents as may be necessary or appropriate to consummate this transaction in accordance with the terms of this Agreement.

5.4 Closing Obligations of Wasatch. At Closing, Wasatch shall do the following:

(a) Payment of Sale Price. Pay to Escrow Agent, in cash or by wire transfer of ready funds, for disbursement pursuant to Section 2.2, the sales price.

(b) Other Closing Funds. Deposit with Escrow Agent any and all other amounts required to be paid by Wasatch pursuant to this Agreement at the Closing.

(c) Lease. Deliver to Escrow Agent two copies of the Lease, duly executed and acknowledged by Wasatch.

(d) Memorandum of Lease. Deliver to Escrow Agent a copy of the Memorandum of Lease, duly executed and acknowledged by Wasatch.

(e) Environmental Indemnity. Deliver to Escrow Agent two copies of an Environmental Indemnity Agreement (the "Environmental Indemnity"), duly executed by Wasatch.

(f) Deed of Trust. Deliver to Escrow Agent a copy of the Deed of Trust duly executed and acknowledged by Wasatch.

(g) Additional Documents. Execute, acknowledge as appropriate, and deliver to SITLA such other documents as may be necessary or appropriate to consummate this transaction in accordance with the terms of this Agreement.

5.5 Closing Costs.

(a) Escrow Fees. At Closing, SITLA and Wasatch agree to each pay one-half (1/2) of the escrow charges for such Closing.

(b) Recording Fees. Wasatch shall pay the costs to record the Patent and the Memorandum of Lease. Wasatch shall pay the recording fees for the Deed of Trust and filing fees for recording with the Tooele County Recorder and filing with the Department of Commerce the Financing Statements.

(c) Other Closing Costs. Any other Closing costs not specifically provided for in this Agreement shall be paid by SITLA and Wasatch according to the custom in Salt Lake City, Utah.

(d) Manner of Payment. All closing costs payable by SITLA shall be deducted from the proceeds otherwise payable to SITLA at the Closing. On or before the Closing, Wasatch shall deposit with Escrow Agent cash in an amount sufficient to pay all closing costs payable by Wasatch.

5.6 Payments and Disbursements to Be Handled through the Escrow. The various charges and credits contemplated by this Agreement will be handled by Escrow Agent through the escrow by appropriate charges and credits to Wasatch and SITLA. All amounts payable pursuant to this Agreement

will be paid to Escrow Agent for disposition through the escrow. Escrow Agent is authorized to make all disbursements to the parties and to third parties contemplated by this Agreement from funds deposited for those purposes, as necessary or appropriate to close this transaction.

5.7 Closing the Transaction. Upon satisfaction by SITLA and Wasatch of their respective obligations to be performed at or prior to Closing, Escrow Agent shall close the transaction by doing the following:

- (a) Record with the Tooele County Recorder the Patent, the Memorandum of Lease, the Deed of Trust, and one copy of the Financing Statement;
- (b) File with the Utah Department of Commerce, Division of Corporations and Commercial Code, one copy of the Financing Statement;
- (c) Deliver one fully executed copy of the Lease and one fully executed copy of the Environmental Indemnity to each of SITLA and Wasatch;
- (d) Deliver the FIRPTA Affidavit to Wasatch;
- (e) Provide Wasatch with the title policies contemplated by Section 5.3(f); and
- (f) Make the disbursements contemplated by the SITLA Closing Settlement Statement and the Wasatch Closing Settlement Statement.

5.8 Special Reimbursement to SITLA. Wasatch has agreed to reimburse SITLA for fifty percent (50%) of SITLA's outside counsel legal fees that SITLA is incurring in drafting the Agreements to evidence all of the transactions contemplated hereby. Promptly upon the mutual execution of this Agreement, SITLA will forward to Wasatch an itemized bill or bills for such fees, which have been approved by SITLA staff for such services. If the Closing occurs, then at the Closing Wasatch shall reimburse SITLA for 50% of the outside counsel legal fees incurred by SITLA from and after June 13, 2003; *provided, however*, that the maximum amount reimbursable by Wasatch under this provision is \$12,500. This reimbursement shall be made directly to SITLA outside of the escrow, and Escrow Agent shall have no responsibility with respect to such reimbursement.

ARTICLE 6 ADDITIONAL COVENANTS

6.1 Risk of Loss. Except as provided in Section 3.3, the risk of loss or damage to the Subject Property and all liability to third persons until the close of escrow shall be borne by SITLA.

6.2 No Further Title Encumbrances. Following the Opening Date but subject to the terms of Section 6.3, SITLA agrees that, without the prior written consent and approval of Wasatch, SITLA will not enter into or place, or permit to be placed, against the Subject Property any lien, encumbrance, easement, covenant, lease, or other matter affecting the title to the Property that SITLA has not agreed will be released, at the expense of SITLA, on or prior to Closing, other than the Permitted Exceptions.

6.3 The Mineral Estate. SITLA is required by law to reserve the mineral estate upon any lease or conveyance of the Subject Property. Notwithstanding the foregoing, upon execution of the Agreement and during the Option Term, SITLA shall consult with Wasatch prior to mineral leasing or disposition and shall not permit any mineral development activities that would physically disturb or cause

unreasonable interference with the proposed landfill operations of Wasatch. The provisions of this Section 6.3 shall survive the Closing.

6.4 Water Rights. In connection with the conveyance of the Initial Sale Parcel to Wasatch, SITLA shall also transfer to Wasatch 30 acre feet of water rights for use for dust control purposes from the water rights currently appurtenant to the Subject Property and other related property that SITLA obtained from the U.S. Bureau of Land Management in the same exchange transaction; *subject, however,* to approval by the State Engineer and any limitations the State Engineer may impose and subject also to a diminution in the amount of water rights transferred such that SITLA has sufficient retained water rights to continue grazing operations on such related property at their now existing levels. The water rights shall be transferred outside of escrow upon the Closing, and Escrow Agent shall have no responsibility or liability with respect thereto.

6.5 Brokerage. SITLA warrants to Wasatch that SITLA has not dealt with any broker or other real estate agent in connection with this transaction. Wasatch warrants to SITLA that Wasatch has not dealt with any broker or other real estate agent in connection with this transaction. If any person shall assert a claim to a finder's fee, marketing fee, commission or other compensation on account of alleged employment as a finder or broker or performance of services as a finder or broker in connection with this transaction, the party under whom the finder or broker is claiming shall indemnify and hold the other party harmless for, from and against any such claim and all costs, expenses and liabilities incurred in connection with such claim or any action or proceeding brought on such claim, including, but not limited to, counsel and witness fees and court costs in defending against such claim. The provisions of this Section 6.5 shall survive the Closing or the cancellation or termination of the Agreement and Option for any reason.

6.6 Duty to Defend. The parties acknowledge that competitors or other third parties may seek to challenge the validity or enforceability of, or otherwise set aside or modify, this Agreement, the Lease, the Deed of Trust, the Environmental Indemnity or other aspects of the transactions contemplated by such documents. If either party receives notice of any such action or threatened action, such party shall promptly notify the other party in writing, providing all particulars known to the party providing such notice. Both parties have a duty to actively and diligently defend this Agreement, the Lease, the Deed of Trust, the Environmental Indemnity and the transactions contemplated by such documents and in that connection shall cooperate and coordinate with one another, with each party to bear its own costs in connection with any joint defense. The provisions of this Section 6.6 shall survive the Closing.

ARTICLE 7 REMEDIES

7.1 Remedies of SITLA. If Wasatch fails to deposit the sales price in the time and manner set forth in this Agreement or to perform when due any other act required by this Agreement or otherwise breaches this Agreement, the sole and exclusive remedy of SITLA will be to cancel this Agreement and the escrow, such cancellation to be effective immediately upon SITLA giving written notice of cancellation to Wasatch and Escrow Agent. Notwithstanding the foregoing, any such cancellation shall not excuse performance by Wasatch of its obligations under Section 3.5 or under any provision that is designated as surviving the cancellation of this Agreement, with respect to which SITLA shall have all rights and remedies at law or in equity to enforce.

7.2 Remedies of Wasatch. If SITLA fails to perform when due any act of SITLA required by this Agreement, then, in addition to whatever other remedies are available to Wasatch at law or in equity, including the right to have specific performance of this Agreement, Wasatch may cancel this Agreement,

such cancellation to be effective immediately upon Wasatch giving written notice of cancellation to SITLA and Escrow Agent. Notwithstanding the foregoing, any such cancellation shall not excuse performance by SITLA under any provision that is designated as surviving the cancellation of this Agreement, with respect to which Wasatch shall have all rights and remedies at law or in equity to enforce.

ARTICLE 8 GENERAL PROVISIONS

8.1 Assignment. Wasatch understands, acknowledges, and agrees that SITLA is entering into this Agreement and the transactions contemplated by this Agreement, the Lease and the Deed of Trust on the basis of and in reliance on the identity and control of Wasatch and its shareholders, the expertise of Wasatch and its shareholders in the solid waste management business, and reputation and financial capabilities of Wasatch and its shareholders. Accordingly, except as otherwise provided in this Article 8, Wasatch shall not directly or indirectly, voluntarily or by operation of law, sell, assign, encumber, pledge or otherwise transfer or hypothecate all or any part of the Lease Parcel or Wasatch's interest hereunder (collectively an "Assignment"), or permit the Lease Parcel to be occupied by anyone other than Wasatch or sublet the Lease Parcel or any portion thereof (collectively a "Sublease"), other than as permitted in Article 8. Notwithstanding any provision of this Agreement, without SITLA's prior written consent, which consent SITLA may withhold in its sole and absolute discretion, Wasatch shall not enter into an Assignment or Sublease hereunder prior to the time that Wasatch has achieved, for one (1) full calendar year, Net Receipts equal to the Break Point, as defined and described in the Lease (the "Prohibited Assignment or Sublease Period"). In addition to any other provisions of this Article 8, Wasatch shall not enter into any Assignment or Sublease without the prior approval of SITLA's Board, which shall review such Assignment or Sublease consistent with the Board's fiduciary responsibilities to SITLA's beneficiaries.

8.2 Request for Consent. If Wasatch desires at any time after the Prohibited Assignment or Sublease Period to enter into an Assignment or Sublease, Wasatch shall, at least sixty days prior to the effective date of the Assignment or Sublease, request in writing SITLA's consent to the Assignment or Sublease and provide the following:

- (a) The name of the proposed assignee or subtenant (the "transferee") and the names of the individuals ultimately owning or controlling, directly or indirectly, the proposed transferee;
- (b) A copy of the proposed Assignment or Sublease; and
- (c) A detailed description of the proposed transaction, together with a written authorization from Wasatch authorizing SITLA, its agents, representatives, and advisers to contact the proposed transferee to discuss and verify any and all aspects of the proposed transaction and the information provided by Wasatch pursuant to this Section 8.2.

At least thirty days prior to the effective date of the Assignment or Sublease, Wasatch shall provide to SITLA such information concerning the proposed transferee and transaction as SITLA shall have requested following its receipt of Wasatch's request for consent, including, without limitation, detailed information as to the identity of the proposed transferee (including the identity of all entities and individuals, other than shareholders in a publicly traded company who own directly or indirectly any ownership interest in the transferee), detailed financial information with respect to the proposed transferee, information demonstrating the business experience and reputation of the proposed transferee in

the solid waste management industry, and such other information as SITLA deems appropriate to its decision to approve or disapprove.

8.3 Conditions to Consent. At any time within thirty days after SITLA's receipt of the notice specified in Section 8.2 and the information that Wasatch is required to provide pursuant to Section 8.2, SITLA may by written notice to Wasatch elect either to (a) consent to the proposed Assignment or Sublease, (b) refuse to consent to the proposed Assignment or Sublease. In this regard, SITLA and Wasatch agree (by way of example and without limitation) that it shall be reasonable for SITLA to withhold its consent if any of the following situations exist or may exist:

(a) In SITLA's reasonable business judgment; the proposed transferee lacks sufficient business reputation, expertise, or experience to successfully and profitably operate the Landfill;

(b) The financial condition of the proposed transferee is unacceptable to SITLA, in SITLA's reasonable judgment, to enable such proposed transferee to fully and timely perform the terms and conditions of this Agreement and the Lease, including the indemnification obligations of the Wasatch under the Lease;

(c) In SITLA's reasonable judgment, operation of the Landfill by the proposed transferee would materially reduce the amount of percentage rent that SITLA would receive over the life of the Lease or would materially increase the risk to any of the SITLA indemnitees of any claims for which SITLA has been indemnified by Wasatch, and with respect to such risk, SITLA shall be deemed reasonable to condition such consent on the proposed transferee agreeing to a covenant to operate and increasing the annual rent to an amount equal to the average annual percentage rent paid by Wasatch under the Lease during the previous three (3) calendar years; or

(d) An Event of Default under the Lease or hereunder has occurred and is continuing or an event has occurred which is continuing that, with the passage of time and/or the giving of notice, would constitute an Event of Default.

Nothing contained in this Article 8 shall prohibit SITLA from requesting additional information if Wasatch, or its successor, is a debtor in a bankruptcy case.

8.4 Effect of Consent. If SITLA consents to the Sublease or Assignment within said thirty day period, Wasatch may enter into such Assignment or Sublease, but only upon the terms and conditions set forth in the notice furnished by Wasatch to SITLA pursuant to Section 8.2. Wasatch shall promptly provide to SITLA a copy of the fully executed Sublease or Assignment.

8.5 No Release; Improper Assignment or Sublease Void. No consent by SITLA to any Assignment or Sublease by Wasatch shall relieve Wasatch of any obligation to be performed by Wasatch under this Agreement, whether arising before or after the Assignment or Sublease. The consent by SITLA to any Assignment or Sublease shall not relieve Wasatch of the obligation to obtain SITLA's express written consent to any other Assignment or Sublease. Any Assignment or Sublease that is not in compliance with this Section shall be absolutely null and void, shall be an Event of Default and, at the option of SITLA, shall entitle SITLA to immediately terminate this Agreement. The acceptance of rent or payment of any other monetary obligation by SITLA from a proposed assignee or sublessee shall not constitute the consent by SITLA to such Assignment or Sublease.

8.6 Transferee Obligations. Each transferee shall assume, as provided in this Section, all obligations of Wasatch under this Agreement and shall be and remain liable jointly and severally with

Wasatch for the payment of annual rent, percentage rent and all other monetary obligations under the Lease, and for the performance of all the terms, covenants, conditions and agreements herein contained on Wasatch's part to be performed under this Agreement. In connection with an Assignment, Wasatch or the assignee shall deliver an instrument (acceptable in form and substance to SITLA) whereby the assignee assumes all of the terms, covenants, conditions and agreements of this Agreement and the Lease. However the failure or refusal of the assignee to execute such instrument of assumption shall not release or discharge the assignee from its liability as set forth above. In connection with a Sublease, Wasatch or the sublessee shall deliver to SITLA an instrument (acceptable in form and substance to SITLA and in recordable form) agreeing that sublessee shall be bound by all of the terms and conditions of this Agreement and the Lease, and that sublessee shall, at SITLA's sole option, attorn to SITLA as lessor under the Sublease if this Lease is terminated for any reason and SITLA chooses to keep the Sublease in effect.

8.7 Licensees. Wasatch agrees not to permit any business to be operated in or from the Lease Parcel by any licensee or other person without the prior written consent of SITLA, which consent SITLA may give or withhold in its sole and absolute discretion.

8.8 Expenses. Regardless of whether SITLA grants its consent to an Assignment or Sublease, Wasatch shall pay to SITLA, in connection with any proposed Assignment or Sublease, a non-refundable fee equal to the greater of (a) \$2,500 if SITLA handles the request internally, or (b) the reasonable costs and fees incurred by SITLA to retain outside counsel to assist and advise SITLA with respect to such transfer and, if SITLA's consent is granted in its discretion, consummating the proposed transfer in reviewing and preparing documents in connection therewith.

8.9 Indirect Transfers. The sale, issuance or transfer of any voting capital stock of Wasatch, if Wasatch is a corporate entity, or of any ownership interests, if Wasatch is a noncorporate entity, or any voting capital stock of any corporate entity which directly or indirectly controls Wasatch, or any interests in any noncorporate entity which directly or indirectly controls Wasatch, to any party which is not already an owner of stock or such ownership interests in Wasatch which results in a change in the direct or indirect voting control (or a change in the identity of any Person with the power to vote or control at least 10% of the voting shares of any class of stock or other interests in Wasatch) of Wasatch or any corporate or noncorporate entity which directly or indirectly controls Wasatch shall be deemed to be an Assignment of this Agreement within the meaning of this Article 8; *provided, however,* that, any other provision of this Agreement to the contrary notwithstanding, the trading in the securities of any Person that is a publicly traded entity shall not be deemed to be an indirect transfer or otherwise subject to the provisions of this Section 8.9.

8.10 Special Provision for Early Term Assignments and Subleases. If in full compliance with the requirements of this Article 8, Wasatch enters into an Assignment or Sublease during the first five years following the Operations Commencement Date as defined in the Lease, Wasatch shall pay to SITLA, in addition to the amounts specified in Section 8.8, the Transfer Amount, such amount to be paid to SITLA on the date that the Assignment or Sublease first becomes effective. If the Transfer Amount is not paid as required by this Section 8.10, then the approval by SITLA to the Assignment or Sublease shall automatically be deemed to have been revoked and the provisions of Section 8.5 shall apply. As used in this Agreement, the "Transfer Amount" means 10% of the Net Consideration received by Wasatch in connection with such Assignment or Sublease, and the term "Net Consideration" means the total consideration received by Wasatch in connection with such Assignment or Sublease (including the total of all deferred payments to be received by Wasatch in the future, if any), expressed in dollars, less the then book value of the operating assets of the Landfill.

8.11 Binding Effect. Except as limited by the foregoing provision, the provisions of this Agreement are binding upon and shall inure to the benefit of the parties and their respective successors and assigns.

8.12 Attorneys' Fees. If legal counsel is employed or if any action is brought by either party in respect to its rights under this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees and court costs as determined by the court.

8.13 Waivers. No waiver of any of the provisions of this Agreement shall constitute a waiver of any other provision, whether or not similar, nor shall any waiver be a continuing waiver. Except as expressly provided in this Agreement, no waiver shall be binding unless executed in writing by the party making the waiver. Either party may waive any provision of this Agreement intended for its benefit; provided, however, such waiver shall in no way excuse the other party from the performance of any of its other obligations under this Agreement.

8.14 Construction and Counterparts. This Agreement shall be construed according to Utah law. The headings of this Agreement are for purposes of reference only and shall not limit or define the meaning of any provision of this Agreement. This Agreement may be executed in any number of counterparts, each of which shall be an original but all of which shall constitute one and the same instrument. References in this Agreement to "Sections," "Articles," and "Exhibits" refer to the Sections and Articles of and the Exhibits to this Lease unless otherwise noted.

8.15 Time. Time is of the essence of this Agreement.

8.16 Notices. Notices will be in writing and will be given by personal delivery, by deposit in the United States mail, certified mail, return receipt requested, postage prepaid, or by express delivery service, freight prepaid. Notices will be delivered or addressed to SITLA and Wasatch at the addresses set forth on the first page of this Agreement or at such other address or number as a party may designate in writing. For purposes of this Agreement, notices shall be only be deemed to have been received and to be effective upon actual receipt thereof by the party to whom the notice is directed.

8.17 Further Documentation. Each party agrees in good faith to execute such further or additional documents as may be necessary or appropriate to fully carry out the intent and purpose of this Agreement.

8.18 Time Periods. Except as expressly provided for herein, the time for performance of any obligation or taking any action under this Agreement shall be deemed to expire at 5:00 p.m. (local Salt Lake City time) on the last day of the applicable time period provided for herein. If the time for the performance of any obligation or taking any action under this Agreement expires on a Saturday, Sunday or legal holiday, the time for performance or taking such action shall be extended to the next succeeding day which is not a Saturday, Sunday or legal holiday.

8.19 No Joint Venture. Nothing contained in this Agreement shall be deemed or construed to create the relationship of principal and agent, partnership, or any other similar association between SITLA and Wasatch.

8.20 Entire Agreement. This Agreement, which includes Exhibits A through F, constitutes the entire agreement between the parties pertaining to the subject matter contained in this Agreement. All prior and contemporaneous agreements, representations and understandings of the parties, oral or written, are superseded by and merged in this Agreement. No supplement, modification or amendment of this Agreement shall be binding unless in writing and executed by Wasatch and SITLA.

DATED as of the day and year first above written.

SITLA:

STATE OF UTAH, ACTING THROUGH THE
SCHOOL AND INSTITUTIONAL TRUST
LANDS ADMINISTRATION

By [Signature]
Name: Kevin Scott Carter
Title: Director

Approved as to Form:

[Signature]
Mark L. Shurtleff, Utah Attorney General
by John W. Andrews, Special Assistant
Attorney General

WASATCH:

WASATCH REGIONAL SOLID WASTE
MANAGEMENT CORPORATION,
a Utah corporation

By [Signature]
Name: Kevin S. Garn
Title: President C.O.O.

EXHIBIT A
LEGAL DESCRIPTION OF THE SUBJECT PROPERTY

Lease Parcel Description:

Township 1 North, Range 8 West, SLB&M
Section 3: Lots 3 & 4, S2NW4, SW4
Section 4: Lots 1, 2, & 3, SE4NW4, E2SW4, SE4, S2NE4

Township 2 North, Range 8 West, SLB&M
Section 32: E2E2
Section 33: All
Section 34: W2

Lease Parcel Acreage: 1,968.73 acres m/l

Separate Borrow Site Description:

Township 2 North, Range 8 West, SLB&M
Section 36: All

Borrow Area Acreage: 640.00 acres m/l.

EXHIBIT B
FORM OF LEASE

LEASE AND AGREEMENT TO PURCHASE

LEASE NUMBER _____

Between

THE STATE OF UTAH, acting through
the SCHOOL AND INSTITUTIONAL
TRUST LANDS ADMINISTRATION,
as Lessor

and

WASATCH REGIONAL SOLID WASTE
MANAGEMENT CORPORATION,
a Utah corporation,
as Lessee

Dated _____, 200_____

TABLE OF CONTENTS.

| | Page |
|-----------|---|
| ARTICLE 1 | DEFINITIONS 1 |
| ARTICLE 2 | LEASE OF PREMISES 5 |
| 2.1 | Lease..... 5 |
| 2.2 | Lessee's Inspection of the Premises 5 |
| 2.3 | Covenant of Quiet Enjoyment 5 |
| 2.4 | Lessor's Access to Premises..... 5 |
| 2.5 | No Further Liens or Encumbrances..... 5 |
| 2.6 | The Mineral Estate 6 |
| ARTICLE 3 | TERM 6 |
| 3.1 | Commencement Date and Term..... 6 |
| 3.2 | Obligations on Lease Termination 6 |
| 3.3 | Holding Over..... 6 |
| 3.4 | Option Terms..... 6 |
| 3.5 | Early Termination..... 6 |
| ARTICLE 4 | RENT 7 |
| 4.1 | Annual Rent..... 7 |
| 4.2 | Percentage Rent Provisions 7 |
| 4.3 | Net Lease..... 9 |
| 4.4 | Interest on Past Due Obligations 9 |
| 4.5 | Late Charges..... 9 |
| 4.6 | Special Rent Provision 10 |
| ARTICLE 5 | PURCHASE OPTION..... 10 |
| 5.1 | Grant of Purchase Option..... 10 |
| 5.2 | Notice of Option Exercise 10 |
| 5.3 | Purchase Terms 11 |
| 5.4 | Mandatory Purchase 13 |
| ARTICLE 6 | OTHER PROPERTY OWNED BY LESSOR..... 14 |
| 6.1 | Adjacent Property..... 14 |
| 6.2 | Latecomers Agreements 14 |
| ARTICLE 7 | Use of the Premises 14 |
| 7.1 | Use..... 14 |
| 7.2 | The Borrow Section..... 15 |

TABLE OF CONTENTS
(continued)

Page

| | | |
|------------|---|----|
| 7.3 | No Management Responsibilities..... | 15 |
| 7.4 | Nuisances | 15 |
| 7.5 | Observance of Governmental Regulations | 15 |
| 7.6 | Environmental Compliance..... | 15 |
| 7.7 | Construction | 16 |
| 7.8 | Ownership and Removal of Lessee Improvements | 16 |
| 7.9 | Development at Lessee's Expense | 16 |
| 7.10 | Indemnification Obligations with Respect to Lessee Improvements | 16 |
| 7.11 | Mechanics' Liens | 17 |
| 7.12 | Notices and Filings..... | 17 |
| ARTICLE 8 | UTILITIES | 17 |
| 8.1 | Utilities | 17 |
| ARTICLE 9 | TAXES AND ASSESSMENTS | 18 |
| 9.1 | Payment of Taxes and Assessments | 18 |
| 9.2 | Privilege of Contesting..... | 18 |
| ARTICLE 10 | INSURANCE AND INDEMNITY | 19 |
| 10.1 | Indemnity | 19 |
| 10.2 | Waivers..... | 19 |
| 10.3 | Certain Insurance Not Required | 19 |
| 10.4 | Liability Insurance..... | 19 |
| 10.5 | Other Insurance | 20 |
| 10.6 | Policy Requirements..... | 20 |
| ARTICLE 11 | DAMAGE AND DESTRUCTION | 20 |
| 11.1 | No Abatement of Rent..... | 20 |
| 11.2 | Damage or Destruction..... | 20 |
| ARTICLE 12 | CONDEMNATION | 21 |
| 12.1 | Total Condemnation..... | 21 |
| 12.2 | Condemnation of a Portion of Premises..... | 21 |
| 12.3 | Condemnation Award..... | 21 |
| 12.4 | Date of Condemnation..... | 21 |
| ARTICLE 13 | ASSIGNMENT BY LESSEE..... | 21 |
| 13.1 | Assignment..... | 21 |

TABLE OF CONTENTS
(continued)

Page

| | | |
|------------|--|----|
| 13.2 | Request for Consent | 21 |
| 13.3 | Conditions to Consent | 22 |
| 13.4 | Effect of Consent | 22 |
| 13.5 | No Release; Improper Assignment or Sublease Void | 22 |
| 13.6 | Transferee Obligations | 22 |
| 13.7 | Licensees | 23 |
| 13.8 | Expenses | 23 |
| 13.9 | Indirect Transfers | 23 |
| ARTICLE 14 | FINANCING LIENS; SALE OF PREMISES BY LESSOR | 23 |
| 14.1 | No Encumbrances Generally | 23 |
| 14.2 | Lessee's Right to Mortgage | 23 |
| 14.3 | Purpose of Leasehold Mortgage | 23 |
| 14.4 | Notice to Lessor of Leasehold Mortgage | 24 |
| 14.5 | Leasehold Mortgagee Protection | 24 |
| 14.6 | Lessor Not Liable | 25 |
| 14.7 | Prohibitions on Encumbrances by Lessor | 25 |
| 14.8 | Sale of Lessor's Interest | 25 |
| 14.9 | Non-Recourse Liability | 25 |
| ARTICLE 15 | DEFAULTS | 25 |
| 15.1 | Events of Default | 25 |
| 15.2 | Remedies | 26 |
| 15.3 | Remedies Cumulative | 27 |
| 15.4 | No Acceptance of Surrender | 27 |
| 15.5 | Costs and Attorneys' Fees | 27 |
| 15.6 | Waiver of Jury Trial and Counterclaims | 28 |
| 15.7 | No Waiver | 28 |
| 15.8 | Accord and Satisfaction | 28 |
| ARTICLE 16 | BANKRUPTCY OF TENANT | 28 |
| 16.1 | Additional Rights of Lessor | 28 |
| 16.2 | Proceeds of Assignment to Lessor | 29 |
| 16.3 | Right of First Refusal | 29 |
| 16.4 | Assignee's Assumption of Liabilities | 29 |

TABLE OF CONTENTS
(continued)

| | Page |
|--|------|
| ARTICLE 17 GENERAL PROVISIONS | 29 |
| 17.1 Indemnity Provisions..... | 29 |
| 17.2 Waiver of Breach..... | 29 |
| 17.3 Notices..... | 30 |
| 17.4 Severability..... | 30 |
| 17.5 Recording | 30 |
| 17.6 Construction | 30 |
| 17.7 Lessor's Consent | 30 |
| 17.8 Successors | 30 |
| 17.9 Governing Law..... | 30 |
| 17.10 Brokerage | 30 |
| 17.11 Time is of the Essence..... | 31 |
| 17.12 Relationship of the Parties..... | 31 |
| 17.13 Time Periods..... | 31 |
| 17.14 Limitation on Interest..... | 31 |
| 17.15 Quitclaim..... | 31 |
| 17.16 Termination of State Trust | 31 |
| 17.17 Lessee's Obligations to the State of Utah..... | 31 |
| 17.18 Tax Immunity | 31 |
| 17.19 Limited Waiver of Sovereign Immunity | 31 |
| 17.20 Counterparts | 31 |
| 17.21 Impartial Interpretation..... | 32 |
| 17.22 Entire Agreement | 32 |

LEASE AND AGREEMENT TO PURCHASE

LEASE NUMBER _____

THIS LEASE AND AGREEMENT TO PURCHASE, LEASE NUMBER _____, is entered into this _____ day of _____, 200____ by and between the STATE OF UTAH, acting by and through the SCHOOL AND INSTITUTIONAL TRUST LANDS ADMINISTRATION ("Lessor"), and WASATCH REGIONAL SOLID WASTE MANAGEMENT CORPORATION, a Utah corporation ("Lessee").

RECITALS:

A. Lessor owns the Premises (as defined herein) located in Tooele County, State of Utah, which Lessor desires to lease to Lessee, and which Lessee desires to lease from Lessor. The Premises, as they exist on the date of this Lease, are legally described on Exhibit A.

B. The Premises have been designated as _____, as defined in Rule _____ of the Utah Administrative Code, and this Lease is entered into pursuant to such Rule.

AGREEMENT:

IN CONSIDERATION of the foregoing recitals, the mutual promises contained herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Lessor and Lessee hereby agree as follows:

ARTICLE I DEFINITIONS

As used herein, the following terms shall have the meanings respectively indicated:

1.1 "Adjacent Property" means the real property owned by Lessor and more particularly described on Exhibit B. The Adjacent Property is not part of the Premises and is only subject to the provisions of Section 6.1.

1.2 "Applicable Environmental Law" means the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. Sections 9601 *et seq.*, the Resource Conservation and Recovery Act, 42 U.S.C. Sections 6901, *et seq.*, the Federal Water Pollution Control Act, 33 U.S.C. Sections 1251 *et seq.*, the Clean Air Act, 42 U.S.C. Sections 7401, *et seq.*, the Hazardous Materials Transportation Act, 49 U.S.C. Sections 5101 *et seq.*, the Toxic Substances Control Act, 15 U.S.C. Sections 2601 *et seq.*, the Safe Drinking Water Act, 42 U.S.C. Sections 300f through 300j-26, and the Utah Solid and Hazardous Waste Management Act, Sections 19-6-101 *et seq.*, Utah Code Annotated, as such acts have been or are hereafter amended from time to time; any so called superfund or superlien law; and any other federal, state and local statute, law, ordinance, code, rule, regulation, order or decree regulating, relating to or imposing liability or standards of conduct concerning any hazardous, toxic or dangerous waste, substance or material as now or any time hereafter in effect.

1.3 "Borrow Section" means that portion of the Premises designated on Exhibit A as the Borrow Section.

1.4 "Break Point" means \$7,300,000.

1.5 "Claims" means any and all obligations, debts, costs, and liabilities and any and all demands, causes of action, and claims, of every type, kind, nature or character, direct or indirect, known or unknown, absolute or contingent, determined or speculative, at law, in equity or otherwise, including reasonable attorneys' fees and litigation and court costs. Without limiting the generality of the foregoing, Claims also includes third party claims for personal injury or real or personal property damage, administrative proceedings (including informal proceedings), judgments, damages, punitive damages, penalties, fines, costs, liabilities, interest or losses (including, without limitation, diminution in value of the Premises, damages, and sums paid in settlement of claims, reasonable attorney's fees, consultant fees, expert fees and any reasonable fees and expenses incurred in enforcing an indemnity obligation. Claims do not mean allegations challenging Lessor's authority to enter into this transaction due to alleged defects in administration procedure or constitutional authority, or similar allegations by competitors relating to Lessor's authority to enter into this transaction, or relating to compliance with Lessor's own rules and regulations.

1.6 "Commencement Date" means the date of this Lease, which shall be the same as the date of "Closing" pursuant to the Option Agreement.

1.7 "Contractual Cost Adjustments" means those pass-through contractual increases in tipping fees under waste disposal contracts which Lessee may negotiate to compensate Lessee for actual operating cost increases for specific items during the term of a fixed fee take or pay waste disposal contract, such as adjustments to compensate Lessee with respect to increased state waste taxes, energy prices, and the like. As contracts are renegotiated, the negotiated tipping fee for the new contract term will "reset" the tipping fee and will not be deemed to include any Contractual Cost Adjustments until such time as Lessee negotiates a cost based adjustment in the new tipping fee under such new contract for actual operating cost increases for specific items during the term of such new contract.

1.8 "CPI Index" means the Consumer Price Index, published by the U.S. Bureau of Labor Statistics, All Urban Consumers, U.S. City Average, All Items (1982-84=100). If, on a relevant date, the CPI Index does not exist in the above format, Lessor will substitute any official index published by the Bureau of Labor Statistics, any successor agency, or similar governmental agency, which is then in existence and which is then most nearly comparable to the CPI Index.

1.9 "Deed of Trust" means the Deed of Trust, referred to in the Option Agreement which is given by Lessee to secure its obligations under this Lease among other things.

1.10 "Default Rate" means the greater of (a) ten percent per annum, or (b) four percentage points added to the prime lending rate of Wells Fargo Bank as announced at its main Salt Lake City office, as such prime rate varies from time to time.

1.11 "Environmental Insurance Costs" means the premiums for environmental impairment insurance that Lessee is required to carry pursuant to this Lease or the Deed of Trust.

1.12 "Force Majeure" means any of the following events or circumstances: strikes, lockouts or other labor difficulties, acts of God, the requirements of any local, state or federal law, rule or regulation, fire or other casualty, condemnation, war, riot, insurrection or any other event or circumstance beyond Lessee's reasonable control, it being understood, however, that general economic conditions or Lessee's inability to pay shall not be deemed an event of Force Majeure.

1.13 "Governmental Authorities" means the State of Utah (other than in its capacity as Lessor), the Utah Department of Environmental Quality, Tooele County, and any other political subdivision, court, or agency having jurisdiction over the Premises (federal, state, or local).

1.14 "Gross Receipts" for a particular calendar year means all income and receipts of any nature of kind whatsoever arising or otherwise derived from the following for the year for which Percentage Rent is being determined:

(a) The Premises, including, without limitation, rents, fees, and other amounts or consideration of any kind received by Lessee or any other Person in which Lessee has any ownership interest, with respect to the Premises including, without limitation, amounts received by Lessee or any other Person in which Lessee has any ownership interest from subtenants and licensees operating at or from the Premises; and

(b) The Landfill, including, without limitation, tipping fees, take or pay payments, advance payments for tipping rights, capacity reservations, airspace fees, and revenues from methane gas sales and sales of tax credits, emissions credits, or other credits.

Gross Receipts shall include, without limitation, receipts from sales and services: (i) where the requests or orders therefor originate in, at, from, or arising out of the use of the Premises or the Landfill, whether delivery or performance is made from the Premises or Landfill or from some other place; (ii) any amounts deducted from Gross Receipts in determining Net Receipts for a particular year, to the extent that such amounts are refunded or otherwise reimbursed to Lessee or any other Person in which Lessee has any ownership interest in a subsequent year; and (iii) which Lessee or any other Person in which Lessee has any ownership interest, in the normal and customary course of its business, would credit or attribute to its operations at the Premises or the Landfill or any part thereof. Any sums deposited with and forfeited to Lessee or any other Person in which Lessee has any ownership interest shall be included in Gross Receipts. No income or similar tax based on income or profits shall be deducted from Gross Receipts.

1.15 "Hazardous Substance" means any hazardous or toxic substance, material, or waste which is or becomes regulated by any local governmental authority, the State of Utah, or the United States Government, including, without limitation, (a) any substance, chemical or waste that is or shall be listed or defined as hazardous, toxic or dangerous under Applicable Environmental Law; (b) any other chemical, material or substance, exposure to which is prohibited, limited or regulated by any federal, state or local governmental authority pursuant to any environmental, health and safety or similar law, code, ordinance, rule, regulation, order or decree and which may or could pose a hazard to the health and safety of occupants or users of the Premises or any part thereof or any adjoining property or cause damage to the environment; (c) any petroleum products; (d) PCBs; (e) leaded paint; and (f) asbestos and asbestos containing materials.

1.16 "Landfill" means the municipal solid waste landfill facility being operated by Lessee from time to time on any portion of the Purchased Property.

1.17 "Lease" means this Lease with Option to Purchase, Lease No. _____, as the same may be amended, supplemented, and renewed from time to time.

1.18 "Lease Term" means the period of time commencing on the Commencement Date and continuing to 11:59 p.m. on that day which is 50 years after the Commencement Date; *provided, however,* that the Lease Term also includes any renewal term under Section 3.4.

1.19 "Lessee Improvements" means any and all improvements constructed from time to time on the Premises by or at the direction of Lessee as permitted by the terms of this Lease. Lessee Improvements do not include temporary or portable structures or other fixtures and items of personal property that are not intended as permanent improvements to the Premises.

1.20 "Lessee Taxes" means those taxes that are imposed on the operation of the Landfill, such as any per ton waste taxes or similar taxes. Lessee Taxes do not include real or personal property taxes, including any privilege tax assessed pursuant to the provisions of Utah Code Ann. Sections 59-4-101 *et seq.*, as amended from time to time, or any similar provision of law, nor do Lessee Taxes include any income or franchise tax imposed on Lessee.

1.21 "Lessor Indemnitees" means Lessor and the State of Utah and their respective officers, directors, employees, agents, elected and appointed officials, successors and assigns.

1.22 "Net Receipts" means, for a particular calendar year, the Gross Receipts for such year less Contractual Cost Adjustments, Public Exactions, Lessee Taxes, and Environmental Insurance Costs incurred with respect to such year. For the purposes of computing Net Receipts for a particular calendar year, Gross Receipts, Contractual Cost Adjustments, Public Exactions, Lessee Taxes and Environmental Insurance Costs shall be calculated on an accrual basis with respect to that calendar year, such that only the portion of Gross Receipts, Contractual Cost Adjustments, Public Exactions, Lessee Taxes and Environmental Insurance Costs that would properly be accrued during such year in accordance with generally accepted accounting principles consistently applied shall enter into the computation of Net Receipts. For purposes of computing Net Receipts, any Public Exactions, Environmental Insurance Costs, and Lessee Taxes that have been paid prior to the Commencement Date shall be deemed to have been made on the Commencement Date, subject to the accrual principles set forth in this definition of Net Receipts.

1.23 "Operations Commencement Date" the date that Lessee first accepts solid waste for disposal at the Landfill.

1.24 "Option Agreement" means the Option Agreement, dated as of _____, 2004, by and between Lessor and Lessee.

1.25 "Person" means any natural person, any unincorporated association, any corporation, any partnership, any joint venture, any limited liability company, any trust, any other legal entity, Lessor, and any Governmental Authority.

1.26 "Premises" means the real property described on Exhibit A; *provided, however*, that upon the closing of the purchase of any parcel of the Premises pursuant to the provisions of Article 5, such parcel shall not be deemed to be included in the Premises from and after the date of closing of the purchase of such parcel.

1.27 "Public Exactions" means all money Lessee must pay to a governmental entity as a condition of (a) entering into a waste management contract for disposal of municipal waste at the Landfill, such as rebates to municipalities, or (b) obtaining land use approvals for the Landfill and as a condition of permitting the Landfill as a class 1 municipal solid waste landfill (other than building permits); *provided, however*, that the only governmental entities, payments to which are entitled to be treated as Public Exactions pursuant to this clause (b) are Tooele County and the Utah Department of Environmental Quality. Public Exactions under clause (b) may include the actual, reasonable incurred cost of certain improvements required by Tooele County (on and off site) which are not used in or directly related to the operation of the Landfill, such as any required landscaping but not including capital items such as roads or water and other utility facilities and lines; *provided, however*, that to the extent that Tooele County imposes a per ton or per trip road maintenance fee, such fee is entitled to be deducted as a Public Exaction.

1.28 "Purchased Property" means the Initial Sale Parcel described in the Option Agreement and any portion of the Premises that are purchased by Lessee pursuant to the provisions of Article 5 as well as any portion of the Adjacent Property purchased by Lessee pursuant to the provisions of Article 6.

1.29 "Rent" means and includes the Annual Rent payable pursuant to Section 4.1, the Percentage Rent payable pursuant to Section 4.2, the Estimated Payments payable pursuant to Section 4.2(d), and all other amounts due and payable from Lessee to Lessor pursuant to this Lease.

ARTICLE 2 LEASE OF PREMISES

2.1 Lease. Subject to the terms and conditions of this Article 2 and in consideration of the covenants of Lessee contained in this Lease, Lessor leases the Premises to Lessee, as of the Commencement Date, in "AS IS" condition, including any and all defects, latent or otherwise existing as of the Commencement Date. Lessor warrants title to the Premises against those claiming by, through, or under Lessor, but not otherwise; *SUBJECT, HOWEVER*, to: (a) current taxes and assessments (if applicable), reservations in patents (including the mineral reservation described in Section 2.6) and all rights-of-way, easements, covenants, conditions, restrictions, mining claims, mineral leases, obligations, and liabilities of record as of the date hereof; (b) all matters which an accurate survey or physical inspection of the Premises would disclose; and (c) all zoning and building code requirements and other governmental laws, rules, ordinances and regulations now or hereafter in effect.

2.2 Lessee's Inspection of the Premises. Lessee acknowledges that Lessee has inspected the Premises to Lessee's complete satisfaction, observed its physical characteristics and existing conditions, the operations thereon and on adjacent areas, and, except as to the specific representations and warranties of Lessor in this Lease and in the Option Agreement, if any, Lessee hereby waives any and all objections to, complaints about, or claims regarding the Premises and its physical characteristics and existing conditions, including, without limitation, subsurface soil and water conditions and solid and hazardous waste and hazardous substances on, under or adjacent to the Premises. Lessee further hereby assumes the risk of changes in applicable laws and regulations relating to past, present and future environmental conditions on the Premises and the risk that adverse physical characteristics and conditions, including, without limitation, the presence of hazardous substances or other contaminants, may not have been revealed by its investigation. Except with respect to the specific representations and warranties of Lessor in this Lease and in the Option Agreement, if any, Lessor is hereby released from all responsibility and liability regarding the operation, condition (including the presence in the soil, air, structures, and surface and subsurface waters of materials or substances that have been or may in the future be determined to be toxic, hazardous, undesirable or subject to regulation and that may need to be specially treated, handled and/or removed from the Premises under current or future federal, state and local laws and regulations), valuation or utility of the Premises, or its suitability for any purpose whatsoever. Lessee expressly acknowledges that Lessee has not relied on any warranties, promises, understandings or representations, express or implied, oral or written, of Lessor or of any agent of Lessor, relating to the Premises, except as specifically set forth in this Lease or in the Option Agreement, if any.

2.3 Covenant of Quiet Enjoyment. Subject to the provisions of this Lease, including without limitation the provisions of Sections 2.4 and 2.6, Lessor covenants that so long as Lessee shall pay the Rent, perform the obligations of Lessee contained in this Lease and shall not be in default in the performance of any of such obligations, Lessor shall take no act or fail to take any action that would deny Lessee and its permitted subtenants, licensees, successors and assigns the right to freely, peaceably, and quietly have, hold and enjoy full and exclusive use and enjoyment of the Premises. Nothing contained in

this Agreement shall prohibit Lessor from exercising any and all remedies available to Lessor if Lessee is a debtor in any bankruptcy case.

2.4 Lessor's Access to Premises. Lessor and its agents, at all reasonable times and upon reasonable notice to Lessee, shall have free and full access to the Premises for the purpose of examining or inspecting the condition thereof for the purpose of determining if Lessee is performing the covenants and agreements of this Lease and for the purpose of posting such notices as Lessor may desire to protect the rights of Lessor.

2.5 No Further Liens or Encumbrances. During the Lease Term, but subject to the terms of Section 2.6, Lessor agrees that, without the prior written consent and approval of Lessee, Lessor will not enter into or place, or permit to be placed, against the Premises any lien, encumbrance, easement, covenant, lease, or other matter affecting the title to the Premises, other than the Permitted Exceptions as defined in the Option Agreement.

2.6 The Mineral Estate. Lessee acknowledges that Lessor is required by law to reserve the mineral estate upon any lease or conveyance of the Premises. Notwithstanding the foregoing, during the Lease Term, Lessor shall consult with Lessee prior to mineral leasing or disposition and shall not permit any mineral development activities that would physically disturb or cause unreasonable interference with the activities of Lessee permitted by this Lease.

ARTICLE 3 TERM

3.1 Commencement Date and Term. This Lease shall commence on the Commencement Date and continue for the Lease Term, subject to the terms and conditions set forth in this Lease which may permit or provide for an earlier termination.

3.2 Obligations on Lease Termination. Upon the termination of this Lease for any cause other than a default by Lessor, Lessee shall immediately surrender peaceable possession of the Premises, including any Lessee Improvements then located thereon to Lessor in good condition and repair (ordinary depreciation, reasonable wear and tear, casualty loss, and condemnation loss excepted).

3.3 Holding Over. If Lessee or any successor in interest to Lessee should remain in possession of the Premises after expiration of the Lease Term without executing a new lease, then such holding over shall be construed as a tenancy from month-to-month, subject to all the covenants, terms, provisions and obligations of this Lease except for the provisions relating to the Rent payable hereunder, which Rent, during any holdover period shall be equal to 150% of the amount of Rent otherwise calculated to be paid during the holdover period, together with all other sums owing to Lessor hereunder. Nothing contained herein shall be construed as Lessor's permission for Lessee to hold over or as limiting Lessor's remedies against a holdover lessee, if the Premises are not surrendered at the end of the Lease Term. Lessee shall indemnify the Lessor Indemnitees for, from and against any Claims resulting from delay by Lessee in so surrendering the Premises, including without limitation, any claims made by any succeeding Lessee based on such delay.

3.4 Option Terms. Provided that neither an Event of Default nor an event that, with the giving of notice or the passage of time, or both, would constitute an Event of Default has occurred that is continuing either on the date of exercise or the date of commencement of a renewal term, Lessee shall have the option to extend this Lease for four additional terms of 10 years each by delivering to Lessor written notice at least 360 days prior to the expiration of the Lease Term then in effect. If Lessee elects to

renew this Lease, such renewal shall be subject to all the covenants, terms, provisions and obligations of this Lease (other than as to length of term), unless otherwise agreed to in writing by both Lessor and Lessee.

3.5 Early Termination. If Lessee permanently closes its Landfill operations, then the Lease shall terminate at such time. For purposes of this Lease, the Lessee shall be deemed to have permanently closed the Landfill upon the occurrence of any of the following: (a) Lessee gives written notice of the permanent closure of the Landfill, accompanied by evidence that the closure has been approved by all relevant Governmental Authorities and Lessee has fulfilled or otherwise made adequate and satisfactory provision for any and all post-closure obligations; or (b) operations at the Landfill have ceased for a continuous period of at least two full years other than for reasons of Force Majeure. For purposes of clause (b) and the continuous operations provision, operations will be deemed to have ceased for a continuous two-year period notwithstanding the fact that the Landfill may have been operated for up to 60 days during the two-year period.

ARTICLE 4 RENT

4.1 Annual Rent.

(a) Annual Rent Prior to the Operations Commencement Date. For the period from and including the Commencement Date to, but not including the Operations Commencement Date, Lessee shall pay to Lessor annual rent during such period in an amount equal to \$25.00 per year for each acre of land in the Premises (the "Annual Rent").

(b) Annual Rent From the Operations Commencement Date. For the period from and including the Operations Commencement Date through the remainder of the Lease Term, Lessee shall pay to Lessor annual rent (also "Annual Rent") during such period in an amount equal to \$25.00 per year for each acre of land in the Premises; *provided, however*, that on the fifth anniversary of the Operations Commencement Date and on the fifth anniversary of each prior rent adjustment (each an "Adjustment Date"), Annual Rent under this Section 4.1(b) shall be equal to the Annual Rent in effect immediately prior to the Adjustment Date multiplied by a fraction, the numerator of which is the CPI Index for the month (the "Index Month") preceding the month in which the Adjustment Date occurs and the denominator of which is the CPI Index for that month which is 60 months prior to the Index Month, except that in no event will the Annual Rent following an Adjustment Date be less than the Annual Rent in effect immediately prior to such Adjustment Date.

(c) Payment of Annual Rent. Annual Rent shall be paid annually in advance on the Commencement Date and on each subsequent anniversary of the Commencement Date, without any deduction or offset. Annual Rent shall be payable with regard to the total number of acres in the Premises as of the date such Annual Rent payment is due. Such Annual Rent payment will be accompanied by an engineer's certificate certifying to Lessor the number of acres in the Premises as of the date the Annual Rent payment is due, in order to enable Lessor to verify that the amount of the payment is correct.

4.2 Percentage Rent Provisions.

(a) Obligation to Pay Percentage Rent. In addition to the Annual Rent and other sums required to be paid by Lessee under this Lease, from and after the Operations

Commencement Date, Lessee shall pay "Percentage Rent" in an amount equal to 5.0% of the annual Net Receipts for the calendar year for which Percentage Rent is being determined, up to and including the Break Point plus an amount equal to 7.0% of the annual Net Receipts for the same calendar year in excess of the Break Point.

(b) Payment of Percentage Rent. Percentage Rent shall be due and payable within 30 days following the end of each calendar year commencing with the calendar year during which the Operations Commencement Date occurs. Percentage Rent for the first calendar year which includes the Operations Commencement Date shall be determined by annualizing all relevant amounts entering into the computation of Net Receipts during such first calendar year, computing the Percentage Rent based on such annualized numbers and then by prorating such Percentage Rent based on the actual number of days in such first year from the Operations Commencement Date to the end of such calendar year, which prorated amount shall be the amount of Percentage Rent to be paid by Lessee for such partial first year. Percentage Rent for the calendar year in which the Lease Term expires or otherwise terminates shall be payable within 30 days following the end of such calendar year, with Percentage Rent being computed for the entire calendar year and then being prorated based on the actual number of days in such calendar year from the beginning of such calendar year to the date that the Lease expires or is otherwise terminated, which prorated amount shall be the amount of Percentage Rent to be paid by Lessee for the final year of the Lease Term.

(c) Offset. Lessee shall be entitled to offset against annual Percentage Rent for a particular calendar year, the following amounts:

(i) Any Annual Rent actually paid by Lessee pursuant to Section 4.1(a)(ii) with respect to such calendar year; and

(ii) Any amount actually paid by Lessee pursuant to Section 5.2(a) during such year on account of the purchase of portions of the Premises.

If the aggregate total of offset amounts for a given calendar year exceed the Percentage Rent for such year, the excess cannot be carried forward nor offset against any future Estimated Payments of payments of Percentage Rent.

(d) Obligation to Make Estimated Payments; Amount. Commencing on the last day of the first calendar quarter of the first full calendar year of the Lease Term occurring after the Operations Commencement Date and continuing on the last day of each subsequent calendar quarter during the Lease Term (such days being March 31, June 30, September 30, and December 31), Lessee shall make estimated payments (the "Estimated Payments") to Lessee on account of Percentage Rent to be paid with respect to the calendar year during which such Estimated Payments are being made in an amount equal to 25% of the Percentage Rent actually paid by Lessee to Lessor with respect to the prior calendar year, except that with respect to Estimated Payments made during the first full calendar year following the year in which the Operations Commencement Date occurs, the Estimated Payments for that year shall be in an amount equal to 25% of the annualized Percentage Rent for the year in which the Operations Commencement Date occurs as determined pursuant to Section 4.2(b).

(e) Annual Reconciliation. There shall be deducted from Percentage Rent otherwise due with respect to a particular calendar year, after taking into account any applicable offsets under Section 4.2(c) the aggregate total of Estimated Payments actually made during such year. If, however, the aggregate total of Estimated Payments actually made for a particular year

exceeds the amount of Percentage Rent otherwise due with respect to a particular calendar year, taking the offsets into account, and no Event of Default has occurred nor has any event or circumstance occurred that is continuing which, with the giving of notice or the passage of time, or both, would constitute an Event of Default, the excess shall be refunded to Lessee within 30 days following the date that the Percentage Rent payment is otherwise due.

(f) Lessee Reports. On or before the thirtieth day following the end of each calendar year, commencing with the year in which the Operations Commencement Date occurs, Lessee shall submit to Lessor a detailed written statement signed by Lessee and certified by Lessee to be true and correct (the "Net Receipts Statement"), showing the amount of Gross Receipts, Net Receipts and all items entering into the computation of Net Receipts, including Contractual Cost Adjustments, Environmental Insurance Costs, Public Exactions, and Taxes for the preceding calendar year as well as the amount of Percentage Rent due for such calendar year, all determined in accordance with the requirements of this Lease.

(g) Lessee Records. Lessee agrees to keep full, complete and proper books, records and accounts of Gross Receipts and Net Receipts and all items entering into the computation of Net Receipts and Percentage Rent normally examined and required to be kept by an independent accountant pursuant to accepted auditing standards in performing an audit of Net Receipts. All such books, records and accounts shall be kept for a period of at least five years following the end of the calendar year to which they relate. Within five years after the end of such calendar year, Lessor, its agents and employees, upon at least seven days prior written notice, may examine and inspect all of the books and records relating to the Premises and the Landfill (including income tax returns) for the purpose of investigating and verifying the accuracy of the Net Receipts Statement for that calendar year.

(h) Audit. At any time within five years after the end of a particular calendar year, Lessor may cause an audit of Lessee's business to be made for the purpose of verifying the accuracy of the Net Receipts Statement for such calendar year. The audit shall be performed by a certified public accountant selected by Lessor, and Lessee agrees to make all records available for the audit at the Landfill offices, unless Lessor agrees to a different location. If the results of the audit show that Lessee's Net Receipts Statement for any period has been understated, then, within ten days of the determination of such deficiency, Lessee shall pay any applicable deficiency to Lessor, together with interest thereon at the Default Rate from the date such payment should originally have been made until the date actually paid. If the results of the audit show that Lessee's Net Receipts Statement for any period has been understated by four percent or more, then, within twenty days of the determination of such deficiency, Lessee shall also pay Lessor the cost of the audit. If the results of the audit show that Lessee's Net Receipts Statement for any period has been overstated, then within thirty days of the determination of the overstatement, Lessor shall pay any such applicable overpayment to Lessee.

(i) Construction and Completion Deadlines; Continuous Operations.

(i) Within 180 days following the date of execution of this Lease, Lessee shall commence construction of a Landfill on the Purchased Property consisting of at least one cell with an aggregate design capacity of at least one million cubic yards (the "Initial Landfill Project"). The date such construction is commenced is referred to as the "Construction Commencement Date." For purposes of this Section 4.2(i), construction will not be deemed to have commenced until such time as Lessee actually begins excavation activities on the Purchased Property.

(ii) Lessee shall complete the Initial Landfill Project, including all ancillary facilities and off-site improvements, such that the Initial Landfill Project is fully operational and ready to receive municipal waste within 180 days of the Construction Commencement Date. The date by which Lessee is to have completed the Initial Landfill Project in accordance with the foregoing requirements is referred to as the "Completion Date."

(iii) The Construction Commencement Date and the Construction Completion Date shall be extended by reason of Force Majeure.

(iv) Following the Completion Date, the Landfill shall be operated continuously as a Landfill during such time as the Lease is in effect or any of the Obligations (as defined in the Deed of Trust) are otherwise outstanding, subject only to cessation of operations for temporary periods as a result of Force Majeure events, with Force Majeure for these purposes being deemed to include general economic conditions within the geographic area in which Trustor or any of its direct competitors operates. Any other provision of this Lease to the contrary notwithstanding, Lessee shall not be deemed to be in breach of the requirements of this Section 4.2(i)(iv) unless the Landfill has ceased continuous operations for at least two full years. For purposes of this Section 4.2(i)(iv), operations will be deemed to have ceased for a continuous two-year period notwithstanding the fact that the Landfill may have been operated for up to 60 days during the two-year period.

4.3 Net Lease. This is a net lease and it is the intention of the parties that, except as otherwise provided or limited by the specific provisions of this Lease, Lessee shall be responsible for all costs and expenses of the ownership, development, maintenance, repair and operation of the Premises and the Landfill incurred or accrued during the Lease Term. Any present or future law to the contrary notwithstanding, this Lease shall not terminate, nor shall Lessee be entitled to any abatement, reduction, set-off, counterclaim, defense or deduction with respect to any Rent or other sum payable hereunder, nor shall the obligations of Lessee hereunder be affected, by reason of any damage to or destruction of the Premises or by any taking of the Premises or any part thereof by condemnation, except as provided in this Lease.

4.4 Interest on Past Due Obligations. Any amount due to Lessor which is not paid when due and within any applicable notice and cure period shall bear interest from the original due date until paid at the Default Rate.

4.5 Late Charges. If Lessee fails to make any Rent payment when due and such failure continues for 30 days following written notice of failure to Lessee, Lessee shall be obligated, upon Lessor's demand, to pay a late fee of 3% of the amount due to cover the administrative costs incurred by Lessor in connection with such delinquent payment, which late fee shall be in addition to interest or other enforcement costs under this Lease. The total amount of the delinquent Rent payment plus the late fee shall bear interest at the Default Rate from the date of delinquency and shall continue until the entire amount (including the delinquent payment, the late fee and any accrued interest) is paid. Unless Lessor agrees in writing to the contrary, Lessee shall not be relieved of its obligation to pay the late fee and interest accruing hereunder, even in the event Lessor has terminated the Lease.

4.6 Special Rent Provision. If at any time after expiration of the Lease Term or following an earlier termination of this Lease for any reason whatsoever, other than a default by Lessor, Lessee operates the Landfill and generates any Net Receipts, then, any other provision of this Lease to the contrary notwithstanding, Lessee shall continue to be obligated to pay an amount to Lessor equal to the

Percentage Rent that would have been due with respect to such Net Receipts if this Lease were then in effect. For purposes of this Section 4.6 and the payments required by this Section 4.6, from and after such expiration or termination, all of the provisions of this Lease relating to Percentage Rent, include rights and remedies for failure to make the payments required by this Section 4.6 shall govern and be the agreement of the parties with respect to the rights and obligations of the parties as to such payments. The making of any such payments and the provisions of this Section 4.6 shall not be deemed in any way to revive or continue the Lease or give Lessee any rights whatsoever in the Premises following the expiration or termination of the Lease. This provision is given as additional consideration for the lease of the Premises to Lessee for the Lease Term.

ARTICLE 5 AGREEMENT TO PURCHASE

5.1 Obligation to Purchase. Prior to Lessee commencing any landfill operations on any portion of the Premises, Lessee shall be obligated to purchase such portion of the Premises (each a "Parcel") on the terms and conditions set forth in this Article 5. Lessee shall give Lessor a written notice (a "Notice of Purchase") meeting the requirements of Section 5.3 during the Lease Term. Any other provision of this Lease to the contrary notwithstanding, Lessee shall not be permitted to purchase any Parcel if either at the time of the Notice of Purchase or closing the purchase of such Parcel an Event of Default has occurred and is continuing or an event has occurred that is continuing which, with the giving of notice or the passage of time, or both, would constitute an Event of Default. If this Lease is terminated as a result of a default by Lessee or if Lessor reenters the Premises pursuant to the provisions of Article 15, then and thereupon the rights and obligations provided for in this Article 5 shall be void and of no further force or effect.

5.2 Notice of Purchase. In order to be valid and proper, the Notice of Purchase must meet the following requirements:

(a) Shape and Location. The Parcel must be contiguous to previously purchased parcels and shall be of a regular shape;

(b) Maximum Acreage. The maximum acreage to be included in a Parcel shall be the amount reasonably necessary to construct on such parcel no more than two cells but in no event more than 50 acres; and

(c) Submittals. The Notice of Purchase must be accompanied by the following:

(i) A useable capacity calculation certified by an independent licensed engineer qualified in such matters that demonstrates that the existing cells at the Landfill are within two years (at current volumes) of being used to their fullest extent possible, together with accompanying surveys of the Landfill demonstrating the remaining capacity of the existing cells; and

(ii) A boundary survey from a licensed land surveyor certified accurate and correct to Lessor and showing the boundary and legal description of the Parcel and the gross acreage within the boundary of the Parcel.

5.3 Purchase Terms. Upon Lessee providing a Notice to Purchase as provided herein, then Lessor shall sell, and Lessee shall purchase, the Parcel described in the Notice to Purchase on the following terms and conditions:

(a) Purchase Price. The Parcel purchase price (the "Purchase Price") shall be equal to the gross acreage of the Parcel multiplied by the Per Acre Amount. As used herein, the "Per Acre Amount" is initially equal to \$1000, with such \$1000 amount being increased on each anniversary of the Commencement Date to equal the amount in effect immediately prior to such adjustment multiplied by a fraction, the numerator of which is the CPI Index for the month immediately preceding the month in which the adjustment is to occur and the denominator is the CPI for the same month one year earlier; *provided, however, that in no event will the new amount be less than the amount in effect for the immediately preceding year.* The Purchase Price shall be paid at Closing (defined later).

(b) Disbursement at Closing. Upon the Closing, all amounts paid according to this Article with respect to the Parcel being purchased, less any closing costs payable by Lessor, shall be disbursed to Lessor, all as provided in the Lessor Closing Settlement Statement (defined later).

(c) Due Diligence. Lessor shall not be required to provide Lessee with either a survey of the Parcel, a title report on the Parcel, a title policy, or any other due diligence information with respect to the Parcel. Lessee shall, at its own expense, satisfy itself with respect to all title and survey matters as well as all other due diligence matters with respect to the Parcel prior to providing the Notice to Purchase with respect thereto, it being agreed that Lessee will purchase the Parcel "AS IS, WHERE IS," without any representations or warranties of any kind whatsoever, express or implied. In that connection, Lessor is hereby released from all responsibility and liability regarding the operation, condition, valuation or utility of the Parcel, its suitability for any purpose whatsoever, or any matter within the scope of a prudent due diligence review of the Parcel comparable to the Due Diligence Review described in the Option Agreement, including, without limitation, any responsibility or liability with respect to the presence in the soil, air, structures, and surface and subsurface waters, of materials or substances that have been or may in the future be determined to be toxic, hazardous, undesirable or subject to regulation and that may need to be specially treated, handled and/or removed from the Parcel under current or future federal, state and local laws and regulations. Lessee expressly acknowledges that Lessee has not relied on any warranties, promises, understandings or representations, express or implied, of Lessor or any agent of Lessor relating to the Parcel.

(d) Escrow. An escrow for the purchase of the Parcel shall be established with an escrow agent to be selected by Lessor ("Escrow Holder"), and a copy of this Lease shall be delivered to Escrow Holder for this purpose.

(e) Escrow Instructions. This Article constitutes escrow instructions to Escrow Holder. If Escrow Holder requires the execution of its standard form printed escrow instructions, Lessee and Lessor agree to execute those instructions; however, those instructions will be construed as applying only to Escrow Holder's engagement. If there are conflicts between the terms of this Article and the terms of the printed escrow instructions, the terms of this Article will control.

(f) Escrow Cancellation Charges. If the Escrow fails to close because of Lessor's default, Lessor will pay all customary escrow cancellation charges. If the Escrow fails to close because of Lessee's default, Lessee will pay all customary escrow cancellation charges. If the Escrow fails to close for any other reason, each party will pay one-half of all customary escrow cancellation charges.

(g) IRS Reporting. Escrow Holder agrees, by acceptance of the escrow, to be the designated "reporting person" under Section 6045(e) of the U.S. Internal Revenue Code of 1986

as amended (the "Code") with respect to the real estate transactions described in this Article and to prepare, file and deliver such information, returns and statements as the U.S. Treasury Department may require by regulations or forms in connection therewith, including Form 1099-B.

(h) Closing Deadline. The closing of the purchase transaction for a particular Parcel (the "Closing") shall occur on the twentieth day following the date that the Notice of Purchase is properly given. Closing shall take place at the office of Lessor.

(i) Closing Statements. Prior to Closing, Escrow Holder will prepare separate closing settlement statements for Lessor and Lessee, reflecting the various charges, proration and credits applicable to such party, as provided in this Article, and provide Lessor with a copy of Lessor's closing settlement statement and Lessee with a copy of Lessee's closing settlement statement. Prior to Closing, Lessor shall have the right to review and approve its closing settlement statement to insure that such settlement statement conforms to the terms of this Article, and the settlement statement for Lessor, as approved by Lessor, is referred to in this Article as the "Lessor Closing Settlement Statement." Prior to Closing, Lessee shall have the right to review and approve its closing settlement statement to insure that such settlement statement conforms to the terms of this Article, and the settlement statement for Lessee, as approved by Lessee, is referred to in this Article as the "Lessee Closing Settlement Statement."

(j) Lessor's Closing Obligations. At Closing, Lessor shall:

(i) Deliver to Lessee a fully executed and acknowledged patent conveying fee simple title to the Parcel to Lessee, subject to current taxes and assessments (including any privilege tax assessed pursuant to the provisions of Utah Code Ann. Sections 59-4-101 *et seq.*, as amended from time to time, or any similar provision of law), reservations in patents, all easements, rights-of-way, covenants, conditions, restrictions, mining claims, mineral leases, obligations and liabilities as may appear of record, and all matters which an accurate survey of the Parcel or a physical inspection of the Parcel would disclose and to any other matters consented to by Lessee or caused by or resulting from the acts of Lessee. At Closing, Lessor will, at its sole cost and expense, remove all monetary liens and encumbrances from the Parcel other than the lien for current taxes and assessments (including any privilege tax assessed pursuant to the provisions of Utah Code Ann. Sections 59-4-101 *et seq.*, as amended from time to time, or any similar provision of law) and other than any Leasehold Mortgage pursuant to Section 14.2. Lessee acknowledges that Lessor is required by law to reserve the mineral estate upon any lease or conveyance of any portion of the Parcel and the patent described in this subsection (i) shall reflect that reservation. Notwithstanding the foregoing, following the Closing, Lessor shall consult with Lessee prior to mineral leasing or disposition with respect to the Parcel and shall not permit any mineral development activities that would physically disturb or cause unreasonable interference with the Lessee's operations on the Parcel.

(ii) Execute and deliver to Lessee a certificate of non-foreign status in accordance with Section 1445 of the Code.

(iii) Execute, acknowledge as appropriate, and deliver to Lessee such other documents as may be necessary or appropriate to transfer and convey all of the Parcel to Lessee and to otherwise consummate the sale of the Parcel to Lessee in accordance with the terms of this Article.

(k) Lessee's Closing Obligations. At Closing, Lessee shall undertake the following:

(i) Pay to Escrow Holder, in cash or by wire transfer of ready funds, for disbursement pursuant to Section 5.3(b), the Purchase Price.

(ii) Execute, acknowledge, and deliver to Lessor an amendment to the Deed of Trust adding the Parcel to the lien of the Deed of Trust, such amendment to be in form and substance reasonably satisfactory to Lessor.

(iii) Execute, acknowledge as appropriate, and deliver to Lessor such other documents as may be necessary or appropriate to consummate this transaction in accordance with the terms of this Article.

(l) Charges; Closing Costs; and Prorations. Lessee shall pay 100% of the escrow fee. All recording fees will be paid by Lessor. Improvement liens or similar assessments and taxes, either existing or proposed, will not be prorated but will be the responsibility of Lessee. Any other closing costs not provided for above will be paid by Lessee and Lessor as they shall mutually agree or, in the absence of such agreement, according to the usual and customary practice in the county in which the Parcel is located.

(m) Payments and Disbursements to Be Handled through the Escrow. The various charges, credits and prorations contemplated by this Article will be handled by Escrow Holder through the escrow by appropriate charges and credits to Lessee and Lessor and will be reflected in the Lessor Closing Settlement Statement or the Lessee Closing Settlement Statement, as appropriate. All amounts payable pursuant to this Article will be paid to Escrow Holder for disposition through the escrow. Escrow Holder is authorized to make all disbursements to the parties and to third parties contemplated by this Article from funds deposited for those purposes, as necessary or appropriate to close this transaction and as set forth in the Lessor Closing Settlement Statement and the Lessee Closing Settlement Statement.

(n) Possession. At Closing, Lessee will be possession of the Parcel pursuant to the terms of the Lease and will continue in possession of the Parcel following the Closing.

5.4 Final Mandatory Purchase. At such time as the Landfill has reached 90% of the permitted capacity taking into account the entire Premises and all property purchased by Lessee pursuant to the Option Agreement or this Article 5, as reasonably determined by Lessor, Lessee shall be required to purchase the remaining portion of the Premises that has not previously been purchased by Lessee pursuant to this Article 5 (the "Remaining Parcel"). Such obligation to purchase the Remaining Parcel shall be triggered by Lessor giving to Lessee a written notice of required exercise at any time after the 90% of capacity requirement has been met. Such written notice shall have the same effect as if Lessee had given a Notice of Purchase with respect to the Remaining Parcel as of the date of receipt by Lessee of the notice from Lessor, and the sale and purchase shall be on the terms and conditions specified in Section 5.3.

ARTICLE 6 OTHER PROPERTY OWNED BY LESSOR

6.1 Adjacent Property. Lessor owns the Adjacent Property. The Adjacent Property may, in the future, be suitable to include as part of the Landfill. Accordingly, Lessor agrees as follows:

(a) Restrictions. During the Lease Term, Lessor shall appropriately restrict the uses of the Adjacent Property to uses that are not incompatible with the potential use of the Adjacent Property for landfill purposes; and

(b) Right of First Offer. If, during the Lease Term, Lessor determines to sell any portion of the Adjacent Property, Lessor shall first offer such portion of the Adjacent Property to Lessor for purchase by Lessee at fair market value for a period of 60 days. If Lessee elects to purchase such portion of the Adjacent Property, such purchase shall be made in accordance with the terms of Section 5.3, except that the purchase price shall be the fair market value as reasonably determined by Lessor. Such portion of the Adjacent Property shall thereupon be deemed part of the Landfill with respect to which Percentage Rent is due. If Lessee does not so elect to purchase, then Lessor may sell such portion of the Adjacent Property free of any interest of Lessee and free of the restrictions in Section 6.1(a).

6.2 Latecomers Agreements. Lessor agrees that, in connection with the sale or lease of more than five years during the Lease Term of any real property owned by Lessor that fronts on any off-site road improvements made by Lessee to serve the Landfill, Lessor shall require the purchaser or lessee to reimburse Lessee for the reasonable off-site road improvement costs for labor and materials actually incurred by Lessee in constructing the off-site road improvements, such reimbursement to be made on a frontage foot basis and upon presentation of documentation reasonably detailing such costs.

ARTICLE 7 USE OF THE PREMISES

7.1 Use. Lessee shall have the right to improve, use and operate the Premises solely for the following purposes and none others, all of which shall be at the sole expense of Lessee: Providing a buffer zone for the Landfill, including the installation of a perimeter fence as required by the terms of the applicable permits relating to the Landfill; installing and maintaining monitoring wells and related monitoring facilities; installing and maintaining horizontal infrastructure improvements, such as water lines, roads, and the like, to service the Landfill; constructing and operating administrative buildings and related administrative facilities to serve the Landfill; and utilizing borrow material, as necessary for Landfill operations and in accordance with applicable laws relating to mined land reclamation. Under no condition or circumstance shall any of the Premises be used as a landfill or for the storage or dumping of any waste or Hazardous Substance.

7.2 The Borrow Section. Notwithstanding any other provisions of this Lease, no Annual Rent shall be due with respect to the Borrow Section and the sole use that Lessee shall be entitled to make of the Borrow Section will be to use it for borrow material, as necessary for Landfill operations. Lessee's borrow operations under this Section 7.2 and pursuant to Section 7.1 shall be subject to applicable laws relating to mined land reclamation and to reasonable slope stability, recontouring and revegetation measures prescribed by Lessor.

7.3 No Management Responsibilities. Lessor shall have no management responsibilities with respect to the activities or operations of Lessee under the Lease.

7.4 Nuisances. Lessee agrees not to conduct or permit to be conducted any public or private nuisance on or from the Premises. Lessee agrees not to permit or commit any waste of the Premises.

7.5 Observance of Governmental Regulations. In Lessee's use and occupancy of the Premises and the exercise by Lessee of its rights and the performance by Lessee of its obligations under

this Lease, Lessee shall comply with all laws, orders, rules, regulations, permits, licenses, directives, ordinances and requirements of all Governmental Authorities having jurisdiction over Premises, or any part thereof, as they may relate to the Premises; including, without limitation, those pertaining to reclamation and restoration of the Premises, and Lessee shall pay all costs, expenses, liabilities, losses, fines, penalties, claims and demands including, without limitation, attorneys' fees, that may in any way arise out of or be imposed because of the failure of Lessee to comply with such laws, orders, rules, regulations, directives, ordinances and requirements.

7.6 Environmental Compliance.

(a) Restrictions on Hazardous Substances: Remedial Work. Lessee shall not cause or permit any Hazardous Substance to be brought, kept or used in or about the Premises by Lessee, its officers, directors, owners, agents, employees, contractors, or subcontractors except in commercial quantities not in violation of Applicable Environmental Law and similar to those quantities usually kept on similar premises by others similarly situated. Lessee, its officers, directors, owners, agents, employees, contractors, and subcontractors shall use and dispose of such materials in compliance with all applicable federal, state and local laws, including, without limitation, Applicable Environmental Law. If the presence of any Hazardous Substance on, in or under the Premises caused or permitted by Lessee, its officers, directors, owners, agents, employees, contractors or subcontractors results in any contamination of the Premises, Lessee shall promptly take all actions, at its sole expense, as are reasonably necessary to return the affected area to the condition existing prior to the introduction of any such Hazardous Substance, including, without limitation, any investigation or monitoring of site conditions or any clean up, remediation, response, removal, encapsulation, containment or restoration work required by Applicable Environmental Law because of the presence of any such Hazardous Substance on, in or under the Premises or any release or suspected release or threat of release of any such Hazardous Substance in the air, soil, surface water or ground water (collectively, the "Remedial Work"). Lessee shall obtain all necessary licenses, manifests, permits and approvals to perform the Remedial Work. Lessee shall promptly perform all Remedial Work and the disposal of all waste generated by the Remedial Work in accordance with all Applicable Environmental Law. Notwithstanding the foregoing, Lessee may transport municipal solid waste, which is classified as a Hazardous Substance, over the Premises en route to its final destination on lands owned by Lessee.

(b) Compliance with Applicable Environmental Law. Without limiting the generality of the foregoing or any other provision of this Lease, Lessee shall be solely and completely responsible for insuring that the Premises and all activities thereon (including activities of Lessee, its officers, directors, owners, employees, agents, contractors and subcontractors) comply fully with Applicable Environmental Law, and for responding to, defending against and/or complying with any administrative order, request or demand relating to (i) potential or actual contamination occurring on the Premises during the Lease Term, (ii) third party claims for Remedial Work relating to potential or actual contamination occurring on the Premises during the Lease Term or for the costs of any such Remedial Work or for the costs of any such Remedial Work which the third-party claimant has undertaken, whether such order, request, demand or claim names Lessor, Lessee or both. Lessee's responsibility under this Section includes, but is not limited to, promptly responding to such orders, requests, demands and claims on behalf of Lessor and defending against any assertion of Lessor's financial responsibility or individual duty to perform thereunder.

(c) Indemnification. Lessee shall indemnify, save harmless and defend each of the Lessor Indemnitees for, from and against any and all Claims incurred by, sought from or asserted

directly or indirectly against any Lessor Indemnitee during or after the term of this Lease as a result of the presence of any Hazardous Substance on, in or under the Premises or any release of any Hazardous Substance into the air, soil, surface water or ground water, which Hazardous Substance was brought, kept or used in or about the Premises by Lessee, its officers, directors, owners, employees, agents, contractors or subcontractors, or as a result of a breach by Lessee of its obligations under this Section 7.6. Lessee shall assume, pursuant to the foregoing indemnity, any liabilities or responsibilities which are assessed against any Lessor Indemnitee in any action described under Section 7.6(b) and under this Section 7.6(c). Lessee shall promptly provide to Lessor copies of all communications, filings or other writings, photographs or materials given to or received from any Person or Governmental Authority in connection with any cleanup or Remedial Work conducted by Lessee, and shall notify Lessor of, and permit Lessor's representative to attend any meetings or oral communications relating thereto.

7.7 Construction. All Lessee Improvements shall be constructed at the sole cost and expense of Lessee by duly licensed and reputable contractors, in a first class workmanlike manner, and in full compliance with the requirements of any and all laws, ordinances, permits, licenses, and regulations applicable thereto, including zoning and building code requirements of all Governmental Authorities at the time said Lessee Improvements are constructed, including, without limitation, the Americans with Disabilities Act of 1990 and applicable state regulations relating to the construction and operation of solid waste disposal facilities. All such Lessee Improvements shall be constructed to the then applicable industry standards for like projects. Lessee shall obtain and maintain, at no cost to Lessor, any and all bonds, letters of credit or other assurances of completion required by any Governmental Authorities in connection with the construction of any Lessee Improvements and shall provide copies of such items to Lessor upon written request from Lessor.

7.8 Ownership and Removal of Lessee Improvements. All Lessee Improvements, and all alterations and additions thereto constructed by or on behalf of Lessee, shall be and remain the exclusive property of Lessee during the Lease Term. Notwithstanding the foregoing, such Lessee Improvements may only be removed with the written consent of Lessor, which consent may be withheld in the Lessor's sole and absolute discretion. Prior to the expiration or termination of this Lease, all such Lessee Improvements (excluding roads, utilities and permanent improvements) shall be removed from the Premises at Lessee's expense and Lessee shall restore the Premises to their condition as of the Commencement Date, to the extent commercially practicable and reasonable. Lessee shall also remove, expiration or termination of the Lease Term, any and all temporary or portable structures or other fixtures and items of personal property then located on the Premises.

7.9 Development at Lessee's Expense. Lessee shall bear all expenses in connection with the design, pre-development, development, improvement, construction, alteration and repair of the Premises and all Lessee Improvements thereon and shall indemnify, defend and hold the Lessor Indemnitees and the Premises harmless for, from and against any and all Claims associated therewith or arising therefrom.

7.10 Indemnification Obligations with Respect to Lessee Improvements. Lessee agrees to indemnify, defend, and hold the each of the Lessor Indemnitees free and harmless for, from and against any and all Claims arising out of or in connection with any failure of Lessee to comply, in its use of the Premises, with all applicable governmental laws, rules and regulations or any failure of Lessee to maintain the Premises in a safe condition.

7.11 Mechanics' Liens.

(a) Lessee Is Not Lessor's Agent. The parties agree, and notice is hereby given, that Lessee is not the agent of Lessor for the construction, alteration or repair of any Lessee

Improvements, the same being done at the sole direction and expense of Lessee. All contractors, materialmen, mechanics, and laborers are hereby charged with notice that they must look only to Lessee for the payment of any charge for work done or material furnished on the Premises during the Lease Term. Lessee shall have no right, authority or power to bind Lessor or any interest of Lessor for the payment of any claim for labor or material, or for any charge or expense, incurred by Lessee as to improvements, alterations or repairs on or to the Premises, and Lessee shall post notices on the Premises during all construction work of any nature whatsoever that Lessor is not responsible for any material and labor used on the Premises.

(b) Covenant Against Mechanics' Liens. Lessee shall not suffer or permit to be enforced against the Premises, or any part thereof, and shall indemnify and hold each of the Lessor Indemnitees and the Premises harmless for, from, and against any mechanic's, materialmen's, contractor's or subcontractor's liens arising from, and any claim for damage growing out of, the work of any construction, repair, restoration, replacement, or improvement done by or on behalf of Lessee and all Claims associated therewith. Lessee shall pay or cause to be paid all of such liens, claims, or demands before any action is brought to enforce the same against the Premises. If Lessee shall in good faith contest the validity of any such lien, claim, or demand, then Lessee shall, at its expense, defend itself and Lessor against the same and shall pay and satisfy any adverse judgment that may be rendered thereon prior to execution thereof and in the event of any such contest Lessee shall, at the request of Lessor, provide such security as Lessor may reasonably require to protect the interests of Lessor in the Premises from the effect of such lien.

7.12 Notices and Filings. Lessee shall provide Lessor with copies of any and all filings with and notices to any and all Governmental Authorities with respect to the Premises and copies of any and all notices, complaints, or other actions by any Governmental Authority received by Lessee or its agents with respect to the Premises.

ARTICLE 8 UTILITIES

8.1 Utilities. During the Lease Term, Lessee agrees to pay, when due, and to indemnify, defend and hold the Lessor Indemnitees and the Premises harmless for, from and against any liability for all charges for water, sewer, gas, electricity, telephone, CATV, and all other utility services of every kind and nature supplied to and used on the Premises, including all connection fees and/or pending assessment charges. Any interruptions or impairments of utility services of any nature or in any manner whatsoever shall not affect any of Lessee's obligations under this Lease.

ARTICLE 9 TAXES AND ASSESSMENTS

9.1 Payment of Taxes and Assessments. Except as otherwise provided in Section 9.2, Lessee shall pay, prior to delinquency:

(a) All valid taxes, assessments, levies, fees, fines, penalties and all other governmental charges, general and special, ordinary and extraordinary, foreseen and unforeseen (including any privilege tax assessed pursuant to the provisions of Utah Code Ann. Sections 59-4-101 *et seq.*, as amended from time to time, or any similar provision of law);

(i) Which, during the Lease Term, are imposed or levied upon or assessed against (A) the Premises; (B) any Rent or other sum payable by Lessee hereunder; or (C) this Lease and the leasehold estate hereby created; or

(ii) Which arises in respect of the operation, possession or use of the Premises; and

(b) All sales, use, or similar taxes imposed or levied upon, assessed against or measured by any Rent or other amounts payable to Lessor hereunder, but not income taxes.

If Lessee fails to pay any of the foregoing before they become delinquent, Lessor, after notice to Lessee, may pay such delinquent taxes, assessments, levies, fees, fines, penalties and governmental charges, and all expenditures and costs incurred thereby shall be payable within 20 days after such notice to Lessee. Lessee will furnish to Lessor, promptly after demand therefor, proof of payment of all items referred to above which are payable by Lessee. If any such assessment may legally be paid in installments, Lessee may pay such assessment in installments.

9.2 Privilege of Contesting. Upon at least 10 days prior written notice to Lessor and Lessee furnishing to Lessor such bonds or other security as reasonably determined and requested by Lessor, Lessee may protest, contest, object to or oppose the legality or amount of any such taxes and assessments to be paid by Lessee hereunder. In the event of any such contest, Lessee may defer payment of any such tax or assessment so long as the legality or the amount thereof is being so contested, diligently and in good faith; *provided, however*, that if at any time payment of the whole or any part thereof shall become necessary to prevent the termination by sale or otherwise of the right of redemption of any property affected thereby or to prevent physical eviction of either Lessor or Lessee because of nonpayment thereof, Lessee shall pay the same in order to prevent such termination of the right of redemption or such eviction. Any such contest shall be at the sole cost and expense of Lessee, and Lessee shall pay any costs or expenses incurred by Lessor as a result of any such contest. Each refund of any tax, assessment, fee or charge so contested shall be paid to Lessee, and Lessor shall not, without prior approval of Lessee, make or enter into or finally agree to any settlement, compromise or any deposition of any contest or discontinue or withdraw any contest or accept any refund, other adjustment or credit of or from any such tax or assessment as a result of any contest. Any and all penalties and interest that become due as a result of any such contest shall be paid by Lessee.

ARTICLE 10 INSURANCE AND INDEMNITY

10.1 Indemnity.

(a) General Indemnity. Lessor shall not be liable for and Lessee covenants and agrees to indemnify and save all Lessor Indemnitees entirely harmless for, from and against each and every Claim arising out of any accident or other occurrence causing injury to or death of persons or damage to property by reason of construction or maintenance of any Lessee Improvements, of any additions, alterations or renovations thereto, or due to the condition of the Premises or any Lessee Improvements thereon, or the use or neglect thereof by Lessee or any agent, employee, invitee, contractor, or customer of Lessee, or any other Person, or otherwise occurring upon the Premises or any improvements thereon. Lessee further agrees to indemnify and save all Lessor Indemnitees and the interests of Lessor in the Premises entirely harmless for, from and against all Claims arising out of any failure of Lessee to comply with any of Lessee's

obligations under this Lease, including without limitation reasonable attorneys' fees and court costs.

(b) Provisions Relating to All Indemnities. Each provision of this Lease imposing an indemnification obligation on Lessee is in addition to all other indemnification provisions and shall not be construed in a manner that modifies or limits any other indemnification provision in this Lease. All indemnification provisions in this Lease shall survive the expiration or earlier termination of this Lease as to Claims arising or accruing prior to the expiration or earlier termination of this Lease. The indemnification provided by Lessee in this Section 10.1 and elsewhere in this Lease shall not be construed or interpreted as in any way restricting, limiting or modifying Lessee's insurance or other obligations under this Lease, and such indemnification provisions are independent of Lessee's insurance and other obligations. Lessee's compliance with the insurance requirements and other obligations under this Lease does not in any way restrict, limit or modify Lessee's indemnification obligations under this Lease.

10.2 Waivers. To the fullest extent permitted by law, Lessee hereby waives all Claims against Lessor arising from the following, except to the extent resulting from the gross negligence or willful misconduct of Lessor, its agents, servants, contractors, or employees: (a) any personal injury, bodily injury or property damage occurring in or at the Premises; (b) any loss of or damage to property of Lessee, its subtenants, agents, contractors, or employees located in the Premises by theft or otherwise; (c) any personal injury, bodily injury, or property damage caused by occupants of property adjacent to the Premises or the public or by the construction of any private, public, or quasi-public work occurring in the Premises; (d) any interruption or stoppage of any utility service or for any damage to persons or property resulting from such stoppage; (e) business interruption or loss of use of the Premises suffered by Lessee; (vi) damages or injuries or interference with Lessee's business, loss of occupancy or quiet enjoyment and any other loss resulting from the exercise by Lessor of any right or the performance by Lessor of any of Lessor's obligations under this Lease; or (vii) any bodily injury to an employee of Lessee, its subtenants, agents, contractors, or employees arising out of and in the course of employment of the employee and occurring anywhere in or about the Premises.

10.3 Certain Insurance Not Required. Nothing in this Lease shall be deemed to require Lessee to obtain or maintain any earthquake, flood, rental loss, business interruption, or property insurance.

10.4 Liability Insurance. Throughout the Lease Term, Lessee shall provide and maintain commercial general liability insurance (including contractual liability coverage) insuring it against claims for personal injury, bodily injury or death, and property damage or destruction arising out of Lessee's negligent acts or omissions or arising out of its indemnity obligations under this Lease. Such insurance shall be written with an insurer licensed to do business in the State of Utah and shall name Lessor as additional insured. The limits of liability of all such insurance shall be not less than \$10,000,000 combined single limit (covering personal injury, bodily injury or death and property damage or destruction) per occurrence, with a deductible not to exceed \$100,000. The limits of such insurance shall not limit the liability of Lessee under this Lease. Lessee shall furnish Lessor with certificates evidencing such insurance.

10.5 Other Insurance. Lessee shall, at all times during the Lease Term and at the sole cost and expense of Lessee, maintain and keep in force:

(a) Workmen's Compensation Insurance. All workmen's compensation insurance on its employees, if any, required under the applicable workmen's compensation laws of the State of Utah;

(b) Environmental Impairment Insurance. A policy of environmental impairment insurance in the amount of at least \$10,000,000, with Lessor to be an additional insured on such policy, or in such additional amount as Lessor may reasonably determine in exercising its prudent judgment in light of environmental risks potentially encountered in connection with Lessee's operations on the Premises; and

(c) Other Coverages. Such other and additional insurance policies as a prudent ground lessee or developer in the position of Lessee would maintain or as is required from time to time by applicable law, consistent with industry standards applicable to Lessee's business, other than those referred to in Section 10.3. Lessor shall be an additional insured on all such policies.

10.6 Policy Requirements. All insurance policies required or otherwise provided and maintained under this Article 10 shall contain provisions to the effect that the insurance shall not be canceled or modified without 30 days prior written notice to Lessor and that no modification shall be effective unless approved in writing by Lessor. All such policies shall be issued by a commercially reasonable company or companies, financially responsible and authorized to do business in the state in which the Premises are located, as Lessee shall determine, and shall be approved by Lessor, such approval not to be unreasonably withheld or delayed. The various coverage limits stated in this Article 10 shall be increased from time to time as requested by Lessor to reflect reasonable and customary practices in the solid waste disposal industry.

ARTICLE 11 DAMAGE AND DESTRUCTION

11.1 No Abatement of Rent. No damage to or destruction of Lessee Improvements shall effect an abatement or reduction in rental, it being understood that this is a ground lease. Lessee waives any provisions of the law that may be to the contrary.

11.2 Damage or Destruction. If any Lessee Improvements are damaged or destroyed during the Lease Term, Lessee shall either repair such Lessee Improvements to the extent necessary to make them safe and secure or remove such Lessee Improvements from the Premises.

ARTICLE 12 CONDEMNATION

12.1 Total Condemnation. If during the Lease Term the entire Premises are taken under the power of eminent domain or conveyed by Lessor under the threat thereof (a "Condemnation"), this Lease shall terminate as of the date of Condemnation. All rent and other obligations shall be paid and performed up to such date, and Lessee shall have no claim against Lessee for the value of any unexpired term of this Lease.

12.2 Condemnation of a Portion of Premises. If during the Lease Term a portion of the Premises is taken by a Condemnation and such partial taking renders the Premises unsuitable for Lessee's business, as reasonably determined in good faith by Lessee, this Lease shall terminate as of the date of Condemnation. In the event of a partial taking by Condemnation which is not extensive enough to render the Premises unsuitable for Lessee's business, this Lease shall continue in full force and effect. In the event of such partial condemnation, the Annual Rent shall be equitably reduced.

12.3 Condemnation Award. In the event of any Condemnation, whether whole or partial, Lessee shall not be entitled, and hereby waives any right, to any part of the award, as damages or otherwise, for such Condemnation and Lessor shall receive the full amount of such award, including any award for the leasehold estate. Notwithstanding the foregoing, Lessee shall have the right to claim and recover from the condemning authority, but not from Lessor, such compensation as may be separately awarded to, or recoverable by, Lessee in Lessee's own right on account of any damage to Lessee's business and Lessee Improvements by reason of the Condemnation (except the loss of the leasehold estate) and for or on account of any cost or loss to which Lessee might be put in removing Lessee's fixtures, leasehold improvements and equipment.

12.4 Date of Condemnation. For purposes of this Lease the date of Condemnation shall mean the earlier of the date (a) possession of the Premises is delivered to the taking authority, or (b) title to the Premises is vested in the taking authority.

ARTICLE 13 ASSIGNMENT BY LESSEE

13.1 Assignment. Lessee understands, acknowledges, and agrees that Lessor is entering into this Lease and the transactions contemplated by this Lease, the Option and the Deed of Trust on the basis of and in reliance on the identity and control of Lessee and its shareholders, the expertise of Lessee and its shareholders in the solid waste management business, and reputation and financial capabilities of Lessee and its shareholders. Accordingly, except as otherwise provided in this Article 13, Lessee shall not directly or indirectly, voluntarily or by operation of law, sell, assign, encumber, pledge or otherwise transfer or hypothecate all or any part of the Premises or Lessee's leasehold estate hereunder (collectively an "Assignment"), or permit the Premises to be occupied by anyone other than Lessee or sublet the Premises or any portion thereof (collectively a "Sublease"), other than as permitted in Article 14. Notwithstanding any provision of this Agreement, without Lessor's prior written consent, which consent Lessor may withhold in its sole and absolute discretion, Lessee shall not enter into an Assignment or Sublease hereunder prior to the time that Lessee has achieved, for one (1) full calendar year, Net Receipts equal to the Break Point (the "Prohibited Assignment or Sublease Period"). In addition to any other provisions of this Article 13, Lessee shall not enter into any Assignment or Sublease without the prior approval of Lessor's Board, which shall review such Assignment or Sublease consistent with the Board's fiduciary responsibilities to Lessor's beneficiaries.

13.2 Request for Consent. If Lessee desires at any time after the Prohibited Assignment or Sublease Period to enter into an Assignment or Sublease of the Premises or any portion thereof, Lessee shall, at least sixty days prior to the effective date of the Assignment or Sublease, request in writing Lessor's consent to the Assignment or Sublease and provide the following:

(a) The name of the proposed assignee or subtenant (the "transferee") and the names of the individuals ultimately owning or controlling, directly or indirectly, the proposed transferee;

(b) A copy of the proposed Assignment or Sublease; and

(c) A detailed description of the proposed transaction, together with a written authorization from Lessee authorizing Lessor, its agents, representatives, and advisers to contact the proposed transferee to discuss and verify any and all aspects of the proposed transaction and the information provided by Lessee pursuant to this Section 13.2.

At least thirty days prior to the effective date of the Assignment or Sublease, Lessee shall provide to Lessor such information concerning the proposed transferee and transaction as Lessor shall have requested following its receipt of Lessee's request for consent, including, without limitation, detailed information as to the identity of the proposed transferee (including the identity of all entities and individuals, other than shareholders in a publicly traded company who own directly or indirectly any ownership interest in the transferee), detailed financial information with respect to the proposed transferee, information demonstrating the business experience and reputation of the proposed transferee in the solid waste management industry, and such other information as Lessor deems appropriate to its decision to approve or disapprove.

13.3 Conditions to Consent. At any time within thirty days after Lessor's receipt of the notice specified in Section 13.2 and the information that Lessee is required to provide pursuant to Section 13.2, Lessor may by written notice to Lessee elect either to (a) consent to the proposed Assignment or Sublease, (b) refuse to consent to the proposed Assignment or Sublease. In this regard, Lessor and Lessee agree (by way of example and without limitation) that it shall be reasonable for Lessor to withhold its consent if any of the following situations exist or may exist:

(a) In Lessor's reasonable business judgment, the proposed transferee lacks sufficient business reputation, expertise, or experience to successfully and profitably operate the Landfill;

(b) The financial condition of the proposed transferee is unacceptable to Lessor, in Lessor's reasonable judgment, to enable such proposed transferee to fully and timely perform the terms and conditions of this Lease, including the indemnification obligations of the Lessee under this Lease;

(c) In Lessor's reasonable judgment, operation of the Landfill by the proposed transferee would materially reduce the amount of Percentage Rent that Lessor would receive over the life of the Lease or would materially increase the risk to any of the Lessor Indemnitees of any Claims for which Lessor has been indemnified by Lessee, and with respect to such risk, Lessor shall be deemed reasonable to condition such consent on the proposed transferee agreeing to a covenant to operate and increasing the Annual Rent to an amount equal to the average annual Percentage Rent paid by Lessee during the previous three (3) calendar years; or

(d) An Event of Default has occurred and is continuing or an event has occurred which is continuing that, with the passage of time and/or the giving of notice, would constitute an Event of Default.

Nothing contained in this Article 13 shall prohibit Lessor from requesting additional information if Lessee, or its successor, is a debtor in a bankruptcy case.

13.4 Effect of Consent. If Lessor consents to the Sublease or Assignment within said thirty day period, Lessee may enter into such Assignment or Sublease of the Premises or portion thereof, but only upon the terms and conditions set forth in the notice furnished by Lessee to Lessor pursuant to Section 13.2. Lessee shall promptly provide to Lessor a copy of the fully executed Sublease or Assignment.

13.5 No Release: Improper Assignment or Sublease Void. No consent by Lessor to any Assignment or Sublease by Lessee shall relieve Lessee of any obligation to be performed by Lessee under this Lease, whether arising before or after the Assignment or Sublease. The consent by Lessor to any Assignment or Sublease shall not relieve Lessee of the obligation to obtain Lessor's express written

consent to any other Assignment or Sublease. Any Assignment or Sublease that is not in compliance with this Section shall be absolutely null and void, shall be an Event of Default and, at the option of Lessor, shall entitle Lessor to immediately terminate this Lease. The acceptance of rent or payment of any other monetary obligation by Lessor from a proposed assignee or sublessee shall not constitute the consent by Lessor to such Assignment or Sublease.

13.6 Transferee Obligations. Each transferee shall assume, as provided in this Section, all obligations of Lessee under this Lease and shall be and remain liable jointly and severally with Lessee for the payment of Annual Rent, Percentage Rent and all other monetary obligations hereunder, and for the performance of all the terms, covenants, conditions and agreements herein contained on Lessee's part to be performed for the remainder of the Term. In connection with an Assignment, Lessee or the assignee shall deliver an instrument (acceptable in form and substance to Lessor) whereby the assignee assumes all of the terms, covenants, conditions and agreements of the Lease. However the failure or refusal of the assignee to execute such instrument of assumption shall not release or discharge the assignee from its liability as set forth above. In connection with a Sublease, Lessee or the sublessee shall deliver to Lessor an instrument (acceptable in form and substance to Lessor and in recordable form) agreeing that sublessee shall be bound by all of the terms and conditions of the Lease, other than those pertaining to Rent, applicable to the subleased portion of the Premises and that sublessee shall, at Lessor's sole option, attorn to Lessor as lessor under the Sublessee if this Lease is terminated for any reason and Lessor chooses to keep the Sublease in effect.

13.7 Licensees. Lessee agrees not to permit any business to be operated in or from the Premises by any licensee or other person without the prior written consent of Lessor, which consent Lessor may give or withhold in its sole and absolute discretion.

13.8 Expenses. Regardless of whether Lessor grants its consent to an Assignment or Sublease pursuant to this Lease, Lessee shall pay to Lessor, in connection with any proposed Assignment or Sublease, a non-refundable fee equal to the greater of (a) \$2,500 if Lessor handles the request internally, or (b) the reasonable costs and fees incurred by Lessor to retain outside counsel to assist and advise Lessor with respect to such transfer and, if Lessor's consent is granted in its discretion, consummating the proposed transfer in reviewing and preparing documents in connection therewith.

13.9 Indirect Transfers. The sale, issuance or transfer of any voting capital stock of Lessee, if Lessee is a corporate entity, or of any ownership interests, if Lessee is a noncorporate entity, or any voting capital stock of any corporate entity which directly or indirectly controls Lessee, or any interests in any noncorporate entity which directly or indirectly controls Lessee, to any party which is not already an owner of stock or such ownership interests in Lessee, which results in a change in the direct or indirect voting control (or a change in the identity of any Person with the power to vote or control at least 10% of the voting shares of any class of stock or other interests in Lessee) of Lessee or any corporate or noncorporate entity which directly or indirectly controls Lessee shall be deemed to be an Assignment of this Lease within the meaning of this Article 13; *provided, however*, that, any other provision of this Lease to the contrary notwithstanding, the trading in the securities of any Person that is a publicly traded entity shall not be deemed to be an indirect transfer or otherwise subject to the provisions of this Section 13.9.

13.10 Special Provision for Early Term Assignments and Subleases. If in full compliance with the requirements of this Article 13, Lessee enters into an Assignment or Sublease during the first five years following the Operations Commencement Date, Lessee shall pay to Lessor, in addition to the amounts specified in Section 13.8, the Transfer Amount; such amount to be paid to Lessor on the date that the Assignment or Sublease first becomes effective. If the Transfer Amount is not paid as required by this Section 13.10, then the approval by Lessor to the Assignment or Sublease shall automatically be

deemed to have been revoked and the provisions of Section 13.5 shall apply. As used in this Lease, the "Transfer Amount" means 10% of the Net Consideration received by Lessee in connection with such Assignment or Sublease, and the term "Net Consideration" means the total consideration received by Lessee in connection with such Assignment or Sublease (including the total of all deferred payments to be received by Lessee in the future, if any), expressed in dollars, less the then book value of the operating assets of the Landfill.

ARTICLE 14 FINANCING LIENS; SALE OF PREMISES BY LESSOR

14.1 No Encumbrances Generally. Except as otherwise permitted by Section 14.2, during the Lease Term, Lessee shall not cause nor permit any lien, claim, charge, or encumbrance of any nature or description whatsoever to attach to or encumber the Premises or Lessee's leasehold interest in the Premises or any part of either thereof.

14.2 Lessee's Right to Mortgage. Provided no Event of Default has occurred and subject to the terms and conditions set forth in this Lease, Lessee shall have the right to encumber its leasehold interest by one or more mortgages, deeds of trust, security agreements or otherwise (each, a "Leasehold Mortgage"); *subject, however,* to the limitations set forth in this Article 14.

14.3 Purpose of Leasehold Mortgage. A Leasehold Mortgage shall only be permitted for the purpose of securing Permitted Financing and any renewals and refinancing of Permitted Financing. As used herein, "Permitted Financing" means first lien financing for the acquisition of Purchased Property, the acquisition of engineering, planning and consulting services, the acquisition of equipment, startup capital, and/or for construction and development of Lessee Improvements or improvements to the Landfill from a bona fide third party institutional lender.

14.4 Notice to Lessor of Leasehold Mortgage. No holder of a Leasehold Mortgage shall have the rights or benefits set forth in this Article 14, nor shall the provisions of this Article 14 be binding upon Lessor with respect to a particular Leasehold Mortgage, unless and until a copy of the fully executed Leasehold Mortgage and of each assignment thereof shall have been delivered to Lessor, notwithstanding any other form of notice, actual or constructive.

14.5 Leasehold Mortgagee Protection. If Lessee shall enter into a Leasehold Mortgage pursuant to this Article 14, then so long as any such Leasehold Mortgage shall remain unsatisfied of record, the following provisions shall apply:

(a) Notice of Default. Lessor, upon serving upon Lessee any notice of default under this Lease, shall also serve a copy of such notice upon the holder of such Leasehold Mortgage, at the address provided for in Section 14.5(e).

(b) Right to Cure. Any holder of such Leasehold Mortgage, in case Lessee shall be in default under this Lease, shall, within the time period and otherwise as herein provided, have the right to remedy such default, or cause the same to be remedied, and Lessor shall accept such performance by or at the instance of such holder as if the same had been made by Lessee.

(c) Leasehold Mortgagee Foreclosure. Notwithstanding anything to the contrary contained herein, upon the occurrence of an Event of Default, other than a default with respect to the payment of money, Lessor shall take no action to terminate the Lease without first giving the holder of such Leasehold Mortgage written notice thereof and a reasonable time thereafter within

which either (i) to obtain possession of the leasehold estate (including possession by a receiver); or (ii) to institute, prosecute and complete foreclosure proceedings or otherwise acquire Lessee's interest under this Lease so long as such holder cures all defaults then reasonably susceptible of being cured by such holder; *provided, however*, that (x) such holder shall not be obligated to continue such possession or to continue such foreclosure proceedings after such defaults have been cured; (y) nothing herein contained shall preclude Lessor from exercising any rights or remedies under this Lease with respect to any other default by Lessee during the pendency of such foreclosure proceedings; and (z) such holder shall agree with Lessor in writing to comply during the period of such forbearance with such of the terms, conditions and covenants of this Lease as are reasonably susceptible of being complied with by such holder.

(d) Termination of Lease: New Lease. If this Lease is terminated pursuant to the terms hereof prior to the expiration of the Lease Term, Lessor shall serve upon the holder of such Leasehold Mortgage written notice that the Lease has been terminated together with a statement of any and all sums which would at that time be due and owing under this Lease but for such termination, and of all other defaults, if any, under this Lease then known to Lessor. Such holder shall thereupon have the option to obtain a new lease in accordance with and upon the following terms and conditions: Upon written request of the holder of such Leasehold Mortgage, within thirty days after service of such notice that this Lease has been terminated, Lessor shall enter into a new lease with such holder, or its designee, provided such new lease shall be: (i) entered into at the reasonable cost of the new lessee thereunder; (ii) effective as of the date of termination of this Lease; and (iii) for a term equal to the remaining term under this Lease and at the Rent and upon all agreements, terms, covenants and conditions hereof, including applicable rights of renewal or options to extend. Such new lease shall require the new lessee to perform any unfulfilled obligations of Lessee under this Lease. Upon the execution of such new lease, the lessee named therein shall pay any and all sums which would at the time of the execution thereof be due under this Lease but for such termination, and shall pay expenses, including reasonable attorneys' fees, court costs and disbursements incurred by Lessor in connection with such defaults and termination, the recovery of possession of the Premises, and the preparation, execution and delivery of such new lease.

(e) Delivery of Notice. Any notice or other communication which Lessor shall desire or is required to give to or serve upon the holder of such Leasehold Mortgage on this Lease shall be in writing and shall be served by mail, addressed to such holder at its address as set forth in such Leasehold Mortgage, or in the last assignment thereof delivered to Lessor pursuant to Section 14.4, or at such other place as such holder may designate in writing to Lessor.

14.6 Lessor Not Liable. Under no circumstances shall Lessor or the State of Utah be liable with respect to any Leasehold Mortgage financing or any obligations under any Leasehold Mortgage nor shall lien of such Leasehold Mortgage attach to the fee interest of Lessee in the Premises.

14.7 Prohibitions on Encumbrances by Lessor. Lessor shall not to subject its interest in the Premises to any mortgage, deed of trust, assignments of rents and leases, security agreement or security instrument.

14.8 Sale of Lessor's Interest. In the event Lessor receives an offer to purchase Lessor's interest in this Lease and the Premises, which offer Lessor desires in its sole and absolute discretion to accept (the "Offer"), Lessor shall provide a copy of the Offer to Lessee (the "Offer Notice"). For a period of thirty (30) days from the date of the Offer Notice, Lessee shall have the right to purchase the property which is the subject of the Offer on the same terms and conditions set forth in the Offer, which shall be exercised by delivering written notice to Lessor within thirty (30) days from the date of the Offer

Notice. If Lessee does not exercise its right to purchase the property which is the subject of the Offer within such thirty day period, Lessee shall be deemed to have waived its right of first refusal to purchase the property which is the subject of the Offer, and Lessor shall be free to proceed to sell the property which is the subject of the Offer on the terms and conditions described in the Offer, or terms which are more favorable to Lessor than those specified in the Offer, free from any rights of Lessee. If Lessee exercises its right to purchase the property which is the subject of the Offer as provided herein, the closing of such sale shall take place within thirty (30) days from the date of Lessee's exercise of its right to purchase the property which is the subject of the Offer. In the event of any sale, transfer or conveyance of Lessor's interest in this Lease, Lessor shall be entirely relieved of all liability for Lessor's obligations under this Lease accruing thereafter, and the assignee or purchaser shall be deemed without any further agreement between the parties or their successors in interest to have assumed all of the obligations of Lessor under this Lease accruing after such conveyance.

ARTICLE 15 DEFAULTS

15.1 Events of Default. Any of the following occurrences or acts shall constitute an event of default ("Events of Default") under this Lease:

(a) Rent. If Lessee shall fail to pay any Rent or other sum when due and such failure shall continue for a period of thirty (30) days (provided, however, if Lessor has been required to give Lessee one (1) such notice during the current calendar year, the notice for all further Events of Default during such calendar year shall be reduced to five (5) days;

(b) Other Defaults. If Lessee shall fail to observe or perform any other provision hereof and such failure shall continue for 30 days after notice to Lessee of such failure; *provided, however,* that if such failure cannot reasonably be cured within such 30-day period, such failure shall not be an Event of Default if Lessee commences actions to effect such cure within the 30-day period and thereafter diligently proceeds to, and does, cure the failure;

(c) Bankruptcy. If Lessee shall file a petition in bankruptcy or for reorganization or for an arrangement pursuant to any federal or state bankruptcy law or any similar federal or state law, or shall be adjudicated a bankrupt or shall make an assignment for the benefit of creditors or shall admit in writing its inability to pay its debts generally as they become due, or if a petition or answer proposing the adjudication of Lessee as a bankrupt or its reorganization pursuant to any federal or state bankruptcy law or any similar federal or state law shall be filed in any court and Lessee shall consent to or acquiesce in the filing thereof or such petition or answer shall not be discharged or denied within 90 days after the occurrence of any of the foregoing;

(d) Other Insolvency Events. If a receiver, trustee or liquidator of Lessee or of all or substantially all of the assets of Lessee or of the Premises or Lessee's leasehold interest therein shall be appointed in any proceeding brought by Lessee, or if any such receiver, trustee or liquidator shall be appointed in any proceeding brought against Lessee and shall not be discharged within 90 days after the occurrence thereof, or if Lessee shall consent to or acquiesce in such appointment; or

(e) Deed of Trust. The occurrence of any default under either the Deed of Trust that is not cured within any applicable notice or cure period.

15.2 Remedies. If an Event of Default shall have occurred and be continuing, Lessor shall have the following rights and remedies:

(a) Termination. Lessor shall have the right to terminate this Lease effective immediately upon delivery of notice thereof to Lessee. Lessee shall immediately surrender possession of the Premises upon receipt of such notice from Lessor. Upon and notwithstanding any such termination, Lessee shall owe to Lessor, and Lessee agrees to pay the Liquidated Rent Amount, in addition to any and all other amounts otherwise payable by Lessee to Lessor in connection with the Event of Default, including without limitation, any and all damages arising as a result of the breach by Lessee of any of the terms and covenants of this Lease other than the Rent Obligation. Lessor and Lessee acknowledge and agree that the amount of Percentage Rent that will be due over the Lease Term (assuming that all renewal options were exercised and taking into account the offsets permitted by Section 4.2(c)), and thus the amount that will be due to Lessee on account of the Rent Obligation, is difficult to ascertain or otherwise estimate at the time of entering into this Lease. Accordingly, the parties are agreeing to the Liquidated Rent Amount as a fair and reasonable approximation of the damages that Lessor will suffer in the event of a breach of the Rent Obligation. To this end, the parties agree that "Liquidated Rent Amount" means the sum of the following:

(i) The worth at the time of termination of any unpaid "Percentage Rent" (as defined in the Lease) which had been earned at the time of such Event of Default, including Percentage Rent for the calendar year in which the termination occurs, computed as provided in Section 4.2(b) and allowing interest at the Default Rate; plus

(ii) The sum of the Annual Estimated Percentage Rent, determined as provided below, for each year of the 40 calendar year period commencing with the first calendar year following termination; *provided, however*, that, if on the date of termination, the Lease is in a renewal term pursuant to Section 3.4, then the 40 year period shall be reduced to a period of calendar years equal to 100 minus the number of full calendar years of the Lease Term that have elapsed from the Commencement Date to the date of termination. As used herein, "Annual Estimated Percentage Rate" for a particular calendar year shall be equal to the net present value of the Percentage Rent computed for a particular year in accordance with the formula set forth in Section 4.2(a), using a discount rate of 6%, using as the Net Receipts number for such year, the Liquidated Annual Net Receipts number for such year that is set forth in the table attached to this Lease as Schedule 1, assuming that the Percentage Rent computed with respect thereto for a particular calendar year were due and payable on the last day of such calendar year.

The Liquidated Rent Amount shall bear interest at the Default Rate until paid. Any other provision of this Lease to the contrary notwithstanding, prior to the occurrence of an Event of Default, Trustor shall have absolutely no right whatsoever to "prepay" the Rent Obligation by paying the Liquidated Rent Amount. The sole purpose for determining the Liquidated Rent Amount is to quantify the Rent Obligations for the purpose of implementing the remedy provisions of this Article 15. As used herein, "Rent Obligation" means the obligation of Lessee to pay Annual Rent and Percentage Rent.

(b) Performance for Lessee. Lessor shall have the right, but not the obligation, to render the performance required to cure such default or breach and to charge to Lessee all costs and expenses (including an administration fee equal to fifteen percent of such costs and expenses) incurred in connection therewith, together with interest thereon from the date incurred at the

Default Rate. Lessee shall within five days pay such amount upon presentment of a statement to Lessee.

(c) Receiver. Lessor shall have the right to obtain the appointment of a receiver in any court of competent jurisdiction, and the receiver may take possession of any personal property belonging to Lessee and used in the conduct of the business of Lessee being carried on in the Premises. Lessee agrees that the entry or possession by said receiver of the Premises and said personal property shall not constitute an eviction of Lessee from the Premises or any portion thereof, and Lessee hereby agrees to hold Lessor harmless from any claim by any person arising out of or in any way connected with the entry by said receiver in taking possession of the Premises and/or said personal property. Neither the application for the appointment of such receiver, nor the appointment of such receiver, shall be construed as an election on Lessor's part to terminate this Lease unless a written notice of such intention is given to Lessee.

(d) Other Remedies. Lessor shall have all other rights and remedies at law or in equity for such Event of Default.

15.3 Remedies Cumulative. No remedy in this Lease conferred upon Lessor shall be considered exclusive of any other remedy, but the same shall be cumulative and shall be in addition to every other remedy given hereunder, or now or hereafter existing at law or in equity or by statute, including, but not limited to, the right to maintain an action to recover all amounts due hereunder. Lessor may exercise its rights and remedies at any time, in any order, to any extent, and as often as Lessor deems advisable.

15.4 No Acceptance of Surrender. Any acceptance by Lessor of surrender of the Premises by Lessee shall only arise from, and must be evidenced by, written acknowledgment of acceptance of surrender signed by Lessor. No other act or conduct of Lessor, whether consisting of the acceptance of the keys to the Premises, or otherwise, shall be deemed to be or constitute an acceptance by Lessor of the surrender of the Premises by Lessee prior to the expiration of the Lease Term.

15.5 Costs and Attorneys' Fees. If either party commences a legal proceeding to enforce any of the terms of this Lease, the prevailing party in such action shall have the right to recover reasonable attorneys' fees and costs from the other party, to be fixed by the court in the same action. "Legal proceedings" includes appeals from a lower court judgment as well as proceedings in the Federal Bankruptcy Court ("Bankruptcy Court"), whether or not they are adversary proceedings or contested matters. The prevailing party (a) as used in the context of proceedings in the Bankruptcy Court means the prevailing party in an adversary proceeding or contested matter or any other actions taken by the non-bankruptcy party which are reasonably necessary to protect its rights under this Lease, and (b) as used in the context of proceedings in any court other than the Bankruptcy Court means the party that prevails in obtaining a remedy or relief which most nearly reflects the remedy or relief which the party sought; so that, for example, the prevailing party may be a party which is ordered to pay \$100.00 where the obligation to pay \$80.00 was undisputed and the claiming party alleged that it was entitled to \$1,000.00.

15.6 Waiver of Jury Trial and Counterclaims. If Lessor is the prevailing party, Lessor shall be entitled to recover from Lessee immediately upon demand all costs and reasonable attorneys' fees, expert witness fees, costs of tests and analysis, travel and accommodation expenses, deposition and trial transcript copies, court costs and other similar costs and fees incurred by Lessor in enforcing its rights and remedies under this Lease, regardless of whether legal proceedings are actually commenced. The parties hereto do hereby waive trial by jury in any action, proceeding or counterclaim brought by either of the parties hereto against the other on any matters whatsoever arising out of or in any way connected with this

Lease, the relationship of Lessor and Lessee, Lessee's use or occupancy of the Premises, and/or any claim of injury or damage.

15.7 No Waiver. No delay or omission of Lessor to exercise any right or power arising from any default shall impair any such right or power, or shall be construed to be a waiver of any such default or an acquiescence therein. No waiver of a default shall be effective unless it is in writing. No written waiver by Lessor of any provision of this Lease or any breach by Lessee hereunder shall be deemed to be a waiver of any other provision hereof, or of any subsequent breach by Lessee of the same or any other provision. Lessor's consent to or approval of any act by Lessee requiring Lessor's consent or approval shall not be deemed to render unnecessary the procurement of Lessor's consent to or approval of any subsequent act of Lessee, whether or not similar to the act so consented to or approved.

15.8 Accord and Satisfaction. Payment by Lessee or receipt by Lessor of a lesser amount than the Rent or other charges herein stipulated shall be deemed to be on account of the earliest due stipulated Rent or other charges, and no endorsement or statement on any check or any letter accompanying any check payment as rent or other charges shall be deemed an accord and satisfaction, and Lessor shall accept such check or payment without prejudice to Lessor's right to recover the balance of such Rent or other charges or pursue any other remedy in this Lease to the Lessee.

ARTICLE 16 BANKRUPTCY OF TENANT

16.1 Additional Rights of Lessor. If any provision of Article 15 is unenforceable by reason of any state or federal insolvency and/or bankruptcy law, and any trustee in bankruptcy or debtor-in-possession elects to assume or assign Lessee's rights and obligations hereunder, Lessor may nonetheless terminate this Lease unless such trustee, debtor-in-possession or assignee cures all defaults then existing hereunder, and provides adequate assurances:

- (a) Of the source of rent and other consideration due under this Lease;
- (b) That assumption or assignment of this Lease will not breach any provision of the Lease, or any other lease, financing agreement or master agreement relating to the Building or Premises; and
- (c) In the event of an assignment, that the financial condition and operating experience of the proposed assignee and guarantors shall be similar to the financial condition and operating experience of Lessee and Lessee's guarantors, if any, as of the execution of this Lease.

16.2 Proceeds of Assignment to Lessor. If this Lease is assigned to any person or entity pursuant to the provisions of the Bankruptcy Code, 11 U.S.C. 101, et seq. (the "Bankruptcy Code"), any and all monies or other consideration payable or otherwise to be delivered in connection with such assignment shall be paid or delivered to Lessor, shall be and remain the exclusive property of Lessor, and shall not constitute property of Lessee or of the estate of Lessee within the meaning of the Bankruptcy Code. Any and all monies or other considerations constituting property under the preceding sentence not paid or delivered to Lessor shall be held in trust for the benefit of Lessor and be promptly paid to or turned over to Lessor.

16.3 Right of First Refusal. If, pursuant to the provisions of the Bankruptcy Code, Lessee assumes this Lease and proposes to assign the same to any person or entity who shall have made a bona fide offer to accept an assignment of this Lease on terms acceptable to Lessee, then notice of such

proposed assignment, setting forth (a) the name and address of such person, (b) all of the terms and conditions of such offer, and (c) the adequate assurance to be provided Lessor to assure such person's future performance under the Lease, including, without limitations, the assurances referred to in Section 16.1, shall be given to Lessor by Lessee no later than twenty days after receipt by Lessee, but in any event no later than ten days prior to the date that Lessee shall make application to a court of competent jurisdiction for authority and approval to enter into such assignment and assumption. Lessor shall thereupon have the prior right and option, to be exercised by notice to Lessor given at any time prior to the effective date of such proposed assignment, to accept an assignment of this Lease upon the same terms and conditions and for the same consideration, if any, as the bona fide offer made by such person, less any brokerage commissions which may be payable out of the consideration to be paid by such person for the assignment of this Lease.

16.4 Assignee's Assumption of Liabilities. Any person or entity to which this Lease is assigned pursuant to the provisions of the Bankruptcy Code shall be deemed without further act or deed to have assumed all of the obligations arising under this Lease on and after the date of such assignment. Any such assignee shall upon demand execute and deliver to Lessor an instrument confirming such assumption.

ARTICLE 17

NON-COMPETE COVENANT; LEASE AND PERMIT COVENANTS PURSUANT TO UTAH CODE ANN. §53C-4-202

17.1 Non-Compete Covenant. During the Lease Term, Lessee shall not, directly or indirectly, own any interest in or operate a Landfill which takes deliveries of municipal solid waste from any point of delivery within the State of Utah (collectively, the "Competitive Activities"). The ownership of any capital stock, if such entity is a corporate entity, or of any ownership interest, if such entity is a non-corporate entity, shall be deemed a breach of the foregoing covenant. Notwithstanding the foregoing, if Lessee has fully complied with the provisions of Articles 13 hereof with respect to such Assignment or Sublease, Lessee shall not be deemed to be in breach of the foregoing covenant if Lessee enters into an Assignment or Sublease, or if such assignee or sublessee subsequently engages in such Competitive Activities.

17.2 Lease and Permit Covenants. Pursuant to Utah Code Ann. §53C-4-202, Lessor and Lessee agree as follows: (i) Lessee shall promptly pay the Rent payable hereunder, as and when due hereunder, upon demand; (ii) no waste may be committed by Lessee on the Premises; (iii) the Premises shall be promptly surrendered by Lessee at the expiration of the Term; (iv) Lessee shall not sublet or assign the Premises or this Lease without the prior written consent of Lessor's Director, except as expressly provided herein; (v) failure by Lessee to pay the agreed Rent for a period of one (1) month from the time Rent is due shall resort in a forfeiture of the Lease after notice; and (vi) where authorized improvements have been placed on the Premises by a person other than Lessee, the Director of Lessor may require the Lessee to allow the owner of the improvements to remove them within ninety (90) days.

ARTICLE 18

GENERAL PROVISIONS

18.1 Indemnity Provisions. Whenever this Lease provides that one party shall indemnify another Person, such indemnity obligation shall be construed to not extend to the gross negligence, recklessness, willful misconduct, or breach of this Lease by the Person so indemnified.

18.2 Waiver of Breach. No waiver of the breach of any provision of this Lease shall be construed as a waiver of any preceding or succeeding breach of the same or any other provision of this Lease, nor shall the acceptance of rent by Lessor during any period of time in which Lessee is in default in any respect other than payment of such rent be deemed to be a waiver of such default.

18.3 Notices. Notices shall be in writing and shall be given by (a) personal delivery, (b) deposit in the United States mail, certified mail, return receipt requested (which receipt shall be preserved as evidence of delivery), postage prepaid, or (c) overnight express delivery service, addressed or transmitted to Lessor and Lessee at the following addresses, or to such other addresses as either party may designate to the other in a writing delivered in accordance with the provisions of this Section:

If to Lessor: SCHOOL AND INSTITUTIONAL TRUST
 LANDS ADMINISTRATION
 Attn: Director
 675 East 500 South, Suite 500
 Salt Lake City, UT 84102

If to Lessee: WASATCH REGIONAL SOLID WASTE
 MANAGEMENT CORPORATION
 P. O. Box 68133
 Park City, Utah 84060
 Attention: Kevin S. Garn, President

All notices shall be deemed to have been delivered and shall be effective upon the date of actual receipt.

18.4 Severability. The invalidity of any provision of this Lease, as determined by a court of competent jurisdiction, shall in no way affect the validity of any other provision hereof.

18.5 Recording. Concurrently with the execution of this Lease, the parties will execute and record a memorandum of this Lease in form reasonably satisfactory to Lessee.

18.6 Construction. The titles which are used following the number of each Section are so used only for convenience in locating various provisions of this Lease and shall not be deemed to affect the interpretation or construction of such provisions. The parties acknowledge that each party and its counsel have reviewed and revised this Lease. This Lease shall not be construed for or against Lessor or Lessee. References in this Lease to "Sections," "Articles," and "Exhibits" refer to the Sections and Articles of and the Exhibits to this Lease unless otherwise noted.

18.7 Party's Consent. Whenever this Lease provides for or requires the consent or approval of a party, such consent or approval may be given or withheld in the sole and absolute discretion of such party, unless a standard of reasonableness is expressly stated.

18.8 Successors. Subject to the restrictions contained in Articles 13 and 14, this Lease and all of provisions hereof shall be binding upon and inure to the benefit of the successors and assigns of Lessor and Lessee.

18.9 Governing Law. The terms, conditions, covenants, and agreements herein contained shall be governed, construed, and controlled according to the laws of the State of Utah.

18.10 Brokerage. Lessor warrants to Lessee that Lessor has not dealt with any broker or other real estate agent in connection with this transaction. Lessee warrants to Lessor that Lessee has not dealt with any broker or other real estate agent in connection with this transaction. If any person shall assert a claim to a finder's fee, marketing fee, commission or other compensation on account of alleged employment as a finder or broker or performance of services as a finder or broker in connection with this transaction, the party under whom the finder or broker is claiming shall indemnify and hold the other party harmless for, from and against any such Claim arising therefrom or related thereto.

18.11 Time is of the Essence. Time is of the essence of this Lease and in the performance of all of the covenants and conditions hereof.

18.12 Relationship of the Parties. The relationship of the parties hereto is that of Lessor and Lessee, and it is expressly understood and agreed that Lessor does not in any way, nor for any purpose, become a partner of Lessee or a joint venturer with Lessee in the conduct of Lessee's business, or otherwise, and that the provisions of any agreement between Lessor and Lessee relating to rent are made solely for the purpose of providing a method whereby rental payments are to be measured and ascertained.

18.13 Time Periods. In the event the time for the performance of any obligation or the taking of any action hereunder expires on a Saturday, Sunday or legal holiday, the time for performance or taking such action shall be extended to the next succeeding day which is not a Saturday, Sunday or legal holiday.

18.14 Limitation on Interest. This Lease is expressly limited so that in no event shall the amount paid or agreed to be paid for any loan or forbearance provided for in this Lease exceed the highest lawful rate permissible under any law which a court of competent jurisdiction may deem applicable. If, for any reason whatsoever, performance of this Lease, or of any other agreement entered into between the parties in connection with this Lease results in exceeding such highest rate of interest, then, ipso facto, the interest rate provided for in this Lease or in any related instrument shall be reduced to such highest lawful rate; and, if for any reason the payee shall receive as interest an amount which would exceed such highest lawful rate, such amount which would be excessive interest shall be applied to the reduction of the unpaid principal balance and not to the payment of interest; and if a surplus remains after full payment of principal and lawful interest the surplus shall be remitted to the payor. This provision controls every other provision of this Lease.

18.15 Quitclaim. At the expiration or earlier termination of this Lease, Lessee shall execute, acknowledge and deliver to Lessor, within five (5) days after written demand, from Lessor to Lessee, any quitclaim deed or other document deemed necessary or desirable by Lessor's counsel to remove the cloud of this Lease from the real property subject to this Lease.

18.16 Termination of State Trust. Nothing contained in this Lease shall operate to delay or prevent a termination of State trust responsibilities with respect to the Premises by the issuance of a fee patent or otherwise during the Lease Term; however, such termination shall not serve to abrogate this Lease. Lessor shall notify Lessee of any such change in the status of the Premises.

18.17 Lessee's Obligations to the State of Utah. So long as the Premises are held in trust by the State of Utah or subject to a restriction against alienation imposed by the State of Utah, all of Lessee's obligations under this Lease are to the State of Utah as well as to Lessor.

18.18 Tax Immunity. Nothing contained in this Lease shall be deemed to constitute a waiver of applicable laws providing tax immunity to trust property or any interest therein or income therefrom.

18.19 Counterparts. This Lease may be executed in any number of counterparts, each of which shall be an original but all of which shall constitute one and the same instrument.

18.20 Impartial Interpretation. This Lease is the result of negotiations between Lessor and Lessee and, therefore, the language contained in this Lease shall be construed as a whole according to its fair meaning and not strictly for or against either Lessor or Lessee.

18.21 Entire Agreement. This Lease sets forth all the promises, inducements, agreements, conditions, and understandings between Lessor and Lessee relative to the Premises, and there are no promises, agreements, conditions, or understandings, either oral or written, express or implied, between them other than are set forth herein or in the Deed of Trust or the Environmental Indemnity referred to in the Deed of Trust. No subsequent alteration, amendment, change, or addition to this Lease shall be binding upon Lessor or Lessee unless in writing and signed by each of them. Parole evidence shall never be admissible in any court, tribunal, arbitration or governmental agency to modify, amend or vary the terms of this Lease.

IN WITNESS WHEREOF, the parties hereto have executed this Lease on the day and year first written above.

LESSOR:

STATE OF UTAH, ACTING THROUGH THE
SCHOOL AND INSTITUTIONAL TRUST
LANDS ADMINISTRATION

By _____
Name: _____
Title: _____

Approved as to Form:

Mark L. Shurtleff, Utah Attorney General
by _____, Special Assistant
Attorney General

LESSEE:

WASATCH REGIONAL SOLID WASTE
MANAGEMENT CORPORATION,
a Utah corporation

By _____
Name: Kevin S. Garn
Title: President

STATE OF UTAH)
) ss.
COUNTY OF SALT LAKE)

The foregoing instrument was acknowledged before me this ____ day of _____, 200__ by _____, the _____ of the STATE OF UTAH, ACTING THROUGH THE SCHOOL AND INSTITUTIONAL TRUST LANDS ADMINISTRATION, on behalf of the State of Utah School and Institutional Trust Lands Administration.

My Commission Expires:

NOTARY PUBLIC
Residing at _____

STATE OF UTAH)
) ss.
COUNTY OF SALT LAKE)

The foregoing instrument was acknowledged before me this ____ day of _____, 200__ by _____, the _____ of WASATCH REGIONAL SOLID WASTE MANAGEMENT CORPORATION, a Utah corporation, on behalf of the corporation.

My Commission Expires:

NOTARY PUBLIC
Residing at _____

SCHEDULE 1

LIQUIDATED ANNUAL NET RECEIPTS

| CALENDAR YEAR | LIQUIDATED ANNUAL NET RECEIPTS |
|---------------|--------------------------------|
| 2004 | 3,290,800 |
| 2005 | 3,290,800 |
| 2006 | 7,863,875 |
| 2007 | 7,863,875 |
| 2008 | 15,109,750 |
| 2009 | 15,109,750 |
| 2010 | 15,109,750 |
| 2011 | 15,109,750 |
| 2012 | 15,109,750 |
| 2013 | 15,109,750 |
| 2014 | 30,610,000 |
| 2015 | 30,610,000 |
| 2016 | 30,610,000 |
| 2017 | 30,610,000 |
| 2018 | 30,610,000 |
| 2019 | 30,610,000 |
| 2020 | 30,610,000 |
| 2021 | 30,610,000 |
| 2022 | 30,610,000 |
| 2023 | 30,610,000 |
| 2024 | 49,980,000 |
| 2025 | 49,980,000 |
| 2026 | 49,980,000 |
| 2027 | 49,980,000 |
| 2028 | 49,980,000 |
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| 2097 | 49,980,000 |
| 2098 | 49,980,000 |
| 2099 | 49,980,000 |
| 2100 | 49,980,000 |
| 2101 | 49,980,000 |
| 2102 | 49,980,000 |
| 2103 | 49,980,000 |
| 2104 | 49,980,000 |
| 2105 | 49,980,000 |

EXHIBIT A
LEGAL DESCRIPTION OF THE PREMISES

Lease Parcel Description:

Township 1 North, Range 8 West, SLB&M

Section 3: Lots 3 & 4, S2NW4, SW4

Section 4: Lots 1, 2, & 3, SE4NW4, E2SW4, SE4, S2NE4

Township 2 North, Range 8 West, SLB&M

Section 32: E2E2

Section 33: All

Section 34: W2

Lease Parcel Acreage: 1,968.73 acres m/l

Separate Borrow Site Description:

Township 2 North, Range 8 West, SLB&M

Section 36: All

Borrow Area Acreage: 640.00 acres m/l.

EXHIBIT B
LEGAL DESCRIPTION OF ADJACENT PROPERTY

Landfill Adjacent Property Description:

Township 1 North, Range 3 West, SLB&M

Section 9: E2

Section 10: W2

Section 15: W2

Section 16: E2

Adjacent Lands Acreage: 1,280.00 acres m/l

EXHIBIT C
FORM OF DEED OF TRUST

When Recorded Return To:

Greg R. Nielsen, Esq.
SNELL & WILMER, L.L.P.
Gateway Tower West
15 West South Temple, Suite 1200
Salt Lake City, Utah 84101

DEED OF TRUST, ASSIGNMENT OF RENTS,
SECURITY AGREEMENT, AND FIXTURE FILING

From

WASATCH REGIONAL SOLID WASTE
MANAGEMENT CORPORATION,
a Utah corporation,
as Trustor

With

THE STATE OF UTAH, acting through
the SCHOOL AND INSTITUTIONAL
TRUST LANDS ADMINISTRATION,
as Beneficiary

Dated _____, 200__

TABLE OF CONTENTS

Page

| | | |
|-----------|--|----|
| ARTICLE 1 | COVENANTS AND AGREEMENTS OF TRUSTOR | 3 |
| 1.1 | Payment and Performance of Secured Obligations | 3 |
| 1.2 | Use of the Trust Estate | 3 |
| 1.3 | Required Insurance | 5 |
| 1.4 | Policy Requirements; Delivery of Policies | 6 |
| 1.5 | Casualties; Insurance Proceeds | 6 |
| 1.6 | Assignment of Policies Upon Foreclosure | 7 |
| 1.7 | Indemnification; Subrogation; Waiver of Offset | 7 |
| 1.8 | Impositions | 8 |
| 1.9 | Utilities | 9 |
| 1.10 | Actions Affecting Trust Estate | 9 |
| 1.11 | Actions By Trustee or Beneficiary | 9 |
| 1.12 | Transfer of Trust Estate by Trustor | 9 |
| 1.13 | Eminent Domain | 10 |
| 1.14 | Additional Security | 10 |
| 1.15 | Appointment of Successor Trustee | 11 |
| 1.16 | Inspections | 11 |
| 1.17 | Ownership and Liens and Encumbrances | 11 |
| 1.18 | Trustee's Powers | 11 |
| 1.19 | Beneficiary's Powers | 12 |
| 1.20 | Trade Names | 12 |
| 1.21 | Financial and Compliance Reporting | 12 |
| 1.22 | Construction and Completion Deadlines; Continuous Operations | 13 |
| 1.23 | Trustor's Representations and Warranties | 14 |
| 1.24 | Class 5 Permit | 15 |
| 1.25 | General Indemnification | 16 |
| 1.26 | Operator Agreements | 16 |
| 1.27 | Agreement to Subordinate | 18 |
| ARTICLE 2 | ASSIGNMENT OF RENTS | 18 |
| 2.1 | Assignment of Rents | 18 |
| 2.2 | Collection Upon an Event of Default | 18 |
| 2.3 | Application of Rents | 19 |

TABLE OF CONTENTS
(continued)

| | Page |
|---|------|
| 2.4 Mortgages in Possession | 19 |
| 2.5 Indemnity | 19 |
| 2.6 No Obligation to Perform..... | 19 |
| 2.7 No Consent..... | 19 |
| ARTICLE 3 SECURITY AGREEMENT..... | 19 |
| 3.1 Creation of Security Interest..... | 19 |
| 3.2 Representations, Warranties and Covenants of Trustor..... | 20 |
| 3.3 Beneficiary Rights..... | 21 |
| 3.4 Use of Collateral by Trustor..... | 23 |
| 3.5 Remedies Upon an Event of Default..... | 23 |
| 3.6 Security Agreement..... | 24 |
| 3.7 Fixture Filing..... | 24 |
| 3.8 Financing Statement..... | 25 |
| 3.9 Trustor Agreement | 25 |
| ARTICLE 4 DEFAULT; REMEDIES..... | 25 |
| 4.1 Events of Default..... | 25 |
| 4.2 Acceleration Upon Default; Additional Remedies..... | 26 |
| 4.3 Exercise of Power of Sale | 27 |
| 4.4 Personal Property | 28 |
| 4.5 Appointment of Receiver | 28 |
| 4.6 Remedies Not Exclusive | 28 |
| 4.7 Deficiency | 28 |
| 4.8 Marshalling of Assets..... | 28 |
| 4.9 No Merger | 28 |
| 4.10 Request for Notice..... | 28 |
| ARTICLE 5 RELEASE AND RECONVEYANCE OF TRUST ESTATE..... | 29 |
| 5.1 Reconveyance by Trustee..... | 29 |
| 5.2 Partial Reconveyance | 29 |
| ARTICLE 6 MISCELLANEOUS..... | 29 |
| 6.1 Change, Discharge, Termination, or Waiver..... | 29 |
| 6.2 Trustor Waiver of Rights..... | 29 |
| 6.3 Independent Lease Obligations | 29 |

TABLE OF CONTENTS
(continued)

| | Page |
|--|------|
| 6.4 Reconveyance by Trustee..... | 29 |
| 6.5 Notices..... | 30 |
| 6.6 Acceptance by Trustee | 30 |
| 6.7 Captions and References | 30 |
| 6.8 Invalidity of Certain Provisions | 30 |
| 6.9 Attorneys' Fees..... | 30 |
| 6.10 Governing Law..... | 30 |
| 6.11 Number and Gender | 30 |
| 6.12 Counterparts | 30 |
| 6.13 Status of Title | 30 |
| 6.14 Integration | 31 |
| 6.15 Binding Effect | 31 |
| 6.16 Time of the Essence | 31 |
| 6.17 Survival | 31 |

DEED OF TRUST, ASSIGNMENT OF RENTS,
SECURITY AGREEMENT, AND FIXTURE FILING

THIS DEED OF TRUST CONSTITUTES A SECURITY AGREEMENT, AND IS FILED AS A FIXTURE FILING, WITH RESPECT TO ANY PORTION OF THE TRUST ESTATE IN WHICH A PERSONAL PROPERTY SECURITY INTEREST OR LIEN MAY BE GRANTED OR CREATED PURSUANT TO THE UTAH UNIFORM COMMERCIAL CODE OR UNDER COMMON LAW, AND AS TO ALL REPLACEMENTS, SUBSTITUTIONS, AND ADDITIONS TO SUCH PROPERTY AND THE PROCEEDS THEREOF. FOR PURPOSES OF THE SECURITY INTEREST OR LIEN CREATED HEREBY, BENEFICIARY IS THE "SECURED PARTY" AND TRUSTOR IS THE "DEBTOR." TRUSTOR IS THE RECORD OWNER OF THE PROPERTY.

THIS DEED OF TRUST, ASSIGNMENT OF RENTS, SECURITY AGREEMENT, AND FIXTURE FILING (as it may be amended, supplemented, renewed or extended from time to time, the "Deed of Trust") is made as of _____, 200__, by and among WASATCHE REGIONAL SOLID WASTE MANAGEMENT CORPORATION, a Utah corporation ("Trustor"), with its business address at _____, _____, a Utah corporation ("Trustee"), whose mailing address is _____, and the STATE OF UTAH, acting through the SCHOOL AND INSTITUTIONAL TRUST LANDS ADMINISTRATION ("Beneficiary"), whose mailing address is 675 East 500 North, Suite 500, Salt Lake City, Utah 84102.

FOR GOOD AND VALUABLE CONSIDERATION, including the indebtedness herein recited and the trust herein created, the receipt of which is hereby acknowledged, Trustor hereby irrevocably grants, transfers, conveys and assigns to Trustee, IN TRUST, WITH POWER OF SALE, for the benefit and security of Beneficiary, under and subject to the terms and conditions hereinafter set forth, all of Trustor's right, title and interest in and to that certain real property located in the County of Tooele, State of Utah, more particularly described in Exhibit A to this Deed of Trust (the "Property");

TOGETHER WITH all right, title, or interest of Trustor in any and all buildings and other improvements now or hereafter erected on the Property including, without limitation, fixtures, attachments, appliances, equipment, machinery, and other personal property attached to such buildings and other improvements (collectively, the "Improvements"), all of which shall be deemed and construed to be a part of the real property;

TOGETHER WITH all rents, subrents, issues, profits, damages, royalties, income and other benefits now or hereafter derived from the Property and the Improvements (collectively, the "Rents");

TOGETHER WITH all leasehold estate, right, title and interest of Trustor in and to all leases or subleases covering the Property or the Improvements or any portion thereof now or hereafter existing or entered into, and all right, title and interest of Trustor thereunder, including, without limitation, all rights of Trustor against guarantors thereof, all cash or security deposits, advance rentals, and deposits or payments of similar nature (collectively, the "Leases");

TOGETHER WITH all interests, estates or other claims, both in law and in equity, which Trustor now has or may hereafter acquire in the Property or the Improvements;

TOGETHER WITH all easements, rights-of-way and other rights now owned or hereafter acquired by Trustor used in connection with the Property or the Improvements or as a means of access

thereto (including, without limitation, all rights pursuant to any trackage agreements and all rights to the nonexclusive use of common drive entries, and all tenements, hereditaments and appurtenances thereof and thereto) and all water and water rights and shares of stock evidencing the same;

TOGETHER WITH all right, title and interest now owned or hereafter acquired by Trustor in and to any greater estate in the Property or the Improvements;

TOGETHER WITH all right, title, and interest now owned or hereafter acquired by Trustor in all licenses, permits, approvals, or other authorizations (federal, state, and local) used or useful in connection with or in any way relating to the Property or Improvements, including any operating permits and licenses and building permits relating to the development or operation of the Property and Improvements as a municipal solid waste landfill (the "Landfill");

TOGETHER WITH all right, title, and interest of Trustor in and to (a) the personal property listed on Exhibit B and all other personal property now or hereafter owned by Trustor that is now or hereafter located on or used in connection with the Property or the Improvements; (b) all other personal property that is now or hereafter located on or used in connection with the Property or the Improvements, including, without limiting the foregoing, all of Trustor's present and future "Fixtures," "Equipment," "Inventory," and "General Intangibles" (as such terms are defined in Utah Code Annotated §§ 70A-1-101 *et seq.*, as amended from time to time, or any successor statute (the "UCC")); (c) all personal property and rights and interests in personal property of similar type or kind hereafter acquired by Trustor, and (d) all appurtenances and additions thereto and substitutions or replacements thereof (such personal property, together with proceeds (as hereinafter provided), are referred to herein collectively as the "Personal Property");

TOGETHER WITH all right, title, and interest of Trustor, now owned or hereafter acquired, in and to any land lying within the right-of-way of any street, open or proposed, adjoining the Property, and any and all sidewalks, alleys, and strips and gores of land adjacent to or used in connection with the Property;

TOGETHER WITH all the estate, interest, right, title, other claim, or demand, both in law and in equity (including, without limitation, claims or demands with respect to the proceeds of insurance, indemnities, performance or redemption bonds, judgments, awards of damages, and settlements with respect thereto) that Trustor now has or may hereafter acquire in the Property, the Improvements, the Personal Property, or any other part of the Trust Estate (as defined below), and any and all awards made for the taking by eminent domain, or by any proceeding or purchase in lieu thereof, of the whole or any part of the Trust Estate (including, without limitation, any awards resulting from a change of grade of streets and awards for severance damages); and

TOGETHER WITH all accessions to, substitutions for, and replacements, products, and proceeds of any of the foregoing, including, without limitation, the conversion, voluntary or involuntary, into cash or liquidated claims, of any of the foregoing.

The entire estate, property, right, title, and interest hereby conveyed to Trustee may hereafter be collectively referred to as the "Trust Estate."

TO HAVE AND TO HOLD the Trust Estate unto the Trustee and Trustee's successors, substitutes and assigns, IN TRUST, however, upon the terms, provisions, and conditions herein set forth.

FOR THE PURPOSE OF SECURING (in such order of priority as Beneficiary may elect) the following (collectively, the "Obligations"):

(a) Payment and performance by Trustor of all of the obligations of Trustor pursuant to the Lease and Agreement to Purchase, of even date herewith, executed by Trustor and Beneficiary (as such Lease with Option to Purchase may be amended, supplemented, renewed, or extended from time to time, the "Lease"), including without limitation, the obligation to pay "Annual Rent" and "Percentage Rent" as those terms are defined in the Lease;

(b) Payment and performance by Trustor of all of the obligations of Trustor set forth in the Lease that are stated to survive the expiration or earlier termination of the Lease;

(c) Payment and performance by Trustor of all of the obligations of Trustor set forth in Section 4.6 of the Lease arising after the expiration or earlier termination of the Lease;

(d) Payment of all sums advanced by Beneficiary to protect the Trust Estate, with interest thereon equal to the Default Rate (as that term is defined in the Lease);

(e) Performance of every obligation of Trustor contained in this Deed of Trust, with the Lease, this Deed of Trust, and all other documents now or hereafter evidencing or securing the obligations under the Lease or executed in connection with the transactions contemplated by the Lease being referred to as the "Trustor Documents;" *provided, however,* that the Environmental Indemnity Agreement of even date herewith (the "Environmental Indemnity") given by Trustor to Beneficiary is not included as a Trustor Document secured by the lien of this Deed of Trust, any provision of the Trustor Documents to the contrary notwithstanding);

(f) Performance of every obligation of Trustor contained in any agreement, document, or instrument now or hereafter executed by Trustor reciting that the obligations thereunder are secured by this Deed of Trust;

(g) For the benefit of Beneficiary, compliance with and performance of each and every provision of any declaration of covenants, conditions and restrictions, any easement, license, or permit or any other agreement, document, or instrument by which the Trust Estate is bound or may be affected or to which Trustor is a party; and

(h) All modifications, extensions and renewals of any of the obligations secured hereby, however evidenced.

ARTICLE I COVENANTS AND AGREEMENTS OF TRUSTOR

1.1 Payment and Performance of Secured Obligations. Trustor shall pay when due and/or perform each of the Obligations.

1.2 Use of the Trust Estate.

(a) Beneficiary shall have no management responsibilities with respect to the activities or operations of Trustor under the Lease.

(b) Trustor agrees not to conduct or permit to be conducted any public or private nuisance on or from the Property or the Improvements. Trustor agrees not to permit or commit any waste of the Trust Estate.

(c) All Improvements shall be constructed at the sole cost and expense of Trustor by duly licensed and reputable contractors, in a first class workmanlike manner, and in full and strict compliance with the requirements of any and all laws, ordinances, permits, licenses, and regulations applicable thereto, including zoning and building code requirements of all Governmental Authorities at the time said Improvements are constructed and including the Americans with Disabilities Act of 1990 (the "ADA"). All such Improvements shall be constructed and operated in accordance with the then applicable industry standards for the construction and operation of similar landfill project. Trustor shall obtain and maintain, at no cost to Beneficiary, any and all bonds, letters of credit or other assurances of completion required by any Governmental Authorities in connection with the construction of any Improvements and shall provide copies of such items to Beneficiary upon written request from Beneficiary. As used in this Deed of Trust, the term "Governmental Authority" means the State of Utah (other than in its capacity as Beneficiary), the Utah Department of Environmental Quality, Tooele County, and any other political subdivision, agency, or court having jurisdiction over any of the Trust Estate (federal, state, or local).

(d) Trustor shall bear all expenses in connection with the design, pre-development, development, improvement, construction, alteration and repair of the Property and all Improvements thereon and shall indemnify, defend and hold Beneficiary Indemnitees and the Trust Estate harmless for, from and against any and all Claims (as that term is defined in the Lease) associated therewith or arising therefrom. As used in this Deed of Trust, the term "Beneficiary Indemnitees" means Beneficiary and the State of Utah and their respective officers, directors, employees, agents, elected and appointed officials, successors and assigns.

(e) Trustor shall keep the Trust Estate in good condition and repair. Trustor shall not remove, demolish, or substantially alter any of the Improvements, except with the prior written consent of Beneficiary. Trustor shall complete promptly and in a good and workmanlike manner any Improvement that may be now or hereafter constructed on the Property and promptly restore in like manner any Improvements that may be damaged or destroyed from any cause whatsoever and pay when due all claims for labor performed and materials furnished therefor. Trustor shall strictly comply with all Requirements (as defined below), including all Requirements relating to the operation of the Landfill on the Property (including, without limitation, all closure and post-closure Requirements), and shall not suffer to occur or exist any violation of any Requirement, and Trustor shall pay all costs, expenses, liabilities, losses, fines, penalties, claims and demands including, without limitation, attorneys' fees, that may in any way arise out of or be imposed because of the failure of Trustor to comply with such Requirements. Trustor shall keep and maintain abutting grounds, sidewalks, roads, parking and landscape areas in good and safe order, and state of repair. As used in this Deed of Trust, the term "Requirement" and "Requirements" mean, respectively, each and all obligations and requirements now or hereafter in effect by which Trustor or the Trust Estate are bound or which are otherwise applicable to the Trust Estate, construction of any Improvements on the Trust Estate, or operation, occupancy or use of the Trust Estate, including, without limitation (i) such obligations and requirements imposed by common law or any law, statute, ordinance, regulation, or rule (federal, state, or local), and (ii) such obligations and requirements of, in, or in respect of (A) any consent, authorization, license, permit, or approval relating to the Trust Estate, (B) any condition, covenant, restriction, easement, or right-of-way reservation applicable to the Trust Estate, (C) any Lien or Encumbrance, (D) any other agreement, document, or instrument to which Trustor is a party or by which Trustor or the Trust Estate is bound or affected, and (E) any order, writ, judgment, injunction, decree, determination, or award of any arbitrator, other private adjudicator or Governmental Authority to which Trustor is a party or by which Trustor or the Trust Estate is bound or affected).

(f) Trustor shall fully and timely perform all of its obligations under the Lease.

(g) Trustor shall, at all times, maintain in full force and effect all necessary permit, licenses, agreements, consents, and other authorizations required or necessary to operate a Class A municipal solid waste disposal landfill on the Property meeting the requirements of Section 1.23(j).

1.3 Required Insurance. Trustor shall at all times provide, maintain and keep in force or cause to be provided, maintained and kept in force with respect to the Trust Estate, at no expense to Trustee or Beneficiary, the following policies of insurance, and shall pay, as the same becomes due and payable, all premiums in respect thereto:

(a) Property. Property insurance against loss or damage by fire, lightning, windstorm, hail, smoke and all other risks and perils from time to time included in "special form" all risk policies, such coverage to be in an amount not less than the full insurable value of the Improvements on a replacement cost basis;

(b) Liability Insurance. Commercial general liability insurance (including contractual liability coverage) insuring Trustor against claims for personal injury, bodily injury or death, and property damage or destruction arising out of Trustor's negligent acts or omissions or arising out of Trustor's indemnity obligations under the Lease and this Deed of Trust. The limits of liability of all such insurance shall be not less than \$10,000,000 combined single limit (covering personal injury, bodily injury or death and property damage or destruction) per occurrence, with a deductible not to exceed \$10,000, provided, however, that upon Trustor providing Beneficiary with evidence of customary set asides and reserves in continuing amounts reasonably acceptable to Beneficiary, such deductible limit may be increased to \$100,000. The limits of such insurance shall not limit the liability of Trustor under this Deed of Trust;

(c) Workmen's Compensation Insurance. All workmen's compensation insurance on its employees, if any, required under the applicable workmen's compensation laws of the State of Utah;

(d) Environmental Impairment Insurance. A policy of environmental impairment insurance in the amount of at least \$10,000,000; and

(e) Other Coverages. Such other and additional insurance policies as a prudent developer/operator in the position of Trustor would maintain or as is required from time to time by applicable law.

All insurance required shall be procured and maintained in financially sound and generally recognized responsible insurance companies selected by Trustor and subject to the approval of Beneficiary. Such companies should be authorized to write such insurance in the State of Utah. The company issuing the policies shall be rated "A." or better by A.M. Best Co., in Bests' Key guide.

1.4 Policy Requirements: Delivery of Policies.

(a) At Beneficiary's option all policies of insurance shall either have attached thereto a Beneficiary's loss payable endorsement for the benefit of Beneficiary in form satisfactory to Beneficiary or shall name Beneficiary as an additional insured, as appropriate to the type of coverage. Trustor shall furnish Beneficiary with certificates of insurance for each required policy setting forth the coverage, the limits of liability, the name of the carrier, the policy number and

the period of coverage. At least 30 days prior to the expiration of each required policy, Trustor shall deliver to Beneficiary evidence reasonably satisfactory to Beneficiary of the payment of premium and the renewal or replacement of such policy continuing insurance in form as required by this Deed of Trust. All such policies shall contain a provision that, notwithstanding any contrary agreement between Trustor and insurance company, such policies will not be canceled, allowed to lapse without renewal, surrendered or materially amended, which term shall include any reduction in the scope or limits of coverage, without at least 30 days' prior written notice to Beneficiary.

(b) If Trustor fails to obtain, maintain, or deliver to Beneficiary the policies of insurance with respect to the Trust Estate required by this Deed of Trust, Beneficiary may, at Beneficiary's election, but without any obligation so to do, procure such insurance or single-interest insurance for such risks covering Beneficiary's interest, and Trustor will pay all premiums thereon promptly upon demand by Beneficiary, and until such payment is made by Trustor, the amount of all such premiums shall bear interest at the Default Rate.

1.5 Casualties; Insurance Proceeds.

(a) Trustor shall give prompt written notice thereof to Beneficiary after the happening of any casualty to or in connection with the Trust Estate or any part thereof, whether or not covered by insurance.

(b) Provided no Event of Default has occurred and is continuing, the proceeds of any insurance payable in connection with such casualty shall be payable to Beneficiary, and Beneficiary agrees, upon request of Trustor, to make such proceeds available to Trustor, on such reasonable terms and conditions as Beneficiary may from time to time impose, for the repair and restoration of the Property and the Improvements. If Trustor receives any proceeds of insurance resulting from such casualty, Trustor shall promptly pay over such proceeds to Beneficiary for disposition as provided above.

(c) Following the occurrence and during the continuance of an Event of Default, Trustor authorizes and directs any affected insurance company to make payment of such proceeds directly to Beneficiary, and if Trustor receives any proceeds of insurance resulting from such casualty following the occurrence and during the continuance of an Event of Default, Trustor shall promptly pay over such proceeds to Beneficiary. All proceeds of insurance received by Beneficiary as provided above in this subsection (c) may be applied by Beneficiary to payment of the Obligations in such order as Beneficiary shall determine.

(d) Trustor shall not be excused from repairing or maintaining the Trust Estate as provided in Section 1.2 and as required by any applicable private or governmental covenants, conditions, restrictions, or Requirements or restoring all damage or destruction to the Trust Estate, regardless of whether or not there are insurance proceeds available to Trustor or whether any such proceeds are sufficient in amount, and the application or release by Beneficiary of any insurance proceeds shall not cure or waive any default or notice of default under this Deed of Trust, or invalidate any act done pursuant to such default or notice of default.

1.6 Assignment of Policies Upon Foreclosure. In the event of foreclosure of this Deed of Trust as a mortgage, a sale under the power of sale, or any other transfer of title or assignment of the Trust Estate in extinguishment, in whole or in part, of the Obligations, all right, title and interest of Trustor in and to all policies of insurance required by Section 1.3 shall inure to the benefit of and pass to

the successor in interest to Trustor or the purchaser or grantee of the Trust Estate, to the extent such policies are assignable pursuant to the terms thereof.

1.7 Indemnification; Subrogation; Waiver of Offset.

(a) If Beneficiary or any other Beneficiary Indemnitee is made a party to any litigation concerning the Trust Estate or any part thereof or interest therein or the occupancy of the Trust Estate by Trustor, then Trustor shall indemnify, defend and hold each of Beneficiary Indemnitees harmless for, from and against all liability by reason of said litigation, including reasonable attorneys' fees and expenses incurred by Beneficiary as a result of any such litigation, whether or not any such litigation is prosecuted to judgment. Beneficiary may employ an attorney or attorneys to protect its rights hereunder, and in the event of such employment following any breach by Trustor, Trustor shall pay Beneficiary reasonable attorneys' fees and expenses incurred by Beneficiary, whether or not an action is actually commenced against Trustor by reason of its breach.

(b) Trustor waives any and all right to claim or recover against each of Beneficiary Indemnitees for loss of or damage to Trustor, the Trust Estate, Trustor's property or the property of others under Trustor's control from any cause insured against or required to be insured against by this Deed of Trust.

(c) All sums payable by Trustor pursuant to this Deed of Trust or the other Trustor Documents shall be paid without notice (except for such notice as may be expressly required hereunder or under the Trustor Documents), demand, counterclaim, setoff, deduction or defense and without abatement, suspension, deferment, diminution or reduction, and the obligations and liabilities of Trustor hereunder shall in no way be released, discharged or otherwise affected (except as expressly provided herein) by reason of: (i) any damage to or destruction of or any condemnation or similar taking of the Trust Estate or any part thereof; (ii) any restriction or prevention of or interference by any Person (as defined below) with any use of the Trust Estate or any part thereof; (iii) any title defect or encumbrance or any eviction from the Property or the Improvements or any part thereof by title paramount or otherwise; (iv) any bankruptcy, insolvency, reorganization, composition, adjustment, dissolution, liquidation or other like proceeding relating to Beneficiary, or any action taken with respect to this Deed of Trust by any trustee or receiver of Beneficiary, or by any court, in any such proceeding; (v) any claim that Trustor has or might have against Beneficiary; (vi) any default or failure on the part of Beneficiary to perform or comply with any of the terms of the Trustor Documents; or (vii) any other occurrence whatsoever, whether similar or dissimilar to the foregoing; whether or not Trustor shall have notice or knowledge of any of the foregoing. Except as expressly provided herein, Trustor waives all rights now or hereafter conferred by statute or otherwise to any abatement, suspension, deferment, diminution or reduction of any sum secured hereby and payable by Trustor. As used in this Deed of Trust, the term "Person" means any natural person, any unincorporated association, any corporation, any partnership, any joint venture, any limited liability company, any trust, any other legal entity, Beneficiary, and any Governmental Authority.

1.8 Impositions.

(a) Trustor shall pay, or cause to be paid, prior to delinquency, all real and personal property taxes and assessments, general and special, "Public Exactions," as that term is defined in the Lease, and all other taxes and assessments of any kind or nature whatsoever (including, without limitation, non-governmental levies or assessments such as maintenance charges, levies, or charges resulting from covenants, conditions and restrictions affecting the Trust Estate) that are

assessed or imposed upon Trustor, the Trust Estate, or the operations conducted by Trustor on the Property or that become due and payable and that create, may create, or appear to create a lien upon the Trust Estate (the above are sometimes referred to herein individually as an "Imposition" and collectively as "Impositions"); *provided, however*, that if by law any Imposition is payable, or may at the option of the taxpayer be paid, in installments, Trustor may pay the same or cause it to be paid, together with any accrued interest on the unpaid balance of such Imposition, in installments as the same becomes due and before any fine, penalty, interest, or cost may be added thereto for the nonpayment of any such installment and interest.

(b) If at any time after the date hereof there shall be assessed or imposed a fee, tax, or assessment on Beneficiary and measured by or based in whole or in part upon this Deed of Trust or the outstanding amount of the Obligations, then all such taxes, assessments or fees shall be deemed to be included within the term "Impositions" as defined in Section 1.8(a) and Trustor shall pay and discharge the same as herein provided with respect to the payment of Impositions. If Trustor fails to pay such Impositions prior to delinquency, Beneficiary may, at its option, declare all or part of the Obligations, immediately due and payable. If Trustor is prohibited by law from paying such Impositions, Beneficiary may, at its option, declare all or part of the Obligations due and payable on a date which is not less than six months from the date such prohibition is imposed on Trustor.

(c) Subject to the provisions of Section 1.8(d) and upon request by Beneficiary, Trustor shall deliver to Beneficiary within 30 days after the date upon which any Imposition is due and payable by Trustor official receipts of the appropriate taxing authority, or other proof satisfactory to Beneficiary, evidencing the payment thereof.

(d) Trustor shall have the right before any delinquency occurs to contest or object to the amount or validity of any Imposition by appropriate proceedings, but this shall not be deemed or construed in any way as relieving, modifying, or extending Trustor's covenant to pay any such Imposition at the time and in the manner provided in this Section 1.8, unless Trustor has given prior written notice to Beneficiary of Trustor's intent to so contest or object to an Imposition, and unless, in Beneficiary's absolute and sole discretion, (i) Trustor shall demonstrate to Beneficiary's satisfaction that the proceedings to be initiated by Trustor shall conclusively operate to prevent the sale of the Trust Estate or any part thereof or interest therein to satisfy such Imposition prior to final determination of such proceedings, (ii) Trustor shall furnish a good and sufficient bond or surety as requested by and satisfactory to Beneficiary, or (iii) Trustor shall demonstrate to Beneficiary's satisfaction that Trustor has provided a good and sufficient undertaking as may be required or permitted by law to accomplish a stay of any such sale.

(e) Trustor shall not initiate or suffer to occur or exist the joint assessment of any real and personal property included in the Trust Estate or any other procedure whereby the lien of real property taxes and the lien of personal property taxes shall be assessed, levied, or charged to the Trust Estate as a single lien.

1.9 Utilities. Trustor shall pay when due all charges that are incurred by Trustor for the benefit of the Trust Estate or that may become a charge or lien against the Trust Estate for gas, electricity, water, sewer, or other services furnished to the Trust Estate.

1.10 Actions Affecting Trust Estate. Trustor shall appear in and contest any action or proceeding purporting to affect the security hereof or the rights or powers of Beneficiary or Trustee; and shall pay all costs and expenses (including, without limitation, costs of evidence of title, litigation, and reasonable attorneys' fees) in any such action or proceeding in which Beneficiary or Trustee may appear.

1.11 Actions By Trustee or Beneficiary. If Trustor fails to make any payment or to do any act as and in the manner provided in any of the Trustor Documents, Beneficiary and/or Trustee, each in its absolute and sole discretion, without obligation so to do, without releasing Trustor from any obligation, and with only such notice to or demand upon Trustor as may be reasonable under the then existing circumstances, but in no event exceeding 10 days prior written notice, may make or do the same in such manner and to such extent as either may deem necessary or appropriate. In connection therewith (without limiting their general powers, whether conferred herein, in another Trustor Document or by law), Beneficiary and Trustee shall have and are hereby given the right, but not the obligation, (a) to enter upon and take possession of the Trust Estate; (b) to make additions, alterations, repairs and improvements to the Trust Estate that they or either of them may consider necessary or appropriate to keep the Trust Estate in good condition and repair; (c) to appear and participate in any action or proceeding affecting or which may affect the security hereof or the rights or powers of Beneficiary or Trustee; (d) to pay, purchase, contest or compromise any Lien or Encumbrance (as defined below) or alleged Lien or Encumbrance whether superior or junior to this Deed of Trust; and (e) in exercising such powers, to pay necessary expenses (including, without limitation, expenses of employment of counsel or other necessary or desirable consultants). Trustor shall, immediately upon demand therefor by Beneficiary and Trustee or either of them, pay to Beneficiary and Trustee an amount equal to all respective costs and expenses incurred by them in connection with the exercise by either Beneficiary or Trustee or both of the foregoing rights (including, without limitation, costs of evidence of title, court costs, appraisals, surveys and receiver's, trustee's and reasonable attorneys' fees) together with interest thereon from the date of such expenditures at the Default Rate.

1.12 Transfer of Trust Estate by Trustor. Trustor agrees that, in the event of any Transfer (as hereinafter defined), without the prior written consent of Beneficiary (other than a Permitted Transfer), Beneficiary shall have the absolute right, at its option, without prior demand or notice, to declare all sums secured hereby immediately due and payable. Consent to one such Transfer shall not be deemed to be a waiver of the right to require consent to future or successive Transfers. Beneficiary may grant or deny such consent in its sole discretion and, if consent should be given, any such Transfer shall be subject to this Deed of Trust, and such transferee shall assume all obligations hereunder and agree to be bound by all provisions contained herein. Such assumption shall not, however, release Trustor from any liability thereunder without the express prior written consent of Beneficiary, in Beneficiary's sole and absolute discretion. As used herein, "Transfer" shall mean:

(a) Any sale, transfer, conveyance, hypothecation, encumbrance, lease or vesting of the Trust Estate or any part thereof or interest therein to or in any Person, whether voluntary, involuntary, by operation of law, or otherwise, except the Permitted Exceptions (as such term is defined in Exhibit C to this Deed of Trust);

(b) Any sale, transfer, assignment, conveyance, hypothecation, encumbrance or vesting of any general partnership interest in Trustor or any partner in Trustor to or in any Person (if Trustor or any partner in Trustor is a partnership) whether voluntary, involuntary, by operation of law, or otherwise, except the Permitted Exceptions;

(c) Any sale, transfer, assignment, conveyance, hypothecation, encumbrance or vesting of any member interest in Trustor or any member in Trustor to or in any Person (if Trustor or any member in Trustor is a limited liability company) whether voluntary, involuntary, by operation of law, or otherwise, except the Permitted Exceptions;

(d) Any sale, transfer, assignment, conveyance, hypothecation, encumbrance or vesting of any shares of stock in Trustor or any partner in Trustor to or in any Person or any consolidation or merger of Trustor or any partner in Trustor into or with any Person (if Trustor or

any partner or member in Trustor is a corporation) whether voluntary, involuntary, by operation of law, or otherwise, except the Permitted Exceptions; or

(e) The execution of any agreements to do any of the foregoing, except the Permitted Exceptions.

Notwithstanding the foregoing, a Transfer made to the assignee of the Lease or a sublessee under the Lease pursuant to a permitted "Assignment" or "Sublease" (as those terms are defined in the Lease) pursuant to the terms of the Lease shall be deemed a "Permitted Transfer" and shall not be subject to the other provisions of this Section 1.12.

1.13 Eminent Domain.

(a) If any proceeding or action be commenced for the taking of the Trust Estate, or any part thereof or interest therein, for public or quasi-public use under the power of eminent domain, condemnation (including, without limitation, inverse condemnation) or otherwise (hereinafter collectively referred to as a "Taking"), or if the same be taken or damaged by reason of any public improvement or Taking, or should Trustor receive any notice or other information regarding such Taking or damage, Trustor shall give prompt written notice thereof to Beneficiary. All compensation, awards, damages, rights of action and proceeds awarded to Trustor by reason of any such Taking or damage or received by Trustor as the result of a transfer in lieu of a Taking (the "Condemnation Proceeds") are hereby assigned to Beneficiary, and Trustor agrees to execute such further assignments of the Condemnation Proceeds as Beneficiary or Trustee may require. If Trustor receives any Condemnation Proceeds Trustor shall promptly pay over such proceeds to Beneficiary. Beneficiary is hereby authorized and empowered by Trustor, at Beneficiary's option and in Beneficiary's sole discretion, as attorney-in-fact for Trustor, to settle, adjust, or compromise any claim for loss or damage in connection with any Taking or proposed Taking and, without regard to the adequacy of its security, to commence, appear in and prosecute in its own name and/or on behalf of Trustor any such action or proceeding arising out of or relating to a Taking or proposed Taking.

(b) Trustor shall not be excused from repairing or maintaining the Trust Estate as provided in Section 1.2 or restoring all damage or destruction to the Trust Estate, regardless of whether or not there are Condemnation Proceeds available to Trustor or whether any such Condemnation Proceeds are sufficient in amount. The application or release of the Condemnation Proceeds shall not cure or waive any default or notice of default hereunder or under any other Trustor Document or invalidate any act done pursuant to such default or notice of default.

1.14 Additional Security. No other security now existing, or hereafter taken, to secure the Obligations secured hereby shall be impaired or affected by the execution of this Deed of Trust. All security for the Obligations from time to time shall be taken, considered and held as cumulative. Any taking of additional security, execution of partial releases of the security, or any extension of the time of payment of, or modification of other terms of any of the Obligations shall not diminish the force, effect or lien of this Deed of Trust and shall not affect or impair the liability of any maker, guarantor, surety or endorser for the payment or performance of any of the Obligations. If Beneficiary at any time holds additional security for any of the Obligations, it may enforce the sale thereof or otherwise realize upon the same, at its option, either before, concurrently with, or after a sale or realization is made hereunder.

1.15 Appointment of Successor Trustee. Beneficiary may, from time to time, by a written instrument executed and acknowledged by Beneficiary, mailed to Trustor and recorded in the county in

which the Trust Estate is located and by otherwise complying with the provisions of applicable law, substitute a successor or successors to any Trustee named herein or acting hereunder, and such successor(s) shall, without conveyance from the Trustee predecessor, succeed to all title, estate, rights, powers and duties of such predecessor.

1.16 Inspections. Beneficiary, and its agents, representatives officers, and employees, are authorized to enter at any reasonable time upon or in any part of the Trust Estate for the purpose of inspecting the same to determine compliance by Trustor with the requirements of this Deed of Trust and for the purpose of performing any of the acts Beneficiary is authorized to perform hereunder or under the terms of any of the Trustor Documents.

1.17 Ownership and Liens and Encumbrances. Trustor is, and as to any portion of the Trust Estate acquired hereafter will upon such acquisitions be, and shall remain the owner of the Trust Estate free and clear of any Liens and Encumbrances. Trustor shall not grant, shall not suffer to exist, and shall pay and promptly discharge, at Trustor's cost and expense, all Liens and Encumbrances and any claims thereof upon the Trust Estate, or any part thereof or interest therein. Trustor shall notify Beneficiary immediately in writing of any Lien or Encumbrance or claim thereof. Trustor shall have the right to contest in good faith the validity of any involuntary Lien or Encumbrance, provided Trustor shall first deposit with Beneficiary a bond or other security satisfactory to Beneficiary in such amount as Beneficiary shall reasonably require, but not more than one 150% of the amount of the claim, and provided further that if Trustor loses such contest, Trustor shall thereafter diligently proceed to cause such Lien or Encumbrance to be removed and discharged. If Trustor shall fail to remove and discharge any Lien or Encumbrance or claim thereof, then, in addition to any other right or remedy of Beneficiary, Beneficiary may, after only such notice to Trustor as may be reasonable under the then existing circumstances, but shall not be obligated to, discharge the same, either by paying the amount claimed to be due, or by procuring the discharge of such Lien or Encumbrance by depositing in a court a bond or the amount claimed or otherwise giving security for such claim, or by procuring such discharge in such manner as is or may be prescribed by law. Trustor shall, immediately upon demand therefor by Beneficiary, pay to Beneficiary an amount equal to all costs and expenses incurred by Beneficiary in connection with the exercise by Beneficiary of the foregoing right to discharge any Lien or Encumbrance or claim thereof, together with interest thereon from the date of each such expenditure at the Default Rate. Such costs and expenses shall be secured by this Deed of Trust. "Lien or Encumbrance" and "Liens and Encumbrances" mean, respectively, each and all of the following in respect of the Trust Estate: leases, other rights to occupy or use, mortgages, deeds of trust, pledges, security agreements, assignments, assignments as security, conditional sales, title retention arrangements or agreements, conditions, covenants, and restrictions, mechanics' and materialmen's liens, and other charges, liens, encumbrances, or adverse interests, whether voluntarily or involuntarily created and regardless of whether prior or subordinate to any estate, right, title, or interest granted to Trustee or Beneficiary in this Deed of Trust, excluding from the foregoing the Permitted Exceptions.

1.18 Trustee's Powers. At any time, or from time to time, without liability therefor and without notice, upon written request of Beneficiary and presentation of this Deed of Trust and without affecting the personal liability of any person for payment of the Obligations or the effect of this Deed of Trust upon the remainder of said Trust Estate, Trustee may (a) reconvey any part of said Trust Estate, (b) consent in writing to the making of any map or plat thereof, (c) join in granting any easement thereon, or (d) join in any extension agreement or any agreement subordinating the lien or charge hereof.

1.19 Beneficiary's Powers. Without affecting the liability of any Person liable for the payment of the Obligations herein mentioned, and without affecting the lien or charge of this Deed of Trust upon any portion of the Trust Estate not then or theretofore released as security for the Obligations, Beneficiary may, from time to time and without notice (a) release any person so liable, (b) extend the

Obligations, (c) grant other indulgences, (d) release or reconvey, or cause to be released or reconveyed, at any time at Beneficiary's option any parcel, portion or all of the Trust Estate, (e) take or release any other or additional security or any guaranty for any Obligation herein mentioned, or (f) make compositions or other arrangements with debtors in relation thereto.

1.20 Trade Names. At the request of Beneficiary from time to time, Trustor shall execute a certificate in form satisfactory to Beneficiary listing the trade names or fictitious business names under which Trustor intends to operate the Trust Estate or any business located thereon and representing and warranting that Trustor does business under no other trade names or fictitious business names with respect to the Trust Estate. Trustor shall immediately notify Beneficiary in writing of any change in said trade names or fictitious business names, and will, upon request of Beneficiary, execute any additional financing statements and other certificates necessary to reflect the change in trade names or fictitious business names.

1.21 Financial and Compliance Reporting. Until payment and performance in full of the Obligations, Trustor covenants and agrees that it will:

(a) . Furnish to Beneficiary, as soon as available and in any event not later than 60 days after the close of each fiscal quarter (other than the fiscal quarter ending on December 31), beginning with the first quarter of the first fiscal year after the fiscal year during which this Deed of Trust is executed, financial statements of Trustor on a consolidated basis prepared by Trustor containing the calculation of Net Receipts in form and substance satisfactory to Beneficiary, duly certified (subject to routine year-end audit adjustments) by an authorized officer of Trustor.

(b) Together with each annual and quarterly financial report required pursuant to subsections (a) and (b) above, furnish to Beneficiary a compliance certificate, properly completed and duly executed by the controller or chief financial officer of Trustor (a "Compliance Certificate"). Each Compliance Certificate shall: (a) state that, to the best of such officer's knowledge, no Event of Default exists and no event has occurred that is continuing which, with the giving of notice or the passage of time, or both, would constitute an event of default, or if an Event of Default or other such event does exist, state the nature thereof, the period of existence thereof and what action Trustor proposes to take with respect thereto; (b) reaffirm the representations and warranties contained in Section 1.23 or elsewhere in this Deed of Trust; and (c) contain such other information and certifications as Beneficiary shall reasonably request.

(c) Promptly advise Beneficiary with respect to and furnish to Beneficiary copies of:

(i) All information relating to any changes in the disclosures made pursuant to this Deed of Trust, including, without limitation, the representations and warranties set forth herein;

(ii) Any Claims against Trustor or whether pending or overtly threatened;

(iii) Any default by any of the members pursuant to the operating agreement pursuant to which Trustor has been organized;

(iv) Any other matter that would materially and adversely affect the ability of Trustor to perform its obligations thereunder;

(v) Any and all filings with and notices to any and all Governmental Authorities with respect to the Trust Estate or the Landfill and copies of any and all notices, complaints, or other actions by any Governmental Authority received by Trustor or its agents with respect to the Trust Estate, or any portion thereof, or the Landfill; and

(vi) Any notice received by Trustor to the effect that its operations are not in compliance with any of the requirements of "Applicable Environmental Law" (as that term is defined in the Lease) or are the subject of any federal or state investigation evaluation whether any remedial action is needed to respond to a release of any toxic or hazardous waste or substance into the environment, which non-compliance or remedial action could reasonably be expected to have a material adverse effect on Trustor, the Landfill or the Trust Estate.

1.22 Construction and Completion Deadlines; Continuous Operations.

(a) Within 180 days following the date of execution of this Deed of Trust, Trustor shall commence construction of a Landfill on the Property consisting of at least two cells with an aggregate design capacity of at least one million cubic yards (the "Initial Landfill Project"). The date such construction is commenced is referred to as the "Construction Commencement Date." For purposes of this Section 1.22(a), construction will not be deemed to have commenced until such time as Trustor actually begins excavation activities on the Property.

(b) Trustor shall complete the Initial Landfill Project, including all ancillary facilities and off-site improvements, such that the Initial Landfill Project is fully operational and ready to receive municipal waste within 180 days of the Construction Commencement Date. The date by which Trustor is to have completed the Initial Landfill Project in accordance with the foregoing requirements is referred to as the "Completion Date."

(c) The Construction Commencement Date and the Construction Completion Date shall be extended by reason of Force Majeure, as defined in the Lease.

(d) Following the Completion Date, the Landfill shall be operated continuously as a Landfill during such time as the Lease is in effect or any of the Obligations are otherwise outstanding, subject only to cessation of operations for temporary periods as a result of Force Majeure events, with Force Majeure for these purposes being deemed to include general economic conditions within the geographic area in which Trustor or any of its direct competitors operates. Any other provision of this Deed of Trust to the contrary notwithstanding, Trustor shall not be deemed to be in breach of the requirements of this Section 1.22(d) unless the Landfill has ceased continuous operations for at least two full years. For purposes of this Section 1.22(d), operations will be deemed to have ceased for a continuous two-year period notwithstanding the fact that the Landfill may have been operated for up to 60 days during the two-year period.

1.23 Trustor's Representations and Warranties. On a continuing basis from the date of execution of this Deed of Trust and thereafter until payment and performance in full of the Obligations, Trustor represents and warrants to Beneficiary that:

(a) Trustor is a corporation company duly organized, validly existing and in good standing under the laws of the State of Utah and has the full power and authority to carry on its business as now being conducted and as proposed to be conducted, to execute, deliver, and perform its obligations under this Deed of Trust, the Lease, and all other documents to be executed by it pursuant to the transactions contemplated by the Lease and this Deed of Trust, to

grant to Beneficiary the security interests contemplated by the Trustor Documents, and to do any and all other things required of it hereunder.

(b) The execution, delivery and performance of this Deed of Trust, the Lease and the other documents contemplated herein (i) have been duly authorized by all requisite action of Trustor and each member of Trustor, (ii) do not require registration with or consent or approval of, or other action by, any Governmental Authority or other Person, (iii) will not violate any Requirements, Trustor's operating agreement or certificate of organization, or any provision of any indenture, note, agreement or other instrument to which Trustor is a party or by which it or any of its properties or assets are bound, and (iv) will not be in conflict with, result in a breach of or constitute (with or without notice or passage of time) a default under, or cause or permit the acceleration of any obligation under, or result in or require the creation or imposition of any Lien or Encumbrance.

(c) The Trustor Documents will be, when executed and delivered, legal, valid and binding obligations of Trustor, enforceable in accordance with their respective terms except as the enforceability thereof may be limited by bankruptcy, insolvency, reorganization, moratorium or other similar laws affecting creditors' rights generally.

(d) Trustor is and will be the lawful sole owner of the entire Trust Estate, free, clear and discharged of and from all Liens and Encumbrances other than the Permitted Exceptions.

(e) The address of the chief executive office and the chief place of business of Trustor and the locations of all books and records concerning the Trust Estate is the address of Trustor set forth on the first page of this Deed of Trust.

(f) There are no actions, suits or proceedings, at law or in equity, and no proceedings before any arbitrator or by or before any Governmental Authority, pending, or, to the best knowledge of Trustor, threatened against or affecting Trustor or the Trust Estate.

(g) Trustor is able to pay its debts as they mature, has capital sufficient to carry on its business, and has assets the fair market value of which exceeds its liabilities, and no such party will be rendered insolvent, undercapitalized or unable to pay maturing debts by the execution or performance of the Trustor Documents.

(h) Trustor has filed by the due date, or within a granted extension therefor, all federal, state and local tax returns and other reports it is required by law to file, has paid or caused to be paid all taxes, assessments and other governmental charges that are shown to be due and payable under such returns, and has made adequate provision for the payment of such taxes, assessments or other governmental charges which have accrued but are not yet payable. No Liens or Encumbrances exist with respect to any such taxes.

(i) No warranty or representation by Trustor contained herein or in any certificate or other document furnished by Trustor pursuant hereto contains any untrue statement of material fact or omits to state a material fact necessary to make such warranty or representation not misleading in light of the circumstances under which it was made.

(j) Trustor has obtained all federal, state and local permits and entitlements necessary for the construction and operation of a Class 1 municipal solid waste landfill on the Property and the Premises subject to the Lease, upon acquisition of those Premises pursuant to the option to purchase contained in the Lease, having a design capacity of at least 50 million cubic

yards, with no daily volume cap or waste generation restrictions for volumes from within the State of Utah, including all land use entitlements and siting agreements from Tooele County, and all such permits and entitlements are in full force and effect.

(k) Trustor has obtained binding long-term disposal contracts with municipalities or other political subdivisions in the State of Utah for delivery to the landfill of at least 1,000 tons per day in the aggregate for all such contracts and such contracts are in full force and effect.

1.24 Class 5 Permit. Beneficiary agrees that Trustor shall be entitled to apply for and obtain a Class 5 permit for the Landfill and to accept Class 5 waste at the Landfill, only upon the prior written consent of Beneficiary, which consent shall not be unreasonably withheld and upon compliance with all applicable statutory and regulatory laws and requirements. Until such time as Trustor has obtained a Class 5 permit for the Landfill and has fulfilled all conditions to the use of the Landfill for purposes of accepting Class 5 waste, Trustor agrees that the Landfill will only be operated as a Class 1 landfill and will only accept Class 1 waste. For purposes of the Trust Documents and any document executed in connection therewith, the term "Class 1" and the term "Class 5" means as currently defined in the regulations promulgated by the Utah Division of Solid and Hazardous Waste and located at Utah Administrative Code R315-301-2 (2003).

1.25 General Indemnification.

(a) Beneficiary shall not be liable for and Trustor covenants and agrees to indemnify and save all Beneficiary Indemnitees entirely harmless for, from and against each and every Claim arising out of any accident or other occurrence causing injury to or death of persons or damage to property by reason of construction or maintenance of any Improvements, of any additions, alterations or renovations thereto, or due to the condition of the Property, the Personal Property, or any Improvements thereon, or the use or neglect thereof by Trustor or any agent, employee, invitee, contractor, or customer of Trustor, or any other Person, or otherwise occurring upon the Property or any Improvements thereon. Trustor further agrees to indemnify and save all Beneficiary Indemnitees and the interests of Beneficiary in the Trust Estate entirely harmless for, from and against all Claims arising out of any failure of Trustor to comply with any of Trustor's obligations under this Deed of Trust, including without limitation reasonable attorneys' fees and court costs.

(b) Each provision of this Deed of Trust imposing an indemnification obligation on Trustor is in addition to all other indemnification provisions and shall not be construed in a manner that modifies or limits any other indemnification provision in this Deed of Trust or in the Lease. All indemnification provisions in this Deed of Trust shall survive the payment and performance in full of the Obligations as to Claims arising or accruing prior thereto. The indemnification provided by Trustor in this Section 1.25 and elsewhere in this Deed of Trust shall not be construed or interpreted as in any way restricting, limiting or modifying Trustor's insurance or other obligations under this Deed of Trust, and such indemnification provisions are independent of Trustor's insurance and other obligations. Trustor's compliance with the insurance requirements and other obligations under this Deed of Trust does not in any way restrict, limit or modify Trustor's indemnification obligations under this Deed of Trust.

(c) To the fullest extent permitted by law, Trustor hereby waives all Claims against Beneficiary arising from the following, except to the extent resulting from the gross negligence or willful misconduct of Beneficiary, its agents, servants, contractors, or employees: (i) any personal injury, bodily injury or property damage occurring in or at the Property; (ii) any loss of or damage to property of Trustor, its subtenants, agents, contractors, or employees located at the

Property by theft or otherwise; (iii) any personal injury, bodily injury, or property damage caused by occupants of property adjacent to the Property or the public or by the construction of any private, public, or quasi-public work occurring in the Property or Improvements; (iv) any interruption or stoppage of any utility service or for any damage to persons or property resulting from such stoppage; (v) business interruption or loss of use of the Trust Estate suffered by Trustor; (vi) damages or injuries or interference with Trustor's business and any other loss resulting from the exercise by Beneficiary of any right or the performance by Beneficiary of any of Beneficiary's obligations under this Deed of Trust; or (vii) any bodily injury to an employee of Trustor, its subtenants, agents, contractors, or employees arising out of and in the course of employment of the employee and occurring anywhere in or about the Property.

1.26 Operator Agreements.

(a) Trustor understands, acknowledges, and agrees that Beneficiary is entering into this Deed of Trust and the transactions contemplated by the Trustor Documents on the basis of and in reliance on the identity and control of Trustor and its shareholders, the expertise of Trustor and its shareholders in the solid waste management business, and reputation and financial capabilities of Trustor and its shareholders. Accordingly, Trustor shall not enter into any agreement with any third-party pursuant to which such third party would become entitled to operate any portion of the Landfill (an "Operator Agreement") without the prior written consent of Beneficiary, which shall not be unreasonably withheld, being obtained in each instance, subject to the terms and conditions contained in this Section 1.26.

(b) If Trustor desires at any time to enter into an Operator Agreement, Trustor shall, at least sixty days prior to the effective date of the Operator Agreement, request in writing Beneficiary's consent to the Operator Agreement and provide the following:

(i) The name of the proposed operator and the names of the individuals ultimately owning or controlling, directly or indirectly, the proposed operator;

(ii) A copy of the proposed Operator Agreement; and

(iii) A detailed description of the proposed transaction, together with a written authorization from Trustor authorizing Beneficiary, its agents, representatives, and advisers to contact the proposed operator to discuss and verify any and all aspects of the proposed transaction and the information provided by Trustor pursuant to this Section 1.26.

(c) At least 30 days prior to the effective date of the Operator Agreement, Trustor shall provide to Beneficiary such information concerning the proposed operator and transaction as Beneficiary shall have requested following its receipt of Trustor's request for consent, including, without limitation, detailed information as to the identity of the proposed operator (including the identity of all entities and individuals, other than shareholders in a publicly traded company who own directly or indirectly any ownership interest in the operator), detailed financial information with respect to the proposed operator, information demonstrating the business experience and reputation of the proposed operator in the solid waste management industry, and such other information as Beneficiary deems appropriate to its decision to approve or disapprove.

(d) At any time within 30 days after Beneficiary's receipt of the notice specified in Section 1.26(b) and the information that Trustor is required to provide pursuant to Sections 1.26(b) and 1.26(c), Lessor may by written notice to Trustor elect either to (1) consent to the

proposed Operator Agreement, (2) refuse to consent to the proposed Operator Agreement. In this regard, Beneficiary and Trustor agree (by way of example and without limitation) that it shall be reasonable for Beneficiary to withhold its consent if any of the following situations exist or may exist:

(i) In Beneficiary's reasonable business judgment, the proposed operator lacks sufficient business reputation, expertise, or experience to successfully and profitably operate the Landfill;

(ii) The financial condition of the proposed operator is unacceptable to Lessor, in Lessor's reasonable judgment, to enable such proposed operator to fully and timely perform the terms and conditions of this Lease, including the indemnification obligations of the Trustor under this Lease;

(iii) In Beneficiary's reasonable judgment, operation of the Landfill by the proposed operator would materially reduce the amount of Percentage Rent that Beneficiary would receive pursuant to the Lease over the life of the Lease or would materially increase the risk to any of the Beneficiary Indemnitees of any Claims for which Beneficiary has been indemnified by Trustor; or

(iv) An Event of Default has occurred and is continuing or an event has occurred which is continuing that, with the passage of time and/or the giving of notice, would constitute an Event of Default.

(e) If Beneficiary consents to the Operator Agreement within said thirty day period, Trustor may enter into such Operator Agreement, but only upon the terms and conditions set forth in the notice furnished by Trustor to Lessor pursuant to Section 1.26(b). Trustor shall promptly provide to Beneficiary a copy of the fully executed Operator Agreement.

(f) No consent by Beneficiary to any Operator Agreement shall relieve Trustor of any of the Obligations. The consent by Lessor to any Operator Agreement shall not relieve Trustor of the obligation to obtain Beneficiary's express written consent to any other Operator Agreement. Any Operator Agreement that is not in compliance with this Section shall be absolutely null and void, shall be an Event of Default.

(g) Each operator pursuant to an approved Operator Agreement shall assume, as provided in this Section, all obligations of Trustor under this Deed of Trust with respect to the use and operation of the Landfill and the Property and Improvements.

(h) Regardless of whether Beneficiary grants its consent to an Operator Agreement, Trustor shall pay to Beneficiary, in connection with any proposed Operator Agreement, a non-refundable fee equal to the greater of (i) \$2,500 if Beneficiary handles the request internally, or (ii) the reasonable costs and fees incurred by Beneficiary to retain outside counsel to assist and advise Beneficiary with respect to such transfer and, if Beneficiary's consent is granted in its discretion, consummating the proposed transfer in reviewing and preparing documents in connection therewith.

1.27 Agreement to Subordinate. Upon Trustor's request, Beneficiary agrees to subordinate the lien of this Deed of Trust to a Leasehold Mortgage permitted under the Lease that also proposes to encumber the Trust Estate or any portion thereof and, in connection therewith, to execute a subordination.

agreement in favor of the holder of the Leasehold Mortgage in form and content reasonably satisfactory to Beneficiary.

ARTICLE 2 ASSIGNMENT OF RENTS

2.1 Assignment of Rents. Trustor hereby absolutely and irrevocably assigns and transfers to Beneficiary all the Rents of the Trust Estate, and hereby gives to and confers upon Beneficiary the right, power, and authority to collect the Rents. Trustor irrevocably appoints Beneficiary its true and lawful attorney-in-fact, at the option of Beneficiary at any time and from time to time, to demand, receive, and enforce payment, to give receipts, releases, and satisfactions, and to sue, in the name of Trustor or Beneficiary, for all Rents and apply the same to the payment of the Obligations in such order as Beneficiary shall determine. Trustor hereby authorizes and directs the lessees, tenants, and occupants to make all payments under the Leases directly to Beneficiary upon written demand by Beneficiary, without further consent of Trustor; *provided, however*, that Trustor shall have the right to collect such Rents (but not more than one month in advance unless the written approval of Beneficiary is first obtained), and to retain and enjoy same, so long as an Event of Default shall not have occurred hereunder or under the other Trustor Documents. The assignment of the Rents of the Trust Estate in this Article 2 is intended to be an absolute assignment from Trustor to Beneficiary, and not merely the grant of a lien or security interest.

2.2 Collection Upon an Event of Default. Upon the occurrence of an Event of Default, Beneficiary may, at any time without notice, either in person, by agent or by a receiver appointed by a court, and without regard to the adequacy of any security for the Obligations, enter upon and take possession of the Trust Estate, or any part thereof, and, with or without such entry or taking possession, in its own name sue for or otherwise collect the Rents (including, without limitation, those past due and unpaid) and apply the same, less costs and expenses of operation and collection (including, without limitation, reasonable attorneys' fees) upon payment of the Obligations in such order as Beneficiary may determine. The collection of such Rents, or the entering upon and taking possession of the Trust Estate, or the application of the Rents as aforesaid, shall not cure or waive any default or notice of default hereunder or invalidate any act done in response to such default or pursuant to such notice of default. Trustor also hereby authorizes Beneficiary upon such entry, at its option, to take over and assume the management, operation and maintenance of the Trust Estate and to perform all acts Beneficiary in its sole discretion deems necessary and proper and to expend such sums out of Rents as may be needed in connection therewith, in the same manner and to the same extent as Trustor theretofore could do (including, without limitation, the right to enter into new leases, to cancel, surrender, alter or amend the terms of, and/or renew existing leases collectively, the "Leases", and/or to make concessions to tenants). Trustor hereby releases all claims of any kind or nature against Beneficiary arising out of such management, operation and maintenance, excepting the liability of Beneficiary to account as hereinafter set forth and except for claims relating to the gross negligence or intentional misconduct of Beneficiary.

2.3 Application of Rents. Upon such entry, Beneficiary shall, after payment of all property charges and expenses (including, without limitation, reasonable compensation to such managing agent as it may select and employ) and after the accumulation of a reserve to meet requisite amounts, credit the net amount of the Rents received by it to the Obligations, but the manner of the application of such net income and which items shall be credited shall be determined in the sole discretion of Beneficiary. Beneficiary shall not be accountable for more moneys than it actually receives from the Trust Estate; nor shall it be liable for failure to collect Rents. Beneficiary shall make reasonable efforts to collect Rents, reserving, however, within its own absolute and sole discretion, the right to determine the method of collection and the extent to which enforcement of collection of Rents shall be prosecuted and Beneficiary's judgment shall be deemed conclusive and reasonable.

2.4 Mortgagee in Possession. It is not the intention of the parties hereto that an entry by Beneficiary upon the Property under the terms of this instrument shall make Beneficiary a party in possession in contemplation of the law, except at the option of Beneficiary.

2.5 Indemnity. Except with respect to any gross negligence or intentionally misconduct by a Beneficiary Indemnitee, Trustor hereby agrees to indemnify and hold harmless each Beneficiary Indemnitee for, from and against any and all losses, liabilities, obligations, claims, demands, damages, penalties, judgments, costs, and expenses, including legal fees and expenses, howsoever and by whomsoever asserted, arising out of or in any way connected with this assignment; and all such losses, liabilities, obligations, claims, demands, damages, penalties, judgments, costs and expenses shall be deemed added to the Obligations secured hereby and shall be secured by any and all other instruments securing the Obligations.

2.6 No Obligation to Perform. Nothing contained herein shall operate or be construed to obligate Beneficiary to perform any obligations of Trustor under any Lease (including, without limitation, any obligation arising out of any covenant of quiet enjoyment therein contained in the event the lessee under any such Lease shall have been joined as a party defendant in any action to foreclose and the estate of such lessee shall have been thereby terminated). Prior to actual entry into and taking possession of the Property by Beneficiary, this assignment shall not operate to place upon Beneficiary any responsibility for the operation, control, care, management or repair of the Trust Estate or any portion thereof, and the execution of this assignment by Trustor shall constitute conclusive evidence that all responsibility for the operation, control, care, management and repair of the Trust Estate is and shall be that of Trustor, prior to such actual entry and taking of possession.

2.7 No Consent. Nothing in this Article 2 shall be deemed to constitute the express or implied consent of Beneficiary to any Lease. Consent for Trustor to enter into Leases is governed strictly by the provisions of Section 1.12.

ARTICLE 3 SECURITY AGREEMENT

3.1 Creation of Security Interest. This Deed of Trust constitutes and shall be deemed to be a "security agreement" for all purposes of the UCC. With respect to Personal Property comprising the Trust Estate, whether now owned or existing or hereafter acquired or arising, wherever located and whether in Trustor's possession and control or in the possession and control of a third party (collectively, the "Collateral"), Beneficiary is granted a security interest hereunder, and shall be entitled to all the rights and remedies of a "secured party" under the UCC.

3.2 Representations, Warranties and Covenants of Trustor. Trustor hereby represents, warrants and covenants (which representations, warranties and covenants shall survive creation of any indebtedness of Trustor to Beneficiary and any extension of credit thereunder) as follows:

(a) The Collateral is not used or bought for personal, family or household purposes.

(b) The tangible portion of the Collateral will be kept on or at the Property or Improvements and Trustor will not, without the prior written consent of Beneficiary, remove the Collateral or any portion thereof therefrom except such portions or items of Collateral which are consumed or worn out in ordinary usage, all of which shall be promptly replaced by Trustor with similar items of greater value.

(c) Trustor's principal place of business and chief executive office is in the State of Utah at the address set forth in the introductory paragraph hereof. Trustor does not do business under any trade name except as previously disclosed in writing to Beneficiary. Trustor will immediately notify Beneficiary in writing of any change in its place of business or the adoption or change of any trade name or fictitious business name, and hereby authorizes Beneficiary to prepare, file and record any additional financing statements or other certificates necessary to reflect the adoption or change in trade name or fictitious business name.

(d) Trustor will not make any change to its legal name, which legal name as shown in the introductory paragraph hereto is true and correct, its state of formation, organization or registration, or the location of its chief executive office or principal place of business, or its organizational structure or governing documents, without the prior written consent of Beneficiary.

(e) Trustor shall immediately notify Beneficiary of any claim against the Collateral adverse to the interest of Beneficiary therein.

(f) The grant of a security interest to Beneficiary by this Deed of Trust shall not be construed to derogate from or impair the lien or provisions of, or the rights of Beneficiary under, this Deed of Trust with respect to any property described herein which is real property, or which the parties have agreed to treat as real property.

(g) Except for the security interest of Beneficiary hereunder, and except as sold in the ordinary course of Trustor's business, Trustor is, and as to Collateral acquired or arising after the date hereof, Trustor will be, the owner of the Collateral free and clear of all Liens.

(h) -All accounts and all books, records and documents relating to the Collateral are and will be genuine and in all respects what they purport to be; the amount of each Account shown on the books and records of Trustor represented as owing or to be owing at maturity by each Account debtor is and will be the correct amount actually owing or to be owing by such Account debtor at maturity; Trustor has no knowledge of any fact which would impair the validity or collectibility of any of the Accounts.

(i) Trustor will deliver to Beneficiary at such times and in such form as shall be designated by Beneficiary, assignments, copies of such schedules, reports and other information relevant to the Collateral as Beneficiary shall from time to time reasonably request. Trustor will also immediately deliver to Beneficiary any and all certificates of title to, or other comparable evidence of ownership of, each item of the Equipment.

(j) Trustor will keep the tangible portion of the Collateral in good condition, repair and order. Trustor will not sell, lease, grant a security interest in or otherwise dispose of the Collateral, or any part thereof, except as expressly permitted in this Deed of Trust and will not, without Beneficiary's prior written consent (and subject to such conditions and requirements as Beneficiary may impose in giving any such consent), change the location of any of Trustor's places of business or remove or permit removal of any of the Collateral from any of Trustor's present places of business, except that Trustor may remove inventory sold in the ordinary course of Trustor's business.

(k) Without the prior written consent of Beneficiary, which consent shall be granted or denied in good faith, Trustor will not enter into any merger or consolidation, or sell, lease or

otherwise dispose of all or substantially all of its assets, or enter into any transaction outside the ordinary course of Trustor's business.

(1) In addition to any other notices required pursuant to this Deed of Trust, Trustor will promptly advise Beneficiary in reasonable detail: (i) of the assertion or imposition of any Lien or Encumbrance against any or all of the Collateral; (ii) of any material adverse change in the composition or aggregate value of the Collateral; (iii) concerning the commencement of or any material development in any investigation of Trustor, or any administrative or judicial proceeding against Trustor, by any Governmental Authority if such investigation or proceeding may result in the imposition of any Lien or Encumbrance against the Collateral or any part thereof (whether or not any such Lien or Encumbrance has then been claimed or asserted); and (iv) concerning any other event likely to have a material adverse effect on the aggregate value of the Collateral or on the perfection or priority of Beneficiary's security interest therein.

3.3 Beneficiary Rights.

(a) Beneficiary, or any person or persons designated by it, shall have the right, from time to time, to call at Trustor's place or places of business during reasonable business hours, and, without hindrance or delay, to inspect, audit, check and make extracts from Trustor's books, records, journals, orders, receipts and any correspondence and other data relating to the Collateral or to Trustor's business and shall have the right to make such verification concerning the Collateral as Beneficiary may consider reasonable under the circumstances, all at Trustor's expense. So long as there is then no continuing Event of Default, Beneficiary agrees to give Trustor reasonable advance notice of its intent to exercise its rights under this Section 3.3(a).

(b) Trustor hereby irrevocably appoints Beneficiary as Trustor's agent and attorney-in-fact, with full power in Trustor's name or its own name and at Trustor's expense, and whether Beneficiary acts directly or through one or more of its representatives, to execute, endorse and deliver any and all agreements, assignments, pledges, instruments, documents, and any other writings, and to take any and all other actions, which Beneficiary may in its reasonable discretion deem necessary or desirable to effect the terms and purposes of this Article 3, including without limitation: (i) to make, file, adjust and settle claims in connection with insurance and to endorse any checks, drafts or other orders or instruments for the payment of money received at any time by Trustor or Beneficiary pursuant to any such insurance; (ii) to endorse any checks, drafts or other orders or instruments for the payment of money representing any other payment on or proceeds of any of the Collateral; (iii) to take any action which Beneficiary is authorized to take under Section 1.11 if Trustor fails to perform or comply with any of its duties, covenants or agreements hereunder; and (iv) to exercise any and all rights and remedies provided in this Article 3 or elsewhere in this Deed of Trust or under the UCC; *provided, however*, that Beneficiary shall not be entitled to exercise its rights under this Section 3.3(b) unless and until an Event of Default has occurred and then only during such time as the Event of Default is continuing.

(c) Trustor agrees that Beneficiary shall have no obligation to exercise any of its rights, powers and remedies hereunder and no liability to Trustor or any other person for not doing so. Trustor further agrees that to the extent Beneficiary does exercise any of such rights, powers or remedies, (i) Beneficiary shall be accountable to Trustor and/or any other persons only for amounts it actually receives as the result of such exercise (and not for amounts to which it is or may be entitled or which it might have received had it elected to take additional action), and (ii) neither Beneficiary nor any of its representatives or agents shall have any liability to Trustor

or any other person for any act or omission in connection with such exercise except for Beneficiary's or any such representative's or agent's willful misconduct or gross negligence.

(d) Trustor shall remain obligated and liable under each waste disposal agreement, siting agreement, hosting agreement, Operator Agreements (if approved by Beneficiary pursuant to Section 1.26) and other agreement between Trustor and any Account debtor or other obligor (any such waste disposal contract or other agreement being hereafter referred to in this Section 3.3(d) as a "Trustor Agreement") and shall observe and faithfully perform all Trustor's representations, warranties, covenants and agreements thereunder in accordance with the terms thereof. Beneficiary shall have no obligation or liability whatsoever under any Trustor Agreement or to make any inquiry concerning the nature or sufficiency of any payment or other performance received by Beneficiary under any Trustor Agreement or to present or file any claim or to take any other action to require or enforce the performance of, or to collect, require or enforce the payment of any amount due under, any Trustor Agreement.

(e) Beneficiary, in the exercise of its reasonable discretion, shall have the right to approve in advance any Trustor Agreement which requires the consent or approval of Beneficiary (such as hosting agreements to which Beneficiary is a necessary party). With respect to other major Trustor Agreements with respect to the design, development and operation of the Landfill, such as design agreements, construction contracts, long-term disposal and waste management agreements, and other significant operational agreements, Trustor shall provide copies of such agreements to Beneficiary at least 30 days prior to their execution to permit Beneficiary to comment on such agreements; *provided, however*, that under no circumstances shall Beneficiary's consent to such agreements be required.

(f) Trustor agrees that apart from Beneficiary's duty under the UCC to use reasonable care in the custody and preservation of Collateral in its possession, Beneficiary shall have no obligation, duty or liability with respect to items of the Collateral in its possession or control, whether before or during the continuance of an Event of Default. Without limiting the generality of its agreement contained in the preceding sentence, Trustor further agrees that Beneficiary's use of reasonable care in the custody and preservation of the Collateral does not include, with respect to any instrument or chattel paper, any duty or obligation to preserve Trustor's rights against prior parties or any other rights which Trustor may have thereunder, which duty and obligation shall remain exclusively with Trustor. In addition, Beneficiary shall have no duty or obligation (i) to insure any items of the Collateral in its possession (as to which items Trustor shall bear the risk of loss or damage to the extent Beneficiary elects not to provide any or all insurance necessary to cover such loss), or (ii) to perfect or otherwise preserve, protect or defend any security interest, lien or encumbrance in favor of Trustor arising under any Trustor Agreement or otherwise. Beneficiary may but shall not be obligated to use or operate any items of the Collateral for the purpose of preserving such items or their value, and if Beneficiary elects at any time to do so, it shall be liable to Trustor only for its willful misconduct or gross negligence.

(g) Trustor shall pay or reimburse Beneficiary on demand for all reasonable costs and expenses (including without limitation reasonable attorneys fees and legal expenses) paid or incurred by Beneficiary in exercising any of its rights, powers and remedies hereunder and for all other costs and expenses which Beneficiary has or shall have paid by reason of Trustor's failure or refusal to do so as and when required hereunder. The amount of any such cost or expense shall be repayable on demand and until repayment shall constitute, together with all accrued interest thereon at the Default Rate, part of the Obligations.

3.4 Use of Collateral by Trustor. Until the occurrence of an Event of Default hereunder or under any other Trustor Document, Trustor may have possession of the Collateral and use it in any lawful manner not inconsistent with this Deed of Trust and not inconsistent with any policy of insurance thereon.

3.5 Remedies Upon an Event of Default.

(a) In addition to the remedies provided in Section 4.2, upon the occurrence of an Event of Default hereunder, Beneficiary shall have all of the rights and remedies of a Beneficiary under the UCC, and Beneficiary may, at its option, do any one or more of the following:

(i) Either personally, or by means of a court appointed receiver, take possession of all or any of the Collateral and exclude therefrom Trustor and all others claiming under Trustor, and thereafter hold, store, use, operate, manage, maintain and control, make repairs, replacements, alterations, additions and improvements to and exercise all rights and powers of Trustor with respect to the Collateral or any part thereof. In the event Beneficiary demands, or attempts to take possession of the Collateral in the exercise of any rights under this Deed of Trust, Trustor agrees to promptly turn over and deliver possession thereof to Beneficiary;

(ii) Without notice to or demand upon Trustor, make such payments and do such acts as Beneficiary may deem necessary to protect its security interest in the Collateral (including, without limitation, paying, purchasing, contesting or compromising any Lien or Encumbrance, whether superior or inferior to such security interest) and in exercising any such powers or authority to pay all expenses (including, without limitation, litigation costs and reasonable attorney's fees) incurred in connection therewith;

(iii) Require Trustor from time to time to assemble the Collateral, or any portion thereof, at a place designated by Beneficiary and reasonably convenient to both parties, and deliver promptly such Collateral to Beneficiary, or an agent or representative designated by Beneficiary. Beneficiary, and its agents and representatives, shall have the right to enter upon any or all of Trustor's Property and property to exercise Beneficiary's rights hereunder;

(iv) Realize upon the Collateral or any part thereof as herein provided or in any manner permitted by law and exercise any and all of the other rights and remedies conferred upon Beneficiary by this Deed of Trust, any other Trustor Document, or by law, either concurrently or in such order as Beneficiary may determine;

(v) Sell or cause to be sold in such order as Beneficiary may determine, as a whole or in such parcels as Beneficiary may determine, the Collateral and the remainder of the Trust Estate;

(vi) Sell, lease, or otherwise dispose of the Collateral at public sale, upon terms and in such manner as Beneficiary may determine. Beneficiary may be a purchaser at any sale; and

(vii) Exercise any other remedies of a secured party under the UCC, the other Trustor Documents or any other applicable law.

(b) Unless the Collateral is perishable or threatens to decline speedily in value or is of a type customarily sold on a recognized market, Beneficiary shall give Trustor at least five days' prior written notice of the time and place of any public sale of the Collateral or other intended disposition thereof to be made. Such notice may be mailed to Trustor at the address set forth for notices in this Deed of Trust.

(c) The proceeds of any sale under Section 3.5(a)(vi) shall be applied as follows:

(i) To the repayment of the reasonable costs and expenses of taking, holding, and preparing for the sale and the selling of the Collateral (including, without limitation, costs of litigation and reasonable attorneys' fees) and the discharge of all Impositions, Liens and Encumbrances, and claims thereof, if any, on the Collateral prior to the security interest granted herein (except any Impositions or Liens and Encumbrances subject to which such sale shall have been made);

(ii) To the payment of the Obligations in such order as Beneficiary shall determine; and

(iii) The surplus, if any, shall be paid to Trustor or to whomsoever may be lawfully entitled to receive the same, or as a court of competent jurisdiction may direct.

Beneficiary shall have the right to enforce one or more remedies hereunder, successively or concurrently, and such action shall not operate to estop or prevent Beneficiary from pursuing any further remedy that it may have. Any repossession or retaking or sale of the Collateral pursuant to the terms hereof shall not operate to release Trustor until full payment of any deficiency has been made in cash.

3.6 Security Agreement. This Deed of Trust constitutes and shall be deemed to be a "security agreement" for all purposes of the Uniform Commercial Code of Utah and Beneficiary shall be entitled to all the rights and remedies of a "secured party" under such Uniform Commercial Code.

3.7 Fixture Filing. Upon its recording in the real property records, this Deed of Trust shall be effective as a financing statement filed as a fixture filing. In addition, a carbon, photographic or other reproduced copy of this Deed of Trust and/or any financing statement relating hereto shall be sufficient for filing and/or recording as a financing statement. The filing of any other financing statement relating to any personal property, rights or interests described herein shall not be construed to diminish any right or priority hereunder. Certain UCC-1 financing statement information is set forth on Exhibit D to this Deed of Trust.

3.8 Financing Statement. Trustor hereby irrevocably authorizes Beneficiary at any time and from time to time to file in any filing office in any Uniform Commercial Code jurisdiction any initial financing statements and amendments thereto that (a) indicate the Collateral (i) as all assets of Trustor or words of similar effect, regardless of whether any particular asset comprised in the Collateral falls within the scope of Article 9 of the UCC of such jurisdiction, or (ii) as being of an equal or lesser scope or with greater detail, and (b) contain any other information required by Part 5 of Article 9 of the UCC for the sufficiency or filing office acceptance of any financing statement or amendment, including (i) whether Trustor is an organization, the type of organization and any organization identification number issued to Trustor, and (ii) in the case of a financing statement filed as a fixture filing or indicating Collateral as as-extracted collateral or timber to be cut, a sufficient description of real property to which the Collateral relates. Trustor agrees to furnish any such information to Beneficiary promptly upon request. All costs of such filings shall be paid by Trustor. Trustor also ratifies its authorization for Beneficiary to have filed in any Uniform Commercial Code jurisdiction any initial financing statements or amendments thereto if

filed prior to the date hereof. Beneficiary is fully authorized to file, record, or otherwise utilize such documents as it deems necessary to perfect and/or enforce any security interest or lien granted hereunder.

3.9 Trustor Agreement. Trustor acknowledges that it is not authorized to file any financing statement or amendment or termination statement with respect to any financing statement without the prior written consent of Beneficiary and agrees that it will not do so without the prior written consent of Beneficiary, subject to Trustor's rights under Section 9-509(4)(b) of the UCC.

ARTICLE 4 DEFAULT; REMEDIES

4.1 Events of Default.

(a) Each of the following shall constitute an event of default ("Event of Default"):

(i) Failure by Trustor to pay any monetary amount within ten days of the date when due under any Trustor Document.

(ii) Any failure by Trustor to perform any obligation not involving the payment of money to Beneficiary, or to comply with any other term or condition applicable to Trustor hereunder and the expiration of thirty days after written notice of such failure by Beneficiary to Trustor, or, if by its nature such failure cannot be cured within such 30-day period, Trustor fails to commence such cure within such 30-day period or fails to diligently complete such cure within a reasonable time.

(iii) Any representation or warranty by Trustor in any Trustor Document is materially false, incorrect, or misleading as of the date made.

(iv) The occurrence of any Transfer, other than a Permitted Transfer.

(v) The occurrence of any Event of Default, as such term is defined in any other Trustor Document.

4.2 Acceleration Upon Default; Additional Remedies.

(a) Upon the occurrence of an Event of Default, Beneficiary may, at its option, declare all or any part of the Obligations immediately due and payable without any presentment, demand, protest or notice of any kind.

(b) Solely for purposes of determining the amount of the Rent Obligation (as defined below) due and payable in connection with the exercise of any remedies pursuant to this Deed of Trust, the amount of the Rent Obligation shall be equal to the Liquidated Rent Amount, calculated in the manner provided for in the Lease, as of the date of the Event of Default or the date of termination of the Lease, whichever first occurs. As used in this Deed of Trust, the term "Rent Obligation" means the obligation of Trustor to pay "Annual Rent" and "Percentage Rent" as defined in and pursuant to the Lease. Trustor and Beneficiary acknowledge and agree that the amount of Percentage Rent (as defined in the Lease) that will be due over the Lease Term (as defined in the Lease taking into account the offsets permitted by Section 4.2(c) of the Lease), and thus the amount that will be due to Beneficiary on account of the Rent Obligation, is difficult to ascertain or otherwise estimate at the time of entering into this Deed of Trust. Accordingly, the

parties are agreeing to the Liquidated Rent Amount as a fair and reasonable approximation of the damages that Beneficiary will suffer in the event of a breach of the Rent Obligation. The Liquidated Rent Amount shall bear interest at the Default Rate until paid. The Liquidated Rent Amount is in addition to any and all other amounts otherwise payable by Trustor to Beneficiary in connection with an Event of Default and Beneficiary's exercise of its rights and remedies, including without limitation, any and all damages arising as a result of the breach by Trustor of any of the Obligations other than the Rent Obligation. Any other provision of this Deed of Trust or the other Trustor Documents to the contrary notwithstanding, prior to the occurrence of an Event of Default, Trustor shall have absolutely no right whatsoever to "prepay" the Rent Obligation by paying to Beneficiary the Liquidated Rent Amount. The sole purpose for determining the Liquidated Rent Amount is to quantify the Rent Obligations for the purpose of implementing the remedy provisions of this Article 4.

(c) Beneficiary may, in addition to the exercise of any or all of the remedies specified in Article 3:

(i) Either in person or by agent, with or without bringing any action or proceeding, or by a receiver appointed by a court and without regard to the adequacy of its security, enter upon and take possession of the Trust Estate, or any part thereof, in its own name or in the name of Trustee, and do any acts that it deems necessary or desirable to preserve the value, marketability or rentability of the Trust Estate, or any part thereof or interest therein, increase the income therefrom or protect the security hereof and, with or without taking possession of the Trust Estate, sue for or otherwise collect the Rents, or any part thereof, including, without limitation, those past due and unpaid, and apply the same, less costs and expenses of operation and collection (including, without limitation, reasonable attorneys' fees) upon the Obligations, all in such order as Beneficiary may determine. The entering upon and taking possession of the Trust Estate, the collection of such Rents and the application thereof as aforesaid, shall not cure or waive any default or notice of default hereunder or invalidate any act done in response to such default or pursuant to such notice of default and, notwithstanding the continuance in possession of all or any portion of the Trust Estate or the collection, receipt and application of Rents, Trustee or Beneficiary shall be entitled to exercise every right provided for in any of the Trustor Documents or by law upon occurrence of any Event of Default, including, without limitation, the right to exercise the power of sale;

(ii) Commence an action to foreclose the lien of this Deed of Trust as a mortgage, appoint a receiver, or specifically enforce any of the covenants hereof;

(iii) Exercise of the power of sale herein contained and deliver to Trustee a written statement of breach, notice of default and election to cause Trustor's interest in the Trust Estate to be sold; or

(iv) Exercise all other rights and remedies provided herein, in any Trustor Document, or by law.

4.3 Exercise of Power of Sale. After the lapse of such time as may then be required by law following the recordation of the notice of default, and notice of default and notice of sale having been given as then required by law, Trustee, without demand on Trustor, shall sell the Trust Estate on the date and at the time and place designated in the notice of sale, either as a whole or in separate parcels, and in such order as Beneficiary may determine (but subject to any statutory right of Trustor to direct the order in which such property, if consisting of several known lots or parcels, shall be sold), at public auction to

the highest bidder, the purchase price payable in lawful money of the United States at the time of sale. The person conducting the sale may, for any cause deemed expedient, postpone the sale from time to time until it shall be completed and, in every such case, notice of postponement shall be given by public declaration thereof by such person at the time and place last appointed for the sale; provided, if the sale is postponed for longer than forty-five days beyond the date designated in the notice of sale, notice of the time, date, and place of sale shall be given in the same manner as the original notice of sale. Trustee shall execute and deliver to the purchaser a Trustee's Deed conveying the Property so sold, but without any covenant of warranty, express or implied. The recitals in the Trustee's Deed of any matters or facts shall be conclusive proof of the truthfulness thereof. Any person, including Beneficiary, may bid at the sale. Trustee shall apply the proceeds of the sale as follows:

FIRST: To the costs and expenses of exercising the power of sale and of the sale, including the payment of the trustee's and reasonable attorney's fees actually incurred not to exceed the amount which may be provided for in the trust deed.

SECOND: To payment of the Liquidated Amount.

THIRD: The balance, if any, to the person or person's legally entitled to the proceeds, or the trustee, in the trustee's discretion, may deposit the balance of the proceeds with the clerk of the district court of the county in which the sale took place, in accordance with Utah Code Annotated § 57-1-29.

Upon any sale made under or by virtue of this section, whether made under the power of sale herein granted or under or by virtue of judicial proceedings or of a judgment or decree of foreclosure and sale, Beneficiary may bid for and acquire the Trust Estate or any part thereof and, in lieu of paying cash therefor, may make settlement for the purchase price by crediting against the Liquidated Amount the net sales price, after deducting therefrom the expenses of the sale and the cost of the action and any other sums which Beneficiary is authorized to deduct under this Deed of Trust. Beneficiary, upon so acquiring the Property or any part thereof, shall be entitled to hold, lease, rent, operate, manage, and sell the same in any manner provided by applicable laws.

4.4 Personal Property. It is the express understanding and intent of the parties that as to any personal property interests subject to Article 9 of the UCC, Beneficiary, upon an Event of Default, may proceed under the UCC or may proceed as to both real and personal property interests in accordance with the provisions of this Deed of Trust and its rights and remedies in respect of real property, and treat both real and personal property interests as one parcel or package of security.

4.5 Appointment of Receiver. Upon the occurrence of an Event of Default, Beneficiary, as a matter of right and without notice to Trustor or any one claiming under Trustor, and without regard to the then value of the Trust Estate or the interest of Trustor therein, shall have the right to apply to any court having jurisdiction to appoint a receiver or receivers of the Trust Estate, and Trustor hereby irrevocably consents to such appointment and waives notice of any application therefor. Any such receiver or receivers shall have all the usual powers and duties of receivers in like or similar cases, and all the powers and duties of Beneficiary in case of entry as provided herein, and shall continue as such and exercise all such powers until the later of the date of confirmation of sale of the Trust Estate or the date of expiration of any redemption period, unless such receivership is sooner terminated.

4.6 Remedies Not Exclusive. Trustee and Beneficiary, and each of them, shall be entitled to enforce payment and performance of any and all of the Obligations and to exercise all rights and powers under the Trustor Documents and under the law now or hereafter in effect, notwithstanding some or all of the Obligations may now or hereafter be otherwise secured or guaranteed. Neither the acceptance of this

Deed of Trust nor its enforcement, whether by court action or pursuant to the power of sale or other rights herein contained, shall prejudice or in any manner affect Trustee's or Beneficiary's right to realize upon or enforce any other security or guaranty now or hereafter held by Trustee or Beneficiary, it being agreed that Trustee and Beneficiary, and each of them, shall be entitled to enforce this Deed of Trust and any other security or any guaranty now or hereafter held by Beneficiary or Trustee in such order and manner as they or either of them may in their absolute discretion determine. No remedy herein conferred upon or reserved to Trustee or Beneficiary is intended to be exclusive of any other remedy herein or by law provided or permitted, but each shall be cumulative and shall be in addition to every other remedy given hereunder, or now or hereafter existing under the law. Every power or remedy given by any of the Trustor Documents or by law to Trustee or Beneficiary or to which either of them may be otherwise entitled, may be exercised, concurrently or independently, from time to time and as often as may be deemed expedient by Trustee or Beneficiary and, to the extent permitted by law, either of them may pursue inconsistent remedies.

4.7 Deficiency. Trustor agrees to pay any deficiency arising from any cause, to which Beneficiary may be entitled after applications of the proceeds of any sale.

4.8 Marshalling of Assets. Trustor, on its own behalf and on behalf of its successors and assigns, hereby expressly waives all rights to require a marshalling of assets by Trustee or Beneficiary, or to require Trustee or Beneficiary, upon a foreclosure, to first resort to the sale of any portion of the Trust Estate which might have been retained by Trustor before foreclosing upon and selling any other portion as may be conveyed by Trustor subject to this Deed of Trust.

4.9 No Merger. In the event of a foreclosure of this Deed of Trust or any other mortgage or deed of trust securing the Obligations, the Obligations then due Beneficiary shall not be merged into any decree of foreclosure entered by the court, and Beneficiary may concurrently or subsequently seek to foreclose one or more mortgages or deeds of trust which also secure said Obligations.

4.10 Request for Notice. Trustor hereby requests a copy of any notice of default and that any notice of sale hereunder be mailed to it at the address set forth in Section 6.5.

ARTICLE 5 RELEASE AND RECONVEYANCE OF TRUST ESTATE

5.1 Reconveyance by Trustee. Upon written request of Beneficiary stating that all Obligations have been satisfied in full, and upon surrender of this Deed of Trust and the Note to Trustee for cancellation and retention and upon payment by Trustor of Trustee's fees, Trustee shall reconvey to Trustor, or to the person or persons legally entitled thereto, without warranty, any portion of the Trust Estate then held hereunder. The recitals in such reconveyance of any matters or facts shall be conclusive proof of the truthfulness thereof. The grantee in any reconveyance may be described as "the person or persons legally entitled thereto."

5.2 Partial Reconveyance. At any time, without liability therefore and without notice, and without affecting the personal liability of Trustor or any other person for payment of the Obligations, Trustee may, with the consent of Beneficiary: (a) release and reconvey by deed of reconveyance, any part of the Trust Estate from the lien hereof; (b) consent to the making and recording of any maps or plats of the Trust Estate; (c) join in granting any easement on the Trust Estate; or (d) join in any extension agreement or any agreement subordinating or modifying the lien or charge hereof. If Trustee shall perform any such acts or execute complete or partial reconveyances it shall be paid a fee in accordance with its established fees and charges therefor.

ARTICLE 6
MISCELLANEOUS

6.1 Change, Discharge, Termination, or Waiver. No provision of this Deed of Trust may be changed, discharged, terminated, or waived except in a writing signed by the party against whom enforcement of the change, discharge, termination, or waiver is sought. No failure on the part of Beneficiary to exercise and no delay by Beneficiary in exercising any right or remedy under the Trustor Documents or under the law shall operate as a waiver thereof.

6.2 Independent Lease Obligations. The rights and remedies of Beneficiary in this Deed of Trust are independent of any and all rights and remedies that Beneficiary may have as the lessor under the Lease, and Beneficiary may exercise any or all of such rights and remedies without regard to its rights and remedies under this Deed of Trust.

6.3 Reconveyance by Trustee. Upon written request of Beneficiary stating that all Obligations have been satisfied in full, and upon surrender of this Deed of Trust to Trustee for cancellation and retention and upon payment by Trustor of Trustee's fees, Trustee shall reconvey to Trustor, or to the person or persons legally entitled thereto, without warranty, any portion of the Trust Estate then held hereunder. The recitals in such reconveyance of any matters or facts shall be conclusive proof of the truthfulness thereof. The grantee in any reconveyance may be described as "the person or persons legally entitled thereto."

6.4 Notices. All notices, requests and demands to be made hereunder to the parties hereto shall be in writing and shall be delivered by hand or sent by registered or certified mail, return receipt requested, (except for any notice address which is a post office box, in which case notice shall be given by first class mail) through the United States Postal Service to the addresses shown on the first page of this Deed of Trust or such other address which the parties may provide to one another in accordance herewith. Such notices, requests and demands, if sent by mail, shall be deemed given two (2) days after deposit in the United States mail, and if delivered by hand, shall be deemed given when delivered.

6.5 Acceptance by Trustee. Trustee accepts this Trust when this Deed of Trust, duly executed and acknowledged, is made a public record as provided by law.

6.6 Captions and References. The headings at the beginning of each section of this Deed of Trust are solely for convenience and are not part of this Deed of Trust. Unless otherwise indicated, each reference in this Deed of Trust to a section or an exhibit is a reference to the respective section herein or exhibit hereto.

6.7 Invalidity of Certain Provisions. If any provision of this Deed of Trust is unenforceable, the enforceability of the other provisions shall not be affected and they shall remain in full force and effect. If the lien of this Deed of Trust is invalid or unenforceable as to any part of the debt, or if the lien is invalid or unenforceable as to any part of the Trust Estate, the unsecured or partially secured portion of the debt shall be completely paid prior to the payment of the remaining and secured or partially secured portion of the debt, and all payments made on the debt, whether voluntary or under foreclosure or other enforcement action or procedure, shall be considered to have been first paid on and applied to the full payment of that portion of the debt which is not secured or fully secured by the lien of this Deed of Trust.

6.8 Attorneys' Fees. Trustor agrees to pay all costs of enforcement of the Trust Documents and collection of any of the Obligations (including, without limitation, reasonable attorney's fees) whether or not any action or proceeding is brought (including, without limitation, all such costs incurred

in connection with any bankruptcy, receivership, or other court proceedings (whether at the trial or appellate level)), together with interest therein from the date of demand at the Default Rate.

6.9 Governing Law. THIS DEED OF TRUST AND THE RIGHTS AND OBLIGATIONS OF THE PARTIES SHALL BE GOVERNED BY AND CONSTRUED AND INTERPRETED IN ACCORDANCE WITH THE LAWS OF THE STATE OF UTAH (EXCLUDING UTAH CONFLICT OF LAWS RULES). WHENEVER POSSIBLE, THE PROVISIONS OF THIS DEED OF TRUST SHALL BE INTERPRETED IN SUCH A MANNER AS TO BE EFFECTIVE AND VALID UNDER APPLICABLE LAW.

6.10 Number and Gender. In this Deed of Trust the singular shall include the plural and the masculine shall include the feminine and neuter gender and vice versa, if the context so requires.

6.11 Counterparts. This document may be executed and acknowledged in counterparts, all of which executed and acknowledged counterparts shall together constitute a single document. Signature and acknowledgment pages may be detached from the counterparts and attached to a single copy of this document to form physically one document, which may be recorded.

6.12 Status of Title. Trustor represents and warrants that it is the lawful owner of the Trust Estate free and clear of all Liens and Encumbrances and holds a fee simple estate in the Property and Improvements, subject only to the Permitted Exceptions.

6.13 Integration. The Trustor Documents, together with the Environmental Indemnity, contain the complete understanding and agreement of Trustor and Beneficiary and supersede all prior representations, warranties, agreements, arrangements, understandings, and negotiations.

6.14 Binding Effect. The Trustor Documents will be binding upon, and inure to the benefit of, Trustor, Trustee and Beneficiary and their respective successors and assigns.

6.15 Time of the Essence. Time is of the essence with regard to the each provision of the Trustor Documents as to which time is a factor.

6.16 Survival. The representations, warranties, and covenants of Trustor in the Trustor Documents shall survive the execution and delivery of the Trustor Documents.

IN WITNESS WHEREOF, Trustor has executed this Deed of Trust as of the day and year first above written.

TRUSTOR:

WASATCH REGIONAL SOLID WASTE
MANAGEMENT CORPORATION, a Utah
corporation

By: _____
Name: _____
Title: _____

BENEFICIARY:

STATE OF UTAH, ACTING THROUGH THE
SCHOOL AND INSTITUTIONAL TRUST
LANDS ADMINISTRATION

By _____
Name: _____
Title: _____

Approved as to Form:

Mark L. Shurtleff, Utah Attorney General
by _____, Special Assistant
Attorney General

STATE OF UTAH)
) ss.
COUNTY OF SALT LAKE)

The foregoing instrument was acknowledged before me this ____ day of _____, 200__ by _____, the _____ of WASATCH REGIONAL SOLID WASTE MANAGEMENT CORPORATION, a Utah corporation, on behalf of the corporation.

My Commission Expires: _____

NOTARY PUBLIC
Residing at _____

STATE OF UTAH)
) ss.
COUNTY OF SALT LAKE)

The foregoing instrument was acknowledged before me this ____ day of _____, 200__ by _____, the _____ of the STATE OF UTAH, ACTING THROUGH THE SCHOOL AND INSTITUTIONAL TRUST LANDS ADMINISTRATION, on behalf of the State of Utah School and Institutional Trust Lands Administration.

My Commission Expires: _____

NOTARY PUBLIC
Residing at _____

ENVIRONMENTAL INDEMNITY AGREEMENT

Given By

WASATCH REGIONAL SOLID WASTE
MANAGEMENT CORPORATION,
a Utah corporation

to

THE STATE OF UTAH, acting through
the SCHOOL AND INSTITUTIONAL
TRUST LANDS ADMINISTRATION

Dated _____, 200__

ENVIRONMENTAL INDEMNITY AGREEMENT

BY THIS AGREEMENT, executed as of _____, 200__ in connection with and as partial consideration for the transactions contemplated by the Lease and the Option Agreement, WASATCH REGIONAL SOLID WASTE MANAGEMENT, CORPORATION, a Utah corporation ("Wasatch") hereby certifies, represents, and warrants to the STATE OF UTAH, acting by and through the SCHOOL AND INSTITUTIONAL TRUST LANDS ADMINISTRATION ("SITLA"), and agrees as follows:

1. Definitions. As used herein, the following terms shall have the meaning specified below:

(a) "Agreement" means this Environmental Indemnity Agreement and all modifications, supplements, and amendments thereto.

(b) "De Minimis Amounts" means any Hazardous Substance either (i) being transported on or from the Property or being stored for use by Wasatch on the Property or (ii) being currently used by Wasatch on the Property, in either case in such quantities and in a manner that both (A) does not constitute a violation or threatened violation of any Environmental Law or require any reporting or disclosure under any Environmental Law and (B) is consistent with customary business practice for such operations in the state where the Property is located.

(c) "Deed of Trust" means the Deed of Trust, Assignment of Rents, Security Agreement, and Fixture Filing, of even date herewith, between Wasatch, as trustor, and SITLA, as beneficiary, as the same may be amended, supplemented, and renewed from time to time.

(d) "Environmental Claim" means any and all actual or threatened liabilities, claims, actions, causes of action, judgments, orders, inquiries, investigations, studies or notices relating to any Hazardous Substance or any Environmental Law including without limitation those arising as a result of strict liability, whether under Environmental Law or otherwise, and those arising out of the negligence of the Indemnified Party.

(e) "Environmental Law" means any federal, state or local law, whether common law, statute, ordinance, rule, regulation, or judicial or administrative decision or policy or guideline, pertaining to Hazardous Substances, health, industrial hygiene, environmental conditions, solid and hazardous waste disposal, or the regulation or protection of the environment, and all amendments thereto as of this date and to be added in the future and any successor statute or rule or regulation promulgated thereto.

(f) "Hazardous Substance" means all of the following:

(i) Any substance, material, or waste that is included within the definitions of "hazardous substances," "hazardous materials," "hazardous waste," "toxic substances," "toxic materials," "toxic waste," or words of similar import in any Environmental Law;

(ii) Those substances listed as hazardous substances by the United States Department of Transportation (or any successor agency) (49 C.F.R. 172.101 and amendments thereto) or by the Environmental Protection Agency (or any successor agency) (40 C.F.R. Part 302 and amendments thereto); and

(iii) Any substance, material, or waste that contains petroleum, is petroleum-related, or a petroleum by-product, asbestos or asbestos-containing material, polychlorinated biphenyls, flammable, explosive, radioactive, freon gas, radon, or a pesticide, herbicide, or any other agricultural chemical.

(g) "Indemnified Parties" means and includes SITLA and the State of Utah and their respective officers, directors, employees, agents, elected and appointed officials, successors and assigns.

(h) "Landfill" means a municipal solid waste landfill facility from time to time operated on the Property.

(i) "Lease" means the Lease and Agreement to Purchase, Lease No. _____, dated of even date herewith, between Wasatch and SITLA; as the same may be amended, supplemented, and renewed from time to time.

(j) "Operating Permit" means the permit issued by _____ for operation of the Landfill as either a "Class 1" or "Class 5" waste disposal site.

(k) "Option Agreement" means the Option Agreement, dated as of _____, 2004, by and between Wasatch and SITLA.

(l) "Permanent Closure" means the permanent closure of the Landfill accompanied by a written covenant from Wasatch not to reopen the Landfill on any part of the Property and the satisfaction by Wasatch of all closure and post closure obligations under the Operating Permit, the Utah Solid and Hazardous Waste Act and applicable regulations, and other Environmental Law and the posting or other provision of any and all financial assurances, such as closure bonds and the like, that are required by the Operating Permit, any governmental authority, or applicable Environmental Law in connection with the closing of the Landfill.

(m) "Permitted Waste" means any and all waste, including any Hazardous Substance, that Wasatch is permitted, pursuant to Environmental Law, to accept for disposal at the Landfill under its Operating Permit.

(n) "Property" means all real property that is or was at any time encumbered by the Deed of Trust, which may later include any and all property previously released from the Deed of Trust or property that is acquired by Wasatch pursuant to the Lease and then added to the lien of the Deed of Trust.

(o) "Release" means any releasing, spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, migrating, disposing, or dumping of any substance into the environment.

(p) "Wasatch Documents" means the Lease, the Deed of Trust, and all other documents now or hereafter evidencing or securing the obligations under the Lease or executed in connection with the transactions contemplated by the Lease, other than this Agreement. Any other provision of this Agreement or the Wasatch Documents to the contrary notwithstanding, the obligations of Wasatch pursuant to this Agreement are not secured by the Deed of Trust.

2. Representations and Warranties. Wasatch represents, warrants, and covenants to and with the Indemnified Parties as follows, which warranties are true and correct as of the date of this Agreement and shall remain true so long as this Agreement continues:

(a) Neither Wasatch nor, to the best knowledge of Wasatch, the Property is in violation of any Environmental Law applicable to the Property, and neither Wasatch nor, to the best knowledge of Wasatch, the Property is subject to any existing, pending or threatened investigation pertaining to the Property by any federal, state or local governmental authority or are subject to any remedial obligation or lien under or in connection with any Environmental Law.

(b) Indemnitor, including, without limitation, any officer, director, employee, agent, affiliate, tenant, partner or joint venturer of Indemnitor, has no actual knowledge or notice of the actual, alleged or threatened presence or Release of Hazardous Substances in, on, around or potentially affecting any part of the Property or the soil, groundwater or soil vapor in, on or under the Property, or the migration of any Hazardous Substance, from or to any other property adjacent to or in the vicinity of the Property, provided that the foregoing representation and warranty does not apply to De Minimum Amounts and Permitted Waste in compliance with the Operating Permit and all other applicable laws and regulations, including Environmental Laws.

(c) The intended future use of Property by Wasatch will not result in the Release of any Hazardous Substance, in, on, around or potentially affecting any part of the Property or in the soil, groundwater or soil vapor on or under the Property, or the migration of any Hazardous Substance from or to any other property adjacent to or in the vicinity of the Property, other than Permitted Waste in compliance with the Operating Permit and all other applicable laws and regulations, including Environmental Laws.

(d) The Operating Permit is in full force and effect and Wasatch is not in default with respect to any of its obligations pursuant to the Operating Permit nor has any event or circumstance occurred that, with the giving of notice or the passage of time, or both, would constitute a default by Wasatch under the Operating Permit.

3. Covenants of Wasatch.

(a) Wasatch shall maintain the Operating Permit in full force and effect until Permanent Closure has occurred pursuant to Environmental Laws.

(b) Wasatch shall neither use nor permit any third party to use, generate, manufacture, produce, store, or Release, in, on, under or about the Property, or transfer to or from the Property, any Hazardous Substance except De Minimis Amounts and Permitted Waste in compliance with all applicable Environmental Laws, provided that if any third party, by act or omission or by intent or accident, allows any foregoing action to occur, Wasatch shall promptly remedy such condition, at its sole expense and responsibility, in accordance with Paragraph 5 below. Furthermore, Wasatch shall not permit any liens under any Environmental Law to be placed on any portion of the Property.

(c) Wasatch has complied and shall comply at the sole expense and responsibility of Wasatch, with the Operating Permit and all other applicable laws and regulations, including Environmental Laws, governing or applicable to Hazardous Substances, including those relating to the operation of the Property as a Landfill.

(d) Wasatch shall promptly notify SITLA in writing if Wasatch has any actual knowledge or notice of the following: (i) that any statement in Paragraph 2 above is no longer accurate; (ii) any lien, action or notice affecting the Property or Wasatch applicable to the Property; (iii) the institution of any investigation, inquiry or proceeding concerning Wasatch or the Property pursuant to any Environmental Law or otherwise relating to Hazardous Substances, or (iv) the discovery of any occurrence, condition or state of facts which would render any representation or warranty contained in this Agreement incorrect in any respect if made at the time of such discovery.

(e) The obligations of Wasatch under this Agreement shall not be diminished or affected in any respect as a result of any notice, disclosure or knowledge, if any, to or by any of the Indemnified Parties of the Release, presence, existence or threatened Release of Hazardous Substances in, on, around, or potentially affecting the Property or the soil, groundwater or soil vapor on or under the Property, or of any matter covered by the obligations of Wasatch hereunder. No Indemnified Party shall be deemed to have permitted, caused, contributed to or acquiesced in any such Release, presence, existence or threatened Release of Hazardous Substances or any other matter covered by the obligations of Wasatch hereunder solely because SITLA or any other Indemnified Party had notice, disclosure or knowledge thereof, whether at the time this Agreement is delivered or at any other time.

(f) Wasatch shall conduct and complete, to the satisfaction of SITLA and all applicable governmental authorities, all remedial, removal, and other actions necessary to clean up and remove Hazardous Substances (other than De Minimis Amounts and Permitted Waste) in, on, or materially affecting the Property: (i) in accordance with all applicable Environmental Laws; and (ii) in accordance with all applicable orders and directives of all governmental authorities, including the Operating Permit. Wasatch shall provide to SITLA copies of all results and reports relating to such remedial, removal, and other actions.

4. SITLA Rights.

(a) SITLA shall have the right, but not the obligation, without in any way limiting the other rights and remedies of SITLA under the this Agreement or the Wasatch Documents, to enter onto the Property, take and remove soil or groundwater samples, conduct tests and/or site assessments on any part of the Property or to take such other actions as it deems necessary or advisable to clean up, remove, resolve, or minimize the impact of, or otherwise deal with, any Hazardous Substances on or affecting the Property following receipt of any notice from any person or entity asserting the existence or possible existence of any Hazardous Substances pertaining to the Property or any part thereof that, if true, could result in an Environmental Claim, order, notice, suit, imposition of a lien on the Property, or other action and/or that, in the sole opinion of SITLA, could jeopardize the security of SITLA under the Wasatch Documents. All reasonable costs and expenses paid or incurred by SITLA in the exercise of any such rights shall be payable by Wasatch upon demand.

(b) SITLA shall have the right at any time to appear in and to participate in, as a party if it elects, and be represented by counsel of its own choice in, any action or proceeding in connection with any Environmental Law that affects the Property. Upon demand by any Indemnified Party, Wasatch shall defend any investigation, action or proceeding involving any matter covered by the obligations of Wasatch hereunder which is brought or commenced against any Indemnified Party, whether alone or together with Wasatch or any other person, all at the cost of Wasatch and by counsel to be approved by the Indemnified Party in the exercise of its reasonable judgment. In the alternative, any Indemnified Party may elect to conduct its own

defense at the expense of Wasatch. Wasatch shall not, without the prior written consent of SITLA: (a) settle or compromise any action, suit, proceeding or claim or consent to the entry of any judgment that does not include as an unconditional term thereof the delivery by the claimant or plaintiff to SITLA of a full and complete written release of the Indemnified Parties (in form, scope and substance satisfactory to SITLA in its sole discretion) from all liability in respect of such action, suit, proceeding or claim; or (b) settle or compromise any action, suit, proceeding or claim in any manner that may adversely affect the Indemnified Parties or obligate the Indemnified Parties to pay any sum or perform any obligation as determined by SITLA in its sole discretion.

5. Indemnification. Wasatch shall indemnify and hold the Indemnified Parties harmless from, for and against any and all Environmental Claims, liabilities, damages (including foreseeable and unforeseeable consequential damages), losses, fines, penalties, judgments, awards, settlements, and costs and expenses (including, without limitation, reasonable attorneys' fees, experts', engineers' and consultants' fees, and costs and expenses of investigation, testing, remediation and dispute resolution) (collectively referred to as "Environmental Costs") that directly or indirectly arise out of or relate in any way to:

- (a) Any investigation, cleanup, remediation, removal, or restoration work of site conditions of the Property relating to Hazardous Substances (whether on the Property or any other property);
- (b) Any resulting damages, harm, or injuries to the person or property of any third parties or to any natural resources involving Hazardous Substances relating to the Property;
- (c) Any actual or alleged past or present disposal, generation, manufacture, presence, processing, production, Release, storage, transportation, treatment, or use of any Hazardous Substance on, under, or about the Property;
- (d) Any actual or alleged presence of any Hazardous Substance on the Property;
- (e) Any actual or alleged past or present violation of any Environmental Law relating to the Property;
- (f) Any actual or alleged past or present migration of any Hazardous Substance from the Property to any other property, whether adjoining, in the vicinity, or otherwise, or migration of any Hazardous Substance onto the Property from any other property, whether adjoining, in the vicinity, or otherwise;
- (g) Any lien on any part of the Property under any Environmental Law;
- (h) Any Environmental Claim by any federal, state, or local governmental agency and any claim that any Indemnified Party is liable for any such asserted Environmental Claim allegedly because it is an "owner" or "operator" of the Property under any Environmental Law;
- (i) Any Environmental Claim asserted against any Indemnified Party by any person other than a governmental agency, including any person who may purchase or lease all or any portion of the Property from Wasatch, from any Indemnified Party, or from any other purchaser or lessor; any person who may at any time have any interest in all or any portion of the Property; any person who may at any time be responsible for any cleanup costs or other Environmental Claims relating to the Property; and any person claiming to have been injured in any way as a result of exposure to any Hazardous Substance relating to the Property;

(j) Any Environmental Claim which any Indemnified Party reasonably believes at any time may be incurred to comply with any law, judgment, order, regulation, or regulatory directive relating to Hazardous Substances and the Property, or which any Indemnified Party reasonably believes at any time may be incurred to protect the public health or safety;

(k) Any Environmental Claim resulting from currently existing conditions in, on, around, or materially affecting the Property, whether known or unknown by Wasatch or the Indemnified Parties at the time this Agreement is executed, and any such Environmental Claim resulting from the activities of Wasatch, the tenants of Wasatch, or any other person, in, on, around, or materially affecting the Property; or

(l) Breach of any representation or warranty by or covenant of Wasatch in this Agreement.

Notwithstanding anything contained herein to the contrary, the foregoing indemnity shall not apply to (i) matters resulting solely from the gross negligence or willful misconduct of any Indemnified Party, or (ii) matters resulting solely from the actions of Indemnified Parties taken after such parties have taken title to, or exclusive possession of the Property, provided that, in both cases, such matters shall not arise from or be accumulated with any condition of the Property, which condition was not caused by an Indemnified Party. The foregoing indemnity is expressly intended to include, and does include, any Environmental Costs arising as a result of any strict liability imposed or threatened to be imposed on an Indemnified Party in connection with any of the indemnified matters described in this Paragraph 5 or arising as a result of the negligence of an Indemnified Party in connection with such matters.

6. Reinstatement of Obligations. If any time all or any part of any payment made by Wasatch or received by an Indemnified Party from Wasatch under or with respect to this Agreement is or must be rescinded or returned for any reason whatsoever (including, but not limited to, the insolvency, bankruptcy or reorganization of Wasatch), then the obligations of Wasatch hereunder shall, to the extent of the payment rescinded or returned, be deemed to have continued in existence, notwithstanding such previous payment made by Wasatch, or receipt of payment by an Indemnified Party, and the obligations of Wasatch hereunder shall continue to be effective or be reinstated, as the case may be, as to such payment, all as though such previous payment by Wasatch had never been made.

7. Reservation of Rights. Nothing in this Agreement shall be construed to limit any claim or right which any Indemnified Party may otherwise have at any time against Wasatch or any other person arising from any source other than this Agreement, including any claim for fraud, misrepresentation, waste, or breach of contract other than this Agreement, and any rights of contribution or indemnity under federal, state or local environmental law or other applicable law, regulation or ordinance.

8. No Waiver; Rights Cumulative. If any Indemnified Party delays or fails to exercise any right or remedy against Wasatch, that alone shall not be construed as a waiver of that right or remedy. All remedies of any Indemnified Party against Wasatch are cumulative.

9. Successors and Assigns. This Agreement shall be binding upon Wasatch and its successors and shall inure to the benefit of the Indemnified Parties, and the successors and assigns of the Indemnified Parties. Wasatch shall not have any right to assign its obligations under this Agreement. This Agreement is assignable by SITLA, and any full or partial assignment hereof by SITLA shall operate to vest in the assignee all rights and powers herein conferred upon and granted to SITLA and so assigned by SITLA. Wasatch expressly waives notice of transfer or assignment of this Agreement and

acknowledges that the failure by SITLA to give any such notice shall not affect the liabilities of Wasatch hereunder.

10. Termination. The indemnity obligations of Wasatch pursuant to Paragraph 5 of this Agreement and all other obligations of Wasatch hereunder shall continue in full force and effect for a period of five years following the later to occur of (a) expiration or termination of the Lease and performance by Wasatch of all of its "Obligations" (as that term is defined in the Deed of Trust); and (b) Permanent Closure of the Landfill (as defined herein to include completion of all required post closure activities and monitoring).

11. Misrepresentation. If any material warranty, representation or statement contained herein shall be or shall prove to have been false when made or if Wasatch shall fail or neglect to perform or observe any of the terms, provisions or covenants contained herein, the same shall constitute an Event of Default (as defined in the Wasatch Documents) under the Wasatch Documents.

12. Notices. Any notice required or permitted in connection herewith shall be given in the manner provided in any Wasatch Document.

13. Reliance; Separate Action. Wasatch acknowledges that SITLA has and will rely upon the representations, warranties and agreements herein set forth in closing the transactions contemplated by the Option Agreement and that the execution and delivery of this Agreement is an essential condition but for which SITLA would not close such transactions. Wasatch agrees that this Agreement and the indemnity contained herein is separate, independent and in addition to the undertakings of Wasatch under the Wasatch Documents. Wasatch agrees that a separate action may be brought to enforce the provisions of this Agreement which shall in no way be deemed to be an action on the Lease or with respect to the Obligations.

14. Waiver. Wasatch waives any right or claim of right to cause a marshaling of the assets of Wasatch or to cause SITLA to proceed against any of the security for the Obligations before proceeding under this Agreement against Wasatch. Wasatch agrees that any payments required to be made hereunder shall become due on demand.

15. Successive Actions. Notwithstanding any law to the contrary, the parties expressly agree that a separate right of action hereunder shall arise each time any Indemnified Party acquires knowledge of any matter indemnified by Wasatch under this Agreement. Separate and successive actions may be brought hereunder to enforce any of the provisions hereof at any time and from time to time. No action hereunder shall preclude any subsequent action, and Wasatch hereby waives and covenants not to assert any defense in the nature of splitting of causes of action or merger of judgments.

16. Construction. In this Agreement, the word "person" includes any individual, company, trust or other legal entity of any kind. The word "include(s)" means "include(s), without limitation," and the word "including" means "including, but not limited to." When the context and construction so require, all words used in the singular shall be deemed to have been used in the plural and vice versa.

17. Severability. Every provision of this Agreement is intended to be severable. If any term, provision, section or subsection of this Agreement is declared to be illegal or invalid, for any reason whatsoever, by a court of competent jurisdiction, such illegality or invalidity shall not affect the other terms, provisions, sections or subsections of this Agreement, which shall remain binding and enforceable. To the extent there is any conflict between this Agreement and the terms and provisions of any of the other Wasatch Documents, the terms and provisions of this Agreement shall control.

18. Cost and Expenses. On demand, Wasatch agrees to pay all of the Indemnified Parties' costs and expenses, including reasonable attorneys' fees, which may be incurred in any effort to enforce any term of this Agreement, including all such costs and expenses which may be incurred by any Indemnified Party in any legal action, reference, mediation or arbitration proceeding. From the time(s) incurred until paid in full to the Indemnified Party, those sums shall bear interest at the Default Rate set forth in the Lease.

19. Time. Time is of the essence of this Agreement, and of each and every provision hereof. The waiver by Indemnified Party of any breach or breaches hereof shall not be deemed, nor shall the same constitute, a waiver of any subsequent breach or breaches.

20. Governing Law. This Agreement and the transaction contemplated hereunder shall be governed by and construed in accordance with the laws of the State of Utah, without giving effect to conflict of laws principles.

21. Counterparts. This Agreement may be executed in any number of counterparts each of which shall be deemed an original, but all such counterparts together shall constitute but one Agreement.

22. Captions for Convenience. The captions and headings of the paragraphs of this Agreement are for convenience of reference only and shall not be construed in interpreting the provisions hereof.

IN WITNESS WHEREOF, Wasatch has executed this Agreement as of the date set forth herein.

WASATCH:

WASATCH REGIONAL SOLID WASTE
MANAGEMENT CORPORATION,
a Utah corporation

By _____
Name: _____
Title: _____

EXHIBIT E
BENCHMARK REQUIREMENTS

FIRST BENCHMARK REQUIREMENTS

1. Wasatch is proceeding diligently to permit and engineer the Subject Property for a municipal Class 1 solid waste landfill.
2. Wasatch has obtained and delivered to SITLA executed letters of intent for one-third (1/3) of the required contracts listed as an Exercise Condition in Section 1.5(b)(iv).

SECOND BENCHMARK REQUIREMENTS

1. Wasatch is proceeding diligently to permit and engineer the Subject Property for a municipal Class 1 solid waste landfill.
2. Wasatch has obtained and delivered to SITLA executed letters of intent for two-thirds (2/3) of the required contracts listed as an Exercise Condition in Section 1.5(b)(iv).

EXHIBIT A
PROPERTY DESCRIPTION

That certain real property owned by Trustor and situated in the County of Washington, State of Utah and described as follows:

Lease Parcel Description:

Township 1 North, Range 8 West, SLB&M

Section 3: Lots 3 & 4, S2NW4, SW4

Section 4: Lots 1, 2, & 3, SE4NW4, E2SW4, SE4, S2NE4

Township 2 North, Range 8 West, SLB&M

Section 32: E2E2

Section 33: All

Section 34: W2

Lease Parcel Acreage: 1,968.73 acres m/l

Separate Borrow Site Description:

Township 2 North, Range 8 West, SLB&M

Section 36: All

Borrow Area Acreage: 640.00 acres m/l.

EXHIBIT B
DESCRIPTION OF PERSONAL PROPERTY

1. All personal property, (including, without limitation, all goods, supplies, equipment, furniture, furnishings, fixtures, machinery, inventory, and construction materials) in which Trustor now or hereafter acquires an interest or right, which is now or hereafter located on or affixed to the Property or the Improvements or used or useful in the operation, use, or occupancy thereof or the construction of any Improvements thereon, together with any interest of Trustor in and to personal property which is leased or subject to any superior security interest, and all books, records, leases and other agreements, documents, and instruments of whatever kind or character relating to the Property, the Improvements, or such personal property;

2. All fees, income, rents, issues, profits, earnings, receipts, royalties, and revenues which, after the date hereof and while any portion of the Obligations remains unpaid or unperformed, may accrue from such personal property or any part thereof or from the Property, the Improvements or any other part of the Trust Estate, or which may be received or receivable by Trustor from any hiring, using, letting, leasing, subhiring, subletting, subleasing, occupancy, operation, or use thereof;

3. All other intangible property and rights relating to the Property, the Improvements, the personal property described in paragraph 1 above or the operation, occupancy, or use thereof, including, without limitation, all governmental and private contracts, hosting and siting agreements, municipal waste disposal agreements, permits, licenses, and approvals relating to construction on or operation, occupancy, or use of the Property or Improvements, all names under or by which the Property or Improvements may at any time be operated or known, all rights to carry on business under any such names, or any variant thereof, all trade names and trademarks relating in any way to the Property or the Improvements, and all good will in any way relating to the Property or the Improvements;

4. All "Accounts" of Trustor, as that term is defined in the UCC, including all present and future rights of Trustor to payment for goods or other personal property sold, leased, licensed or otherwise conveyed or assigned or for services rendered, whether or not evidenced by instruments or chattel paper (and including all such instruments and chattel paper), and whether or not earned by performance;

5. Trustor's rights under all insurance policies covering the Property, the Improvements, the Personal Property, and the other parts of the Trust Estate and any and all proceeds, loss payments, and premium refunds payable regarding the same;

6. All reserves, deferred payments, deposits, refunds, cost savings, and payments of any kind relating to the construction of any Improvements on the Property;

7. All water stock relating to the Property;

8. All causes of action, claims, compensation, and recoveries for any damage to, destruction of, or condemnation or taking of the Property, the Improvements, the Personal Property, or any other part of the Trust Estate; or for any conveyance in lieu thereof, whether direct or consequential, or for any damage or injury to the Property, the Improvements, the Personal Property, or any other part of the Trust Estate, or for any loss or diminution in value of the Property, the Improvements, the Personal Property, or any other part of the Trust Estate;

9. All architectural, structural, mechanical, and engineering plans and specifications prepared for construction of Improvements or extraction of minerals or gravel from the Property and all studies, data, and drawings related thereto; and also all contracts and agreements of Trustor relating to the

EXHIBIT A
Legal Description of the Premises

Lease Parcel Description:

Township 1 North, Range 8 West, SLB&M

Section 3: Lots 3 & 4, S2NW4, SW4

Section 4: Lots 1, 2, & 3, SE4NW4, E2SW4, SE4, S2NE4

Township 2 North, Range 8 West, SLB&M

Section 32: E2E2

Section 33: All

Section 34: W2

Lease Parcel Acreage: 1,968.73 acres m/l

Separate Borrow Site Description:

Township 2 North, Range 8 West, SLB&M

Section 36: All

Borrow Area Acreage: 640.00 acres m/l.

EXHIBIT B
Legal Description of the Adjacent Property

Township 1 North, Range 8 West, SLB&M

Section 9: E2

Section 10: W2

Section 15: W2

Section 16: E2

Adjacent Lands Acreage: 1,280.00 acres m/l

aforesaid plans and specifications or to the aforesaid studies, data, and drawings or to the construction of Improvements on or extraction of minerals or gravel from the Property; and

10. All proceeds from sale or disposition of any of the aforesaid collateral.

As used in this Exhibit B the terms "Obligations" "Trust Estate", "Property", "Improvements", and "Personal Property" shall have the meanings set forth in the Deed of Trust to which this Exhibit B is attached.

EXHIBIT C
PERMITTED EXCEPTIONS

"Permitted Exceptions" means the following:

1. Sale, transfer, or other disposition of any Personal Property that is consumed or worn out in ordinary usage and that is promptly replaced with similar items of equal or greater value.
2. Liens and Encumbrances being contested in accordance with Section 1.17 of the Deed of Trust.
3. Impositions being contested in accordance with Section 1.8(d) of this Deed of Trust.
4. This Deed of Trust.
5. Purchase money liens on items of Personal Property collateral.
6. The lien of current real and personal property taxes not yet due.
7. Patent reservations, easements, rights of way, and covenants, conditions, and restrictions of record as of the date of this Deed of Trust.

EXHIBIT D
FINANCING STATEMENT INFORMATION

Beneficiary/Secured Party is:

THE STATE OF UTAH, ACTING THROUGH THE SCHOOL
AND INSTITUTIONAL TRUST LANDS ADMINISTRATION
675 East 500 North, Suite 500
Salt Lake City, Utah 84102

The Debtor is:

WASATCH REGIONAL SOLID WASTE MANAGEMENT CORPORATION,
a Utah corporation

Debtor's Tax Identification No.: 43-2024852

The Collateral is the Personal Property (including all fixtures) as described in the Deed of Trust.

Beneficiary/Secured Party is ___ is not X a seller or purchase money lender of the Collateral.

EXHIBIT D
FORM OF ENVIRONMENTAL INDEMNITY

EXHIBIT F
FORM OF MEMORANDUM OF LEASE

Recording Requested by and
When Recorded Mail To:

Attention: _____, Esq.

*MEMORANDUM OF LEASE AND AGREEMENT TO PURCHASE
LEASE NUMBER _____*

THIS MEMORANDUM OF LEASE AND AGREEMENT TO PURCHASE (LEASE NUMBER _____) (the "Memorandum") is executed as of _____, 200__, between The State of Utah, acting through the School and Institutional Trust Lands Administration, of 675 East 500 South, Salt Lake City, Utah 84102-2818, [or its assigns] (hereinafter referred to as "Lessor"), and Wasatch Regional Solid Waste Management Corporation, a Utah corporation, of P. O. Box 68133, Park City, Utah 84060 (hereinafter referred to as "Lessee"), collectively, the "Parties" and individually, a "Party". Any capitalized terms used, but not defined herein, shall have the meanings given to such terms in the Lease and Agreement to Purchase (Lease Number _____) dated _____, 200__, between Lessor and Lessee (the "Lease").

1. The Premises. For sufficient consideration received, Lessor leases to Lessee and Lessee leases from Lessor, on the terms and conditions set forth in the Lease certain real property located in Tooele County, State of Utah, which are legally described on Exhibit A. Certain other real property located adjacent to the Premises (the "Adjacent Property") is also owned by Lessor but is not part of the Premises. However, the Adjacent Property may, in the future, be suitable to include as part of the municipal solid waste landfill facility being operated by Lessee. The Adjacent Property is legal described on Exhibit B.

2. Term. The term of the Lease shall commence on the date of the Lease and continue to 11:59 p.m. on the day which is 60 years after such date and shall include any renewal term.

3. Option to Extend. Lessee shall have the option to extend the Lease for four (4) additional terms of 10 years each by delivering to Lessor written notice at least 360 days prior to the expiration of the Term then in effect.

LESSEE:

WASATCH REGIONAL SOLID WASTE
MANAGEMENT CORPORATION,
a Utah corporation

By: _____
Name: _____
Title: _____

STATE OF UTAH)
) ss.
COUNTY OF SALT LAKE)

The foregoing instrument was acknowledged before me this ____ day of _____, 200__ by
_____, the _____ of the STATE OF UTAH, ACTING
THROUGH THE SCHOOL AND INSTITUTIONAL TRUST LANDS ADMINISTRATION, on
behalf of the State of Utah School and Institutional Trust Lands Administration.

My Commission Expires: _____

NOTARY PUBLIC
Residing at _____

STATE OF UTAH)
) ss.
COUNTY OF SALT LAKE)

The foregoing instrument was acknowledged before me this ____ day of _____, 200__ by
_____, the _____ of WASATCH REGIONAL SOLID WASTE
MANAGEMENT CORPORATION, a Utah corporation, on behalf of the corporation.

My Commission Expires: _____

NOTARY PUBLIC
Residing at _____

4. Inquiries. Inquiries concerning the precise terms of the Lease may be made:

TO LESSOR:

State of Utah
School and Institutional Trust Lands Administration
675 East 500 South, Suite 500
Salt Lake City, Utah 84102-2818
Attention: John W. Andrews, Esq.

TO LESSEE:

Wasatch Regional Solid Waste Management Corporation
P. O. Box 68133
Park City, Utah 84060
Attention: Jodi Hoffman, Esq.

5. Successors. The rights and obligations created in the Lease shall bind and inure to the benefit of the respective heirs, personal representatives, successors, grantees and assigns of Landlord and Tenant and the respective restrictions, covenants and obligations pertaining to the Premises shall run with the land.

6. Incorporation and Conflicts. All of the terms and conditions of the Lease are incorporated herein by reference as though set forth fully herein. In the event of any conflict between the terms hereof and of the Lease, the Lease shall prevail.

IN WITNESS WHEREOF, this Memorandum of Lease is executed as of the date first above written.

LESSOR:

STATE OF UTAH, ACTING THROUGH THE
SCHOOL AND INSTITUTIONAL TRUST
LANDS ADMINISTRATION

By: _____
Name: _____
Title: _____



State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

Department of
Environmental Quality

William J. Sinclair
Acting Executive Director

DIVISION OF SOLID AND
HAZARDOUS WASTE
Dennis R. Downs
Director

June 1, 2009

Darin Olson
Wasatch Regional Landfill, Inc.
675 South Gladiola
Salt Lake City, Utah 84104

and

Kevin Carter
State of Utah School and Institutional Trust Lands Administration
675 East 500 South, Suite 500
Salt Lake City, Utah 84102-2818

Subject: Class V Landfill Permit Modification Approval

Dear Mr. Olson and Mr. Carter:

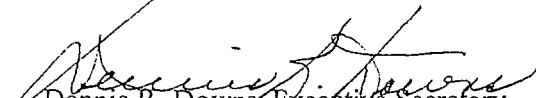
The 30-day public comment period for the Wasatch Regional Class V draft permit modification began on April 21, 2009. The announcement of the public comment period appeared in *The Salt Lake Tribune*, *Deseret News*, and *The Tooele Transcript Bulletin*. No comments were received. Accordingly, no changes were made to the draft permit modification.

Enclosed is Permit #0501M2, which expires on February 17, 2010. A public notice of the modification issuance will appear in the same newspapers as mentioned above.

Representatives of the Division of Solid and Hazardous Waste and/or representatives of the Tooele County Health Department will conduct periodic inspections. The inspections are to assess compliance with the conditions of the Permit and the Solid Waste Permitting and Management Rules.

If you have any questions, please contact Rob Powers or Ralph Bohn at 801-538-6170.

Sincerely,



Dennis R. Downs, Executive Secretary
Utah Solid and Hazardous Waste Control Board

Enclosure: Modified Permit

DRD/rdp/kk

c: Myron Bateman, E.H.S., M.P.A., Health Officer, Tooele County Health Department
Kirk Treece, Allied Waste
Kim Higgins, State of Utah School and Institutional Trust Lands Administration

TN200900622.DOC

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Mailing Address: P.O. Box 144880 • Salt Lake City, UT 84114-4880
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UTAH SOLID AND HAZARDOUS WASTE CONTROL BOARD
MODIFIED SOLID WASTE PERMIT

CLASS V LANDFILL

Pursuant to the provisions of the *Utah Solid and Hazardous Waste Act*, Title 19, Chapter 6, Utah Code Annotated (UCA) 1953, as amended (the Act) and the *Utah Solid Waste Permitting and Management Rules*, Utah Administrative Code (UAC) R315-301 through 320 adopted thereunder,

Owner/Operator: Wasatch Regional Landfill Inc.

and

Property Owner: State of Utah School and Institutional Trust Lands Administration

are hereby authorized to construct and operate the Wasatch Regional Class V Landfill located in Tooele County, Utah on the acreage as shown in the *Permit Application-Class V Municipal Solid Waste Disposal Facility- Wasatch Regional Landfill, Prepared by PSOMAS, January 2005*, (tracking # 0500027) as deemed complete on January 14, 2005 and as modified by *Permit Modification for the Class V Municipal Solid Waste Disposal Facility- Wasatch Regional Landfill, Prepared by Vector Engineering, Inc., March 9, 2009*, (tracking # 09.00888) as deemed complete on March 18, 2009.

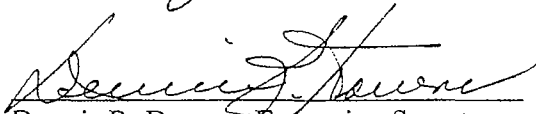
The operation of the landfill is subject to the condition that Wasatch Regional Landfill Inc. and State of Utah School and Institutional Trust Lands Administration meet the requirements set forth herein.

All references to UAC R315-301 through 320 are to regulations that are in effect on the date that this modified permit becomes effective.

This modified permit shall become effective June 1, 2009.

This modified permit shall expire at midnight February 17, 2010.

Modification signed this 1 day of June, 2009.


Dennis R. Downs, Executive Secretary
Utah Solid and Hazardous Waste Control Board

PERMIT REQUIREMENTS

LANDFILL NAME: Wasatch Regional Class V Landfill

LANDFILL OWNER/
OPERATOR: Wasatch Regional Landfill Inc.
675 South Gladiola
Salt Lake City, Utah 84104
(phone: 801-972-4234)

and

LANDFILL OWNER: State of Utah School and Institutional Trust Lands Administration
675 East 500 South, Suite 500
Salt Lake City, Utah 84102-2818
(Phone: 801-538-5100)

TYPE OF PERMIT: Class V Landfill

PERMIT NUMBER: 0501M2

LOCATION: Landfill site is located in all or part of Township 1 north, Range 8 west, Sections 3 and 4 and all or part of Township 2 North Range 8 west, Sections 32, 33, and 34 SLMB; Tooele County, the southeastern corner of the site located at North Lat. 40 deg° 50 min' 28 sec", West Long. 112 deg° 44 min' 0 sec"

Permit as used in this document is defined in UAC R315-301-2(55).

The application consisting of the *Permit Application-Class V Municipal Solid Waste Disposal Facility- Wasatch Regional Landfill, Prepared by PSOMAS, January 2005* (tracking # 05.00027), as deemed complete on January 14, 2005, the final *Wasatch Regional Landfill-Municipal Solid Waste Landfill Permit Modification- Design Engineering Report* (tracking # 04.04384) as deemed complete on June 27, 2005, and *Permit Modification for the Class V Municipal Solid Waste Disposal Facility- Wasatch Regional Landfill, Prepared by Vector Engineering, Inc., March 9, 2009* (tracking # 09.00888), as deemed complete on March 18, 2009 are hereby incorporated by reference into this Modified Solid Waste Permit and will be referred to as the permit application throughout this modified permit. Throughout the remainder of this permit the term "permit" shall be used in place of the term "modified permit." All representations made in the permit application are part of this permit and are enforceable under UAC 315-301-5(2). The permit application will become part of the operating record of the

Landfill. Where differences in wording exist between this permit and the application, the wording of the permit supersedes that of the application.

The facility shall consist of disposal cells for the disposal of waste as described in section IB1 of this permit, hereafter referred to as the Class V cell or cells and cells for the disposal of waste as described in section IB2 of this permit, hereafter referred to as the Class VI cell or cells.

By this permit to own and operate, the Permittees are subject to the following conditions.

I. GENERAL COMPLIANCE RESPONSIBILITIES

A. General Operation

The Permittees shall operate the landfill in accordance with all applicable requirements of UAC R315-302 and 303, for a Class V landfill and the applicable requirements of UAC R315-305 for the cell designated for disposal of waste approved for Class VI landfills that are in effect as of the date of this permit unless otherwise noted in this permit. Any permit noncompliance or other noncompliance constitutes a violation of UAC R315-302 or 303 and is grounds for appropriate enforcement action, permit revocation, modification, or denial of a permit renewal application.

B. Acceptable Waste

1. The following are acceptable for disposal in the Class V cells:

Non-hazardous solid waste that may include, municipal solid waste, commercial waste, industrial waste, construction/demolition waste, and special waste as defined in UAC R315-301. The permittee may accept conditionally exempt small quantity generator hazardous waste as specified in UAC R315-303-4(7)(a)(i)(B) and PCB's as specified by UAC R315-315-7(2).

2. The following are acceptable for disposal in the Class VI cells:

Construction and demolition waste; yard waste; inert waste; waste tires, upon meeting the requirements of UCA 19-6-804 and UAC R315-320; and petroleum-contaminated soils, upon meeting the requirements of UAC R315-315-8(3).

C. Prohibited Waste

2. The following are wastes prohibited from disposal in the Class V cell:

No hazardous waste as defined by UAC R315-1 and R315-2 or PCB's as defined by UAC R315-301-2(53), except as allowed in Section IB (Acceptable Waste) of this permit, may be accepted for treatment, storage, or disposal at the landfill. Any prohibited waste received and accepted for treatment, storage, or disposal at the facility will constitute a violation of this permit and UAC R315-303-4(7).

2. The following are wastes prohibited from disposal in the Class VI cell:

No hazardous waste as defined by UAC R315-1 and R315-2; no PCB's as defined by UAC R315-301-2(53), except construction/demolition waste containing PCB's as specified by UAC R315-315-7(2)(a) and (c); no household waste, except waste resulting from the abatement, rehabilitation, renovation and remodeling of homes and other residences; no municipal waste; no special waste, except as specified in this permit; no commercial waste; no dead animals, and no industrial waste shall be accepted for disposal at the Class VI cell.

Any prohibited waste received and accepted for treatment, storage, or disposal at the facility will constitute a violation of this permit, of UCA 19-6-101 through 123 and of UAC R315-301 through 320.

D. Inspections and Inspection Access

The Permittees shall allow the Executive Secretary of the Utah Solid and Hazardous Waste Control Board or an authorized representative of the Board, including representatives from the Tooele County Health Department, to enter at reasonable times and:

1. Inspect the landfill or other premises, practices or operations regulated or required under the terms and conditions of this Permit or UAC R315-301 through 320;
2. Have access to and copy any records required to be kept under the terms and conditions of this Permit or UAC R315-301 through 320;
3. Inspect any loads of waste, treatment facilities or processes, pollution management facilities or processes, or control facilities or processes required under this Permit or regulated under UAC R315-301 through 320; and

4. Create a record of any inspection by photographic, videotape, electronic, or any other reasonable means.

E. Noncompliance

If monitoring, inspection, or testing indicates that any permit condition or any applicable rule under UAC R315-301 through 320 may be or is being violated, the Permittees shall promptly make corrections to the operation or other activities to bring the facility into compliance with all permit conditions or rules. In the event of any noncompliance with any permit condition or violation of an applicable rule, the Permittees shall promptly take any feasible action reasonably necessary to correct the noncompliance or violation and mitigate any risk to the human health or the environment. Actions may include eliminating the activity causing the noncompliance or violation and containment of any waste or contamination using barriers or access restrictions, placing of warning signs, or permanently closing areas of the facility. The Permittees shall: document the noncompliance or violation in the operating record, on the day the event occurred or the day it was discovered; notify the Executive Secretary of the Solid and Hazardous Waste Control Board within 24 hours, or the next business day following documentation of the event; and give written notice of the noncompliance or violation and measures taken to protect public health and the environment within seven days of Executive Secretary notification. Within thirty days of the documentation of the event, the Permittees shall submit, to the Executive Secretary, a written report describing the nature and extent of the noncompliance or violation and the remedial measures taken or to be taken to protect human health and the environment and to eliminate the noncompliance or violation. Upon receipt and review of the assessment report, the Executive Secretary may order the Permittees to perform appropriate remedial measures including development of a site remediation plan for approval by the Executive Secretary.

In an enforcement action, the Permittees may not claim as a defense that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with UAC R315-301 through 320 and this permit.

Compliance with the terms of this permit does not constitute a defense to actions brought under any other local, State, or Federal laws. This permit does not exempt the Permittees from obtaining any other local, State or Federal permits or approvals.

The issuance of this Permit does not convey any property rights, other than the rights inherent in this permit, in either real or personal property, 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 including zoning ordinances.

The provisions of this Permit are severable. If any provision of this Permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect. If the application of any provision of this Permit to any circumstance is held invalid, its application to other circumstances shall not be affected.

F. Revocation

This permit is subject to revocation if any condition of this permit is not being met. The Permittees will be notified in writing prior to any proposed revocation action and such action will be subject to all applicable hearing procedures established under UAC R315-12 and the *Utah Administrative Procedures Act*.

Revocation of this permit does not revoke the financial assurance established for closure and post-closure care of the facility, nor remove any responsibility on the part of the Permittees for completion of closure and post-closure care for the facility required in UAC R315-302-3.

G. Attachment Incorporation

Attachments incorporated by reference are enforceable conditions of this permit, as are documents incorporated by reference into the attachments. Language in this permit supercedes any conflicting language in the attachments or documents incorporated into the attachments.

II. DESIGN AND CONSTRUCTION

A. Design and Construction

Prior to Construction. The Permittees shall submit construction design drawings and a Construction Quality Control and Construction Quality Assurance (CQC/CQA) Plans for the construction of Class V or Class VI cells to the Executive Secretary for approval prior to each landfill cell, cell liner, run-on and runoff diversion system, waste treatment facility, or final cover construction event. Buildings do not require approval. The Permittees shall construct the Class V cells according to the equivalent design contained in the permit application including cells, cell liners, run-on and run-off diversion systems, waste treatment facilities, and the final cover in accordance with the design drawings and CQC/CQA Plans submitted and approved by the Executive Secretary. The permittees shall construct Class VI cells in accordance with the design approved

in Permit Modification for the Class V Municipal Solid Waste Disposal Facility- Wasatch Regional Landfill, Prepared by Vector Engineering, Inc., March 9, 2009 (tracking # 09.00888).

Subsequent to Construction. The Permittees shall notify the Executive Secretary upon completion of construction of any landfill cell, cell liner, run-on or run-off diversion system, waste treatment facility, or final cover. Landfill cells may not be used for treatment or disposal of waste until all CQC/CQA documents and construction related documents including as-builts, for all Class V cells, are approved by the Executive Secretary. The Permittees shall submit as-built drawings for each construction event that are signed and sealed by an engineer registered in the State of Utah.

Partial Final Cover. The Permittees shall notify the Executive Secretary of any proposed incremental closure or placement of any part of the final cover. Construction of any portion of the final cover shall be considered as a separate construction event and shall be approved separately from any other construction or expansion of the landfill. Design approval must be received from the Executive Secretary prior to construction and must be accompanied by a CQC/CQA Plan, for each construction season where incremental closure is performed.

All engineering drawings submitted to the Executive Secretary must be stamped, signed, and approved by a professional engineer with a current registration in Utah.

Permit Modification

The Permit Modification that was requested includes: A Landfill Height Increase, a separate Construction and Demolition Waste Cell and an Alternative Fill Plan. For details please refer to the following document: Permit Modification for the Wasatch Regional Landfill March 9, 2009 (tracking #09.00888).

B. Run-On Control

Drainage channels and diversions shall be constructed as specified in the permit application and maintained at all times to effectively prevent runoff from the surrounding area from entering the landfill.

C. Quality Assurance Construction Plan

A quality assurance plan for construction of the liner system, leachate collection system, and final landfill cover shall be submitted by the Permittees along with all

necessary documentation to the Executive Secretary. Executive Secretary approval must be received prior to construction of any part of the liner system or final cover at the landfill.

A qualified independent third party shall perform the quality assurance function of the approved construction quality control/quality assurance (QC/QA) plan. The results must be submitted as part of the as-built drawings to the Executive Secretary.

III. LANDFILL OPERATION

A. Operations Plan

The Operations Plan, for the facility and individual Class V and Class VI cells, included in the permit application and the solid waste permit issued by the Executive Secretary shall be kept onsite at the landfill. The landfill shall be operated in accordance with the operations plan as included in the permit application. If necessary, the facility owner may modify the Operations Plan, provided that the modification meets all of the requirements of UAC R315-301 through 320 and is as protective of human health and the environment as that approved in the permit application. Any modification to the Operations Plan shall be noted in the operating record

B. Security

The Permittees shall operate the Landfill so that unauthorized entry to the facility is prevented. All facility gates and other access routes shall be locked during the time the landfill is not open. At least two persons, employed by the Wasatch Regional Landfill Inc., shall be at the landfill during all hours that the landfill is open. Fencing and any other access controls as shown in the permit application shall be constructed to prevent access of persons or livestock by other routes.

C. Training

Permittees shall provide training for on-site personnel in landfill operation, including waste load inspection, hazardous waste identification, and personal safety and protection.

D. Burning of Waste

Intentional burning of solid waste is prohibited and is a violation of UAC R315-303-4(2)(b).

E. Daily Cover

The solid waste received at Class V cells shall be completely covered at the end of each working day with a minimum of six inches of earthen material.

Use of any alternative daily cover must be approved by the Executive Secretary. If an alternative cover is approved at any time during the life of this permit the following conditions will apply:

1. Apply standard daily cover (min. 6 inches of soil) at least once per week, primarily to serve as a firebreak.
2. Apply standard daily cover any time the daily cover will be exposed for greater than 24 hours (normally this occurs once per week and also satisfies Condition "a" above).
3. Apply standard daily cover when weather conditions (e.g., wind, rain, etc.) prevent proper use of alternate daily cover. Conditions 1, 2 and 3 do not normally apply if the alternative daily cover is contaminated soil or tire/wood chips.
4. Record alternative daily cover use dates in the facility daily operating log.
5. Permission to use alternative daily cover may be rescinded or amended if the requirements to prevent blowing debris, minimize access to the waste by vectors, minimize the threat of fires at the open face, minimize odors, or shed precipitation are not met, or if necessary to prevent nuisance conditions or adverse impacts to human health and or the environment.

The Permittees shall cover the waste disposed in Class VI cells as necessary to prevent fires and to control vectors, blowing litter, odor, scavenging, and fugitive dust. Wastes that are capable of attracting or providing food for vectors, materials that may become windblown litter, or fine materials that may become fugitive dust shall be covered with a minimum of six inches of earth at the end of the working day in which they are received. An alternative cover material may be used when the material meets the requirements of UAC R315-303-4(4)(b) through (d) or when the alternative daily cover meets the requirement of UAC R315-303-4(4)(e).

A minimum of six inches of earthen cover shall be provided no less than once each month for all other wastes received at Class VI cells. This cover must consist of soil, no alternative may be used.

At the end of any day of operation, when soil or an alternative cover is placed on Class VI cells, the amount and type of cover placed and the area receiving cover shall be recorded in the operating record and certified by the operator

F. Ground Water Monitoring

The Permittees shall monitor the ground water underlying the landfill in accordance with the Ground Water Sampling and Analysis Plan contained in the permit application. The Permittees shall modify the Ground Water Sampling and Analysis Plan to reflect the installation of the groundwater monitoring wells. The modified Ground Water Sampling and Analysis Plan shall be submitted to the Executive Secretary for review. The modified Ground Water Sampling and Analysis Plan must be approved by the Executive Secretary prior to receipt of waste at the landfill. The modified Ground Water Monitoring Plan must include surveyed as-builts, well logs, detailed drawings and maps for all the groundwater monitoring wells, and any necessary changes to the ground water QA/QC Plan, sampling procedures, and statistical methods.

Ground water monitoring of Class VI cells is not required.

G. Gas Monitoring

The Permittees shall monitor explosive gases at the landfill in accordance with the Gas Monitoring Plan contained in the permit application and shall otherwise meet the requirements of UAC R315-303-3(5). If necessary, the facility owner may modify the Gas Monitoring Plan, provided that the modification meets all of the requirements of UAC R315-301 through 320 and is as protective of human health and the environment as that approved in the permit application. Any modification to the Gas Monitoring Plan shall be noted in the operating record.

If the concentrations of explosive gases at any of the facility structures, at the property boundary or beyond, ever exceed the standards set in UAC R315-303-2(2)(a), the Permittees shall immediately take all necessary steps to ensure protection of human health and notify the Executive Secretary. Within seven days of detection, place in the operating record the explosive gas levels detected and a description of the immediate steps taken to protect human health. Implementation of a remediation plan shall meet the requirements as stated in UAC R315-303-3(5)(b) and shall be submitted to and receive approval from the Executive Secretary prior to implementation.

Gas monitoring of Class VI cells is not required.

H. Waste Inspections

The Permittees shall visually inspect incoming waste loads to verify that no wastes other than those allowed by this permit are disposed in the landfill. A complete waste inspection shall be conducted at a minimum frequency of 1 % of incoming loads. Loads to be inspected are to be chosen on a random basis.

All containers capable of holding more than five gallons of liquid will be inspected to assure that the container is empty.

All loads that the operator suspects may contain a waste not allowed for disposal at the landfill will be inspected.

Complete random inspections shall be conducted as follows:

1. The operator shall conduct the random waste inspection at the working face or an area designated by the operator;
2. The load to be inspected will be chosen on a random basis;
3. Loads subjected to complete inspection shall be unloaded at the designated area;
4. Loads shall be spread by equipment or by hand tools;
5. A visual inspection of the waste shall be conducted by personnel trained in hazardous waste recognition and recognition of other unacceptable waste; and
6. The inspection shall be recorded on the waste inspection form found in permit application. The form shall be placed in the operating record at the end of the operating day.

I. Disposal of Liquids

Disposal of containers larger than household size (five gallons) holding any liquid, noncontainerized material containing free liquids, sludge containing free liquids, or any waste containing free liquids in containers larger than five gallons is prohibited.

J. Disposal of Special Wastes

Animal carcasses may be disposed at the bottom of the Class V cell working face and must be covered with other solid waste or earth by the end of the operating day they are received.

Asbestos containing material shall be handled and disposed in accordance with UAC-315-315-2 in Class V cells only.

If loads of incinerator ash is accepted for disposal it shall be transported in such a manner to prevent leakage or the release of fugitive dust. The ash shall be completely covered with a minimum of six inches of material, or use other methods or material, if necessary, to control fugitive dust. Ash may be used for daily cover when its use does not create human health and environmental hazard in the Class V cell only.

K. Self Inspections

The Permittees shall inspect the facility to prevent malfunctions and deterioration, operator errors, and discharges that may cause or lead to the release of wastes or contaminated materials to the environment or create a threat to human health. These general inspections shall be completed no less than quarterly and shall cover the following areas: Waste placement, compaction, and cover; cell liner; leachate collection system; fences and access controls; roads; run-on/run-off controls; ground water monitoring wells; final and intermediate cover; litter controls; and records. A record of the inspections shall be placed in the daily operating record on the day of the inspection. Areas needing correction, as noted on the inspection report, shall be corrected. The corrective actions shall be documented in the daily operating record.

L. Recordkeeping

The Permittees shall maintain and keep on file at Wasatch Regional Class V Landfill office, a daily operating record and other general records of landfill operation as required by UAC R315-302-2(3).

The daily operating record shall include the following items:

1. The number of loads of waste and the weights or estimates of weights or volume of waste received each day of operation and recorded at the end of each operating day;
2. Major deviations from the approved plan of operation recorded at the end of the operating day the deviation occurred;

3. Results of other monitoring required by this permit recorded in the operating record on the day of the event or the day the information is received;
4. Records of all inspections conducted by the Permittees, results of the inspections, and corrective actions taken shall be recorded in the record on the day of the event.

The general record of landfill operations shall include the following items:

1. A copy of the Permit including the permit application;
2. Results of inspections conducted by representatives of the Utah Solid and Hazardous Waste Control Board and/or representatives of the Tooele County Health Department, when forwarded to the Permittees;
3. Closure and Post-closure care plans;
4. Records of employee training;
5. Results of groundwater monitoring; and
6. Results of landfill gas monitoring.

M. Reporting

The Permittees shall prepare and submit, to the Executive Secretary, an Annual Report as required in UAC R315-302-2(4). The Annual Report shall include: the period covered by the report, the annual quantity of waste received, an annual update of the financial assurance mechanism, a re-application for approval of the financial assurance mechanism, any leachate analysis results, all ground water monitoring results, the statistical analysis of ground water monitoring results, the results of gas monitoring, and all training programs completed.

N. Roads

All access roads, within the landfill boundary, used for transporting waste to the landfill for disposal shall be improved and maintained as necessary to assure safe and reliable all-weather access to the disposal area.

IV. CLOSURE REQUIREMENTS

A. Closure

Final cover of the landfill shall be as shown in the permit application. Cover of Class V cells shall meet at a minimum the standard design for closure as specified in the UAC (R315-303-3(4)) plus sufficient cover soil or equivalent material to protect the low permeability layer from the effects of frost, desiccation, and root penetration. A quality assurance plan for construction of the final landfill cover shall be submitted to, and approval of the plan must be received from the Executive Secretary prior to construction of any part of the final cover at the landfill.

The final cover for Class VI cells shall meet the requirements of UAC R315-303-5(5) and the approved design submitted as part of *Permit Modification for the Class V Municipal Solid Waste Disposal Facility- Wasatch Regional Landfill, Prepared by Vector Engineering, Inc., March 9, 2009* (tracking # 09.00888).

B. Title Recording

The Permittees shall also meet the requirements of UAC R315-302-2(6) by recording with the Tooele County Recorder as part of the record of title that the property has been used as a landfill.

C. Post-Closure Care

Post-closure care at the closed landfill shall be done in accordance with the Post-Closure Care Plan contained in the permit application. Post-closure care shall continue until all waste disposal sites at the landfill have stabilized and the finding of UAC R315-302-3(7)(c) is made.

D. Financial Assurance

A financial assurance mechanism covering closure and post-closure care costs shall be proposed by the Permittees and approved by the Executive Secretary. The approved mechanism shall be established by the Permittees prior to receipt of waste. An annual revision of closure costs and financial assurance funding shall be submitted to the Executive Secretary as part of the annual report. The financial assurance fund shall be adequately funded to provide for the cost of closure at any stage or phase or anytime during the life of the landfill, and must be fully funded within five years of the date waste is first received at the landfill. If a trust fund is chosen as the financial assurance method the first payment to the fund will be

20% of the estimated closure and post-closure care costs. If a trust fund is used, annual payments shall be determined by the following formula:

$$NP=[CE-CV]/Y$$

Where NP is the next payment, CE is the current cost estimate for closure and post-closure care (updated for inflation or other changes), CV is the current value of the trust fund, and Y is the number of years remaining in the pay-in period.

The Permittees shall notify the Executive Secretary of the establishment of the approved financial assurance mechanism and must receive acknowledgment from the Executive Secretary that the established mechanism complies with the approved method.

E. Financial Assurance Annual Update

An annual revision of closure costs and financial assurance funding as, required by R315-309-2(2), shall be submitted to the Executive Secretary as part of the annual report

V. ADMINISTRATIVE REQUIREMENTS

A. Permit Modification

Modifications to this permit may be made upon application by the Permittees or by the Executive Secretary. The Permittees will be given written notice of any permit modification initiated by the Executive Secretary.

B. Permit Transfer

This permit may be transferred to a new permittee or new permittees by meeting the requirements of the permit transfer provisions of UAC R315-310-10.

C. Expansion

This permit is for the operation of a Class V Landfill according to the design and Operation Plan described and explained in the permit modification application. Any expansion of the current footprint designated in the description contained in the permit application, but within the property boundaries designated in the permit application, will require submittal of plans and specifications to the Executive Secretary. The plans and specifications must be approved by the Executive Secretary prior to construction.

Any expansion of the landfill facility beyond the property boundaries designated in the description contained in the permit application will require submittal of a new permit application in accordance with the requirements of UAC R315-310 and UCA 19-6-108(1)(d) including all approvals required in UCA 19-6-108.

Any addition to the acceptable wastes described in Section 1B will require submittal of all necessary information to the Executive Secretary and the approval of the Executive Secretary. Acceptance for PCB bulk product waste under UAC R315-315-7(3)(b) can only be done after submittal of the required information to the Executive Secretary and modification of Section IC of this permit.

D. Expiration

This permit shall expire on February 17, 2010. Application for permit renewal shall be made at least 180 days prior to the expiration of this permit. If a timely renewal application is made and the permit renewal is not complete by the expiration date, this permit will continue in force until renewal is completed or denied.

E. Status Notification

Eighteen months from the date of this permit the Executive Secretary shall be notified in writing of the status of the construction of this facility unless construction is complete and operation has commenced. If construction has not begun within 18 months the Permittees will submit adequate justification to the Executive Secretary as to the reasons that construction has not commenced. If no submission is made or the submission is judged inadequate by the Executive Secretary, this permit will be revoked.

F. Construction Approval and Request to Operate

The Permittees shall meet each of the following conditions prior to receipt of waste:

1. The Permittees shall notify the Executive Secretary, prior to acceptance of waste that all the requirements of this permit have been met and all required facilities, structures and accounts are in place as required.
2. The Permittees shall submit to the Executive Secretary, documentation that local government approval has been obtained for operation of this landfill.

3. The Permittees shall not construct any portion of a Class V where the bottom elevation is less than 5 feet above the historic high ground water level or any Class VI cell where the bottom elevation is less than 10 feet above the historic high ground water level.

The United States of America

To all to whom these presents shall come, Greeting:

UTU-79 162-FD

WHEREAS,

State of Utah, School and Institutional Trust Lands Administration

is entitled to a land patent pursuant to Section 206 of the Act of October 21, 1976 (90 Stat. 2756; 43 U.S.C. 1716) as amended by the Act of August 20, 1988 (102 Stat. 1086-1094; 43 U.S.C. 1718, 1740), and pursuant to the Utah West Desert Land Exchange Act of 2000, Public Law 106-301 (114 Stat. 1059), for the following described land in Tooele County:

I-80 Block
Salt Lake Meridian, Utah

Parcel #1001
T. 2 N., R. 8 W.,
Sec. 33, All.
Containing 640.00 acres, more or less, of surface and minerals.

Parcel #1002
T. 2 N., R. 8 W.,
Sec. 34, All.
Containing 640.00 acres, more or less, of surface and minerals.

Parcel #1003
T. 2 N., R. 8 W.,
Sec. 35, All.
Containing 640.00 acres, more or less, of surface and minerals.

Parcel #1004
T. 1 N., R. 8 W.,
Sec. 3, Lots 1-4, S $\frac{1}{2}$ N $\frac{1}{2}$, S $\frac{1}{2}$ (All).
Containing 678.24 acres, more or less, of surface and minerals.

Patent Number 43-2001-0012

UTU-79162-FID

Parcel #1005
T. 1 N., R. 8 W.,
Sec. 4, Lots 1-4, S $\frac{1}{2}$ N $\frac{1}{2}$, S $\frac{1}{2}$ (All).
Containing 679.04 acres, more or less, of surface and minerals.

Parcel #1006
T. 1 N., R. 8 W.,
Sec. 9, E $\frac{1}{2}$.
Containing 320.00 acres, more or less, of surface and minerals.

Parcel #1007
T. 1 N., R. 8 W.,
Sec. 10, All.
Containing 640.00 acres, more or less, of surface and minerals.

Parcel #1008
T. 1 N., R. 8 W.,
Sec. 15, All.
Containing 640.00 acres, more or less, of surface and minerals.

Parcel #1009
T. 1 N., R. 8 W.,
Sec. 17, E $\frac{1}{2}$.
Containing 320.00 acres, more or less, of surface and minerals.

Parcel #1010
T. 1 N., R. 8 W.,
Sec. 22, All.
Containing 640.00 acres, more or less, of surface and minerals.

Parcel #1011
T. 1 N., R. 8 W.,
Sec. 27, All.
Containing 640.00 acres, more or less, of surface and minerals.

Parcel #1012
T. 1 N., R. 8 W.,
Sec. 28, All.
Containing 640.00 acres, more or less, of surface and minerals.

Parcel #1013
T. 1 N., R. 8 W.,
Sec. 29, All.
Containing 640.00 acres, more or less, of surface and minerals.

Patent Number 43-2001-0012

UTU-79162-F)

Parcel #1014
 T. 1 N., R. 8 W.,
 Sec. 30, Lots 1-4, E $\frac{1}{2}$, E $\frac{1}{2}$ W $\frac{1}{2}$ (All).
 Containing 640.08 acres, more or less, of surface and minerals.

Parcel #1015
 T. 1 N., R. 8 W.,
 Sec. 31, Lots 1, 2, NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$.
 Containing 480.17 acres, more or less, of surface and minerals.

Parcel #1016
 T. 1 S., R. 6 W.,
 Sec. 29, SW $\frac{1}{4}$ SW $\frac{1}{4}$.
 Containing 40.00 acres, more or less, of surface and minerals.

Parcel #1017
 T. 1 S., R. 7 W.,
 Sec. 17, All.
 Containing 640.00 acres, more or less, of surface and minerals.

Parcel #1018
 T. 1 S., R. 7 W.,
 Sec. 20, W $\frac{1}{2}$ E $\frac{1}{2}$, W $\frac{1}{2}$.
 Containing 480.00 acres, more or less, of surface and minerals.

Parcel #1019
 T. 1 S., R. 7 W.,
 Sec. 29, W $\frac{1}{2}$ NE $\frac{1}{4}$, W $\frac{1}{2}$.
 Containing 400.00 acres, more or less, of surface and minerals.

Parcel #1020
 T. 1 S., R. 8 W.,
 Sec. 1, Lots 1-4, S $\frac{1}{2}$ N $\frac{1}{2}$, S $\frac{1}{2}$ (All).
 Containing 653.76 acres, more or less, of surface and minerals.

Parcel #1021
 T. 1 S., R. 8 W.,
 Sec. 5, Lots 1-4, SE $\frac{1}{4}$ NE $\frac{1}{4}$.
 Containing 204.84 acres, more or less, of surface and minerals.

Parcel #1022
 T. 2 S., R. 5 W.,
 Sec. 6, Lots 3-5, SE $\frac{1}{4}$ NW $\frac{1}{4}$.
 Containing 149.02 acres, more or less, of surface and minerals.

Patent Number 43-2001-0012

UTU-79162-F)

Parcel #1023
 T. 2 S., R. 6 W.,
 Sec. 1, Lot 1, SE $\frac{1}{4}$ NE $\frac{1}{4}$.
 Containing 80.02 acres, more or less, of surface and minerals.

Parcel #1024
 T. 3 S., R. 6 W.,
 Sec. 27, S $\frac{1}{2}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$, S $\frac{1}{2}$ SE $\frac{1}{4}$.
 Containing 320.00 acres, more or less, of surface and minerals.

The above parcels aggregate 11,845.17 acres, more or less of surface and minerals.

NOW KNOW YE, that there is, therefore, granted by the UNITED STATES, unto State of Utah, School and Institutional Trust Lands Administration, the land described above; TO HAVE AND TO HOLD the said land with all the rights, privileges, immunities, and appurtenances, of whatsoever nature, thereunto belonging, unto State of Utah, School and Institutional Trust Lands Administration, and to its successors and assigns, forever; and

EXCEPTING AND RESERVING TO THE UNITED STATES:

1. A right-of-way thereon for ditches and canals constructed by the authority of the United States. Act of August 10, 1890 (43 U.S.C. 945).

SUBJECT TO:

1. Those rights for a buried fiber optic cable, granted to the United States Air Force, its successors and assigns, by right-of-way reservation number UTU-86591, issued pursuant to Section 507 of the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to Lot 2, NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W.; S $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 1; Lots 3, 4, SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 5, T. 1 S., R. 8 W., (Parcels #1015, 1020, 1021);
2. Those rights for a buried irrigation pipeline, granted to Grantsville Irrigation Company, its successors and assigns, by right-of-way number UTU-04324, pursuant to the Act of March 3, 1891 (26 Stat. 1101); as to the SE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 27, T. 3 S., R. 6 W., (Parcel #1024);
3. Those rights for a buried irrigation pipeline, granted to Grantsville Irrigation Company, its successors and assigns, by right-of-way number UTU-54160, issued pursuant to the Act of October 21, 1976, (90 Stat. 2776, 43 U.S.C. 1761); as to the SE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 27, T. 3 S., R. 6 W., (Parcel #1024);
4. Those rights for an electric power transmission line, granted to Utah Power and Light Co., its successors and assigns, by right-of-way number UTU-14158, pursuant to the Act of October 21, 1976, (90 Stat. 2776, 43 U.S.C. 1761); as to Lot 5, SE $\frac{1}{4}$ NW $\frac{1}{4}$, Section 5, T. 2 S., R. 5 W.; Lot 1, SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 1, T. 2 S., R. 6 W.; Lot 3, SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, Section 3; E $\frac{1}{2}$ W $\frac{1}{4}$, Section 10; E $\frac{1}{2}$ W $\frac{1}{4}$, Section 15; E $\frac{1}{2}$ W $\frac{1}{4}$, Section 22; NE $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ NE $\frac{1}{4}$, Section 27, T. 1 N., R. 8 W.; E $\frac{1}{2}$ W $\frac{1}{4}$, Section 34, T. 2 N., R. 8 W., (Parcels #1002, 1004, 1007, 1008, 1010, 1011, 1023);

Patent Number 43-2001-0012

UTU-79162-F01

5. Those rights for an electric power transmission line, granted to Pacificorp dba Utah Power and Light Co., its successors and assigns, by right-of-way number UTU-07965, pursuant to the Act of October 21, 1973, (90 Stat. 2776, 43 U.S.C. 1761); as to the SW $\frac{1}{4}$ SW $\frac{1}{4}$, Section 29, T. 1 S., R. 6 W.; SE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W.; S $\frac{1}{2}$ SW $\frac{1}{4}$, Section 1; Lots 2, 3, 4, SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 5, T. 1 S., R. 8 W. (Parcels #1015, 1016, 1021);
6. Those rights for a railroad station grounds, granted to Western Pacific Railway Company, its successors and assigns, by right-of-way number UTSL-07627, issued pursuant to the Act of March 3, 1875, (18 Stat. 482); as to the NW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W., (Parcel #1015);
7. Those rights for a railroad, granted to Western Pacific Railroad Company, its successors and assigns, by right-of-way number UTSL-082680, issued pursuant to the Act of March 3, 1875, (18 Stat. 482); as to Lot 2, NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W.; Lots 2, 3, 4, SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 5; S $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 1, T. 1 S., R. 8 W., (Parcels #1015, 1020, 1021);
8. Those rights for a highway material site, granted to the Bureau of Public Roads for in behalf of the Utah Department of Transportation, its successors and assigns, by right-of-way number UTSL-068793, pursuant to Section 17 of the Federal Aid Highway Act of November 9, 1921, (42 Stat. 212); as to the S $\frac{1}{2}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 30; N $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W., (Parcels #1014 and 1015);
9. Those rights for a highway, granted to the Bureau of Public Roads for in behalf of the Utah Department of Transportation, its successors and assigns, by right-of-way number UTU-04240, pursuant to Section 17 of the Federal Aid Highway Act of November 9, 1921, (42 Stat. 212); as to the W $\frac{1}{2}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 17; E $\frac{1}{2}$ NW $\frac{1}{4}$, N $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SW $\frac{1}{4}$, Section 20; W $\frac{1}{2}$ W $\frac{1}{4}$, Section 29, T. 1 S., R. 7 W., (Parcels #1017-1019);
10. Those rights for an electric power transmission line, granted to Utah Power and Light Co., its successors and assigns, by right-of-way number UTU-025608, pursuant to Act of March 4, 1911 (34 Stat. 1253); as to the SW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 17; SW $\frac{1}{4}$ SW $\frac{1}{4}$, Section 22; N $\frac{1}{2}$ NW $\frac{1}{4}$, S $\frac{1}{2}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 27, T. 1 N., R. 8 W., (Parcels #1009-1011);
11. Those rights for an electric power transmission line, granted to Utah Power and Light Co., its successors and assigns, by right-of-way number UTU-027629, pursuant to the Act of March 4, 1911 (34 Stat. 1253; 43 U.S.C. 961); as to Lots 1-4, SE $\frac{1}{4}$ SW $\frac{1}{4}$, Section 30; E $\frac{1}{2}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$ NE $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W., (Parcels #1014 and 1015);
12. Those rights for a highway, granted to the Bureau of Public Roads for in behalf of the Utah Department of Transportation, its successors and assigns, by right-of-way number UTU-1089, pursuant to Section 317 of the Federal Aid Highway Act of August 27, 1956 (72 Stat. 885); as to Lot 4, Section 5, T. 1 S., R. 8 W., (Parcel #1021);

Patent Number 43-2001-0012

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UTU-79162-FC

13. Those rights for a highway, granted to the Bureau of Public Roads for in behalf of the Utah Department of Transportation, its successors and assigns, by right-of-way number UTU-9861, pursuant to Section 317 of the Federal Aid Highway Act of August 27, 1958 (72 Stat. 885); as to the $W\frac{1}{2}E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$, Section 34, T. 2 N., R. 8 W.; $W\frac{1}{2}E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$, Section 3; $W\frac{1}{2}E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$, Section 10; $W\frac{1}{2}E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$, Section 15; $W\frac{1}{2}E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$, Section 22; $W\frac{1}{2}E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$, Section 27, T. 1 N., R. 8 W., (Parcels #1002, 1004, 1007, 1008, 1010, 1011);
14. Those rights for a railroad, granted to Western Pacific Railroad Company, its successors and assigns, by right-of-way number UTU-9989, issued pursuant to the Act of March 3, 1875, (18 Stat. 482; 43 U.S.C. 934-939); as to the $E\frac{1}{2}W\frac{1}{2}$, Section 34, T. 2 N., R. 8 W., $E\frac{1}{2}W\frac{1}{2}$, Section 3; $E\frac{1}{2}W\frac{1}{2}$, Section 10; $E\frac{1}{2}W\frac{1}{2}$, Section 15; $E\frac{1}{2}W\frac{1}{2}$, $SW\frac{1}{4}SW\frac{1}{4}$, Section 22; $NW\frac{1}{4}NW\frac{1}{4}$, Section 27; $E\frac{1}{2}NE\frac{1}{4}$, $SW\frac{1}{4}NE\frac{1}{4}$, $SE\frac{1}{4}SW\frac{1}{4}$, $W\frac{1}{2}SE\frac{1}{4}$, Section 28, T. 1 N., R. 8 W.; Lots 3, 4, Section 5, T. 1 S., R. 8 W., (Parcels #1002, 1004, 1007, 1008, 1010, 1011, 1012);
15. Those rights for an electric power transmission line, granted to Utah Power and Light Co., its successors and assigns, by right-of-way number UTU-10333, pursuant to the Act of March 4, 1911 (34 Stat. 1253; 43 U.S.C. 961); as to the $E\frac{1}{2}W\frac{1}{2}$, Section 34, T. 2 N., R. 8 W.; $E\frac{1}{2}W\frac{1}{2}$, Section 3; $E\frac{1}{2}W\frac{1}{2}$, Section 10; $E\frac{1}{2}W\frac{1}{2}$, Section 15; $E\frac{1}{2}W\frac{1}{2}$, Section 22; $NE\frac{1}{4}NW\frac{1}{4}$, Section 27, T. 1 N., R. 8 W., (Parcels #1002, 1004, 1007, 1008, 1010, 1011);
16. Those rights for a buried brine pipeline, granted to Magnesium Corporation of America (Magcorp), its successors and assigns, by right-of-way number UTU-12292, issued pursuant to the Act of February 15, 1901 (31 Stat. 790; 43 U.S.C. 959); as to the $E\frac{1}{2}W\frac{1}{2}$, Section 35, T. 2 N., R. 8 W., and pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the $S\frac{1}{2}SE\frac{1}{4}$, Section 15; $NW\frac{1}{4}NE\frac{1}{4}$, Section 22, T. 1 N., R. 8 W., (Parcels #1003, 1008, 1010);
17. Those rights for buried natural gas pipeline, granted to Mountain Fuel Supply Co., its successors and assigns, by right-of-way number UTU-13048, pursuant to Section 28 of the Act of February 25, 1920, as amended (41 Stat. 499); as to the $NE\frac{1}{4}NE\frac{1}{4}$, Section 34; $W\frac{1}{2}NW\frac{1}{4}$, $N\frac{1}{4}SW\frac{1}{4}$, $SE\frac{1}{4}SW\frac{1}{4}$, Section 35, T. 2 N., R. 8 W., (Parcels #1002 and 1003);
18. Those rights for an electric power transmission line, granted to Utah Power and Light Co., its successors and assigns, by right-of-way number UTU-10359, pursuant to the Act of March 4, 1911 (34 Stat. 1253; 43 U.S.C. 961); as to the $W\frac{1}{2}NE\frac{1}{4}$, $SE\frac{1}{4}NW\frac{1}{4}$, $E\frac{1}{2}SW\frac{1}{4}$, Section 17; $E\frac{1}{2}NW\frac{1}{4}$, $N\frac{1}{4}SW\frac{1}{4}$, $SW\frac{1}{4}SW\frac{1}{4}$, Section 20; $W\frac{1}{2}W\frac{1}{2}$, Section 29, T. 1 S., R. 7 W., (Parcels #1017, 1018, 1019);
19. Those rights for a buried water pipeline, granted to Magnesium Corporation of America (Magcorp), its successors and assigns, by right-of-way number UTU-13180, issued pursuant to the Act of February 15, 1901 (31 Stat. 790; 43 U.S.C. 959); as to the $W\frac{1}{2}E\frac{1}{2}$, Section 34, T. 2 N., R. 8 W.; $W\frac{1}{2}E\frac{1}{2}$, Section 3; $W\frac{1}{2}E\frac{1}{2}$, Section 10; $W\frac{1}{2}E\frac{1}{2}$, Section 15; $W\frac{1}{2}E\frac{1}{2}$, Section 22; $W\frac{1}{2}E\frac{1}{2}$, Section 27, T. 1 N., R. 8 W., (Parcels #1002, 1004, 1007, 1008, 1010, 1011);

Patent Number 43-2701-0012

UTU-79162-FC

20. Those rights for a buried water pipeline, granted to Magnesium Corporation of America (Magcorp), its successors and assigns, by right-of-way number UTU-36736, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the S $\frac{1}{2}$ SE $\frac{1}{4}$, Section 22; N $\frac{1}{2}$ NE $\frac{1}{4}$, Section 27, T. 1 N., R. 8 W., (Parcels #1010 and 1011);
21. Those rights for a haul road, granted to Hoinam, Inc., its successors and assigns, by right-of-way number UTU-45959, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the S $\frac{1}{2}$ SW $\frac{1}{4}$, Section 22; N $\frac{1}{2}$ NW $\frac{1}{4}$, Section 27, T. 1 N., R. 8 W., (Parcels #1010 and 1011);
22. Those rights for a water well and buried water pipeline, granted to Magnesium Corporation of America (Magcorp), its successors and assigns, by right of-way number UTU-47287, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the NW $\frac{1}{4}$ SW $\frac{1}{4}$, Section 29, T. 1 S., R. 7 W., (Parcel #1019);
23. Those rights for a water collection system, including dikes, access roads, and canals, granted to Magnesium Corporation of America (Magcorp), its successors and assigns, by right-of-way number UTU-51504, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the W $\frac{1}{2}$ W $\frac{1}{2}$ Section 35, T. 2 N., R. 8 W., (Parcel #1003);
24. Those rights for a water collection system, including dikes, access roads, and canals, granted to Cargill Inc., its successors and assigns, by right-of-way number UTU-72412, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the SW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 27, T. 1 N., R. 8 W.; S $\frac{1}{2}$ SW $\frac{1}{2}$, Section 1, T. 1 S., R. 8 W., (Parcels #1011 and 1020);
25. Those rights for an access road, granted to Magnesium Corporation of America (Magcorp), its successors and assigns, by right-of-way number UTU-53703, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the S $\frac{1}{2}$ SE $\frac{1}{4}$, Section 22; N $\frac{1}{2}$ NE $\frac{1}{4}$, Section 27, T. 1 N., R. 8 W., (Parcels #1010 and 1011);
26. Those rights for a brine canal, granted to Magnesium Corporation of America (Magcorp), its successors and assigns, by right-of-way number UTU-53713, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the E $\frac{1}{2}$ NE $\frac{1}{4}$, E $\frac{1}{2}$ SE $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 35, T. 2 N., R. 8 W., (Parcel #1003);
27. Those rights for a buried brine pipeline, granted to Magnesium Corporation of America (Magcorp), its successors and assigns, by right-of-way number UTU-54897, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the E $\frac{1}{2}$ W $\frac{1}{2}$, Section 34, T. 2 N., R. 8 W.; E $\frac{1}{2}$ W $\frac{1}{2}$, Section 3; E $\frac{1}{2}$ W $\frac{1}{2}$, Section 10; E $\frac{1}{2}$ W $\frac{1}{2}$, Section 15; E $\frac{1}{2}$ W $\frac{1}{2}$, SW $\frac{1}{4}$ SW $\frac{1}{4}$, Section 22; NW $\frac{1}{4}$ NW $\frac{1}{4}$, Section 27; E $\frac{1}{2}$ NE $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, S $\frac{1}{2}$ SW $\frac{1}{4}$, Section 28; Lot 4, Section 30; Lot 1, E $\frac{1}{2}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, E $\frac{1}{2}$ SE $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W.; Lots 3, 4, Section 5, T. 1 S., R. 8 W., (Parcels #1002, 1004, 1007, 1008, 1010, 1011, 1012, 1014, 1015, 1021);

Patent Number 43-2001-0012

UTU-79162-FD

28. Those rights for a buried fiber optic cable, granted to U.S. Sprint Inc., its successors and assigns, by right-of-way number UTU-68148, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to Lot 2, NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W.; S $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 1, Lots 1-4, SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 5, T. 1 S., R. 8 W., (Parcels #1015, 1020, 1021);
29. Those rights for a buried fiber optic cable, granted to U.S. West, its successors and assigns, by right-of-way number UTU-63224, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to W $\frac{1}{2}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, Section 17; E $\frac{1}{2}$ NW $\frac{1}{4}$, N $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SW $\frac{1}{4}$, Section 20; W $\frac{1}{2}$ W $\frac{1}{2}$ Section 29, T. 1 S., R. 7 W., (Parcels #1017, 1018, 1019);
30. Those rights for a buried fiber optic cable, granted to U.S. West, its successors and assigns, by right-of-way number UTU-66617, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the SE $\frac{1}{4}$ NW $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W., (Parcel #1015);
31. Those rights for an electric power transmission line, granted to Utah Power and Light Co., its successors and assigns, by right-of-way number UTU-66667, pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to Lot 2, NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W., (Parcel #1015);
32. Those rights for an electric power transmission line, granted to PacifiCorp dba Utah Power and Light Co., its successors and assigns, by right-of-way number UTU-69543, pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to Lots 1, 2, SE $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$, E $\frac{1}{2}$ SE $\frac{1}{4}$, Section 31, T. 1 N., R. 8 W.; S $\frac{1}{2}$ S $\frac{1}{2}$, Section 1; Lots 1-4, Section 5, T. 1 S., R. 8 W., (Parcels #1015, 1020, 1021);
33. Those rights for a buried water pipeline, granted to Cargill Inc., its successors and assigns, by right-of-way number UTU-70306, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the W $\frac{1}{2}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, Section 17; E $\frac{1}{2}$ NW $\frac{1}{4}$, N $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SW $\frac{1}{4}$, Section 20; W $\frac{1}{2}$ W $\frac{1}{2}$, Section 29, T. 1 S., R. 7 W., (Parcels #1017, 1018, 1019);
34. Those rights for a buried telephone cable, granted to U.S. West, its successors and assigns, by right-of-way number UTU-70329, issued pursuant to the Act of October 21, 1976, (90 Stat. 2776, 43 U.S.C. 1761); as to Lot 4, SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 5, T. 1 S., R. 8 W., (Parcel #1021);
35. Those rights for an evaporative pond system, granted to Cargill Inc., its successors and assigns, by right-of-way number UTU-72413, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to the S $\frac{1}{2}$, Section 27; SE $\frac{1}{4}$, Section 28, T. 1 N., R. 8 W.; Section 1, T. 1 S., R. 8 W., (Parcels #1011 and 1012);

Patent Number 43-2001-0012

UTU-79162-FC

36. Those rights to use, control, maintain, improve, and repair an access road in favor of the United States of America, Bureau of Land Management by right-of-way UTU-77648, issued pursuant to Section 507 of the Act of October 21, 1976 (90 Stat. 2781, 43 U.S.C. 1767); as to the S $\frac{1}{2}$ S $\frac{1}{2}$ Section 22; N $\frac{1}{2}$ N $\frac{1}{2}$ Section 27, T. 1 N., R. 8 W., (Parcels #1010 and 1011);
37. Those rights to use, control, maintain, improve, and repair an access road in favor of the United States of America, Bureau of Land Management by right-of-way UTU-77649, issued pursuant to Section 507 of the Act of October 21, 1976 (90 Stat. 2781, 43 U.S.C. 1767); as to the NE $\frac{1}{4}$, Section 17; NW $\frac{1}{4}$, NW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 29, T. 1 S. R. 7 W., (Parcel #1017 and 1019);
38. Those rights to use, control, maintain, improve, and repair an access road in favor of the United States of America, Bureau of Land Management by right-of-way UTU-77650, issued pursuant to Section 507 of the Act of October 21, 1976 (90 Stat. 2781, 43 U.S.C. 1767); as to NW $\frac{1}{4}$ SW $\frac{1}{4}$, Section 28, T. 5 S., R. 4 W., (Parcel #1032);
39. Domestic livestock grazing use by Delle Cattle Company, as holder of grazing permit No. 432206, for the Skurk Ridge Allotment (#4033). The right of the permittee to graze livestock pursuant to the terms and conditions of this permit which expires on October 31, 2010. Annual fees based on 249 animal unit months (AUMs) for grazing use of subject permit in an amount to coincide with the authorized Federal grazing fees as published annually in the Federal Register, shall be paid to the Patentee, as to all of Sections 33, 34, 35, T. 2 N., R. 8 W.; and all of Sections 3, 4, 10, 15 and part of Section 12, T. 1 N., R. 8 W., (Parcels #1001-1005, 1007, 1008, 1010);
40. Domestic livestock grazing use by Martin Anderson, as holder of grazing permit No. 432017, for the Lone Rock Allotment (#04022). The right of the permittee to graze livestock pursuant to the terms and conditions of this permit which expires on October 31, 2010. Annual fees based on 16 animal unit months (AUMs) for grazing use of subject permit in an amount to coincide with the authorized Federal grazing fees as published annually in the Federal Register, shall be paid to the Patentee, as to all of Section 17 and part of Sections 20 and 29, T. 1 S., R. 7 W., (Parcels #1017-1019);
41. Domestic livestock grazing use by Brown's Diamond J, as holder of grazing permit No. 432006, for the Lakeside Allotment (#04027). The right of the permittee to graze livestock pursuant to the terms and conditions of this permit which expires on October 31, 2010. Annual fees based on 40 animal unit months (AUMs) for grazing use of subject permit in an amount to coincide with the authorized Federal grazing fees as published annually in the Federal Register, shall be paid to the Patentee, as to all of Section 1 and part of Section 5, T. 1 S., R. 8 W.; and all of Sections 27, 28, 29, 30 and part of Sections 9, 17, 22, 31, T. 1 N., R. 8 W., (Parcels #1006, 1009-1015, 1020, 1021);
42. Domestic livestock grazing use by Vernon Beef Project, as holder of grazing permit No. 432003, for the Lakeside Allotment (#04027). The right of the permittee to graze livestock pursuant to the terms and conditions of this permit which expires on October 31, 2010. Annual fees based on 199 animal unit months (AUMs) for grazing use of subject permit in an amount to coincide with the authorized Federal grazing fees as published annually in the Federal Register, shall be paid to the Patentee, as to all of Section 1 and part of Section 5, T. 1 S., R. 8 W.; and all of Sections 27, 28, 29, 30 and part of Sections 9, 17, 22, 31, T. 1 N., R. 8 W., (Parcels #1006, 1009-1015, 1020, 1021);

Patent Number 43-2001-0012

Form 1860-10
(April 1988)

UTU-79182-FC

- 43. Domestic livestock grazing use by John and Chleo Boyer, as holder of grazing permit No. 432011, for the Lakeside Allotment (#04027). The right of the permittee to graze livestock pursuant to the terms and conditions of this permit which expires on October 31, 2010. Annual fees based on 34 animal unit months (AUMs) for grazing use of subject permit in an amount to coincide with the authorized Federal grazing fees as published annually in the Federal Register, shall be paid to the Patentee, as to all of Section 1 and part of Section 5, T. 1 S., R. 8 W.; and all of Sections 27, 28, 29, 30 and part of Sections 9, 17, 22, 31, T. 1 N., R. 8 W., (Parcels #1006, 1009-1015, 1020, 1021);
- 43. Domestic livestock grazing use by Richard Anderson, as holder of grazing permit No. 432005, for the Lakeside Allotment (#04027). The right of the permittee to graze livestock pursuant to the terms and conditions of this permit which expires on October 31, 2010. Annual fees based on 174 animal unit months (AUMs) for grazing use of subject permit in an amount to coincide with the authorized Federal grazing fees as published annually in the Federal Register, shall be paid to the Patentee, as to all of Section 1 and part of Section 5, T. 1 S., R. 8 W.; and all of Sections 27, 28, 29, 30 and part of Sections 9, 17, 22, 31, T. 1 N., R. 8 W., (Parcels #1006, 1009-1015, 1020, 1021); and
- 44. Those rights, if any, for mining claims.

Further subject to all applicable provisions of that certain Utah West Desert Land Exchange Act of 2000, Public Law 106-301 (114 Stat. 1059).



IN TESTIMONY WHEREOF, the undersigned authorized officer of the Bureau of Land Management, in accordance with the provisions of the Act of June 17, 1948 (62 Stat. 476), has, in the name of the United States, caused these letters to be made Patent, and the Seal of the Bureau to be hereunto affixed.

GIVEN under my hand, in Salt Lake City, Utah
the Nineteenth day of January
in the year of our Lord two thousand and One of the Independence
of the United States the two hundred and Twenty-Fifth

By Sally Wisely
Sally Wisely
State Director

Patent Number 43-2001-0012

APPENDIX 2.5
Class V Needs Assessment Report

*Needs Assessment
Report*

**Class V
Wasatch Regional
Solid Waste Landfill**

Prepared For:
**Wasatch Regional
Solid Waste
Management
Corporation**

Prepared By:

PSOMAS

**2825 East Cottonwood Parkway
Suite 120
Salt Lake City, Utah 84121**

December 2004

NEEDS ASSESSMENT REPORT

WASATCH REGIONAL LANDFILL

PREPARED FOR:

WASATCH REGIONAL SOLID WASTE MANAGEMENT CORPORATION

PREPARED BY:

P S O M A S

2825 E. COTTONWOOD PARKWAY, SUITE 120
SALT LAKE CITY, UTAH 84121-7056
801/270-5777

December 2004

Purpose

The purpose of this report is to show that the Wasatch Regional Solid Waste Facility is in compliance to State Statute 19-6-108-(10). The facility is also in compliance with Section (9) of the same statute, as shown in the permit.

Compliance to State Statute 19-6-108-(10)

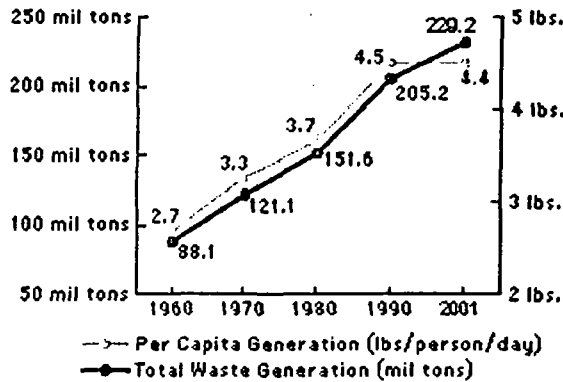
19-6-108-(10)

- a) *Evidence that the proposed commercial facility has a proven market of nonhazardous solid or hazardous waste, including:*
- i. information on the source, quantity, and price charged for treating, storing, and disposing of potential nonhazardous solid or hazardous waste in the state and regionally;*
 - ii. a market analysis of the need for a commercial facility given existing and potential generation of nonhazardous solid or hazardous waste in the state and regionally;*
 - iii. a review of other existing and proposed commercial nonhazardous solid or hazardous waste facilities regionally and nationally that would compete for the treatment, storage, or disposal of the nonhazardous solid or hazardous waste;*
- b) *a description of the public benefits of the proposed facility, including:*
- i. the need in the state for the additional capacity for the management of nonhazardous solid or hazardous waste;*

In 2003 the landfills of Utah disposed of 2,445,411 tons (DEQ, Utah Landfill Inventory) of municipal solid waste (MSW), the majority of which was generated on the Wasatch Front (Brigham City to Nephi and Kamas to Grantsville).

According to data provided by the Environmental Protection Agency (EPA), U.S. total waste generation has been a on a steady rise. In 1960, the per capita generation of waste was 2.7 pounds per person per day, and total waste generation was 88.1 million tons. The latest data (2001) shows the per capita generation of waste was 4.4 pounds per person per day, and total waste generation was 229.2 million tons.

Figure 0. Trends in MSW Generation



Here in Utah, the per capita generation of MSW ranges from 5.73 to 6.51 pounds per person per day, according to DEQ 1994-2000 data (DEQ, Utah Solid Waste Plan Update, 5). This is over one pound per person higher than the national average.

The projected population growth rates show that MSW generation rates will continue to increase. According to the Wasatch Front Regional council and the U.S. Bureau of Census, the population in the Wasatch Front Region as of 2005 is projected to be 1,427,643 persons. It is estimated that this number will increase to 2,176,651 in the following 25 years (see Table 1). Based on the current per capita generation rates and the predicted population growth, MSW would increase by 150% for the Wasatch Front (excluding Utah County).

Table 1. Projected population numbers for the Wasatch Front.

| County | Year | | | | | |
|--------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| Davis | 261,297 | 292,173 | 322,395 | 346,203 | 369,640 | 392,003 |
| Morgan | 7,856 | 8,829 | 9,810 | 10,659 | 11,552 | 12,453 |
| Salt Lake | 914,190 | 1,028,508 | 1,136,706 | 1,223,218 | 1,308,787 | 1,383,907 |
| Tooele | 42,450 | 50,333 | 58,487 | 65,852 | 73,413 | 80,938 |
| Weber | 201,850 | 227,032 | 251,782 | 271,369 | 290,204 | 307,350 |
| TOTAL | 1,427,643 | 1,606,875 | 1,779,180 | 1,917,301 | 2,053,596 | 2,176,651 |

The Governors office of Planning Budget predicts that the population along the Wasatch Front Region will increase from approximately 2 million people in 2005 to 3.1 million by 2030, which again translates to 150% increase in population, and therefore MSW generation.

The National Solid Waste Management Association (NSWMA) reports regional and national tipping fee averages. The average national tipping fee in 2002 was \$33.70 per ton and was \$23.40 (NSWMA, 2) for the region in which Utah is included (West Central Region). As can be see in Table 2, the average tipping fee in this region is among the lowest in the country, 70% of the national average and 35% of what is charged in the Northeast.

Table 2. Average Tipping Fees by Region

| Region | Landfill Tipping Fee (Dollars/Ton) |
|---------------|------------------------------------|
| Northeast | 69.07 |
| Mid-Atlantic | 45.26 |
| South | 30.43 |
| Midwest | 34.14 |
| South Central | 23.28 |
| West Central | 23.40 |
| West | 38.90 |
| National | 33.70 |

The tipping fees in Utah are even slightly lower than the average for the region. It is noted that Salt lake Valley Solid Waste Management Facility and Trans-Jordan Landfills both charge \$22/ton. The ECDC landfill, one of the other permitted Class V landfills that would be considered competition, was also contacted. ECDC rates vary by contract and typically range from \$22/ton up to \$100/ton.

The current rail rates for shipping waste to ECDC are too high and have caused Allied Waste to look for other more cost effective options. ECDC will continue to solicit volumes from surrounding states, but the majority MSW volumes for the Wasatch Front will no longer go to ECDC due to the rising rail costs.

During the next ten years it is anticipated that two to three MSW and C&D landfills along the Wasatch front will reach capacity. The current volume from these landfills is 3,500 tons per day. The collection companies for Allied Waste dispose of 1,200 tons per day of MSW and C&D that will be disposed at the Wasatch facility. The range of pricing will be from \$23 per ton to \$32 per ton at various transfer stations that will feed the landfill.

The proposed Wasatch Regional Solid Waste Landfill would be able to help meet these projected demands along the Wasatch Front, as well help meet partial waste disposal needs for surrounding states. Due to the close proximity to the Wasatch Front, it will be cost effective to send waste to this facility. The initial projected tipping fee for the proposed facility is \$18/ton; well below the region average and the other nearby landfill facilities.

There are five permitted Class V landfills in Utah. However, due to size or use, only two permitted landfills would most likely compete with Wasatch Regional Solid Waste Landfill. These are the ECDC Landfill – located in East Carbon, Carbon County, and the Solitude facility – located in the City of Green River, Emery County. The driving distance to Solitude from Salt Lake City is approximately 180 miles, compared to 60 miles to the Wasatch Landfill from Salt Lake City. Transportation costs account for 40-80% of disposal costs, and therefore, Solitude would not be viable alternative to meeting the full need of the Wasatch Front. Due to the fact that transportation costs represent a high fraction of total disposal costs, it is not anticipated that other facilities

across the nation, especially those outside of the Western US region, will compete with this facility.

ECDC is the other landfill that would compete for the treatment, storage or disposal of the waste. However, both ECDC and Wasatch Regional Solid Waste Landfills will be owned and operated by Allied Waste. They will therefore compete in some respects, but will also be able to compliment one another as the owner will have an investment in seeing both landfills being profitable. For example, Wasatch Regional Solid Waste Landfill would extend the service life and capacity of regional landfills such as ECDC. The diverting of waste to Wasatch Regional Landfill will be an excellent choice because of its proximity to waste sources along the Wasatch Front.

Based on the 150% growth rate predicted over the next 25 years, as noted above, the need along the Wasatch Front for additional capacity is very real. In the Utah Solid Waste Plan Update (page 7), it states, "As the population has increased the need for more disposal volume and the need for alternatives to disposal has become apparent."

The proposed Wasatch Regional Solid Waste Landfill can help meet these needs by providing new landfill capacity, as well as by diverting trash streaming to existing facilities and extend the capacity of those facilities.

The public schools of Utah will also benefit from the unique arrangement that Wasatch Regional Landfill has with the State Institutional Trust Lands Administration (SITLA). As part of this arrangement, SITLA receives 7-9% of the gross income from tipping fees. The 7% applies to 2,500 tons/day or less, and the 9% applies to over 2,500 tons/day. It is anticipated that the facility will charge \$18/ton and receiving at least 2,500 tons/day to start and an anticipated 3,000 tons/day in about 5 years. This money will be distributed statewide for State schools and capital facilities.

ii. the energy and resources recoverable by the proposed facility;

One of the great benefits of the Wasatch Regional Solid Waste Landfill is its proximity to the main sources of the MSW generation. Only 60 miles from Salt Lake City, a large reduction in air pollution in the form of vehicle emissions would be realized as opposed to transporting the waste further.

Additionally, the methane gas captured from the maturing landfill can be sold to neighboring industries. Currently, U.S. Magnesium is the closest large-scale industry that could potentially benefit from the use of the methane gas. Also, the surrounding area is master-planned for industrial use. The methane could also be sold to the future developer of this land, as well.

iii. the reduction of nonhazardous solid or hazardous waste management methods, which are less suitable for the environment, that would be made possible by the proposed facility;

In order to be in compliance with 19-6-108-(10,b,iii) it must be shown that the chosen site is a favorable one.

The siting of a new landfill can be one of the most difficult tasks in developing a landfill, since there are so many factors that must be considered. Addressing landfill site needs along the Wasatch Front, the DEQ's states (Utah Solid Waste Plan Update, March 2002), "Siting of new landfills becomes more difficult as population grows and availability of land that is suited for landfill siting is limited by encroaching housing and other land uses."

The Wasatch Regional Solid Waste Landfill was sited based on careful consideration of its environmental impacts. The proposed landfill is isolated from the general public, and yet is easily accessed by both rail and surface roads. As mentioned previously, the area around the landfill is master-planned to be industrial use and encroaching houses will not be a problem since the nearest residential areas are an appreciable distance away. Furthermore, it is the closest Class V landfill to the Wasatch Front and is in an excellent proximity to the waste source. It is easily accessed by rail and surface roads and thus, transportation emissions will be reduced compared to other Class V landfills.

Additionally, the landfill is located in an arid climate where the ground water quality is poor. Since the average annual rainfall is low, less leachate will be produced and groundwater contamination potential will be decreased. Furthermore, the groundwater has a relatively high concentration of total dissolved solids and is not suitable for drinking water.

iv. whether any other available site or method for the management of hazardous waste would be less detrimental to the public health or safety or to the quality of the environment;

Not applicable since this is not a request for a Subtitle C hazardous waste permit.

c) compliance history of an owner or operator of a proposed commercial nonhazardous solid or hazardous waste treatment, storage, or disposal facility, which may be applied by the executive secretary in a nonhazardous solid or hazardous waste operation plan decision, including any plan conditions.

Wasatch Regional Solid Waste Management Corporation and State Institutional Trust Lands Administration do not have a compliance history or any other record of relevant violations.

References

Department of Environmental Quality (DEQ), division of Solid & Hazardous Waste, *Utah Landfill Inventory* (Calendar 2003 data).

Department of Environmental Quality (DEQ), division of Solid & Hazardous Waste, *Utah Solid Waste Plan Update*, March 2002.

Environmental Protection Agency (EPA), *Municipal Solid Waste – Basic Facts*, <http://www.epa.gov/epaoswer/non-hw/muncpl/facts.htm>

National Solid Wastes Management Association (NSWMA), *NSWMA 2002 Tipping Fee Survey*, 2002.

APPENDIX 3
FACILITY LOCATION STANDARDS (PSOMAS)



te of Utah

MICHAEL O. LEAVITT
Governor

OLENE S. WALKER
Lieutenant Governor

Department of Community and Economic Development

DAVID HARMER
Executive Director

Division of State History / Utah State Historical Society

PHILIP H. NOTARIANNI
Division Director

June 12, 2003

Jamie Tsandes

Via E-mail: jtsandes@psomas.com

RE: Tooele Cultural/Historic Resources - T2N, R8W, Section 33; T1N, R8W, Section 10

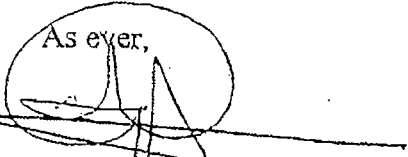
In Reply Please Refer to Case No. 03-1127

Dear Ms. Tsandes:

The Utah State Historic Preservation Office has reviewed our cultural resource files for the requested area of potential effect. Five archaeological surveys have been conducted in the area that have covered a good sample portion of the area of potential effect. Based on data available USHPO recommends that no cultural surface properties are located within the describe area of potential effect.

If you have questions, please contact me at (801) 533-3555. My email address is: jdykman@utah.gov

As ever,

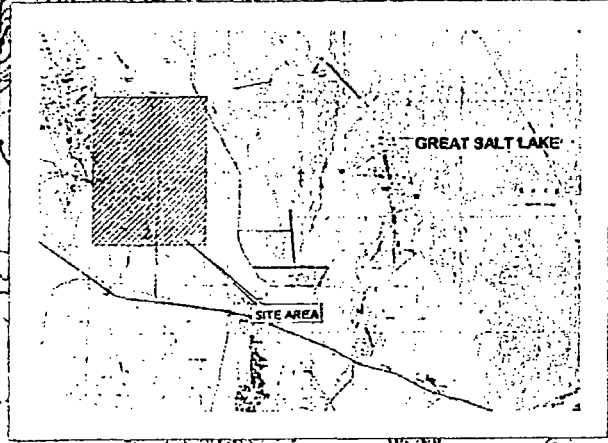
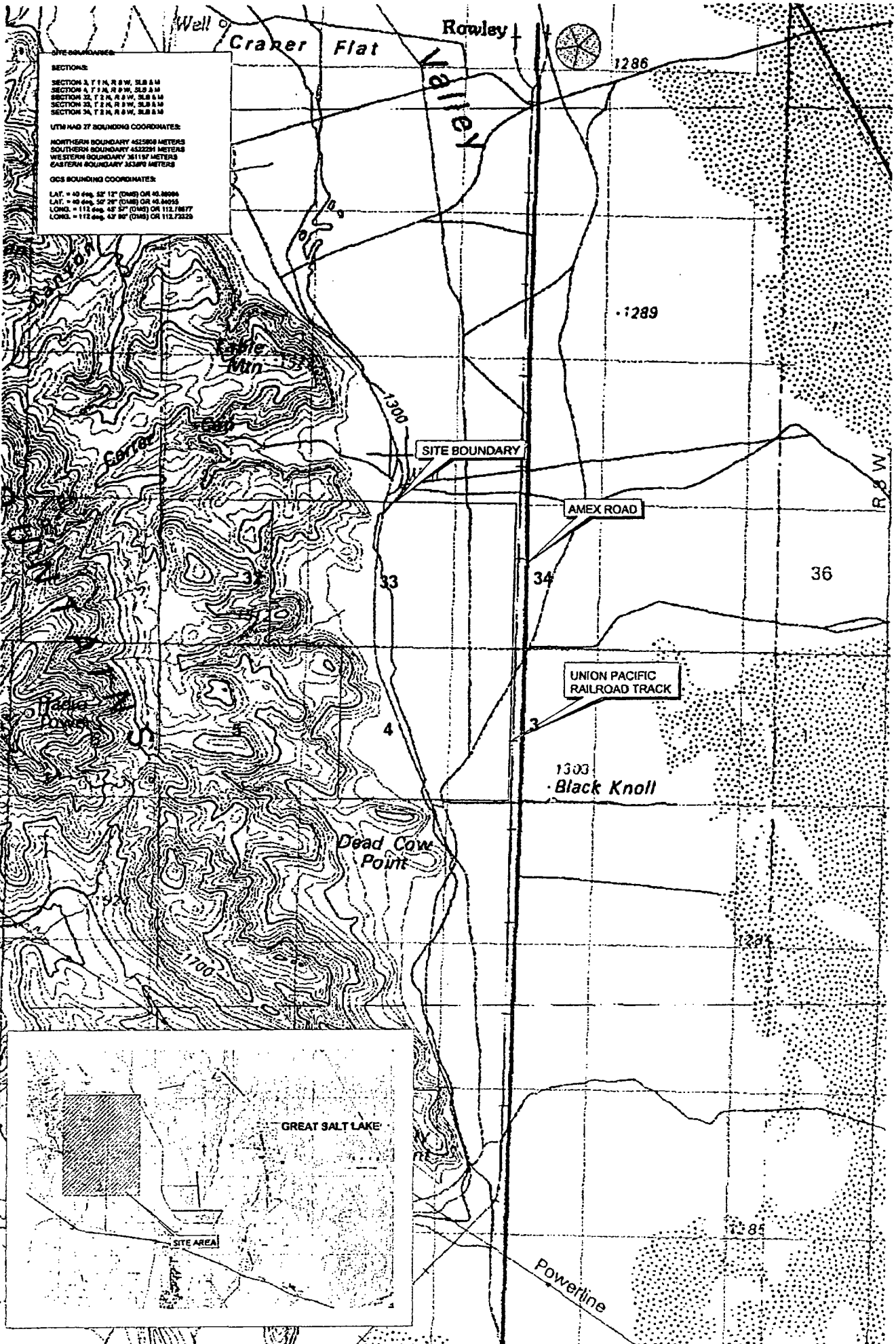


James L. Dykmann
Deputy State Historic
Preservation Officer - Archaeology

JLD:03-1127 OR

APPENDIX 3.2
Endangered/Threatened Species

ONE BOUNDARY:
 SECTIONS:
 SECTION 3, T 2 N, R 9 W, S 8 & M
 SECTION 4, T 2 N, R 9 W, S 8 & M
 SECTION 32, T 2 N, R 9 W, S 8 & M
 SECTION 33, T 2 N, R 9 W, S 8 & M
 SECTION 34, T 2 N, R 9 W, S 8 & M
 UTM HAD 27 BOUNDING COORDINATES:
 NORTHERN BOUNDARY 452500 METERS
 SOUTHERN BOUNDARY 452200 METERS
 WESTERN BOUNDARY 361157 METERS
 EASTERN BOUNDARY 363070 METERS
 GCS BOUNDING COORDINATES:
 LAT. = 40 46p 52' 12" (DMS) OR 40.76994
 LAT. = 40 46p 52' 20" (DMS) OR 40.80056
 LONG. = 112 46p 45' 57" (DMS) OR 112.78177
 LONG. = 112 46p 45' 59" (DMS) OR 112.78329





State of Utah

Department of
Natural Resources

Division of
Wildlife Resources

ROBERT L. MORGAN
Executive Director

KEVIN K. CONWAY
Division Director

OLENE S. WALKER
Governor

GAYLE F. McKEACHNIE
Lieutenant Governor

May 6, 2004

Boris Petkovic
PSOMAS
2825 E. Cottonwood Pkwy, Suite 120
Salt Lake City, UT 84121

Dear Mr. Petkovic:

I am writing in response to your email dated May 5, 2004 for information regarding species of special concern proximal to a proposed project site located south of Rowley, Utah.

The Utah Division of Wildlife Resources (UDWR) does not have records of occurrence for any threatened, endangered, or sensitive species near the proposed project site.

The information provided in this letter is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, and because data requests are evaluated for the specific type of proposed action, any given response is only appropriate for its respective request.

In addition to the information you requested, other significant wildlife values might also be present on the designated site. Please contact UDWR's habitat manager for the central region, Doug Sakaguchi, at (801) 491-5678 if you have any questions.

Please contact our office at (801) 538-4759 if you require further assistance.

Sincerely,

Lenora B. Sullivan
Information Manager
Utah Natural Heritage Program

Endangered and Threatened Animals of Utah

1998

Acknowledgments

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Utah State University Extension Service
Department of Fisheries and Wildlife
The Jack H. Berryman Institute
Utah Division of Wildlife
U.S. Fish and Wildlife Service
Office of Extension and Publications

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Quinney Professorship for Wildlife Conflict Management

This bulletin was developed under the auspices of the Quinney Professorship for Wildlife Conflict Management through the sponsorship of the S. J. and Jessie E. Quinney Foundation in partnership with the College of Natural Resources, Jack H. Berryman Institute for Wildlife Damage Management, U.S. Fish and Wildlife Service, Utah Department of Natural Resources, and Utah Division of Wildlife Resources.

Contents

| | |
|---|------|
| Purpose of this Guide | iii |
| Introduction | v |
| What are endangered and threatened species? | vi |
| Why some species become endangered or threatened? | vi |
| Why protect endangered species? | vi |
| The Federal Endangered Species Act of 1973 (ESA) | viii |
| Mammals | |
| Black-footed Ferret | 1 |
| Grizzly Bear | 5 |
| Gray Wolf | 9 |
| Utah Prairie Dog | 13 |
| Birds | |
| Bald Eagle | 17 |
| Peregrine Falcon | 21 |
| Mexican Spotted Owl | 25 |
| Southwestern Willow Flycatcher | 29 |
| Fishes | |
| Humpback Chub | 33 |
| Bonytail | 35 |
| Razorback Sucker | 37 |
| June Sucker | 39 |
| Virgin River Chub | 41 |
| Colorado Squawfish | 43 |
| Woundfin | 45 |
| Reptiles | |
| Desert Tortoise | 47 |
| Invertebrates | |
| Kanab Ambersnail | 49 |
| Utah Valvata | 51 |
| Utah Sensitive Species List | 53 |
| Sensitive Bird Species of Utah | 56 |
| Sensitive Mammal Species of Utah | 57 |
| Sensitive Amphibian Species of Utah | 58 |
| Sensitive Reptile Species of Utah | 58 |
| Sensitive Fish Species of Utah | 59 |
| Sensitive Mollusk Species of Utah | 60 |

Peregrine Falcon

(*Falco peregrinus*)—Endangered

Description

The peregrine is a relatively large falcon (16-20" tall) with a wing-span of 3 to 4 feet; all falcons are distinguished from other raptors by their pointed wings. Peregrine adults have a distinctive black "helmet" (black crown and back of neck with a black wedge extending below the eye). Adults also have a steel blue to black back with light horizontal barring across the chest and belly. Immatures have a brown "helmet" and back and have vertical streaks on the chin, chest and belly. Prairie Falcons (*Falco mexicanus*) are similar to immature peregrines but are usually a lighter brown and have distinctive black "arm-pits" (axillaries).

Distribution and Habitat

The subspecies which breeds in Utah is the American Peregrine Falcon (*F.p. anatum*); The Arctic subspecies (*F.p. tundrius*) occurs occasionally during the winter.



Photo courtesy of US Fish and Wildlife Service

The nesting population in Utah is increasing and breeding sites occur in the Utah Mountain, Basin and Range, Mojave and Colorado Plateau ecoregions. The largest concentrations are along the Colorado River and its tributaries in the southeastern portion of the state. The historic distribution is well documented along the Wasatch Front, but is less well understood for the remote and rugged canyon country of southern Utah.

Peregrines nest on tall cliffs (usually below 6000 feet elevation) near and often directly above streams, rivers, or reservoirs, though some sites can be several miles from water. Nests are shallow scrapes placed in cracks, holes, and small caves on cliff faces. Peregrines forage on a variety of birds which are associated with open water, streamside, wetland, cliff, and open meadow habitats. Typical prey includes waterfowl, shorebirds, doves, swallows, swifts and meadow-larks.

Life History

While many peregrines migrate from Utah in the winter, some remain throughout the year. While nesting dates may vary across the state, courtship displays in the breeding area usually begin around late March and early April. In mid to late April, the female scrapes a shallow depression in which she lays 3-4 (sometimes 5) eggs. Incubation is done primarily by the female and lasts from 29 to 32 days. During the incubation period, the male frequently delivers food items to the female. Hatching usually occurs in late May; nestlings are tended by both adults and fledge when they are about 35 to 42 days old (June-July). Immatures may remain in the nest area until September or

October, where they can be seen with the adults.

The timing of fall migration can vary with local conditions, but usually begins in late September or early October. Adults often migrate before immature birds. Wintering destinations also vary widely, with some peregrines remaining in Utah year-round. Most Utah migrants probably winter in the southwestern US and portions of west Mexico, though some may travel as far as South America. Migrants may return to their Utah breeding grounds as early as February in some years.

Threats and Reasons for Decline

Peregrine populations declined dramatically in the 1940's-1960's. Much of the decline can be attributed to the effects of pesticide residues (particularly residues of organochlorines such as DDT) which caused egg shell thinning and lead to decreased productivity. Other factors that probably contributed to the population decline include climatic change (long-term drying of wetlands), botulism, and human disturbance (shooting, nest site disturbance, etc.).

Peregrine populations have rebounded since the late 1960's, particularly after 1985. This population recovery has been so dramatic that the species is currently being considered for delisting or downlisting (from Endangered to Threatened). In Utah, the number of nesting peregrines has increased greatly, and the distribution of peregrines has expanded. Some of the increase and expansion probably represents the discovery of previously unknown nesting areas.

Several threats still exist to the peregrine in Utah. The primary threat is loss of foraging habitat and disturbance of nest sites associated with urban encroachment along the Wasatch Front.

Also, increased outdoor recreation poses a potential threat to nest sites even in remote locations of Utah. Outbreaks of botulism (a disease which can cause adult mortality) regularly occur in the state's wetlands, particularly around the Great Salt Lake. And, while the use of organochlorines has been banned on the breeding grounds, peregrines are exposed to a variety of pesticides, including organochlorines, on their wintering grounds. Several pesticides are used on breeding season foraging areas, and their influence on peregrine productivity is not well understood.

Recovery Efforts

The American Peregrine Falcon Rocky Mountain/Southwest Population Recovery Plan was published in 1984. This plan outlines the steps which need to be taken in order to recover the peregrine population in Utah and many other western states.

Utah has been very active in recovery efforts. Peregrine nest sites and adjacent habitats are protected and a significant portion of nest sites are monitored annually to determine occupancy and productivity (number of young produced). Peregrines have been reintroduced around the Great Salt Lake on a number of nesting towers (which are still maintained and regularly used by peregrines). Information on nest site locations, occupancy, and productivity is being compiled to determine the magnitude of the peregrine population increase in Utah. In addition, Utah is working closely with other southwestern states to assess the extent of population recovery. Utah's recovery efforts have been made possible through close coordination of several state and federal agencies, nongovernmental

organizations, universities, researchers, private corporations, and private landowners.

How You Can Help

You can help by reporting the location of peregrine nesting sites to regional Utah Division of Wildlife Resources offices; if the nest is on federal land, you can report the site to the local office of the Bureau of Land Management, National Park Service, or U.S. Forest Service. If you see an adult peregrine fly into a crack or cave in a tall (>100 ft) cliff during the spring or summer, it is likely a nesting site. Also, nestling peregrines can often be observed standing on the cliff face near the nest site.

If you find an injured falcon, contact your local Utah Division of Wildlife Resources office. They will help recover the birds and find the nearest raptor rehabilitator. If you find a dead peregrine or witness a shooting or other illegal activity, contact any state or federal law enforcement office and notify them of its location. You should not pick up a dead falcon since it may have been poisoned.

Where To Learn More

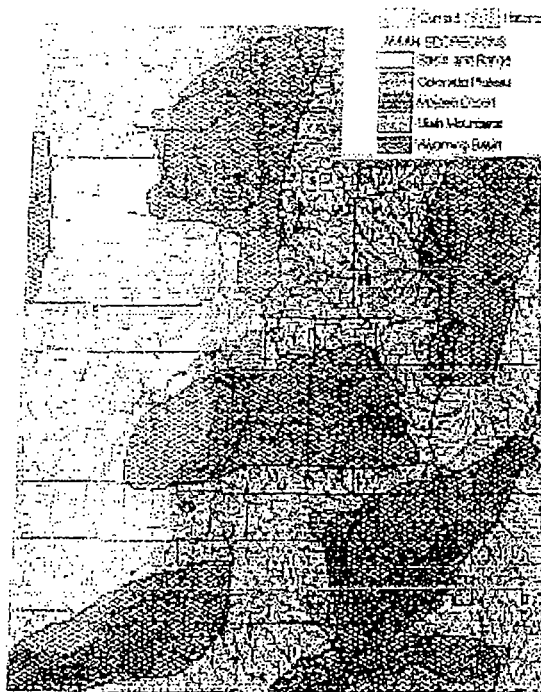
Several books on Peregrine Falcons and raptors are available at bookstores and libraries. These range from technical to general accounts. Other educational materials such as video tapes and CDROMs are available through specialty (nature) bookstores and (wild) bird shops. Web sites can be found by searching for the keywords "Peregrine Falcons," "falcons," "hawks," "raptors," and "birds of prey."

For More Information

Nongame Avian Program Coordinator
Utah Division of Wildlife Resources
1594 W. North Temple, Suite 2110
PO Box 146301
Salt Lake City, UT 84114-6301
801-538-4764

or

U.S. Fish and Wildlife Service
Utah Field Office
145 East 1300 South, Suite 404
Salt Lake City, UT 84115
801-524-5001



Peregrine Falcon distribution.



Peregrine Falcon habitat photocourtesy of Gar Workman.

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- U.S. Fish and Wildlife Service. 1984. American Peregrine Falcon Recovery Plan (Rocky Mountain/Southwest Population). U.S. Fish and Wildlife Service, Denver, Colo.

Utah Sensitive Species List

(February 1998)

Definitions

- A. **Wildlife:** the purposes of this list, includes all vertebrate animals, crustaceans, including brineshrimp and crayfish; and mollusks in Utah that are living in nature, except feral animals.
- B. **Extinct Species:** any wildlife species that has disappeared in the world.
- C. **Extirpated Species:** any wildlife species that has disappeared from Utah since 1800.
- D. **State Endangered Species:** any wildlife species or subspecies which is threatened with extirpation from Utah or extinction resulting from very low or declining numbers, alteration and/or reduction of habitat, detrimental environmental changes, or any combination of the above. Continued long-term survival is unlikely without implementation of special measures. A management program is needed for these species if a Recovery Plan has not been developed.
- E. **State Threatened Species:** any wildlife species or subspecies which is likely to become an endangered species within the foreseeable future throughout all or a significant part of its range in Utah or the world. A management program is needed for these species if a Recovery Plan has not been developed.
- F. **Species of Special Concern:** any wildlife species or subspecies that has experienced a substantial decrease in population, distribution and/or habitat availability (**SP**), or occurs in limited areas and/or numbers due to a restricted or specialized habitat (**SD**), or has both a declining population and a limited range (**SP/SD**). A management program, including protection or enhancement, is needed for these species.
- G. **Conservation Species:** any wildlife species or subspecies, except those species currently listed under the Endangered Species Act as Threatened or Endangered, that meets the state criteria of Endangered, Threatened or of Special Concern, but is currently receiving sufficient special management under a Conservation Agreement developed and/or implemented by the state to preclude its listing above. In the event that the conservation agreement is not implemented, the species will be elevated to the appropriate category.

Sensitive Bird Species of Utah

Extinct Species

Passenger Pigeon (*Ectopistes migratorius*)

State Endangered Species

American Peregrine Falcon (*Falco peregrinus anatum*)¹

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)¹

State Threatened Species

Bald Eagle (*Haliaeetus leucocephalus*)²

Ferruginous Hawk (*Buteo regalis*)

Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)

Mexican Spotted Owl (*Strix occidentalis lucida*)²

Species of Special Concern

(SP: Due to declining populations)

Northern Goshawk (*Accipiter gentilis*)

Swainson's Hawk (*Buteo swainsoni*)

Caspian Tern (*Sterna caspia*)

Black Tern (*Chlidonias niger*)

Burrowing Owl (*Athene cunicularia*)

Common Yellowthroat (*Geothlypis trichas*)

Short-eared Owl (*Asio flammeus*)

(SD: Due to limited distribution)

American White Pelican (*Pelecanus erythrorhynchos*)

California Condor (*Gymnogyps californianus*)

Osprey (*Pandion haliaetus*)

Sharp-tailed Grouse (*Tympanuchus phasianellus columbianus*)

Williamson's Sapsucker (*Sphyrapicus thyroideus*)

Three-toed Woodpecker (*Picoides tridactylus*)

(SP/SD: Due to declining populations and limited distribution)

Sage Grouse (*Centrocercus urophasianus*)

Mountain Plover (*Charadrius montanus*)³

Long-billed Curlew (*Numenius americanus*)

Black Swift (*Cypseloides niger*)

Lewis' Woodpecker (*Melanerpes lewis*)

Crissal Thrasher (*Toxostoma crissale*)

Bell's Vireo (*Vireo bellii*)

Grasshopper Sparrow (*Ammodramus saxatilis*)

Blue Grosbeak (*Guiraca caerulea*)

Bobolink (*Dolichonyx oryzivorus*)

¹Species is federally listed as Endangered

²Species is federally listed as Threatened

³Species is federally listed as Candidate

Sensitive Mammal Species of Utah

Extirpated

Grizzly Bear (*Ursus arctos*)
Fisher (*Martes pennanti*)
Gray Wolf (*Canis lupus*)

State Endangered Species

Black-footed Ferret (*Mustela nigripes*)¹

State Threatened Species

Utah Prairie Dog (*Cynomys parvidens*)²
Wolverine (*Gulo gulo*)

Species of Special Concern

(SP: Due to declining populations)

Spotted Bat (*Euderma maculatum*)

(SD: Due to limited distribution)

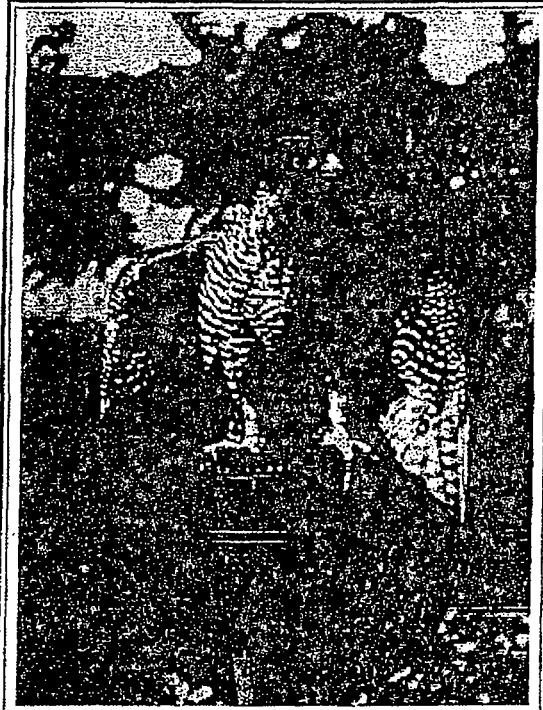
Allen's Big-eared Bat (*Idionycteris phyllotis*)
Fringed Myotis (*Myotis thysanodes*)
Dwarf Shrew (*Sorex nanus*)
Desert Shrew (*Notiosorex craufordii*)
Abert's Squirrel (*Sciurus aberti navajo*)
Belding Ground Squirrel (*Spermophilus beldingi*)
Thirteen-lined Ground Squirrel (*Spermophilus tridecemlineatus*)
Spotted Ground Squirrel (*Spermophilus pilosoma*)
Wyoming Ground Squirrel (*Spermophilus elegans*)
Yellow Pine Chipmunk (*Tamias amoenus*)
Rock Pocket Mouse (*Chaetodipus intermedius*)
Olive-backed Pocket Mouse (*Perognathus fasciatus*)
Merriam's Kangaroo Rat (*Dipodomys merriami*)
Chisel-toothed Kangaroo Rat (*Dipodomys microps celsus*)
Cactus Mouse (*Peromyscus eremicus*)
Southern Grasshopper Mouse (*Onychomys torridus*)
Martens (*Martes americana*)
Pika (*Ochotona princeps*)
Ringtail (*Bassariscus astutus*)
Northern Flying Squirrel (*Glaucomys sabrinus*)

(SP/SD: Due to declining populations and limited distribution)

Western Red Bat (*Lasturus blossevillii*)
Big Free-tailed Bat (*Nyctinomops macrotis*)
Brazilian Free-tailed Bat (*Tadarida brasiliensis mexicana*)
Townsend's Big-eared Bat (*Plecotus townsendii*)
Desert Kangaroo Rat (*Dipodomys deserti*)
Northern Rock Mouse (*Peromyscus nasutus*)
Stephen's Woodrat (*Neotoma stephensi*)
Virgin River Montane Vole (*Microtus montanus rivularis*)
Mexican vole (*Microtus mexicanus*)
Northern River Otter (*Lutra canadensis*)
North American Lynx (*Felis lynx canadensis*)

¹Species is federally listed as Endangered

²Species is federally listed as Threatened

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STATE OF UTAH
NATURAL RESOURCES
Division of Wildlife Resources

Common Name

PEREGRINE FALCON

Scientific Name

FALCO PEREGRINUS

[View Utah Distribution Map](#)

Photo by Unknown Photographer
Photo Courtesy of Utah Division of Wildlife Resources

Although the peregrine falcon, *Falco peregrinus*, is still rare in Utah, it has become much more abundant throughout its range in recent years. The widespread use of the pesticide DDT in the 1940s, 1950s, and 1960s caused a drastic reduction in peregrine falcon numbers (and in the numbers of other raptor species) throughout North America. It was eventually determined that DDT was moving up the food chain and causing raptors to lay thin-shelled eggs that would often break during incubation. DDT was banned in early 1970s, which allowed the peregrine falcon to start its recovery. By August 1999, the peregrine falcon had recovered to the point that it was removed from the Federal endangered species list.

Birds captured in flight are the main food item for the peregrine falcon. The species is distributed very widely, breeding in a variety of habitats on every continent except Antarctica. Eggs are incubated for about one month and the average clutch size is four. The peregrine falcon is the world's fastest bird, capable of attaining speeds of over 200 miles per hour.

Sources:

- Biological and Conservation Database. 2002. Utah Division of Wildlife Resources, The Nature Conservancy, and NatureServe.



State of Utah
Department of Natural Resources
Division of Wildlife Resources

Utah Sensitive Species List

December 18, 2003

This list has been prepared pursuant to Utah Division of Wildlife Resources Administrative Rule R657-48. By rule, wildlife species that are federally listed, candidates for federal listing, or for which a conservation agreement is in place automatically qualify for the *Utah Sensitive Species List*. The additional species on the *Utah Sensitive Species List*, "wildlife species of concern," are those species for which there is credible scientific evidence to substantiate a threat to continued population viability. It is anticipated that wildlife species of concern designations will identify species for which conservation actions are needed, and that timely and appropriate conservation actions implemented on their behalf will preclude the need to list these species under the provisions of the federal Endangered Species Act. Please see Appendix A for the rationale behind each wildlife species of concern designation.

Utah Sensitive Species List

Birds

Federal Candidate Species

Gunnison Sage-grouse
Yellow-billed Cuckoo

Centrocercus minimus
Coccyzus americanus

Federally Threatened Species

Bald Eagle
Mexican Spotted Owl

Haliaeetus leucocephalus
Strix occidentalis lucida

Federally Endangered Species

California Condor (experimental)
Whooping Crane (extirpated)
Southwestern Willow Flycatcher

Gymnogyps californianus
Grus americana
Empidonax traillii extimus

Conservation Agreement Species

Northern Goshawk

Accipiter gentilis

Wildlife Species of Concern

Grasshopper Sparrow
Short-eared Owl
Burrowing Owl
Ferruginous Hawk
Greater Sage-grouse
Black Swift
Bobolink
Lewis's Woodpecker
Long-billed Curlew
American White Pelican
Three-toed Woodpecker
Sharp-tailed Grouse

Ammodramus savannarum
Asio flammeus
Athene cunicularia
Buteo regalis
Centrocercus urophasianus
Cypseloides niger
Dolichonyx oryzivorus
Melanerpes lewis
Numenius americanus
Pelecanus erythrorhynchos
Picoides tridactylus
Tympanuchus phasianellus

Utah's State Listed Species by County

Disclaimer: This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS); other species of special concern likely occur in Utah Counties. This list includes both current and historic records. (Last updated on February 27, 2004).

Beaver County

| <u>Common Name</u> | <u>Scientific Name</u> | <u>State Status</u> |
|----------------------------|----------------------------|---------------------|
| BALD EAGLE | HALIAEETUS LEUCOCEPHALUS | S-ESA |
| BIG FREE-TAILED BAT | NYCTINOMOPS MACROTIS | SPC |
| BONNEVILLE CUTTHROAT TROUT | ONCORHYNCHUS CLARKI UTAH | CS |
| BURROWING OWL | ATHENE CUNICULARIA | SPC |
| CALIFORNIA CONDOR | GYMNOGYPS CALIFORNIANUS | S-ESA |
| DARK KANGAROO MOUSE | MICRODIPODOPS MEGACEPHALUS | SPC |
| FERRUGINOUS HAWK | BUTEO REGALIS | SPC |
| FRINGED MYOTIS | MYOTIS THYSANODES | SPC |
| GREATER SAGE-GROUSE | CENTROCERCUS UROPHASIANUS | SPC |
| HAMLIN VALLEY PYRG | PYRGULOPSIS HAMLINENSIS | SPC |
| KIT FOX | VULPES MACROTIS | SPC |
| LEAST CHUB | IOTICHTHYS PHLEGETHONTIS | CS |
| LONG-BILLED CURLEW | NUMENIUS AMERICANUS | SPC |
| NORTHERN GOSHAWK | ACCIPITER GENTILIS | CS |
| PYGMY RABBIT | BRACHYLAGUS IDAHOENSIS | SPC |
| SHORT-EARED OWL | ASIO FLAMMIBUS | SPC |
| THREE-TOED WOODPECKER | PECOIDES TRIDACTYLUS | SPC |
| TOWNSEND'S BIG-EARED BAT | CORYNORHINUS TOWNSENDII | SPC |
| UTAH PRAIRIE-DOG | CYNOMYS PARVIDENS | S-ESA |

Box Elder County

| <u>Common Name</u> | <u>Scientific Name</u> | <u>State Status</u> |
|----------------------------|------------------------------|---------------------|
| AMERICAN WHITE PELICAN | PELECANUS ERYTHORHYNCHOS | SPC |
| BALD EAGLE | HALIAEETUS LEUCOCEPHALUS | S-ESA |
| BLUEHEAD SUCKER | CATOSTOMUS DISCOBOLUS | SPC |
| BOBOLINK | DOLICHONYX ORYZIVORUS | SPC |
| BONNEVILLE CUTTHROAT TROUT | ONCORHYNCHUS CLARKI UTAH | CS |
| BURROWING OWL | ATHENE CUNICULARIA | SPC |
| DESERET MOUNTAIN SNAIL | OREOHELIX PERIPHERICA | SPC |
| FAT-WHORLED POND SNAIL | STAGNICOLA BONNEVILLENENSIS | S-ESA |
| FERRUGINOUS HAWK | BUTEO REGALIS | SPC |
| GRASSHOPPER SPARROW | AMMODRAMUS SAVANNARUM | SPC |
| GRAY WOLF | CANIS LUPUS | S-ESA |
| GREATER SAGE-GROUSE | CENTROCERCUS UROPHASIANUS | SPC |
| JUNE SUCKER | CHASMISTES LIORUS | S-ESA |
| KIT FOX | VULPES MACROTIS | SPC |
| LAMONTAN CUTTHROAT TROUT | ONCORHYNCHUS CLARKI HENSHAWI | S-ESA |
| LEAST CHUB | IOTICHTHYS PHLEGETHONTIS | CS |
| LEWIS'S WOODPECKER | MELANERPES LEWIS | SPC |
| LONG-BILLED CURLEW | NUMENIUS AMERICANUS | SPC |

Summit County (con't)

| <u>Common Name</u> | <u>Scientific Name</u> | <u>State Status</u> |
|-----------------------|---------------------------|---------------------|
| FERRUGINOUS HAWK | BUTEO REGALIS | SPC |
| GREATER SAGE-GROUSE | CENTROCERCUS UROPHASIANUS | SPC |
| LEATHERSIDE CHUB | GILA COPEI | SPC |
| LEWIS'S WOODPECKER | MELANERPES LEWIS | SPC |
| LONG-BILLED CURLEW | NUMENIUS AMERICANUS | SPC |
| NORTHERN GOSHAWK | ACCIPITER GENTILIS | CS |
| THREE-TOED WOODPECKER | PICOIDES TRIDACTYLUS | SPC |
| WESTERN PEARLSHELL | MARGARITIFERA FALCATA | SPC |
| WESTERN TOAD | BUFO BOREAS | SPC |

Tooele County

| <u>Common Name</u> | <u>Scientific Name</u> | <u>State Status</u> |
|---------------------------------|----------------------------|---------------------|
| AMERICAN WHITE PELICAN | PELECANUS ERYTHORHYNCHOS | SPC |
| BALD EAGLE | HALIAEETUS LEUCOCEPHALUS | S-ESA |
| BOBOLINK | DOLICHONYX ORYZIVORUS | SPC |
| BONNEVILLE CUTTHROAT TROUT | ONCORHYNCHUS CLARKI UTAH | CS |
| BURROWING OWL | ATHENE CUNICULARIA | SPC |
| CALIFORNIA FLOATER | ANODONTA CALIFORNIENSIS | SPC |
| COLUMBIA SPOTTED FROG | RANA LUTEIVENTRIS | CS |
| DARK KANGAROO MOUSE | MICRODIPODOPS MEGACEPHALUS | SPC |
| EUREKA MOUNTAINSNAIL | OREOHELIX EUREKENSIS | SPC |
| FERRUGINOUS HAWK | BUTEO REGALIS | SPC |
| GRASSHOPPER SPARROW | AMMODRAMUS SAVANNARUM | SPC |
| GREATER SAGE-GROUSE | CENTROCERCUS UROPHASIANUS | SPC |
| KIT FOX | VULPES MACROTIS | SPC |
| LEAST CHUB | IOTICHTHYS PHELEGETHONTIS | CS |
| LEWIS'S WOODPECKER | MELANERPES LEWIS | SPC |
| LONG-BILLED CURLEW | NUMENIUS AMERICANUS | SPC |
| LYRATE MOUNTAINSNAIL | OREOHELIX HAYDENI | SPC |
| NORTHERN GOSHAWK | ACCIPITER GENTILIS | CS |
| NORTHWEST BONNEVILLE PYRG | PYRGULOPSIS VARIEGATA | SPC |
| PREBLE'S SHREW | SOREX PREBLEI | SPC |
| PYGMY RABBIT | BRACHYLAGUS (DAHOENSIS) | SPC |
| SHORT-EARED OWL | ASIO FLAMMEUS | SPC |
| SOUTHERN BONNEVILLE SPRINGSNAIL | PYRGULOPSIS TRANSVERSA | SPC |
| SOUTHERN TIGHTCOIL | OGARIDISCUS SUBRUPICOLA | SPC |
| TOWNSEND'S BIG-EARED BAT | CORYNORHINUS TOWNSENDII | SPC |
| UTAH PHYSA | PHYSELLA UTAHENSIS | SPC |
| YELLOW-BILLED CUCKOO | COCCYZUS AMERICANUS | S-ESA |

Uintah County

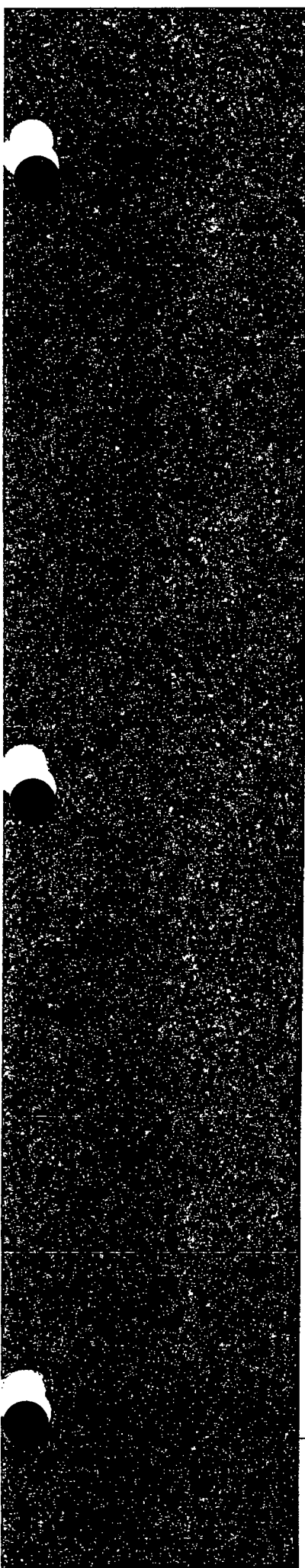
| <u>Common Name</u> | <u>Scientific Name</u> | <u>State Status</u> |
|------------------------|--------------------------|---------------------|
| AMERICAN WHITE PELICAN | PELECANUS ERYTHORHYNCHOS | SPC |
| BALD EAGLE | HALIAEETUS LEUCOCEPHALUS | S-ESA |
| BIG FRES-TAILED BAT | NYCTINOMOPS MACROTIS | SPC |
| BLACK SWIFT | CYPSELOIDES NIGER | SPC |

Weber County (con't)

| <u>Common Name</u> | <u>Scientific Name</u> | <u>State Status</u> |
|----------------------------|------------------------------------|---------------------|
| BONNEVILLE CUTTHROAT TROUT | ONCORHYNCHUS CLARKI UTAH | CS |
| BURROWING OWL | ATHENE CUNICULARIA | SPC |
| COLUMBIA SPOTTED FROG | RANA LUTEIVENTRIS | CS |
| DESERET MOUNTAINSNAIL | OREOHELIX PERIPHERICA | SPC |
| FERRUGINOUS HAWK | BUTEO REGALIS | SPC |
| GRASSHOPPER SPARROW | AMMODRAMUS SAVANNARUM | SPC |
| GRAY WOLF | CANIS LUPUS | S-ESA |
| GREATER SAGE-GROUSE | CENTROCERCUS UROPHASIANUS | SPC |
| JUNE SUCKER | CHASMISTES LIORUS | S-ESA |
| KIT FOX | VULPES MACROTIS | SPC |
| LEWIS'S WOODPECKER | MELANERPES LEWIS | SPC |
| LONG-BILLED CURLEW | NUMENIUS AMERICANUS | SPC |
| LYRATE MOUNTAINSNAIL | OREOHELIX HAYDENI | SPC |
| NORTHERN GOSHAWK | ACCIPITER GENTILIS | CS |
| SHARP-TAILED GROUSE | TYMPANUCHUS PHASIANELLUS | SPC |
| SHORT-EARED OWL | ASIO FLAMMEUS | SPC |
| TOWNSEND'S BIG-EARED BAT | CORYNORHINUS TOWNSENDII | SPC |
| WASATCH MOUNTAINSNAIL | OREOHELIX PERIPHERICA WASATCHENSIS | S-ESA |
| YELLOW-BILLED CUCKOO | COCCYZUS AMERICANUS | S-ESA |

Key to State Status Field

| <u>Symbol</u> | <u>Definition</u> |
|---------------|--|
| S-ESA | Federally-listed or candidate species under the Endangered Species Act. |
| SPC | Wildlife species of concern. |
| CS | Species receiving special management under a Conservation Agreement in order to preclude the need for Federal listing. |



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**REVISED GEOTECHNICAL REPORT
WASATCH REGIONAL
SOLID WASTE LANDFILL
TOOELE COUNTY, UTAH**

Prepared For:

PSOMAS

File No.: 35467.003

November 29, 2004

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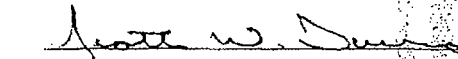
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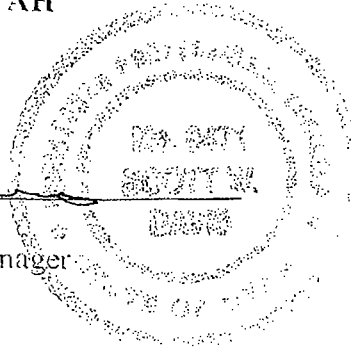
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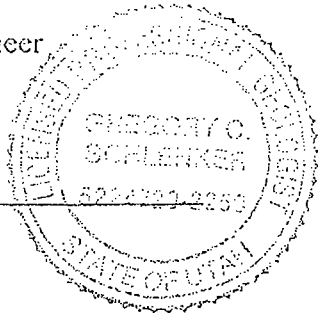
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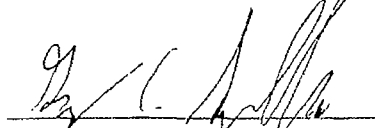
**REVISED GEOTECHNICAL REPORT
WASATCH REGIONAL SOLID WASTE LANDFILL
TOOELE COUNTY, UTAH**


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TABLE OF CONTENTS

| <u>SECTION</u> | <u>PAGE</u> |
|---|-------------|
| 1. INTRODUCTION..... | 1 |
| 1.1 Purpose and Scope of Work..... | 1 |
| 1.2 Description..... | 1 |
| 2. INVESTIGATION PROCEDURES..... | 3 |
| 2.1 Field Exploration..... | 3 |
| 2.1.1 Geotechnical Exploration..... | 3 |
| 2.1.2 Geological Exploration..... | 4 |
| 2.2 Laboratory Testing..... | 4 |
| 3. GENERAL SITE CONDITIONS..... | 5 |
| 3.1 Surface Conditions..... | 5 |
| 3.2 Subsurface Conditions..... | 5 |
| 3.2.1 Soils..... | 5 |
| 3.2.2 Groundwater..... | 6 |
| 4. GEOLOGIC CONDITIONS..... | 9 |
| 4.1 Geologic Setting..... | 9 |
| 4.2 Geologic Hazards..... | 10 |
| 4.2.1 Seismicity..... | 10 |
| 4.2.2 Surface Fault Rupture Hazards..... | 13 |
| 4.2.3 Liquefaction Hazards..... | 14 |
| 4.2.4 Flooding and Debris Flows..... | 15 |
| 4.2.5 Seiche..... | 15 |
| 4.2.6 Landslide Hazards..... | 16 |
| 4.2.7 Subsidence Hazards..... | 16 |
| 5. ENGINEERING EVALUATION AND RECOMMENDATIONS..... | 17 |
| 5.1 General Conclusions..... | 17 |
| 5.2 Earthwork..... | 17 |
| 5.2.1 Subgrade Preparation..... | 17 |
| 5.2.2 Excavatability..... | 18 |
| 5.2.3 Landfill Design..... | 18 |
| 5.2.4 Fill Placement and Compaction..... | 19 |
| 5.3 Stability..... | 19 |
| 5.4 Settlement..... | 22 |
| 5.5 Other Design Aspects..... | 22 |
| 6. CLOSURE..... | 23 |
| 6.1 Limitations..... | 23 |
| 6.2 Additional Services..... | 24 |
| 7. REFERENCES..... | 25 |

TABLE OF CONTENTS
(continued)

| | | <u>PAGE</u> |
|---------------|--|-------------|
| TABLES | | |
| I | Quaternary Faults Within a 62-Mile (100-km) Radius of Proposed Site..... | 11 |

APPENDICES

| | | | |
|---|-------|---|--|
| A | 1 | Site Vicinity Map | |
| | 2 | Site Engineering Geology | |
| | 3 | Quaternary Fault Map | |
| | 4 | Probabilistic Peak Horizontal Acceleration – 10% in 50 Years | |
| | 5 | Probabilistic Peak Horizontal Acceleration – 2% in 50 Years | |
| | 6 | Boring & Test Pit Location Drawing | |
| | 7-49 | Boring & Test Pit Logs | |
| | 50 | Key to Soil Symbols and Terms | |
| B | 1-5 | Summary of Laboratory Test Results | |
| | 6-11 | Plasticity Chart | |
| | 12-18 | Grain Size Distribution | |
| | 19-30 | Consolidation Test Results & Time Rate Consolidation | |
| | 31 | Unconfined Compression Test | |
| | 32-34 | Direct Shear Test | |
| C | | Water Quality Tests (Inorganic Analysis Report & QC Summary Report) | |
| D | | Liquefaction and Lateral Spread Analysis Results | |
| E | | Stability Analysis Results | |
| | 1 | Landfill Berm, 3:1 Slope, Static Condition | |
| | 2 | Landfill Berm, 3:1 Slope, Seismic Condition | |
| | 3 | Landfill Berm, 3:1 Slope, Full Cell, Static Condition | |
| | 4 | Landfill Berm, 3:1 Slope, Full Cell, Seismic Condition | |
| | 5 | Landfill Waste, 4:1 Slope, Full Cell, Static Condition | |
| | 6 | Landfill Waste, 4:1 Slope, Full Cell, Seismic Condition | |
| | 7 | Landfill Waste, Working Face, 3:1 Slope, Static Condition | |
| | 8 | Landfill Waste, Working Face, 3:1 Slope, Seismic Condition | |
| F | | Important Information About Your Geotechnical Report | |

I. INTRODUCTION

I.1 PURPOSE AND SCOPE OF WORK

This report presents the results of the geotechnical and geological exploration, testing, evaluation, and preliminary recommendations for the proposed Wasatch Regional Solid Waste Landfill site located near Rowley in Tooele County, Utah. This report was revised to incorporate comments from the State of Utah, Department of Environmental Quality Requests for Additional Information #1 (03/24/04), #2 (09/03/04) and #3 (11/03/04) and is intended to support efforts for obtaining a landfill permit for a 2000-acre parcel and to provide preliminary design information for portions of the parcel. The general location of the project site is indicated on the Site Vicinity Map, Figure A-1, included in Appendix A.

In general, the geotechnical work included subsurface exploration, representative soil sampling, water sampling, field and laboratory testing, geological reconnaissance, engineering and geological analyses, and preparation of this report. This report focuses on evaluation of the subsurface conditions encountered during subsurface exploration, the nature and engineering properties of the subsurface soils, and provides preliminary geotechnical and geological conclusions and recommendations regarding the proposed landfill. The work performed for this report was authorized by Psomas, and was conducted in accordance with our proposals dated September 9 and October 17, 2003.

I.2 DESCRIPTION

The proposed ±2,000-acre landfill site is located approximately three miles south of Rowley, Utah. Development plans for the 2,000-acre site are currently preliminary and conceptual, but we understand the landfill could be as high as 100 feet or more above existing grade. Landfill material will be placed on a leachate collection system overlying a liner, and a cap will be placed over the landfill for closure. Each day as landfill operations wind down, a soil cover will be placed on top of newly placed landfill material. The bottom liner may consist of 18 inches of

soil overlying a drainage layer (gravel or a drainage composite material) and an HDPE liner on top of a geocomposite lining (GCL) material. Once the landfill reaches design height, the top and sides of the landfill material will be capped. The cap material may consist of a minimum 6-inch soil cover overlying a 60-mil HDPE geomembrane underlain by a GCL material. If possible, it is desired that soil material for the clay liner, cap and daily cover be obtained from soils removed from beneath the landfill footprint and from borrow areas along the west side of the 2000-acre landfill site. The containment berm slopes are currently planned at 3H:1V (Horizontal:Vertical) and the cap/cover slopes are currently planned at 4H:1V.

2. INVESTIGATION PROCEDURES

2.1 FIELD EXPLORATION

2.1.1 Geotechnical Exploration

Subsurface soil conditions were explored by drilling 11 borings to depths of approximately 27 to 52 feet and excavating 16 test pits to depths of approximately 11.5 to 13 feet below the existing ground surface. Approximate boring and test pit locations are indicated on the Boring and Test Pit Location Drawing, Figure A-6, in Appendix A. Previously, three (3) borings, denoted with (i), were drilled to depths of about 31 to 39.5 feet below existing grade. These boring logs are also included in Appendix A. Ground surface elevations for the borings and test pits were either surveyed or estimated by Psomas through query to the USGS 10-meter Digital Elevation Model (DEM) and are reported on the boring and test pit logs. Surveyed elevations are indicated with an (*) on the logs.

Logs of the subsurface conditions, as encountered in the borings and test pits, were recorded at the time of field exploration by our staff and are presented on the Log of Borings and Test Pits (Figures A-7 through A-49). A key to soil symbols and terms is included as Figure A-50.

The soil borings were drilled using hollow-stem drilling techniques. Soil samples were obtained using a standard split-spoon sampler and 3-inch outside diameter thin-walled (Shelby) tubes. The split-spoon samplers were driven by a 140-pound hammer free-falling through a distance of 30 inches. The sampler driving resistance, expressed as "blows per foot" of penetration, is presented on the boring logs at the respective sampling depths. The Shelby tubes were pushed into the soils beneath the bottom of the augers.

The test pits were excavated using a rubber-tire backhoe. Representative bulk soil samples were obtained from the soil pile during test pit excavations. After the test pits were logged, the excavated soil was replaced in the test pits in lifts and compacted using the back of the backhoe

bucket. Kleinfelder field personnel visually classified the soil samples, and representative portions of each sample were packaged and transported to our laboratory for testing. The information provided on the boring and test pit logs contained herein include soil descriptions, consistency evaluations, sampling intervals, and groundwater conditions at the time of field exploration.

2.1.2 Geological Exploration

The general geologic conditions at the site were evaluated by an experienced engineering geologist to assess the general geologic setting and structure as well as to note potential geologic hazards that may influence site development. The geologic investigation included a review of available geologic literature, aerial photographs and maps, as well as a field reconnaissance to observe site-specific geologic features and/or hazards. Results of the geologic investigation are presented in Section 4 of this report. Information obtained from the geologic investigation was used to select preferred locations for subsurface exploration.

2.2 LABORATORY TESTING

Representative samples were tested in the laboratory to evaluate physical and engineering properties of the soils. Moisture content tests were performed to evaluate the various soil deposits. Sieve analyses, percent passing the No. 200 sieve, liquid limit, and plastic limit tests were performed on selected samples to aid in classification of the soils. Standard Proctor testing was performed to define the moisture/density relationship of on-site near-surface soils. Direct shear tests were performed on selected samples to assist in evaluating stability of the proposed landfill. Laboratory test results are presented on the Log of Borings and Test Pits, Figures A-7 through A-49 (in Appendix A), and on the table and figures in Appendix B.

In addition to the soil tests, water quality tests were also performed on groundwater samples by American West Analytical Laboratory, who holds current certification for testing all parameters identified in this report. These test results are presented in Appendix C.

3. GENERAL SITE CONDITIONS

3.1 SURFACE CONDITIONS

The site currently consists of undeveloped rangeland that is bordered on the east by a Union Pacific Railroad spur and Amex Road and on the west by the Lakeside Mountains, a small mountain range. The central and eastern portions of the site are relatively flat to sloping slightly downward toward the northeast. The western portion of the site borders the steeper slopes of the Lakeside Mountains. Vegetation consists primarily of sagebrush, weeds, and grasses.

3.2 SUBSURFACE CONDITIONS

3.2.1 Soils

Subsurface conditions encountered at the boring and test pit locations are depicted on the individual logs included in Appendix A. Stratification boundaries shown on the logs represent the approximate location of changes in material types and actual in-situ transitions between materials may be gradual.

Based on the results of the borings and test pits, subsurface conditions beneath the proposed landfill predominantly consisted of Silty SAND to Sandy SILT (SM to ML) overlying SILTY CLAY (CL-ML) to Lean CLAY (CL) or Elastic SILT (MH) soils with varying amounts of sand. A cemented sand layer approximately 1 to 2 feet thick was encountered at approximately 5 to 12 feet below the existing ground surface. Other layers of Silty SAND, Sandy SILT, and Poorly Graded GRAVEL with silt and sand were encountered at depth (at or near the bottom of the borings) below the clay soils. The sand soils were typically loose to very dense as indicated by penetration resistance values ranging from 7 blows per foot to more than 50 blows per 6 inches. The silt and clay soils ranged from soft to hard with penetration resistance values varying from 1 to 44 blows per foot. Laboratory tests indicate the subsurface soils have Liquid Limits ranging from 20 to 102 and corresponding Plasticity Indices of 0 (non-plastic) to 53. Moisture contents

ranged from 2 to 46 percent, and dry densities varied from 72 to 117 pounds per cubic foot (pcf). Consolidation test results indicate the silt and clay soils are slightly to moderately compressible. A direct shear test performed on a remolded sample of the Sandy Lean CLAY soils indicated an internal friction angle value of 35 degrees and an apparent cohesion of 550 pounds per square foot (psf). A direct shear test performed on an in-situ sample of the Silty SAND soils indicated an internal friction angle of 31 degrees and zero cohesion. Falling-head permeability tests indicated that remolded Sandy Lean CLAY (B-2 at 2 feet) will have a permeability on the order of 2×10^{-8} cm/sec and Sandy SILTY CLAY (B-4 at 2 feet) will have a permeability on the order of 2×10^{-7} cm/sec. The direct shear and permeability samples were compacted to about 95 percent of the maximum dry density (as determined by ASTM D698) and near the optimum moisture content.

Based on the results of the two borings (B-6 and B-7) and test pits, subsurface conditions in the proposed southwest borrow area predominantly consisted of SILT with varying amounts of sand (ML) and Silty SAND to Silty GRAVEL overlying alternating layers of Lean CLAY with varying amounts of sand (CL) and sand/gravel soils to the maximum depths explored of about 50 feet below the existing ground surface. The sand/gravel soils of these layers consisted of Poorly Graded SAND with silt (SP-SM), Silty SAND with varying amounts of gravel (SM), and Silty to Clayey GRAVEL with sand (GM to GC). Laboratory tests indicate the silt soils have Liquid Limits ranging from 20 to 49 and corresponding Plasticity Indices of 0 (non-plastic) to 19. Moisture contents ranged from 1 to 32 percent, and dry densities varied from 82 to 132 pounds per cubic foot (pcf). Direct shear tests performed on an in-situ sample of SILT with sand soils indicated an internal friction angle of 29 degrees and an apparent cohesion of 75 psf.

3.2.2 Groundwater

Numerous factors contribute to groundwater fluctuations, and the evaluation of these factors is beyond the scope of this report. Groundwater levels at the site may vary depending on the season or during periods of high precipitation, runoff, or snowmelt.

One-inch diameter PVC pipe was placed in Borings B-3 and B-5 to depths of 30 feet after backfilling with auger cuttings between depths of 30 and 50 feet below existing grade. The bottom 15 feet of the PVC pipes were slotted. The interval between 15 and 30 feet was backfilled with sand and the upper 15 feet was backfilled with silty/clayey auger cuttings. Two-inch diameter PVC pipe was placed in Borings B-6, B-8, B-9 and B-10 to various depths and were backfilled in a similar manner (see Log of Borings for details). In April 2004, a two-inch diameter PVC pipe that was slotted and backfilled with material similar to that described above was installed approximately 10 feet south of B-5 to a depth of about 50 feet to facilitate better water level measurements at that location. Water levels were measured at various times after the PVC pipes were installed, as follows:

| Boring | Measurement Date | Water Level Below Ground Surface at Boring (feet) |
|--------|------------------|---|
| B-3 | 9/25/03 | 17.9 |
| | 11/14/03 | 17.1 |
| | 3/25/04 | 20.5 |
| B-5 | 3/25/04 | Dry (to 29.6 feet) |
| | 4/16/04* | 39.6* |
| B-6 | 3/25/04 | Dry (to 46.0 feet) |
| B-8 | 10/29/03 | 19.7 |
| | 3/25/04 | 19.9 |
| B-9 | 3/25/04 | 17.1 |
| B-10 | 10/29/03 | 15.1 |
| | 3/25/04 | 15.1 |

*2-inch diameter PVC pipe placed to depth of 50 feet

Groundwater was encountered as shallow as about 15 to 16 feet below existing grade in May, September and October of 2003, which was during the fifth year of drought in Northern Utah. Therefore, higher water levels are likely at other times of the year as well as on a year-to-year basis during non-drought periods. Historic groundwater levels are not available from near-by well records, but evaluation of the samples obtained from our field exploration indicates that groundwater levels in the subsurface soils may have historically, or prehistorically, been as high as the depths indicated below with respect to the existing ground surface at the boring and test pit locations.

The groundwater level depths tabulated below were interpreted from the shallowest observance of secondary reduction oxides below which secondary Calcium Carbonate or other soluble secondary soil indices were observed to be absent in the soil samples recovered from our borings and test pits. These depths are interpreted to represent the highest elevation of high soil moisture conditions at the site. Capillary rise in the subsurface soils may possibly have also contributed to the presence of secondary reduction oxides in the soils above the past water level, with the estimated rise as shown (dependent on the soil grain size). Given the absence of historical groundwater depth measurement at the site, the evaluation of secondary soil indices serves as a reasonable means of estimating historic high groundwater depth at the site.

| Boring/ Test Pit | Approximate Total Boring/Test Pit Depth* (feet) | Groundwater Depth* at Time of Field Exploration (feet) | Estimated Historic High Groundwater Depth* (feet) | Estimated Maximum Capillary Rise (feet) |
|---------------------|--|---|---|--|
| B-6 | 44 | Not Encountered | 22 | 1.5 |
| B-7 | 52 | Not Encountered | 30 | 3 |
| B-8 | 27 | 20 | 5 | 9 |
| B-9 | 52 | 23 | 4 | 8 |
| B-10 | 52 | 17 | 3 | 6.5 |
| B-11 | 52 | 38 | 8 | 8.5 |
| TP-13 | 13 | Not Encountered | 5 | 7 |
| TP-15 | 14 | Not Encountered | 7 | 5 |
| TP-16 | 14 | Not Encountered | 5 | 10 |

*Depth below ground surface at boring or test pit location, including any estimated capillary rise.

4. GEOLOGIC CONDITIONS

4.1 GEOLOGIC SETTING

The site is located in northeast Tooele County approximately 32 miles northwest of the City of Tooele in northern Utah. The site is located within the Basin and Range Physiographic Province. The Basin and Range Province is characterized by generally north-trending valleys and mountain ranges that have formed by displacement along normal faults resulting from regional tectonic extension. The province consists of mountainous terrain separated by broad basin-like valleys, with semi-arid to mesic climatic conditions (Hunt, 1967). The Lakeside Mountains are located immediately to the west of the site, and the Great Salt Lake is approximately 2.5 miles to the east of the site. The site is within the Bonneville basin of the Basin and Range Physiographic Province. The Bonneville Basin was inundated by paleolakes during the Pleistocene Epoch, with the most recent inundation by Lake Bonneville between 26,000 and 13,000 years ago (Hunt, 1967; Currey and Oviatt, 1985).

The geology of the site vicinity consists (from bottom to top) of moderately northwestward dipping Paleozoic limestone formations that are overlain by variable Pleistocene age (1.6 million to 10,000 years ago) lacustrine deposits attributed to late-Pleistocene paleolakes, and Holocene age (10,000 years ago to present) alluvial and eolian deposition (Hintze, 1980; Currey and Oviatt, 1985). Although no bedrock was encountered in our borings and test pits that penetrated to depths of about 50 feet, based on observed bedrock structures east and west of the site, the site appears to be structurally situated on bedrock that dips downward to the northwest.

The surficial Quaternary sediments observed at the site, and penetrated by our borings and test pits consist of lacustrine deposits that have been laid down during the Pleistocene Epoch by paleolakes that originated in the Bonneville Basin (Currey and Oviatt, 1985), and subsequent eolian and alluvial deposition. The lacustrine sediments were deposited between 26,000 and 13,000 years ago when Lake Bonneville rose to an elevation of approximately 5,100 feet and inundated the Bonneville Basin. At approximately 15,000 years ago the lake overflowed to the

north into the Snake River drainage, lowering the water level to approximately 4,800 feet. Approximately 14,000 years ago, climatic thresholds forced the lake to recede to near present day Great Salt Lake levels of approximately 4,200 feet (Currey and Oviatt, 1985). The engineering geology of the site is shown on Figure A-2. The lacustrine deposits [L(r)c-m] consist primarily of clays and silts. Portions of the site are covered with thin vegetated eolian dune sands [E(d)m-s] that have been reworked by wind and re-deposited since the regression of the Lake Bonneville. Alluvial fan deposits [A(f)m-b] on the southeast portion of the site have also been deposited since the regression of the lake by debris flows that originated from the Lakeside Mountains. The eolian deposits consist primarily of silts and sands, and the alluvial fan deposits consist of silt to boulder size particles. Limestone bedrock (L.S) is exposed on the mountain slopes to the west of the site.

4.2 GEOLOGIC HAZARDS

4.2.1 Seismicity

The site is located within the Intermountain Seismic Belt, a seismically active region that extends from Arizona to Montana (Smith et al., 1991). Active faults in the region are potential sources for seismic loading hazards for the proposed landfill. Active earthquake faults are considered as faults that have moved during the past 10,000 years (Holocene epoch). However, for critical facilities the Utah Geological Survey considers faults that have moved during the past 130,000 years as active (Christensen, et al.). A summary of Quaternary age (1.6 million years) faults and fold systems within a 62-mile (100 km) radius of the site is presented below on Table 1 and shown on Figure A-3, Quaternary Fault Map. Figure A-3 also shows the map index number for the individual faults or fault zones listed on Table 1.

As indicated in Table 1 and on Figure A-3, the Lakeside Mountains (west side) fault is the closest fault, but the nearest active seismogenic source (<130,000 years) is the Stansbury fault zone located approximately 11.4 miles (18.4 kilometers) south of the site. Besides the Stansbury fault zone, several of the listed active faults within the region could potentially subject the site to

Table 1
Quaternary Faults Within a 62-Mile (100-km) Radius of Proposed Site

| Fault System (Black et. al. 2003) | Nearest Distance and Direction From Site Miles; (km); Direction | Characteristic Magnitude (Halling, et al., 2002) | Map Index Number Figure A-3 |
|--|--|--|---------------------------------------|
| Lakeside Mountains (west side) fault | 5.5; (8.8); NW | 6.1 | 2384s |
| Cedar Mountains (east side) faults | 6.7; (10.8); SW | 6.4 | 2385 |
| Stansbury fault zone | 11.4; (18.4); S | 7.0 | 2395 |
| Puddle Valley fault zone | 15.5; (25.0); NW | 6.9 | 2383 |
| East Lakeside Mountains fault zone | 20.1; (32.4); N | 6.9 | 2368 |
| Skull Valley (mid valley) faults | 23.4; (37.7); S | N.A. | 2387 |
| East Great Salt Lake fault zone, Antelope Island section | 25.5; (41.0); NE | 7.4 | 2369c |
| Oquirrh fault zone | 27.5; (44.3); SE | 7.2 | 2398 |
| East Great Salt Lake fault zone, Promontory section | 28.3; (45.5); NE | 7.4 | 2369a |
| Southern Oquirrh Mountains fault zone | 36.5; (58.7); SE | 6.6 | 2399 |
| Saint Johns Station fault zone | 36.8; (59.2); SE | 6.1 | 2397 |
| West Valley fault zone, Granger segment | 37.1; (59.7); SE | 6.9 | 2386b |
| Topliff Hill fault zone | 37.1; (59.7); SE | 6.7 | 2407 |
| Clover fault zone | 38.8; (62.5); SE | 6.1 | 2396 |
| Dolphin Island fracture zone | 40.6; (65.4); NW | 6.7 | 2367 |
| West Valley fault zone, Taylorsville segment | 41.3; (66.4); SE | 6.9 | 2386a |
| Wasatch fault zone, Salt Lake City segment | 42.5; (68.4); E | 7.1 | 2351f |
| Big Pass faults | 42.4; (68.3); NW | 6.6 | 2366 |
| Wasatch fault zone, Weber segment | 45.5; (73.3); NE | 7.1 | 2351e |
| Lookout Pass fault | 47.6; (76.6); S | 6.2 | 2404 |
| Wasatch fault zone, Provo segment | 53.3; (85.7); SE | 7.2 | 2351g |
| Sheep Rock fault zone | 53.1; (85.5); S | 6.5 | 2405 |
| Wasatch fault zone, Brigham City segment | 53.6; (86.2); NE | 6.9 | 2351d |
| Vernon Hills fault zone | 53.9; (86.7); S | 6.1 | 2406 |
| East Great Salt Lake fault zone, Fremont Island section | 56.2; (90.4); NE | 7.4 | 2369b |
| Utah Lake faults and folds | 56.4; (90.7); SE | 6.9 | 2409 |
| Morgan fault, northern Morgan section | 56.6; (91.1); NE | 6.3 | 2353a |
| Ogden Valley North Fork fault | 56.6; (91.1); NE | 6.8 | 2376 |
| Morgan fault, central Morgan section | 58.0; (93.4); NE | 6.7 | 2353b |
| East Canyon fault, southern East Canyon section | 58.1; (93.5); NE | 6.5 | 2354b |
| Silver Island Mountains (west side) fault | 58.1; (93.5); W | 6.2 | 2381 |
| North Promontory fault | 58.3; (93.8); NE | 7.0 | 2361 |
| East Canyon fault, northern East Canyon section | 58.7; (94.5); NE | 6.5 | 2354a |
| Mantua Area Faults | 58.7; (94.5); NE | 6.7 | 2373 |
| James Peak Fault | 58.3; (94.7); NE | 7.0 | 2378 |
| Ogden Valley northeast margin fault | 59.5; (95.8); NE | 6.5 | 2379 |
| East Canyon (east side) fault (suspected) | 60.0; (96.5); E | N.A. | 2350s |

seismic loads. Figures A-4 and A-5 provide probabilistic peak horizontal acceleration maps for 10 percent and 2 percent exceedance, respectively, in 50 years. These figures indicate that the East Great Salt Lake fault zone (2369a, b, c), and the Wasatch fault zone (2351d, e, f, g) should be considered as the primary contributor to the seismic hazard to the proposed landfill site. The East Great Salt Lake fault zone is considered active and capable of generating earthquakes as large as magnitude 7.4, and the Wasatch fault zone is also considered active and capable of generating earthquakes as large as magnitude 7.2. Surface faulting commonly occurs in conjunction with events of magnitude 6 or larger.

The site is seismically characterized by probabilistic peak ground accelerations on rock of 0.11g for the 10 percent probability of exceedance in 50 years, and 0.22g for the 2 percent probability of exceedance in 50 years, as determined by the site specific hazard query performed for this evaluation (U.S. Geological Survey Web Page, 2003). Ground accelerations greater than reported above are possible but will have a lower probability of occurrence.

Deterministic estimates by Halling et al. (2002) indicate the deterministic maximum peak bedrock horizontal acceleration for the site would be between 0.3g and 0.4g. We do not anticipate accelerations greater than these as a result of seismic activity in the region.

The Utah Department of Environmental Quality (DEQ), Solid Waste Permitting and Management Rules Section R315-302-1.(2),(b),(ii) specifies that "a new facility or a lateral expansion of an existing facility shall not be located within Seismic Impact Zones unless the owner or operator demonstrates to the satisfaction of the Executive Secretary that all containment structures including liners, leachate collection systems, and surface water collection systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site."

Seismic Impact Zones are regions with a 90% or greater probability that the horizontal acceleration will exceed 0.10g in 250 years, which is equivalent to the two (2) percent probability of exceedance in 50 years. This would include the entirety of Tooele County. New facilities cannot be located within a Seismic Impact Zone unless the owner demonstrates that

facility design will resist maximum horizontal acceleration. Although a site-specific seismic characterization was beyond the scope of our preliminary investigation, we have applied seismic acceleration values based on United States Geological Survey (USGS) published data as well as data prepared by Halling et. al. (2003) to estimate peak bedrock accelerations at the site. The values presented for a 2 percent probability of exceedance in 50 years were used to evaluate the stability of the landfill berms and the completed cells as presently designed. Based on our analyses, it is our opinion that the containment structures, including liners, leachate collection systems and surface water collection systems can be appropriately designed to resist this level of maximum horizontal acceleration in lithified earth material for the site. A further discussion of our stability evaluations and results is presented in Section 5.3.

A site-specific seismic characterization of the site will be performed as part of the design-level geotechnical investigation to follow. This evaluation will further refine peak accelerations at the base of the cell and within the waste by considering the dampening or magnification effects of the soil column to the bedrock acceleration.

4.2.2 Surface Fault Rupture Hazards

The Utah DEQ, Solid Waste Permitting and Management Rules Section R315-302-1.(2),(b),(i) specifies that "a new facility or a lateral expansion of an existing facility shall not be located within 200 feet of a Holocene fault..." Active earthquake faults are generally considered to be faults that have disrupted the ground surface within the past 10,000 years of earth history (the Holocene epoch). Implied with this definition is that such faults are relatively likely to disrupt the ground surface in the relatively near future. This site is not known to be over any active or Holocene age faults. The nearest active faulting to the site are traces on the Stansbury fault zone (2395) located about 11.4 miles south of the site (Black et al., 2003).

4.2.3 Liquefaction Hazards

In conjunction with the ground shaking potential of large magnitude seismic events as discussed previously, sediments underlying the site may possess a potential for liquefaction during such events. Liquefaction is a phenomenon whereby loose, saturated, granular soil deposits lose a significant portion of their shear strength due to excess pore water pressure buildup resulting from dynamic loading, such as that caused by an earthquake. Among other effects, liquefaction can result in densification of such deposits causing settlements of overlying layers after an earthquake as excess pore water pressures are dissipated. The primary factors affecting liquefaction potential of a soil deposit are: (1) level and duration of seismic ground motions; (2) soil type and consistency; and (3) depth to groundwater.

Liquefaction potential was evaluated using the method developed and presented by Youd, et al. (2001). Results of the analyses are presented in spreadsheet form for each boring in Appendix D. The analysis procedure utilizes soil and groundwater data from the borings, drilling and sampling methods employed, laboratory test results and the previously determined seismic parameters to evaluate if liquefaction will occur. If liquefaction is indicated (Factor of Safety (FOS) < 1.0), the incremental settlement from each soil zone is calculated in the far right column of the spreadsheet and totaled at the top of the spreadsheet.

To yield a conservative analysis, we used historic high groundwater level estimates and did not consider the effect of the weight of the completed landfill cell. The analysis indicates that some isolated layers of potentially liquefiable soil exist, which could result in approximately 0 to 3.4 inches of liquefaction-induced settlement and less than 3 inches of lateral spreading.

It should be noted that liquefaction analyses are based on information derived from hollow-stem auger drilling and Standard Penetration Test (SPT) sampling methods can produce overly conservative results. Additional analyses using the results of Cone Penetrometer Testing (CPT) in conjunction with conventional borings can provide more refined data that can be used to develop more accurate estimates of liquefaction-induced settlement. We will propose that CPT

soundings be performed as part of the additional investigation required for final design. However, based on the analyses performed, it is our opinion that the estimated settlements will not damage the landfill liner.

4.2.4 Flooding and Debris Flows

The highest historical recorded level of the Great Salt Lake occurred in late 1986 and early 1987. The level recorded during this rise was 4,212 feet. Because of potential property damage surrounding the lake, the State of Utah constructed pumps on the west side of the lake in 1987 to control levels in the main body of the lake. Optimally, the pumps would maintain lake levels below 4,209 feet in the future. However a sizable and rapid spring run-off could result in inflows that far exceed outflow capacity of the pumps (personal conversation Mr. Wallace Gwynn, Utah, Geological Survey).

Clear-water flood hazards, and/or debris flows may result from the small canyons emitting from the Lakeside Mountains to the west of the site. The alluvial fan deposits [A(f)m-b] on the west side of the site indicate that this process has occurred in the past, and should be expected in the future in response to storm events. The magnitude of future debris flow events would be controlled by several factors including storm duration, timing, and wildfire impact. No dams or other water impoundment structures are located up-gradient from the site.

4.2.5 Seiche

Earthquake-induced seiche or wind-induced seiche from the Great Salt Lake does not appear to be a hazard at the site, because the site is at least 30 feet higher than the recorded historical high level of the lake. Furthermore, at the historic high level of the Great Salt Lake of 4,212 feet, the lakeshore would still be approximately two miles east of the site.

4.2.6 Landslide Hazards

Slope gradients on the site are on the order of 0.1 to 1.0 percent, thus slope stability concerns do not appear to be an issue for the proposed construction. Furthermore, no landslides have been mapped in the vicinity of the site (Harty, 1991). However, the site is located approximately 6,000 feet west of a moderate escarpment that is formed along an abandoned shoreline probably related to past Great Salt Lake levels. The escarpment drops downward to the east approximately 5 to 10 feet in elevation. This topographic relationship is potentially related to lateral spread failure initiated by the liquefaction of sediments at depth. However, no lateral spread deposits are known to exist in the vicinity of the site that might indicate past events and the results of our preliminary liquefaction analyses of site soils indicate that lateral spreading is unlikely to impact the site during a future earthquake event.

4.2.7 Subsidence Hazards

Based upon regional bedrock lithology (Hintze, 1980), the site is likely underlain at depth by limestone and dolomites as well as other lithologies. The limestone units could potentially be susceptible to karst processes and sinkhole formation, and the dolomites may contain significant salt beds that could undergo deformation or collapse. However, localized deformation or collapse from karst or salt deformation was not observed on the >14,000 year old lacustrine deposits observed on the surface of the site.

According to the Mine Location Database maintained by the Utah Automated Geographic Reference Center (AGRC, 2001), the nearest mining activity to the site is a surface quarry approximately 4.5 miles to the northwest of the site. No below ground mine features are known in the vicinity of the site.

Under the present environmental and groundwater conditions, subsidence deformation from karst, salt deformation or mining is not expected to impact the site.

5. ENGINEERING EVALUATION AND RECOMMENDATIONS

5.1 GENERAL CONCLUSIONS

Based on the results of our field exploration and laboratory testing, it is our opinion that the proposed landfill can be placed at the site, provided the preliminary recommendations contained in this report are followed and further design-level investigations are performed once more detailed plans are developed. Geologically, items that will affect the design of the landfill are mainly limited to possible groundwater fluctuations and seismic shaking at the site during large earthquake events on areal faults. Known faults do not traverse the site, lateral spreading appears unlikely, and liquefaction of susceptible sand/silt layers is estimated to result in liquefaction-induced settlements on the order of 3 inches or less. Preliminary recommendations regarding site grading, stability, static settlement, and other geotechnical design aspects of the project are provided in the following sections of this report.

5.2 EARTHWORK

5.2.1 Subgrade Preparation

Clearing, stripping, and grubbing should be performed beneath the proposed landfill footprint to remove unsuitable materials such as vegetation, topsoil, and any other deleterious materials. These materials should be removed from the site or may be stockpiled outside of the landfill area for possible use as daily cover material. We recommend that at least the upper 1 foot be removed prior to placing any fill materials.

Following clearing and stripping, the exposed soils beneath the landfill footprint should be scarified to a minimum depth of 3 inches, moisture conditioned to near optimum, and compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D698 (Standard Proctor).

Depending on the time of year construction occurs, we anticipate that typical construction equipment can be used at the site. However, if the native soils become wet when exposed, they may soften and pump when compacted and subjected to construction traffic. If this occurs, track-mounted equipment should be used for construction.

5.2.2 Excavatability

Based on observations made during excavating the test pits, we anticipate that some difficulty may be encountered in the cemented sand layer if excavations extend more than 8 to 10 feet below existing grade. We anticipate that excavation of such materials may require the use of a heavy-duty backhoe or bulldozer. If excavations within the borrow area extend into the steeper slopes along the western part of the borrow area, heavy-duty equipment may also be required. However, in all excavation situations, the contractor should satisfy himself as to the difficulty involved and the type of equipment needed.

The possible depth of excavation within the landfill footprint will be dependent on the groundwater level at the time of excavation. Historic groundwater levels have been discussed above in Section 3.2.2 "Groundwater."

It is the responsibility of the contractor to provide safe working conditions in connection with all excavations, including below grade and underground excavations. All excavations should comply with all Federal, State, and local regulations and laws.

5.2.3 Landfill Design

After removal of vegetation and topsoil, the near-surface soils at the site include clayey soils in some areas having a permeability of about 10^{-7} cm/sec. Such soils generally appear suitable for use in a clay liner, provided they are moisture-conditioned, placed, and compacted appropriately. The areas beneath the landfill that do not contain clay within the upper 5 feet appear to consist primarily of sand/silt soils. The upper 3 to 4 feet of near-surface soils in the proposed borrow

area also appear to consist of sand/silt. These sand/silt materials appear suitable for use as part of the daily soil cover.

The leachate collection system that is planned above the clay liner should consist of relatively clean sand that will also act as a filter between the clay and the landfill material. Typically, a washed concrete sand or equivalent that has less than 10 percent passing the No. 200 sieve will be adequate. The on-site soils do not meet this requirement. If gravel material is used, then a filter fabric will be required above and below the gravel. With either sand or gravel, a filter fabric may be needed around collection pipes.

5.2.4 Fill Placement and Compaction

Fill materials should be placed in uniform loose lifts and compacted to at least 95 percent of the maximum dry density as determined by ASTM D698 (Standard Proctor). The moisture content for scarified soils should be within 2 percent (\pm) of optimum for granular soils and 0 to 3 percent above optimum for clay/silt soils at the time of compaction. Imported fill materials should be approved by the Geotechnical Engineer prior to importing. Also, prior to placing any fill, the excavations should be observed by the Geotechnical Engineer to observe that all unsuitable materials have been removed and the exposed soils are in a firm, unyielding condition.

5.3 STABILITY

Stability of the landfill containment berms as well as that of the waste slopes for working face and final cell configurations, as presently designed, were evaluated for both static and seismic conditions. These evaluations were performed with GSTABL7, version 2 computer software. Factor of safety values generated in the analysis were calculated by the Modified Bishop Method.

Input values for berm and completed cell configurations were obtained from Cross-Section and Contour Plans dated 05/15/04 and prepared by Psomas. Soil unit weight and strength properties used in our analyses were derived from laboratory tests performed on representative samples of

the native soils and are presented on the graphical analysis results in Appendix E. Unit weight and strength properties for the waste were obtained from published literature (Kavazanjian, E., Jr., et al). Seismic parameters used in the analyses were obtained by site-specific hazard query as described in Section 4.2.1 of this report. For stability evaluations, one-half of the maximum horizontal bedrock acceleration (0.22 g) was used in the analysis which is accepted practice for structures that are not laterally restrained.

The following conventional minimum factor of safety values were applied to assess the stability of the landfill berm and waste slopes under both static and seismic conditions;

| <u>Condition</u> | <u>Factor of Safety</u> |
|--|-------------------------|
| Landfill Berm and Waste Slopes-Static Condition | >1.5 |
| Landfill Berm and Waste Slopes-Seismic Condition | >1.3 |

Several analyses were performed to evaluate stability of the landfill as presently designed under these conditions. Figures E1 and E2 in Appendix E illustrate the analyses for the landfill berm alone. These analyses indicate the berm is stable under both static and seismic conditions with minimum factors of safety of 2.1 and 1.5, respectively.

Figures E3 and E4 illustrate the analyses for berm stability under full cell conditions. Given the planned height of the waste, different properties were assigned to the upper and lower portions of the waste to account for the increased stress at depth. These values are presented on the referenced figures. In general, higher unit weight and friction values and lower cohesion values were assigned to the deeper (lower half) of the waste mass. These analyses indicate the berm and waste are stable under both static and seismic conditions with minimum factors of safety of 2.2 and 1.5, respectively.

Figures E5 and E6 illustrate the analyses for waste slope stability under full cell conditions. Different properties were again assigned to the upper and lower portions of the waste as in the previous analyses. These analyses indicate the waste slope is stable under both static and seismic conditions with minimum factors of safety of 2.4 and 1.6, respectively.

The state of Utah, Department of Environmental Quality (DEQ) requested that we evaluate the stability of the working face of the waste during placement at a slope of 3:1 (H:V). The properties of the waste were modified from previous analyses to reflect this condition. In this evaluation, a friction angle of 0 degrees and a cohesion value of 500 psf were used to represent lower stress, short-term loading conditions. Figures E7 and E8 illustrate the analyses for this condition. These analyses indicate the waste slope is stable under both static and seismic conditions to a height of 50 feet with minimum factors of safety of 1.7 and 1.3, respectively.

In addition, the DEQ requested that we evaluate stability of the inward slope of the berm under full cell conditions. Since the berm itself is stable under both static and seismic conditions, the addition of waste will serve to buttress the inward slope of the berm, thereby enhancing stability. Therefore, a computer analysis was not performed for this scenario.

Once the landfill liner and cap material components are selected, additional stability analyses will be performed as part of the final design investigation to address stability of the liner components themselves and their influence on stability of the berm and waste. We understand that a geomembrane combined with geocomposite liner materials may comprise the final soil cover for the landfill. In addition, the liner underlying the landfill may be sloped to facilitate leachate collection. Typical friction angle values for slick membranes (i.e. HDPE material) can range from as low as 10 degrees to as much as 20 degrees or higher. We recommend using textured geomembrane materials to increase the stability of the liner system. The geomembranes should be anchored to provide adequate stability.

Temporary construction excavation slopes will likely be stable at 1.5H:1V or flatter at heights up to 20 feet, provided the slope is not exposed for more than a week and it is not subjected to loads at the top of the slope or to water infiltrating the slope face.

5.4 SETTLEMENT

We estimate that settlement of the native ground surface beneath the landfill will occur as the landfill height and weight increases. The amount of settlement will be different within the western portion of the site, where the topography is steeper and more undulating with rock outcrops, than the eastern portion of the site, which is flatter. For instance, the amount of total settlement at the floor of the cell within the eastern portion of the site will likely be about 2 to 3 percent of the fill height, or about 96 to 144 inches for a fill height of about 400 feet. The western portions of the site will likely experience approximate settlements of 1 to 2 percent of the fill height, or about 24 to 48 inches for a fill height of about 200 feet. The difference in settlement from the crest of the waste to the western berm could be on the order 72 to 104 inches over a distance of approximately 2800 feet. This settlement will need to be considered when designing the landfill liners and drainage systems for the cells.

Since additional field investigation and analyses are required prior to final design and construction of the landfill and since the DEQ Rules allow for submission of consolidation data and recommendations following the permit, a thorough consolidation study will be performed as part of final design for the landfill cells. This study will include evaluation of total and differential settlement of the perimeter and interior berms as well as the cell bottoms under design loads. This information will be used to design final embankment and waste heights, cell liner and leachate collection systems for the landfill cells.

5.5 OTHER DESIGN ASPECTS

With the exception of B-2(i), the groundwater was sampled from within piezometers installed during field exploration. Typically, the piezometers were purged and samples were placed in appropriate bottles for transportation to the laboratory where filtering and testing was performed. Purging was not performed at B-2(i) where the water samples were obtained by means of a geo-probe. Due to the differences in sampling method, we believe the test results from the nearby B-8 are more accurate than from B-2(i). The results of the water quality tests are included in Appendix C.

6. CLOSURE

6.1 LIMITATIONS

The recommendations contained in this report should be considered preliminary (for conceptual design only) and are based on our field exploration, laboratory tests, and our understanding of the proposed construction. The subsurface data used in the preparation of this preliminary report was obtained from our previous explorations and the 11 borings drilled and 16 soil test pits excavated for this investigation. It is likely that variations in the soil and groundwater conditions exist between borings and test pits, and beyond the area explored. The nature and extent of variations may not be evident until or unless construction occurs. If any conditions are encountered at this site that are different from those described in this report, our firm should be immediately notified so that we may make any necessary revisions to recommendations contained in this report.

This report was prepared in accordance with the generally accepted standard of practice at the time the report was written. No warranty, express or implied, is made.

It is the Client's responsibility to see that all parties to the project, including the Designer, Contractor, Subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

This report may be used only by the client and only for the purposes stated within a reasonable time from its issuance. Land use, site conditions (both on- and off-site), or other factors may change over time, and additional work may be required. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else, unless specifically agreed to in advance by Kleinfelder in writing will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

6.2 ADDITIONAL SERVICES

We recommend that additional design-level geotechnical investigation be performed once more detailed plans are developed. Kleinfelder should be consulted to verify that the proposed design and/or construction is performed in accordance with the recommendations made in this report. We also recommend that an adequate program of tests and observations be made during any construction to verify compliance with these recommendations. Tests and observations should include, but not necessarily be limited to, the following:

- Excavation observation and in-place moisture/density testing during site preparation, earthwork, and fill placement; and
- Consultation as may be required during construction.

We also recommend that project plans and specifications be reviewed by the Geotechnical Engineer to verify compatibility with our conclusions and recommendations. Additional information concerning the scope and cost of these services can be obtained from our office.

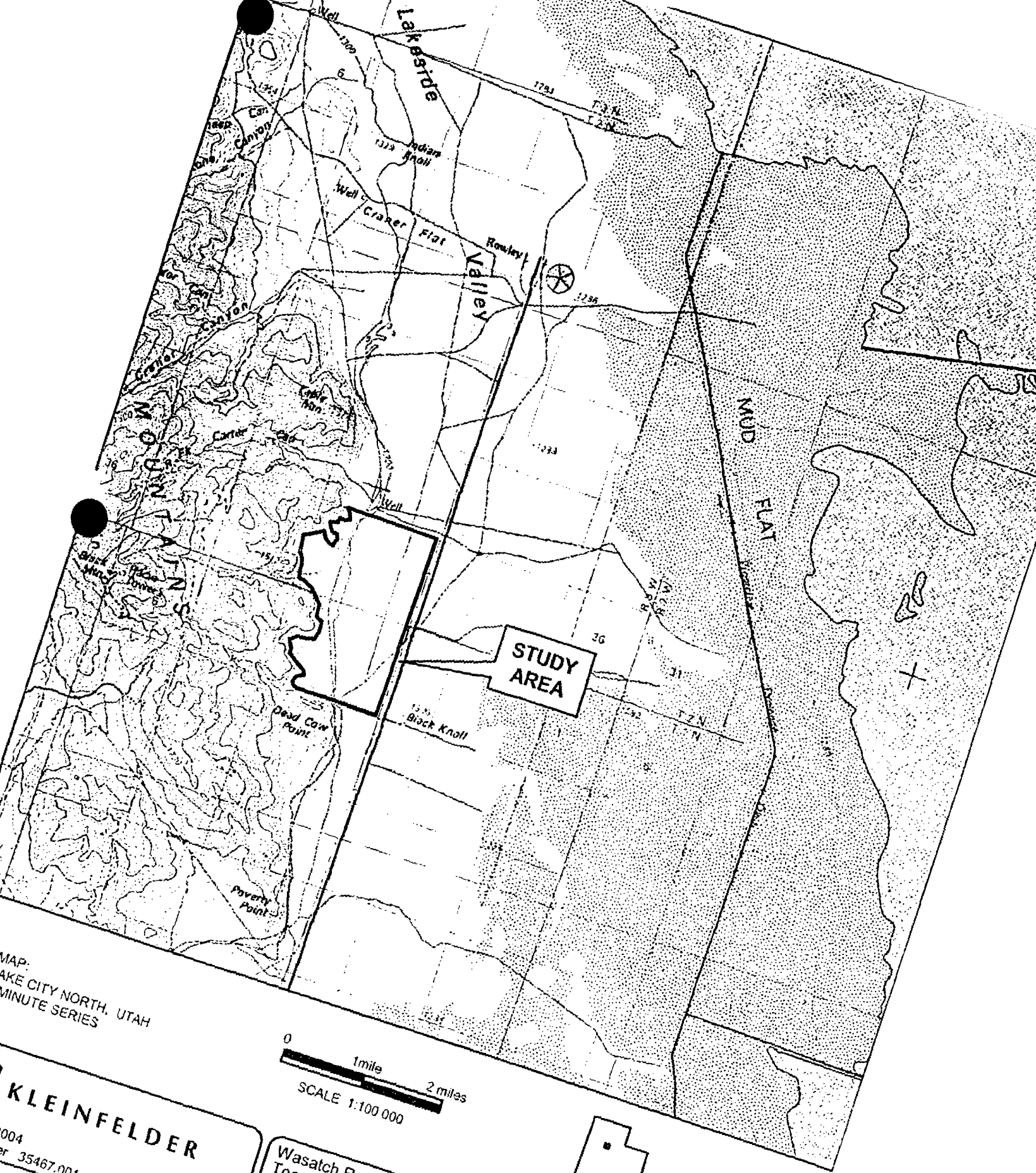
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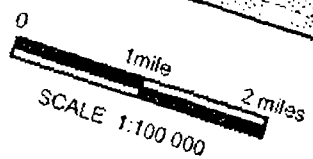
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APPENDIX A



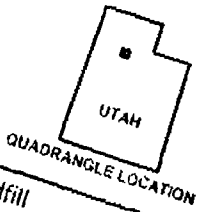
MAP:
LAKE CITY NORTH, UTAH
MINUTE SERIES



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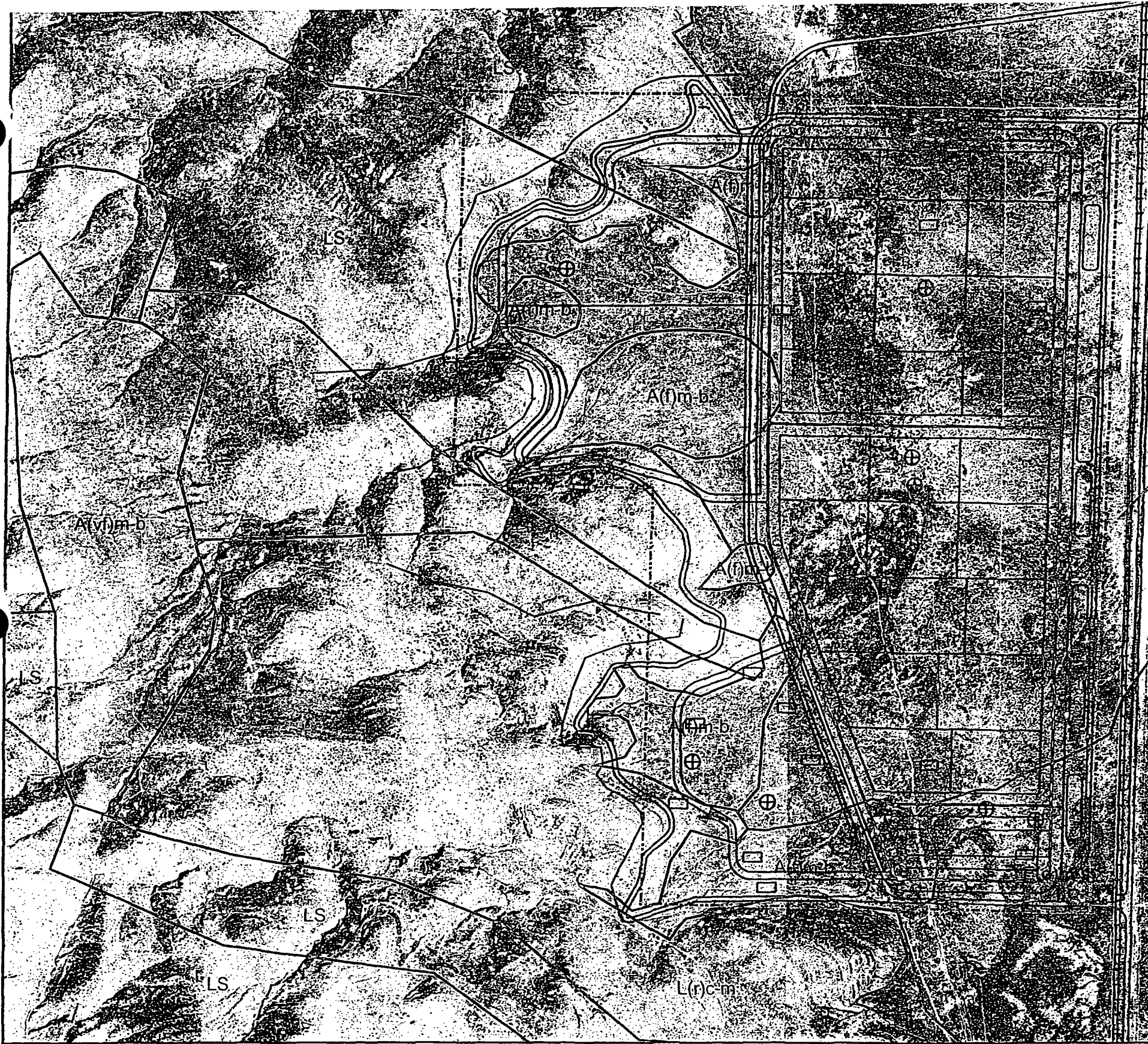
Wasatch Regional Solid Waste Landfill
Tooele County, Utah




SITE VICINITY



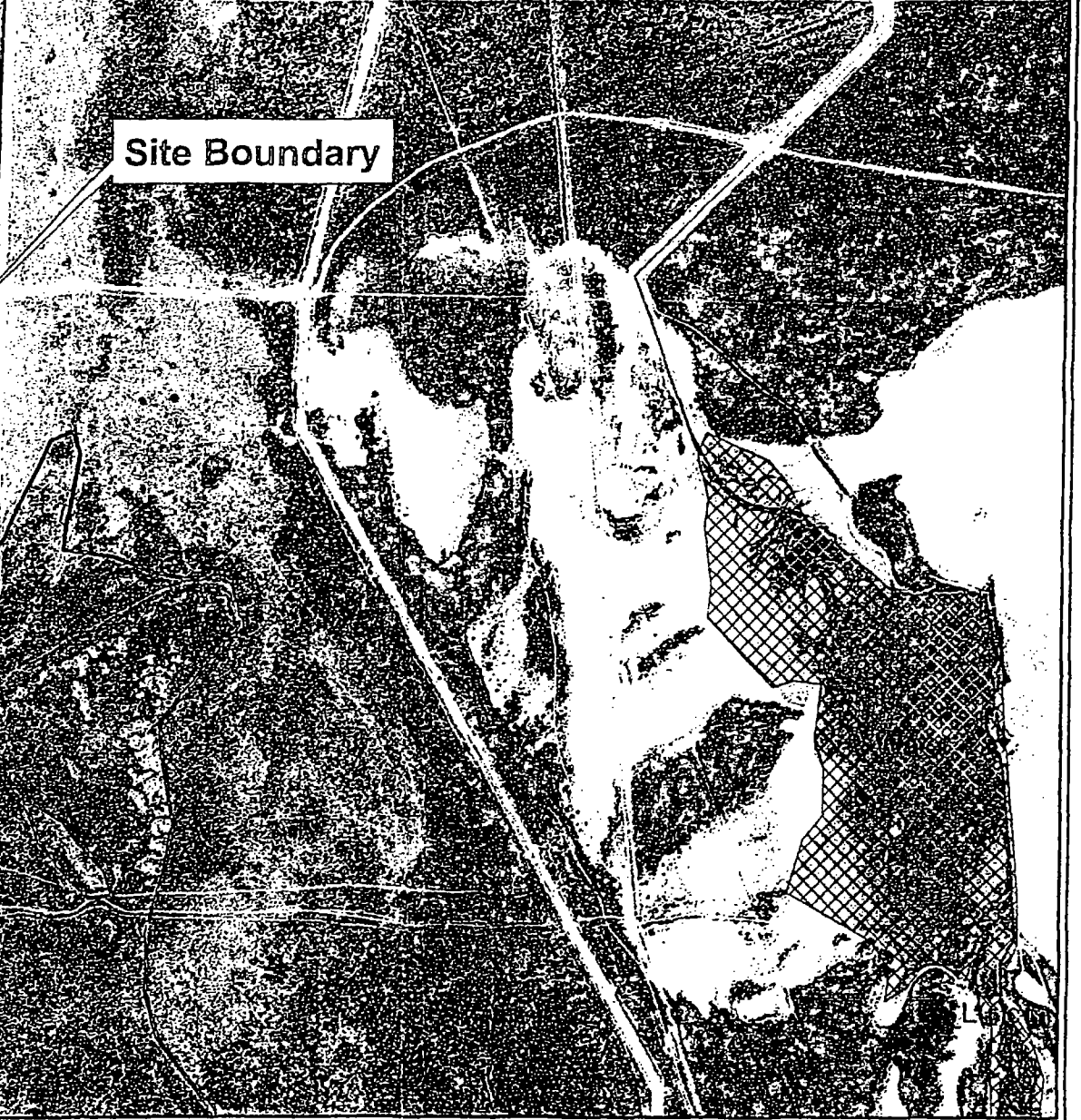
SLC4Q319.dpt
FIGURE



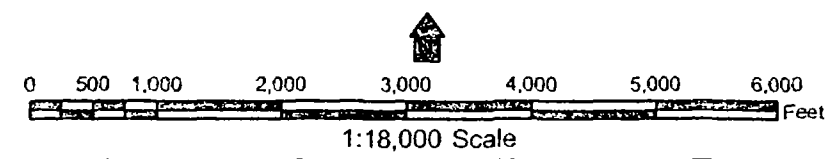
EXPLANATION

- A(f)m-b Alluvial fan deposits, silt to boulder size particles
- A(vf)m-b Alluvial valley-fill deposits, silt to boulder size particles
- E(d)m-s Eolian dune deposits, silt to sand size particles
- L(r)c-m Lacustrine regressional deposits, clay to silt size particles
- LS Limestone bedrock
-  Water

Site Boundary



Photography Source:
 U.S. Geological Survey Digitalortho quadangle
 titled "Delle" and "Poverty Point, Utah" From
http://agrc.utah.gov/agrc_sgid/sgidindices/

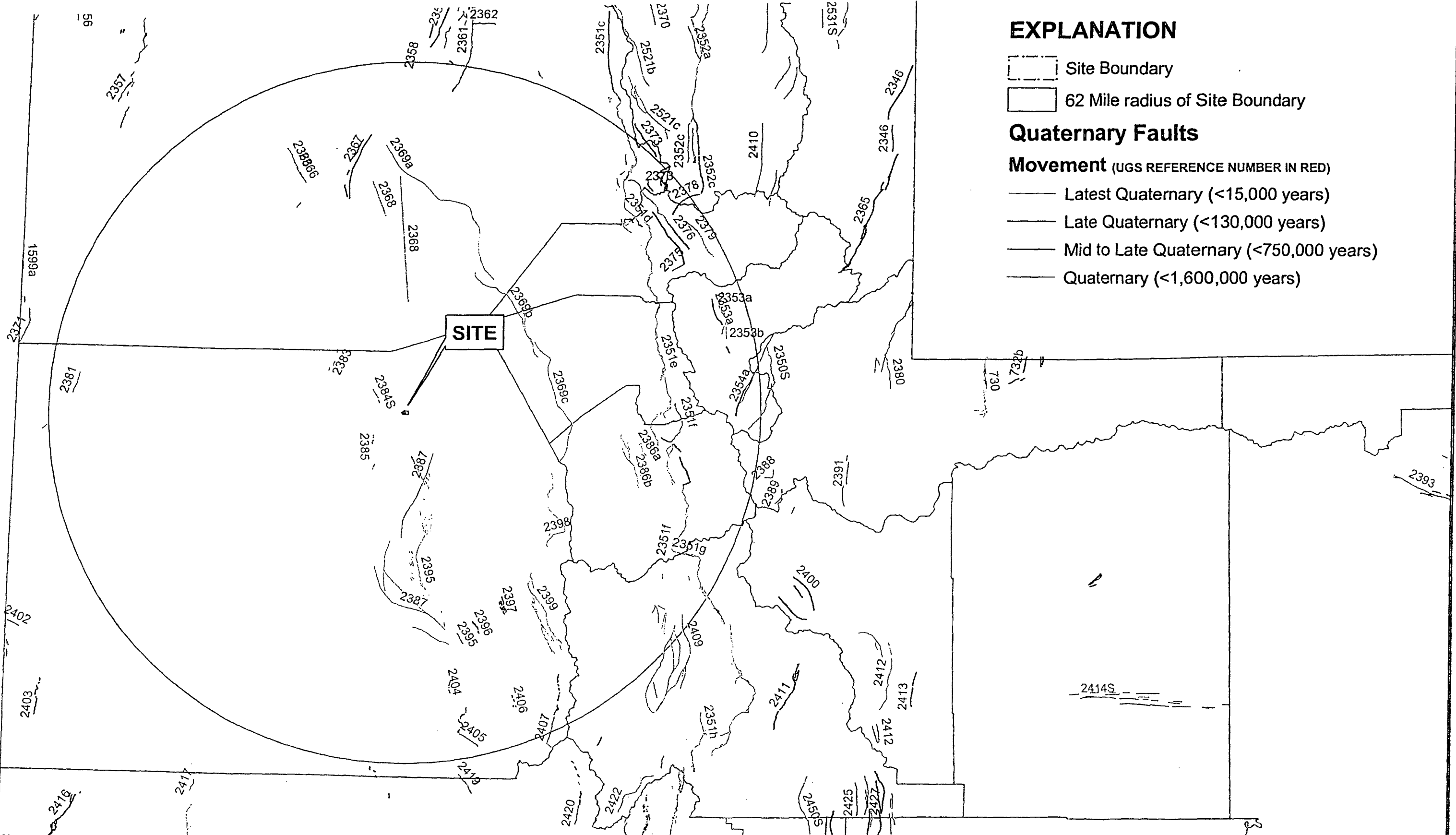



KLEINFELDER
 Project Number 35467

Geotechnical Engineering Studies
 Wasatch Regional Solid Waste Landfill Site

Site Engineering Geology

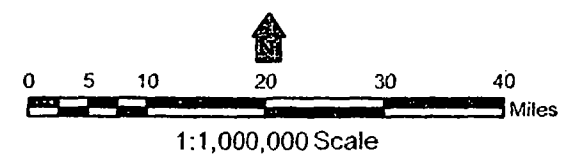
SLC4M165
FIGURE
A-2



EXPLANATION

- Site Boundary
- 62 Mile radius of Site Boundary
- Quaternary Faults**
- Movement** (UGS REFERENCE NUMBER IN RED)
- Latest Quaternary (<15,000 years)
- Late Quaternary (<130,000 years)
- Mid to Late Quaternary (<750,000 years)
- Quaternary (<1,600,000 years)

Source:
 2003 Digital database titled "Quaternary fault and fold database and map of Utah" by Black et al., 2003, UGS Map 193DM

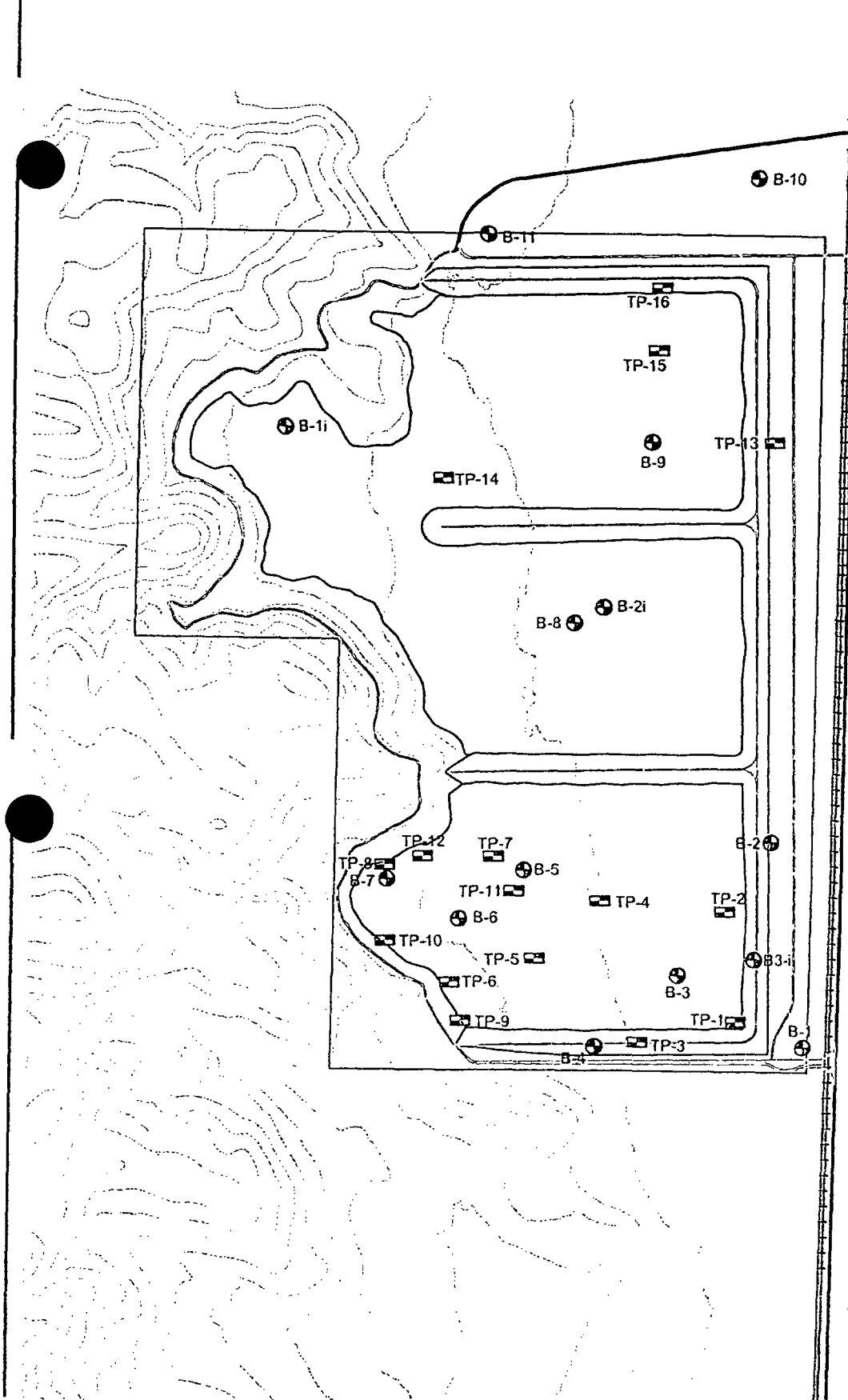


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 Project Number 35467

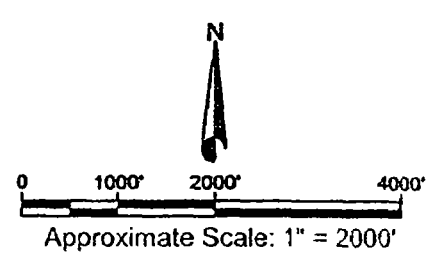
Geotechnical Engineering Studies
 Wasatch Regional Solid Waste Landfill Site

Quaternary Fault Map

SLC4M106
FIGURE A-3



- LEGEND**
- Approximate Test Pit Location
 - Approximate Boring Location



SLC4d221.dwg



Date: 05/17/2004
 Project Number 35467.003

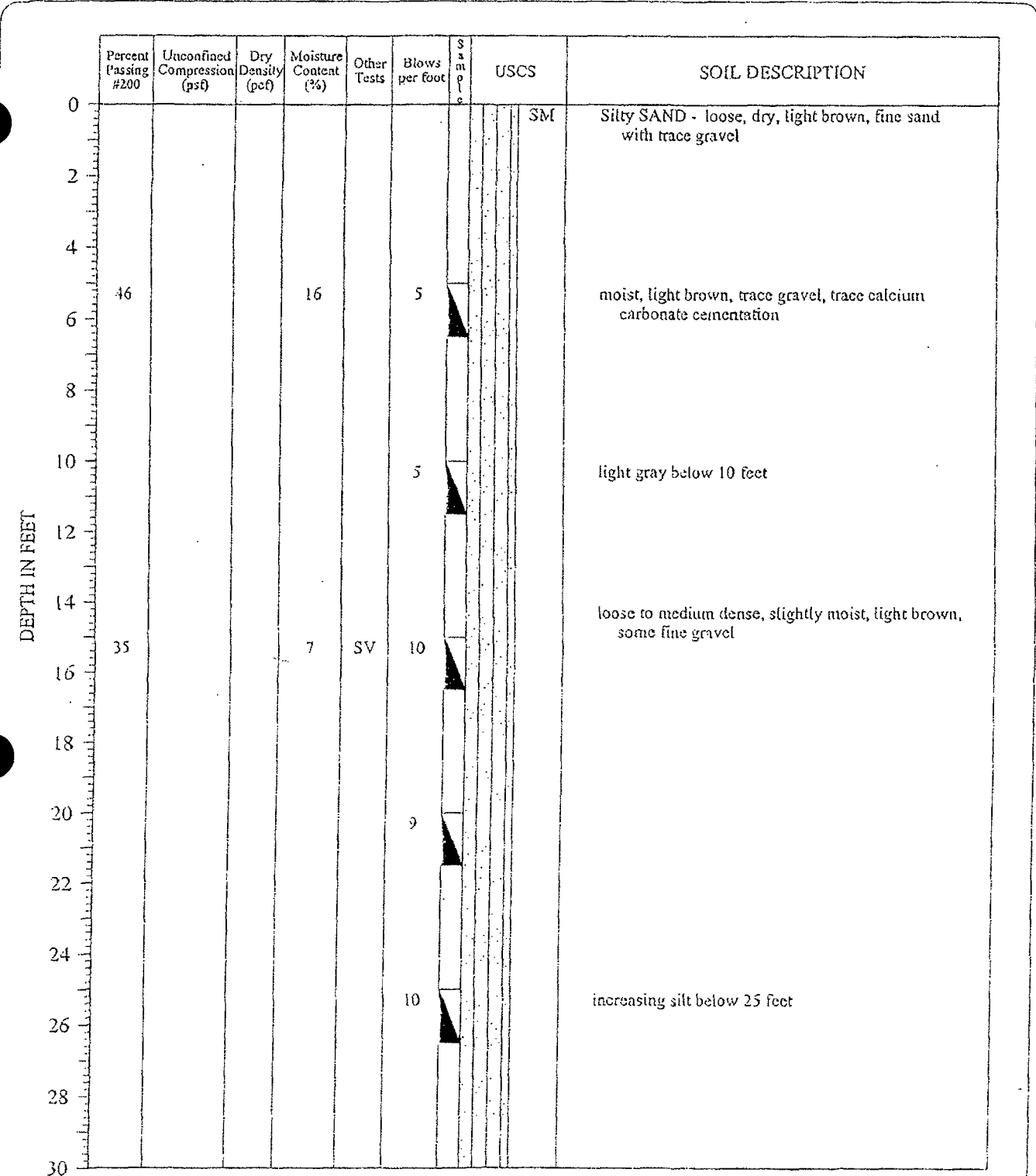
Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

**BORING AND TEST PIT
 LOCATION DRAWING**

FIGURE

A-6

BING LOG-E-S SLC3209-GP 1/1/504



DATE DRILLED: 5-30-03
 TOTAL DEPTH: 39.5 feet
 DIAMETER OF BORING: 8 inches

LOGGED BY: I. Schofield
 EQUIPMENT: CME 55
 ELEVATION: 4353.6* feet



LOG OF BORING B- 1(i)
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-7

PROJECT NO. 31168.001

JUN 10 2004 11:50 AM SLC2009091 11/15/04

DEPTH IN FEET

| Depth (ft) | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | Sample | USCS | SOIL DESCRIPTION |
|------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|--------|------|---|
| 30 | 50 | | | 9 | | 19 | | | Silty SAND (continued), slightly moist, brown, some fine gravel (limestone) |
| 32 | | | | | | | | | |
| 34 | | | | | | | | | |
| 36 | | | | | | | | | |
| 38 | | | | | | 25 | | | |
| 40 | | | | | | | | 39.5 | |
| 42 | | | | | | | | | |
| 44 | | | | | | | | | |
| 46 | | | | | | | | | |
| 48 | | | | | | | | | |
| 50 | | | | | | | | | |
| 52 | | | | | | | | | |
| 54 | | | | | | | | | |
| 56 | | | | | | | | | |
| 58 | | | | | | | | | |
| 60 | | | | | | | | | |

DATE DRILLED: 5-30-03
 TOTAL DEPTH: 39.5 feet
 DIAMETER OF BORING: 8 inches

LOGGED BY: I. Schofield
 EQUIPMENT: CME 55
 ELEVATION: 4353.6* feet



LOG OF BORING B- 1(i)
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-8

PROJECT NO. 31168.001

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | Samp | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|------|------|--|
| | | | | | | | | | |
| 0 | | | | | | | | SM | Silty SAND - very loose, dry, brown, some fine gravel |
| 2 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5.0 | | | | | | | | ML | SILT - stiff, slightly moist, light brown, seam of clay at 5.6 feet |
| 6.0 | | | | | | | | CL | Lean CLAY - stiff, moist, brown to olive gray |
| 8 | | | | | | | | | |
| 10 | | | 28 | | PT | Push | | | |
| 11.5 | | | | | | | | SP | Poorly Graded SAND - loose to medium dense, slightly moist, light brown |
| 14.5 | | | | | | | | SW | Well Graded SAND - dense, slightly moist, light brown, medium grained with fine gravel |
| 15.5 | | | | | | | | SM | Silty SAND - dense, slightly moist, light brown |
| 17 | 17 | | | | SV | | | | medium dense, wet below 20 feet |
| 20 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |
| 26 | | | | | | | | | |
| 28.0 | | | | | | | | MEI | Elastic SILT - soft, wet, olive brown to gray |
| 30 | | | | | | | | | |

DATE DRILLED: 5-30-03
TOTAL DEPTH: 31.5 feet
DIAMETER OF BORING: 8 inches

LOGGED BY: I. Schofield
EQUIPMENT: CME 55
ELEVATION: 4242.7 feet

PJNG LOG-E-A SLC32099.GPJ 11/15/04



KLEINFELDER

LOG OF BORING B- 2(i)
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE

A-9

PROJECT NO. 31168.001

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | S a m p l e | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|-------------|------|------------------|
| | 30 | | | | | Pf | 2 | | |
| 31.5 | | | | | | | | | |
| 32 | | | | | | | | | |
| 34 | | | | | | | | | |
| 36 | | | | | | | | | |
| 38 | | | | | | | | | |
| 40 | | | | | | | | | |
| 42 | | | | | | | | | |
| 44 | | | | | | | | | |
| 46 | | | | | | | | | |
| 48 | | | | | | | | | |
| 50 | | | | | | | | | |
| 52 | | | | | | | | | |
| 54 | | | | | | | | | |
| 56 | | | | | | | | | |
| 58 | | | | | | | | | |
| 60 | | | | | | | | | |

DATE DRILLED: 5-30-03
TOTAL DEPTH: 31.5 feet
DIAMETER OF BORING: 8 inches

LOGGED BY: I. Schofield
EQUIPMENT: CME 55
ELEVATION: 4242.7 feet

ZUNC LOC-E-A 31C32698SU 11/15/04



LOG OF BORING B- 2(i)
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-10

PROJECT NO. 31168.001

RING LOG-F-A SUCTZ099.GPJ 11/15/04

DEPTH IN FEET

| Depth (ft) | Percent Passing #200 | Unconfined Compression (pst) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | USCS | SOIL DESCRIPTION |
|------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|------|--|
| 0 - 6.5 | | | | | | Push | SM | Silty SAND - loose, dry, brown with some clay below 5 feet, medium dense |
| 6.5 - 10 | | | | | | | SP | Poorly Graded SAND with silt - medium dense, slightly moist, light brown, fine grained |
| 10 - 12 | 10 | | 5 | | SV | 21 | | |
| 12 - 16 | | | | | | 39 | | wet below 15 feet, dense |
| 16 - 20 | 10 | | | | | 21 | | medium dense, gray below 21 feet |
| 20 - 25 | | | | | | 29 | | sulfur odor at 25 feet |
| 25 - 30 | 20 | | | | | Push | | |

DATE DRILLED: 5-30-03
 TOTAL DEPTH: 31.0 feet
 DIAMETER OF BORING: 8 inches

LOGGED BY: I. Schofield
 EQUIPMENT: CME 55
 ELEVATION: 4240.0 feet

KI KLEINFELDER

LOG OF BORING B- 3(i)
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-11

PROJECT NO. 31168.001

Boring Log-E-A SLC2099-03 11/15/04

DEPTH IN FEET

| Depth (ft) | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | Soil Type | USCS | SOIL DESCRIPTION |
|------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|-----------|------------|---|
| 30 | | | | | | | | SP-Cl 31.0 | Interlayered seams of SAND and Lean CLAY - medium stiff to stiff, wet, gray |
| 32 | | | | | | | | | |
| 34 | | | | | | | | | |
| 36 | | | | | | | | | |
| 38 | | | | | | | | | |
| 40 | | | | | | | | | |
| 42 | | | | | | | | | |
| 44 | | | | | | | | | |
| 46 | | | | | | | | | |
| 48 | | | | | | | | | |
| 50 | | | | | | | | | |
| 52 | | | | | | | | | |
| 54 | | | | | | | | | |
| 56 | | | | | | | | | |
| 58 | | | | | | | | | |
| 60 | | | | | | | | | |

DATE DRILLED: 5-30-03
 TOTAL DEPTH: 31.0 feet
 DIAMETER OF BORING: 8 inches

LOGGED BY: I. Schofield
 EQUIPMENT: CME 55
 ELEVATION: 4240.0 feet

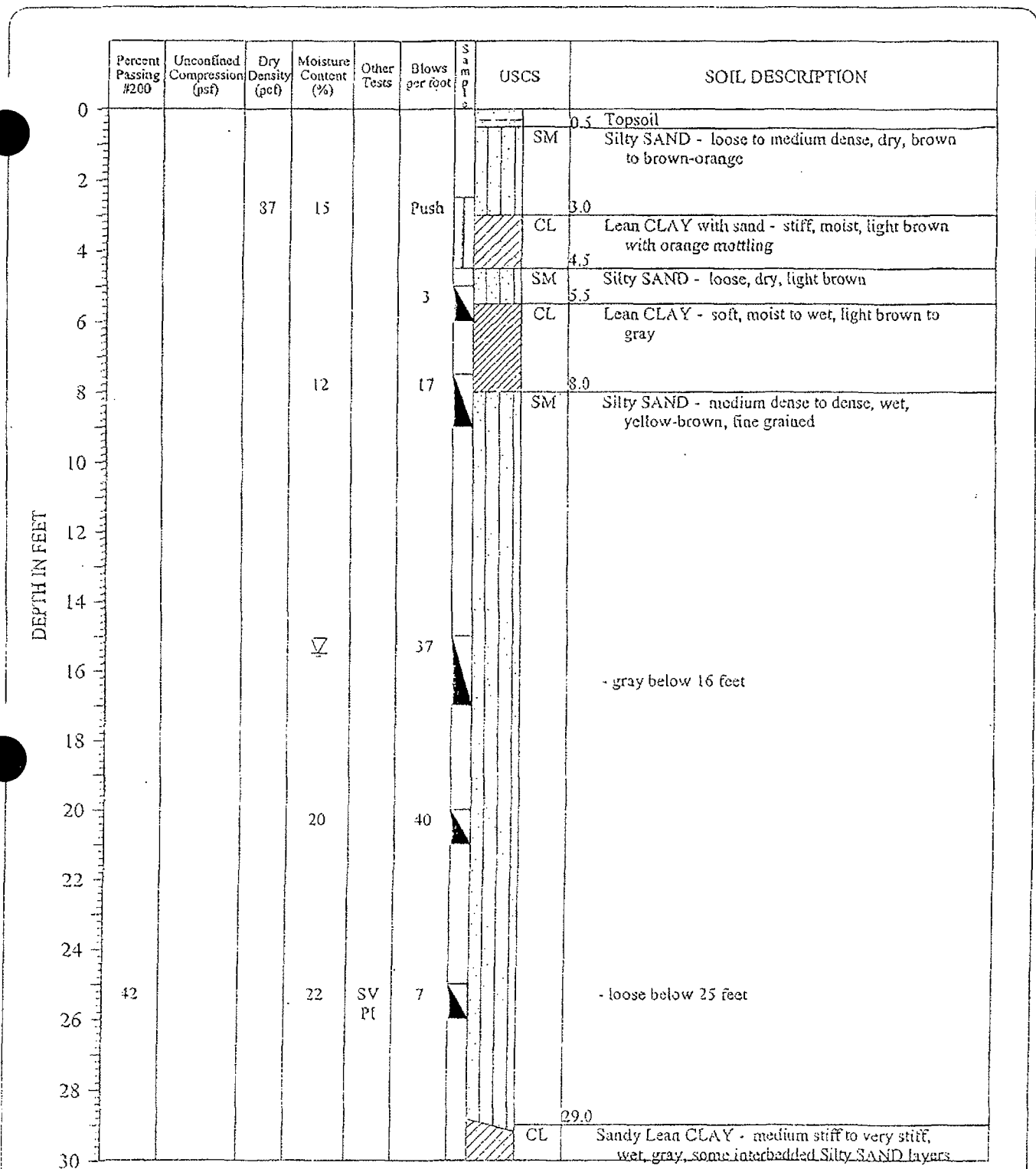


PROJECT NO. 31168.001

LOG OF BORING B- 3(i)
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-12

RING LOG-B-1A SLC-42098.GPJ 11/15/04



DATE DRILLED: 9-17-03
 TOTAL DEPTH: 51.5 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4246.0 feet



LOG OF BORING B-1
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-13

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | S a m p l e | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|----------------------------|------|--|
| | 30 | | | 21 | | | 12 | | |
| 32 | | | | | | | | | |
| 34 | | | | | | | | | |
| 36 | | | | | | 4 | | | |
| 38 | | | | | | | | | |
| 40 | | | 18 | | | Push | | | |
| 42 | | | | | | | | | |
| 44 | | | | | | | | | |
| 46 | | | | | | 20 | | | green-gray below 46 feet |
| 48 | | | | | | | | | |
| 49.0 | | | | | | | | SM | Silty SAND - very dense, wet, gray, 3" thick clay layer at 51 feet |
| 50 | | | 18 | | | 41 | | | |
| 50.5" | | | | | | 50/5" | | | |
| 51.5 | | | | | | | | | |
| 52 | | | | | | | | | |
| 54 | | | | | | | | | |
| 56 | | | | | | | | | |
| 58 | | | | | | | | | |
| 60 | | | | | | | | | |

DATE DRILLED: 9-17-03
TOTAL DEPTH: 51.5 feet
DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
EQUIPMENT: Hollow Stem Auger
ELEVATION: 4246.0 feet

XING LOG-E-A. SICHZUS.GPJ 11/15/04



LOG OF BORING B- 1
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-14

PROJECT NO. 35467.003

ENG LOG-E-A SUC-2095-C01 11/15/04

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|------|--|
| 0 | | | | | | | | 0.5 Topsoil |
| 2 | 55 | | 24 | | SV PI | 7 | CL | Sandy Lean CLAY - medium stiff, moist to dry, olive with orange mottling, trace of gravel |
| 4 | | | | | | | | |
| 6 | 77 | | 77 | 40 | PI | Push | CL | 5.0 Lean CLAY with sand - medium stiff, moist to dry, olive with orange mottling |
| 8 | | | | | | | | |
| 10 | | | | | | | | |
| 12 | | | | | | | | |
| 14 | | | | | | | | |
| 16 | | | 20 | | | 19 | SM | 7.5 Silty to Clayey SAND - loose to medium dense, moist, light brown, some fine gravel, moderate cementation |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |
| 26 | 47 | | | 35 | PI | 3 | CL | 15.5 Silty SAND - medium dense, wet, gray, fine grained |
| 28 | | | | | | | | |
| 30 | | | | | | | | 24.0 Lean CLAY - soft, wet, gray, frequent sand seams |
| | | | | | | | | 30.0 |

DATE DRILLED: 9-17-03
 TOTAL DEPTH: 50.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4233.4 feet

KI KLEINFELDER

LOG OF BORING B- 2
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-15

PROJECT NO. 35467.003

KING LOG-E-A, SL-C-2095, CPJ 11/15/04

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | Sample | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|--------|------|--|
| | | | | | | | | | |
| 30 | | | | | | Push | | SM | Silty SAND - medium dense, wet, gray |
| 35.5 | | | 26 | | | 5 | | CL | Lean CLAY - medium stiff, wet, olive-gray |
| 39.5 | | | | | | | | | - 1-foot thick layer of Silty SAND at 39.5 feet |
| 45 | | | 27 | | | 7 | | | - frequent 3"-thick Sandy SILT lenses at 45 feet |
| 48.0 | | | | | | | | SM | Silty SAND - very dense, wet, olive-gray, fine grained |
| 50.0 | | | | | | 56 | | | |

DATE DRILLED: 9-17-03
 TOTAL DEPTH: 50.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4233.4 feet

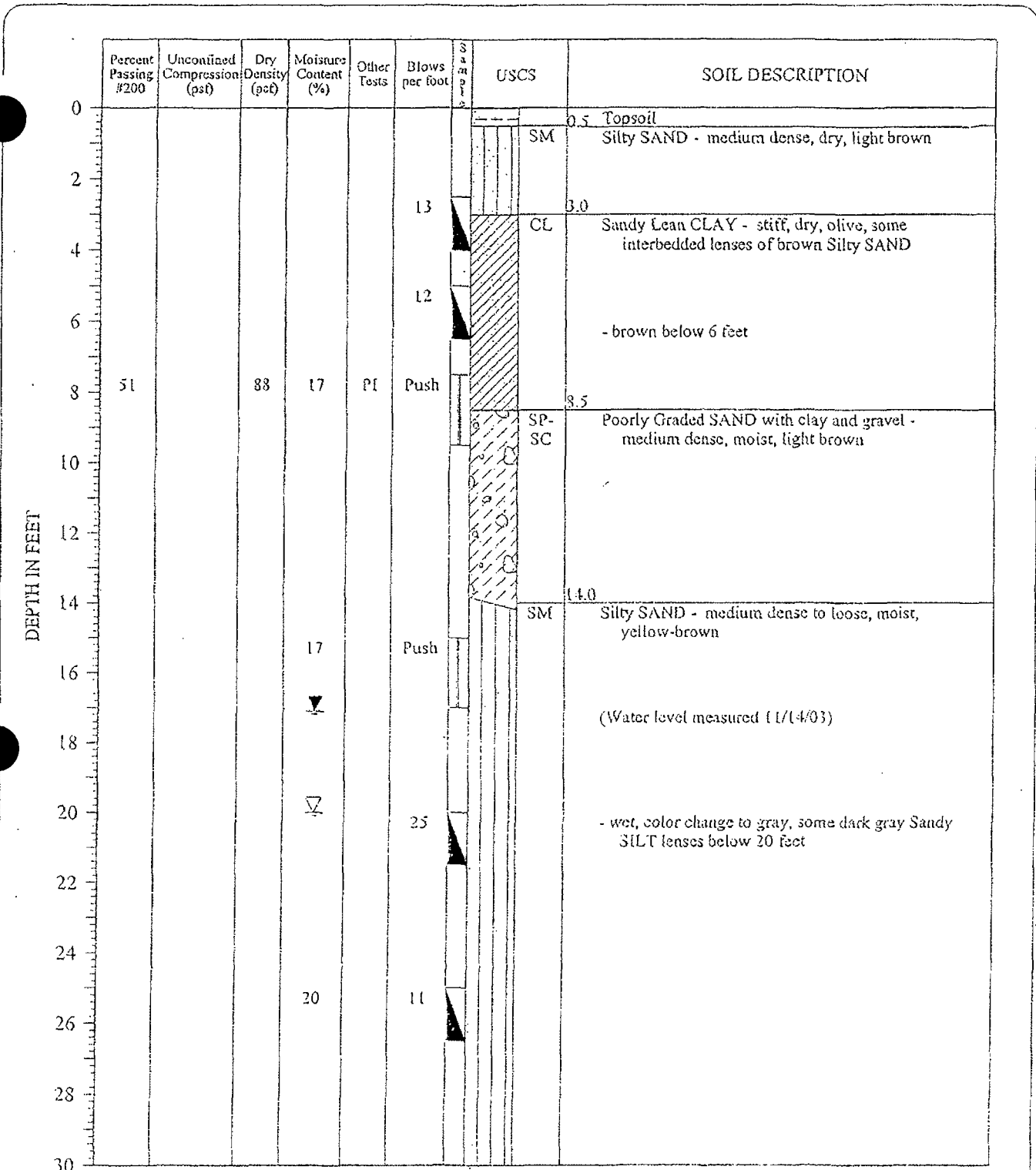


LOG OF BORING B- 2
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-16

PROJECT NO. 35467.003

RING LOG-E-A SLC-2093.DWG 11/15/04



DATE DRILLED: 9-19-03
 TOTAL DEPTH: 50.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4247.3* feet



LOG OF BORING B-3
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-17

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | Sample | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|--------|------|--|
| 30 | | | | | | 8 | | | Silty SAND (continued) |
| 32 | | | | | | | | | |
| 34 | | | 97 | 27 | | | | | |
| 36 | | | | | | Push | | | |
| 38 | | | | | | | | | |
| 40 | | | | | | | | CL | Lean CLAY - medium stiff, wet, olive, with Sandy SILT layer approximately 3" thick at 40 feet |
| 42 | | | | | | 7 | | | |
| 44 | | | | | | | | SM | Silty SAND - dense, wet, olive, fine |
| 46 | | | 31 | | | 32 | | | |
| 48 | | | | | | | | CL | Lean CLAY with gravel - hard, wet, olive |
| 50 | | | | | | 17 50/5" | | | Hole backfilled to about 30 feet. Piezometer installed with slotted PVC pipe and sand pack from 30 to 15 feet; PVC pipe backfilled with silty/clayey auger cuttings above 15 feet. |
| 52 | | | | | | | | | |
| 54 | | | | | | | | | |
| 56 | | | | | | | | | |
| 58 | | | | | | | | | |
| 60 | | | | | | | | | |

DATE DRILLED: 9-19-03
TOTAL DEPTH: 50.0 feet
DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
EQUIPMENT: Hollow Stem Auger
ELEVATION: 4247.3 feet



LOG OF BORING B-3
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-18

PROJECT NO. 35467.003

SING LOC-E-A SLC208.GPJ 11/15/04

ENGINEER: E.A. SLOCUM, CIVIL 11/15/04

DEPTH IN FEET

| Depth (ft) | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | USCS | SOIL DESCRIPTION |
|------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|-----------|---|
| 0 - 0.5 | | | | | | | SM | Topsoil Silty SAND - dry, light brown |
| 0.5 - 2.0 | 64 | | 12 | | SV PI | Push | CL- ML | Sandy SILTY CLAY - stiff, dry, light brown |
| 2.0 - 5.0 | | | | | | | CL | Lean CLAY with sand - medium stiff to stiff, moist, brown |
| 5.0 - 20.5 | 65 | | 83 | 15 | PI | Push | | - olive with orange mottling below 15 feet |
| 20.5 - 26 | | | | 8 | | 28 50/6" | SM | Silty SAND - very dense, moist, olive-orange, fine grained, trace of gravel |
| 26 - 30 | | | | | | 44 | | |

DATE DRILLED: 9-18-03
 TOTAL DEPTH: 50.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Follow Stem Auger
 ELEVATION: 4258.2 feet



LOG OF BORING B- 4
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-19

PROJECT NO. 35467.003

SUNG LOG-E-A SLCWZ098-GPJ 1/17/04

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | Sample | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|--------|------|---|
| 30 | 20 | | | 19 | SV | 38 | | | Silty SAND (continued) - olive below 31 feet |
| 34 | | | | | | 16 | | CL | Lean CLAY - stiff to very stiff, moist, gray, frequent sandy silt seams |
| 40 | | | 112 | 16 | | Push | | SM | Silty SAND with gravel - wet, gray |
| 44 | | | | | | | | ML | Sandy SILT - stiff, wet, gray, trace of gravel |
| 46 | 67 | | | 23 | SV Pt | 8 | | | |
| 50 | | | | 23 | | 13 | | | - cemented clumps up to 3/4" size below 48 feet |

DATE DRILLED: 9-18-03
 TOTAL DEPTH: 50.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4258.2 feet

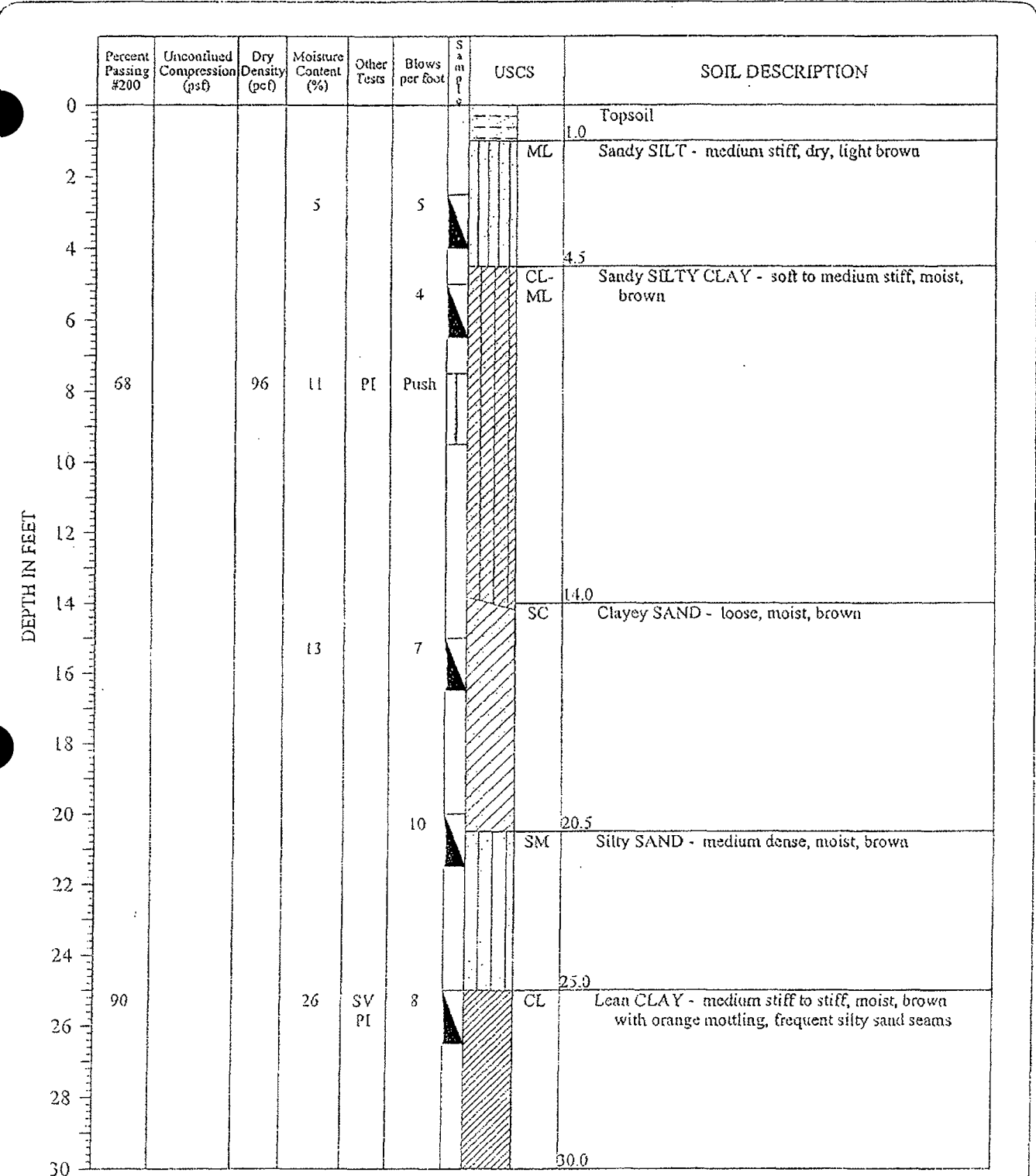


LOG OF BORING B- 4
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-20

PROJECT NO. 35467.003

JING LOG-E-A SLC7208.GPJ 1/15/04



DATE DRILLED: 9-18-03
 TOTAL DEPTH: 50.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4267.0* feet



LOG OF BORING B-5
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-21

PROJECT NO. 35467.903

DEPTH IN FEET

30
32
34
36
38
40
42
44
46
48
50
52
54
56
58
60

| Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | Sample | USCS | SOIL DESCRIPTION |
|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|--------|-------------|--|
| | | | 4 | | Push | | SM | Silty SAND - medium dense, moist, brown |
| | | | | | | | 33.5 | |
| | | | | | | | GP-GM | Poorly Graded GRAVEL with silt and sand - very dense, wet, gray |
| 10 | | | ∇ | SV | 60 | | | |
| | | | | | | | 41 50/3" | |
| | | | | | | | 42 | |
| | | | 11 | | | | 46.0 | |
| | | | | | | | CL | Lean CLAY - hard, moist to wet, gray, frequent silty sand layers |
| | | | | | Push | | | |
| | | | | | | | 50.0 | |
| | | | | | | | | Hole backfilled to about 30 feet. Piezometer installed with slotted PVC pipe and sand pack from 30 to 15 feet; PVC pipe backfilled with silty/clayey auger cuttings above 15 feet. |

DATE DRILLED: 9-18-03
 TOTAL DEPTH: 50.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4267.0* feet

JNG LOG-E-A SLC2095.GPJ 11/15/03

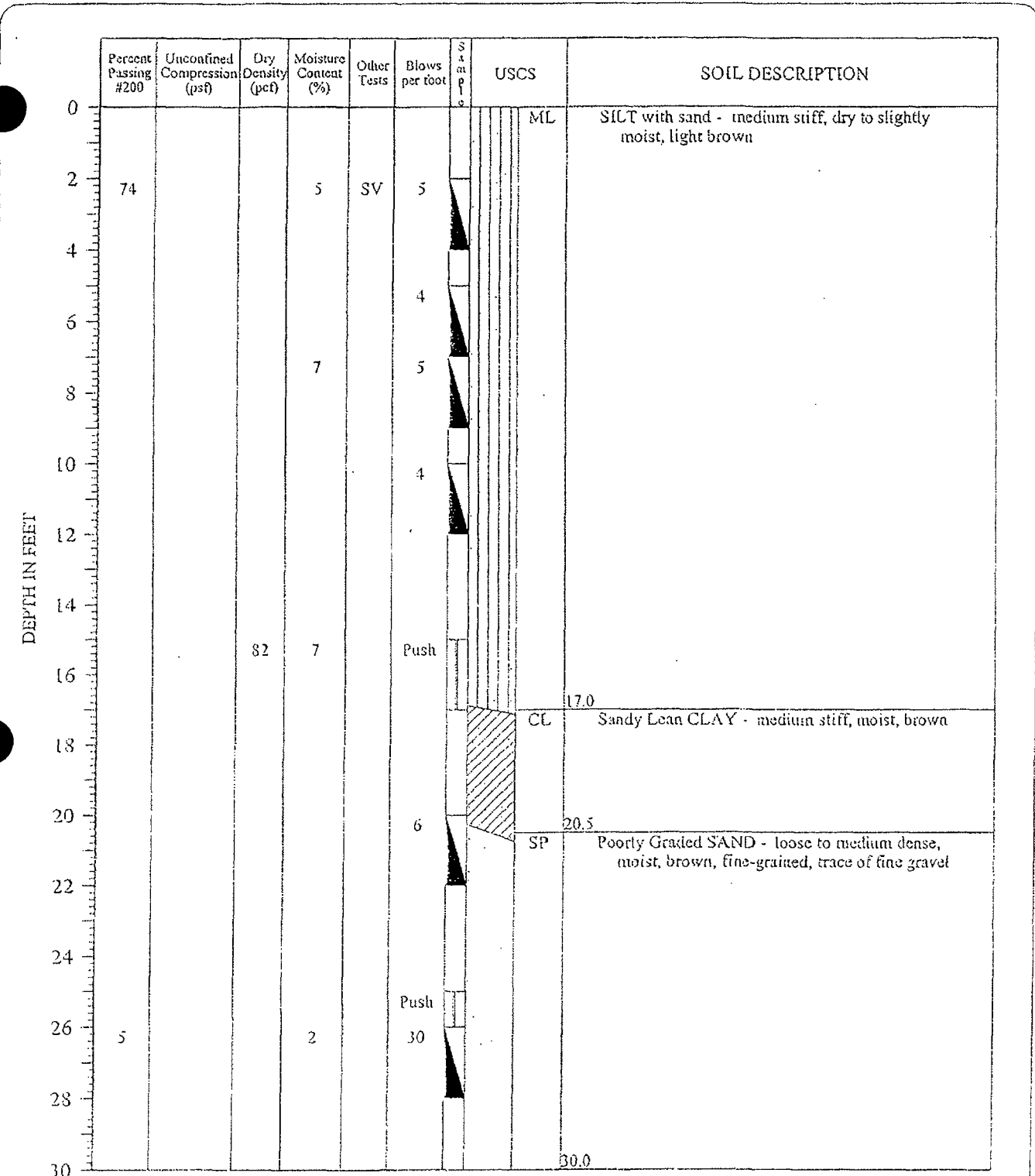


LOG OF BORING B- 5
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-22

PROJECT NO. 35467.003

LOG NO. 35467.003 1/1/04



DATE DRILLED: 10-28-03
 TOTAL DEPTH: 44.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4292.1* feet



LOG OF BORING B- 6
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-23

PROJECT NO. 35467.003

JING LOG-E-6 SLC#208.GPJ 1/15/04

DEPTH IN FEET

| Depth (ft) | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | USCS | SOIL DESCRIPTION |
|------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|------|--|
| 30 | | | | | | 77 | SM | Silty SAND - dense, moist, light brown, fine-grained, trace of gravel |
| 32 | | | | | | | | |
| 34 | | | | | | | | |
| 36 | | | 32 | | | 12 | CL | Lean CLAY - stiff, moist, light brown to olive brown, medium plasticity |
| 38 | | | | | | | | |
| 40 | | | | | | Push | | |
| 42 | | | | | | 69 | SM | Silty SAND with gravel - dense, moist, brown, fine-grained |
| 44 | | | | | | | | Refusal (probably on large cobble or boulder) at about 44 feet Piezometer installed with slotted PVC pipe and sand pack from 34 to 44 feet; PVC pipe backfilled with bentonite from 30 to 34 feet; and PVC pipe backfilled with auger cuttings above 30 feet. |
| 46 | | | | | | | | |
| 48 | | | | | | | | |
| 50 | | | | | | | | |
| 52 | | | | | | | | |
| 54 | | | | | | | | |
| 56 | | | | | | | | |
| 58 | | | | | | | | |
| 60 | | | | | | | | |

DATE DRILLED: 10-28-03
 TOTAL DEPTH: 44.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4292.1* feet



LOG OF BORING B- 6
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-24

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|------|--|
| 0 | | | | | | | ML | Sandy SILT - medium stiff, dry, light brown, weakly cemented |
| 2 | | | 8 | | | 7 | | |
| 4 | 69 | | | 10 | SV | 5 | | |
| 6 | | | | | | | | |
| 8 | | | | | | 8 | SC | Clayey SAND - loose, slightly moist, olive-brown, fine-grained |
| 10 | | | 132 | 1 | | 8 | | |
| 12 | | | | | | 60 | GM | Silty GRAVEL with sand - very dense, moist, brown, coarse gravel |
| 14 | | | | | | 97.5" | | |
| 16 | 21 | | | 3 | | 16 | | |
| 18 | | | | | | | SC | Clayey SAND - medium dense, slightly moist, brown |
| 20 | | | | | | 15 | | |
| 22 | | | | | | | CL | Sandy Lean CLAY - stiff, moist, brown |
| 24 | | | | | | | | |
| 26 | 29 | | | 4 | SV | 36 | GC | Clayey GRAVEL with sand - dense, moist, brown |
| 28 | | | | | | | | |
| 30 | | | | | | | | |

DATE DRILLED: 10-29-03
TOTAL DEPTH: 52.0 feet
DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
EQUIPMENT: Hollow Stem Auger
ELEVATION: 4325.3 feet



LOG OF BORING B-7
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-25

PROJECT NO. 35467.003

USG LOG-E-A-S-2008-CP1 1/15/04

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | S a m p l e | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|----------------------------|------|--|
| 30 | | | | | | 17 | | | 30.5 Clayey GRAVEL with sand (continued) |
| 32 | | | | | | | | SM | Silty SAND with gravel - medium dense to dense, moist, brown, fine gravel, weakly cemented |
| 34 | | | | | | | | | |
| 36 | | | | 6 | | 37 | | | |
| 38 | | | | | | | | | 38.0 |
| 40 | | | | | | 41 | | | GM |
| 42 | | | | | | 54/5" | | | Silty GRAVEL with sand - very dense, moist, brown |
| 44 | | | | | | | | | -much harder drilling below 40 feet |
| 46 | | | | 7 | | 10 | | | 45.0 |
| 48 | | | | | | 50/5" | | GC | Clayey GRAVEL with sand - very dense, slightly moist, light brown, moderately cemented |
| 50 | | | | | | | | | |
| 52 | | | | | | 57 | | | 52.0 |
| 54 | | | | | | | | | |
| 56 | | | | | | | | | |
| 58 | | | | | | | | | |
| 60 | | | | | | | | | |

DATE DRILLED: 10-29-03
TOTAL DEPTH: 52.0 feet
DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
EQUIPMENT: Hollow Stem Auger
ELEVATION: 4325.3 feet

JNG LOG-E-A SILCZ098.GPJ 11/15/04



LOG OF BORING B- 7
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-26

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|-------|--|
| 0 | | | | | | | CL | Sandy Lean CLAY - stiff, slightly moist, light brown |
| 2 | | | | | | 14 | | |
| 4 | 93 | | | 22 | PI | | CL | Lean CLAY - slightly moist, light brown with rust colored oxidation areas |
| 6 | | | | | | 14 | | |
| 8 | | | | | | | | |
| 10 | | | 5 | | | 35 | SP-SM | Poorly Graded SAND with silt - dense, moist, light brown, fine sand |
| 12 | | | | | | | | |
| 14 | | | | | | 45 | | |
| 16 | | | | | | | | |
| 18 | | | | | | | SM | Silty SAND - medium dense, very moist, greenish gray with rust, fine sand |
| 20 | | | 20 | | | 25 | | |
| 22 | | | | | | | | (Water level measured 10/29/03) Lean CLAY layer about 12-inches thick at 21.5 feet, moist, dark greenish gray |
| 24 | | | | | | | | |
| 26 | | | | | | 51 | | |
| 27.0 | | | | | | | | Piezometer installed with slotted PVC pipe and sand pack from 27 to 22 feet; PVC pipe backfilled with bentonite from 22 to 17 feet; and PVC pipe backfilled with auger cuttings above 17 feet. |
| 28 | | | | | | | | |
| 30 | | | | | | | | |

DATE DRILLED: 10-23-03
TOTAL DEPTH: 27.0 feet
DIAMETER OF BORING: 7 inches

LOGGED BY: L. Diamond
EQUIPMENT: Hollow Stem Auger
ELEVATION: 4246.1[±] feet



LOG OF BORING B- 8
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-27

PROJECT NO. 35467.003

ING 1.0G-E-A SLC-2698 GFD 11/15/04

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | S i m p l e | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|-------------|----------|---|
| | | | | | | | | | |
| 0 | | | | | | 13 | | CL | Lean CLAY - stiff, moist to slightly moist, light brown |
| 2 | 90 | | | 16 | SV | 13 | | | - low to moderate cementation below 1.5 feet |
| 4 | | | | | | 11 | | | - color changes to olive-brown with orange mottling below 4 feet |
| 6 | | | | | | 10 | | | - approximately 3" sandy silt layer at 5.5 feet |
| 8 | 42 | | 94 | 12 | Pf | Push | | SC | 8.0 9.0 9.5 Clayey SAND - medium dense, moist, light brown |
| 10 | | | | | | 47 | | SP-SM SM | Poorly Graded SAND with silt - dense, moist, brown, fine to medium-grained sand |
| 12 | | | 100 | 7 | | 138 | | | Silty SAND with gravel - very dense, moist, light brown, fine-grained |
| 14 | | | | | | 64 | | | |
| 16 | | | | | | 48 | | | |
| 18 | | | 107 | 21 | | 73 | | | -color change to gray |
| 20 | | | | | | | | | |
| 22 | | | | | | | | | |
| 24 | | | | | | | | | |
| 26 | | | | | | 15 | | | -color change to olive-gray |
| 28 | | | | | | | | MH | 23.5 Elastic SILT - medium stiff, very moist, green-gray |
| 30 | | | | | | | | | |

DATE DRILLED: 10-28-03
TOTAL DEPTH: 52.0 feet
DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
EQUIPMENT: Hollow Stem Auger
ELEVATION: 4238.3* feet



LOG OF BORING B- 9
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-28

PROJECT NO. 35467.003

KING LOG-EX-SLC-2098-CPJ 11/13/04

RING LOG-5-A SLUG/DB/UP/ 11/15/04

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|------|--|
| 30 | 95 | | 72 | 46 | PI | Push | | Elastic SILT (continued) |
| 32 | | | | | | | | |
| 34 | | | | | | 8 | SM | Silty SAND - loose, wet, brown-gray |
| 36 | | | | | | | | |
| 38 | | | | | | | CL | Lean CLAY - medium stiff, wet, green-gray |
| 40 | | | 117 | 16 | | 6 | SM | Silty SAND with gravel - very dense, wet, gray, fine-grained sand |
| 42 | | | | | | 34 50/5" | | |
| 44 | | | | | | | | |
| 46 | | | | | | 67 | | |
| 48 | | | | | | | CL | Lean CLAY - hard, wet, olive |
| 50 | | | | 37 | | 61 | | |
| 52 | | | | | | | SM | Silty SAND - very dense, wet, brown-gray |
| 54 | | | | | | | | Boring backfilled with cuttings below 30 feet. Piezometer installed with slotted PVC pipe and sand pack from 30 to 15 feet; PVC pipe backfilled with bentonite from 15 to 12 feet; and PVC pipe backfilled with auger cuttings above 12 feet. |
| 56 | | | | | | | | |
| 58 | | | | | | | | |
| 60 | | | | | | | | |

DATE DRILLED: 10-28-03
 TOTAL DEPTH: 52.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4238.3* feet



LOG OF BORING B-9
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-29

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|------|--|
| 0 | | | | 5 | | 29 | CL | Lean CLAY - very stiff to stiff, dry to moist, light brown, medium plasticity |
| 2 | | | | | | 13 | | - some Sandy SILT seams at 3 feet |
| 4 | 89 | | | 27 | PI | 5 | | |
| 6 | | | | | | Push | 6.5 | |
| 8 | | | | | | 26 | SM | Silty SAND - very dense to dense, moist to very moist, light brown, fine-grained |
| 10 | | | 96 | 7 | | 31 | | |
| 12 | | | | | | 46 | | |
| 14 | | | | 19 | | 50/5" | | |
| 16 | | | | | | 60 | | - wet, color change to gray below 16 feet (Water level measured 10/29/03) |
| 18 | | | | | | 71 | | |
| 20 | 41 | | | 26 | PI | 31 | | |
| 22 | | | | | | 1 1/12" | 21.0 | Lean CLAY - soft, wet, olive to gray, medium to high plasticity, frequent sandy silt seams |
| 24 | | | | | | Push | 24.0 | Silty SAND - dense, wet, gray, fine-grained |
| 26 | | | | | | | | |
| 28 | | | | | | | | |
| 30 | | | | | | | | |

DATE DRILLED: 10-27-03
TOTAL DEPTH: 52.0 feet
DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
EQUIPMENT: Hollow Stem Auger
ELEVATION: 4232.8* feet

RING LOG-E-A 31C-2095.GPJ 11/15/04



LOG OF BORING B-10
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-30

PROJECT NO. 35467.003

RING LOG-B-A SIL-42095-C17 11/15/04

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | S a m p l e | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|----------------------------|------|--|
| 30 | | | 18 | | | 29 | | | Silty SAND (continued) |
| 32 | | | | | | | | | |
| 34 | | | | | | | | | |
| 36 | 76 | | 26 | | SV PI | 11 | | CL | Lean CLAY with sand - stiff, wet, olive-gray, low to medium plasticity, frequent silty sand seams |
| 38 | | | | | | | | | |
| 40 | | | 23 | | | Push | | | |
| 42 | | | | | | | | | |
| 44 | | | | | | | | | |
| 46 | | | | | | 80 | | SM | Silty SAND - very dense to dense, wet, gray, fine-grained |
| 48 | | | | | | | | | |
| 50 | | | 19 | | | 42 | | | |
| 52 | | | | | | | | | 52.0 |
| 54 | | | | | | | | | Boring backfilled with cuttings below 30 feet. Piezometer installed with slotted PVC pipe and sand pack from 30 to 15 feet; PVC pipe backfilled with bentonite from 15 to 12 feet; and PVC pipe backfilled with auger cuttings above 12 feet. |
| 56 | | | | | | | | | |
| 58 | | | | | | | | | |
| 60 | | | | | | | | | |

DATE DRILLED: 10-27-03
 TOTAL DEPTH: 52.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Hollow Stem Auger
 ELEVATION: 4232.3* feet



LOG OF BORING B-10
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-31

PROJECT NO. 35467.003

KING LOG-B-A SL-C42095.GPJ 11/15/04

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|-------|---|
| 0 | | | | | | 4 | CL-ML | Sandy SILTY CLAY - medium stiff, dry, light brown, medium plasticity |
| 2 | 66 | | | 6 | PI | 6 | | -slight moisture |
| 4 | | | | | | 4 | | - Sandy SILT seams at 5 feet |
| 6 | | | | | | 6 | | |
| 8 | | | | | | 9 | | - Sandy SILT seams at 8 feet |
| 9.0 | | | | | | | 9.0 | |
| 10 | 79 | 3580 | 105 | 20 | PI UC | Push | ML | SILT with sand - stiff, slightly moist to moist, light brown to brown, fine-grained, low to medium plasticity |
| 12 | | | | | | 12 | | -color change to olive with orange mottling below 12 feet |
| 13.5 | | | | | | | 13.5 | |
| 14 | | | 103 | 2 | | 53 | SM | Silty SAND - dense, moist, light brown, fine-grained |
| 16 | | | | | | 35 | | |
| 18 | | | 106 | 2 | | 72 | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |
| 26 | | | | | | 52 | | |
| 28 | | | | | | | | |
| 30 | | | | | | | | |

DATE DRILLED: 10-27-03
 TOTAL DEPTH: 52.0 feet
 DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
 EQUIPMENT: Follow Stem Auger
 ELEVATION: 4256.5 feet



LOG OF BORING B-11
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-32

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Unconfined Compression (psi) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Blows per foot | Sample | USCS | SOIL DESCRIPTION |
|---------------|----------------------|------------------------------|-------------------|----------------------|-------------|----------------|--------|------|--|
| 30 | | | 106 | 15 | | 9 | | | Silty SAND (continued), color change to yellow-brown |
| 32 | | | | | | 47 | | | |
| 34 | | | | | | 50/5.5" | | | |
| 34.0 | | | | | | | | ML | Sandy SILT - stiff, very moist, gray, fine-grained |
| 36 | 54 | | 23 | PI | | 9 | | | |
| 38 | | | | | | | | | |
| 38 | | | | | | | | | |
| 39.0 | | | | | | | | SM | Silty SAND - dense, wet, gray, fine-grained |
| 40 | | | 18 | | | 43 | | | |
| 42 | | | | | | | | | |
| 44 | | | | | | | | | |
| 46 | | | 112 | 13 | | 30 | | | |
| 48 | | | | | | | | | |
| 50 | | | | | | 28 | | | |
| 52 | | | | | | | | | - 3-inch thick Lean CLAY layer at 51 feet |
| 52.0 | | | | | | | | | |
| 54 | | | | | | | | | |
| 56 | | | | | | | | | |
| 58 | | | | | | | | | |
| 60 | | | | | | | | | |

DATE DRILLED: 10-27-03
TOTAL DEPTH: 52.0 feet
DIAMETER OF BORING: 7 inches

LOGGED BY: M. Wilson
EQUIPMENT: Hollow Stem Auger
ELEVATION: 4256.5 feet

JING LOG-EA SLC42098.GPJ 1/15/05



LOG OF BORING B-11
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-33

PROJECT NO. 35467.003

TPIT LOG E-A SLC208.GPJ 11/15/04

DEPTH IN FEET

| Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | USCS | SOIL DESCRIPTION |
|----------------------|----------------------|-------------------|----------------------|-------------|-------|---|
| | | | | | | 0.3 Topsoil: Sandy SILT - dry, gray, roots |
| 57 | | | 22 | SV PI | CL | Sandy Lean CLAY - slightly moist, brown with white veinlets |
| | | | | | | 3.0 |
| 89 | | | 40 | PI | CL | Lean CLAY - slightly moist, brown with white veinlets - olive gray, very sticky below 4.5 feet |
| | | | | | | 8.0 |
| | | | | | SC | Cemented SAND - dry, light brown, well cemented with abundant voids |
| 11 | | | 9 | SV | SP-SM | Poorly Graded SAND with silt - slightly moist, light brown, trace of gravel |
| | | | | | | 12.0 |

DATE EXCAVATED: 9-18-03
TOTAL DEPTH: 12.0 feet

LOGGED BY: M. Ivers
EQUIPMENT: Cat 416 CIT Backhoe
ELEVATION: 4243.5* feet



LOG OF TEST PIT TP-1
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-34

PROJECT NO. 35467.003

DEPTH IN FEET

| Percent Passing #200 | Shear Strength (pst) | Dry Density (pcf) | Moisture Content (%) | Other Tests | USCS | SOIL DESCRIPTION |
|----------------------|----------------------|-------------------|----------------------|-------------|------|--|
| | | | | | | 0.5 Topsoil: SILT - dry, gray, roots |
| | | | 23 | | ML | Sandy SILT - slightly moist, brown |
| 97 | | | 32 | PI | CL | 2.5 Lean CLAY - brown with white veinlets - olive gray, sticky below 4 feet |
| | | | | | | 8.0 |
| | | | | | SC | Cemented SAND - dry, light brown, well cemented with abundant voids |
| | | | | | | 10.0 |
| 31 | | | 12 | SV | SM | Silty SAND with gravel - slightly moist, brown, fine subrounded gravel |
| | | | | | | 12.0 |

DATE EXCAVATED: 9-18-03
TOTAL DEPTH: 12.0 feet

LOGGED BY: M. Ivers
EQUIPMENT: Cat 416 CFT Backhoe
ELEVATION: 4237.4 feet

KLEINFELDER

LOG OF TEST PIT TP- 2
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-35

PROJECT NO. 35467.003

JFH LOG E-A SLC2098.CPJ 11/13/04

PIT LOG E-A SLCVZWS.GPJ 11/15/01

DEPTH IN FEET

| Depth (ft) | Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | USCS | SOIL DESCRIPTION |
|------------|----------------------|----------------------|-------------------|----------------------|-------------|------|---|
| 0 - 0.8 | | | | | | | Topsoil: SILT - dry, gray, with roots |
| 0.8 - 7.0 | 75 | | 16 | | SV | ML | SILT with sand - slightly moist, brown |
| 7.0 - 12.0 | 92 | | 27 | | PI | SC | Cemented SAND - dry, light brown, well cemented - brown with rust below 9 feet |
| 12.0 - 30 | | | 27 | | | | |

DATE EXCAVATED: 9-18-03
TOTAL DEPTH: 12.0 feet

LOGGED BY: M. Ivers
EQUIPMENT: Cat 416 CIT Backhoe
ELEVATION: 4249.4 feet

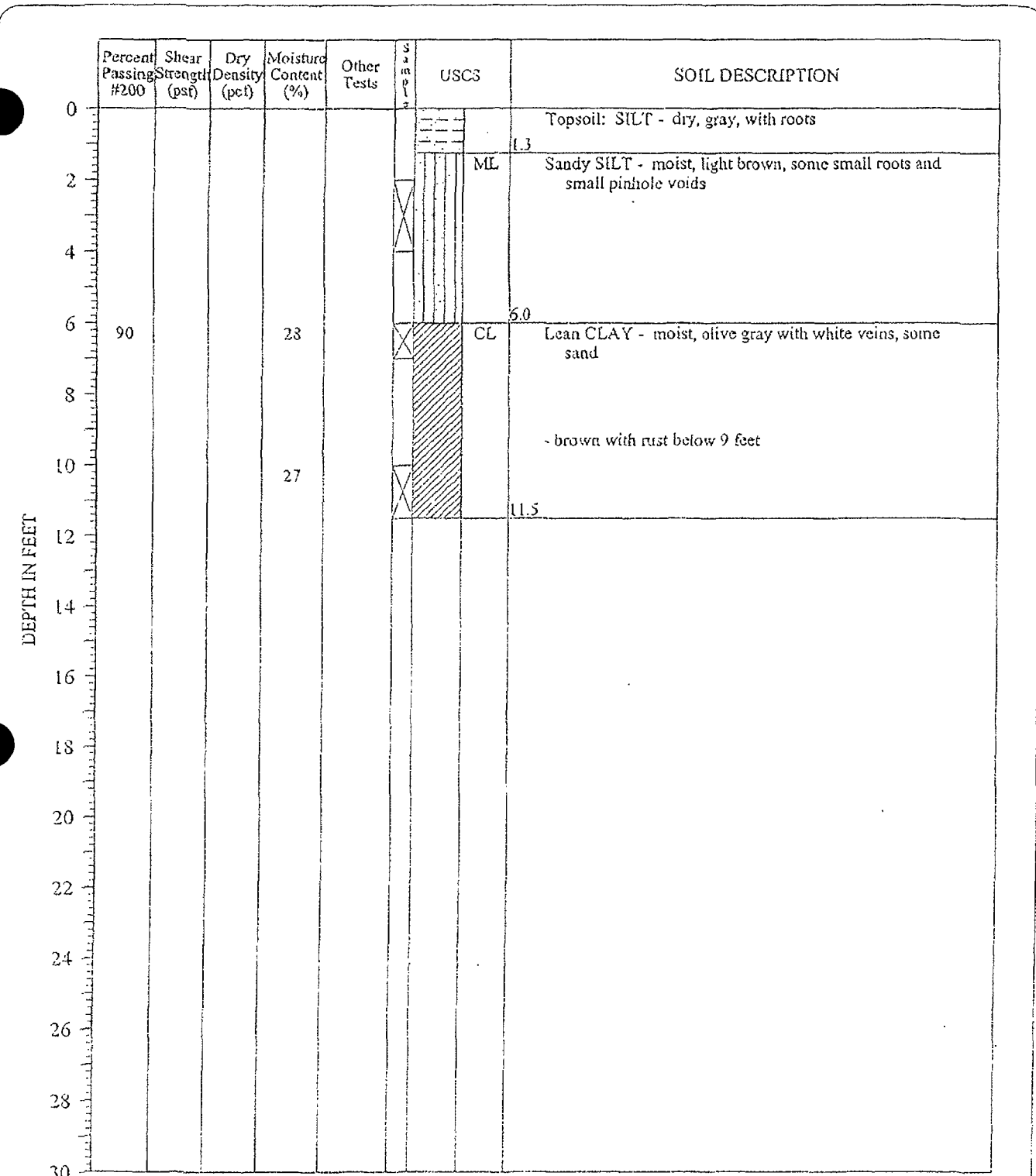


LOG OF TEST PIT TP-3
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-36

PROJECT NO. 35467.003

PIT LOG E-A SLC#2096-GPJ 1/15/04



DATE EXCAVATED: 9-18-03
 TOTAL DEPTH: 11.5 feet

LOGGED BY: M. Ivers
 EQUIPMENT: Cat 416 CIT Backhoe
 ELEVATION: 4248.7 feet



LOG OF TEST PIT TP- 4
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-37

PROJECT NO. 35467.003

PIT LOG E-A SLC\208\CPJ 11/15/04

DEPTH IN FEET

| Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Sample | USCS | SOIL DESCRIPTION |
|----------------------|----------------------|-------------------|----------------------|-------------|--------|------|---|
| | | | | | | | 0.3 Topsoil: SILT - dry, gray, roots |
| 75 | | | 1 | SV | | ML | SILT with sand - dry, brown, many pinhole voids and roots |
| | | | | | | | 7.0 |
| 67 | | | 8 | SV | | ML | Sandy SILT - dry, brown, fine |
| | | | | | | | 13.0 |

DATE EXCAVATED: 9-19-03
 TOTAL DEPTH: 13.0 feet

LOGGED BY: M. Ivers
 EQUIPMENT: Cat 416 CIT Backhoe
 ELEVATION: 4273.7 feet



LOG OF TEST PIT TP- 5
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-38

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Shear Strength (psi) | Dry Density (pcf) | Moisture Content (%) | Other Tests | S a m p l e s | USCS | SOIL DESCRIPTION |
|---------------|----------------------|----------------------|-------------------|----------------------|-------------|---------------|------|--|
| | 0 | | | | | | | |
| 1 | 53 | | | 1 | SV PI | | ML | Sandy SILT - dry, brown, pinhole voids and small roots |
| 2 | | | | | | | | 3.0 |
| 4 | | | | | | | GM | Silty GRAVEL with sand and cobbles - dry, brown, subrounded clasts |
| 6 | | | | | | | | 7.0 |
| 8 | | | | | | | ML | SILT - dry, brown |
| 10 | | | | 7 | | | SM | Silty SAND - dry, brown, fine |
| 12 | | | | | | | | 13.0 |
| 14 | | | | | | | | |
| 16 | | | | | | | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |
| 26 | | | | | | | | |
| 28 | | | | | | | | |
| 30 | | | | | | | | |

DATE EXCAVATED: 9-19-03
TOTAL DEPTH: 13.0 feet

LOGGED BY: M. Ivers
EQUIPMENT: Cat 416 CTT Backhoe
ELEVATION: 4319.0 feet

PIT LOG E-A, SLC7096-GPI 11/15/04



LOG OF TEST PIT TP- 6
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-39

PROJECT NO. 35467.003

TPIT LOG E-A SLC-2098 GPJ 11/15/04

DEPTH IN FEET

| Depth (ft) | Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | USCS | SOIL DESCRIPTION |
|------------|----------------------|----------------------|-------------------|----------------------|-------------|------|---|
| 0 | | | | | | | 0.5 Topsoil |
| 0 - 2 | 35 | | | 2 | SV PI | SM | Silty SAND - dry, brown, pinhole voids and roots, some gravel |
| 2 - 4 | | | | 2 | | GM | Silty GRAVEL with sand and cobbles - dry, brown |
| 4 - 6 | | | | | | SM | Silty SAND - slightly moist, brown, fine |
| 6 - 12 | | | | 4 | | | |
| 12.0 | | | | | | | |

DATE EXCAVATED: 9-19-03
 TOTAL DEPTH: 12.0 feet

LOGGED BY: M. Ivers
 EQUIPMENT: Cat 416 CIT Backhoe
 ELEVATION: 4272.0* feet



LOG OF TEST PIT TP- 7
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-40

PROJECT NO. 35467.003

PIT LOG E-a SL-C-2098 GFI 11/15/04

DEPTH IN FEET

| Depth (ft) | Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | USCS | SOIL DESCRIPTION |
|------------|----------------------|----------------------|-------------------|----------------------|-------------|------|---|
| 0 | | | | | | | 0.5 Topsoil |
| 2 | 15 | | 2 | | SV | GM | Silty GRAVEL with sand - dry to slightly moist, brown, calcite skin on many clasts, some cobbles and scattered boulders |
| 10 | | | | | | | - fewer cobbles and boulders, increasing silt content below 9.5 feet |
| 12.0 | | | | | | | |
| 14 | | | | | | | |
| 16 | | | | | | | |
| 18 | | | | | | | |
| 20 | | | | | | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

DATE EXCAVATED: 9-19-03
 TOTAL DEPTH: 12.0 feet

LOGGED BY: M. Ivers
 EQUIPMENT: Cat 416 CIT Backhoe
 ELEVATION: 4330.0 feet



LOG OF TEST PIT TP- 8
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-41

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | SAMPLE | USCS | SOIL DESCRIPTION |
|---------------|----------------------|----------------------|-------------------|----------------------|-------------|--------|------|------------------|
| | 0 | | | 1 | | SV | | GP-GM |
| 2 | | | | | | | | |
| 4 | | | | | | | | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| 10 | | | | | | | | |
| 11.0 | | | | | | | | |
| 12 | | | | | | | | |
| 14 | | | | | | | | |
| 16 | | | | | | | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |
| 26 | | | | | | | | |
| 28 | | | | | | | | |
| 30 | | | | | | | | |

DATE EXCAVATED: 11-14-03
TOTAL DEPTH: 11.0 feet

LOGGED BY: R. McDonald
EQUIPMENT: Cat 416 CIT Backhoe
ELEVATION: 4335.2 feet

PIT LOG E-A S1 C42098 GFI 11/15/04



LOG OF TEST PIT TP-9
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-42

PROJECT NO. 35467.003

TEST PIT LOG E-A SLCR20% GPJ 11/15/03

DEPTH IN FEET

| Depth (ft) | Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | USCS | SOIL DESCRIPTION |
|------------|----------------------|----------------------|-------------------|----------------------|-------------|-------|--|
| 0 | | | | | | | 0.3 Topsoil |
| 0.3 | | | | | | GP-GM | Poorly Graded GRAVEL with silt and sand - slightly moist, yellow-brown, trace of cobbles and occasional small boulders |
| 6.0 | | | | | | SM | Silty SAND - slightly moist, yellow-brown, some gravel, slightly cemented |
| 11.0 | | | | | | | - refusal on rock at 11 feet |

DATE EXCAVATED: 11-14-03
 TOTAL DEPTH: 11.0 feet

LOGGED BY: R. McDonald
 EQUIPMENT: Cat 416 CTT Backhoe
 ELEVATION: 4318.5* feet



LOG OF TEST PIT TP-10
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-43

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | S.P. No. | USCS | SOIL DESCRIPTION |
|---------------|----------------------|----------------------|-------------------|----------------------|-------------|----------|-----------|---|
| | | | | | | | | |
| 0 | | | | | | | | 0-3 Topsoil |
| 2 | 79 | | 11 | SV PI | | | CL- ML | SILTY CLAY with sand - slightly moist, brown |
| 6 | | | | | | | SM | 5.0 Silty SAND - slightly moist, yellow-brown |
| 12 | | | | | | | SP- SM | 12.0 13.0 Poorly Graded SAND with silt - slightly moist, yellow-brown |
| 30 | | | | | | | | |

DATE EXCAVATED: 11-14-03
TOTAL DEPTH: 13.0 feet

LOGGED BY: R. McDonald
EQUIPMENT: Cat 416 CIT Backhoe
ELEVATION: 4271.1* feet

TEST PIT LOG E-A SLC#2098.GPJ 11/15/04



LOG OF TEST PIT TP-11
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-44

PROJECT NO. 35467.003

DEPTH IN FEET

| Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Sample | USCS | SOIL DESCRIPTION |
|----------------------|----------------------|-------------------|----------------------|-------------|--------|-----------|---|
| 79 | | | 11 | SV PI | 0-3 | CL-ML | Topsoil SILTY CLAY with sand - slightly moist, brown |
| | | | | | 6.0 | SM | Silty SAND - slightly moist, yellow-brown |
| | | | | | 12.0 | SP- SM | Poorly Graded SAND with silt - slightly moist, yellow-brown |
| | | | | | 13.0 | | |

DATE EXCAVATED: 11-14-03
TOTAL DEPTH: 13.0 feet

LOGGED BY: R. McDonald
EQUIPMENT: Cat 416 CIT Backhoe
ELEVATION: -4271.1' feet



LOG OF TEST PIT TP-11
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-44

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Sample | USCS | SOIL DESCRIPTION |
|---------------|----------------------|----------------------|-------------------|----------------------|-------------|--------|------|--|
| | | | | | | | | |
| 0 | | | | | | | | 0.3 Topsoil Sandy SILTY CLAY - slightly moist, yellow-brown |
| 2 | | | 5 | | PI | | | |
| 4 | | | | | | | | |
| 6 | | | | | | | | 5.0 Silty Clayey GRAVEL with sand - slightly moist, yellow-brown, with some cobbles |
| 8 | | | | | | | | |
| 10 | | | | | | | | 10.0 Poorly Graded GRAVEL with silt and sand - slightly moist, yellow-brown, with some cobbles |
| 12 | | | | | | | | |
| 14 | | | | | | | | 14.0 |
| 16 | | | | | | | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |
| 26 | | | | | | | | |
| 28 | | | | | | | | |
| 30 | | | | | | | | |

DATE EXCAVATED: 11-14-03
TOTAL DEPTH: 14.0 feet

LOGGED BY: R. McDonald
EQUIPMENT: Cat 416 CIT Backhoe
ELEVATION: 4307.5* feet

TEST PIT LOG E-A SLC42098.GPJ 1/15/04

KI KLEINFELDER

LOG OF TEST PIT TP-12
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-45

PROJECT NO. 35467.003

TEST LOG E-A SLC42098.GPJ 11/15/04

DEPTH IN FEET

| Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Sample | USCS | SOIL DESCRIPTION |
|----------------------|----------------------|-------------------|----------------------|-------------|--------|-----------------------|--|
| | | | | | | | Topsoil, with roots to 15" |
| | | | | | | 1.3 ML | SILT with sand - moist, red-yellow, fine sand |
| | | | 29 | PI | | 5.0 CL | Lean CLAY with sand - very moist, olive-brown, mottled |
| | | | | | | 9.0 SM | Silty SAND - light brown, medium to coarse grain with strongly cemented layers (caliche) |
| | | | 9 | | | 12.0 SP-SM 13.0 | Poorly Graded SAND with silt - moist, yellow-brown, fine-grained |

DATE EXCAVATED: 11-14-03
TOTAL DEPTH: 13.0 feet

LOGGED BY: R. McDonald
EQUIPMENT: Cat 416 CIT Backhoe
ELEVATION: 4233.6* feet

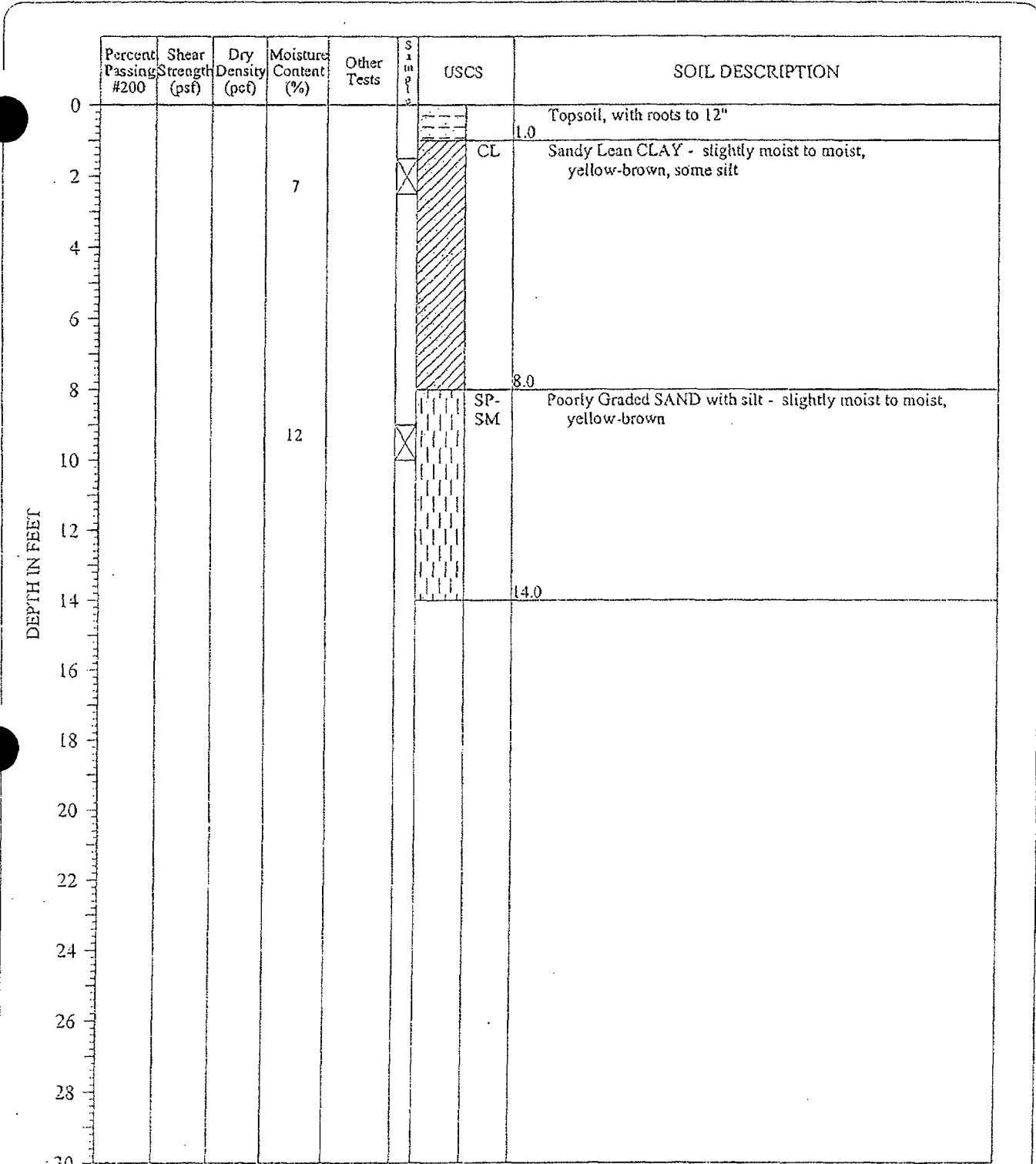


LOG OF TEST PIT TP-13
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-46

PROJECT NO. 35467.003

_STP11 LOG E-A SLC12093.GPJ 11/15/04



DATE EXCAVATED: 11-14-03
 TOTAL DEPTH: 14.0 feet

LOGGED BY: R. McDonald
 EQUIPMENT: Cat 416 CIT Backhoe
 ELEVATION: 4274.2' feet



LOG OF TEST PIT TP-14
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-47

PROJECT NO. 35467.003

TP15 LOG E-A SLC-2098-011 11/15/04

DEPTH IN FEET

| Depth (ft) | Percent Passing #200 | Shear Strength (pst) | Dry Density (pcf) | Moisture Content (%) | Other Tests | USCS | SOIL DESCRIPTION |
|------------|----------------------|----------------------|-------------------|----------------------|-------------|------|--|
| 0 - 1.0 | | | | | | | Topsoil, with roots to 12 inches |
| 1.0 - 7.5 | 72 | | | 15 | SV | CL | Lean CLAY with sand - moist, yellow-brown |
| 7.5 - 9.0 | | | | | | ML | SILT - moist, olive-brown, some fine sand, mottled |
| 9.0 - 14.0 | | | | 30 | PI | SM | Silty SAND - slightly moist, yellow-brown, strongly cemented from 9 to 10 feet, with large gravels and cobbles |
| 14.0 - 30 | | | | 10 | | | |

DATE EXCAVATED: 11-14-03
 TOTAL DEPTH: 14.0 feet

LOGGED BY: R. McDonald
 EQUIPMENT: Cat 416 CIT Backhoe
 ELEVATION: 4237.5* feet



LOG OF TEST PIT TP-15
 Wasatch Regional Solid Waste Landfill
 Tooele County, Utah

FIGURE
A-48

PROJECT NO. 35467.003

| DEPTH IN FEET | Percent Passing #200 | Shear Strength (psf) | Dry Density (pcf) | Moisture Content (%) | Other Tests | Sample | USCS | SOIL DESCRIPTION |
|---------------|----------------------|----------------------|-------------------|----------------------|-------------|--------|------|--|
| | | | | | | | | |
| 0 | | | | | | | | Topsoil, with roots to 12" |
| 1.0 | | | | | | | | |
| 2 | | | 17 | | | | CL | Sandy Lean CLAY - slightly moist, yellow-brown, fine-grained sand |
| 4.0 | | | 26 | | | | CL | Lean CLAY - moist, olive-brown, with occasional sand layers |
| 12.0 | | | | | | | SM | Silty SAND - moist, light brown, with silt and gravel (strongly cemented sand) |
| 14.0 | | | 11 | | | | | |
| 14.0 | | | | | | | | |
| 16 | | | | | | | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |
| 26 | | | | | | | | |
| 28 | | | | | | | | |
| 30 | | | | | | | | |

DATE EXCAVATED: 11-14-03
TOTAL DEPTH: 14.0 feet

LOGGED BY: R. McDonald
EQUIPMENT: Cat 416 CTT Backhoe
ELEVATION: 4238.3* feet

TEST PIT LOG E.A. SLC42088.GPJ 11/15/03

KI KLEINFELDER

LOG OF TEST PIT TP-16
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-49

PROJECT NO. 35467.003

UNIFIED SOIL CLASSIFICATION SYSTEM

| MAJOR DIVISIONS | USCS SYMBOL | TYPICAL DESCRIPTIONS |
|---|-------------|--|
| GRAVELS (More than half of coarse fraction is larger than the #4 sieve) | GW | WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES |
| | GP | POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES |
| | GM | SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES |
| | GC | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES |
| SANDS (More than half of coarse fraction is smaller than the #4 sieve) | SW | WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES |
| | SP | POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES |
| | SM | SILTY SANDS, SAND-GRAVEL-SILT MIXTURES |
| | SC | CLAYEY SANDS SAND-GRAVEL-CLAY MIXTURES |
| FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve) | ML | INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY |
| | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
| | OL | ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| | MH | INORGANIC SILTS, MICACEOUS OR ORYCTOCEOUS FINE SAND OR SILT |
| SILTS AND CLAYS (Liquid limit less than 50) | CH | INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS |
| | OH | ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY |
| HIGHLY ORGANIC SOILS | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS |

LOG KEY SYMBOLS

| | | | |
|--|---|--|--|
| | BULK / BAG SAMPLE | | STANDARD PENETRATION SPLIT SPOON SAMPLER (2 inch outside diameter) |
| | MODIFIED CALIFORNIA SAMPLER (2-1/2 inch outside diameter) | | SHELBY TUBE (3 inch outside diameter) |
| | CALIFORNIA SAMPLER (3 inch outside diameter) | | DIAMOND BIT CORE BARREL (47.6mm Cores) |
| | WATER LEVEL (level after completion) | | WATER LEVEL (level where first encountered) |

CEMENTATION

| DESCRIPTION | DESCRIPTION |
|-------------|--|
| WEAKLY | CRUMBLES OR BREAKS WITH HANDLING OR SLIGHT FINGER PRESSURE |
| MODERATELY | CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE |
| STRONGLY | WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE |

OTHER TESTS KEY

| | | | |
|-----|-------------------------------|----|------------------------|
| C | CONSOLIDATION | SV | PARTICLE SIZE ANALYSIS |
| PI | PLASTICITY INDEX | DS | DIRECT SHEAR |
| UC | UNCONFINED COMPRESSION | T | TRIAXIAL |
| S | SOLUBILITY | R | RESISTIVITY |
| O | ORGANIC CONTENT | RV | R-VALUE |
| CBR | CALIFORNIA BEARING RATIO | SS | SOLUBLE SULFATES |
| P | MOISTURE/DENSITY RELATIONSHIP | PM | PERMEABILITY |
| SF | SOIL FERTILITY | | |

MODIFIERS

| DESCRIPTION | % |
|-------------|--------|
| TRACE | <5 |
| SOME | 5 - 12 |
| WITH | >12 |

MOISTURE CONTENT

| DESCRIPTION | FIELD TEST |
|-------------|--|
| | ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH |
| | DAMP BUT NO VISIBLE WATER |
| | VISIBLE FREE WATER, USUALLY SOIL BELOW WATER TABLE |

STRATIFICATION

| DESCRIPTION | THICKNESS | DESCRIPTION | THICKNESS |
|-------------|-------------|-------------|-------------------------------------|
| SEAM | 1/16 - 1/2" | OCCASIONAL | ONE OR LESS PER FOOT OF THICKNESS |
| LAYER | 1/2 - 12" | FREQUENT | MORE THAN ONE PER FOOT OF THICKNESS |

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

| APPARENT DENSITY | SPT (blows/ft) | MODIFIED CA. SAMPLER (blows/ft) | CALIFORNIA SAMPLER (blows/ft) | RELATIVE DENSITY (%) | FIELD TEST |
|------------------|----------------|---------------------------------|-------------------------------|----------------------|--|
| VERY LOOSE | <4 | <4 | <5 | 0 - 15 | EASILY PENETRATED WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND |
| LOOSE | 4 - 10 | 5 - 12 | 5 - 15 | 15 - 35 | DIFFICULT TO PENETRATE WITH 1/2-INCH REINFORCING ROD PUSHED BY HAND |
| MEDIUM DENSE | 10 - 30 | 12 - 35 | 15 - 40 | 35 - 65 | EASILY PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER |
| DENSE | 30 - 50 | 35 - 80 | 40 - 70 | 65 - 85 | DIFFICULT TO PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER |
| VERY DENSE | >50 | >80 | >70 | 85 - 100 | PENETRATED ONLY A FEW INCHES WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER |

CONSISTENCY - FINE-GRAINED SOIL

| CONSISTENCY | SPT (blows/ft) | FORVANE UNGRAINED SHEAR STRENGTH (tsf) | POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf) | FIELD TEST |
|--------------|----------------|--|---|--|
| VERY SOFT | <2 | <0.125 | <0.25 | EASILY PENETRATED SEVERAL INCHES BY THUMB. EXUDES BETWEEN THUMB AND FINGERS WHEN SQUEEZED BY HAND. |
| SOFT | 2 - 4 | 0.125 - 0.25 | 0.25 - 0.5 | EASILY PENETRATED ONE INCH BY THUMB. MOLDED BY LIGHT FINGER PRESSURE. |
| MEDIUM STIFF | 4 - 8 | 0.25 - 0.5 | 0.5 - 1.0 | PENETRATED OVER 1/2 INCH BY THUMB WITH MODERATE EFFORT. MOLDED BY STRONG FINGER PRESSURE. |
| STIFF | 8 - 15 | 0.5 - 1.0 | 1.0 - 2.0 | INDENTED ABOUT 1/2 INCH BY THUMB BUT PENETRATED ONLY WITH GREAT EFFORT. |
| VERY STIFF | 15 - 30 | 1.0 - 2.0 | 2.0 - 4.0 | READILY INDENTED BY THUMBNAIL. |
| HARD | >30 | >2.0 | >4.0 | INDENTED WITH DIFFICULTY BY THUMBNAIL. |

GENERAL NOTES

- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
- No warranty is provided as to the continuity of soil conditions between individual sample locations.
- Logs represent general soil conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification designations presented on the logs were evaluated by visual methods only. Therefore, actual designations (based on laboratory tests) may vary.

FIGURE

A-50

APPENDIX B

| LOCATION | | NATURAL MOISTURE | NATURAL DRY | GRADATION | | | ATTERBERG LIMITS | | OTHER TESTS* | UNIFIED SOIL CLASSIFICATION |
|------------|------------|------------------|---------------|------------|----------|-------------------|------------------|------------------|---|--------------------------------------|
| BORING NO. | DEPTH (ft) | CONTENT (%) | DENSITY (pcf) | GRAVEL (%) | SAND (%) | SILT AND CLAY (%) | LIQUID LIMIT | PLASTICITY INDEX | | |
| B-1(i) | 5 | 16 | | | | 46 | | | | Silty SAND (SM) |
| B-1(i) | 15 | 7 | | 1 | 65 | 35 | | | | Silty SAND (SM) |
| B-1(i) | 30 | 9 | | | | 50 | | | | Silty SAND (SM) |
| B-2(i) | 10 | 28 | | | | | 34 | 11 | | Lean CLAY (CL) |
| B-2(i) | 20 | | | 0 | 83 | 17 | | | | Silty SAND (SM) |
| B-2(i) | 30 | | | | | | 102 | 53 | | Elastic SILT (MH) |
| B-3(i) | 10 | 5 | | 0 | 90 | 10 | | | | Poorly Graded SAND with silt (SP-SM) |
| B-3(i) | 20 | | | | | 10 | | | | Poorly Graded SAND with silt (SP-SM) |
| B-3(i) | 29 | | | | | 20 | | | | Silty SAND (SM) |
| B-1 | 2.5 | 15 | 87 | | | | | | | Silty SAND (SM) |
| B-1 | 7.5 | 12 | | | | | | | | Lean CLAY (CL) |
| B-1 | 20 | 20 | | | | | | | | Silty SAND (SM) |
| B-1 | 25 | 22 | | 0 | 58 | 42 | 20 | Non-Plastic | | Silty SAND (SM) |
| B-1 | 30 | 21 | | | | | | | | Sandy Lean CLAY (CL) |
| B-1 | 40 | 18 | | | | | | | | Sandy Lean CLAY (CL) |
| B-1 | 50 | 18 | | | | | | | | Silty SAND (SM) |
| B-2 | 2 | 24 | | 1 | 44 | 55 | 34 | 11 | pH=8.1; R=56; WSS=12,800; $\phi=35^\circ$; c=550 | Sandy Lean CLAY (CL) |
| B-2 | 5 | 41 | 77 | | | 77 | 47 | 23 | C | Lean CLAY with sand (CL) |
| B-2 | 15 | 20 | | | | | | | | Silty SAND (SM) |
| B-2 | 25 | 36 | | | | 47 | 34 | 14 | | Lean CLAY with sand seams (CL) |
| B-2 | 35 | 26 | | | | | | | | Lean CLAY (CL) |
| B-2 | 45 | 27 | | | | | | | | Lean CLAY (CL) |
| B-3 | 7.5 | 17 | 88 | | | 51 | 38 | 15 | C | Sandy Lean CLAY (CL) |

*R = Resistivity (ohm-cm); WSS = Water Soluble Sulfates (ppm); UC = Unconfined Compression (psf); ϕ = Internal Friction Angle (degrees); c = Apparent Cohesion; TV = Torvane (psf);
C = Consolidation Test; CBK = California Bearing Ratio (%); S = Swell Potential (%); ND = Non Detect



KLEINFELDER

PROJECT NO. 35467.003

SUMMARY OF LABORATORY TEST RESULTS

Wasatch Regional Solid Waste Landfill
Utah

FIGURE

B-1

| SAMPLING LOCATION | | NATURAL MOISTURE CONTENT (%) | NATURAL DRY DENSITY (pcf) | GRADATION | | | ATTERBERG LIMITS | | OTHER TESTS* | UNIFIED SOIL CLASSIFICATION |
|-------------------|------------|------------------------------|---------------------------|------------|----------|-------------------|------------------|------------------|--------------------------|---|
| BORING NO. | DEPTH (ft) | | | GRAVEL (%) | SAND (%) | SILT AND CLAY (%) | LIQUID LIMIT | PLASTICITY INDEX | | |
| B-3 | 15 | 17 | | | | | | | Silty SAND (SM) | |
| B-3 | 25 | 20 | | | | | | | Silty SAND (SM) | |
| B-3 | 35 | 27 | 97 | | | | | | Silty SAND (SM) | |
| B-3 | 45 | 31 | | | | | | | Silty SAND (SM) | |
| B-4 | 2 | 12 | | 0 | 36 | 64 | 22 | 6 | Sandy SILTY CLAY (CL-ML) | |
| B-4 | 7.5 | 17 | | | | | | | Sandy Lean CLAY (CL) | |
| B-4 | 15 | 15 | 83 | | | 65 | 29 | 10 | C | Sandy Lean CLAY (CL) |
| B-4 | 20 | 8 | | | | | | | | Silty SAND (SM) |
| B-4 | 30 | 19 | | 1 | 80 | 20 | | | | Silty SAND (SM) |
| B-4 | 40 | 16 | 112 | | | | | | | Silty SAND with gravel (SM) |
| B-4 | 45 | 23 | | 1 | 32 | 67 | 21 | Non-Plastic | | Sandy SILT (ML) |
| B-4 | 48.5 | 23 | | | | | | | | Sandy SILT (ML) |
| B-5 | 2.5 | 5 | | | | | | | | Sandy SILT (ML) |
| B-5 | 7.5 | 11 | 96 | | | 68 | 22 | 7 | C | Sandy SILTY CLAY (CL-ML) |
| B-5 | 15 | 13 | | | | | | | | Clayey SAND (SC) |
| B-5 | 25 | 26 | | 0 | 10 | 90 | 34 | 13 | | Lean CLAY (CL) |
| B-5 | 30 | 4 | | | | | | | | Silty SAND (SM) |
| B-5 | 35 | | | 70 | 20 | 10 | | | | Poorly Graded GRAVEL with silt and sand (GP-GM) |
| B-5 | 45 | 11 | | | | | | | | Poorly Graded GRAVEL with silt and sand (GP-GM) |
| B-6 | 2 | 5 | | 0 | 26 | 74 | | | | SILT with sand (ML) |
| B-6 | 7 | 7 | | | | | | | | SILT with sand (ML) |
| B-6 | 15 | 7 | 82 | | | | | | $\phi=29^\circ$; $c=75$ | SILT with sand (ML) |
| B-6 | 26 | 2 | | | | 5 | | | | Poorly Graded SAND (SP) |

*R = Resistivity (ohm-cm); WSS = Water Soluble Sulfates (ppm); UC = Unconfined Compression (psi); ϕ = Internal Friction Angle (degrees); c = Apparent Cohesion; TV = Torvane (psi);
C = Consolidation Test; CBR = California Bearing Ratio (%); S = Swell Potential (%); ND = Non Detect



KLEINFELDER

PROJECT NO. 35467.003

SUMMARY OF LABORATORY TEST RESULTS

Wasatch Regional Solid Waste Landfill

Utah

FIGURE

B-2

| SAMPLE LOCATION | | NATURAL MOISTURE CONTENT (%) | NATURAL DRY DENSITY (pcf) | GRADATION | | | ATTERBERG LIMITS | | OTHER TESTS* | UNIFIED SOIL CLASSIFICATION |
|-----------------|------------|------------------------------|---------------------------|------------|----------|-------------------|------------------|------------------|--------------------------------------|-----------------------------|
| BORING NO. | DEPTH (ft) | | | GRAVEL (%) | SAND (%) | SILT AND CLAY (%) | LIQUID LIMIT | PLASTICITY INDEX | | |
| B-6 | 35 | 32 | | | | | | | Lean CLAY (CL) | |
| B-7 | 2 | 8 | | | | | | | Sandy SILT (ML) | |
| B-7 | 5 | 10 | | 0 | 31 | 69 | | | Sandy SILT (ML) | |
| B-7 | 10 | 1 | 132 | | | | | | Silty GRAVEL with sand (GM) | |
| B-7 | 15 | 3 | | | | 21 | | | Clayey SAND (SC) | |
| B-7 | 25 | 4 | | 37 | 34 | 29 | | | Clayey GRAVEL with sand (GC) | |
| B-7 | 35 | 6 | | | | | | | Silty SAND with gravel (SM) | |
| B-7 | 45 | 7 | | | | | | | Clayey GRAVEL with sand (GC) | |
| B-8 | 5 | 22 | | | | 93 | 38 | 13 | Lean CLAY (CL) | |
| B-8 | 10.5 | 5 | | | | | | | Poorly Graded SAND with silt (SP-SM) | |
| B-8 | 20 | 20 | | | | | | | Silty SAND (SM) | |
| B-9 | 2 | 17 | | 0 | 10 | 90 | | | Lean CLAY (CL) | |
| B-9 | 8 | 12 | 94 | | | 42 | 29 | 9 | C | Clayey SAND (SC) |
| B-9 | 11 | 7 | 100 | | | | | | | Silty SAND with gravel (SM) |
| B-9 | 17 | 21 | 107 | | | | | | | Silty SAND with gravel (SM) |
| B-9 | 30 | 46 | 72 | | | 95 | 73 | 27 | C | Elastic SILT (MH) |
| B-9 | 40 | 16 | 117 | | | | | | | Silty SAND with gravel (SM) |
| B-9 | 50 | 37 | | | | | | | | Lean CLAY (CL) |
| B-10 | 0 | 5 | | | | | | | | Lean CLAY (CL) |
| B-10 | 4 | 27 | | | | 89 | 42 | 16 | | Lean CLAY (CL) |
| B-10 | 10 | 7 | 96 | | | | | | $\phi=31^\circ$; $c=0$ | Silty SAND (SM) |
| B-10 | 14 | 19 | | | | | | | | Silty SAND (SM) |
| B-10 | 20 | 26 | | | | 41 | 21 | Non-Plastic | | Silty SAND (SM) |
| B-10 | 30 | 19 | | | | | | | | Silty SAND (SM) |
| B-10 | 35 | 27 | | 0 | 24 | 76 | 26 | 8 | | Lean CLAY with sand (CL) |

*R = Resistivity (ohm-cm); WSS = Water Soluble Sulfates (ppm); UC = Unconfined Compression (psf); ϕ = Internal Friction Angle (degrees); c = Apparent Cohesion; TV = Torvane (psf);

C = Consolidation Test; CBR = California Bearing Ratio (%); S = Swell Potential (%); ND = Non Detect



KLEINFELDER

PROJECT NO. 35467.003

SUMMARY OF LABORATORY TEST RESULTS

Wasatch Regional Solid Waste Landfill

Utah

FIGURE

B-3

| SAMPLE LOCATION | | NATURAL MOISTURE CONTENT (%) | NATURAL DRY DENSITY (pcf) | GRADATION | | | ATTERBERG LIMITS | | OTHER TESTS* | UNIFIED SOIL CLASSIFICATION |
|-----------------|------------|------------------------------|---------------------------|------------|----------|-------------------|------------------|-----------------------------|--------------------------------------|-----------------------------|
| BORING NO. | DEPTH (ft) | | | GRAVEL (%) | SAND (%) | SILT AND CLAY (%) | LIQUID LIMIT | PLASTICITY INDEX | | |
| B-10 | 40 | 23 | | | | | | | Lean CLAY with sand (CL) | |
| B-10 | 50 | 19 | | | | | | | Silty SAND (SM) | |
| B-11 | 2 | 6 | | | 66 | 24 | 6 | | Sandy SILTY CLAY (CL-ML) | |
| B-11 | 10 | 20 | 105 | | 79 | 45 | 16 | UC=3,580; C | SILT with sand (ML) | |
| B-11 | 14 | 2 | 103 | | | | | | Silty SAND (SM) | |
| B-11 | 18 | 2 | 106 | | | | | | Silty SAND (SM) | |
| B-11 | 30 | 15 | 106 | | | | | | Silty SAND (SM) | |
| B-11 | 35 | 23 | | | 54 | 21 | Non-Plastic | | Sandy SILT (ML) | |
| B-11 | 40 | 19 | | | | | | | Silty SAND (SM) | |
| B-11 | 45 | 18 | 112 | | | | | | Silty SAND (SM) | |
| TP-1 | 1 | 22 | | 0 | 43 | 57 | 39 | 16 | Sandy Lean CLAY (CL) | |
| TP-1 | 4 | 40 | | | | 89 | 44 | 18 | Lean CLAY (CL) | |
| TP-1 | 10 | 9 | | 6 | 83 | 11 | | | Poorly Graded SAND with silt (SP-SM) | |
| TP-2 | 1 | 23 | | | | | | | Sandy SILT (ML) | |
| TP-2 | 3 | 32 | | | | 97 | 43 | 17 | Lean CLAY (CL) | |
| TP-2 | 11 | 12 | | 20 | 49 | 31 | | | Silty SAND with gravel (SM) | |
| TP-3 | 2 | 16 | | 0 | 25 | 75 | | | SILT with sand (ML) | |
| TP-3 | 7 | 27 | | | | 92 | 35 | 13 | Lean CLAY (CL) | |
| TP-3 | 9 | 27 | | | | | | | Lean CLAY (CL) | |
| TP-4 | 6 | 28 | | | | 90 | | | Lean CLAY (CL) | |
| TP-4 | 10 | 27 | | | | | | pH=8.5; R=250; WSS=2,400 | Lean CLAY (CL) | |
| TP-5 | 2 | 1 | | 0 | 25 | 75 | | | SILT with sand (ML) | |
| TP-5 | 8 | 8 | | 0 | 33 | 67 | | | Sandy SILT (ML) | |

*R = Resistivity (ohm-cm); WSS = Water Soluble Sulfates (ppm); UC = Unconfined Compression (psf); ϕ = Internal Friction Angle (degrees); c = Apparent Cohesion; TV = Torvane (psf);
C = Consolidation Test; CBR = California Bearing Ratio (%); S = Swell Potential (%); ND = Non Detect



KLEINFELDER

PROJECT NO. 35467.003

SUMMARY OF LABORATORY TEST RESULTS

Wasatch Regional Solid Waste Landfill

Utah

FIGURE

B-4

| SAMPLE LOCATION | | NATURAL MOISTURE CONTENT (%) | NATURAL DRY DENSITY (pcf) | GRADATION | | | ATTERBERG LIMITS | | OTHER TESTS* | UNIFIED SOIL CLASSIFICATION |
|-----------------|------------|------------------------------|---------------------------|------------|----------|-------------------|------------------|------------------|--|-----------------------------|
| BORING NO. | DEPTH (ft) | | | GRAVEL (%) | SAND (%) | SILT AND CLAY (%) | LIQUID LIMIT | PLASTICITY INDEX | | |
| TP-7 | 1 | 2 | | 10 | 55 | 35 | 20 | Non-Plastic | Silty SAND (SM) | |
| TP-7 | 4 | 2 | | | | | | | Silty GRAVEL with sand (GM) | |
| TP-7 | 8 | 4 | | | | | | | Silty SAND (SM) | |
| TP-8 | 2 | 2 | | 51 | 34 | 15 | | | Silty GRAVEL with sand (GM) | |
| TP-9 | 1 | 1 | | 66 | 26 | 8 | | | Poorly Graded GRAVEL with silt and sand (GP-GM) | |
| TP-11 | 1 | 7 | | 0 | 21 | 79 | 26 | 6 | SILTY CLAY with sand (CL-ML) | |
| TP-12 | 2 | 5 | | | | 51 | 22 | 6 | Sandy SILTY CLAY (CL-ML) | |
| TP-13 | 4 | 29 | | | | 83 | 49 | 19 | pH=8.1; R=53; WSS=14,830 SILT with sand (ML) | |
| TP-13 | 12 | 9 | | | | | | | Poorly Graded SAND with silt (SP-SM) | |
| TP-14 | 2 | 7 | | | | | | | Sandy Lean CLAY (CL) | |
| TP-14 | 9 | 12 | | | | | | | Silty SAND (SM) | |
| TP-15 | 1 | 16 | | 0 | 28 | 72 | | | Lean CLAY with sand (CL) | |
| TP-15 | 8 | 30 | | | | 87 | 48 | 18 | SILT (ML) | |
| TP-15 | 14 | 10 | | | | | | | Silty SAND (SM) | |
| TP-16 | 2 | 17 | | | | | | | pH=8.6; R=88; WSS=1,553 Lean CLAY with sand (CL) | |
| TP-16 | 5 | 26 | | | | | | | Lean CLAY (CL) | |
| TP-16 | 13 | 11 | | | | | | | Silty SAND (SM) | |

*R = Resistivity (ohm-cm); WSS = Water Soluble Sulfates (ppm); UC = Unconfined Compression (psf); ψ = Internal Friction Angle (degrees); c = Apparent Cohesion; TV = Torvane (psf);
C = Consolidation Test; CBR = California Bearing Ratio (%); S = Swell Potential (%); ND = Non Detect



KLEINFELDER

PROJECT NO. 35467.003

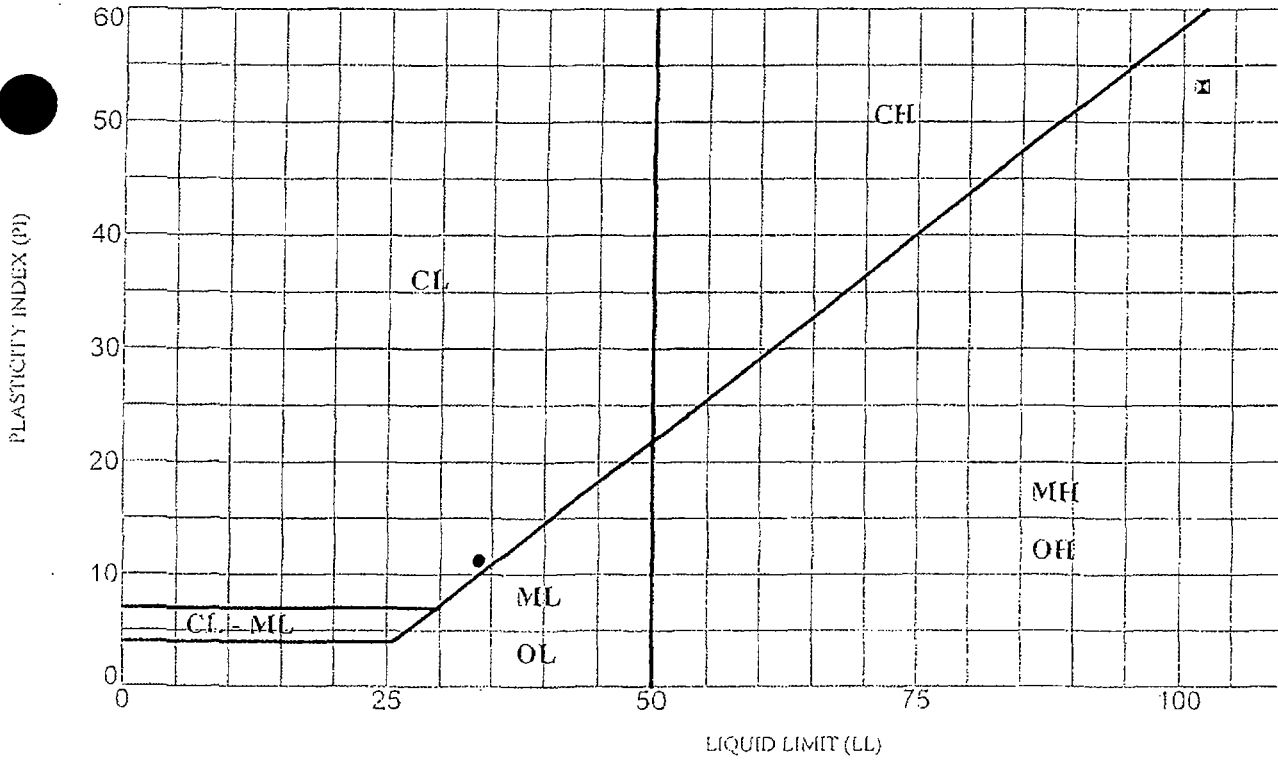
SUMMARY OF LABORATORY TEST RESULTS

Wasatch Regional Solid Waste Landfill

Utah

FIGURE

B-5



| Specimen Identification | USCS Classification | LL | PL | PI |
|-------------------------|---------------------|-----|----|----|
| ● B- 2(i) at 10.0 feet | Lean CLAY (CL) | 34 | 22 | 12 |
| ⊠ B- 2(i) at 30.0 feet | Elastic SILT (MH) | 102 | 49 | 53 |
| | | | | |
| | | | | |
| | | | | |

LL - Liquid Limit

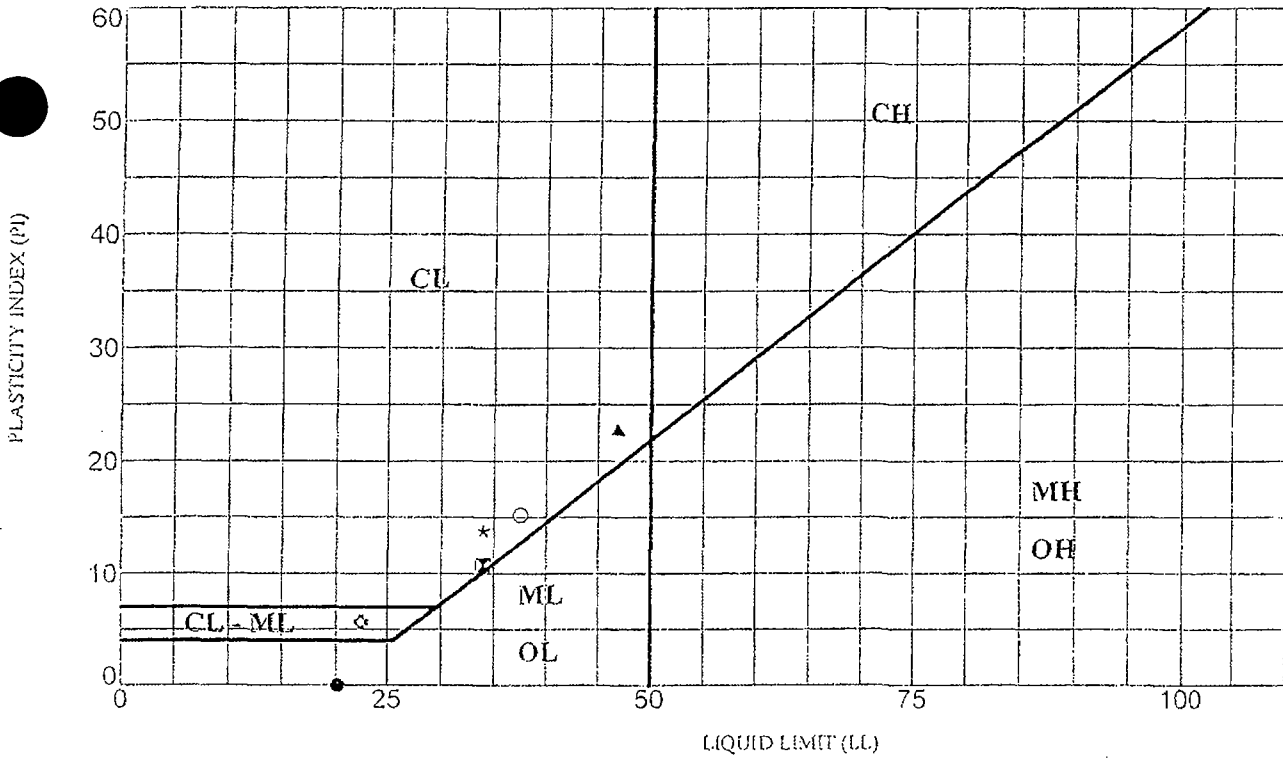
PL - Plastic Limit

PI - Plasticity Index

Unified Soil Classification
Fine Grained Soil Groups

| | LL < 50 |
|----|---|
| ML | Inorganic silts and clayey silts to very fine sands of low plasticity |
| CL | Inorganic clays of low to medium plasticity |
| OL | Organic silts and organic silty clays of low plasticity |

| | LL ≥ 50 |
|----|---|
| MH | Inorganic silts and clayey silts of high plasticity |
| CH | Inorganic clays of high plasticity |
| OH | Organic clays of high plasticity, organic silts |



| Specimen Identification | USCS Classification | LL | PL | PI |
|-------------------------|--------------------------|----|----|----|
| ● B- 1 at 25.0 feet | Silty SAND (SM) | 20 | 20 | NP |
| ⊠ B- 2 at 2.0 feet | Sandy Lean CLAY (CL) | 34 | 23 | 11 |
| ▲ B- 2 at 5.0 feet | Lean CLAY with sand (CL) | 47 | 24 | 23 |
| ★ B- 2 at 25.0 feet | Clayey SAND (SC) | 34 | 20 | 14 |
| ○ B- 3 at 7.5 feet | Sandy Lean CLAY (CL) | 37 | 22 | 15 |
| ⊙ B- 4 at 2.0 feet | Sandy SILTY CLAY (CL-ML) | 22 | 17 | 5 |

LL - Liquid Limit

PL - Plastic Limit

PI - Plasticity Index

Unified Soil Classification
Fine Grained Soil Groups

| LL < 50 | |
|---------|---|
| ML | Inorganic silts and clayey silts to very fine sands of low plasticity |
| CL | Inorganic clays of low to medium plasticity |
| OL | Organic silts and organic silty clays of low plasticity |

| LL ≥ 50 | |
|---------|---|
| MH | Inorganic silts and clayey silts of high plasticity |
| CH | Inorganic clays of high plasticity |
| OH | Organic clays of high plasticity, organic silts |



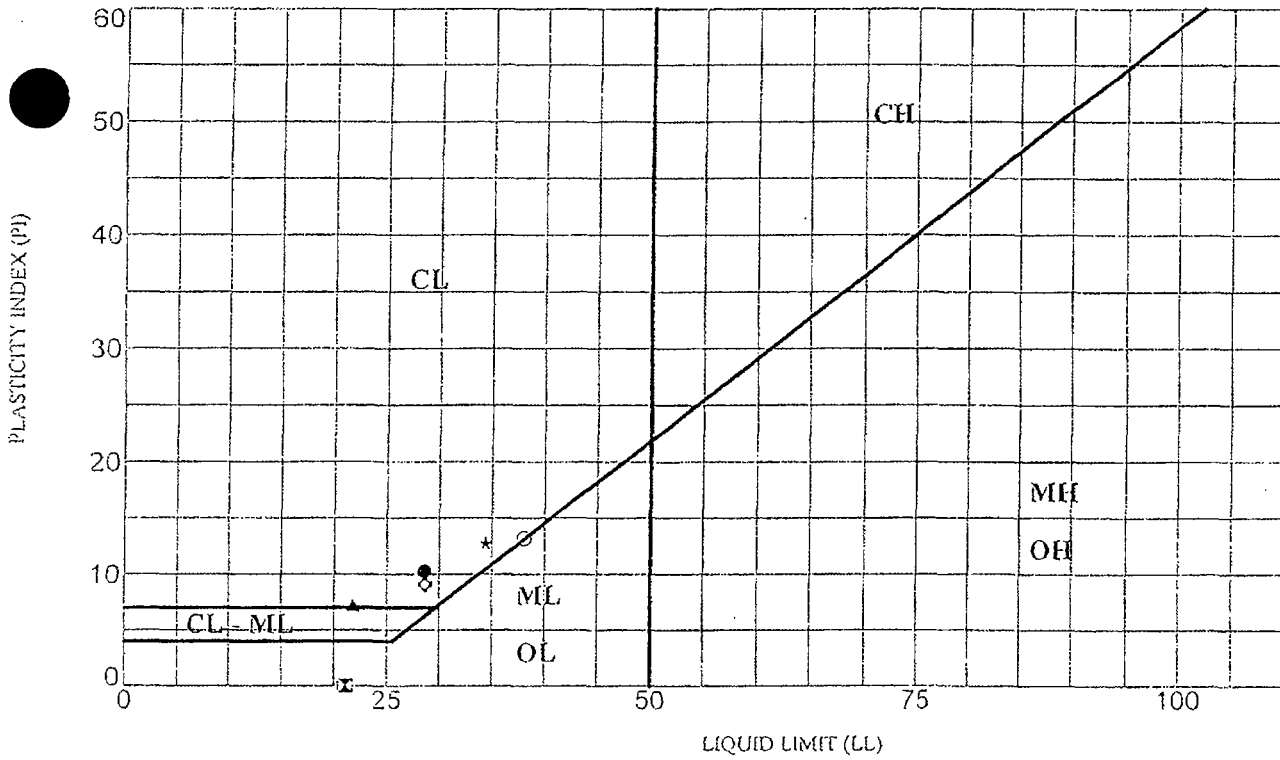
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

PLASTICITY CHART

FIGURE

B-7

PROJECT NO. 35467.003



| Specimen Identification | USCS Classification | LL | PL | PI |
|-------------------------|--------------------------|----|----|----|
| B-4 at 15.0 feet | Sandy Lean CLAY (CL) | 28 | 18 | 10 |
| □ B-4 at 45.0 feet | Sandy SILT (ML) | 21 | 21 | NP |
| ▲ B-5 at 7.5 feet | Sandy SILTY CLAY (CL-ML) | 22 | 15 | 7 |
| ★ B-5 at 25.0 feet | Lean CLAY (CL) | 34 | 22 | 12 |
| ○ B-8 at 5.0 feet | Lean CLAY (CL) | 38 | 25 | 13 |
| ◇ B-9 at 8.0 feet | Clayey SAND (SC) | 29 | 20 | 9 |

LL - Liquid Limit

PL - Plastic Limit

PI - Plasticity Index

Unified Soil Classification
Fine Grained Soil Groups

| | LL < 50 |
|----|---|
| ML | Inorganic silts and clayey silts to very fine sands of low plasticity |
| CL | Inorganic clays of low to medium plasticity |
| OL | Organic silts and organic silty clays of low plasticity |

| | LL ≥ 50 |
|----|---|
| MH | Inorganic silts and clayey silts of high plasticity |
| CH | Inorganic clays of high plasticity |
| OH | Organic clays of high plasticity, organic silts |



KLEINFELDER

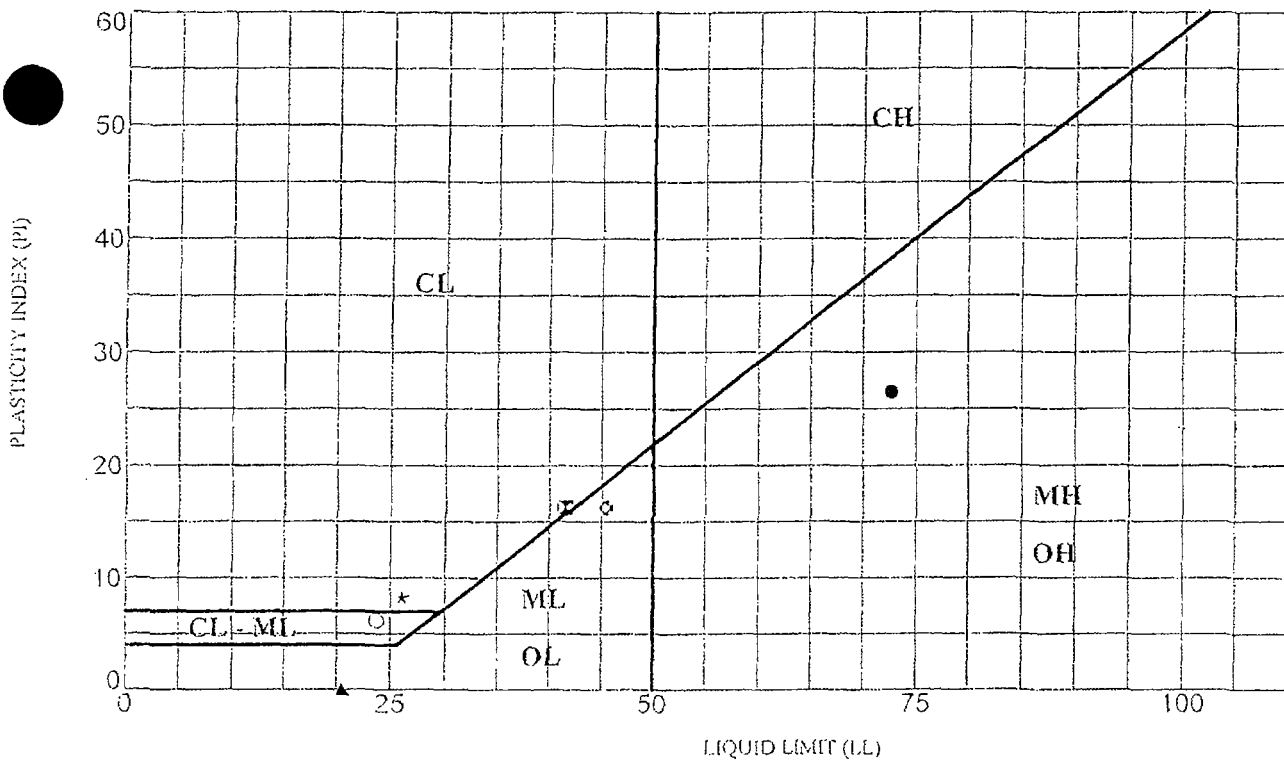
PROJECT NO. 35467.003

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

PLASTICITY CHART

FIGURE

B-8



| Specimen Identification | USCS Classification | LL | PL | PI |
|-------------------------|--------------------------|----|----|----|
| ● B-9 at 30.0 feet | Elastic SILT (MH) | 73 | 46 | 27 |
| ⊠ B-10 at 4.0 feet | Lean CLAY (CL) | 41 | 25 | 16 |
| ▲ B-10 at 20.0 feet | Silty SAND (SM) | 20 | 20 | NP |
| ★ B-10 at 35.0 feet | Lean CLAY with sand (CL) | 26 | 18 | 8 |
| ○ B-11 at 2.0 feet | Sandy SILTY CLAY (CL-ML) | 24 | 18 | 6 |
| ⊕ B-11 at 10.0 feet | SILT with sand (ML) | 45 | 29 | 16 |

LL - Liquid Limit

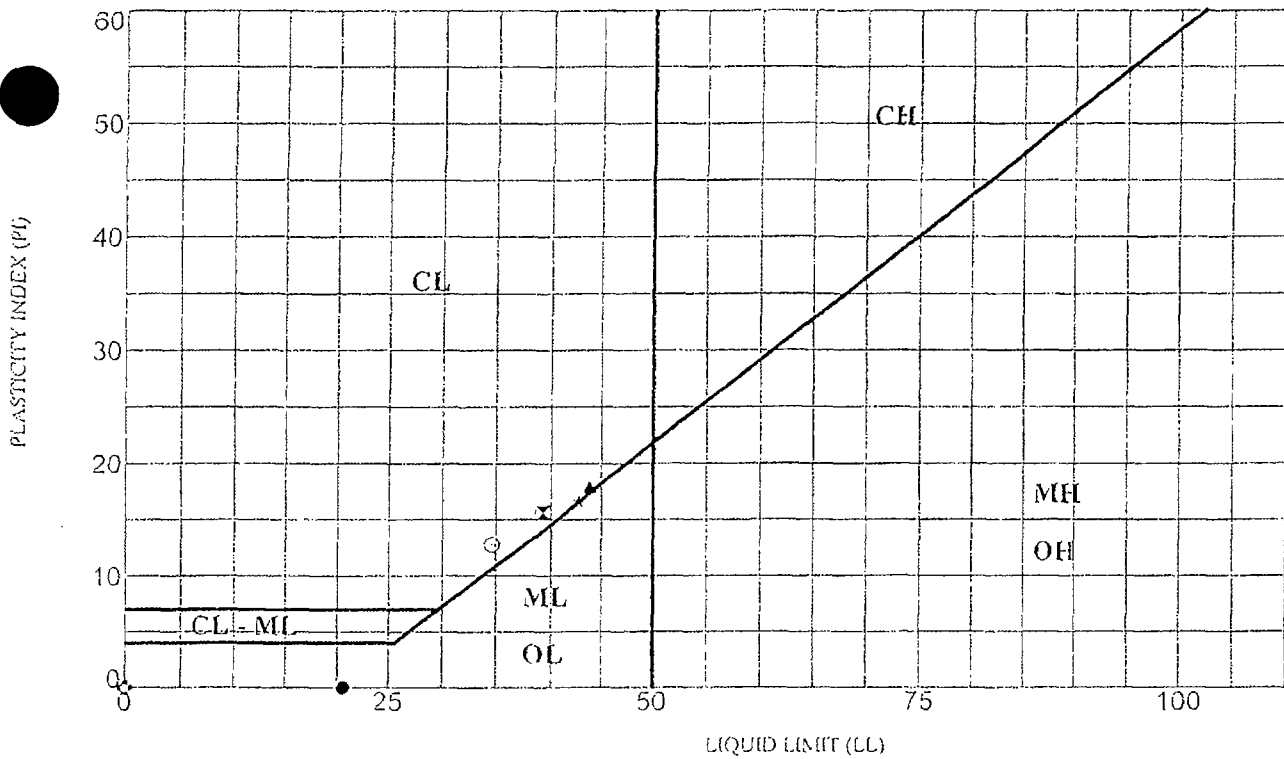
PL - Plastic Limit

PI - Plasticity Index

Unified Soil Classification
Fine Grained Soil Groups

| | LL < 50 |
|----|---|
| ML | Inorganic silts and clayey silts to very fine sands of low plasticity |
| CL | Inorganic clays of low to medium plasticity |
| OL | Organic silts and organic silty clays of low plasticity |

| | LL ≥ 50 |
|----|---|
| MH | Inorganic silts and clayey silts of high plasticity |
| CH | Inorganic clays of high plasticity |
| OH | Organic clays of high plasticity, organic silts |



| Specimen Identification | USCS Classification | LL | PL | PI |
|-------------------------|----------------------|----|----|----|
| ● B-11 at 35.0 feet | Sandy SILT (ML) | 21 | 21 | NP |
| ▣ TP- 1 at 1.0 feet | Sandy Lean CLAY (CL) | 39 | 24 | 15 |
| ▲ TP- 1 at 4.0 feet | Lean CLAY (CL) | 44 | 26 | 18 |
| ★ TP- 2 at 3.0 feet | Lean CLAY (CL) | 43 | 26 | 17 |
| ○ TP- 3 at 7.0 feet | Lean CLAY (CL) | 35 | 22 | 13 |
| ◇ TP- 6 at 1.0 feet | Sandy SILT (ML) | NP | NP | NP |

LL - Liquid Limit

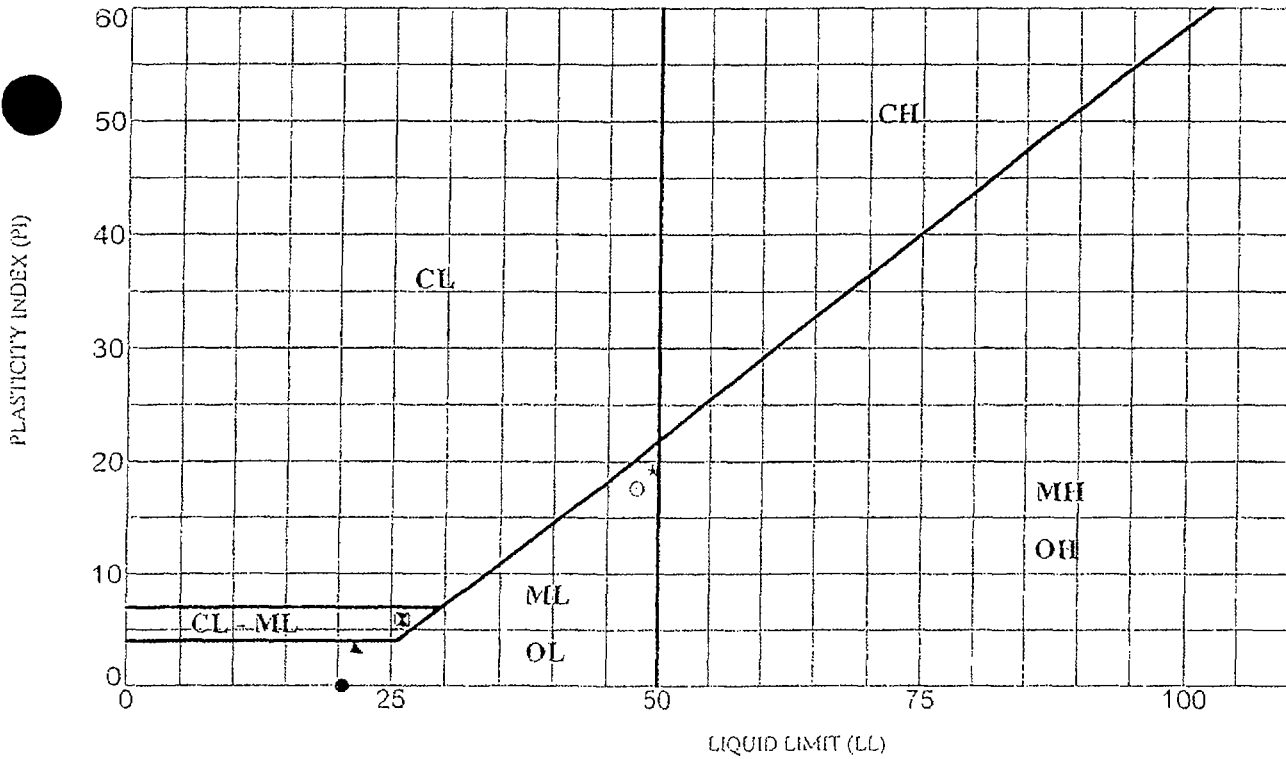
PL - Plastic Limit

PI - Plasticity Index

Unified Soil Classification
Fine Grained Soil Groups

| | LL < 50 |
|----|---|
| ML | Inorganic silts and clayey silts to very fine sands of low plasticity |
| CL | Inorganic clays of low to medium plasticity |
| OL | Organic silts and organic silty clays of low plasticity |

| | LL ≥ 50 |
|----|---|
| MH | Inorganic silts and clayey silts of high plasticity |
| CH | Inorganic clays of high plasticity |
| OH | Organic clays of high plasticity, organic silts |



| Specimen Identification | USCS Classification | LL | PL | PI |
|-------------------------|------------------------------|----|----|----|
| ● TP-7 at 1.0 feet | Silty SAND (SM) | 20 | 20 | NP |
| ⊠ TP-11 at 1.0 feet | SILTY CLAY with sand (CL-ML) | 26 | 20 | 6 |
| ▲ TP-12 at 2.0 feet | Sandy SILTY CLAY (CL-ML) | 22 | 18 | 4 |
| ★ TP-13 at 4.0 feet | SILT with sand (ML) | 49 | 30 | 19 |
| ⊙ TP-15 at 8.0 feet | SILT (ML) | 48 | 30 | 18 |

LL - Liquid Limit

PL - Plastic Limit

PI - Plasticity Index

Unified Soil Classification
Fine Grained Soil Groups

| LL < 50 | |
|---------|---|
| ML | Inorganic silts and clayey silts to very fine sands of low plasticity |
| CL | Inorganic clays of low to medium plasticity |
| OL | Organic silts and organic silty clays of low plasticity |

| LL ≥ 50 | |
|---------|---|
| MH | Inorganic silts and clayey silts of high plasticity |
| CH | Inorganic clays of high plasticity |
| OH | Organic clays of high plasticity, organic silts |



KLEINFELDER

PROJECT NO. 35467.003

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

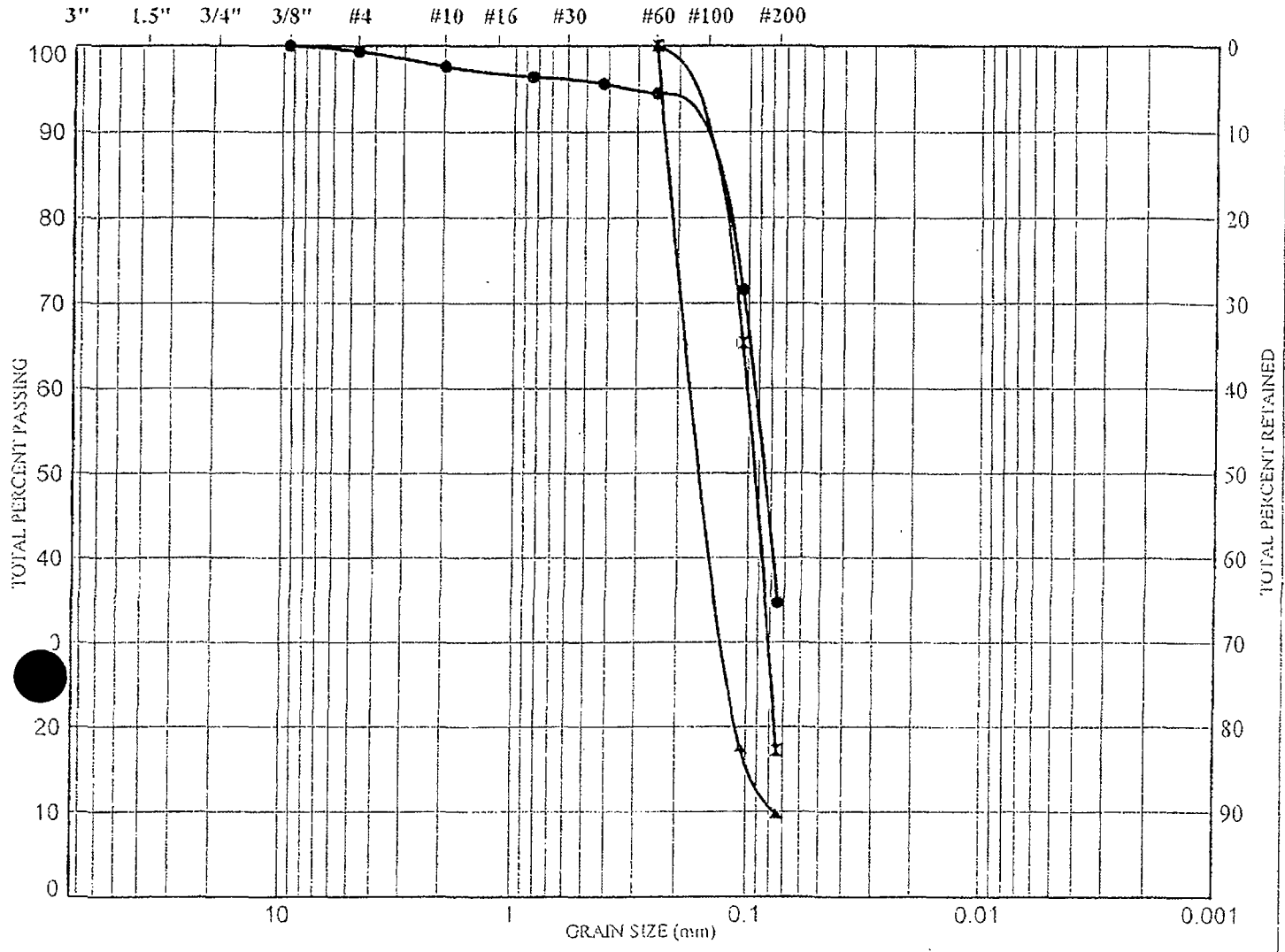
PLASTICITY CHART

FIGURE

B-11

| SIEVE ANALYSIS | | | | | HYDROMETER | | |
|----------------|------|--------|--------|------|------------|--|------|
| GRAVEL | | SAND | | | SILT | | CLAY |
| coarse | fine | coarse | medium | fine | | | |

U.S. STANDARD SIEVE SIZES



| Symbol | Sample | Depth (ft) | USCS Soil Description | USCS Classification |
|--------|---------|------------|-----------------------|---------------------|
| ● | B- 1(i) | 15.0 | Silty SAND | SM |
| ⊠ | B- 2(i) | 20.0 | Silty SAND | SM |
| ▲ | B- 3(i) | 10.0 | SAND - w/some silt | SP-SM |



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PROJECT NO. 31168.001

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

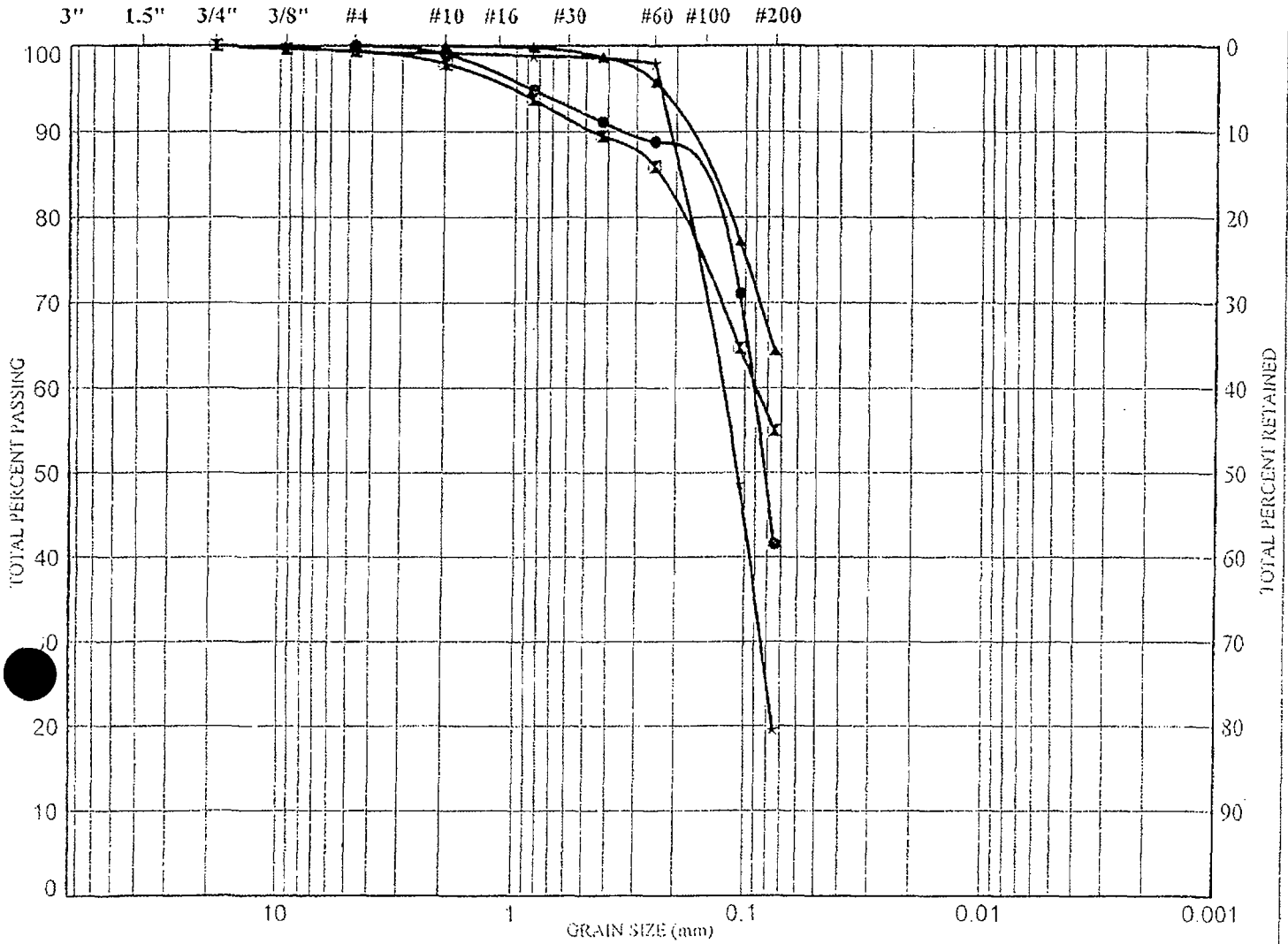
GRAIN SIZE DISTRIBUTION

FIGURE

B-12

| SIEVE ANALYSIS | | | | | HYDROMETER | |
|----------------|------|--------|--------|------|------------|------|
| GRAVEL | | SAND | | | SILT | CLAY |
| coarse | fine | coarse | medium | fine | | |

U.S. STANDARD SIEVE SIZES



| Symbol | Sample | Depth (ft) | USCS Soil Description | USCS Classification |
|--------|--------|------------|-----------------------|---------------------|
| ● | B-1 | 25.0 | Silty SAND | SM |
| ◻ | B-2 | 2.0 | Sandy Lean CLAY | CL |
| ▲ | B-4 | 2.0 | Sandy SILTY CLAY | CL-ML |
| * | B-4 | 30.0 | Silty SAND | SM |



KLEINFELDER

PROJECT NO. 35467.003

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

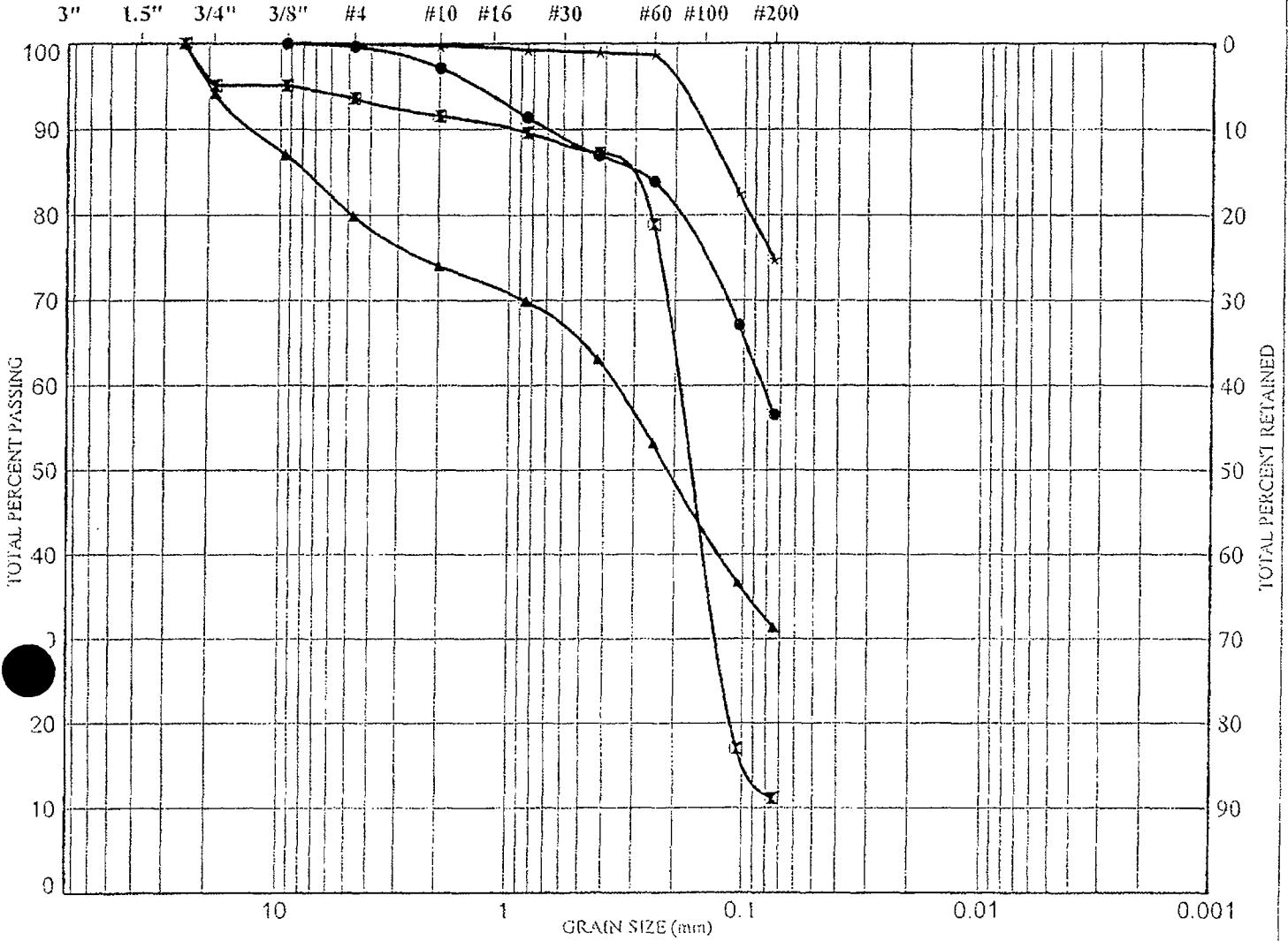
GRAIN SIZE DISTRIBUTION

FIGURE

B-13

| SIEVE ANALYSIS | | | | | HYDROMETER | |
|----------------|------|--------|--------|------|------------|------|
| GRAVEL | | SAND | | | SILT | CLAY |
| coarse | fine | coarse | medium | fine | | |

U.S. STANDARD SIEVE SIZES



| Symbol | Sample | Depth (ft) | USCS Soil Description | USCS Classification |
|--------|--------|------------|------------------------------|---------------------|
| ● | TP-1 | 1.0 | Sandy Lean CLAY | CL |
| ⊠ | TP-1 | 10.0 | Poorly Graded SAND with silt | SP-SM |
| ▲ | TP-2 | 11.0 | Silty SAND with gravel | SM |
| ★ | TP-3 | 2.0 | SILT with sand | ML |



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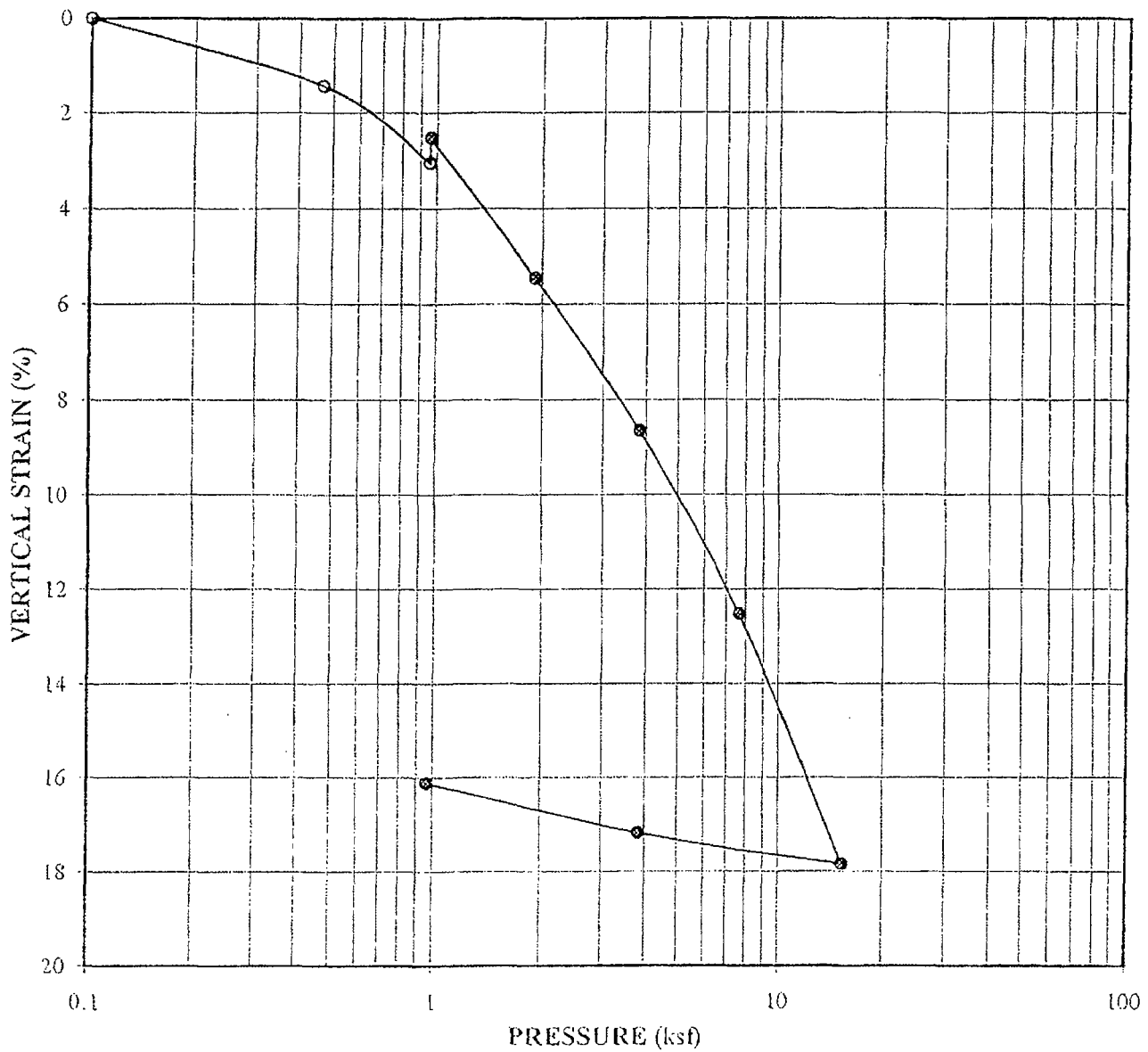
Wasatch Regional Solid Waste Landfill

Tooele County, Utah

GRAIN SIZE DISTRIBUTION

FIGURE

B-16



| | |
|-----------------------------|---------------------|
| Sample | B-2 |
| Depth | 5.0 |
| Description | Lean CLAY with sand |
| Classification | CL |
| Approx. Overburden Pressure | 0.60 ksf |
| Preconsolidation Pressure | |
| Compression Ratio | 0.177 |
| Recompression Ratio | 0.018 |
| Overconsolidation Ratio | |

| | Initial | Final |
|--------------------|---------|-------|
| Dry Density, pcf | 78.1 | 93.0 |
| Water Content, % | 44.4 | 35.7 |
| Sample Height, in. | 1.00 | 0.84 |

NOTE: Water Added at 1 ksf



KLEINFELDER

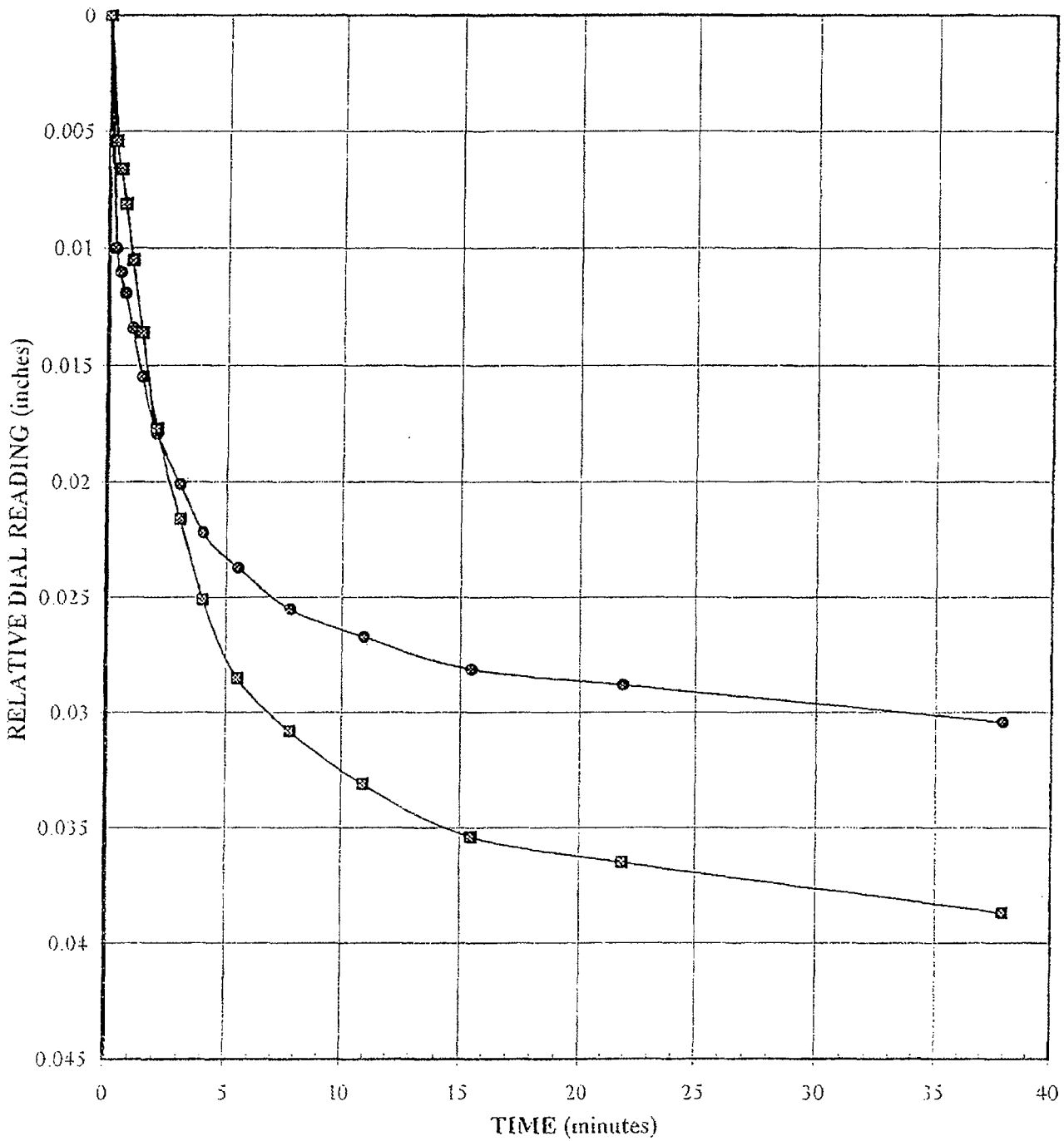
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Wasatch Regional Solid Waste Landfill
Tooele County, Utah

CONSOLIDATION TEST RESULTS

FIGURE

B-19



| | | |
|------------------------------|-------|-------|
| Sample | B-2 | |
| Depth | 5 | |
| Pressure (psf) | ● 4 | ■ 8 |
| C_v (ft ² /day) | 12.44 | 10.06 |

KH KLEINFELDER

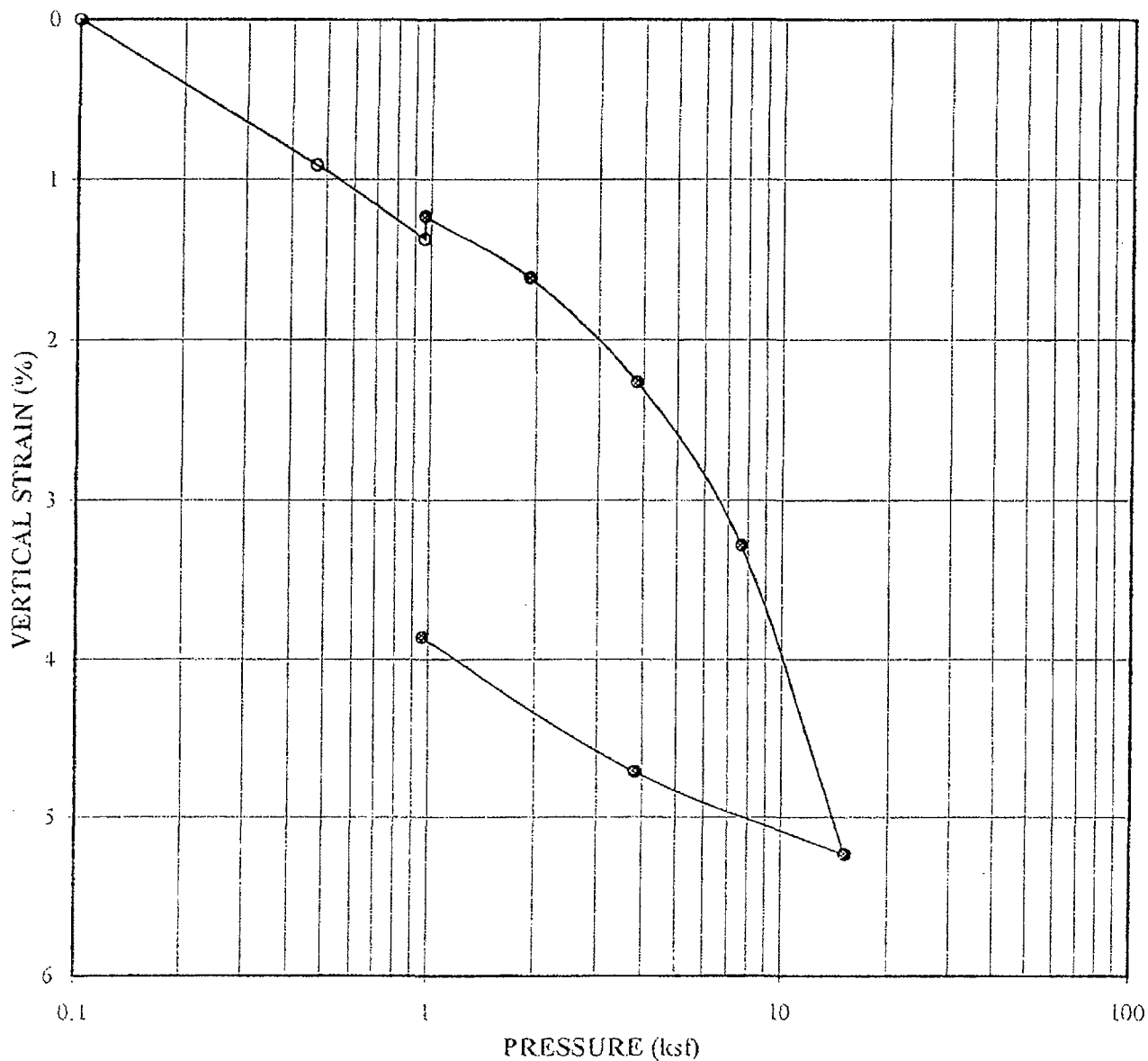
PROJECT NO. 35467.001

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

TIME RATE CONSOLIDATION

FIGURE

B-20



| | |
|-----------------------------|-----------------|
| Sample | B-3 |
| Depth | 7.5 |
| Description | Sandy Lean CLAY |
| Classification | CL |
| Approx. Overburden Pressure | 0.90 ksf |
| Preconsolidation Pressure | |
| Compression Ratio | 0.065 |
| Recompression Ratio | 0.014 |
| Overconsolidation Ratio | |

| | Initial | Final |
|--------------------|---------|-------|
| Dry Density, pcf | 88.4 | 92.0 |
| Water Content, % | 31.3 | 23.5 |
| Sample Height, in. | 1.00 | 0.96 |

NOTE: Water Added at 1 ksf



KLEINFELDER

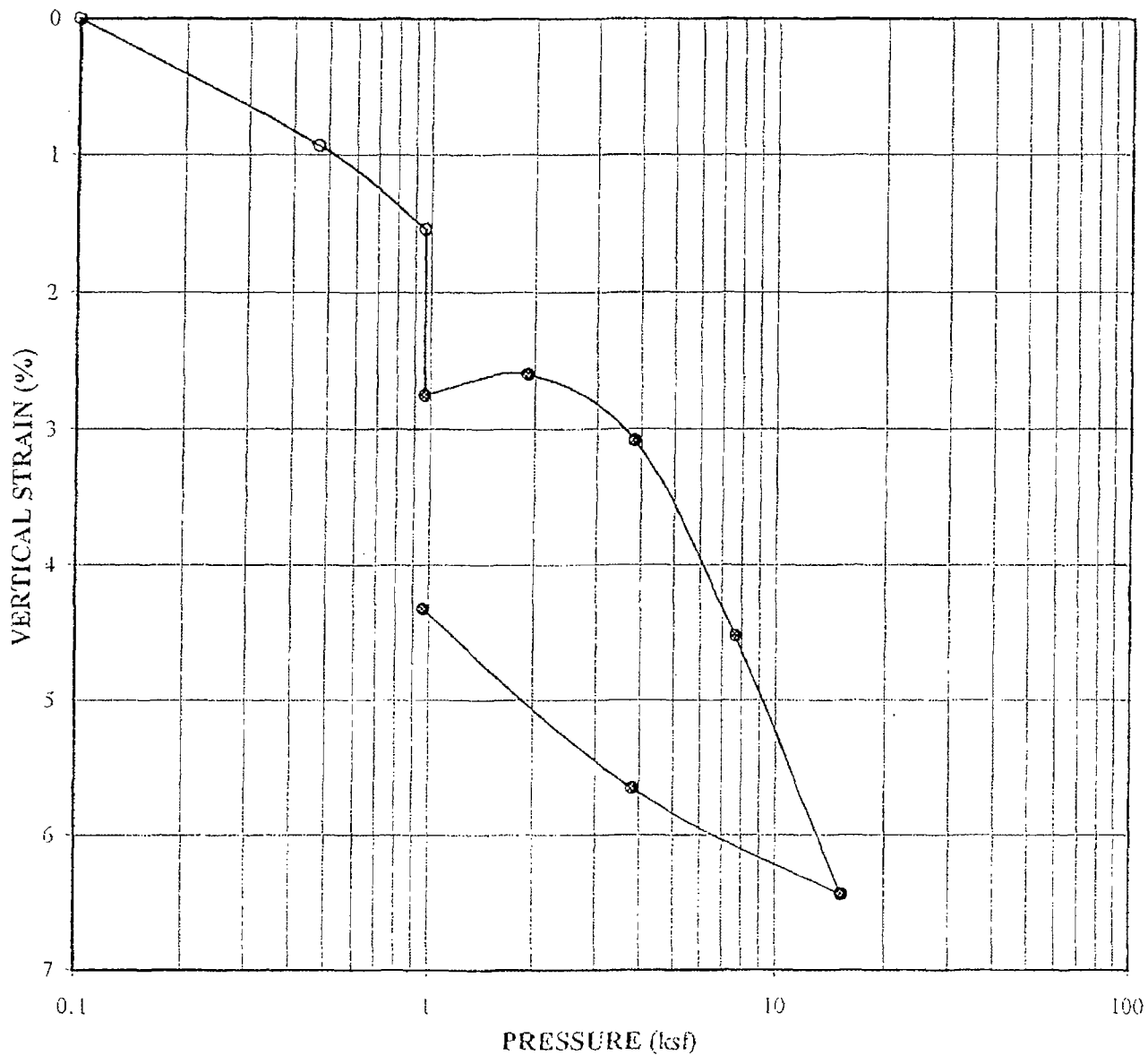
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Wasatch Regional Solid Waste Landfill
Tooele County, Utah

CONSOLIDATION TEST RESULTS

FIGURE

B-21



| | |
|-----------------------------|-----------------|
| Sample | B-4 |
| Depth | 15.0 |
| Description | Sandy Lean CLAY |
| Classification | CL |
| Approx. Overburden Pressure | 1.80 ksf |
| Preconsolidation Pressure | |
| Compression Ratio | 0.064 |
| Recompression Ratio | 0.022 |
| Overconsolidation Ratio | |

| | Initial | Final |
|--------------------|---------|-------|
| Dry Density, pcf | 101.2 | 105.8 |
| Water Content, % | 3.3 | 3.3 |
| Sample Height, in. | 1.00 | 0.96 |

NOTE: Water Added at 1 ksf



KLEINFELDER

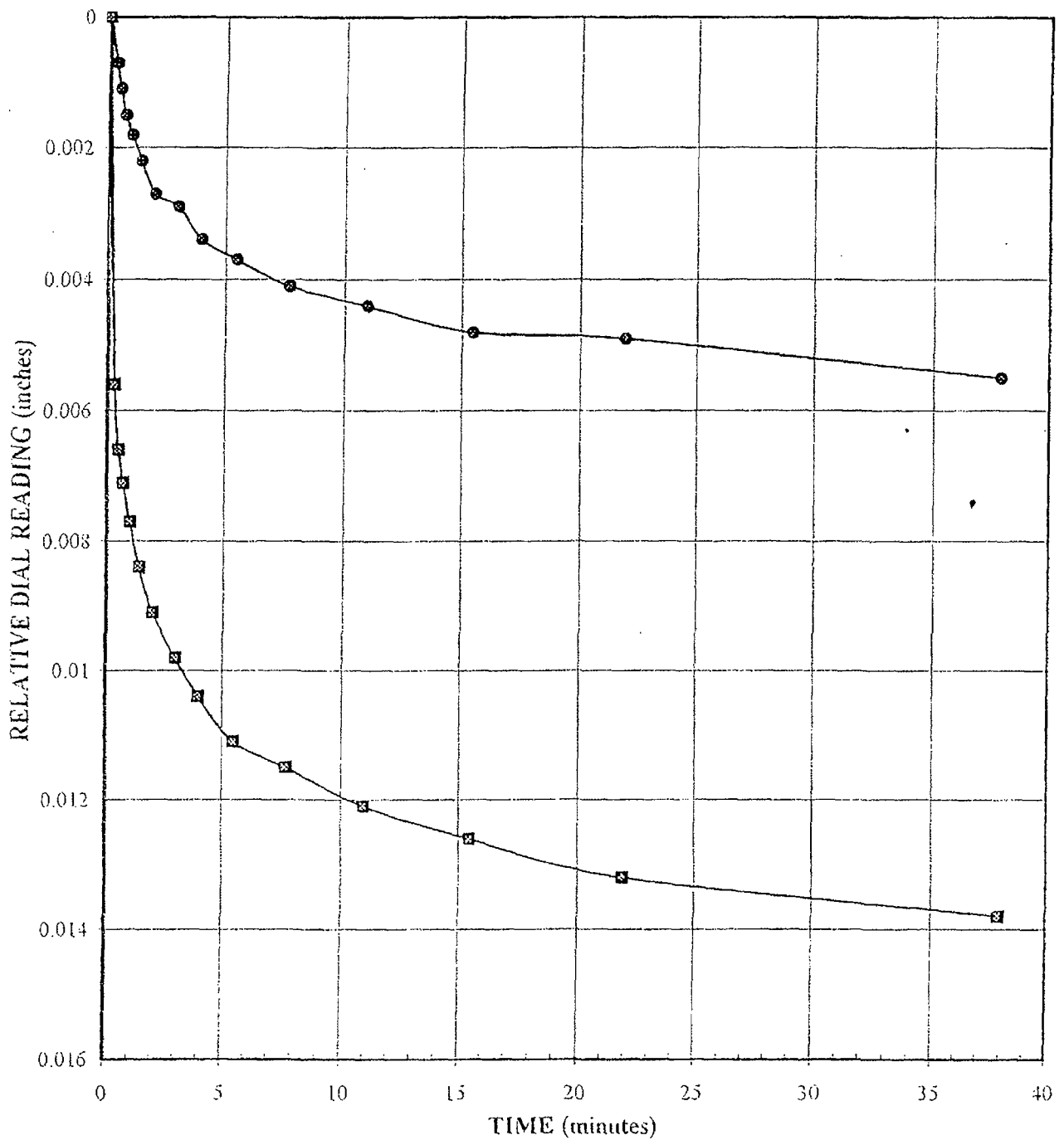
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Wasatch Regional Solid Waste Landfill
Tooele County, Utah

CONSOLIDATION TEST RESULTS

FIGURE

B-22



| | | |
|---------------------------|------|-------|
| Sample | B-4 | |
| Depth | 15 | |
| Pressure (psf) | ⊙ 4 | ⊠ 8 |
| Cv (ft ² /day) | 2.61 | 12.48 |



KLEINFELDER

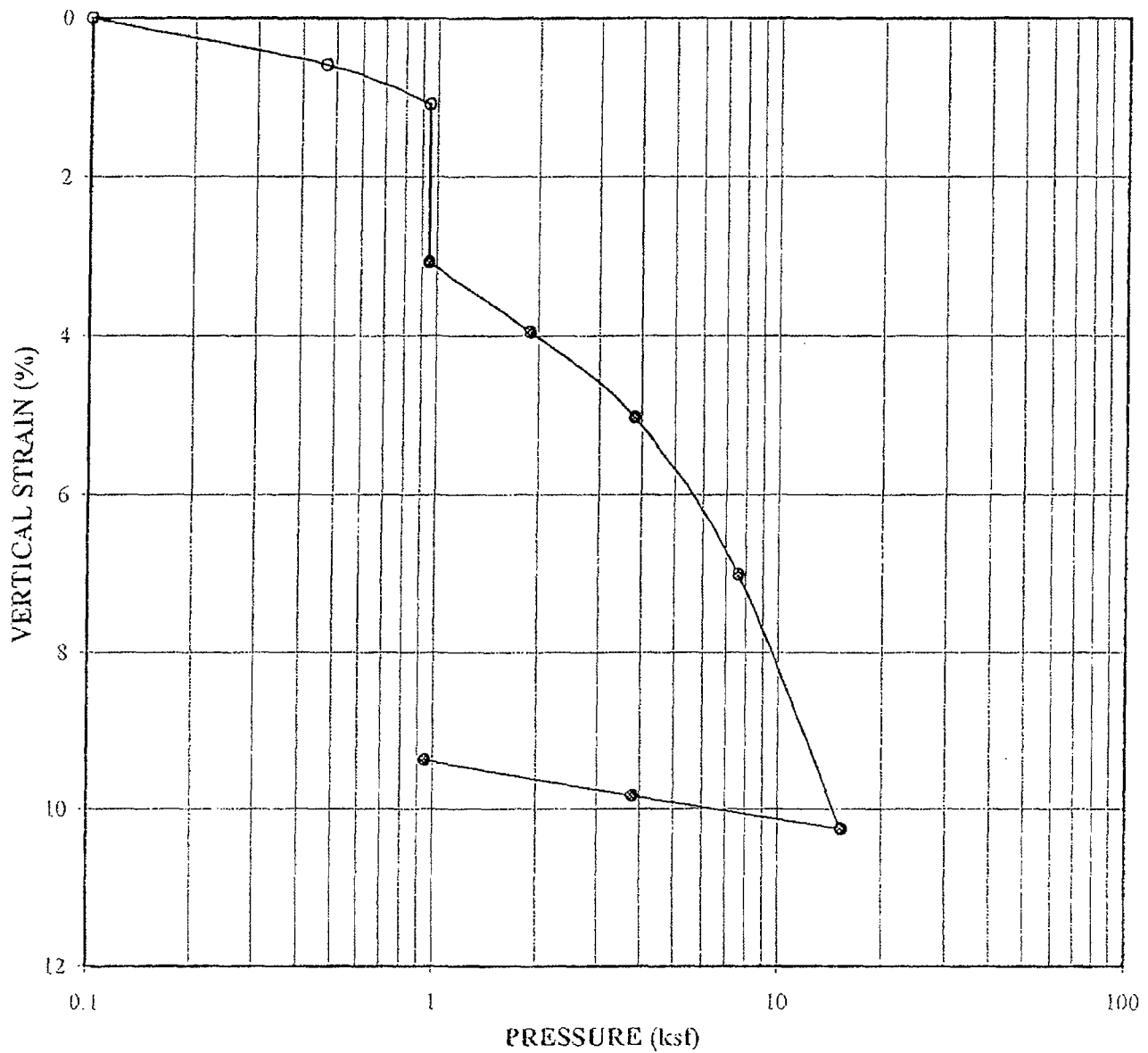
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Wasatch Regional Solid Waste Landfill
Tooele County, Utah.

TIME RATE CONSOLIDATION

FIGURE

B-23



| | |
|-----------------------------|------------------|
| Sample | B-5 |
| Depth | 7.5 |
| Description | Sandy SILTY CLAY |
| Classification | CL-ML |
| Approx. Overburden Pressure | 0.90 ksf |
| Preconsolidation Pressure | |
| Compression Ratio | 0.108 |
| Recompression Ratio | 0.007 |
| Overconsolidation Ratio | |

| | Initial | Final |
|--------------------|---------|-------|
| Dry Density, pcf | 96.2 | 106.2 |
| Water Content, % | 9.7 | 2.2 |
| Sample Height, in. | 1.00 | 0.91 |

NOTE: Water Added at 1 ksf



KLEINFELDER

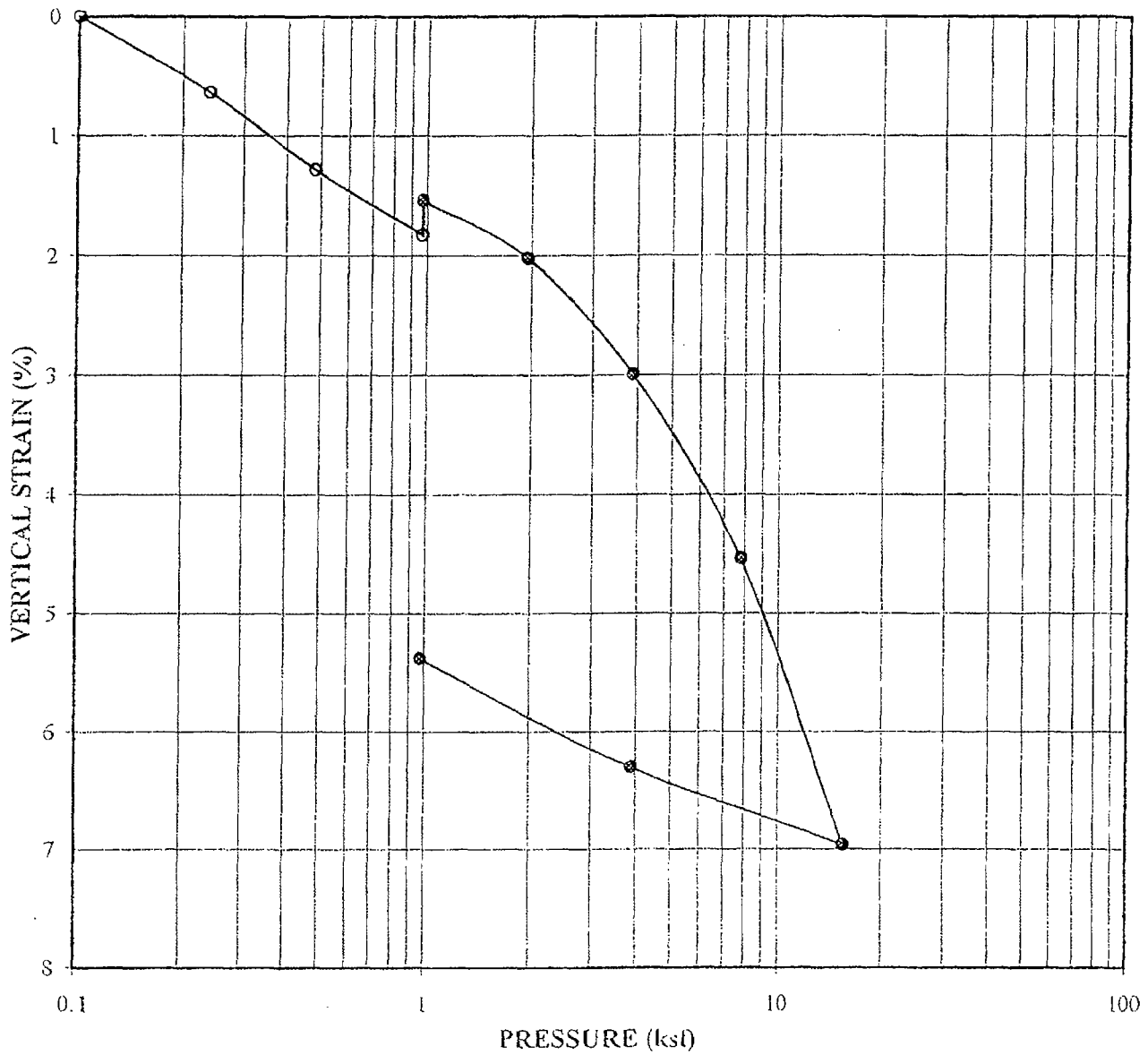
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Wasatch Regional Solid Waste Landfill
Tooele County, Utah

CONSOLIDATION TEST RESULTS

FIGURE

B-24



| | |
|-----------------------------|-------------|
| Sample | B-9 |
| Depth | 8.0 |
| Description | Clayey SAND |
| Classification | SC |
| Approx. Overburden Pressure | 0.96 ksf |
| Preconsolidation Pressure | |
| Compression Ratio | 0.031 |
| Recompression Ratio | 0.015 |
| Overconsolidation Ratio | |

| | Initial | Final |
|--------------------|---------|-------|
| Dry Density, pcf | 93.6 | 98.9 |
| Water Content, % | 27.2 | 19.7 |
| Sample Height, in. | 1.00 | 0.95 |

NOTE: Water Added at 1 ksf



KLEINFELDER

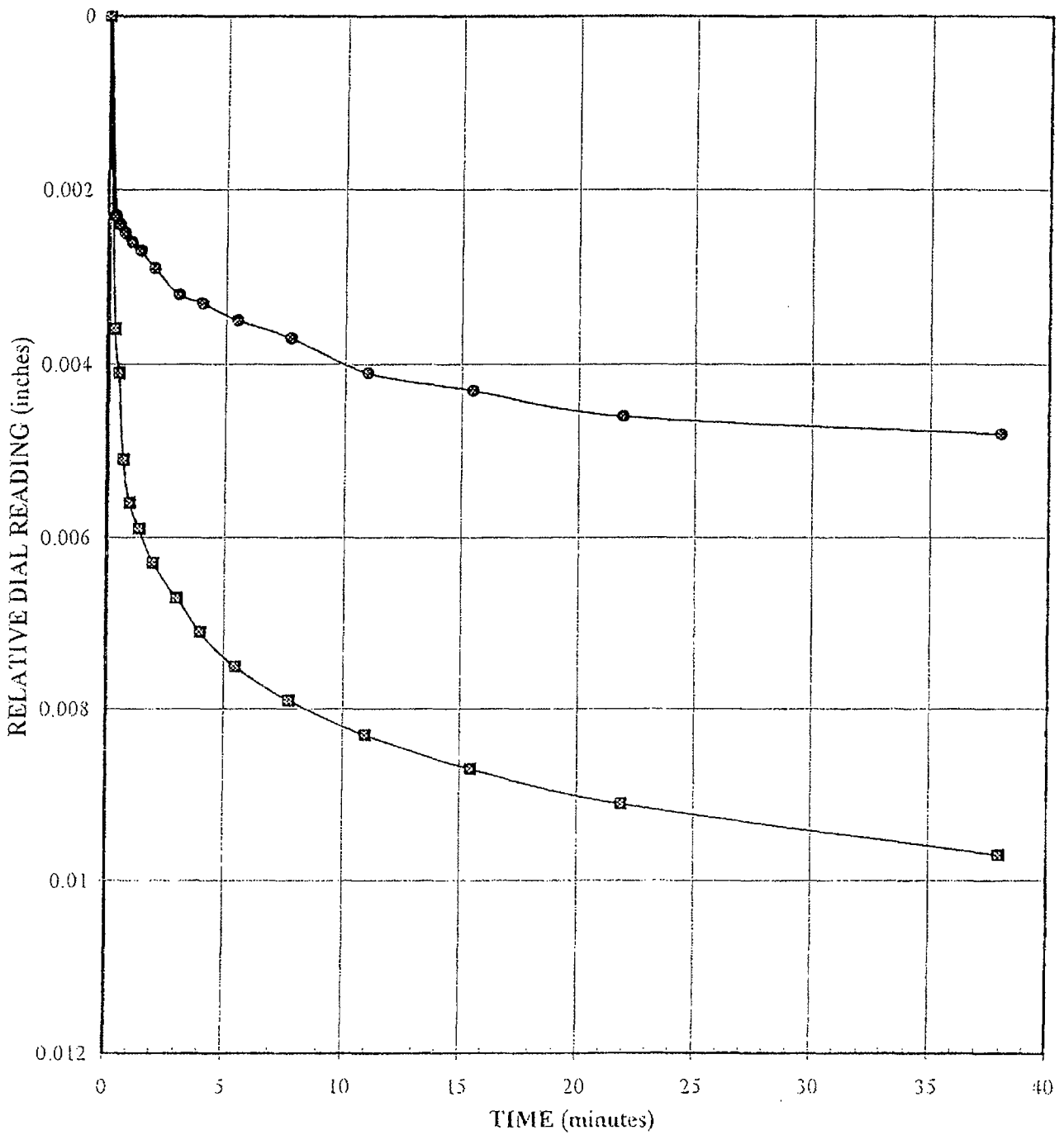
Wasatch Regional Solid Waste Landfill
Tooele County

FIGURE

B-25

PROJECT NO. 35467.003

CONSOLIDATION TEST RESULTS



| | | |
|---------------------------|-------|-------|
| Sample | B-9 | |
| Depth | 8 | |
| Pressure (psf) | ● 2 | ■ 4 |
| Cv (ft ² /day) | 14.58 | 13.37 |



KLEINFELDER

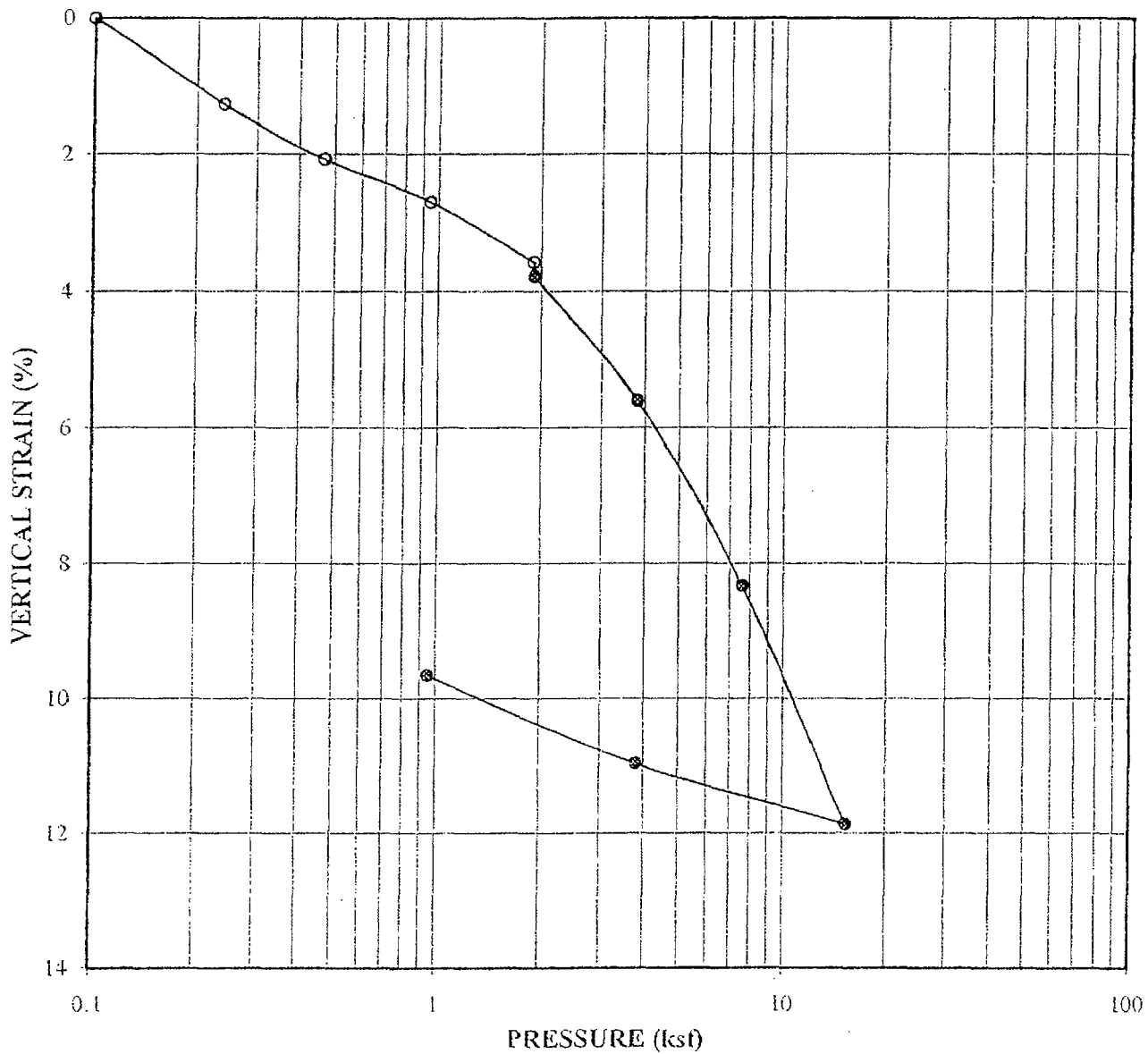
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Wasatch Regional Solid Waste Landfill
Tooele County

TIME RATE CONSOLIDATION

FIGURE

B-26



| | |
|-----------------------------|--------------|
| Sample | B-9 |
| Depth | 30.0 |
| Description | Elastic SILT |
| Classification | MH |
| Approx. Overburden Pressure | 3.60 ksf |
| Preconsolidation Pressure | |
| Compression Ratio | 0.118 |
| Recompression Ratio | 0.022 |
| Overconsolidation Ratio | |

| | Initial | Final |
|--------------------|---------|-------|
| Dry Density, pcf | 72.2 | 80.0 |
| Water Content, % | 43.9 | 43.9 |
| Sample Height, in. | 1.00 | 0.90 |

NOTE: Water Added at 2 ksf



KLEINFELDER

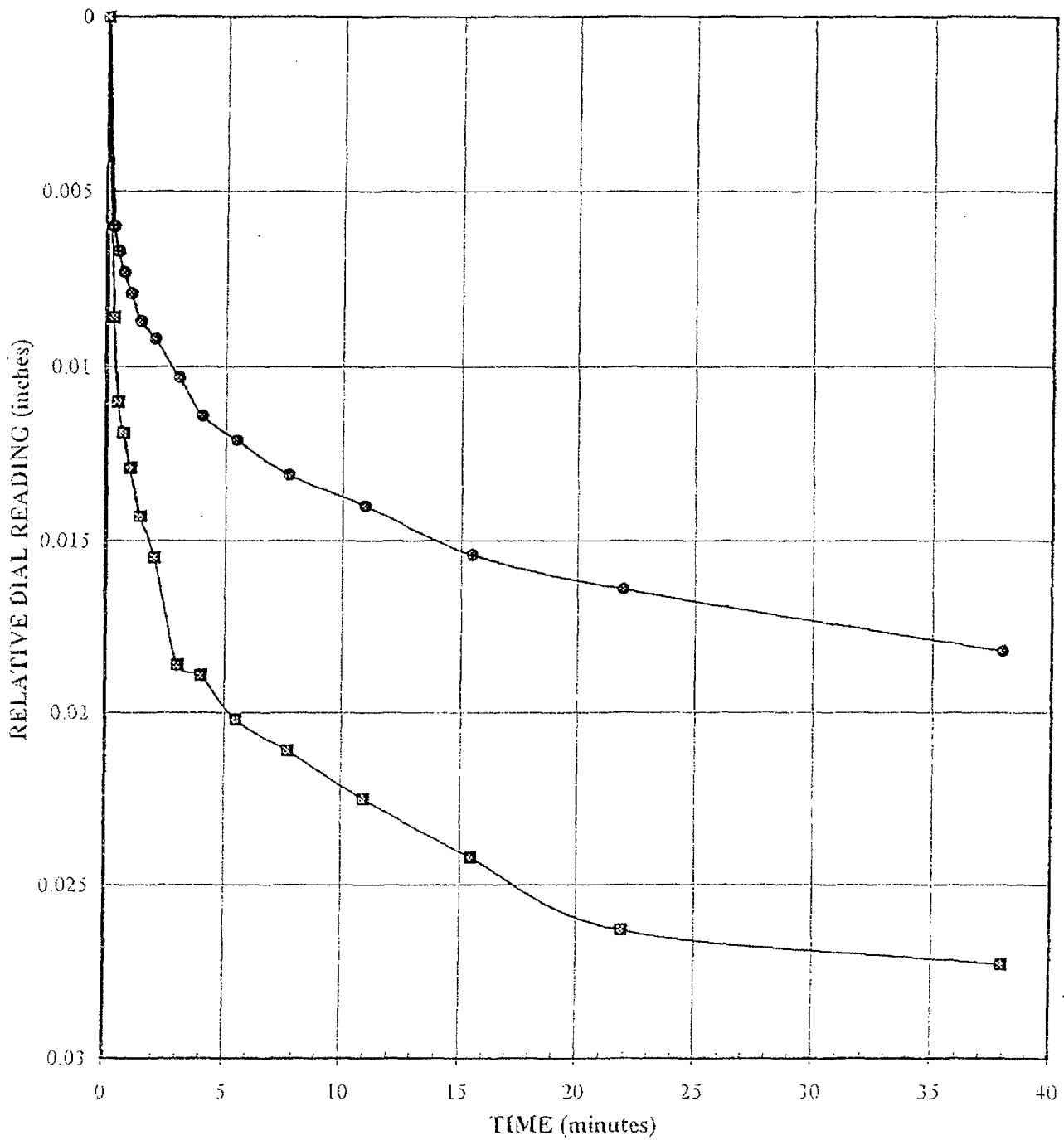
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Wasatch Regional Solid Waste Landfill
Tooele County

CONSOLIDATION TEST RESULTS

FIGURE

B-27



| | | |
|---------------------------|-------|-------|
| Sample | B-9 | |
| Depth | 30 | |
| Pressure (psf) | ⊗ 4 | ⊠ 8 |
| Cv (ft ² /day) | 13.23 | 10.09 |



KLEINFELDER

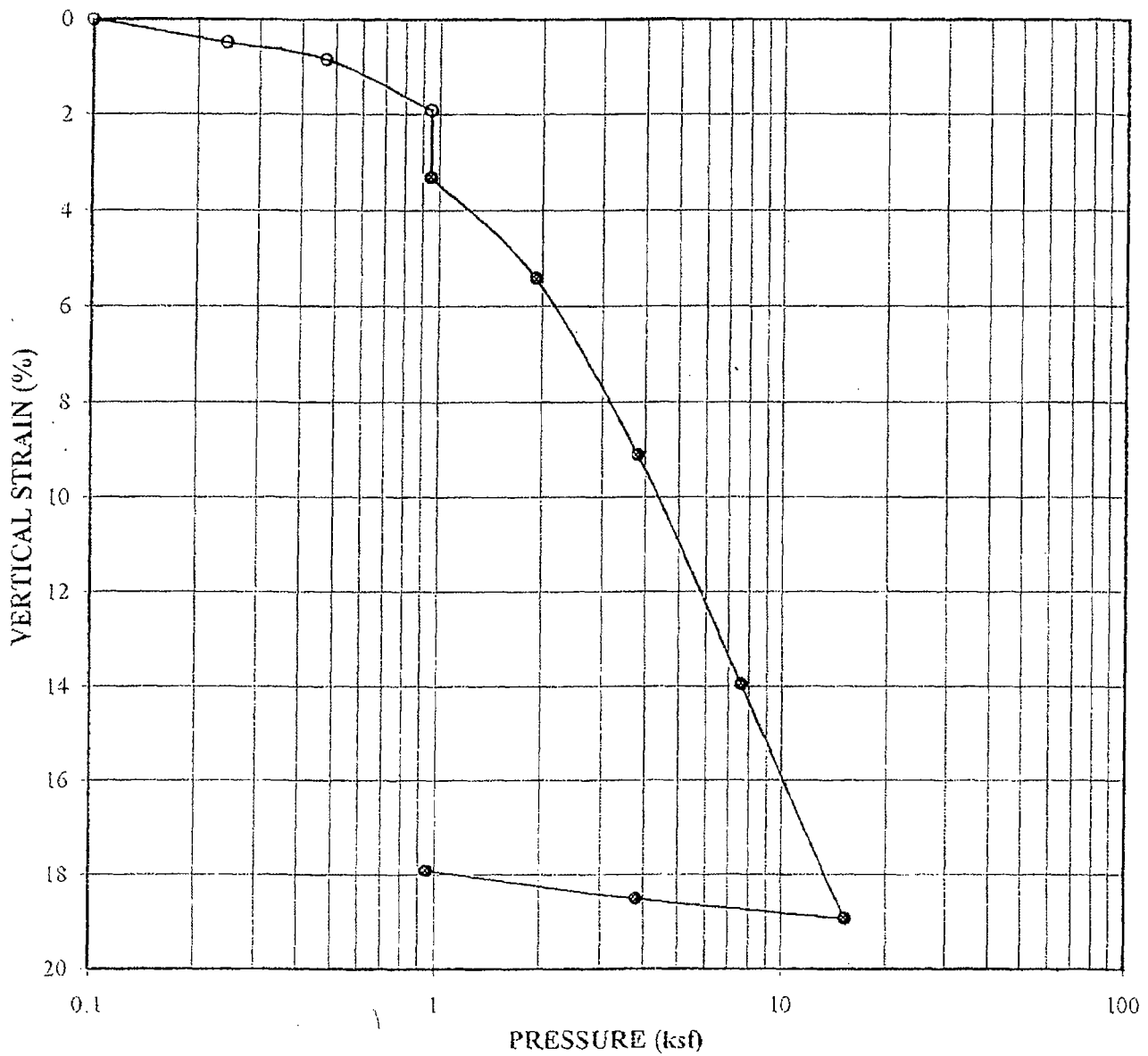
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Wasatch Regional Solid Waste Landfill
Tooele County

TIME RATE CONSOLIDATION

FIGURE

B-28



| | |
|-----------------------------|----------------|
| Sample | B-11 |
| Depth | 10.0 |
| Description | SILT with sand |
| Classification | ML |
| Approx. Overburden Pressure | 1.20 ksf |
| Preconsolidation Pressure | |
| Compression Ratio | 0.165 |
| Recompression Ratio | 0.010 |
| Overconsolidation Ratio | |

| | Initial | Final |
|--------------------|---------|-------|
| Dry Density, pcf | 72.0 | 87.7 |
| Water Content, % | 34.5 | 34.5 |
| Sample Height, in. | 1.00 | 0.82 |

NOTE: Water Added at 1 ksf



KLEINFELDER

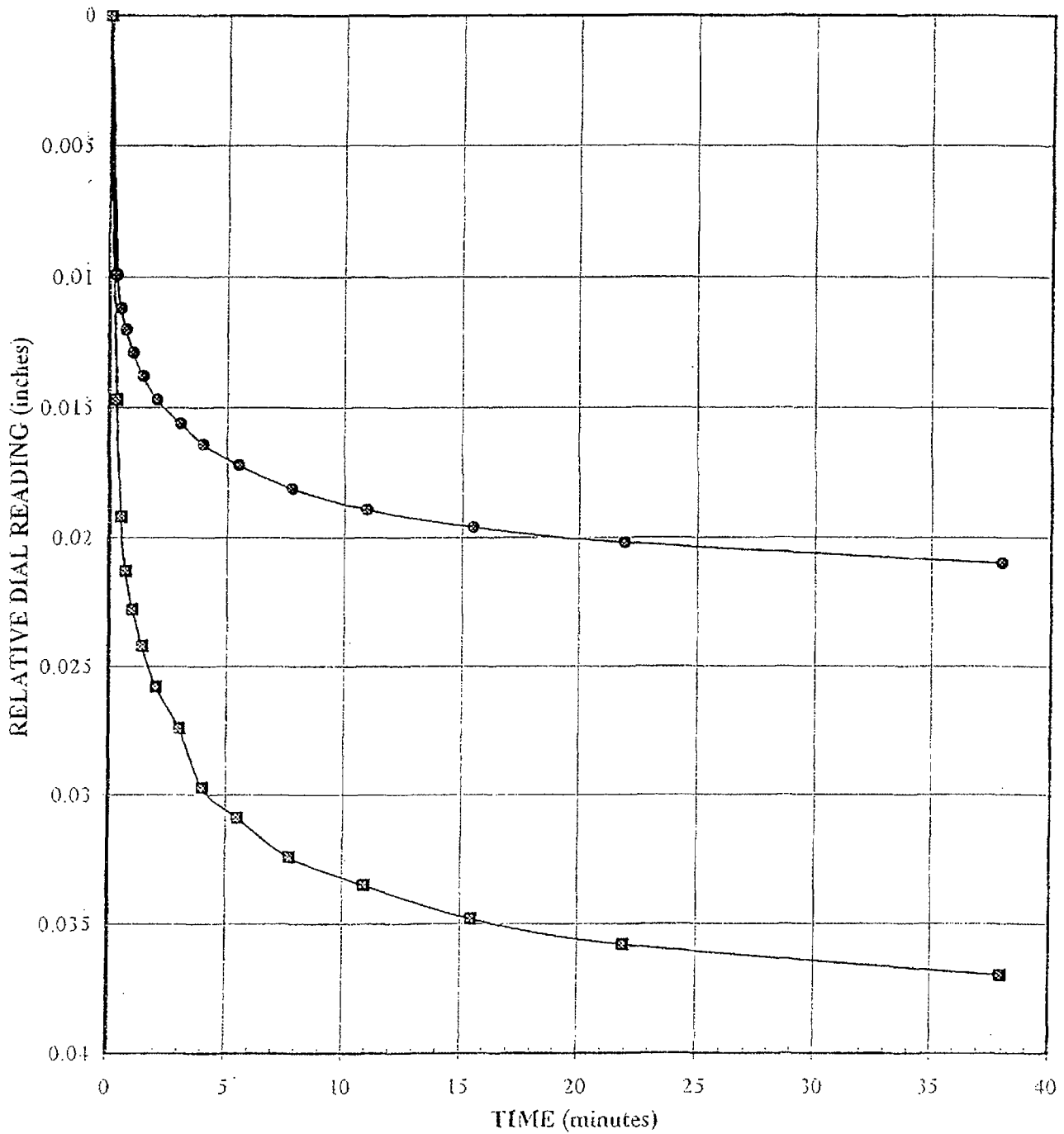
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Wasatch Regional Solid Waste Landfill
Tooele County

CONSOLIDATION TEST RESULTS

FIGURE

B-29



| | | |
|---------------------------------------|-------|------|
| Sample | B-11 | |
| Depth | 10 | |
| Pressure (psf) | ● 2 | ■ 4 |
| C _v (ft ² /day) | 13.08 | 9.33 |



KLEINFELDER

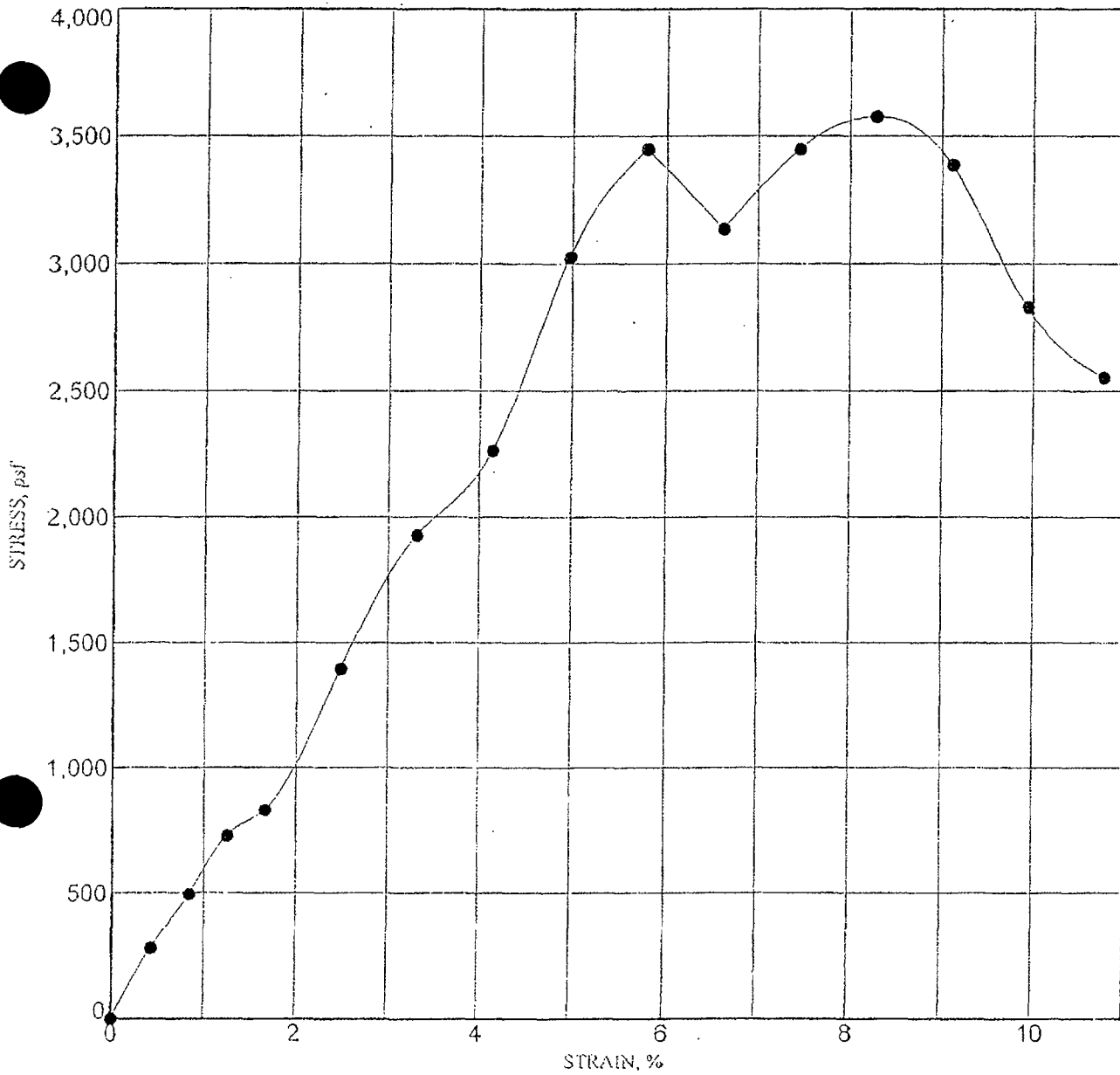
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Tooele County

TIME RATE CONSOLIDATION

FIGURE

B-30



| Specimen Identification | USCS Classification | q_u (psf) | DD (pcf) | MC (%) | -#200 (%) |
|-------------------------|---------------------|-------------|----------|--------|-----------|
| ● B-11 at 10.0 feet | SILT with sand (ML) | 3580 | 105 | 20 | 79 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |



KLEINFELDER

PROJECT NO. 35467.003

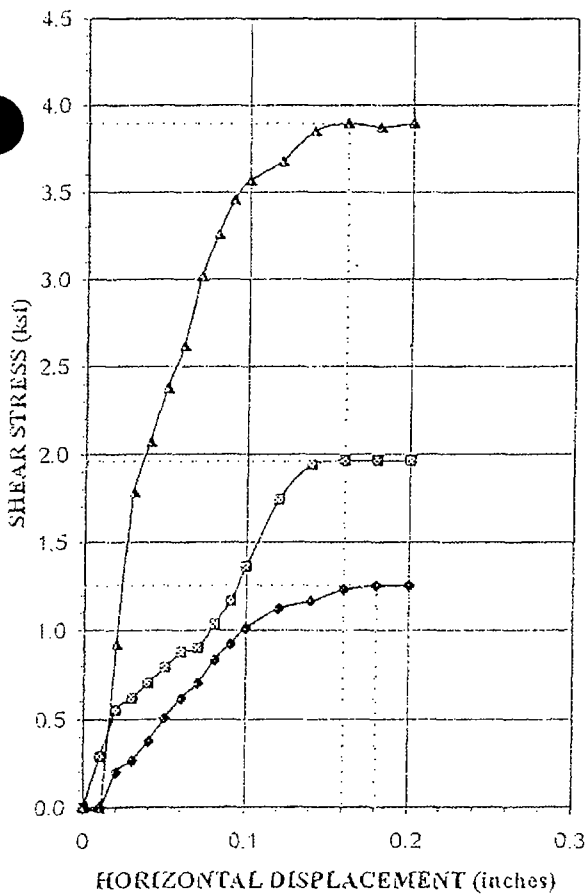
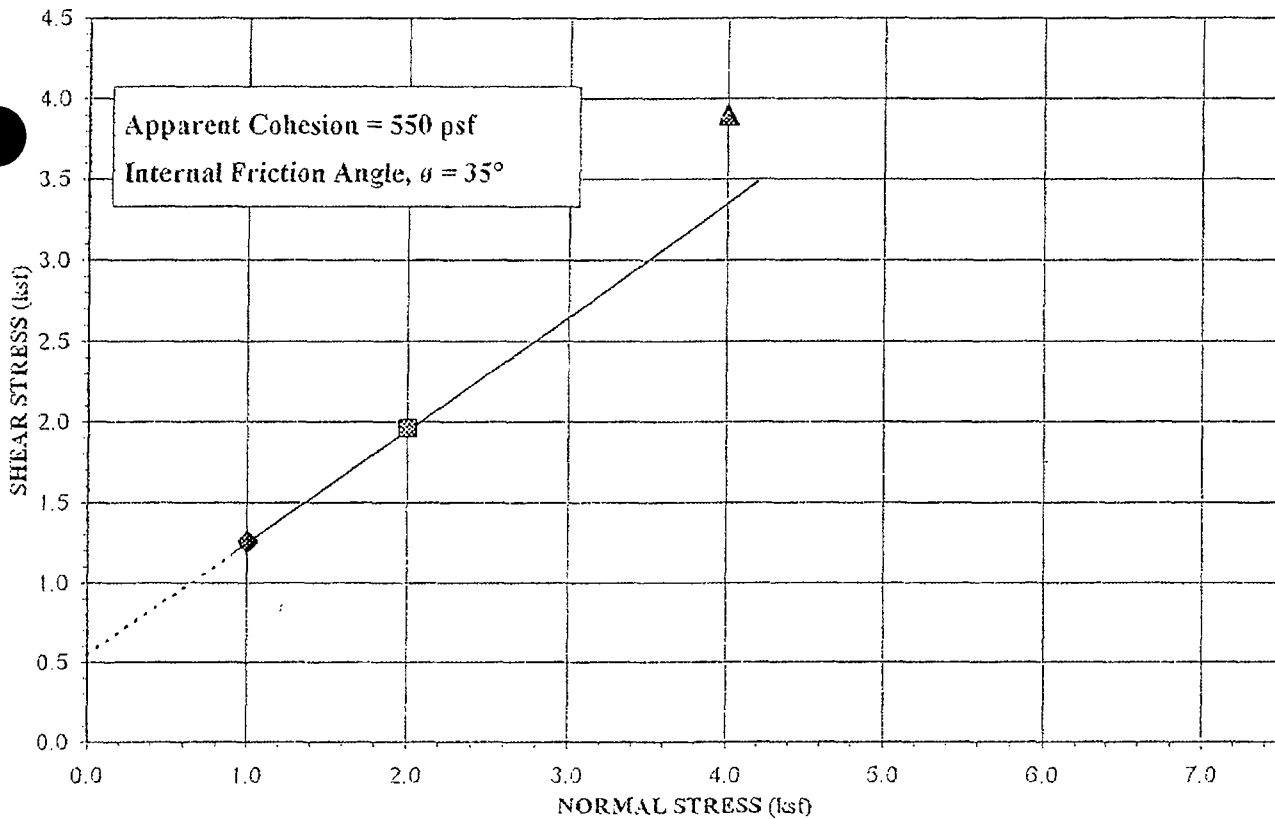
Wasatch Regional Solid Waste Landfill

Tooele County, Utah

UNCONFINED COMPRESSION TEST

FIGURE

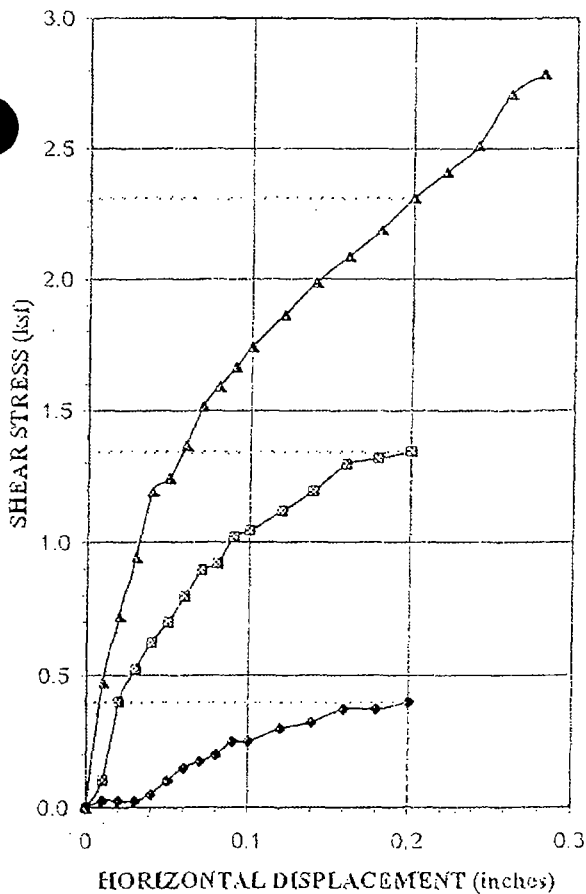
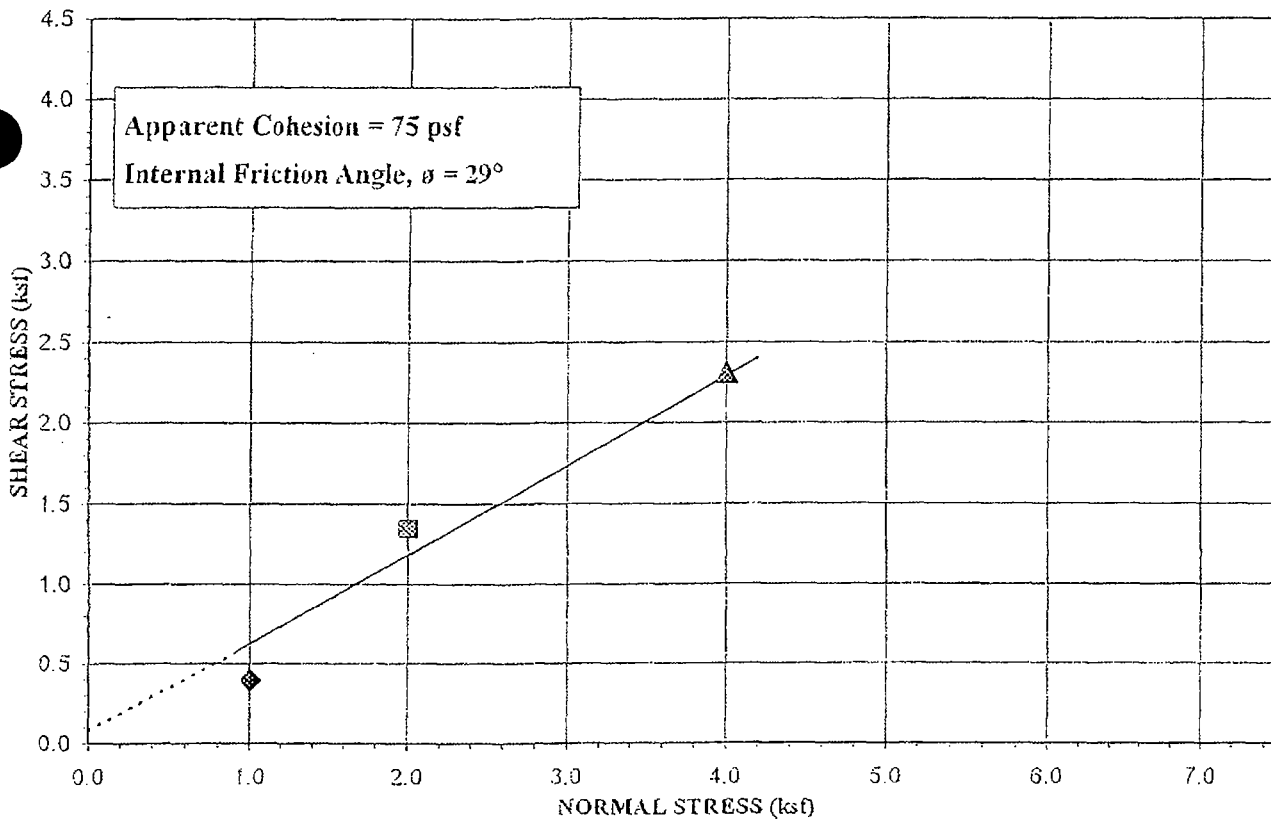
B-31



| | |
|------------------------------------|-------------|
| Source: B-2 | Depth: 2 ft |
| Type of Test: Consolidated Drained | |

| Test No. (Symbol) | 1 (→) | 2 (⊠) | 3 (Δ) |
|-------------------------|-----------------------------|-------|-------|
| Sample Type | Remolded to 95% max density | | |
| Height, in. | 1 | 1 | 1 |
| Diameter, in. | 2.41 | 2.41 | 2.41 |
| Dry Density Before, pcf | 103.3 | 100.3 | 101.0 |
| Dry Density After, pcf | 99.4 | 94.5 | 94.6 |
| Moisture % Before | 15.4 | 15.4 | 15.4 |
| Moisture % After | 22.4 | 21.8 | 20.2 |
| Consolidation Load, kg | 1.4 | 2.9 | 5.7 |
| Normal Load, ksf | 1.00 | 2.00 | 4.00 |
| Shear Stress, ksf | 1.26 | 1.96 | 3.90 |
| Strain Rate | 0.07 in/min | | |

| Sample Properties | |
|-------------------------------|----------------------|
| Liquid Limit, % | 34 |
| Plasticity Index, % | 11 |
| Cohesion, psf | 550 |
| Friction Angle, ϕ | 35 |
| Percent Gravel | 1 |
| Percent Sand | 44 |
| Percent Passing No. 200 sieve | 55 |
| Classification | Sandy Lean CLAY (CL) |



| | |
|--|--------------|
| Source: B-6 | Depth: 15 ft |
| Type of Test: Consolidated Drained/Unsaturated | |

| Test No. (Symbol) | 1 (◆) | 2 (⊠) | 3 (△) |
|-------------------------|--------------------------------|-------|-------|
| Sample Type | Remolded (~to in-situ density) | | |
| Height, in. | 1 | 1 | 1 |
| Diameter, in. | 2.41 | 2.41 | 2.41 |
| Dry Density Before, pcf | 82.2 | 83.4 | 80.7 |
| Dry Density After, pcf | 82.2 | 83.4 | 81.3 |
| Moisture % Before | 8.0 | 6.8 | 7.0 |
| Moisture % After | 8.0 | 6.8 | 7.0 |
| Consolidation Load, kg | 1.4 | 2.9 | 5.7 |
| Normal Load, ksf | 1.00 | 2.00 | 4.00 |
| Shear Stress, ksf | 0.40 | 1.34 | 2.31 |
| Strain Rate | 0.08 in/min | | |

| Sample Properties | |
|-------------------------------|---------------------|
| Liquid Limit, % | --- |
| Plasticity Index, % | --- |
| Cohesion, psf | 75 |
| Friction Angle, ϕ | 29 |
| Percent Gravel | --- |
| Percent Sand | --- |
| Percent Passing No. 200 sieve | --- |
| Classification | SILT with sand (ML) |

KH KLEINFELDER

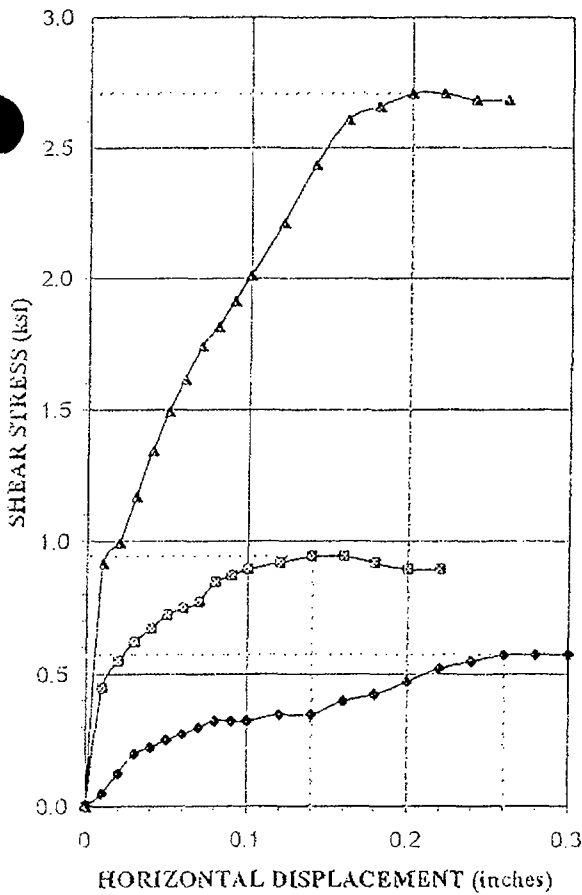
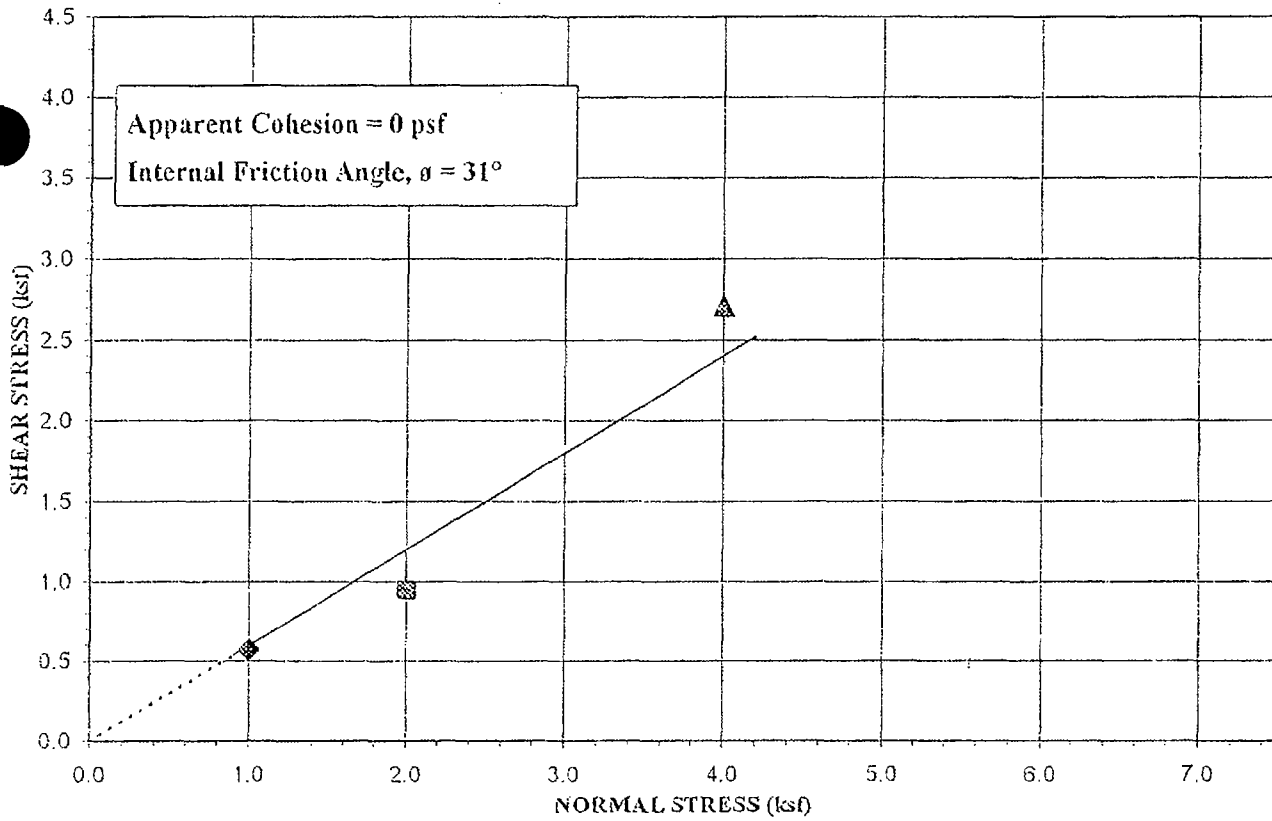
PROJECT NO. 35467.003

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

DIRECT SHEAR TEST

FIGURE

B-33



| | |
|--|--------------|
| Source: B-10 | Depth: 10 ft |
| Type of Test: Consolidated Drained/Unsaturated | |

| Test No. (Symbol) | 1 (◆) | 2 (◻) | 3 (▲) |
|-------------------------|--------------------------------|-------|-------|
| Sample Type | Remolded (~to in-situ density) | | |
| Height, in. | 1 | 1 | 1 |
| Diameter, in. | 2.41 | 2.41 | 2.41 |
| Dry Density Before, pcf | 93.0 | 96.4 | 96.8 |
| Dry Density After, pcf | 93.0 | 96.4 | 97.1 |
| Moisture % Before | 6.8 | 6.8 | 6.8 |
| Moisture % After | 6.8 | 6.8 | 6.8 |
| Consolidation Load, kg | 1.4 | 2.9 | 5.7 |
| Normal Load, ksf | 1.00 | 2.00 | 4.00 |
| Shear Stress, ksf | 0.57 | 0.94 | 2.71 |
| Strain Rate | 0.08 in/min | | |

| Sample Properties | |
|-------------------------------|-----------------|
| Liquid Limit, % | --- |
| Plasticity Index, % | --- |
| Cohesion, psf | 0 |
| Friction Angle, ϕ | 31 |
| Percent Gravel | --- |
| Percent Sand | --- |
| Percent Passing No. 200 sieve | --- |
| Classification | Silty SAND (SM) |

KLEINFELDER

PROJECT NO. 35467.003

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

DIRECT SHEAR TEST

FIGURE

B-34

APPENDIX C



INORGANIC ANALYSIS REPORT

AMERICAN WEST ANALYTICAL LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: June 10, 2003
Project: BlackKnoll LF / 31168

Contact: Renee Zollinger
Date Received: June 10, 2003

Lab Sample ID: L55846-01B

Field Sample ID: BKB2060903 B-2(i)

463 West 3600 South Salt Lake City, Utah 84115

DISSOLVED METALS

Table with 7 columns: Analytical Results, Units, Date Analyzed, Method Used, Reporting Limit, Analytical Results. Rows for Calcium and Sodium.

- Analyte concentration is too high for accurate spike recovery.

(801) 263-8686
Free (888) 263-8686
Fax (801) 263-8687
Email: awal@awal-labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: [Signature]
Laboratory Supervisor

Report Date: June 11, 2003

analysis applicable to the CWA, SDWA and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached Chain-of-Custody. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only upon written contact. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



INORGANIC ANALYSIS REPORT

AMERICAN WEST ANALYTICAL LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: September 25, 2003
Project: Tooele #1 Landfill / 35467.001

Contact: Bill Turner
Date Received: September 25, 2003

Lab Sample ID:
L57192-02

Field Sample ID:
TL092503-02 (B-3)

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Free (888) 263-8686
Fax (801) 263-8687
: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Result |
|------------------------|----------|------------------|--------------|-----------------|-------------------|
| Ammonia (as N) | mg/L | 10/02/03 | 350.1 | 0.050 | 0.76 |
| Bicarbonate (As CaCO3) | mg/L | 09/26/03 | 2320 B | 10 | 210 |
| Carbonate (As CaCO3) | mg/L | 09/26/03 | 2320 B | 10 | < 10 |
| Chloride | mg/L | 09/30/03 | SM 4500-CL E | 5.0 | 3,600 |
| COD | mg/L | 09/26/03 | HACH 8000 | 10 | 94 ¹ |
| Nitrate (as N) | mg/L | 09/26/03 5:02 pm | 353.2 | 0.010 | < 0.010 |
| pH | pH units | 09/25/03 5:20 pm | 150.1 | 0 | 7.85 |
| Sulfate | mg/L | 09/29/03 | 375.4 | 5.0 | 320 |
| TDS | mg/L | 09/26/03 | 160.1 | 10 | 6,500 |
| Total Organic Carbon | mg/L | 09/29/03 | 415.1 | 1.0 | 7.9 |

¹ Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

Released by:
Laboratory Supervisor

Report Date: October 6, 2003

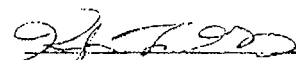
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57192
 Project: Tooele #1 Landfill / 35467.001

Dept: ME
 SampType: MBLK

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|-----------|-----------|-------|--------|-----------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| MB-14120 | Arsenic | mg/L | 7060A | < 0.0050 | | | | - | | | | 9/29/2003 |
| MB-14120 | Lead | mg/L | 7421 | < 0.0050 | | | | - | | | | 9/29/2003 |
| MB-14120 | Antimony | mg/L | 7041 | < 0.0050 | | | | - | | | | 10/1/2003 |
| MB-14120 | Selenium | mg/L | 7740 | < 0.0050 | | | | - | | | | 10/1/2003 |
| MB-14120 | Thallium | mg/L | 7841 | < 0.0020 | | | | - | | | | 10/1/2003 |
| MB-14156 | Mercury | mg/L | 7470A | < 0.00020 | | | | - | | | | 10/2/2003 |
| MB-14151 | Calcium | mg/L | 6010B | < 1.0 | | | | - | | | | 10/3/2003 |
| MB-14151 | Iron | mg/L | 6010B | < 0.010 | | | | - | | | | 10/3/2003 |
| MB-14151 | Magnesium | mg/L | 6010B | < 1.0 | | | | - | | | | 10/3/2003 |
| MB-14151 | Manganese | mg/L | 6010B | < 0.0050 | | | | - | | | | 10/3/2003 |
| MB-14151 | Potassium | mg/L | 6010B | < 1.0 | | | | - | | | | 10/3/2003 |
| MB-14151 | Sodium | mg/L | 6010B | < 1.0 | | | | - | | | | 10/3/2003 |
| MB-14120 | Barium | mg/L | 6010B | < 0.0020 | | | | - | | | | 10/2/2003 |
| MB-14120 | Beryllium | mg/L | 6010B | < 0.0010 | | | | - | | | | 10/2/2003 |
| MB-14120 | Cadmium | mg/L | 6010B | < 0.0040 | | | | - | | | | 10/2/2003 |
| MB-14120 | Chromium | mg/L | 6010B | < 0.010 | | | | - | | | | 10/2/2003 |
| MB-14120 | Cobalt | mg/L | 6010B | < 0.010 | | | | - | | | | 10/2/2003 |
| MB-14120 | Copper | mg/L | 6010B | < 0.0040 | | | | - | | | | 10/2/2003 |
| MB-14120 | Nickel | mg/L | 6010B | < 0.0050 | | | | - | | | | 10/2/2003 |
| MB-14120 | Vanadium | mg/L | 6010B | < 0.0050 | | | | - | | | | 10/2/2003 |
| MB-14120 | Zinc | mg/L | 6010B | < 0.0050 | | | | - | | | | 10/2/2003 |
| MB-14185 | Silver | mg/L | 6010B | < 0.010 | | | | - | | | | 10/3/2003 |

Released by:


 Laboratory Supervisor

Report Date: October 6, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57192
 Project: Tooele #1 Landfill / 35467.001

Dept: WC
 Samp'l type: MBLK

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|-----------|-------------------------------------|-------|------------|---------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| MB-R32092 | Bicarbonate (As CaCO ₃) | mg/L | 2320 B | < 10 | | | | - | | | | 9/26/2003 |
| MB-R32092 | Carbonate (As CaCO ₃) | mg/L | 2320 B | < 10 | | | | - | | | | 9/26/2003 |
| MB-R32181 | Chloride | mg/l. | SM 4500-Cl | < 5.0 | | | | - | | | | 9/30/2003 |
| MB-14125 | COD | mg/l. | HACH 8000 | < 10 | | | | - | | | | 9/26/2003 |
| MB-14142 | Ammonia (as N) | mg/L | 350.1 | < 0.050 | | | | - | | | | 10/2/2003 |
| MB-R32133 | Nitrate (as N) | mg/l. | 353.2 | < 0.010 | | | | - | | | | 9/26/2003 |
| MB-R32128 | Sulfate | mg/L | 375.4 | < 5.0 | | | | - | | | | 9/29/2003 |
| MB-R32140 | TDS | mg/L | 160.1 | < 10 | | | | - | | | | 9/26/2003 |
| MB-R32123 | Total Organic Carbon | mg/L | 415.1 | < 1.0 | | | | - | | | | 9/29/2003 |

Released by:


 Laboratory Supervisor

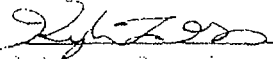
Report Date: October 6, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57192
 Project: Tooele #1 Landfill / 35467.001

Dept: ME
 Samp Type: LCS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|-----------|-------|--------|---------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| LCS-14120-AA | Arsenic | mg/L | 7060A | 0.04872 | 0.05555 | 0 | 87.7 | 85-115 | | | | 9/29/2003 |
| LCS-14120-AA | Lead | mg/L | 7421 | 0.04792 | 0.05555 | 0 | 86.3 | 85-115 | | | | 9/29/2003 |
| LCS-14120-AA | Antimony | mg/L | 7041 | 0.05166 | 0.05555 | 0 | 93 | 85-115 | | | | 10/1/2003 |
| LCS-14120-AA | Selenium | mg/L | 7740 | 0.05214 | 0.05555 | 0 | 93.9 | 85-115 | | | | 10/1/2003 |
| LCS-14120-AA | Thallium | mg/L | 7841 | 0.05621 | 0.05555 | 0 | 101 | 85-115 | | | | 10/1/2003 |
| LCS-14156 | Mercury | mg/L | 7470A | 0.00305 | 0.00333 | 0 | 91.6 | 80-120 | | | | 10/2/2003 |
| LCS-14151-ICP | Calcium | mg/L | 6010B | 1.109 | 1.111 | 0 | 99.8 | 75-125 | | | | 10/3/2003 |
| LCS-14151-ICP | Iron | mg/L | 6010B | 1.152 | 1.111 | 0 | 104 | 75-125 | | | | 10/3/2003 |
| LCS-14151-ICP | Magnesium | mg/L | 6010B | 1.176 | 1.111 | 0 | 106 | 75-125 | | | | 10/3/2003 |
| LCS-14151-ICP | Manganese | mg/L | 6010B | 1.141 | 1.111 | 0 | 103 | 75-125 | | | | 10/3/2003 |
| LCS-14151-ICP | Potassium | mg/L | 6010B | 11.29 | 11.11 | 0 | 102 | 75-125 | | | | 10/3/2003 |
| LCS-14151-ICP | Sodium | mg/L | 6010B | 1.09 | 1.111 | 0 | 98.1 | 75-125 | | | | 10/3/2003 |
| LCS-14120-ICP | Barium | mg/L | 6010B | 0.9662 | 1.111 | 0 | 87 | 75-125 | | | | 10/2/2003 |
| LCS-14120-ICP | Beryllium | mg/L | 6010B | 0.9731 | 1.111 | 0 | 87.6 | 75-125 | | | | 10/2/2003 |
| LCS-14120-ICP | Cadmium | mg/L | 6010B | 1.039 | 1.111 | 0 | 93.5 | 75-125 | | | | 10/2/2003 |
| LCS-14120-ICP | Chromium | mg/L | 6010B | 1.013 | 1.111 | 0 | 91.1 | 75-125 | | | | 10/2/2003 |
| LCS-14120-ICP | Cobalt | mg/L | 6010B | 1.016 | 1.111 | 0 | 91.5 | 75-125 | | | | 10/2/2003 |
| LCS-14120-ICP | Copper | mg/L | 6010B | 1.005 | 1.111 | 0 | 90.5 | 75-125 | | | | 10/2/2003 |
| LCS-14120-ICP | Nickel | mg/L | 6010B | 1.025 | 1.111 | 0 | 92.3 | 75-125 | | | | 10/2/2003 |
| LCS-14120-ICP | Vanadium | mg/L | 6010B | 1.01 | 1.111 | 0 | 90.9 | 75-125 | | | | 10/2/2003 |
| LCS-14120-ICP | Zinc | mg/L | 6010B | 1.025 | 1.111 | 0 | 92.2 | 75-125 | | | | 10/2/2003 |
| LCS-14185-ICP | Silver | mg/L | 6010B | 0.9734 | 1.111 | 0 | 87.6 | 75-125 | | | | 10/3/2003 |

Released by: 
 Laboratory Supervisor

Report Date: October 6, 2003

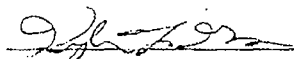
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57192
 Project: Tooele #1 Landfill / 35467.001

Dept: WC
 SampType: LCS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|------------|----------------------|----------|------------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| LCS-R32181 | Chloride | mg/L | SM 4500-Cl | 26 | 25 | 0 | 104 | 90-110 | | | | 9/30/2003 |
| LCS-14125 | COD | mg/L | HACH 8000 | 299 | 300 | 0 | 99.7 | 85-115 | | | | 9/26/2003 |
| LCS-14142 | Ammonia (as N) | mg/L | 350.1 | 0.99 | 1 | 0 | 99 | 90-110 | | | | 10/2/2003 |
| LCS-R32133 | Nitrate (as N) | mg/L | 353.2 | 1.03 | 1 | 0 | 103 | 90-110 | | | | 9/26/2003 |
| LCS-R32075 | pH | pH units | 150.1 | 8.98 | 9 | 0 | 99.8 | 98-102 | | | | 9/25/2003 |
| LCS-R32128 | Sulfate | mg/L | 375.4 | 1025 | 1000 | 0 | 102 | 90-110 | | | | 9/29/2003 |
| LCS-R32140 | TDS | mg/L | 160.1 | 218 | 205 | 0 | 106 | 80-120 | | | | 9/26/2003 |
| LCS-R32123 | Total Organic Carbon | mg/L | 415.1 | 9.7 | 10 | 0 | 97 | 90-110 | | | | 9/29/2003 |

Released by:


 Laboratory Supervisor

Report Date: October 6, 2003

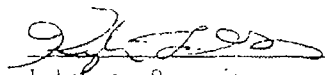
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L57192
Project: Tooele #1 Landfill / 35467.001

Dept: WC
SampType: LCS1

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|------------|---------|-------|-----------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| LCS1-14125 | COD | mg/L | HACH 8000 | 102 | 100 | 0 | 102 | 85-115 | | | | 9/26/2003 |

Released by:


Laboratory Supervisor

Report Date: October 6, 2003

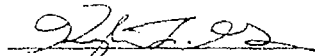
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L57192
Project: Tooele #1 Landfill / 35467.001

Dept: WC
SampType: LCS2

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|------------|---------|-------|-----------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| LCS2-14125 | COD | mg/L | HACH 8000 | 1009 | 1000 | 0 | 101 | 85-115 | | | | 9/26/2003 |

Released by:


Laboratory Supervisor

Report Date: October 6, 2003


QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57192
 Project: Tooele #1 Landfill / 35467.001

Dept: ME
 SampType: MS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|----------------|-----------|-------|--------|----------|---------------|-----------------|--------|--------|------|-----------|------------|---------------|
| L57192-02FMS-A | Arsenic | mg/L | 7060A | 0.0683 | 0.05555 | 0.02782 | 72.9 | 80-120 | | | 1 | 9/29/2003 |
| L57192-02FMS-A | Lead | mg/L | 7421 | 0.04264 | 0.05555 | 0 | 76.8 | 80-120 | | | 1 | 9/29/2003 |
| L57192-02FMS-A | Antimony | mg/L | 7041 | 0.04935 | 0.05555 | 0 | 88.8 | 80-120 | | | | 10/1/2003 |
| L57192-02FMS-A | Selenium | mg/L | 7740 | 0.04176 | 0.05555 | 0 | 75.2 | 80-120 | | | 1 | 10/1/2003 |
| L57192-02FMS-A | Thallium | mg/L | 7841 | 0.04098 | 0.05555 | 0 | 73.8 | 80-120 | | | 1 | 10/1/2003 |
| L57169-04GMS | Mercury | mg/L | 7470A | 0.002678 | 0.00333 | 3.764E-05 | 79.3 | 80-120 | | | 1 | 10/2/2003 |
| L57192-02FMS | Mercury | mg/L | 7470A | 0.003364 | 0.00333 | 9.049E-05 | 98.3 | 80-120 | | | | 10/2/2003 |
| L57192-02EMS | Calcium | mg/L | 6010B | 177.3 | 1.111 | 187.9 | -957 | 75-125 | | | 2 | 10/3/2003 |
| L57217-01KMS | Calcium | mg/L | 6010B | 679.9 | 1.111 | 694.7 | -1330 | 75-125 | | | 2 | 10/3/2003 |
| L57192-02EMS | Iron | mg/L | 6010B | 12.59 | 1.111 | 12.44 | 13.6 | 75-125 | | | | 10/3/2003 |
| L57217-01KMS | Iron | mg/L | 6010B | 3.438 | 1.111 | 2.665 | 69.6 | 75-125 | | | 1 | 10/3/2003 |
| L57192-02EMS | Magnesium | mg/L | 6010B | 178.8 | 1.111 | 187.7 | -805 | 75-125 | | | 2 | 10/3/2003 |
| L57217-01KMS | Magnesium | mg/L | 6010B | 193 | 1.111 | 194.5 | -134 | 75-125 | | | 2 | 10/3/2003 |
| L57217-01KMS | Manganese | mg/L | 6010B | 1.148 | 1.111 | 0.07371 | 96.7 | 75-125 | | | | 10/3/2003 |
| L57192-02EMS | Manganese | mg/L | 6010B | 1.405 | 1.111 | 0.4219 | 88.5 | 75-125 | | | | 10/3/2003 |
| L57217-01KMS | Potassium | mg/L | 6010B | 23.32 | 11.11 | 12.78 | 94.9 | 75-125 | | | | 10/3/2003 |
| L57192-02EMS | Potassium | mg/L | 6010B | 132.3 | 11.11 | 129.5 | 24.5 | 75-125 | | | 2 | 10/3/2003 |
| L57192-02EMS | Sodium | mg/L | 6010B | 1836 | 1.111 | 1949 | -10200 | 75-125 | | | 2 | 10/3/2003 |
| L57217-01KMS | Sodium | mg/L | 6010B | 119.5 | 1.111 | 122.8 | -298 | 75-125 | | | 2 | 10/3/2003 |
| L57192-02FMS | Barium | mg/L | 6010B | 0.9663 | 1.111 | 0.06421 | 81.2 | 75-125 | | | | 10/2/2003 |
| L57192-02FMS | Beryllium | mg/L | 6010B | 0.9546 | 1.111 | 0 | 85.9 | 75-125 | | | | 10/2/2003 |
| L57192-02FMS | Cadmium | mg/L | 6010B | 0.9401 | 1.111 | 0 | 84.6 | 75-125 | | | | 10/2/2003 |
| L57192-02FMS | Chromium | mg/L | 6010B | 0.9714 | 1.111 | 0 | 87.4 | 75-125 | | | | 10/2/2003 |
| L57192-02FMS | Cobalt | mg/L | 6010B | 0.9249 | 1.111 | 0 | 83.2 | 75-125 | | | | 10/2/2003 |
| L57192-02FMS | Copper | mg/L | 6010B | 1.086 | 1.111 | 0.01103 | 96.8 | 75-125 | | | | 10/2/2003 |
| L57192-02FMS | Nickel | mg/L | 6010B | 0.9414 | 1.111 | 0 | 84.7 | 75-125 | | | | 10/2/2003 |
| L57192-02FMS | Vanadium | mg/L | 6010B | 1.004 | 1.111 | 0 | 90.4 | 75-125 | | | | 10/2/2003 |

Released by:


 Laboratory Supervisor

Report Date: October 6, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L57192
Project: Tooele #1 Landfill / 35467.001

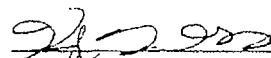
Dept: ME
SamplType: MS

| | | | | | | | | | |
|--------------|--------|------|-------|-------|-------|--------|------|--------|-----------|
| L57192-02FMS | Zinc | mg/L | 6010B | 1.041 | 1.111 | 0.0266 | 91.3 | 75-125 | 10/2/2003 |
| L57192-02FMS | Silver | mg/L | 6010E | 1.112 | 1.111 | 0 | 100 | 75-125 | 10/3/2003 |
| L57169-01HMS | Silver | mg/L | 6010B | 1.223 | 1.111 | 0 | 110 | 75-125 | 10/3/2003 |

¹ Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

² Analyte concentration is too high for accurate spike recovery.

Released by:


Laboratory Supervisor

Report Date: October 6, 2003

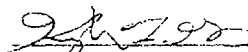
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57192
 Project: Tooele #1 Landfill / 35467.001

Dept: ME
 SampType: MSD

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|----------------|-----------|-------|--------|----------|---------------|-----------------|-------|--------|-------|-----------|------------|---------------|
| L57192-02FMSD- | Arsenic | mg/L | 7060A | 0.0695 | 0.05555 | 0.02782 | 75 | 80-120 | 1.74 | 20 | 1 | 9/29/2003 |
| L57192-02FMSD- | Lead | mg/L | 7421 | 0.04305 | 0.05555 | 0 | 77.5 | 80-120 | 0.97 | 20 | 1 | 9/29/2003 |
| L57192-02FMSD- | Antimony | mg/L | 7041 | 0.05004 | 0.05555 | 0 | 90.1 | 80-120 | 1.4 | 20 | | 10/1/2003 |
| L57192-02FMSD- | Selenium | mg/L | 7740 | 0.04345 | 0.05555 | 0 | 78.2 | 80-120 | 3.95 | 20 | 1 | 10/1/2003 |
| L57192-02FMSD- | Thallium | mg/L | 7841 | 0.04394 | 0.05555 | 0 | 79.1 | 80-120 | 6.97 | 20 | 1 | 10/1/2003 |
| L57169-04GMSD | Mercury | mg/L | 7470A | 0.002698 | 0.00333 | 3.764E-05 | 79.9 | 80-120 | 0.768 | 20 | 1 | 10/2/2003 |
| L57192-02FMSD | Mercury | mg/L | 7470A | 0.003464 | 0.00333 | 9.049E-05 | 101 | 80-120 | 2.92 | 20 | | 10/2/2003 |
| L57192-02FMSD | Calcium | mg/L | 6010B | 184 | 1.111 | 187.9 | -350 | 75-125 | 3.73 | 20 | 2 | 10/3/2003 |
| L57217-01KMSD | Calcium | mg/L | 6010B | 689.3 | 1.111 | 694.7 | -486 | 75-125 | 1.37 | 20 | 2 | 10/3/2003 |
| L57192-02EMSD | Iron | mg/L | 6010B | 12.98 | 1.111 | 12.44 | 48.7 | 75-125 | 3.05 | 20 | 2 | 10/3/2003 |
| L57217-01KMSD | Iron | mg/L | 6010B | 4.756 | 1.111 | 2.665 | 188 | 75-125 | 32.2 | 20 | 1 @ | 10/3/2003 |
| L57192-02EMSD | Magnesium | mg/L | 6010B | 184.6 | 1.111 | 187.7 | -282 | 75-125 | 3.2 | 20 | 2 | 10/3/2003 |
| L57217-01KMSD | Magnesium | mg/L | 6010B | 188.9 | 1.111 | 194.5 | -500 | 75-125 | 2.13 | 20 | 2 | 10/3/2003 |
| L57217-01KMSD | Manganese | mg/L | 6010B | 1.145 | 1.111 | 0.07371 | 96.5 | 75-125 | 0.263 | 20 | | 10/3/2003 |
| L57192-02EMSD | Manganese | mg/L | 6010B | 1.437 | 1.111 | 0.4219 | 91.3 | 75-125 | 2.21 | 20 | | 10/3/2003 |
| L57217-01KMSD | Potassium | mg/L | 6010B | 23.69 | 1.111 | 12.78 | 98.2 | 75-125 | 1.55 | 20 | | 10/3/2003 |
| L57192-02EMSD | Potassium | mg/L | 6010B | 137.1 | 1.111 | 129.5 | 68.2 | 75-125 | 3.6 | 20 | 2 | 10/3/2003 |
| L57192-02EMSD | Sodium | mg/L | 6010B | 1839 | 1.111 | 1949 | -9900 | 75-125 | 0.163 | 20 | 2 | 10/3/2003 |
| L57217-01KMSD | Sodium | mg/L | 6010B | 119.8 | 1.111 | 122.8 | -266 | 75-125 | 0.293 | 20 | 2 | 10/3/2003 |
| L57192-02FMSD | Barium | mg/L | 6010B | 0.9685 | 1.111 | 0.06421 | 81.4 | 75-125 | 0.224 | 20 | | 10/2/2003 |
| L57192-02FMSD | Beryllium | mg/L | 6010B | 0.958 | 1.111 | 0 | 86.2 | 75-125 | 0.35 | 20 | | 10/2/2003 |
| L57192-02FMSD | Cadmium | mg/L | 6010B | 0.9468 | 1.111 | 0 | 85.2 | 75-125 | 0.707 | 20 | | 10/2/2003 |
| L57192-02FMSD | Chromium | mg/L | 6010B | 0.9775 | 1.111 | 0 | 88 | 75-125 | 0.623 | 20 | | 10/2/2003 |
| L57192-02FMSD | Cobalt | mg/L | 6010B | 0.9284 | 1.111 | 0 | 83.6 | 75-125 | 0.382 | 20 | | 10/2/2003 |
| L57192-02FMSD | Copper | mg/L | 6010B | 1.098 | 1.111 | 0.01103 | 97.8 | 75-125 | 1.05 | 20 | | 10/2/2003 |
| L57192-02FMSD | Nickel | mg/L | 6010B | 0.9429 | 1.111 | 0 | 84.9 | 75-125 | 0.158 | 20 | | 10/2/2003 |
| L57192-02FMSD | Vanadium | mg/L | 6010B | 1.009 | 1.111 | 0 | 90.8 | 75-125 | 0.442 | 20 | | 10/2/2003 |

Released by:


 Laboratory Supervisor

Report Date: October 6, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L57192
Project: Tooele #1 Landfill / 35467.001

Dept: ME
SampType: MSD

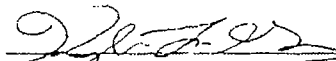
| | | | | | | | | | | | |
|-------------|--------|------|-------|-------|-------|--------|------|--------|-------|----|-----------|
| L57192-02FM | Zinc | mg/L | 6010B | 1.049 | 1.111 | 0.0266 | 92 | 75-125 | 0.817 | 20 | 10/2/2003 |
| L57192-02FM | Silver | mg/L | 6010B | 1.0% | 1.111 | 0 | 98.6 | 75-125 | 1.47 | 20 | 10/3/2003 |
| L57169-01HM | Silver | mg/L | 6010B | 1.211 | 1.111 | 0 | 109 | 75-125 | 0.933 | 20 | 10/3/2003 |

¹ Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

@ High RPD due to suspected matrix interference.

² Analyte concentration is too high for accurate spike recovery.

Released by:


Laboratory Supervisor

Report Date: October 6, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57192
 Project: Tooele #1 Landfill / 35467.001

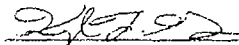
Dept: WC
 Sample Type: MS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|--------------|----------------------|-------|------------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| L57192-02AMS | Chloride | mg/L | SM 4500-Cl | 3679 | 100 | 3580 | 99 | 90-110 | | | | 9/30/2003 |
| L57113-01BMS | Chloride | mg/L | SM 4500-Cl | 47870 | 10000 | 36740 | 111 | 90-110 | | | 2 | 9/30/2003 |
| L57192-02BMS | COD | mg/L | HACH 8000 | 122 | 50 | 94 | 56 | 85-115 | | | 1 | 9/26/2003 |
| L57184-02BMS | COD | mg/L | HACH 8000 | 114 | 50 | 60 | 108 | 85-115 | | | | 9/26/2003 |
| L57192-02DMS | Ammonia (as N) | mg/L | 350.1 | 1.76 | 1 | 0.76 | 100 | 90-110 | | | | 10/2/2003 |
| L57143-01GMS | Ammonia (as N) | mg/L | 350.1 | 1.07 | 1 | 0.19 | 88 | 90-110 | | | 1 | 10/2/2003 |
| L57206-04AMS | Nitrate (as N) | mg/L | 353.2 | 1.01 | 1 | 0 | 101 | 90-110 | | | | 9/26/2003 |
| L57192-01AMS | Nitrate (as N) | mg/L | 353.2 | 1.1 | 1 | 0.05 | 105 | 90-110 | | | | 9/26/2003 |
| L57195-01CMS | Sulfate | mg/L | 375.4 | 8835 | 5000 | 3962 | 97.5 | 80-120 | | | | 9/29/2003 |
| L57192-02AMS | Sulfate | mg/L | 375.4 | 858 | 500 | 319 | 108 | 80-120 | | | | 9/29/2003 |
| L57192-02DMS | Total Organic Carbon | mg/L | 415.1 | 18.4 | 10 | 7.9 | 105 | 80-120 | | | | 9/29/2003 |
| L57169-01EMS | Total Organic Carbon | mg/L | 415.1 | 34.6 | 10 | 24 | 106 | 80-120 | | | | 9/29/2003 |
| L57143-04HMS | Total Organic Carbon | mg/L | 415.1 | 13.1 | 10 | 2.6 | 105 | 80-120 | | | | 9/29/2003 |

¹ Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

² Analyte concentration is too high for accurate spike recovery.

Released by:


 Laboratory Supervisor

Report Date: October 6, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57192
 Project: Tooele #1 Landfill / 35467.001

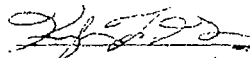
Dept: WC
 SampType: MSD

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|----------------------|-------|------------|--------|---------------|-----------------|------|--------|-------|-----------|------------|---------------|
| L57192-02AMSD | Chloride | mg/L | SM 4500-Cl | 3685 | 100 | 3580 | 103 | 90-110 | 0.109 | 10 | | 9/30/2003 |
| L57113-01BMSD | Chloride | mg/L | SM 4500-Cl | 47940 | 10000 | 36740 | 112 | 90-110 | 0.157 | 10 | 2 | 9/30/2003 |
| L57192-02BMSD | COD | mg/l | HACH 8000 | 124 | 50 | 94 | 60 | 85-115 | 1.63 | 10 | 1 | 9/26/2003 |
| L57184-02BMSD | COD | mg/L | HACH 8000 | 112 | 50 | 60 | 104 | 85-115 | 1.77 | 10 | | 9/26/2003 |
| L57192-02DMSD | Ammonia (as N) | mg/L | 350.1 | 1.8 | 1 | 0.76 | 104 | 90-110 | 2.25 | 10 | | 10/2/2003 |
| L57143-01GMSD | Ammonia (as N) | mg/L | 350.1 | 1.07 | 1 | 0.19 | 88 | 90-110 | 0 | 10 | 1 | 10/2/2003 |
| L57206-04AMSD | Nitrate (as N) | mg/L | 353.2 | 0.99 | 1 | 0 | 99 | 90-110 | 2 | 10 | | 9/26/2003 |
| L57192-01AMSD | Nitrate (as N) | mg/L | 353.2 | 1.11 | 1 | 0.05 | 106 | 90-110 | 0.905 | 10 | | 9/26/2003 |
| L57195-01CMSD | Sulfate | mg/L | 375.4 | 8835 | 5000 | 3962 | 97.5 | 80-120 | 0 | 10 | | 9/29/2003 |
| L57192-02AMSD | Sulfate | mg/L | 375.4 | 884 | 500 | 319 | 113 | 80-120 | 2.99 | 10 | | 9/29/2003 |
| L57192-02DMSD | Total Organic Carbon | mg/L | 415.1 | 17.9 | 10 | 7.9 | 100 | 80-120 | 2.75 | 20 | | 9/29/2003 |
| L57169-01EMSD | Total Organic Carbon | mg/L | 415.1 | 33.5 | 10 | 24 | 95 | 80-120 | 3.23 | 20 | | 9/29/2003 |
| L57143-04HMSD | Total Organic Carbon | mg/L | 415.1 | 13.3 | 10 | 2.6 | 107 | 80-120 | 1.52 | 20 | | 9/29/2003 |

¹ Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

² Analyte concentration is too high for accurate spike recovery.

Released by:


 Laboratory Supervisor

Report Date: October 6, 2003

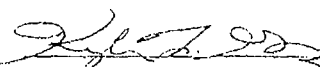
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57192
 Project: Tooele #1 Landfill / 35467.001

Dept: WC
 SampType: DUP

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|---------|----------|--------|--------|---------------|-----------------|------|--------|-------|-----------|------------|---------------|
| L57193-01CDUP | pH | pH units | 150.1 | 7.35 | 0 | 7.35 | 0 | - | 0 | 5 | | 9/25/2003 |
| L57192-01ADUP | pH | pH units | 150.1 | 7.88 | 0 | 7.89 | 0 | - | 0.127 | 5 | | 9/25/2003 |
| L57175-01CDUP | pH | pH units | 150.1 | 7.47 | 0 | 7.46 | 0 | - | 0.134 | 5 | | 9/25/2003 |
| L57192-02CDUP | TDS | mg/L | 160.1 | 6840 | 0 | 6480 | 0 | - | 5.41 | 20 | | 9/26/2003 |
| L57169-01DDUP | TDS | mg/L | 160.1 | 42000 | 0 | 50500 | 0 | - | 18.4 | 20 | | 9/26/2003 |
| L57143-04BDUP | TDS | mg/L | 160.1 | 290 | 0 | 290 | 0 | - | 0 | 20 | | 9/26/2003 |

Released by:


 Laboratory Supervisor

Report Date: October 6, 2003



INORGANIC ANALYSIS REPORT

**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

Client: Kleinfelder-SLC
Date Sampled: November 14, 2003
Project: Tooele Landfill / 35467.003

Contact: Bill Turner
Date Received: November 14, 2003

Lab Sample ID:
L57871-01E

Field Sample ID:
TL-111403-01 (B-3)

463 West 3600 South
Salt Lake City, Utah
84115

TOTAL METALS

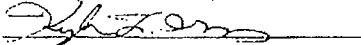
| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Results |
|--------------------|-------|-----------------------|-------------|-----------------|--------------------|
| Calcium | mg/L | 11/20/2003 1:35:50 PM | 6010B | 1.0 | 110 ² |
| Iron | mg/L | 11/20/2003 1:35:50 PM | 6010B | 0.010 | 1.0 |
| Magnesium | mg/L | 11/20/2003 1:35:50 PM | 6010B | 1.0 | 160 ² |
| Manganese | mg/L | 11/20/2003 1:35:50 PM | 6010B | 0.0050 | 0.11 |
| Potassium | mg/L | 11/20/2003 1:35:50 PM | 6010B | 1.0 | 150 ² |
| Sodium | mg/L | 11/20/2003 1:35:50 PM | 6010B | 10 | 1,800 ² |

(801) 263-8686
Free (888) 263-8686
Fax (801) 263-8687
: awal@awal-Labs.com

² Analyte concentration is too high for accurate spike recovery.

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: 
Laboratory Supervisor

Report Date: November 26, 2003



**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Free (888) 263-8686
Fax (801) 263-8687
awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

INORGANIC ANALYSIS REPORT

Client: Kleinfelder-SLC
Date Sampled: November 14, 2003
Project: Tooele Landfill / 35467.003

Contact: Bill Turner
Date Received: November 14, 2003

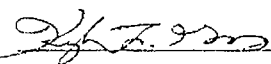
Lab Sample ID:
L57871-01F

Field Sample ID:
TL-111403-01 (B-3)

DISSOLVED METALS

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Results |
|--------------------|-------|------------------------|-------------|-----------------|--------------------|
| Antimony | mg/L | 11/24/2003 5:06:22 PM | 7041 | 0.0050 | < 0.0050 |
| Arsenic | mg/L | 11/24/2003 12:39:32 PM | 7060A | 0.0050 | < 0.0050 |
| Barium | mg/L | 11/25/2003 6:30:36 PM | 6010B | 0.0020 | 0.050 |
| Beryllium | mg/L | 11/25/2003 6:30:36 PM | 6010B | 0.0010 | < 0.0010 |
| Cadmium | mg/L | 11/25/2003 6:30:36 PM | 6010B | 0.0040 | < 0.0040 |
| Chromium | mg/L | 11/25/2003 6:30:36 PM | 6010B | 0.010 | < 0.010 |
| Cobalt | mg/L | 11/25/2003 6:30:36 PM | 6010B | 0.010 | < 0.010 |
| Copper | mg/L | 11/25/2003 6:30:36 PM | 6010B | 0.0040 | 0.019 |
| Lead | mg/L | 11/24/2003 2:59:50 PM | 7421 | 0.0050 | < 0.0050 |
| Mercury | mg/L | 11/18/2003 12:14:12 PM | 7470A | 0.00020 | < 0.00020 |
| Nickel | mg/L | 11/25/2003 6:30:36 PM | 6010B | 0.0050 | < 0.0050 |
| Selenium | mg/L | 11/24/2003 10:20:21 AM | 7740 | 0.0050 | < 0.0050 |
| Silver | mg/L | 11/25/2003 7:34:19 PM | 6010B | 0.010 | < 0.010 |
| Thallium | mg/L | 11/24/2003 6:21:06 PM | 7841 | 0.0020 | < 0.0020 |
| Vanadium | mg/L | 11/25/2003 6:30:36 PM | 6010B | 0.0050 | < 0.0050 |
| Zinc | mg/L | 11/25/2003 6:30:36 PM | 6010B | 0.0050 | 0.038 |

* Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

Released by: 

Laboratory Supervisor

Report Date:

November 26, 2003

Page 2 of 12

Analysis applicable to the CWA, SDWA and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached Chain-of-Custody. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with its advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only on request. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57871
 Project: Tooele Landfill / 35467.003

Dept: ME
 SampType: MBLK

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|-------------|-----------|-------|--------|-----------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| MB-14732 | Arsenic | mg/L | 7060A | < 0.0050 | | | | - | | | | 11/24/2003 |
| MB-14732 | Lead | mg/L | 7421 | < 0.0050 | | | | - | | | | 11/24/2003 |
| MB-14732 | Antimony | mg/L | 7041 | < 0.0050 | | | | - | | | | 11/24/2003 |
| MB-14732 | Selenium | mg/L | 7740 | < 0.0050 | | | | - | | | | 11/24/2003 |
| MB-14732 | Thallium | mg/L | 7841 | < 0.0020 | | | | - | | | | 11/24/2003 |
| MB-14723 | Mercury | mg/L | 7470A | < 0.00020 | | | | - | | | | 11/18/2003 |
| MB-14725 | Calcium | mg/L | 6010B | < 1.0 | | | | - | | | | 11/20/2003 |
| MB-14725 | Iron | mg/L | 6010B | < 0.010 | | | | - | | | | 11/20/2003 |
| MB-14725 | Magnesium | mg/L | 6010B | < 1.0 | | | | - | | | | 11/20/2003 |
| MB-14725 | Manganese | mg/L | 6010B | < 0.0050 | | | | - | | | | 11/20/2003 |
| MB-14725 | Potassium | mg/L | 6010B | < 1.0 | | | | - | | | | 11/20/2003 |
| MB-14725 | Sodium | mg/L | 6010B | < 1.0 | | | | - | | | | 11/20/2003 |
| MB-14732 | Barium | mg/L | 6010B | < 0.0020 | | | | - | | | | 11/25/2003 |
| MB-14732 | Beryllium | mg/L | 6010B | < 0.0010 | | | | - | | | | 11/25/2003 |
| MB-14732 | Cadmium | mg/L | 6010B | < 0.0040 | | | | - | | | | 11/25/2003 |
| MB-14732 | Chromium | mg/L | 6010B | < 0.010 | | | | - | | | | 11/25/2003 |
| MB-14732 | Cobalt | mg/L | 6010B | < 0.010 | | | | - | | | | 11/25/2003 |
| MB-14732 | Copper | mg/L | 6010B | < 0.0040 | | | | - | | | | 11/25/2003 |
| MB-14732 | Nickel | mg/L | 6010B | < 0.0050 | | | | - | | | | 11/25/2003 |
| MB-14732 | Vanadium | mg/L | 6010B | < 0.0050 | | | | - | | | | 11/25/2003 |
| MB-14732 | Zinc | mg/L | 6010B | < 0.0050 | | | | - | | | | 11/25/2003 |
| MB-14733-Ag | Silver | mg/L | 6010B | < 0.010 | | | | - | | | | 11/25/2003 |

Released by: *[Signature]*
 Laboratory Supervisor

Report Date: November 26, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57871
 Project: Tooele Landfill / 35467.003

Dept: WC
 SampType: MBLK

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|-----------|-------------------------------------|-------|-----------|---------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| MB-R33357 | Bicarbonate (As CaCO ₃) | mg/L | 2320 B | < 10 | | | | - | | | | 11/17/2003 |
| MB-R33357 | Carbonate (As CaCO ₃) | mg/L | 2320 B | < 10 | | | | - | | | | 11/17/2003 |
| MB-R33412 | Chloride | mg/L | 4500-Cl E | < 5.0 | | | | - | | | | 11/18/2003 |
| MB-14794 | COD | mg/L | HACH 8000 | < 10 | | | | - | | | | 11/20/2003 |
| MB-14786 | Ammonia (as N) | mg/L | 350.1 | < 0.050 | | | | - | | | | 11/24/2003 |
| MB-R33360 | Nitrate (as N) | mg/L | 353.2 | < 0.010 | | | | - | | | | 11/14/2003 |
| MB-R33359 | Sulfate | mg/L | 375.4 | < 5.0 | | | | - | | | | 11/17/2003 |
| MB-R33429 | TDS | mg/L | 160.1 | < 10 | | | | - | | | | 11/18/2003 |
| MB-R33362 | Total Organic Carbon | mg/L | 415.1 | < 1.0 | | | | - | | | | 11/17/2003 |

Released by:


 Laboratory Supervisor

Report Date: November 26, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57871
 Project: Tooele Landfill / 35467.003

Dept: ME
 SampType: LCS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|-----------|-------|--------|----------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| LCS-14732-AA | Arsenic | mg/L | 7060A | 0.05699 | 0.05555 | 0 | 103 | 85-115 | | | | 11/24/2003 |
| LCS-14732-AA | Lead | mg/L | 7421 | 0.05116 | 0.05555 | 0 | 92.1 | 85-115 | | | | 11/24/2003 |
| LCS-14732-AA | Antimony | mg/L | 7041 | 0.05639 | 0.05555 | 0 | 102 | 85-115 | | | | 11/24/2003 |
| LCS-14732-AA | Selenium | mg/L | 7740 | 0.0626 | 0.05555 | 0 | 113 | 85-115 | | | | 11/24/2003 |
| LCS-14732-AA | Thallium | mg/L | 7841 | 0.06013 | 0.05555 | 0 | 108 | 85-115 | | | | 11/24/2003 |
| LCS-14723 | Mercury | mg/L | 7470A | 0.003197 | 0.00333 | 0 | 96 | 80-120 | | | | 11/18/2003 |
| LCS-14725-ICP | Calcium | mg/L | 6010B | 1.156 | 1.111 | 0 | 104 | 75-125 | | | | 11/20/2003 |
| LCS-14725-ICP | Iron | mg/L | 6010B | 1.175 | 1.111 | 0 | 106 | 75-125 | | | | 11/20/2003 |
| LCS-14725-ICP | Magnesium | mg/L | 6010B | 1.104 | 1.111 | 0 | 99.3 | 75-125 | | | | 11/20/2003 |
| LCS-14725-ICP | Manganese | mg/L | 6010B | 1.165 | 1.111 | 0 | 105 | 75-125 | | | | 11/20/2003 |
| LCS-14725-ICP | Potassium | mg/L | 6010B | 11.85 | 11.11 | 0 | 107 | 75-125 | | | | 11/20/2003 |
| LCS-14725-ICP | Sodium | mg/L | 6010B | 0.9722 | 1.111 | 0 | 87.5 | 75-125 | | | | 11/20/2003 |
| LCS-14732-ICP | Barium | mg/L | 6010B | 1.142 | 1.111 | 0 | 103 | 75-125 | | | | 11/25/2003 |
| LCS-14732-ICP | Beryllium | mg/L | 6010B | 1.14 | 1.111 | 0 | 103 | 75-125 | | | | 11/25/2003 |
| LCS-14732-ICP | Cadmium | mg/L | 6010B | 1.19 | 1.111 | 0 | 107 | 75-125 | | | | 11/25/2003 |
| LCS-14732-ICP | Chromium | mg/L | 6010B | 1.156 | 1.111 | 0 | 104 | 75-125 | | | | 11/25/2003 |
| LCS-14732-ICP | Cobalt | mg/L | 6010B | 1.157 | 1.111 | 0 | 104 | 75-125 | | | | 11/25/2003 |
| LCS-14732-ICP | Copper | mg/L | 6010B | 1.15 | 1.111 | 0 | 104 | 75-125 | | | | 11/25/2003 |
| LCS-14732-ICP | Nickel | mg/L | 6010B | 1.171 | 1.111 | 0 | 105 | 75-125 | | | | 11/25/2003 |
| LCS-14732-ICP | Vanadium | mg/L | 6010B | 1.147 | 1.111 | 0 | 103 | 75-125 | | | | 11/25/2003 |
| LCS-14732-ICP | Zinc | mg/L | 6010B | 1.182 | 1.111 | 0 | 106 | 75-125 | | | | 11/25/2003 |
| LCS-14733-ICP | Silver | mg/L | 6010B | 1.052 | 1.111 | 0 | 94.7 | 75-125 | | | | 11/25/2003 |

Released by: 
 Laboratory Supervisor

Report Date: November 26, 2003



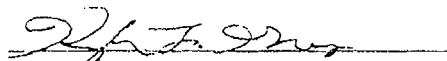
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57871
 Project: Tooele Landfill / 35467.003

Depr: WC
 SampType: LCS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|------------|----------------------|----------|-----------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| LCS-R33412 | Chloride | mg/L | 4500-Cl E | 24 | 25 | 0 | 96 | 90-110 | | | | 11/18/2003 |
| LCS2-14794 | COD | mg/L | HACH 8000 | 1002 | 1000 | 0 | 100 | 85-115 | | | | 11/20/2003 |
| LCS1-14794 | COD | mg/L | HACH 8000 | 99 | 100 | 0 | 99 | 85-115 | | | | 11/20/2003 |
| LCS-14794 | COD | mg/L | HACH 8000 | 298 | 300 | 0 | 99.3 | 85-115 | | | | 11/20/2003 |
| LCS-14786 | Ammonia (as N) | mg/L | 350.1 | 1.05 | 1 | 0 | 105 | 90-110 | | | | 11/24/2003 |
| LCS-R33360 | Nitrate (as N) | mg/L | 353.2 | 1.03 | 1 | 0 | 103 | 90-110 | | | | 11/14/2003 |
| LCS-R33352 | pH | pH units | 150.1 | 8.99 | 9 | 0 | 99.9 | 98-102 | | | | 11/14/2003 |
| LCS-R33359 | Sulfate | mg/L | 375.4 | 1000 | 1000 | 0 | 100 | 90-110 | | | | 11/17/2003 |
| LCS-R33429 | TDS | mg/L | 160.1 | 214 | 205 | 0 | 104 | 80-120 | | | | 11/18/2003 |
| LCS-R33362 | Total Organic Carbon | mg/L | 415.1 | 10.5 | 10 | 0 | 105 | 90-110 | | | | 11/17/2003 |

Released by:


 Laboratory Supervisor

Report Date: November 26, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57871
 Project: Tooele Landfill / 35467.003

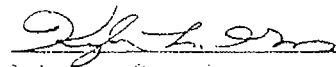
Dept: ME
 SampType: MS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|----------------|-----------|-------|--------|----------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| L57871-01FMS-A | Arsenic | mg/L | 7060A | 0.05996 | 0.05555 | 0 | 108 | 80-120 | | | | 11/24/2003 |
| L57871-01FMS-A | Lead | mg/L | 7421 | 0.04274 | 0.05555 | 0 | 76.9 | 80-120 | | | | 11/24/2003 |
| L57871-01FMS-A | Antimony | mg/L | 7041 | 0.04962 | 0.05555 | 0 | 89.3 | 80-120 | | | | 11/24/2003 |
| L57871-01FMS-A | Selenium | mg/L | 7740 | 0.04297 | 0.05555 | 0 | 77.4 | 80-120 | | | | 11/24/2003 |
| L57871-01FMS-A | Thallium | mg/L | 7841 | 0.04836 | 0.05555 | 0 | 87.1 | 80-120 | | | | 11/24/2003 |
| L57859-01BMS | Mercury | mg/L | 7470A | 0.001068 | 0.00333 | 0 | 32.1 | 80-120 | | | | 11/18/2003 |
| L57871-01FMS | Mercury | mg/L | 7470A | 0.00353 | 0.00333 | 0 | 106 | 80-120 | | | | 11/18/2003 |
| L57871-01EMS | Calcium | mg/L | 6010B | 110 | 1.111 | 111.7 | -154 | 75-125 | | | 2 | 11/20/2003 |
| L57871-01EMS | Iron | mg/L | 6010B | 2.089 | 1.111 | 1.041 | 94.3 | 75-125 | | | | 11/20/2003 |
| L57871-01EMS | Magnesium | mg/L | 6010B | 161.9 | 1.111 | 164.3 | -222 | 75-125 | | | 2 | 11/20/2003 |
| L57871-01EMS | Manganese | mg/L | 6010B | 1.168 | 1.111 | 0.1123 | 95 | 75-125 | | | | 11/20/2003 |
| L57871-01EMS | Potassium | mg/L | 6010B | 154.5 | 1.111 | 147.3 | 64.5 | 75-125 | | | 2 | 11/20/2003 |
| L57871-01EMS | Sodium | mg/L | 6010B | 1804 | 1.111 | 1811 | -630 | 75-125 | | | 2 | 11/20/2003 |
| L57871-01FMS | Barium | mg/L | 6010B | 1.056 | 1.111 | 0.05047 | 90.5 | 75-125 | | | | 11/25/2003 |
| L57871-01FMS | Beryllium | mg/L | 6010B | 1.028 | 1.111 | 0 | 92.5 | 75-125 | | | | 11/25/2003 |
| L57871-01FMS | Cadmium | mg/L | 6010B | 1.042 | 1.111 | 0 | 93.8 | 75-125 | | | | 11/25/2003 |
| L57871-01FMS | Chromium | mg/L | 6010B | 1.08 | 1.111 | 0 | 97.2 | 75-125 | | | | 11/25/2003 |
| L57871-01FMS | Cobalt | mg/L | 6010B | 1.018 | 1.111 | 0 | 91.7 | 75-125 | | | | 11/25/2003 |
| L57871-01FMS | Copper | mg/L | 6010B | 1.198 | 1.111 | 0.01874 | 106 | 75-125 | | | | 11/25/2003 |
| L57871-01FMS | Nickel | mg/L | 6010B | 1.026 | 1.111 | 0 | 92.3 | 75-125 | | | | 11/25/2003 |
| L57871-01FMS | Vanadium | mg/L | 6010B | 1.117 | 1.111 | 0 | 101 | 75-125 | | | | 11/25/2003 |
| L57871-01FMS | Zinc | mg/L | 6010B | 1.163 | 1.111 | 0.03787 | 101 | 75-125 | | | | 11/25/2003 |
| L57871-01FMS | Silver | mg/L | 6010B | 1.094 | 1.111 | 0 | 98.5 | 75-125 | | | | 11/25/2003 |

¹ Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

² Analyte concentration is too high for accurate spike recovery.

Released by:


 Laboratory Supervisor

Report Date: November 26, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57871
 Project: Tooele Landfill / 35467.003

Dept: ME
 SampType: MSD

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|-----------|-------|--------|----------|---------------|-----------------|-------|--------|-------|-----------|------------|---------------|
| L57871-01FMSD | Arsenic | mg/L | 7060A | 0.06013 | 0.05555 | 0 | 108 | 80-120 | 0.285 | 20 | | 11/24/2003 |
| L57871-01FMSD | Lead | mg/L | 7421 | 0.04174 | 0.05555 | 0 | 75.1 | 80-120 | 2.38 | 20 | 1 | 11/24/2003 |
| L57871-01FMSD | Antimony | mg/L | 7041 | 0.05115 | 0.05555 | 0 | 92.1 | 80-120 | 3.03 | 20 | | 11/24/2003 |
| L57871-01FMSD | Selenium | mg/L | 7740 | 0.04569 | 0.05555 | 0 | 82.3 | 80-120 | 6.14 | 20 | | 11/24/2003 |
| L57871-01FMSD | Thallium | mg/L | 7841 | 0.04896 | 0.05555 | 0 | 88.1 | 80-120 | 1.23 | 20 | | 11/24/2003 |
| L57859-01BMSD | Mercury | mg/L | 7470A | 0.001043 | 0.00333 | 0 | 31.3 | 80-120 | 2.39 | 20 | 1 | 11/18/2003 |
| L57871-01FMSD | Mercury | mg/L | 7470A | 0.003799 | 0.00333 | 0 | 114 | 80-120 | 7.33 | 20 | | 11/18/2003 |
| L57871-01EMSD | Calcium | mg/L | 6010B | 111 | 1.111 | 111.7 | -69.7 | 75-125 | 0.848 | 20 | 2 | 11/20/2003 |
| L57871-01EMSD | Iron | mg/L | 6010B | 2.135 | 1.111 | 1.041 | 98.4 | 75-125 | 2.16 | 20 | | 11/20/2003 |
| L57871-01EMSD | Magnesium | mg/L | 6010B | 133.5 | 1.111 | 164.3 | -92.1 | 75-125 | 0.891 | 20 | 2 | 11/20/2003 |
| L57871-01EMSD | Manganese | mg/L | 6010B | 1.135 | 1.111 | 0.1123 | 96.5 | 75-125 | 1.42 | 20 | | 11/20/2003 |
| L57871-01EMSD | Potassium | mg/L | 6010B | 156.2 | 1.111 | 147.3 | 80.1 | 75-125 | 1.12 | 20 | | 11/20/2003 |
| L57871-01EMSD | Sodium | mg/L | 6010B | 1831 | 1.111 | 1811 | 1800 | 75-125 | 1.49 | 20 | 2 | 11/20/2003 |
| L57871-01EMSD | Barium | mg/L | 6010B | 1.083 | 1.111 | 0.05047 | 92.9 | 75-125 | 2.46 | 20 | | 11/25/2003 |
| L57871-01FMSD | Beryllium | mg/L | 6010B | 1.054 | 1.111 | 0 | 94.9 | 75-125 | 2.48 | 20 | | 11/25/2003 |
| L57871-01FMSD | Cadmium | mg/L | 6010B | 1.051 | 1.111 | 0 | 94.6 | 75-125 | 0.843 | 20 | | 11/25/2003 |
| L57871-01FMSD | Chromium | mg/L | 6010B | 1.09 | 1.111 | 0 | 98.1 | 75-125 | 0.922 | 20 | | 11/25/2003 |
| L57871-01FMSD | Cobalt | mg/L | 6010B | 1.024 | 1.111 | 0 | 92.1 | 75-125 | 0.525 | 20 | | 11/25/2003 |
| L57871-01FMSD | Copper | mg/L | 6010B | 1.208 | 1.111 | 0.01874 | 107 | 75-125 | 0.781 | 20 | | 11/25/2003 |
| L57871-01FMSD | Nickel | mg/L | 6010B | 1.04 | 1.111 | 0 | 93.6 | 75-125 | 1.43 | 20 | | 11/25/2003 |
| L57871-01FMSD | Vanadium | mg/L | 6010B | 1.123 | 1.111 | 0 | 101 | 75-125 | 0.511 | 20 | | 11/25/2003 |
| L57871-01FMSD | Zinc | mg/L | 6010B | 1.174 | 1.111 | 0.03787 | 102 | 75-125 | 0.967 | 20 | | 11/25/2003 |
| L57871-01FMSD | Silver | mg/L | 6010B | 1.098 | 1.111 | 0 | 98.8 | 75-125 | 0.355 | 20 | | 11/25/2003 |

¹ Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

² Analyte concentration is too high for accurate spike recovery.

Released by:


 Laboratory Supervisor

Report Date: November 26, 2003

QC SUMMARY REPORT

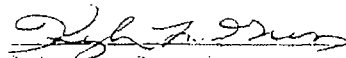
CLIENT: Kleinfelder-SLC
 Work Order: L57871
 Project: Tooele Landfill / 35467.003

Dept: WC
 SampType: MS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|--------------|----------------------|-------|-----------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| L57856-03AMS | Chloride | mg/L | 4500-Cl E | 670 | 100 | 560 | 110 | 90-110 | | | | 11/18/2003 |
| L57871-01CMS | COD | mg/L | HACH 8000 | 69 | 50 | 28 | 82 | 85-115 | | | | 11/20/2003 |
| L57871-01DMS | Ammonia (as N) | mg/L | 350.1 | 2.3 | 1 | 1.32 | 98 | 90-110 | | | | 11/24/2003 |
| L57871-04AMS | Nitrate (as N) | mg/L | 353.2 | 1.01 | 1 | 0 | 101 | 90-110 | | | | 11/14/2003 |
| L57871-01AMS | Sulfate | mg/L | 375.4 | 524 | 250 | 261 | 105 | 80-120 | | | | 11/17/2003 |
| L57871-01DMS | Total Organic Carbon | mg/L | 415.1 | 13 | 10 | 1.4 | 116 | 80-120 | | | | 11/17/2003 |

† Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

Released by:


 Laboratory Supervisor

Report Date: November 26, 2003

QC SUMMARY REPORT

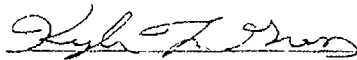
CLIENT: Kleinelder-SLC
 Work Order: L57871
 Project: Tooele Landfill / 35467.003

Dept: WC
 SampType: MSD

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|----------------------|-------|-----------|--------|---------------|-----------------|------|--------|-------|-----------|------------|---------------|
| L57856-03AMSD | Chloride | mg/L | 4500-CIE | 650 | 100 | 560 | 90 | 90-110 | 3.03 | 10 | | 11/18/2003 |
| L57871-01CMSD | COD | mg/L | HACH 8000 | 70 | 50 | 28 | 84 | 85-115 | 1.44 | 10 | | 11/20/2003 |
| L57871-01DMSD | Ammonia (as N) | mg/L | 350.1 | 2.31 | 1 | 1.32 | 99 | 90-110 | 0.434 | 10 | | 11/24/2003 |
| L57871-01AMSD | Nitrate (as N) | mg/L | 353.2 | 1 | 1 | 0 | 100 | 90-110 | 0.995 | 10 | | 11/14/2003 |
| L57871-01AMSD | Sulfate | mg/L | 375.4 | 511 | 250 | 261 | 100 | 80-120 | 2.51 | 10 | | 11/17/2003 |
| L57871-01DMSD | Total Organic Carbon | mg/L | 415.1 | 12.8 | 10 | 1.4 | 114 | 80-120 | 1.55 | 20 | | 11/17/2003 |

† Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

Released by:


 Laboratory Supervisor

Report Date: November 26, 2003

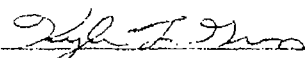
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57871
 Project: Tooele Landfill / 35467.003

Dept: WC
 Samp' Type: DUP

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|---------|----------|--------|--------|---------------|-----------------|------|--------|-------|-----------|------------|---------------|
| L57871-01ADUP | pH | pH units | 150.1 | 7.98 | 0 | 7.97 | 0 | - | 0.125 | 5 | | 11/14/2003 |
| L57864-01BDUP | pH | pH units | 150.1 | 6.09 | 0 | 6.1 | 0 | - | 0.164 | 5 | | 11/14/2003 |
| L57871-01BDUP | TDS | mg/L | 100.1 | 6590 | 0 | 6340 | 0 | - | 3.87 | 20 | | 11/18/2003 |

Released by:


 Laboratory Supervisor

Report Date: November 26, 2003



INORGANIC ANALYSIS REPORT

**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

Client: Kleinfelder-SLC
Date Sampled: October 29, 2003
Project: Tooele WRSW Landfill / 35467.002

Contact: Bill Turner
Date Received: October 29, 2003

Lab Sample ID:
L57654-01A

Field Sample ID:
B-10

163 West 3600 South
Salt Lake City, Utah
84115

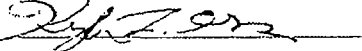
DISSOLVED METALS

(801) 263-8686
Free (888) 263-8686
Fax (801) 263-8687
awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Results |
|--------------------|-------|------------------------|-------------|-----------------|--------------------|
| Antimony | mg/L | 10/30/2003 1:23:53 PM | 7041 | 0.0050 | < 0.0050 |
| Arsenic | mg/L | 10/30/2003 12:42:30 PM | 7060A | 0.0050 | 0.032 |
| Barium | mg/L | 10/31/2003 12:25:52 PM | 6010B | 0.0020 | 0.11 |
| Beryllium | mg/L | 10/31/2003 12:25:52 PM | 6010B | 0.0010 | < 0.0010 |
| Cadmium | mg/L | 10/31/2003 12:25:52 PM | 6010B | 0.0040 | < 0.0040 |
| Chromium | mg/L | 10/31/2003 12:25:52 PM | 6010B | 0.010 | < 0.010 |
| Cobalt | mg/L | 10/31/2003 12:25:52 PM | 6010B | 0.010 | < 0.010 |
| Copper | mg/L | 10/31/2003 12:25:52 PM | 6010B | 0.0040 | 0.0082 |
| Lead | mg/L | 10/30/2003 11:25:47 AM | 7421 | 0.0050 | < 0.0050 |
| Mercury | mg/L | 10/30/2003 2:05:27 PM | 7470A | 0.00020 | < 0.00020 |
| Nickel | mg/L | 10/31/2003 12:25:52 PM | 6010B | 0.0050 | < 0.0050 |
| Selenium | mg/L | 10/30/2003 | 7740 | 0.0050 | < 0.0050 |
| Silver | mg/L | 10/30/2003 12:59:00 PM | 6010B | 0.010 | < 0.010 |
| Thallium | mg/L | 10/30/2003 3:59:14 PM | 7841 | 0.0020 | < 0.0020 |
| Vanadium | mg/L | 10/31/2003 12:25:52 PM | 6010B | 0.0050 | 0.010 |
| Zinc | mg/L | 10/31/2003 12:25:52 PM | 6010B | 0.0050 | 0.12 |

Released by: 
Laboratory Supervisor

Report Date: October 31, 2003



INORGANIC ANALYSIS REPORT

AMERICAN WEST ANALYTICAL LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: October 29, 2003
Project: Tooele WRSW Landfill / 35467.002

Contact: Bill Turner
Date Received: October 29, 2003

Lab Sample ID:
L57654-02A

Field Sample ID:
B-8

463 West 3600 South
Salt Lake City, Utah
84115

DISSOLVED METALS

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Results |
|--------------------|-------|------------------------|-------------|-----------------|--------------------|
| Antimony | mg/L | 10/30/2003 1:23:58 PM | 7041 | 0.0050 | < 0.0050 |
| Arsenic | mg/L | 10/30/2003 12:42:20 PM | 7060A | 0.0050 | < 0.0050 |
| Barium | mg/L | 10/31/2003 12:41:43 PM | 6010B | 0.0020 | 0.071 |
| Beryllium | mg/L | 10/31/2003 12:41:43 PM | 6010B | 0.0010 | < 0.0010 |
| Cadmium | mg/L | 10/31/2003 12:41:43 PM | 6010B | 0.0040 | < 0.0040 |
| Chromium | mg/L | 10/31/2003 12:41:43 PM | 6010B | 0.010 | < 0.010 |
| Cobalt | mg/L | 10/31/2003 12:41:43 PM | 6010B | 0.010 | < 0.010 |
| Copper | mg/L | 10/31/2003 12:41:43 PM | 6010B | 0.0040 | 0.0041 |
| Lead | mg/L | 10/30/2003 11:25:47 AM | 7421 | 0.0050 | < 0.0050 |
| Mercury | mg/L | 10/30/2003 2:05:27 PM | 7470A | 0.00020 | < 0.00020 |
| Nickel | mg/L | 10/31/2003 12:41:43 PM | 6010B | 0.0050 | < 0.0050 |
| Selenium | mg/L | 10/30/2003 2:50:06 PM | 7740 | 0.0050 | < 0.0050 |
| Silver | mg/L | 10/30/2003 1:14:48 PM | 6010B | 0.010 | < 0.010 |
| Thallium | mg/L | 10/30/2003 2:57:04 PM | 7841 | 0.0020 | < 0.0020 |
| Vanadium | mg/L | 10/31/2003 12:41:43 PM | 6010B | 0.0050 | 0.0058 |
| Zinc | mg/L | 10/31/2003 12:41:43 PM | 6010B | 0.0050 | 0.11 |

(801) 263-8686
Free (888) 263-8686
Fax (801) 263-8687
E: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

* Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

Released by:
Laboratory Supervisor

Report Date: October 31, 2003



INORGANIC ANALYSIS REPORT

**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

Client: Kleinfelder-SLC
Date Sampled: October 29, 2003
Project: Tooele WRSW Landfill / 35467.002

Contact: Bill Turner
Date Received: October 29, 2003

Lab Sample ID:
L57654-01B

Field Sample ID:
B-10

163 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Free (888) 263-8686
Fax (801) 263-8687
awal@awal-Labs.com

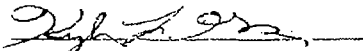
TOTAL METALS

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Results |
|--------------------|-------|-----------------------|-------------|-----------------|--------------------|
| Calcium | mg/L | 10/30/2003 5:05:28 PM | 6010B | 100 | 6,600 ¹ |
| Iron | mg/L | 10/30/2003 5:05:28 PM | 6010B | 1.0 | 870 ² |
| Magnesium | mg/L | 10/30/2003 5:05:28 PM | 6010B | 100 | 2,300 ² |
| Manganese | mg/L | 10/30/2003 5:05:28 PM | 6010B | 0.0050 | 15 ² |
| Potassium | mg/L | 10/30/2003 5:05:28 PM | 6010B | 100 | 640 ² |
| Sodium | mg/L | 10/30/2003 5:05:28 PM | 6010B | 100 | 5,600 ² |

¹ Analyte concentration is too high for accurate spike recovery.

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: 
Laboratory Supervisor

Report Date: October 31, 2003



**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

INORGANIC ANALYSIS REPORT

Client: Kleinfelder-SLC
Date Sampled: October 29, 2003
Project: Tooele WRSW Landfill / 35467.002

Contact: Bill Turner
Date Received: October 29, 2003

Lab Sample ID:
L57654-02B

Field Sample ID:
B-8

163 West 3600 South
Salt Lake City, Utah
84115

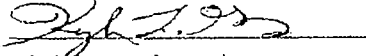
TOTAL METALS

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Results |
|--------------------|-------|-----------------------|-------------|-----------------|--------------------|
| Calcium | mg/L | 10/30/2003 5:22:11 PM | 6010B | 1.0 | 7,000 |
| Iron | mg/L | 10/30/2003 5:22:11 PM | 6010B | 0.010 | 870 |
| Magnesium | mg/L | 10/30/2003 5:22:11 PM | 6010B | 1.0 | 2,600 |
| Manganese | mg/L | 10/30/2003 5:22:11 PM | 6010B | 0.0050 | 20 |
| Potassium | mg/L | 10/30/2003 5:22:11 PM | 6010B | 1.0 | 360 |
| Sodium | mg/L | 10/30/2003 5:22:11 PM | 6010B | 1.0 | 5,000 |

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awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: 
Laboratory Supervisor

Report Date: October 31, 2003



INORGANIC ANALYSIS REPORT

AMERICAN WEST ANALYTICAL LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: November 14, 2003
Project: Tooele Landfill / 35467.003

Contact: Bill Turner
Date Received: November 14, 2003

Lab Sample ID: L57871-01

Field Sample ID: TL-111403-01 (B-3)

163 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
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Fax (801) 263-8687
awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Table with 6 columns: Analytical Results, Units, Date Analyzed, Method Used, Reporting Limit, Analytical Result. Rows include Ammonia (as N), Bicarbonate (As CaCO3), Carbonate (As CaCO3), Chloride, COD, Nitrate (as N), pH, Sulfate, TDS, and Total Organic Carbon.

2 Analyte concentration is too high for accurate spike recovery.

1 Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

Released by: [Signature]
Laboratory Supervisor

Report Date: November 26, 2003



**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

INORGANIC ANALYSIS REPORT

Client: Kleinfelder-SLC
Date Sampled: October 29, 2003
Project: Tooele WRSW Landfill / 35467.002

Contact: Bill Turner
Date Received: October 29, 2003

Lab Sample ID:
L57654-02

Field Sample ID:
B-8

463 West 3600 South
Salt Lake City, Utah
84115

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Result |
|------------------------|----------|-------------------|--------------|-----------------|--------------------|
| Ammonia (as N) | mg/L | 10/31/03 | 350.1 | 0.050 | 0.19 '@ |
| Bicarbonate (As CaCO3) | mg/L | 10/30/03 | 2320 B | 10 | 150 |
| Carbonate (As CaCO3) | mg/L | 10/30/03 | 2320 B | 10 | < 10 |
| Chloride | mg/L | 10/31/03 | SM 4500-CL E | 5.0 | 9,200 |
| COD | mg/L | 10/30/03 | HACH 8000 | 10 | 2,000 ¹ |
| Nitrate (as N) | mg/L | 10/30/03 11:07 am | 353.2 | 0.010 | 3.5 |
| pH | pH units | 10/29/03 6:30 pm | 150.1 | 0 | 7.54 |
| Sulfate | mg/L | 10/30/03 | 375.4 | 5.0 | 3,500 |
| TDS | mg/L | 10/30/03 | 160.1 | 10 | 24,000 |
| Total Organic Carbon | mg/L | 10/30/03 | 415.1 | 1.0 | 86 [*] |

* Sample required additional preservative upon receipt.

¹ Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

@ High RPD due to suspected matrix interference.

Released by:

Laboratory Supervisor

Report Date:

October 31, 2003

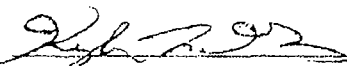
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57654
 Project: Tooele WRSW Landfill / 35467.002

Dept: ME
 SampType: MBLK

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|-----------|-----------|-------|--------|-----------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| MB-14519 | Arsenic | mg/L | 7060A | < 0.0050 | | | | - | | | | 10/30/2003 |
| MB-14519 | Lead | mg/L | 7421 | < 0.0050 | | | | - | | | | 10/30/2003 |
| MB-14519 | Antimony | mg/L | 7041 | < 0.0050 | | | | - | | | | 10/30/2003 |
| MB-14519 | Selenium | mg/L | 7740 | < 0.0050 | | | | - | | | | 10/30/2003 |
| MB-14519 | Thallium | mg/L | 7841 | < 0.0020 | | | | - | | | | 10/30/2003 |
| MB-14524 | Mercury | mg/L | 7470A | < 0.00020 | | | | - | | | | 10/30/2003 |
| MB-14517 | Calcium | mg/L | 6010B | < 1.0 | | | | - | | | | 10/30/2003 |
| MB-14517 | Iron | mg/L | 6010B | < 0.010 | | | | - | | | | 10/30/2003 |
| MB-14517 | Magnesium | mg/L | 6010B | < 1.0 | | | | - | | | | 10/30/2003 |
| MB-14517 | Manganese | mg/L | 6010B | < 0.0050 | | | | - | | | | 10/30/2003 |
| MB-14517 | Potassium | mg/L | 6010B | < 1.0 | | | | - | | | | 10/30/2003 |
| MB-14517 | Sodium | mg/L | 6010B | < 1.0 | | | | - | | | | 10/30/2003 |
| MB-14519 | Barium | mg/L | 6010B | < 0.0020 | | | | - | | | | 10/31/2003 |
| MB-14519 | Beryllium | mg/L | 6010B | < 0.0010 | | | | - | | | | 10/31/2003 |
| MB-14519 | Cadmium | mg/L | 6010B | < 0.0040 | | | | - | | | | 10/31/2003 |
| MB-14519 | Chromium | mg/L | 6010B | < 0.010 | | | | - | | | | 10/31/2003 |
| MB-14519 | Cobalt | mg/L | 6010B | < 0.010 | | | | - | | | | 10/31/2003 |
| MB-14519 | Copper | mg/L | 6010B | < 0.0040 | | | | - | | | | 10/31/2003 |
| MB-14519 | Nickel | mg/L | 6010B | < 0.0050 | | | | - | | | | 10/31/2003 |
| MB-14519 | Vanadium | mg/L | 6010B | < 0.0050 | | | | - | | | | 10/31/2003 |
| MB-14519 | Zinc | mg/L | 6010B | < 0.0050 | | | | - | | | | 10/31/2003 |
| MB-14521 | Silver | mg/L | 6010B | < 0.010 | | | | - | | | | 10/30/2003 |

Released by:


 Laboratory Supervisor

Report Date: October 31, 2003

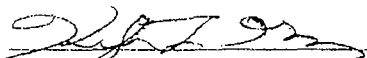
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57654
 Project: Tooele WRSW Landfill / 35467.002

Dept: WC
 Samp/Type: MBLK

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|-----------|-------------------------------------|-------|------------|---------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| MB-R32970 | Bicarbonate (As CaCO ₃) | mg/L | 2320 B | < 10 | | | | - | | | | 10/30/2003 |
| MB-R32970 | Carbonate (As CaCO ₃) | mg/L | 2320 B | < 10 | | | | - | | | | 10/30/2003 |
| MB-R33005 | Chloride | mg/L | SM 4500-Cl | < 5.0 | | | | - | | | | 10/31/2003 |
| MB-14522 | COD | mg/L | HACH 8000 | < 10 | | | | - | | | | 10/30/2003 |
| MB-14520 | Ammonia (as N) | mg/L | 350.1 | < 0.050 | | | | - | | | | 10/31/2003 |
| MB-R33001 | Nitrate (as N) | mg/L | 353.2 | < 0.010 | | | | - | | | | 10/30/2003 |
| MB-R32975 | Sulfate | mg/L | 375.4 | < 5.0 | | | | - | | | | 10/30/2003 |
| MB-R33011 | TDS | mg/L | 160.1 | < 10 | | | | - | | | | 10/30/2003 |
| MB-R32977 | Total Organic Carbon | mg/L | 415.1 | < 1.0 | | | | - | | | | 10/30/2003 |

Released by:


 Laboratory Supervisor

Report Date: October 31, 2003



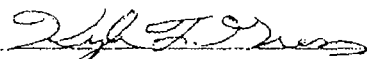
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L57654
Project: Tooele WRSW Landfill / 35467.002

Dept: ME
SampType: LCS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|-----------|-------|--------|----------|---------------|-----------------|------|---------|------|-----------|------------|---------------|
| LCS-14519-AA | Arsenic | mg/L | 7060A | 0.05348 | 0.05555 | 0 | 96.3 | 85-115 | | | | 10/30/2003 |
| LCS-14519-AA | Lead | mg/L | 7421 | 0.05355 | 0.05555 | 0 | 96.4 | 85-115 | | | | 10/30/2003 |
| LCS-14519-AA | Antimony | mg/L | 7041 | 0.05034 | 0.05555 | 0 | 90.6 | 85-115 | | | | 10/30/2003 |
| LCS-14519-AA | Selenium | mg/L | 7740 | 0.05619 | 0.05555 | 0 | 101 | 85-115 | | | | 10/30/2003 |
| LCS-14519-AA | Thallium | mg/L | 7841 | 0.05279 | 0.05555 | 0 | 95 | 85-115 | | | | 10/30/2003 |
| LCS-14524 | Mercury | mg/L | 7470A | 0.002889 | 0.00333 | 0 | 86.8 | \$0-120 | | | | 10/30/2003 |
| LCS-14517-ICP | Calcium | mg/L | 6010B | 1.101 | 1.111 | 0 | 99.1 | 75-125 | | | | 10/30/2003 |
| LCS-14517-ICP | Iron | mg/L | 6010B | 1.05 | 1.111 | 0 | 94.5 | 75-125 | | | | 10/30/2003 |
| LCS-14517-ICP | Magnesium | mg/L | 6010B | 1.083 | 1.111 | 0 | 97.5 | 75-125 | | | | 10/30/2003 |
| LCS-14517-ICP | Manganese | mg/L | 6010B | 1.129 | 1.111 | 0 | 102 | 75-125 | | | | 10/30/2003 |
| LCS-14517-ICP | Potassium | mg/L | 6010B | 10.19 | 11.11 | 0 | 91.7 | 75-125 | | | | 10/30/2003 |
| LCS-14517-ICP | Sodium | mg/L | 6010B | 1.249 | 1.111 | 0 | 112 | 75-125 | | | | 10/30/2003 |
| LCS-14519-ICP | Barium | mg/L | 6010B | 1.159 | 1.111 | 0 | 104 | 75-125 | | | | 10/31/2003 |
| LCS-14519-ICP | Beryllium | mg/L | 6010B | 1.166 | 1.111 | 0 | 105 | 75-125 | | | | 10/31/2003 |
| LCS-14519-ICP | Cadmium | mg/L | 6010B | 1.206 | 1.111 | 0 | 109 | 75-125 | | | | 10/31/2003 |
| LCS-14519-ICP | Chromium | mg/L | 6010B | 1.171 | 1.111 | 0 | 105 | 75-125 | | | | 10/31/2003 |
| LCS-14519-ICP | Cobalt | mg/L | 6010B | 1.18 | 1.111 | 0 | 106 | 75-125 | | | | 10/31/2003 |
| LCS-14519-ICP | Copper | mg/L | 6010B | 1.16 | 1.111 | 0 | 104 | 75-125 | | | | 10/31/2003 |
| LCS-14519-ICP | Nickel | mg/L | 6010B | 1.187 | 1.111 | 0 | 107 | 75-125 | | | | 10/31/2003 |
| LCS-14519-ICP | Vanadium | mg/L | 6010B | 1.15 | 1.111 | 0 | 103 | 75-125 | | | | 10/31/2003 |
| LCS-14519-ICP | Zinc | mg/L | 6010B | 1.184 | 1.111 | 0 | 107 | 75-125 | | | | 10/31/2003 |
| LCS-14521-ICP | Silver | mg/L | 6010B | 1.061 | 1.111 | 0 | 95.5 | 75-125 | | | | 10/30/2003 |

Released by:


Laboratory Supervisor

Report Date: October 31, 2003


QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57654
 Project: Tooele WRSW Landfill / 35467.002

Dept: WC
 SampType: LCS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|------------|----------------------|----------|------------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| LCS-R33005 | Chloride | mg/L | SM 4500-C1 | 24.37 | 25 | 0 | 97.5 | 90-110 | | | | 10/31/2003 |
| LCS-14522 | COD | mg/L | HACH 8000 | 309 | 300 | 0 | 103 | 85-115 | | | | 10/30/2003 |
| LCS-14520 | Ammonia (as N) | mg/L | 350.1 | 0.951 | 1 | 0 | 95.1 | 90-110 | | | | 10/31/2003 |
| LCS-R33001 | Nitrate (as N) | mg/L | 353.2 | 1.07 | 1 | 0 | 107 | 90-110 | | | | 10/30/2003 |
| LCS-R32964 | pH | pH units | 150.1 | 8.99 | 9 | 0 | 99.9 | 98-102 | | | | 10/29/2003 |
| LCS-R32975 | Sulfate | mg/L | 375.4 | 1000 | 1000 | 0 | 100 | 90-110 | | | | 10/30/2003 |
| LCS-R33011 | TDS | mg/L | 160.1 | 200 | 205 | 0 | 97.6 | 80-120 | | | | 10/30/2003 |
| LCS-R32977 | Total Organic Carbon | mg/L | 415.1 | 9.9 | 10 | 0 | 99 | 90-110 | | | | 10/30/2003 |

Released by:


 Laboratory Supervisor

Report Date: October 31, 2003

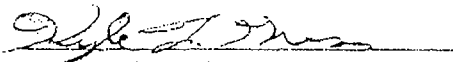
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L57654
Project: Tooele WRSW Landfill / 35467.002

Dept: WC
Samp/Type: LCS1

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|------------|---------|-------|-----------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| LCS1-14522 | COD | mg/l. | HACH 8000 | 104 | 100 | 0 | 104 | 85-115 | | | | 10/30/2003 |

Released by:


Laboratory Supervisor

Report Date: October 31, 2003

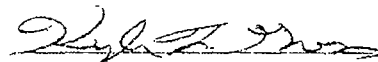
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L57654
Project: Tooele WRSW Landfill / 35467.002

Dept: WC
SampType: LCS2

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|------------|---------|-------|-----------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| LCS2-14522 | COD | mg/L | HACH 8000 | 1025 | 1000 | 0 | 102 | 85-115 | | | | 10/30/2003 |

Released by:


Laboratory Supervisor

Report Date: October 31, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57654
 Project: Tooele WRSW Landfill / 35467.002

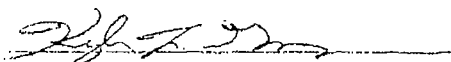
Dept: ME
 SampType: MS

| Sample ID | Analyte | Units | Method | Result | Amount SPD | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|----------------|-----------|-------|--------|----------|---------------|--------------------|-------|--------|------|-----------|------------|------------------|
| L57654-02AMS-A | Arsenic | mg/L | 7060A | 0.04464 | 0.05555 | 0.003303 | 74.4 | 80-120 | | | 1 | 10/30/2003 |
| L57654-02AMS-A | Lead | mg/L | 7421 | 0.04411 | 0.05555 | 0 | 79.4 | 80-120 | | | 1 | 10/30/2003 |
| L57654-02AMS-A | Antimony | mg/L | 7041 | 0.03969 | 0.05555 | 0 | 71.4 | 80-120 | | | 1 | 10/30/2003 |
| L57654-02AMS-A | Selenium | mg/L | 7740 | 0.03846 | 0.05555 | 0.003484 | 63 | 80-120 | | | 1 | 10/30/2003 |
| L57654-02AMS-A | Thallium | mg/L | 7841 | 0.00557 | 0.05555 | 0 | 9.97 | 80-120 | | | 1 | 10/30/2003 |
| L57654-01AMS | Mercury | mg/L | 7470A | 0.002636 | 0.00333 | 6.988E-05 | 77 | 80-120 | | | 1 | 10/30/2003 |
| L57654-01BMS | Calcium | mg/L | 6010B | 6654 | 1.111 | 6620 | 3060 | 75-125 | | | 2 | 10/30/2003 |
| L57654-01BMS | Iron | mg/L | 6010B | 878.4 | 1.111 | 868.5 | 891 | 75-125 | | | 2 | 10/30/2003 |
| L57654-01BMS | Magnesium | mg/L | 6010B | 2244 | 1.111 | 2277 | -2970 | 75-125 | | | 2 | 10/30/2003 |
| L57654-01BMS | Manganese | mg/L | 6010B | 15.33 | 1.111 | 15 | 29.8 | 75-125 | | | 2 | 10/30/2003 |
| L57654-01BMS | Potassium | mg/L | 6010B | 670.4 | 1.111 | 640.7 | 267 | 75-125 | | | 2 | 10/30/2003 |
| L57654-01BMS | Sodium | mg/L | 6010B | 5690 | 1.111 | 5648 | 3780 | 75-125 | | | 2 | 10/30/2003 |
| L57654-01AMS | Barium | mg/L | 6010B | 1.005 | 1.111 | 0.1053 | 80.9 | 75-125 | | | | 10/31/2003 |
| L57654-01AMS | Beryllium | mg/L | 6010B | 0.9402 | 1.111 | 0 | 84.6 | 75-125 | | | | 10/31/2003 |
| L57654-01AMS | Cadmium | mg/L | 6010B | 0.9551 | 1.111 | 0 | 85.8 | 75-125 | | | | 10/31/2003 |
| L57654-01AMS | Chromium | mg/L | 6010B | 1.04 | 1.111 | 0 | 93.6 | 75-125 | | | | 10/31/2003 |
| L57654-01AMS | Cobalt | mg/L | 6010B | 0.948 | 1.111 | 0 | 85.3 | 75-125 | | | | 10/31/2003 |
| L57654-01AMS | Copper | mg/L | 6010B | 1.282 | 1.111 | 0.008154 | 115 | 75-125 | | | | 10/31/2003 |
| L57654-01AMS | Nickel | mg/L | 6010B | 0.9571 | 1.111 | 0 | 86.1 | 75-125 | | | | 10/31/2003 |
| L57654-01AMS | Vanadium | mg/L | 6010B | 1.091 | 1.111 | 0.01 | 97.3 | 75-125 | | | | 10/31/2003 |
| L57654-01AMS | Zinc | mg/L | 6010B | 1.218 | 1.111 | 0.1196 | 98.8 | 75-125 | | | | 10/31/2003 |
| L57654-01AMS | Silver | mg/L | 6010B | 1.086 | 1.111 | 0 | 97.8 | 75-125 | | | | 10/30/2003 |

1 Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

2 Analyte concentration is too high for accurate spike recovery.

Released by:


 Laboratory Supervisor

Report Date: October 31, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57654
 Project: Tooele WRSW Landfill / 35467.002

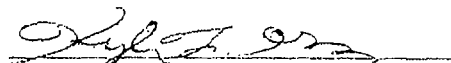
Dept: ME
 Samp Type: MSD

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|-----------|-------|--------|----------|---------------|-----------------|-------|--------|--------|-----------|------------|---------------|
| L57654-02AMSD | Arsenic | mg/L | 7060A | 0.04515 | 0.05555 | 0.003303 | 75.3 | 80-120 | 1.11 | 20 | 1 | 10/30/2003 |
| L57654-02AMSD | Lead | mg/L | 7421 | 0.04426 | 0.05555 | 0 | 79.7 | 80-120 | 0.347 | 20 | 1 | 10/30/2003 |
| L57654-02AMSD | Antimony | mg/L | 7041 | 0.03761 | 0.05555 | 0 | 67.7 | 80-120 | 5.38 | 20 | 1 | 10/30/2003 |
| L57654-02AMSD | Selenium | mg/L | 7740 | 0.03894 | 0.05555 | 0 | 70.1 | 80-120 | | | 1 | 10/30/2003 |
| L57654-02AMSD | Thallium | mg/L | 7841 | 0.005882 | 0.05555 | 0 | 10.6 | 80-120 | 6.05 | 20 | 1 | 10/30/2003 |
| L57654-01AMSD | Mercury | mg/L | 7470A | 0.002606 | 0.00353 | 6.988E-05 | 76.1 | 80-120 | 1.14 | 20 | 1 | 10/30/2003 |
| L57654-01BMSD | Calcium | mg/L | 6010B | 6793 | 1.111 | 6620 | 15600 | 75-125 | 2.07 | 20 | 2 | 10/30/2003 |
| L57654-01BMSD | Iron | mg/L | 6010B | 882.8 | 1.111 | 868.5 | 1290 | 75-125 | 0.5 | 20 | 2 | 10/30/2003 |
| L57654-01BMSD | Magnesium | mg/L | 6010B | 2331 | 1.111 | 2277 | 4860 | 75-125 | 3.8 | 20 | 2 | 10/30/2003 |
| L57654-01BMSD | Manganese | mg/L | 6010B | 15.7 | 1.111 | 15 | 62.9 | 75-125 | 2.37 | 20 | 2 | 10/30/2003 |
| L57654-01BMSD | Potassium | mg/L | 6010B | 660.3 | 1.111 | 640.7 | 176 | 75-125 | 1.52 | 20 | 2 | 10/30/2003 |
| L57654-01BMSD | Sodium | mg/L | 6010B | 5752 | 1.111 | 5648 | 9360 | 75-125 | 1.08 | 20 | 2 | 10/30/2003 |
| L57654-01AMSD | Barium | mg/L | 6010B | 0.9809 | 1.111 | 0.1053 | 78.8 | 75-125 | 2.38 | 20 | | 10/31/2003 |
| L57654-01AMSD | Beryllium | mg/L | 6010B | 0.9119 | 1.111 | 0 | 82.1 | 75-125 | 3.06 | 20 | | 10/31/2003 |
| L57654-01AMSD | Cadmium | mg/L | 6010B | 0.949 | 1.111 | 0 | 85.4 | 75-125 | 0.435 | 20 | | 10/31/2003 |
| L57654-01AMSD | Chromium | mg/L | 6010B | 1.03 | 1.111 | 0 | 92.7 | 75-125 | 0.966 | 20 | | 10/31/2003 |
| L57654-01AMSD | Cobalt | mg/L | 6010B | 0.9472 | 1.111 | 0 | 85.2 | 75-125 | 0.0911 | 20 | | 10/31/2003 |
| L57654-01AMSD | Copper | mg/L | 6010B | 1.272 | 1.111 | 0.008154 | 114 | 75-125 | 0.802 | 20 | | 10/31/2003 |
| L57654-01AMSD | Nickel | mg/L | 6010B | 0.9573 | 1.111 | 0 | 86.2 | 75-125 | 0.0167 | 20 | | 10/31/2003 |
| L57654-01AMSD | Vanadium | mg/L | 6010B | 1.087 | 1.111 | 0.01 | 96.9 | 75-125 | 0.425 | 20 | | 10/31/2003 |
| L57654-01AMSD | Zinc | mg/L | 6010B | 1.21 | 1.111 | 0.1196 | 98.1 | 75-125 | 0.652 | 20 | | 10/31/2003 |
| L57654-01AMSD | Silver | mg/L | 6010B | 1.085 | 1.111 | 0 | 97.6 | 75-125 | 0.139 | 20 | | 10/30/2003 |

1 Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

2 Analyte concentration is too high for accurate spike recovery.

Released by:


 Laboratory Supervisor

Report Date: October 31, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57654
 Project: Tooele WRSW Landfill / 35467.002

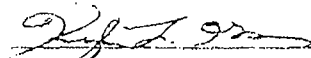
Dept: WC
 SampType: MS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|--------------|----------------------|-------|------------|--------|---------------|-----------------|-------|--------|------|-----------|------------|---------------|
| L57654-01BMS | Chloride | mg/L | SM 4500-Cl | 11430 | 1000 | 10570 | 85.8 | 90-110 | | | 2 | 10/31/2003 |
| L57654-02EMS | COD | mg/L | HACH 8000 | 16500 | 50 | 2040 | 28900 | 85-115 | | | 1 | 10/30/2003 |
| L57654-02DMS | Ammonia (as N) | mg/L | 350.1 | 0.829 | 1 | 0.186 | 64.3 | 90-110 | | | 1 | 10/31/2003 |
| L57654-01BMS | Nitrate (as N) | mg/L | 353.2 | 1.2 | 1 | 0.14 | 106 | 90-110 | | | | 10/30/2003 |
| L57636-01BMS | Nitrate (as N) | mg/L | 353.2 | 3.38 | 1 | 2.35 | 103 | 90-110 | | | | 10/30/2003 |
| L57654-01BMS | Sulfate | mg/L | 375.4 | 4360 | 2500 | 1734 | 105 | 80-120 | | | | 10/30/2003 |
| L57654-01BMS | Total Organic Carbon | mg/L | 415.1 | 41.2 | 10 | 63 | -218 | 80-120 | | | 1 | 10/30/2003 |

1 Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

2 Analyte concentration is too high for accurate spike recovery.

Released by:


 Laboratory Supervisor

Report Date: October 31, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
 Work Order: L57654
 Project: Tooele WRSW Landfill / 35467.002

Dept: WC
 SampType: MSD

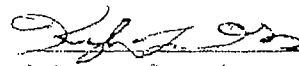
| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|----------------------|-------|------------|--------|---------------|-----------------|-------|--------|-------|-----------|------------|---------------|
| L57654-01BMSD | Chloride | mg/L | SM 4500-Cl | 11460 | 1000 | 10370 | 88.9 | 90-110 | 0.271 | 10 | * | 10/31/2003 |
| L57654-02FMSD | COD | mg/L | HACH 8000 | 16410 | 50 | 2040 | 28700 | 85-115 | 0.547 | 10 | * | 10/30/2003 |
| L57654-02DMSD | Ammonia (as N) | mg/L | 350.1 | 0.946 | 1 | 0.186 | 76 | 90-110 | 13.2 | 10 | @ | 10/31/2003 |
| L57654-01BMSD | Nitrate (as N) | mg/L | 353.2 | 1.23 | 1 | 0.14 | 109 | 90-110 | 2.47 | 10 | | 10/30/2003 |
| L57656-01AMSD | Nitrate (as N) | mg/L | 353.2 | 3.35 | 1 | 2.35 | 100 | 90-110 | 0.892 | 10 | | 10/30/2003 |
| L57654-01BMSD | Sulfate | mg/L | 375.4 | 4235 | 2500 | 1734 | 100 | 80-120 | 2.91 | 10 | | 10/30/2003 |
| L57654-01DMSD | Total Organic Carbon | mg/L | 415.1 | 44.3 | 10 | 63 | -187 | 80-120 | 7.25 | 20 | * | 10/30/2003 |

* Analyte concentration is too high for accurate spike recovery.

* Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

@ High RPD due to suspected matrix interference.

Released by:


 Laboratory Supervisor

Report Date: October 31, 2003



INORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: March 25, 2004
Project: Tooele Landfill / 35467.003

Contact: Bill Turner
Date Received: March 25, 2004

Lab Sample ID:
L59523-02

Field Sample ID:
TL032504-02 (B-3)

463 West 3600 South
Salt Lake City, Utah
84115

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Result |
|--------------------|-------|---------------|-------------|-----------------|-------------------|
| TDS | mg/L | 03/26/04 | 160.1 | 10 | 3,500 |

(801) 263-8686
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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by:

Laboratory Supervisor

Report Date:

March 29, 2004

Page 2 of 4



INORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: October 29, 2003
Project: Tooele WRSW Landfill / 35467.002

Contact: Bill Turner
Date Received: October 29, 2003

Lab Sample ID:
L57654-01

Field Sample ID:
B-10

163 West 3600 South
Salt Lake City, Utah
84115

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Fax (801) 263-8687
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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Result |
|------------------------|----------|-------------------|--------------|-----------------|---------------------|
| Ammonia (as N) | mg/L | 10/31/03 | 350.1 | 0.050 | 1.2 |
| Bicarbonate (As CaCO3) | mg/L | 10/30/03 | 2320 B | 10 | 220 |
| Carbonate (As CaCO3) | mg/L | 10/30/03 | 2320 B | 10 | < 10 |
| Chloride | mg/L | 10/31/03 | SM 4500-CL E | 5.0 | 11,000 ² |
| COD | mg/L | 10/30/03 | HACH 8000 | 10 | 1,400 |
| Nitrate (as N) | mg/L | 10/30/03 11:07 am | 353.2 | 0.010 | 0.14 |
| pH | pH units | 10/29/03 6:30 pm | 150.1 | 0 | 7.69 |
| Sulfate | mg/L | 10/30/03 | 375.4 | 5.0 | 1,700 |
| TDS | mg/L | 10/30/03 | 160.1 | 10 | 23,000 |
| Total Organic Carbon | mg/L | 10/30/03 | 415.1 | 1.0 | 63 ¹ |

¹ Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

² Analyze concentration is too high for accurate spike recovery.

Released by:

Laboratory Supervisor

Report Date:

October 31, 2003



INORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: April 16, 2004
Project: WRSW Landfill / 35467.003

Contact: Bill Turner
Date Received: April 16, 2004

Lab Sample ID:
L59884-01

Field Sample ID:
WRSW041604-01 (new B-5)

463 West 3600 South
Salt Lake City, Utah
84115

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Result |
|--------------------|-------|---------------|-------------|-----------------|-------------------|
| TDS | mg/L | 04/16/04 | 160.1 | 10 | 5,600 |

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Kyle F. Gross
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Peggy McNicol
QA Officer

Released by:

Laboratory Supervisor

Report Date:

April 19, 2004



INORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: March 25, 2004
Project: Tooele Landfill / 35467.003

Contact: Bill Turner
Date Received: March 25, 2004

Lab Sample ID:
L59523-03

Field Sample ID:
TL032504-03 (B-8)

63 West 3600 South
Salt Lake City, Utah
84115

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Result |
|--------------------|-------|---------------|-------------|-----------------|-------------------|
| TDS | mg/L | 03/26/04 | 160.1 | 10 | 24,000 |

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: [Signature]
Laboratory Supervisor

Report Date: March 29, 2004



INORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: March 25, 2004
Project: Tooele Landfill / 35467.003

Contact: Bill Turner
Date Received: March 25, 2004

Lab Sample ID:
L59523-04

Field Sample ID:
TL032504-04 (B-4)

163 West 3600 South
Salt Lake City, Utah
84115

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Result |
|--------------------|-------|---------------|-------------|-----------------|-------------------|
| TDS | mg/L | 03/26/04 | 160.1 | 10 | 22,000 |

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: [Signature]
Laboratory Supervisor

Report Date: March 29, 2004

Analysis applicable to the CWA, SDWA and RCRA are performed in accordance to NELAC protocols. Pertinent sampling information is located on the attached Chain-of-Custody. This report is provided for the exclusive use of the addressee. Privileges of subsequent use of the name of this company or any member of its staff, or reproduction of this report in connection with the advertisement, promotion or sale of any product or process, or in connection with the re-publication of this report for any purpose other than for the addressee will be granted only if the addressee is notified in writing. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.



INORGANIC ANALYSIS REPORT

AMERICAN WEST ANALYTICAL LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: June 10, 2003
Project: BlackKnoll LF / 31168

Contact: Renee Zollinger
Date Received: June 10, 2003

Lab Sample ID:
L55846-01

Field Sample ID:
BKB2060903 B-2 (i)

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
Email: awal@awal-Labs.com


| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Result |
|--------------------|----------|------------------|-------------|-----------------|-------------------|
| Chloride | mg/L | 06/10/03 | M 4500-CL | 5.0 | 14,000 + |
| Conductivity | µmhos/cm | 06/10/03 | 120.1 | 2.0 | 39,000 |
| pH | pH units | 06/10/03 9:45 am | 150.1 | 0 | 7.86 |
| Sulfate | mg/L | 06/10/03 | 375.4 | 5.0 | 5,000 |
| TDS | mg/L | 06/11/03 | 160.1 | 10 | 31,000 * |

+ Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

* Sample residue over method limit.

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: 
Laboratory Supervisor

Report Date: June 11, 2003



INORGANIC ANALYSIS REPORT

**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

Client: Kleinfelder-SLC
Date Sampled: September 25, 2003
Project: Tooele #1 Landfill / 35467.001

Contact: Bill Turner
Date Received: September 25, 2003

Lab Sample ID:
L57192-02E

Field Sample ID:
TL092503-02 (B-3)

463 West 3600 South
Salt Lake City, Utah
84115

TOTAL METALS

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Results |
|--------------------|-------|----------------------|-------------|-----------------|--------------------|
| Calcium | mg/L | 10/3/2003 1:45:17 PM | 6010B | 1.0 | 190 ² |
| Iron | mg/L | 10/3/2003 1:46:17 PM | 6010B | 0.010 | 12 ² |
| Magnesium | mg/L | 10/3/2003 1:46:17 PM | 6010B | 1.0 | 190 ² |
| Manganese | mg/L | 10/3/2003 1:46:17 PM | 6010B | 0.0050 | 0.42 |
| Potassium | mg/L | 10/3/2003 1:46:17 PM | 6010B | 1.0 | 130 ² |
| Sodium | mg/L | 10/3/2003 1:46:17 PM | 6010B | 100 | 1,900 ² |

² Analyte concentration is too high for accurate spike recovery.

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Kyle F. Gross
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Peggy McNicol
QA Officer

Released by:

Laboratory Supervisor

Report Date:

October 6, 2003



INORGANIC ANALYSIS REPORT

**AMERICAN
WEST
ANALYTICAL
LABORATORIES**

Client: Kleinfelder-SLC
Date Sampled: September 25, 2003
Project: Tooele #1 Landfill / 35467.001

Contact: Bill Turner
Date Received: September 25, 2003

Lab Sample ID:
L57192-02F

Field Sample ID:
TL092503-02 (B-3)

463 West 3600 South
Salt Lake City, Utah
84115

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

DISSOLVED METALS

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Results |
|--------------------|-------|-----------------------|-------------|-----------------|--------------------|
| Antimony | mg/L | 10/1/2003 4:20:02 PM | 7041 | 0.0050 | < 0.0050 |
| Arsenic | mg/L | 9/29/2003 6:04:13 PM | 7060A | 0.0050 | 0.028 |
| Barium | mg/L | 10/2/2003 8:56:11 PM | 6010B | 0.0020 | 0.064 |
| Beryllium | mg/L | 10/2/2003 8:56:11 PM | 6010B | 0.0010 | < 0.0010 |
| Cadmium | mg/L | 10/2/2003 8:56:11 PM | 6010B | 0.0040 | < 0.0040 |
| Chromium | mg/L | 10/2/2003 8:56:11 PM | 6010B | 0.010 | < 0.010 |
| Cobalt | mg/L | 10/2/2003 8:56:11 PM | 6010B | 0.010 | < 0.010 |
| Copper | mg/L | 10/2/2003 8:56:11 PM | 6010B | 0.0040 | 0.011 |
| Lead | mg/L | 9/29/2003 8:53:36 PM | 7421 | 0.0050 | < 0.0050 |
| Mercury | mg/L | 10/2/2003 8:07:10 AM | 7470A | 0.00020 | < 0.00020 |
| Nickel | mg/L | 10/2/2003 8:56:11 PM | 6010B | 0.0050 | < 0.0050 |
| Selenium | mg/L | 10/1/2003 12:29:54 PM | 7740 | 0.0050 | < 0.0050 |
| Silver | mg/L | 10/2/2003 3:23:29 PM | 6010B | 0.010 | < 0.010 |
| Thallium | mg/L | 10/1/2003 7:14:21 PM | 7841 | 0.0020 | < 0.0020 |
| Vanadium | mg/L | 10/2/2003 8:56:11 PM | 6010B | 0.0050 | < 0.0050 |
| Zinc | mg/L | 10/2/2003 8:56:11 PM | 6010B | 0.0050 | 0.027 |

* Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

Released by:

Laboratory Supervisor

Report Date:

October 6, 2003

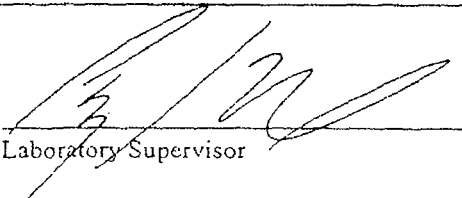
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L59884
Project: WRSW Landfill / 35467.003

Dept: WC
SampType: MBLK

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|-----------|---------|-------|--------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| MB-R36584 | TDS | mg/L | 160.1 | < 10 | | | | - | | | | 4/16/2004 |

Released by:


Laboratory Supervisor

Report Date: April 19, 2004

A

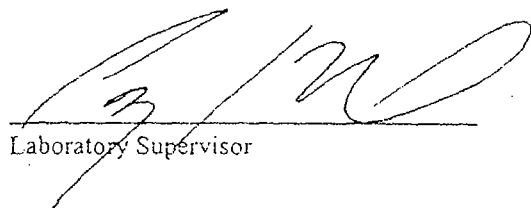
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L59884
Project: WRSW Landfill / 35467.003

Dept: WC
SampType: LCS

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|------------|---------|-------|--------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| LCS-R36584 | TDS | mg/L | 160.1 | 204 | 205 | 0 | 99.5 | 80-120 | | | | 4/16/2004 |

Released by:



Laboratory Supervisor

Report Date: April 19, 2004

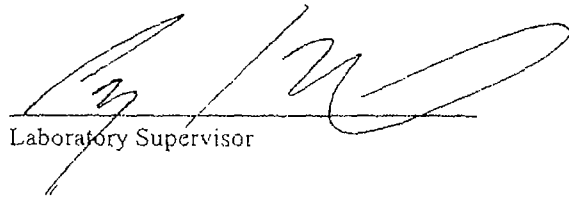
QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L59884
Project: WRSW Landfill / 35467.003

Dept: WC
SampType: DUP

| Sample ID | Analyte | Units | Method | Result | Amount Spiked | Original Amount | %REC | Limits | %RPD | RPD Limit | Qualifiers | Analysis Date |
|---------------|---------|-------|--------|--------|---------------|-----------------|------|--------|------|-----------|------------|---------------|
| L59884-01ADUP | TDS | mg/L | 160.1 | 6780 | 0 | 5600 | 0 | - | 19.1 | 20 | | 4/16/2004 |
| L59766-38ADUP | TDS | mg/L | 160.1 | 1080 | 0 | 1060 | 0 | - | 1.87 | 20 | | 4/16/2004 |

Released by:



Laboratory Supervisor

Report Date: April 19, 2004



INORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Kleinfelder-SLC
Date Sampled: March 25, 2004
Project: Tooele Landfill / 35467.003

Contact: Bill Turner
Date Received: March 25, 2004

Lab Sample ID:
L59523-01

Field Sample ID:
TL032504-01 (B-10)

163 West 3600 South
Salt Lake City, Utah
84115

| Analytical Results | Units | Date Analyzed | Method Used | Reporting Limit | Analytical Result |
|--------------------|-------|---------------|-------------|-----------------|-------------------|
| TDS | mg/L | 03/26/04 | 160.1 | 10 | 21,000 |

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by:

Laboratory Supervisor

Report Date:

March 29, 2004

APPENDIX D

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-1

Liquefaction Analysis

| Field Parameters | |
|----------------------------------|------|
| Water Depth (ft) | 14 |
| Borehole Diameter (in) | 8 |
| ModCal Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RC5 |
| Fill Height (ft) | 0 |

| Earthquake Parameters | |
|---|------|
| Magnitude, M_w | 6.80 |
| Peak Horizontal Acceleration, a_{max} | 0.22 |
| Magnitude Scaling Factor, MSF | 1.28 |

2% PE in 50 yrs.

| | |
|--------------------------|----------|
| Reference Pressure (tsf) | 1.058108 |
|--------------------------|----------|

Total Estimated Liquefaction-Induced Settlement = **0.0** inches
 (Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 16 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

| Sample Depth, z (ft) | Blow Count, N | Sampler Type 1=cal, 2=spl | Rod Length (ft) | Percent Fines (%) | Total Stress, S_t (tsf) | Effective Stress, S_e (tsf) | Overburden Stress Correction, C_H | Rod Length Correction, C_R | Sampler Type Correction, C_S | Borehole Diameter Correction, C_B | Energy Ratio Correction, C_E | Total Correction (%) | $(N)_{80}$ | $(N_1)_{80}$ | $(N_1)_{80-CS}$ | $CRR_{7.5}$ | Magnitude Corrected $CRR_{7.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FOS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) | | |
|----------------------|---------------|------------------------------|-----------------|-------------------|---------------------------|-------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|------------|--------------|-----------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|------|------|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|--|--|
| 6 | 3 | 2 | 10 | 85 | 0.345 | 0.345 | 1.44 | 0.80 | 1.00 | 1.15 | 1.07 | 1.41 | 3 | 4 | 10 | 0.11 | 0.15 | 0.99 | | | N | Above WT | 6.0 | | | | | | | | | | |
| 8.5 | 17 | 2 | 10 | 42 | 0.489 | 0.489 | 1.32 | 0.80 | 1.00 | 1.15 | 1.07 | 1.30 | 17 | 22 | 32 | | | | | | | N | Above WT | 8.5 | | | | | | | | | |
| 16 | 37 | 2 | 20 | 42 | 0.920 | 0.858 | 1.09 | 0.95 | 1.00 | 1.15 | 1.07 | 1.28 | 43 | 47 | 62 | | | | | | | N | | 16.0 | | | | | | | | | |
| 21 | 40 | 2 | 25 | 42 | 1.208 | 0.989 | 1.03 | 0.95 | 1.00 | 1.15 | 1.07 | 1.20 | 47 | 48 | 63 | | | | | | | N | | 21.0 | | | | | | | | | |
| 26 | 7 | 2 | 30 | 42 | 1.495 | 1.121 | 0.97 | 0.95 | 1.00 | 1.15 | 1.07 | 1.13 | 8 | 8 | 15 | 0.16 | 0.20 | 0.94 | | | | N | | 26.0 | 1.12 | 0.18 | | | | | | | |
| 31 | 12 | 2 | 35 | 50 | 1.783 | 1.252 | 0.92 | 1.00 | 1.00 | 1.15 | 1.07 | 1.13 | 15 | 14 | 21 | 0.23 | 0.30 | 0.92 | | | | N | | 31.0 | | | | | | | | | |
| 36 | 4 | 2 | 40 | 50 | 2.070 | 1.384 | 0.88 | 1.00 | 1.00 | 1.15 | 1.07 | 1.08 | 5 | 4 | 10 | 0.11 | 0.15 | 0.88 | | | | N | | 36.0 | | | | | | | | | |
| 46 | 20 | 2 | 50 | 50 | 2.645 | 1.647 | 0.80 | 1.00 | 1.00 | 1.15 | 1.07 | 0.98 | 25 | 20 | 28 | 0.39 | 0.50 | 0.79 | | | | N | | 46.0 | | | | | | | | | |
| 51 | 50+ | 2 | 55 | 15 | 2.933 | 1.778 | 0.76 | 1.00 | 1.00 | 1.15 | 1.07 | 0.94 | 50+ | 50+ | 50+ | | | | | | | N | | 51.0 | | | | | | | | | |

The analysis to determine the liquefaction resistance of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," published by Youd et al. in the October 2001 publication of the Journal of Geotechnical and Geoenvironmental Engineering.

| | Initials | Date |
|---------------|----------|----------|
| Completed By: | CMH | 11/29/04 |
| Reviewed By: | | |

Notes: 1. _____
 2. _____
 3. _____

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-2

Liquefaction Analysis

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 16 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

| Field Parameters | |
|----------------------------------|------|
| Water Depth (ft) | 14 |
| Borehole Diameter (in) | 8 |
| ModCal Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RCS |
| Fill Height (ft) | 0 |

| Earthquake Parameters | |
|---|------|
| Magnitude, M_w | 6.80 |
| Peak Horizontal Acceleration, a_{max} | 0.22 |
| Magnitude Scaling Factor, MSF | 1.28 |

| | |
|--------------------------|----------|
| Reference Pressure (tsf) | 1.058108 |
|--------------------------|----------|

Total Estimated Liquefaction-Induced Settlement = **0.0** inches
 (Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Sample Depth, z (ft) | Blow Count, N | Sampler Type | Rod Length (ft) | Percent Fines (%) | Total Stress, S_t (tsf) | Effective Stress, S_v (tsf) | Overburden Stress Correction, C_u | Rod Length Correction, C_R | Sampler Type Correction, C_S | Borehole Diameter Correction, C_B | Energy Ratio Correction, C_E | Total Correction (%) | $(N)_{60}$ | $(N_1)_{60}$ | $(N_1)_{60-cs}$ | $CRR_{7.5}$ | Magnitude Corrected $CRR_{7.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FOS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) |
|----------------------|---------------|--------------|-----------------|-------------------|---------------------------|-------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|------------|--------------|-----------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|------|-----|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|
| 3.5 | 7 | 2 | 5 | 55 | 0.201 | 0.201 | 1.58 | 0.75 | 1.00 | 1.15 | 1.07 | 1.46 | 6 | 10 | 17 | 0.18 | 0.24 | 0.99 | | | N | Above WT | 3.5 | | | | | | | | |
| 8.5 | 9 | 2 | 10 | 15 | 0.489 | 0.489 | 1.32 | 0.80 | 1.00 | 1.15 | 1.07 | 1.30 | 9 | 12 | 15 | 0.16 | 0.20 | 0.98 | | | N | Above WT | 8.5 | | | | | | | | |
| 16 | 19 | 2 | 20 | 15 | 0.920 | 0.858 | 1.09 | 0.95 | 1.00 | 1.15 | 1.07 | 1.28 | 22 | 24 | 28 | 0.37 | 0.47 | 0.97 | | | N | | 16.0 | 3.17 | 0.15 | | | | | | |
| 26 | 3 | 2 | 30 | 47 | 1.495 | 1.121 | 0.97 | 0.95 | 1.00 | 1.15 | 1.07 | 1.13 | 3 | 3 | 9 | 0.11 | 0.14 | 0.94 | | | N | | 26.0 | | | | | | | | |
| 36 | 5 | 2 | 40 | 85 | 2.070 | 1.384 | 0.88 | 1.00 | 1.00 | 1.15 | 1.07 | 1.08 | 6 | 5 | 11 | 0.13 | 0.16 | 0.88 | | | N | | 36.0 | | | | | | | | |
| 41 | 4 | 2 | 45 | 85 | 2.358 | 1.515 | 0.84 | 1.00 | 1.00 | 1.15 | 1.07 | 1.03 | 5 | 4 | 10 | 0.11 | 0.14 | 0.84 | | | N | | 41.0 | | | | | | | | |
| 46 | 7 | 2 | 50 | 85 | 2.645 | 1.647 | 0.80 | 1.00 | 1.00 | 1.15 | 1.07 | 0.98 | 9 | 7 | 13 | 0.14 | 0.18 | 0.79 | | | N | | 46.0 | | | | | | | | |
| 49.5 | 56 | 2 | 55 | 15 | 2.846 | 1.739 | 0.77 | 1.00 | 1.00 | 1.15 | 1.07 | 0.95 | 69 | 53 | 58 | | | | | | N | | 49.5 | | | | | | | | |

The analysis to determine the liquefaction resistance of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," published by Youd et al. in the October 2001 publication of the *Journal of Geotechnical and Geoenvironmental Engineering*.

| | Initials | Date |
|---------------|----------|----------|
| Completed By: | CMH | 11/29/04 |
| Reviewed By: | | |

Notes: 1. _____
 2. _____
 3. _____

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-3

Liquefaction Analysis

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 16 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

| Field Parameters | |
|----------------------------------|------|
| Water Depth (ft) | 14 |
| Borehole Diameter (in) | 8 |
| ModCat Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RC5 |
| Fill Height (ft) | 0 |

| Earthquake Parameters | |
|--|------|
| Magnitude, M_w | 6.80 |
| Peak Horizontal Acceleration, $a_{m,cr}$ | 0.22 |
| Magnitude Scaling Factor, MSF | 1.28 |

2% PE in 50 yrs.

| | |
|--------------------------|----------|
| Reference Pressure (tsf) | 1.058108 |
|--------------------------|----------|

Total Estimated Liquefaction-Induced Settlement = **2.3 inches**
 (Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Sample Depth, z (ft) | Blow Count, N | Sampler Type | Rod Length (ft) | Percent Fines (%) | Total Stress, S_v (tsf) | Effective Stress, S_v' (tsf) | Overburden Stress Correction, C_u | Rod Length Correction, C_R | Sampler Type Correction, C_s | Borehole Diameter Correction, C_a | Energy Ratio Correction, C_E | Total Correction (%) | $(N_1)_{60}$ | $(N_1)_{60}$ | $(N_1)_{60-z}$ | $CRR_{7.5}$ | Magnitude Corrected $CRR_{7.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FOS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) | |
|----------------------|---------------|--------------|-----------------|-------------------|---------------------------|--------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|--------------|--------------|----------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|------|-------|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|--|
| 3.5 | 13 | 2 | 5 | 51 | 0.201 | 0.201 | 1.58 | 0.75 | 1.00 | 1.15 | 1.07 | 1.46 | 12 | 19 | 28 | 0.36 | 0.46 | 0.99 | | | | N | Above WT | 3.5 | | | | | | | | |
| 6 | 12 | 2 | 10 | 51 | 0.345 | 0.345 | 1.44 | 0.80 | 1.00 | 1.15 | 1.07 | 1.41 | 12 | 17 | 25 | 0.30 | 0.38 | 0.99 | | | | N | Above WT | 6.0 | | | | | | | | |
| 21 | 25 | 2 | 25 | 15 | 1.208 | 0.989 | 1.03 | 0.95 | 1.00 | 1.15 | 1.07 | 1.20 | 29 | 30 | 34 | | | | | | | | | 21.0 | | | | | | | | |
| 26 | 11 | 2 | 30 | 15 | 1.495 | 1.121 | 0.97 | 0.95 | 1.00 | 1.15 | 1.07 | 1.13 | 13 | 12 | 16 | 0.17 | 0.21 | 0.94 | | | | | 26.0 | 1.19 | 0.18 | | | | | | | |
| 31 | 8 | 2 | 35 | 15 | 1.783 | 1.252 | 0.92 | 1.00 | 1.00 | 1.15 | 1.07 | 1.13 | 10 | 9 | 12 | 0.13 | 0.17 | 0.92 | | | | | 31.0 | 0.90 | 0.19 | 2.56% | | | | 7.5 | 2.30 | |
| 41 | 7 | 2 | 45 | 85 | 2.358 | 1.515 | 0.84 | 1.00 | 1.00 | 1.15 | 1.07 | 1.03 | 9 | 7 | 14 | 0.15 | 0.19 | 0.84 | | | | N | 41.0 | | | | | | | | | |
| 46 | 32 | 2 | 50 | 15 | 2.645 | 1.647 | 0.80 | 1.00 | 1.00 | 1.15 | 1.07 | 0.98 | 39 | 31 | 35 | | | | | | | | 46.0 | | | | | | | | | |
| 49.5 | 50+ | 2 | 55 | 70 | 2.946 | 1.739 | 0.77 | 1.00 | 1.00 | 1.15 | 1.07 | 0.95 | 50+ | 50+ | 50+ | | | | | | | N | 49.5 | | | | | | | | | |

The analysis to determine the liquefaction resistance of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," published by Youd et al. in the October 2001 publication of the *Journal of Geotechnical and Geoenvironmental Engineering*.

| | Initials | Date |
|---------------|----------|----------|
| Completed By: | CMH | 11/29/04 |
| Reviewed By: | | |

Notes: 1. _____
 2. _____
 3. _____

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-4

Liquefaction Analysis

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 16 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

| Field Parameters | |
|----------------------------------|------|
| Water Depth (ft) | 14 |
| Borehole Diameter (in) | 8 |
| ModCal Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RC5 |
| Fill Height (ft) | 0 |

| Earthquake Parameters | |
|---|------|
| Magnitude, M_w | 6.80 |
| Peak Horizontal Acceleration, a_{max} | 0.22 |
| Magnitude Scaling Factor, MSF | 1.28 |

2% PE in 50 yrs.

| | |
|--------------------------|----------|
| Reference Pressure (tsf) | 1.058108 |
|--------------------------|----------|

Total Estimated Liquefaction-Induced Settlement = 0.0 inches
 (Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Sample Depth, z (ft) | Blow Count, N | Sampler Type | Rod Length (ft) | Percent Fines (%) | Total Stress, S_t (tsf) | Effective Stress, S_v (tsf) | Overburden Stress Correction, C_N | Rod Length Correction, C_R | Sampler Type Correction, C_S | Borehole Diameter Correction, C_B | Energy Ratio Correction, C_E | Total Correction (%) | $(N)_{60}$ | $(N)_{60}$ | $(N)_{60-cs}$ | $CRR_{7.5}$ | Magnitude Corrected $CRR_{7.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FOS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) |
|----------------------|---------------|--------------|-----------------|-------------------|---------------------------|-------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|------------|------------|---------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|------|-----|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|
| 6 | 6 | 2 | 10 | 65 | 0.345 | 0.345 | 1.44 | 0.80 | 1.00 | 1.15 | 1.07 | 1.41 | 6 | 8 | 15 | 0.16 | 0.21 | 0.99 | | | N | Above WT | 6.0 | | | | | | | | |
| 8.5 | 8 | 2 | 10 | 65 | 0.439 | 0.489 | 1.32 | 0.80 | 1.00 | 1.15 | 1.07 | 1.30 | 8 | 10 | 17 | 0.19 | 0.24 | 0.98 | | | N | Above WT | 8.5 | | | | | | | | |
| 21 | 50+ | 2 | 25 | 20 | 1.208 | 0.989 | 1.03 | 0.95 | 1.00 | 1.15 | 1.07 | 1.20 | 50+ | 50+ | 50+ | | | | | | | | 21.0 | | | | | | | | |
| 26 | 44 | 2 | 30 | 20 | 1.495 | 1.121 | 0.97 | 0.95 | 1.00 | 1.15 | 1.07 | 1.13 | 51 | 50 | 58 | | | | | | | | 25.0 | | | | | | | | |
| 31 | 38 | 2 | 35 | 20 | 1.783 | 1.252 | 0.92 | 1.00 | 1.00 | 1.15 | 1.07 | 1.13 | 47 | 43 | 50 | | | | | | | | 31.0 | | | | | | | | |
| 36 | 16 | 2 | 40 | 85 | 2.070 | 1.334 | 0.86 | 1.00 | 1.00 | 1.15 | 1.07 | 1.08 | 20 | 17 | 26 | 0.31 | 0.39 | 0.98 | | | N | | 36.0 | | | | | | | | |
| 46 | 8 | 2 | 50 | 67 | 2.645 | 1.847 | 0.80 | 1.00 | 1.00 | 1.15 | 1.07 | 0.98 | 10 | 8 | 14 | 0.15 | 0.20 | 0.79 | | | | | 46.0 | 1.09 | 0.18 | | | | | | |
| 49.5 | 13 | 2 | 55 | 67 | 2.846 | 1.739 | 0.77 | 1.00 | 1.00 | 1.15 | 1.07 | 0.95 | 16 | 12 | 20 | 0.21 | 0.27 | 0.76 | | | | | 49.5 | 1.54 | 0.18 | | | | | | |

The analysis to determine the liquefaction resistance of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," published by Youd et al. in the October 2001 publication of the *Journal of Geotechnical and Geoenvironmental Engineering*.

| | Initials | Date |
|---------------|----------|----------|
| Completed By: | CMH | 11/29/04 |
| Reviewed By: | | |

Notes: 1. _____
 2. _____
 3. _____

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-5

Liquefaction Analysis

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 16 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

| Field Parameters | |
|----------------------------------|------|
| Water Depth (ft) | 14 |
| Borehole Diameter (in) | 8 |
| ModCal Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RC5 |
| Fill Height (ft) | 0 |

| Earthquake Parameters | |
|---|-----------------------|
| Magnitude, M_w | 6.90 |
| Peak Horizontal Acceleration, a_{max} | 0.22 2% PE in 50 yrs. |
| Magnitude Scaling Factor, MSF | 1.28 |

| | |
|--------------------------|----------|
| Reference Pressure (tsf) | 1.058108 |
|--------------------------|----------|

Total Estimated Liquefaction-Induced Settlement = 0.0 inches

(Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Sample Depth, z (ft) | Blow Count, N | Sampler Type | Rod Length (ft) | Percent Fines (%) | Total Stress, S_v (tsf) | Effective Stress, S_v' (tsf) | Overburden Stress Correction, C_N | Rod Length Correction, C_R | Sampler Type Correction, C_S | Borehole Diameter Correction, C_B | Energy Ratio Correction, C_E | Total Correction (%) | $(N)_{60}$ | $(N_1)_{60}$ | $(N_1)_{60-cs}$ | $CRR_{7.5}$ | Magnitude Corrected $CRR_{7.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FOS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) | |
|----------------------|---------------|--------------|-----------------|-------------------|---------------------------|--------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|------------|--------------|-----------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|------|-----|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|--|
| 3.5 | 5 | 2 | 5 | 67 | 0.201 | 0.201 | 1.53 | 0.75 | 1.00 | 1.15 | 1.07 | 1.46 | 5 | 7 | 14 | 0.15 | 0.19 | 0.89 | | | | | Above WT | 3.5 | | | | | | | | |
| 6 | 4 | 2 | 10 | 68 | 0.345 | 0.345 | 1.44 | 0.80 | 1.00 | 1.15 | 1.07 | 1.41 | 4 | 6 | 12 | 0.13 | 0.17 | 0.99 | | | N | | Above WT | 6.0 | | | | | | | | |
| 16 | 7 | 2 | 20 | 15 | 0.920 | 0.853 | 1.09 | 0.95 | 1.00 | 1.15 | 1.07 | 1.23 | 8 | 9 | 12 | 0.13 | 0.17 | 0.97 | | | N | | 16.0 | 1.24 | 0.17 | | | | | | | |
| 21 | 10 | 2 | 25 | 15 | 1.209 | 0.989 | 1.03 | 0.95 | 1.00 | 1.15 | 1.07 | 1.20 | 12 | 12 | 15 | 0.16 | 0.21 | 0.95 | | | N | | 21.0 | | | | | | | | | |
| 26 | 8 | 2 | 30 | 90 | 1.495 | 1.121 | 0.97 | 0.95 | 1.00 | 1.15 | 1.07 | 1.13 | 9 | 9 | 16 | 0.17 | 0.22 | 0.94 | | | N | | 26.0 | | | | | | | | | |
| 38 | 60 | 2 | 40 | 10 | 2.070 | 1.334 | 0.88 | 1.00 | 1.00 | 1.15 | 1.07 | 1.08 | 74 | 65 | 67 | | | | | | | | 38.0 | | | | | | | | | |
| 41 | 50+ | 2 | 45 | 10 | 2.358 | 1.515 | 0.84 | 1.00 | 1.00 | 1.15 | 1.07 | 1.03 | 50+ | 50+ | 50+ | | | | | | | | 41.0 | | | | | | | | | |
| 46 | 42 | 2 | 50 | 10 | 2.645 | 1.647 | 0.80 | 1.00 | 1.00 | 1.15 | 1.07 | 0.98 | 52 | 41 | 43 | | | | | | | | 46.0 | | | | | | | | | |

The analysis to determine the liquefaction resistance of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils" Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, published by Youd et al. in the October 2001 publication of the Journal of Geotechnical and Geoenvironmental Engineering.

| | Initials | Date |
|---------------|----------|----------|
| Completed By: | CML | 11/29/04 |
| Reviewed By: | | |

Notes:
 1. _____
 2. _____
 3. _____

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-6

Liquefaction Analysis

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 15 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

| Field Parameters | |
|----------------------------------|------|
| Water Depth (ft) | 100 |
| Borehole Diameter (in) | 5 |
| ModCal Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RCS |
| Fill Height (ft) | 0 |

| Earthquake Parameters | |
|---|------|
| Magnitude, M_w | 6.80 |
| Peak Horizontal Acceleration, a_{max} | 0.22 |
| Magnitude Scaling Factor, MSF | 1.28 |

2% PE in 50 yrs.

| | |
|--------------------------|----------|
| Reference Pressure (tsf) | 1.058106 |
|--------------------------|----------|

Total Estimated Liquefaction-Induced Settlement = 0.0 inches
 (Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Sample Depth, z (ft) | Blow Count, N | Sampler Type | Rod Length (ft) | Percent Fines (%) | Total Stress, S_v (tsf) | Effective Stress, S_v' (tsf) | Overburden Stress Correction, C_w | Rod Length Correction, C_R | Sampler Type Correction, C_s | Borehole Diameter Correction, C_b | Energy Ratio Correction, C_e | Total Correction (%) | $(N)_{80}$ | $(N)_{60}$ | $(N)_{80-60}$ | $CRR_{7.5}$ | Magnitude Corrected $CRR_{7.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FOS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) | |
|----------------------|---------------|--------------|-----------------|-------------------|---------------------------|--------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|------------|------------|---------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|-----|-----|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|--|
| 3 | 5 | 2 | 5 | 74 | 0.173 | 0.173 | 1.51 | 0.75 | 1.00 | 1.15 | 1.07 | 1.48 | 5 | 7 | 14 | 0.15 | 0.19 | 0.99 | | | | | Above WT | 3.0 | | | | | | | | |
| 6 | 4 | 2 | 10 | 71 | 0.345 | 0.345 | 1.44 | 0.80 | 1.00 | 1.15 | 1.07 | 1.41 | 4 | 6 | 12 | 0.13 | 0.17 | 0.99 | | | | | Above WT | 6.0 | | | | | | | | |
| 8 | 5 | 2 | 10 | 74 | 0.460 | 0.460 | 1.35 | 0.80 | 1.00 | 1.15 | 1.07 | 1.32 | 5 | 7 | 13 | 0.14 | 0.18 | 0.96 | | | | | Above WT | 8.0 | | | | | | | | |
| 11 | 4 | 2 | 15 | 74 | 0.633 | 0.633 | 1.22 | 0.85 | 1.00 | 1.15 | 1.07 | 1.28 | 4 | 5 | 11 | 0.12 | 0.16 | 0.98 | | | | | Above WT | 11.0 | | | | | | | | |
| 21 | 6 | 2 | 25 | 5 | 1.208 | 1.208 | 0.94 | 0.95 | 1.00 | 1.15 | 1.07 | 1.10 | 7 | 7 | 7 | 0.08 | 0.11 | 0.95 | | | | | Above WT | 21.0 | | | | | | | | |
| 27 | 30 | 2 | 30 | 5 | 1.553 | 1.553 | 0.82 | 0.95 | 1.00 | 1.15 | 1.07 | 0.96 | 35 | 29 | 29 | 0.40 | 0.52 | 0.93 | | | | | Above WT | 27.0 | | | | | | | | |
| 31 | 77 | 2 | 35 | 15 | 1.783 | 1.783 | 0.76 | 1.00 | 1.00 | 1.15 | 1.07 | 0.94 | 94 | 72 | 78 | | | | | | | | Above WT | 31.0 | | | | | | | | |
| 36 | 12 | 2 | 40 | 35 | 2.070 | 2.070 | 0.70 | 1.00 | 1.00 | 1.15 | 1.07 | 0.86 | 15 | 10 | 17 | 0.18 | 0.24 | 0.88 | | | | N | Above WT | 36.0 | | | | | | | | |
| 42 | 69 | 2 | 45 | 15 | 2.415 | 2.415 | 0.63 | 1.00 | 1.00 | 1.15 | 1.07 | 0.77 | 85 | 53 | 59 | | | | | | | | Above WT | 42.0 | | | | | | | | |

The analysis to determine the liquefaction resistances of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," published by Youd et al. in the October 2001 publication of the *Journal of Geotechnical and Geoenvironmental Engineering*.

- Notes: 1. Groundwater was not encountered during drilling of B-6. For liquefaction analysis above, the groundwater was entered at 100 feet below ground surface.
 2.
 3.

| | Initials | Date |
|---------------|----------|----------|
| Completed By: | CMH | 11/29/04 |
| Reviewed By: | | |

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-7

Liquefaction Analysis

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 16 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

| Field Parameters | |
|----------------------------------|------|
| Water Depth (ft) | 100 |
| Borehole Diameter (in) | 8 |
| ModCal Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RC5 |
| Fill Height (ft) | 0 |

| Earthquake Parameters | |
|---|------|
| Magnitude, M_w | 6.80 |
| Peak Horizontal Acceleration, a_{max} | 0.22 |
| Magnitude Scaling Factor, MSF | 1.28 |

2% PE in 50 yrs.

| | |
|--------------------------|----------|
| Reference Pressure (tsf) | 1.058108 |
|--------------------------|----------|

Total Estimated Liquefaction-Induced Settlement = **0.0 inches**
 (Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Sample Depth, z (ft) | Blow Count, N | Sampler Type | Rod Length (ft) | Percent Fines (%) | Total Stress, S_t (tsf) | Effective Stress, S_v (tsf) | Overburden Stress Correction, C_H | Rod Length Correction, C_R | Sampler Type Correction, C_S | Borehole Diameter Correction, C_B | Energy Ratio Correction, C_E | Total Correction (%) | $(N_1)_{60}$ | $(N_1)_{60-cs}$ | $CRR_{7.5}$ | Magnitude Corrected $CRR_{7.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FOS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) |
|----------------------|---------------|--------------|-----------------|-------------------|---------------------------|-------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|--------------|-----------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|-----|-----|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|
| 3 | 7 | 2 | 5 | 69 | 0.173 | 0.173 | 1.51 | 0.75 | 1.00 | 1.15 | 1.07 | 1.48 | 6 | 10 | 17 | 0.19 | 0.24 | 0.99 | | | | Above WT | 3.0 | | | | | | | |
| 6 | 5 | 2 | 10 | 69 | 0.345 | 0.345 | 1.44 | 0.80 | 1.00 | 1.15 | 1.07 | 1.41 | 5 | 7 | 13 | 0.15 | 0.19 | 0.99 | | | | Above WT | 6.0 | | | | | | | |
| 8 | 8 | 2 | 10 | 15 | 0.460 | 0.460 | 1.35 | 0.80 | 1.00 | 1.15 | 1.07 | 1.32 | 8 | 11 | 14 | 0.15 | 0.19 | 0.98 | | | N | Above WT | 8.0 | | | | | | | |
| 15 | 16 | 2 | 20 | 21 | 0.920 | 0.920 | 1.06 | 0.95 | 1.00 | 1.15 | 1.07 | 1.24 | 19 | 20 | 25 | 0.30 | 0.38 | 0.97 | | | | Above WT | 16.0 | | | | | | | |
| 21 | 15 | 2 | 25 | 15 | 1.208 | 1.208 | 0.94 | 0.95 | 1.00 | 1.15 | 1.07 | 1.10 | 17 | 16 | 20 | 0.21 | 0.27 | 0.95 | | | N | Above WT | 21.0 | | | | | | | |
| 25 | 36 | 2 | 30 | 29 | 1.495 | 1.495 | 0.84 | 0.95 | 1.00 | 1.15 | 1.07 | 0.98 | 42 | 35 | 45 | | | | | | N | Above WT | 25.0 | | | | | | | |
| 31 | 17 | 2 | 35 | 15 | 1.733 | 1.733 | 0.76 | 1.00 | 1.00 | 1.15 | 1.07 | 0.94 | 21 | 16 | 19 | 0.21 | 0.26 | 0.92 | | | | Above WT | 31.0 | | | | | | | |
| 36 | 37 | 2 | 40 | 15 | 2.070 | 2.070 | 0.70 | 1.00 | 1.00 | 1.15 | 1.07 | 0.86 | 45 | 32 | 33 | | | | | | | Above WT | 36.0 | | | | | | | |
| 46 | 50+ | 2 | 50 | 15 | 2.645 | 2.645 | 0.55 | 1.00 | 1.00 | 1.15 | 1.07 | 0.73 | 50+ | 50+ | 50+ | | | | | | N | Above WT | 46.0 | | | | | | | |
| 51 | 67 | 2 | 55 | 93 | 2.933 | 2.933 | 0.55 | 1.00 | 1.00 | 1.15 | 1.07 | 0.68 | 82 | 46 | 60 | | | | | | N | Above WT | 51.0 | | | | | | | |

The analysis to determine the liquefaction resistance of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," published by Youd et al. in the October 2001 publication of the *Journal of Geotechnical and Geoenvironmental Engineering*.

| | Initials | Date |
|---------------|----------|----------|
| Completed By: | CMH | 11/29/04 |
| Reviewed By: | | |

- Notes:
- Groundwater was not encountered during drilling of B-7. For liquefaction analysis above, the groundwater was entered at 100 feet below ground surface.
 -
 -

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-8

Liquefaction Analysis

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 16 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

Field Parameters

| | |
|----------------------------------|------|
| Water Depth (ft) | 14 |
| Borehole Diameter (in) | 8 |
| ModCal Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RC5 |
| Fill Height (ft) | 0 |

Earthquake Parameters

| | |
|---|----------|
| Magnitude, M_w | 6.80 |
| Peak Horizontal Acceleration, a_{max} | 0.22 |
| Magnitude Scaling Factor, MSF | 1.28 |
| Reference Pressure (tsf) | 1.058108 |

2% PE in 50 yrs.

Total Estimated Liquefaction-Induced Settlement = **0.0 inches**
 (Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Sample Depth, z (ft) | Blow Count, N | Sampler Type | Rod Length (ft) | Percent Fines (%) | Total Stress, S_v (tsf) | Effective Stress, S_v' (tsf) | Overburden Stress Correction, C_N | Rod Length Correction, C_R | Sampler Type Correction, C_S | Borehole Diameter Correction, C_B | Energy Ratio Correction, C_E | Total Correction (%) | $(N)_{60}$ | $(N_1)_{60}$ | $(N_1)_{60-CS}$ | $CRR_{1.5}$ | Magnitude Corrected $CRR_{1.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FOS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) |
|----------------------|---------------|--------------|-----------------|-------------------|---------------------------|--------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|------------|--------------|-----------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|-----|-----|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|
| 3 | 14 | 2 | 5 | 93 | 0.173 | 0.173 | 1.51 | 0.75 | 1.00 | 1.15 | 1.07 | 1.48 | 13 | 21 | 30 | 0.46 | 0.60 | 0.99 | | | N | Above WT | 3.0 | | | | | | | | |
| 5 | 18 | 2 | 10 | 93 | 0.345 | 0.345 | 1.44 | 0.80 | 1.00 | 1.15 | 1.07 | 1.41 | 18 | 25 | 36 | | | | | | N | Above WT | 6.0 | | | | | | | | |
| 8 | 14 | 2 | 10 | 93 | 0.460 | 0.460 | 1.35 | 0.83 | 1.00 | 1.15 | 1.07 | 1.32 | 14 | 18 | 27 | 0.34 | 0.44 | 0.98 | | | N | Above WT | 5.0 | | | | | | | | |
| 11 | 35 | 2 | 15 | 0 | 0.633 | 0.633 | 1.22 | 0.85 | 1.00 | 1.15 | 1.07 | 1.28 | 36 | 45 | 45 | | | | | | | | Above WT | 11.0 | | | | | | | |
| 16 | 45 | 2 | 20 | 0 | 0.920 | 0.858 | 1.09 | 0.95 | 1.00 | 1.15 | 1.07 | 1.28 | 52 | 57 | 57 | | | | | | | | | 16.0 | | | | | | | |
| 21 | 25 | 2 | 25 | 15 | 1.208 | 0.989 | 1.03 | 0.95 | 1.00 | 1.15 | 1.07 | 1.20 | 29 | 30 | 34 | | | | | | | | | 21.0 | | | | | | | |
| 26 | 51 | 2 | 30 | 15 | 1.495 | 1.121 | 0.97 | 0.95 | 1.00 | 1.15 | 1.07 | 1.13 | 59 | 58 | 63 | | | | | | | | | 26.0 | | | | | | | |

The analysis to determine the liquefaction resistance of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils. Summary Report from the 1996 NCEER and 1993 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," published by Youd et al. in the October 2001 publication of the Journal of Geotechnical and Geoenvironmental Engineering.

| | | |
|---------------|---------------|----------------|
| Completed By: | Initials: CMH | Date: 11/29/04 |
| Reviewed By: | | |

Notes: 1. _____
 2. _____
 3. _____

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-9

Liquefaction Analysis

Total Estimated Liquefaction-Induced Settlement = 3.4 inches
 (Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 16 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

Field Parameters

| | |
|----------------------------------|------|
| Water Depth (ft) | 14 |
| Borehole Diameter (in) | 3 |
| ModCal Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RC5 |
| Fill Height (ft) | 0 |

Earthquake Parameters

| | |
|---|----------|
| Magnitude, M_w | 6.80 |
| Peak Horizontal Acceleration, a_{max} | 0.22 |
| Magnitude Scaling Factor, MSF | 1.28 |
| Reference Pressure (tsf) | 1.053108 |

2% PE in 50 yrs.

| Sample Depth, z (ft) | Blow Count, N | Sampler Type | Rod Length (ft) | Percent Fines (%) | Total Stress, S_v (tsf) | Effective Stress, S_v' (tsf) | Overburden Stress Correction, C_w | Rod Length Correction, C_R | Sampler Type Correction, C_s | Borehole Diameter Correction, C_b | Energy Ratio Correction, C_E | Total Correction (%) | $(N)_{60}$ | $(N)_{60}$ | $(N)_{60-cs}$ | $CRR_{7.5}$ | Magnitude Corrected $CRR_{7.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FOS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) | |
|----------------------|---------------|--------------|-----------------|-------------------|---------------------------|--------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|------------|------------|---------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|------|-------|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|--|
| 1 | 13 | 2 | 5 | 90 | 0.058 | 0.058 | 1.75 | 0.75 | 1.00 | 1.15 | 1.07 | 1.61 | 12 | 21 | 30 | | | | | | | N | Above WT | 1.0 | | | | | | | | |
| 3 | 13 | 2 | 5 | 90 | 0.173 | 0.173 | 1.61 | 0.75 | 1.00 | 1.15 | 1.07 | 1.43 | 12 | 19 | 23 | 0.36 | 0.48 | 0.99 | | | | N | Above WT | 3.0 | | | | | | | | |
| 5 | 11 | 2 | 10 | 90 | 0.268 | 0.268 | 1.49 | 0.90 | 1.00 | 1.15 | 1.07 | 1.47 | 11 | 16 | 24 | 0.28 | 0.36 | 0.99 | | | | N | Above WT | 5.0 | | | | | | | | |
| 7 | 10 | 2 | 10 | 90 | 0.403 | 0.403 | 1.39 | 0.80 | 1.00 | 1.15 | 1.07 | 1.37 | 10 | 14 | 21 | 0.23 | 0.30 | 0.99 | | | | N | Above WT | 7.0 | | | | | | | | |
| 10 | 47 | 2 | 15 | 15 | 0.575 | 0.575 | 1.26 | 0.85 | 1.00 | 1.15 | 1.07 | 1.32 | 49 | 62 | 67 | | | | | | | | Above WT | 10.0 | | | | | | | | |
| 12 | 138 | 2 | 15 | 15 | 0.690 | 0.690 | 1.19 | 0.85 | 1.00 | 1.15 | 1.07 | 1.24 | 144 | 177 | 182 | | | | | | | | Above WT | 12.0 | | | | | | | | |
| 14 | 64 | 2 | 15 | 15 | 0.805 | 0.805 | 1.12 | 0.85 | 1.00 | 1.15 | 1.07 | 1.17 | 67 | 75 | 81 | | | | | | | | | 14.0 | | | | | | | | |
| 16 | 43 | 2 | 20 | 15 | 0.920 | 0.358 | 1.09 | 0.95 | 1.00 | 1.15 | 1.07 | 1.28 | 56 | 61 | 67 | | | | | | | | | 16.0 | | | | | | | | |
| 18 | 73 | 2 | 20 | 15 | 1.035 | 0.310 | 1.07 | 0.95 | 1.00 | 1.15 | 1.07 | 1.24 | 85 | 91 | 98 | | | | | | | | | 13.0 | | | | | | | | |
| 26 | 15 | 2 | 30 | 15 | 1.495 | 1.121 | 0.97 | 0.95 | 1.00 | 1.15 | 1.07 | 1.13 | 17 | 17 | 20 | 0.22 | 0.28 | 0.94 | | | | | 26.0 | 1.58 | 0.18 | | | | | | | |
| 36 | 8 | 2 | 40 | 15 | 2.070 | 1.334 | 0.86 | 1.00 | 1.00 | 1.15 | 1.07 | 1.08 | 10 | 9 | 12 | 0.15 | 0.16 | 0.88 | | | | | 36.0 | 0.06 | 0.19 | 2.81% | | | 10.0 | | | |
| 46 | 67 | 2 | 50 | 15 | 2.645 | 1.647 | 0.80 | 1.00 | 1.00 | 1.15 | 1.07 | 0.98 | 92 | 65 | 71 | | | | | | | | | 46.0 | | | | | | | | |
| 51 | 61 | 2 | 55 | 35 | 2.933 | 1.778 | 0.70 | 1.00 | 1.00 | 1.15 | 1.07 | 0.94 | 75 | 57 | 74 | | | | | | | | N | 51.0 | | | | | | | | |

The analysis to determine the liquefaction resistance of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," published by Youd et al. in the October 2001 publication of the *Journal of Geotechnical and Geoenvironmental Engineering*.

| | | |
|---------------|---------------|----------------|
| Completed By: | Initials: CMH | Date: 11/29/04 |
| Revised By: | | |

Notes: 1. _____
 2. _____
 3. _____

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-10

Liquefaction Analysis

| Field Parameters | |
|----------------------------------|------|
| Water Depth (ft) | 14 |
| Borehole Diameter (in) | 5 |
| ModCal Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RC5 |
| Fill Height (ft) | 0 |

| Earthquake Parameters | |
|---|----------|
| Magnitude, M_w | 6.80 |
| Peak Horizontal Acceleration, a_{max} | 0.22 |
| Magnitude Scaling Factor, MSF | 1.25 |
| Reference Pressure (tsf) | 1.053108 |

2% PE in 50 yrs.

Total Estimated Liquefaction-Induced Settlement = 0.0 inches

(Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 16 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

| Sample Depth, z (ft) | Blow Count, N | Sampler Type | Rod Length (ft) | Percent Fines (%) | Total Stress, S_v (tsf) | Effective Stress, S_e (tsf) | Overburden Stress Correction, C_u | Rod Length Correction, C_R | Sampler Type Correction, C_S | Borehole Diameter Correction, C_B | Energy Ratio Correction, C_E | Total Correction (%) | $(N)_{80}$ | $(N_1)_{80}$ | $(N_1)_{80-cs}$ | $CRR_{7.5}$ | Magnitude Corrected $CRR_{7.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FCS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) |
|----------------------|---------------|--------------|-----------------|-------------------|---------------------------|-------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|------------|--------------|-----------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|-----|-----|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|
| 1 | 29 | 2 | 5 | 89 | 0.058 | 0.058 | 1.75 | 0.75 | 1.00 | 1.15 | 1.07 | 1.61 | 27 | 47 | 61 | | | | | | | N | Above WT | 1.0 | | | | | | | |
| 3 | 13 | 2 | 5 | 89 | 0.173 | 0.173 | 1.61 | 0.75 | 1.00 | 1.15 | 1.07 | 1.48 | 12 | 19 | 28 | 0.35 | 0.48 | 0.99 | | | | N | Above WT | 3.0 | | | | | | | |
| 5 | 5 | 2 | 10 | 89 | 0.288 | 0.288 | 1.49 | 0.80 | 1.00 | 1.15 | 1.07 | 1.47 | 5 | 7 | 14 | 0.15 | 0.19 | 0.99 | | | | N | Above WT | 5.0 | | | | | | | |
| 9 | 26 | 2 | 10 | 41 | 0.515 | 0.518 | 1.30 | 0.80 | 1.00 | 1.15 | 1.07 | 1.23 | 26 | 33 | 45 | | | | | | | | Above WT | 9.0 | | | | | | | |
| 13 | 60 | 2 | 15 | 41 | 0.748 | 0.748 | 1.15 | 0.95 | 1.00 | 1.15 | 1.07 | 1.20 | 63 | 72 | 92 | | | | | | | | Above WT | 13.0 | | | | | | | |
| 15 | 42 | 2 | 20 | 41 | 0.863 | 0.831 | 1.11 | 0.95 | 1.00 | 1.15 | 1.07 | 1.29 | 49 | 54 | 70 | | | | | | | | | 15.0 | | | | | | | |
| 17 | 71 | 2 | 20 | 41 | 0.978 | 0.884 | 1.08 | 0.95 | 1.00 | 1.15 | 1.07 | 1.26 | 83 | 89 | 112 | | | | | | | | | 17.0 | | | | | | | |
| 19 | 31 | 2 | 20 | 41 | 1.093 | 0.937 | 1.06 | 0.95 | 1.00 | 1.15 | 1.07 | 1.22 | 36 | 38 | 51 | | | | | | | | | 19.0 | | | | | | | |
| 21 | 50+ | 2 | 25 | 41 | 1.208 | 0.989 | 1.03 | 0.95 | 1.00 | 1.15 | 1.07 | 1.20 | 50+ | 50+ | 50+ | | | | | | | | | 21.0 | | | | | | | |
| 31 | 29 | 2 | 35 | 15 | 1.733 | 1.252 | 0.92 | 1.00 | 1.00 | 1.15 | 1.07 | 1.13 | 36 | 33 | 37 | | | | | | | | | 31.0 | | | | | | | |
| 36 | 11 | 2 | 40 | 75 | 2.070 | 1.384 | 0.85 | 1.00 | 1.00 | 1.15 | 1.07 | 1.08 | 13 | 12 | 19 | 0.21 | 0.26 | 0.88 | | | | N | | 36.0 | | | | | | | |
| 46 | 80 | 2 | 50 | 15 | 2.645 | 1.647 | 0.80 | 1.00 | 1.00 | 1.15 | 1.07 | 0.98 | 98 | 78 | 85 | | | | | | | | | 46.0 | | | | | | | |
| 51 | 42 | 2 | 55 | 15 | 2.933 | 1.778 | 0.75 | 1.00 | 1.00 | 1.15 | 1.07 | 0.94 | 52 | 33 | 44 | | | | | | | | | 51.0 | | | | | | | |

The analysis to determine the liquefaction resistance of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils. Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," published by Youd et al. in the October 2001 publication of the Journal of Geotechnical and Geoenvironmental Engineering.

| | Initials | Date |
|---------------|----------|----------|
| Completed By: | CAH | 11/29/04 |
| Reviewed By: | | |

Notes: 1. _____
 2. _____
 3. _____

Project: Wasatch Regional Solid Waste Landfill
 Project Number: 35467.004
 Boring: B-11

Liquefaction Analysis

| Field Parameters | |
|----------------------------------|------|
| Water Depth (ft) | 14 |
| Borehole Diameter (in) | 8 |
| ModCal Sampler Conversion Factor | 0.77 |
| Drill Rig Code | RC5 |
| Fill Height (ft) | 0 |

| Earthquake Parameters | |
|---|-----------------------|
| Magnitude, M_w | 6.80 |
| Peak Horizontal Acceleration, a_{max} | 0.22 2% PE in 50 yrs. |
| Magnitude Scaling Factor, MSF | 1.28 |
| Reference Pressure (tsf) | 1.058108 |

Total Estimated Liquefaction-Induced Settlement = **0.0** inches
 (Sum of "Liquefaction-Induced Settlement By Layer" Column)

| Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) | Soil Layer | Bottom Layer Depth (ft) | USCS Soil Group Symbol | Raw Blow Count | Total Unit Weight (pcf) |
|------------|-------------------------|------------------------|----------------|-------------------------|------------|-------------------------|------------------------|----------------|-------------------------|
| 1 | 55.0 | | | 115 | 11 | | | | |
| 2 | | | | | 12 | | | | |
| 3 | | | | | 13 | | | | |
| 4 | | | | | 14 | | | | |
| 5 | | | | | 15 | | | | |
| 6 | | | | | 16 | | | | |
| 7 | | | | | 17 | | | | |
| 8 | | | | | 18 | | | | |
| 9 | | | | | 19 | | | | |
| 10 | | | | | 20 | | | | |

| Sample Depth, z (ft) | Blow Count, N | Sampler Type | Rod Length (ft) | Percent Fines (%) | Total Stress, S_t (tsf) | Effective Stress, S_v (tsf) | Overburden Stress Correction, C_N | Rod Length Correction, C_R | Sampler Type Correction, C_s | Borehole Diameter Correction, C_b | Energy Ratio Correction, C_E | Total Correction (%) | $(N)_{60}$ | $(N_1)_{60}$ | $(N_1)_{60-cs}$ | $CRR_{7.5}$ | Magnitude Corrected $CRR_{7.5}$ | Stress Reduction Coefficient, r_d | Soil Fraction Finer Than 0.0002 inches (%) | Natural Water Content, w | Liquid Limit, LL | Liquefiable According to Chinese Criteria? (Y/N) | Above Water Table | Sample Depth, z (ft) | FOS | CSR | Volumetric Strain (%) | Top of Liquefiable Layer (ft) | Bottom of Liquefiable Layer (ft) | Liquefiable Layer Thickness (ft) | Liquefaction-Induced Settlement By Layer (in) |
|----------------------|---------------|--------------|-----------------|-------------------|---------------------------|-------------------------------|-------------------------------------|------------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------|------------|--------------|-----------------|-------------|---------------------------------|-------------------------------------|--|----------------------------|------------------|--|-------------------|----------------------|------|-----|-----------------------|-------------------------------|----------------------------------|----------------------------------|---|
| 1 | 4 | 2 | 5 | 66 | 0.058 | 0.058 | 1.75 | 0.75 | 1.00 | 1.15 | 1.07 | 1.61 | 4 | 6 | 13 | 0.14 | 0.18 | 1.00 | | | N | Above WT | 1.0 | | | | | | | | |
| 3 | 6 | 2 | 5 | 66 | 0.173 | 0.173 | 1.61 | 0.75 | 1.00 | 1.15 | 1.07 | 1.48 | 6 | 9 | 16 | 0.17 | 0.21 | 0.99 | | | N | Above WT | 3.0 | | | | | | | | |
| 5 | 4 | 2 | 10 | 66 | 0.288 | 0.288 | 1.49 | 0.80 | 1.00 | 1.15 | 1.07 | 1.47 | 4 | 6 | 12 | 0.13 | 0.17 | 0.99 | | | N | Above WT | 5.0 | | | | | | | | |
| 7 | 6 | 2 | 10 | 66 | 0.403 | 0.403 | 1.39 | 0.80 | 1.00 | 1.15 | 1.07 | 1.37 | 6 | 8 | 15 | 0.16 | 0.20 | 0.99 | | | N | Above WT | 7.0 | | | | | | | | |
| 9 | 9 | 2 | 10 | 66 | 0.518 | 0.518 | 1.30 | 0.80 | 1.00 | 1.15 | 1.07 | 1.28 | 9 | 12 | 19 | 0.20 | 0.26 | 0.98 | | | N | Above WT | 9.0 | | | | | | | | |
| 13 | 12 | 2 | 15 | 79 | 0.748 | 0.748 | 1.15 | 0.85 | 1.00 | 1.15 | 1.07 | 1.20 | 13 | 14 | 22 | 0.25 | 0.32 | 0.97 | | | N | Above WT | 13.0 | | | | | | | | |
| 15 | 53 | 2 | 20 | 15 | 0.863 | 0.831 | 1.11 | 0.95 | 1.00 | 1.15 | 1.07 | 1.29 | 62 | 68 | 74 | | | | | | | | | 15.0 | | | | | | | |
| 17 | 35 | 2 | 20 | 15 | 0.978 | 0.884 | 1.08 | 0.95 | 1.00 | 1.15 | 1.07 | 1.26 | 41 | 44 | 49 | | | | | | | | | 17.0 | | | | | | | |
| 19 | 72 | 2 | 20 | 15 | 1.093 | 0.937 | 1.06 | 0.95 | 1.00 | 1.15 | 1.07 | 1.23 | 84 | 89 | 95 | | | | | | | | | 19.0 | | | | | | | |
| 26 | 52 | 2 | 30 | 15 | 1.495 | 1.121 | 0.97 | 0.95 | 1.00 | 1.15 | 1.07 | 1.13 | 61 | 59 | 64 | | | | | | | | | 26.0 | | | | | | | |
| 36 | 9 | 2 | 40 | 54 | 2.070 | 1.384 | 0.88 | 1.00 | 1.00 | 1.15 | 1.07 | 1.08 | 11 | 10 | 17 | 0.18 | 0.23 | 0.88 | | | | | 36.0 | 1.20 | 0.19 | | | | | | |
| 41 | 43 | 2 | 45 | 15 | 2.358 | 1.515 | 0.84 | 1.00 | 1.00 | 1.15 | 1.07 | 1.03 | 53 | 44 | 49 | | | | | | | | | 41.0 | | | | | | | |
| 46 | 80 | 2 | 50 | 15 | 2.645 | 1.647 | 0.80 | 1.00 | 1.00 | 1.15 | 1.07 | 0.98 | 98 | 78 | 85 | | | | | | | | | 46.0 | | | | | | | |
| 51 | 28 | 2 | 55 | 15 | 2.933 | 1.778 | 0.76 | 1.00 | 1.00 | 1.15 | 1.07 | 0.94 | 34 | 26 | 30 | 0.47 | 0.60 | 0.74 | | | | | 51.0 | | | | | | | | |

The analysis to determine the liquefaction resistance of soils was performed according to the procedure presented in the article "Liquefaction Resistance of Soils: Summary Report from the 1995 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," published by Youd et al. in the October 2001 publication of the *Journal of Geotechnical and Geoenvironmental Engineering*.

| | | |
|---------------|---------------|----------------|
| Completed By: | Initials: CMH | Date: 11/29/04 |
| Reviewed By: | | |

Notes:
 1. _____
 2. _____
 3. _____

Revised MLR Equations for Prediction of Lateral Spread Displacement

T.L. Youd, C.M. Hansen, and S.F. Bartlett

Project: Wasatch Regional Solid Waste Landfill
 Borehole: B-3
 Date: 15-Nov-04

| | |
|--|--|
| | |
| | |
| | |

Horizontal Displacement Calculation

| | | | | | | |
|--|--------|-------|---------------------|---------------------|------------------------|---|
| Does the site contain a free face (f) or a ground slope (g)? | | | | | | g |
| M _w | R (km) | S (%) | T ₁₅ (m) | F ₁₅ (%) | D50 ₁₅ (mm) | |
| 6.8 | 33 | 2 | 2.3 | 15 | 0.35 | |

Estimated Displacement: **0.06** m

R* Calculation

| | |
|----------------|-------|
| R ₀ | R* |
| 2.58 | 35.58 |

Ground Slope Equation:

$$\log D_h = -16.213 + 1.532 M - 1.406 \log R^* - 0.012 R + 0.338 \log S + 0.540 \log T_{15} + 3.413 \log (100 - F_{15}) - 0.795 \log (D50_{15} + 0.1 \text{ mm})$$

Free Face Equation:

$$\log D_h = -16.713 + 1.532 M - 1.406 \log R^* - 0.012 R + 0.592 \log W + 0.540 \log T_{15} + 3.413 \log (100 - F_{15}) - 0.795 \log (D50_{15} + 0.1 \text{ mm})$$

- D_h = Horizontal Displacement, (meters)
- M = Moment Magnitude of Earthquake, M_w
- R = Horizontal Distance to Nearest Seismic Energy Source or Fault Rupture, (kilometers)
- R* = R + R₀
- R₀ = 10^(0.89 M - 5.64)
- W = (H/L)*100 = Free Face Ratio, (percent)
- H = Height of the Free Face, (meters)
- L = Length to the Free Face from the Point of Displacement (meters)
- S = Ground Slope, (percent)
- T₁₅ = Thickness of Saturated Cohesionless Soils with (N₁)₆₀ < 15, (meters)
- F₁₅ = Average Fines Content in T₁₅, (particle size <0.075 millimeters, in percent)
- D50₁₅ = Average D₅₀ in T₁₅, (millimeters)

| | | |
|---------------|----------|----------|
| | Initials | Date |
| Completed By: | C m H | 11/29/04 |
| Reviewed By: | | |

** "W Calculation" is independent of "Horizontal Displacement Calculation." The value for the free face ratio, W, calculated in the "W Calculation" must be manually entered into the input cell for W in "Horizontal Displacement Calculation."

Revised MLR Equations for Prediction of Lateral Spread Displacement

T.L. Youd, C.M. Hansen, and S.F. Bartlett

Project: Wasatch Regional Solid Waste Landfill
 Borehole: B-9
 Date: 15-Nov-04

| | |
|--|--|
| | |
| | |
| | |

Horizontal Displacement Calculation

| Does the site contain a free face (f) or a ground slope (g)? | | | | | | g |
|--|--------|-------|---------------------|---------------------|------------------------|---|
| M _w | R (km) | S (%) | T ₁₅ (m) | F ₁₅ (%) | D50 ₁₅ (mm) | |
| 6.8 | 33 | 2 | 1.4 | 15 | 0.35 | |

Estimated Displacement: 0.05 m

R* Calculation

| R ₀ | R* |
|----------------|-------|
| 2.58 | 35.58 |

Ground Slope Equation:

$$\text{Log } D_h = -16.213 + 1.532 M - 1.406 \text{ Log } R^* - 0.012 R + 0.338 \text{ Log } S + 0.540 \text{ Log } T_{15} + 3.413 \text{ Log } (100 - F_{15}) - 0.795 \text{ Log } (D50_{15} + 0.1 \text{ mm})$$

Free Face Equation:

$$\text{Log } D_h = -16.713 + 1.532 M - 1.406 \text{ Log } R^* - 0.012 R + 0.592 \text{ Log } W + 0.540 \text{ Log } T_{15} + 3.413 \text{ Log } (100 - F_{15}) - 0.795 \text{ Log } (D50_{15} + 0.1 \text{ mm})$$

D_h = Horizontal Displacement, (meters)

M = Moment Magnitude of Earthquake, M_w

R = Horizontal Distance to Nearest Seismic Energy Source or Fault Rupture, (kilometers)

R* = R + R₀

R₀ = 10^(0.89 M - 5.64)

W = (H/L)*100 = Free Face Ratio, (percent)

H = Height of the Free Face, (meters)

L = Length to the Free Face from the Point of Displacement (meters)

S = Ground Slope, (percent)

T₁₅ = Thickness of Saturated Cohesionless Soils with (N₁)₆₀ < 15, (meters)

F₁₅ = Average Fines Content in T₁₅, (particle size <0.075 millimeters, in percent)

D50₁₅ = Average D₅₀ in T₁₅, (millimeters)

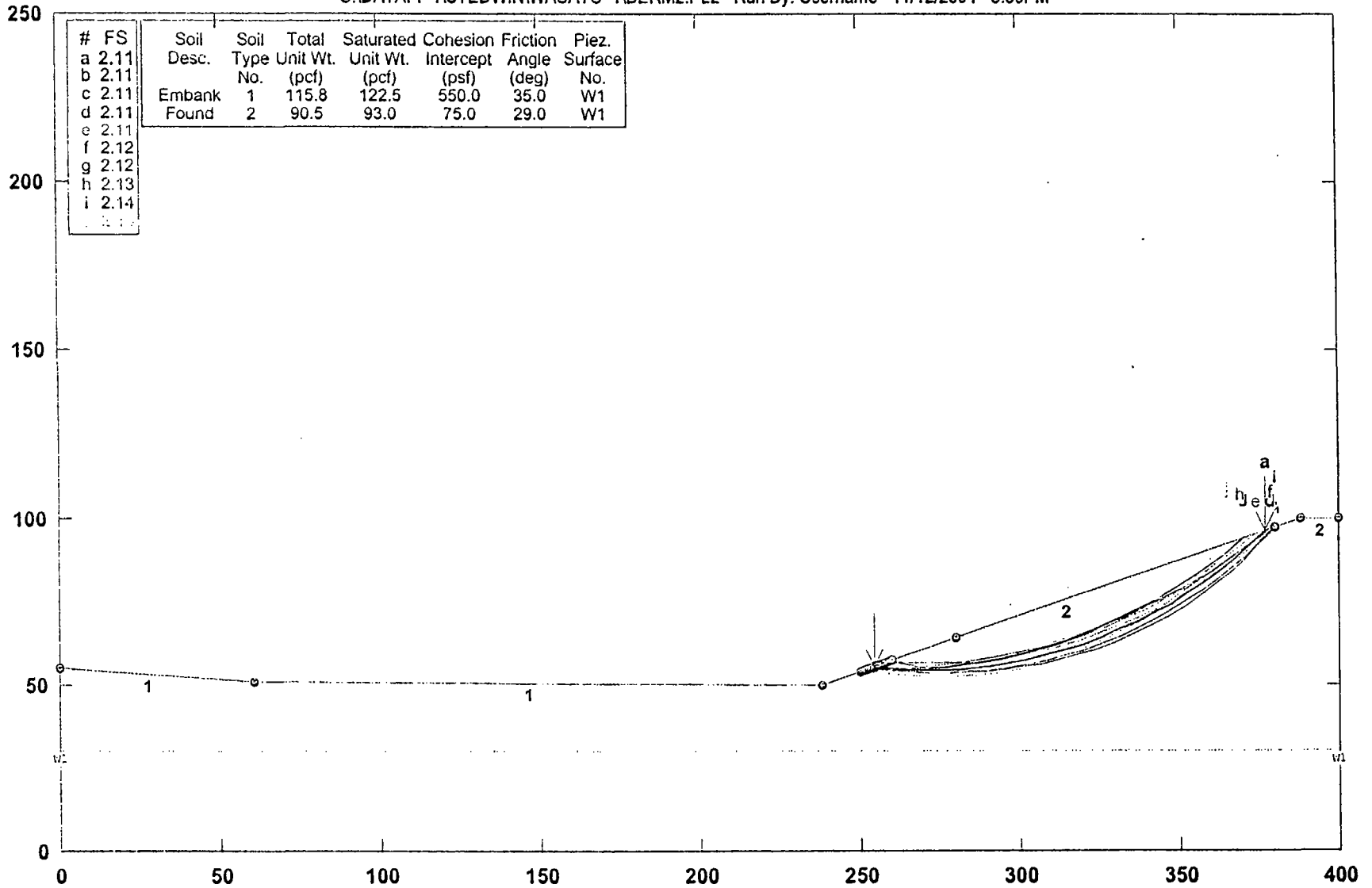
| | Initials | Date |
|---------------|----------|----------|
| Completed By: | cmh | 11/29/04 |
| Reviewed By: | | |

** "W Calculation" is independent of "Horizontal Displacement Calculation." The value for the free face ratio, W, calculated in the "W Calculation" must be manually entered into the input cell for W in "Horizontal Displacement Calculation."

APPENDIX E

Wasatch Regional Landfill Berm, 3:1 Slope, Static Condition

C:\DATA\FI-1\STEDWIN\WASATC-1\BERM2.PL2 Run By: Username 11/12/2004 3:39PM



| # | FS | Soil Desc. | Soil Type | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface |
|---|------|------------|-----------|----------------------|--------------------------|--------------------------|----------------------|---------------|
| a | 2.11 | | | | | | | |
| b | 2.11 | | | | | | | |
| c | 2.11 | Embank | 1 | 115.8 | 122.5 | 550.0 | 35.0 | W1 |
| d | 2.11 | Found | 2 | 90.5 | 93.0 | 75.0 | 29.0 | W1 |
| e | 2.11 | | | | | | | |
| f | 2.12 | | | | | | | |
| g | 2.12 | | | | | | | |
| h | 2.13 | | | | | | | |
| i | 2.14 | | | | | | | |

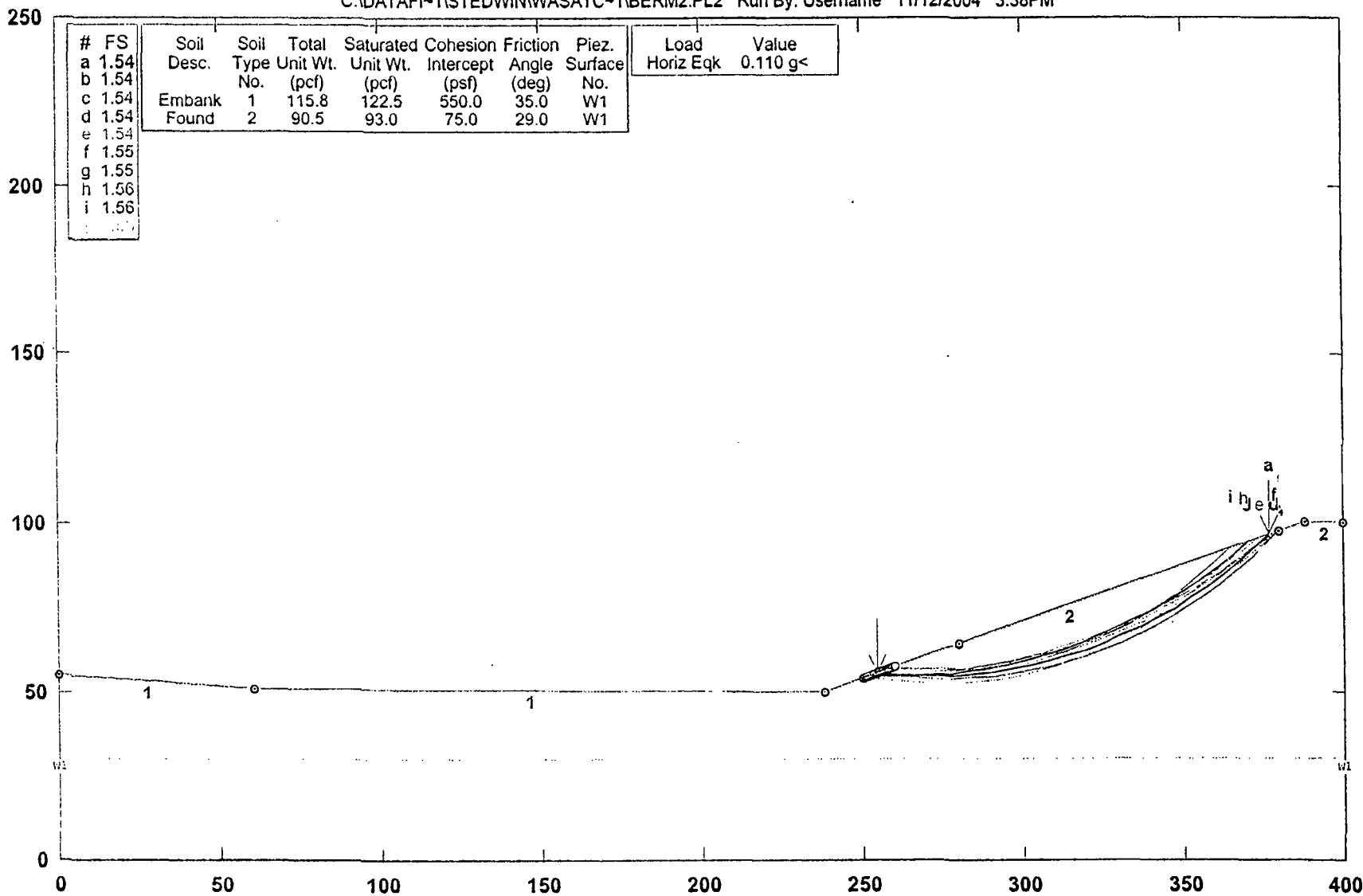
GSTABL7 v.2 FSmin=2.11

Safety Factors Are Calculated By The Modified Bishop Method



Wasatch Regional Landfill Berm, 3:1 Slope, Seismic Condition

C:\DATA\FI-1\STEDWIN\WASATC-1\BERM2.PL2 Run By: Username 11/12/2004 3:38PM



| # | FS | Soil Desc. | Soil Type | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No. | Load Horiz Eqk | Value |
|---|------|------------|-----------|----------------------|--------------------------|--------------------------|----------------------|-------------------|----------------|-------|
| a | 1.54 | | | | | | | | | |
| b | 1.54 | | | | | | | | | |
| c | 1.54 | Embark | 1 | 115.8 | 122.5 | 550.0 | 35.0 | W1 | | |
| d | 1.54 | Found | 2 | 90.5 | 93.0 | 75.0 | 29.0 | W1 | | |
| e | 1.54 | | | | | | | | | |
| f | 1.55 | | | | | | | | | |
| g | 1.55 | | | | | | | | | |
| h | 1.56 | | | | | | | | | |
| i | 1.56 | | | | | | | | | |

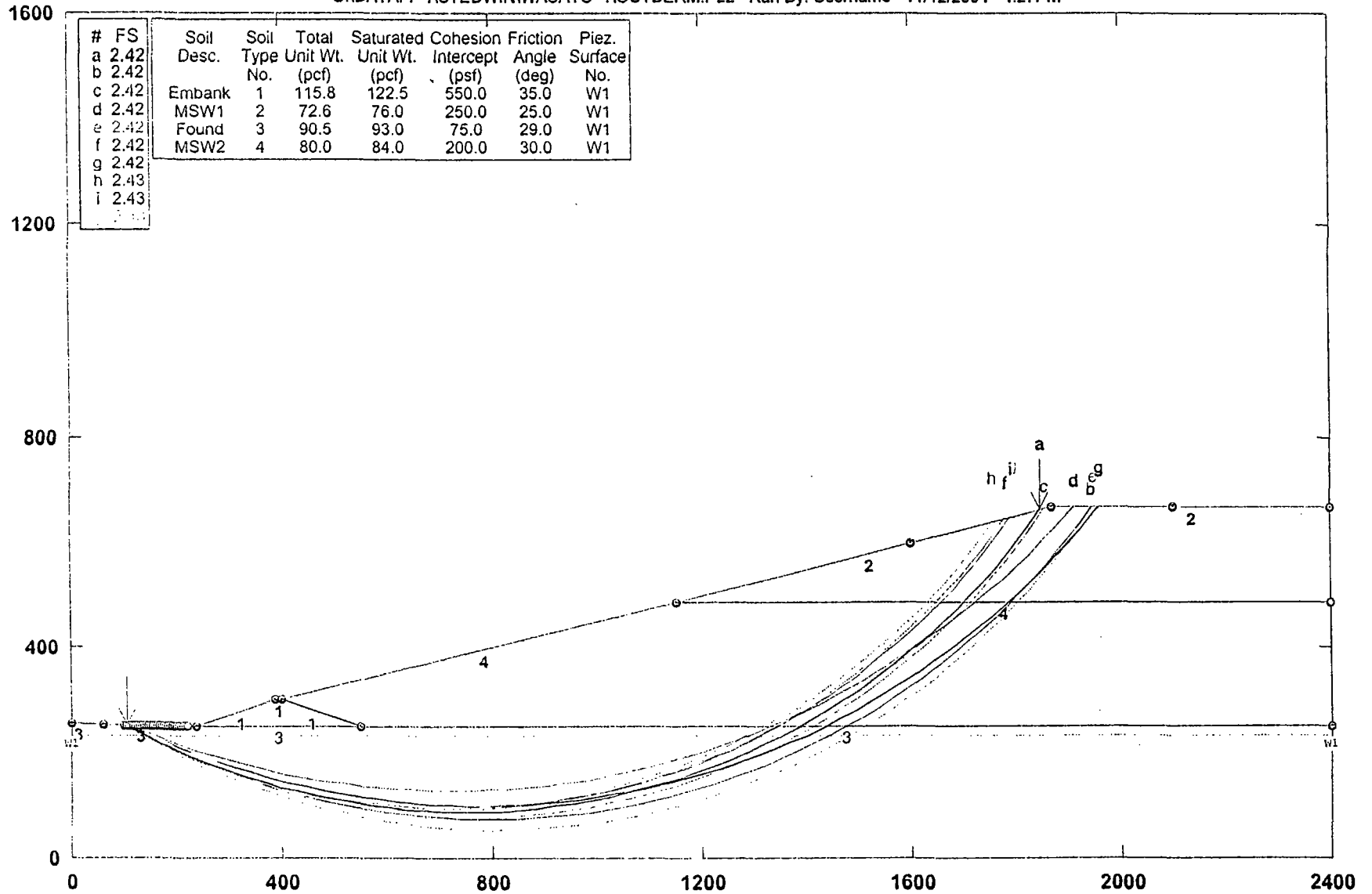
GSTABL7 v.2 FSmin=1.54

Safety Factors Are Calculated By The Modified Bishop Method



Wasatch Regional Landfill Outside Berm 3:1 Slope, Full Cell Static Condition

C:\DATA\FI-1\STEDWIN\WASATC-1\OUTBERM.PL2 Run By: Username 11/12/2004 4:27PM



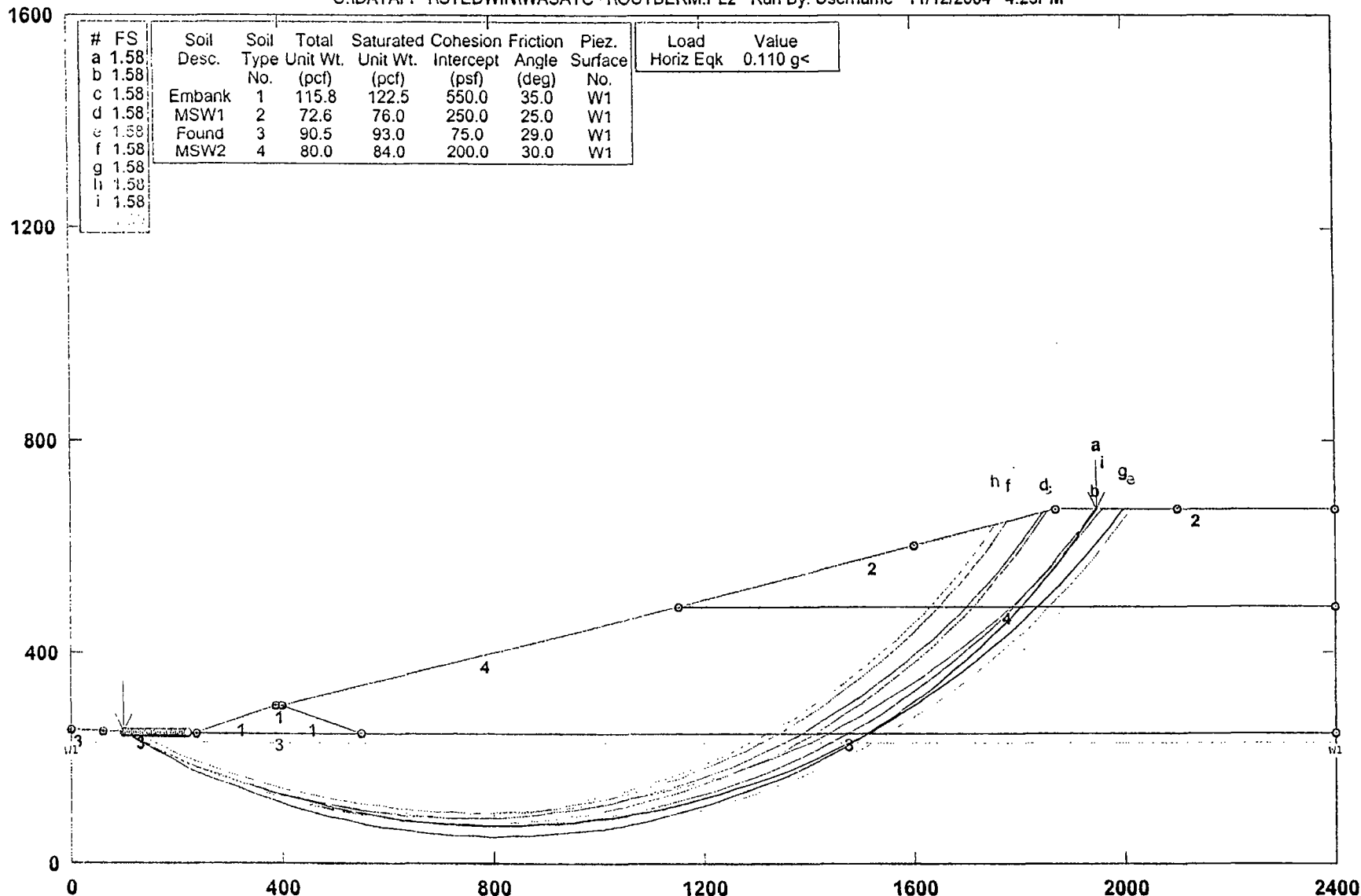
GSTABL7 v.2 FSmin=2.42

Safety Factors Are Calculated By The Modified Bishop Method



Wasatch Regional Landfill Outside Berm 3:1 Slope, Full Cell Seismic Condition

C:\DATAFI~1\STEDWIN\WASATC~1\OUTBERM.PL2 Run By: Username 11/12/2004 4:23PM



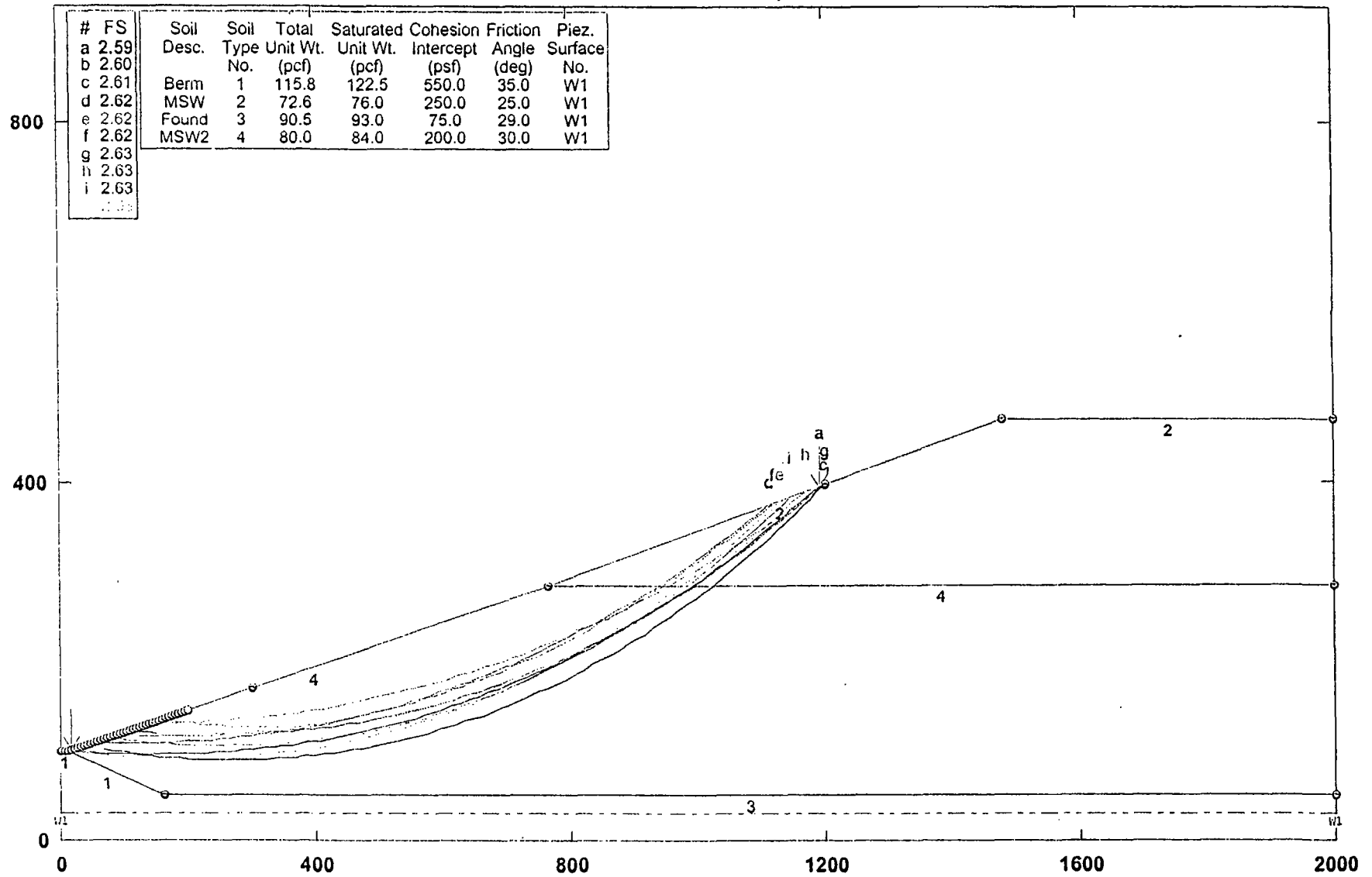
GSTABL7 v.2 FSmin=1.58

Safety Factors Are Calculated By The Modified Bishop Method



Wasatch Regional Landfill Final Height, 4:1 Waste Slope, Static Condition

C:\DATA\FI-1\STEDWIN\WASATC-1\FINAL1.PL2 Run By: Username 11/12/2004 3:46PM



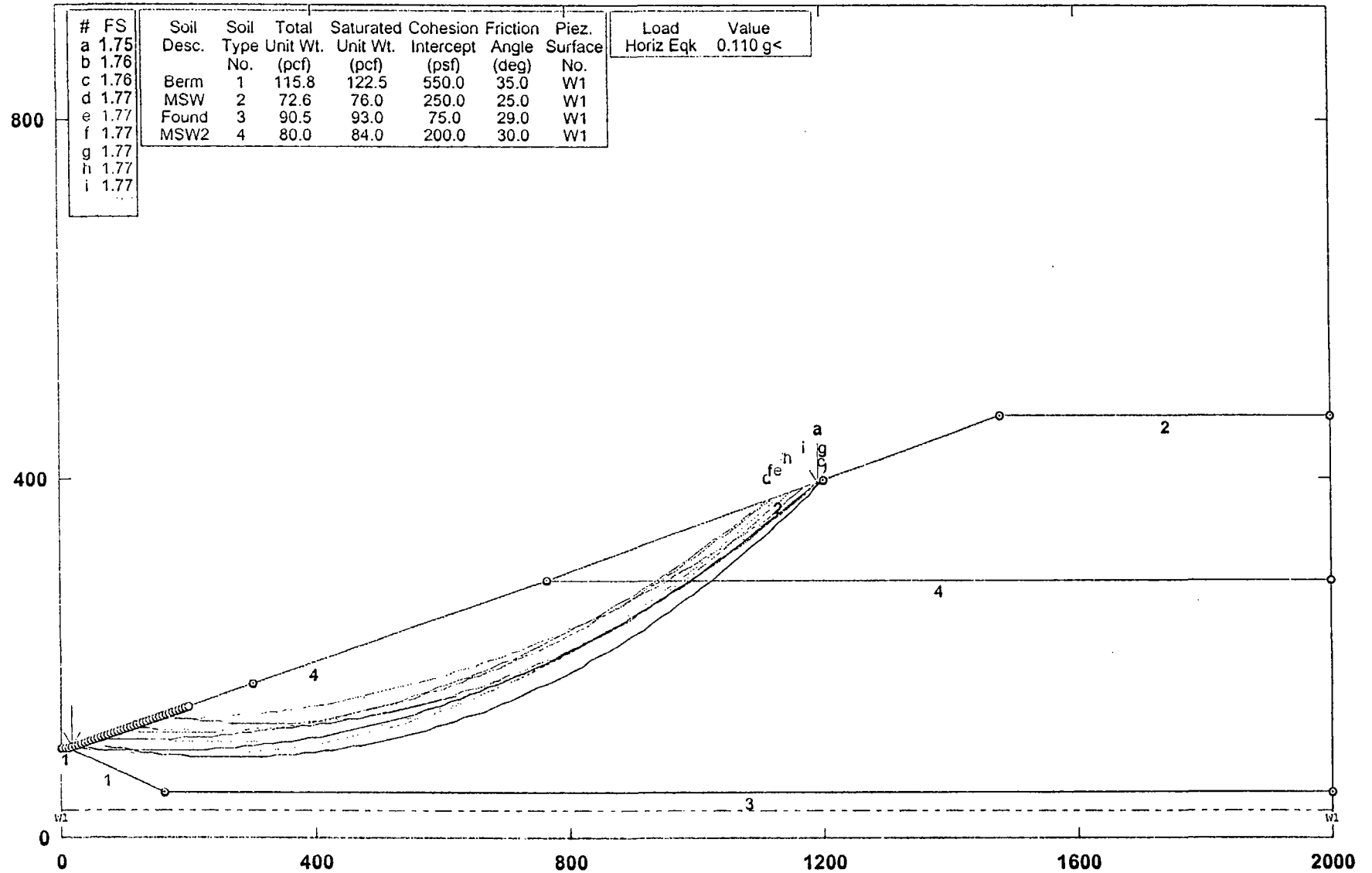
GSTABL7 v.2 FSmin=2.59

Safety Factors Are Calculated By The Modified Bishop Method



Wasatch Regional Landfill Final Height, 4:1 Waste Slope, Seismic Condition

C:\DATAFI-1\STEDWINWASATC-1\FINAL1.PL2 Run By: Username 11/12/2004 3:44PM



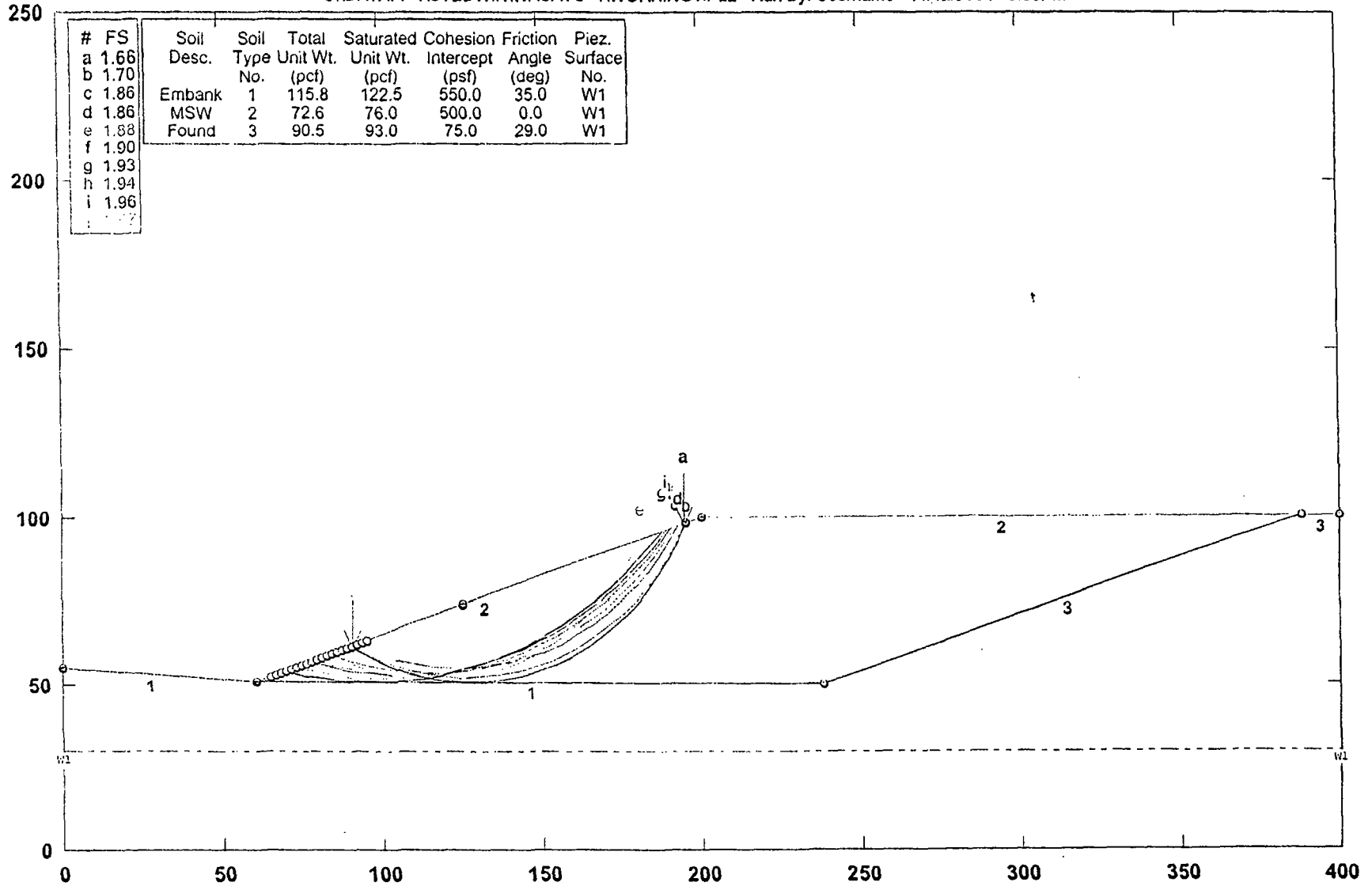
GSTABL7 v.2 FSmin=1.75

Safety Factors Are Calculated By The Modified Bishop Method



Wasatch Regional Landfill, Waste WorkingFace, 3:1 Waste Slope, Static Condition

C:\DATA\FI-1\STEDWIN\WASATC-1\WORKING1.PL2 Run By: Username 11/12/2004 3:09PM



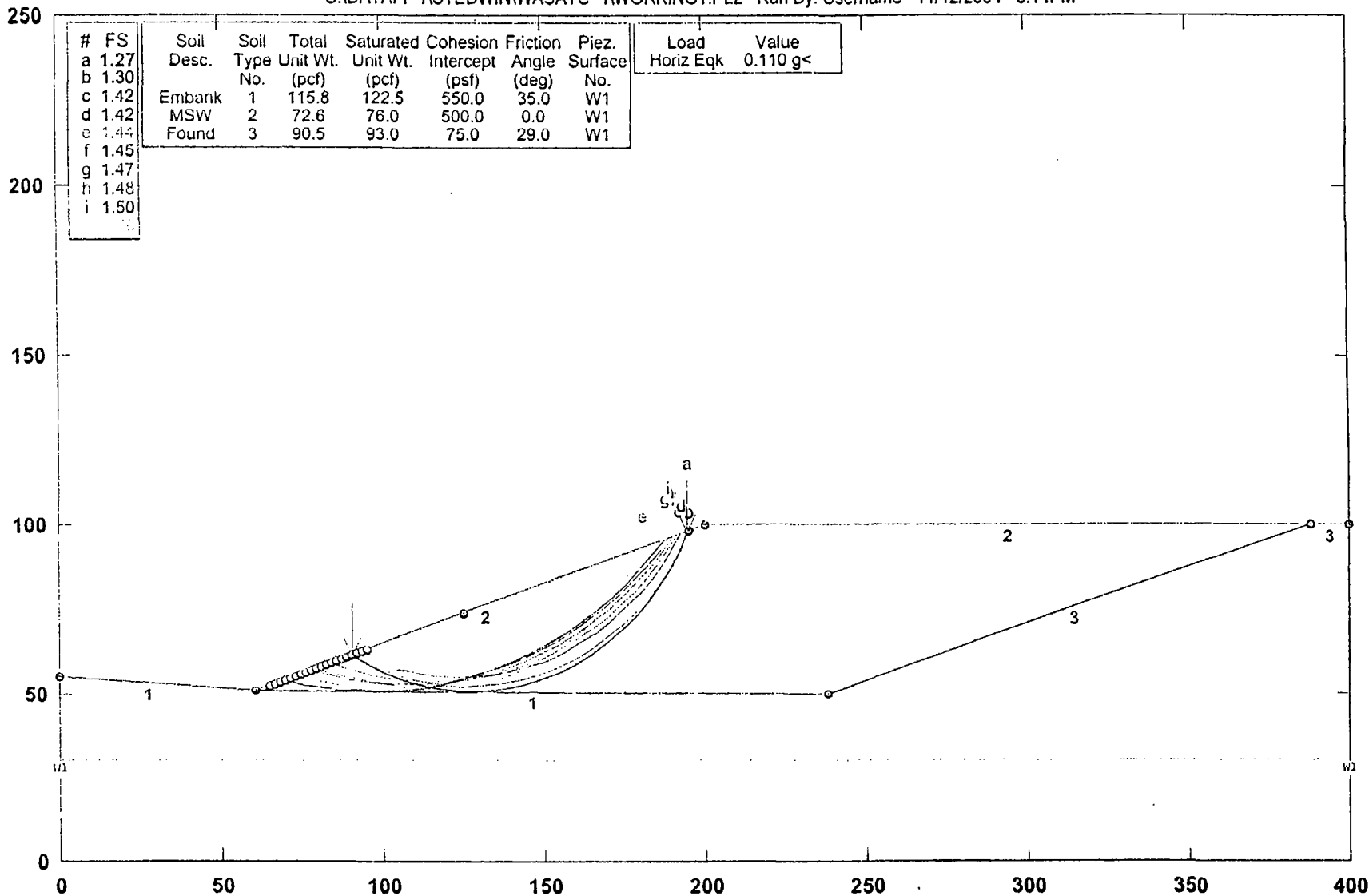
GSTABL7 v.2 FSmin=1.66

Safety Factors Are Calculated By The Modified Bishop Method



Wasatch Regional Landfill, Waste WorkingFace, 3:1 Waste Slope, Seismic Condition

C:\DATA\FI-1\STEDWIN\WASATC-1\WORKING1.PL2 Run By: Username 11/12/2004 3:14PM



GSTABL7 v.2 FSmin=1.27

Safety Factors Are Calculated By The Modified Bishop Method



APPENDIX F

Important Information About Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. Always contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.*

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

Wetlands for the Tooele Landfill Site

Introduction

Jamie Tsandes, Environmental Planner, and Ronald J. Kass, Professional Wetland Scientist (PWS), in accordance with the 1987 "Corps of Engineers Wetlands Delineation Manual", conducted a field inventory on the SITLA property in Tooele, Utah on April 9, 2004.

A manmade wet area has been created on the Black Knoll site that is approximately .10 acres in size. The location of the wetland in respect to the property boundary is shown in Figure 1. The water is used for cattle drinking water, and due to the overflow onto the land, surface hydrology is present. A wetland determination was performed to verify the vegetation, soils, and hydrology. Supporting data sheets indicate that the soils and hydrology do not meet the minimum parameters to be considered a wetland. Therefore, this area is not a wetland as classified by the U.S. Army Corps of Engineers. Figure 2 and Figure 3 and are photographs of the site.

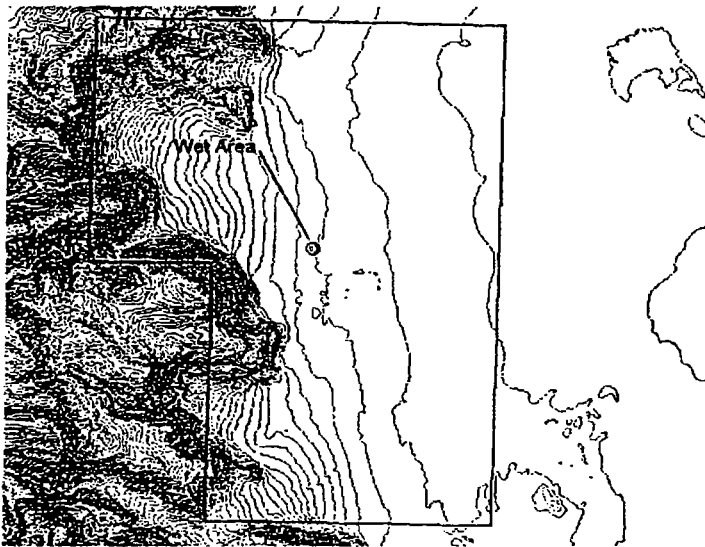


Figure 1. Approximate location of the wet area in relationship to the site boundary.



Figure 2. Photograph taken in April 2004 during the site inventory.

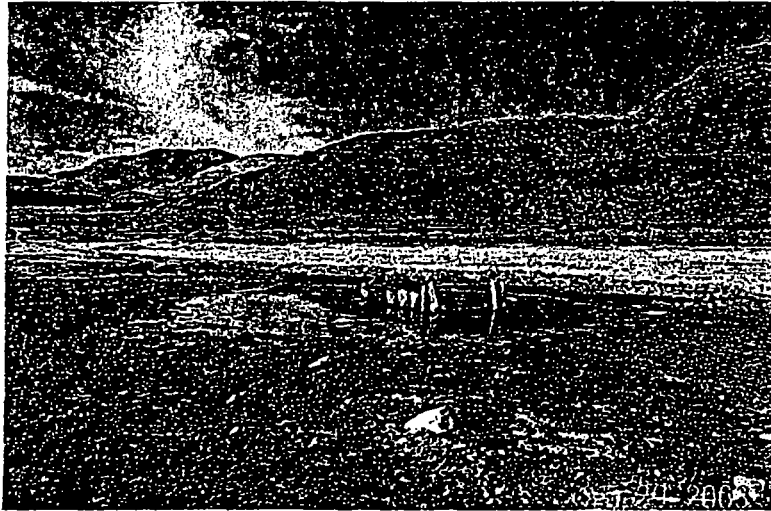


Figure 3. Photograph taken in 2003 of the wet area.

Existing Conditions

The dominant vegetation on site includes greasewood, sandberg bluegrass, and saltgrass, which is a result of the ponding surface water. The saltgrass grows only in the areas where the artificial cattle watering area ponds for long periods of time.

Natural Resource Conservation Service (NRCS) County Soil Survey, the soil for the area is classified as a Timpie Series, which consists of very deep, well-drained, moderately slowly permeable soils on the lake terraces and fan remnants. The soils are also high in alkaline as a result from the historic Lake Bonneville that once covered the area. The Timpie Series is not on the Tootle County Hydric Soils list. Two soils samples were performed at a depth of 18".

The soil chroma was evaluated and determined to be 10 YR 5/4 as per the Munsell Soil Color Chart, indicating non-hydric conditions.

The hydrology that currently sustains the wet area is manmade for the purposes of cattle drinking; the wet area does not meet the hydrology parameters for a wetland as characterized by the U.S. Army Corps of Engineers.

Data Sheets

DATA FORM ROUTINE WETLAND DETERMINATION (1987 COE Wetlands Delineation Manual)

| | |
|---|-----------------------------|
| Project/Site: <u>Tooele Landfill</u> | Date: <u>4/7/04</u> |
| Applicant/Owner: <u>Wasatch Regional Landfill</u> | County: <u>Utah</u> |
| Investigator: <u>Jamie Tsundes / Ken Vass</u> | State: <u>Utah</u> |
| Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No | Community ID: <u>upland</u> |
| Is the site significantly disturbed (Atypical Situation)? <input type="radio"/> Yes <input checked="" type="radio"/> No | Transect ID: _____ |
| Is the area a potential Problem Area? <input type="radio"/> Yes <input checked="" type="radio"/> No | Plot ID: _____ |
| (If needed, explain on reverse.) | |

VEGETATION

| Dominant Plant Species | Stratum | Indicator | Dominant Plant Species | Stratum | Indicator |
|-----------------------------------|---------|------------|------------------------|---------|-----------|
| 1. <u>Sarcobatus vermiculatus</u> | | <u>UPL</u> | 9. _____ | | |
| 2. <u>Rhus trilobata</u> | | <u>UPL</u> | 10. _____ | | |
| 3. <u>Pea Secunda</u> | | <u>UPL</u> | 11. _____ | | |
| 4. _____ | | | 12. _____ | | |
| 5. _____ | | | 13. _____ | | |
| 6. _____ | | | 14. _____ | | |
| 7. _____ | | | 15. _____ | | |
| 8. _____ | | | 16. _____ | | |

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 0

Remarks: The site is dry, with some artificial water for cattle drinking.

HYDROLOGY

| | |
|---|--|
| <input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available | Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks) |
| Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.) | Remarks: <u>No hydrology - Aerial photographs indicate no standing water that occurs naturally. A man-made 8' x 3' dam has been created to capture runoff for cattle drinking.</u> |

SOILS

| | | | | | |
|---|---------|--|----------------------------------|---------------------------------------|--|
| Map Unit Name | | ISeries and Phase: <u>Timpie</u> | | Drainage Class: <u>deeply drained</u> | |
| Taxonomy (Subgroup): | | Field Observations | | Confirm Mapped Type? <u>Yes</u> No | |
| Profile Description: | | | | | |
| Depth (Inches) | Horizon | Matrix Color (Munsell Moist) | Mottle Colors (Munsell Moist) | Mottle Abundance: Contrast | Texture, Concretions, Structure, etc. |
| <u>5-12"</u> | | <u>10yR 5/4</u> | <u>-</u> | <u>-</u> | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Hydric Soil Indicators: | | | | | |
| <input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chrome Colors | | <input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks) | | | |
| Remarks: <u>The soil was very dry.</u> | | | | | |

WETLAND DETERMINATION

| | | |
|---|--|--|
| Hydrophytic Vegetation Present? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Circle) | (Circle) |
| Wetland Hydrology Present? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Circle) | |
| Hydric Soils Present? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Circle) | |
| Is this Sampling Point Within a Wetland? | | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Circle) |
| Remarks: <u>This area does not have all three wetland characteristics and is therefore not a wetland. The site is located to the west of the Great Salt Lake and is currently grazed by cattle.</u> | | |

DATA FORM
ROUTINE WETLAND DETERMINATION
 (1987 COE Wetlands Delineation Manual)

| | |
|---|---|
| Project/Site: <u>Tooele Landfill</u> Applicant/Owner: <u>Wasatch Regional Landfill</u> Investigator: <u>Juanita Tsandes / Ron KASS</u> | Date: <u>4/9/04</u> County: <u>Tooele</u> State: <u>Utah</u> |
| Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No Is the site significantly disturbed (Atypical Situation)? <input type="radio"/> Yes <input checked="" type="radio"/> No Is the area a potential Problem Area? <input type="radio"/> Yes <input checked="" type="radio"/> No (If needed, explain on reverse.) | Community ID: <u>Cattle water area</u> Transect ID: _____ Plot ID: <u>1</u> |

VEGETATION

| Dominant Plant Species | Stratum | Indicator | Dominant Plant Species | Stratum | Indicator |
|------------------------------|---------|-------------|------------------------|---------|-----------|
| 1. <u>Distichlis spicata</u> | _____ | <u>FACW</u> | 9. _____ | _____ | _____ |
| 2. _____ | _____ | _____ | 10. _____ | _____ | _____ |
| 3. _____ | _____ | _____ | 11. _____ | _____ | _____ |
| 4. _____ | _____ | _____ | 12. _____ | _____ | _____ |
| 5. _____ | _____ | _____ | 13. _____ | _____ | _____ |
| 6. _____ | _____ | _____ | 14. _____ | _____ | _____ |
| 7. _____ | _____ | _____ | 15. _____ | _____ | _____ |
| 8. _____ | _____ | _____ | 16. _____ | _____ | _____ |

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: The Saltgrass in this area grows only within the artificial cattle watering area.

HYDROLOGY

| | |
|--|---|
| <input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs ___ Other ___ No Recorded Data Available | Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks) |
| Field Observations: Depth of Surface Water: <u>0</u> (in.) Depth to Free Water in Pit: <u>—</u> (in.) Depth to Saturated Soil: <u>—</u> (in.) | Remarks: <u>Aerial photography indicates an artificial area that captures surface water for cattle drinking purposes. The hydrology is artificial and does not meet the appropriate characteristics for a wetland.</u> |

SOILS

| Map Unit Name (Series and Phase): <u>Timpel</u> | | Drainage Class: <u>deep well drained</u> | | | |
|---|---------|--|----------------------------------|------------------------------|--|
| Taxonomy (Subgroup): | | Field Observations Confirm Mapped Type? <input checked="" type="radio"/> Yes <input type="radio"/> No | | | |
| Profile Description: | | | | | |
| Depth (Inches) | Horizon | Matrix Color (Munsell Moist) | Mottle Colors (Munsell Moist) | Mottle Abundance/Contrast | Texture, Concretions, Structure, etc. |
| <u>5-12"</u> | | <u>10y5 5/4</u> | <u>-</u> | <u>-</u> | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Hydric Soil Indicators: | | | | | |
| <input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chrome Colors | | <input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks) | | | |
| Remarks: <u>The soil is saturated only on the surface.</u> | | | | | |

WETLAND DETERMINATION

| | |
|---|--|
| Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No (Circle) | (Circle) |
| Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No | |
| Hydric Soils Present? <input checked="" type="radio"/> Yes <input type="radio"/> No | Is this Sampling Point Within a Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No |
| Remarks: <u>Although the vegetation is FAew, the site does not support hydric soils and natural hydrology to meet the characteristics of a wetland. The site is located in a dry, grazed area that has not indicators of wetland habitat.</u> | |

References

http://www.met.utah.edu/jhorel/homepages/jhorel/seminar_lake.html

Natural Resource Conservation Service (NRCS), United State Department of Agriculture. Soil Survey of Tooele, Utah.

U.S. Fish and Wildlife Service- National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary.

GretagMacbeth. 2000. Munsell Soil Color Chart. New Windsor, NY.

Wetland Training Institute. 2002. Field Guide for Wetland Delineation, 1987 Corps of Engineers Manual.



1997 Results - Cropland Utah



Utah cropland occupies a very small part of the total surface area of the state. It comprises about 3% of the total surface area as of 1997. In 1982 that figure was closer to 4%. The database for 1997 indicated that about 705,300 acres were cultivated and 973,800 were noncultivated. The difference being that cultivated ground is in row crops or hay and pasture in rotation with row crops. Non cultivated ground is that which is in permanent hay, pasture or orchards. It is interesting to note that according to NRI data, there was about 105,000 acres of cropland converted to urban land throughout the state during the 15-year period between 1982 and 1997.

Much of the cropland is non-irrigated. In these cases, the average annual precipitation is more than 12 inches and the frost-free season is more than 60 days. The soils are loamy with about 3.5 inches of available water holding capacity. The better sites have few if any rocks but, many of these areas are very gravelly or cobbly. Non-irrigated cropping is normally on valley side slopes of 25 percent or less and low lying basins. Areas suitable for this type of farming normally have a range of mountains nearby which assist with the proper distribution of precipitation. Since most of the rain falls in the mountainous areas, the soils near the mountains receive more water than those more distant from the mountains.

Irrigated farming is normally in valleys that have affordable water, loamy soils and a growing season of 50 days or more. Other factors include slopes of less than 20 percent and soils with an available water holding capacity of about 4 inches in the upper 3 feet.

Cropping of both types are divided into field and orchard crops. Dominant field crops are spring and winter wheat, barley, beans, corn for grain and silage, alfalfa and grass hay, oats, onions and potatoes. Non-irrigated acreages are normally in fall or spring wheat or barley. Dominant orchard crops include apples, apricots, cherries, peaches, and pears.

Orchards of apples, cherries, peaches, pears and apricots are found in several locations around the state. Fruit and vegetable crops make up about 5 percent of Utah's crops. Many of the Utah agricultural products are being used in other states and in other countries.

Prime farmland is described as farmland with resources available to sustain high levels of production. The exact definition is listed in the National Soil Survey Handbook. In Utah, it normally requires irrigation to make prime farmland. In general, prime farmland has a dependable water supply, a favorable temperature and growing season, acceptable levels of acidity or alkalinity, an acceptable content of salt and sodium, and few or no rocks. Unique farmland in Utah is primarily in the form of orchards. Farmlands of statewide importance are those soils which nearly qualify for prime farmland and produce high sustainable yields.



Search

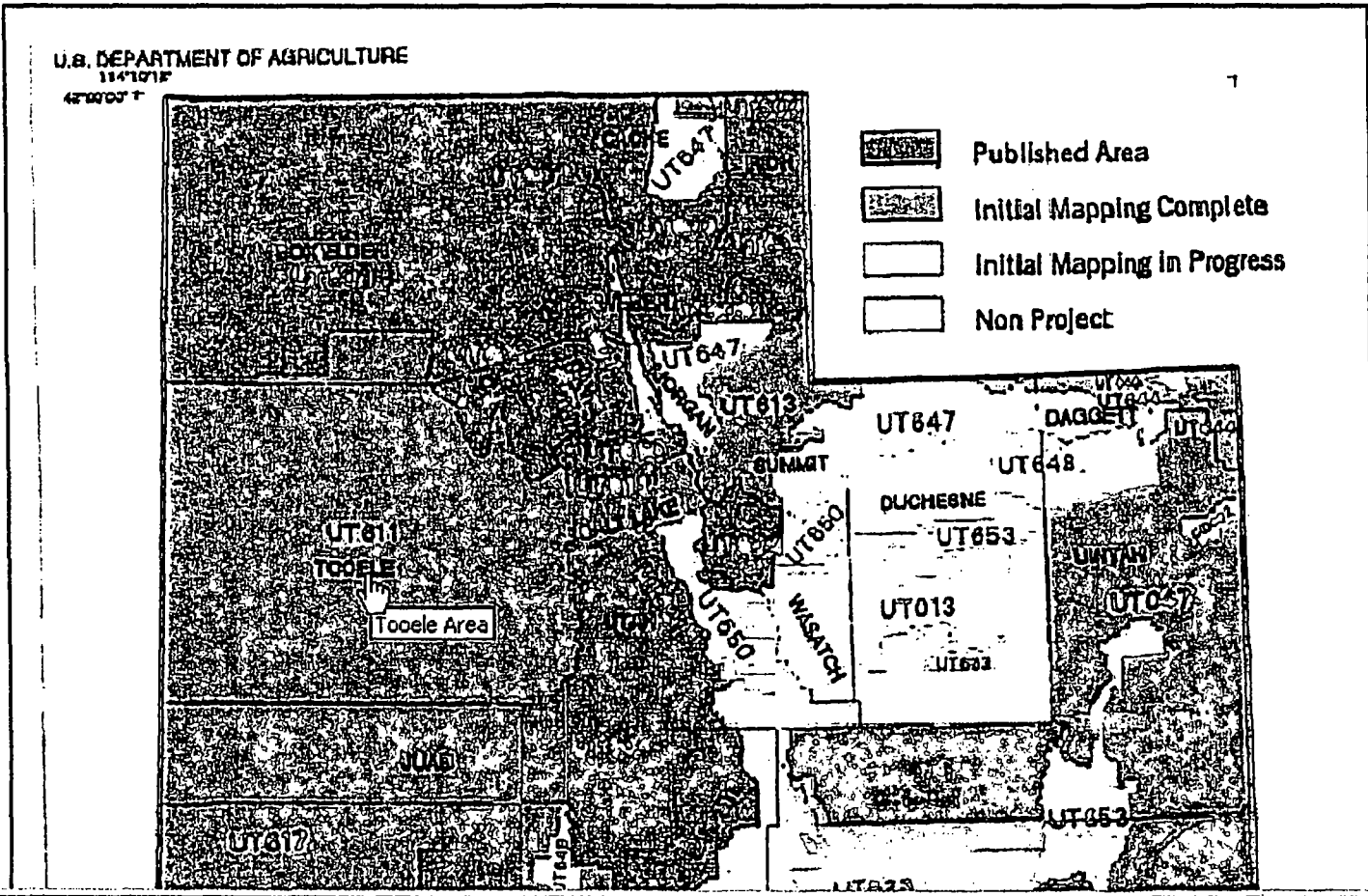
Utah

Enter Keywords

Utah's Prime Farmland Legends | Utah NRCS

For an alternate way to get Utah's Prime Farmland Legends [click here](#)

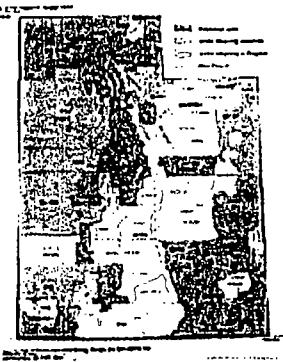
- Technical Resources**
- ▶ eFOTG
 - ▶ Grazing Lands Conservation Initiative
 - ▶ National Plant Database
 - ▶ National Technical Resources
 - ▶ NRCS Technical Resources
 - ▶ Plant Materials Centers
 - ▶ Utah National Resources Inventory (NRI)
 - ▶ Utah Snow Survey
 - ▶ Utah Soil Survey
-
- ▶ Find a Service Center
 - ▶ West Region



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-
- ▶ Find a Service Center
-
- ▶ West Region

Prime Farmland Legends - Utah NRCS



Access to soil survey information is provided through maps. All text and tables relate to the map symbols and the areas delineated on these maps. Persons with disabilities who require alternative means for communication of soil survey information should contact the NRCS at the USDA Service Center that services the county of interest. Service Center locations can be found on the [USDA-Office Locator](#) web page.

Click on thumbnail for detail or use Text Alternate Links Below:

The documents below require [Adobe Acrobat](#)

- ▶ [UT047 Uintah Area](#)
- ▶ [UT601 Box Elder County, Western Part](#)
- ▶ [UT602 Box Elder County, Eastern Part](#)
- ▶ [UT603 Cache Valley Area](#)
- ▶ [UT604 Rich County](#)
- ▶ [UT607 Davis-Weber Area](#)
- ▶ [UT608 Fairfield-Nephi Area](#)
- ▶ [UT609 Morgan Area](#)
- ▶ [UT611 Tooele Area](#)

Table Y.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name.)

| Map symbol | Soil name |
|------------|-----------|
|------------|-----------|































No selected map units are classified as Prime Farmland

APPENDIX 4
GEOHYDROLOGICAL ASSESSMENT (PSOMAS)

APPENDIX 4.1
Sole Source Aquifers

CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY

PART 149--SOLE SOURCE AQUIFERS

| | | | |
|---|---|---------|-------------------------------------|
|  |  | 149.1 | Purpose. |
|  |  | 149.2 | Definitions. |
|  |  | 149.3 | Critical Aquifer Protection Areas. |
|  |  | 149.100 | Applicability. |
|  |  | 149.101 | Definitions. |
|  |  | 149.102 | Project review authority. |
|  |  | 149.103 | Public information. |
|  |  | 149.104 | Submission of petitions. |
|  |  | 149.105 | Decision to review. |
|  |  | 149.106 | Notice of review. |
|  |  | 149.107 | Request for information. |
|  |  | 149.108 | Public hearing. |
|  |  | 149.109 | Decision under section 1424(e). |
|  |  | 149.110 | Resubmittal of redesigned projects. |
|  |  | 149.111 | Funding to redesigned projects. |



(c) The Director shall follow the procedures in §124.5 in terminating any exemption under this section.

PART 149—SOLE SOURCE AQUIFERS

Subpart A—Criteria for Identifying Critical Aquifer Protection Areas

Sec.

- 149.1 Purpose.
- 149.2 Definitions.
- 149.3 Critical Aquifer Protection Areas.

Subpart B—Review of Projects Affecting the Edwards Underground Reservoir, A Designated Sole Source Aquifer in the San Antonio, Texas Area

- 149.100 Applicability.
- 149.101 Definitions.
- 149.102 Project review authority.
- 149.103 Public information.
- 149.104 Submission of petitions.
- 149.105 Decision to review.
- 149.106 Notice of review.
- 149.107 Request for information.
- 149.108 Public hearing.
- 149.109 Decision under section 1424(e).
- 149.110 Resubmittal of redesigned projects.
- 149.111 Funding to redesigned projects.

AUTHORITY: Sec. 1424(e), Safe Drinking Water Act (42 U.S.C. 300h-3(e)); sec. 1427 of the Safe Drinking Water Act, (42 U.S.C. 300h-6).

Subpart A—Criteria for Identifying Critical Aquifer Protection Areas

SOURCE: 52 FR 23986, June 26, 1987, unless otherwise noted.

§149.1 Purpose.

The purpose of this subpart is to provide criteria for identifying critical aquifer protection areas, pursuant to section 1427 of the Safe Drinking Water Act (SDWA).

§149.2 Definitions.

(a) *Aquifer* means a geological formation, group of formations, or part of a formation that is capable of yielding a significant amount of water to a well or spring.

(b) *Recharge* means a process, natural or artificial, by which water is added to the saturated zone of an aquifer.

(c) *Recharge Area* means an area in which water reaches the zone of saturation (ground water) by surface infiltration; in addition, a *major recharge area*

is an area where a major part of the recharge to an aquifer occurs.

(d) *Sole or Principal Source Aquifer (SSA)* means an aquifer which is designated as an SSA under section 1424(e) of the SDWA.

[54 FR 6843, Feb. 14, 1989]

§149.3 Critical Aquifer Protection Areas.

A Critical Aquifer Protection Area is either:

(a) All or part of an area which was designated as a sole or principal source aquifer prior to June 19, 1986, and for which an areawide ground-water quality protection plan was approved, under section 208 of the Clean Water Act, prior to that date; or

(b) All or part of a major recharge area of a sole or principal source aquifer, designated before June 19, 1988, for which:

(1) The sole or principal source aquifer is particularly vulnerable to contamination due to the hydrogeologic characteristics of the unsaturated or saturated zone within the suggested critical aquifer protection area; and

(2) Contamination of the sole or principal source aquifer is reasonably likely to occur, unless a program to reduce or prevent such contamination is implemented; and

(3) In the absence of any program to reduce or prevent contamination, reasonably foreseeable contamination would result in significant cost, taking into account:

(i) The cost of replacing the drinking water supply from the sole or principal source aquifer, and

(ii) Other economic costs and environmental and social costs resulting from such contamination.

[54 FR 6843, Feb. 14, 1989]

Subpart B—Review of Projects Affecting the Edwards Underground Reservoir, A Designated Sole Source Aquifer in the San Antonio, Texas Area

SOURCE: 42 FR 51574, Sept. 29, 1977, unless otherwise noted. Redesignated at 52 FR 23986, June 26, 1987.



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Watershed Protection
Wetlands

Appendix G

Section 1424(e) Safe Drinking Water Act Creating the Sole Source Aquifer Program

(e) If the Administrator determines, on his own initiative or upon petition, that an area has an aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health, he shall publish notice of that determination in the Federal Register. After the publication of any such notice, no commitment for Federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be entered into for any project which the Administrator determines may contaminate such aquifer through a recharge zone so as to create a significant hazard to public health, but a commitment for Federal financial assistance may, if authorized under another provision of law, be entered into to plan or design the project to assure that it will not so contaminate the aquifer.

TABLE OF CONTENTS

- [Chapter 1.](#) Introduction
- [Chapter 2.](#) Overview of Petition Processing
- [Chapter 3.](#) Phase I - Petition Preparation
- [Chapter 4.](#) Phase II - Initial Petition Review / Determination of Completeness
- [Chapter 5.](#) Phase III - Detailed Review / Technical Verification
- [Chapter 6.](#) Phase IV - Designation Determination

APPENDICES

- [A.](#) Sole Source Aquifer Definitions
- [B.](#) Sole Source Fact Sheet
- [C.](#) Sources of Technical Information
- [D.](#) EPA Regional Contacts
- [E.](#) Completeness Determination Checklist
- [F.](#) Statements of Meaning--Minimum Set of Data Elements for Wells
- [G.](#) Section 1424(e) Safe Drinking Water Act

For information on this page, contact: Rinaldo.Lawrence@epamail.epa.gov

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Last updated on Wednesday, June 25th, 2003

- 6 0.75 [EPA: Federal Register: Revisions to the Underground Injection Control Regulations for Class V Injection Wells](http://www.epa.gov/EPA-WATER/1998/July/Day-29/w19936.htm)
<http://www.epa.gov/EPA-WATER/1998/July/Day-29/w19936.htm>
Summary: These are motor vehicle waste disposal wells, industrial waste disposal wells, and cesspools in ground water-based source water protection areas. Sec. 144.85 description of when additional requirements apply to Class V cesspools, motor vehicle waste disp
- 7 0.75 [EPA: Federal Register: Revisions to the Underground Injection Control Regulations for Class V Injection Wells](http://www.epa.gov/EPA-WATER/1999/December/Day-07/w31048.htm)
<http://www.epa.gov/EPA-WATER/1999/December/Day-07/w31048.htm>
Summary: SUMMARY: Today the Environmental Protection Agency (EPA) is promulgating revisions to the Class V Underground Injection Control (UIC) regulations. 4. Motor Vehicle Waste Disposal Wells In its proposal, EPA determined that injection wells located in ground
- 8 0.75 [EPA: Federal Register: Pipeline Safety: Areas Unusually Sensitive to Environmental Damage](http://www.epa.gov/EPA-WATER/1999/December/Day-30/w33614.htm)
<http://www.epa.gov/EPA-WATER/1999/December/Day-30/w33614.htm>
Summary: SUMMARY: This proposed rule defines drinking water and ecological areas that are unusually sensitive to environmental damage if there is a hazardous liquid pipeline release. Participants identified public water systems, wellhead protection areas, and sol
- 9 0.75 [EPA: Federal Register: Pipeline Safety: Areas Unusually Sensitive to Environmental Damage](http://www.epa.gov/EPA-GENERAL/1999/December/Day-30/g33614.htm)
<http://www.epa.gov/EPA-GENERAL/1999/December/Day-30/g33614.htm>
Summary: SUMMARY: This proposed rule defines drinking water and ecological areas that are unusually sensitive to environmental damage if there is a hazardous liquid pipeline release. Participants identified public water systems, wellhead protection areas, and sol

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Search performed on Tuesday, March 02, 2004

APPENDIX 4.2
Groundwater Flow and Velocity

Job No. 8WEL010100 Sheet 1 of 1

Prepared by BRH Date 5/17/2007

Project Name WASATCH REGIONAL LANDFILL

Reviewed by _____ Date _____

Title GROUNDWATER VELOCITY CALC.

FWA No. _____

$$i = \frac{\Delta H}{L} = \frac{4230 - 4220}{1917}$$

In "steps" area

$$i = 0.0052$$

$$i = 0.52\%$$

$$k \approx 1 \times 10^{-7} \text{ cm/s}$$

$$v_d = ki$$

$$v_d = 5.2 \times 10^{-7} \text{ cm/s}$$

$$v = \frac{ki}{n} = \frac{v_d}{n}$$

$$n = 0.25$$

$$v = 2.1 \times 10^{-6} \text{ cm/s} \quad (2.2 \text{ ft/year})$$

Job No. 81066010100 Sheet 1 of 1

Prepared by Bret Date 5/17/2004

Project Name WASATCH REGIONAL LANDFILL

Reviewed by _____ Date _____

Title POROSITY CALCULATIONS

FWA No. _____

$$A + B - 1 \quad w \approx 20\%$$

$$S = 1$$

$$\gamma_d = 87 \text{ pcf}$$

$$\gamma = \gamma_d (1 + w)$$

$$= 87(1.2)$$

$$\gamma = 104 \text{ pcf}$$

$$G_s = \frac{\gamma}{\gamma_w} = \frac{104}{62.4} = 1.67$$

$$S_e = w G_s$$

$$e = \frac{(0.2)(1.67)}{1} = 0.33$$

$$n = \frac{e}{1 + e} = \frac{0.33}{1.33} = 0.25$$

$$n_e = n \quad \text{Assume } \lambda = 1$$

$$n_e = n = 0.25$$



WELLPRT Well Log Information Listing

Version: 2002.04.04.00 Rundate: 09/17/2003 04:28 PM

Utah Division of Water Rights

Water Well Log

LOCATION:

S 20 ft E 2775 ft from NW CORNER of SECTION 3 T 1N R 8W BASE SL Elevation:
01

OWNER(S):

OWNER: BINGHAM ENVIRONMENTAL INC.
ADDRESS: 5160 WILEY POST WAY
CITY: SALT LAKE CITY STATE: UT ZIP: 84116
REMARKS: 8015322230DAVE CLINE OR BRAD LINDSAY

DRILLER ACTIVITIES:

ACTIVITY # 1
DRILLER: CONETEC INC LICENSE #: 745
START DATE: / / COMPLETION DATE: / /