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UTAH DIVISION OF
SOLID & HAZARDOUS WASTE

PERMIT APPLICATION
CLASS V MUNICIPAL SOLID WASTE DISPOSAL FACILITY

WASATCH REGIONAL SOLID WASTE LANDFILL

PREPARED FOR:

THE UTAH STATE DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ),
DIVISION OF SOLID AND HAZARDOUS WASTE

AND

WASATCH REGIONAL SOLID WASTE MANAGEMENT CORPORATION
P.O. BOX 681333
PARK CITY, UTAH 84068

PREPARED BY:

P S O M A S

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November 2004

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Glossary of Acronyms

ADC	Alternate Daily Cover
AGRC	Automated Geographic Reference Center
AMC	Antecedent Moisture Condition
API	American Petroleum Institute
ARC	Antecedent Runoff Condition
BLM	Bureau of Land Management
BMP	Best Management Practices
CAD	Computer Aided Drafting/Design
C&D	Construction and Demolition
CAS	Chemical Abstracts Service
CCL	Compacted Clay Liner
CCN	Composite Curve Number
CFR	Code of Federal Regulations
CQA	Construction Quality Assurance
CWA	Clean Water Act
DEM	Digital Elevation Model
DEQ	Department of Environmental Quality
DWR	Division of Water Rights
DWR	Division of Wildlife Resources
DWR	Division of Water Resources
EG	Emission Guidelines
EPA	Environmental Protection Agency
ET	Evapotransportation
FEMA	Federal Emergency Management Agency
FWPCA	Federal Water Pollution Control Act
GCL	Geosynthetic/Geocomposite Clay Liner
HDPE	High Density Polyethylene
HELP	Hydrologic Evaluation of Landfill Performance
LAI	Leaf Area Index
LCRS	Leachate Collection and Removal System
LCS	Leachate Collection System
LEL	Lower Explosion Limit
LFG	Landfill Gas
MOLO	Manager of Landfill Operations
MSW	Municipal Solid Waste

NAD 27	North American Datum of 1927
NMOC	Non-Methane Organic Compound
NOAA	National Oceanic and Atmospheric Administration
NRCS	National Resources Conservation Service
NSPS	New Source Performance Standards
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act
SCS	Soil Conservation Service
SDWA	Safe Drinking Water Act
SITLA	State School and Institutional Trust Land Administration
SPCC	Spill Prevention Control and Countermeasure
SSA	Sole Source Aquifer
SWANA	Solid Waste Association of North America
SWPP	Storm Water Pollution Prevention
SWPPP	Storm Water Pollution Prevention Plan
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality
UEL	Upper Explosive Limit
UPDES	Utah Pollution and Discharge and Elimination System
USACE	US Army Corps of Engineers
USDA	US Department of Agriculture
USGS	US Geological Survey
WES	Waterways Experiment Station
WQA	Water Quality Act
WRSWMC	Wasatch Regional Solid Waste Management Corporation

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Section 1 – General Information

1.1 Facility Descriptions, Plans, and Maps

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 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.

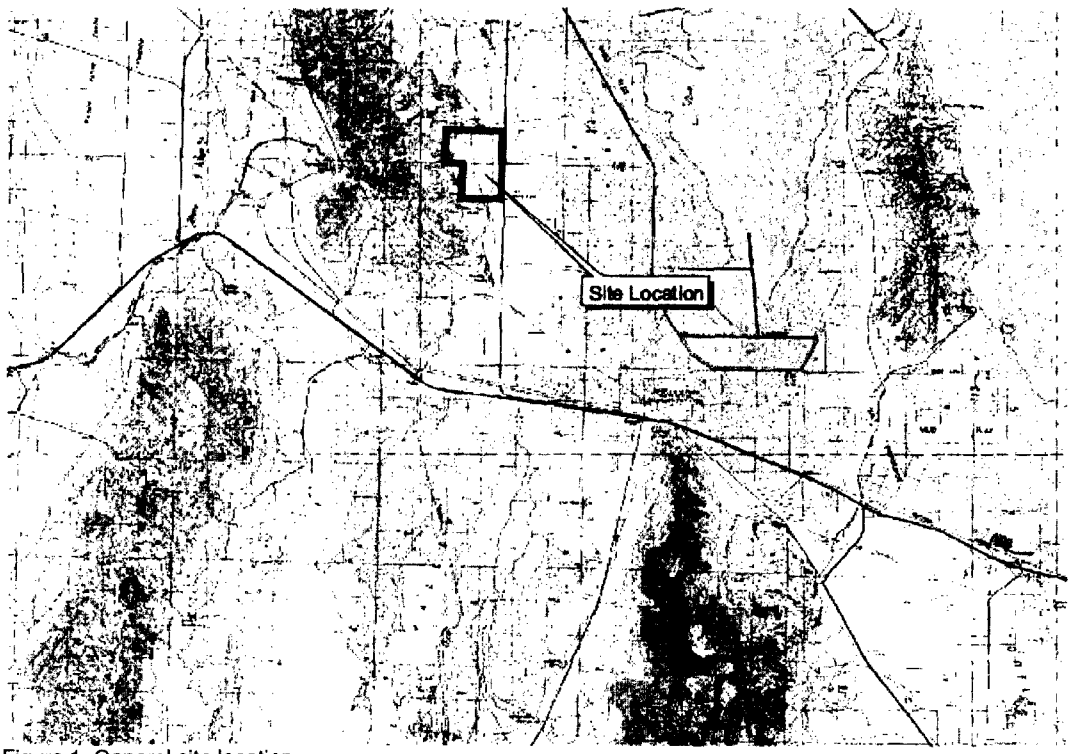

Figure 1. General site location.

There are no residences within several miles of the Wasatch landfill 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 3,000 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 Wasatch landfill site.

Plans, exhibits, figures, and maps are contained in this permit application. Exhibit 1 illustrates the overall site plan.

1.2 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 (see Appendix 1.2 for the Lease Agreement and Proof of Ownership). 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.

1.2.1 Legal Description of Location

The Wasatch landfill site, shown in more detail in Figure 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.*

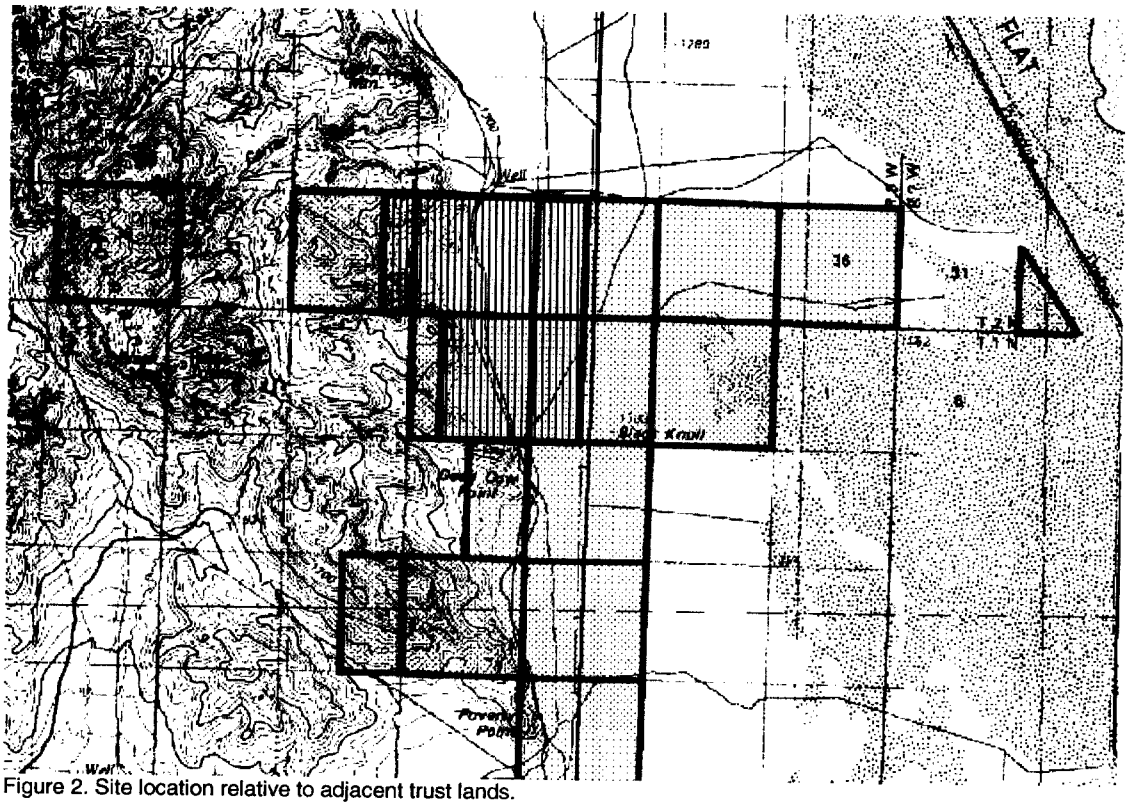

Figure 2. Site location relative to adjacent trust lands.

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

1.2.2 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 Wasatch Regional Solid Waste Management Corporation ("Wasatch Regional") to operate the landfill site. The land will be transferred to Wasatch Regional for landfill construction in accordance with the lease agreement. A letter of support/consent from SITLA was obtained and is included as Appendix 1.1. Appendix 1.2 contains Proof of Ownership and the Lease Agreement.

1.2.3 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.

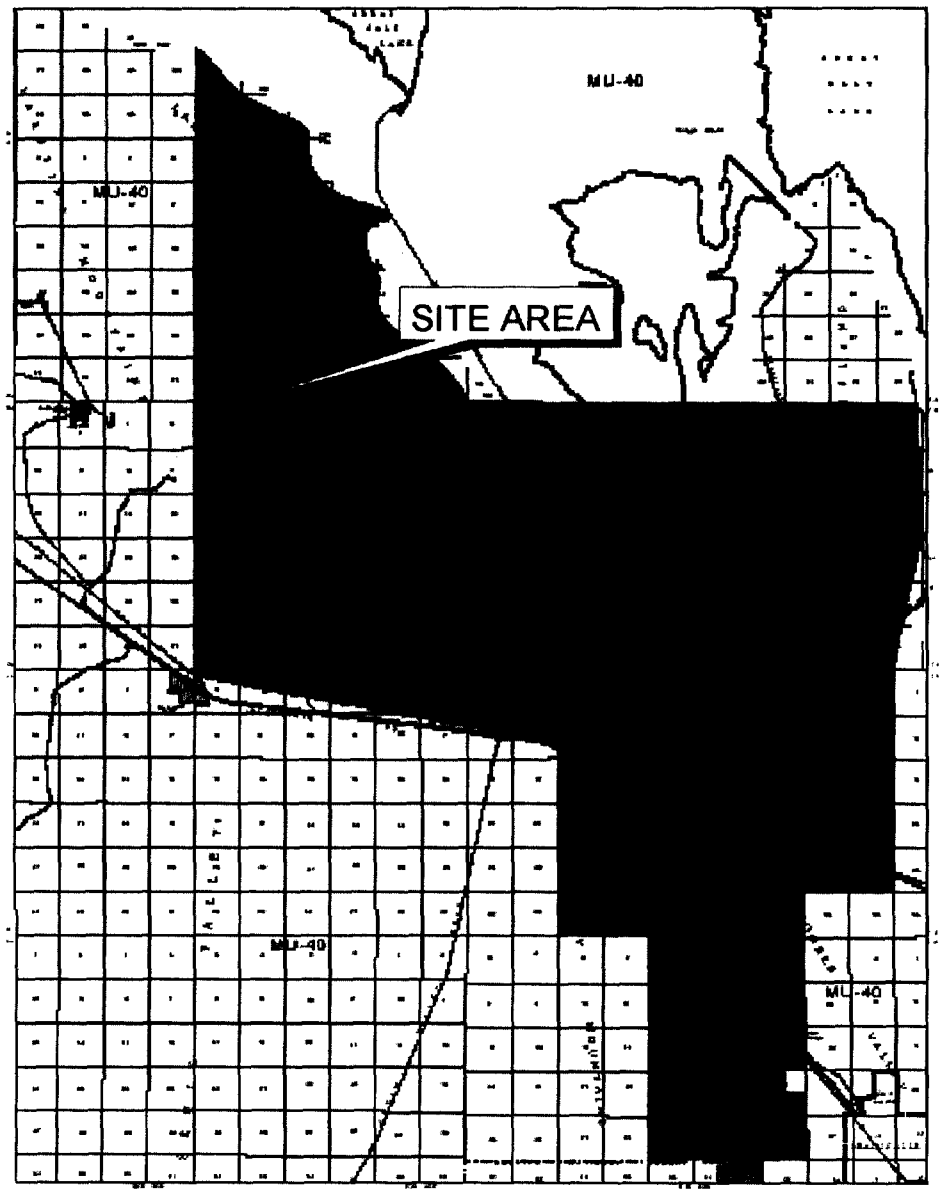

Figure 3. Zoning districts within the Delle USGS quadrangle. Zone MU-40 (shown in light blue) surrounds most of zone MG (shown in dark purple).

1.3 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 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

1.4 Class V Landfill Status

A Class V landfill is defined as a commercial nonhazardous solid waste disposal facility that is permitted by the Executive Secretary to receive municipal solid waste, any other nonhazardous solid waste, not otherwise limited by rule or solid waste permit and waste from conditionally exempt small quantity generator of hazardous waste as defined by Section R315-2-5.

Class V landfills are facilities that are operated for a profit. The type of waste that is received is dependent on the permit and can be all nohazardous solid waste, industrial waste, construction/demolition waste, or any combination of these.

1.5 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.

Initially, the expected waste stream is expected to increase from 1,200 to 3,000 tons/day in the first few years, and eventually be able to accommodate up to 10,800 tons/day of solid waste at buildout via either truck and/or rail. If needed, this daily capacity rate can be increased.

Wasatch also plans to construct, if and when appropriate, a separate Construction and Demolition (C&D) waste cell for its municipal customers who process such waste. At the appropriate time, this Class IV cell will be permitted and constructed to meet the regulatory requirements of the waste type.

1.6 Schedule of Construction

As per regulation (315-302-2(2)(a)), a description of the intended schedule of construction is required.

Facility plan approvals will be reviewed by the Executive Secretary no later than 18 months after the permit is issued and periodically thereafter, to determine if the schedule of construction is reasonably being followed. Failure to comply with the schedule of construction may result in revocation of the plan approval.

The Wasatch Regional landfill will submit final design plans six months after obtaining all the permits required for construction. Within three months of approval of the design plans, the construction bidding and the contractor selection will begin. The Wasatch Regional landfill will begin construction three months after the bidding phase contractor selection. The first phase of The Wasatch Regional Solid Waste facility will be completed within one construction season.

Appendix 1.1
SITLA Support Letter

State of Utah

School and Institutional
TRUST LANDS ADMINISTRATION

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

Michael O. Leavitt
Governor

Kevin S. Carter
Director

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.

Sincerely,

Kevin S. Carter
Director

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

AGENT AUTHORIZATION

I(we), State of Utah, School & Institutional Trust Lands Administratio, 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.

Director (Property Owner)

(Property Owner)

(Property Owner)

(Property Owner)

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

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

NOTARY PUBLIC
Michelle Lee Barndt
875 East 500 South #500
Salt Lake City, Utah 84102
Commission Expires
June 1, 2005
STATE OF UTAH

Michelle Lee Barndt (Notary)

Residing in: SLC, UT

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 1.2
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**

257020.7

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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.

(iii) JR

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)(~~ii~~) 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(c)**, 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 in 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 1 Environmental Assessment. Prior to entering into this Agreement, SITLA provided Wasatch with a phase 1 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 Title Insurance Company (_____) ("**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.

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.

the sale price under Section 2.1

(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**").

(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 _____
Name: Kevin Scott Carter
Title: Director

Approved as to Form:

_____
Mark L. Shurtleff, Utah Attorney General
by Joshua D. Andrews, Special Assistant Attorney General

WASATCH:

WASATCH REGIONAL SOLID WASTE MANAGEMENT CORPORATION,
a Utah corporation

By _____
Name: ~~Kevin S. Garn~~ John D. Hoffman
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___

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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 1
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 $7,800,000.

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 60 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 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 5.2** 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, prorations 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 boa 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
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2087	49,980,000
2088	49,980,000
2089	49,980,000
2090	49,980,000
2091	49,980,000
2092	49,980,000
2093	49,980,000
2094	49,980,000
2095	49,980,000
2096	49,980,000
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 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

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__

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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 **WASATCH 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 1
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 environmental, 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.

(l) 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 lessee; 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 of 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: _____

Appendix 1.3
Property Ownership

Form 1860-9
(January 1988)

The United States of America

To all to whom these presents shall come, Greeting:

UTU-79162-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. 1716, 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, S½N½, S½ (All).
Containing 678.24 acres, more or less, of surface and minerals.

Patent Number 43-2001-0012

UTU-79162-FD

Parcel #1005
T. 1 N., R. 8 W.,
Sec. 4, Lots 1-4, S½N½, S½ (All),
Containing 679.04 acres, more or less, of surface and minerals.

Parcel #1006
T. 1 N., R. 8 W.,
Sec. 9, E½,
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, E½,
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, E½, E½W½ (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, NE¼, E½NW¼, NE¼SW¼, N½SE¼, SE¼SE¼.
Containing 480.17 acres, more or less, of surface and minerals.

Parcel #1016
T. 1 S., R. 6 W.,
Sec. 29, SW¼SW¼.
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, W½E½, W½.
Containing 480.00 acres, more or less, of surface and minerals.

Parcel #1019
T. 1 S., R. 7 W.,
Sec. 29, W½NE¼, W½.
Containing 400.00 acres, more or less, of surface and minerals.

Parcel #1020
T. 1 S., R. 8 W.,
Sec. 1, Lots 1-4, S½N½, S½ (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, SE¼NE¼.
Containing 204.84 acres, more or less, of surface and minerals.

Parcel #1022
T. 2 S., R. 5 W.,
Sec. 6, Lots 3-5, SE¼NW¼.
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, SE¼NE¼.
Containing 80.02 acres, more or less, of surface and minerals.

Parcel #1024
T. 3 S., R. 6 W.,
Sec. 27, S½NW¼, SW¼, S½SE¼.
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 30, 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-66591, issued pursuant to Section 507 of the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to Lot 2, NE¼SW¼, NW¼SE¼, SE¼SE¼, Section 31, T. 1 N., R. 8 W.; S½SW¼, SW¼SE¼, Section 1; Lots 3, 4, SE¼NE¼, 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 SE¼SE¼, 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 SE¼SE¼, 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, SE¼NW¼, Section 5, T. 2 S., R. 5 W.; Lot 1, SE¼NE¼, Section 1, T. 2 S., R. 6 W.; Lot 3, SE¼NW¼, E½SW¼, Section 3; E½W½, Section 10; E½W½, Section 15; E½W½, Section 22; NE¼NW¼, NW¼NE¼, S½NE¼, Section 27, T. 1 N., R. 8 W.; E½W½, Section 34, T. 2 N., R. 8 W., (Parcels #1002, 1004, 1007, 1008, 1010, 1011, 1023);

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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, 1976, (90 Stat. 2776, 43 U.S.C. 1761); as to the SW¼SW¼, Section 29, T. 1 S., R. 6 W.; SE¼SE¼, Section 31, T. 1 N., R. 8 W.; S½SW¼, Section 1; Lots 2, 3, 4, SE¼NE¼, 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 NW¼SE¼, SE¼SE¼, 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-062680, issued pursuant to the Act of March 3, 1875, (18 Stat. 482); as to Lot 2, NE¼SW¼, NW¼SE¼, SE¼SE¼, Section 31, T. 1 N., R. 8 W.; Lots 2, 3 , 4, SE¼NE¼, Section 5; S½SW¼, SW¼SE¼, 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 S½SE¼SE¼, Section 30; N½NE¼NE¼, 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 W½NE¼, SE¼NW¼, E½SW¼, NW¼SE¼, Section 17; E½NW¼, N½SW¼, SW¼SW¼, Section 20; W½W¼, 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 SW¼SE¼, Section 17; SW¼SW¼, Section 22; N½NW¼, S½NE¼, NE¼SE¼, 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, SE¼SW¼, Section 30; E½NW¼, SW¼NE¼, NE¼SW¼, 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, 1958 (72 Stat. 885); as to Lot 4, Section 5, T. 1 S., R. 8 W., (Parcel #1021);

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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 W½E½, E½W½, Section 34, T. 2 N., R. 8 W.; W½E½, E½W½, Section 3; W½E½, E½W½, Section 10; W½E½, E½W½, Section 15; W½E½, E½W½, Section 22; W½E½, E½W½, 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 E½W½, Section 34, T. 2 N., R. 8 W., E½W½, Section 3; E½W½, Section 10; E½W½, Section 15; E½W½, SW¼SW¼, Section 22; NW¼NW¼, Section 27; E½NE¼, SW¼NE¼, SE¼SW¼, W½SE¼, 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 E½W½, Section 34, T. 2 N., R. 8 W.; E½W½, Section 3; E½W½, Section 10; E½W½, Section 15; E½W½, Section 22; NE¼NW¼, 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 E½W½, 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 S½SE¼, Section 15; NW¼NE¼, 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 NE¼NE¼, Section 34; W½NW¼, N½SW¼, SE¼SW¼, 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 W½NE¼, SE¼NW¼, E½SW¼, Section 17; E½NW¼, N½SW¼, SW¼SW¼, Section 20; W½W½, 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-18180, issued pursuant to the Act of February 15, 1901 (31 Stat. 790; 43 U.S.C. 959); as to the W½E½, Section 34, T. 2 N., R. 8 W.; W½E½, Section 3; W½E½, Section 10; W½E½, Section 15; W½E½, Section 22; W½E½, Section 27, T. 1 N., R. 8 W., (Parcels #1002, 1004, 1007, 1008, 1010, 1011);

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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 S½SE¼, Section 22; N½NE¼, Section 27, T. 1 N., R. 8 W., (Parcels #1010 and 1011);

21. Those rights for a haul road, granted to Holnam, 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 S½SW¼, Section 22; N½NW¼, 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 NW¼SW¼, 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 W½W½ 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 SW¼SE¼, Section 27, T. 1 N., R. 8 W.; S½SW¼, 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 S½SE¼, Section 22; N½NE¼, 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 E½NE¼, E½SE¼, SW¼SE¼, 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 E½W½, Section 34, T. 2 N., R. 8 W.; E½W½, Section 3; E½W½, Section 10; E½W½, Section 15; E½W½, SW¼SW¼, Section 22; NW¼NW¼, Section 27; E½NE¼, SW¼SE¼, NW¼SE¼, S½SW¼, Section 28; Lot 4, Section 30; Lot 1, E½NW¼, NE¼SW¼, NW¼SE¼, E½SE¼, 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);

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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-58148, issued pursuant to the Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761); as to Lot 2, NE¼SW¼, NW¼SE¼, SE¼SE¼, Section 31, T. 1 N., R. 8 W.; S½SW¼, SW¼SE¼, Section 1, Lots 1-4, SE¼NE¼, 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 W½NE¼, SE¼NW¼, E½SW¼, Section 17; E½NW¼, N½SW¼, SW¼SW¼, Section 20; W½W½ 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 SE¼NW¼, 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, NE¼SW¼, NW¼SE¼, 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, SE¼NW¼, NE¼SW¼, NW¼SE¼, E½SE¼, Section 31, T. 1 N., R. 8 W.; S½S½, 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 W½NE¼, SE¼NW¼, E½SW¼, Section 17; E½NW¼, N½SW¼, SW¼SW¼, Section 20; W½W½, 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, SE¼NE¼, 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 S½, Section 27; SE¼, Section 28, T. 1 N., R. 8 W.; Section 1, T. 1 S., R. 8 W., (Parcels #1011 and 1012);

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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 S½S½ Section 22; N½N½ 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 the Act of October 21, 1976 (90 Stat. 2781, 43 U.S.C. 1767); as to the NE¼, Section 17; NW¼, NW¼NE¼ 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 NW¼SW¼, 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 Skunk 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 22, 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);

Form 1860-10
(April 1988)

UTU-79162-FE

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).

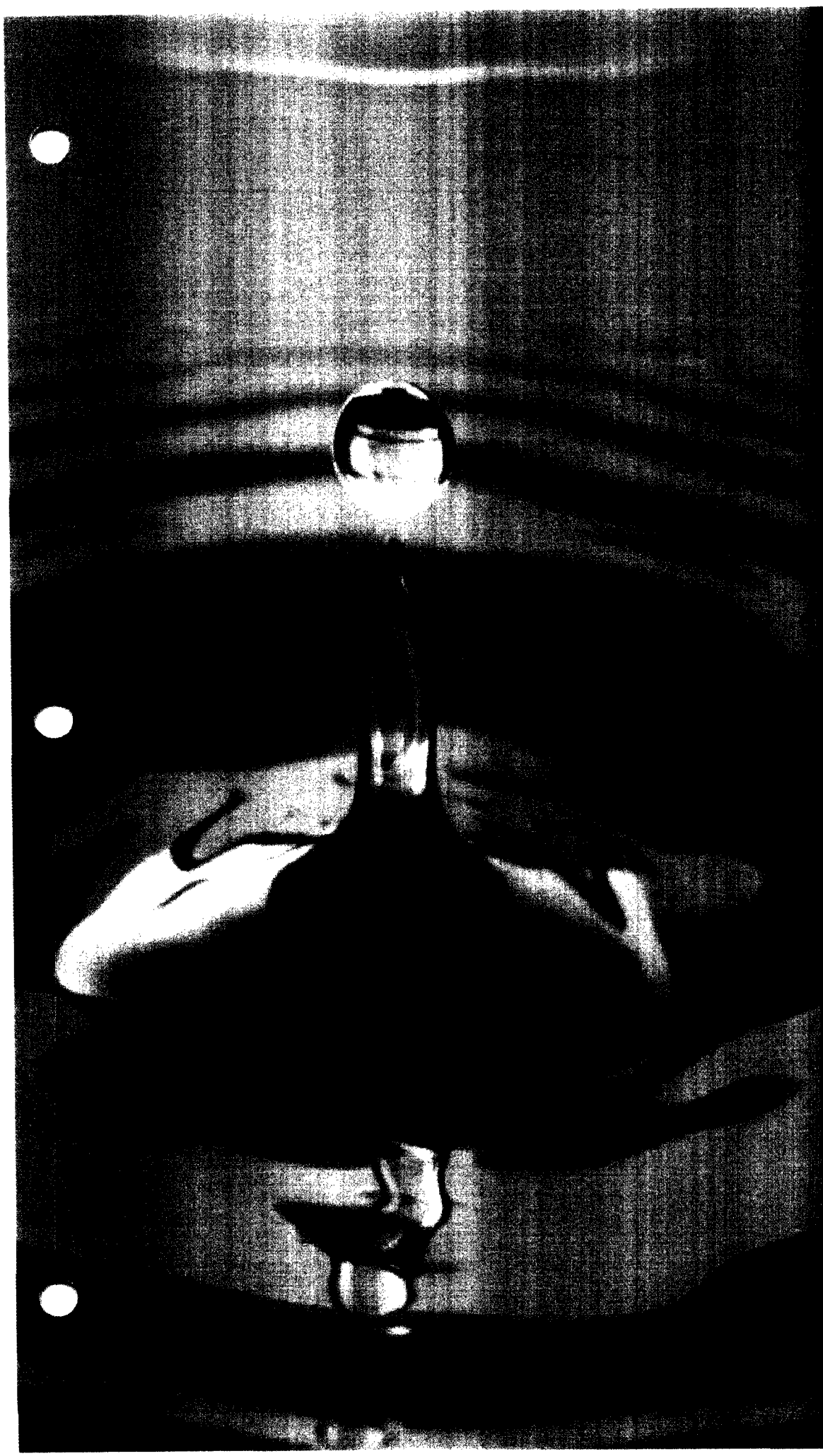
IN TESTIMONY WHEREOF, the undersigned authorized officer of the Bureau of Land Management, in accordance with the provisions of the Act of June 17, 1948 (62 Stat. 476), has, in the name of the United States, caused these letters to be made Patent, and the Seal of the Bureau to be hereunto affixed.

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 1.4
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;

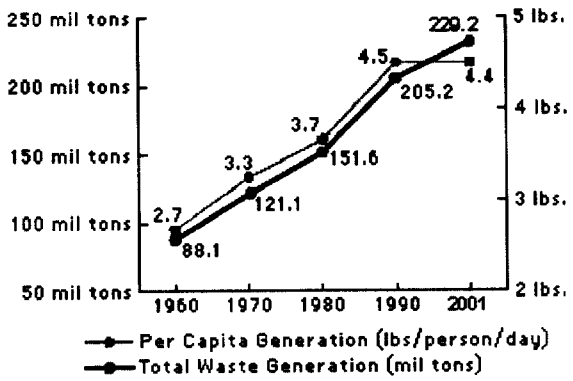
b) a description of the public benefits of the proposed facility, including:

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 1. 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.

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Section 2 - Facility Location Standards

2.1 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.

2.2 Site Buffer

Figure 1, in Appendix 2.1, demonstrates that the proposed Wasatch landfill site boundary does not contain parks, monuments, or recreation areas (United Stated 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.

2.3 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 proposed site boundary. Additional details, support, and the letter from DWR can be found in Appendix 2.8. The proposed landfill is not located in a wildlife management area.

2.4 Farmland

Appendix 2.2 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 farmland 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.

2.5 Existing Residences

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

2.6 Archeological/Cultural Features

A signed letter from Jim Dykmann, State Deputy Historic Officer, is included in Appendix 2.3. It certifies that no important archeological or historical sites are located within the site boundary.

2.7 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).

2.8 Geology

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

- Subsidence;
- Dam failure flood potential;
- Over underground mines;
- Over salt domes or salt beds;
- Geologic features that could compromise structure stability;
- Within 200' of a Holocene fault;
- Seismic impact zones (unless containment systems are designed to withstand the impact of a seismic event);
- Unstable areas.

The geotechnical report found in Appendix 2.7 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 2 in Appendix 2.4 illustrates the general geologic features in the site vicinity, Appendix 2.5 shows the geologic cross section for the proposed Wasatch landfill site. See Section 5 for a more detailed discussion of site geology.

2.9 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 Wasatch landfill 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 5 for additional discussion of site hydrology.

2.10 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 proposed Wasatch landfill 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 Appendix 2.6. 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 2.6.

2.11 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, the groundwater level (where found) is currently 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 5 for a more detailed discussion of groundwater issues as they relate to siting criteria and location standards.

Appendix 2.1
Figure 1, 1,000' Buffer

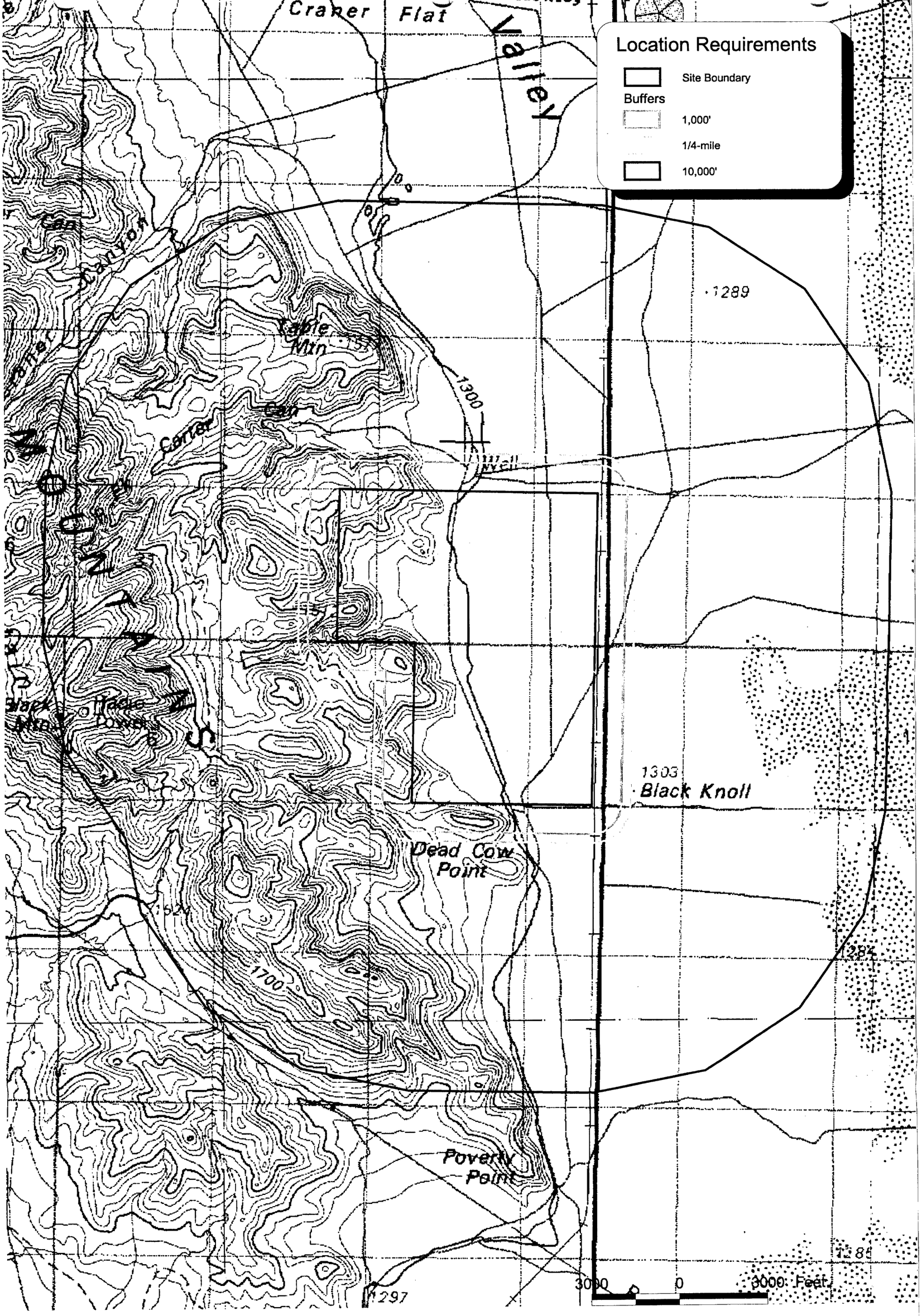

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Figure 1
Site Vicinity Map

Appendix 2.2
NRCS Farmland Data

United States Department of Agriculture
NRCS Natural Resources Conservation Service

Utah

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.

Prime Soils Legends | Utah NRCS - Microsoft Internet Explorer

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Address http://www.ut.nrcs.usda.gov/technical/soils/biggieprime.html

United States Department of Agriculture

NRCS Natural Resources Conservation Service

Utah

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Utah

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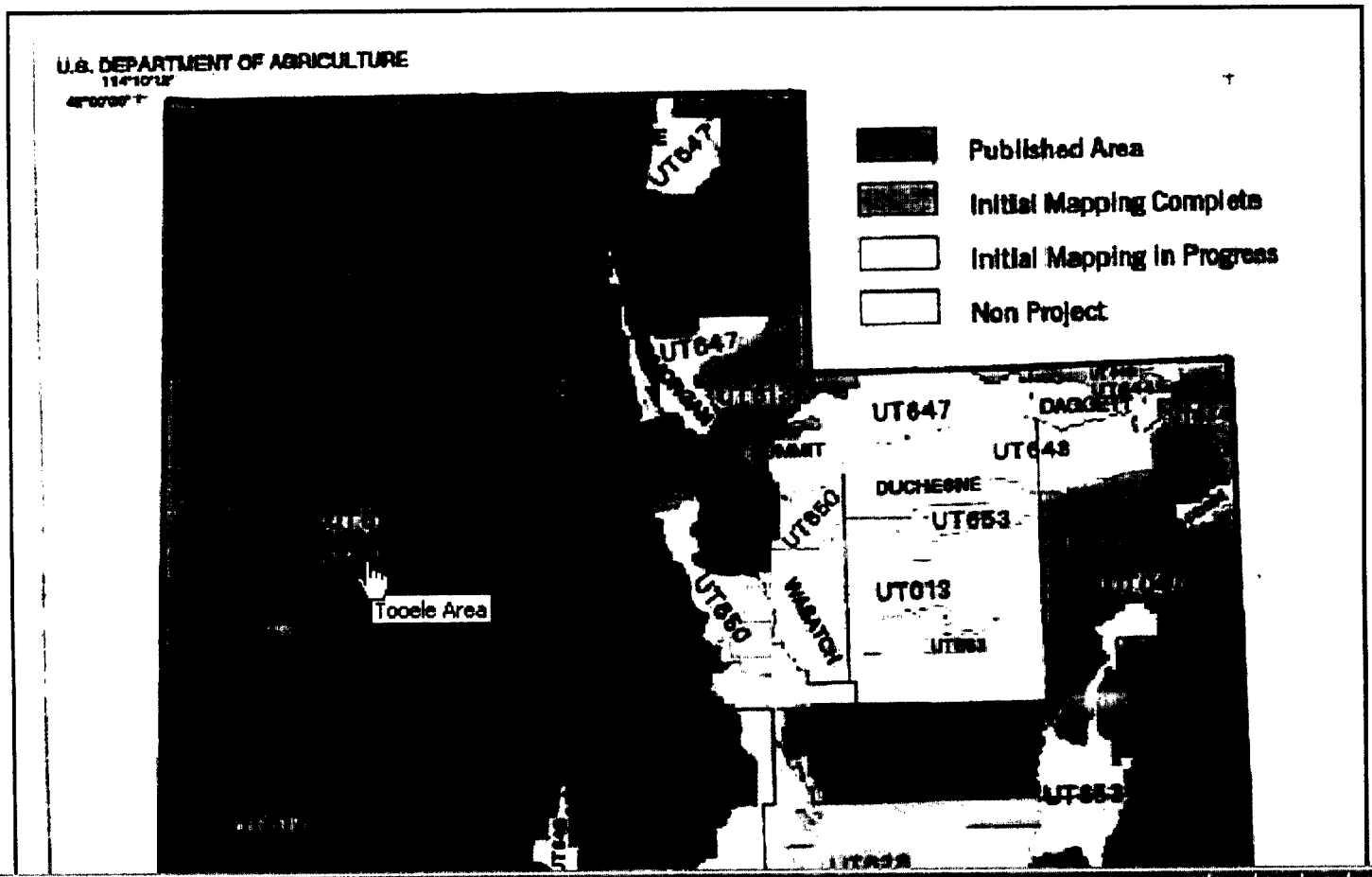
Technical Resources

- 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

Utah's Prime Farmland Legends | Utah NRCS

For an alternate way to get Utah's Prime Farmland Legends click here



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Utah

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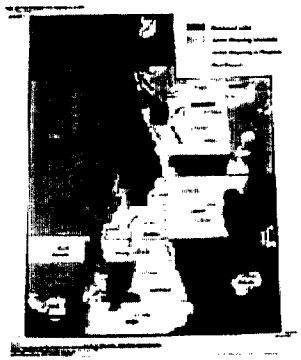
Technical Resources

- 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

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

Print date:

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 2.3
Letter from Jim Dykmann, State Deputy Historic Officer

State 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 F. 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.

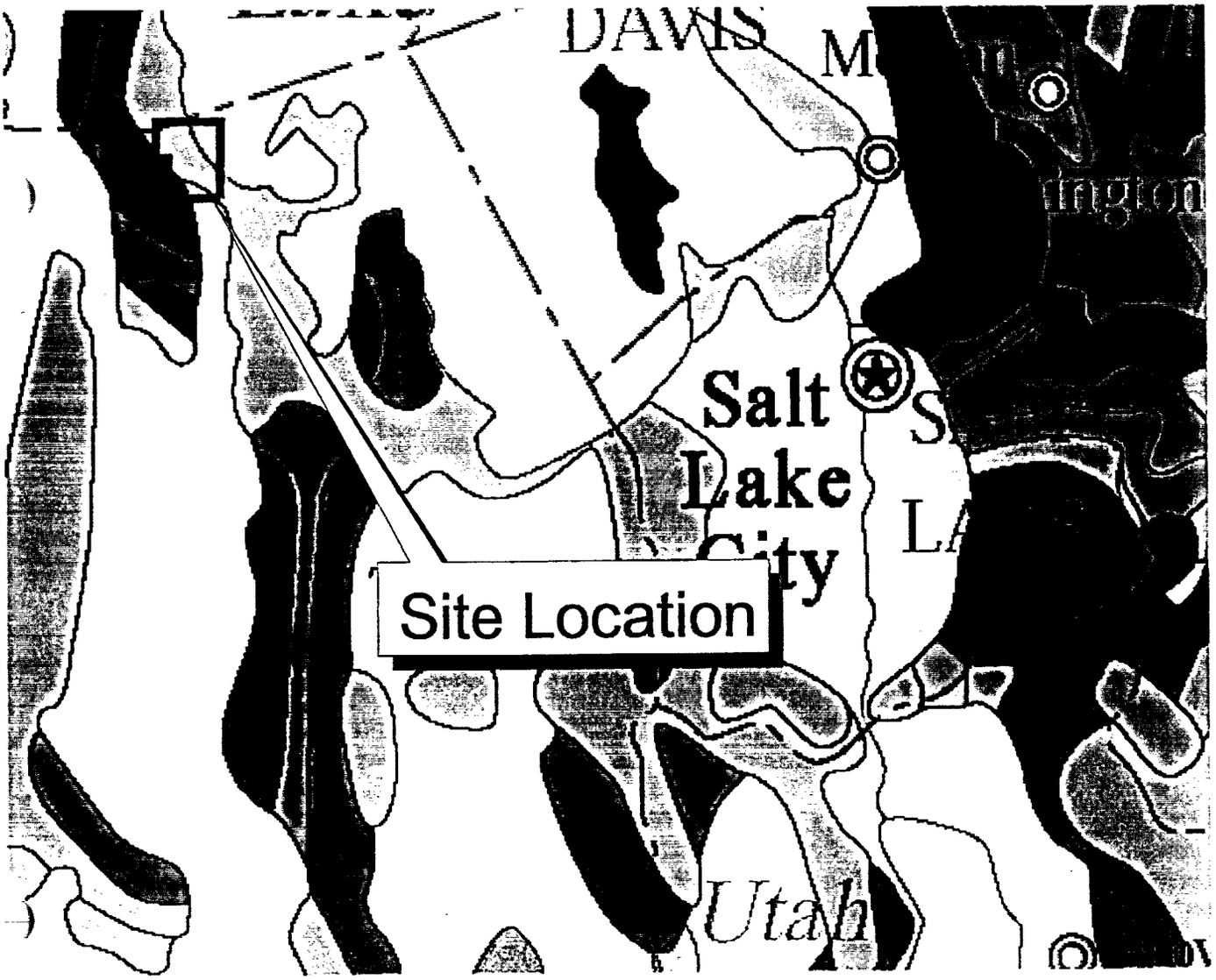
If you have questions, please contact me at (801) 533-3555. My email address is: jdykman@utah.gov

As ever,

James L. Dykmann
Deputy State Historic
Preservation Officer - Archaeology

JLD:03-1127 OR

Appendix 2.4
General Geologic Features



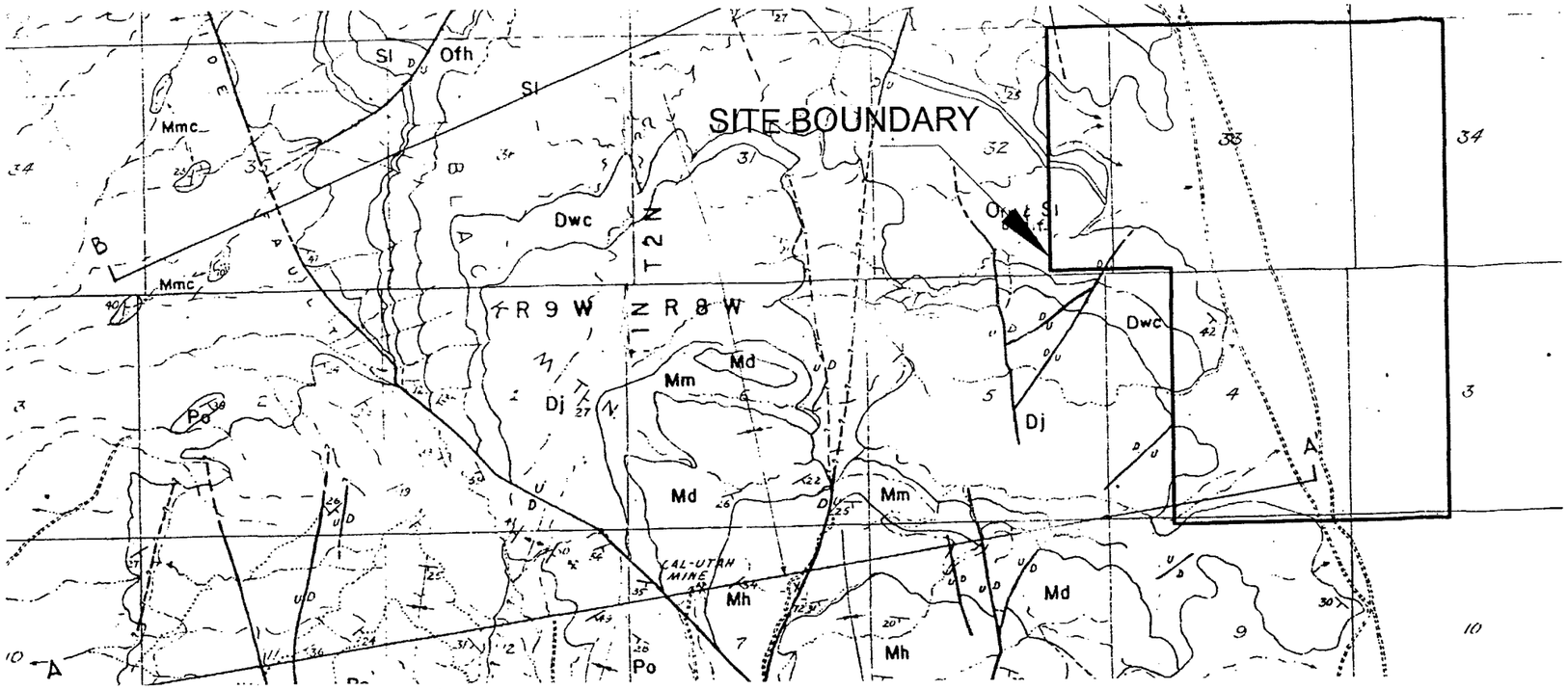
LEGEND

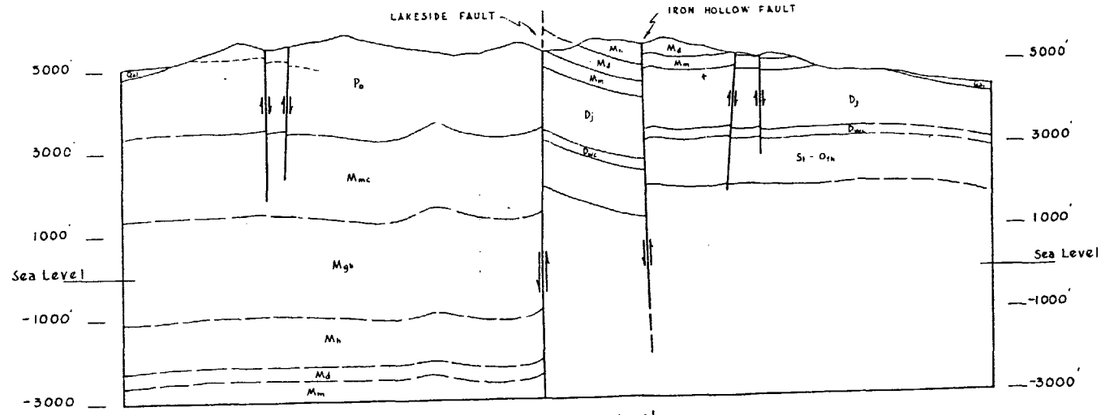
Quaternary mud flats	Tertiary (older)	Mississippian
Quaternary	Cretaceous	Ordovician-Silurian-Devonian
Basalt	Jurassic	Cambrian
Tertiary volcanics	Triassic	Precambrian
Tertiary (younger)	Pennsylvanian-Permian	Intrusive rocks

PSOMAS

Figure 2
Base Geology Map

Appendix 2.5
Figure 3, Geologic Cross-Section





STRUCTURE SECTION A-A'

PENNSYLVANIAN	Po	Oquirrh fm.
MISSISSIPPIAN	Mmc	Manning Canyon fm.
	Mgb	Great Blue ls.
	Mh	Humbug fm.
	Md	Deseret ls.
	Mm	Madison ls.
DEVONIAN	Dj	Jefferson dol.
	Dwc	Water Canyon fm.
SILURIAN	Sl	Laketown dol.
ORDOVICIAN	Ofh	Fish Haven dol.
	Osp	Swan Peak fm.
	Ogc	Garden City ls.
CAMBRIAN	€l	Lynch dol.
	€b	Bowman ls.
	€h	Hertmann ls.
	€o	Ophir sh.
	€t	Tintic qtzt.

DATE 2-5-2004
SCALE NTS
PROJECT NO. BWEL010100

WASATCH REGIONAL LANDFILL
GEOLOGIC CROSS SECTION

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED -
DRAWN BRH
CHECKED SSC

Appendix 2.6
Wet Area and Potential Wetland Determination

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.

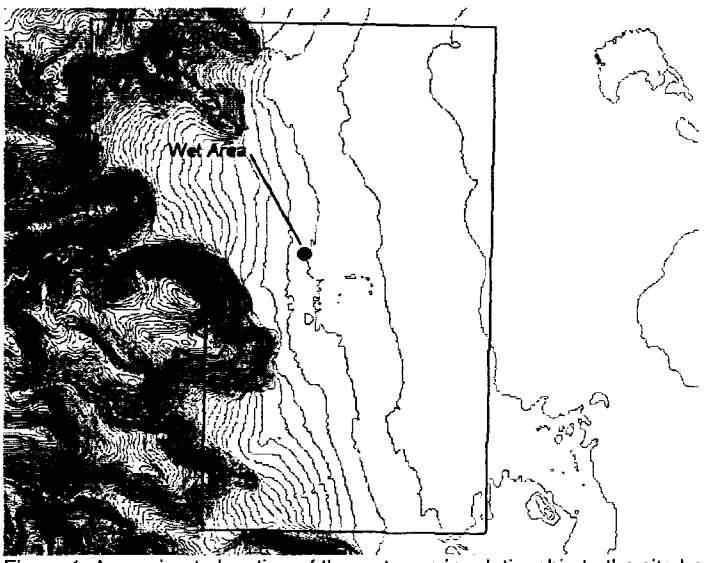


Figure 1. Approximate location of the wet area in relationship to the site boundary.

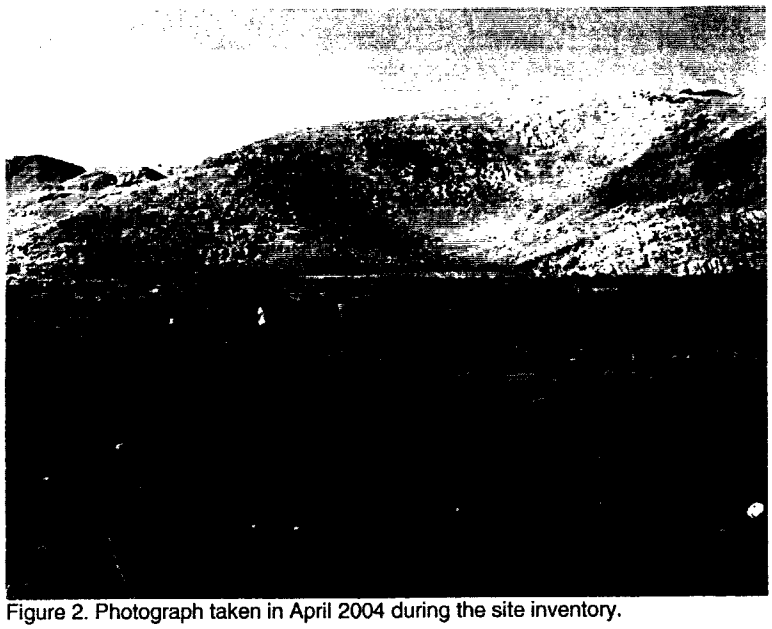


Figure 2. Photograph taken in April 2004 during the site inventory.

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 Tooele 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: Tooele Land fill Applicant/Owner: Wasatch Regional landfill Investigator: Jamie Tsandes / Ken Kass	Date: 4/9/04 County: Tooele State: Utah
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: Upland Transect ID: ____ Plot ID: ____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Sarcobatus vermiculatus		UPL	9.		
2. Ranunculus testiculatus		UPL	10.		
3. Poa Scinuda		UPL	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). Ø

Remarks: The site is dry, with some artificial water for cattle drinking.

HYDROLOGY

X Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
X Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: — (in.)

Depth to Free Water in Pit: — (in.)

Depth to Saturated Soil: — (in.)

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)

Remarks: 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.

SOILS

Map Unit Name (Series and Phase): Timpie

Drainage Class: deep well drained soils

Field Observations Confirm Mapped Type? (Yes) No

Taxonomy (Subgroup):

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
5-13"		10yr 5/4	—	—	

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: The soil is very dry.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No) (Circle)	
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	
		(Circle)
Is this Sampling Point Within a Wetland?		Yes (No)

Remarks: 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.

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Tooele Landfill Applicant/Owner: Wasatch Regional Landfill Investigator: Jamie Jeandes / Ron Kass	Date: 4/9/04 County: Tooele State: Utah
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: cattle watering area Transect ID: ____ Plot ID: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Distichlis spicata		FACW	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

X Recorded Data (Describe in Remarks): __ Stream, Lake, or Tide Gauge X 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: 0 (in.) Depth to Free Water in Pit: — (in.) Depth to Saturated Soil: — (in.)	

Remarks: 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

SOILS

Map Unit Name (Series and Phase): Timpie

Drainage Class: deep well drained

Field Observations Confirm Mapped Type? (Yes) No

Taxonomy (Subgroup):

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
5-18"		10yr 5/4	–	–	

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: The soil is saturated only on the surface

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No (Circle)	
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	
Is this Sampling Point Within a Wetland?		(Circle) Yes (No)

Remarks: Although the vegetation is FACW, 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.

Approved by HQUSACE 3/92

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.

Appendix 2.7
Geotechnical Report

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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Prepared for:

Mr. Scott Carlson, P.E.
Psomas
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, UT 84121

File No.: 35467.003

REVISED GEOTECHNICAL REPORT
WASATCH REGIONAL SOLID WASTE LANDFILL
TOOELE COUNTY, UTAH

Scott W. Davis, P.E.
Geotechnical Division Manager

for
Curt Christensen, P.E.
Principal Geotechnical Engineer

Greg Schlenker, Ph.D., P.G.
Project Geologist

KLEINFELDER, INC.
849 West LeVoy Drive, Suite 200
Taylorsville, Utah 84123
(801) 261-3336

November 29, 2004

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1. INTRODUCTION

1.1 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-l, 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.

1.2 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

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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.

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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

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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.

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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

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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.

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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.

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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.

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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

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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 (LS) 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

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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	58.8;	(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

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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 0.3*g* and 0.4*g*. 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 0.10*g* 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

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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).

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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

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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.

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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.

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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 8 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).

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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

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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 (±) 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

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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;

Condition	Factor of Safety
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.

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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 shouldbe 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.

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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.

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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.

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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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7. REFERENCES

AGRC, 2001, Utah Automated Geographic Reference Center Web Page, Geographic Names Information System, ftp://ftp.agrc.state.ut.us/NAD83/MetadataHTML/SGID100 MinesGNIS.html

Black, B.D., Hecker, S., Hylland, M.D., Christenson, G.E., and McDonald, G.N., 2003, Quaternary and fold database on map of Utah: Utah Geological Survey map 193DM

Christenson, G.E., Batatian, D.L., and Nelson, C.V., 2003, Guidelines for evaluating surface fault-fault rupture hazards in Utah: Utah Geological Survey Miscellaneous Publication 03-6, 14 p.

Currey, D.R., and Oviatt, C.G., 1985, Durations, average rates, and probable causes of Lake Bonneville expansion, still-stands, and contractions during the last deep-lake cycle, 32,000 to 10,000 years ago, in Kay, P.A., and Diaz, H.F., (eds.), Problems of and prospects for predicting Great Salt Lake levels - Processing of a NOAA Conference, March 26-28, 1985: Salt Lake City, Utah.

Harty, K.M, 1991; Landslide map of Utah: Utah Geological and Mineral Survey Map 133, scale 1:500,000

Halling, M.W., Keaton, J.R., Anderson, L.R., and Kohler, W., 2002, Deterministic maximum peak bedrock acceleration maps for Utah: Utah Geological Survey Miscellaneous Publication 02-11, 57 p.

Hintze, L.F., 1980, Geologic Map of Utah: Utah Geological and Mineral Survey Map M-A-1, 1:500,000 scale.

Hunt, C.B., 1967, Physiography of the United States: San Francisco, W.H. Freeman, 480 p

Smith, R. B., and Arabasz, W. J. 1991, Seismicity of the Intermountain Seismic Belt, in Slemmons, D. B., Engdahl, E. R., Zoback, M. D., and Blackwell, D. D., editors, Neotectonics of North America, Geological Society of America, Decade Map Volume 1, p. 185-228.

U.S. Geological Survey Web Page, 2003, U.S. Geological Survey National Seismic Hazard Mapping Project, http://geohazards.cr.usgs.gov/eq/.

Youd, T.L., et al, 2001, "Liquefaction Resistance Of Soils: Summary Report from the 1996 NCEER And 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils,"

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merican Society of Civil Engineers, Journal Of Geotechnical And Geoenvironmental Engineering, Vol. 127, No. 10, October, 2001, p. 817-833.

Kavazanjian, E., Jr., Matasovic, N., Bonaparte, R., and Schmertmann, G.R., 1995, "Evaluation of MSW Properties for Seismic Analysis," Geoenvironment 2000, ASCE Geotechnical Special Publication No. 46, Vol. 2, pp.1126

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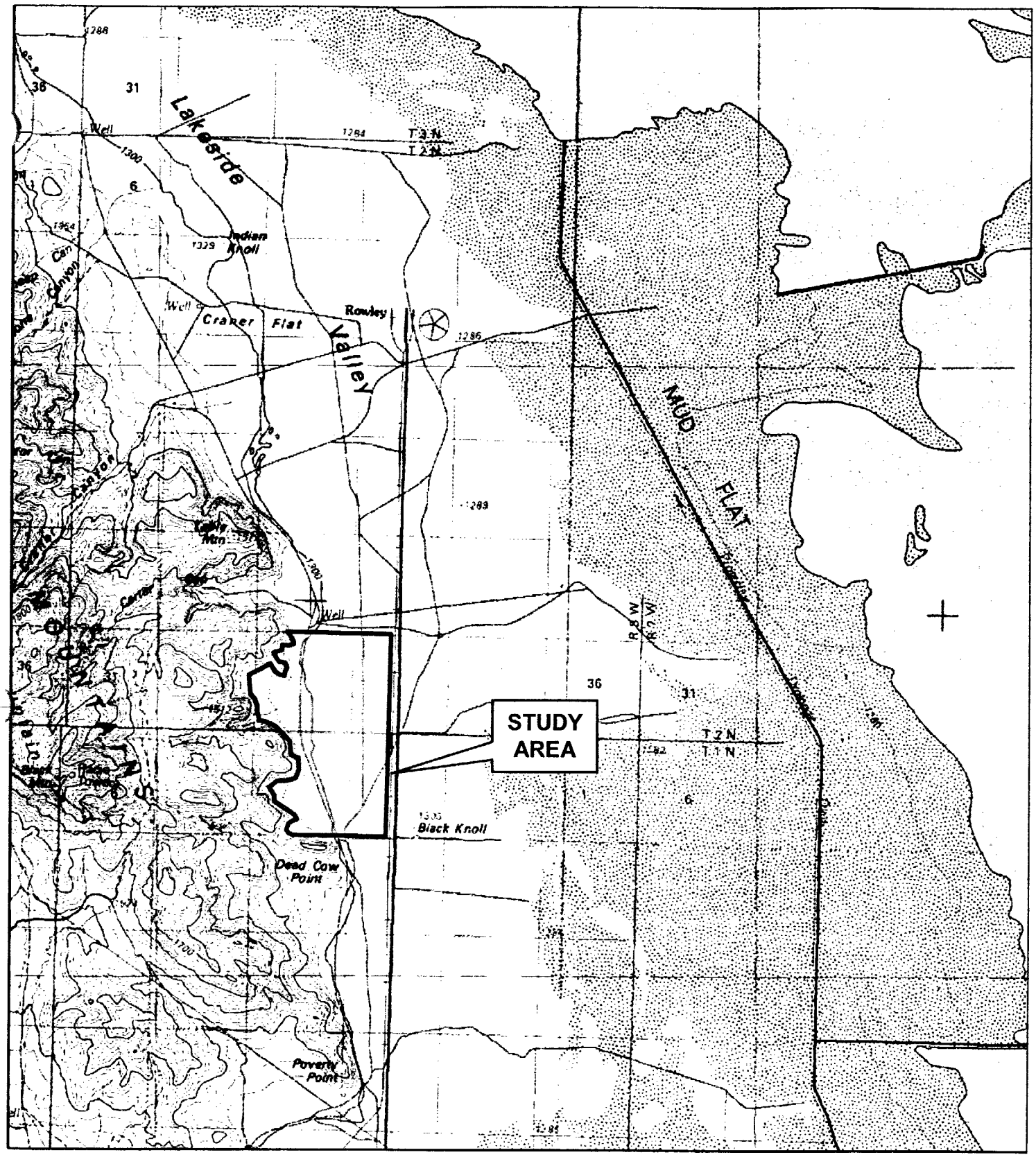
APPENDIX A



BASE MAP:
SALT LAKE CITY NORTH, UTAH
30 X 60 MINUTE SERIES

0 1mile 2 miles

SCALE 1:100 000

UTAH

QUADRANGLE LOCATION

SLC4Q319.ppt

KLEINFELDER

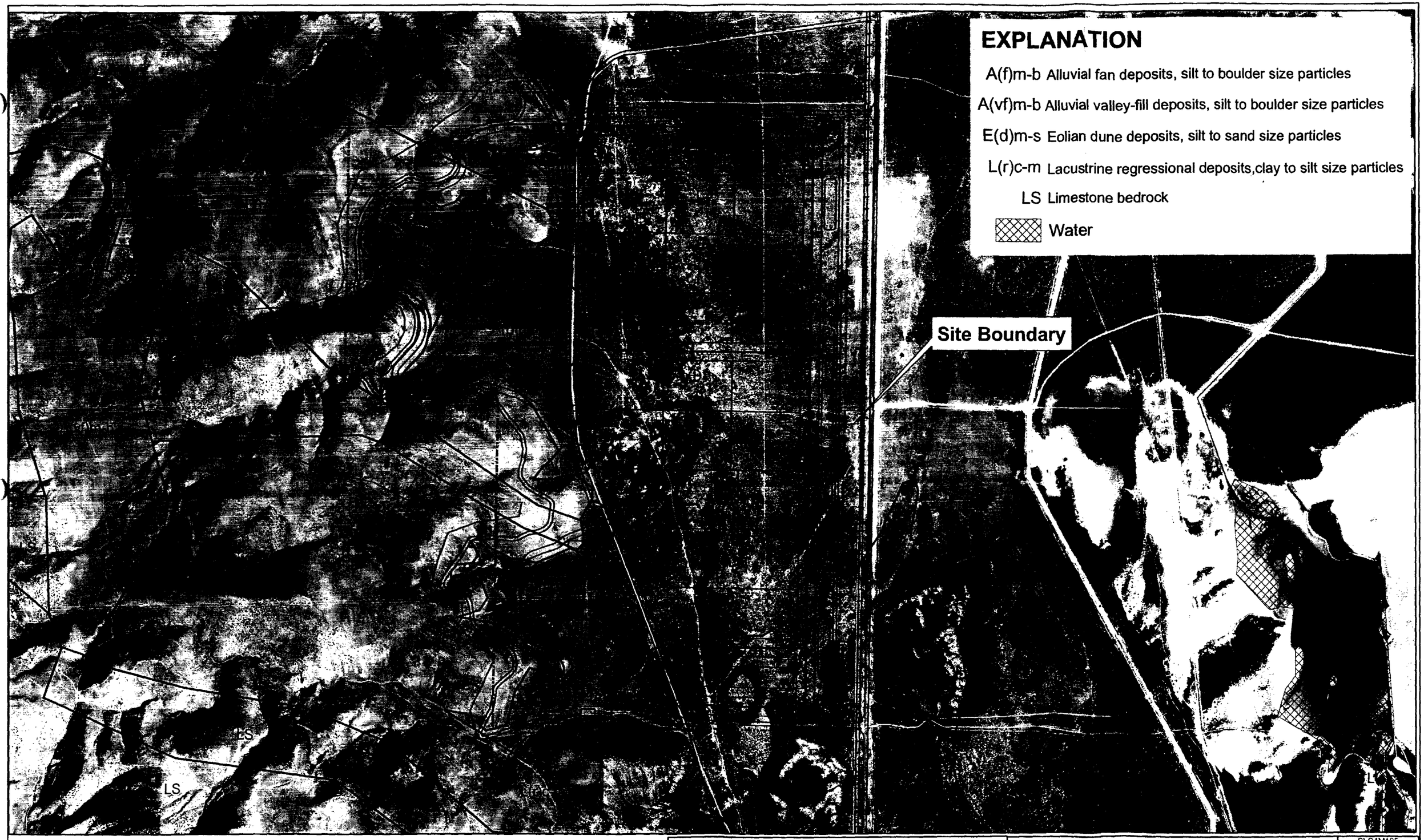
Date: 11/29/2004
Project Number 35467.001

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

SITE VICINITY MAP

FIGURE

A-1



Photography Source:
U.S. Geological Survey Digitalortho qaudrangle
titled "Delle" and "Poverty Point, Utah" From
http://agrc.utah.gov/agrc_sgid/sgidindicies/

0 500 1,000 2,000 3,000 4,000 5,000 6,000 Feet
1:18,000 Scale

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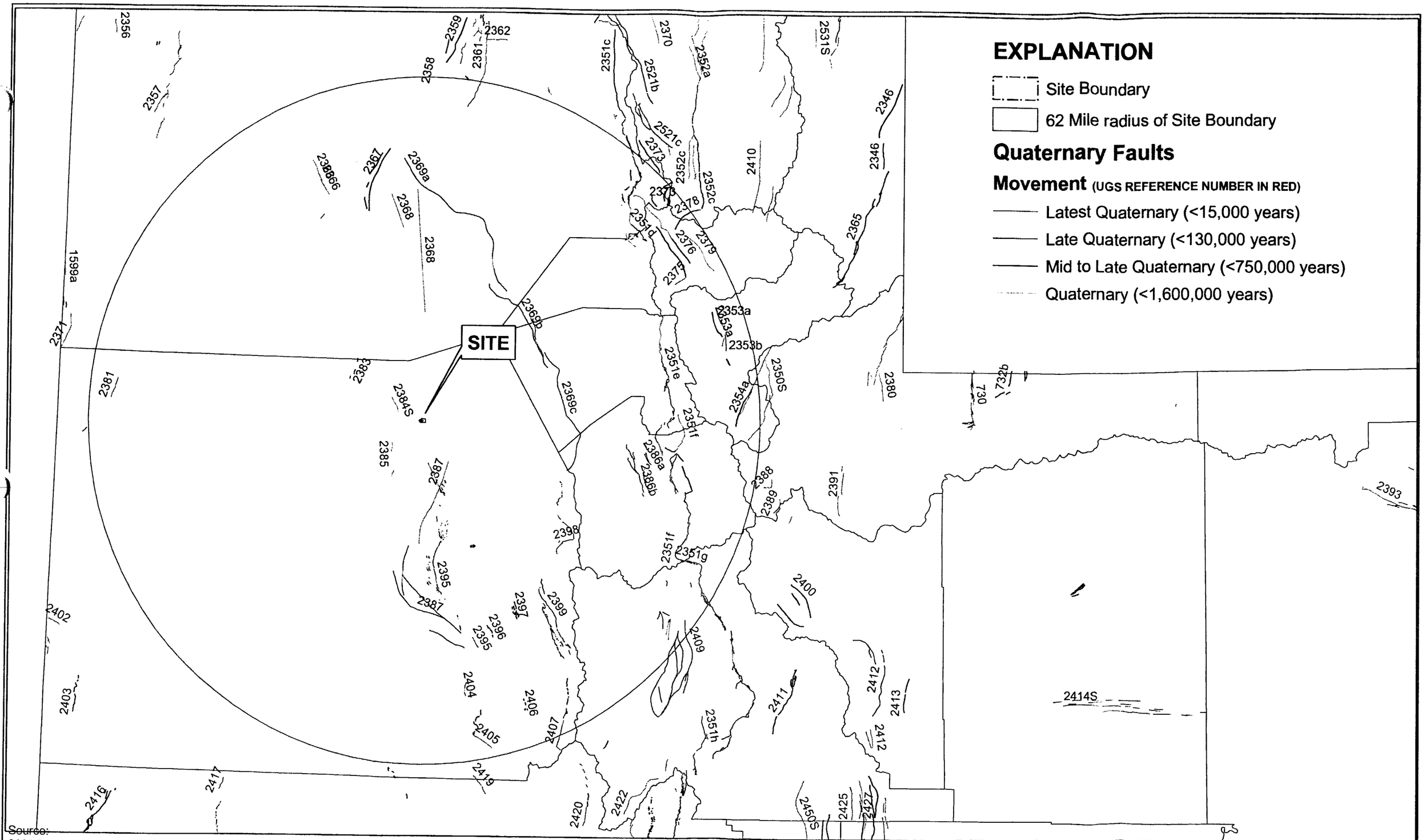
Project Number 35467

Geotechnical Engineering Studies
Wasatch Regional Solid Waste Landfill Site

Site Engineering Geology

SLC4M165
FIGURE
A-2



Source:
2003 Digital database titled "Quaternary fault and fold database and map of Utah" by Black et al., 2003, UGS Map 193DM

0 5 10 20 30 40 Miles
1:1,000,000 Scale

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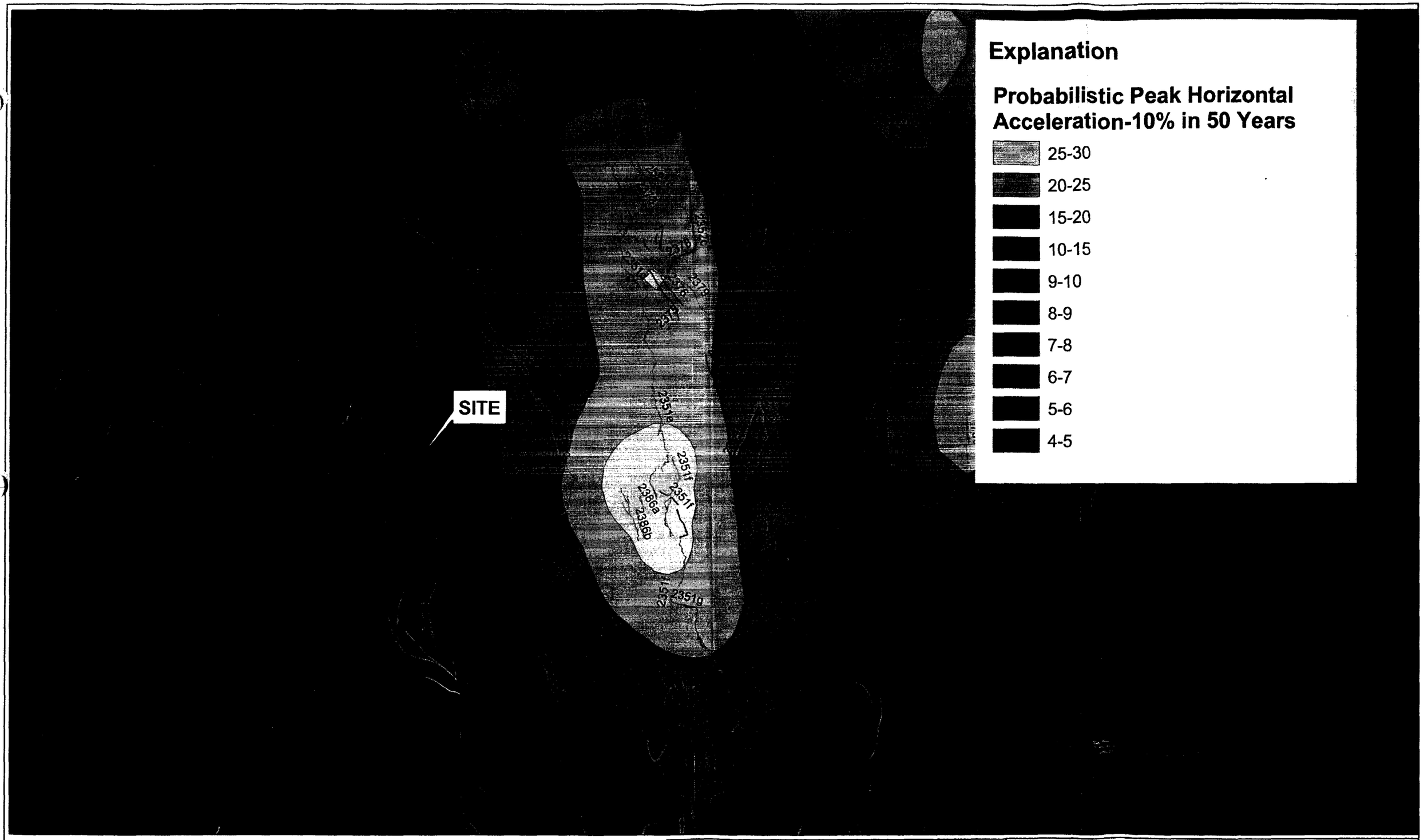
Geotechnical Engineering Studies
Wasatch Regional Solid Waste Landfill Site

Quaternary Fault Map

SLC4M166
FIGURE
A-3



Source:
U.S. Geological Survey National Seismic Hazard Mapping Project
http://geohazards.cr.usgs.gov/eq/index.html

0 5 10 20 30 40 Miles

1:1,000,000 Scale

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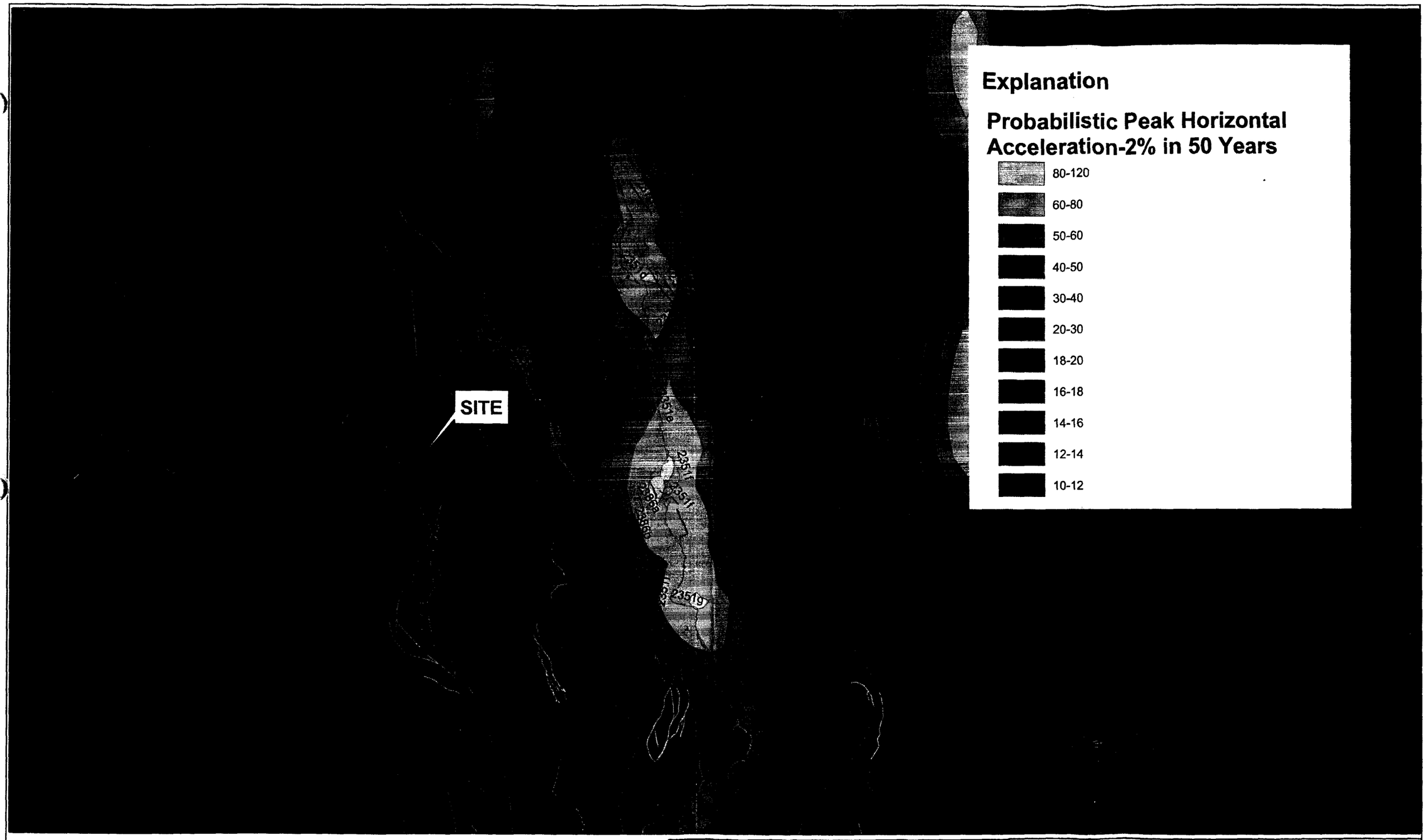
Geotechnical Engineering Studies
Wasatch Regional Solid Waste Landfill Site

Probabilistic Peak Horizontlal Acceleration-10% in 50 Years

SLC4M167

FIGURE A-4



Source:
U.S. Geological Survey National Seismic Hazard Mapping Project
http://geohazards.cr.usgs.gov/eq/index.html

0 5 10 20 30 40 Miles

1:1,000,000 Scale

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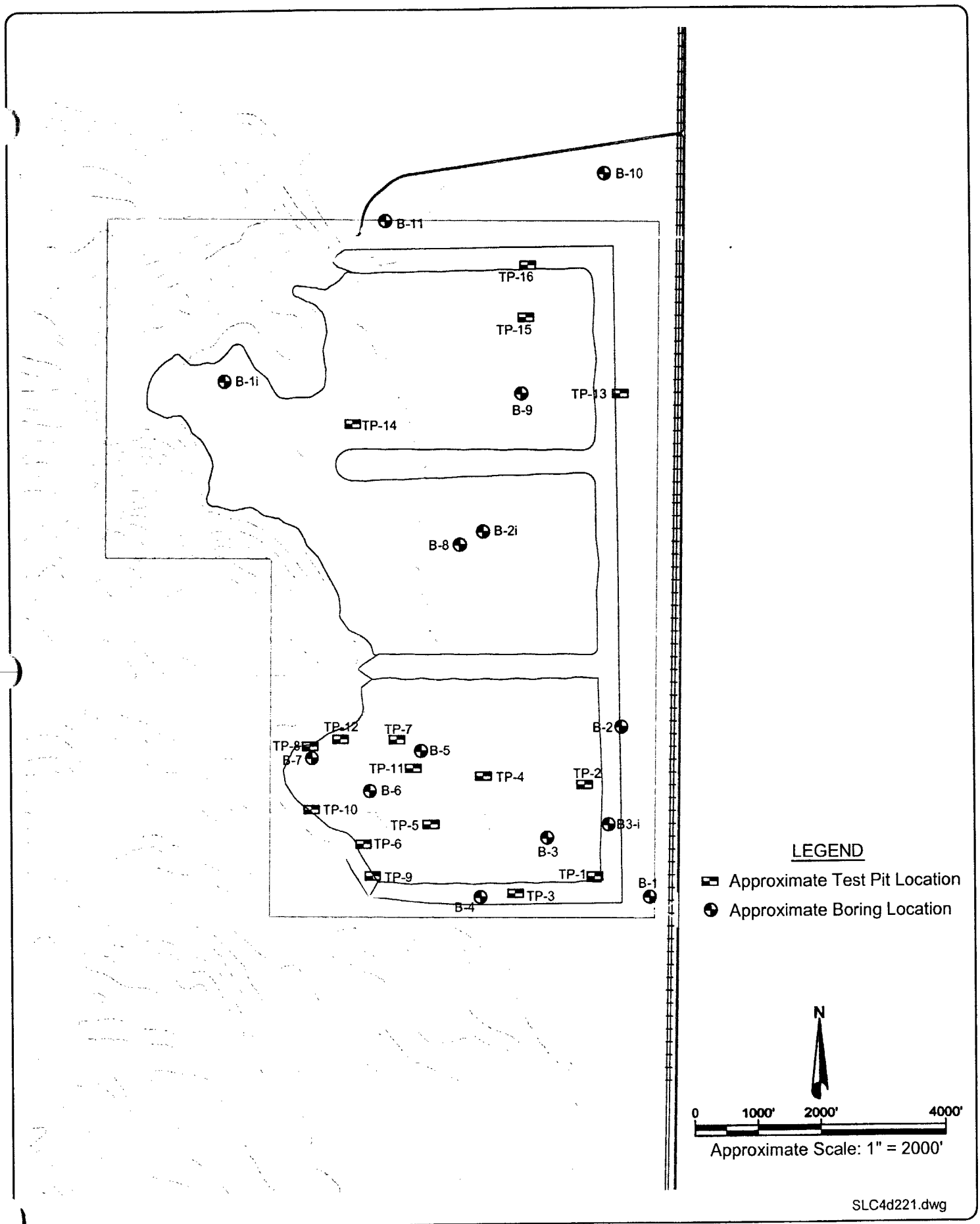
Geotechnical Engineering Studies
Wasatch Regional Solid Waste Landfill Site

Probabilistic Peak Horizontlal Acceleration-2% in 50 Years

SLC4M168

FIGURE A-5



SLC4d221.dwg

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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

DEPTH IN FEET	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0								SM	Silty SAND - loose, dry, light brown, fine sand with trace gravel
2									
4									
6	46			16		5			moist, light brown, trace gravel, trace calcium carbonate cementation
8									
10						5			light gray below 10 feet
12									
14									loose to medium dense, slightly moist, light brown, some fine gravel
16	35			7	SV	10			
18									
20						9			
22									
24									
26						10			increasing silt below 25 feet
28									
30									

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**

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LOG OF BORING B- 1(i)

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-7

Depth in Feet	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			
									39.5
40									
42									
44									
46									
48									
50									
52									
54									
56									
58									
60									

DEPTH IN FEET

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**

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LOG OF BORING B- 1(i)

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-8

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0								SM	Silty SAND - very loose, dry, brown, some fine gravel
5.0									
5.5						8		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
10				28	PI	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						59		SM	Silty SAND - dense, slightly moist, light brown
20	17			▽	SV	23			medium dense, wet below 20 feet
24									dense, wet, gray and lighter gray alternating seams
25						42			
28.0								MH	Elastic SILT - soft, wet, olive brown to gray

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 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**

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LOG OF BORING B- 2(i)

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-9

BORING LOG-E-A SLC3Z099.GPJ 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					PI	2			Elastic SILT (continued)
31.5									
32									
34									
36									
38									
40									
42									
44									
46									
48									
50									
52									
54									
56									
58									
60									

DEPTH IN FEET

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**

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PROJECT NO. **31168.001**

LOG OF BORING B- 2(i)

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-10

BORING LOG-E-A SLC32099.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0								SM	Silty SAND - loose, dry, brown
2									
4									
5						Push			with some clay below 5 feet, medium dense
6.5								SP	Poorly Graded SAND with silt - medium dense, slightly moist, light brown, fine grained
8									
10	10			5	SV	21			
12									
14				▽					
15						39			wet below 15 feet, dense
16									
18									
20	10					21			medium dense, gray below 21 feet
22									
24									
25						29			sulfur odor at 25 feet
26									
28									
29	20					Push			
30									30.0

DEPTH IN FEET

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**

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LOG OF BORING B- 3(i)

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-11

BORING LOG-E-A SLC32099.GPJ 11/15/04

Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
							SP-CL	Interlayered seams of SAND and Lean CLAY - medium stiff to stiff, wet, gray (31.0)

DEPTH IN FEET: 30, 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**

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LOG OF BORING B- 3(i)

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-12

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0									0.5 Topsoil
								SM	Silty SAND - loose to medium dense, dry, brown to brown-orange
2			87	15		Push			3.0
								CL	Lean CLAY with sand - stiff, moist, light brown with orange mottling
4									4.5
								SM	Silty SAND - loose, dry, light brown
						3			5.5
6								CL	Lean CLAY - soft, moist to wet, light brown to gray
8				12		17			8.0
								SM	Silty SAND - medium dense to dense, wet, yellow-brown, fine grained
10									
12									
14									
				▽		37			
16									- gray below 16 feet
18									
20				20		40			
22									
24									
	42			22	SV PI	7			- loose below 25 feet
26									
28									29.0
								CL	Sandy Lean CLAY - medium stiff to very stiff, wet, gray, some interbedded Silty SAND layers
30									

DEPTH IN FEET

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**

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PROJECT NO. **35467.003**

LOG OF BORING B- 1

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-13

ORING LOG-E-A SLC4Z098.GPJ 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				21		12			Sandy Lean CLAY (continued)
32									
34									
36						4			
38									
40				18		Push			
42									
44									
46						20			- green-gray below 46 feet
48									49.0
50				18		41 50/5"		SM	Silty SAND - very dense, wet, gray, 3" thick clay layer at 51 feet 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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 1

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-14

BORING LOG-E-A SLC4Z098.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0									0.5 Topsoil
2	55			24	SV PI	7	B	CL	Sandy Lean CLAY - medium stiff, moist to dry, olive with orange mottling, trace of gravel
5.0									
6	77		77	40	PI	Push		CL	Lean CLAY with sand - medium stiff, moist to dry, olive with orange mottling
7.5									
8						9		SC-SM	Silty to Clayey SAND - loose to medium dense, moist, light brown, some fine gravel, moderate cementation
15.5									
16				20 ▽		19		SM	Silty SAND - medium dense, wet, gray, fine grained
20						Push			
24.0									
24	47			35	PI	3		CL	Lean CLAY - soft, wet, gray, frequent sand seams
30.0									

DEPTH IN FEET

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**

KLEINFELDER

PROJECT NO. 35467.003

LOG OF BORING B- 2

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-15

BORING LOG-E-A SLC42098.GPJ 11/15/04

Depth (ft)	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
32									
34									
				26		5			35.5
36								CL	Lean CLAY - medium stiff, wet, olive-gray
38									
40						4			- 1-foot thick layer of Silty SAND at 39.5 feet
42									
44									
				27		7			- frequent 3"-thick Sandy SILT lenses at 45 feet
46									
									48.0
48								SM	Silty SAND - very dense, wet, olive-gray, fine grained
						56			
									50.0
50									
52									
54									
56									
58									
60									

DEPTH IN FEET

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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 2

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-16

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0									0.5 Topsoil
								SM	Silty SAND - medium dense, dry, light brown
2									3.0
						13		CL	Sandy Lean CLAY - stiff, dry, olive, some interbedded lenses of brown Silty SAND
4									
						12			
6									- brown below 6 feet
8	51		88	17	PI	Push			8.5
								SP-SC	Poorly Graded SAND with clay and gravel - medium dense, moist, light brown
10									
12									
14									14.0
								SM	Silty SAND - medium dense to loose, moist, yellow-brown
				17		Push			
16									
				▼					(Water level measured 11/14/03)
18									
20				▽		25			- wet, color change to gray, some dark gray Sandy SILT lenses below 20 feet
22									
24									
				20		11			
26									
28									
30									

DEPTH IN FEET

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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 3

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-17

BORING LOG-E-A SLC4Z098.GPJ 11/15/04

Depth (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		Push			
36									
38									
39.0								CL	Lean CLAY - medium stiff, wet, olive, with Sandy SILT layer approximately 3" thick at 40 feet
40						7			
42									
44.0								SM	Silty SAND - dense, wet, olive, fine
44									
				31		32			
46									
48.0								CL	Lean CLAY with gravel - hard, wet, olive
48						17			
						50/5"			
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.
50									
52									
54									
56									
58									
60									

DEPTH IN FEET

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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 3

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-18

BORING LOG-E-A SLC4Z098.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0									0.5 Topsoil
								SM	Silty SAND - dry, light brown
2									2.0
	64			12	SV PI	Push		CL-ML	Sandy SILTY CLAY - stiff, dry, light brown
4									
									5.0
						6		CL	Lean CLAY with sand - medium stiff to stiff, moist, brown
6									
8				17		8			
10									
12									
14									
	65		83	15	PI	Push			- olive with orange mottling below 15 feet
16									
18									
20				8		28			20.5
						50/6"		SM	Silty SAND - very dense, moist, olive-orange, fine grained, trace of gravel
22									
24									
				▽		44			
26									
28									
30									

DEPTH IN 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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 4

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-19

Depth (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
32									
34									34.0
								CL	Lean CLAY - stiff to very stiff, moist, gray, frequent sandy silt seams
						16			
36									
38									
40			112	16		Push			40.5
								SM	Silty SAND with gravel - wet, gray
42									
44									44.0
								ML	Sandy SILT - stiff, wet, gray, trace of gravel
	67			23	SV PI	8			
46									
48									
				23		13			- cemented clumps up to 3/4" size below 48 feet
50									50.0
52									
54									
56									
58									
60									

DEPTH IN 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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 4

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-20

BORING LOG-E-A SLC4209B.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0									Topsoil
1.0								ML	Sandy SILT - medium stiff, dry, light brown
2				5		5			
4									
4.5								CL-ML	Sandy SILTY CLAY - soft to medium stiff, moist, brown
6						4			
8	68		96	11	PI	Push			
10									
12									
14.0								SC	Clayey SAND - loose, moist, brown
14									
16				13		7			
18									
20						10			
20.5								SM	Silty SAND - medium dense, moist, brown
22									
24									
25.0								CL	Lean CLAY - medium stiff to stiff, moist, brown with orange mottling, frequent silty sand seams
26	90			26	SV PI	8			
28									
30.0									

DEPTH IN 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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 5

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-21

BORING LOG-E-A SLC4Z098.GPJ 11/15/04

Depth (feet)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
30				4		Push		SM	Silty SAND - medium dense, moist, brown
32									
33.5									
34								GP-GM	Poorly Graded GRAVEL with silt and sand - very dense, wet, gray
36	10			▽	SV	60			
38									
40						41 50/3"			
42									
44									
46				11		42			
46.0								CL	Lean CLAY - hard, moist to wet, gray, frequent silty sand layers
48						Push			
50.0									
50									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									

DEPTH IN 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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 5

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-22

BORING LOG-E-A SLC4Z098.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0								ML	SILT with sand - medium stiff, dry to slightly moist, light brown
2	74			5	SV	5			
4									
6						4			
8				7		5			
10						4			
12									
14									
16			82	7		Push			
17.0								CL	Sandy Lean CLAY - medium stiff, moist, brown
18									
20						6			
20.5								SP	Poorly Graded SAND - loose to medium dense, moist, brown, fine-grained, trace of fine gravel
22									
24									
26						Push			
	5			2		30			
28									
30									30.0

DEPTH IN FEET

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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 6

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-23

BORING LOG-E-A SLC4Z098.GPJ 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						77		SM	Silty SAND - dense, moist, light brown, fine-grained, trace of gravel
32									
34									
35.0									
36				32		12		CL	Lean CLAY - stiff, moist, light brown to olive brown, medium plasticity
38									
40						Push			
40.5								SM	Silty SAND with gravel - dense, moist, brown, fine-grained
42						69			
44									
44.0									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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 6

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-24

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0								ML	Sandy SILT - medium stiff, dry, light brown, weakly cemented
2				8		7			
4									
6	69			10	SV	5			
7.0								SC	Clayey SAND - loose, slightly moist, olive-brown, fine-grained
8						8			
10			132	1		8			
10.5								GM	Silty GRAVEL with sand - very dense, moist, brown, coarse gravel
12						60 97/5"			
14									
16	21			3		16			
17.0								SC	Clayey SAND - medium dense, slightly moist, brown
18									
20						15			
21.5								CL	Sandy Lean CLAY - stiff, moist, brown
22									
24									
24.5								GC	Clayey GRAVEL with sand - dense, moist, brown
26	29			4	SV	36			
28									
30									

DEPTH IN FEET

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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 7

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-25

BORING LOG-E-A SLC4Z098.GPJ 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						17			30.5 Clayey GRAVEL with sand (continued)
								SM	Silty SAND with gravel - medium dense to dense, moist, brown, fine gravel, weakly cemented
32									
34									
36				6		37			
38									38.0
								GM	Silty GRAVEL with sand - very dense, moist, brown
40						41 111 54/5"			-much harder drilling below 40 feet
42									
44									45.0
				7		10 50/5"		GC	Clayey GRAVEL with sand - very dense, slightly moist, light brown, moderately cemented
46									
48									
50						67			
52									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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 7

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-26

Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
							CL	Sandy Lean CLAY - stiff, slightly moist, light brown
					14			
								4.5
93			22	PI	18		CL	Lean CLAY - slightly moist, light brown with rust colored oxidation areas
					14			
					35			10.5
			5				SP-SM	Poorly Graded SAND with silt - dense, moist, light brown, fine sand
					45			
								18.0
							SM	Silty SAND - medium dense, very moist, greenish gray with rust, fine sand
			20		25			
			▼					(Water level measured 10/29/03) Lean CLAY layer about 12-inches thick at 21.5 feet, moist, dark greenish gray
			▽		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.

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 8

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-27

BORING LOG-E-A SLC4Z098.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
0						13		CL	Lean CLAY - stiff, moist to slightly moist, light brown
									- low to moderate cementation below 1.5 feet
2	90			16	SV	13			
4						11			- color changes to olive-brown with orange mottling below 4 feet
									- approximately 3" sandy silt layer at 5.5 feet
6						10			
8	42		94	12	PI	Push		SC	Clayey SAND - medium dense, moist, light brown
9.0									
						47		SP-SM	Poorly Graded SAND with silt - dense, moist, brown, fine to medium-grained sand
9.5								SM	Silty SAND with gravel - very dense, moist, light brown, fine-grained
10			100	7		138			
12						64			
14						48			
16			107	21		73			
18									-color change to gray
20									
22				▽					
24						15			
26									-color change to olive-gray
28									
28.5								MH	Elastic SILT - medium stiff, very moist, green-gray
30									

DEPTH IN FEET

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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 9

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-28

JORING LOG-E-A SLC4Z098.GPJ 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	95		72	46	PI	Push			Elastic SILT (continued)
32									
33.5									
34								SM	Silty SAND - loose, wet, brown-gray
36						8			
36.5								CL	Lean CLAY - medium stiff, wet, green-gray
38									
39.0								SM	Silty SAND with gravel - very dense, wet, gray, fine-grained sand
40			117	16		6 34 50/5"			
42									
44									
46						67			
48.0								CL	Lean CLAY - hard, wet, olive
50				37		61			
51.0								SM	Silty SAND - very dense, wet, brown-gray
52.0									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.
54									
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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B- 9

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-29

ORING LOG-E-A SLC42098.GPJ 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
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
								SM	Silty SAND - very dense to dense, moist to very moist, light brown, fine-grained
8						26			
10			96	7		31 46 50/5"			
12						60			
14				19		42			
16						71			- wet, color change to gray below 16 feet
				▼					(Water level measured 10/29/03)
18						31			
20	41			26	PI	1 1/12"			
									21.0
22								CL	Lean CLAY - soft, wet, olive to gray, medium to high plasticity, frequent sandy silt seams
24									24.0
								SM	Silty SAND - dense, wet, gray, fine-grained
26						Push			
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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B-10

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-30

BORING LOG-E-A SLC4Z098.GPJ 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				18		29			Silty SAND (continued)
32									
34									
35.0									
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									
45.5						80			
46								SM	Silty SAND - very dense to dense, wet, gray, fine-grained
48									
50				19		42			
52.0									
52									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.
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: **4232.8* feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B-10

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-31

DEPTH IN FEET	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	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
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
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: **Hollow Stem Auger**
ELEVATION: **4256.5 feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B-11

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-32

Depth (ft)	Percent Passing #200	Unconfined Compression (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Blows per foot	Sample	USCS	SOIL DESCRIPTION
30			106	15		9 47 50/5.5"			Silty SAND (continued), color change to yellow-brown
32									
34									34.0
								ML	Sandy SILT - stiff, very moist, gray, fine-grained
36	54			23	PI	9			
38				▽					
									39.0
								SM	Silty SAND - dense, wet, gray, fine-grained
40				18		43			
42									
44									
46			112	18		80			
48									
50						28			
									- 3-inch thick Lean CLAY layer at 51 feet
52									52.0
54									
56									
58									
60									

DEPTH IN FEET

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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF BORING B-11

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-33

Depth (ft)	Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
0								
							CL	0.3 Topsoil: Sandy SILT - dry, gray, roots
	57			22	SV PI			Sandy Lean CLAY - slightly moist, brown with white veinlets
2								3.0
							CL	Lean CLAY - slightly moist, brown with white veinlets
4	89			40	PI			- olive gray, very sticky below 4.5 feet
6								
8								8.0
							SC	Cemented SAND - dry, light brown, well cemented with abundant voids
10								10.0
	11			9	SV		SP-SM	Poorly Graded SAND with silt - slightly moist, light brown, trace of gravel
12								12.0
14								
16								
18								
20								
22								
24								
26								
28								
30								

DEPTH IN FEET

DATE EXCAVATED: **9-18-03**
TOTAL DEPTH: **12.0 feet**

LOGGED BY: **M. Ivers**
EQUIPMENT: **Cat 416 CIT Backhoe**
ELEVATION: **4243.5* feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP- 1

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-34

TEST PIT LOG E-A SLC4Z098.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
0								0.5 Topsoil: SILT - dry, gray, roots
1				23		X	ML	Sandy SILT - slightly moist, brown
2								2.5
3	97			32	PI	X	CL	Lean CLAY - brown with white veinlets
4								- olive gray, sticky below 4 feet
6						X		
8						X		8.0
9							SC	Cemented SAND - dry, light brown, well cemented with abundant voids
10								10.0
11	31			12	SV	X	SM	Silty SAND with gravel - slightly moist, brown, fine subrounded gravel
12								12.0
14								
16								
18								
20								
22								
24								
26								
28								
30								

DEPTH IN FEET

DATE EXCAVATED: **9-18-03**
TOTAL DEPTH: **12.0 feet**

LOGGED BY: **M. Ivers**
EQUIPMENT: **Cat 416 CIT Backhoe**
ELEVATION: **4237.4 feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP- 2

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-35

EST PIT LOG E-A SLC42098.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
0								0.8 Topsoil: SILT - dry, gray, with roots
							ML	SILT with sand - slightly moist, brown
2	75			16	SV			
4								
6								7.0
	92			27	PI		SC	Cemented SAND - dry, light brown, well cemented
8								
				27				- brown with rust below 9 feet
10								
12								12.0
14								
16								
18								
20								
22								
24								
26								
28								
30								

DEPTH IN FEET

DATE EXCAVATED: **9-18-03**
TOTAL DEPTH: **12.0 feet**

LOGGED BY: **M. Ivers**
EQUIPMENT: **Cat 416 CIT Backhoe**
ELEVATION: **4249.4 feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP- 3

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-36

TEST PIT 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
0								Topsoil: SILT - dry, gray, with roots
1.3								
2							ML	Sandy SILT - moist, light brown, some small roots and small pinhole voids
4								
6.0								
6	90			28			CL	Lean CLAY - moist, olive gray with white veins, some sand
8								- brown with rust below 9 feet
10				27				
11.5								
12								
14								
16								
18								
20								
22								
24								
26								
28								
30								

DEPTH IN FEET

DATE EXCAVATED: **9-18-03**
TOTAL DEPTH: **11.5 feet**

LOGGED BY: **M. Ivers**
EQUIPMENT: **Cat 416 CIT Backhoe**
ELEVATION: **4248.7 feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP- 4

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-37

TEST PIT LOG E-A SLC42098.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
0.8								Topsoil: SILT - dry, gray, roots
2	75			1	SV	X	ML	SILT with sand - dry, brown, many pinhole voids and roots
7.0								
8	67			8	SV	X	ML	Sandy SILT - dry, brown, fine
13.0								

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 12, 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 CIT Backhoe**
ELEVATION: **4273.7 feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP- 5

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-38

EST PIT LOG E-A SLC42098.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
0								0.5 Topsoil
1	53			1	SV PI		ML	Sandy SILT - dry, brown, pinhole voids and small roots
3.0							GM	Silty GRAVEL with sand and cobbles - dry, brown, subrounded clasts
7.0							ML	SILT - dry, brown
9.0							SM	Silty SAND - dry, brown, fine
10				7				
13.0								

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 12, 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 CIT Backhoe**
ELEVATION: **4319.0 feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP- 6

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-39

TEST PIT LOG E-A SLC42098.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
0								0.5 Topsoil
1	35			2	SV PI		SM	Silty SAND - dry, brown, pinhole voids and roots, some gravel
2								
4				2			GM	4.0 Silty GRAVEL with sand and cobbles - dry, brown
6							SM	6.0 Silty SAND - slightly moist, brown, fine
8				4				
10								
12								12.0
14								
16								
18								
20								
22								
24								
26								
28								
30								

DEPTH IN FEET

DATE EXCAVATED: **9-19-03**
TOTAL DEPTH: **12.0 feet**

LOGGED BY: **M. Ivers**
EQUIPMENT: **Cat 416 CIT Backhoe**
ELEVATION: **4272.0* feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP- 7

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-40

EST PIT 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
0								0.5 Topsoil
2	15			2	SV	X	GM	Silty GRAVEL with sand - dry to slightly moist, brown, calcite skin on many clasts, some cobbles and scattered boulders
4								
6								
8								
10								- fewer cobbles and boulders, increasing silt content below 9.5 feet
12								12.0
14								
16								
18								
20								
22								
24								
26								
28								
30								

DEPTH IN FEET

DATE EXCAVATED: **9-19-03**
TOTAL DEPTH: **12.0 feet**

LOGGED BY: **M. Ivers**
EQUIPMENT: **Cat 416 CIT Backhoe**
ELEVATION: **4330.0 feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP- 8

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-41

EST PIT LOG E-A SLC42098.GPJ 11/15/04

Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
			1	SV		GP-GM	0.3 Topsoil Poorly Graded GRAVEL with silt and sand - dry to slightly moist, yellow-brown, trace of cobbles and occasional small boulders 11.0

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP- 9

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-42

EST PIT LOG E-A SLC42098.GPJ 11/15/04

Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
						GP-GM	0.3 Topsoil Poorly Graded GRAVEL with silt and sand - slightly moist, yellow-brown, trace of cobbles and occasional small boulders
						SM	6.0 Silty SAND - slightly moist, yellow-brown, some gravel, slightly cemented
							11.0 - refusal on rock at 11 feet

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 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: **4318.5* feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP-10

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-43

TEST PIT LOG E-A SLC4Z098.GPJ 11/15/04

Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
79			11	SV PI		CL-ML	0.3 Topsoil SILTY CLAY with sand - slightly moist, brown
						SM	6.0 Silty SAND - slightly moist, yellow-brown
						SP-SM	12.0 Poorly Graded SAND with silt - slightly moist, yellow-brown 13.0

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30

DATE EXCAVATED: **11-14-03**
TOTAL DEPTH: **13.0 feet**

LOGGED BY: **R. McDonald**
EQUIPMENT: **Cat 416 CIT Backhoe**
ELEVATION: **4271.1* feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP-11

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-44

TEST PIT LOG E-A SLC42098.GPJ 11/15/04

Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
79			11	SV PI		CL-ML	0.3 Topsoil SILTY CLAY with sand - slightly moist, brown
						SM	6.0 Silty SAND - slightly moist, yellow-brown
						SP-SM	12.0 Poorly Graded SAND with silt - slightly moist, yellow-brown 13.0

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30

DATE EXCAVATED: **11-14-03**
TOTAL DEPTH: **13.0 feet**

LOGGED BY: **R. McDonald**
EQUIPMENT: **Cat 416 CIT Backhoe**
ELEVATION: **4271.1* feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP-11

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-44

TEST PIT LOG E-A SLC42098.GPJ 11/15/04

Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
						CL-ML	0.3 Topsoil Sandy SILTY CLAY - slightly moist, yellow-brown
			5	PI			
						GC-GM	5.0 Silty Clayey GRAVEL with sand - slightly moist, yellow-brown, with some cobbles
						GP-GM	10.0 Poorly Graded GRAVEL with silt and sand - slightly moist, yellow-brown, with some cobbles
							14.0

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 12, 14, 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**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP-12

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-45

.EST PIT LOG E-A SLC42098.GPJ 11/15/04

Depth (ft)	Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
0								Topsoil, with roots to 15"
1.3							ML	SILT with sand - moist, red-yellow, fine sand
2						X		
4				29	PI	X		
5.0							CL	Lean CLAY with sand - very moist, olive-brown, mottled
6								
8						X		
9.0							SM	Silty SAND - light brown, medium to coarse grain with strongly cemented layers (caliche)
10						X		
12.0							SP-SM	Poorly Graded SAND with silt - moist, yellow-brown, fine-grained
12				9		X		
13.0								
14								
16								
18								
20								
22								
24								
26								
28								
30								

DEPTH IN FEET

DATE EXCAVATED: **11-14-03**
TOTAL DEPTH: **13.0 feet**

LOGGED BY: **R. McDonald**
EQUIPMENT: **Cat 416 CIT Backhoe**
ELEVATION: **4233.6* feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP-13

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-46

EST PIT LOG E-A SLC42098.GPJ 11/15/04

Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
							Topsoil, with roots to 12" (1.0)
			7		X	CL	Sandy Lean CLAY - slightly moist to moist, yellow-brown, some silt (8.0)
			12		X	SP-SM	Poorly Graded SAND with silt - slightly moist to moist, yellow-brown (14.0)

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 12, 14, 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: **4274.2* feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP-14

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-47

TEST PIT LOG E-A SLC4Z098.GPJ 11/15/04

Depth (feet)	Percent Passing #200	Shear Strength (psf)	Dry Density (pcf)	Moisture Content (%)	Other Tests	Sample	USCS	SOIL DESCRIPTION
0								Topsoil, with roots to 12 inches
1.0	72			15	SV		CL	Lean CLAY with sand - moist, yellow-brown
7.5				30	PI		ML	SILT - moist, olive-brown, some fine sand, mottled
9.0							SM	Silty SAND - slightly moist, yellow-brown, strongly cemented from 9 to 10 feet, with large gravels and cobbles
14.0				10				

DEPTH IN FEET: 0, 2, 4, 6, 8, 10, 12, 14, 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: **4237.5* feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP-15

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-48

EST PIT 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
0								Topsoil, with roots to 12"
1.0								
2				17			CL	Sandy Lean CLAY - slightly moist, yellow-brown, fine-grained sand
4.0								
4				26			CL	Lean CLAY - moist, olive-brown, with occasional sand layers
6								
8								
10								
12.0								
12				11			SM	Silty SAND - moist, light brown, with silt and gravel (strongly cemented sand)
14.0								
14								
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: **4238.3* feet**

KLEINFELDER

PROJECT NO. **35467.003**

LOG OF TEST PIT TP-16

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

FIGURE
A-49

TEST PIT LOG E-A SLC42098.GPJ 11/15/04

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% 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)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% 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)	SILTS AND CLAYS (Liquid limit less than 50)		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
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			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
- MODIFIED CALIFORNIA SAMPLER (2-1/2 inch outside diameter)
- CALIFORNIA SAMPLER (3 inch outside diameter)
- WATER LEVEL (level after completion)
- STANDARD PENETRATION SPLIT SPOON SAMPLER (2 inch outside diameter)
- SHELBY TUBE (3 inch outside diameter)
- DIAMOND BIT CORE BARREL (47.6mm Cores)
- WATER LEVEL (level where first encountered)

CEMENTATION

DESCRIPTION	DESCRIPTION
WEAKELY	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
DRY	ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISIBLE FREE WATER, USUALLY SOIL BELOW WATER TABLE

GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.
2. No warranty is provided as to the continuity of soil conditions between individual sample locations.
3. Logs represent general soil conditions observed at the point of exploration on the date indicated.
4. 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.

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 - 60	40 - 70	65 - 85	DIFFICULT TO PENETRATED A FOOT WITH 1/2-INCH REINFORCING ROD DRIVEN WITH 5-LB HAMMER
VERY DENSE	>50	>60	>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)	TORVANE UNDRAINED 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.

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FIGURE

A-50

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APPENDIX B

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-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; ø=35°; 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 = Resisitivity (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-1

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-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						o=29°; c=75	SILT with sand (ML)
B-6	26	2				5				Poorly Graded SAND (SP)

*R = Resisitivity (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-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						ϕ=31°; 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 = Resisitivity (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

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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 = Resisitivity (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

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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 = Resisitivity (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

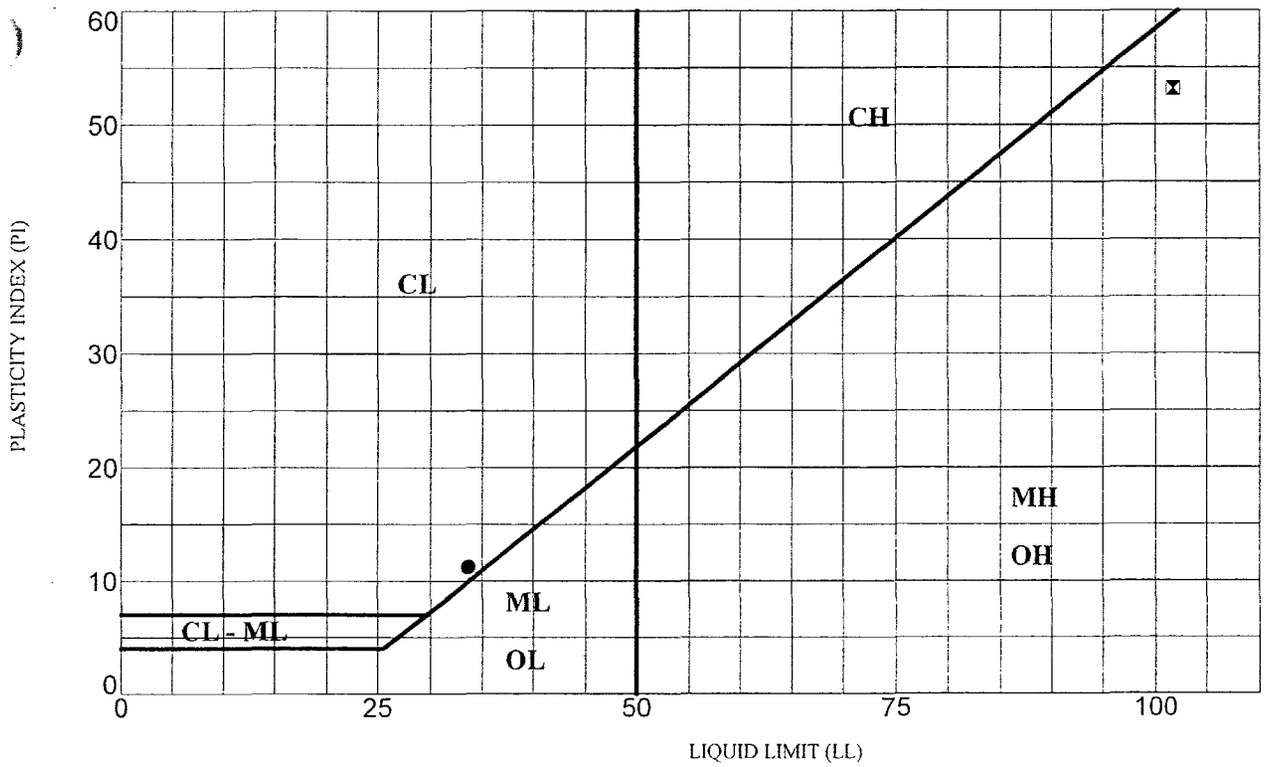
SUMMARY OF LABORATORY TEST RESULTS

Wasatch Regional Solid Waste Landfill

Utah

FIGURE

B-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

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Wasatch Regional Solid Waste Landfill

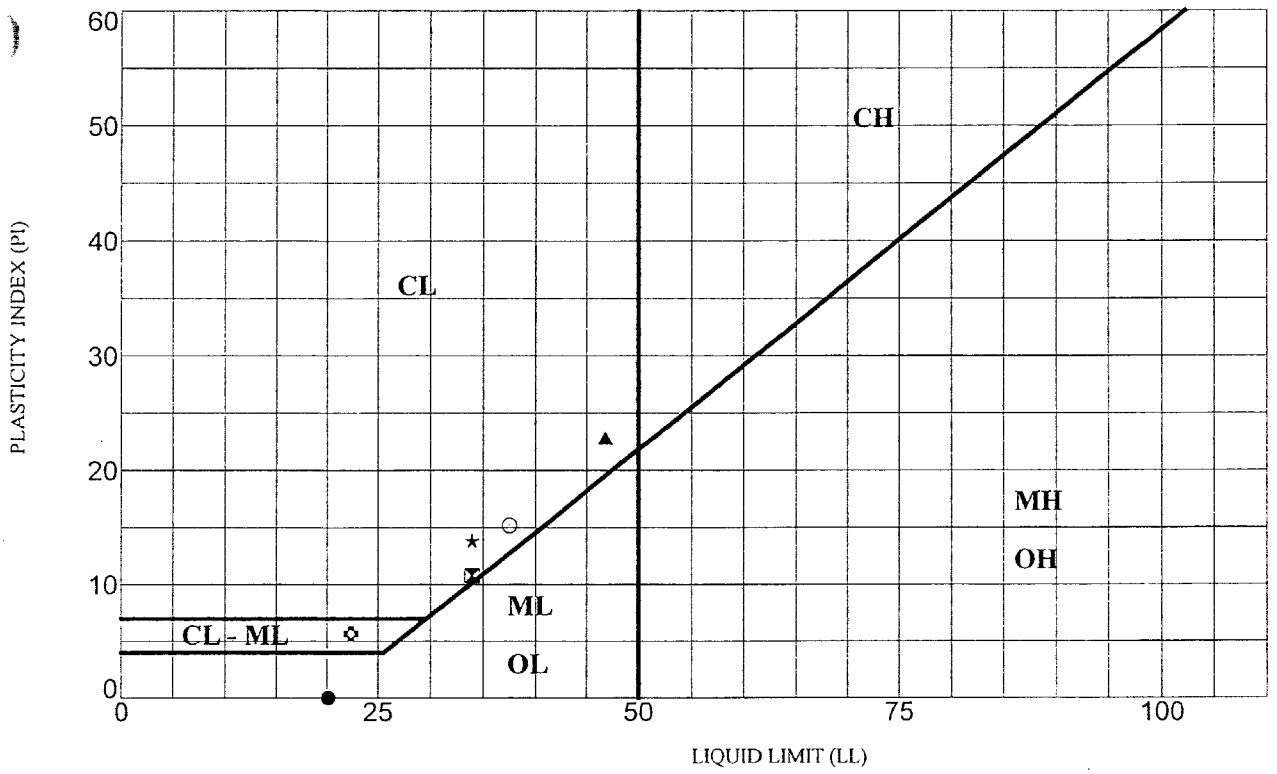
Tooele County, Utah

PLASTICITY CHART

FIGURE

B-6

NEW PI/6-E-B SLC37041.GPJ 11/26/03



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

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Wasatch Regional Solid Waste Landfill

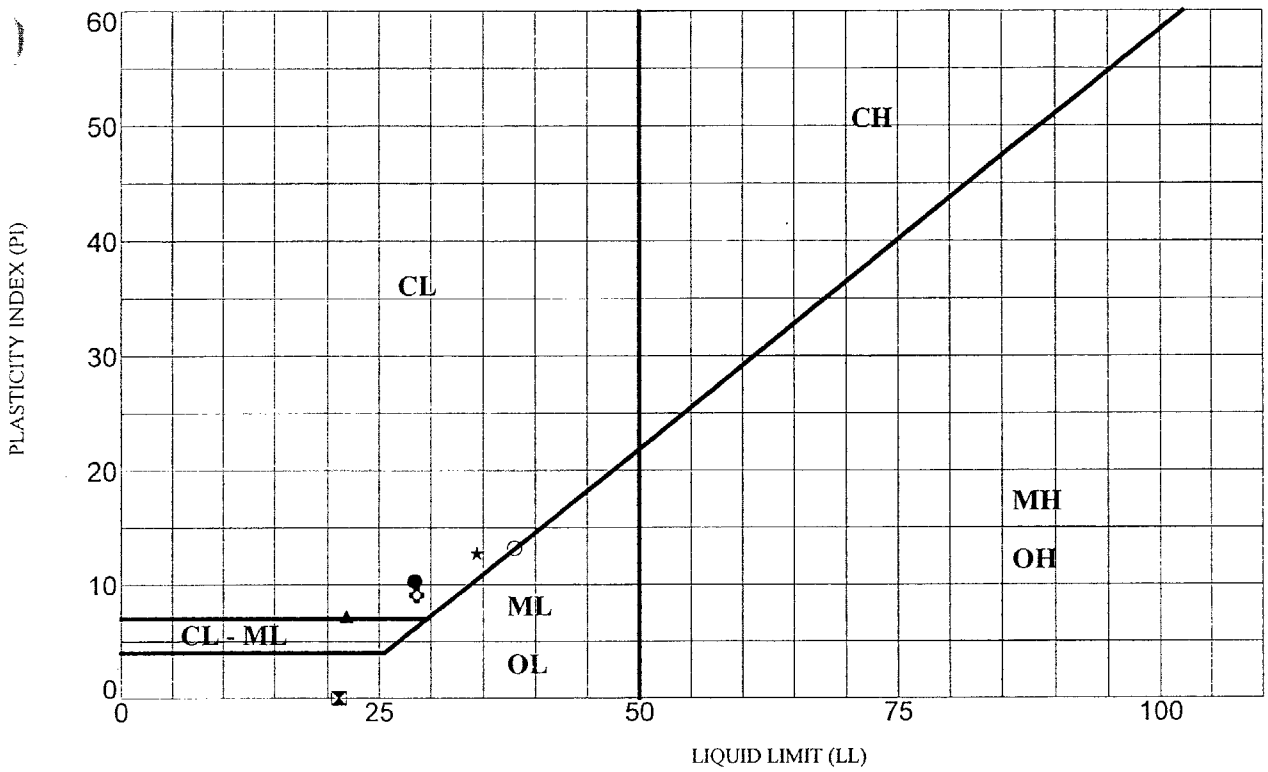
Tooele County, Utah

PLASTICITY CHART

FIGURE

B-7

NEW PI/6-E-B SL[illegible]074.GPJ 11/26/03



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

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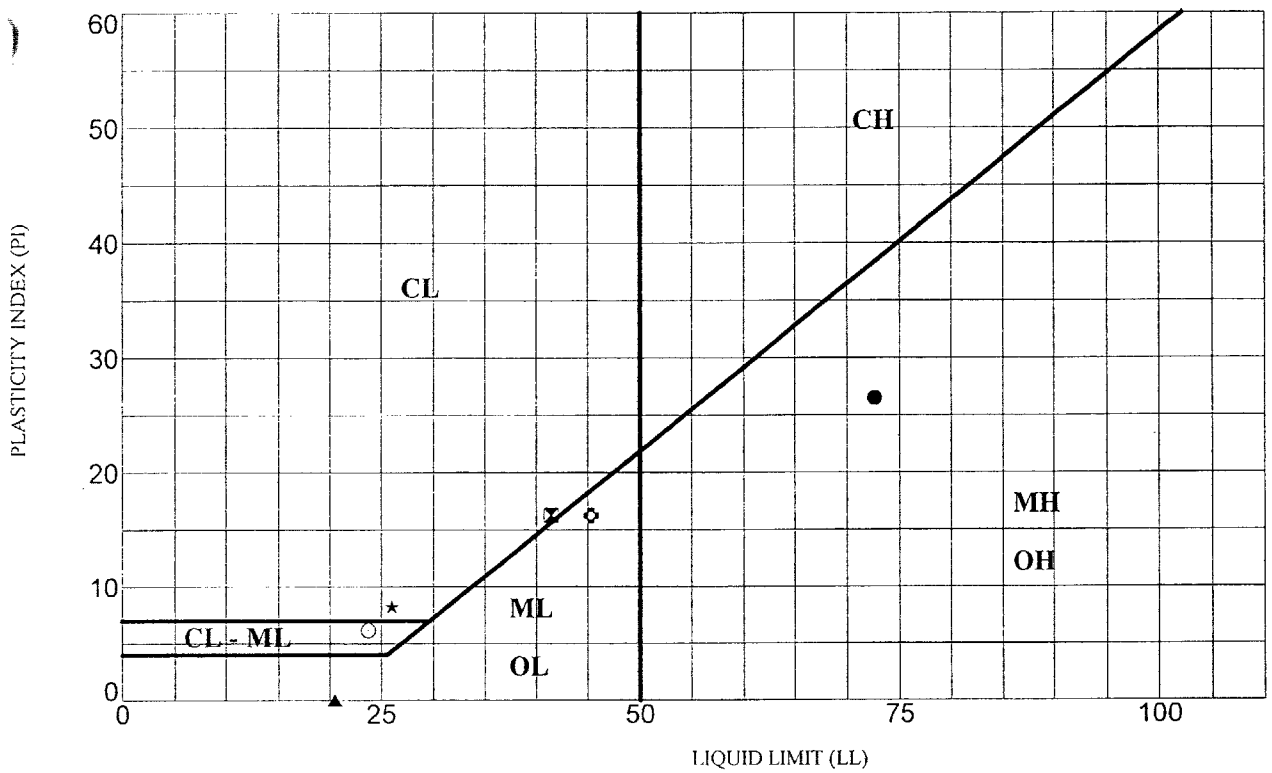
Tooele County, Utah

PLASTICITY CHART

FIGURE

B-8

NEW PI/6-E-B SLC\72074.GPJ 11/26/03



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

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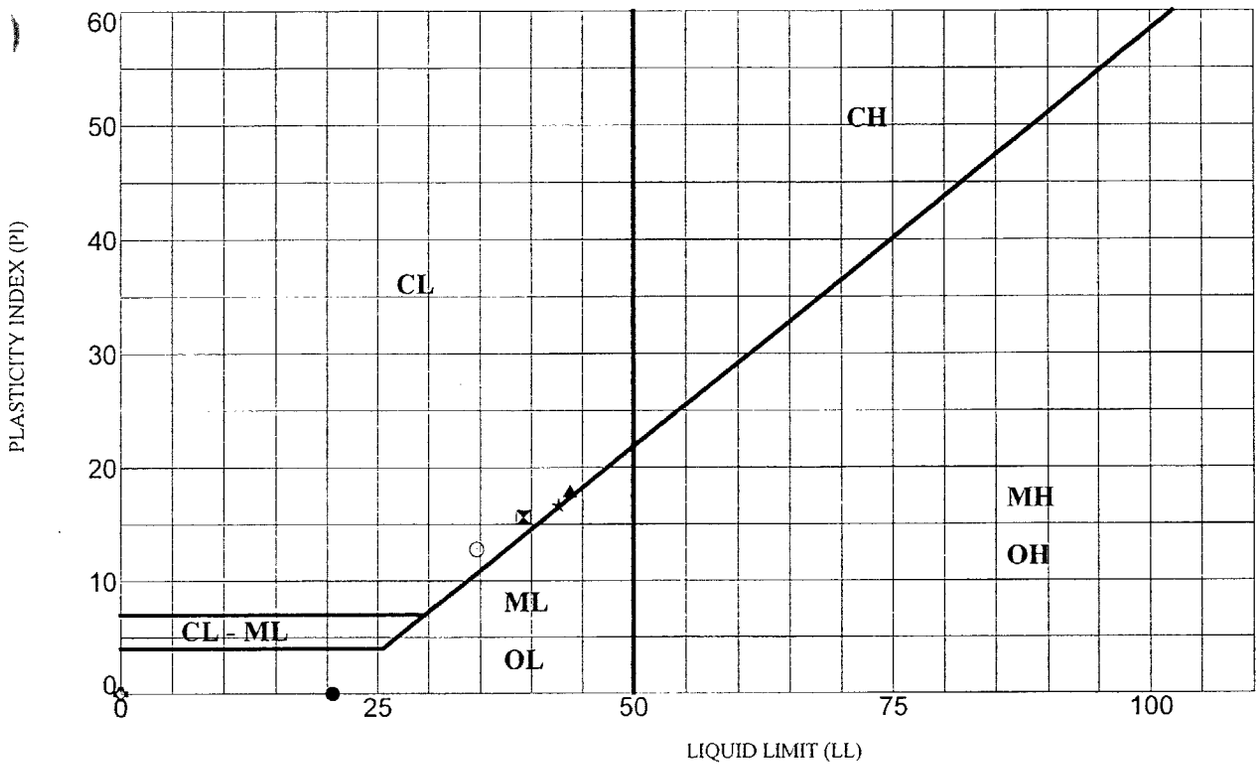
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

PLASTICITY CHART

FIGURE
B-9

NEW PI/6-E-B SL[illegible]074.GPJ 11/26/03



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

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Wasatch Regional Solid Waste Landfill

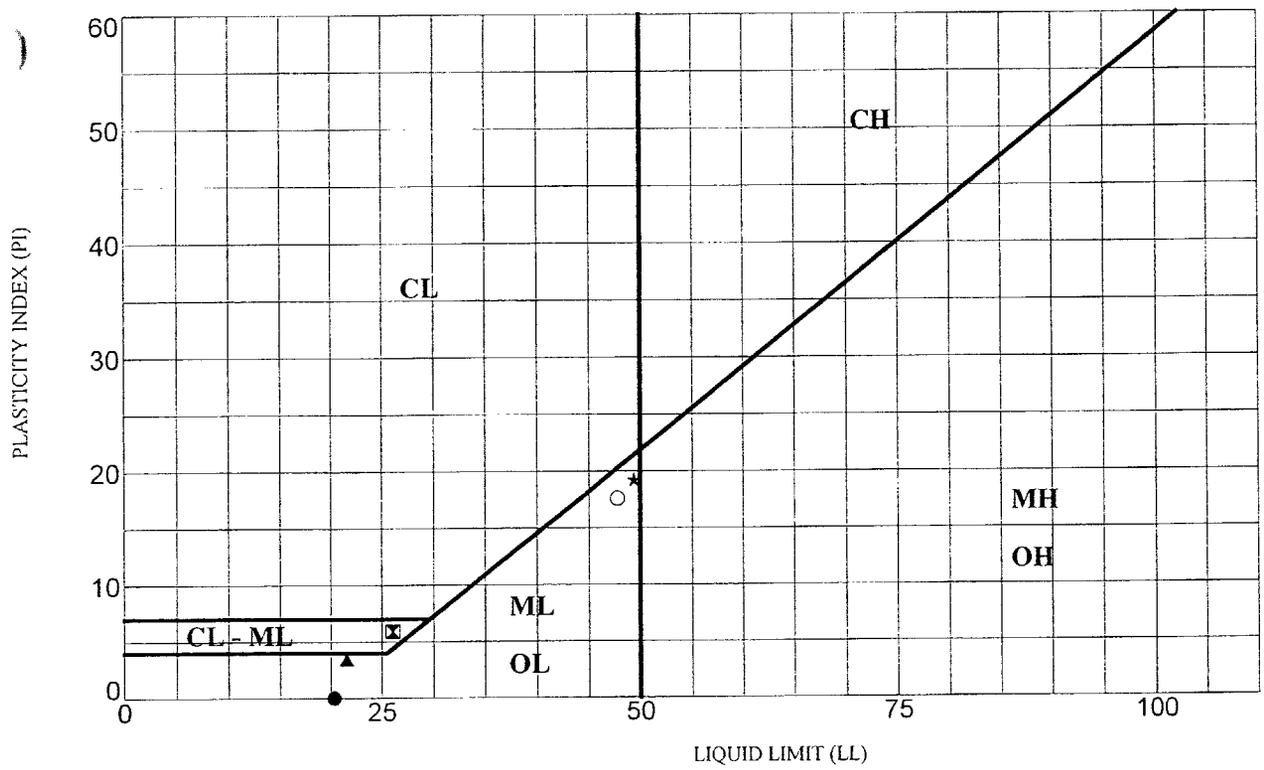
Tooele County, Utah

PLASTICITY CHART

FIGURE

B-10

NEW PI/6-E-B SLC[illegible]074.GPJ 11/26/03



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

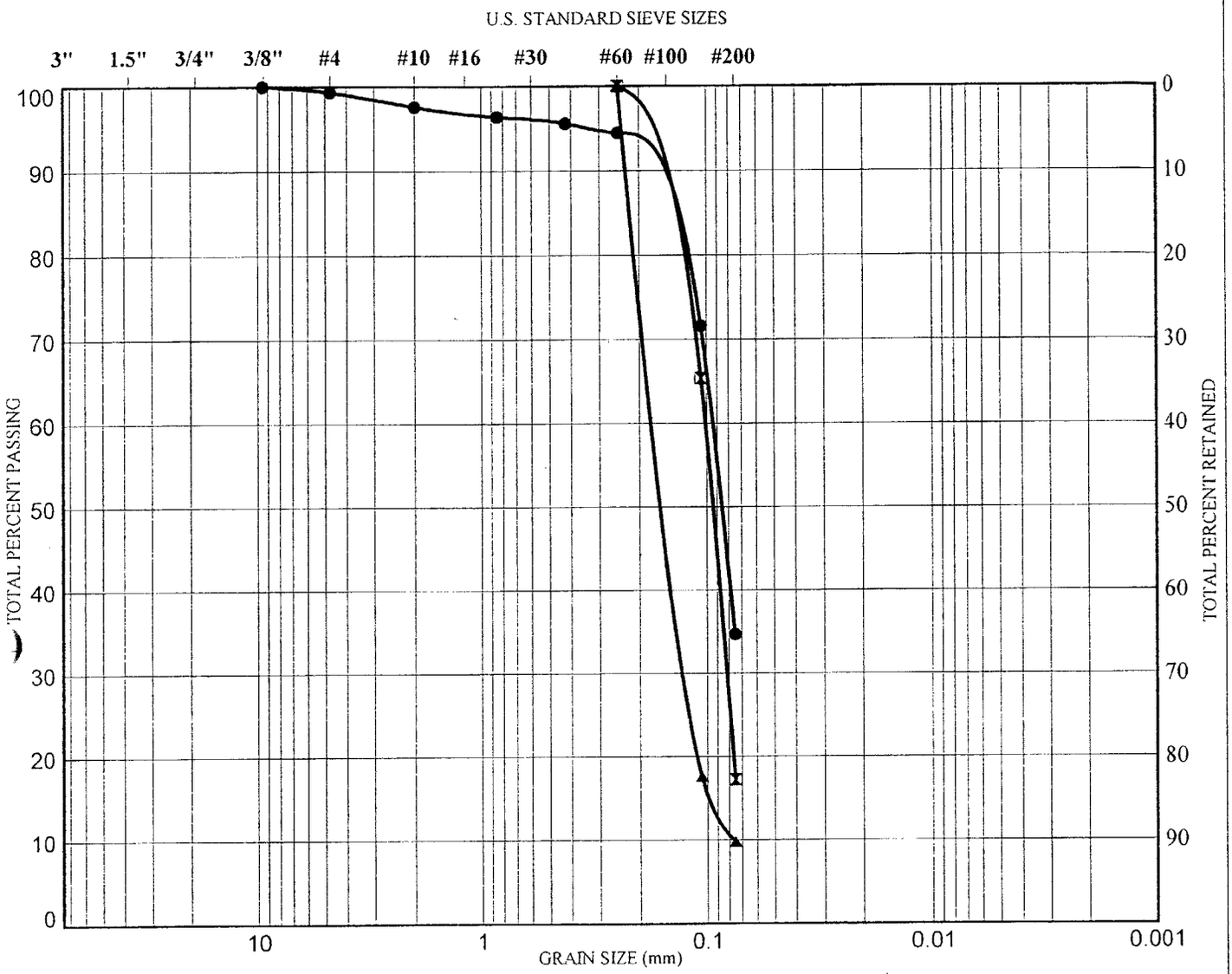
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

PLASTICITY CHART

FIGURE
B-11

NEW PI/6-E-B SLC27074.GPJ 11/26/03

SIEVE ANALYSIS					HYDROMETER	
GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		



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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Wasatch Regional Solid Waste Landfill

Tooele County, Utah

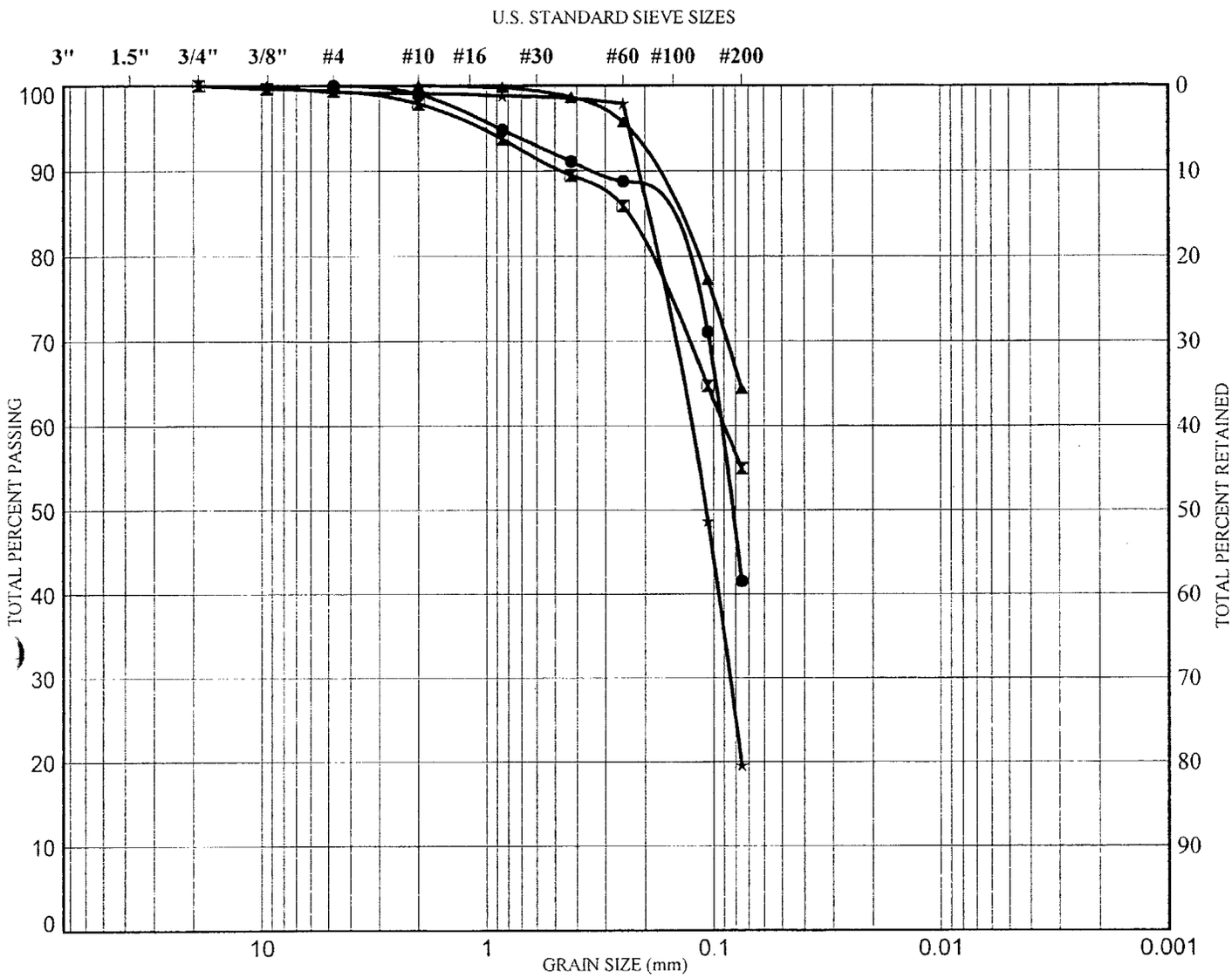
GRAIN SIZE DISTRIBUTION

FIGURE

B-12

NEW GS/4-E-B SLC97041.GPJ 11/26/03

SIEVE ANALYSIS					HYDROMETER	
GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		



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

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Wasatch Regional Solid Waste Landfill

Tooele County, Utah

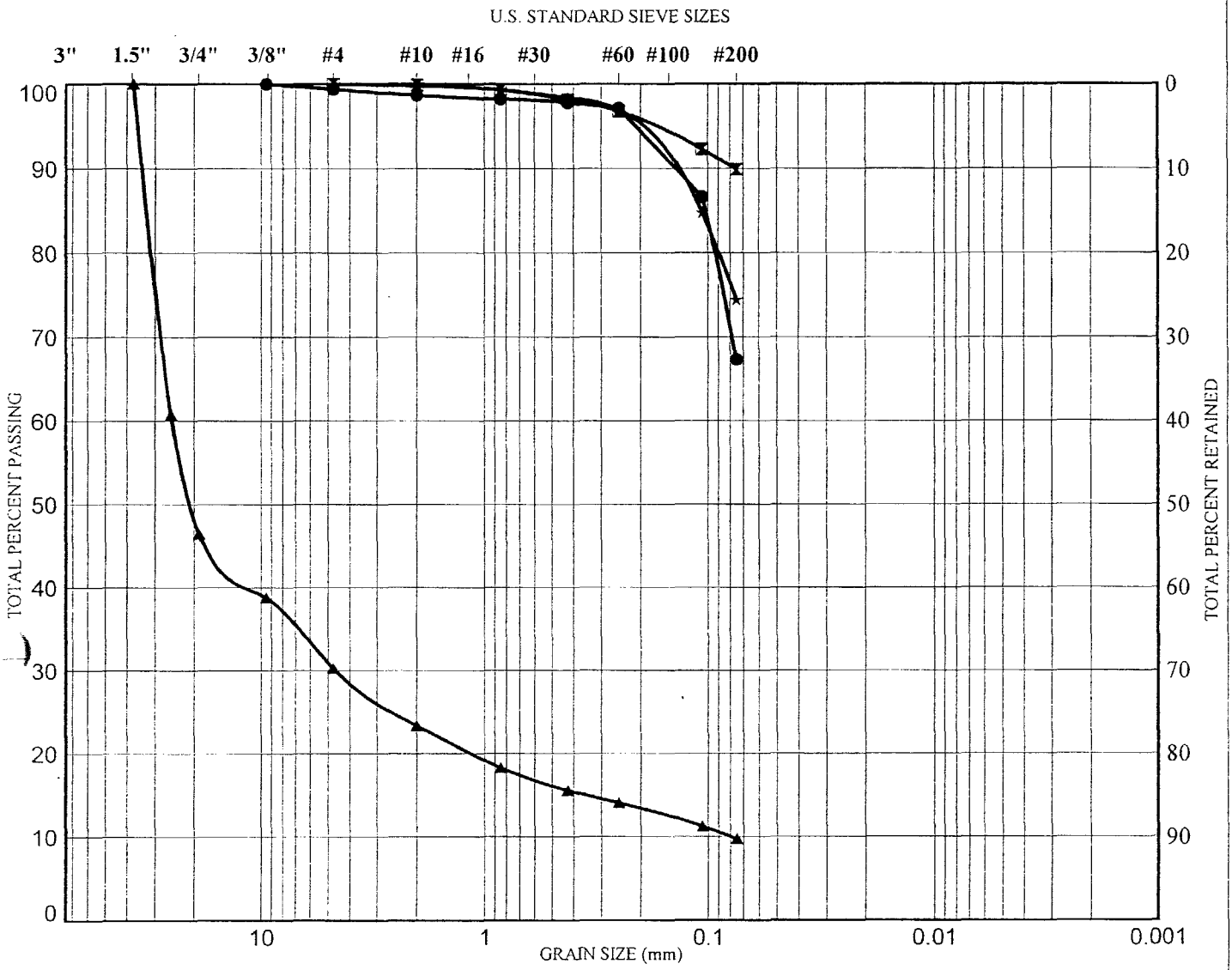
GRAIN SIZE DISTRIBUTION

FIGURE

B-13

NEW GS/4-E-B SLC 7074.GPJ 11/26/03

SIEVE ANALYSIS					HYDROMETER	
GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		



Symbol	Sample	Depth (ft)	USCS Soil Description	USCS Classification
●	B- 4	45.0	Sandy SILT	ML
⧗	B- 5	25.0	Lean CLAY	CL
▲	B- 5	35.0	Poorly Graded GRAVEL with silt and sand	GP-GM
★	B- 6	2.0	SILT with sand	ML

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Wasatch Regional Solid Waste Landfill

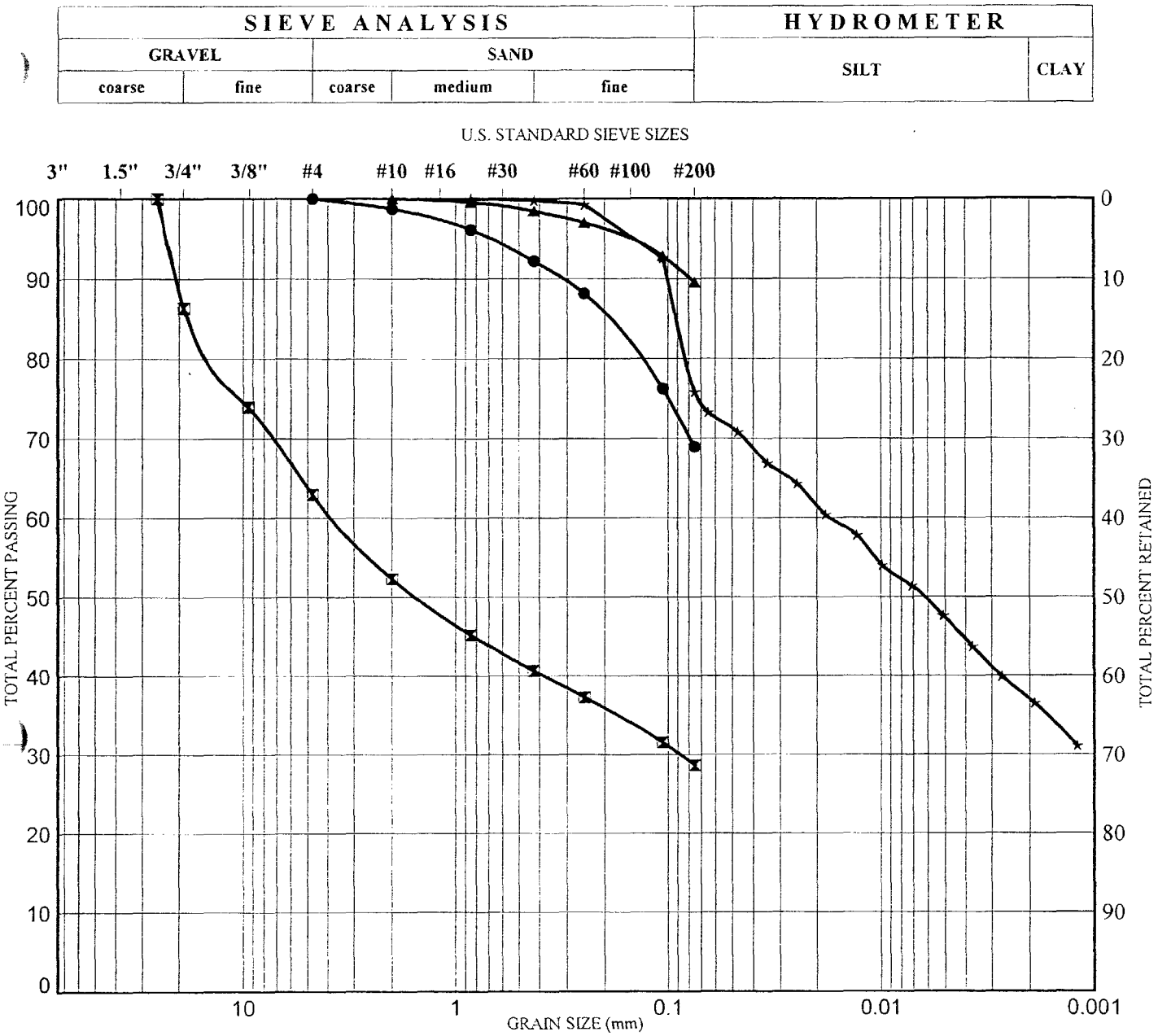
Tooele County, Utah

GRAIN SIZE DISTRIBUTION

FIGURE

B-14

NEW GS/4-E-B SLC3Z074.GPJ 11/26/03



Symbol	Sample	Depth (ft)	USCS Soil Description	USCS Classification
●	B- 7	5.0	Sandy SILT	ML
⊠	B- 7	25.0	Clayey GRAVEL with sand	GC
▲	B- 9	2.0	Lean CLAY	CL
★	B-10	35.0	Lean CLAY with sand	CL

KLEINFELDER

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Wasatch Regional Solid Waste Landfill

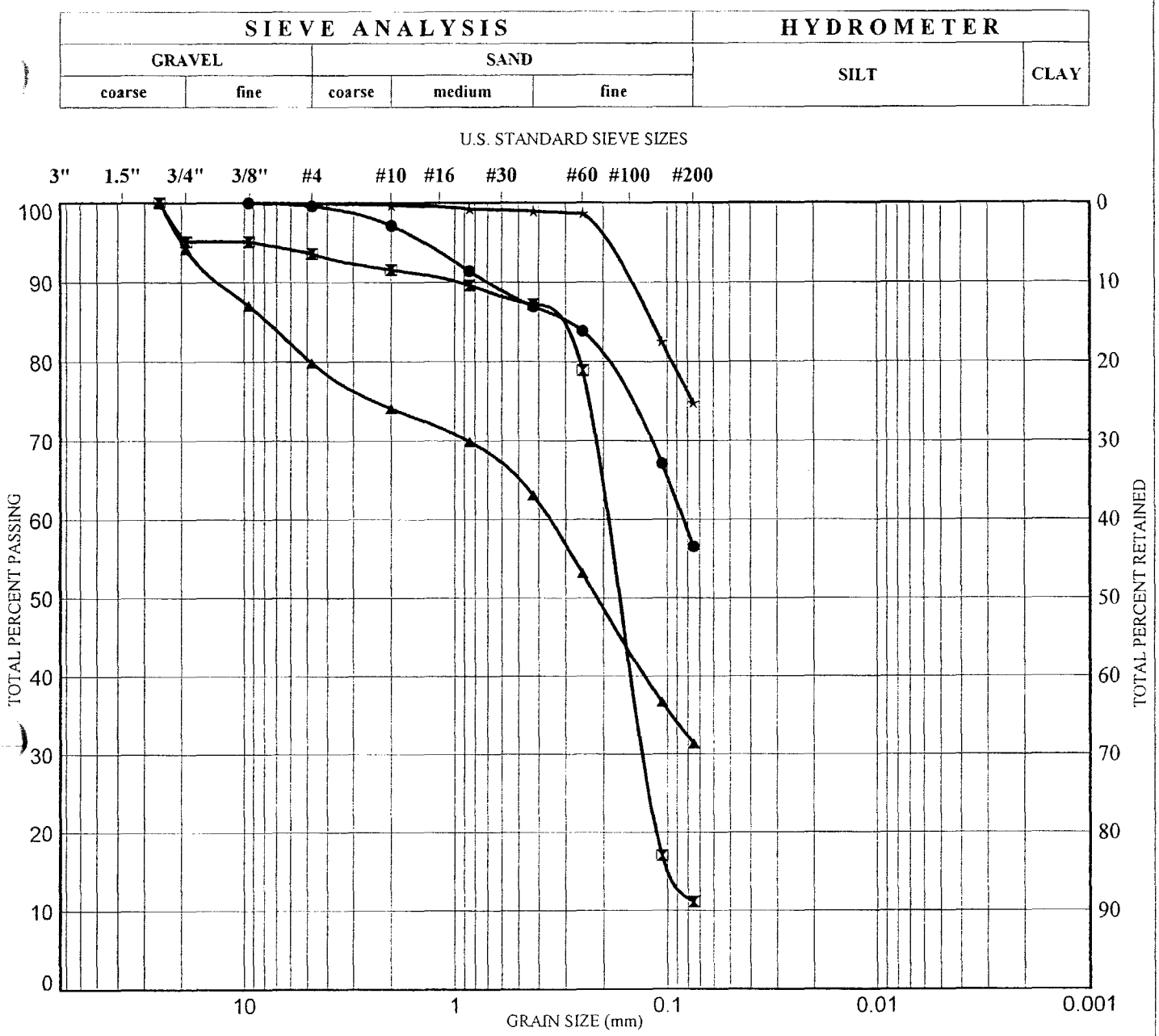
Tooele County, Utah

GRAIN SIZE DISTRIBUTION

FIGURE

B-15

NEW GS/4-E-B SLC32074.GPJ 11/26/03



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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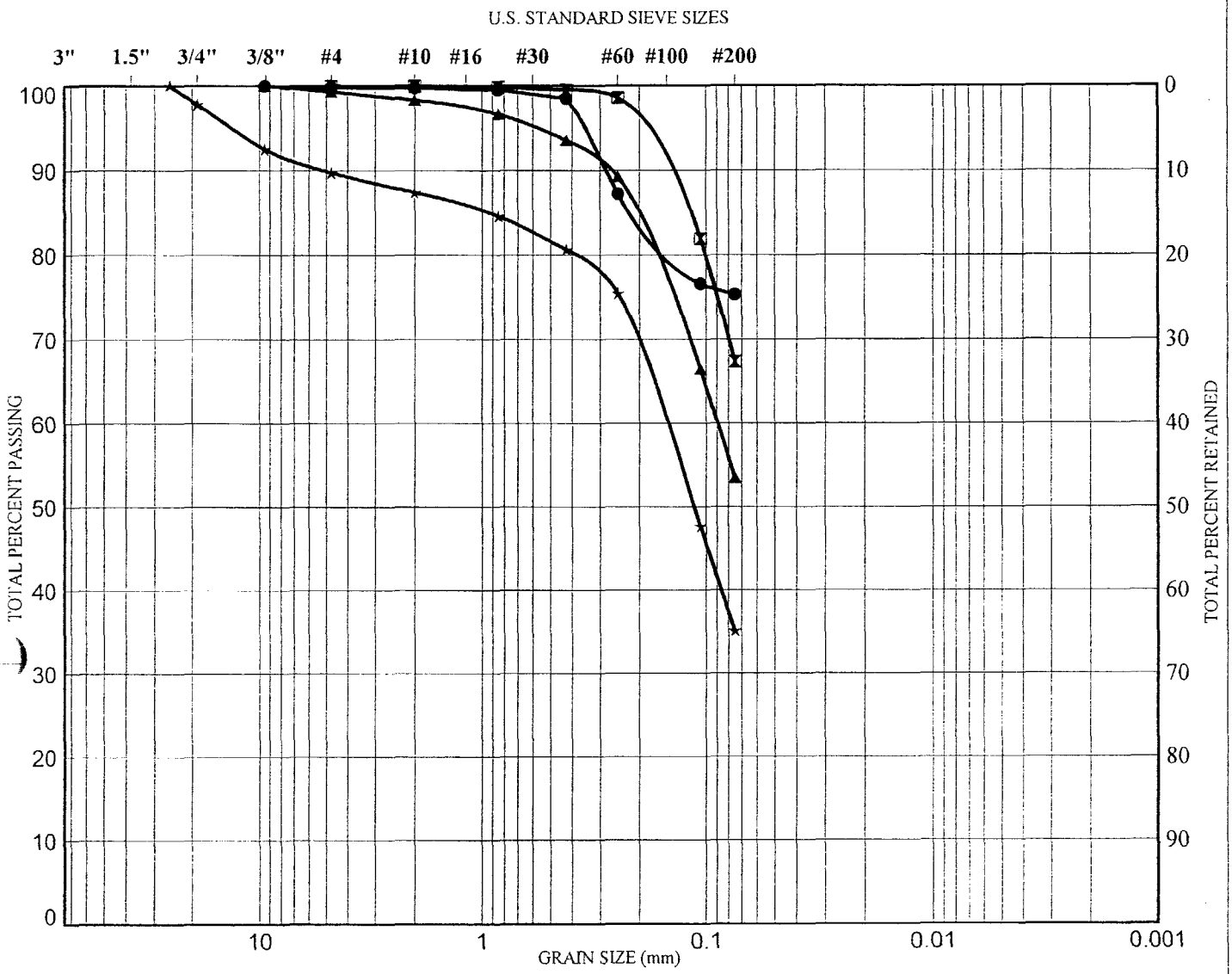
GRAIN SIZE DISTRIBUTION

FIGURE

B-16

NEW GS/4-E-B SLC3Z074.GPJ 11/26/03

SIEVE ANALYSIS					HYDROMETER	
GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		



Symbol	Sample	Depth (ft)	USCS Soil Description	USCS Classification
●	TP- 5	2.0	SILT with sand	ML
⧗	TP- 5	8.0	Sandy SILT	ML
▲	TP- 6	1.0	Sandy SILT	ML
★	TP- 7	1.0	Silty SAND	SM

KLEINFELDER

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Wasatch Regional Solid Waste Landfill

Tooele County, Utah

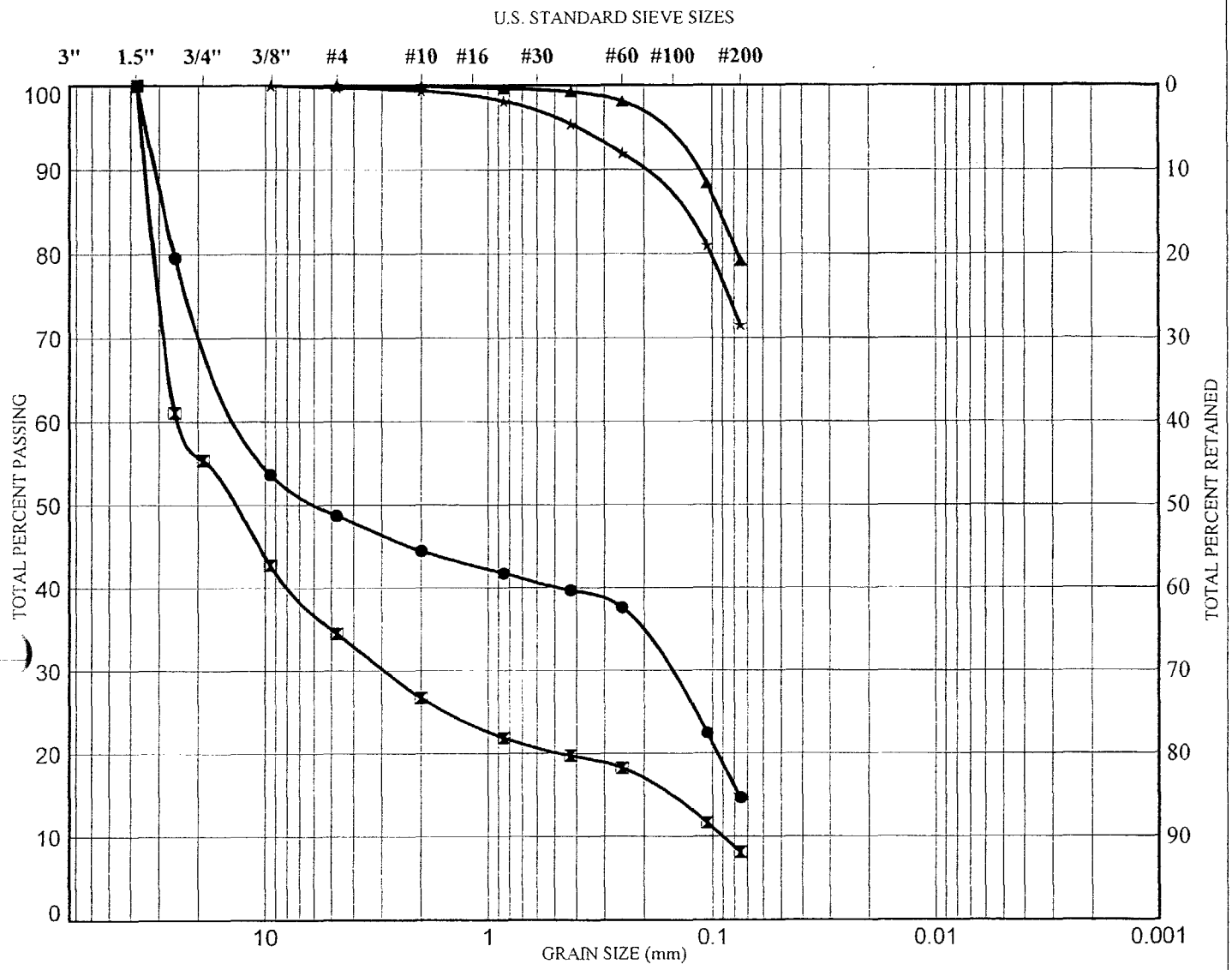
GRAIN SIZE DISTRIBUTION

FIGURE

B-17

NEW GS/4-E-B SLC32074.GPJ 11/26/03

SIEVE ANALYSIS					HYDROMETER	
GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		



Symbol	Sample	Depth (ft)	USCS Soil Description	USCS Classification
●	TP- 8	2.0	Silty GRAVEL with sand	GM
⊠	TP- 9	1.0	Poorly Graded GRAVEL with silt and sand	GP-GM
▲	TP-11	1.0	SILTY CLAY with sand	CL-ML
★	TP-15	1.0	Lean CLAY with sand	CL

KLEINFELDER

PROJECT NO. 35467.003

Wasatch Regional Solid Waste Landfill

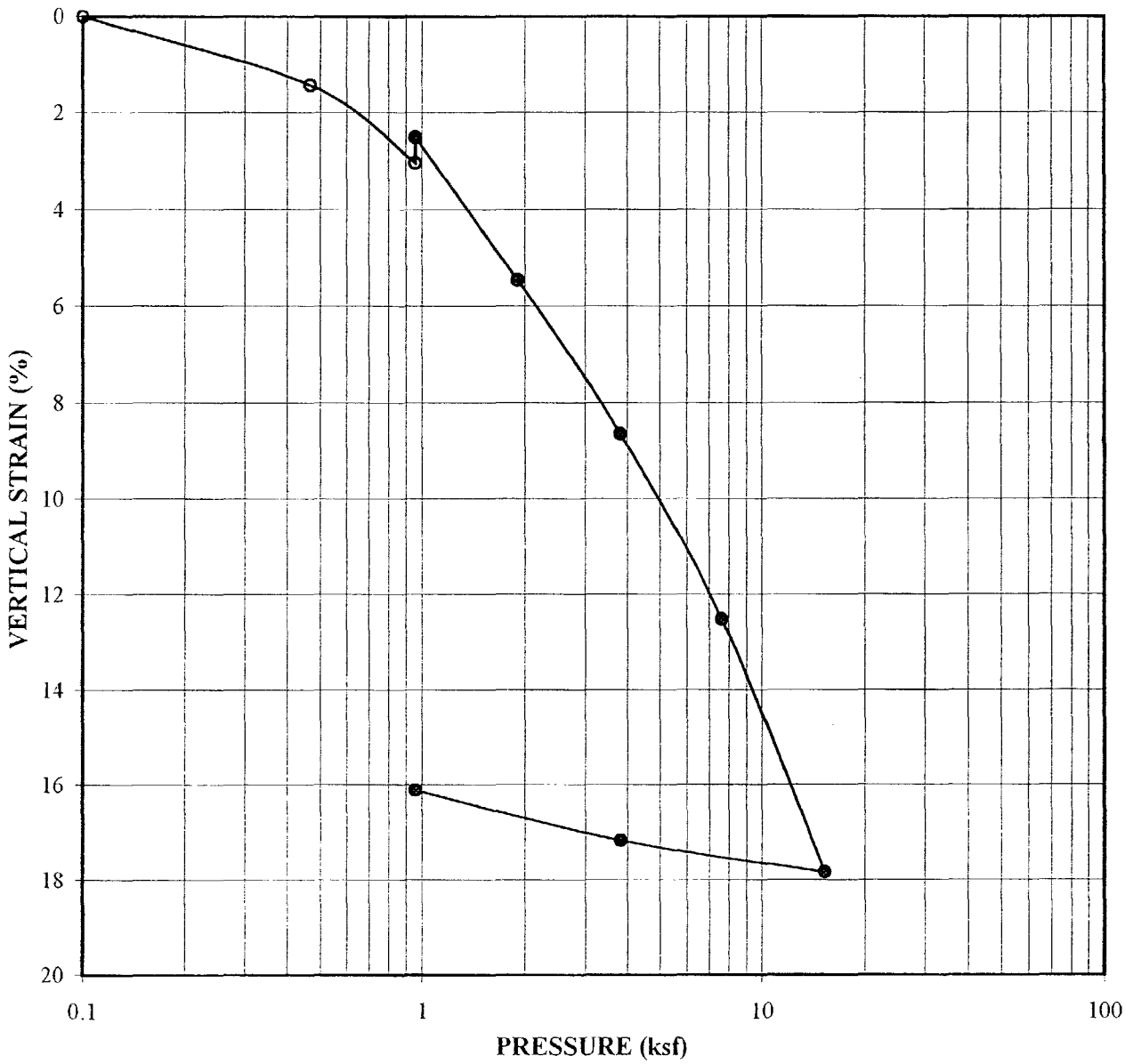
Tooele County, Utah

GRAIN SIZE DISTRIBUTION

FIGURE

B-18

NEW GS/4-E-B SLC\3Z074.GPJ 11/26/03



Sample	B-2
Depth	5.0
Description	Lean CLAY with sand
Classification	CL
Approx. Overburden Pressur	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

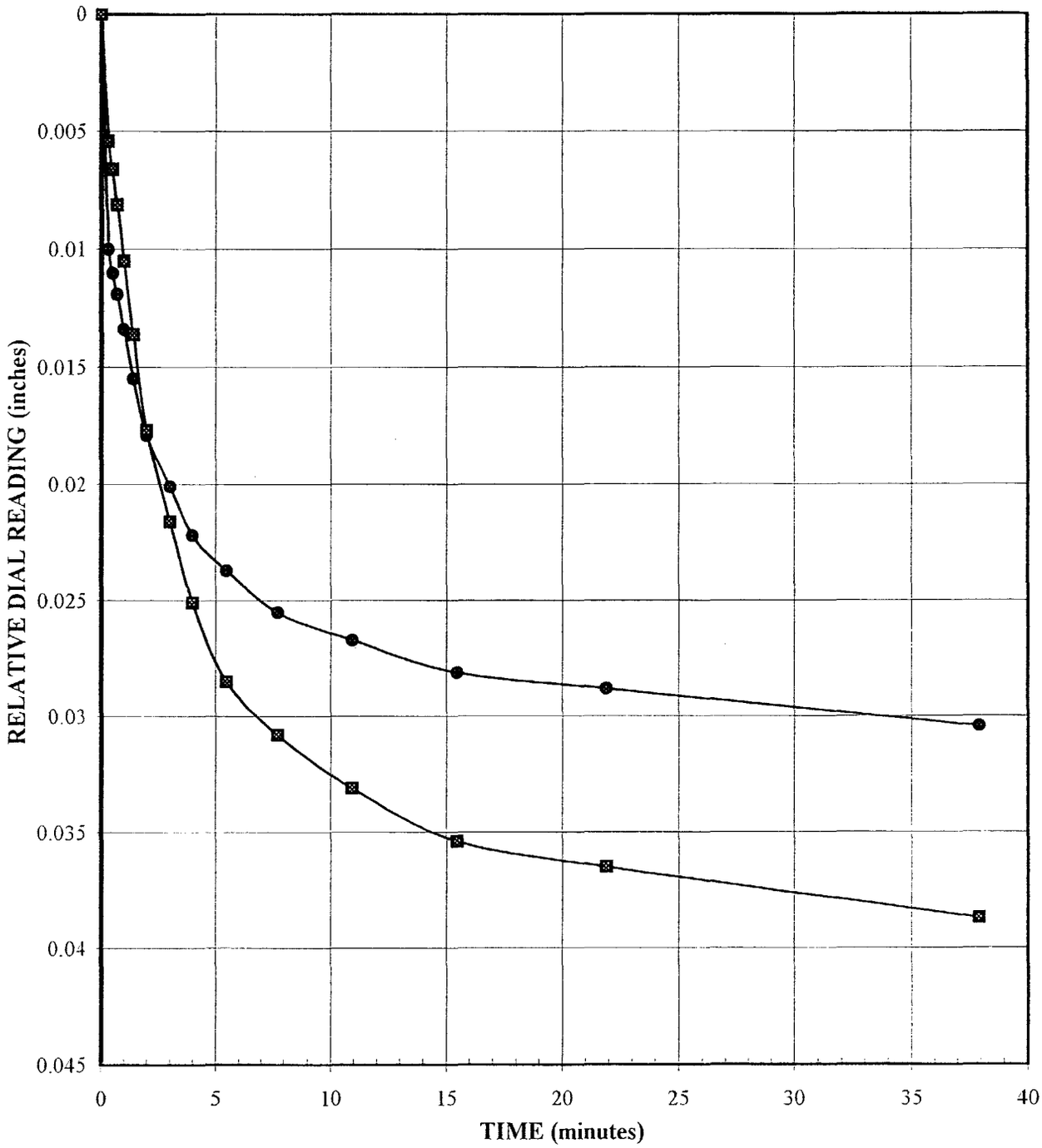
PROJECT NO. 35467.001

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

CONSOLIDATION TEST RESULTS

FIGURE

B-19



Sample	B-2	
Depth	5	
Pressure (psf)	● 4	■ 8
Cv (ft²/day)	12.44	10.06

KLEINFELDER

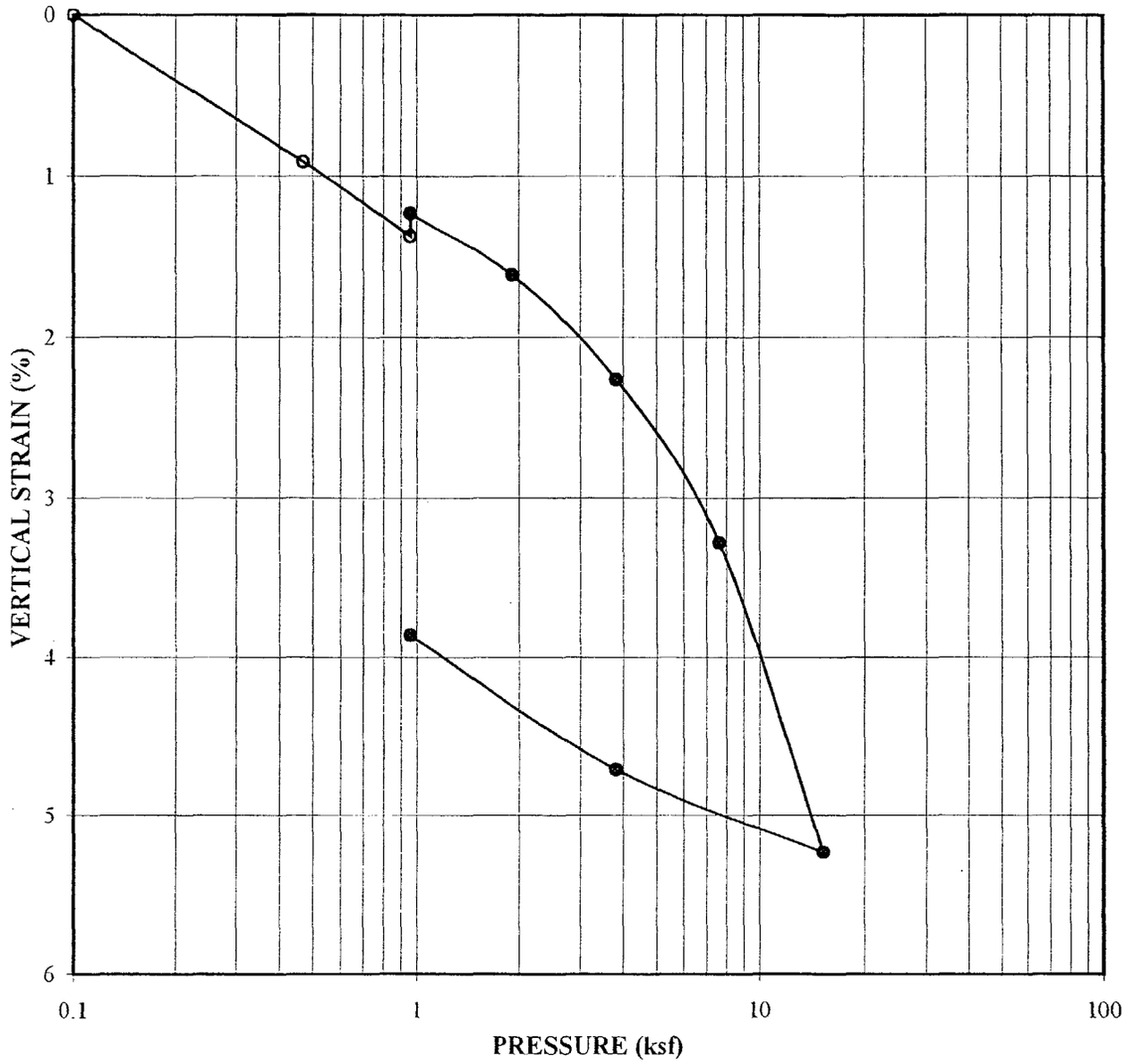
PROJECT NO. 35467.001

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 Pressur	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

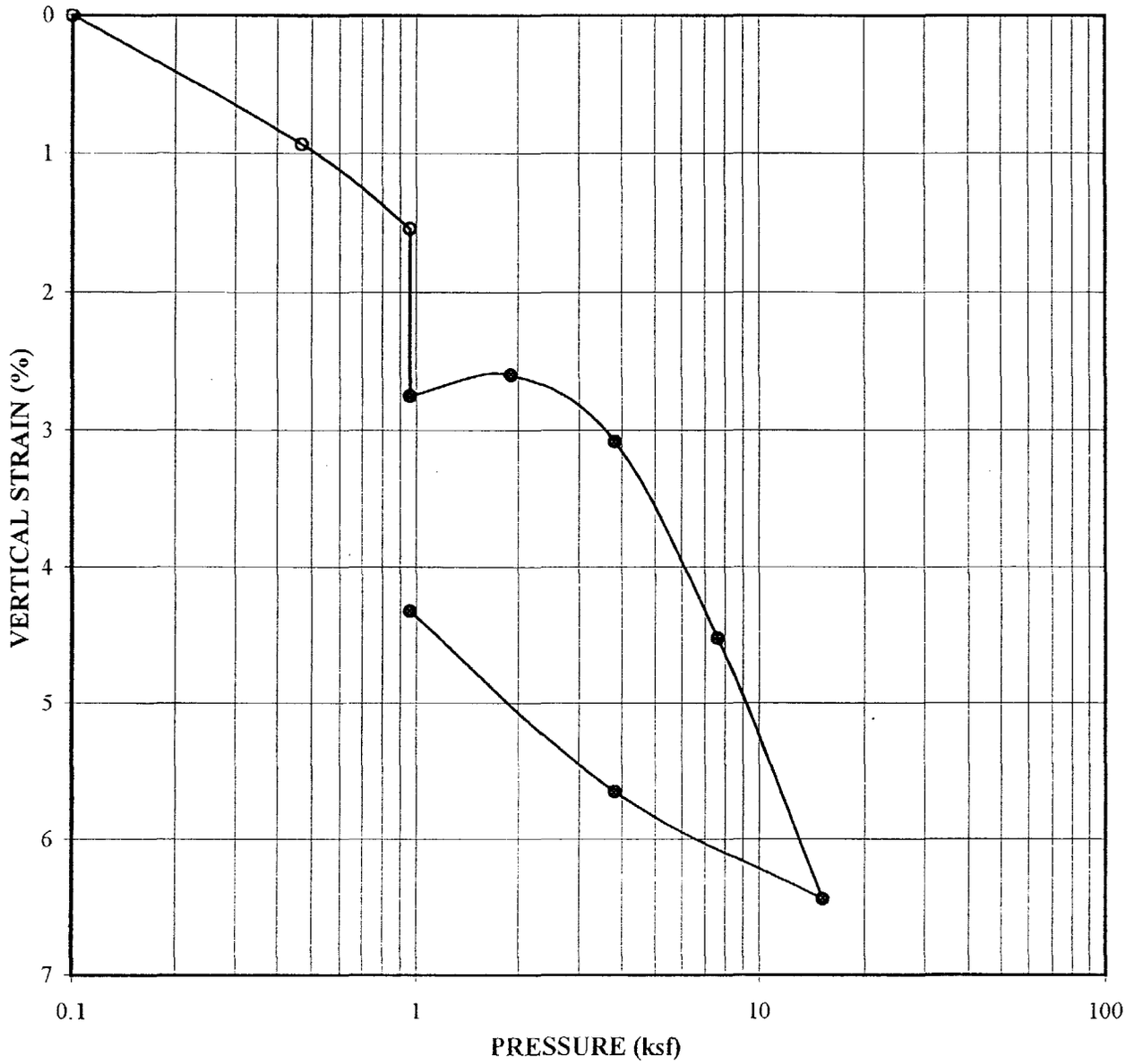
PROJECT NO. 35467.001

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 Pressur	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

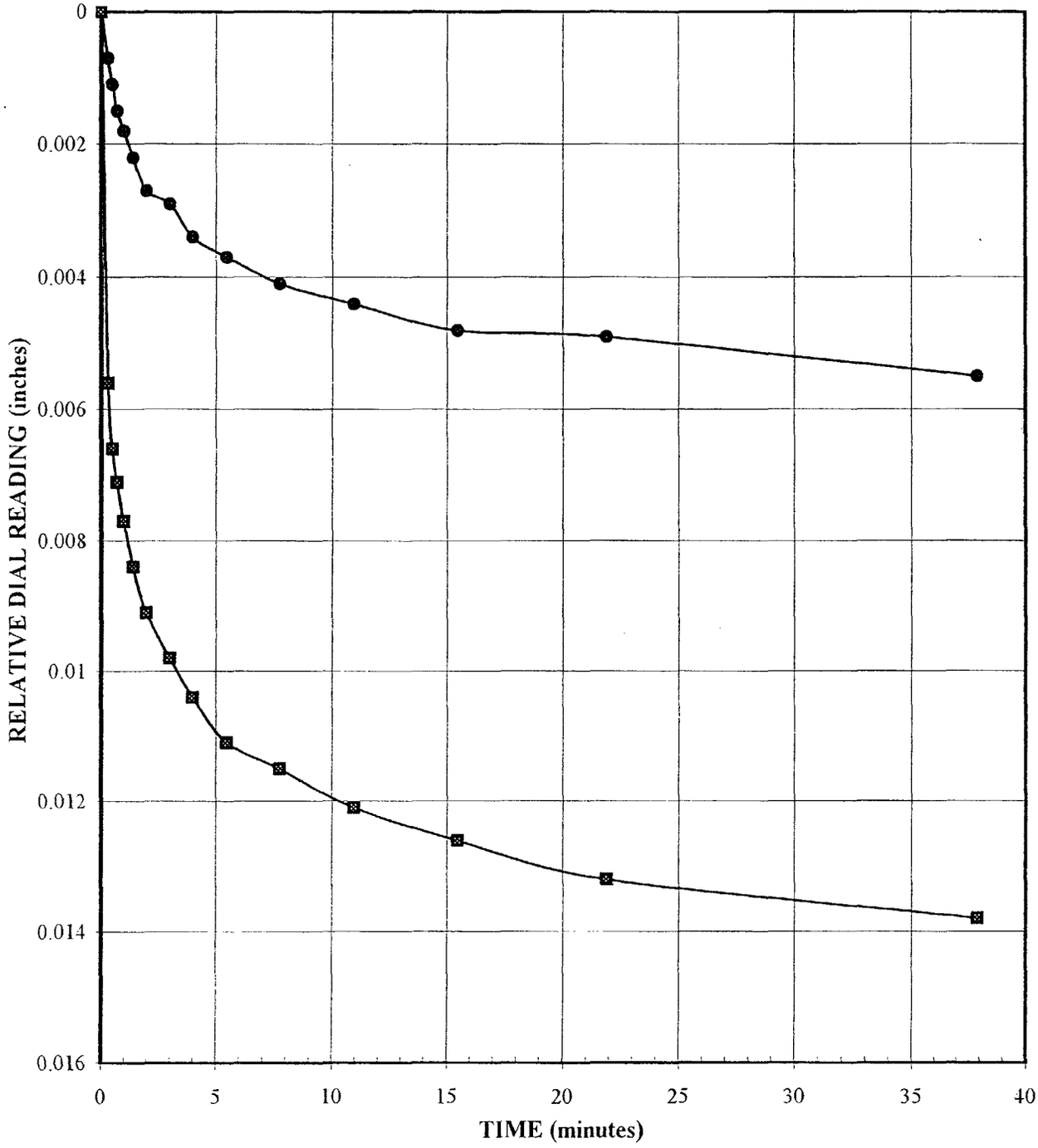
PROJECT NO. 35467.001

Wasatch Regional Solid Waste Landfill
Tooele County, Utah

CONSOLIDATION TEST RESULTS

FIGURE

B-22



Sample	B-4	
Depth	15	
Pressure (psf)	● 4	■ 8
Cv (ft²/day)	2.61	12.48

KLEINFELDER

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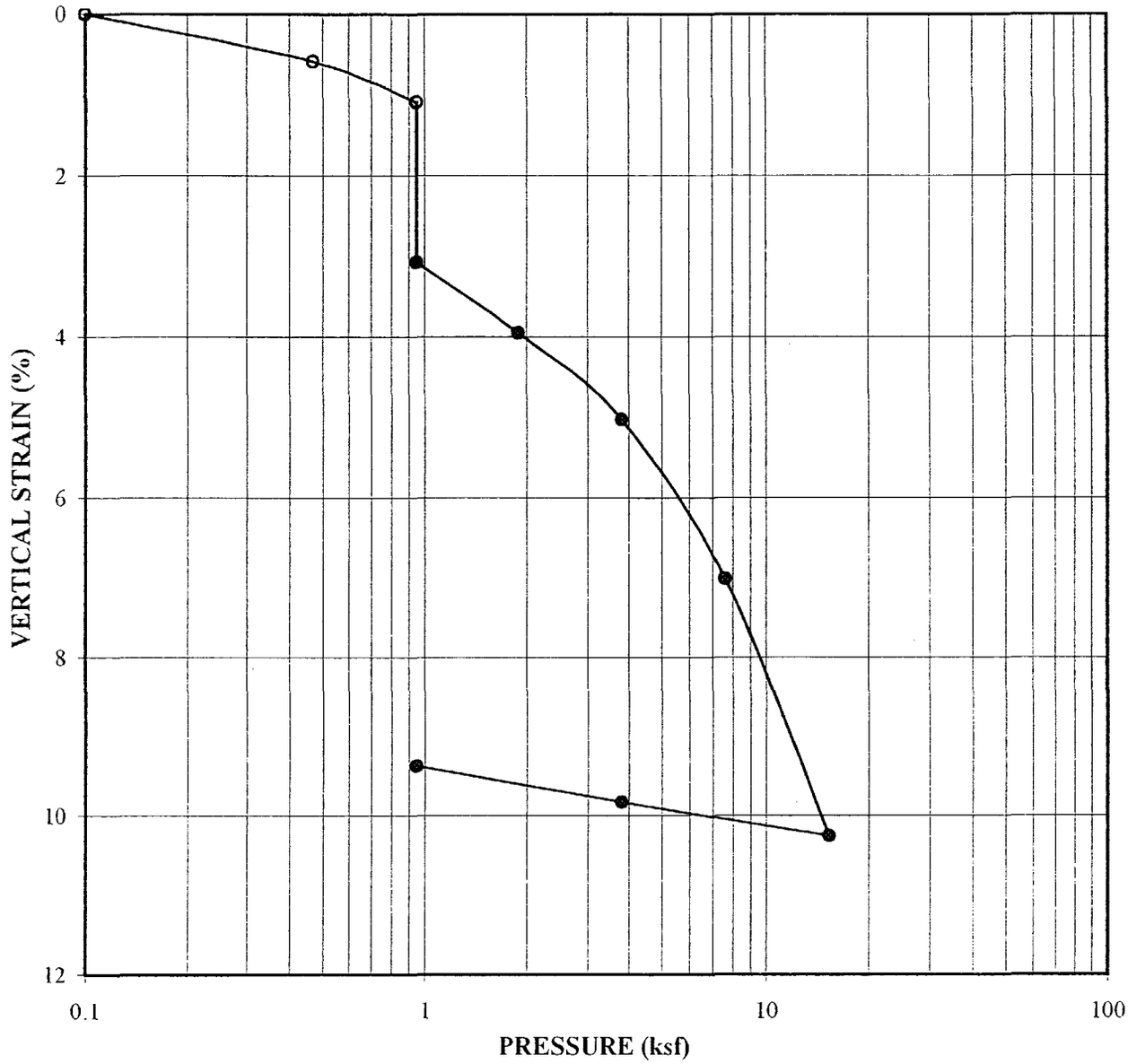
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

TIME RATE CONSOLIDATION

FIGURE

B-23



Sample	B-5
Depth	7.5
Description	Sandy SILTY CLAY
Classification	CL-ML
Approx. Overburden Pressur	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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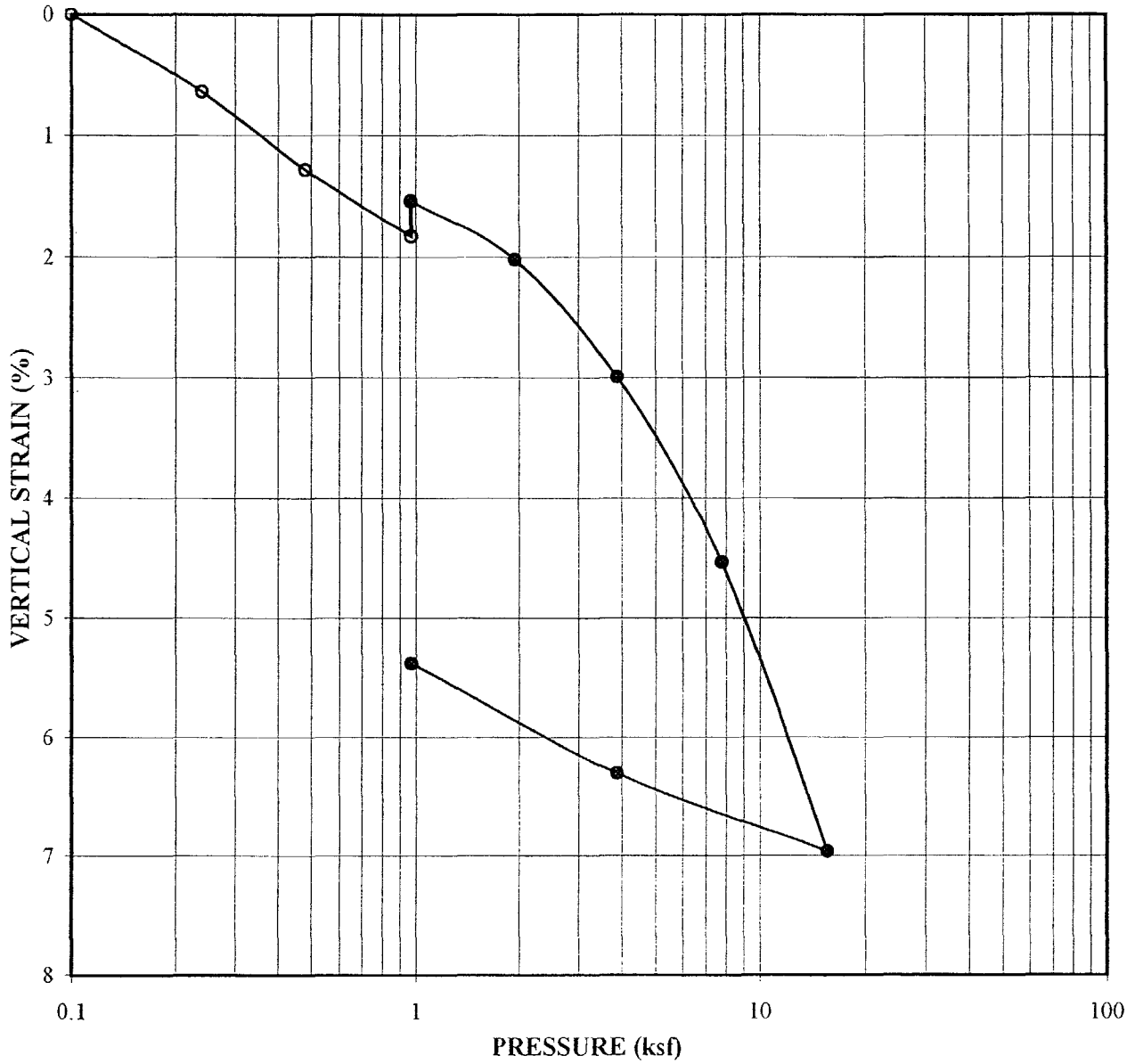
Wasatch Regional Solid Waste Landfill
Tooele County, Utah

CONSOLIDATION TEST RESULTS

FIGURE

B-24



Sample	B-9
Depth	8.0
Description	Clayey SAND
Classification	SC
Approx. Overburden Pressur	0.96 ksf
Preconsolidation Pressure	
Compression Ratio	0.081
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

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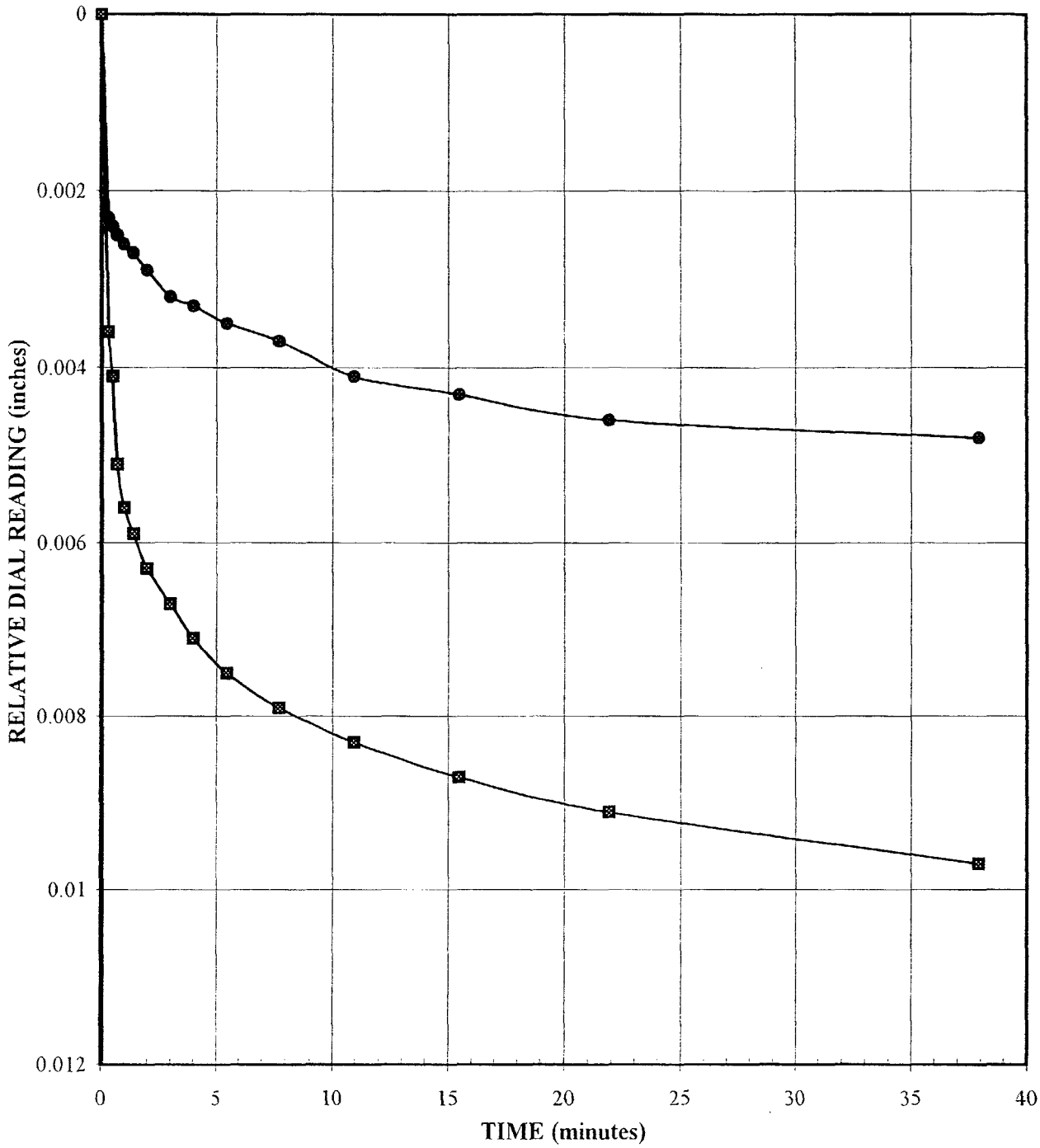
Wasatch Regional Solid Waste Landfill
Tooele County

CONSOLIDATION TEST RESULTS

FIGURE

B-25



Sample	B-9	
Depth	8	
Pressure (psf)	● 2	■ 4
Cv (ft²/day)	14.58	13.37

KLEINFELDER

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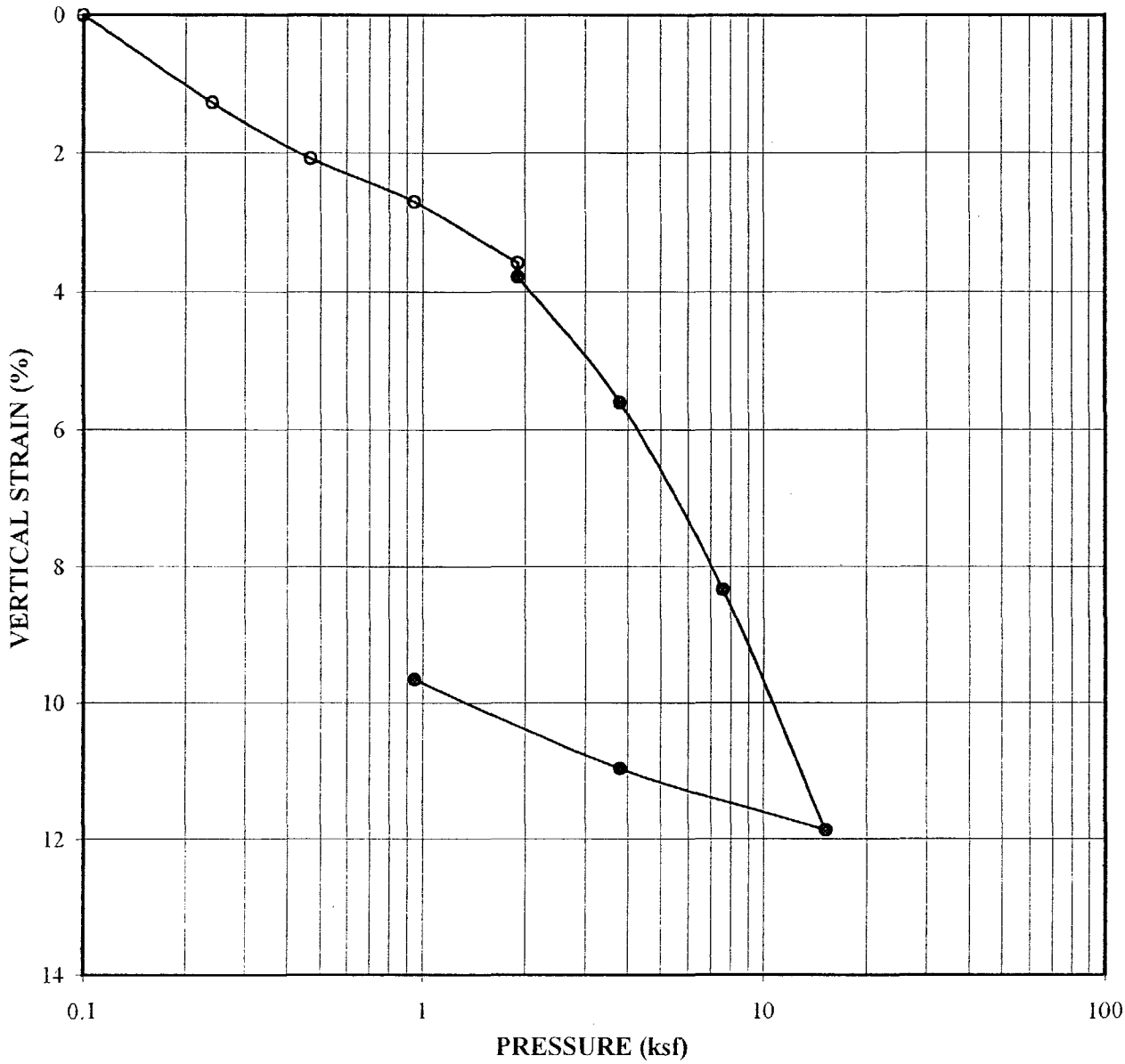
Wasatch Regional Solid Waste Landfill
Tooele County

TIME RATE CONSOLIDATION

FIGURE

B-26



Sample	B-9
Depth	30.0
Description	Elastic SILT
Classification	MH
Approx. Overburden Pressur	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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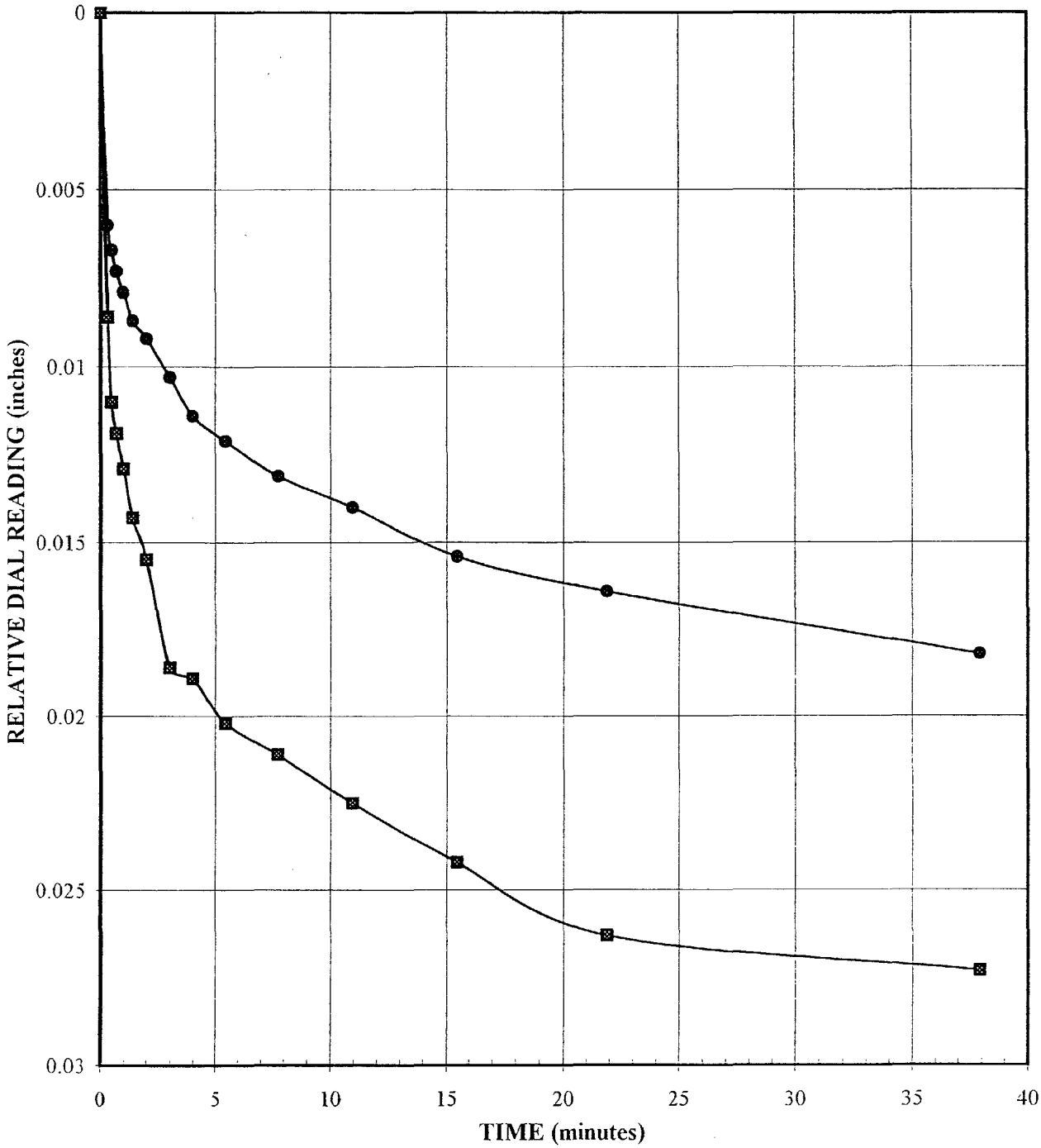
Wasatch Regional Solid Waste Landfill
Tooele County

CONSOLIDATION TEST RESULTS

FIGURE

B-27



Sample	B-9	
Depth	30	
Pressure (psf)	● 4	■ 8
Cv (ft²/day)	13.23	10.09

KLEINFELDER

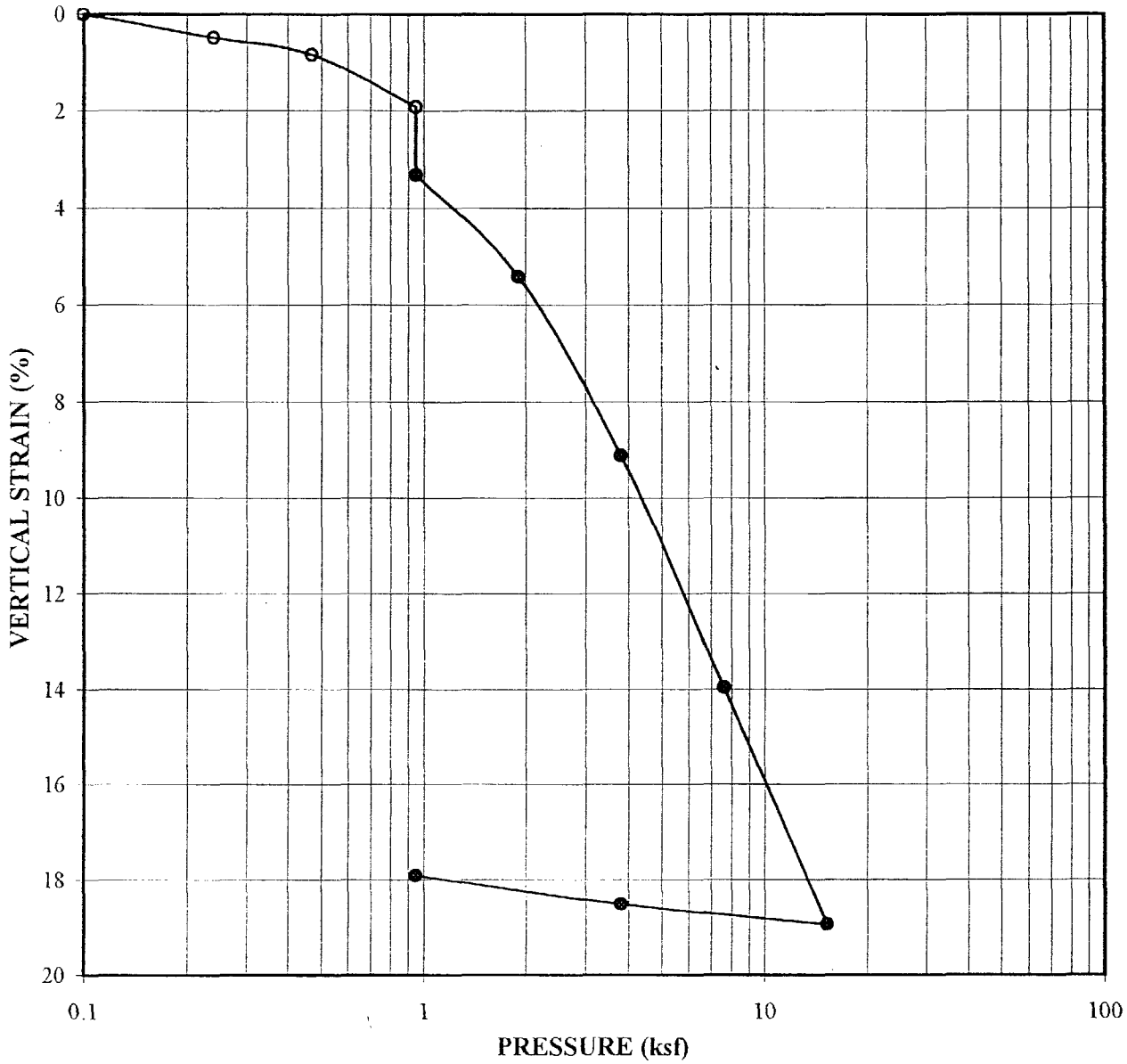
PROJECT NO. 35467.003

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 Pressur	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

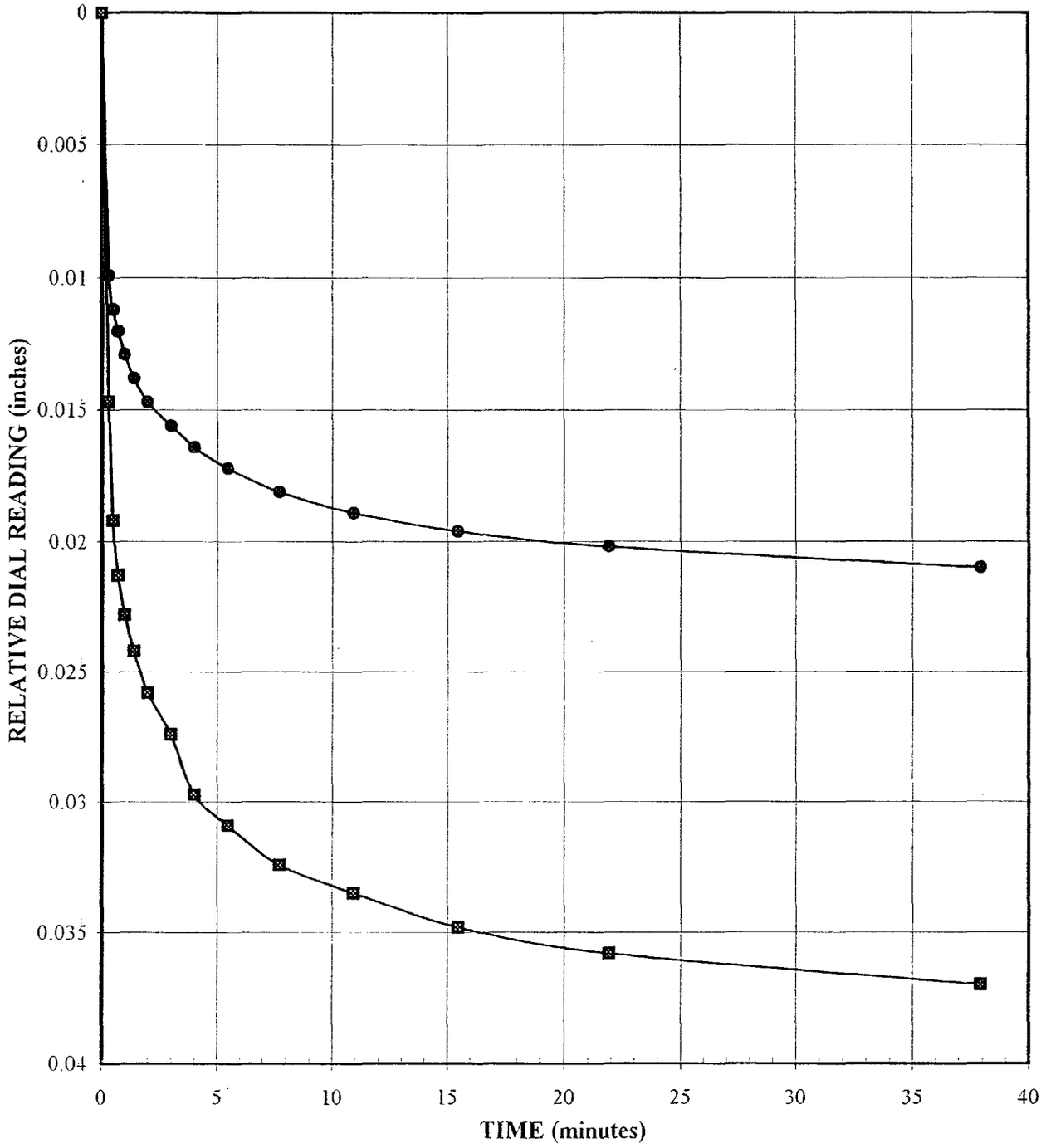
PROJECT NO. 35467.003

Wasatch Regional Solid Waste Landfill
Tooele County

CONSOLIDATION TEST RESULTS

FIGURE

B-29



Sample	**B-11**	
Depth	**10**	
Pressure (psf)	● **2**	■ **4**
Cv (ft²/day)	**13.08**	**9.33**

KLEINFELDER

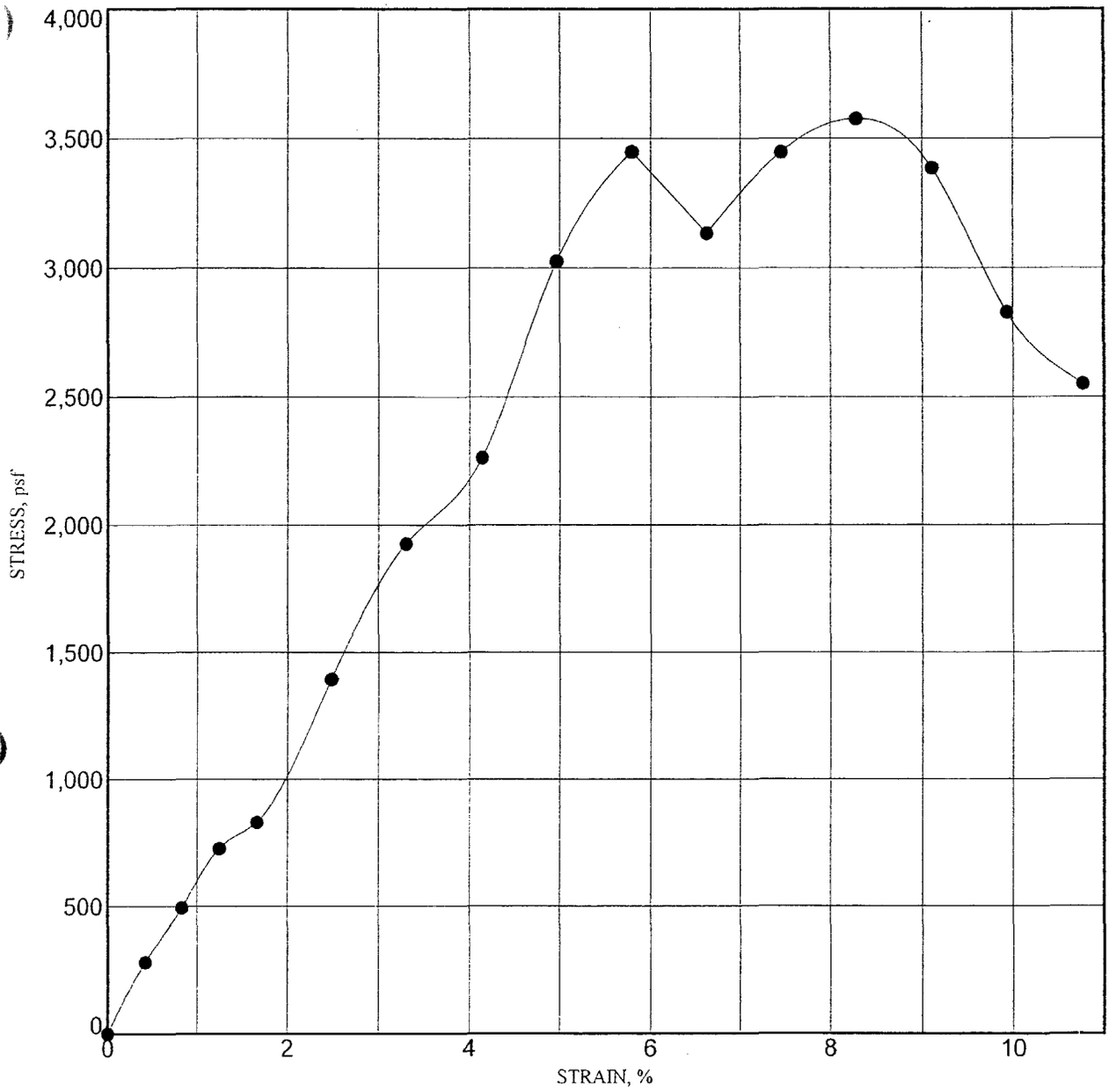
PROJECT NO. **35467.003**

Wasatch Regional Solid Waste Landfill
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

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Wasatch Regional Solid Waste Landfill

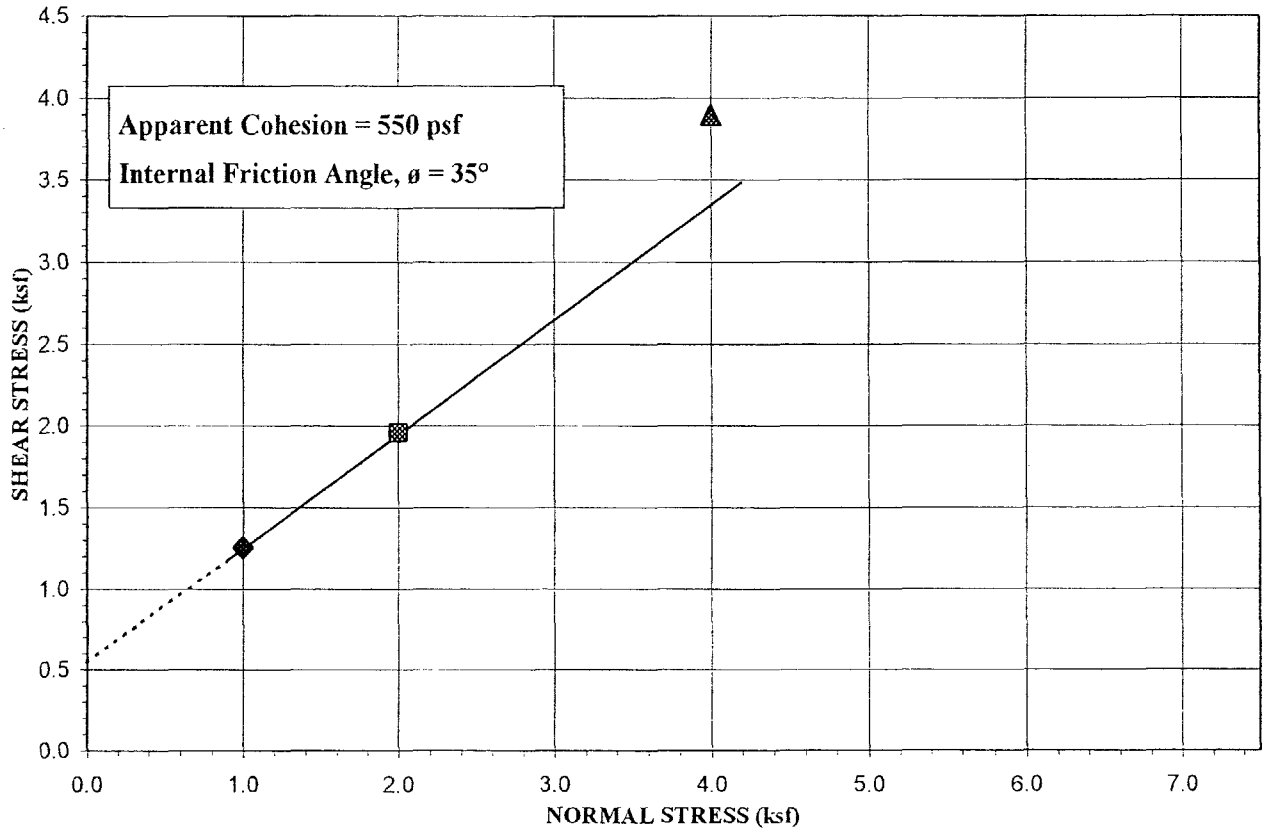
Tooele County, Utah

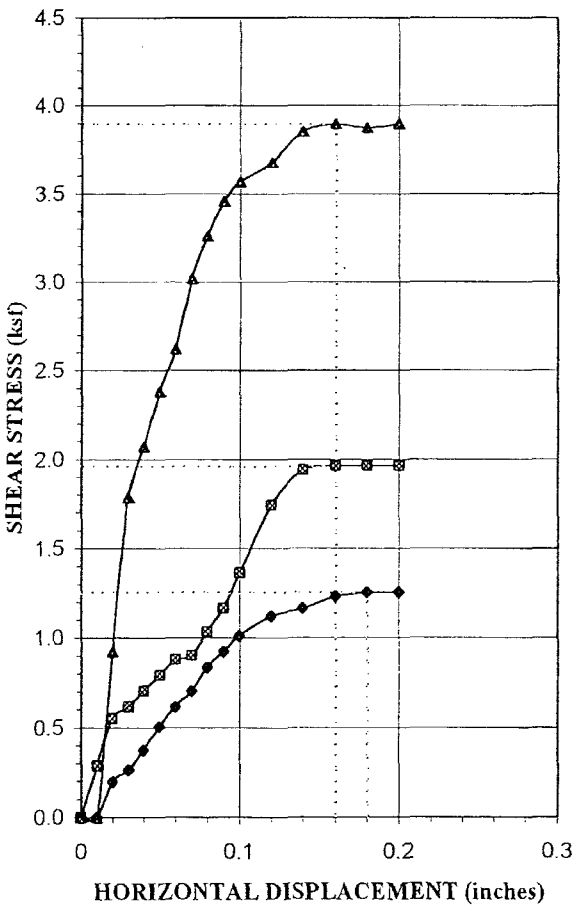
UNCONFINED COMPRESSION TEST

FIGURE

B-31

NEW UNCONFINED A-E-B SLC3Z074.GPJ 11/26/03





Source: B-2	Depth: 2 ft
Type of Test:	Consolidated Drained

Test No. (Symbol)	1 (◆)	2 (▩)	3 (▲)
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)

KLEINFELDER

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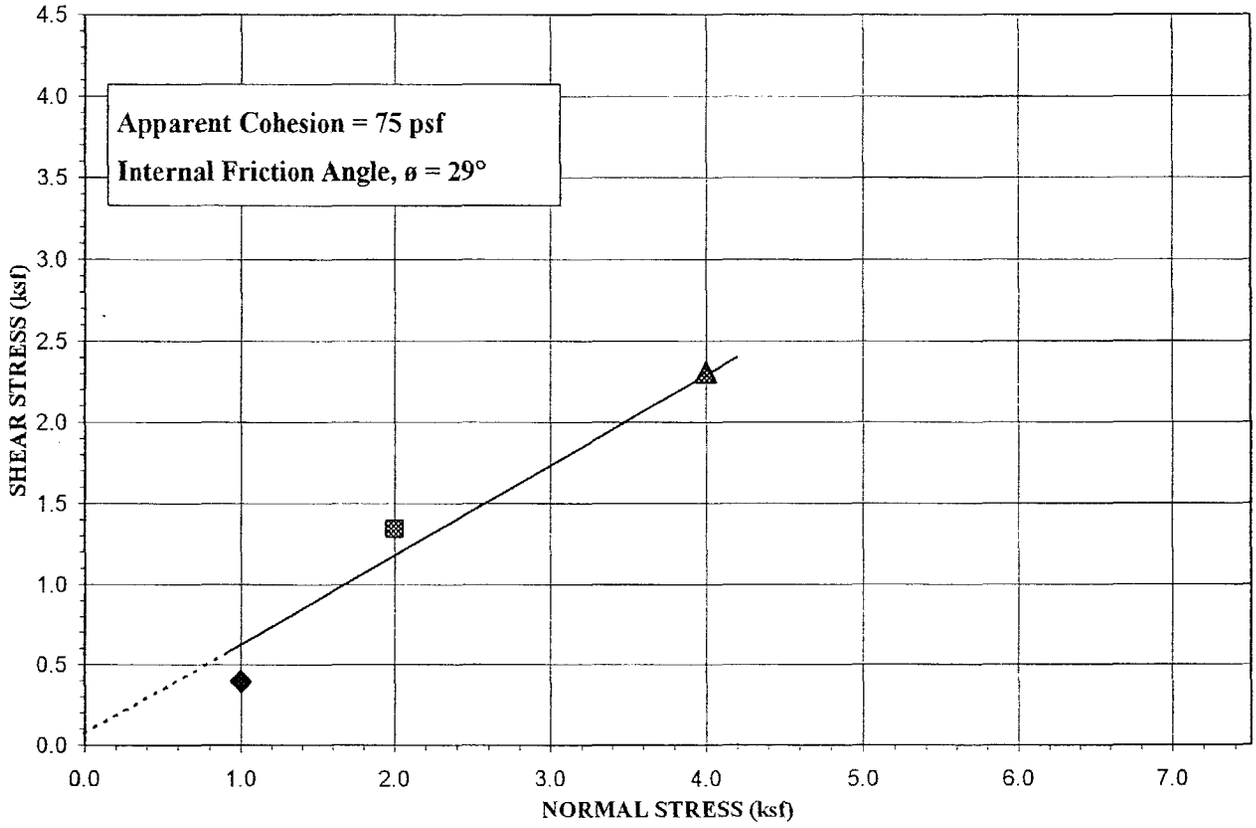
Wasatch Regional Solid Waste Landfill

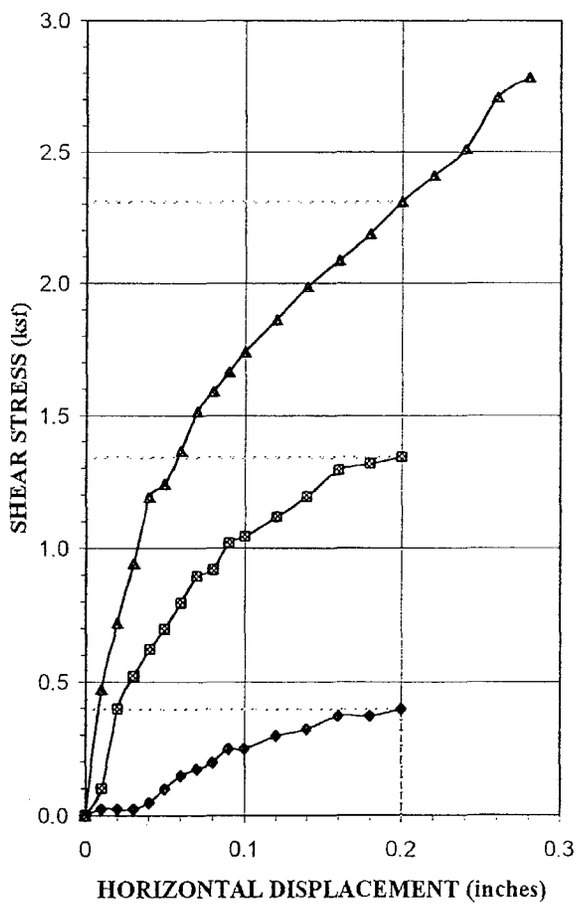
Tooele County, Utah

DIRECT SHEAR TEST

FIGURE

B-32





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)

KLEINFELDER

PROJECT NO. 35467.003

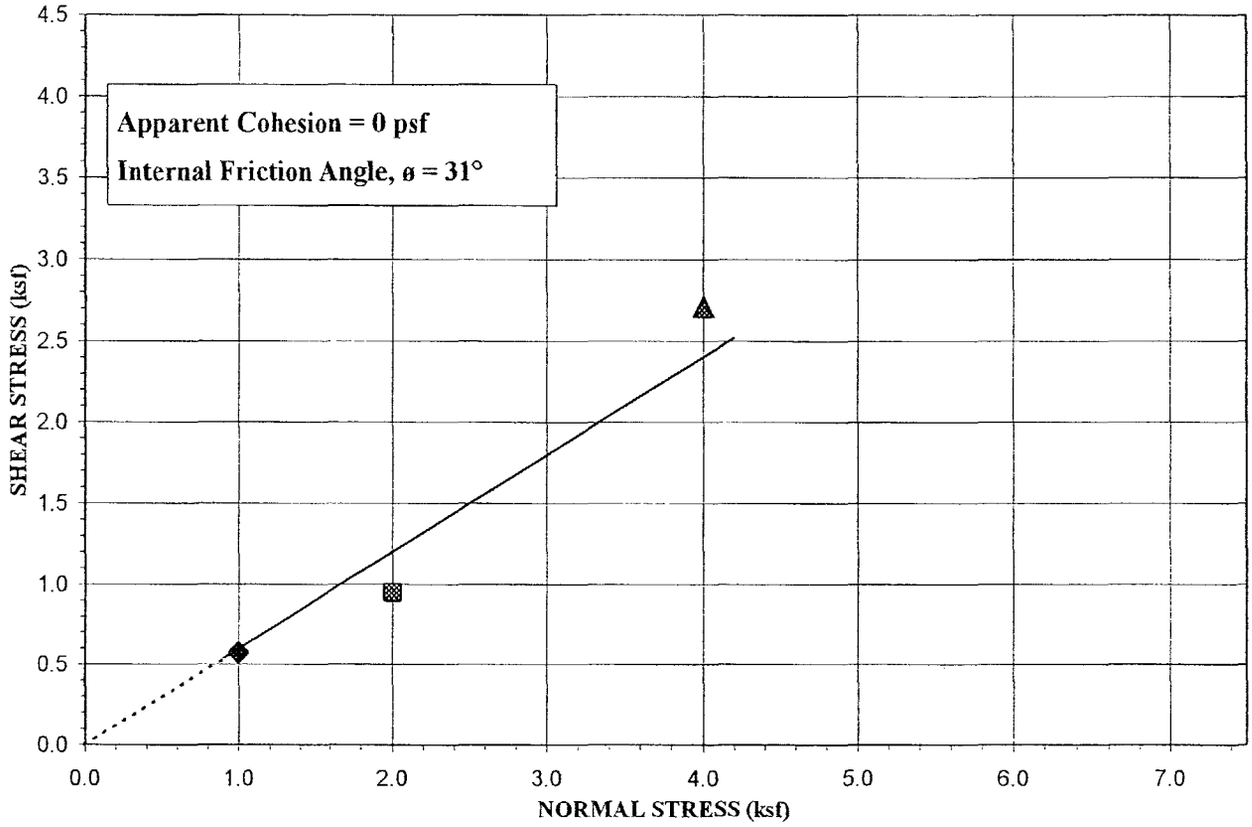
Wasatch Regional Solid Waste Landfill

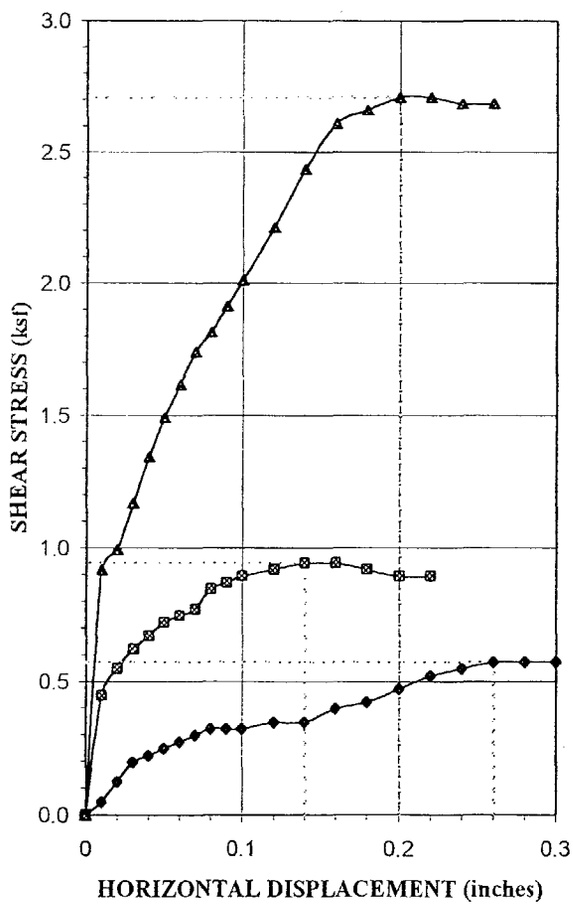
Tooele County, Utah

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

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
-mail: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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)

DISSOLVED METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Results	
Calcium	mg/L	6/10/03	6010B	100	**880**	-
Sodium	mg/L	6/10/03	6010B	100	**7,800**	-

- Analyte concentration is too high for accurate spike recovery.

Released by: _____
Laboratory Supervisor

Report Date: June 11, 2003

All 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 on 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

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
e-mail: awal@awal-Labs.com

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)

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

All 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 on 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

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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)

TOTAL METALS

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Results	
Calcium	mg/L	10/3/2003 1:46:17 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.

Released by: _____
Laboratory Supervisor

Report Date: October 6, 2003

ıll 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 eport 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 vith 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 ın 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.

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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)

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** [1]
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 8:38:36 PM	7421	0.0050	< 0.0050 [1]
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 [1]
Silver	mg/L	10/3/2003 3:23:29 PM	6010B	0.010	< 0.010
Thallium	mg/L	10/1/2003 7:14:21 PM	7841	0.0020	< 0.0020 [1]
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**

[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

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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)

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

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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
SampType: MBLK

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
MB-R32092	Bicarbonate (As CaCO3)	mg/L	2320 B	< 10				-				9/26/2003
MB-R32092	Carbonate (As CaCO3)	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
SampType: 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			2	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
SampType: 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	6010B	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
L57192-02EMSD	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 (a)	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	11.11	12.78	98.2	75-125	1.55	20		10/3/2003
L57192-02EMSD	Potassium	mg/L	6010B	137.1	11.11	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

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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

L57192-02FMSD	Zinc	mg/L	6010B	1.049	1.111	0.0266	92	75-125	0.817	20	10/2/2003
L57192-02FMSD	Silver	mg/L	6010B	1.096	1.111	0	98.6	75-125	1.47	20	10/3/2003
L57169-01HMSD	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
SampType: 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	3683	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.

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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
L57195-01CDUP	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

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Laboratory Supervisor

Report Date: October 6, 2003

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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:
L57871-01E

Field Sample ID:
TL-111403-01 (B-3)

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

2 Analyte concentration is too high for accurate spike recovery.

Released by: _____
Laboratory Supervisor

Report Date: November 26, 2003

ll 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 eport 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 vith 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 n 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

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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 12:30:32 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 [1]
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 [1]
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**

[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: November 26, 2003

ll 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 :port 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 ith 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 n 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.

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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)

Analytical Results	Units	Date Analyzed	Method Used	Reporting Limit	Analytical Result
Ammonia (as N)	mg/L	11/24/03	350.1	0.050	**1.3**
Bicarbonate (As CaCO3)	mg/L	11/17/03	2320 B	10	**180**
Carbonate (As CaCO3)	mg/L	11/17/03	2320 B	10	< 10
Chloride	mg/L	11/18/03	4500-CL E	5.0	**3,300** [2]
COD	mg/L	11/20/03	HACH 8000	10	**28** [1]
Nitrate (as N)	mg/L	11/14/03 7:14 pm	353.2	0.010	< 0.010
pH	pH units	11/14/03 5:00 pm	150.1	0	**7.97**
Sulfate	mg/L	11/17/03	375.4	5.0	**260**
TDS	mg/L	11/18/03	160.1	10	**6,300**
Total Organic Carbon	mg/L	11/17/03	415.1	1.0	**1.4**

[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: Kyle F. Gross
Laboratory Supervisor

Report Date: November 26, 2003

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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: Kyle F. Gross
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 CaCO3)	mg/L	2320 B	< 10				-				11/17/2003
MB-R33357	Carbonate (As CaCO3)	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

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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

Dept: 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			[1]	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			[1]	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			[1]	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	11.11	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	163.3	1.111	164.3	-92.1	75-125	0.891	20	[2]	11/20/2003
L57871-01EMSD	Manganese	mg/L	6010B	1.185	1.111	0.1123	96.5	75-125	1.42	20		11/20/2003
L57871-01EMSD	Potassium	mg/L	6010B	156.2	11.11	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
L57871-01FMSD	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			[1]	11/20/2003
L57871-01DMS	Ammonia (as N)	mg/L	350.1	2.3	1	1.32	98	90-110				11/24/2003
L57871-01AMS	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

[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: November 26, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-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-Cl E	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	[1]	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

[1] Spike recovery indicates matrix interference. The method is in control as indicated by the laboratory control sample (LCS).

Released by: Kyle L. Green
Laboratory Supervisor

Report Date: November 26, 2003

QC SUMMARY REPORT

CLIENT: Kleinfelder-SLC
Work Order: L57871
Project: Tooele 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
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	160.1	6590	0	6340	0	-	3.87	20		11/18/2003

Released by: _____
Laboratory Supervisor

Report Date: November 26, 2003

INORGANIC ANALYSIS REPORT

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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

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 2:30:06 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**

' 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

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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

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	**0.032**
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**

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Laboratory Supervisor

Report Date: October 31, 2003

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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

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**

Released by: _____
Laboratory Supervisor

Report Date: October 31, 2003

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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:
L57654-01B

Field Sample ID:
B-10

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**	[2]
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]

[2] Analyte concentration is too high for accurate spike recovery.

Released by: _____
Laboratory Supervisor

Report Date: October 31, 2003

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Kyle F. Gross
Laboratory Director

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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

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** [1]@
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

All 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 on 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

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

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

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] Analyte concentration is too high for accurate spike recovery.

Released by: _____
Laboratory Supervisor

Report Date: October 31, 2003

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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
SampType: MBLK

Sample ID	Analyte	Units	Method	Result	Amount Spiked	Original Amount	%REC	Limits	%RPD	RPD Limit	Qualifiers	Analysis Date
MB-R32970	Bicarbonate (As CaCO3)	mg/L	2320 B	< 10				-				10/30/2003
MB-R32970	Carbonate (As CaCO3)	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	80-120				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-Cl	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
SampType: 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: [signature]
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	1023	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 Spiked	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	0.005537	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	11.11	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	0.9531	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
SampType: 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	0.00333	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	11.11	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
L57636-01AMS	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
L57654-01DMS	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	10570	88.9	90-110	0.271	10	[2]	10/31/2003
L57654-02EMSD	COD	mg/L	HACH 8000	16410	50	2040	28700	85-115	0.547	10	[1]	10/30/2003
L57654-02DMSD	Ammonia (as N)	mg/L	350.1	0.946	1	0.186	76	90-110	13.2	10	[1]@	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
L57636-01AMSD	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	[1]	10/30/2003

[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).
@ 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
Toll Free (888) 263-8686
Fax (801) 263-8687
Email: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: _____
Laboratory Supervisor

Report Date: March 29, 2004

All 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

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**

(801) 263-8686
Toll Free (888) 263-8686
Fax (801) 263-8687
Email: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: _____
Laboratory Supervisor

Report Date: April 19, 2004

All 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

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)

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	**24,000**

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: _____
Laboratory Supervisor

Report Date: March 29, 2004

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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-9)

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	**22,000**

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Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: _____
Laboratory Supervisor

Report Date: March 29, 2004

All 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

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)

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	**21,000**

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Toll Free (888) 263-8686
Fax (801) 263-8687
Email: awal@awal-Labs.com

Kyle F. Gross
Laboratory Director

Peggy McNicol
QA Officer

Released by: _____
Laboratory Supervisor

Report Date: March 29, 2004

All 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

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

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

APPENDIX D

Project:	Wasatch Regional Solid Waste Landfill
Project Number:	35467.004
Boring:	B-1

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	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 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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								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									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									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						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+									51.0							

	Initials	Date
Completed By:	CMt	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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.
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	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)

Sample Depth, z (ft)	Blow Count, N	Sampler Type 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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					**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						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									49.5							

	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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.
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
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 = 2.3 inches

(Sum of "Liquefaction-Induced Settlement By Layer" Column)

Sample Depth, z (ft)	Blow Count, N	Sampler Type 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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	2.846	1.739	0.77	1.00	1.00	1.15	1.07	0.95	50+	50+	50+							N		49.5							

	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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.
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	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 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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	0.489	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									26.0							
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	1.384	0.88	1.00	1.00	1.15	1.07	1.08	20	17	26	0.31	0.39	0.88				N		36.0							
46	8	2	50	67	2.645	1.647	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					

	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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.
2.
3.

Project:	Wasatch Regional Solid Waste Landfill
Project Number:	35467.004
Boring:	B-5

Liquefaction Analysis

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				

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

Sample Depth, z (ft)	Blow Count, N	Sampler Type 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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	1.58	0.75	1.00	1.15	1.07	1.46	5	7	14	0.15	0.19	0.99					**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	0.858	1.09	0.95	1.00	1.15	1.07	1.28	8	9	12	0.13	0.17	0.97				N		16.0							
21	10	2	25	15	1.208	0.989	1.03	0.95	1.00	1.15	1.07	1.20	12	12	15	0.16	0.21	0.95						21.0	**1.24**	0.17					
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							
36	60	2	40	10	2.070	1.384	0.88	1.00	1.00	1.15	1.07	1.08	74	65	67									36.0							
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							

	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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.
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					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	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 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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	1.61	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	74	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	0.98					**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	85	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							

	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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.

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	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 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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	1.61	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							
16	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							
26	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**	26.0							
31	17	2	35	15	1.783	1.783	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	36								**Above WT**	36.0							
46	50+	2	50	15	2.645	2.645	0.59	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							

	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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-7. For liquefaction analysis above, the groundwater was entered at 100 feet below ground surface.
2.
3.

Project:	Wasatch Regional Solid Waste Landfill
Project Number:	35467.004
Boring:	B-8

Liquefaction Analysis

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				

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

Sample Depth, z (ft)	Blow Count, N	Sampler Type 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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	1.61	0.75	1.00	1.15	1.07	1.48	13	21	30	0.46	0.60	0.99				N	**Above WT**	3.0							
6	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	0.80	1.00	1.15	1.07	1.32	14	18	27	0.34	0.44	0.98				N	**Above WT**	8.0							
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							

	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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.
2.
3.

Project:	Wasatch Regional Solid Waste Landfill
Project Number:	35467.004
Boring:	B-9

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	2% PE in 50 yrs.
Magnitude Scaling Factor, MSF	1.28	

Reference Pressure (tsf)	1.058108

Total Estimated Liquefaction-Induced Settlement = 3.4 inches

(Sum of "Liquefaction-Induced Settlement By Layer" Column)

Sample Depth, z (ft)	Blow Count, N	Sampler Type 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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	1.48	12	19	28	0.38	0.48	0.99				N	**Above WT**	3.0							
5	11	2	10	90	0.288	0.288	1.49	0.80	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	171	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	48	2	20	15	0.920	0.858	1.09	0.95	1.00	1.15	1.07	1.28	56	61	67									16.0							
18	73	2	20	15	1.035	0.910	1.07	0.95	1.00	1.15	1.07	1.24	85	91	98									18.0							
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	1.384	0.88	1.00	1.00	1.15	1.07	1.08	10	9	12	0.13	0.16	0.88						36.0	**0.86**	0.19	2.81%			10.0	**3.37**
46	67	2	50	15	2.645	1.647	0.80	1.00	1.00	1.15	1.07	0.98	82	66	71									46.0							
51	61	2	55	85	2.933	1.778	0.76	1.00	1.00	1.15	1.07	0.94	75	57	74							N		51.0							

	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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.
2.
3.

Project:	Wasatch Regional Solid Waste Landfill
Project Number:	35467.004
Boring:	B-10

Liquefaction Analysis

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				

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

Sample Depth, z (ft)	Blow Count, N	Sampler Type 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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	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	0.38	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	0.518	0.518	1.30	0.80	1.00	1.15	1.07	1.28	26	33	45								**Above WT**	9.0							
13	60	2	15	41	0.748	0.748	1.15	0.85	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	1.23	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	1.783	1.252	0.92	1.00	1.00	1.15	1.07	1.13	36	33	37									31.0							
36	11	2	40	76	2.070	1.384	0.88	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	0.76	1.00	1.00	1.15	1.07	0.94	52	39	44									51.0							

	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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.
2.
3.

Project:	Wasatch Regional Solid Waste Landfill
Project Number:	35467.004
Boring:	B-11

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	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 1=cal, 2=spt	Rod Length (ft)	Percent Fines (%)	Total Stress, S_t (tsf)	Effective Stress, S_e (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 (%)	$(N)_{60}$	$(N_1)_{60}$	$(N_1)_{60\text{-}cs}$	$CRR_{7.5}$	Magnitude Corrected $CRR_{7.5}$	Stress Reduction Coefficient, r_d	Soil Fraction Finer Than 0.0002 inches (%)	Natural Water Content, ω	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					**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							

	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

The analysis to determine the liquefaction resistance of soils was performed according to the proceedure 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.
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:

$$\text{Log } D_h = -16.213 + 1.532\,M - 1.406 \text{ Log } R^* - 0.012\,R + 0.338 \text{ Log } S + 0.540 \text{ Log } T_{15} + 3.413 \text{ Log } (100 - F_{15}) - 0.795 \text{ Log } (D50_{15} + 0.1 \text{ mm})$$

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)
$R^* = R + R_0$
$R_0 = 10^{(0.89\,M - 5.64)}$
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)
T_{15} = Thickness of Saturated Cohesionless Soils with $(N_1)_{60} < 15$, (meters)
F_{15} = Average Fines Content in T_{15}, (particle size <0.075 millimeters, in percent)
$D50_{15}$ = Average D_{50} in T_{15}, (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."

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)
$R^* = R + R_0$
$R_0 = 10^{(0.89\,M - 5.64)}$
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)
T_{15} = Thickness of Saturated Cohesionless Soils with $(N_1)_{60} < 15$, (meters)
F_{15} = Average Fines Content in T_{15}, (particle size <0.075 millimeters, in percent)
$D50_{15}$ = Average D_{50} in T_{15}, (millimeters)

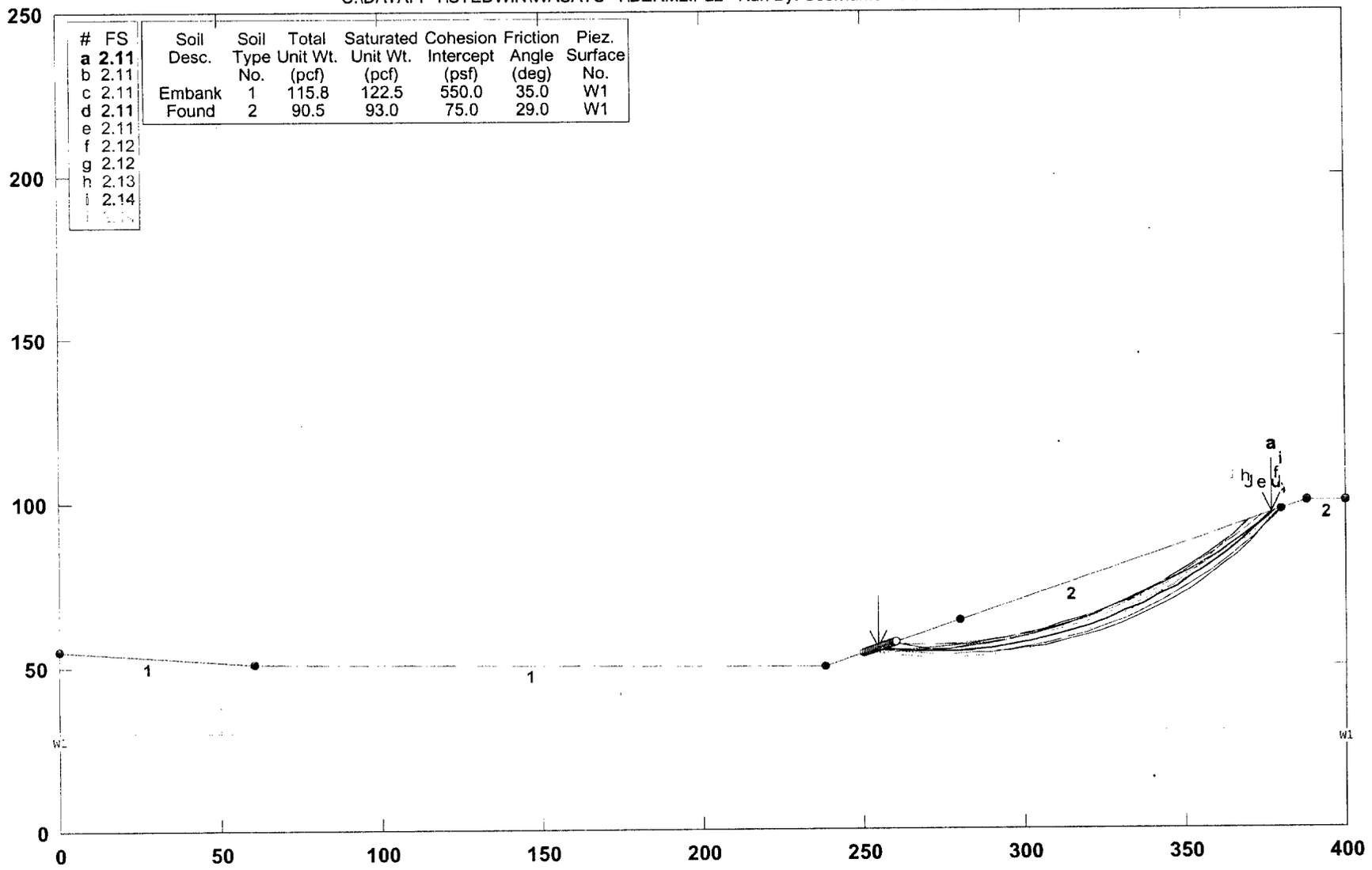
	Initials	Date
Completed By:	CMH	11/29/04
Reviewed By:		

** "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:\DATAFI~1\STEDWIN\WASATC~1\BERM2.PL2 Run By: Username 11/12/2004 3:39PM



#	FS
a	**2.11**
b	2.11
c	2.11
d	**2.11**
e	2.11
f	2.12
g	2.12
h	2.13
i	2.14

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Embank	1	115.8	122.5	550.0	35.0	W1
Found	2	90.5	93.0	75.0	29.0	W1

GSTABL7 v.2 FSmin=2.11

Safety Factors Are Calculated By The Modified Bishop Method

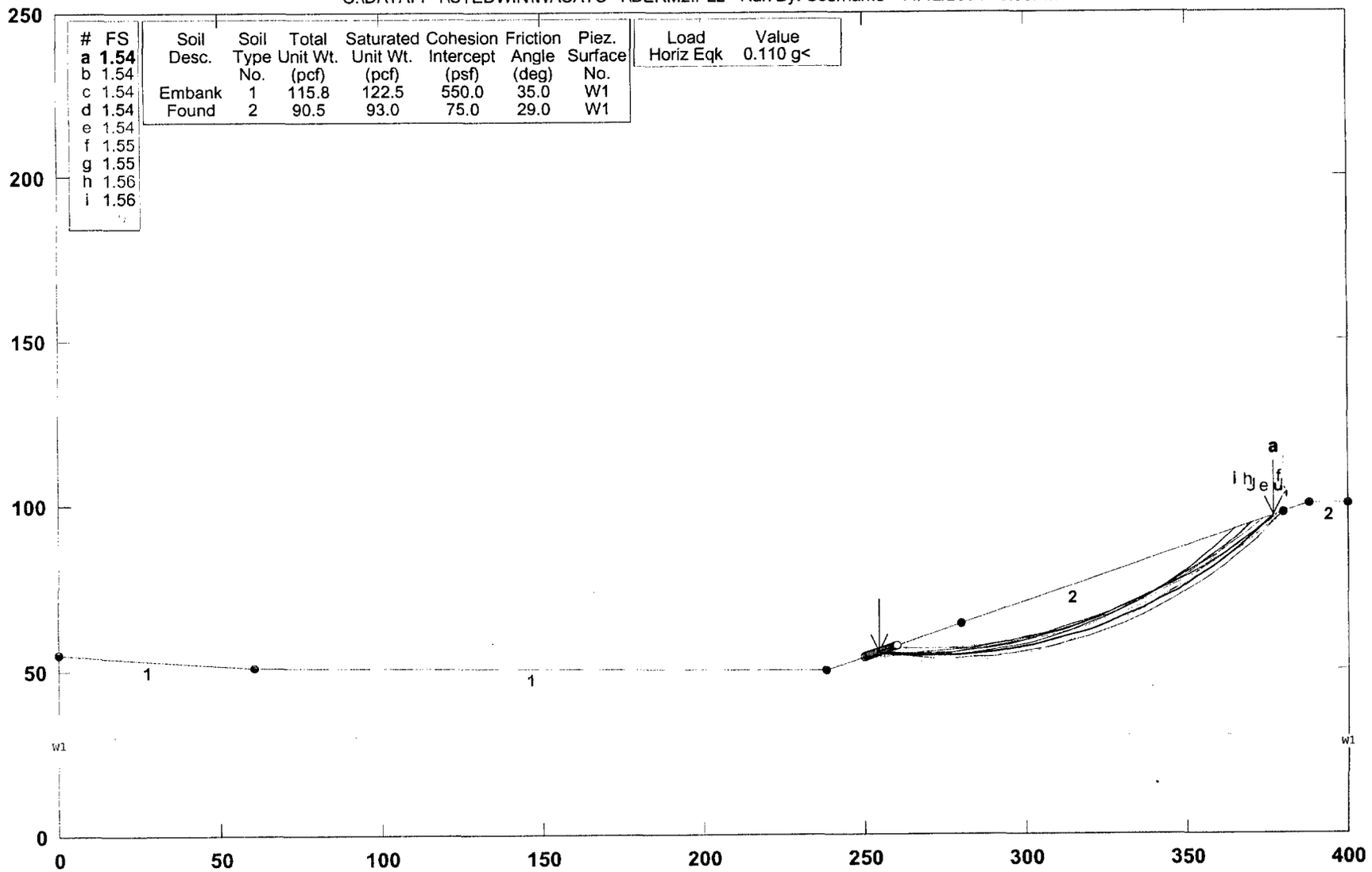
Wasatch Regional Landfill Berm, 3:1 Slope, Seismic Condition

C:\DATAFI~1\STEDWIN\WASATC~1\BERM2.PL2 Run By: Username 11/12/2004 3:38PM

#	FS
a	**1.54**
b	1.54
c	1.54
d	1.54
e	1.54
f	1.55
g	1.55
h	1.56
i	1.56

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Embank	1	115.8	122.5	550.0	35.0	W1
Found	2	90.5	93.0	75.0	29.0	W1

Load	Value
Horiz Eqk	0.110 g<



GSTABL7 v.2 FSmin=1.54

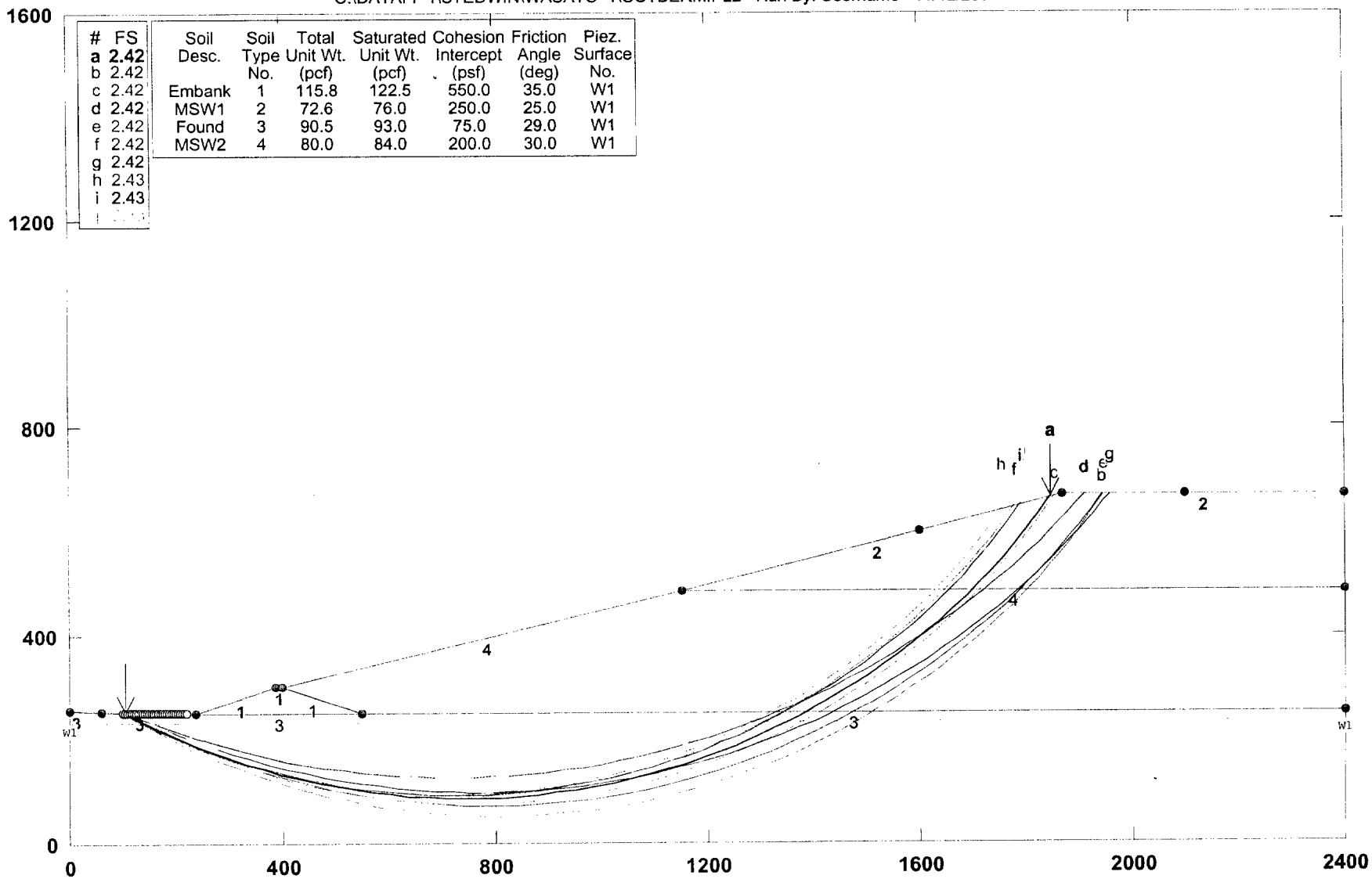
Safety Factors Are Calculated By The Modified Bishop Method

Wasatch Regional Landfill Outside Berm 3:1 Slope, Full Cell Static Condition

C:\DATAFI~1\STEDWIN\WASATC~1\OUTBERM.PL2 Run By: Username 11/12/2004 4:27PM

#	FS
a	**2.42**
b	2.42
c	2.42
d	2.42
e	2.42
f	2.42
g	2.42
h	2.43
i	2.43

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Embank	1	115.8	122.5	550.0	35.0	W1
MSW1	2	72.6	76.0	250.0	25.0	W1
Found	3	90.5	93.0	75.0	29.0	W1
MSW2	4	80.0	84.0	200.0	30.0	W1



GSTABL7 v.2 FSmin=2.42

Safety Factors Are Calculated By The Modified Bishop Method

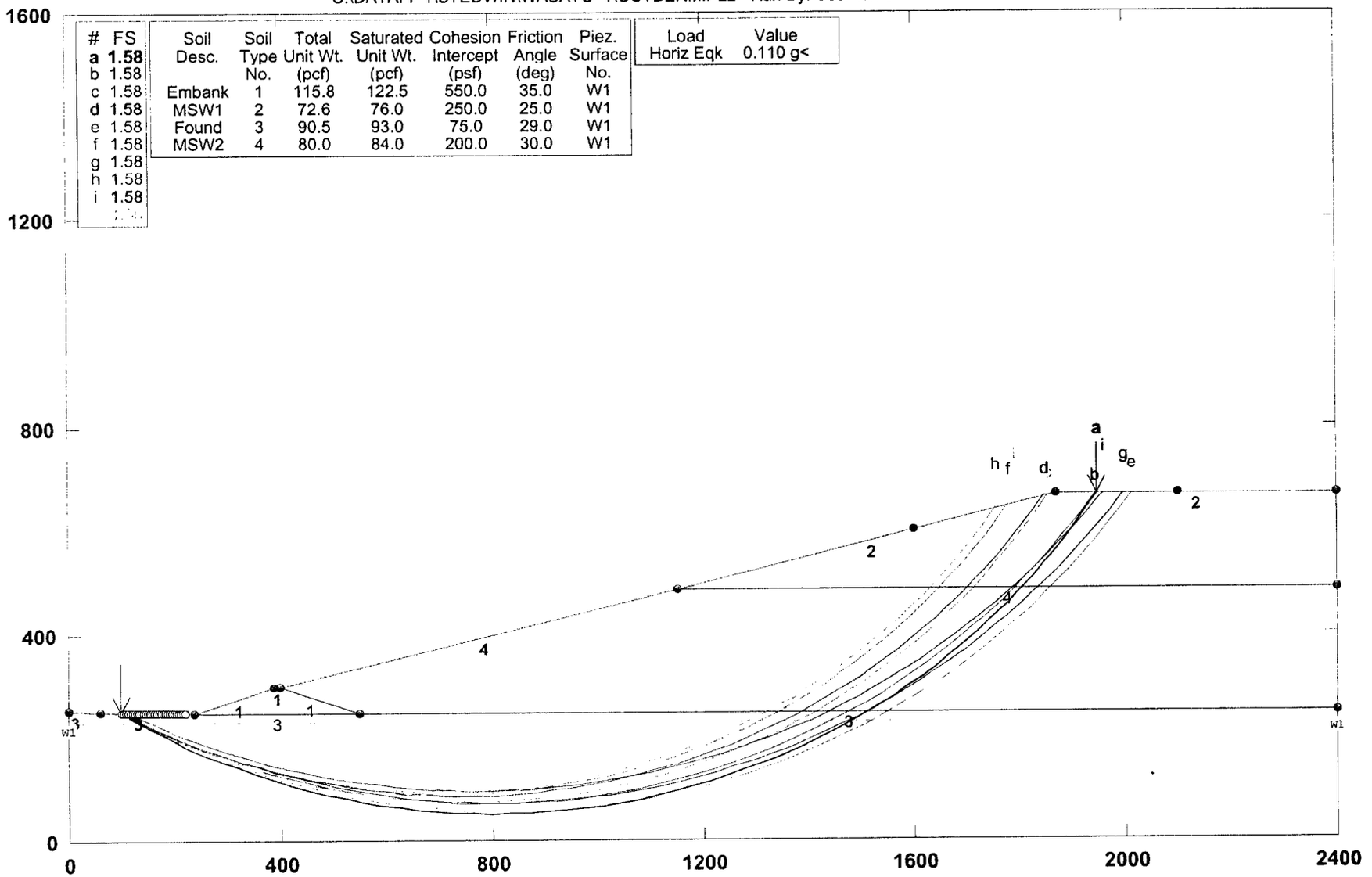
Wasatch Regional Landfill Outside Berm 3:1 Slope, Full Cell Seismic Condition

C:\DATAFI~1\STEDWIN\WASATC~1\OUTBERM.PL2 Run By: Username 11/12/2004 4:23PM

#	FS
a	**1.58**
b	1.58
c	1.58
d	1.58
e	1.58
f	1.58
g	1.58
h	1.58
i	1.58

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Embank	1	115.8	122.5	550.0	35.0	W1
MSW1	2	72.6	76.0	250.0	25.0	W1
Found	3	90.5	93.0	75.0	29.0	W1
MSW2	4	80.0	84.0	200.0	30.0	W1

Load	Value
Horiz Eqk	0.110 g<



GSTABL7 v.2 FSmin=1.58

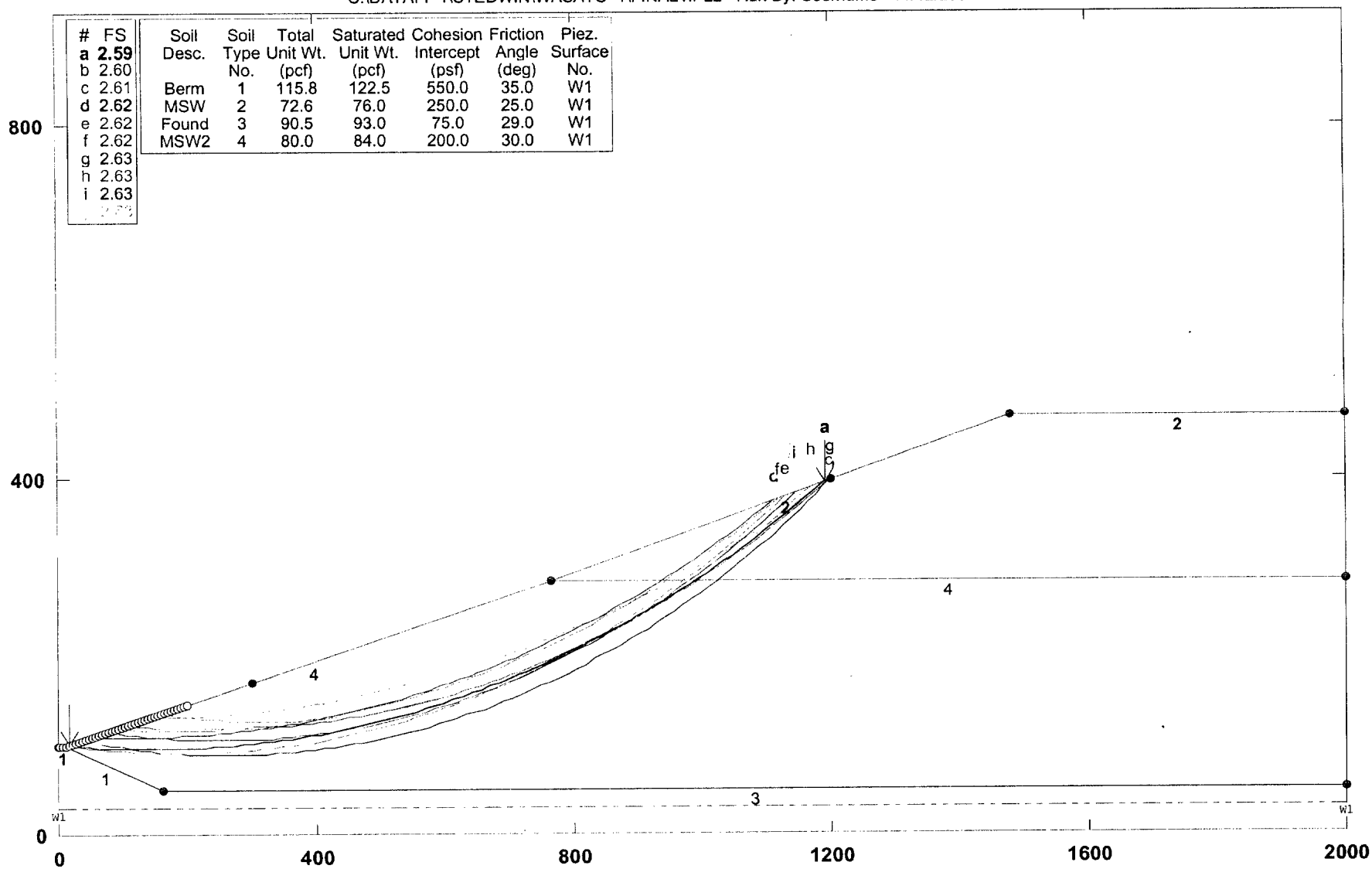
Safety Factors Are Calculated By The Modified Bishop Method

Wasatch Regional Landfill Final Height, 4:1 Waste Slope, Static Condition

C:\DATAFI~1\STEDWIN\WASATC~1\FINAL1.PL2 Run By: Username 11/12/2004 3:46PM

#	FS
a	**2.59**
b	2.60
c	2.61
d	2.62
e	2.62
f	2.62
g	2.63
h	2.63
i	2.63

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Berm	1	115.8	122.5	550.0	35.0	W1
MSW	2	72.6	76.0	250.0	25.0	W1
Found	3	90.5	93.0	75.0	29.0	W1
MSW2	4	80.0	84.0	200.0	30.0	W1



GSTABL7 v.2 FSmin=2.59

Safety Factors Are Calculated By The Modified Bishop Method

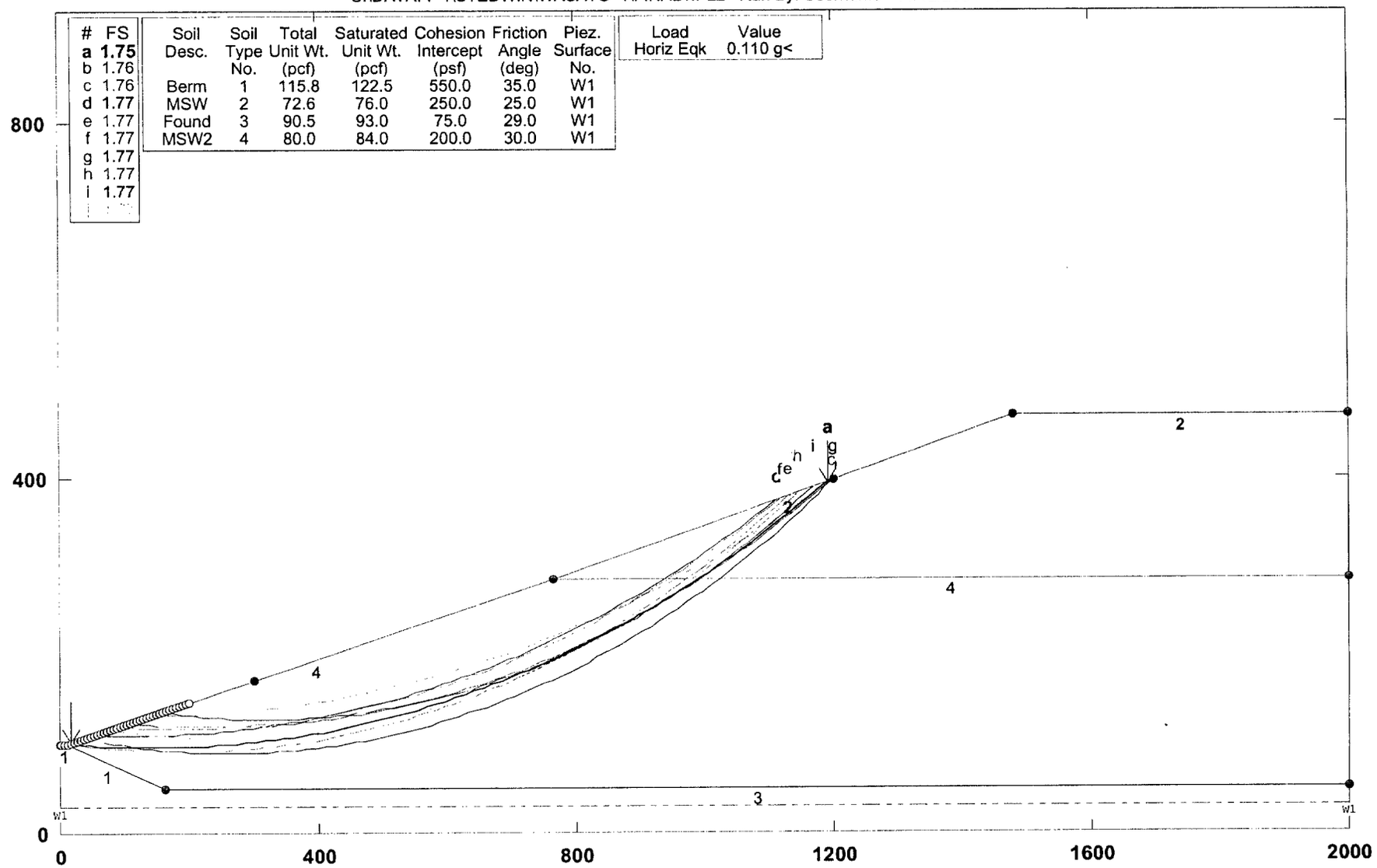
Wasatch Regional Landfill Final Height, 4:1 Waste Slope, Seismic Condition

C:\DATAFI~1\STEDWIN\WASATC~1\FINAL1.PL2 Run By: Username 11/12/2004 3:44PM

#	FS
a	**1.75**
b	1.76
c	1.76
d	1.77
e	1.77
f	1.77
g	1.77
h	1.77
i	1.77

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Berm	1	115.8	122.5	550.0	35.0	W1
MSW	2	72.6	76.0	250.0	25.0	W1
Found	3	90.5	93.0	75.0	29.0	W1
MSW2	4	80.0	84.0	200.0	30.0	W1

Load	Value
Horiz Eqk	0.110 g<



GSTABL7 v.2 FSmin=1.75

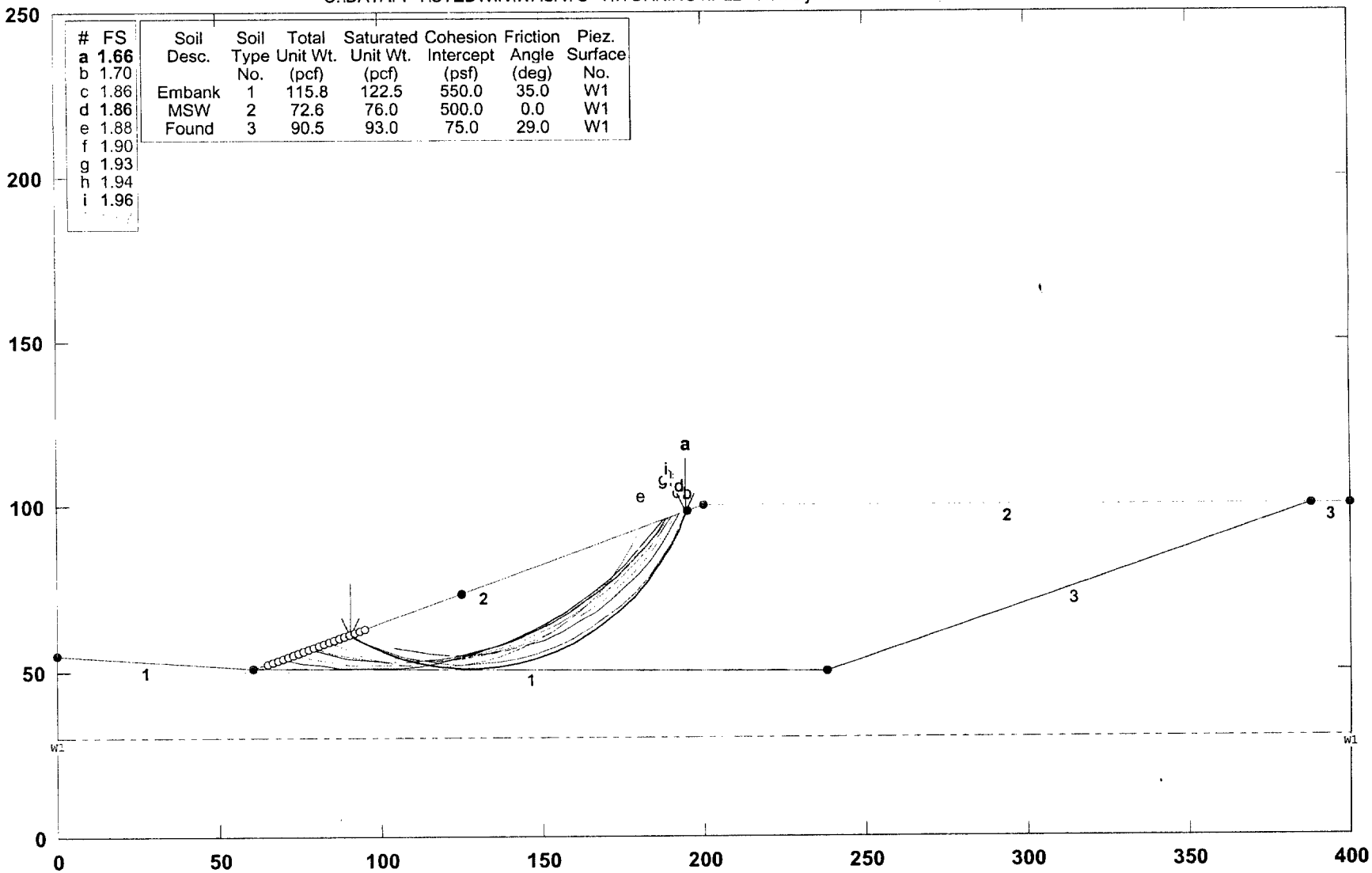
Safety Factors Are Calculated By The Modified Bishop Method

Wasatch Regional Landfill, Waste WorkingFace, 3:1 Waste Slope, Static Condition

C:\DATAFI~1\STEDWIN\WASATC~1\WORKING1.PL2 Run By: Username 11/12/2004 3:09PM

#	FS
a	**1.66**
b	1.70
c	1.86
d	**1.86**
e	1.88
f	1.90
g	1.93
h	1.94
i	1.96

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Embank	1	115.8	122.5	550.0	35.0	W1
MSW	2	72.6	76.0	500.0	0.0	W1
Found	3	90.5	93.0	75.0	29.0	W1



GSTABL7 v.2 FSmin=1.66

Safety Factors Are Calculated By The Modified Bishop Method

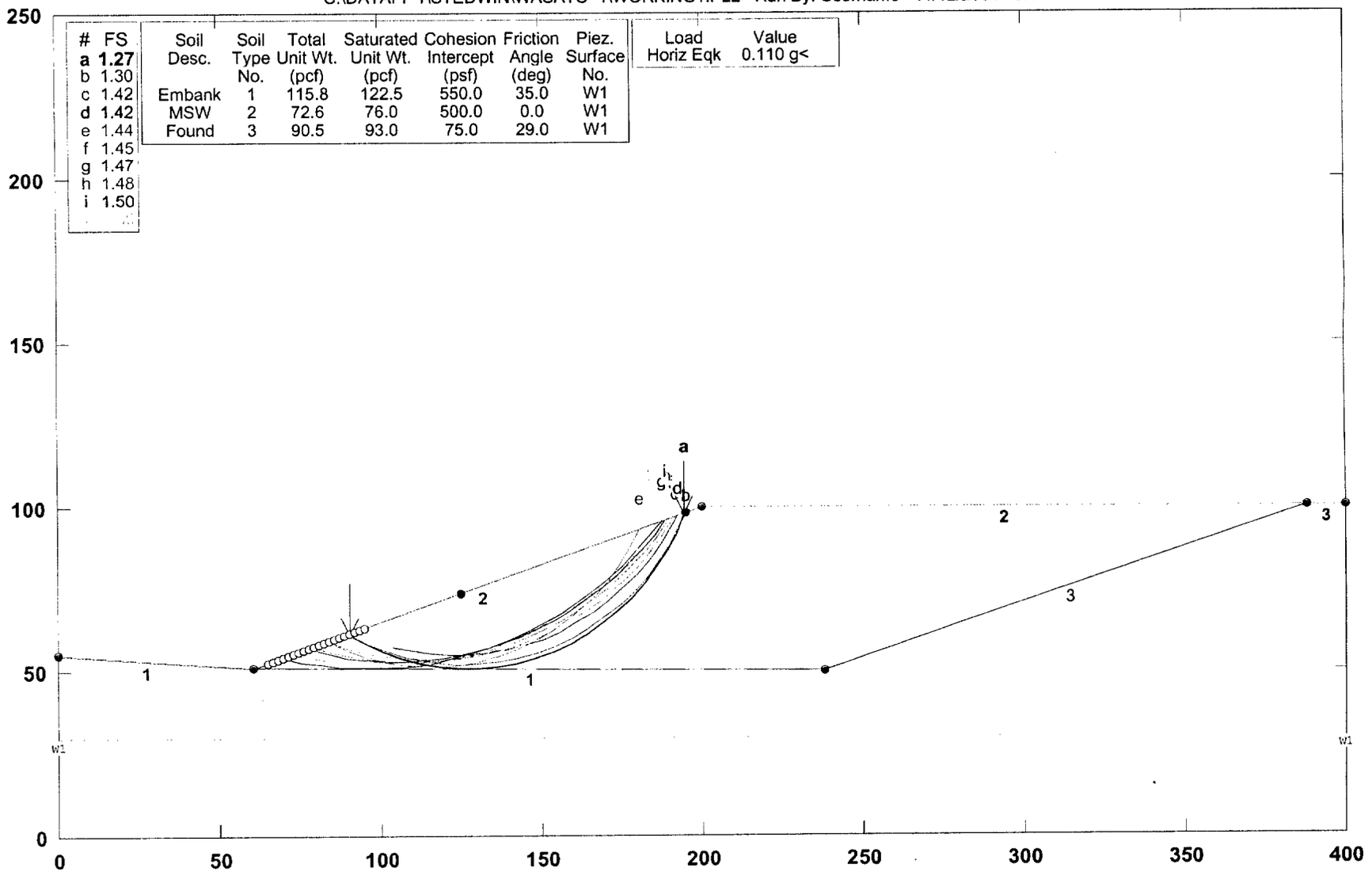
Wasatch Regional Landfill, Waste WorkingFace, 3:1 Waste Slope, Seismic Condition

C:\DATAFI~1\STEDWIN\WASATC~1\WORKING1.PL2 Run By: Usemame 11/12/2004 3:14PM

#	FS
a	**1.27**
b	1.30
c	1.42
d	**1.42**
e	1.44
f	1.45
g	1.47
h	1.48
i	1.50

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Embank	1	115.8	122.5	550.0	35.0	W1
MSW	2	72.6	76.0	500.0	0.0	W1
Found	3	90.5	93.0	75.0	29.0	W1

Load	Value
Horiz Eqk	0.110 g<



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.

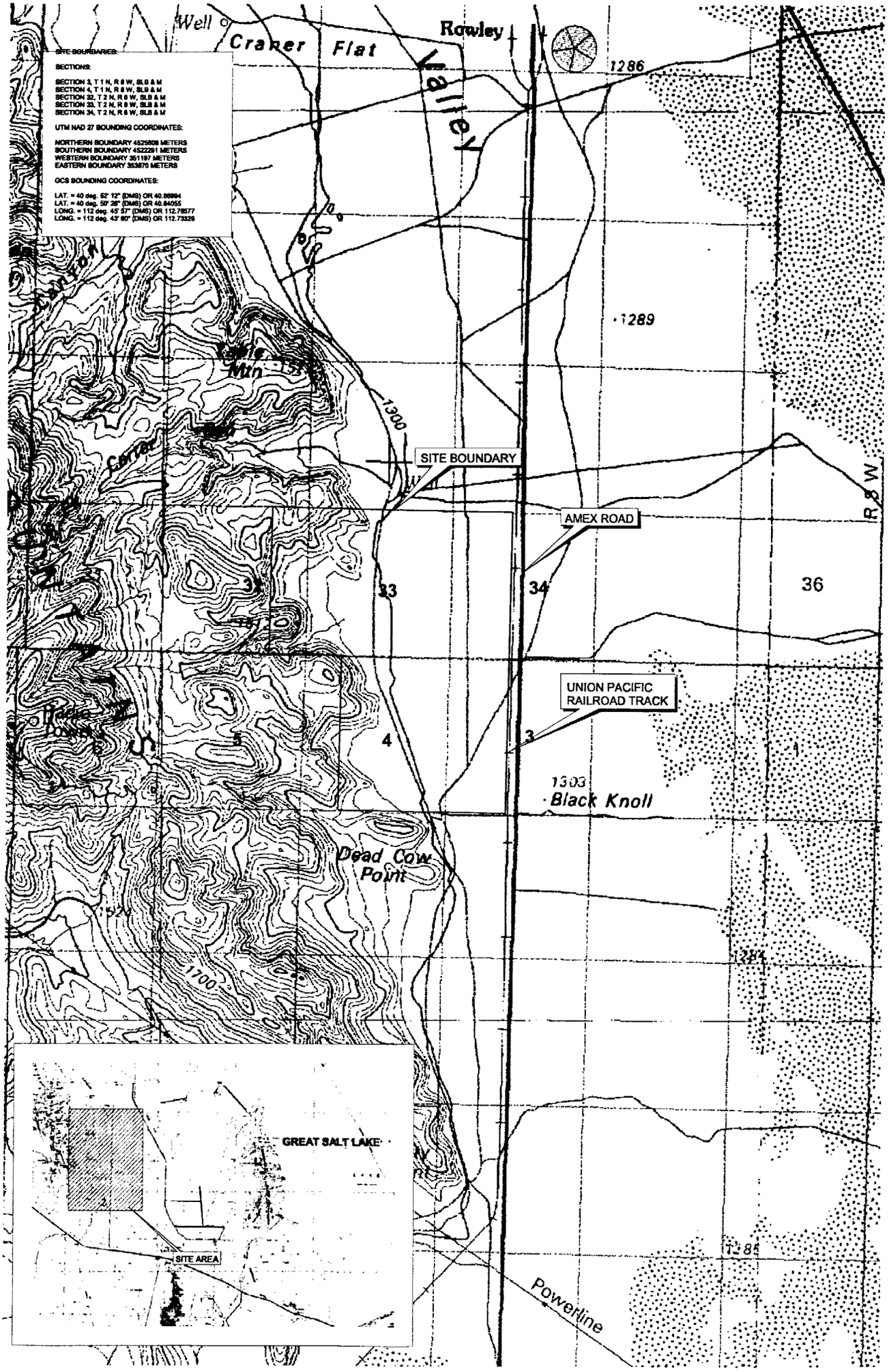
Most Geotechnical Findings Are Professional Opinions

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

Appendix 2.8 – Endangered/Threatened Species


SITE BOUNDARIES:
SECTIONS:
SECTION 3, T 1 N, R 8 W, SLB & M
SECTION 4, T 1 N, R 8 W, SLB & M
SECTION 32, T 2 N, R 8 W, SLB & M
SECTION 33, T 2 N, R 8 W, SLB & M
SECTION 34, T 2 N, R 8 W, SLB & M
UTM NAD 27 BOUNDING COORDINATES:
NORTHERN BOUNDARY 4525808 METERS
SOUTHERN BOUNDARY 4522291 METERS
WESTERN BOUNDARY 351197 METERS
EASTERN BOUNDARY 353870 METERS
GCS BOUNDING COORDINATES:
LAT. = 40 deg. 52' 12" (DMS) OR 40.86964
LAT. = 40 deg. 50' 28" (DMS) OR 40.84055
LONG. = 112 deg. 45' 57" (DMS) OR 112.76577
LONG. = 112 deg. 43' 60" (DMS) OR 112.73329
Well of
Craner Flat
Rowley
Valley
1286
1289
Eagle Mtn
1300
Carter
SITE BOUNDARY
AMEX ROAD
R 8 W
33
34
36
UNION PACIFIC RAILROAD TRACK
3
4
1303
Black Knoll
Dead Cow Point
1700
1284
1285
Powerline
GREAT SALT LAKE
SITE AREA

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

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Endangered and Threatened Animals of Utah

1998

Acknowledgments

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Peregrine Falcon

(*Falco peregrinus*)—Endangered

Description

The peregrine is a relatively large falcon (16-20" tall) with a wingspan 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 "armpits" (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 U.S. 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 meadowlarks.

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 U.S. 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 nests 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 CD ROMs 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

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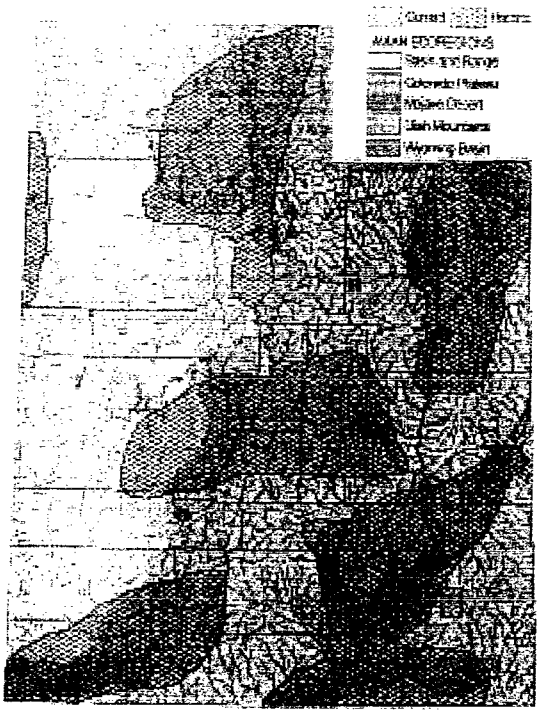
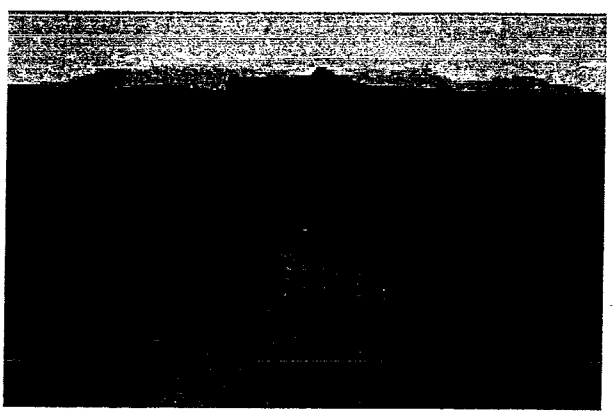
801-538-4764

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 photo courtesy of Gar Workman.

References

Cade, T. J., J. H. Enderson, C. G. Thelander, and C. M. White. 1988. Peregrine Falcon Populations: Their Management and Recovery. The Peregrine Fund, Inc., Boise, Ida.

Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The Birder's Handbook. Simon and Schuster, Inc., New York, N.Y.

Johnsgard, P. A. 1990. Hawks, Eagles and Falcons of North America: Biology and Natural History. Smithsonian Institution Press, Washington, D.C.

Palmer, R. S. 1988. Handbook of North American Birds: Volume 5, Diurnal Raptors, Part 2. Yale University Press, New Haven, Conn.

Porter, R. D., and C. M. White. 1973. The Peregrine Falcon in Utah, Emphasizing Ecology and Competition with the Prairie Falcon. Biological Series-Volume XVII, Number 1, Brigham Young University, Provo, Utah.

Porter, R. D., M. A. Jenkins and A. L. Gaski. Working Bibliography of the Peregrine Falcon. National Wildlife Federation Scientific and Technical Series 9, National Wildlife Federation, Washington, D.C.

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 brine shrimp 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 extiction 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 (*Centrocerus 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 savannarum*)
Blue Grosbeak (*Guiraca caerulea*)
Bobolink (*Dolichonyx oryzivorus*)

[1]Species is federally listed as Endangered
[2]Species is federally listed as Threatened
[3]Species 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 crawfordi*)
Abert's Squirrel (*Sciurus aberti navajo*)
Belding Ground Squirrel (*Spermophilus beldingi*)
Thirteen-lined Ground Squirrel (*Spermophilus tridecemlineatus*)
Spotted Ground Squirrel (*Spermophilus spilosoma*)
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*)
Marten (*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 (*Lasiurus 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*)

[1]Species is federally listed as Endangered
[2]Species is federally listed as Threatened

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	*Centrocercus minimus*
Yellow-billed Cuckoo	*Coccyzus americanus*

Federally Threatened Species

Bald Eagle	*Haliaeetus leucocephalus*
Mexican Spotted Owl	*Strix occidentalis lucida*

Federally Endangered Species

California Condor (experimental)	*Gymnogyps californianus*
Whooping Crane (extirpated)	*Grus americana*
Southwestern Willow Flycatcher	*Empidonax traillii extimus*

Conservation Agreement Species

Northern Goshawk	*Accipiter gentilis*

Wildlife Species of Concern

Grasshopper Sparrow	*Ammodramus savannarum*
Short-eared Owl	*Asio flammeus*
Burrowing Owl	*Athene cunicularia*
Ferruginous Hawk	*Buteo regalis*
Greater Sage-grouse	*Centrocercus urophasianus*
Black Swift	*Cypseloides niger*
Bobolink	*Dolichonyx oryzivorus*
Lewis's Woodpecker	*Melanerpes lewis*
Long-billed Curlew	*Numenius americanus*
American White Pelican	*Pelecanus erythrorhynchos*
Three-toed Woodpecker	*Picoides tridactylus*
Sharp-tailed Grouse	*Tympanuchus phasianellus*

See Appendix A for the rationale behind each wildlife species of concern designation.

http://dwrcdc.nr.utah.gov/ucdc/ViewReports/sscounty_20040227.pdf

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

Common Name	Scientific Name	State Status
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 FLAMMEUS	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PRAIRIE-DOG	CYNOMYS PARVIDENS	S-ESA

Box Elder County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	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 MOUNTAINSNAIL	OREOHELIX PERIPHERICA	SPC
FAT-WHORLED PONDSNAIL	STAGNICOLA BONNEVILLENSIS	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
LAHONTAN 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)

Common Name	Scientific Name	State Status
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

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	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 PHLEGETHONTIS	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 IDAHOENSIS	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

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	S-ESA
BIG FREE-TAILED BAT	NYCTINOMOPS MACROTIS	SPC
BLACK SWIFT	CYPSELOIDES NIGER	SPC

Weber County (con't)

Common Name	Scientific Name	State Status
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

Symbol	Definition
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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Section 3 - Plan of Operations

3.1 Introduction

Wasatch Regional is submitting the following Plan of Operation (the Plan) for the Wasatch 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.

3.2 Plan of Operation

The selection of the Operator will be reviewed and approved by the Salt Lake Valley Solid Waste Council authority. The Plan shall be retained at the office of the Operator and the Landfill gatehouse, and will be provided to Utah DEQ, upon request, for review. The responsibility for compliance with the Plan shall be that of the Operations Manager. 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 and approval. Approved modifications will be incorporated into the Plan.

3.3 Hours of Operation

The anticipated hours of operation at the Wasatch Landfill will be Monday through Saturday, 7:00 a.m. to 6:00 p.m. and shall be posted at the landfill entrance. The landfill will be closed on all major holidays. There shall be at least two landfill attendants on-site, with one person on the active face, at all times during operating hours. The entry gate will be locked when no site operator is present.

3.4 Construction Phasing

The construction and operation of the landfill facility will proceed in a phased fashion during each permit period of 5 years. For the first permit period, it is anticipated that approximately 80 acres of area will be lined. This, of course, depends upon the rate at which waste arrives at the facility. This would be accomplished by constructed line areas every year or so approximately 20 acres in size. The filling of the landfill will proceed in a manner consistent with the drawings and concepts presented in this permit application. Appendix 3.1 illustrates the manner in which waste would be filled during the early 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. Runon and runoff diversion ditches and other necessary components, as indicated in Appendix 3.1, would be modified and/or constructed as necessary to prevent runon or leachate from leaving the lined areas. Liners would then be joined as appropriate, consistent with a CQA/CQC plan and liner construction standards. Temporary earthen or manufactured berms would be used at the unbermed boundaries of each lining phase to contain leachate. Additional detail of each of the aforementioned components will need to be provided during design.

3.5 Waste Handling Procedures

A plan for operating a Class V landfill must provide a description of on-site solid waste handling procedures during the active life of the facility (UAC R315-302-2 (2)). The landfill will not provide access or facilities for waste disposal by the general public. A waste handling procedure overview flowchart is provided in Appendix 3.2.

All incoming waste shipments will be recorded in a **Waste Flow Record** (see Appendix 3.3 for example) and will items such as:

- Date and time waste loads were received and inspected
- Vehicle license number
- Driver's name, organization and signature
- Load volume estimate (based on vehicle and load size)
- Type of waste accepted for disposal

The landfill attendant will direct the private haulers to discharge their loads in the active face for disposal. Currently in Utah, baled waste is deposited in the same manner as non-baled waste. The waste is then spread in layers not to exceed two feet in 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 Alternative Daily Cover to be approved by the State, or ADC). Proposed ADCs include green waste, compost, contaminated soils, foams, tackifiers, tarps, etc. All areas of the working face of the landfill that will not receive waste for periods longer than

30 days will be covered with a minimum of 12 inches of soil or alternative cover approved by the Executive Secretary. For areas that will not receive waste for periods longer than one year, an additional 6 inches of soil will be applied on top of the already existing 12 inches of intermediate cover. The purpose of the additional soil cover is to ensure that the waste is properly contained for extended periods of inactivity. Efforts will be made to minimize the disturbance of these areas during normal operation of the landfill. To ensure the proper containment of the waste in these areas, regular (quarterly) inspections will be performed. Maintenance of these areas will be performed as needed.

3.5.1 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 nondurable 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 such as yard trimmings, 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, nonhazardous 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:

- 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, wastes containing PCBs, 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.

3.5.2 Special Waste Handling Procedures

Asbestos

Asbestos waste will be accepted at the Wastach Regional Solid Waste. Asbestos waste 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 ensure that the asbestos waste is adequately wetted and contained. 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 in such way 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 of the landfill and covered, within 18 hours, with a minimum of 6 inches of soil or other material not containing asbestos. 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.

In case that 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 operator will then thoroughly rinse out the haul truck.

The facility operators will provide adequate barriers in the vicinity of the asbestos disposal area to control public access. The access to the asbestos disposal site will be limited to no more than two entrances by gates that will be locked when left unattended. In addition, the facility operators will place warning signs that comply with the requirements of 40 CFR Part 61.154(b) 1995 ed. at the entrances and at intervals no greater than 200 feet along the perimeter of the sections where asbestos waste is deposited.

Ash

The Wasatch Regional Solid Waste facility 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. In addition, water sprays/sprinklers will be used during unloading of the ash waste in order to prevent ash release into the air. All ash waste will be immediately covered with a minimum of 6 inches of cover soil.

Dead Animals

Dead animals accepted at the Wasatch Regional Solid Waste facility 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 other waste. In case that 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 waste water treatment plant sludge, or septage containing no free liquids will be accepted at the Wasatch Regional Solid Waste facility. 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, the Wasatch Regional Solid Waste facility will accept liquid-filled containers that are a part of the household waste stream, small and similar in size to a container which would normally be found in household waste (five gallons or less). The Wasatch Regional Solid Waste facility, in order to minimize the amount of liquids accepted at the landfill, will not accept any containerized liquids larger than household waste (five gallons or less).

Bulky Waste

Bulky waste such as automobile bodies, furniture, and appliances will be accepted at the Wasatch Regional Solid Waste facility provided that it is crushed prior to disposal. All bulky waste will be disposed in the working face of the landfill cell.

Waste Asphalt

The preferred management of waste asphalt is recycling. The Wasatch Regional Solid Waste facility 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

The Wasatch Regional Solid Waste Facility 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

The Wasatch Regional Solid Waste Facility will not have separate cells, designed and constructed, for the disposal and subsequent retrieval and recycling of waste tires or waste tires materials. The waste tires received at the Wasatch Regional Solid Waste facility will be disposed at the bottom of the working lined cell.

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 working lined or C/D cell.

PCB Containing Waste

The Wasatch Regional Solid Waste facility will accept the following PCB-containing waste:

- waste containing PCBs at concentrations less than 50 ppm as found in situ at the original remediation site as specified by 40 CFR 761.61 (2001)
- PCB household waste as defined by 40 CFR 761.3 (2001)
- small quantities, 10 or fewer, of intact, non-leaking small PCB capacitors from fluorescent lights

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

Wasatch Regional Solid Waste facility will 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, pasteures, 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

In case that the protective gear is 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.

3.5.3 Prohibited Waste

Waste types that are prohibited and will not be accepted into the landfill include hazardous wastes and most liquid wastes.

Hazardous waste types are those that because of their quantity, concentration, physical, chemical, or infection 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 corrisive, toxic, ignitable, or reactive ingredients. Examples of household hazardous waste include paints, cleaners, oils, unused fuels, fertilizers, antifreeze, poisons, and some pesticices.

Noncontainerized 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.

3.5.4 Scavenging

As per Utah Code Rule R315-303-4(2)(d) scavenging will be prohibited at the Wasatch Regional Solid Waste facility.

3.6 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 3.3).

3.6.1 Prohibited Waste Exclusion Program

The Wasatch Regional Solid Waste Facility 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 list the types of waste that are accepted, the waste not accepted on the site and the penalty for illegal disposal. 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 3.3) 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 then 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

If the landfill staff observes waste loads containing liquid waste not accepted by the landfill, the load will be rejected, the landfill staff will complete the Waste Inspection Report (see Appendix 3.3), and notify the Executive Secretary and the generator within 24 hours. All landfill staff will be trained to recognize liquid-filled containers that may require segregation and further inspection. In the event that a suspect container is observed, it will be determined whether or not the container is empty. Only empty, vented containers, which do not contain any hazardous materials will be accepted for disposal. Landfill operators are instructed not to open containers without first checking with the landfill supervisor/manager. All inspection will be performed in a designated fenced area with restricted access. Containers that do not meet the criteria described above will be rejected. In case that a liquid-filled container is discovered and the generator is unknown, the container will be stored in a designated fenced area until trained personnel can perform a hazardous waste determination. If the contents are determined to be non-hazardous, they will be mixed with soil and the soil and container will be disposed of on-site. If the contents are determined to be a hazardous waste, the landfill operator will make arrangements with a licensed transport and disposal facility to remove the container 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. In the event of a hazardous waste determination landfill operator will notify, within 24 hours, the Executive Secretary, the hauler, and the generator.

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 3.3) will be completed and will include:

- Date and time waste loads were received and inspected
- Name of the waste originator
- 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

If the waste load is determined to contain waste accepted by the landfill, the landfill attendant will direct waste haulers to discharge their loads in the discharge area (near the active face) where landfill personnel will transport the load to the active face for disposal.

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 the Wasatch Regional Solid Waste facility. 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 wear coveralls, respirators, puncture resistant gloves and shoes, and shatterproof glasses
- The waste will be unloaded in area near but not immediately next to the active face.
- The waste will be carefully spread for observation using a track loader.
- 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 hazardous will be handled and stored in a designated area as a hazardous waste until proven otherwise. 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.

3.6.2 Weekly Inspections

The Operator will perform weekly walk-through inspections of the entire landfill property to look for the following:

- defects in the run-on/run-off control systems;
- scattered litter potentially missed during weekly pickup (see Appendix 3.8 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.

The Operator will take action to correct any unsatisfactory conditions observed immediately. All observations and corrective action taken will be recorded in the weekly inspections form (see Appendix 3.4).

3.6.3 Quarterly Inspections

Detailed quarterly inspections will be performed by the Landfill Inspector and will identify the following:

- Wastes are sufficiently compacted
- A minimum of six inches of soil is applied (height of lift = 25-feet, max.)
- Interim cover is being applied and graded appropriately
- Trench walls are constructed in accordance with OSHA standards
- 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 place 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
- Fire-break is maintained around active portion of the Landfill

- 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 noted in writing (see Appendix 3.4) and presented to the Landfill Operator. It will then be the responsibility of the Landfill Operator to correct the unsatisfactory conditions.

3.6.4 Inspection Records

Records of quarterly inspections will be maintained with the Plan of Operation, for a minimum of three years from the date of inspection and will include at a minimum:

- The date and time of inspection
- The printed name and signature of the inspector
- A notation of observations made
- The date and nature of any repairs or corrective action

3.6.5 Daily Operating Records

As per Utah Administrative Code R315-302-2(3)(a) the Wasatch Regional Solid Waste facility will maintain and keep on-site a daily operating record (see Appendix 3.5 for example). The daily operating record will be completed at the end of each day of operations and it will contain:

- 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 and notification procedures
- results of ground water and gas monitoring that may be required
- an inspection log or summary
- maintenance log or summary

3.6.6 Other Records

In addition to daily operating and inspection records the Wasatch Regional Solid Waste facility 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 recirculation of leachate gas or condensate into the landfill as allowed by Subsection R315-309-2(3)

- closure and post-closure care plans (see Section 7 and Section 8 respectively)
- cost estimates and financial assurance documentation (see Section 9)
- other information pertaining to operation, maintenance, monitoring, or inspections as may be required by the Executive Secretary.

3.6.7 Annual Report

As per Utah Administrative Code R315-302-2(4) the Wasatch Regional Solid Waste facility 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:
    - uncompacted 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.

3.7 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

3.7.1 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 3.5)

3.7.2 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 3.5)

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. *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.

3.7.3 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 3.5). All corrective actions taken will be recorded in the daily operating report and the weekly inspection report.

3.7.4 Equipment Breakdown

On-site landfill staff is prepared to perform minor repairs of equipment. Equipment is transported off-site for major repairs. Additional equipment may be leased, if necessary.

3.7.5 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.

3.7.6 Groundwater Monitoring

For a detailed Groundwater Monitoring Plan, see Appendix 3.10.

3.7.7 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.

3.8 Equipment and Equipment Maintenance

3.8.1 Equipment

The following equipment will be required for facility operation at the Wasatch landfill:

- 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;
- Fork-trucks for baled waste, for unloading bales from haul trucks and transferring them to the working face of the cell;
- Articulated trucks with tipping frames.
- Track Loaders 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;
- Scrapers or draglines;
- Water trucks and road graders.

3.8.2 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)

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 *Wasatch Regional Solid Waste Landfill Groundwater Monitoring Plan* (see Appendix 3.10).

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 3.11).

3.9 Facility Maintenance

The landfill operator is responsible for maintaining the landfill

- signs
- boundary posts/fencing
- surface areas

See Appendix 3.6 for maintenance form.

3.9.1 Signs

The landfill operator ensures that the landfill entrance sign provides the landfill name, hours of operation, list of materials not accepted by the landfill, and emergency contact information.

3.9.2 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.

3.9.3 Litter Control

The landfill operator ensures that the landfill surface remains free of loose waste, debris, and litter. A comprehensive Litter Control Plan can be found in Appendix 3.8.

3.9.4 Fugitive Dust Control

A comprehensive Fugitive Dust Control and Mitigation Plan can be found in Appendix 3.9. This plan has been reviewed and accepted by the Compliance Section of the State Division of Air Quality, Department of Environmental Quality.

3.9.5 Roads and Traffic Controls

The main access road to the Wasatch Regional Solid Waste facility is a paved, all-weather road. The Wasatch Regional Solid Waste facility will maintain all paved roads and keep them accessible throughout the year. In addition, traffic control measures will be implemented (see Exhibit 8) in order to direct incoming and outgoing traffic. The landfill operators will ensure that all traffic control measures are operational, and properly maintained.

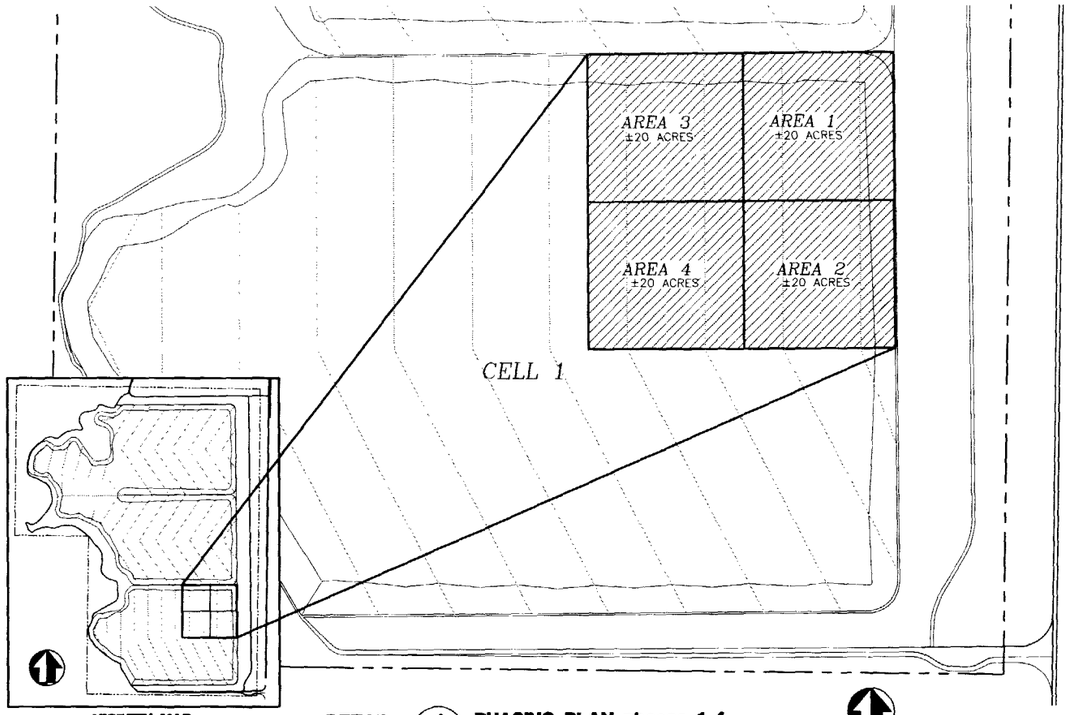
3.10 Training and Safety Plan

A comprehensive Training and Safety Plan can be found in Appendix 3.7

3.11 Closure and Post-Closure Care Plans

Closure and Post-Closure Care Plans are included in this permit application as Sections 7 and 8 respectively.

Appendix 3.1
Phasing Plan

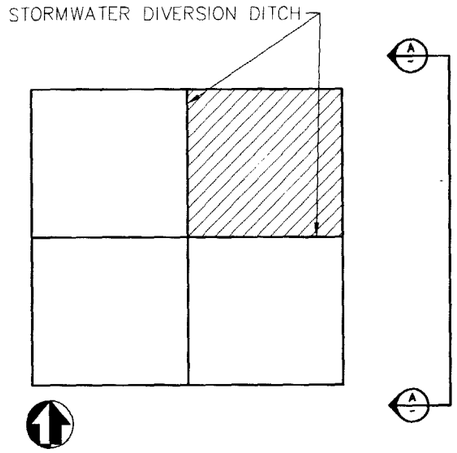


VICINITY MAP
NOT TO SCALE

DETAIL 1 - PHASING PLAN phases 1-4
SCALE: 1"=500'

500 0 500 1000
SCALE OF FEET

PHASE I



SECTION A - PHASE I SECTION
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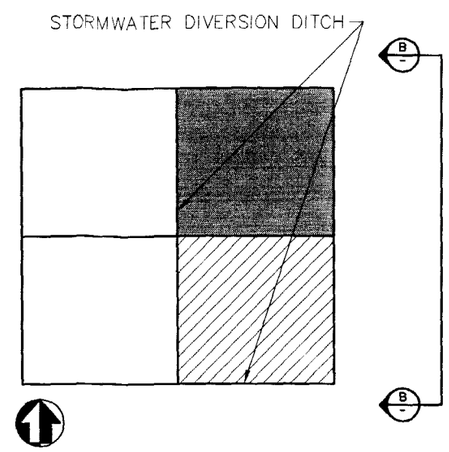
VERTICAL SCALE: 1"=200'

PHASE II



SECTION B - PHASE II SECTION
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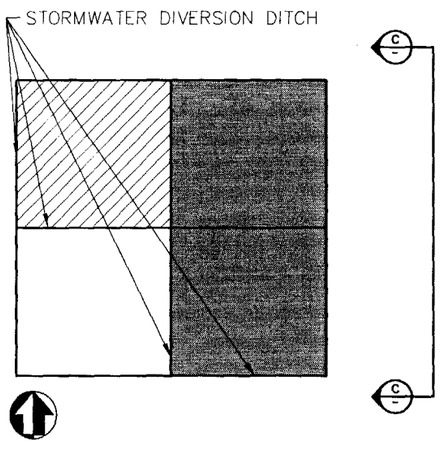
VERTICAL SCALE: 1"=200'

PHASE III



SECTION C - PHASE III SECTION
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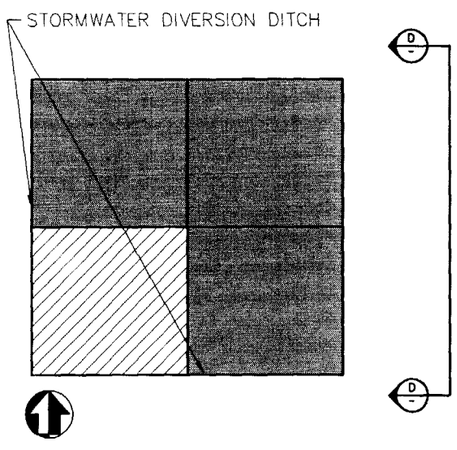
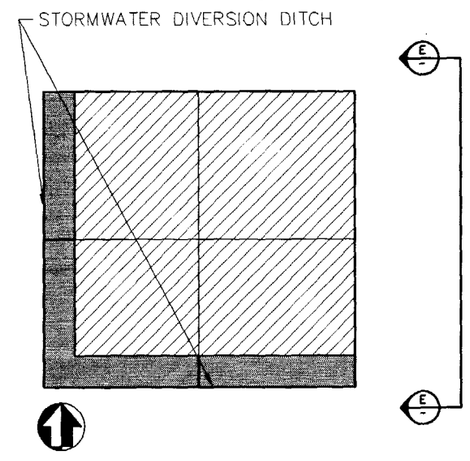
VERTICAL SCALE: 1"=200'

PHASE IV



SECTION D - PHASE IV SECTION
HORIZONTAL SCALE: 1"=400'
VERTICAL SCALE: 1"=200'

PHASE V



SECTION E - PHASE V SECTION
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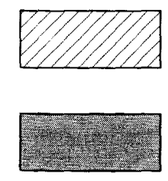
VERTICAL SCALE: 1"=200'



ACTIVE AREA

FILLED AREA

LICENSED PROFESSIONAL ENGINEER
No. 187721
SCOTT CARLSON
STATE OF UTAH

DATE	05-15-04
SCALE	SEE DRAWING
PROJECT NO.	8WEL010100

WASATCH REGIONAL LANDFILL
PHASING PLAN YEARS 1-5

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

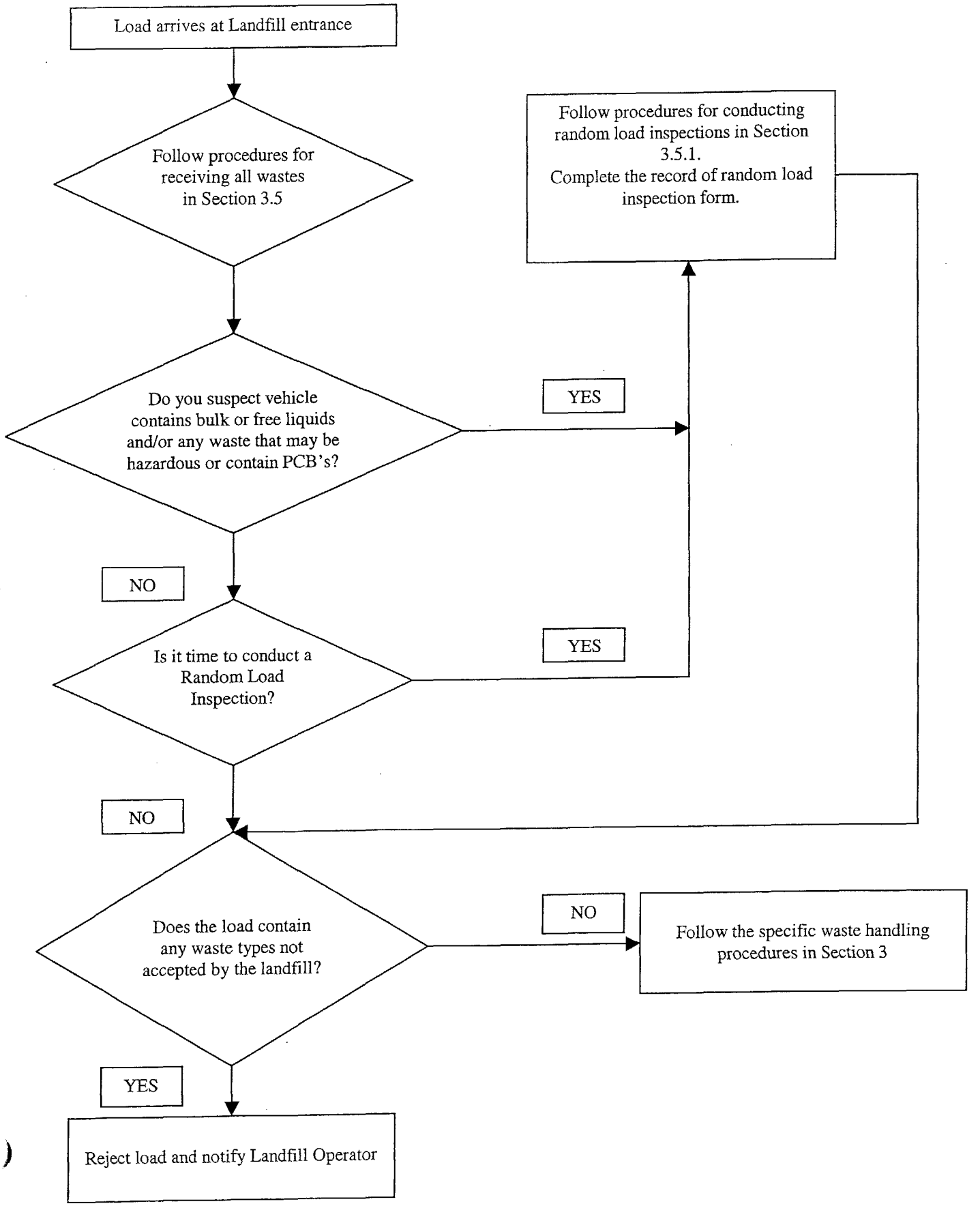
DESIGNED	BRH
DRAWN	DRC
CHECKED	SSC

EXHIBIT

OF

Appendix 3.2
Waste Handling Procedure Overview

Waste Handling Procedure Overview



Appendix 3.3
Municipal Waste Flow Record
Waste Inspection Report

MUNICIPAL WASTE FLOW RECORD

CELL NO: _____

DATE: _____

TIME	GENERATOR	VEHICLE LICENSE NO.	DRIVER LICENSE NO.	WEIGHT	DRIVER SIGNATURE

Initials_____

WASTE INSPECTION REPORT

Operator: _____ Date: _____ Time: _____

Generator: _____ Vehicle Type & ID: _____

Net Wt or Volume: _____ tons ☐ cubic yards ☐

Driver Name: _____

Load Description: _____

Types of Waste:

Household ☐	Commercial ☐	Industrial ☐
Ash ☐	Soil ☐	C&D ☐
Asbestos ☐	Tires ☐	Animals ☐
Sealed containers ☐		Free Liquid ☐
Contained gas ☐		
RCRA Hazwaste ☐	Describe: _____	

INSPECTION RESULTS: LOAD ACCEPTED ☐

LOAD REJECTED ☐

IF REJECTED, NOTIFY DEQ AND GENERATOR.

Date and time DEQ notified: _____

Date and time Generator notified: _____

INSPECTOR'S SIGNATURE: _____

Appendix 3.4
General Inspection Form

QUARTERLY INSPECTION FORM

FACILITY NAME:
PHONE NUMBER:
EMERGENCY PHONE:
ADDRESS:

DATE: _____

TIME: _____

INSPECTOR'S NAME: _____

INSPECTOR'S SIGNATURE: _____

ACTIVE FACILITY? ☐ YES ☐ NO

EVALUATION	COMPLIANCE STATUS			COMMENTS
CONDITION OF ROADWAYS	☐ YES	☐ NO	☐ N/A	
CONDITION OF GATE AND ENTRY	☐ YES	☐ NO	☐ N/A	
CONDITION OF FENCES	☐ YES	☐ NO	☐ N/A	
CONDITION OF RUN-ON/RUN-OFF CONTROLS	☐ YES	☐ NO	☐ N/A	
CONDITION OF COVER SYSTEM	☐ YES	☐ NO	☐ N/A	
CALLING TREE IN PLACE AND CURRENT	☐ YES	☐ NO	☐ N/A	
EMPLOYEE TRAINING REGIME	☐ YES	☐ NO	☐ N/A	
OPERATING RECORDS/REPORTS	☐ YES	☐ NO	☐ N/A	

STATUS OF MONITORING REPORTS AND STATISTICAL ANALYSIS OF RESULTS:

OTHER:

RECOMMENDED ACTIONS:

Initials_____

WEEKLY INSPECTION FORM

DATE: _____

TIME: _____

INSPECTOR'S NAME: _____

INSPECTOR'S SIGNATURE: _____

FACILITY NAME:

PHONE NUMBER:

EMERGENCY PHONE:

ADDRESS:

ACTIVE FACILITY? ☐ YES ☐ NO

EVALUATION	COMPLIANCE STATUS			COMMENTS
SAFETY EQUIPMENT VISIBLE AND IN WORKING ORDER:				
FIRE EXTINGUISHER	☐ YES	☐ NO	☐ N/A	
FIRE BLANKET	☐ YES	☐ NO	☐ N/A	
EYE WASH	☐ YES	☐ NO	☐ N/A	
FIRST AID KIT	☐ YES	☐ NO	☐ N/A	
CHEMICAL SPILL RESPONSE KIT	☐ YES	☐ NO	☐ N/A	
MONITORING EQUIPMENT CALIBRATED AND MAINTAINED?	☐ YES	☐ NO	☐ N/A	
ACTIVE FACE IN COMPLIANCE WITH OSHA STANDARDS?	☐ YES	☐ NO	☐ N/A	
FUGITIVE LITTER AND DUST CONTROL	☐ YES	☐ NO	☐ N/A	

GENERAL FACILITY HYGIENE:				
ODOR	☐ GOOD	☐ FAIR	☐ POOR	☐ N/A
BUILDING CLEANLINESS	☐ GOOD	☐ FAIR	☐ POOR	☐ N/A
FACILITY GROUNDS	☐ GOOD	☐ FAIR	☐ POOR	☐ N/A
OTHER	☐ GOOD	☐ FAIR	☐ POOR	☐ N/A

RECOMMENDED ACTIONS:

_____

_____

_____

_____

Initials_____

Appendix 3.5
Daily Operating Record

Daily Operating Record

RECORDER NAME (PLEASE PRINT):_____

DATE OF OPERATION:_____

WEIGHT (OR VOLUME)
OF WASTE RECEIVED:_____ ☐ TONS ☐ CUBIC YARDS

NUMBER OF VEHICLES ENTERING:_____

TYPE OF WASTE RECEIVED (IF AVAILABLE):

DEVIATIONS FROM APPROVED PLAN OF OPERATION

DESCRIPTION OF DEVIATION:

ACTION TAKEN:

ADDITIONAL COMMENTS:

Initials_____

TRAINING AND NOTIFICATION PROCEDURES

DESCRIPTION OF TRAINING AND NOTIFICATION PROCEDURE(S):

☐ INTRO TRAINING ☐ SAFETY TRAINING ☐ ANNUAL TRAINING

☐ POLICIES AND PROCEDURES ☐ OTHER: _____

TRAINER: _____

MATERIAL COVERED:

TYPE OF TRAINING:

☐ OJT ☐ CLASSROOM ☐ SEMINAR ☐ OTHER: _____

VERIFICATION/CERTIFICATE/RECORD IN FILE? ☐ YES ☐ NO

MANDATORY? ☐ YES ☐ NO

ONGOING? ☐ YES ☐ NO

RENEWABLE? ☐ YES ☐ NO

ADDITIONAL COMMENTS:

Initials_____

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHERED AND EVALUATED THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

SIGNATURE: _____

DATE: _____

Initials_____

Appendix 3.6
Facility Maintenance Form

MAINTENANCE INSPECTION FORM

FACILITY NAME:
PHONE NUMBER:
EMERGENCY PHONE:
ADDRESS:

INSPECTOR'S NAME:_____

DATE OF MAINTENANCE INSPECTION:_____

ACTIVE FACILITY? ☐ YES ☐ NO

FACILITY CONTACT:

NAME _____ PHONE NUMBER _____

EVALUATION	COMPLIANCE STATUS			COMMENTS
APPROPRIATE SIGN, GATE, AND ATTENDANT	☐ YES	☐ NO	☐ N/A	_____
CONTROL OF INSECTS AND RODENTS	☐ YES	☐ NO	☐ N/A	_____
WINDBLOWN LITTER AND DUST CONTROL	☐ YES	☐ NO	☐ N/A	_____
CONFINEMENT OF ACTIVE AREA	☐ YES	☐ NO	☐ N/A	_____
ADEQUATE COVERING AND COMPACTION	☐ YES	☐ NO	☐ N/A	_____
DIVERSION OF SURFACE WATER AWAY FROM ACTIVE AREA	☐ YES	☐ NO	☐ N/A	_____
ABSENCE OF EXTERIOR SLOPE LEACHATE SEEPS	☐ YES	☐ NO	☐ N/A	_____
APPROPRIATE OPEN BURNING	☐ YES	☐ NO	☐ N/A	_____
UNAUTHORIZED WASTE ABSENT	☐ YES	☐ NO	☐ N/A	_____
MAINTENANCE OF MONITORING DEVICES	☐ YES	☐ NO	☐ N/A	_____
MAINTENANCE OF ACCESS ROADS TO ACTIVE AREAS	☐ YES	☐ NO	☐ N/A	_____
MAINTENANCE OF VEGETATIVE COVER	☐ YES	☐ NO	☐ N/A	_____
IN COMPLIANCE WITH APPROVED PHASING PLAN FOR LANDFILL DEVELOPMENT, GAS SYSTEM INSTALLATION, AND CLOSURE?	☐ YES	☐ NO	☐ N/A	_____
GAS EXTRACTION SYSTEM OPERATION	☐ YES	☐ NO	☐ N/A	_____
MAINTENANCE OF LEACHATE HANDLING SYSTEM	☐ YES	☐ NO	☐ N/A	_____
OTHER: _____	☐ YES	☐ NO	☐ N/A	_____

ADDITIONAL COMMENTS:

_____

_____

Initials_____

Appendix 3.7
Training and Safety Plan

General Training and Safety Plan

Introduction

The Wasatch Regional Solid Waste Management facility will require that all employees have a working knowledge of the maintenance and operational techniques necessary to operate and maintain the landfill facility in a manner to preserve human health, safety, and the environment. All training will be accomplished through on-the-job training and classroom training sessions. The Landfill Manager or a professional trainer would be in charge of directing the training programs. All employees will be required to complete the introductory training within three months of employment, followed by an annual review of basic waste management skills.

Training Schedule

The landfill manager will be required to pass the Solid Waste Association of North America (SWANA) Manager of Landfill Operations (MOLO) course or equivalent. Landfill managers will maintain current SWANA landfill manager training. In addition landfill manager and supervisors will be required to attend classes on general OSHA safety training. All landfill operators will be required to take one or both of the SWANA training courses: Landfill Operator Training and Waste Screening or equivalent. Some of the areas covered by the SWANA training are:

- personal protective equipment (PPE)
- first aid
- hazard communications
- general landfill practices
- heavy equipment operation
- load inspection for unauthorized waste
- identification of hazardous waste and waste containing PCBs
- general site safety and emergency response
- record keeping and reporting
- inspections

The Wasatch Regional Solid Waste Management facility will implement several continuing education training programs for the landfill employees. Continuing education efforts will include, but are not limited to:

Introductory Training

All facility employees will go through this training. Introductory training will ensure that all operators are familiar with solid waste regulations, record

keeping, and transporter requirements as outline in the plan of operations. This will be a quarterly reviewed, on-the-job training, and directed by the landfill manager. Introductory training will be required and/or offered to employees at least quarterly. In case that an employee is absent for a training session, the information covered at the meeting will be provided to the employee.

Policies and Procedures Training

This training is mandatory for all landfill employees and will be held at least quarterly. The purpose of this training will be to ensure that all employees are familiar with the plan of operations and all the procedures outlined in the plan of operations. Depending on the specific area that the training will focus on the facility manager will conduct on-the-job training or organize a lecture/video course session. Policies and procedures training will be reviewed on a quarterly basis.

Safety Training

Safety training meeting will be held once a week taking a minimum of 15 minutes. Safety training will cover personal protection, hazardous waste recognition, hazardous material handling, landfill gas, emergency response and first aid. Annual reviews will be made to the safety plan. All facility employees will be required to attend safety training meetings. The facility manager, depending on the topic will organize a classroom or a video course training session. All safety meetings and all training will be documented by indicating the topic covered and main points discussed (see appendix 3.7 for the training record form). All employees will be required to sign and date the appropriate forms.

Safety Plan

The safety plan involves the use of cellular phones and two-way radios on-site capable of contacting emergency services to provide safety for the staff and the users of the facility. PPE's and First Aid Kits will be provided and maintained on-site as described in the Equipment and Facilities Maintenance portion of the plan. In case of an injury, depending on the severity, the injured worker may treat himself or call an ambulance. The landfill manager will be notified in case of more severe injuries, and will ensure availability of proper medical care. If an emergency response team is called to the facility, site personnel will complete an incident report and record the time, date, type of injury, actions taken, response time of the emergency team, and the time at which the injured individual was evacuated from the site. Specific safety and health guidelines for the landfill gas monitoring program are included in the LFG Monitoring and Control plan (see appendix 3.11). Prior to the start of

landfill operations more detailed safety and health guidelines will be developed and incorporated in the safety training of all employees.

Appendix 3.8
Litter Control Plan

Litter Control Plan

This plan addresses methods of controlling wind-blown litter resulting from normal operations at the Wasatch Regional Solid Waste facility. The purpose of this plan is to minimize and eliminate wind-blown litter as required by various rules and regulations of Utah Code.

As per R315-302-2(2)(h), each plan of operation shall include a plan to control wind-blown litter that includes equipment and methods to contain litter, including a schedule and methods to collect scattered litter in a timely fashion.

As per R315-303-4(2)(c), an owner or operator of a landfill shall roperate the facility to: collect scattered litter as necessary to avoid fie hazard and aesthetic nuisance.

Wasatch Regional Solid Waste Management Corporation will make every effort to minimize wind-blown litter on the site and surrounding areas. Efforts to minimize or eliminate litter will consist of various activities, as well as other site features. The strategies used to minimize or eliminate wind-blown litter are designed to be redundant in nature.

Covering Loads

WRSMC will require that all waste loads entering the landfill to be covered. In the event that the landfill receives an uncovered load, the violator will be required to pay a double tipping fee.

All vehicles transporting waste loads shall continue to keep their loads covered as they proceed to the working face of the active cell of the landfill. Should it be required the uncovering of the waste load will only be allowed inside the cell at the working face of the landfill.

Size of Working Face

One of the most efficient ways to control and prevent litter is to minimize the size of the working face of the cell. The unloading area of the working face of the cell will be given special attention, as it is the final opportunity to prevent litter. The working face of the cell of the landfill will be minimized as much as practical in order, to reduce the amount of waste exposed to the wind. Usually the active face is minimized to extent that it can accommodate two lengths of equipment blade. The size of the active face will be monitored daily by the landfill operators to ensure that the active face is minimized.

Daily Cover

At the end of the day, all exposed waste will be covered with a minimum 6 inches of soil or other approved and effective Alternate Daily Cover (ADC) so that no waste is left without cover during the hours when the landfill is closed. At certain phases of the landfill, an intermediate 12 inch soil cover will be applied in addition to the minimum 6 inches of daily cover.

Wind Screen and Fences

Mobile wind screens at least 10 feet high, will be used both in the upwind and downwind directions and will be positioned around the working face. Downwind panels will intercept blowing litter from the working face. Upwind panels will reduce the wind speed across the working face. Based on the prevailing wind conditions and the position of the working face of the cell, the wind screens can be quickly moved and positioned as appropriate. Wind screens will be moved using heavy equipment.

Perimeter Fence

An 8-foot high (minimum) chain-link perimeter fence will be constructed around the active phase(s) of the site. The perimeter fence will have lockable gates (both person-size and vehicle-size) installed at appropriate intervals. The perimeter fence will be moved and positioned accordingly with the expansion and construction of the landfill. The perimeter fence will act as backup redundantly to the mobile wind screens.

Weekly Pickup

Litter pick-up will be conducted weekly or as needed, as a redundant measure to the mobile wind screens and perimeter fencing. The pickup will apply to the entire site, including access and haul roads, as well as the geographic area around the site. In order to ensure proper management and efficient control of wind-blown litter relative to the weekly pickups the inspection form will be completed weekly. The form will identify the areas cleaned during the pickup, or areas that need more attention, identify any damage to the mobile wind screens and/or perimeter fencing, and the amount of litter collected.

High Wind Conditions

In the unlikely situation of high wind (sustained wind speeds exceeding 20 miles per hour) special operational considerations will be made. The landfill operators will further reduce the size of the working face as much as possible. In addition, the facility operators will monitor and restrict the

number of trucks which are allowed to discharge their loads at one time in order to the compaction equipment to compact the waste streams faster and more efficiently. All efforts will be made to prevent the discharging vehicles from dumping their loads into incoming high winds. Should the high winds continue so severe as to present situations that the wind-blown litter cannot be controlled effectively, the facility operator will evaluate the option of closing the landfill for the day. Extra cleanup measures will be taken during high wind conditions; litter pickup will begin immediately and extra personnel will be made available during these conditions.

Appendix 3.9
Fugitive Dust Mitigation and Control Plan

State of Utah

Department of
Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF AIR QUALITY
Richard W. Sprott
Director

OLENE S. WALKER
Governor

GAYLE F. McKEACHNIE
Lieutenant Governor

DAQC-770-04

June 1, 2004

Brad Hartman
Project Engineer
PSOMAS
2825 East Cottonwood Parkway
Salt Lake City, Utah 84121

Dear Mr. Hartman:

Re: Revised Fugitive Dust Control Plan submitted May 19, 2004 - Utah Administrative Code (UAC) R307-309-4. Fugitive Emissions and Fugitive Dust - Fugitive Dust Control Plan for the Construction and Operation of the Wasatch Regional Solid Waste Landfill, Tooele County

A revised Fugitive Dust Control Plan (Plan) was received by the Division of Air Quality from PSOMAS in behalf of the Wasatch Regional Solid Waste Management Corporation (WRSWMC), to be constructed and operated at approximately 6 miles north of Interstate 80, north/northwest of Grantsville and south of Rowley, Tooele County, Utah. Judy Hoffman of WRSWMC has been identified as the person responsible for the implementation of, and compliance with the Plan.

The revised fugitive dust control plan submitted appears to fulfill WRSWMC's requirement to submit a fugitive dust control plan in accordance with UAC R307-309-4 at this time. This notice does not relieve WRSWMC of its obligations to comply with all other applicable provisions of the UAC.

Failure to fully implement the Fugitive Dust Control Plan and/or failure to comply with the applicable requirements of the UAC or permit conditions may result in compliance actions, Compliance Advisories or Notices of Violation and associated penalties.

If you have any questions regarding this notice, please contact Gisela Jensen (801) 536-4406. When responding refer to the date on this letter.

Sincerely,

Jeff N. Dean, Compliance Manager
Division of Air Quality

JND:GIJ:md

cc: Tooele County Health Department

FUGITIVE DUST MITIGATION AND CONTROL PLAN

WASATCH REGIONAL SOLID WASTE LANDFILL

PREPARED FOR:

THE UTAH STATE DIVISION OF AIR QUALITY AND DIVISION OF SOLID AND HAZARDOUS WASTE, DEPARTMENT OF ENVIRONMENTAL QUALITY

AND

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

April 2004

Fugitive Dust Mitigation and Control Plan

Introduction

This plan has been developed in order to address the measures and methods for controlling on-site fugitive dust resulting from normal operations at the Wasatch Regional Landfill. It is the intent of this report to provide control strategies for the minimization of fugitive dust emissions as required by Utah Code Rule R307-205 and the Utah Division of Air Quality.

The proposed landfill will be privately owned and operated by Wasatch Regional Solid Waste Management Corporation (WRSWMC), a Utah Corporation. WRSWMC will be responsible for the implementation, and compliance of this plan. The address and contact person for WRSWMC is:

Wasatch Regional Solid Waste Management Corporation
Jodi Hoffman
PO Box 681333
Park City, Utah 84088

The general site location, shown in Figure 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. The site property is currently owned by the Utah State Institutional Trust Lands Administration (SITLA). WRL has entered into a ground lease agreement with SITLA in order to operate the facility.

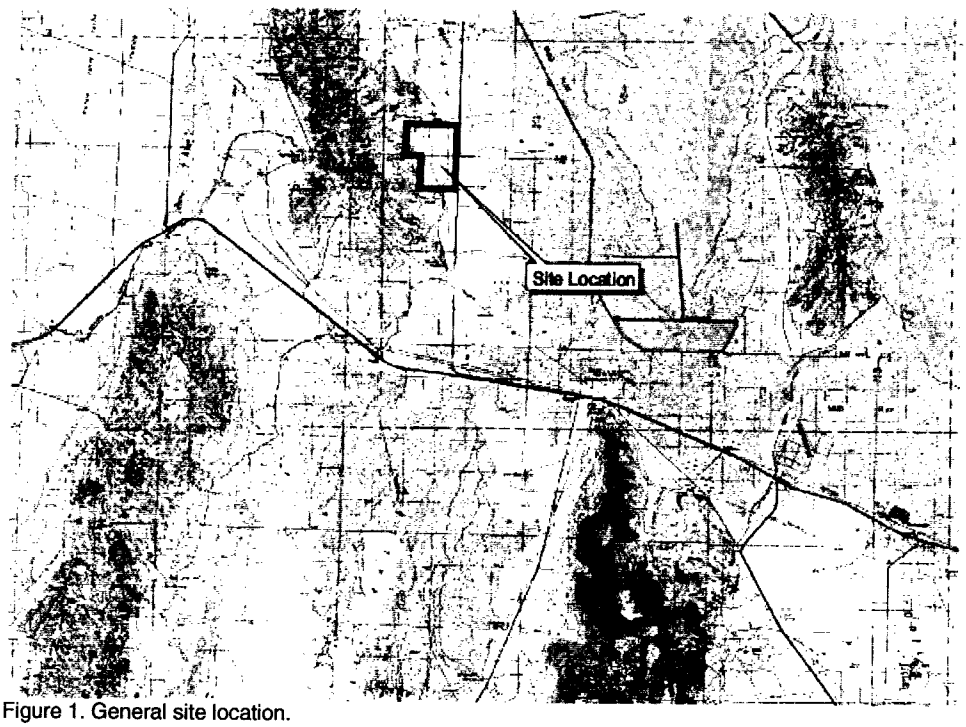


Figure 1. General site location.

There are no residences within several miles of the Wasatch landfill 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 3,000 acres of adjacent Utah 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 Wasatch landfill site.

The Wasatch landfill site, shown in more detail in Figure 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.*

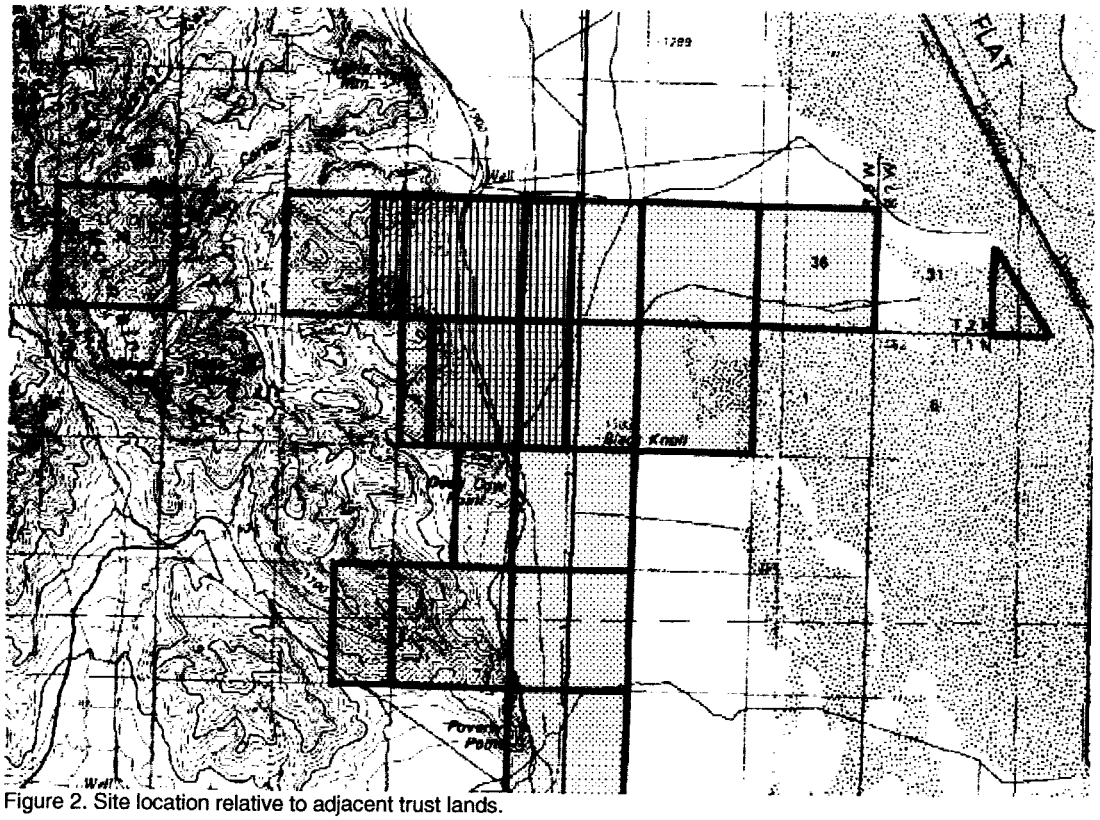


Figure 2. Site location relative to adjacent trust lands.

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

Fugitive Dust Emission Sources

Windblown dust occurs both from natural and man-made sources. While dust is common for the undisturbed areas in the West, it becomes much more common where the natural soils have been disturbed by construction and operational activities. During normal facility operations, several sources of fugitive dust emissions are possible. In addition to normal waste handling procedures, at certain times during the lifetime of the facility portions of the facility will be under expansion construction. The types of materials that potentially emit fugitive dust are non-hazardous waste material, on-site soil (silts and sands), and imported soil materials. The activities that may result in fugitive dust emissions are, but not limited to:

- landfill cell haul road traffic
- gravel/dirt road traffic
- waste unloading operations
- waste compaction
- soil excavation
- soil stockpiling
- soil spreading

- soil screening
- expansion construction

Fugitive Dust Mitigation and Control Measures

According to Utah Code Rule R307-205-2 fugitive emissions from sources constructed after April 25, 1971, shall not exceed 20 percent opacity. The percent opacity will be determined either by observations made by a qualified operator or by opacity/dust monitors.

The Wasatch Regional Landfill will implement, on an as needed basis, an appropriate combination of the following mitigation measures in order to prevent and control fugitive dust emissions:

- Water spray from an on-site water truck, misting systems, or sprinklers can be used to effectively reduce and prevent fugitive dust emissions. Water can be used as a dust suppressant in all areas of the landfill including soil stockpile areas. The site operator must use appropriate amounts of water in order to control fugitive dust emissions, excess amounts of water may create mud, and during cold months may freeze and cause equipment problems.

- Paving represents the most efficient way of controlling fugitive dust emissions. The entrance area of the landfill and the roads leading to active cells will be paved to specified distance.

- Paved road cleaning with vacuum street cleaning equipment, washing or scraping at regular intervals.

- Track-out controls - reducing dirt tracked from unpaved haul roads and construction areas, using paved or gravel entry aprons and/or devices such as steel grates that are capable of knocking mud and bulk dirt off vehicle tires.

- Trucks hauling non-hazardous waste, soil and construction materials, and other items to or from the site, should be fully covered and have secured cargo loads to prevent leakage from truck beds, sideboards, tailgate, or bottom dump gate.

- Applying chemical dust suppressants. Chemical dust suppressants can be widely applied on paved and unpaved roads, on exposed and disturbed areas of the landfill, and on graded sloped surfaces. Chemical dust suppressants should be applied in amounts and rates as recommended by the manufacturer. Some chemical dust suppressants have significant performance limitations in arid and semi-arid climates,

these limitations should be accounted for when choosing the chemical dust suppressant.

- Applying gravel to unpaved roads and areas of exposed soil minimizes dust emissions. It is important that the gravel applied contains minimal amount of fines as they have a tendency to migrate to the surface and become a source of airborne dust.

- Reducing vehicle speed – the maximum vehicle speed in unpaved areas should not exceed 15 miles per hour, or other speed as appropriate to control dust.

- Install temporary windbreaks around the site. This measure is recommended for construction activities and limited to smaller areas. More permanent windbreaks can be achieved by planting bushes and trees, and constructing earthen banks and rock walls.

- Slow or stop waste handling procedures (waste unloading, compaction, daily cover), and construction activities during high wind events (wind speeds 20-25 miles per hour). An on-site anemometer could be installed to measure wind speed and alert the landfill personnel.

- Phase construction, soil clearing and stabilization in a manner that will minimize the length of time and the amount of exposure of unstable soil.

- Use geotextiles and/or revegetation techniques on graded sloped surfaces to prevent wind and water erosion.

- Cover disturbed and exposed areas with rock, geotextiles, bark, hay (crimped into the surface), or other organic mulch.

- Re-vegetate areas no longer used (closed cell areas) by planting or seeding. Xeriscaping (using plants that require little or no additional water) should be considered, given the importance of water conservation and the regional arid climate.

- In properly lined areas (within cells), recirculated leachate can be used as a dust suppressor during waste compaction, unloading, and waste covering activities.

- Vehicle traffic over non-paved areas can be a source of significant dust. Staging areas can be set up to limit the distance vehicles must travel over non paved areas.

- Whenever possible, dry and wet waste material should be mixed, during the loading of the haul vehicles.

- Proper tire pressure should be maintained in all vehicles operated at the landfill.

- Prompt clean up of accidental spills ensures that the spill does not become a fugitive dust emission source.

Appendix 3.10
Groundwater Monitoring Plan

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Ground Water Monitoring Plan

Introduction

The primary objective of the proposed ground water monitoring plan is to protect human health and the environment by monitoring for the presence of contaminants as per Utah Administrative Code (UAC) R315-308-4, thereby enabling any necessary corrective action. This report describes the operational guidelines, including monitoring well design and construction plans, as they pertain to ground water monitoring. The planned locations of the monitoring wells are shown on Exhibit 1.

Ground water monitoring will continue throughout the active life, closure, and post-closure period of the facility. Background concentrations of the parameters listed in Section R315-308-4 will be established on an intra-well basis using eight independent samples from each upgradient and downgradient monitoring well within the first year of operation or as quickly as possible.

After background levels have been determined, the ground water underlying the landfill will be sampled semiannually for pH, water temperature, water conductivity, and the various organic and inorganic constituents (including heavy metals) listed in Section R315-308-4 (Table 1, Table 2 and Table 3). The ground water surface elevation, flow rate, and direction of flow will also be determined during each sampling event. The Facility Operator will be responsible for ensuring compliance with current regulations as applicable to the ground water monitoring plan, and for enforcing the plan as described in this report.

A detailed site-specific groundwater monitoring plan, including well logs, well design, and updated sampling and analysis procedures will be submitted and approved after the initial monitoring well development and prior to facility operation.

Monitoring Well Construction

All ground water monitoring wells will be constructed with flush threaded, 2-inch-outside-diameter (O.D.), Schedule 40 PVC blank casing and 2-inch-O.D., machine-slotted PVC screen. The well screen will be positioned across the water table to facilitate detection of a floating immiscible phase. The well screen will span from the unsaturated zone to approximately 20 ft below the water table surface. The annular space between each well screen and borehole will be packed with clean, graded sand, which extends from the bottom of the borehole to 2 feet above the screened interval. The PVC will be suspended during construction to keep it from touching the sides of the borehole.

A 3-foot bentonite pellet seal will be placed above the sand pack followed by a 4 to 1 cement/bentonite grout to approximately 1 foot below grade. Concrete will be placed to ground surface, and both a locking cap and traffic-

rated, watertight vault box will be installed. A detailed description of well construction, including design schematics and well logs, will be submitted to and approved by the state for approval before operation of the landfill.

Table 1. Section R315-308-4 Inorganic Constituents

Inorganic Constituents	CAS	Ground Water Protection Standard (mg/L)
Ammonia (as N)	7664-41-7	
Carbonate/Bicarbonate		
Calcium		
Chemical Oxygen Demand (COD)		
Chloride		
Iron	7439-89-6	
Magnesium		
Manganese	7439-96-5	
Nitrate (as N		
pH		
Potassium		
Sodium		
Sulfate		
Total Dissolved Solids (TDS)		
Total Organic Carbon (TOC)		

Table 2. Section R315-308-4 Heavy Metals

Heavy Metals	CAS	Ground Water Protection Standard (mg/L)
Antimony	7440-36-0	0.006
Arsenic	7440-38-2	0.05
Barium	7440-39-3	2
Beryllium	7440-41-7	0.004
Cadmium	7440-43-9	0.005
Chromium		0.1
Cobalt	7440-48-4	2
Copper	7440-50-8	1.3
Lead		0.015
Mercury	7439-97-6	0.002
Nickel	7440-02-0	0.1
Selenium	7782-49-2	0.05
Silver	7440-22-4	0.1
Thallium		0.002
Vanadium	7440-62-2	0.3
Zinc	7440-66-6	5

Table 3. Section R315-308-4 Organic Constituents

Organic Constituents	CAS	Ground Water Protection Standard (mg/L)
Acetone	67-64-1	4
Acrylonitrile	107-13-1	0.1
Benzene	71-43-2	0.005
Bromochloromethane	74-97-5	0.01
Bromodichloromethane[1]	75-27-4	0.1
Bromoform[1]	75-25-2	0.1
Carbon disulfide	75-15-0	4
Carbon tetrachloride	56-23-5	0.005
Chlorobenzene	108-90-7	0.1
Chloroethane	75-00-3	15
Chloroform[1]	67-66-3	0.1
Dibromochloromethane[1]	124-48-1	0.1
1,2-Dibromo-3-chloropropane	96-12-8	0.0002
1,2-Dibromoethane	106-93-4	0.00005
1,2-Dichlorobenzene (ortho)	95-50-1	0.6
1,4-Dichlorobenzene (para)	106-46-7	0.075
trans-1,4-Dichloro-2-butene	110-57-6	
1,1-Dichloroethane	75-34-3	4
1,2-Dichloroethane	107-06-2	0.005
1,1-Dichloroethylene	75-35-4	0.007
cis-1,2-Dichloroethylene	156-59-2	0.07
trans-1,2-Dichloroethylene	156-60-5	0.1
1,2-Dichloropropane	78-87-5	0.005
cis-1,3-Dichloropropene	10061-01-5	0.002
trans-1,3-Dichloropropene	10061-02-6	0.002
Ethylbenzene	100-41-4	0.7
2-Hexanone	591-78-6	1.5
Methyl bromide	74-83-9	0.01
Methyl chloride	74-87-3	0.003
Methylene bromide	74-95-3	0.4
Methylene chloride	75-09-2	0.005
Methyl ethyl ketone	78-93-3	0.17
Methyl iodide	74-88-4	
4-Methyl-2-pentanone	108-10-1	3
Styrene	100-42-5	0.1
1,1,1,2-Tetrachloroethane	630-20-6	0.07
1,1,2,2-Tetrachloroethane	79-34-5	0.005
Tetrachloroethylene	127-18-4	0.005
Toluene	108-88-3	1
1,1,1-Trichloroethane	71-55-6	0.2
1,1,2-Trichloroethane	79-00-5	0.005
Trichloroethylene	79-01-6	0.005
Trichlorofluoromethane	75-69-4	10
1,2,3-Trichloropropane	96-18-4	0.04
Vinyl acetate	108-05-4	37
Vinyl Chloride	75-01-4	0.002
Xylenes	1330-20-7	10

[1]The ground water protection standard of 0.1 mg/L is for the total of Bromodichloromethane, Bromoform, Chloroform, and Dibromochloromethane.

Initial Monitoring Well Development and Survey

Monitoring wells will be developed with a development rig using standard surging and bailing techniques prior to groundwater sampling. Each monitoring well will be surged using an appropriately sized surge block attached to a 10-foot section of steel AW rod and a stainless steel line. The wells will be surged in approximately 3-foot intervals, which forces groundwater to flow into and out of the well screen, allowing the filter pack to settle effectively and fine-grained sediments to break up, go into suspension, and then migrate into the well. The wells will then be jetted, surged, and bailed with a clean stainless steel bailer to remove a portion of the silts and clays. This reduces the turbidity of the water-bearing zone and allows representative aquifer water to enter the well. The bailer and submersible pump will be washed thoroughly with detergent solution and rinsed with both tap water and deionized water before each well is developed. During development, water pH, conductivity, and temperature will be monitored and recorded.

The ground water monitoring network will consist of 2 upgradient wells and 4 downgradient wells. The downgradient wells will be placed no more than 150 meters (500 feet) from the unit boundary of each active cell. In addition, monitoring wells will be placed downgradient of each evaporation pond. Table 4 shows the number of monitoring wells and the frequency of sampling events. Additional wells, if required by the Executive Secretary, will be constructed in such a manner as to prevent contamination of samples, and the sample strata between aquifers and the water bearing strata, as presented in Subsection R315-308-2(2).

In order to maintain sample independence, background samples will be collected at a rate not to exceed one every 45 days. This sampling frequency will provide sufficient time for groundwater traveling at a seepage velocity of 5.4 cm/month to move a minimum distance of 3.2 inches, and therefore, will ensure that the groundwater within the well casing is pristine and not containing groundwater from previous sampling events. Background samples will be collected as described in the Sample Collection and Analysis Section of this report.

Table 4. Groundwater Monitoring Schedule

First Year (or as soon as possible)	
Number of Wells Upgradient	2
Sampling Frequency	8
Number of Wells Downgradient	4
Sampling Frequency	4
Subsequent Years	
Number of Wells	28
Sampling Frequency	2

The location and vertical elevation of each well will be surveyed relative to an on-site datum or nearby benchmark.

The landfill operator will inspect and maintain the landfill monitoring well locks (including lubricating or replacing locks, if necessary). The landfill operator will also repair and replace the landfill monitoring well protective casings, covers, hinges and any other exposed parts as necessary. Well redevelopment will be done in accordance with the instructions outlined in Subsection R315-308-2(2).

Sample Collection and Analysis

All ground water samples will be collected using approved sampling protocol and rigorous quality control/quality assurance. An adequate stock of supplies and equipment for monitoring will be available on the project site or provided by the contracted laboratory prior to each sampling event. Monitoring equipment and supplies will be stored in a manner conducive to their longevity.

Supplies maintained onsite will include, but not be limited to:

- Electronic water level indicator
- Field pH meter
- Field conductivity meter
- Field thermometer
- Personal protective equipment as prescribed by the facility health and safety policy
- Sample containers for both field and laboratory analysis
- Graduated waste water bucket, graduated cylinder, beakers and glassware as needed
- Timing device capable of measuring to the nearest second
- Decontamination kit as prescribed by the facility health and safety policy
- Impermeable material for use as a ground cloth
- Sampling activity log forms
- Chain of custody forms

Prior to groundwater purging and sampling, groundwater surface elevations of all wells will be measured. Water levels will be recorded to the nearest one hundredth of a foot at all monitoring wells. Groundwater elevations will be calculated by subtracting the depth to water measurements from the survey elevation of the top of the well casing. The direction of ground water flow and the flow velocity will also be determined at each sampling event. Ground water surface elevations will be determined a second time at the conclusion of each sampling event.

Each well will be purged using a low flow pump or bailing designed to be non-aerating and non-leaching. Purging will continue until at least three casing volumes have been purged from each monitoring well, or until temperature, pH, and specific conductivity measurements have stabilized to within ten

percent over at least two measurements. The pumping rate will not exceed 200 milliliters per minute.

Once purging is complete, groundwater samples will be collected and stored in their respective containers according to the procedures provided by the testing laboratory. Volatile parameters will be sampled first. If the well has been purged dry, samples will be taken as soon as a sufficient volume of ground water has entered the well.

Immediately following collection, samples for laboratory analytical testing will be capped, labeled, and documented on the Chain of Custody form, sealed in a re-sealable plastic storage bag, placed in an ice chilled cooler, and delivered within 24 hours to a state-certified laboratory. Field analytical procedures will be conducted in accordance with the field instrument manufacturer's instructions.

Quality assurance samples will include, but not be limited to, a rinse blank, a trip blank, and field duplicates. The rinse blank will be a vial of reagent grade water that is circulated through the bailer prior to sampling. The trip blank will be a vial of reagent grade water included in each cooler during sampling and shipping. These blanks are used to provide an indication of contamination introduced as a consequence of the sampling and shipping procedure. Field duplicates will be collected at a rate of 10 percent. If fewer than 10 samples are collected one field duplicate will be included. A detailed description of the QA/QC sampling procedures and protocol will be submitted to and approved by the state for approval prior to operation of the landfill.

Reusable equipment will be decontaminated between each sampling location by washing in a bucket of non-phosphate soap solution, rinsing in a bucket of clean water, and rinsing in a separate bucket of deionized or distilled water. To minimize cross-contamination between locations, monitoring wells will be sampled in the order of "cleanest" to "dirtiest", where practical, based on the results of the previous monitoring.

A laboratory certified by the state of Utah and approved for the procedures and test methods being conducted will analyze ground water samples. The laboratory will provide the analysis results, along with detection limits and a list of test methods used for each constituent.

The facility operator will review the results of the laboratory analysis. The reviewer will verify that sample identification numbers match, chain of custody and field notes have been completed properly, each analysis was performed using the requested method and within an acceptable time frame, reported limits are consistent with parameter detection limits, and that all QA/QC is included and is acceptable.

Each sampling event will be meticulously documented. The facilities operating records will include, but not be limited to, the following:

- A report on the procedures followed during collection, including quality control/quality assurance
- Results of field measured parameters

- A report of the chain of custody
- Quality control/quality assurance laboratory procedures
- Results of the laboratory analysis listed by name and Chemical Abstracts Service (CAS) number
- List of detection limits and analytical methods used
- Statistical analysis of the results of the ground water monitoring

Results will also be recorded in the sampling activity log. Sampling information, including purge volumes and field measurements, will be recorded on Sampling Event Data Sheets. A copy of the facilities operating records will be submitted to the Executive Secretary in the annual report required by Subsection R315-302-2(4)(e).

Statistical Analysis

The facility operator will perform a statistical analysis of the ground water sample analytical results in order to determine whether a statistically significant change has occurred as compared to the established background water quality conditions for selected parameters. The analysis will be completed within 30 days of the receipt of the sample results.

The statistical method selected will be dependant upon the distribution of the background data. If the distribution of the data is normal or lognormal, then a parametric analysis of variance (ANOVA) based on the estimation of the mean, followed by a multiple comparisons procedure, will be employed. If the data are not distributed normally or lognormally, or if the distribution cannot be determined then a Shewhart-CUSUM control chart approach will be used.

Because of potential variation in ground water quality observed from well to well an intra-well comparison of the data will be done. This will facilitate monitoring changes in ground water quality for each individual well and will take into consideration any changes in background concentrations. The level of significance for intra-well comparisons will be no less than 0.05 (95% confidence) regardless of the statistical method used. If the facility operator determines that a statistically significant change in the concentration of an R315-308-4 parameter has occurred then assessment monitoring will begin (see Corrective Action Plan below).

Assessment Monitoring

In accordance with R315-308-2(10), the following will be completed in the event of potential contamination of an R315-308-4 listed parameter:

- Written notification will be submitted to the Executive Secretary within 14 days of completion of the statistical analysis and within 30 days of receiving the sample results

- The results of the statistical analysis will be recorded in the facility operating record
- Notification to the Executive Secretary will indicate which constituents have shown statistically significant changes
- The ground water in all monitoring wells will be resampled immediately (both up and downgradient) for all Appendix II, 40 CFR Part 258 constituents
- The Executive Secretary will be notified of the name, CAS number, and concentration of all resampled constituents, including any additional constituents that may have been included in the ground water monitoring plan
- The notification will indicate any statistically significant increase over background of any resampled constituent in any monitoring well at the compliance point
- A complete statistical analysis of the resampled R315-308-4 constituents will be submitted to the Executive Secretary within seven days

If the operator fails to demonstrate after 90 days that the contamination was caused by a source other than the solid waste disposal facility, as specified in Subsection R315-308-2(4)(b), the operator will initiate assessment monitoring as per Subsection 315-308-2(11 & 12) (Figure 1). Assessment monitoring will include monitoring all downgradient wells on a quarterly basis for all R315-308-4 constituents, and for those constituents detected from Appendix II, 40 CFR Part 258. Appendix II, 40 CFR part 258 constituents not detected will

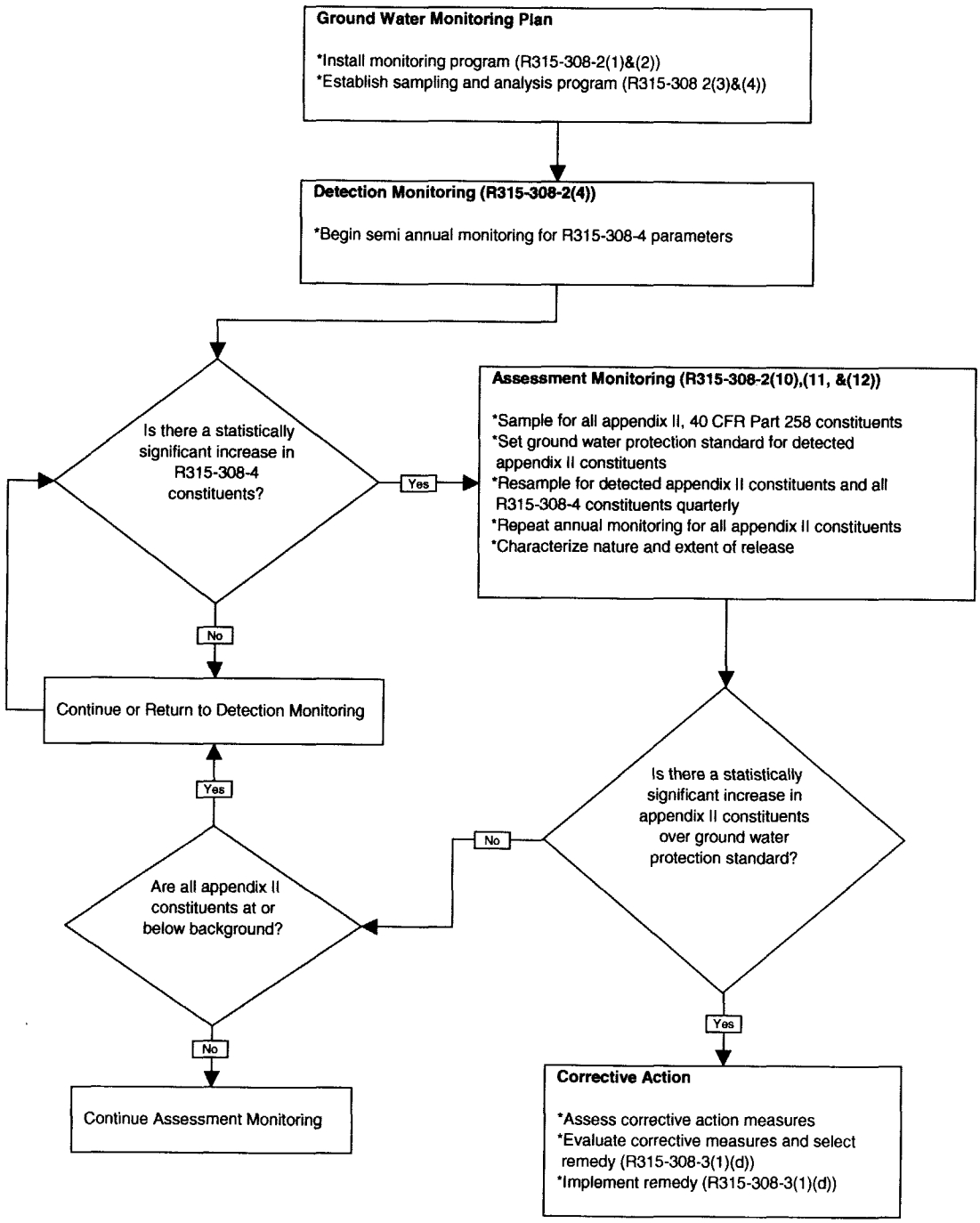

Figure 1. Summary of ground water monitoring and corrective action.

be sampled for on an annual basis in all downgradient wells. The results from all ground water sampling events will undergo a statistical analysis as described previously in this report.

If one or more of the Appendix II, 40 CFR part 258 constituents are detected at statistically significant levels above background the facility operator will document the findings and notify the Executive Secretary within 14 days of discovery, identifying the constituent(s) and concentrations(s) that have exceed the ground water quality standards. The operator will also notify all affected parties, and monitor and characterize the nature and extent of the release as outlined in Subsection R315-308-2(12).

Corrective Action Plan

In the event that the corrective action plan is implemented the operator will monitor as required in Subsection R315-308-2(11)(d). The operator will take any measure required by the Executive Secretary to protect human health and the environment. Corrective action measures will be discussed in a public meeting with interested and affected parties. Corrective action measures will address at least the following:

- The performance, reliability, ease of implementation, and potential impacts of remedies
    - Safety impacts
    - Cross-media impacts
    - Residual contamination exposure
- Time requirements, including starting and completion dates
- Remediation costs
- Public health or environmental requirements that may substantially affect implementation of the remedy

The corrective action remedy will be submitted to the Executive Secretary no more than 14 days after the selection of the remedy. Upon approval by the Executive Secretary the plan will be implemented according to an approved schedule. Additional actions will be taken in compliance with Subsection R315-308-3.

Appendix 3.11
Landfill Gas Monitoring and Control Plan

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Landfill Gas Monitoring Program

Introduction

The primary objective of the Landfill Gas Control and Monitoring Program is to protect air quality and manage the emission of explosive gases generated by the landfill. The monitoring guidelines established in this report will apply during the active life of the landfill as well as the post-closure period of 30 years.

In accordance with Subsection R315-303-2(2)(a), the concentration of explosive gas generated by the landfill will not exceed:

- 25% of the lower explosive limit (LEL) for explosive gas in facility structures on or off-site excluding gas control or recovery components
- The LEL for the explosive gas at or beyond the property boundary

The landfill operator will ensure that ambient air quality standards at the boundary of the facility are not violated. The landfill will also comply with current emission standards from any emission of landfill gas (LFG), combustion processes, or any other release associated with the facility.

The Landfill Gas Control and Monitoring Program will include monitoring along the perimeters of the landfill, and inside buildings within the facility boundaries. In the event that concentrations of these gases exceed 25% of the LEL in buildings, or the LEL elsewhere within the property boundary, the steps outlined in the Contingency Plan of this report will be taken.

Background

The decomposition of organic solid waste in the landfill environment produces LFG. The chemical composition of the LFG depends on the waste type and stage of decomposition. In the early stages of decomposition aerobic processes result in the production of primarily CO_2 and water vapor. As oxygen is depleted the decomposition changes from aerobic to anaerobic. LFG produced under anaerobic conditions consists mainly of methane and carbon dioxide, both of which are odorless. Trace constituents of other volatiles, often malodorous or toxic gases, are also found in LFG.

LFG can migrate laterally through soil into structures located on or near landfills. Since methane presents a fire or explosive threat, LFG must be controlled to protect property, and public health and safety. Thus, engineered

solutions are needed to efficiently and safely monitor, collect, and process landfill gas.

Monitoring System

The monitoring system will consist of a series of in-ground probes installed around the perimeter, and at strategic location within the property boundary. Probes will be used to monitor explosive gas concentrations and non-methane organic compound (NMOC) emissions. The probes will not be connected to or in the vicinity of any negative pressure source. An example of a typical NMOC monitoring probe is illustrated in (Figure 1).

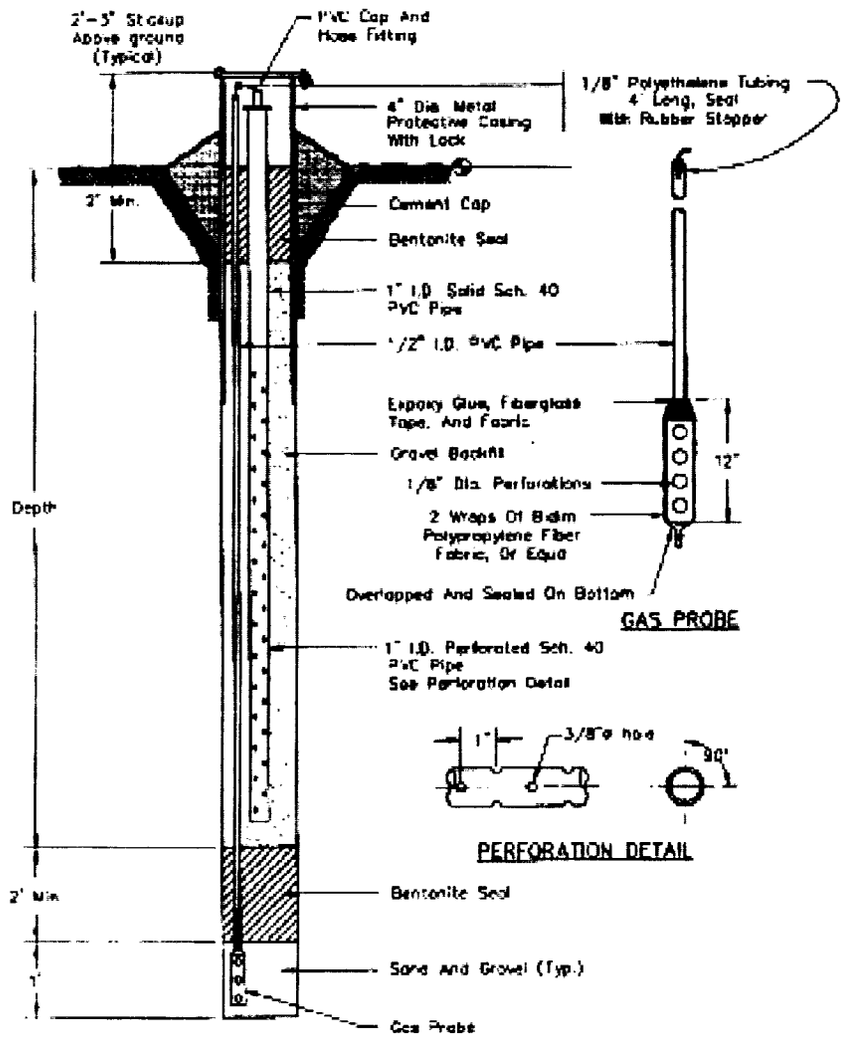


Figure 1. Schematic of typical NMOC monitoring probe.

A network of permanent monitoring probes installed around each cell liner will monitor NMOC migration. Explosive gases will be monitored inside buildings by an alarm and monitoring system, as well as around the perimeter of the landfill. The total number of permanent probes will ultimately be based on the results of monitoring initial cells and proximity to receptors along the perimeters of the landfill.

Additional probes may be placed near receptors such as parking lots and open places where the public may gather. A preliminary probe layout is included as Map 1 of the Landfill Gas Monitoring Plan.

NMOC Monitoring Procedures

1. Non-methane organic compound emissions will be determined using EPA method 25C. The facility operator will monitor the permanent NMOC probes on a quarterly basis during the active life and post closure period of the landfill. Appendix A of this report includes an example sample form for NMOC monitoring.

   To effectively monitor NMOC emissions using a monitoring probe, the following procedures will be implemented in order:

   - Obtain pressure reading
   - Purge a predetermined volume of gas from the permanent probe;
   - Observe the gas concentration after purging and record the steady state (continuous) gas reading; and
   - Obtain liquid level readings.

   Pressure readings in the probes provide useful data for assessing the migration of gases and are typically expressed in inches of water column.

   Liquid level measurements are considered in evaluating the performance of probes. If the liquid level is above the screened or perforated portion of the probe, then the probe is considered temporarily ineffective and the monitoring data for that monitoring event will be considered invalid. Liquid level measurements obtained during probe installations are to be considered when determining the screened or perforated length of each probe.

Explosive Gas Monitoring Procedures

In accordance with R315-303-3(5)(a), the landfill operators will monitor explosive gases quarterly. Explosive gas monitoring will be performed with a dual range, natural gas indicator that measures concentration as percent by volume of methane equivalents. Two ranges of detection are available: 0 percent to 5 percent and 0 percent to 100 percent methane by volume. Combustible gas monitoring procedures are done initially in the high range. If the reading is less than 5 percent, the procedure is repeated at the low range. The facility operator will monitor the gas probes for the LEL of methane in air, or 5 percent methane in air with 20.5 percent oxygen.

At the conclusion of the monitoring event the results will be categorized into one of four scenarios:

- High Percent Gas and High Pressure: In this situation, there is an indication of combustible gas accumulation and migration attributed to elevated pressure. Special attention should be taken in reporting these findings. Additional borehole probing may be required to determine the extent of migration.

- High Percent Gas and No/Low Pressure: In this situation, there is an indication of combustible gas accumulation and migration attributed to diffusion (movement from higher concentration to lower concentration) rather than pressure. Although this does not present an immediate concern, the analyst should pay special attention to the probe during upcoming monitoring.

- No/Low Percent Gas and High Pressure: In this situation, the pressure observed may be attributed to the water level rising above the screened section of the probe or to the barometric pressure of that particular day. The analyst should observe the liquid level measurements and make special note if the screened portion is below the liquid level.

- No Percent Gas and No Pressure: In this situation, there is no evidence of combustible gas accumulation within the probe.

Collection System Design

The design process for the LFG collection system will be divided into two phases. The first phase will be an investigation to determine the technical and financial requirements of the LFG recovery system. The second phase will include the actual design and implementation of the system.

The Phase I investigation will consist of the following:

- Collection and review of existing data
- Onsite inspection
- Initial screening
- Field tests

The Phase II design will begin after an appropriate LFG collection system has been selected based on the results of the Phase I investigation.

Contingency Plan

If the concentration of explosive gases exceeds the standard set in Subsection R315-303-2(2)(a), the facility operator will:

- Immediately take all necessary steps to protect human health
- Notify the Executive secretary within 24 hours
- Record the explosive gas measured concentrations and steps taken to protect human health within seven days
- Implement an approved remediation plan within 60 days
- Place a copy of the remediation plan in the operating record within 60 days

An emergency evacuation plan, including meeting points and escape routes, will be developed by the facility operator.

Equipment Maintenance

All equipment used in the LFG monitoring and collection process will be maintained regularly in accordance with the manufacturers recommendations. The LFG sample collector will calibrate hand-held probes prior to each use. The probe calibration will be documented on the appropriate quarterly LFG monitoring results form.

Probes will be checked for plugs. Facility personnel will make sure probes are not damaged, filled with or partially filled with water, covered with dirt or mud, or otherwise destroyed. Additionally, probes will be clearly marked with valves or caps securely attached to them. Plugged probes may result in the LFG monitor pump laboring noticeably, or even shutting down completely. Additionally, monitoring records may show a change from recorded levels of gas to a string of consecutive zero readings. The equipment manufacturer or a licensed representative will perform any required maintenance or repair on technical monitoring equipment.

Health and Safety Considerations

This section of the report identifies the standards established for field activities as they pertain to landfill gas monitoring. The Plan has been developed to comply with State and Federal laws and regulations designed to protect employees' from toxic, hazardous or infectious materials and physical hazards they may be exposed to in the work environment. The following include general health and safety guidelines for the LFG monitoring program:

- If field personnel come in contact with a hazardous environment or situation, they will inform their supervisor of the event. This form of communication is intended to provide safe and healthy working conditions, without limiting the rights and responsibilities under the law of management and employees.
- Methane gas found in concentrations between its LEL (5% by volume) and the UEL (15% by volume) should be handled with extreme caution. Methane in this range constitutes a flammable mixture and if it is discovered in an environment with a source of heat for ignition, an explosion could occur.
- Minimize risk of exposure to landfill gas. Personnel should turn their backs to the wind whenever checking probes so that if LFG escapes from the probe it will be less likely to be inhaled. LFG may also contain other chemical constituent gases such as vinyl chloride, benzene, and toluene, which may pose risks at gas monitoring wells or collection and removal systems
- Minimize the time spent in low or partially enclosed or covered areas where landfill decomposition gas may collect.
- When entering and sampling on-site structures for LFG be aware of possible enclosed space conditions where gases or vapors may collect.
- Field activities should be planned to accommodate adverse weather conditions and select appropriate clothing and equipment.
- Select Personal Protective Equipment (PPE) based on the hazards that may be encountered during the site visit.
- Health and safety instrumentation will be used when hazardous or toxic contaminants are known or suspected. Selection of instrumentation shall be based upon the hazards that will be encountered during the site visit.
- Stay upwind and a safe distance away from the source of the hazard whenever possible.
- Never put notebooks or other equipment down in waste areas while monitoring.

- Avoid exposure to landfill decomposition gas at or near gas collection and venting systems. Pay close attention to air surveillance/instrumentation readings and alarms.
- Eating and smoking are prohibited while on a solid waste facility, except in designated areas.
- Under no circumstances is contaminated equipment to be brought into an office setting or personal dwelling. Contaminated equipment should be stored in a predesignated area. Predesignated areas should be identified for storage of contaminated equipment requiring decontamination.

For additional information consult the facility Training and Safety Plan.

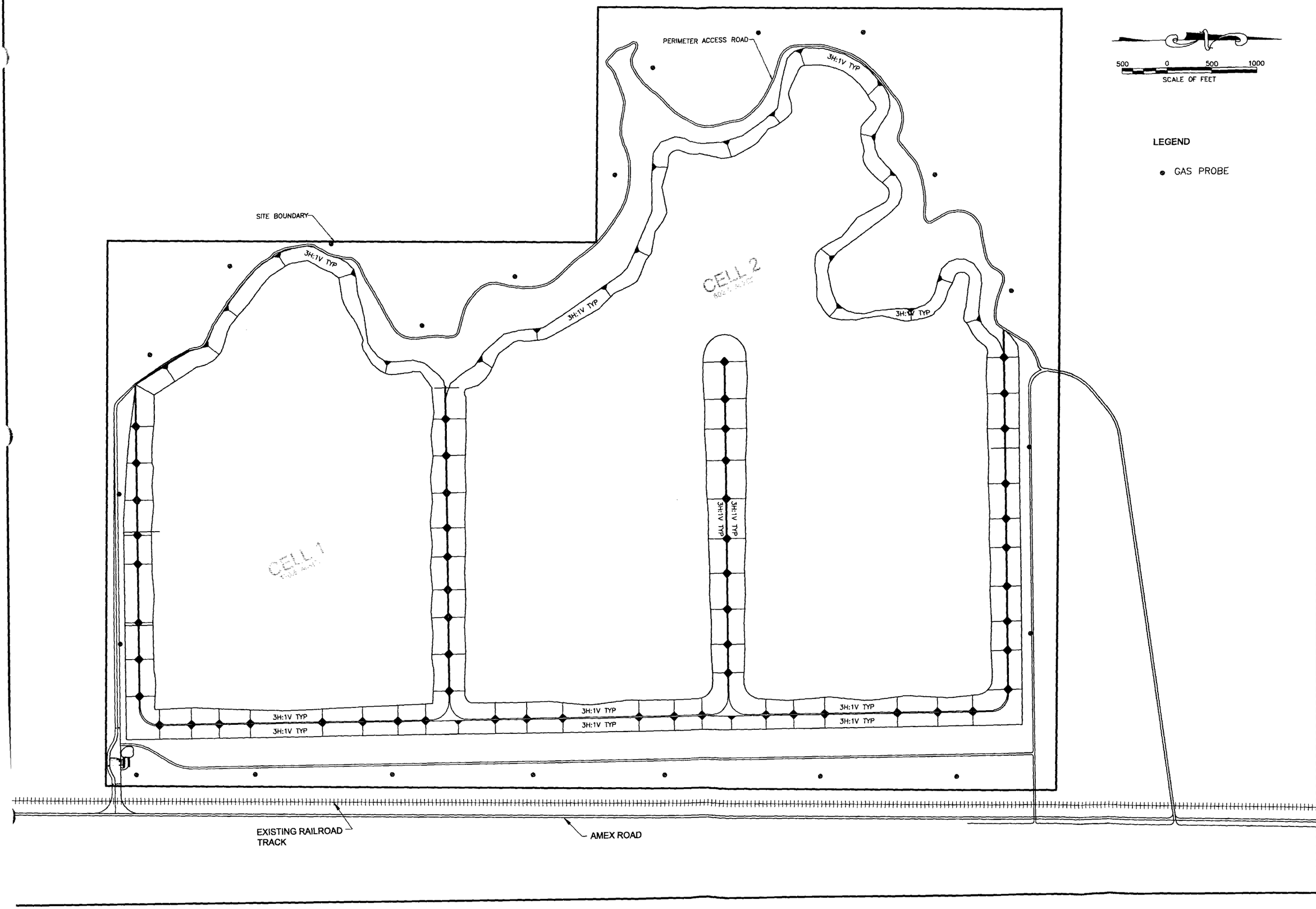
Appendix A

LFG Monitoring Results Sample Form

Name of Landfill:	Address of Landfill
SWIS No.	Date of Inspection:
Inspector's Name:	

Equipment Use Device	Number or Type	Calib. Date	Weather Data:
1. Gastech (CGI)			Temperature:_____
2. Gastech (CGI)			Cloud Cover:_____
3. Draeger (detection tube)			
4. Draeger (detection tube)			
5. Bar Hole			

Sampling Location Number or Probe Number	Depth	Combust. Gas: % or PPM	O2 % or PPM	Draeger Type/Amount



LICENSED PROFESSIONAL ENGINEER No. 187727 S. SCOTT CARLSON STATE OF UTAH

DATE	2-5-2004
SCALE	1" = 500'
PROJECT NO.	8WEL010100

WASATCH REGIONAL LANDFILL LANDFILL GAS SYSTEM

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED	JKT
DRAWN	JWH
CHECKED	SSC

MAP 1

RESULTS OF LANDFILL GAS MONITORING

INSPECTOR'S NAME:_____

DATE OF MONITORING/SAMPLING EVENT:_____

CORRESPONDING SAMPLING EVENT DATA SHEET NUMBER:_____

CHAIN OF CUSTODY REPORT NUMBER:_____

MONITORING DEVICE:

TYPE_____ CALIBRATION DATE_____

WEATHER DATA:

TEMPERATURE _____ WIND SPEED _____

CLOUD COVER _____ WIND DIRECTION _____

PRECIPITATION _____ HUMIDITY _____

ANALYTICAL RESULTS

WELL	PRESSURE	LIQUID	GAS (PPM)	OXYGEN (PPM)

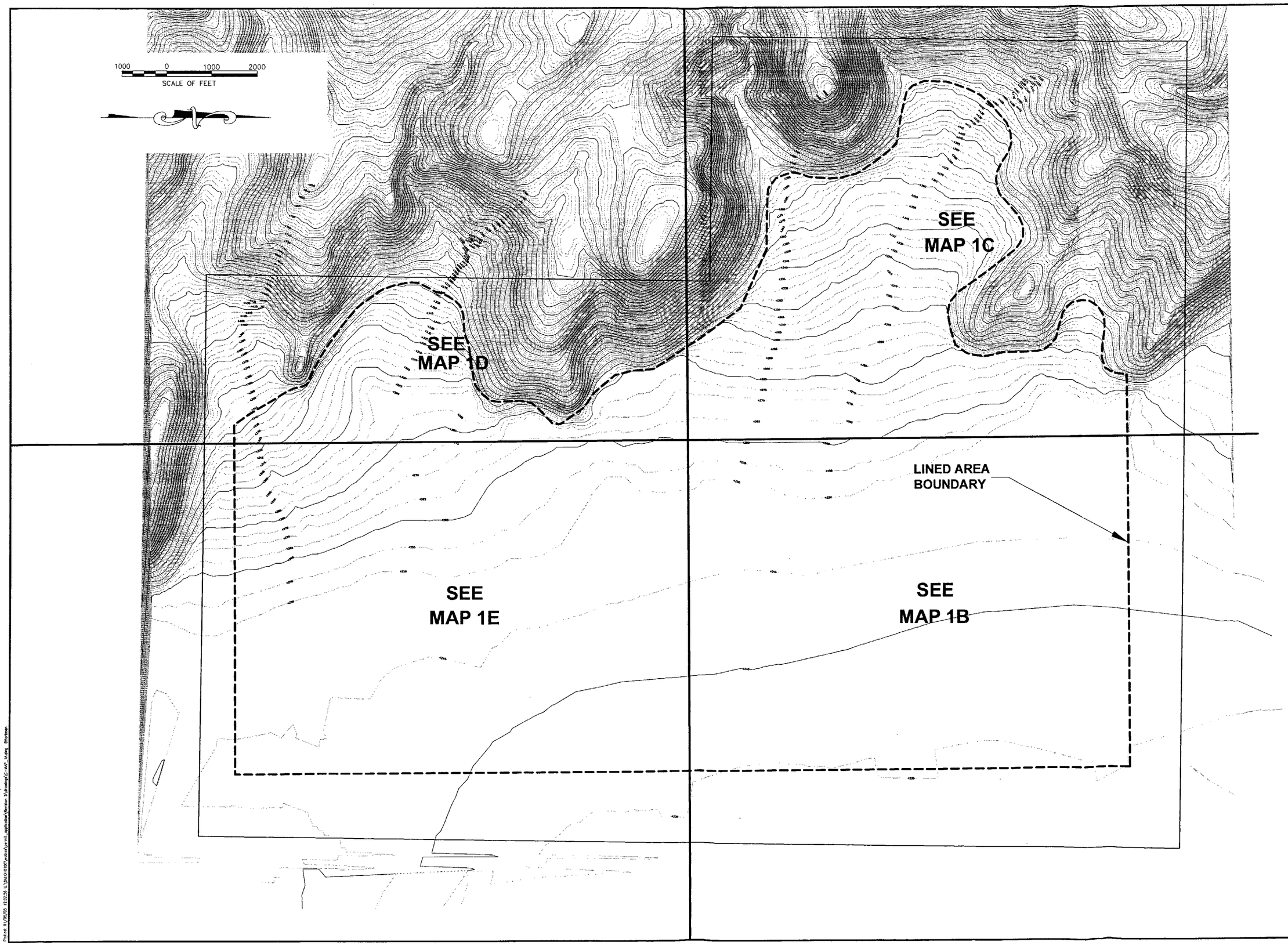
Initials_____

ANALYTICAL RESULTS DATE: ____________

WELL	PRESSURE	LIQUID	GAS (PPM)	OXYGEN (PPM)

FIELD OBSERVATIONS:

Initials_____



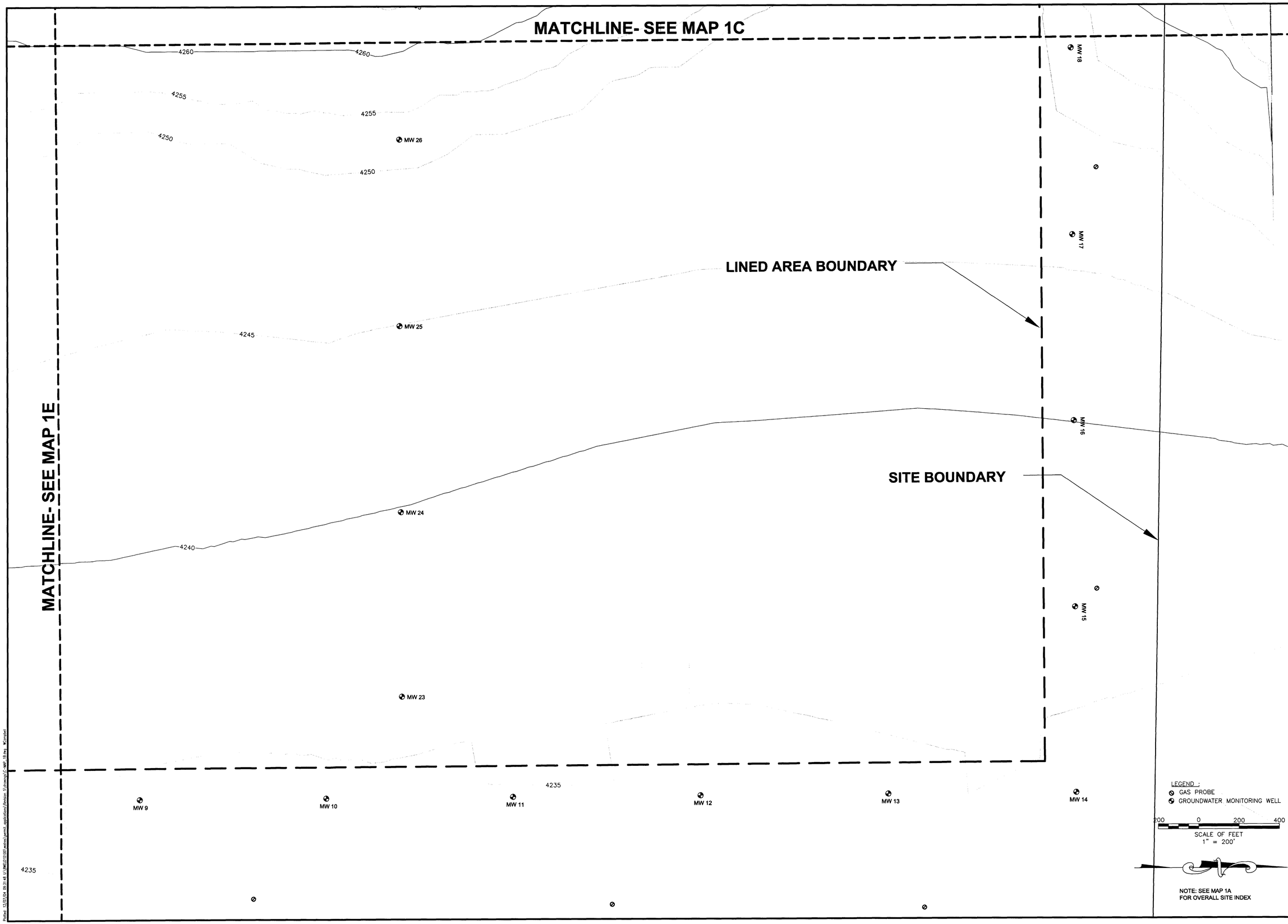
DATE: 11-10-2003
PLOT DATE:
SCALE: SEE DRAWING
PROJECT NUMBER: 8WEL010100

WASATCH REGIONAL LANDFILL
SITE TOPOGRAPHY

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED: BRH
DRAFTED: BP
CHECKED: SSC

MAP 1A



LICENSED PROFESSIONAL ENGINEER
No. 187727
S. SCOTT CARLSON
STATE OF UTAH

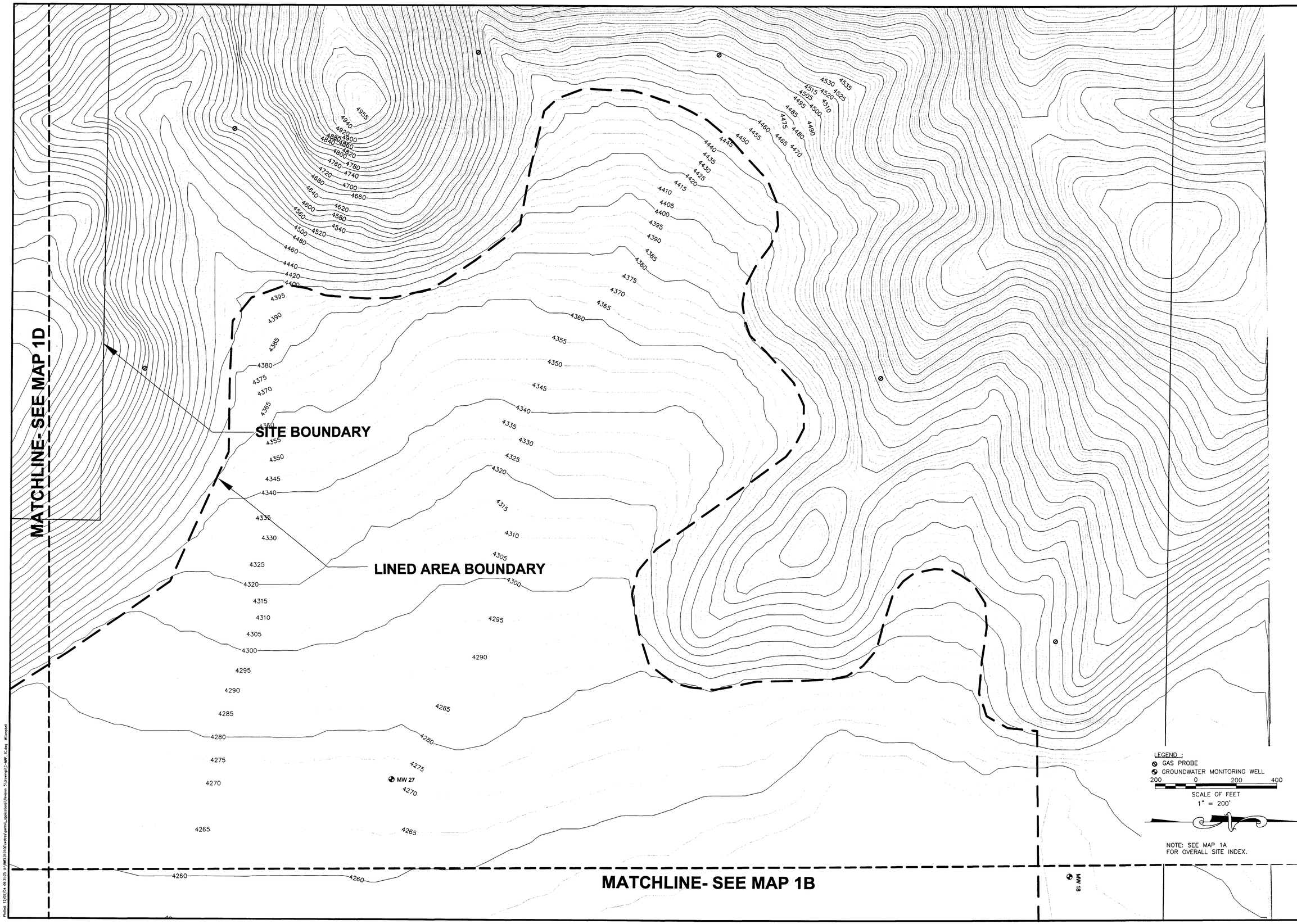
DATE: 10-20-2003
PLOT DATE:
SCALE: SEE SCALE BAR
PROJECT NUMBER: 8WEL010100

WASATCH REGIONAL LANDFILL
SITE TOPOGRAPHY

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED: BRH
DRAFTED: BP
CHECKED: SSC

MAP
1B
OF



LICENSED PROFESSIONAL ENGINEER
No. 187727
S. SCOTT
CARLSON
STATE OF UTAH

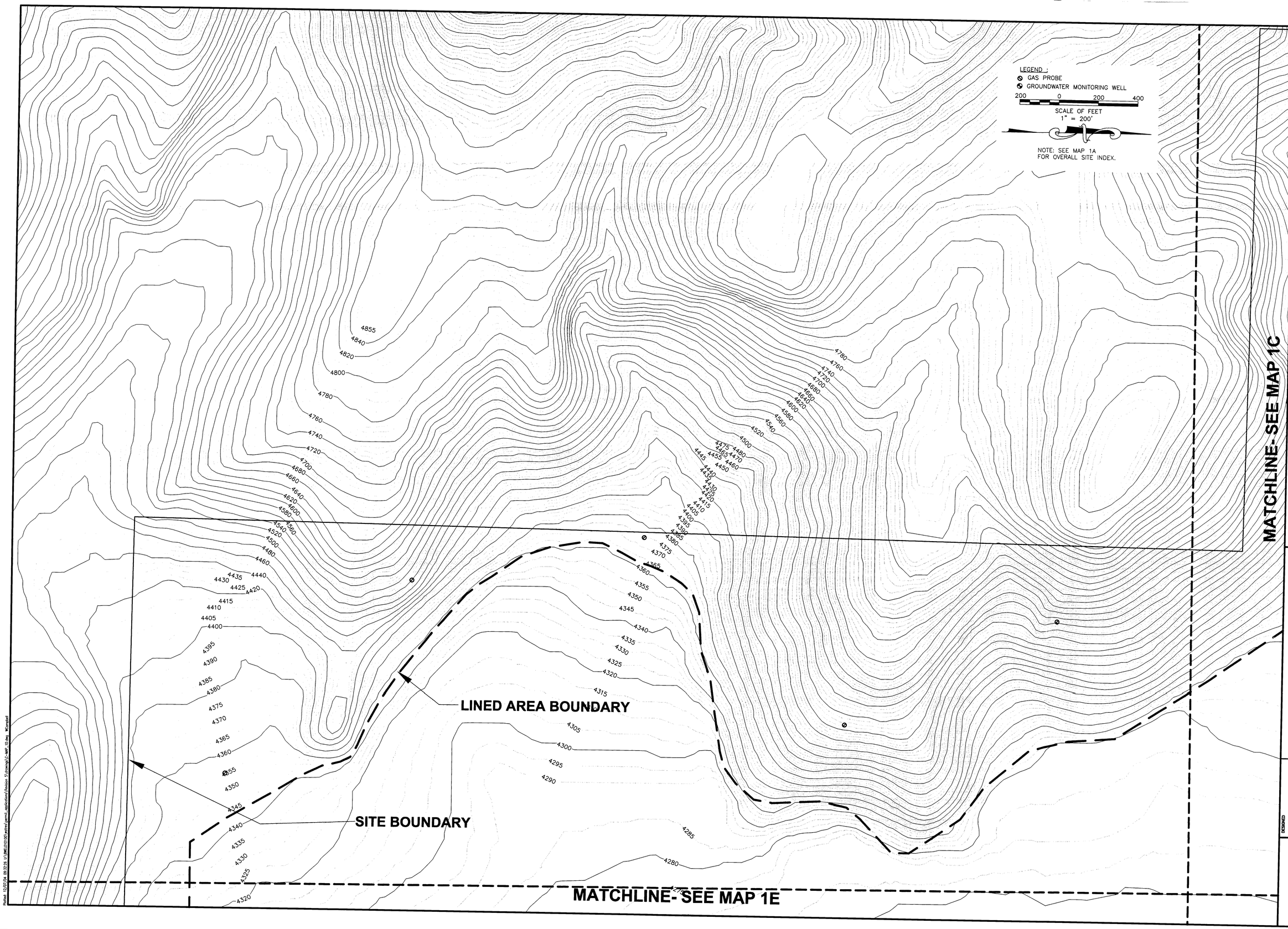
DATE: 10-20-2003
PLOT DATE:
SCALE: SEE SCALE BAR
PROJECT NUMBER: 8WEL010100

WASATCH REGIONAL LANDFILL
SITE TOPOGRAPHY

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED: BRH
DRAFTED: BP
CHECKED: SSC

MAP 1C
OF —



LICENSED PROFESSIONAL ENGINEER
No. 187727
S. SCOTT
CARLSON
STATE OF UTAH

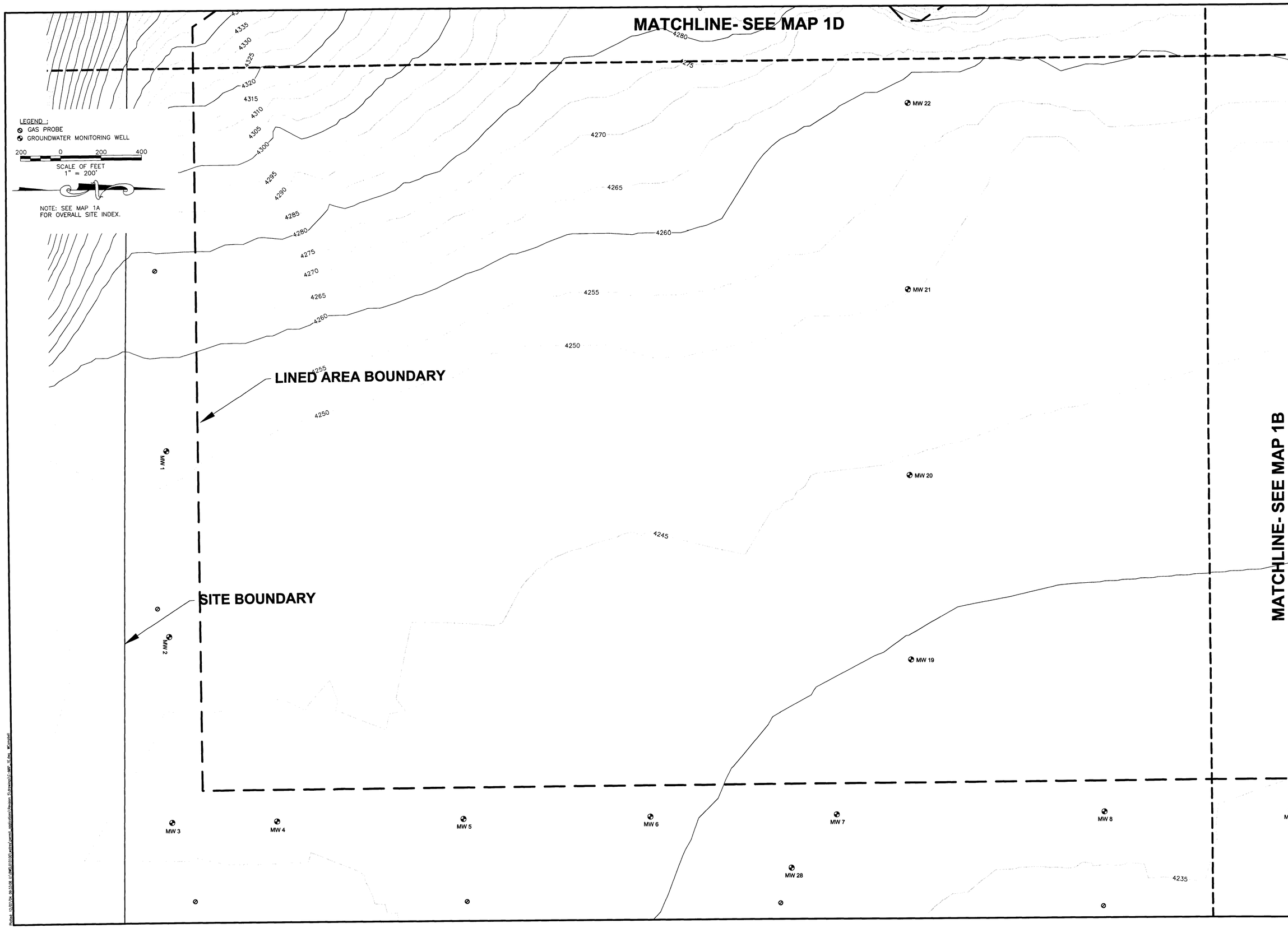
DATE: 10-20-2003
PLOT DATE:
SCALE: SEE SCALE BAR
PROJECT NUMBER: 8WEL010100

WASATCH REGIONAL LANDFILL
SITE TOPOGRAPHY

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED: BRH
DRAFTED: BP
CHECKED: SSC

MAP 1D
OF —



LICENSED PROFESSIONAL ENGINEER
No. 187721
S. SCOTT A. CARLSON
STATE OF UTAH

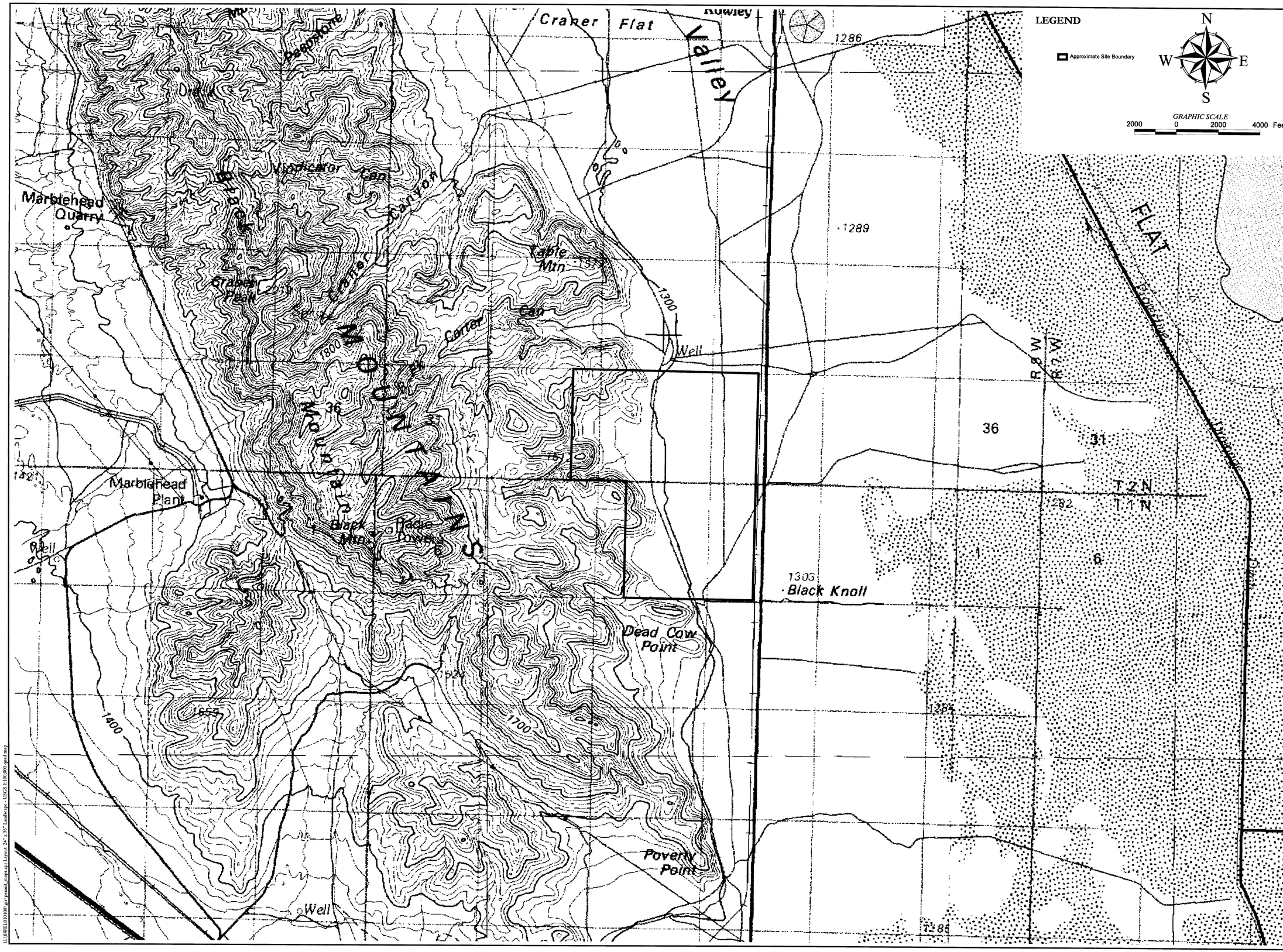
DATE: 10-20-2003
PLOT DATE:
SCALE: SEE SCALE BAR
PROJECT NUMBER: 8WEL010100

WASATCH REGIONAL LANDFILL SITE TOPOGRAPHY

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED: BRH
DRAFTED: BP
CHECKED: SSC

MAP 1E
OF —



LICENSED PROFESSIONAL ENGINEER
No. 187727
S. SCOTT CARLSON
STATE OF UTAH

DATE	10-6-2003
PLOT DATE	10-6-2003
SCALE	1" = 2,000'
PROJECT NUMBER	8WEL010100

WASATCH REGIONAL LANDFILL
USGS 1:100,000 QUADRANGLE MAP
(TOOELE QUAD)

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED	BRH
DRAFTED	BRH
CHECKED	SSC

MAP 2 of 2

U:\8WEL010100\gis\permit_maps.apr Layout: 24" x 36" Landscape - USGS 1:100,000 quad map

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Section 5 - Geohydrological Assessment

5.1 Local and Regional Geology

5.1.1 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. Appendix 2.7 contains the full geotechnical report prepared by Kleinfelder between June 2003 and May 2004. This geotechnical report 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 2 (Facility Location Standards) of this permit application.

5.2 Local and Regional Hydrology

5.2.1 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 records12.83 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).

5.2.2 Groundwater

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

The geotechnical study 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 the geotechnical report found in Appendix 2.7.

The majority of the groundwater within the site boundary are, 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). The geotechnical report located in Appendix 2.7 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 not known 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, these groundwaters are not classified as Class 1B (Irreplaceable Groundwater).

The site it also not known to be 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 aquife 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 5.6. 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 1. The groundwater flow direction is generally northeast, with an average hydraulic gradient (i) in the "steeper" areas of approximately 0.52 percent.

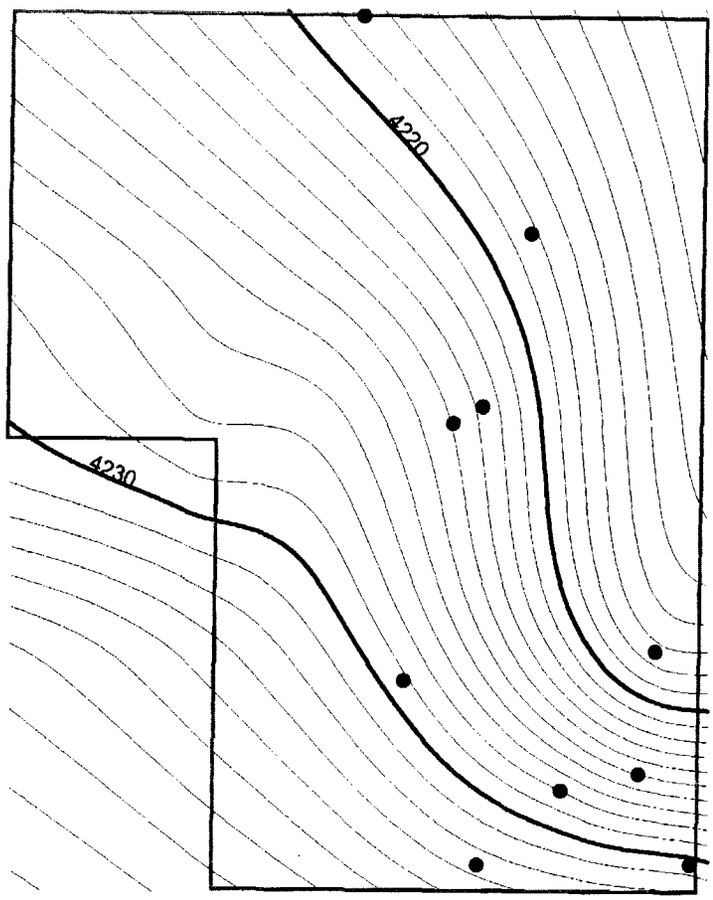

Figure 1. Groundwater contours indicating direction and gradient, along with borehole locations which encountered groundwater (red dots). Contour elevations in feet, with a 1-ft interval.

As per the geotechnical study, an equivalent hydraulic conductivity in the direction of groundwater flow is approximately $1x10^{-4}$ 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 $5.2x10^{-7}$ cm/s (1.4 cm/month). Considering porosity, however, the actual seepage velocity is estimated at $2.1x10^{-6}$ cm/s (5.4 cm/month, or about 2.2 ft/yr) assuming an estimated porosity (n) of 0.25 (see calculations in Appendix 5.5).Additional detail regarding groundwater properties and quality can be found in the geotechnical report found in Appendix 2.7.

5.2.3 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 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.

It is also believed that the wet spot (see Section 5.2.5 and Section 2, Facility Location Standards) may be associated with a former well.

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 2, and the well log information listing can be found in Appendix 5.3. The owner of this well is Bingham Environmental, Inc. in Salt Lake City, Utah.

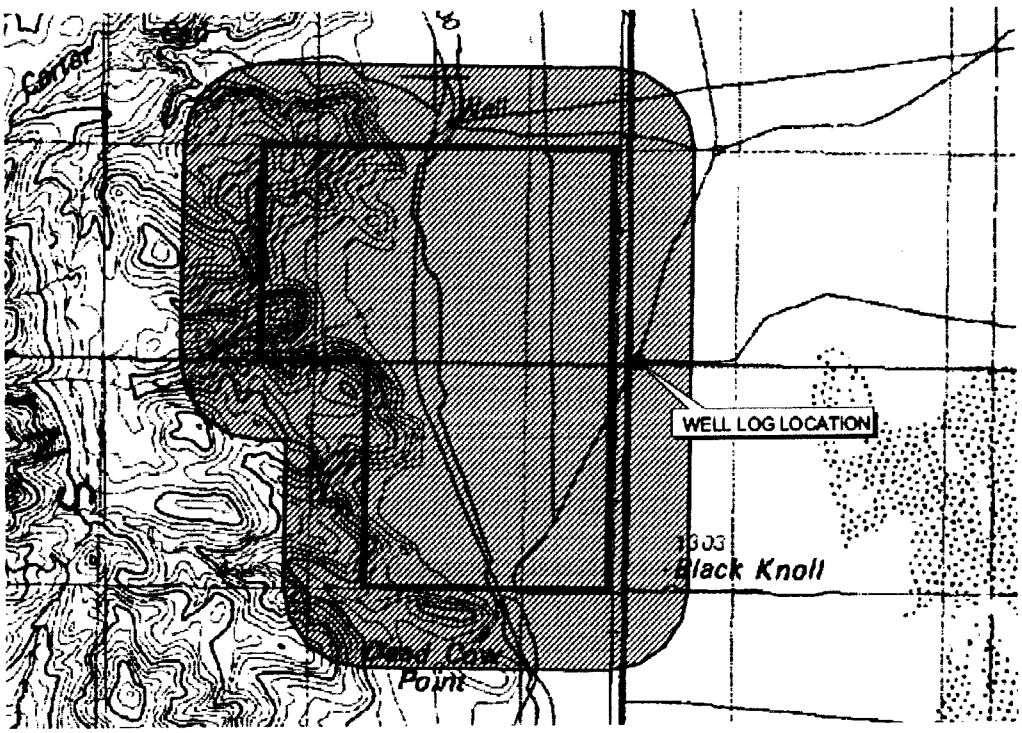

Figure 2. Well log location from the DWR well log database. Red hatched areas represent a 2,000 f buffer zone surrounding the site.

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 location of these two potential wells are shown in Figure 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).

5.2.4 Water Rights

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 a 2,000 foot buffer surrounding the site boundary. A memorandum, included as Appendix 5.1, 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 5.2 of this section.

Water right numbers inside the 2,000 foot site buffer are shown in Figure 3 and covered in Appendix 5.2 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.

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 is no longer valid. This is due to the fact that it had been rejected several years ago. 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.

Water Right 16-696

This water right is owned by the United States of America, Bureau of Land Management (BLM). The BLM maintains a 100% ownership interest in this water right. An application to appropriate water (A58905) was 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 all of 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, the application was approved on August 3, 1984.

The application called for the construction of a 5 foot dam to create a 0.1 acre-feet storage reservoir/earthen impoundment, and collects surface runoff as a source. The purpose and use of the reservoir is for the stockwatering of animals belonging to BLM permitees on a year-round basis. In this case, 600 head of cattle of the "Lakeside Allotment" were using the water.

Water Right 16-697

This water right is also owned by the United States of America - Bureau of land Management (BLM). The BLM maintains a 100% ownership interest in this water right. An application to appropriate water (A58906) was filed with the Utah State Engineer on June 2, 1983. Apparently all of the required information and documentation was not submitted at the time of filing. When all of 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 submittal. After the review and evaluation process, which is administered by the State's Engineer office, application A58906 was ultimately approved on August 3, 1984.

The application called for the construction of a 6 foot dam to create storage reservoir with a 0.1 acre-feet capacity. The purpose of the reservoir is for the stockwatering of animals belonging to BLM permitees on a year–round basis. The proposed use was specifically intended for the stockwatering of the "Lakeside Allotment" which consists of 600 head of cattle.

Water Right 16-698

The water right is owned by the United States of America - Bureau of Land Management ("BLM"). The BLM maintains a 100% ownership interest in this water right. An application to appropriate water (A58907) was 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 all of 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 amended submittal. After the review and evaluation process, application A58907 was ultimately approved on August 3, 1984.

The application called for the construction of an 8 foot dam to create a storage reservoir on property that they own. This storage reservoir is to collect surface runoff and the reservoir is designed with a capacity of 0.1 acre-feet. This reservoir is to provide stock watering for animals of BLM permitees authorized to use public lands and water and other incidental wildlife use on a year-round basis. The proposed use was specifically intended for the stockwatering of the "Lakeside Allotment" which consists of 600 head of cattle.

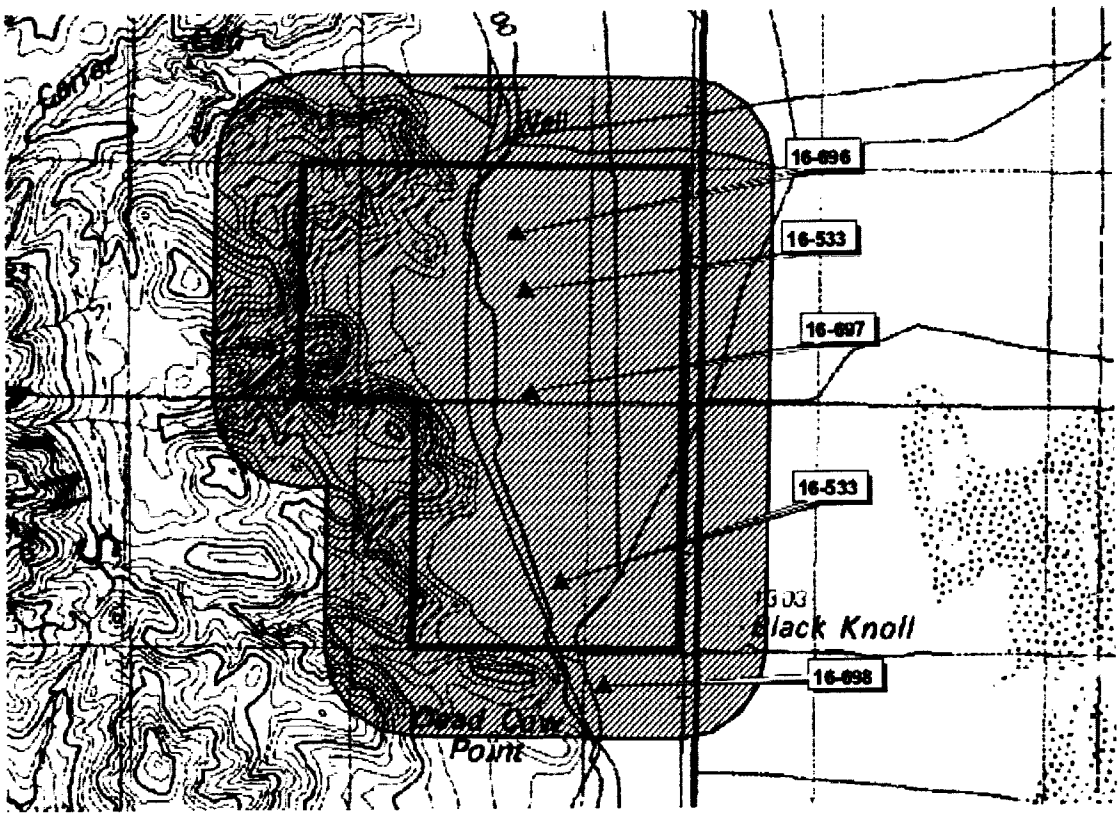

Figure 3. Water right numbers on record for the site area (blue line) including a 2,000 foot buffer surrounding in (red hatched area).

It should be noted that the BLM water rights described above are in the process of being transferred to SITLA.

5.2.5 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.

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 and Figure 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 allow drainage to pass eastward under Amex road and/or the Union Pacific railroad line if necessary.

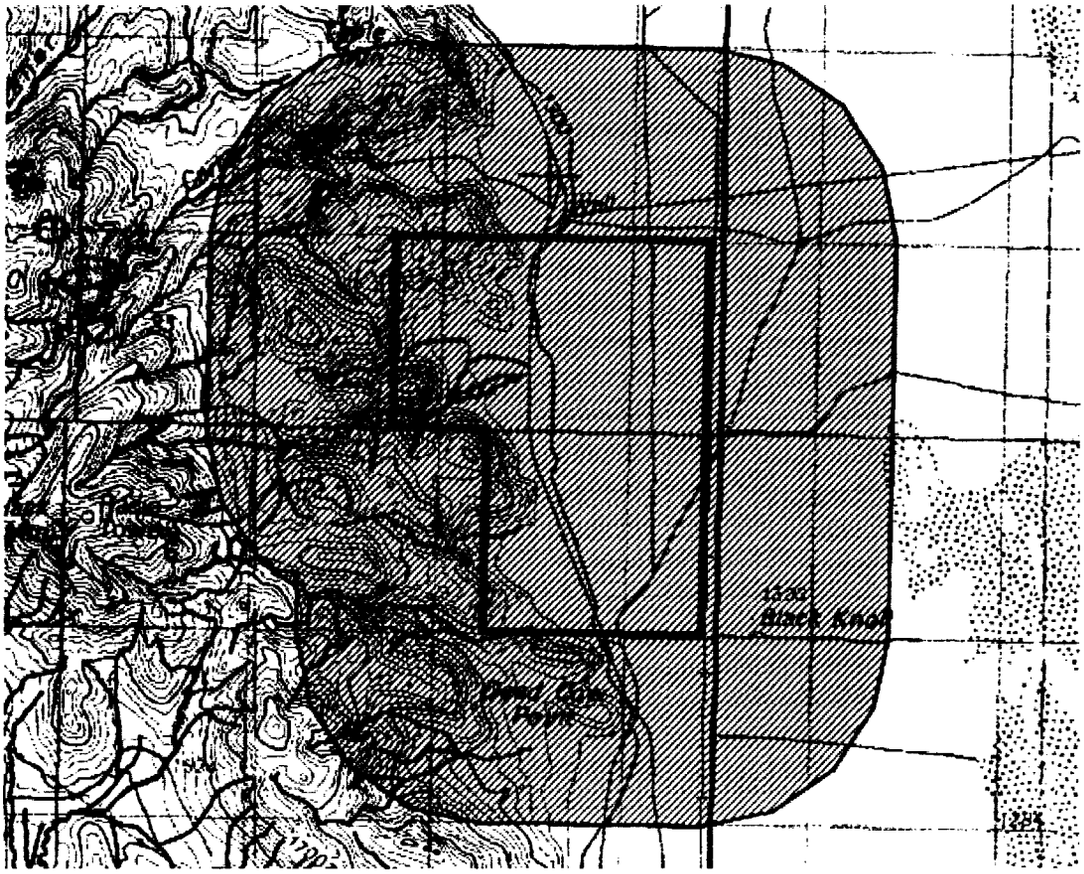

Figure 4. Ephemeral drainages west of the project site and 1-mile buffer (shown in red hatch).

Figure 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).

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 (Facility Location Standards) of this report and the Water Balance portion of this section contain additional discussion of local and regional hydrology.

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 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 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 (4,224 feet) 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.

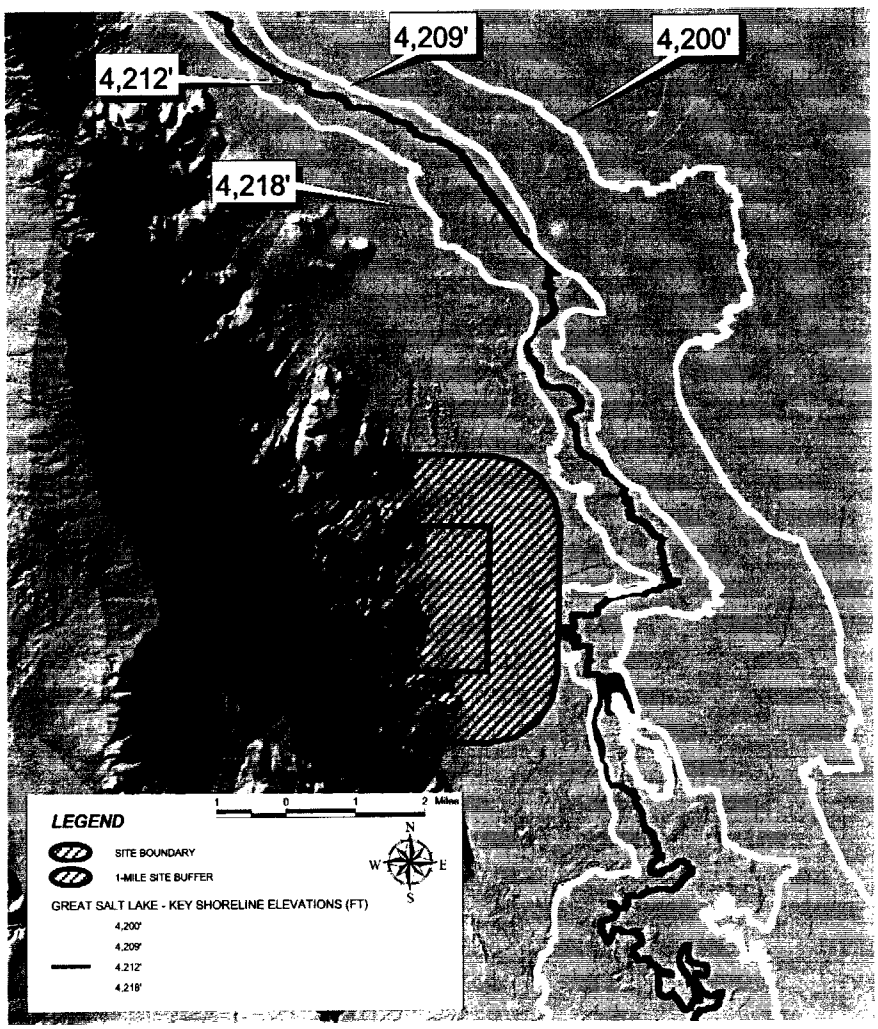

Figure 6. Key shoreline elevations of the Great Salt Lake, adapted from USGS DEM and AGRC data.

Wetlands

One wet area exists inside the site boundary. More detailed discussion of this area is covered in Section 2 (Facility Location Standards).

5.2.6 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 prepared by

Kleinfelder (found in Appendix 2.7) contains testing and laboratory results on groundwater quality specific to the area studied.

5.2.7 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 to be a part of the Ground Water Monitoring Plan, and is discussed in more detail in that plan (Appendix 3.10).

5.2.8 Site Water Balance

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 = runon, or offsite rainfall excess
B = groundwater/subsurface flow
F = infiltration
RO = onsite runoff
ET = evapotranspiration

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 records12.83 inches of annual precipitation (Ashcroft 28).

Evapotranspiration is the combination of evaporation and transpiration from plants and vegetation. Published evaporation maps list lake evaporation, that is, 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 evapotransipiration (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, Runon, 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 runon 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 or waters 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.

Water Balance

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

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.

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 was 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. Other input and layer parameters for the open and closed cell conditions are shown in Table 1, Table 2, Table 3, Table 4, and Table 5. Model output can be found in Appendix 5.4.

Table 1. HELP layer/design data for Open/active cell conditions.

	HELP Layer No.	Description	Thickness/Depth	HELP layer type[1]
	1	Daily Cover Soil	6"	vertical percolation
Waste	2	MSW	25'	vertical percolation
LCRS/Liner	3	Cover soil above LCRS	18"	vertical percolation
	4	Geocomposite/Geonet	0.25"	lateral drainage
	5	HDPE Geomembrane	60 mil	geomembrane liner
	6	Sodium Bentonite GCL encased in geotextiles	0.6"	barrier soil liner

Table 2. HELP input parameters for layer/design data for closed cell conditions.

	HELP Layer No.	Description	Thickness/Depth	HELP layer type[1]
CapCover	1	Vegetated surface/erosive layer combined with protection layer	24"	vertical percolation
	2	Geocomposite/Geonet	0.25"	lateral drainage
	3	HDPE Geomembrane	60 mil	geomembrane liner
	4	Sodium Bentonite GCL encased in geotextiles	0.6"	barrier soil liner
	5	Foundation/support layer	12"	vertical percolation
Waste	6	MSW	95'	vertical percolation
LCRS/Liner	7	Cover soil above LCRS	18"	vertical percolation
	8	Geocomposite/Geonet	0.25"	
	9	HDPE Geomembrane	60 mil	geomembrane liner
	10	Sodium Bentonite GCL encased in geotextiles	0.6"	barrier soil liner

Table 3. HELP soil property input parameters for closed cell conditions.

	HELP Layer	Soil Texture/Type USCS/USDA	HELP No.	Description	Total Porosity (vol/vol)	Field Capacity (vol/vol)	Wilting Point (vol/vl)	Saturated Hydraulic Conductivity (cm/s)
CapCover	1	SC/SCL	10	Soil	0.417	0.045	0.018	$1.0x10^{-2}$
	2	-	20	Drainage net	0.85	0.1	0.005	$1.0x10^{1}$
	3	-	35	HDPE	-	-	-	$2.0x10^{-13}$
	4	-	17	Bentonite Mat	0.75	0.747	0.4	$3.0x10^{-9}$
	5	ML	9	Soil	0.501	0.284	0.135	$1.9x10^{-4}$
Waste	6	-	18	MSW (900 lb/cy)	0.671	0.292	0.077	$1.0x10^{-3}$
LCRS/Liner	7	SC/SCL	10	Soil	0.417	0.045	0.018	$1.0x10^{-2}$
	8	-	20	Drainage net	0.85	0.1	0.005	$1.0x10^{1}$
	9	-	35	HDPE	-	-	-	$2.0x10^{-13}$
	10	-	17	Bentonite Mat	0.75	0.747	0.4	$3.0x10^{-9}$

Table 4. HELP soil property input parameters for open/active cell conditions.

	HELP Layer	Soil Texture/Type USCS/USDA	HELP No.	Description	Total Porosity (vol/vol)	Field Capacity (vol/vol)	Wilting Point (vol/vl)	Saturated Hydraulic Conductivity (cm/s)
	1	SC/SCL	10	Soil	0.417	0.045	0.018	$1.0x10^{-2}$
Waste	2	-	18	MSW (900 lb/cy)	0.671	0.292	0.077	$1.0x10^{-3}$
LCRS/Liner	3	SC/SCL	10	Soil	0.417	0.045	0.018	$1.0x10^{-2}$
	4	-	20	Drainage net	0.85	0.1	0.005	$1.0x10^{1}$
	5	-	35	HDPE	-	-	-	$2.0x10^{-13}$
	6	-	17	Bentonite Mat	0.75	0.747	0.4	$3.0x10^{-9}$

The simulation was ran for 50 years with output on an annual basis. Table 5 list the water balance results for the open/active and closed cell conditions.

Table 5. HELP model results for open and closed conditions.

Parameter	Average Annual Amounts (in.)	
	Open Scenario	Closed Scenario
Precipitation	12.46	12.46
Runoff	0	0.122
Evapotranspiration	12.445	12.212
Drainge collected in geonet (cap)	0.026	0.014
Drainge collected in geonet (bottom liner)	N/A	0
Infiltration through bottom liner	0	0

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.

Works Cited

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.

Appendix 5.1
Water Rights Memorandum

MEMORANDUM

TO: SCOTT CARLSON, PE, PLS

FROM: DOUG SCOW

SUBJECT: WATER RIGHTS REVIEW

DATE: 6/11/2003

CC: FILE

Please find attached the preliminary review (absent a site visit) for the water rights associated with the proposed site for the Tooele # 1 Municipal Landfill. I have left the report in "draft" form to allow for your comments and/or additions. Included as an appendix are copies of the official files for ease of reference. Once you have completed your review of the report and any necessary changes have been made, I'll provide you with an electronic copy so that you can incorporate the information into your final report as necessary.

If you have any questions or if you need any additional information, please let me know. I have enjoyed working with you on this aspect of your project.

DRAFT

MEMORANDUM

TO: SCOTT CARLSON, PE, PLS

FROM: WESTERN STATES WATER

SUBJECT: WATER RIGHTS – PRELIMINARY REPORT (ABSENT SITE VISIT)

DATE: 6/11/2003

CC: FILE

SECTION I

INTRODUCTION

This memorandum provides for a review of certain water rights associated with the proposed site for the Tooele #1 Municipal Landfill. There are five water rights, which have been reviewed which are located within the proposed site boundary as well as directly adjacent to the proposed site. The water rights reviewed in this report are as follows:

- Water Right 16-533
- Water Right 16-677
- Water Right 16-696
- Water Right 16-697
- Water Right 16-698

A brief review of the above-referenced water rights was conducted at the Division of Water Rights to determine the current status of the water rights based on the official file of record with the State of Utah. After locating and reviewing the files, a brief meeting was held with the Regional Engineer who has jurisdiction over the proposed site area.

After a review of the files and meeting with the Regional Engineer, it was determined that two of the water rights (16-533 and 16-677) were no longer valid due to the fact that they had both been rejected some years back and the actual hard copy files have been destroyed by the Division of Water Rights. These two water rights, for the purpose of this review will be considered null and void as they have no current standing with the State of Utah, Division of Water Rights. A detail of the valid water rights is presented in SECTION II.

DRAFT

SECTION II

WATER RIGHTS

Water Right 16-696:

This water right is owned by the United State of America – Bureau of Land Management ("BLM"). The BLM maintains a 100% ownership interest in this water right. An application to appropriate water (A58905) was 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 all of the appropriate information and documentation was submitted to the State Engineer's office in its entirety, the priority date was "rolled back" to March 22, 1984, the date of the amended submittal. After the review and evaluation process, which is administered by the State Engineer's office, application A58905 was ultimately approved on August 3, 1984.

The BLM filed the application which called for the construction of a 5 foot dam to create a storage reservoir on property that they own. This storage reservoir is to collect surface runoff as a source and the reservoir is designed with a capacity of 0.1 acre-feet. The reservoir, as stated, consists of an earthen impoundment to collect the surface run-off and inundates 0.1 acres. This reservoir is to provide stockwatering for animals of BLM permitees authorized to use public lands and water and other incidental wildlife use on a year-round basis. The proposed use was specifically intended for the stockwatering of the "Lakeside Allotment" which consists of 600 head of cattle.

Water Right 16-697:

This water right is owned by the United State of America – Bureau of Land Management ("BLM"). The BLM maintains a 100% ownership interest in this water right. An application to appropriate water (A58906) was 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 all of the appropriate information and documentation was submitted to the State Engineer's office in its entirety, the priority date was "rolled back" to March 22, 1984, the date of the amended submittal. After the review and evaluation process, which is administered by the State Engineer's office, application A58906 was ultimately approved on August 3, 1984.

The BLM filed the application which called for the construction of a 6 foot dam to create a storage reservoir on property that they own. This storage reservoir is to collect surface runoff as a source and the reservoir is designed with a capacity of 0.1 acre-feet. The reservoir, as stated, consists of an earthen impoundment to collect the surface run-off and inundates 0.15 acres. This reservoir is to provide stockwatering for animals of BLM permitees authorized to use public lands and water and other incidental wildlife use on a year-round basis. The proposed use was specifically intended for the stockwatering of the "Lakeside Allotment" which consists of 600 head of cattle.

Water Right 16-698:

This water right is owned by the United State of America – Bureau of Land Management ("BLM"). The BLM maintains a 100% ownership interest in this water right. An application to appropriate water (A58907) was 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 all of the appropriate information and documentation was submitted to the State Engineer's office in its entirety, the priority date was "rolled back" to March 22, 1984, the date of the amended submittal. After the review and evaluation process, which is administered by the State Engineer's office, application A58907 was ultimately approved on August 3, 1984.

The BLM filed the application which called for the construction of an 8 foot dam to create a storage reservoir on property that they own. This storage reservoir is to collect surface runoff as a source and the reservoir is designed with a capacity of 0.1 acre-feet. The reservoir, as stated, consists of an earthen impoundment to collect the surface run-off and inundates 0.2 acres. This reservoir is to provide stockwatering for animals of BLM permitees authorized to use public lands and water and other incidental wildlife use on a year-round basis. The proposed use was specifically intended for the stockwatering of the "Lakeside Allotment" which consists of 600 head of cattle.

A copy of the official file of record for each water right presented in this review is included in this report as Appendix A. This copy is representative of the file contents as of June 4, 2003.

SECTION III

POTENTIAL SITE IMPACT – WATER RIGHTS

Given the intended and approved uses for the above-referenced water rights, some mitigation would be a necessary component of any feasibility analysis regarding the construction of a landfill at the proposed location.

Of the three water rights that have been reviewed, two (16-696 & 16-697) are located within the proposed site boundary. The third 16-698, is located adjacent to the Southern boundary line of the proposed site. With the primary use of these water rights being stockwatering for the permitted users of the subject public land and water, additional sources and/or collection systems would need to be developed if the landfill inundated the property where the existing points of diversion for these water rights are located. This mitigation activity would need to be developed to the extent so as to provide for the same quantity of water that currently is approved for use with the corresponding storage component. The mitigation efforts would also need to be in an area that could provide for the same amount of runoff water as a source that is being captured and utilized at the current existing

locations. It would also stand to reason that any existing permits which authorize use of the land and water would have to be reissued and relocated to another location to accommodate the grazing and required stockwatering of the Lakeside Allotment (600 head of cattle). Although water right 16-698 is located outside of the proposed site boundary, similar impacts could be realized with the construction of a landfill including displacement of land suitable for grazing and watering of livestock. This water right could also require the same type of mitigation as those water rights located directly within the proposed site boundary.

A site visit would need to be conducted to further evaluate the proposed site in terms of the water rights and any potential impact the landfill would have on impairment of the existing water rights.

Appendix A

UTAH DIVISION OF WATER RIGHTS

Select Related Information

(WARNING: Water Rights makes NO claims as to the accuracy of this data.) RUN DATE: 06/04/2003 Page 1

NUM: 16-533 APPLICATION/CLAIM NO.: A38841 CERT. NO.:

NERSHIP**********

ME: Gardner, Jack M. OWNER MISC:
DR: 220 Felt Bldg.
TY: Salt Lake City STATE: UT ZIP: 84111
ME: Stewart, Douglas D. OWNER MISC:
DR: 220 Felt Bldg
TY: Salt Lake City STATE: UT ZIP: 84111
ME: Stock, Eldon M. OWNER MISC:
DR: 220 Felt Bldg.
TY: Salt Lake City STATE: UT ZIP: 84111
ND OWNED BY APPLICANT?

TES, ETC.**********

LING: 06/04/1968 |PRIORITY: 06/04/1968 |ADV BEGAN: 07/05/1968 |ADV ENDED: |NEWSPAPER:
OTST END: |PROTESTED: [Yes] |APPR/REJ: [ ] |APPR/REJ: |PROOF DUE: |EXTENSION:
EC/PROOF: [ ] |ELEC/PROOF: |CERT/WUC: |LAP, ETC: 06/22/1984 |PROV LETR: |RENOVATE:
CON REQ: |TYPE: [ ]
Book No. Type of Right: APPL Status: REJD Source of Info: APPL Map: Date Verified: 02/27/1984 Initials: WHS

CATION OF WATER RIGHT**********

OW: 5.0 cfs SOURCE: Underground Water Well
OUNTY: Tooele COMMON DESCRIPTION:

NTS OF DIVERSION -- UNDERGROUND:

N 1500 ft W 500 ft from SE cor, Sec 04, T 1N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
S 2800 ft E 1400 ft from NW cor, Sec 10, T 1N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
N 300 ft 0 ft from S4 cor, Sec 21, T 1N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
N 300 ft W 300 ft from SE cor, Sec 29, T 1N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
N 2640 ft W 2640 ft from SE cor, Sec 06, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
N 1850 ft E 1600 ft from SW cor, Sec 08, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 109 to ft. YEAR DRILLED: WELL LOG?
Comment:
N 750 ft W 2000 ft from SE cor, Sec 17, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?

Comment:
8) S 2000 ft E 2400 ft from NW cor, Sec 17, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
9) S 1800 ft W 900 ft from NE cor, Sec 20, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
10) N 2600 ft W 2800 ft from SE cor, Sec 28, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
11) S 2800 ft W 1500 ft from NE cor, Sec 33, T 2N, R 8W, SLBM DIAM: ins. DEPTH: to ft. YEAR DRILLED: WELL LOG?
Comment:
12) N 100 ft W 20 ft from SE cor, Sec 36, T 3N, R 9W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:

LACE OF USE OF WATER RIGHT

	NORTH-WEST¼				NORTH-EAST¼				SOUTH-WEST¼				SOUTH-EAST¼			
	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE
ec 04 T 1N R 8W SLBM	*	:	:	*	*	:	:	*	*	:	:	*	*	X:	X:	X*
ec 10 T 1N R 8W SLBM	*	:	:	*	*	:	:	*	*	X:	X:	X*	*	:	:	*
ec 21 T 1N R 8W SLBM	*	:	:	*	*	:	:	*	*	:	:	*	*	X:	X:	X*
ec 28 T 1N R 8W SLBM	*	:	:	*	*	:	:	*	*	:	:	*	*	X:	X:	X*
ec 29 T 1N R 8W SLBM	*	:	:	*	*	:	:	*	*	:	:	*	*	X:	X:	X*
ec 06 T 2N R 8W SLBM	*	:	:	*	*	:	:	*	*	:	:	*	*	X:	X:	X*
ec 08 T 2N R 8W SLBM	*	:	:	*	*	:	:	*	*	X:	X:	X*	*	:	:	*
ec 08 T 2N R 8W SLBM	*	:	:	*	*	X:	X:	X*	*	:	:	*	*	:	:	*
ec 17 T 2N R 8W SLBM	*	X:	X:	X*	*	:	:	*	*	:	:	*	*	X:	X:	X*
ec 20 T 2N R 8W SLBM	*	:	:	*	*	X:	X:	X*	*	:	:	*	*	:	:	*
ec 28 T 2N R 8W SLBM	*	:	:	*	*	:	:	*	*	:	:	*	*	X:	X:	X*
ec 33 T 2N R 8W SLBM	*	:	:	*	*	:	:	*	*	:	:	*	*	X:	X:	X*

SES OF WATER RIGHT

LAIMS USED FOR PURPOSE DESCRIBED: 533

Referenced To: Claims Groups: 1 Type of Reference -- Claims: Purpose: Remarks:

###DOMESTIC: 30 Persons Diversion Limit: PERIOD OF USE: 01/01 TO 12/31

###MINING: DISTRICT: Lakeside NAME: Lost Silver Lode
ORES: Gold,Silver,Lead,Zinc PERIOD OF USE: 01/01 TO 12/31

###OTHER Processing and washing gravel.

THER COMMENTS

Protested by U.S. Bureau of Land Management.
Wells Nos. 1, 2, 3, and 12 will also be used for milling of ores.
This application REJECTED by Memorandum Decision dated June 22, 1984.

E N D O F D A T A

UTAH DIVISION OF WATER RIGHTS

(WARNING: Water Rights makes NO claims as to the accuracy of this data.) RUN DATE: 06/04/2003 Page 1

NUM: 16-677 APPLICATION/CLAIM NO.: A58975 CERT. NO.:

NERSHIP**********

ME: Delle, City of OWNER MISC: c/o Neil Ray Cornwell
DR: 907 North 19th East
TY: Salt Lake City STATE: UT ZIP: 84108
ND OWNED BY APPLICANT? No

TES, ETC.**********

LING: 06/13/1983|PRIORITY: 06/13/1983|ADV BEGAN: 02/23/1984|ADV ENDED: |NEWSPAPER: Tooele Transcript
DTST END:04/07/1984|PROTESTED: [No] |APPR/REJ: [ ]|APPR/REJ: |PROOF DUE: |EXTENSION:
EC/PROOF:[ ]|ELEC/PROOF: |CERT/WUC: |LAP, ETC: 07/13/1984|PROV LETR: |RENOVATE:
CON REQ: |TYPE: [ ]
Book No. Type of Right: APPL Status: REJD Source of Info: APPL Map: Date Verified: 02/27/1984 Initials: WES

CATION OF WATER RIGHT**********

OW: 0.1 cfs SOURCE: Underground Water Well
UNTY: Tooele COMMON DESCRIPTION: Delle

INTS OF DIVERSION -- UNDERGROUND:
S 550 ft E 550 ft from NW cor, Sec 05, T 1N, R 8W, SLBM DIAM: 8 ins. DEPTH: 400 to 600 ft. YEAR DRILLED: WELL LOG?
Comment:
S 1200 ft E 100 ft from NW cor, Sec 05, T 1N, R 8W, SLBM DIAM: 8 ins. DEPTH: 400 to 600 ft. YEAR DRILLED: WELL LOG?
Comment:

CE OF USE OF WATER RIGHT**********

	NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
	NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE
05 T 1N R 8W SLBM	* X: : : *	* : : : *	* : : : *	* : : : *

S OF WATER RIGHT**********

IMS USED FOR PURPOSE DESCRIBED: 677
Referenced To: Claims Groups: 1 Type of Reference -- Claims: Purpose: Remarks:

##STOCKWATERING: 314 Cattle or Equivalent Diversion Limit: PERIOD OF USE: 01/01 TO 12/31

###DOMESTIC: 150 Family Diversion Limit: PERIOD OF USE: 01/01 TO 12/31

###MUNICIPAL: Delle City PERIOD OF USE: 01/01 TO 12/31

THER COMMENTS**********

Applicant is in process of negotiating for purchase of power Delle City Town-
site.

**********E N D O F D A T A**********

UTAH DIVISION OF WATER RIGHTS

(WARNING: Water Rights makes NO claims as to the accuracy of this data.) RUN DATE: 06/04/2003 Page 1

NUM: 16-696 APPLICATION/CLAIM NO.: A58905 CERT. NO.:

NERSHIP**********

ME: USA Bureau of Land Management OWNER MISC:
DR: 2370 South 2300 West
TY: Salt Lake City STATE: UT ZIP: 84119 INTEREST: 100%
ND OWNED BY APPLICANT? Yes

TES, ETC.**********

LING: 06/02/1983|PRIORITY: 03/22/1984|ADV BEGAN: 04/19/1984|ADV ENDED: |NEWSPAPER: Tooele Transcript
OTST END:06/02/1984|PROTESTED: [No] |APPR/REJ: [Approved]|APPR/REJ: 08/03/1984|PROOF DUE: 10/31/1987|EXTENSION:
EC/PROOF:[Election]|ELEC/PROOF:02/19/1987|CERT/WUC: 07/31/1989|LAP, ETC: |PROV LETR: |RENOVATE:
CON REQ: |TYPE: [ ]
Book No. Type of Right: APPL Status: WUCS Source of Info: WUC Map: 14 Date Verified: 08/07/1989 Initials: WHS

CATION OF WATER RIGHT**********

OW: 0.1 acre-feet SOURCE: Surface Runoff (Stkwtrg. Reservoir)
JNTY: Tooele COMMON DESCRIPTION: 6 miles N. of Delle

INT OF DIVERSION -- SURFACE:
S 1500 ft W 1700 ft from NE cor, Sec 33, T 2N, R 8W, SLBM
Diverting Works: An earthen impoundment Source: Surface Runoff

ACE OF USE OF WATER RIGHT**********

	NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
	NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE
: 33 T 2N R 8W SLBM	* : : : *	* : : X: *	* : : : *	* : : : *

S OF WATER RIGHT**********

IMS USED FOR PURPOSE DESCRIBED: 696
Referenced To: Claims Groups: 1 Type of Reference -- Claims: Purpose: Remarks:

##STOCKWATERING: 600 Cattle or Equivalent Diversion Limit: PERIOD OF USE: 01/01 TO 12/31
eside Allotment

##WILDLIFE Incidental wildlife purposes.

```
torage from 01/01 to 12/31, inclusive, in Unnamed Reservoir with a maximum capacity of 0.100 acre-feet, located in:
 Height of Dam:          5   NORTH-WEST¼      NORTH-EAST¼      SOUTH-WEST¼      SOUTH-EAST¼
 Area Inundated:      0.10   NW NE SW SE      NW NE SW SE      NW NE SW SE      NW NE SW SE
ec 33 T  2N R  8W SLBM       *  :  :  :  *    *  :  : X:  *    *  :  :  :  *    *  :  :  :  *
THER COMMENTS****************************************************************************************************************

    The required information necessary to complete this application was not
    received until March 22, 1984, even though it was originally filed
    June 2, 1983.  The priority date is thus brought down to March 22, 1984.
*****************************************************************************************************************************
******************************************************E N D   O F   D A T A**************************************************
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UTAH DIVISION OF WATER RIGHTS

Select Related Information

(WARNING: Water Rights makes NO claims as to the accuracy of this data.) RUN DATE: 06/04/2003 Page 1

NUM: 16-697 APPLICATION/CLAIM NO.: A58906 CERT. NO.:

NERSHIP**********

ME: USA Bureau of Land Management OWNER MISC:
DR: 2370 South 2300 West
TY: Salt Lake City STATE: UT ZIP: 84119 INTEREST: 100%
ND OWNED BY APPLICANT? Yes

TES, ETC.**********

ING: 06/02/1983|PRIORITY: 03/22/1984|ADV BEGAN: 04/19/1984|ADV ENDED: |NEWSPAPER: Tooele Transcript
TST END:06/02/1984|PROTESTED: [No] |APPR/REJ: [Approved]|APPR/REJ: 08/03/1984|PROOF DUE: 10/31/1987|EXTENSION:
C/PROOF:[Election]|ELEC/PROOF:02/19/1987|CERT/WUC: 07/31/1989|LAP, ETC: |PROV LETR: |RENOVATE:
CON REQ: |TYPE: [ ]
Book No. Type of Right: APPL Status: WUCS Source of Info: WUC Map: 14 Date Verified: 08/07/1989 Initials: WHS

ATION OF WATER RIGHT**********

W: 0.1 acre-feet SOURCE: Surface Runoff (Stckwtrg, Reservoir
NTY: Tooele COMMON DESCRIPTION: 6 Miles North of Delle

NT OF DIVERSION -- SURFACE:
N 200 ft W 1300 ft from SE cor, Sec 33, T 2N, R 8W, SLBM
Diverting Works: Earthen impoundment Source: Surface runoff

CE OF USE OF WATER RIGHT**********

	NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
	NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE
33 T 2N R 8W SLBM	* : : : *	* : : : *	* : : : *	* : : : X*

S OF WATER RIGHT**********

IMS USED FOR PURPOSE DESCRIBED: 697
Referenced To: Claims Groups: 1 Type of Reference -- Claims: Purpose: Remarks:

##STOCKWATERING: 600 Cattle or Equivalent Diversion Limit: PERIOD OF USE: 01/01 TO 12/31
eside Allotment

##WILDLIFE Incidental wildlife purposes.

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-----------------------------------------------------------------------------------------------------------------------
orage from 01/01 to 12/31, inclusive, in Unnamed Reservoir with a maximum capacity of 0.100 acre-feet, located in:
 Height of Dam:          6   NORTH-WEST¼        NORTH-EAST¼        SOUTH-WEST¼        SOUTH-EAST¼
 Area Inundated:      0.15   NW NE SW SE        NW NE SW SE        NW NE SW SE        NW NE SW SE
ec 33 T  2N R  8W SLBM       *  :  :  :  *      *  :  :  :  *      *  :  :  :  *      *  :  :  : X*
-----------------------------------------------------------------------------------------------------------------------
THER COMMENTS*************************************************************************************************************
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    The required information necessary to complete this application was not
    received until March 22, 1984, even though it was originally filed
    June 2, 1983.  The priority date is thus brought down to March 22, 1984.
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*************************************************************E N D   O F   D A T A*****************************************************
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UTAH DIVISION OF WATER RIGHTS

Select Related Information

(WARNING: Water Rights makes NO claims as to the accuracy of this data.) RUN DATE: 06/04/2003 Page 1

NUM: 16-698 APPLICATION/CLAIM NO.: A58907 CERT. NO.:

NERSHIP**********

ME: USA Bureau of Land Management OWNER MISC:
DR: 2370 South 2300 West
TY: Salt Lake City STATE: UT ZIP: 84119 INTEREST: 100%
ND OWNED BY APPLICANT? Yes

TES, ETC.**********

LING: 06/02/1983|PRIORITY: 03/22/1984|ADV BEGAN: 04/19/1984|ADV ENDED: |NEWSPAPER: Tooele Transcript
OTST END:06/02/1984|PROTESTED: [No] |APPR/REJ: [Approved]|APPR/REJ: 08/03/1984|PROOF DUE: 10/31/1987|EXTENSION:
EC/PROOF:[Election]|ELEC/PROOF:02/19/1987|CERT/WUC: 07/31/1989|LAP, ETC: |PROV LETR: |RENOVATE:
CON REQ: |TYPE: [ ]
Book No. Type of Right: APPL Status: WUCS Source of Info: WUC Map: 14 Date Verified: 08/07/1989 Initials: WHS

CATION OF WATER RIGHT**********

OW: 0.1 acre-feet SOURCE: Surface Runoff (Stkwtrg. Resevoir)
UNTY: Tooele COMMON DESCRIPTION: 5 Miles North of Delle

INT OF DIVERSION -- SURFACE:
N 4450 ft E 600 ft from SW cor, Sec 10, T 1N, R 8W, SLBM
Diverting Works: An earthen impoundment Source: Surface Runoff

ACE OF USE OF WATER RIGHT**********

	NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
	NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE
10 T 1N R 8W SLBM	* X: : : *	* : : : *	* : : : *	* : : : *

S OF WATER RIGHT**********

IMS USED FOR PURPOSE DESCRIBED: 698
Referenced To: Claims Groups: 1 Type of Reference -- Claims: Purpose: Remarks:

STOCKWATERING: 600 Cattle or Equivalent Diversion Limit: PERIOD OF USE: 01/01 TO 12/31
eside Allotment

WILDLIFE Incidental Wildlife purposes.

```
-----------------------------------------------------------------------------------------------------------------------------
orage from 01/01 to 12/31, inclusive, in Dead Cow Point Reservoir with a maximum capacity of 0.100 acre-feet, located in:
 Height of Dam:          8   NORTH-WEST¼       NORTH-EAST¼       SOUTH-WEST¼       SOUTH-EAST¼
 Area Inundated:      0.20   NW NE SW SE       NW NE SW SE       NW NE SW SE       NW NE SW SE
: 10 T  1N R  8W SLBM       * X:  :  :  *     *  :  :  :  *     *  :  :  :  *     *  :  :  :  *
-----------------------------------------------------------------------------------------------------------------------------
HER COMMENTS*****************************************************************************************************************
-----------------------------------------------------------------------------------------------------------------------------
   The required information necessary to complete this application was not
   received until March 22, 1984, even though it was originally filed
   June 2, 1983.  The priority date is thus brought down to March 22, 1984.
*****************************************************************************************************************************
*****************************************************E N D   O F   D A T A*****************************************************
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IN THE DISTRICT COURT OF THE THIRD JUDICIAL DISTRICT

IN AND FOR TOOELE COUNTY, STATE OF UTAH

IN THE MATTER OF THE GENERAL DETERMINATION OF RIGHTS TO THE USE OF ALL THE WATER, BOTH SURFACE AND UNDERGROUND, WITHIN ALL OF TOOELE COUNTY; ALL OF JUAB COUNTY, EXCEPT THAT PORTION DRAINING TO UTAH LAKE AND TO THE SEVIER RIVER DRAINAGE; AND ALL OF MILLARD, BEAVER, AND IRON COUNTIES EXCEPT THAT PORTION IN THE SEVIER RIVER AND THE VIRGIN RIVER DRAINAGE IN UTAH.	STATEMENT OF WATER USER'S CLAIM Water Right No. 16 - 696 Civil No. 6049 Map No. 14

RECEIVED
JUL 31 1989
WATER RIGHTS
SALT LAKE

****

HOW TO USE THIS FORM:

This form is important to you in asserting your water rights in the pending judicial adjudication described above. Under Utah law, unless you file this form in a timely manner, your water rights cannot be recognized and you may not assert them further. The State Engineer has made a hydrographic survey of this area, which includes your water rights and uses. Your receipt of this form constitutes notice to you that the survey has been completed and that a signed Statement of Water User's Claim is due from you within 90 days. Review the information shown on this form carefully. If you agree with the information and accept it as your Statement of Water User's Claim, sign the form and file it with the District Court in Tooele, Utah. Return two copies of the form to the Division of Water Rights in Salt Lake City, Utah. If you do not agree with the information, contact the Division of Water Rights in Salt Lake City, Utah, to resolve the problem.

****

1. WATER RIGHT AND OWNERSHIP INFORMATION:

   A. NAME: USA Bureau of Land Management INTEREST: 100%
   ADDRESS: 2370 South 2300 West, Salt Lake City, UT 84119

   B. TYPE OF RIGHT: Application To Appropriate No. A58905, Water User's Claim

   C. PRIORITY DATE: March 22, 1984

2. SOURCE INFORMATION:

   A. QUANTITY OF WATER: 0.1 acre-feet

   B. DIRECT SOURCE: Surface Runoff (Stkwtrg. Reservoir)

   C. POINT OF DIVERSION -- SURFACE:
   (1) S 1500 feet W 1700 feet from NE corner, Section 33, T 2N, R 8W, SLBM
   DIVERTING WORKS: An earthen impoundment SOURCE: Surface Runoff

   D. DRAINAGE AREA: Great Salt Lake Desert-South COUNTY: Tooele

   E. STORAGE. Water is to be diverted for storage into:

6. CERTIFICATION OF CLAIM AND WAIVER OF SUMMONS:

The undersigned hereby enters their appearance in this water adjudication proceeding and hereby waives service of summons or other process and waives service of the notice of completion as required by Sections 73-4-4 and 73-3-4 of the Utah Code Annotated, 1953 as amended.

STATE OF UTAH)
) SS
COUNTY OF Salt Lake)

The undersigned swears on oath that he makes and certifies this Water User's Claim either as the claimant himself or as the duly-authorized agent of the claimant, that he has read and knows the contents of the claim, that he signs the same, and that the information supplied therein is true to the best of his knowledge and belief.

Title: District Manager (Individual or Office)

Deane H. Zeller
Signature

Subscribed and sworn to before me this 26th day of July, 1989

Commission expires:

Notary Public
TERESA L. CATLIN
2370 South 2300 West
Salt Lake City, Utah 84119
My Commission Expires
February 8, 1993
State of Utah

Teresa L. Catlin
Notary Public

ES-61 FORM 77 7/77

ELECTION RECORD SHEET

Application No. A58905 W. U. Claim No. 16-696

Name of Appropriator USDI Bureau of Land Management

Address 324 South State #301, Salt Lake City, UT 84111-2303

Date Election Submitted February 19, 1987 Proof Due Date October 31, 1987

Field Checked by BSWC Date 4/24/89

CORRECTIONS AND AMENDMENTS NEEDED FOR AN AMENDATORY CHANGE

	Name and Address	Quantity of Water	Period of Use	Point of Div.	Diversion & Carrying Works	Place of Use	Extent of Use	Suppl. Water Rights	AMENDED CHANGE	
									Date Filed	Date Approved
Field										
Office										

REMARKS:

N

Rough Water User's Claim Prepared ☐

Water User's Claim Typed ☐

Dates Water User Notified:

Water User's Claim Signed ☐

Application No.

FORM 152

RECEIVED
FEB 19 1987
WATER RIGHTS

A T T E N T I O N

THIS FORM IS TO BE USED ONLY WHEN WATER HAS BEEN PLACED TO FULL BENEFICIAL USE

BEFORE THE STATE ENGINEER OF THE STATE OF UTAH
ELECTION TO FILE WATER USER'S CLAIM

APPLICATION NO. 58905 16-696

STATE OF UTAH

COUNTY OF Tooele

USDI Bureau of Land Management, being first duly sworn, says that he is the owner of the above application; that the development contemplated under this application has been completed and the water placed to beneficial use.

In lieu of submitting "Proof of Appropriation" or "Proof of Change" and receiving "Certificate of Appropriation" or "Certificate of Change", the applicant hereby elects to file a "Statement of Water User's Claim" or an "Amended Statement of Water User's Claim" in the pending GENERAL DETERMINATION OF WATER RIGHTS; and the applicant requests that said statement be prepared by the State Engineer and submitted for execution at an early date.

Deane Zeller
APPLICANT
Deane Zeller
Salt Lake District Manager

SUBSCRIBED AND SWORN TO BEFORE ME THIS 17th DAY OF February 19 87.

Teresa L Catt
NOTARY PUBLIC

My Commission Expires June 13, 1988

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Water Rights

1636 West North Temple · Salt Lake City, UT 84116 · 801-533-6071

Scott M. Matheson, Govern
Temple A. Reynolds, Executive Direct
Dee C. Hansen, State Engin

January 29, 1985

U.S. Department of Interior
Bureau of Land Management
2370 South 2300 West
Salt Lake City, Utah 84119

RE: A-58905 (16-696)

Dear Appropriator:

Recently you received approval from the State Engineer on the above-numbered Application. Part of the filing called for the construction of a dam 5 feet high which would create a reservoir capacity of 0.1 acre-feet. The dam is to be located in Section 33, T2N, R8W, SLB&M.

Your Application will serve as notice to the State Engineer that you plan to construct a dam, thus satisfying Section 73-5-12 of the Utah Code Annotated 1953. No plans or specifications will be required, but it is requested that we be notified when the construction of the dam is complete.

Sincerely,

Robert L. Morgan

Robert L. Morgan, P.E.
Directing Dam Safety Engineer

RLM/cp

cc: Weber Area Office
Central Files

Form 33

STATE OF UTAH
NATURAL RESOURCES
Water Rights

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dee C. Hansen, State Engineer

1636 West North Temple • Salt Lake City, UT 84116 • 801-533-6071

August 3, 1984

USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT 84119

Dear Applicant:

RE: APPROVED APPLICATION
NUMBER 16-696 (A58905)

Enclosed is a copy of the above-numbered approved Application. This is your authority to proceed with actual construction work which, under Sections 73-3-10 and 73-3-12, Utah Code Annotated, 1953, as amended, must be diligently prosecuted to completion. The water must be put to beneficial use and proof of appropriation be made to the State Engineer on or before the proof due date shown below otherwise, the application will be lapsed.

*** PROOF DUE DATE: October 31, 1987 ***

Proof of Appropriation is evidence to the State Engineer that the water has been placed to its full intended beneficial use. By law, it must be prepared by a registered engineer or land surveyor, who will certify to the location and the uses for the water. Your proof of appropriation will become the basis for the extent of your water right.

Failure on your part to comply with the requirements of the statutes may result in the forfeiture of this application.

Yours truly,

Dee C. Hansen, P.E.
State Engineer

Enclosure: Copy of Approved Application

Form 97 2M 10-70

RECEIVED
JUN 02 1983
WATER RIGHTS

Application No. 58905

R-17, #38
16-696

APPLICATION TO APPROPRIATE WATER
STATE OF UTAH

NOTE:—The information given in the following blanks should be free from explanatory matter, but when necessary, a complete supplementary statement should be made on the following page under the heading "Explanatory."

For the purpose of acquiring the right to use a portion of the unappropriated water of the State of Utah, for uses indicated by (X) in the proper box or boxes, application is hereby made to the State Engineer, based upon the following showing of facts, submitted in accordance with the requirements of the Laws of Utah.

1. Irrigation ☐ Domestic ☐ Stockwatering ☒ Municipal ☐ Power ☐ Mining ☐ Other Uses ☒
2. The name of the applicant is U.S. Department of Interior Bureau of Land Management
3. The Post Office address of the applicant is 2370 South 2300 West S.L.C. Utah 84119
4. The quantity of water to be appropriated _____ second-feet and/or 0.1 acre-feet
5. The water is to be used for Stockwatering (Major Purpose) from Jan (Month) 1 (Day) to Dec (Month) 31 (Day)

   other use period Wildlife (Minor Purpose) from Jan. 1 (Month) (Day) to Dec. 31 (Month) (Day)

   and stored each year (if stored) from _____ (Month) (Day) to _____ (Month) (Day)
6. The drainage area to which the direct source of supply belongs is _____ (Leave Blank)
7. The direct source of supply is* Surface runoff collected by an Earthen impoundment (stockwatering reservoir) 3-23-84 by letter (Name of stream or other source)

   which is tributary to _____, tributary to _____

*Note.—Where water is to be diverted from a well, a tunnel, or drain, the source should be designated as "Underground Water" in the first space and the remaining spaces should be left blank. If the source is a stream, a spring, a spring area, or a drain, so indicate in the first space, giving its name, if named, and in the remaining spaces, designate the stream channels to which it is tributary, even though the water may sink, evaporate, or be diverted before reaching said channels. If water from a spring flows in a natural surface channel before being diverted, the direct source should be designated as a stream and not a spring.

8. The point of diversion from the source is in Tooele County, situated at a point* 1500 feet South 1700 feet West of Northeast corner Section 33, T. 2N., R. 8W., SLB&M (6 miles North of Delle)

*Note.—The point of diversion must be located definitely by course and distance or by giving the distances north or south, and east or west with reference to a United States land survey corner or United States mineral monument, if within a distance of six miles of either, or if at a greater distance, to some prominent and permanent natural object. No application will be received for filing in which the point of diversion is not defined definitely.

9. The diverting and carrying works will consist of an earthen impoundment by letter 3-23-84

10. If water is to be stored, give capacity of reservoir in acre-feet 0.1 height of dam 5 feet area inundated in acres 0.1 legal subdivision of area inundated SW¼NE¼ Sec. 33

Page No. 2

EXPLANATORY

The following additional facts are set forth in order to define more clearly the full purpose of the proposed application:

Water claimed is intermittent in nature and is variable in amount based upon water run-off and/or precipitation frequency, intensity, and duration. Some of the reservoirs are lined with bentonite to reduce infiltration and provide stockwatering for animals of BLM permittees authorized to use public lands and water.

The reservoirs are located on BLM managed land and are currently in existence and functional.

FEES FOR APPLICATIONS TO APPROPRIATE WATER IN UTAH

Flow rate — c.f.s.	Cost	
0.0 to 0.1	$ 15.00	
over 0.1 to 0.5	30.00	
over 0.5 to 1.0	45.00	
over 1.0 to 15.0	45.00	plus $7.50 for each cfs above the first cubic foot per second.
over 15.0	150.00	

Storage — acre-feet		
0 to 20	22.50	
over 20 to 500	45.00	
over 500 to 7500	45.00	plus $7.50 for each 500 a.f. above the first 500 acre feet.
over 7500	150.00	

(This section is not to be filled in by applicant)

STATE ENGINEER'S ENDORSEMENTS

1. 3-22-84 Application received by mail / over counter in State Engineer's office by [illegible]
2. ..... Priority of Application brought down to, on account of application process completed.
3. 6-2-83 Application fee, $15.00, received by A.M. Rec. No. 02788
4. 7-13-83 Application microfilmed by MA Roll No. 1007-1
5. 6-23-83 Indexed by CP Platted by .....
6. 3-23-84 Application examined by [illegible]
7. ..... Application returned, ... or corrected by office .....
8. ..... Corrected Application resubmitted by mail / over counter to State Engineer's office.
9. 3-23-84 Application approved for advertisement by [illegible] KJm
10. ..... Notice to water users prepared by WW
11. ..... Publication began; was completed .....

EXPLANATORY CONTINUED

FILING FOR WATER IN THE STATE OF UTAH

Rec. by _____
Fee Rec. _____
Platted _____
Microfilmed _____
Roll No. _____

APPLICATION TO APPROPRIATE WATER

For the purpose of acquiring the right to use a portion of the unappropriated water of the State of Utah, application is hereby made to the State Engineer, based upon the following showing of facts, submitted in accordance with the requirements of the Laws of Utah.

WATER USER CLAIM NO. 16 - 696 APPLICATION NO. A58905

1. PRIORITY OF RIGHT: March 22, 1984 FILING DATE: June 2, 1983

2. OWNER INFORMATION
Name: USA Bureau of Land Management
Address: 2370 South 2300 West, Salt Lake City, UT 84119
The land is owned by the applicant(s).

3. QUANTITY OF WATER: 0.1 acre feet (Ac. Ft.)

4. SOURCE: Surface Runoff (Stkwtrg. Reservoir) DRAINAGE: Great Salt Lake Desert-South
POINT(S) OF DIVERSION: COUNTY: Tooele
(1) S. 1500 feet, W. 1700 feet, from the NE Corner of Section 33,
Township 2 N, Range 8 W, SLB&M
Source: Surface Runoff
Description of Diverting Works: An earthen impoundment
COMMON DESCRIPTION: 6 Miles North of Delle

5. STORAGE
Water is to be stored in Unnamed Reservoir from January 1 to December 31.
Capacity 0.1 ac.ft. innundating 0.1 acres. Height of dam 5 feet.
The area innundated by the reservoir includes all or part of each of the following legal subdivisions.

			North East Quarter			North West Quarter			South West Quarter			South East Quarter		
TOWN	RANGE	SEC	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼
2 N	8 W	33			X									

All locations in Salt Lake Base and Meridian

6. NATURE AND PERIOD OF USE
Stockwatering: From January 1 to December 31.
Wildlife: From January 1 to December 31.

7. PURPOSE AND EXTENT OF USE
Stockwatering: 600 animal units.
Lakeside Allotment

STATE OF UTAH
NATURAL RESOURCES
Water Rights

1636 West North Temple • Salt Lake City, UT 84116 • 801-533-6071

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dee C. Hansen, State Engineer

April 12, 1984

Tooele Transcript
Transcript-Bulletin Publ. Co.
Box 390
TOOELE UT 84074

Ladies and Gentlemen: RE: Appl. No. 15-2994 (A58936)

Enclosed is a Notice to Water Users Concerning 15-2994 (A58936) for publication on April 19, 26, & May 3, 1984.

Please send two checking proofs as soon as possible before the first publication date. Upon completion of the three issues, please send two Proofs of Publication, and your last bill in duplicate within thirty days from the date of the last publication.

Yours very truly,

Dee C. Hansen

Dee C. Hansen, P.E.
State Engineer

DCH:cw

Enclosure: Notice to Water Users

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

SALT LAKE DISTRICT OFFICE
2370 SOUTH 2300 WEST
SALT LAKE CITY, UTAH 84119

RECEIVE
MAR 2
WATER

IN REPLY
REFER TO:

7250
(U-202)

MAR 21 1984

Mr. John Solum
Water Rights Division
Natural Resources & Energy
1636 West Temple
Salt Lake City, Utah 84116

Dear John:

Concerning your letter of February 21, 1984, we have reviewed our copies of the unapproved applications. Item Number 7 on the application, the direct source of supply, should state that the source of supply is, "surface runoff collected by an earthen impoundment, (stock watering reservoir)." None of these applications impound live water from a stream or are on a tributary; most are located on gentle slopes of Tooele County. If you have further questions, please call Sheldon Wimmer at 524-5348.

Sincerely yours,

Sheldon Wimmer

Sheldon Wimmer
Supervisory Range Conservationist

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Water Rights

1636 West North Temple • Salt Lake City, UT 84116 • 801-533-6071

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dee C. Hansen, State Engineer

FEBRUARY 21, 1984

U.S. Department of the Interior
Bureau of Land Management
2370 South 2300 West
Salt Lake City, Utah 84119

Dear Sir,

We are in the process of updating our files and would like to know if you still have an interest in Unapproved Applications Nos. 15-2993, 15-2994, 15-3011, 16-678, 16-679, 16-680, 16-681, 16-682, 16-683, 16-684, 16-685, 16-686, 16-687, 16-688, 16-689, 16-690, 16-691, 16-692, 16-693, 16-694, 16-695, 16-696, 16-697, 16-698, 16-699, 16-700, 16-701, 16-702, 16-703, 16-704, 16-705, 16-706, 16-707, 16-708, 16-709, 16-710, 16-711, 16-712, 16-713, 16-714, 16-715, 16-716, 16-717, 16-718, 16-719, 16-720, 17-184, 17-185, and 17-186, all of which are incompletely filled out, and none of which have been advertised.

Please advise us of your intentions as soon as possible. If we do not hear from you by March 30, 1984, we will assume you no longer have an active interest in these applications and they will be rejected.

If you have any questions feel free to contact me at the number shown on the letterhead.

Sincerely,

John E. Solum
Hydrologic Engineer

JES/l
Encls.

NOTICE TO WATER USERS

The following application(s) have been filed with the State Engineer to appropriate water in Tooele County throughout the entire year unless otherwise designated. Locations in SLB&M.

15-2994 (A58936)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stockwtrg.reservoir)
POINT(S) OF DIVERSION:
(1) S. 1200 ft, from NE Cor. Sec. 29, T9S, R3W
(6 Miles East of Lofgreen)
STORAGE: In Dry Lake Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 15 ft., inundating 0.60 acs. in NE¼NE¼, Sec. 29, T9S, R3W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 780 head of livestock
PLACE OF USE:
E½, Sec. 29, T9S, R3W.

15-3011 (A59222)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.5 Ac.Ft.
SOURCE: Surface Runoff (stock Reservoir)
POINT(S) OF DIVERSION:
(1) S. 500 ft, E. 470 ft, from NW Cor. Sec. 10, T9S, R4W
(9 Miles SE of Vernon)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.5 ac.ft., height of dam 20 ft., inundating 1.00 acs. in NW¼NW¼, Sec. 10, T9S, R4W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 500 head of livestock
PLACE OF USE:
S½, Sec. 3, N½, Sec. 10, T9S, R4W.

15-3046 (A59789)
APPLICANT: England Construction
Box 488
Tooele, UT
QUANTITY: 0.015 CFS
SOURCE: 6 in. well 100 ft. to 300 ft. deep.
POINT(S) OF DIVERSION:
(1) N. 1470 ft, E. 1620 ft, from SW Cor. Sec. 5, T4S, R4W
(1 Mile South of Tooele)
PURPOSE AND PERIOD OF USE:
Domestic: 10 persons
Other:
Used in connection with a construction shop and office

PLACE OF USE:
NE¼SW¼, Sec. 5, T4S, R4W.

15-3047 (A59790)
APPLICANT: Gary & Jodean Davis
5904 Red Zinc Dr.
Salt Lake City, UT
QUANTITY: 0.1 CFS
SOURCE: 6 in. well 100 ft. to 200 ft. deep.
POINT(S) OF DIVERSION:
(1) N. 1454 ft, E. 411 ft, from SW Cor. Sec. 32, T5S, R5W
(1 Mile East of Clover)
PURPOSE AND PERIOD OF USE:
Domestic: 1 family
Stockwatering: 10 head of livestock
Irrigation: From Apr 1 to Oct 31, total acreage 5.00 acs.
PLACE OF USE:
NW¼SW¼, Sec. 32, T5S, R5W.

15-3048 (A59799)
APPLICANT: Steven Young
9094 N. Highway 40 #22
Lake Point, UT
QUANTITY: 0.015 CFS
SOURCE: 6 in. well 50 ft. to 200 ft. deep.
POINT(S) OF DIVERSION:
(1) N. 780 ft, E. 1820 ft, from SW Cor. Sec. 2, T2S, R4W
(In Lake Point)
PURPOSE AND PERIOD OF USE:
Domestic: 1 family
Irrigation: From Apr 1 to Oct 31, total acreage 0.25 acs.
PLACE OF USE:
SE¼SW¼, Sec. 2, T2S, R4W.

16-678 (A58886)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtr. reservoir)
POINT(S) OF DIVERSION:
(1) N. 2100 ft, W. 2800 ft, from SE Cor. Sec. 17, T3N, R11W
(20 Miles NE Knolls)
STORAGE: In NW Grassy Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 19 ft., inundating 0.50 acs.
in SW¼NE¼, SE¼, Sec. 17, T3N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 500 head of livestock

PLACE OF USE:
E½, Sec. 17, T3N, R11W.

16-679 (A58887)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 1900 ft, E. 300 ft, from SW Cor. Sec. 35, T1N, R8W
(4 Miles East of Delle)
STORAGE: In Greasewood Pond from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.30 acs.
in NW¼SW¼, Sec. 35, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
W½, Sec. 35, T1N, R8W.

16-680 (A58888)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 CFS
SOURCE: Surface Runoff (stwtrg. reservoir)
POINT(S) OF DIVERSION:
(1) S. 650 ft, W. 3150 ft, from NE Cor. Sec. 22, T1N, R8W
(5 Miles NE of Delle)
STORAGE: In Poverty Point Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.30 acs.
in NE¼NW¼, Sec. 22, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1600 head of livestock
PLACE OF USE:
W½, Sec. 22, T1N, R8W.

16-681 (A58889)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (stckwtering Res)
POINT(S) OF DIVERSION:
(1) N. 925 ft, W. 1175 ft, from SE Cor. Sec. 15, T3N, R11W
(14 Miles NW of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.50 acs.
in SE¼SE¼, Sec. 15, T3N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 260 head of livestock

PLACE OF USE:
E½, Sec. 15, T3N, R11W.

16-682 (A58890)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 300 ft, W. 775 ft, from SE Cor. Sec. 15, T3N, R11W
(14 Miles North of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.20 acs.
in SE¼SE¼, Sec. 15, T3N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 260 head of livestock
PLACE OF USE:
SE¼, Sec. 15, T3N, R11W.

16-683 (A58891)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.5 Ac.Ft.
SOURCE: Surface runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 375 ft, W. 4000 ft, from SE Cor. Sec. 17, T3N, R10W
(13 Miles North of Low)
STORAGE: In Milk Case Reservoir from Jan 1 to Dec 31.
Capacity 0.5 ac.ft., height of dam 5 ft., inundating 0.80 acs.
in SW¼SW¼, Sec. 17, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 900 head of livestock
PLACE OF USE:
W½, Sec. 17, T3N, R10W.

16-684 (A58892)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (stckwtrg. reservoir)
POINT(S) OF DIVERSION:
(1) N. 4700 ft, E. 1325 ft, from SW Cor. Sec. 15, T3N, R10W
(14 Miles north of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NW¼NW¼, Sec. 15, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock

PLACE OF USE:
W½, Sec. 15, T3N, R10W.

16-685 (A58893)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2800 ft, E. 150 ft, from SW Cor. Sec. 14, T3N, R10W
(14 Miles North of Low)
STORAGE: In Gary Kidd Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.50 acs.
in SW¼NW¼, Sec. 14, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock
PLACE OF USE:
W½, Sec. 14, T3N, R10W.

16-686 (A58894)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (stckwtering Res)
POINT(S) OF DIVERSION:
(1) N. 1500 ft, W. 200 ft, from SE Cor. Sec. 13, T3N, R10W
(14 Miles North of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 9 ft., inundating 0.40 acs.
in NE¼SE¼, Sec. 13, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock
PLACE OF USE:
E½, Sec. 13, T3N, R10W.

16-687 (A58895)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 1400 ft, E. 2600 ft, from SW Cor. Sec. 24, T3N, R10W
(13 Miles North of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 8 ft., inundating 0.30 acs.
in NW¼SE¼, Sec. 24, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock

PLACE OF USE:
E½, Sec. 24, T3N, R10W.

16-688 (A58896)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1700 ft, W. 1150 ft, from SE Cor. Sec. 34, T3N, R10W
(11 Miles North of Low)
STORAGE: In Lee's Knoll Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.30 acs.
in NE¼SE¼, Sec. 34, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock
PLACE OF USE:
E½, Sec. 34, T3N, R10W.

16-689 (A58897)
APPLICANT: USA Bureau of Land Managment
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1300 ft, W. 1150 ft, from SE Cor. Sec. 24, T2N, R10W
(7 Miles North of Low)
STORAGE: In Central Puddle Valley Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in SE¼SE¼, Sec. 24, T2N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
E½, Sec. 24, T2N, R10W.

16-690 (A58898)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1100 ft, W. 550 ft, from NE Cor. Sec. 30, T3N, R9W
(14 Miles NW of Delle)
STORAGE: In Grant Rogers Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in NE¼NE¼, Sec. 30, T3N, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock

PLACE OF USE:
E½, Sec. 30, T3N, R9W.

16-691 (A58900)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) S. 150 ft, E. 2200 ft, from NW Cor. Sec. 22, T2N, R10W
(5 Miles North of Low)
STORAGE: In Badger Hole Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.30 acs.
in NE¼NW¼, Sec. 22, T2N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 640 head of livestock
PLACE OF USE:
E½, Sec. 22, T2N, R10W.

16-692 (A58901)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1450 ft, E. 2750 ft, from NW Cor. Sec. 6, T2N, R9W
(10 Miles NE of Low)
STORAGE: In Howard Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in SW¼NE¼, Sec. 6, T2N, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
W½, Sec. 6, T2N, R9W.

16-693 (A58902)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtring Res)
POINT(S) OF DIVERSION:
(1) S. 2700 ft, W. 1650 ft, from NE Cor. Sec. 31, T1N, R11W
(10 Miles West of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in NW¼SE¼, Sec. 31, T1N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 700 head of livestock

PLACE OF USE:
E½, Sec. 31, T1N, R11W.

16-694 (A58903)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 2300 ft, W. 1400 ft, from NE Cor. Sec. 11, T1N, R10W
(4 Miles North of Low)
STORAGE: In Puddle Valley Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 12 ft., inundating 0.30 acs.
in SW¼NE¼, Sec. 11, T1N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
E½, Sec. 11, T1N, R10W.

16-695 (A58904)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1650 ft, E. 700 ft, from NW Cor. Sec. 31, T1N, R8W
(Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 7 ft., inundating 0.20 acs.
in SW¼NW¼, Sec. 31, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
W½, Sec. 31, T1N, R8W.

16-696 (A58905)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1500 ft, W. 1700 ft, from NE Cor. Sec. 33, T2N, R8W
(6 miles N. of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 5 ft., inundating 0.10 acs.
in SW¼NE¼, Sec. 33, T2N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 600 head of livestock

PLACE OF USE:
E½, Sec. 33, T2N, R8W.

16-697 (A58906)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir
POINT(S) OF DIVERSION:
(1) N. 200 ft, W. 1300 ft, from SE Cor. Sec. 33, T2N, R8W
(6 Miles North of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.15 acs.
in SE¼SE¼, Sec. 33, T2N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 600 head of livestock
PLACE OF USE:
E½, Sec. 33, T2N, R8W.

16-698 (A58907)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Resevoir)
POINT(S) OF DIVERSION:
(1) N. 4400 ft, E. 600 ft, from SW Cor. Sec. 10, T1N, R8W
(5 Miles North of Delle)
STORAGE: In Dead Cow Point Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.20 acs.
in NW¼NW¼, Sec. 10, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 600 head of livestock
PLACE OF USE:
W½, Sec. 10, T1N, R8W.

16-699 (A58909)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff
POINT(S) OF DIVERSION:
(1) N. 1920 ft, W. 3300 ft, from SE Cor. Sec. 23, T10S, R10W
(17 Miles SW of Dugway)
STORAGE: In North Table Mountain Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.50 acs.
in NE¼SW¼, Sec. 23, T10S, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock

PLACE OF USE:
W½, Sec. 23, T10S, R10W.

16-700 (A58910)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2200 ft, E. 250 ft, from SW Cor. Sec. 28, T10S, R8W
(20 Miles South of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in NW¼SW¼, Sec. 28, T10S, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 500 head of livestock
PLACE OF USE:
W½, Sec. 28, T10S, R8W.

16-701 (A58911)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1700 ft, W. 2500 ft, from SE Cor. Sec. 26, T1S, R13W
(2 Miles South of Knolls)
STORAGE: In Knolls Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 19 ft., inundating 0.50 acs.
in NE¼SW¼, Sec. 26, T1S, R13W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
S½, Sec. 26, T1S, R13W.

16-702 (A58912)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) S. 4500 ft, E. 800 ft, from NW Cor. Sec. 10, T2S, R11W
(11 Miles SW of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in SW¼SW¼, Sec. 10, T2S, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
W½, Sec. 10, T2S, R11W.

16-703 (A58913)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwrtg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1700 ft, W. 300 ft, from SE Cor. Sec. 4, T3S, R11W
(15 Miles SW of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NE¼SE¼, Sec. 4, T3S, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 4, T3S, R11W.

16-704 (A58914)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 800 ft, W. 2300 ft, from SE Cor. Sec. 9, T3S, R11W
(14 Miles SE of Knolls)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 15 ft., inundating 0.30 acs.
in SW¼SE¼, Sec. 9, T3S, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 9, T3S, R11W.

16-705 (A58915)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2630 ft, E. 2250 ft, from SW Cor. Sec. 17, T3S, R10W
(15 miles South of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.20 acs.
in NE¼SW¼, Sec. 17, T3S, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
E½, Sec. 17, T3S, R10W.

16-706 (A58916)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 2000 ft, W. 1850 ft, from NE Cor. Sec. 26, T2S, R9W
(11 Miles South of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in SW¼NE¼, Sec. 26, T2S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 26, T2S, R9W.

16-707 (A58917)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1750 ft, E. 2200 ft, from SW Cor. Sec. 26, T2S, R9W
(11 Miles South of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in NE¼SW¼, Sec. 26, T2S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
W½, Sec. 26, T2S, R9W.

16-708 (A58918)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 730 ft, E. 600 ft, from NW Cor. Sec. 34, T2S, R9W
(11 Miles South of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.30 acs.
in NW¼NW¼, Sec. 34, T2S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
W½, Sec. 34, T2S, R9W.

16-709 (A58919)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 5100 ft, W. 1200 ft, from SE Cor. Sec. 3, T3S, R9W
(12 Miles South of Delle)
STORAGE: In Earthen impoundment from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NE¼NE¼, Sec. 3, T3S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 3, T3S, R9W.

16-710 (A58920)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg.) Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1800 ft, E. 350 ft, from SW Cor. Sec. 14, T3S, R9W
(13 Miles SW of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.20 acs.
in NW¼SW¼, Sec. 14, T3S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
W½, Sec. 14, T3S, R9W.

16-711 (A58921)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwrtg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 4400 ft, W. 600 ft, from SE Cor. Sec. 27, T3S, R9W
(16 Miles SW of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 12 ft., inundating 0.40 acs.
in NE¼NE¼, Sec. 27, T3S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
E½, Sec. 27, T3S, R9W.

16-712 (A58922)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 950 ft, E. 4550 ft, from SW Cor. Sec. 10, T4S, R9W
(18 Miles NW of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in SE¼SE¼, Sec. 10, T4S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 10, T4S, R9W.

16-713 (A58923)
APPLICANT: U.S.A. Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 4850 ft, W. 250 ft, from SE Cor. Sec. 35, T4S, R9W
(14 Miles NW of Dugway)
STORAGE: In Earthen impoundment from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NE¼NE¼, Sec. 35, T4S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 4000 head of livestock
PLACE OF USE:
E½, Sec. 35, T4S, R9W.

16-714 (A58924)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 720 ft, E. 320 ft, from SW Cor. Sec. 11, T6S, R7W
(9 Miles NE of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in SW¼SW¼, Sec. 11, T6S, R7W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1700 head of livestock

PLACE OF USE:
W½, Sec. 11, T6S, R7W.

16-715 (A58926)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 3900 ft, E. 3500 ft, from NW Cor. Sec. 27, T5S, R19W
(25 Miles S of Wendover)
STORAGE: In Jerry B. Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 15 ft., inundating 0.50 acs.
in NW¼SE¼, Sec. 27, T5S, R19W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 360 head of livestock
PLACE OF USE:
E½, Sec. 27, T5S, R19W.

16-716 (A58930)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) E. 1600 ft, from NW Cor. Sec. 18, T9S, R8W
(13 Miles S of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.10 acs.
in NW¼NW¼, Sec. 18, T9S, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock
PLACE OF USE:
W½, Sec. 18, T9S, R8W.

16-717 (A58931)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 3650 ft, W. 1100 ft, from NE Cor. Sec. 28, T9S, R9W
(15 Miles SW of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 7 ft., inundating 0.20 acs.
in NE¼SE¼, Sec. 28, T9S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock

PLACE OF USE:
E½, Sec. 28, T9S, R9W.

16-718 (A58932)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1000 ft, W. 750 ft, from NE Cor. Sec. 35, T8S, R8W
(10 Miles South Dugway)
STORAGE: In Winter Spring Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 15 ft., inundating 0.50 acs.
in NE¼NE¼, Sec. 35, T8S, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock
PLACE OF USE:
E½, Sec. 35, T8S, R8W.

16-719 (A58933)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1800 ft, E. 2250 ft, from NW Cor. Sec. 32, T8S, R7W
(12 Miles SE of Dugway)
STORAGE: In Burton Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in NE¼NW¼, Sec. 32, T8S, R7W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 520 head of livestock
PLACE OF USE:
W½, Sec. 32, T8S, R7W.

16-720 (A58934)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwatrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 3720 ft, E. 900 ft, from NE Cor. Sec. 18, T8S, R6W
(11 miles SE of Dugway)
STORAGE: In Lookout Pass Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in NW¼SW¼, Sec. 18, T8S, R6W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock

PLACE OF USE:
W½, Sec. 18, T8S, R6W.

17-184 (A58908)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2450 ft, W. 2600 ft, from SE Cor. Sec. 27, T10S, R19W
(8 Miles South of Ibapah)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in NW¼SE¼, Sec. 27, T10S, R19W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 400 head of livestock
PLACE OF USE:
E½, Sec. 27, T10S, R19W.

17-185 (A58927)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 3850 ft, E. 700 ft, from SW Cor. Sec. 5, T8S, R18W
(9 Miles NE of Ibapah)
STORAGE: In Berg Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 15 ft., inundating 0.20 acs.
in SW¼NW¼, Sec. 5, T8S, R18W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 340 head of livestock
PLACE OF USE:
W½, Sec. 5, T8S, R18W.

17-186 (A58929)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1150 ft, E. 1000 ft, from NW Cor. Sec. 12, T9S, R19W
(3 Miles NE of Ibapah)
STORAGE: In Secret Spring Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in NW¼NW¼, Sec. 12, T9S, R19W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 400 head of livestock

PLACE OF USE:
W½, Sec. 12, T9S, R19W.

Protests resisting the granting of these applications with reasons therefore must be filed in duplicate with the State Engineer, 1636 West North Temple, Salt Lake City, Utah 84116 on or before June 2, 1984.

Dee C. Hansen, P.E.
STATE ENGINEER

Published in Tooele Transcript
on April 19, 26, & May 3, 1984.

IN THE DISTRICT COURT OF THE THIRD JUDICIAL DISTRICT

IN AND FOR TOOELE COUNTY, STATE OF UTAH

IN THE MATTER OF THE GENERAL DETERMINATION OF RIGHTS TO THE USE OF ALL THE WATER, BOTH SURFACE AND UNDERGROUND, WITHIN ALL OF TOOELE COUNTY; ALL OF JUAB COUNTY, EXCEPT THAT PORTION DRAINING TO UTAH LAKE AND TO THE SEVIER RIVER DRAINAGE; AND ALL OF MILLARD, BEAVER, AND IRON COUNTIES EXCEPT THAT PORTION IN THE SEVIER RIVER AND THE VIRGIN RIVER DRAINAGE IN UTAH.	STATEMENT OF WATER USER'S CLAIM Water Right No. 16 - 697 Civil No. 6049 Map No. 14

RECEIVED
JUL 31 1989
WATER RIGHTS
SALT LAKE

****

HOW TO USE THIS FORM:

This form is important to you in asserting your water rights in the pending judicial adjudication described above. Under Utah law, unless you file this form in a timely manner, your water rights cannot be recognized and you may not assert them further. The State Engineer has made a hydrographic survey of this area, which includes your water rights and uses. Your receipt of this form constitutes notice to you that the survey has been completed and that a signed Statement of Water User's Claim is due from you within 90 days. Review the information shown on this form carefully. If you agree with the information and accept it as your Statement of Water User's Claim, sign the form and file it with the District Court in Tooele, Utah. Return two copies of the form to the Division of Water Rights in Salt Lake City, Utah. If you do not agree with the information, contact the Division of Water Rights in Salt Lake City, Utah, to resolve the problem.

****

1. WATER RIGHT AND OWNERSHIP INFORMATION:

   A. NAME: USA Bureau of Land Management INTEREST: 100%
   ADDRESS: 2370 South 2300 West, Salt Lake City, UT 84119

   B. TYPE OF RIGHT: Application To Appropriate No. A58906, Water User's Claim

   C. PRIORITY DATE: March 22, 1984

2. SOURCE INFORMATION:

   A. QUANTITY OF WATER: 0.1 acre-feet

   B. DIRECT SOURCE: Surface Runoff (Stckwtrg. Reservoir

   C. POINT OF DIVERSION -- SURFACE:
   (1) N 200 feet W 1300 feet from SE corner, Section 33, T 2N, R 8W, SLBM
   DIVERTING WORKS: Earthen impoundment SOURCE: Surface runoff

   D. DRAINAGE AREA: Great Salt Lake Desert-South COUNTY: Tooele

   E. STORAGE. Water is to be diverted for storage into:

6. CERTIFICATION OF CLAIM AND WAIVER OF SUMMONS:

The undersigned hereby enters their appearance in this water adjudication proceeding and hereby waives service of summons or other process and waives service of the notice of completion as required by Sections 73-4-4 and 73-3-4 of the Utah Code Annotated, 1953 as amended.

STATE OF UTAH)
) SS
COUNTY OF Salt Lake)

The undersigned swears on oath that he makes and certifies this Water User's Claim either as the claimant himself or as the duly-authorized agent of the claimant, that he has read and knows the contents of the claim, that he signs the same, and that the information supplied therein is true to the best of his knowledge and belief.

Title: District Manager (Individual or Office) Deane H. Keller Signature

Subscribed and sworn to before me this 26th day of July, 1989

Commission expires: Notary Public TERESA L. CATLIN 2370 South 2300 West Salt Lake City, Utah 84119 My Commission Expires February 8, 1993 State of Utah

Teresa L. Catlin Notary Public

63-01 FORM 77 7/77

ELECTION RECORD SHEET

Application No. A58906 W. U. Claim No. 16-697

Name of Appropriator USDI Bureau of Land Management

Address 324 South State #301, Salt Lake City, UT 84111-2303

Date Election Submitted February 19, 1987 Proof Due Date October 31, 1987

Field Checked by BS WC Date 6/26/89

CORRECTIONS AND AMENDMENTS NEEDED FOR AN AMENDATORY CHANGE

	Name and Address	Quantity of Water	Period of Use	Point of Div.	Diversion & Carrying Works	Place of Use	Extent of Use	Suppl. Water Rights	AMENDED CHANGE Date Filed	Date Approved
Field										
Office										

REMARKS: NA

Rough Water User's Claim Prepared ☐

Water User's Claim Typed ☐

Dates Water User Notified:

Water User's Claim Signed ☐

Application No. _____

FORM 152

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FEB 19 1987
WATER RIGHTS

A T T E N T I O N

THIS FORM IS TO BE USED ONLY WHEN WATER HAS BEEN PLACED TO FULL BENEFICIAL USE

BEFORE THE STATE ENGINEER OF THE STATE OF UTAH
ELECTION TO FILE WATER USER'S CLAIM

APPLICATION NO. 58906 16-697

STATE OF UTAH

COUNTY OF Tooele

USDI Bureau of Land Management, being first duly sworn, says that he is the owner of the above application; that the development contemplated under this application has been completed and the water placed to beneficial use.

In lieu of submitting "Proof of Appropriation" or "Proof of Change" and receiving "Certificate of Appropriation" or "Certificate of Change", the applicant hereby elects to file a "Statement of Water User's Claim" or an "Amended Statement of Water User's Claim" in the pending GENERAL DETERMINATION OF WATER RIGHTS; and the applicant requests that said statement be prepared by the State Engineer and submitted for execution at an early date.

Deane Zeller
APPLICANT
Deane Zeller,
Salt Lake District Manager

SUBSCRIBED AND SWORN TO BEFORE ME THIS 17th DAY OF February 19 87.

Susan L Call
NOTARY PUBLIC

My Commission Expires June 13, 1988

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Water Rights

1636 West North Temple · Salt Lake City, UT 84116 · 801-533-6071

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dee C. Hansen, State Engineer

January 29, 1985

U.S. Department of Interior
Bureau of Land Management
2370 South 2300 West
Salt Lake City, Utah 84119

RE: A-58906 (16-697)

Dear Appropriator:

Recently you received approval from the State Engineer on the above-numbered Application. Part of the filing called for the construction of a dam 6 feet high which would create a reservoir capacity of 0.1 acre-feet. This dam is to be located in Section 33, T2N, R8W, SLB&M.

Your Application will serve as notice to the State Engineer that you plan to construct a dam, thus satisfying Section 73-5-12 of the Utah Code Annotated 1953. No plans or specifications will be required, but it is requested that we be notified when the construction of the dam is complete.

Sincerely,

Robert L. Morgan

Robert L. Morgan, P.E.
Directing Dam Safety Engineer

RLM/cp

cc: Weber Area Office
Central Files

Form 33

STATE OF UTAH
NATURAL RESOURCES
Water Rights

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Directo
Dee C. Hansen, State Engineer

1636 West North Temple • Salt Lake City, UT 84116 • 801-533-6071

August 3, 1984

USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT 84119

Dear Applicant:

RE: APPROVED APPLICATION
NUMBER 16-697 (A58906)

Enclosed is a copy of the above-numbered approved Application. This is your authority to proceed with actual construction work which, under Sections 73-3-10 and 73-3-12, Utah Code Annotated, 1953, as amended, must be diligently prosecuted to completion. The water must be put to beneficial use and proof of appropriation be made to the State Engineer on or before the proof due date shown below otherwise, the application will be lapsed.

*** PROOF DUE DATE: October 31, 1987 ***

Proof of Appropriation is evidence to the State Engineer that the water has been placed to its full intended beneficial use. By law, it must be prepared by a registered engineer or land surveyor, who will certify to the location and the uses for the water. Your proof of appropriation will become the basis for the extent of your water right.

Failure on your part to comply with the requirements of the statutes may result in the forfeiture of this application.

Yours truly,

Dee C. Hansen, P.E.
State Engineer

Enclosure: Copy of Approved Application

Form 97 2M 10-70

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JUN 02 1983
WATER RIGHTS

Application No. 58906
R-17, #39
16-697

APPLICATION TO APPROPRIATE WATER
STATE OF UTAH

NOTE:—The information given in the following blanks should be free from explanatory matter, but when necessary, a complete supplementary statement should be made on the following page under the heading "Explanatory."

For the purpose of acquiring the right to use a portion of the unappropriated water of the State of Utah, for uses indicated by (X) in the proper box or boxes, application is hereby made to the State Engineer, based upon the following showing of facts, submitted in accordance with the requirements of the Laws of Utah.

1. Irrigation ☐ Domestic ☐ Stockwatering ☒ Municipal ☐ Power ☐ Mining ☐ Other Uses ☒
2. The name of the applicant is U.S. Department of Interior Bureau of Land Management
3. The Post Office address of the applicant is 2370 South 2300 West S.L.C. Utah 84119
4. The quantity of water to be appropriated _____ second-feet and/or 0.1 acre-feet
5. The water is to be used for Stockwatering (Major Purpose) from Jan (Month) 1 (Day) to Dec (Month) 31 (Day)

   other use period Wildlife (Minor Purpose) from Jan (Month) 1 (Day) to Dec (Month) 31 (Day)

   and stored each year (if stored) from _____ (Month) _____ (Day) to _____ (Month) _____ (Day)
6. The drainage area to which the direct source of supply belongs is _____ (Leave Blank)
7. The direct source of supply is* Surface runoff collected by an Earthen impoundment (stockwatering reservoir) (Name of stream or other source) 3-23-84 by letter

   which is tributary to _____, tributary to _____

*Note.—Where water is to be diverted from a well, a tunnel, or drain, the source should be designated as "Underground Water" in the first space and the remaining spaces should be left blank. If the source is a stream, a spring, a spring area, or a drain, so indicate in the first space, giving its name, if named, and in the remaining spaces, designate the stream channels to which it is tributary, even though the water may sink, evaporate, or be diverted before reaching said channels. If water from a spring flows in a natural surface channel before being diverted, the direct source should be designated as a stream and not a spring.

8. The point of diversion from the source is in Tooele County, situated at a point* 200 feet North 1300 feet West of Southeast corner Section 33, T. 2N., R. 8W., SLB&M (5 miles North of Delle)

*Note.—The point of diversion must be located definitely by course and distance or by giving the distances north or south, and east or west with reference to a United States land survey corner or United States mineral monument, if within a distance of six miles of either, or if at a greater distance, to some prominent and permanent natural object. No application will be received for filing in which the point of diversion is not defined definitely.

9. The diverting and carrying works will consist of an earthen impoundment 3-23-84 by letter

10. If water is to be stored, give capacity of reservoir in acre-feet 0.1 height of dam 6 feet area inundated in acres 0.15 legal subdivision of area inundated SE¼SE¼ Sec. 33

Page No. 2

EXPLANATORY

The following additional facts are set forth in order to define more clearly the full purpose of the proposed application:

Water claimed is intermittent in nature and is variable in amount based upon water run-off and/or precipitation frequency, intensity, and duration. Some of the reservoirs are lined with bentonite to reduce infiltration and provide stockwatering for animals of BLM permittees authorized to use public lands and water.

The reservoirs are located on BLM managed land and are currently in existence and functional.

FEES FOR APPLICATIONS TO APPROPRIATE WATER IN UTAH

Flow rate — c.f.s.	Cost	
0.0 to 0.1	$ 15.00	
over 0.1 to 0.5	30.00	
over 0.5 to 1.0	45.00	
over 1.0 to 15.0	45.00	plus $7.50 for each cfs above the first cubic foot per second.
over 15.0	150.00	

Storage — acre-feet		
0 to 20	22.50	
over 20 to 500	45.00	
over 500 to 7500	45.00	plus $7.50 for each 500 a.f. above the first 500 acre feet.
over 7500	150.00	

(This section is not to be filled in by applicant)

STATE ENGINEER'S ENDORSEMENTS

1. 3-22-84 Application received ~~by mail~~ over counter in State Engineer's office by [signature] applicant process completed;
2. ..... Priority of Application brought down to, on account of .....
3. 6-2-83 Application fee, $ 15.00, received by A.M. Rec. No. 02788
4. 7-13-83 Application microfilmed by MA Roll No. 1007-1
5. 6-23-83 Indexed by CP Platted by .....
6. 3-23-84 Application examined by [signature]
7. ..... Application returned, ... or corrected by office .....
8. ..... Corrected Application resubmitted by mail over counter to State Engineer's office.
9. 3-23-84 Application approved for advertisement by [signature] KDP
10. ..... Notice to water users prepared by UW
11. ..... Publication began; was completed .....

EXPLANATORY CONTINUED

FILING FOR WATER IN THE STATE OF UTAH

Rec. by _____
Fee Rec. _____
Platted _____
Microfilmed _____
Roll No. _____

APPLICATION TO APPROPRIATE WATER

For the purpose of acquiring the right to use a portion of the unappropriated water of the State of Utah, application is hereby made to the State Engineer, based upon the following showing of facts, submitted in accordance with the requirements of the Laws of Utah.

WATER USER CLAIM NO. 16 - 697 APPLICATION NO. A58906

1. PRIORITY OF RIGHT: March 22, 1984 FILING DATE: June 2, 1983

2. OWNER INFORMATION
Name: USA Bureau of Land Management
Address: 2370 South 2300 West, Salt Lake City, UT 84119
The land is owned by the applicant(s).

3. QUANTITY OF WATER: 0.1 acre feet (Ac. Ft.)

SOURCE: Surface Runoff DRAINAGE: Great Salt Lake Desert-South
POINT(S) OF DIVERSION: COUNTY: Tooele
(1) N. 200 feet, W. 1300 feet, from the SE Corner of Section 33, Township 2 N, Range 8 W, SLB&M
Source: Surface runoff
Description of Diverting Works: Earthen impoundment
COMMON DESCRIPTION: 6 Miles North of Delle

5. STORAGE
Water is to be stored in Unnamed Reservoir from January 1 to December 31.
Capacity 0.1 ac.ft. innundating 0.15 acres. Height of dam 6 feet.
The area innundated by the reservoir includes all or part of each of the following legal subdivisions.

			North East Quarter				North West Quarter				South West Quarter				South East Quarter			
TOWN	RANGE	SEC	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼
2 N	8 W	33																X

All locations in Salt Lake Base and Meridian

6. NATURE AND PERIOD OF USE
Stockwatering: From January 1 to December 31.
Wildlife: From January 1 to December 31.

7. PURPOSE AND EXTENT OF USE
Stockwatering: 600 animal units.
Lakeside Allotment

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Water Rights

1636 West North Temple • Salt Lake City, UT 84116 • 801-533-6071

Scott M. Matheson, Gover
Temple A. Reynolds, Executive Direc
Dee C. Hansen, State Engir.

FEBRUARY 21, 1984

U.S. Department of the Interior
Bureau of Land Management
2370 South 2300 West
Salt Lake City, Utah 84119

Dear Sir,

We are in the process of updating our files and would like to know if you still have an interest in Unapproved Applications Nos. 15-2993, 15-2994, 15-3011, 16-678, 16-679, 16-680, 16-681, 16-682, 16-683, 16-684, 16-685, 16-686, 16-687, 16-688, 16-689, 16-690, 16-691, 16-692, 16-693, 16-694, 16-695, 16-696, 16-697, 16-698, 16-699, 16-700, 16-701, 16-702, 16-703, 16-704, 16-705, 16-706, 16-707, 16-708, 16-709, 16-710, 16-711, 16-712, 16-713, 16-714, 16-715, 16-716, 16-717, 16-718, 16-719, 16-720, 17-184, 17-185, and 17-186, all of which are incompletely filled out, and none of which have been advertised.

Please advise us of your intentions as soon as possible. If we do not hear from you by March 30, 1984, we will assume you no longer have an active interest in these applications and they will be rejected.

If you have any questions feel free to contact me at the number shown on the letterhead.

Sincerely,

John E. Solum

John E. Solum
Hydrologic Engineer

JES/l
Encls.

NOTICE TO WATER USERS

The following application(s) have been filed with the State Engineer to appropriate water in Tooele County throughout the entire year unless otherwise designated. Locations in SLB&M.

15-2994 (A58936)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stockwtrg.reservoir)
POINT(S) OF DIVERSION:
(1) S. 1200 ft, from NE Cor. Sec. 29, T9S, R3W
(6 Miles East of Lofgreen)
STORAGE: In Dry Lake Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 15 ft., inundating 0.60 acs. in NE¼NE¼, Sec. 29, T9S, R3W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 780 head of livestock
PLACE OF USE:
E½, Sec. 29, T9S, R3W.

15-3011 (A59222)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.5 Ac.Ft.
SOURCE: Surface Runoff (stock Reservoir)
POINT(S) OF DIVERSION:
(1) S. 500 ft, E. 470 ft, from NW Cor. Sec. 10, T9S, R4W
(9 Miles SE of Vernon)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.5 ac.ft., height of dam 20 ft., inundating 1.00 acs. in NW¼NW¼, Sec. 10, T9S, R4W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 500 head of livestock
PLACE OF USE:
S½, Sec. 3, N½, Sec. 10, T9S, R4W.

15-3046 (A59789)
APPLICANT: England Construction
Box 488
Tooele, UT
QUANTITY: 0.015 CFS
SOURCE: 6 in. well 100 ft. to 300 ft. deep.
POINT(S) OF DIVERSION:
(1) N. 1470 ft, E. 1620 ft, from SW Cor. Sec. 5, T4S, R4W
(1 Mile South of Tooele)
PURPOSE AND PERIOD OF USE:
Domestic: 10 persons
Other:
Used in connection with a construction shop and office

PLACE OF USE:
NE¼SW¼, Sec. 5, T4S, R4W.

15-3047 (A59790)
APPLICANT: Gary & Jodean Davis
5904 Red Zinc Dr.
Salt Lake City, UT
QUANTITY: 0.1 CFS
SOURCE: 6 in. well 100 ft. to 200 ft. deep.
POINT(S) OF DIVERSION:
(1) N. 1454 ft, E. 411 ft, from SW Cor. Sec. 32, T5S, R5W
(1 Mile East of Clover)
PURPOSE AND PERIOD OF USE:
Domestic: 1 family
Stockwatering: 10 head of livestock
Irrigation: From Apr 1 to Oct 31, total acreage 5.00 acs.
PLACE OF USE:
NW¼SW¼, Sec. 32, T5S, R5W.

15-3048 (A59799)
APPLICANT: Steven Young
9094 N. Highway 40 #22
Lake Point, UT
QUANTITY: 0.015 CFS
SOURCE: 6 in. well 50 ft. to 200 ft. deep.
POINT(S) OF DIVERSION:
(1) N. 780 ft, E. 1820 ft, from SW Cor. Sec. 2, T2S, R4W
(In Lake Point)
PURPOSE AND PERIOD OF USE:
Domestic: 1 family
Irrigation: From Apr 1 to Oct 31, total acreage 0.25 acs.
PLACE OF USE:
SE¼SW¼, Sec. 2, T2S, R4W.

16-678 (A58886)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtr. reservoir)
POINT(S) OF DIVERSION:
(1) N. 2100 ft, W. 2800 ft, from SE Cor. Sec. 17, T3N, R11W
(20 Miles NE Knolls)
STORAGE: In NW Grassy Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 19 ft., inundating 0.50 acs.
in SW¼NE¼, SE¼, Sec. 17, T3N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 500 head of livestock

PLACE OF USE:
E½, Sec. 17, T3N, R11W.

16-679 (A58887)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 1900 ft, E. 300 ft, from SW Cor. Sec. 35, T1N, R8W
(4 Miles East of Delle)
STORAGE: In Greasewood Pond from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.30 acs.
in NW¼SW¼, Sec. 35, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
W½, Sec. 35, T1N, R8W.

16-680 (A58888)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 CFS
SOURCE: Surface Runoff (stwtrg. reservoir)
POINT(S) OF DIVERSION:
(1) S. 650 ft, W. 3150 ft, from NE Cor. Sec. 22, T1N, R8W
(5 Miles NE of Delle)
STORAGE: In Poverty Point Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.30 acs.
in NE¼NW¼, Sec. 22, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1600 head of livestock
PLACE OF USE:
W½, Sec. 22, T1N, R8W.

16-681 (A58889)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (stckwtering Res)
POINT(S) OF DIVERSION:
(1) N. 925 ft, W. 1175 ft, from SE Cor. Sec. 15, T3N, R11W
(14 Miles NW of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.50 acs.
in SE¼SE¼, Sec. 15, T3N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 260 head of livestock

PLACE OF USE:
E½, Sec. 15, T3N, R11W.

16-682 (A58890)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 300 ft, W. 775 ft, from SE Cor. Sec. 15, T3N, R11W
(14 Miles North of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.20 acs.
in SE¼SE¼, Sec. 15, T3N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 260 head of livestock
PLACE OF USE:
SE¼, Sec. 15, T3N, R11W.

16-683 (A58891)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.5 Ac.Ft.
SOURCE: Surface runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 375 ft, W. 4000 ft, from SE Cor. Sec. 17, T3N, R10W
(13 Miles North of Low)
STORAGE: In Milk Case Reservoir from Jan 1 to Dec 31.
Capacity 0.5 ac.ft., height of dam 5 ft., inundating 0.80 acs.
in SW¼SW¼, Sec. 17, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 900 head of livestock
PLACE OF USE:
W½, Sec. 17, T3N, R10W.

16-684 (A58892)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (stckwtrg. reservoir)
POINT(S) OF DIVERSION:
(1) N. 4700 ft, E. 1325 ft, from SW Cor. Sec. 15, T3N, R10W
(14 Miles north of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NW¼NW¼, Sec. 15, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock

PLACE OF USE:
W½, Sec. 15, T3N, R10W.

16-685 (A58893)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2800 ft, E. 150 ft, from SW Cor. Sec. 14, T3N, R10W
(14 Miles North of Low)
STORAGE: In Gary Kidd Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.50 acs.
in SW¼NW¼, Sec. 14, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock
PLACE OF USE:
W½, Sec. 14, T3N, R10W.

16-686 (A58894)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (stckwtering Res)
POINT(S) OF DIVERSION:
(1) N. 1500 ft, W. 200 ft, from SE Cor. Sec. 13, T3N, R10W
(14 Miles North of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 9 ft., inundating 0.40 acs.
in NE¼SE¼, Sec. 13, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock
PLACE OF USE:
E½, Sec. 13, T3N, R10W.

16-687 (A58895)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 1400 ft, E. 2600 ft, from SW Cor. Sec. 24, T3N, R10W
(13 Miles North of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 8 ft., inundating 0.30 acs.
in NW¼SE¼, Sec. 24, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock

PLACE OF USE:
E½, Sec. 24, T3N, R10W.

16-688 (A58896)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1700 ft, W. 1150 ft, from SE Cor. Sec. 34, T3N, R10W
(11 Miles North of Low)
STORAGE: In Lee's Knoll Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.30 acs.
in NE¼SE¼, Sec. 34, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock
PLACE OF USE:
E½, Sec. 34, T3N, R10W.

16-689 (A58897)
APPLICANT: USA Bureau of Land Managment
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1300 ft, W. 1150 ft, from SE Cor. Sec. 24, T2N, R10W
(7 Miles North of Low)
STORAGE: In Central Puddle Valley Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in SE¼SE¼, Sec. 24, T2N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
E½, Sec. 24, T2N, R10W.

16-690 (A58898)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1100 ft, W. 550 ft, from NE Cor. Sec. 30, T3N, R9W
(14 Miles NW of Delle)
STORAGE: In Grant Rogers Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in NE¼NE¼, Sec. 30, T3N, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock

PLACE OF USE:
E½, Sec. 30, T3N, R9W.

16-691 (A58900)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) S. 150 ft, E. 2200 ft, from NW Cor. Sec. 22, T2N, R10W
(5 Miles North of Low)
STORAGE: In Badger Hole Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.30 acs.
in NE¼NW¼, Sec. 22, T2N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 640 head of livestock
PLACE OF USE:
E½, Sec. 22, T2N, R10W.

16-692 (A58901)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1450 ft, E. 2750 ft, from NW Cor. Sec. 6, T2N, R9W
(10 Miles NE of Low)
STORAGE: In Howard Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in SW¼NE¼, Sec. 6, T2N, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
W½, Sec. 6, T2N, R9W.

16-693 (A58902)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtring Res)
POINT(S) OF DIVERSION:
(1) S. 2700 ft, W. 1650 ft, from NE Cor. Sec. 31, T1N, R11W
(10 Miles West of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in NW¼SE¼, Sec. 31, T1N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 700 head of livestock

PLACE OF USE:
E½, Sec. 31, T1N, R11W.

16-694 (A58903)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 2300 ft, W. 1400 ft, from NE Cor. Sec. 11, T1N, R10W
(4 Miles North of Low)
STORAGE: In Puddle Valley Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 12 ft., inundating 0.30 acs.
in SW¼NE¼, Sec. 11, T1N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
E½, Sec. 11, T1N, R10W.

16-695 (A58904)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1650 ft, E. 700 ft, from NW Cor. Sec. 31, T1N, R8W
(Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 7 ft., inundating 0.20 acs.
in SW¼NW¼, Sec. 31, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
W½, Sec. 31, T1N, R8W.

16-696 (A58905)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1500 ft, W. 1700 ft, from NE Cor. Sec. 33, T2N, R8W
(6 miles N. of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 5 ft., inundating 0.10 acs.
in SW¼NE¼, Sec. 33, T2N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 600 head of livestock

PLACE OF USE:
E½, Sec. 33, T2N, R8W.

16-697 (A58906)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir
POINT(S) OF DIVERSION:
(1) N. 200 ft, W. 1300 ft, from SE Cor. Sec. 33, T2N, R8W
(6 Miles North of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.15 acs.
in SE¼SE¼, Sec. 33, T2N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 600 head of livestock
PLACE OF USE:
E½, Sec. 33, T2N, R8W.

16-698 (A58907)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Resevoir)
POINT(S) OF DIVERSION:
(1) N. 4400 ft, E. 600 ft, from SW Cor. Sec. 10, T1N, R8W
(5 Miles North of Delle)
STORAGE: In Dead Cow Point Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.20 acs.
in NW¼NW¼, Sec. 10, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 600 head of livestock
PLACE OF USE:
W½, Sec. 10, T1N, R8W.

16-699 (A58909)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff
POINT(S) OF DIVERSION:
(1) N. 1920 ft, W. 3300 ft, from SE Cor. Sec. 23, T10S, R10W
(17 Miles SW of Dugway)
STORAGE: In North Table Mountain Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.50 acs.
in NE¼SW¼, Sec. 23, T10S, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock

PLACE OF USE:
W½, Sec. 23, T10S, R10W.

16-700 (A58910)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2200 ft, E. 250 ft, from SW Cor. Sec. 28, T10S, R8W
(20 Miles South of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in NW¼SW¼, Sec. 28, T10S, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 500 head of livestock
PLACE OF USE:
W½, Sec. 28, T10S, R8W.

16-701 (A58911)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1700 ft, W. 2500 ft, from SE Cor. Sec. 26, T1S, R13W
(2 Miles South of Knolls)
STORAGE: In Knolls Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 19 ft., inundating 0.50 acs.
in NE¼SW¼, Sec. 26, T1S, R13W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
S½, Sec. 26, T1S, R13W.

16-702 (A58912)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) S. 4500 ft, E. 800 ft, from NW Cor. Sec. 10, T2S, R11W
(11 Miles SW of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in SW¼SW¼, Sec. 10, T2S, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
W½, Sec. 10, T2S, R11W.

16-703 (A58913)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwrtg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1700 ft, W. 300 ft, from SE Cor. Sec. 4, T3S, R11W
(15 Miles SW of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NE¼SE¼, Sec. 4, T3S, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 4, T3S, R11W.

16-704 (A58914)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 800 ft, W. 2300 ft, from SE Cor. Sec. 9, T3S, R11W
(14 Miles SE of Knolls)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 15 ft., inundating 0.30 acs.
in SW¼SE¼, Sec. 9, T3S, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 9, T3S, R11W.

16-705 (A58915)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2630 ft, E. 2250 ft, from SW Cor. Sec. 17, T3S, R10W
(15 miles South of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.20 acs.
in NE¼SW¼, Sec. 17, T3S, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
E½, Sec. 17, T3S, R10W.

16-706 (A58916)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 2000 ft, W. 1850 ft, from NE Cor. Sec. 26, T2S, R9W
(11 Miles South of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in SW¼NE¼, Sec. 26, T2S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 26, T2S, R9W.

16-707 (A58917)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1750 ft, E. 2200 ft, from SW Cor. Sec. 26, T2S, R9W
(11 Miles South of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in NE¼SW¼, Sec. 26, T2S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
W½, Sec. 26, T2S, R9W.

16-708 (A58918)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 730 ft, E. 600 ft, from NW Cor. Sec. 34, T2S, R9W
(11 Miles South of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.30 acs.
in NW¼NW¼, Sec. 34, T2S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
W½, Sec. 34, T2S, R9W.

16-709 (A58919)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 5100 ft, W. 1200 ft, from SE Cor. Sec. 3, T3S, R9W
(12 Miles South of Delle)
STORAGE: In Earthen impoundment from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NE¼NE¼, Sec. 3, T3S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 3, T3S, R9W.

16-710 (A58920)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg.) Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1800 ft, E. 350 ft, from SW Cor. Sec. 14, T3S, R9W
(13 Miles SW of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.20 acs.
in NW¼SW¼, Sec. 14, T3S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
W½, Sec. 14, T3S, R9W.

16-711 (A58921)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwrtg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 4400 ft, W. 600 ft, from SE Cor. Sec. 27, T3S, R9W
(16 Miles SW of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 12 ft., inundating 0.40 acs.
in NE¼NE¼, Sec. 27, T3S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
E½, Sec. 27, T3S, R9W.

16-712 (A58922)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 950 ft, E. 4550 ft, from SW Cor. Sec. 10, T4S, R9W
(18 Miles NW of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in SE¼SE¼, Sec. 10, T4S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 10, T4S, R9W.

16-713 (A58923)
APPLICANT: U.S.A. Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 4850 ft, W. 250 ft, from SE Cor. Sec. 35, T4S, R9W
(14 Miles NW of Dugway)
STORAGE: In Earthen impoundment from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NE¼NE¼, Sec. 35, T4S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 4000 head of livestock
PLACE OF USE:
E½, Sec. 35, T4S, R9W.

16-714 (A58924)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 720 ft, E. 320 ft, from SW Cor. Sec. 11, T6S, R7W
(9 Miles NE of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in SW¼SW¼, Sec. 11, T6S, R7W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1700 head of livestock

PLACE OF USE:
W½, Sec. 11, T6S, R7W.

16-715 (A58926)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 3900 ft., E. 3500 ft, from NW Cor. Sec. 27, T5S, R19W
(25 Miles S of Wendover)
STORAGE: In Jerry B. Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 15 ft., inundating 0.50 acs.
in NW¼SE¼, Sec. 27, T5S, R19W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 360 head of livestock
PLACE OF USE:
E½, Sec. 27, T5S, R19W.

16-716 (A58930)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) E. 1600 ft, from NW Cor. Sec. 18, T9S, R8W
(13 Miles S of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.10 acs.
in NW¼NW¼, Sec. 18, T9S, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock
PLACE OF USE:
W½, Sec. 18, T9S, R8W.

16-717 (A58931)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 3650 ft, W. 1100 ft, from NE Cor. Sec. 28, T9S, R9W
(15 Miles SW of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 7 ft., inundating 0.20 acs.
in NE¼SE¼, Sec. 28, T9S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock

PLACE OF USE:
E½, Sec. 28, T9S, R9W.

16-718 (A58932)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1000 ft, W. 750 ft, from NE Cor. Sec. 35, T8S, R8W
(10 Miles South Dugway)
STORAGE: In Winter Spring Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 15 ft., inundating 0.50 acs.
in NE¼NE¼, Sec. 35, T8S, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock
PLACE OF USE:
E½, Sec. 35, T8S, R8W.

16-719 (A58933)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1800 ft, E. 2250 ft, from NW Cor. Sec. 32, T8S, R7W
(12 Miles SE of Dugway)
STORAGE: In Burton Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in NE¼NW¼, Sec. 32, T8S, R7W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 520 head of livestock
PLACE OF USE:
W½, Sec. 32, T8S, R7W.

16-720 (A58934)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwatrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 3720 ft, E. 900 ft, from NE Cor. Sec. 18, T8S, R6W
(11 miles SE of Dugway)
STORAGE: In Lookout Pass Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in NW¼SW¼, Sec. 18, T8S, R6W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock

PLACE OF USE:
W½, Sec. 18, T8S, R6W.

17-184 (A58908)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2450 ft, W. 2600 ft, from SE Cor. Sec. 27, T10S, R19W
(8 Miles South of Ibapah)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in NW¼SE¼, Sec. 27, T10S, R19W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 400 head of livestock
PLACE OF USE:
E½, Sec. 27, T10S, R19W.

17-185 (A58927)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 3850 ft, E. 700 ft, from SW Cor. Sec. 5, T8S, R18W
(9 Miles NE of Ibapah)
STORAGE: In Berg Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 15 ft., inundating 0.20 acs.
in SW¼NW¼, Sec. 5, T8S, R18W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 340 head of livestock
PLACE OF USE:
W½, Sec. 5, T8S, R18W.

17-186 (A58929)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1150 ft, E. 1000 ft, from NW Cor. Sec. 12, T9S, R19W
(3 Miles NE of Ibapah)
STORAGE: In Secret Spring Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in NW¼NW¼, Sec. 12, T9S, R19W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 400 head of livestock

PLACE OF USE:
W½, Sec. 12, T9S, R19W.

Protests resisting the granting of these applications with reasons therefore must be filed in duplicate with the State Engineer, 1636 West North Temple, Salt Lake City, Utah 84116 on or before June 2, 1984.

Dee C. Hansen, P.E.
STATE ENGINEER

Published in Tooele Transcript
on April 19, 26, & May 3, 1984.

IN THE DISTRICT COURT OF THE THIRD JUDICIAL DISTRICT

IN AND FOR TOOELE COUNTY, STATE OF UTAH

IN THE MATTER OF THE GENERAL DETERMINATION OF RIGHTS TO THE USE OF ALL THE WATER, BOTH SURFACE AND UNDERGROUND, WITHIN ALL OF TOOELE COUNTY; ALL OF JUAB COUNTY, EXCEPT THAT PORTION DRAINING TO UTAH LAKE AND TO THE SEVIER RIVER DRAINAGE; AND ALL OF MILLARD, BEAVER, AND IRON COUNTIES EXCEPT THAT PORTION IN THE SEVIER RIVER AND THE VIRGIN RIVER DRAINAGE IN UTAH.	STATEMENT OF WATER USER'S CLAIM Water Right No. 16 - 698 Civil No. 6049 Map No. 14

RECEIVED
JUL 31 1989
WATER RIGHTS
SALT LAKE

****

HOW TO USE THIS FORM:

This form is important to you in asserting your water rights in the pending judicial adjudication described above. Under Utah law, unless you file this form in a timely manner, your water rights cannot be recognized and you may not assert them further. The State Engineer has made a hydrographic survey of this area, which includes your water rights and uses. Your receipt of this form constitutes notice to you that the survey has been completed and that a signed Statement of Water User's Claim is due from you within 90 days. Review the information shown on this form carefully. If you agree with the information and accept it as your Statement of Water User's Claim, sign the form and file it with the District Court in Tooele, Utah. Return two copies of the form to the Division of Water Rights in Salt Lake City, Utah. If you do not agree with the information, contact the Division of Water Rights in Salt Lake City, Utah, to resolve the problem.

****

1. WATER RIGHT AND OWNERSHIP INFORMATION:

   A. NAME: USA Bureau of Land Management INTEREST: 100%
   ADDRESS: 2370 South 2300 West, Salt Lake City, UT 84119

   B. TYPE OF RIGHT: Application To Appropriate No. A58907, Water User's Claim

   C. PRIORITY DATE: March 22, 1984

2. SOURCE INFORMATION:

   A. QUANTITY OF WATER: 0.1 acre-feet

   B. DIRECT SOURCE: Surface Runoff (Stkwtrg. Resevoir)

   C. POINT OF DIVERSION -- SURFACE:
   (1) N 4450 feet E 600 feet from SW corner, Section 10, T 1N, R 8W, SLBM
   DIVERTING WORKS: An earthen impoundment SOURCE: Surface Runoff

   D. DRAINAGE AREA: Great Salt Lake Desert-South COUNTY: Tooele

   E. STORAGE. Water is to be diverted for storage into:

6. CERTIFICATION OF CLAIM AND WAIVER OF SUMMONS:

The undersigned hereby enters their appearance in this water adjudication proceeding and hereby waives service of summons or other process and waives service of the notice of completion as required by Sections 73-4-4 and 73-3-4 of the Utah Code Annotated, 1953 as amended.

STATE OF UTAH)
) SS
COUNTY OF Salt Lake)

The undersigned swears on oath that he makes and certifies this Water User's Claim either as the claimant himself or as the duly-authorized agent of the claimant, that he has read and knows the contents of the claim, that he signs the same, and that the information supplied therein is true to the best of his knowledge and belief.

Title: District Manager (Individual or Office) Deane H. Zeller Signature

Subscribed and sworn to before me this 26th day of July, 1989

Commission expires: Notary Public TERESA L. CATLIN 2370 South 2300 West Salt Lake City, Utah 84119 My Commission Expires February 8, 1993 State of Utah

Teresa L. Catlin Notary Public

63-31 FORM 77-7/77

ELECTION RECORD SHEET

Application No. A58907 W. U. Claim No. 16-698

Name of Appropriator USDI Bureau of Land Management

Address 324 South State #301, Salt Lake City, UT 84111-2303

Date Election Submitted February 19, 1987 Proof Due Date October 31, 1987

Field Checked by BSWC Date 6/20/89

CORRECTIONS AND AMENDMENTS NEEDED FOR AN AMENDATORY CHANGE

	Name and Address	Quantity of Water	Period of Use	Point of Div.	Diversion & Carrying Works	Place of Use	Extent of Use	Suppl. Water Rights	AMENDED CHANGE	
									Date Filed	Date Approved
Field										
Office										

REMARKS:

NA

Rough Water User's Claim Prepared ☐

Water User's Claim Typed ☐

Dates Water User Notified:

Water User's Claim Signed ☐

Application No.

FORM 152

RECEIVED
FEB 19 1987
WATER RIGHTS

A T T E N T I O N

THIS FORM IS TO BE USED ONLY WHEN WATER HAS BEEN PLACED TO FULL BENEFICIAL USE

BEFORE THE STATE ENGINEER OF THE STATE OF UTAH
ELECTION TO FILE WATER USER'S CLAIM

APPLICATION NO. 58907 16-698

STATE OF UTAH

COUNTY OF Tooele

USDI Bureau of Land Management, being first duly sworn, says that he is the owner of the above application; that the development contemplated under this application has been completed and the water placed to beneficial use.

In lieu of submitting "Proof of Appropriation" or "Proof of Change" and receiving "Certificate of Appropriation" or "Certificate of Change", the applicant hereby elects to file a "Statement of Water User's Claim" or an "Amended Statement of Water User's Claim" in the pending GENERAL DETERMINATION OF WATER RIGHTS; and the applicant requests that said statement be prepared by the State Engineer and submitted for execution at an early date.

Deane Zeller
APPLICANT
Deane Zeller,
Salt Lake District Manager

SUBSCRIBED AND SWORN TO BEFORE ME THIS 17th DAY OF February 1987.

Jerson L Cole
NOTARY PUBLIC

My Commission Expires June 13, 1988

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Water Rights
1636 West North Temple • Salt Lake City, UT 84116 • 801-533-6071

Scott M. Matheson, Gover
Temple A. Reynolds, Executive Direc
Dee C. Hansen, State Engi

January 29, 1985

U.S. Department of Interior
Bureau of Land Management
2370 South 2300 West
Salt Lake City, Utah 84119

RE: A-58907 (16-698)

Dear Appropriator:

Recently you received approval from the State Engineer on the above-numbered Application. Part of the filing called for the construction of a dam 8 feet high which would create a reservoir capacity of 0.1 acre-feet. This dam is to be located in Section 10, T1N, R8W, SLB&M.

Your Application will serve as notice to the State Engineer that you plan to construct a dam, thus satisfying Section 73-5-12 of the Utah Code Annotated 1953. No plans or specifications will be required, but it is requested that we be notified when the construction of the dam is complete.

Sincerely,

Robert L. Morgan

Robert L. Morgan, P.E.
Directing Dam Safety Engineer

RLM/cp

cc: Weber Area Office
Central Files

STATE OF UTAH
NATURAL RESOURCES
Water Rights

Form 33

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dee C. Hansen, State Engineer

1636 West North Temple • Salt Lake City, UT 84116 • 801-533-6071

August 3, 1984

USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT 84119

Dear Applicant:

RE: APPROVED APPLICATION
NUMBER 16-698 (A58907)

Enclosed is a copy of the above-numbered approved Application. This is your authority to proceed with actual construction work which, under Sections 73-3-10 and 73-3-12, Utah Code Annotated, 1953, as amended, must be diligently prosecuted to completion. The water must be put to beneficial use and proof of appropriation be made to the State Engineer on or before the proof due date shown below otherwise, the application will be lapsed.

*** PROOF DUE DATE: October 31, 1987 ***

Proof of Appropriation is evidence to the State Engineer that the water has been placed to its full intended beneficial use. By law, it must be prepared by a registered engineer or land surveyor, who will certify to the location and the uses for the water. Your proof of appropriation will become the basis for the extent of your water right.

Failure on your part to comply with the requirements of the statutes may result in the forfeiture of this application.

Yours truly,

Dee C. Hansen, P.E.
State Engineer

Enclosure: Copy of Approved Application

Form 97 2M 10-70

RECEIVED
JUN 02 1983
WATER RIGHTS

Application No. 58907
R-19, #40
16-698

APPLICATION TO APPROPRIATE WATER
STATE OF UTAH

NOTE:—The information given in the following blanks should be free from explanatory matter, but when necessary, a complete supplementary statement should be made on the following page under the heading "Explanatory."

For the purpose of acquiring the right to use a portion of the unappropriated water of the State of Utah, for uses indicated by (X) in the proper box or boxes, application is hereby made to the State Engineer, based upon the following showing of facts, submitted in accordance with the requirements of the Laws of Utah.

1. Irrigation ☐ Domestic ☐ Stockwatering ☒ Municipal ☐ Power ☐ Mining ☐ Other Uses ☒
2. The name of the applicant is U.S. Department of Interior Bureau of Land Management
3. The Post Office address of the applicant is 2370 South 2300 West S.L.C. Utah 84119
4. The quantity of water to be appropriated _____ second-feet and/or 0.1 acre-feet
5. The water is to be used for Stockwatering (Major Purpose) from Jan 1 (Month) (Day) to Dec 31 (Month) (Day)
   other use period Wildlife (Minor Purpose) from Jan. 1 (Month) (Day) to Dec. 31 (Month) (Day)
   and stored each year (if stored) from _____ (Month) (Day) to _____ (Month) (Day)
6. The drainage area to which the direct source of supply belongs is _____ (Leave Blank)
   Surface runoff collected by an
7. The direct source of supply is* Earthen impoundment (stockwatering reservoir) 3-23-84 by letter
   (Name of stream or other source)
   which is tributary to _____, tributary to _____

*Note.—Where water is to be diverted from a well, a tunnel, or drain, the source should be designated as "Underground Water" in the first space and the remaining spaces should be left blank. If the source is a stream, a spring, a spring area, or a drain, so indicate in the first space, giving its name, if named, and in the remaining spaces, designate the stream channels to which it is tributary, even though the water may sink, evaporate, or be diverted before reaching said channels. If water from a spring flows in a natural surface channel before being diverted, the direct source should be designated as a stream and not a spring.

8. The point of diversion from the source is in Tooele County, situated at a point* 4400 feet North 600 feet East of Southwest Corner, Section 10, T. 1N., R. 8W., SLB&M (Dead Cow Point Reservoir)
   (5 miles North of Delle)

*Note.—The point of diversion must be located definitely by course and distance or by giving the distances north or south, and east or west with reference to a United States land survey corner or United States mineral monument, if within a distance of six miles of either, or if at a greater distance, to some prominent and permanent natural object. No application will be received for filing in which the point of diversion is not defined definitely.

9. The diverting and carrying works will consist of an earthen impoundment 3-23-84 by letter
10. If water is to be stored, give capacity of reservoir in acre-feet 0.1 height of dam 8 feet

Page No. 2

EXPLANATORY

The following additional facts are set forth in order to define more clearly the full purpose of the proposed application:

Water claimed is intermittent in nature and is variable in amount based upon water run-off and/or precipitation frequency, intensity, and duration. Some of the reservoirs are lined with bentonite to reduce infiltration and provide stockwatering for animals of BLM permittees authorized to use public lands and water.

The reservoirs are located on BLM managed land and are currently in existence and functional.

STATE OF UTAH
NATURAL RESOURCES
Water Rights

1636 West North Temple • Salt Lake City, UT 84116 • 801-533-6071

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dee C. Hansen, State Engineer

April 12, 1984

Tooele Transcript
Transcript-Bulletin Publ. Co.
Box 390
TOOELE UT 84074

Ladies and Gentlemen:

RE: Appl. No. 15-2994 (A58936)

Enclosed is a Notice to Water Users Concerning 15-2994 (A58936) for publication on April 19, 26, & May 3, 1984.

Please send two checking proofs as soon as possible before the first publication date. Upon completion of the three issues, please send two Proofs of Publication, and your last bill in duplicate within thirty days from the date of the last publication.

Yours very truly,

Dee C. Hansen

Dee C. Hansen, P.E.
State Engineer

DCH:cw

Enclosure: Notice to Water Users

FEES FOR APPLICATIONS TO APPROPRIATE WATER IN UTAH

Flow rate — c.f.s.	Cost	
0.0 to 0.1	$ 15.00	
over 0.1 to 0.5	30.00	
over 0.5 to 1.0	45.00	
over 1.0 to 15.0	45.00	plus $7.50 for each cfs above the first cubic foot per second.
over 15.0	150.00	

Storage — acre-feet		
0 to 20	22.50	
over 20 to 500	45.00	
over 500 to 7500	45.00	plus $7.50 for each 500 a.f. above the first 500 acre feet.
over 7500	150.00	

(This section is not to be filled in by applicant)

STATE ENGINEER'S ENDORSEMENTS

1. 3-22-84 Application received ~~by mail~~ over counter in State Engineer's office by [illegible]
2. ..... Priority of Application brought down to, on account of applicant proving completion
3. 6-2-83 Application fee, $15.00, received by A.N. Rec. No. 02788
4. 7-13-83 Application microfilmed by NA Roll No. 1007-1
5. 6-23-83 Indexed by CP Platted by .....
6. 3-23-84 Application examined by [illegible]
7. ..... Application returned, ... or corrected by office .....
8. ..... Corrected Application resubmitted by mail / over counter to State Engineer's office.
9. 3-23-84 Application approved for advertisement by [illegible]
10. ..... Notice to water users prepared by WW
11. ..... Publication began; was completed .....

WATER RIGHTS DATA BASE
ENTERED - DATE [illegible]
VERIFIED - DATE [illegible]

EXPLANATORY CONTINUED

FILING FOR WATER IN THE STATE OF UTAH

Rec. by _____
Fee Rec. _____
Platted _____
Microfilmed _____
Roll No. _____

APPLICATION TO APPROPRIATE WATER

For the purpose of acquiring the right to use a portion of the unappropriated water of the State of Utah, application is hereby made to the State Engineer, based upon the following showing of facts, submitted in accordance with the requirements of the Laws of Utah.

WATER USER CLAIM NO. 16 - 698 APPLICATION NO. A58907

1. PRIORITY OF RIGHT: March 22, 1984 FILING DATE: June 2, 1983

2. OWNER INFORMATION
   Name: USA Bureau of Land Management
   Address: 2370 South 2300 West, Salt Lake City, UT 84119
   The land is owned by the applicant(s).

3. QUANTITY OF WATER: 0.1 acre feet (Ac. Ft.)

4. SOURCE: Surface Runoff (Stkwtrg. Resevoir) DRAINAGE: Great Salt Lake Desert-South
   POINT(S) OF DIVERSION: COUNTY: Tooele
   (1) N. 4400 feet, E. 600 feet, from the SW Corner of Section 10,
   Township 1 N, Range 8 W, SLB&M
   Source: Surface Runoff
   Description of Diverting Works: An earthen impoundment
   COMMON DESCRIPTION: 5 Miles North of Delle

5. STORAGE
   Water is to be stored in Dead Cow Point Reservoir from January 1 to December 31.
   Capacity 0.1 ac.ft. innundating 0.2 acres. Height of dam 8 feet.
   The area innundated by the reservoir includes all or part of each of the following legal subdivisions.

			North East Quarter				North West Quarter				South West Quarter				South East Quarter			
TOWN	RANGE	SEC	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼
1 N	8 W	10						X										

All locations in Salt Lake Base and Meridian

6. NATURE AND PERIOD OF USE
   Stockwatering: From January 1 to December 31.
   Wildlife: From January 1 to December 31.

7. PURPOSE AND EXTENT OF USE
   Stockwatering: 600 animal units.
   Lakeside Allotment

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

SALT LAKE DISTRICT OFFICE
2370 SOUTH 2300 WEST
SALT LAKE CITY, UTAH 84119

RECE
MAR 2
WATER RI

IN REPLY
REFER TO:

7250
(U-202)

MAR 21 1984

Mr. John Solum
Water Rights Division
Natural Resources & Energy
1636 West Temple
Salt Lake City, Utah 84116

Dear John:

Concerning your letter of February 21, 1984, we have reviewed our copies of the unapproved applications. Item Number 7 on the application, the direct source of supply, should state that the source of supply is, "surface runoff collected by an earthen impoundment, (stock watering reservoir)." None of these applications impound live water from a stream or are on a tributary; most are located on gentle slopes of Tooele County. If you have further questions, please call Sheldon Wimmer at 524-5348.

Sincerely yours,

Sheldon Wimmer

Sheldon Wimmer
Supervisory Range Conservationist

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Water Rights
1636 West North Temple • Salt Lake City, UT 84116 • 801-533-6071

Scott M. Matheson, Gove
Temple A. Reynolds, Executive Dire
Dee C. Hansen, State Engi

FEBRUARY 21, 1984

U.S. Department of the Interior
Bureau of Land Management
2370 South 2300 West
Salt Lake City, Utah 84119

Dear Sir,

We are in the process of updating our files and would like to know if you still have an interest in Unapproved Applications Nos. 15-2993, 15-2994, 15-3011, 16-678, 16-679, 16-680, 16-681, 16-682, 16-683, 16-684, 16-685, 16-686, 16-687, 16-688, 16-689, 16-690, 16-691, 16-692, 16-693, 16-694, 16-695, 16-696, 16-697, 16-698, 16-699, 16-700, 16-701, 16-702, 16-703, 16-704, 16-705, 16-706, 16-707, 16-708, 16-709, 16-710, 16-711, 16-712, 16-713, 16-714, 16-715, 16-716, 16-717, 16-718, 16-719, 16-720, 17-184, 17-185, and 17-186, all of which are incompletely filled out, and none of which have been advertised.

Please advise us of your intentions as soon as possible. If we do not hear from you by March 30, 1984, we will assume you no longer have an active interest in these applications and they will be rejected.

If you have any questions feel free to contact me at the number shown on the letterhead.

Sincerely,

John E. Solum
Hydrologic Engineer

JES/l
Encls.

NOTICE TO WATER USERS

The following application(s) have been filed with the State Engineer to appropriate water in Tooele County throughout the entire year unless otherwise designated. Locations in SLB&M.

15-2994 (A58936)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stockwtrg.reservoir)
POINT(S) OF DIVERSION:
(1) S. 1200 ft, from NE Cor. Sec. 29, T9S, R3W
(6 Miles East of Lofgreen)
STORAGE: In Dry Lake Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 15 ft., inundating 0.60 acs. in NE¼NE¼, Sec. 29, T9S, R3W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 780 head of livestock
PLACE OF USE:
E½, Sec. 29, T9S, R3W.

15-3011 (A59222)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.5 Ac.Ft.
SOURCE: Surface Runoff (stock Reservoir)
POINT(S) OF DIVERSION:
(1) S. 500 ft, E. 470 ft, from NW Cor. Sec. 10, T9S, R4W
(9 Miles SE of Vernon)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.5 ac.ft., height of dam 20 ft., inundating 1.00 acs. in NW¼NW¼, Sec. 10, T9S, R4W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 500 head of livestock
PLACE OF USE:
S½, Sec. 3, N½, Sec. 10, T9S, R4W.

15-3046 (A59789)
APPLICANT: England Construction
Box 488
Tooele, UT
QUANTITY: 0.015 CFS
SOURCE: 6 in. well 100 ft. to 300 ft. deep.
POINT(S) OF DIVERSION:
(1) N. 1470 ft, E. 1620 ft, from SW Cor. Sec. 5, T4S, R4W
(1 Mile South of Tooele)
PURPOSE AND PERIOD OF USE:
Domestic: 10 persons
Other:
Used in connection with a construction shop and office

PLACE OF USE:
NE¼SW¼, Sec. 5, T4S, R4W.

15-3047 (A59790)
APPLICANT: Gary & Jodean Davis
5904 Red Zinc Dr.
Salt Lake City, UT
QUANTITY: 0.1 CFS
SOURCE: 6 in. well 100 ft. to 200 ft. deep.
POINT(S) OF DIVERSION:
(1) N. 1454 ft, E. 411 ft, from SW Cor. Sec. 32, T5S, R5W
(1 Mile East of Clover)
PURPOSE AND PERIOD OF USE:
Domestic: 1 family
Stockwatering: 10 head of livestock
Irrigation: From Apr 1 to Oct 31, total acreage 5.00 acs.
PLACE OF USE:
NW¼SW¼, Sec. 32, T5S, R5W.

15-3048 (A59799)
APPLICANT: Steven Young
9094 N. Highway 40 #22
Lake Point, UT
QUANTITY: 0.015 CFS
SOURCE: 6 in. well 50 ft. to 200 ft. deep.
POINT(S) OF DIVERSION:
(1) N. 780 ft, E. 1820 ft, from SW Cor. Sec. 2, T2S, R4W
(In Lake Point)
PURPOSE AND PERIOD OF USE:
Domestic: 1 family
Irrigation: From Apr 1 to Oct 31, total acreage 0.25 acs.
PLACE OF USE:
SE¼SW¼, Sec. 2, T2S, R4W.

16-678 (A58886)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtr. reservoir)
POINT(S) OF DIVERSION:
(1) N. 2100 ft, W. 2800 ft, from SE Cor. Sec. 17, T3N, R11W
(20 Miles NE Knolls)
STORAGE: In NW Grassy Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 19 ft., inundating 0.50 acs.
in SW¼NE¼, SE¼, Sec. 17, T3N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 500 head of livestock

PLACE OF USE:
E½, Sec. 17, T3N, R11W.

16-679 (A58887)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 1900 ft, E. 300 ft, from SW Cor. Sec. 35, T1N, R8W
(4 Miles East of Delle)
STORAGE: In Greasewood Pond from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.30 acs.
in NW¼SW¼, Sec. 35, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
W½, Sec. 35, T1N, R8W.

16-680 (A58888)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 CFS
SOURCE: Surface Runoff (stwtrg. reservoir)
POINT(S) OF DIVERSION:
(1) S. 650 ft, W. 3150 ft, from NE Cor. Sec. 22, T1N, R8W
(5 Miles NE of Delle)
STORAGE: In Poverty Point Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.30 acs.
in NE¼NW¼, Sec. 22, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1600 head of livestock
PLACE OF USE:
W½, Sec. 22, T1N, R8W.

16-681 (A58889)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (stckwtering Res)
POINT(S) OF DIVERSION:
(1) N. 925 ft, W. 1175 ft, from SE Cor. Sec. 15, T3N, R11W
(14 Miles NW of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.50 acs.
in SE¼SE¼, Sec. 15, T3N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 260 head of livestock

PLACE OF USE:
E½, Sec. 15, T3N, R11W.

16-682 (A58890)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 300 ft, W. 775 ft, from SE Cor. Sec. 15, T3N, R11W
(14 Miles North of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.20 acs.
in SE¼SE¼, Sec. 15, T3N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 260 head of livestock
PLACE OF USE:
SE¼, Sec. 15, T3N, R11W.

16-683 (A58891)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.5 Ac.Ft.
SOURCE: Surface runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 375 ft, W. 4000 ft, from SE Cor. Sec. 17, T3N, R10W
(13 Miles North of Low)
STORAGE: In Milk Case Reservoir from Jan 1 to Dec 31.
Capacity 0.5 ac.ft., height of dam 5 ft., inundating 0.80 acs.
in SW¼SW¼, Sec. 17, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 900 head of livestock
PLACE OF USE:
W½, Sec. 17, T3N, R10W.

16-684 (A58892)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (stckwtrg. reservoir)
POINT(S) OF DIVERSION:
(1) N. 4700 ft, E. 1325 ft, from SW Cor. Sec. 15, T3N, R10W
(14 Miles north of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NW¼NW¼, Sec. 15, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock

PLACE OF USE:
W½, Sec. 15, T3N, R10W.

16-685 (A58893)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2800 ft, E. 150 ft, from SW Cor. Sec. 14, T3N, R10W
(14 Miles North of Low)
STORAGE: In Gary Kidd Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.50 acs.
in SW¼NW¼, Sec. 14, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock
PLACE OF USE:
W½, Sec. 14, T3N, R10W.

16-686 (A58894)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (stckwtering Res)
POINT(S) OF DIVERSION:
(1) N. 1500 ft, W. 200 ft, from SE Cor. Sec. 13, T3N, R10W
(14 Miles North of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 9 ft., inundating 0.40 acs.
in NE¼SE¼, Sec. 13, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock
PLACE OF USE:
E½, Sec. 13, T3N, R10W.

16-687 (A58895)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 1400 ft, E. 2600 ft, from SW Cor. Sec. 24, T3N, R10W
(13 Miles North of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 8 ft., inundating 0.30 acs.
in NW¼SE¼, Sec. 24, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock

PLACE OF USE:
E½, Sec. 24, T3N, R10W.

16-688 (A58896)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1700 ft, W. 1150 ft, from SE Cor. Sec. 34, T3N, R10W
(11 Miles North of Low)
STORAGE: In Lee's Knoll Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.30 acs.
in NE¼SE¼, Sec. 34, T3N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock
PLACE OF USE:
E½, Sec. 34, T3N, R10W.

16-689 (A58897)
APPLICANT: USA Bureau of Land Managment
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1300 ft, W. 1150 ft, from SE Cor. Sec. 24, T2N, R10W
(7 Miles North of Low)
STORAGE: In Central Puddle Valley Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in SE¼SE¼, Sec. 24, T2N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
E½, Sec. 24, T2N, R10W.

16-690 (A58898)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1100 ft, W. 550 ft, from NE Cor. Sec. 30, T3N, R9W
(14 Miles NW of Delle)
STORAGE: In Grant Rogers Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in NE¼NE¼, Sec. 30, T3N, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 480 head of livestock

PLACE OF USE:
E½, Sec. 30, T3N, R9W.

16-691 (A58900)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) S. 150 ft, E. 2200 ft, from NW Cor. Sec. 22, T2N, R10W
(5 Miles North of Low)
STORAGE: In Badger Hole Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.30 acs.
in NE¼NW¼, Sec. 22, T2N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 640 head of livestock
PLACE OF USE:
E½, Sec. 22, T2N, R10W.

16-692 (A58901)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1450 ft, E. 2750 ft, from NW Cor. Sec. 6, T2N, R9W
(10 Miles NE of Low)
STORAGE: In Howard Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in SW¼NE¼, Sec. 6, T2N, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
W½, Sec. 6, T2N, R9W.

16-693 (A58902)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtring Res)
POINT(S) OF DIVERSION:
(1) S. 2700 ft, W. 1650 ft, from NE Cor. Sec. 31, T1N, R11W
(10 Miles West of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in NW¼SE¼, Sec. 31, T1N, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 700 head of livestock

PLACE OF USE:
E½, Sec. 31, T1N, R11W.

16-694 (A58903)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 2300 ft, W. 1400 ft, from NE Cor. Sec. 11, T1N, R10W
(4 Miles North of Low)
STORAGE: In Puddle Valley Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 12 ft., inundating 0.30 acs.
in SW¼NE¼, Sec. 11, T1N, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
E½, Sec. 11, T1N, R10W.

16-695 (A58904)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1650 ft, E. 700 ft, from NW Cor. Sec. 31, T1N, R8W
(Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 7 ft., inundating 0.20 acs.
in SW¼NW¼, Sec. 31, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1000 head of livestock
PLACE OF USE:
W½, Sec. 31, T1N, R8W.

16-696 (A58905)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1500 ft, W. 1700 ft, from NE Cor. Sec. 33, T2N, R8W
(6 miles N. of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 5 ft., inundating 0.10 acs.
in SW¼NE¼, Sec. 33, T2N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 600 head of livestock

PLACE OF USE:
E½, Sec. 33, T2N, R8W.

16-697 (A58906)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir
POINT(S) OF DIVERSION:
(1) N. 200 ft, W. 1300 ft, from SE Cor. Sec. 33, T2N, R8W
(6 Miles North of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.15 acs.
in SE¼SE¼, Sec. 33, T2N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 600 head of livestock
PLACE OF USE:
E½, Sec. 33, T2N, R8W.

16-698 (A58907)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Resevoir)
POINT(S) OF DIVERSION:
(1) N. 4400 ft, E. 600 ft, from SW Cor. Sec. 10, T1N, R8W
(5 Miles North of Delle)
STORAGE: In Dead Cow Point Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.20 acs.
in NW¼NW¼, Sec. 10, T1N, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 600 head of livestock
PLACE OF USE:
W½, Sec. 10, T1N, R8W.

16-699 (A58909)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff
POINT(S) OF DIVERSION:
(1) N. 1920 ft, W. 3300 ft, from SE Cor. Sec. 23, T10S, R10W
(17 Miles SW of Dugway)
STORAGE: In North Table Mountain Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.50 acs.
in NE¼SW¼, Sec. 23, T10S, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock

PLACE OF USE:
W½, Sec. 23, T10S, R10W.

16-700 (A58910)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2200 ft, E. 250 ft, from SW Cor. Sec. 28, T10S, R8W
(20 Miles South of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in NW¼SW¼, Sec. 28, T10S, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 500 head of livestock
PLACE OF USE:
W½, Sec. 28, T10S, R8W.

16-701 (A58911)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1700 ft, W. 2500 ft, from SE Cor. Sec. 26, T1S, R13W
(2 Miles South of Knolls)
STORAGE: In Knolls Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 19 ft., inundating 0.50 acs.
in NE¼SW¼, Sec. 26, T1S, R13W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
S½, Sec. 26, T1S, R13W.

16-702 (A58912)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) S. 4500 ft, E. 800 ft, from NW Cor. Sec. 10, T2S, R11W
(11 Miles SW of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in SW¼SW¼, Sec. 10, T2S, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
W½, Sec. 10, T2S, R11W.

16-703 (A58913)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwrtg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1700 ft, W. 300 ft, from SE Cor. Sec. 4, T3S, R11W
(15 Miles SW of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NE¼SE¼, Sec. 4, T3S, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 4, T3S, R11W.

16-704 (A58914)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 800 ft, W. 2300 ft, from SE Cor. Sec. 9, T3S, R11W
(14 Miles SE of Knolls)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 15 ft., inundating 0.30 acs.
in SW¼SE¼, Sec. 9, T3S, R11W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 9, T3S, R11W.

16-705 (A58915)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2630 ft, E. 2250 ft, from SW Cor. Sec. 17, T3S, R10W
(15 miles South of Low)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.20 acs.
in NE¼SW¼, Sec. 17, T3S, R10W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
E½, Sec. 17, T3S, R10W.

16-706 (A58916)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 2000 ft, W. 1850 ft, from NE Cor. Sec. 26, T2S, R9W
(11 Miles South of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in SW¼NE¼, Sec. 26, T2S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 26, T2S, R9W.

16-707 (A58917)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1750 ft, E. 2200 ft, from SW Cor. Sec. 26, T2S, R9W
(11 Miles South of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in NE¼SW¼, Sec. 26, T2S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
W½, Sec. 26, T2S, R9W.

16-708 (A58918)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 730 ft, E. 600 ft, from NW Cor. Sec. 34, T2S, R9W
(11 Miles South of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.30 acs.
in NW¼NW¼, Sec. 34, T2S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
W½, Sec. 34, T2S, R9W.

16-709 (A58919)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 5100 ft, W. 1200 ft, from SE Cor. Sec. 3, T3S, R9W
(12 Miles South of Delle)
STORAGE: In Earthen impoundment from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NE¼NE¼, Sec. 3, T3S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 3, T3S, R9W.

16-710 (A58920)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg.) Reservoir)
POINT(S) OF DIVERSION:
(1) N. 1800 ft, E. 350 ft, from SW Cor. Sec. 14, T3S, R9W
(13 Miles SW of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.20 acs.
in NW¼SW¼, Sec. 14, T3S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
W½, Sec. 14, T3S, R9W.

16-711 (A58921)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwrtg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 4400 ft, W. 600 ft, from SE Cor. Sec. 27, T3S, R9W
(16 Miles SW of Delle)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 12 ft., inundating 0.40 acs.
in NE¼NE¼, Sec. 27, T3S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock

PLACE OF USE:
E½, Sec. 27, T3S, R9W.

16-712 (A58922)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 950 ft, E. 4550 ft, from SW Cor. Sec. 10, T4S, R9W
(18 Miles NW of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in SE¼SE¼, Sec. 10, T4S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 3000 head of livestock
PLACE OF USE:
E½, Sec. 10, T4S, R9W.

16-713 (A58923)
APPLICANT: U.S.A. Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 4850 ft, W. 250 ft, from SE Cor. Sec. 35, T4S, R9W
(14 Miles NW of Dugway)
STORAGE: In Earthen impoundment from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.40 acs.
in NE¼NE¼, Sec. 35, T4S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 4000 head of livestock
PLACE OF USE:
E½, Sec. 35, T4S, R9W.

16-714 (A58924)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 720 ft, E. 320 ft, from SW Cor. Sec. 11, T6S, R7W
(9 Miles NE of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in SW¼SW¼, Sec. 11, T6S, R7W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 1700 head of livestock

PLACE OF USE:
W½, Sec. 11, T6S, R7W.

16-715 (A58926)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 3900 ft, E. 3500 ft, from NW Cor. Sec. 27, T5S, R19W
(25 Miles S of Wendover)
STORAGE: In Jerry B. Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 15 ft., inundating 0.50 acs.
in NW¼SE¼, Sec. 27, T5S, R19W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 360 head of livestock
PLACE OF USE:
E½, Sec. 27, T5S, R19W.

16-716 (A58930)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) E. 1600 ft, from NW Cor. Sec. 18, T9S, R8W
(13 Miles S of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 8 ft., inundating 0.10 acs.
in NW¼NW¼, Sec. 18, T9S, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock
PLACE OF USE:
W½, Sec. 18, T9S, R8W.

16-717 (A58931)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 3650 ft, W. 1100 ft, from NE Cor. Sec. 28, T9S, R9W
(15 Miles SW of Dugway)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 7 ft., inundating 0.20 acs.
in NE¼SE¼, Sec. 28, T9S, R9W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock

PLACE OF USE:
E½, Sec. 28, T9S, R9W.

16-718 (A58932)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.2 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1000 ft, W. 750 ft, from NE Cor. Sec. 35, T8S, R8W
(10 Miles South Dugway)
STORAGE: In Winter Spring Reservoir from Jan 1 to Dec 31.
Capacity 0.2 ac.ft., height of dam 15 ft., inundating 0.50 acs.
in NE¼NE¼, Sec. 35, T8S, R8W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock
PLACE OF USE:
E½, Sec. 35, T8S, R8W.

16-719 (A58933)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1800 ft, E. 2250 ft, from NW Cor. Sec. 32, T8S, R7W
(12 Miles SE of Dugway)
STORAGE: In Burton Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.20 acs.
in NE¼NW¼, Sec. 32, T8S, R7W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 520 head of livestock
PLACE OF USE:
W½, Sec. 32, T8S, R7W.

16-720 (A58934)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwatrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 3720 ft, E. 900 ft, from NE Cor. Sec. 18, T8S, R6W
(11 miles SE of Dugway)
STORAGE: In Lookout Pass Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in NW¼SW¼, Sec. 18, T8S, R6W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 6000 head of livestock

PLACE OF USE:
W½, Sec. 18, T8S, R6W.

17-184 (A58908)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (Stkwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) N. 2450 ft, W. 2600 ft, from SE Cor. Sec. 27, T10S, R19W
(8 Miles South of Ibapah)
STORAGE: In Unnamed Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 10 ft., inundating 0.40 acs.
in NW¼SE¼, Sec. 27, T10S, R19W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 400 head of livestock
PLACE OF USE:
E½, Sec. 27, T10S, R19W.

17-185 (A58927)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface Runoff (stkwtrg reservoir)
POINT(S) OF DIVERSION:
(1) N. 3850 ft, E. 700 ft, from SW Cor. Sec. 5, T8S, R18W
(9 Miles NE of Ibapah)
STORAGE: In Berg Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 15 ft., inundating 0.20 acs.
in SW¼NW¼, Sec. 5, T8S, R18W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 340 head of livestock
PLACE OF USE:
W½, Sec. 5, T8S, R18W.

17-186 (A58929)
APPLICANT: USA Bureau of Land Management
2370 South 2300 West
Salt Lake City, UT
QUANTITY: 0.1 Ac.Ft.
SOURCE: Surface runoff (Stckwtrg. Reservoir)
POINT(S) OF DIVERSION:
(1) S. 1150 ft, E. 1000 ft, from NW Cor. Sec. 12, T9S, R19W
(3 Miles NE of Ibapah)
STORAGE: In Secret Spring Reservoir from Jan 1 to Dec 31.
Capacity 0.1 ac.ft., height of dam 6 ft., inundating 0.10 acs.
in NW¼NW¼, Sec. 12, T9S, R19W.
PURPOSE AND PERIOD OF USE:
Stockwatering: 400 head of livestock

PLACE OF USE:
W½, Sec. 12, T9S, R19W.

Protests resisting the granting of these applications with reasons therefore must be filed in duplicate with the State Engineer, 1636 West North Temple, Salt Lake City, Utah 84116 on or before June 2, 1984.

Dee C. Hansen, P.E.
STATE ENGINEER

Published in Tooele Transcript
on April 19, 26, & May 3, 1984.

Appendix 5.2
Water Rights Data

STATE OF UTAH -- DIVISION OF WATER RIGHTS -- DATA PRINT OUT for 16-533(A38841)

(WARNING: Water Rights makes NO claims as to the accuracy of this data.) RUN DATE: 09/18/2003

WRNUM: 16-533 APPLICATION/CLAIM NO.: A38841 CERT. NO.:

OWNERSHIP**********

NAME: Gardner, Jack M. OWNER MISC:
ADDR: 220 Felt Bldg.
CITY: Salt Lake City STATE: UT ZIP: 84111

NAME: Stewart, Douglas D. OWNER MISC:
ADDR: 220 Felt Bldg
CITY: Salt Lake City STATE: UT ZIP: 84111

NAME: Stock, Eldon M. OWNER MISC:
ADDR: 220 Felt Bldg.
CITY: Salt Lake City STATE: UT ZIP: 84111

LAND OWNED BY APPLICANT?

DATES, ETC.**********

FILING: 06/04/1968	PRIORITY: 06/04/1968	ADV BEGAN: 07/05/1968	ADV ENDED:	NEWSPAPER:
PROTST END:	PROTESTED: [Yes]	APPR/REJ: [ ]	APPR/REJ:	PROOF DUE: / EXTENSION:
ELEC/PROOF: [ ]	ELEC/PROOF:	CERT/WUC:	LAP, ETC: 06/22/1984	PROV LETR: / RENOVATE:
RECON REQ:	TYPE: [ ]			

PD Book No. Map: Date Verified: 02/27/1984 Initials: WHS

Type of Right: Application to Appropriate Source of Info: Application to Appropriate Status: BAD STATUS

LOCATION OF WATER RIGHT**********

FLOW: 5.0 cfs SOURCE: Underground Water Well

COUNTY: Tooele COMMON DESCRIPTION:

POINTS OF DIVERSION -- UNDERGROUND:

(1) N 1500 ft W 500 ft from SE cor, Sec 04, T 1N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
(2) S 2800 ft E 1400 ft from NW cor, Sec 10, T 1N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
(3) N 300 ft 0 ft from S4 cor, Sec 21, T 1N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
(4) N 300 ft W 300 ft from SE cor, Sec 29, T 1N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
(5) N 2640 ft W 2640 ft from SE cor, Sec 06, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
(6) N 1850 ft E 1600 ft from SW cor, Sec 08, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 109 to ft. YEAR DRILLED: WELL LOG?
Comment:
(7) N 750 ft W 2000 ft from SE cor, Sec 17, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
(8) S 2000 ft E 2400 ft from NW cor, Sec 17, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
(9) S 1800 ft W 900 ft from NE cor, Sec 20, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
(10)N 2600 ft W 2800 ft from SE cor, Sec 28, T 2N, R 8W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:
(11)S 2800 ft W 1500 ft from NE cor, Sec 33, T 2N, R 8W, SLBM DIAM: ins. DEPTH: to ft. YEAR DRILLED: WELL LOG?
Comment:
(12)N 100 ft W 20 ft from SE cor, Sec 36, T 3N, R 9W, SLBM DIAM: 12 ins. DEPTH: 100 to 500 ft. YEAR DRILLED: WELL LOG?
Comment:

PLACE OF USE OF WATER RIGHT**********

NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE

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Sec 04 T  1N R  8W SLBM     *  :  :  :  *     *  :  :  :  *     *  :  :  :  *     * X: X: X: X*
Sec 10 T  1N R  8W SLBM     *  :  :  :  *     *  :  :  :  *     * X: X: X: X*     *  :  :  :  *
Sec 21 T  1N R  8W SLBM     *  :  :  :  *     *  :  :  :  *     *  :  :  :  *     * X: X: X: X*
Sec 28 T  1N R  8W SLBM     *  :  :  :  *     *  :  :  :  *     *  :  :  :  *     * X: X: X: X*
Sec 29 T  1N R  8W SLBM     *  :  :  :  *     *  :  :  :  *     *  :  :  :  *     * X: X: X: X*
Sec 06 T  2N R  8W SLBM     *  :  :  :  *     *  :  :  :  *     *  :  :  :  *     * X: X: X: X*
Sec 08 T  2N R  8W SLBM     *  :  :  :  *     *  :  :  :  *     * X: X: X: X*     *  :  :  :  *
Sec 08 T  2N R  8W SLBM     *  :  :  :  *     * X: X: X: X*     *  :  :  :  *     *  :  :  :  *
Sec 17 T  2N R  8W SLBM     * X: X: X: X*     *  :  :  :  *     *  :  :  :  *     * X: X: X: X*
Sec 20 T  2N R  8W SLBM     *  :  :  :  *     * X: X: X: X*     *  :  :  :  *     *  :  :  :  *
Sec 28 T  2N R  8W SLBM     *  :  :  :  *     *  :  :  :  *     *  :  :  :  *     * X: X: X: X*
Sec 33 T  2N R  8W SLBM     *  :  :  :  *     *  :  :  :  *     *  :  :  :  *     * X: X: X: X*
```

USES OF WATER RIGHT

CLAIMS USED FOR PURPOSE DESCRIBED: 533

Referenced To: Claims Groups: 1 Type of Reference -- Claims: Purpose: Remarks:

###DOMESTIC: 30 Persons Diversion Limit: PERIOD OF USE: 01/01 TO 12/31

###MINING: DISTRICT: Lakeside NAME: Lost Silver Lode PERIOD OF USE: 01/01 TO 12/31
ORES: Gold,Silver,Lead,Zinc

###OTHER Processing and washing gravel.

OTHER COMMENTS

Protested by U.S. Bureau of Land Management.
Wells Nos. 1, 2, 3, and 12 will also be used for milling of ores.
This application REJECTED by Memorandum Decision dated June 22, 1984.

END OF DATA

STATE OF UTAH -- DIVISION OF WATER RIGHTS -- DATA PRINT OUT for 16-696(A58905)

(WARNING: Water Rights makes NO claims as to the accuracy of this data.) RUN DATE: 09/18/2003

WRNUM: 16-696 APPLICATION/CLAIM NO.: A58905 CERT. NO.:

OWNERSHIP**********

NAME: USA Bureau of Land Management OWNER MISC:
ADDR: 2370 South 2300 West
CITY: Salt Lake City STATE: UT ZIP: 84119 INTEREST: 100%

LAND OWNED BY APPLICANT? Yes

DATES, ETC.**********

FILING: 06/02/1983|PRIORITY: 03/22/1984|ADV BEGAN: 04/19/1984|ADV ENDED: |NEWSPAPER: Tooele Transcript
PROTST END:06/02/1984|PROTESTED: [No] |APPR/REJ: [Approved]|APPR/REJ: 08/03/1984|PROOF DUE: 10/31/1987|EXTENSION:
ELEC/PROOF:[Election]|ELEC/PROOF:02/19/1987|CERT/WUC: 07/31/1989|LAP, ETC: |PROV LETR: |RENOVATE:
RECON REQ: |TYPE: [ ]

PD Book No. Map: 14 Date Verified: 08/07/1989 Initials: WHS

Type of Right: Application to Appropriate Source of Info: Water User's Claim Status: WUC Signed

LOCATION OF WATER RIGHT**********

FLOW: 0.1 acre-feet SOURCE: Surface Runoff (Stkwtrg. Reservoir)

COUNTY: Tooele COMMON DESCRIPTION: 6 miles N. of Delle

POINT OF DIVERSION -- SURFACE:
(1) S 1500 ft W 1700 ft from NE cor, Sec 33, T 2N, R 8W, SLBM
Diverting Works: An earthen impoundment Source: Surface Runoff

PLACE OF USE OF WATER RIGHT**********

	NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
	NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE
Sec 33 T 2N R 8W SLBM	* : : : *	* : : X: *	* : : : *	* : : : *

USES OF WATER RIGHT**********

CLAIMS USED FOR PURPOSE DESCRIBED: 696
Referenced To: Claims Groups: 1 Type of Reference -- Claims: Purpose: Remarks:

###STOCKWATERING: 600 Cattle or Equivalent Diversion Limit: PERIOD OF USE: 01/01 TO 12/31
Lakeside Allotment

###WILDLIFE Incidental wildlife purposes.

Storage from 01/01 to 12/31, inclusive, in Unnamed Reservoir with a maximum capacity of 0.100 acre-feet, located in:

		NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
Height of Dam:	5	NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE
Area Inundated:	0.10				
Sec 33 T 2N R 8W SLBM		* : : : *	* : : X: *	* : : : *	* : : : *

OTHER COMMENTS**********

The required information necessary to complete this application was not received until March 22, 1984, even though it was originally filed June 2, 1983. The priority date is thus brought down to March 22, 1984.

**********END OF DATA**********

STATE OF UTAH -- DIVISION OF WATER RIGHTS -- DATA PRINT OUT for 16-697(A58906)

(WARNING: Water Rights makes NO claims as to the accuracy of this data.) RUN DATE: 09/18/2003

WRNUM: 16-697 APPLICATION/CLAIM NO.: A58906 CERT. NO.:

OWNERSHIP**********

NAME: USA Bureau of Land Management OWNER MISC:
ADDR: 2370 South 2300 West
CITY: Salt Lake City STATE: UT ZIP: 84119 INTEREST: 100%

LAND OWNED BY APPLICANT? Yes

DATES, ETC.**********

FILING: 06/02/1983 | PRIORITY: 03/22/1984 | ADV BEGAN: 04/19/1984 | ADV ENDED: | NEWSPAPER: Tooele Transcript
PROTST END: 06/02/1984 | PROTESTED: [No] | APPR/REJ: [Approved] | APPR/REJ: 08/03/1984 | PROOF DUE: 10/31/1987 | EXTENSION:
ELEC/PROOF: [Election] | ELEC/PROOF: 02/19/1987 | CERT/WUC: 07/31/1989 | LAP, ETC: | PROV LETR: | RENOVATE:
RECON REQ: | TYPE: [ ]

PD Book No. Map: 14 Date Verified: 08/07/1989 Initials: WHS

Type of Right: Application to Appropriate Source of Info: Water User's Claim Status: WUC Signed

LOCATION OF WATER RIGHT**********

FLOW: 0.1 acre-feet SOURCE: Surface Runoff (Stckwtrg. Reservoir

COUNTY: Tooele COMMON DESCRIPTION: 6 Miles North of Delle

POINT OF DIVERSION -- SURFACE:
(1) N 200 ft W 1300 ft from SE cor, Sec 33, T 2N, R 8W, SLBM
Diverting Works: Earthen impoundment Source: Surface runoff

PLACE OF USE OF WATER RIGHT**********

	NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
	NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE
Sec 33 T 2N R 8W SLBM	* : : : *	* : : : *	* : : : *	* : : : X*

USES OF WATER RIGHT**********

CLAIMS USED FOR PURPOSE DESCRIBED: 697
Referenced To: Claims Groups: 1 Type of Reference -- Claims: Purpose: Remarks:

###STOCKWATERING: 600 Cattle or Equivalent Diversion Limit: PERIOD OF USE: 01/01 TO 12/31
Lakeside Allotment

###WILDLIFE Incidental wildlife purposes.

Storage from 01/01 to 12/31, inclusive, in Unnamed Reservoir with a maximum capacity of 0.100 acre-feet, located in:

		NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
Height of Dam:	6	NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE
Area Inundated:	0.15				
Sec 33 T 2N R 8W SLBM		* : : : *	* : : : *	* : : : *	* : : : X*

OTHER COMMENTS**********

The required information necessary to complete this application was not received until March 22, 1984, even though it was originally filed June 2, 1983. The priority date is thus brought down to March 22, 1984.

**********E N D O F D A T A**********

STATE OF UTAH -- DIVISION OF WATER RIGHTS -- DATA PRINT OUT for 16-698(A58907)

(WARNING: Water Rights makes NO claims as to the accuracy of this data.) RUN DATE: 09/18/2003

WRNUM: 16-698 APPLICATION/CLAIM NO.: A58907 CERT. NO.:

OWNERSHIP**********

NAME: USA Bureau of Land Management OWNER MISC:
ADDR: 2370 South 2300 West
CITY: Salt Lake City STATE: UT ZIP: 84119 INTEREST: 100%

LAND OWNED BY APPLICANT? Yes

DATES, ETC.**********

FILING: 06/02/1983 | PRIORITY: 03/22/1984 | ADV BEGAN: 04/19/1984 | ADV ENDED: | NEWSPAPER: Tooele Transcript
PROTST END: 06/02/1984 | PROTESTED: [No] | APPR/REJ: [Approved] | APPR/REJ: 08/03/1984 | PROOF DUE: 10/31/1987 | EXTENSION:
ELEC/PROOF: [Election] | ELEC/PROOF: 02/19/1987 | CERT/WUC: 07/31/1989 | LAP, ETC: | PROV LETR: | RENOVATE:
RECON REQ: | TYPE: [ ]

PD Book No. Map: 14 Date Verified: 08/07/1989 Initials: WHS

Type of Right: Application to Appropriate Source of Info: Water User's Claim Status: WUC Signed

LOCATION OF WATER RIGHT**********

FLOW: 0.1 acre-feet SOURCE: Surface Runoff (Stkwtrg. Resevoir)

COUNTY: Tooele COMMON DESCRIPTION: 5 Miles North of Delle

POINT OF DIVERSION -- SURFACE:
(1) N 4450 ft E 600 ft from SW cor, Sec 10, T 1N, R 8W, SLBM
Diverting Works: An earthen impoundment Source: Surface Runoff

PLACE OF USE OF WATER RIGHT**********

	NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
	NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE
Sec 10 T 1N R 8W SLBM	* X: : : *	* : : : *	* : : : *	* : : : *

USES OF WATER RIGHT**********

CLAIMS USED FOR PURPOSE DESCRIBED: 698
Referenced To: Claims Groups: 1 Type of Reference -- Claims: Purpose: Remarks:

###STOCKWATERING: 600 Cattle or Equivalent Diversion Limit: PERIOD OF USE: 01/01 TO 12/31
Lakeside Allotment

###WILDLIFE Incidental Wildlife purposes.

Storage from 01/01 to 12/31, inclusive, in Dead Cow Point Reservoir with a maximum capacity of 0.100 acre-feet, located in:
Height of Dam: 8
Area Inundated: 0.20

	NORTH-WEST¼	NORTH-EAST¼	SOUTH-WEST¼	SOUTH-EAST¼
	NW NE SW SE	NW NE SW SE	NW NE SW SE	NW NE SW SE
Sec 10 T 1N R 8W SLBM	* X: : : *	* : : : *	* : : : *	* : : : *

OTHER COMMENTS**********

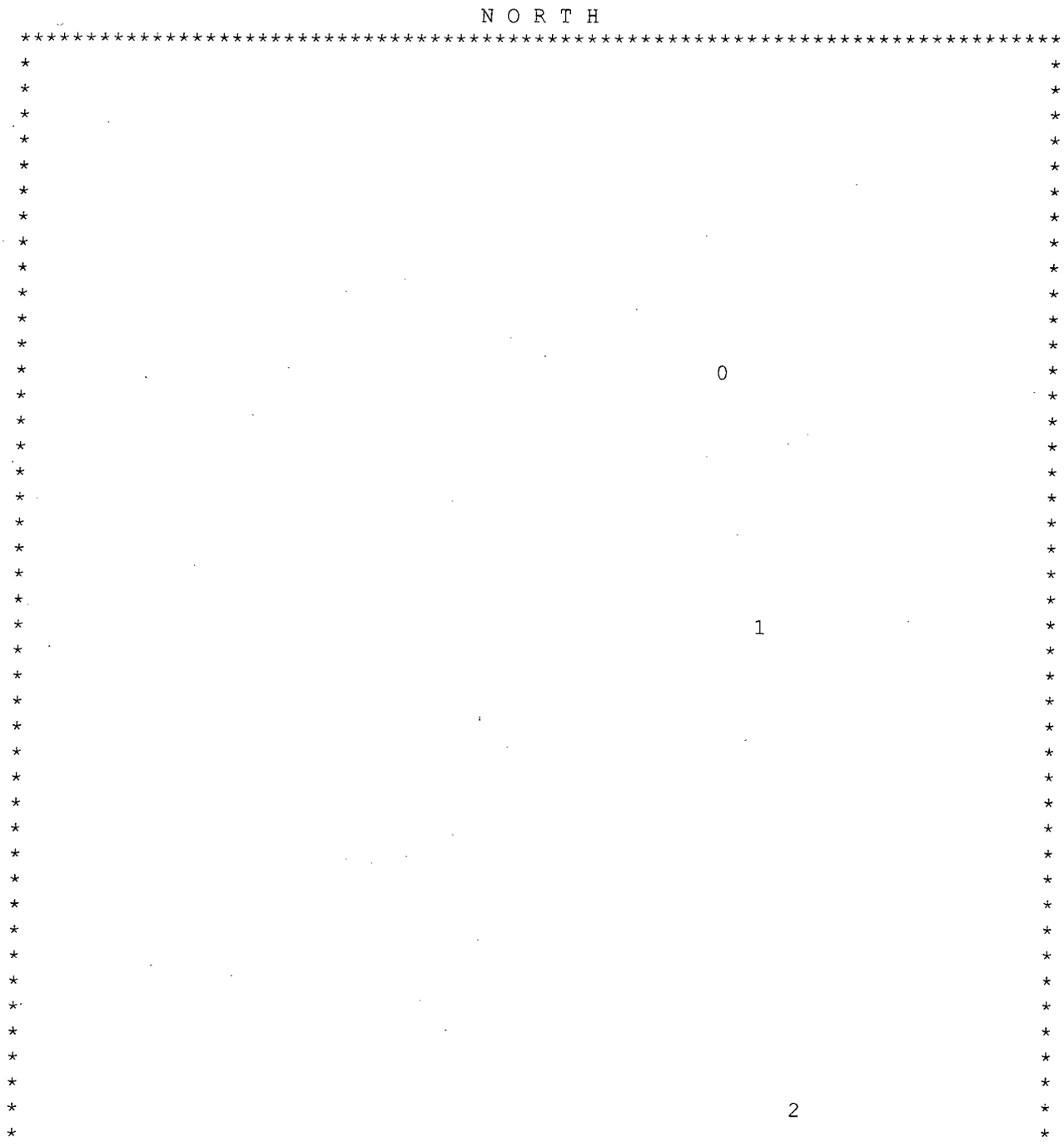
The required information necessary to complete this application was not received until March 22, 1984, even though it was originally filed June 2, 1983. The priority date is thus brought down to March 22, 1984.

**********END OF DATA**********

UTAH DIVISION OF WATER RIGHTS
WATER RIGHT POINT OF DIVERSION PLOT CREATED FRI, SEP 1
PLOT SHOWS LOCATION OF 3 POINTS OF DIV

PLOT OF ALL QUARTER(S) IN SECTION 33 TOWNSHIP 2N RAN

PLOT SCALE IS APPROXIMATELY 1 INCH = 1000 FE



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UTAH DIVISION OF WATER RIGHTS
NWPLAT POINT OF DIVERSION LOCATION PRO

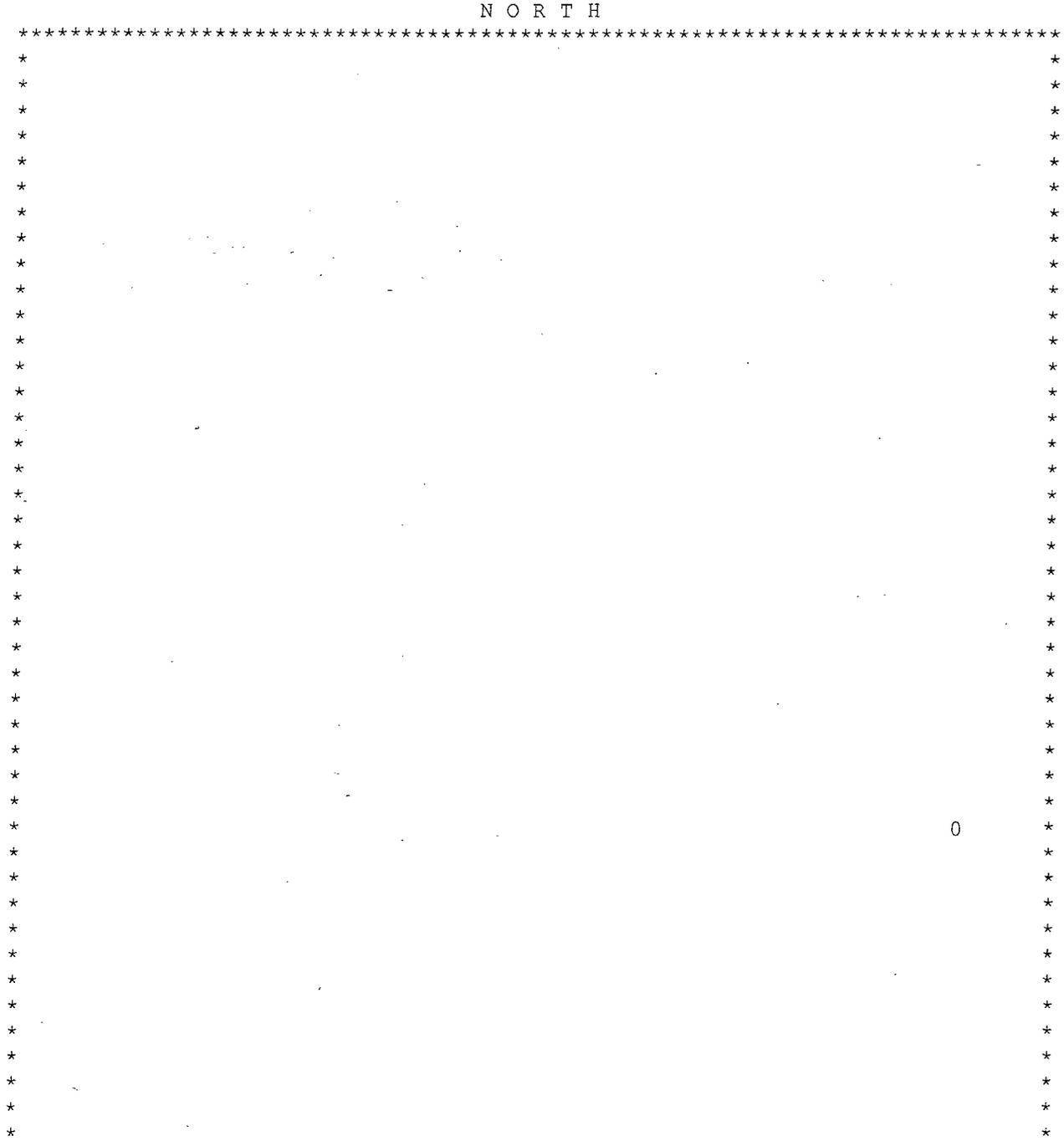
MAP CHAR	WATER RIGHT	QUANTITY CFS	AND/OR	AC-FT	SOURCE DESCRIPTION or WELL INFO DIAMETER	DEPTH	YEAR LOG	POIN NORTH
0	16 696	.0000		.10	Surface Runoff (Stkwtrg. Reser		S	1500
	WATER USE(S): STOCKWATERING OTHER							
	USA Bureau of Land Management				2370 South 2300 West			
1	16 533	5.0000		.00	Underground Water Well		S	2800
	WATER USE(S): DOMESTIC MINING OTHER							
	Stock, Eldon M.				220 Felt Bldg.			
	Stewart, Douglas D.				220 Felt Bldg			
	Gardner, Jack M.				220 Felt Bldg.			
2	16 697	.0000		.10	Surface Runoff (Stckwtrg. Res		N	200
	WATER USE(S): STOCKWATERING OTHER							
	USA Bureau of Land Management				2370 South 2300 West			

UTAH DIVISION OF WATER RIGHTS
WATER RIGHT POINT OF DIVERSION PLOT CREATED FRI, SEP 1
PLOT SHOWS LOCATION OF 1 POINTS OF DIV

PLOT OF ALL QUARTER(S) IN SECTION 4 TOWNSHIP 1N RAN

PLOT SCALE IS APPROXIMATELY 1 INCH = 1000 FE

N O R T H



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UTAH DIVISION OF WATER RIGHTS
NWPLAT POINT OF DIVERSION LOCATION PRO

MAP CHAR	WATER RIGHT	CFS	QUANTITY AND/OR	AC-FT	SOURCE DESCRIPTION or WELL INFO DIAMETER	DEPTH	YEAR LOG	POIN NORTH
0	16 533	5.0000		.00	12	100 - 500		N 1500

WATER USE(S): DOMESTIC MINING OTHER

Stock, Eldon M.	220 Felt Bldg.
Stewart, Douglas D.	220 Felt Bldg
Gardner, Jack M.	220 Felt Bldg.

```
                                            UTAH DIVISION OF WATER RIGHTS
                              WATER RIGHT POINT OF DIVERSION PLOT CREATED FRI, SEP 1
                                         PLOT SHOWS LOCATION OF      2 POINTS OF DIV

                            PLOT OF ALL QUARTER(S) IN SECTION 10  TOWNSHIP 1N    RAN

                                    PLOT SCALE IS APPROXIMATELY  1 INCH =    1000 FE

                                  N O R T H
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UTAH DIVISION OF WATER RIGHTS
NWPLAT POINT OF DIVERSION LOCATION PRO

MAP CHAR	WATER RIGHT	CFS	QUANTITY AND/OR	AC-FT	SOURCE DESCRIPTION or WELL INFO DIAMETER	DEPTH	YEAR LOG	NORTH	POIN
0	16 698	.0000		.10	Surface Runoff (Stkwtrg. Resev			N	4450
	WATER USE(S): STOCKWATERING OTHER								
	USA Bureau of Land Management					2370 South 2300 West			
1	16 533	5.0000		.00	12	100 - 500		S	2800
	WATER USE(S): DOMESTIC MINING OTHER								
	Stock, Eldon M.					220 Felt Bldg.			
	Stewart, Douglas D.					220 Felt Bldg			
	Gardner, Jack M.					220 Felt Bldg.			

Appendix 5.3
Well Log Information Listing

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: / /

Appendix 5.4
HELP Model Results

```
******************************************************************************
******************************************************************************
**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     C:\TEMP\HELP\DATA4.D4
TEMPERATURE DATA FILE:       C:\TEMP\HELP\DATA7.D7
SOLAR RADIATION DATA FILE:   C:\TEMP\HELP\DATA13.D13
EVAPOTRANSPIRATION DATA:     C:\TEMP\HELP\DATA11.D11
SOIL AND DESIGN DATA FILE:   C:\TEMP\HELP\BORIS.D10
OUTPUT DATA FILE:            C:\TEMP\HELP\TEST.OUT


TIME:  16:53     DATE:  10/ 4/2004


******************************************************************************

     TITLE:  WASATCH REGIONAL LANDFILL

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                  TYPE 1 - VERTICAL PERCOLATION LAYER
                      MATERIAL TEXTURE NUMBER  10
          THICKNESS                    =     24.00   INCHES
          POROSITY                     =      0.3980 VOL/VOL
          FIELD CAPACITY               =      0.2440 VOL/VOL
          WILTING POINT                =      0.1360 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.1693 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.119999997000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  1.80
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                  LAYER  2
                                  --------

                  TYPE 2 - LATERAL DRAINAGE LAYER
                      MATERIAL TEXTURE NUMBER  20
          THICKNESS                    =      0.25   INCHES
          POROSITY                     =      0.8500 VOL/VOL
          FIELD CAPACITY               =      0.0100 VOL/VOL
          WILTING POINT                =      0.0050 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.1296 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =   10.0000000000     CM/SEC
          SLOPE                        =      2.00   PERCENT
          DRAINAGE LENGTH              =    250.0    FEET


                                  LAYER  3
                                  --------

                  TYPE 4 - FLEXIBLE MEMBRANE LINER
                      MATERIAL TEXTURE NUMBER  35
          THICKNESS                    =      0.06   INCHES
          POROSITY                     =      0.0000 VOL/VOL
          FIELD CAPACITY               =      0.0000 VOL/VOL
          WILTING POINT                =      0.0000 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.0000 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.199999996000E-12 CM/SEC
          FML PINHOLE DENSITY          =      0.00   HOLES/ACRE
          FML INSTALLATION DEFECTS     =      0.00   HOLES/ACRE
          FML PLACEMENT QUALITY        =  4 - POOR


                                  LAYER  4
                                  --------

                  TYPE 3 - BARRIER SOIL LINER
                      MATERIAL TEXTURE NUMBER  17
          THICKNESS                    =      0.60   INCHES
          POROSITY                     =      0.7500 VOL/VOL
          FIELD CAPACITY               =      0.7470 VOL/VOL
          WILTING POINT                =      0.4000 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.7500 VOL/VOL
```

```
EFFECTIVE SAT. HYD. COND.    =  0.300000003000E-08 CM/SEC


                        LAYER  5
                        --------

          TYPE 1 - VERTICAL PERCOLATION LAYER
              MATERIAL TEXTURE NUMBER   9
THICKNESS                    =     12.00   INCHES
POROSITY                     =      0.5010 VOL/VOL
FIELD CAPACITY               =      0.2840 VOL/VOL
WILTING POINT                =      0.1350 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.2840 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.190000006000E-03 CM/SEC


                        LAYER  6
                        --------

          TYPE 1 - VERTICAL PERCOLATION LAYER
              MATERIAL TEXTURE NUMBER  18
THICKNESS                    =   1140.00   INCHES
POROSITY                     =      0.6710 VOL/VOL
FIELD CAPACITY               =      0.2920 VOL/VOL
WILTING POINT                =      0.0770 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.2920 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC


                        LAYER  7
                        --------

          TYPE 1 - VERTICAL PERCOLATION LAYER
              MATERIAL TEXTURE NUMBER  10
THICKNESS                    =     18.00   INCHES
POROSITY                     =      0.3980 VOL/VOL
FIELD CAPACITY               =      0.2440 VOL/VOL
WILTING POINT                =      0.1360 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.2440 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.119999997000E-03 CM/SEC


                        LAYER  8
                        --------

            TYPE 2 - LATERAL DRAINAGE LAYER
              MATERIAL TEXTURE NUMBER  20
THICKNESS                    =      0.25   INCHES
POROSITY                     =      0.8500 VOL/VOL
FIELD CAPACITY               =      0.0100 VOL/VOL
WILTING POINT                =      0.0050 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.0100 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =   10.0000000000     CM/SEC
SLOPE                        =      2.00   PERCENT
DRAINAGE LENGTH              =    250.0    FEET


                        LAYER  9
                        --------

            TYPE 4 - FLEXIBLE MEMBRANE LINER
              MATERIAL TEXTURE NUMBER  35
THICKNESS                    =      0.06   INCHES
POROSITY                     =      0.0000 VOL/VOL
FIELD CAPACITY               =      0.0000 VOL/VOL
WILTING POINT                =      0.0000 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.0000 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.199999996000E-12 CM/SEC
FML PINHOLE DENSITY          =      1.00   HOLES/ACRE
FML INSTALLATION DEFECTS     =      1.00   HOLES/ACRE
FML PLACEMENT QUALITY        =  2 - EXCELLENT


                        LAYER 10
                        --------

              TYPE 3 - BARRIER SOIL LINER
              MATERIAL TEXTURE NUMBER  17
THICKNESS                    =      0.60   INCHES
POROSITY                     =      0.7500 VOL/VOL
FIELD CAPACITY               =      0.7470 VOL/VOL
WILTING POINT                =      0.4000 VOL/VOL
INITIAL SOIL WATER CONTENT   =      0.7500 VOL/VOL
EFFECTIVE SAT. HYD. COND.    =  0.300000003000E-08 CM/SEC


          GENERAL DESIGN AND EVAPORATIVE ZONE DATA
          ----------------------------------------

NOTE:  SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.
```

SCS RUNOFF CURVE NUMBER	=	75.00	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	310.000	ACRES
EVAPORATIVE ZONE DEPTH	=	24.2	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	4.095	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	9.764	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	3.265	INCHES
INITIAL SNOW WATER	=	0.131	INCHES
INITIAL WATER IN LAYER MATERIALS	=	345.677	INCHES
TOTAL INITIAL WATER	=	345.809	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
SALT LAKE CITY UTAH

STATION LATITUDE	=	40.76	DEGREES
MAXIMUM LEAF AREA INDEX	=	1.00	
START OF GROWING SEASON (JULIAN DATE)	=	117	
END OF GROWING SEASON (JULIAN DATE)	=	289	
EVAPORATIVE ZONE DEPTH	=	24.2	INCHES
AVERAGE ANNUAL WIND SPEED	=	8.80	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	67.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	48.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	39.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	65.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SALT LAKE CITY UTAH

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
1.11	1.10	1.41	1.81	1.21	0.80
0.59	0.75	0.73	0.93	1.00	1.12

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SALT LAKE CITY UTAH

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
28.60	34.10	40.70	49.20	58.80	68.30
77.50	74.90	65.00	53.00	39.70	30.30

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SALT LAKE CITY UTAH
AND STATION LATITUDE = 40.76 DEGREES

****

ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	9.94	11185483.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	9.943	11188492.000	100.03
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.003	-3022.046	-0.03
SOIL WATER AT START OF YEAR	345.677	388990624.000	
SOIL WATER AT END OF YEAR	345.675	388987616.000	
SNOW WATER AT START OF YEAR	0.131	147777.891	1.32
SNOW WATER AT END OF YEAR	0.131	147777.891	1.32
ANNUAL WATER BUDGET BALANCE	0.0000	12.878	0.00

****

****

ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.81	14415096.000	100.00
RUNOFF	0.079	88373.344	0.61
EVAPOTRANSPIRATION	12.994	14621979.000	101.44
DRAINAGE COLLECTED FROM LAYER 2	0.0750	84406.375	0.59
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.190	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0007		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.107	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.083	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.337	-379651.219	-2.63
SOIL WATER AT START OF YEAR	345.675	388987616.000	
SOIL WATER AT END OF YEAR	345.469	388755744.000	
SNOW WATER AT START OF YEAR	0.131	147777.891	1.03
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-12.196	0.00

****

****

ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	8.47	9531293.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	8.288	9326715.000	97.85
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.182	204569.281	2.15
SOIL WATER AT START OF YEAR	345.469	388755744.000	
SOIL WATER AT END OF YEAR	344.895	388110080.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.756	850222.500	8.92
ANNUAL WATER BUDGET BALANCE	0.0000	9.055	0.00

****

****

ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.97	16845748.000	100.00
RUNOFF	0.180	202250.281	1.20
EVAPOTRANSPIRATION	14.656	16492197.000	97.90
DRAINAGE COLLECTED FROM LAYER 2	0.1453	163548.625	0.97
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.208	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0014		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.117	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.090	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		

			CLOSED.OUT
CHANGE IN WATER STORAGE	-0.011	-12243.588	-0.07
SOIL WATER AT START OF YEAR	344.895	388110080.000	
SOIL WATER AT END OF YEAR	345.634	388941760.000	
SNOW WATER AT START OF YEAR	0.756	850222.500	5.05
SNOW WATER AT END OF YEAR	0.006	6298.169	0.04
ANNUAL WATER BUDGET BALANCE	0.0000	-4.069	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.46	11770640.000	100.00
RUNOFF	0.049	55461.312	0.47
EVAPOTRANSPIRATION	10.895	12260629.000	104.16
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.485	-545458.625	-4.63
SOIL WATER AT START OF YEAR	345.634	388941760.000	
SOIL WATER AT END OF YEAR	345.155	388402624.000	
SNOW WATER AT START OF YEAR	0.006	6298.169	0.05
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	8.418	0.00

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.69	16530659.000	100.00
RUNOFF	0.060	68028.242	0.41
EVAPOTRANSPIRATION	13.937	15683558.000	94.88
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.692	779067.187	4.71
SOIL WATER AT START OF YEAR	345.155	388402624.000	
SOIL WATER AT END OF YEAR	345.246	388505760.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.601	675905.562	4.09
ANNUAL WATER BUDGET BALANCE	0.0000	5.684	0.00

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.24	13773673.000	100.00

			CLOSED.OUT
RUNOFF	0.011	12196.894	0.09
EVAPOTRANSPIRATION	12.612	14192809.000	103.04
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.383	-431346.469	-3.13
SOIL WATER AT START OF YEAR	345.246	388505760.000	
SOIL WATER AT END OF YEAR	345.026	388258208.000	
SNOW WATER AT START OF YEAR	0.601	675905.562	4.91
SNOW WATER AT END OF YEAR	0.437	492126.437	3.57
ANNUAL WATER BUDGET BALANCE	0.0000	13.497	0.00

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	9.97	11219242.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	9.734	10953468.000	97.63
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.236	265771.469	2.37
SOIL WATER AT START OF YEAR	345.026	388258208.000	
SOIL WATER AT END OF YEAR	345.607	388911744.000	
SNOW WATER AT START OF YEAR	0.437	492126.437	4.39
SNOW WATER AT END OF YEAR	0.093	104346.172	0.93
ANNUAL WATER BUDGET BALANCE	0.0000	3.287	0.00

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.07	15832975.000	100.00
RUNOFF	0.340	382364.156	2.41
EVAPOTRANSPIRATION	14.102	15868696.000	100.23
DRAINAGE COLLECTED FROM LAYER 2	0.0951	107004.844	0.68
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.177	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0009		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.100	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.077	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.467	-525097.375	-3.32
SOIL WATER AT START OF YEAR	345.607	388911744.000	
SOIL WATER AT END OF YEAR	345.233	388491008.000	
SNOW WATER AT START OF YEAR	0.093	104346.172	0.66

			CLOSED.OUT
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	6.665	0.00

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.58	13030975.000	100.00
RUNOFF	0.244	274178.094	2.10
EVAPOTRANSPIRATION	11.074	12461191.000	95.63
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.263	295595.281	2.27
SOIL WATER AT START OF YEAR	345.233	388491008.000	
SOIL WATER AT END OF YEAR	345.329	388599296.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.166	187316.766	1.44
ANNUAL WATER BUDGET BALANCE	0.0000	11.034	0.00

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ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.58	15281576.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	13.368	15043394.000	98.44
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.212	238207.906	1.56
SOIL WATER AT START OF YEAR	345.329	388599296.000	
SOIL WATER AT END OF YEAR	345.708	389024800.000	
SNOW WATER AT START OF YEAR	0.166	187316.766	1.23
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-25.404	0.00

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ANNUAL TOTALS FOR YEAR 12

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.75	12096979.000	100.00
RUNOFF	0.017	18963.238	0.16
EVAPOTRANSPIRATION	11.424	12855273.000	106.27
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00

			CLOSED.OUT
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.691	-777270.750	-6.43
SOIL WATER AT START OF YEAR	345.708	389024800.000	
SOIL WATER AT END OF YEAR	344.913	388131040.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.104	116499.359	0.96
ANNUAL WATER BUDGET BALANCE	0.0000	13.270	0.00

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ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.08	12468327.000	100.00
RUNOFF	0.040	45567.332	0.37
EVAPOTRANSPIRATION	10.347	11643449.000	93.38
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.693	779308.250	6.25
SOIL WATER AT START OF YEAR	344.913	388131040.000	
SOIL WATER AT END OF YEAR	345.675	388988160.000	
SNOW WATER AT START OF YEAR	0.104	116499.359	0.93
SNOW WATER AT END OF YEAR	0.034	38679.840	0.31
ANNUAL WATER BUDGET BALANCE	0.0000	2.369	0.00

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ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.47	12907193.000	100.00
RUNOFF	0.001	1501.367	0.01
EVAPOTRANSPIRATION	11.592	13044453.000	101.06
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.123	-138753.656	-1.08
SOIL WATER AT START OF YEAR	345.675	388988160.000	
SOIL WATER AT END OF YEAR	345.209	388463392.000	
SNOW WATER AT START OF YEAR	0.034	38679.840	0.30
SNOW WATER AT END OF YEAR	0.377	424697.594	3.29
ANNUAL WATER BUDGET BALANCE	0.0000	-7.192	0.00

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ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.25	12659627.000	100.00
RUNOFF	0.069	77217.203	0.61
EVAPOTRANSPIRATION	11.089	12478971.000	98.57
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.092	103439.273	0.82
SOIL WATER AT START OF YEAR	345.209	388463392.000	
SOIL WATER AT END OF YEAR	345.678	388991520.000	
SNOW WATER AT START OF YEAR	0.377	424697.594	3.35
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.159	0.00

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ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.83	13312302.000	100.00
RUNOFF	0.043	48066.449	0.36
EVAPOTRANSPIRATION	11.650	13109772.000	98.48
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.137	154433.406	1.16
SOIL WATER AT START OF YEAR	345.678	388991520.000	
SOIL WATER AT END OF YEAR	345.815	389145952.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	29.797	0.00

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ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.49	12929699.000	100.00
RUNOFF	0.165	185493.141	1.43
EVAPOTRANSPIRATION	10.479	11791577.000	91.20
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00

AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.847	952644.312	7.37
SOIL WATER AT START OF YEAR	345.815	389145952.000	
SOIL WATER AT END OF YEAR	346.300	389691648.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.362	406958.969	3.15
ANNUAL WATER BUDGET BALANCE	0.0000	-15.209	0.00

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ANNUAL TOTALS FOR YEAR 18

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.95	14572637.000	100.00
RUNOFF	0.416	468087.937	3.21
EVAPOTRANSPIRATION	12.559	14132915.000	96.98
DRAINAGE COLLECTED FROM LAYER 2	0.5300	596362.125	4.09
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.423	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0051		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.242	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.182	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.555	-624718.000	-4.29
SOIL WATER AT START OF YEAR	346.300	389691648.000	
SOIL WATER AT END OF YEAR	346.107	389473888.000	
SNOW WATER AT START OF YEAR	0.362	406958.969	2.79
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-10.920	0.00

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ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	7.44	8372232.000	100.00
RUNOFF	0.118	133271.453	1.59
EVAPOTRANSPIRATION	7.823	8803018.000	105.15
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.501	-564068.312	-6.74
SOIL WATER AT START OF YEAR	346.107	389473888.000	
SOIL WATER AT END OF YEAR	345.386	388662944.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.219	246870.203	2.95
ANNUAL WATER BUDGET BALANCE	0.0000	10.472	0.00

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ANNUAL TOTALS FOR YEAR 20

	INCHES	CU. FEET	CLOSED.OUT PERCENT
PRECIPITATION	14.94	16811986.000	100.00
RUNOFF	0.200	224502.844	1.34
EVAPOTRANSPIRATION	12.934	14554775.000	86.57
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	1.806	2032714.000	12.09
SOIL WATER AT START OF YEAR	345.386	388662944.000	
SOIL WATER AT END OF YEAR	347.412	390942528.000	
SNOW WATER AT START OF YEAR	0.219	246870.203	1.47
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-6.087	0.00

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ANNUAL TOTALS FOR YEAR 21

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.74	13211025.000	100.00
RUNOFF	0.134	151024.734	1.14
EVAPOTRANSPIRATION	13.021	14652662.000	110.91
DRAINAGE COLLECTED FROM LAYER 2	0.8554	962580.187	7.29
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.584	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0082		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.363	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.220	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-2.271	-2555251.750	-19.34
SOIL WATER AT START OF YEAR	347.412	390942528.000	
SOIL WATER AT END OF YEAR	345.027	388259456.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.114	127844.250	0.97
ANNUAL WATER BUDGET BALANCE	0.0000	9.066	0.00

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ANNUAL TOTALS FOR YEAR 22

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.18	14831456.000	100.00
RUNOFF	0.093	104922.648	0.71
EVAPOTRANSPIRATION	11.661	13122272.000	88.48
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	1.426	1604249.750	10.82
SOIL WATER AT START OF YEAR	345.027	388259456.000	

SOIL WATER AT END OF YEAR	345.665	388976960.000	
SNOW WATER AT START OF YEAR	0.114	127844.250	0.86
SNOW WATER AT END OF YEAR	0.902	1014564.120	6.84
ANNUAL WATER BUDGET BALANCE	0.0000	12.450	0.00

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ANNUAL TOTALS FOR YEAR 23

	INCHES	CU. FEET	PERCENT
PRECIPITATION	16.82	18927554.000	100.00
RUNOFF	0.472	531447.937	2.81
EVAPOTRANSPIRATION	16.468	18531570.000	97.91
DRAINAGE COLLECTED FROM LAYER 2	0.5884	662100.375	3.50
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.407	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0059		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.231	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.175	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.709	-797548.937	-4.21
SOIL WATER AT START OF YEAR	345.665	388976960.000	
SOIL WATER AT END OF YEAR	345.801	389129696.000	
SNOW WATER AT START OF YEAR	0.902	1014564.120	5.36
SNOW WATER AT END OF YEAR	0.057	64298.805	0.34
ANNUAL WATER BUDGET BALANCE	0.0000	-15.137	0.00

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ANNUAL TOTALS FOR YEAR 24

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.66	14246304.000	100.00
RUNOFF	0.052	58645.664	0.41
EVAPOTRANSPIRATION	11.774	13249072.000	93.00
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.834	938576.875	6.59
SOIL WATER AT START OF YEAR	345.801	389129696.000	
SOIL WATER AT END OF YEAR	346.495	389911232.000	
SNOW WATER AT START OF YEAR	0.057	64298.805	0.45
SNOW WATER AT END OF YEAR	0.197	221333.406	1.55
ANNUAL WATER BUDGET BALANCE	0.0000	9.675	0.00

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ANNUAL TOTALS FOR YEAR 25

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.93	13424831.000	100.00
RUNOFF	0.273	306942.969	2.29
EVAPOTRANSPIRATION	12.254	13789573.000	102.72

DRAINAGE COLLECTED FROM LAYER 2	0.5115	575622.000	4.29
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.444	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0049		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.228	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.216	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-1.108	-1247334.750	-9.29
SOIL WATER AT START OF YEAR	346.495	389911232.000	
SOIL WATER AT END OF YEAR	345.445	388729344.000	
SNOW WATER AT START OF YEAR	0.197	221333.406	1.65
SNOW WATER AT END OF YEAR	0.139	155893.359	1.16
ANNUAL WATER BUDGET BALANCE	0.0000	27.895	0.00

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ANNUAL TOTALS FOR YEAR 26

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.22	14876470.000	100.00
RUNOFF	0.100	112424.320	0.76
EVAPOTRANSPIRATION	12.256	13791856.000	92.71
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.864	972188.312	6.54
SOIL WATER AT START OF YEAR	345.445	388729344.000	
SOIL WATER AT END OF YEAR	346.448	389857408.000	
SNOW WATER AT START OF YEAR	0.139	155893.359	1.05
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	1.375	0.00

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ANNUAL TOTALS FOR YEAR 27

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.18	14831455.000	100.00
RUNOFF	0.009	10616.219	0.07
EVAPOTRANSPIRATION	13.323	14992408.000	101.09
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.152	-171554.656	-1.16
SOIL WATER AT START OF YEAR	346.448	389857408.000	
SOIL WATER AT END OF YEAR	345.927	389271712.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.368	414138.437	2.79
ANNUAL WATER BUDGET BALANCE	0.0000	-14.476	0.00

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ANNUAL TOTALS FOR YEAR 28

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.65	15360351.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	11.680	13143606.000	85.57
DRAINAGE COLLECTED FROM LAYER 2	0.3312	372725.125	2.43
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.217	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0032		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.105	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.112	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	1.639	1844024.120	12.01
SOIL WATER AT START OF YEAR	345.927	389271712.000	
SOIL WATER AT END OF YEAR	347.651	391211808.000	
SNOW WATER AT START OF YEAR	0.368	414138.437	2.70
SNOW WATER AT END OF YEAR	0.283	318077.812	2.07
ANNUAL WATER BUDGET BALANCE	0.0000	-4.778	0.00

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ANNUAL TOTALS FOR YEAR 29

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.69	15405363.000	100.00
RUNOFF	0.146	163752.328	1.06
EVAPOTRANSPIRATION	14.591	16419608.000	106.58
DRAINAGE COLLECTED FROM LAYER 2	1.4452	1626294.750	10.56
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.912	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0139		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.633	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.279	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-2.492	-2804328.750	-18.20
SOIL WATER AT START OF YEAR	347.651	391211808.000	
SOIL WATER AT END OF YEAR	345.442	388725568.000	
SNOW WATER AT START OF YEAR	0.283	318077.812	2.06
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	35.492	0.00

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ANNUAL TOTALS FOR YEAR 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.22	11500567.000	100.00
RUNOFF	0.040	45045.742	0.39
EVAPOTRANSPIRATION	10.208	11487089.000	99.88
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		

			CLOSED.OUT
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.028	-31559.775	-0.27
SOIL WATER AT START OF YEAR	345.442	388725568.000	
SOIL WATER AT END OF YEAR	345.414	388693984.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-8.028	0.00

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ANNUAL TOTALS FOR YEAR 31

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.57	16395626.000	100.00
RUNOFF	0.276	311017.437	1.90
EVAPOTRANSPIRATION	14.740	16587200.000	101.17
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.447	-502586.844	-3.07
SOIL WATER AT START OF YEAR	345.414	388693984.000	
SOIL WATER AT END OF YEAR	344.967	388191424.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-4.259	0.00

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ANNUAL TOTALS FOR YEAR 32

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.46	11770640.000	100.00
RUNOFF	0.020	22307.150	0.19
EVAPOTRANSPIRATION	9.849	11083081.000	94.16
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.591	665227.875	5.65
SOIL WATER AT START OF YEAR	344.967	388191424.000	
SOIL WATER AT END OF YEAR	345.558	388856640.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	24.438	0.00

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ANNUAL TOTALS FOR YEAR 33

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.61	13064737.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	11.412	12841844.000	98.29
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.198	222884.578	1.71
SOIL WATER AT START OF YEAR	345.558	388856640.000	
SOIL WATER AT END OF YEAR	345.651	388961024.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.105	118486.633	0.91
ANNUAL WATER BUDGET BALANCE	0.0000	8.476	0.00

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ANNUAL TOTALS FOR YEAR 34

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.75	12096975.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	10.889	12253101.000	101.29
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.139	-156124.828	-1.29
SOIL WATER AT START OF YEAR	345.651	388961024.000	
SOIL WATER AT END OF YEAR	345.618	388923392.000	
SNOW WATER AT START OF YEAR	0.105	118486.633	0.98
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.964	0.00

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ANNUAL TOTALS FOR YEAR 35

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.68	15394105.000	100.00
RUNOFF	0.075	84326.164	0.55
EVAPOTRANSPIRATION	13.825	15557609.000	101.06
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.220	-247807.766	-1.61

SOIL WATER AT START OF YEAR	345.618	388923392.000	
SOIL WATER AT END OF YEAR	345.397	388675584.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-22.243	0.00

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ANNUAL TOTALS FOR YEAR 36

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.23	11511821.000	100.00
RUNOFF	0.026	28898.979	0.25
EVAPOTRANSPIRATION	9.323	10490839.000	91.13
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.882	992055.250	8.62
SOIL WATER AT START OF YEAR	345.397	388675584.000	
SOIL WATER AT END OF YEAR	346.279	389667648.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	27.238	0.00

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ANNUAL TOTALS FOR YEAR 37

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.35	13897457.000	100.00
RUNOFF	0.008	8787.340	0.06
EVAPOTRANSPIRATION	13.360	15033706.000	108.18
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-1.018	-1145012.000	-8.24
SOIL WATER AT START OF YEAR	346.279	389667648.000	
SOIL WATER AT END OF YEAR	345.261	388522624.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-24.909	0.00

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ANNUAL TOTALS FOR YEAR 38

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.08	11343024.000	100.00

			CLOSED OUT
RUNOFF	0.122	137558.141	1.21
EVAPOTRANSPIRATION	9.809	11037680.000	97.31
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.149	167769.281	1.48
SOIL WATER AT START OF YEAR	345.261	388522624.000	
SOIL WATER AT END OF YEAR	345.315	388583040.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.095	107362.695	0.95
ANNUAL WATER BUDGET BALANCE	0.0000	16.198	0.00

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ANNUAL TOTALS FOR YEAR 39

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.89	16755717.000	100.00
RUNOFF	0.358	403112.750	2.41
EVAPOTRANSPIRATION	13.825	15557646.000	92.85
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.706	794965.625	4.74
SOIL WATER AT START OF YEAR	345.315	388583040.000	
SOIL WATER AT END OF YEAR	345.960	389308224.000	
SNOW WATER AT START OF YEAR	0.095	107362.695	0.64
SNOW WATER AT END OF YEAR	0.157	177140.328	1.06
ANNUAL WATER BUDGET BALANCE	0.0000	-6.741	0.00

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ANNUAL TOTALS FOR YEAR 40

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.19	13717407.000	100.00
RUNOFF	0.015	17418.125	0.13
EVAPOTRANSPIRATION	13.197	14850858.000	108.26
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-1.023	-1150857.250	-8.39
SOIL WATER AT START OF YEAR	345.960	389308224.000	
SOIL WATER AT END OF YEAR	345.094	388334496.000	
SNOW WATER AT START OF YEAR	0.157	177140.328	1.29

			CLOSED.OUT
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-12.671	0.00

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ANNUAL TOTALS FOR YEAR 41

	INCHES	CU. FEET	PERCENT
PRECIPITATION	16.43	18488686.000	100.00
RUNOFF	0.205	230126.656	1.24
EVAPOTRANSPIRATION	15.008	16888454.000	91.34
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	1.218	1370071.000	7.41
SOIL WATER AT START OF YEAR	345.094	388334496.000	
SOIL WATER AT END OF YEAR	345.990	389342752.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.322	361840.969	1.96
ANNUAL WATER BUDGET BALANCE	0.0000	34.643	0.00

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ANNUAL TOTALS FOR YEAR 42

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.86	12220761.000	100.00
RUNOFF	0.056	63231.687	0.52
EVAPOTRANSPIRATION	11.501	12942194.000	105.90
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.697	-784652.687	-6.42
SOIL WATER AT START OF YEAR	345.990	389342752.000	
SOIL WATER AT END OF YEAR	345.614	388919936.000	
SNOW WATER AT START OF YEAR	0.322	361840.969	2.96
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-11.998	0.00

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ANNUAL TOTALS FOR YEAR 43

	INCHES	CU. FEET	PERCENT
PRECIPITATION	18.41	20716778.000	100.00
RUNOFF	0.113	127043.797	0.61
EVAPOTRANSPIRATION	17.706	19924936.000	96.18
DRAINAGE COLLECTED FROM LAYER 2	1.2430	1398714.000	6.75
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.731	0.00

AVG. HEAD ON TOP OF LAYER 3	0.0127		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.513	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.218	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.652	-733910.687	-3.54
SOIL WATER AT START OF YEAR	345.614	388919936.000	
SOIL WATER AT END OF YEAR	344.962	388186016.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-7.396	0.00

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ANNUAL TOTALS FOR YEAR 44

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.11	14752683.000	100.00
RUNOFF	0.194	218700.484	1.48
EVAPOTRANSPIRATION	12.058	13568477.000	91.97
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.858	965484.625	6.54
SOIL WATER AT START OF YEAR	344.962	388186016.000	
SOIL WATER AT END OF YEAR	345.309	388576320.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.511	575194.250	3.90
ANNUAL WATER BUDGET BALANCE	0.0000	20.088	0.00

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ANNUAL TOTALS FOR YEAR 45

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.38	15056514.000	100.00
RUNOFF	0.571	642497.250	4.27
EVAPOTRANSPIRATION	13.484	15173860.000	100.78
DRAINAGE COLLECTED FROM LAYER 2	0.1916	215563.609	1.43
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.223	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0018		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.128	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.094	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.867	-975391.375	-6.48
SOIL WATER AT START OF YEAR	345.309	388576320.000	
SOIL WATER AT END OF YEAR	344.935	388155072.000	
SNOW WATER AT START OF YEAR	0.511	575194.250	3.82
SNOW WATER AT END OF YEAR	0.019	21034.896	0.14
ANNUAL WATER BUDGET BALANCE	0.0000	-15.446	0.00

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ANNUAL TOTALS FOR YEAR 46

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.06	14696423.000	100.00
RUNOFF	0.164	184388.937	1.25
EVAPOTRANSPIRATION	11.803	13281834.000	90.37
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	1.093	1230160.750	8.37
SOIL WATER AT START OF YEAR	344.935	388155072.000	
SOIL WATER AT END OF YEAR	346.047	389406272.000	
SNOW WATER AT START OF YEAR	0.019	21034.896	0.14
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	39.269	0.00

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ANNUAL TOTALS FOR YEAR 47

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.78	14381337.000	100.00
RUNOFF	0.275	309063.781	2.15
EVAPOTRANSPIRATION	11.625	13081515.000	90.96
DRAINAGE COLLECTED FROM LAYER 2	0.5413	609148.812	4.24
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.380	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0053		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.210	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.169	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.339	381601.969	2.65
SOIL WATER AT START OF YEAR	346.047	389406272.000	
SOIL WATER AT END OF YEAR	346.386	389787872.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	7.099	0.00

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ANNUAL TOTALS FOR YEAR 48

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.47	11781891.000	100.00
RUNOFF	0.090	101000.180	0.86
EVAPOTRANSPIRATION	10.754	12101640.000	102.71
DRAINAGE COLLECTED FROM LAYER 2	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0000		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.000	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.000	0.00

			CLOSED.OUT
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.374	-420751.219	-3.57
SOIL WATER AT START OF YEAR	346.386	389787872.000	
SOIL WATER AT END OF YEAR	346.012	389367136.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	2.264	0.00

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ANNUAL TOTALS FOR YEAR 49

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.26	16046780.000	100.00
RUNOFF	0.137	153941.937	0.96
EVAPOTRANSPIRATION	13.529	15223849.000	94.87
DRAINAGE COLLECTED FROM LAYER 2	0.4346	489065.531	3.05
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.342	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0043		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.198	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.144	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0.160	179914.750	1.12
SOIL WATER AT START OF YEAR	346.012	389367136.000	
SOIL WATER AT END OF YEAR	346.172	389547040.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	8.646	0.00

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ANNUAL TOTALS FOR YEAR 50

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.01	14640158.000	100.00
RUNOFF	0.044	49760.160	0.34
EVAPOTRANSPIRATION	14.147	15919980.000	108.74
DRAINAGE COLLECTED FROM LAYER 2	0.0564	63435.301	0.43
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.188	0.00
AVG. HEAD ON TOP OF LAYER 3	0.0006		
DRAINAGE COLLECTED FROM LAYER 8	0.0000	0.106	0.00
PERC./LEAKAGE THROUGH LAYER 10	0.000000	0.082	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-1.238	-1393025.750	-9.52
SOIL WATER AT START OF YEAR	346.172	389547040.000	
SOIL WATER AT END OF YEAR	344.934	388154016.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	7.660	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 50

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.02	1.11	1.53	1.63	1.27	0.89
	0.52	0.72	0.71	0.89	0.99	1.19
STD. DEVIATIONS	0.57	0.52	0.69	0.77	0.64	0.58
	0.37	0.62	0.59	0.62	0.54	0.47
RUNOFF						
TOTALS	0.020	0.065	0.034	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.003
STD. DEVIATIONS	0.045	0.113	0.062	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.016
EVAPOTRANSPIRATION						
TOTALS	0.514	0.701	2.025	1.960	1.406	1.290
	0.736	0.690	0.668	0.765	0.760	0.696
STD. DEVIATIONS	0.204	0.300	0.548	0.869	0.701	0.613
	0.399	0.624	0.538	0.539	0.318	0.197
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	0.0000	0.0199	0.0863	0.0276	0.0003	0.0002
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0066
STD. DEVIATIONS	0.0000	0.1097	0.2524	0.0924	0.0012	0.0009
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0468
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LATERAL DRAINAGE COLLECTED FROM LAYER 8						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 10						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 3						
AVERAGES	0.0000	0.0025	0.0099	0.0033	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008
STD. DEVIATIONS	0.0000	0.0140	0.0290	0.0110	0.0001	0.0001
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0054
DAILY AVERAGE HEAD ON TOP OF LAYER 9						
AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 50

	INCHES		CU. FEET	PERCENT
PRECIPITATION	12.46	(2.077)	14017863.0	100.00
RUNOFF	0.122	(0.1338)	137270.55	0.979
EVAPOTRANSPIRATION	12.212	(1.9589)	13741745.00	98.030
LATERAL DRAINAGE COLLECTED FROM LAYER 2	0.14088	(0.31716)	158531.422	1.13092
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00000	(0.00000)	0.108	0.00000
AVERAGE HEAD ON TOP OF LAYER 3	0.001	(0.003)		

LATERAL DRAINAGE COLLECTED FROM LAYER 8	0.00000 (	0.00000)	0.066	0.00000
PERCOLATION/LEAKAGE THROUGH LAYER 10	0.00000 (	0.00000)	0.043	0.00000
AVERAGE HEAD ON TOP OF LAYER 9	0.000 (	0.000)		
CHANGE IN WATER STORAGE	-0.017 (	0.8704)	-19688.08	-0.140

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 50

	(INCHES)	(CU. FT.)
PRECIPITATION	1.36	1530408.000
RUNOFF	0.269	302437.4690
DRAINAGE COLLECTED FROM LAYER 2	0.26796	301537.93700
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000000	0.12190
AVERAGE HEAD ON TOP OF LAYER 3	0.955	
MAXIMUM HEAD ON TOP OF LAYER 3	1.754	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	20.4 FEET	
DRAINAGE COLLECTED FROM LAYER 8	0.00000	0.10497
PERCOLATION/LEAKAGE THROUGH LAYER 10	0.000000	0.00766
AVERAGE HEAD ON TOP OF LAYER 9	0.000	
MAXIMUM HEAD ON TOP OF LAYER 9	0.011	
LOCATION OF MAXIMUM HEAD IN LAYER 8 (DISTANCE FROM DRAIN)	0.0 FEET	
SNOW WATER	2.12	2388627.7500

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.3014
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1346

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 50

LAYER	(INCHES)	(VOL/VOL)
1	3.3192	0.1383
2	0.0321	0.1285
3	0.0000	0.0000
4	0.4500	0.7500
5	3.4080	0.2840
6	332.8800	0.2920
7	4.3920	0.2440
8	0.0025	0.0100
9	0.0000	0.0000
10	0.4500	0.7500
SNOW WATER	0.000	

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0
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**                                                                          **
**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE:     C:\TEMP\HELP\DATA4.D4
TEMPERATURE DATA FILE:       C:\TEMP\HELP\DATA7.D7
SOLAR RADIATION DATA FILE:   C:\TEMP\HELP\DATA13.D13
EVAPOTRANSPIRATION DATA:     C:\TEMP\HELP\DATA11.D11
SOIL AND DESIGN DATA FILE:   C:\TEMP\HELP\OPEN.D10
OUTPUT DATA FILE:            C:\TEMP\HELP\OPEN.OUT


TIME:  10:49     DATE:   5/18/2004


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     TITLE:  WASATCH REGIONAL LANDFILL

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                 LAYER  1
                                 --------

                 TYPE 1 - VERTICAL PERCOLATION LAYER
                     MATERIAL TEXTURE NUMBER  10
          THICKNESS                    =      6.00   INCHES
          POROSITY                     =      0.3980 VOL/VOL
          FIELD CAPACITY               =      0.2440 VOL/VOL
          WILTING POINT                =      0.1360 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.2266 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.119999997000E-03 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  1.80
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                 LAYER  2
                                 --------

                 TYPE 1 - VERTICAL PERCOLATION LAYER
                     MATERIAL TEXTURE NUMBER  18
          THICKNESS                    =    300.00   INCHES
          POROSITY                     =      0.6710 VOL/VOL
          FIELD CAPACITY               =      0.2920 VOL/VOL
          WILTING POINT                =      0.0770 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.2745 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC


                                 LAYER  3
                                 --------

                 TYPE 1 - VERTICAL PERCOLATION LAYER
                     MATERIAL TEXTURE NUMBER  10
          THICKNESS                    =     18.00   INCHES
          POROSITY                     =      0.3980 VOL/VOL
          FIELD CAPACITY               =      0.2440 VOL/VOL
          WILTING POINT                =      0.1360 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.2440 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.119999997000E-03 CM/SEC


                                 LAYER  4
                                 --------

                 TYPE 2 - LATERAL DRAINAGE LAYER
                     MATERIAL TEXTURE NUMBER  20
          THICKNESS                    =      0.25   INCHES
          POROSITY                     =      0.8500 VOL/VOL
          FIELD CAPACITY               =      0.0100 VOL/VOL
          WILTING POINT                =      0.0050 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.0100 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =   10.0000000000     CM/SEC
          SLOPE                        =      2.00   PERCENT
          DRAINAGE LENGTH              =    250.0    FEET
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LAYER 5

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	2 - EXCELLENT	

LAYER 6

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 17

THICKNESS	=	0.60	INCHES
POROSITY	=	0.7500	VOL/VOL
FIELD CAPACITY	=	0.7470	VOL/VOL
WILTING POINT	=	0.4000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.7500	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.300000003000E-08	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	75.00	
FRACTION OF AREA ALLOWING RUNOFF	=	0.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	310.000	ACRES
EVAPORATIVE ZONE DEPTH	=	32.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	3.693	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	19.834	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.818	INCHES
INITIAL SNOW WATER	=	0.131	INCHES
INITIAL WATER IN LAYER MATERIALS	=	88.545	INCHES
TOTAL INITIAL WATER	=	88.676	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
SALT LAKE CITY UTAH

STATION LATITUDE	=	40.76	DEGREES
MAXIMUM LEAF AREA INDEX	=	1.00	
START OF GROWING SEASON (JULIAN DATE)	=	117	
END OF GROWING SEASON (JULIAN DATE)	=	289	
EVAPORATIVE ZONE DEPTH	=	32.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	8.80	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	67.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	48.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	39.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	65.00	%

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SALT LAKE CITY UTAH

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
1.11	1.10	1.41	1.81	1.21	0.80
0.59	0.75	0.73	0.93	1.00	1.12

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SALT LAKE CITY UTAH

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
28.60	34.10	40.70	49.20	58.80	68.30
77.50	74.90	65.00	53.00	39.70	30.30

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR SALT LAKE CITY UTAH
AND STATION LATITUDE = 40.76 DEGREES

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MONTHLY TOTALS (IN INCHES) FOR YEAR 1

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.36	0.64	1.27	0.80	0.58	0.34
	0.41	1.34	0.63	1.64	0.79	1.14
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.348	1.362	1.143	1.158	0.645	0.257
	0.394	1.434	0.563	1.233	0.738	0.649
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0005	0.0002	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	9.94	11185483.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	9.924	11167503.000	99.84
DRAINAGE COLLECTED FROM LAYER 4	0.0007	773.445	0.01
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.057	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.015	17196.471	0.15
SOIL WATER AT START OF YEAR	88.545	99639744.000	
SOIL WATER AT END OF YEAR	88.560	99656944.000	
SNOW WATER AT START OF YEAR	0.131	147777.891	1.32
SNOW WATER AT END OF YEAR	0.131	147777.891	1.32
ANNUAL WATER BUDGET BALANCE	0.0000	9.912	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 2

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.40	1.53	1.74	1.10	1.62	0.80
	0.32	2.31	0.64	0.73	0.67	0.95
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.257	0.617	1.551	1.590	1.993	1.333
	1.184	2.316	0.627	0.289	0.925	0.436
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.81	14415096.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	13.118	14761962.000	102.41
DRAINAGE COLLECTED FROM LAYER 4	0.0001	113.901	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.022	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.308	-346983.937	-2.41
SOIL WATER AT START OF YEAR	88.560	99656944.000	
SOIL WATER AT END OF YEAR	88.383	99457736.000	
SNOW WATER AT START OF YEAR	0.131	147777.891	1.03
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	3.320	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 3

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.23	0.70	1.41	0.85	0.34	1.73
	0.38	0.93	0.14	0.44	0.18	1.14
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.204	1.012	1.564	0.927	0.519	1.743
	0.337	0.616	0.499	0.162	0.423	0.373
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0001	0.0007
FROM LAYER 4	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	8.47	9531293.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	8.380	9429975.000	98.94
DRAINAGE COLLECTED FROM LAYER 4	0.0010	1164.322	0.01
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.118	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.089	100145.578	1.05

SOIL WATER AT START OF YEAR	88.383	99457736.000	
SOIL WATER AT END OF YEAR	87.717	98707664.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.756	850222.500	8.92
ANNUAL WATER BUDGET BALANCE	0.0000	7.930	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 4

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.91	1.91	1.54	2.28	1.89	0.41
	0.53	1.10	0.52	0.85	0.77	1.26
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.683	0.772	1.871	3.420	2.238	1.402
	0.885	0.666	0.954	0.845	0.377	0.617
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0005	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.97	16845748.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	14.730	16575206.000	98.39
DRAINAGE COLLECTED FROM LAYER 4	0.0005	596.017	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.057	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.240	269939.937	1.60
SOIL WATER AT START OF YEAR	87.717	98707664.000	
SOIL WATER AT END OF YEAR	88.707	99821528.000	
SNOW WATER AT START OF YEAR	0.756	850222.500	5.05
SNOW WATER AT END OF YEAR	0.006	6298.169	0.04
ANNUAL WATER BUDGET BALANCE	0.0000	6.842	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 5

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.83	1.06	1.86	1.08	1.82	0.76
	0.41	0.00	0.93	0.49	0.59	0.63
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000

					OPEN.OUT	
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.444	0.421	1.752	2.019	2.360	1.068
	0.746	0.053	0.930	0.322	0.513	0.429
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.46	11770640.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	11.056	12440954.000	105.69
DRAINAGE COLLECTED FROM LAYER 4	0.0001	66.001	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.031	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.596	-670384.187	-5.70
SOIL WATER AT START OF YEAR	88.707	99821528.000	
SOIL WATER AT END OF YEAR	88.116	99157440.000	
SNOW WATER AT START OF YEAR	0.006	6298.169	0.05
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	4.533	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 6

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.54	0.95	1.90	1.93	0.87	1.14
	0.73	1.13	0.84	1.08	0.91	1.67
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.658	0.601	1.659	2.557	0.945	1.946
	1.012	0.823	1.274	0.799	0.452	0.822
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FROM LAYER 4	0.0000	0.0000	0.0003	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.69	16530659.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	13.549	15246758.000	92.23
DRAINAGE COLLECTED FROM LAYER 4	0.0003	293.583	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.016	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	1.141	1283603.000	7.76
SOIL WATER AT START OF YEAR	88.116	99157440.000	
SOIL WATER AT END OF YEAR	88.656	99765136.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.601	675905.562	4.09
ANNUAL WATER BUDGET BALANCE	0.0000	4.004	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 7

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.81	0.61	0.33	2.76	1.00	1.04
	0.38	1.15	1.63	1.21	0.19	1.13
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.537	0.533	1.129	2.305	2.399	1.233
	0.316	1.214	1.385	0.969	0.237	0.459
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.24	13773673.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.716	14308961.000	103.89
DRAINAGE COLLECTED FROM LAYER 4	0.0007	830.632	0.01
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.029	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.476	-536113.625	-3.89
SOIL WATER AT START OF YEAR	88.656	99765136.000	
SOIL WATER AT END OF YEAR	88.343	99412800.000	
SNOW WATER AT START OF YEAR	0.601	675905.562	4.91
SNOW WATER AT END OF YEAR	0.437	492126.437	3.57
ANNUAL WATER BUDGET BALANCE	0.0000	-5.527	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 8

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.29	1.77	0.55	2.71	1.07	0.29
	0.33	0.17	0.12	0.68	1.07	0.92
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.269	0.928	1.341	2.080	2.279	0.867
	0.318	0.183	0.125	0.310	0.470	0.617
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	9.97	11219242.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	9.787	11012985.000	98.16
DRAINAGE COLLECTED FROM LAYER 4	0.0016	1789.600	0.02
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.079	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.182	204463.437	1.82
SOIL WATER AT START OF YEAR	88.343	99412800.000	
SOIL WATER AT END OF YEAR	88.870	100005048.000	
SNOW WATER AT START OF YEAR	0.437	492126.437	4.39
SNOW WATER AT END OF YEAR	0.093	104346.172	0.93
ANNUAL WATER BUDGET BALANCE	0.0000	4.729	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 9

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.28	1.72	1.40	3.31	0.08	0.83
	0.73	2.21	0.12	0.90	0.79	0.70
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.698	0.526	1.121	2.273	1.519	1.333
	2.895	2.377	0.106	0.672	0.420	0.368
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0004	0.0172
	0.0178	0.0601	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.001	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.07	15832975.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	14.309	16101942.000	101.70
DRAINAGE COLLECTED FROM LAYER 4	0.0956	107550.961	0.68
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.322	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0001		
CHANGE IN WATER STORAGE	-0.335	-376519.187	-2.38
SOIL WATER AT START OF YEAR	88.870	100005048.000	
SOIL WATER AT END OF YEAR	88.628	99732872.000	
SNOW WATER AT START OF YEAR	0.093	104346.172	0.66
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.441	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 10

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.85	0.30	2.03	1.02	0.24	1.55
	1.14	0.17	2.26	0.03	0.95	1.04
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.314	0.265	1.480	2.018	0.865	1.783
	1.362	0.170	1.688	0.597	0.385	0.537
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
FROM LAYER 4	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.58	13030975.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	11.464	12900954.000	99.00
DRAINAGE COLLECTED FROM LAYER 4	0.0003	301.912	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.029	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		

			OPEN.OUT
CHANGE IN WATER STORAGE	0.115	129717.594	1.00
SOIL WATER AT START OF YEAR	88.628	99732872.000	
SOIL WATER AT END OF YEAR	88.577	99675272.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.166	187316.766	1.44
ANNUAL WATER BUDGET BALANCE	0.0000	1.414	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 11

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.94	0.54	3.09	2.19	0.98	0.68
	1.47	0.30	0.71	0.30	1.19	1.19
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.473	0.547	1.648	2.289	2.018	1.381
	2.537	0.352	0.726	0.259	0.320	0.617
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.58	15281576.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	13.166	14815846.000	96.95
DRAINAGE COLLECTED FROM LAYER 4	0.0005	535.047	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.032	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.413	465196.187	3.04
SOIL WATER AT START OF YEAR	88.577	99675272.000	
SOIL WATER AT END OF YEAR	89.156	100327784.000	
SNOW WATER AT START OF YEAR	0.166	187316.766	1.23
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.362	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 12

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.26	1.10	1.32	0.79	2.31	0.63
	0.17	0.22	0.15	1.54	0.58	0.68

RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.589	0.819	1.249	1.937	2.138	1.991
	0.344	0.198	0.172	0.488	0.403	0.310
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 12

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.75	12096979.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	10.637	11969760.000	98.95
DRAINAGE COLLECTED FROM LAYER 4	0.0000	55.869	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.067	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.113	127162.375	1.05
SOIL WATER AT START OF YEAR	89.156	100327784.000	
SOIL WATER AT END OF YEAR	89.166	100338448.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.104	116499.359	0.96
ANNUAL WATER BUDGET BALANCE	0.0000	0.590	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 13

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.07	0.64	1.79	2.77	1.04	0.47
	0.05	0.13	0.29	0.65	1.51	0.67
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.530	0.696	1.269	2.153	2.373	1.458
	0.950	0.127	0.241	0.131	0.507	0.300
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.08	12468327.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	10.736	12080743.000	96.89
DRAINAGE COLLECTED FROM LAYER 4	0.0000	37.214	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.013	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.344	387541.187	3.11
SOIL WATER AT START OF YEAR	89.166	100338448.000	
SOIL WATER AT END OF YEAR	89.579	100803808.000	
SNOW WATER AT START OF YEAR	0.104	116499.359	0.93
SNOW WATER AT END OF YEAR	0.034	38679.840	0.31
ANNUAL WATER BUDGET BALANCE	0.0000	5.394	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 14

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.23	0.69	1.99	1.61	1.09	0.31
	0.40	0.13	0.46	1.48	0.73	1.35
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.757	0.505	1.416	1.969	2.203	1.361
	0.958	0.161	0.244	0.495	0.423	0.625
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.47	12907193.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	11.115	12507877.000	96.91
DRAINAGE COLLECTED FROM LAYER 4	0.0009	1064.218	0.01
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.023	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.354	398243.281	3.09
SOIL WATER AT START OF YEAR	89.579	100803808.000	
SOIL WATER AT END OF YEAR	89.590	100816032.000	
SNOW WATER AT START OF YEAR	0.034	38679.840	0.30
SNOW WATER AT END OF YEAR	0.377	424697.594	3.29
ANNUAL WATER BUDGET BALANCE	0.0000	9.252	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 15

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.71	0.78	2.29	1.58	0.87	0.25
	0.86	0.04	0.19	1.41	0.96	1.31
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.612	0.444	1.208	1.935	1.906	1.398
	2.135	0.040	0.050	0.571	0.510	0.464
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.25	12659627.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	11.273	12685103.000	100.20
DRAINAGE COLLECTED FROM LAYER 4	0.0000	46.053	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.008	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.023	-25512.799	-0.20
SOIL WATER AT START OF YEAR	89.590	100816032.000	
SOIL WATER AT END OF YEAR	89.945	101215216.000	
SNOW WATER AT START OF YEAR	0.377	424697.594	3.35
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-9.238	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 16

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.52	0.53	0.87	1.32	1.06	2.07
	0.26	0.35	1.14	0.40	1.40	0.91
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.382	0.512	1.350	2.042	1.629	2.319
	1.658	0.350	1.139	0.241	0.501	0.592
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0115	0.0000	0.0001	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.83	13312302.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.716	14309044.000	107.49
DRAINAGE COLLECTED FROM LAYER 4	0.0117	13150.743	0.10
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.054	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.897	-1009895.620	-7.59
SOIL WATER AT START OF YEAR	89.945	101215216.000	
SOIL WATER AT END OF YEAR	89.048	100205328.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	3.044	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 17

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.13	1.58	1.55	1.13	1.55	0.27
	0.04	1.40	0.59	0.08	1.91	1.26
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.114	0.593	1.279	1.946	1.867	1.299
	0.520	1.248	0.482	0.311	0.462	0.354
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FROM LAYER 4	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.49	12929699.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	10.475	11787676.000	91.17
DRAINAGE COLLECTED FROM LAYER 4	0.0101	11376.008	0.09
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.037	0.00

AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	1.005	1130644.500	8.74
SOIL WATER AT START OF YEAR	89.048	100205328.000	
SOIL WATER AT END OF YEAR	89.691	100929008.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.362	406958.969	3.15
ANNUAL WATER BUDGET BALANCE	0.0000	2.640	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 18

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.82	0.34	1.35	2.07	1.56	1.16
	1.12	0.24	0.44	0.00	1.17	1.68
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.388	0.318	0.861	1.792	2.845	1.663
	3.455	0.693	0.248	0.191	0.408	0.506
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0021	0.0215
	0.0004	0.0014	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 18

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.95	14572637.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	13.370	15045188.000	103.24
DRAINAGE COLLECTED FROM LAYER 4	0.0254	28587.875	0.20
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.147	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.445	-501148.937	-3.44
SOIL WATER AT START OF YEAR	89.691	100929008.000	
SOIL WATER AT END OF YEAR	89.607	100834816.000	
SNOW WATER AT START OF YEAR	0.362	406958.969	2.79
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	9.939	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 19

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC

					OPEN.OUT	
PRECIPITATION	1.17	1.02	0.97	0.93	0.45	0.06
	0.28	0.36	0.21	0.58	0.39	1.02
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.573	0.494	1.072	2.200	0.957	0.954
	0.566	0.360	0.129	0.396	0.241	0.278
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	7.44	8372232.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	8.221	9250969.000	110.50
DRAINAGE COLLECTED FROM LAYER 4	0.0000	35.318	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.009	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.781	-878764.625	-10.50
SOIL WATER AT START OF YEAR	89.607	100834816.000	
SOIL WATER AT END OF YEAR	88.607	99709184.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.219	246870.203	2.95
ANNUAL WATER BUDGET BALANCE	0.0000	-7.274	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 20

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.80	0.53	1.96	2.05	1.22	1.60
	0.78	0.47	1.06	0.24	1.23	3.00
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.501	0.448	0.733	2.310	2.723	2.475
	0.777	0.481	0.966	0.269	0.572	0.416
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 20

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.94	16811986.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.672	14259595.000	84.82
DRAINAGE COLLECTED FROM LAYER 4	0.0001	84.959	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.038	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	2.268	2552291.250	15.18
SOIL WATER AT START OF YEAR	88.607	99709184.000	
SOIL WATER AT END OF YEAR	91.094	102508344.000	
SNOW WATER AT START OF YEAR	0.219	246870.203	1.47
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	14.121	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 21

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.45	0.88	1.74	1.53	1.00	0.31
	1.23	1.05	0.09	0.62	1.27	0.57
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.561	0.642	1.459	2.009	1.971	1.187
	3.413	0.861	0.483	0.617	0.406	0.431
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0370	0.0224	0.0226
	0.0000	0.0353	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.001	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 21

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.74	13211025.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	14.040	15799739.000	119.60
DRAINAGE COLLECTED FROM LAYER 4	0.1173	132024.578	1.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.369	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0001		
CHANGE IN WATER STORAGE	-2.418	-2720734.500	-20.59
SOIL WATER AT START OF YEAR	91.094	102508344.000	
SOIL WATER AT END OF YEAR	88.563	99659768.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.114	127844.250	0.97
ANNUAL WATER BUDGET BALANCE	0.0000	-4.368	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 22

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.50	1.51	1.81	1.80	0.03	0.74
	0.34	0.79	0.69	1.41	1.73	1.83
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.421	0.633	1.590	2.560	0.827	1.009
	0.680	0.804	0.292	1.062	0.708	0.650
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 22

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.18	14831456.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	11.236	12643668.000	85.25
DRAINAGE COLLECTED FROM LAYER 4	0.0020	2249.114	0.02
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.053	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	1.942	2185538.500	14.74
SOIL WATER AT START OF YEAR	88.563	99659768.000	
SOIL WATER AT END OF YEAR	89.717	100958584.000	
SNOW WATER AT START OF YEAR	0.114	127844.250	0.86
SNOW WATER AT END OF YEAR	0.902	1014564.120	6.84
ANNUAL WATER BUDGET BALANCE	0.0000	0.759	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 23

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.96	1.62	1.45	2.88	0.78	0.04
	0.91	0.92	0.98	2.58	1.74	0.96
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.688	0.734	1.745	2.814	1.519	1.162
	2.832	1.647	0.760	1.616	0.959	0.590
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0310	0.1254	0.1126	0.0847
	0.0078	0.0058	0.0000	0.0001	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.001	0.001	0.001
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.001	0.001	0.001
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

ANNUAL TOTALS FOR YEAR 23

	INCHES	CU. FEET	PERCENT
PRECIPITATION	16.82	18927554.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	17.066	19203832.000	101.46
DRAINAGE COLLECTED FROM LAYER 4	0.3674	413399.219	2.18
PERC./LEAKAGE THROUGH LAYER 6	0.000001	0.624	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0002		
CHANGE IN WATER STORAGE	-0.613	-689708.250	-3.64
SOIL WATER AT START OF YEAR	89.717	100958584.000	
SOIL WATER AT END OF YEAR	89.949	101219144.000	
SNOW WATER AT START OF YEAR	0.902	1014564.120	5.36
SNOW WATER AT END OF YEAR	0.057	64298.805	0.34
ANNUAL WATER BUDGET BALANCE	0.0000	31.630	0.00

MONTHLY TOTALS (IN INCHES) FOR YEAR 24

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.62	0.65	2.84	1.71	0.61	0.44
	0.08	0.38	1.38	0.78	2.06	1.11
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.454	0.249	1.842	3.035	1.106	1.289
	1.312	0.380	1.309	0.741	0.546	0.703
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

ANNUAL TOTALS FOR YEAR 24

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.66	14246304.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.965	14589224.000	102.41
DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.020	0.00

			OPEN.OUT
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.002	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.305	-342925.094	-2.41
SOIL WATER AT START OF YEAR	89.949	101219144.000	
SOIL WATER AT END OF YEAR	89.504	100719184.000	
SNOW WATER AT START OF YEAR	0.057	64298.805	0.45
SNOW WATER AT END OF YEAR	0.197	221333.406	1.55
ANNUAL WATER BUDGET BALANCE	0.0000	5.520	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 25

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.71	1.08	1.85	0.87	1.80	0.74
	0.88	0.42	0.98	0.42	1.13	1.05
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.464	0.389	1.770	1.920	1.463	1.194
	2.759	0.420	0.980	0.268	0.719	0.616
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 25

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.93	13424831.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.962	14586501.000	108.65
DRAINAGE COLLECTED FROM LAYER 4	0.0004	426.718	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.039	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-1.033	-1162099.250	-8.66
SOIL WATER AT START OF YEAR	89.504	100719184.000	
SOIL WATER AT END OF YEAR	88.530	99622528.000	
SNOW WATER AT START OF YEAR	0.197	221333.406	1.65
SNOW WATER AT END OF YEAR	0.139	155893.359	1.16
ANNUAL WATER BUDGET BALANCE	0.0000	2.813	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 26

JAN/JUL FEB/AUG MAR/SEP APR/OCT MAY/NOV JUN/DEC

PRECIPITATION	0.92 0.00	0.93 0.19	2.72 0.87	1.26 1.24	1.06 1.66	1.00 1.37
RUNOFF	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION	0.424 1.070	0.596 0.116	1.916 0.920	1.990 0.653	1.467 0.841	1.424 0.401
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

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ANNUAL TOTALS FOR YEAR 26

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.22	14876470.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	11.818	13299206.000	89.40
DRAINAGE COLLECTED FROM LAYER 4	0.0000	13.574	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.024	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	1.402	1577250.000	10.60
SOIL WATER AT START OF YEAR	88.530	99622528.000	
SOIL WATER AT END OF YEAR	90.070	101355664.000	
SNOW WATER AT START OF YEAR	0.139	155893.359	1.05
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.283	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 27

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.64 0.24	1.24 0.00	0.66 0.96	2.14 0.12	1.87 0.85	2.48 1.98
RUNOFF	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION	0.607 1.912	0.514 0.032	0.573 0.692	2.702 0.325	2.620 0.307	2.691 0.688
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000 0.0177	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

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ANNUAL TOTALS FOR YEAR 27

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.18	14831455.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	13.664	15375564.000	103.67
DRAINAGE COLLECTED FROM LAYER 4	0.0177	19902.418	0.13
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.038	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.501	-564017.062	-3.80
SOIL WATER AT START OF YEAR	90.070	101355664.000	
SOIL WATER AT END OF YEAR	89.201	100377512.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.368	414138.437	2.79
ANNUAL WATER BUDGET BALANCE	0.0000	5.814	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 28

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.98	0.87	1.44	1.00	1.06	0.89
	0.59	0.29	0.38	2.53	2.82	0.80
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.681	0.698	0.547	1.884	1.558	1.349
	1.971	0.284	0.347	0.846	0.585	0.390
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0003	0.0001	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 28

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.65	15360351.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	11.138	12533339.000	81.60
DRAINAGE COLLECTED FROM LAYER 4	0.0004	445.234	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.041	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	2.512	2826567.000	18.40
SOIL WATER AT START OF YEAR	89.201	100377512.000	
SOIL WATER AT END OF YEAR	91.798	103300136.000	
SNOW WATER AT START OF YEAR	0.368	414138.437	2.70
SNOW WATER AT END OF YEAR	0.283	318077.812	2.07

ANNUAL WATER BUDGET BALANCE	0.0000	0.224	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 29

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.22	0.77	1.53	0.96	0.88	1.77
	1.06	1.91	0.94	1.12	0.35	1.18
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.723	0.371	1.571	2.035	0.842	2.554
	3.055	2.872	0.555	1.262	0.580	0.584
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0341	0.2284	0.1828	0.0133
FROM LAYER 4	0.0087	0.0202	0.0001	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.002	0.001	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.001	0.001	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 29

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.69	15405363.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	17.004	19134670.000	124.21
DRAINAGE COLLECTED FROM LAYER 4	0.4876	548679.375	3.56
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.546	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0003		
CHANGE IN WATER STORAGE	-3.802	-4277988.000	-27.77
SOIL WATER AT START OF YEAR	91.798	103300136.000	
SOIL WATER AT END OF YEAR	88.279	99340232.000	
SNOW WATER AT START OF YEAR	0.283	318077.812	2.06
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	1.668	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 30

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.51	1.24	0.88	1.84	1.28	0.64
	0.78	0.61	0.41	0.25	0.59	1.19
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.510	0.699	1.631	2.143	1.321	0.533
	0.941	0.610	0.329	0.247	0.511	0.634
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
FROM LAYER 4	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000

					OPEN.OUT	
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.22	11500567.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	10.110	11377053.000	98.93
DRAINAGE COLLECTED FROM LAYER 4	0.0004	401.279	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.071	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.109	123114.031	1.07
SOIL WATER AT START OF YEAR	88.279	99340232.000	
SOIL WATER AT END OF YEAR	88.388	99463344.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.058	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 31

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.17	2.03	0.98	2.16	1.69	1.54
	0.72	1.84	0.44	0.52	1.08	0.40
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.475	0.560	1.727	2.979	1.470	2.632
	1.164	1.827	0.438	0.511	0.634	0.371
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
FROM LAYER 4	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 31

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.57	16395626.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	14.789	16642355.000	101.50

			OPEN.OUT
DRAINAGE COLLECTED FROM LAYER 4	0.0003	297.834	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.046	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.220	-247026.500	-1.51
SOIL WATER AT START OF YEAR	88.388	99463344.000	
SOIL WATER AT END OF YEAR	88.169	99216320.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.612	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 32

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.82	1.19	1.65	0.70	1.35	0.76
	0.60	0.50	0.38	0.77	0.55	1.19
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.543	0.706	1.471	1.861	1.108	1.213
	0.631	0.534	0.355	0.562	0.410	0.577
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019
FROM LAYER 4	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 32

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.46	11770640.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	9.971	11220668.000	95.33
DRAINAGE COLLECTED FROM LAYER 4	0.0021	2314.202	0.02
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.063	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.487	547651.375	4.65
SOIL WATER AT START OF YEAR	88.169	99216320.000	
SOIL WATER AT END OF YEAR	88.655	99763968.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	7.002	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 33

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.21	0.37	1.41	1.94	1.81	1.42
	0.04	0.10	0.68	2.04	0.75	0.84
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.191	0.519	1.306	2.186	2.152	1.767
	0.062	0.102	0.418	0.877	0.532	0.648
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000
	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 33

	INCHES	CU. FEET	PERCENT
PRECIPITATION	11.61	13064737.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	10.759	12107392.000	92.67
DRAINAGE COLLECTED FROM LAYER 4	0.0004	406.802	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.052	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.850	956932.687	7.32
SOIL WATER AT START OF YEAR	88.655	99763968.000	
SOIL WATER AT END OF YEAR	89.401	100602416.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.105	118486.633	0.91
ANNUAL WATER BUDGET BALANCE	0.0000	5.135	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 34

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.48	0.35	1.11	1.49	1.63	0.04
	0.80	1.35	0.03	1.44	0.72	1.31
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.316	0.479	1.381	1.937	1.197	1.618
	0.808	0.880	0.500	0.524	0.397	0.539
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 34

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.75	12096975.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	10.575	11900280.000	98.37
DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.118	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.175	196690.437	1.63
SOIL WATER AT START OF YEAR	89.401	100602416.000	
SOIL WATER AT END OF YEAR	89.681	100917592.000	
SNOW WATER AT START OF YEAR	0.105	118486.633	0.98
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	4.273	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 35

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.66	1.21	1.14	1.30	1.22	1.81
	0.50	1.69	1.53	1.16	0.41	1.05
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.387	0.561	1.478	2.155	1.509	1.823
	1.915	1.712	0.888	0.930	0.355	0.558
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 35

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.68	15394105.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	14.271	16059323.000	104.32
DRAINAGE COLLECTED FROM LAYER 4	0.0001	59.464	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.049	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.591	-665270.750	-4.32
SOIL WATER AT START OF YEAR	89.681	100917592.000	
SOIL WATER AT END OF YEAR	89.089	100252320.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-5.855	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 36

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.17	1.27	0.52	0.71	1.65	0.96
	0.28	0.31	0.33	0.42	0.48	2.13
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.464	0.503	1.313	1.399	1.575	1.724
	1.002	0.189	0.351	0.519	0.227	0.558
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 36

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.23	11511821.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	9.822	11052317.000	96.01
DRAINAGE COLLECTED FROM LAYER 4	0.0001	65.399	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.069	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.408	459436.844	3.99
SOIL WATER AT START OF YEAR	89.089	100252320.000	
SOIL WATER AT END OF YEAR	89.498	100711760.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	1.068	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 37

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.15	1.63	1.08	0.62	2.12	0.47
	0.99	0.18	0.69	1.23	1.47	0.72
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.570	0.771	1.047	1.890	2.367	1.385
	1.850	0.180	0.646	0.668	0.511	0.326
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001

					OPEN.OUT	
FROM LAYER 4	0.0069	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

ANNUAL TOTALS FOR YEAR 37

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.35	13897457.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.212	13741749.000	98.88
DRAINAGE COLLECTED FROM LAYER 4	0.0071	7969.793	0.06
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.048	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.131	147728.250	1.06
SOIL WATER AT START OF YEAR	89.498	100711760.000	
SOIL WATER AT END OF YEAR	89.629	100859488.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	9.175	0.00

MONTHLY TOTALS (IN INCHES) FOR YEAR 38

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.09 0.86	1.37 0.72	0.88 1.12	1.18 0.47	0.67 0.86	0.76 1.10
RUNOFF	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION	0.090 1.355	0.476 0.790	1.028 0.939	1.931 0.593	1.370 0.335	1.430 0.431
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000 0.0001	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

ANNUAL TOTALS FOR YEAR 38

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.08	11343024.000	100.00
RUNOFF	0.000	0.000	0.00

EVAPOTRANSPIRATION	10.767	12116324.000	106.82
DRAINAGE COLLECTED FROM LAYER 4	0.0001	66.610	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.030	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.687	-773366.187	-6.82
SOIL WATER AT START OF YEAR	89.629	100859488.000	
SOIL WATER AT END OF YEAR	88.846	99978760.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.095	107362.695	0.95
ANNUAL WATER BUDGET BALANCE	0.0000	-0.757	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 39

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.31	1.07	1.25	1.47	0.75	1.37
	0.23	1.56	0.25	1.78	1.29	1.56
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.544	0.595	1.295	1.778	2.018	1.899
	1.592	1.560	0.176	0.749	0.731	0.794
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 39

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.89	16755717.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	13.731	15451326.000	92.22
DRAINAGE COLLECTED FROM LAYER 4	0.0001	124.461	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.034	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	1.159	1304266.250	7.78
SOIL WATER AT START OF YEAR	88.846	99978760.000	
SOIL WATER AT END OF YEAR	89.943	101213248.000	
SNOW WATER AT START OF YEAR	0.095	107362.695	0.64
SNOW WATER AT END OF YEAR	0.157	177140.328	1.06
ANNUAL WATER BUDGET BALANCE	0.0000	0.931	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 40

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.77	0.95	1.38	2.42	1.24	1.22
	1.17	1.02	0.00	0.90	0.25	0.87
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.459	0.872	1.521	2.113	2.404	1.759
	2.411	1.013	0.040	0.793	0.217	0.358
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0072	0.0001	0.0001	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 40

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.19	13717407.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	13.961	15710279.000	114.53
DRAINAGE COLLECTED FROM LAYER 4	0.0074	8360.630	0.06
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.049	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-1.778	-2001228.370	-14.59
SOIL WATER AT START OF YEAR	89.943	101213248.000	
SOIL WATER AT END OF YEAR	88.322	99389160.000	
SNOW WATER AT START OF YEAR	0.157	177140.328	1.29
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-5.265	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 41

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.07	1.37	3.08	3.23	1.17	1.74
	0.04	0.32	0.59	0.74	1.71	1.37
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.518	0.762	1.525	2.132	2.358	1.868
	2.750	0.735	0.369	0.497	0.486	0.586
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0009	0.0184
	0.0012	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

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ANNUAL TOTALS FOR YEAR 41

	INCHES	CU. FEET	PERCENT
PRECIPITATION	16.43	18488686.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	14.587	16414432.000	88.78
DRAINAGE COLLECTED FROM LAYER 4	0.0205	23063.771	0.12
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.155	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	1.823	2051181.750	11.09
SOIL WATER AT START OF YEAR	88.322	99389160.000	
SOIL WATER AT END OF YEAR	89.824	101078496.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.322	361840.969	1.96
ANNUAL WATER BUDGET BALANCE	0.0000	7.815	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 42

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.25 0.40	1.18 0.02	0.60 0.13	3.11 0.55	2.17 0.54	0.64 1.27
RUNOFF	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION	0.330 1.247	0.515 0.020	1.249 0.130	2.685 0.327	2.411 0.289	2.388 0.522
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

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ANNUAL TOTALS FOR YEAR 42

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.86	12220761.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.112	13629909.000	111.53
DRAINAGE COLLECTED FROM LAYER 4	0.0000	3.467	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.034	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-1.252	-1409151.500	-11.53
SOIL WATER AT START OF YEAR	89.824	101078496.000	
SOIL WATER AT END OF YEAR	88.893	100031184.000	

SNOW WATER AT START OF YEAR	0.322	361840.969	2.96
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.054	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 43

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.21	2.79	1.64	3.11	2.74	0.75
	0.17	0.39	2.09	0.31	1.35	0.86
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.753	0.794	1.690	2.820	3.975	1.992
	2.479	0.466	1.245	1.012	0.729	0.677
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0189	0.0130	0.0053
	0.0165	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 43

	INCHES	CU. FEET	PERCENT
PRECIPITATION	18.41	20716778.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	18.632	20966398.000	101.20
DRAINAGE COLLECTED FROM LAYER 4	0.0539	60615.242	0.29
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.263	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.276	-310240.500	-1.50
SOIL WATER AT START OF YEAR	88.893	100031184.000	
SOIL WATER AT END OF YEAR	88.617	99720944.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	3.560	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 44

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.56	1.78	0.66	1.64	2.00	0.87
	0.49	0.84	0.20	0.98	0.54	1.55
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.601	0.766	1.094	2.524	2.393	1.512
	1.056	0.840	0.200	0.548	0.422	0.588

LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 44

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.11	14752683.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.545	14116406.000	95.69
DRAINAGE COLLECTED FROM LAYER 4	0.0000	16.387	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.027	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.565	636261.937	4.31
SOIL WATER AT START OF YEAR	88.617	99720944.000	
SOIL WATER AT END OF YEAR	88.671	99782016.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.511	575194.250	3.90
ANNUAL WATER BUDGET BALANCE	0.0000	-1.389	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 45

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.71	2.27	1.31	0.86	2.24	0.37
	0.04	0.66	2.52	0.09	0.64	0.67
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.800	0.694	1.526	2.145	2.302	1.302
	1.530	0.649	1.700	0.892	0.377	0.548
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
FROM LAYER 4	0.0132	0.0000	0.0002	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.000
HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 45

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.38	15056514.000	100.00

			OPEN.OUT
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	14.465	16277633.000	108.11
DRAINAGE COLLECTED FROM LAYER 4	0.0135	15229.729	0.10
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.077	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-1.099	-1236360.500	-8.21
SOIL WATER AT START OF YEAR	88.671	99782016.000	
SOIL WATER AT END OF YEAR	88.065	99099816.000	
SNOW WATER AT START OF YEAR	0.511	575194.250	3.82
SNOW WATER AT END OF YEAR	0.019	21034.896	0.14
ANNUAL WATER BUDGET BALANCE	0.0000	11.653	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 46

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.25 0.71	1.26 0.11	1.17 0.22	1.18 1.71	1.48 0.60	0.76 1.61
RUNOFF	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION	0.692 0.814	0.676 0.127	1.792 0.163	1.725 0.598	1.412 0.633	2.095 0.491
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

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ANNUAL TOTALS FOR YEAR 46

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.06	14696423.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	11.218	12623643.000	85.90
DRAINAGE COLLECTED FROM LAYER 4	0.0000	11.981	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.019	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	1.842	2072770.620	14.10
SOIL WATER AT START OF YEAR	88.065	99099816.000	
SOIL WATER AT END OF YEAR	89.926	101193616.000	
SNOW WATER AT START OF YEAR	0.019	21034.896	0.14
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-2.645	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 47

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	0.75	0.92	2.96	0.69	1.12	0.27
	0.39	0.30	1.24	1.45	1.40	1.29
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.224	0.491	1.227	2.339	1.070	1.186
	2.799	0.300	0.620	1.426	0.720	0.411
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0054	0.0124
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 47

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.78	14381337.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	12.815	14420642.000	100.27
DRAINAGE COLLECTED FROM LAYER 4	0.0179	20111.148	0.14
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.212	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.053	-59419.262	-0.41
SOIL WATER AT START OF YEAR	89.926	101193616.000	
SOIL WATER AT END OF YEAR	89.873	101134200.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	3.060	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 48

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.38	0.96	0.56	1.30	0.16	0.46
	0.00	1.82	0.02	1.27	1.10	1.44
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.491	0.520	1.688	1.574	0.644	1.094
	1.012	1.820	0.020	0.210	0.635	0.699
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.000

					OPEN.OUT	
TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

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ANNUAL TOTALS FOR YEAR 48

	INCHES	CU. FEET	PERCENT
PRECIPITATION	10.47	11781891.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	10.407	11710570.000	99.39
DRAINAGE COLLECTED FROM LAYER 4	0.0000	1.988	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.011	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	0.063	71318.562	0.61
SOIL WATER AT START OF YEAR	89.873	101134200.000	
SOIL WATER AT END OF YEAR	89.936	101205520.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	1.221	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 49

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.05 0.42	0.99 0.74	2.10 1.49	1.40 0.18	2.12 0.86	0.90 2.01
RUNOFF	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
EVAPOTRANSPIRATION	0.495 3.041	0.592 0.738	0.905 0.682	2.273 0.983	2.187 0.515	1.716 0.763
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000 0.0256	0.0000 0.0081	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0035 0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000

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ANNUAL TOTALS FOR YEAR 49

	INCHES	CU. FEET	PERCENT
PRECIPITATION	14.26	16046780.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	14.890	16755481.000	104.42
DRAINAGE COLLECTED FROM LAYER 4	0.0371	41762.809	0.26
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.204	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-0.667	-750454.687	-4.68
SOIL WATER AT START OF YEAR	89.936	101205520.000	

SOIL WATER AT END OF YEAR	89.270	100455064.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-9.200	0.00

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MONTHLY TOTALS (IN INCHES) FOR YEAR 50

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	1.51	0.77	2.66	0.52	2.27	1.98
	0.35	0.66	0.65	0.52	0.49	0.63
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	0.632	0.651	1.963	1.820	2.096	2.518
	1.979	0.611	0.579	0.592	0.392	0.484
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATION OF DAILY HEAD ON TOP OF LAYER 5	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

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ANNUAL TOTALS FOR YEAR 50

	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.01	14640158.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	14.316	16109291.000	110.03
DRAINAGE COLLECTED FROM LAYER 4	0.0001	83.935	0.00
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.053	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0000		
CHANGE IN WATER STORAGE	-1.306	-1469220.870	-10.04
SOIL WATER AT START OF YEAR	89.270	100455064.000	
SOIL WATER AT END OF YEAR	87.964	98985840.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	2.939	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 50

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	1.02	1.11	1.53	1.63	1.27	0.89
	0.52	0.72	0.71	0.89	0.99	1.19
STD. DEVIATIONS	0.57	0.52	0.69	0.77	0.64	0.58
	0.37	0.62	0.59	0.62	0.54	0.47

RUNOFF

TOTALS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
STD. DEVIATIONS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

EVAPOTRANSPIRATION

TOTALS	0.489	0.609	1.391	2.126	1.783	1.571
	1.496	0.740	0.594	0.620	0.500	0.528
STD. DEVIATIONS	0.170	0.193	0.333	0.453	0.688	0.524
	0.924	0.675	0.429	0.339	0.173	0.134

LATERAL DRAINAGE COLLECTED FROM LAYER 4

TOTALS	0.0000	0.0000	0.0013	0.0082	0.0068	0.0041
	0.0029	0.0027	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0064	0.0368	0.0301	0.0130
	0.0060	0.0101	0.0001	0.0000	0.0000	0.0000

PERCOLATION/LEAKAGE THROUGH LAYER 6

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 5

AVERAGES	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0003	0.0002	0.0001
	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 50

	INCHES		CU. FEET	PERCENT
PRECIPITATION	12.46	(2.077)	14017863.0	100.00
RUNOFF	0.000	(0.0000)	0.00	0.000
EVAPOTRANSPIRATION	12.445	(2.1613)	14004562.00	99.905
LATERAL DRAINAGE COLLECTED FROM LAYER 4	0.02607	(0.08668)	29331.221	0.20924
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00000	(0.00000)	0.090	0.00000
AVERAGE HEAD ON TOP OF LAYER 5	0.000	(0.000)		
CHANGE IN WATER STORAGE	-0.014	(1.1350)	-16033.62	-0.114

PEAK DAILY VALUES FOR YEARS 1 THROUGH 50

	(INCHES)	(CU. FT.)
PRECIPITATION	1.36	1530408.000
RUNOFF	0.000	0.0000
DRAINAGE COLLECTED FROM LAYER 4	0.01628	18322.43550
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.000000	0.00768
AVERAGE HEAD ON TOP OF LAYER 5	0.004	
MAXIMUM HEAD ON TOP OF LAYER 5	0.010	
LOCATION OF MAXIMUM HEAD IN LAYER 4 (DISTANCE FROM DRAIN)	0.0 FEET	
SNOW WATER	2.12	2388627.7500

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.2724

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.0881

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 50

LAYER	(INCHES)	(VOL/VOL)
1	1.0718	0.1786
2	82.0477	0.2735
3	4.3920	0.2440
4	0.0025	0.0100
5	0.0000	0.0000
6	0.4500	0.7500
SNOW WATER	0.000	

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Appendix 5.5
Groundwater Flow and Velocity Calculations

Job No. 8WEL010100 Sheet 1 of 1 Prepared by BRH Date 5/17/2004

Project Name WASATCH REGIONAL LANDFILL Reviewed by _____ Date _____

Title POROSITY CALCULATIONS FWA No. _____

A+ B-1 $\omega \approx 20\%$

$S = 1$

$\gamma_d = 87$ pcf

$\gamma = \gamma_d(1+\omega)$

$= 87(1.2)$

$\gamma = 104$ pcf

$G_s = \frac{\gamma}{\gamma_w} = \frac{104}{62.4} = 1.67$

$Se = \omega G_s$

$e = \frac{(0.2)(1.67)}{1} = 0.33$

$n = \frac{e}{1+e} = \frac{0.33}{1.33} = 0.25$

$n_e = \lambda n$ Assume $\lambda = 1$

$\boxed{n_e = n = 0.25}$

Job No. 8WEC010100 Sheet 1 of 1 Prepared by BRH Date 5/17/2004

Project Name WASATCH REGIONAL LANDFILL Reviewed by _____ Date _____

Title GROUNDWATER VELOCITY CALCS. FWA No. _____

$$i = \frac{\Delta H}{L} = \frac{4230-4220}{1917}$$

In "steeper" area

$$i = 0.0052$$

$$\boxed{i = 0.52\%}$$

$$k \approx 1 \times 10^{-4} \text{ cm/s}$$

$$V_d = ki$$

$$V_d = 5.2 \times 10^{-7} \text{ cm/s}$$

$$v = \frac{ki}{n} = \frac{V_d}{n}$$

$$n = 0.25$$

$$\boxed{v = 2.1 \times 10^{-6} \text{ cm/s} \quad (2.2 \text{ ft/year})}$$

Appendix 5.6
Sole Source Aquifers – Federal Register Search

Title 40--Protection of Environment

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 proj&chyph;ects.

Back Table of Contents

(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.

Biosolids
Dredging
Drinking Water
Estuaries
Great Lakes
Groundwater
Infrastructure
Lakes, Rivers, Streams
Non-point Pollution
Oceans
Permits & Compliance
Stormwater
Waste Water
Water Quality
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.

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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

U.S. Environmental Protection Agency

Federal Register

Contact Us

Results of Searching the "Federal Register" Area of EPA's Web Site

We have searched the area of EPA's site related to Federal Register and found the following results. You may also search for the same terms across EPA's entire site.

Searched 82556 files for **"sole source aquifer" and utah**; displaying results 1 - 9 of 9 total matches.

Rank	Score	Title of Highlighted Document and URL
1	0.96	EPA: Federal Register: Sole Source Aquifer Determination for Glen Canyon Aquifer System, Moab, Utah http://www.epa.gov/EPA-WATER/2002/January/Day-07/w297.htm **Summary:** AGENCY: Environmental Protection Agency (EPA). SUMMARY: Pursuant to section 1424(e) of the Safe Drinking Water Act, the Acting Regional Administrator of the U.S. Environmental Protection Agency (EPA) in Region VIII has determined that the Glen Canyon Aqui
2	0.92	EPA: Federal Register: Day 07 http://www.epa.gov/EPA-WATER/2002/January/Day-07/index.html **Summary:** > > > > > > > > > > > > Recent Additions | Contact Us | Print Version > Search: > > > > EPA Home > Federal Register > FR Program Requirement Revisions related to the Public Water System Supervision Program for the States of Connecticut, Rhode Island, Ver
3	0.91	EPA: Federal Register: Sole Source Aquifer Determination for Western Uinta Arch Paleozoic Aquifer System, Oakley, UT http://www.epa.gov/EPA-WATER/2000/December/Day-01/w30634.htm **Summary:** AGENCY: Environmental Protection Agency (EPA). SUMMARY: Pursuant to section 1424(e) of the Safe Drinking Water Act, the Regional Administrator of the U.S. Environmental Protection Agency (EPA) in Region VIII has determined that the Western Uinta Arch Pale
4	0.89	EPA: Federal Register: Sole Source Aquifer Determination for the Castle Valley Aquifer System, Castle Valley, UT http://www.epa.gov/EPA-WATER/2001/August/Day-06/w19566.htm **Summary:** AGENCY: Environmental Protection Agency (EPA). SUMMARY: Pursuant to section 1424(e) of the Safe Drinking Water Act, the Regional Administrator of the U.S. Environmental Protection Agency (EPA) in Region VIII has determined that the Castle Valley Aquifer S
5	0.77	EPA: Federal Register: Table of Contents: http://www.epa.gov/EPAFR-CONTENTS/1997/April/Day-09/contents.htm **Summary:** Maritime Administration NOTICES Applications, hearings, determinations, etc.: Lykes Bros. Nuclear Regulatory Commission NOTICES Environmental statements; availability, etc.: Duke Power Co. et al. Surface Transportation Board NOTICES Railroad operation, a

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
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
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 groun

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
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
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

New Search: Within Federal Register GO

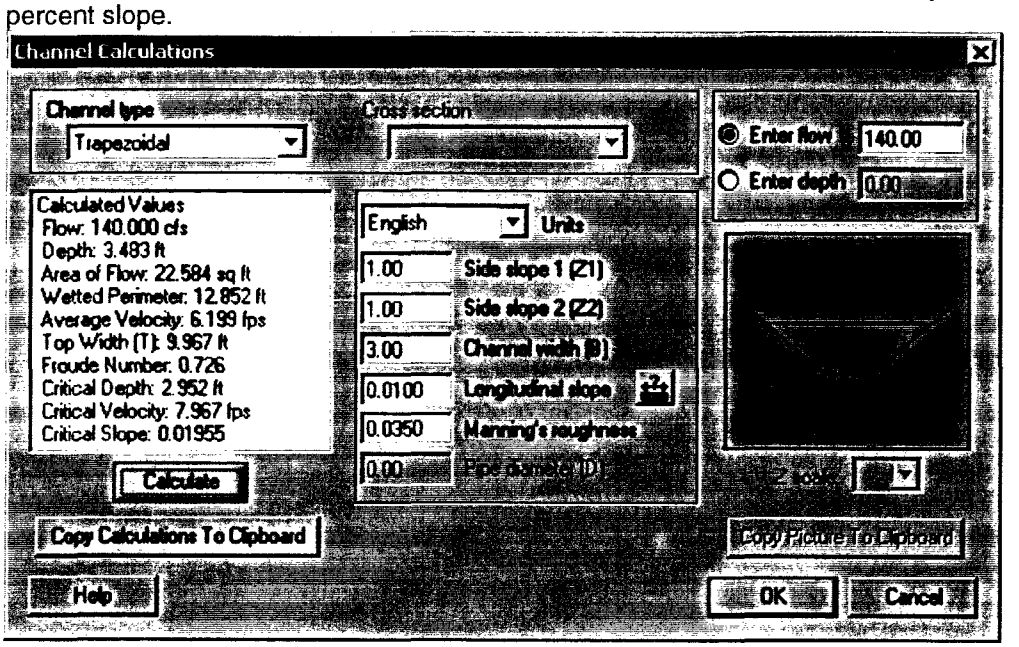
Advanced Search

EPA Home | Privacy and Security Notice | Contact Us

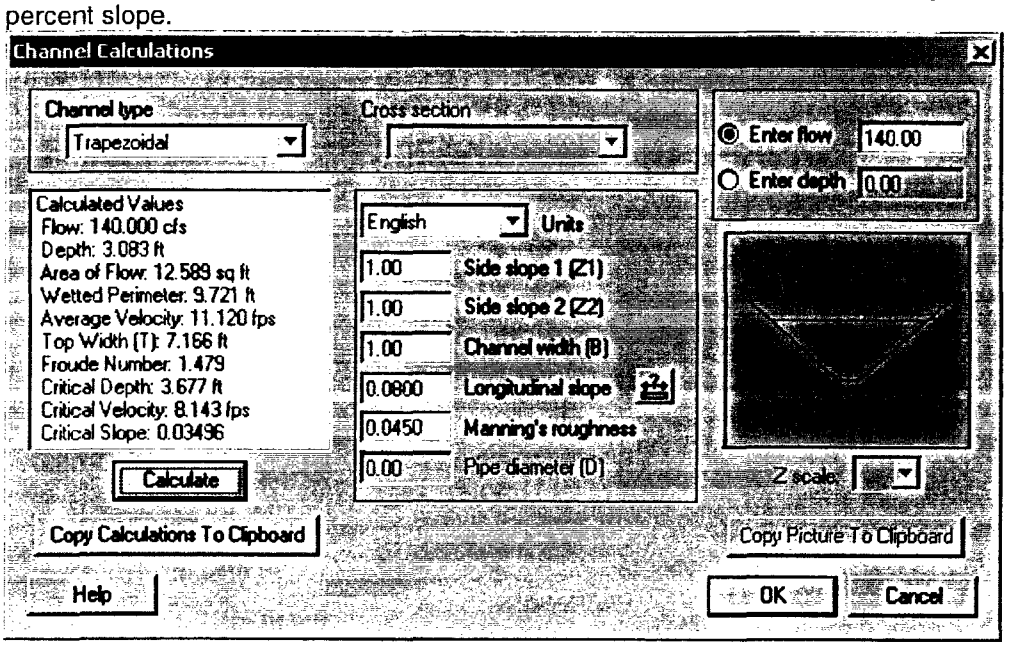
Search performed on Tuesday, March 02, 2004

Appendix 5.7
Runon Diversions, Hydrology and Hydraulic Model and Calculations

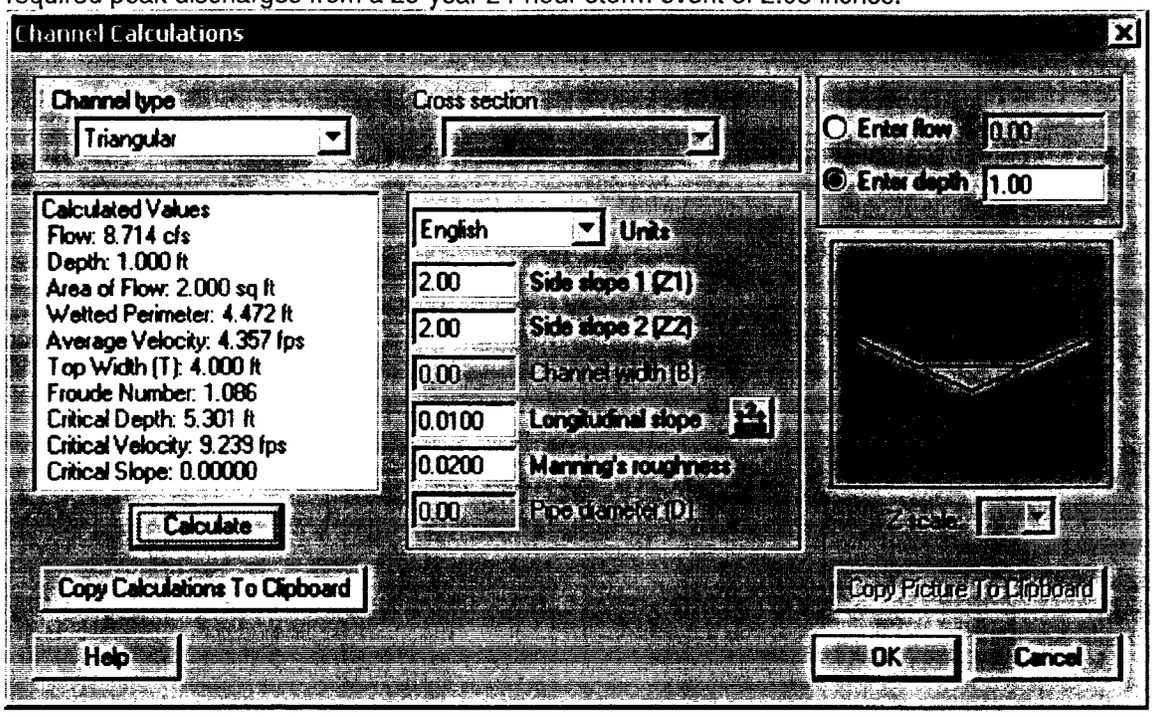
Trapezoidal cross-section, with geometry and depth described below, to convey 140 cfs at 1 percent slope.



Trapezoidal cross-section, with geometry and depth described below, to convey 140 cfs at 8 percent slope.



Triangular cross-section for cut-ditch on finished-grade terraces. Hydraulic capacity exceeds the required peak discharges from a 25-year 24-hour storm event of 2.08 inches.



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1****************************************
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 *                                     *                                                  *
*
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                  *
U.S. ARMY CORPS OF ENGINEERS     *
 *               MAY   1991             *                                                  *
HYDROLOGIC ENGINEERING CENTER    *
 *            VERSION 4.0.1E            *                                                  *
609 SECOND STREET          *
 *                                     *                                                  *
DAVIS, CALIFORNIA 95616       *
 *  RUN DATE  □□□□□□□□  TIME  □□□□□□□□  *                                                  *
(916) 551-1748            *
 *                                     *                                                  *
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,

DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION

KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT

PAGE 1

```
          LINE
ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

             1           ID  HEC-1 Analysis using WMS
             2           ID
             3           ID
                         *DIAGRAM
             4           IT       5  1JAN94       0     500
             5           IO       0

             6           KK   SOUTH
             7           KO       0       0     0.0       0      22
             8           BA     0.4
             9           PB    2.08
            10           IN       6  1JAN94       0
                         * typeII-24hour
            11           PC     0.0   0.001   0.002  0.0031  0.0041  0.0051  0.0062  0.0073  0.0083
0.0094
            12           PC  0.0105  0.0116  0.0127  0.0138   0.015  0.0161  0.0173  0.0185  0.0196
0.0208
```

```
13          PC   0.022  0.0232  0.0244  0.0256  0.0269  0.0281  0.0294  0.0307  0.0319
0.0332
14          PC  0.0345  0.0358  0.0371  0.0384  0.0398  0.0411  0.0425  0.0439  0.0452
0.0466
15          PC   0.048  0.0494  0.0508  0.0523  0.0538  0.0553  0.0568  0.0583  0.0598
0.0614
16          PC   0.063  0.0646  0.0662  0.0679  0.0696  0.0712   0.073  0.0747  0.0764
0.0782
17          PC    0.08  0.0818  0.0836  0.0855  0.0874  0.0892  0.0912  0.0931   0.095
0.097
18          PC   0.099   0.101   0.103  0.1051  0.1072  0.1093  0.1114  0.1135  0.1156
0.1178
19          PC    0.12  0.1223  0.1246  0.1271  0.1296  0.1323   0.135  0.1379  0.1408
0.1439
20          PC   0.147  0.1502  0.1534  0.1566  0.1598   0.163  0.1663  0.1697  0.1733
0.1771
21          PC   0.181  0.1851  0.1895  0.1941  0.1989   0.204  0.2094  0.2152  0.2214
0.228
22          PC   0.235  0.2427  0.2513  0.2609  0.2715   0.283  0.3068  0.3544  0.4308
0.5679
23          PC   0.663   0.682  0.6986   0.713  0.7252   0.735  0.7434  0.7514  0.7588
0.7656
24          PC   0.772   0.778  0.7836   0.789  0.7942   0.799  0.8036   0.808  0.8122
0.8162
25          PC    0.82  0.8237  0.8273  0.8308  0.8342  0.8376  0.8409  0.8442  0.8474
0.8505
26          PC  0.8535  0.8565  0.8594  0.8622  0.8649  0.8676  0.8702  0.8728  0.8753
0.8777
27          PC    0.88  0.8823  0.8845  0.8868   0.889  0.8912  0.8933  0.8955  0.8976
0.8997
28          PC  0.9018  0.9038  0.9058  0.9078  0.9097  0.9117  0.9136  0.9155  0.9174
0.9192
29          PC   0.921  0.9228  0.9245  0.9263   0.928  0.9297  0.9314   0.933  0.9346
0.9362
30          PC  0.9377  0.9393  0.9408  0.9423  0.9437  0.9452  0.9466   0.948  0.9494
0.9507
31          PC   0.952  0.9533  0.9546  0.9559  0.9572  0.9584  0.9597   0.961  0.9622
0.9635
32          PC  0.9648   0.966  0.9672  0.9685  0.9697  0.9709  0.9722  0.9734  0.9746
0.9758
33          PC   0.977  0.9782  0.9794  0.9806  0.9818  0.9829  0.9841  0.9853  0.9864
0.9876
34          PC  0.9888  0.9899   0.991  0.9922  0.9933  0.9944  0.9956  0.9967  0.9978
0.9989
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36          LS     0.0    75.0     0.0

37          UD     1.0

38          KK      2R   CNAME      2C
39          KO       0       0     0.0       0      22
40          RN      2R

41          KK   NORTH
42          KO       0       0     0.0       0      22
43          BA     1.5
44          PB    2.08
45          IN       6  1JAN94       0
            * typeII-24hour
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0.0094
47          PC  0.0105  0.0116  0.0127  0.0138   0.015  0.0161  0.0173  0.0185  0.0196
0.0208
48          PC   0.022  0.0232  0.0244  0.0256  0.0269  0.0281  0.0294  0.0307  0.0319
0.0332
49          PC  0.0345  0.0358  0.0371  0.0384  0.0398  0.0411  0.0425  0.0439  0.0452
0.0466
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          LINE
ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

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0.0614
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0.0782
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0.097
            53          PC   0.099   0.101   0.103  0.1051  0.1072  0.1093  0.1114  0.1135  0.1156
0.1178
            54          PC    0.12  0.1223  0.1246  0.1271  0.1296  0.1323   0.135  0.1379  0.1408
0.1439
            55          PC   0.147  0.1502  0.1534  0.1566  0.1598   0.163  0.1663  0.1697  0.1733
0.1771
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0.228
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0.5679
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0.7656
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0.8162
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0.8505
            61          PC  0.8535  0.8565  0.8594  0.8622  0.8649  0.8676  0.8702  0.8728  0.8753
0.8777
            62          PC    0.88  0.8823  0.8845  0.8868   0.889  0.8912  0.8933  0.8955  0.8976
0.8997
            63          PC  0.9018  0.9038  0.9058  0.9078  0.9097  0.9117  0.9136  0.9155  0.9174
0.9192
            64          PC   0.921  0.9228  0.9245  0.9263   0.928  0.9297  0.9314   0.933  0.9346
0.9362
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0.9507
            66          PC   0.952  0.9533  0.9546  0.9559  0.9572  0.9584  0.9597   0.961  0.9622
0.9635
            67          PC  0.9648   0.966  0.9672  0.9685  0.9697  0.9709  0.9722  0.9734  0.9746
0.9758
            68          PC   0.977  0.9782  0.9794  0.9806  0.9818  0.9829  0.9841  0.9853  0.9864
0.9876
            69          PC  0.9888  0.9899   0.991  0.9922  0.9933  0.9944  0.9956  0.9967  0.9978
0.9989
            70          PC     1.0
            71          LS     0.0    75.0     0.0
            72          UD     1.0

            73          KK      1R   CNAME      1C
            74          KO       0       0     0.0       0      22
            75          RN      1R
            76          ZZ
```

```
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE       (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6        SOUTH
                  V
                  V
    38           2R
                  .
                  .
    41            .        NORTH
                  .            V
                  .            V
    73            .           1R

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************
*************************************
 *                                   *                                                  *
*
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                  *
U.S. ARMY CORPS OF ENGINEERS     *
 *              MAY   1991             *                                                  *
HYDROLOGIC ENGINEERING CENTER    *
 *           VERSION 4.0.1E            *                                                  *
609 SECOND STREET          *
 *                                   *                                                  *
DAVIS, CALIFORNIA 95616       *
 *  RUN DATE  □□□□□□□□  TIME  □□□□□□□□   *                                                  *
(916) 551-1748            *
 *                                   *                                                  *
*
 ****************************************
*************************************
```

HEC-1 Analysis using WMS

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    5 IO          OUTPUT CONTROL VARIABLES
                        IPRNT           0  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                         NMIN           5  MINUTES IN COMPUTATION INTERVAL
                        IDATE      1JAN94  STARTING DATE
                        ITIME        0000  STARTING TIME
                           NQ,        500  NUMBER OF HYDROGRAPH ORDINATES
                       NDDATE      2JAN94  ENDING DATE
                       NDTIME        1735  ENDING TIME
                       ICENT           19  CENTURY MARK

                   COMPUTATION INTERVAL    0.08 HOURS
                        TOTAL TIME BASE   41.58 HOURS

           ENGLISH UNITS
                DRAINAGE AREA          SQUARE MILES
                PRECIPITATION DEPTH    INCHES
                LENGTH, ELEVATION      FEET
                FLOW                   CUBIC FEET PER SECOND
                STORAGE VOLUME         ACRE-FEET
                SURFACE AREA           ACRES
                TEMPERATURE            DEGREES FAHRENHEIT
```

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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** ***

            **************
            *            *
  6 KK      *     SOUTH  *
            *            *
            **************

  7 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           0  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       0.083  TIME INTERVAL IN HOURS

 10 IN          TIME DATA FOR INPUT TIME SERIES
                      JXMIN           6  TIME INTERVAL IN MINUTES
                     JXDATE      1JAN94  STARTING DATE
                     JXTIME           0  STARTING TIME

              SUBBASIN RUNOFF DATA

  8 BA          SUBBASIN CHARACTERISTICS
                      TAREA,        0.40  SUBBASIN AREA

                PRECIPITATION DATA

  9 PB                STORM        2.08  BASIN TOTAL PRECIPITATION

 11 PI            INCREMENTAL PRECIPITATION PATTERN
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.01      0.01
                     0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
0.02      0.04
                     0.05      0.08      0.11      0.08      0.02      0.01      0.01      0.01
0.01      0.01
                     0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00
0.00      0.00
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                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00
                  0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00

  36 LS          SCS LOSS RATE
                    STRTL        0.67  INITIAL ABSTRACTION
                   CRVNBR       75.00  CURVE NUMBER
                    RTIMP        0.00  PERCENT IMPERVIOUS AREA

  37 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG         1.00  LAG

                                                  ***

                                                 UNIT HYDROGRAPH
                                            62 END-OF-PERIOD ORDINATES
            4.     13.     25.     40.     58.     81.    108.    134.    156.
173.
          181.    185.    185.    181.    173.    162.    151.    137.    122.
104.
           89.     78.     68.     59.     52.     47.     41.     36.     32.
27.

           24.     21.     19.     17.     14.     13.     11.     10.      9.
7.
            7.      6.      5.      4.      4.      3.      3.      3.      2.
2.
            2.      2.      2.      1.      1.      1.      1.      1.      1.
0.
            0.      0.

********************************************************************************
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                                        HYDROGRAPH AT STATION     SOUTH

********************************************************************************
******************************
                                                          *
     DA MON HRMN  ORD    RAIN   LOSS  EXCESS    COMP Q    *     DA MON HRMN  ORD    RAIN
LOSS  EXCESS     COMP Q
                                                          *
      1 JAN 0000    1    0.00   0.00   0.00       0.      *      1 JAN 2050  251    0.00
0.00   0.00        4.
      1 JAN 0005    2    0.00   0.00   0.00       0.      *      1 JAN 2055  252    0.00
0.00   0.00        4.
```

	1 JAN 0010	3	0.00	0.00	0.00	0.	*	1 JAN 2100	253	0.00	0.00	0.00
4.												
	1 JAN 0015	4	0.00	0.00	0.00	0.	*	1 JAN 2105	254	0.00	0.00	0.00
4.												
	1 JAN 0020	5	0.00	0.00	0.00	0.	*	1 JAN 2110	255	0.00	0.00	0.00
4.												
	1 JAN 0025	6	0.00	0.00	0.00	0.	*	1 JAN 2115	256	0.00	0.00	0.00
4.												
	1 JAN 0030	7	0.00	0.00	0.00	0.	*	1 JAN 2120	257	0.00	0.00	0.00
4.												
	1 JAN 0035	8	0.00	0.00	0.00	0.	*	1 JAN 2125	258	0.00	0.00	0.00
3.												
	1 JAN 0040	9	0.00	0.00	0.00	0.	*	1 JAN 2130	259	0.00	0.00	0.00
3.												
	1 JAN 0045	10	0.00	0.00	0.00	0.	*	1 JAN 2135	260	0.00	0.00	0.00
3.												
	1 JAN 0050	11	0.00	0.00	0.00	0.	*	1 JAN 2140	261	0.00	0.00	0.00
3.												
	1 JAN 0055	12	0.00	0.00	0.00	0.	*	1 JAN 2145	262	0.00	0.00	0.00
3.												
	1 JAN 0100	13	0.00	0.00	0.00	0.	*	1 JAN 2150	263	0.00	0.00	0.00
3.												
	1 JAN 0105	14	0.00	0.00	0.00	0.	*	1 JAN 2155	264	0.00	0.00	0.00
3.												
	1 JAN 0110	15	0.00	0.00	0.00	0.	*	1 JAN 2200	265	0.00	0.00	0.00
3.												
	1 JAN 0115	16	0.00	0.00	0.00	0.	*	1 JAN 2205	266	0.00	0.00	0.00
3.												
	1 JAN 0120	17	0.00	0.00	0.00	0.	*	1 JAN 2210	267	0.00	0.00	0.00
3.												
	1 JAN 0125	18	0.00	0.00	0.00	0.	*	1 JAN 2215	268	0.00	0.00	0.00
3.												
	1 JAN 0130	19	0.00	0.00	0.00	0.	*	1 JAN 2220	269	0.00	0.00	0.00
3.												
	1 JAN 0135	20	0.00	0.00	0.00	0.	*	1 JAN 2225	270	0.00	0.00	0.00
3.												
	1 JAN 0140	21	0.00	0.00	0.00	0.	*	1 JAN 2230	271	0.00	0.00	0.00
3.												
	1 JAN 0145	22	0.00	0.00	0.00	0.	*	1 JAN 2235	272	0.00	0.00	0.00
3.												
	1 JAN 0150	23	0.00	0.00	0.00	0.	*	1 JAN 2240	273	0.00	0.00	0.00
3.												
	1 JAN 0155	24	0.00	0.00	0.00	0.	*	1 JAN 2245	274	0.00	0.00	0.00
3.												
	1 JAN 0200	25	0.00	0.00	0.00	0.	*	1 JAN 2250	275	0.00	0.00	0.00
3.												
	1 JAN 0205	26	0.00	0.00	0.00	0.	*	1 JAN 2255	276	0.00	0.00	0.00
3.												
	1 JAN 0210	27	0.00	0.00	0.00	0.	*	1 JAN 2300	277	0.00	0.00	0.00
3.												
	1 JAN 0215	28	0.00	0.00	0.00	0.	*	1 JAN 2305	278	0.00	0.00	0.00
3.												
	1 JAN 0220	29	0.00	0.00	0.00	0.	*	1 JAN 2310	279	0.00	0.00	0.00
3.												
	1 JAN 0225	30	0.00	0.00	0.00	0.	*	1 JAN 2315	280	0.00	0.00	0.00
3.												
	1 JAN 0230	31	0.00	0.00	0.00	0.	*	1 JAN 2320	281	0.00	0.00	0.00
3.												
	1 JAN 0235	32	0.00	0.00	0.00	0.	*	1 JAN 2325	282	0.00	0.00	0.00
3.												
	1 JAN 0240	33	0.00	0.00	0.00	0.	*	1 JAN 2330	283	0.00	0.00	0.00
3.												
	1 JAN 0245	34	0.00	0.00	0.00	0.	*	1 JAN 2335	284	0.00	0.00	0.00
3.												
	1 JAN 0250	35	0.00	0.00	0.00	0.	*	1 JAN 2340	285	0.00	0.00	0.00
3.												
	1 JAN 0255	36	0.00	0.00	0.00	0.	*	1 JAN 2345	286	0.00	0.00	0.00
3.												
	1 JAN 0300	37	0.00	0.00	0.00	0.	*	1 JAN 2350	287	0.00	0.00	0.00
3.												

	1 JAN 0305	38	0.00	0.00	0.00	0.	*	1 JAN 2355	288	0.00	0.00	0.00
	1 JAN 0310	39	0.00	0.00	0.00	0.	*	2 JAN 0000	289	0.00	0.00	0.00
	1 JAN 0315	40	0.00	0.00	0.00	0.	*	2 JAN 0005	290	0.00	0.00	0.00
	1 JAN 0320	41	0.00	0.00	0.00	0.	*	2 JAN 0010	291	0.00	0.00	0.00
	1 JAN 0325	42	0.00	0.00	0.00	0.	*	2 JAN 0015	292	0.00	0.00	0.00
	1 JAN 0330	43	0.00	0.00	0.00	0.	*	2 JAN 0020	293	0.00	0.00	0.00
	1 JAN 0335	44	0.00	0.00	0.00	0.	*	2 JAN 0025	294	0.00	0.00	0.00
	1 JAN 0340	45	0.00	0.00	0.00	0.	*	2 JAN 0030	295	0.00	0.00	0.00
	1 JAN 0345	46	0.00	0.00	0.00	0.	*	2 JAN 0035	296	0.00	0.00	0.00
	1 JAN 0350	47	0.00	0.00	0.00	0.	*	2 JAN 0040	297	0.00	0.00	0.00
	1 JAN 0355	48	0.00	0.00	0.00	0.	*	2 JAN 0045	298	0.00	0.00	0.00
	1 JAN 0400	49	0.00	0.00	0.00	0.	*	2 JAN 0050	299	0.00	0.00	0.00
	1 JAN 0405	50	0.00	0.00	0.00	0.	*	2 JAN 0055	300	0.00	0.00	0.00
	1 JAN 0410	51	0.00	0.00	0.00	0.	*	2 JAN 0100	301	0.00	0.00	0.00
	1 JAN 0415	52	0.00	0.00	0.00	0.	*	2 JAN 0105	302	0.00	0.00	0.00
	1 JAN 0420	53	0.00	0.00	0.00	0.	*	2 JAN 0110	303	0.00	0.00	0.00
	1 JAN 0425	54	0.00	0.00	0.00	0.	*	2 JAN 0115	304	0.00	0.00	0.00
	1 JAN 0430	55	0.00	0.00	0.00	0.	*	2 JAN 0120	305	0.00	0.00	0.00
	1 JAN 0435	56	0.00	0.00	0.00	0.	*	2 JAN 0125	306	0.00	0.00	0.00
	1 JAN 0440	57	0.00	0.00	0.00	0.	*	2 JAN 0130	307	0.00	0.00	0.00
	1 JAN 0445	58	0.00	0.00	0.00	0.	*	2 JAN 0135	308	0.00	0.00	0.00
	1 JAN 0450	59	0.00	0.00	0.00	0.	*	2 JAN 0140	309	0.00	0.00	0.00
	1 JAN 0455	60	0.00	0.00	0.00	0.	*	2 JAN 0145	310	0.00	0.00	0.00
	1 JAN 0500	61	0.00	0.00	0.00	0.	*	2 JAN 0150	311	0.00	0.00	0.00
	1 JAN 0505	62	0.00	0.00	0.00	0.	*	2 JAN 0155	312	0.00	0.00	0.00
	1 JAN 0510	63	0.00	0.00	0.00	0.	*	2 JAN 0200	313	0.00	0.00	0.00
	1 JAN 0515	64	0.00	0.00	0.00	0.	*	2 JAN 0205	314	0.00	0.00	0.00
	1 JAN 0520	65	0.00	0.00	0.00	0.	*	2 JAN 0210	315	0.00	0.00	0.00
	1 JAN 0525	66	0.00	0.00	0.00	0.	*	2 JAN 0215	316	0.00	0.00	0.00
	1 JAN 0530	67	0.00	0.00	0.00	0.	*	2 JAN 0220	317	0.00	0.00	0.00
	1 JAN 0535	68	0.00	0.00	0.00	0.	*	2 JAN 0225	318	0.00	0.00	0.00
	1 JAN 0540	69	0.00	0.00	0.00	0.	*	2 JAN 0230	319	0.00	0.00	0.00
	1 JAN 0545	70	0.00	0.00	0.00	0.	*	2 JAN 0235	320	0.00	0.00	0.00
	1 JAN 0550	71	0.00	0.00	0.00	0.	*	2 JAN 0240	321	0.00	0.00	0.00
	1 JAN 0555	72	0.00	0.00	0.00	0.	*	2 JAN 0245	322	0.00	0.00	0.00

	1 JAN 0600	73	0.00	0.00	0.00	0.	*	2 JAN 0250	323	0.00	0.00	0.00
	1 JAN 0605	74	0.00	0.00	0.00	0.	*	2 JAN 0255	324	0.00	0.00	0.00
	1 JAN 0610	75	0.00	0.00	0.00	0.	*	2 JAN 0300	325	0.00	0.00	0.00
	1 JAN 0615	76	0.00	0.00	0.00	0.	*	2 JAN 0305	326	0.00	0.00	0.00
	1 JAN 0620	77	0.00	0.00	0.00	0.	*	2 JAN 0310	327	0.00	0.00	0.00
	1 JAN 0625	78	0.00	0.00	0.00	0.	*	2 JAN 0315	328	0.00	0.00	0.00
	1 JAN 0630	79	0.00	0.00	0.00	0.	*	2 JAN 0320	329	0.00	0.00	0.00
	1 JAN 0635	80	0.00	0.00	0.00	0.	*	2 JAN 0325	330	0.00	0.00	0.00
	1 JAN 0640	81	0.00	0.00	0.00	0.	*	2 JAN 0330	331	0.00	0.00	0.00
	1 JAN 0645	82	0.00	0.00	0.00	0.	*	2 JAN 0335	332	0.00	0.00	0.00
	1 JAN 0650	83	0.00	0.00	0.00	0.	*	2 JAN 0340	333	0.00	0.00	0.00
	1 JAN 0655	84	0.00	0.00	0.00	0.	*	2 JAN 0345	334	0.00	0.00	0.00
	1 JAN 0700	85	0.00	0.00	0.00	0.	*	2 JAN 0350	335	0.00	0.00	0.00
	1 JAN 0705	86	0.00	0.00	0.00	0.	*	2 JAN 0355	336	0.00	0.00	0.00
	1 JAN 0710	87	0.00	0.00	0.00	0.	*	2 JAN 0400	337	0.00	0.00	0.00
	1 JAN 0715	88	0.00	0.00	0.00	0.	*	2 JAN 0405	338	0.00	0.00	0.00
	1 JAN 0720	89	0.00	0.00	0.00	0.	*	2 JAN 0410	339	0.00	0.00	0.00
	1 JAN 0725	90	0.00	0.00	0.00	0.	*	2 JAN 0415	340	0.00	0.00	0.00
	1 JAN 0730	91	0.00	0.00	0.00	0.	*	2 JAN 0420	341	0.00	0.00	0.00
	1 JAN 0735	92	0.00	0.00	0.00	0.	*	2 JAN 0425	342	0.00	0.00	0.00
	1 JAN 0740	93	0.00	0.00	0.00	0.	*	2 JAN 0430	343	0.00	0.00	0.00
	1 JAN 0745	94	0.00	0.00	0.00	0.	*	2 JAN 0435	344	0.00	0.00	0.00
	1 JAN 0750	95	0.00	0.00	0.00	0.	*	2 JAN 0440	345	0.00	0.00	0.00
	1 JAN 0755	96	0.00	0.00	0.00	0.	*	2 JAN 0445	346	0.00	0.00	0.00
	1 JAN 0800	97	0.00	0.00	0.00	0.	*	2 JAN 0450	347	0.00	0.00	0.00
	1 JAN 0805	98	0.00	0.00	0.00	0.	*	2 JAN 0455	348	0.00	0.00	0.00
	1 JAN 0810	99	0.00	0.00	0.00	0.	*	2 JAN 0500	349	0.00	0.00	0.00
	1 JAN 0815	100	0.00	0.00	0.00	0.	*	2 JAN 0505	350	0.00	0.00	0.00
	1 JAN 0820	101	0.00	0.00	0.00	0.	*	2 JAN 0510	351	0.00	0.00	0.00
	1 JAN 0825	102	0.00	0.00	0.00	0.	*	2 JAN 0515	352	0.00	0.00	0.00
	1 JAN 0830	103	0.00	0.00	0.00	0.	*	2 JAN 0520	353	0.00	0.00	0.00
	1 JAN 0835	104	0.00	0.00	0.00	0.	*	2 JAN 0525	354	0.00	0.00	0.00
	1 JAN 0840	105	0.00	0.00	0.00	0.	*	2 JAN 0530	355	0.00	0.00	0.00
	1 JAN 0845	106	0.01	0.01	0.00	0.	*	2 JAN 0535	356	0.00	0.00	0.00
	1 JAN 0850	107	0.01	0.01	0.00	0.	*	2 JAN 0540	357	0.00	0.00	0.00

	1 JAN 0855	108	0.01	0.01	0.00	0.	*	2 JAN 0545	358	0.00	0.00	0.00
	1 JAN 0900	109	0.01	0.01	0.00	0.	*	2 JAN 0550	359	0.00	0.00	0.00
	1 JAN 0905	110	0.01	0.01	0.00	0.	*	2 JAN 0555	360	0.00	0.00	0.00
	1 JAN 0910	111	0.01	0.01	0.00	0.	*	2 JAN 0600	361	0.00	0.00	0.00
	1 JAN 0915	112	0.01	0.01	0.00	0.	*	2 JAN 0605	362	0.00	0.00	0.00
	1 JAN 0920	113	0.01	0.01	0.00	0.	*	2 JAN 0610	363	0.00	0.00	0.00
	1 JAN 0925	114	0.01	0.01	0.00	0.	*	2 JAN 0615	364	0.00	0.00	0.00
	1 JAN 0930	115	0.01	0.01	0.00	0.	*	2 JAN 0620	365	0.00	0.00	0.00
	1 JAN 0935	116	0.01	0.01	0.00	0.	*	2 JAN 0625	366	0.00	0.00	0.00
	1 JAN 0940	117	0.01	0.01	0.00	0.	*	2 JAN 0630	367	0.00	0.00	0.00
	1 JAN 0945	118	0.01	0.01	0.00	0.	*	2 JAN 0635	368	0.00	0.00	0.00
	1 JAN 0950	119	0.01	0.01	0.00	0.	*	2 JAN 0640	369	0.00	0.00	0.00
	1 JAN 0955	120	0.01	0.01	0.00	0.	*	2 JAN 0645	370	0.00	0.00	0.00
	1 JAN 1000	121	0.01	0.01	0.00	0.	*	2 JAN 0650	371	0.00	0.00	0.00
	1 JAN 1005	122	0.01	0.01	0.00	0.	*	2 JAN 0655	372	0.00	0.00	0.00
	1 JAN 1010	123	0.01	0.01	0.00	0.	*	2 JAN 0700	373	0.00	0.00	0.00
	1 JAN 1015	124	0.01	0.01	0.00	0.	*	2 JAN 0705	374	0.00	0.00	0.00
	1 JAN 1020	125	0.01	0.01	0.00	0.	*	2 JAN 0710	375	0.00	0.00	0.00
	1 JAN 1025	126	0.01	0.01	0.00	0.	*	2 JAN 0715	376	0.00	0.00	0.00
	1 JAN 1030	127	0.01	0.01	0.00	0.	*	2 JAN 0720	377	0.00	0.00	0.00
	1 JAN 1035	128	0.01	0.01	0.00	0.	*	2 JAN 0725	378	0.00	0.00	0.00
	1 JAN 1040	129	0.01	0.01	0.00	0.	*	2 JAN 0730	379	0.00	0.00	0.00
	1 JAN 1045	130	0.01	0.01	0.00	0.	*	2 JAN 0735	380	0.00	0.00	0.00
	1 JAN 1050	131	0.01	0.01	0.00	0.	*	2 JAN 0740	381	0.00	0.00	0.00
	1 JAN 1055	132	0.01	0.01	0.00	0.	*	2 JAN 0745	382	0.00	0.00	0.00
	1 JAN 1100	133	0.01	0.01	0.00	0.	*	2 JAN 0750	383	0.00	0.00	0.00
	1 JAN 1105	134	0.01	0.01	0.00	0.	*	2 JAN 0755	384	0.00	0.00	0.00
	1 JAN 1110	135	0.01	0.01	0.00	0.	*	2 JAN 0800	385	0.00	0.00	0.00
	1 JAN 1115	136	0.02	0.02	0.00	0.	*	2 JAN 0805	386	0.00	0.00	0.00
	1 JAN 1120	137	0.02	0.02	0.00	0.	*	2 JAN 0810	387	0.00	0.00	0.00
	1 JAN 1125	138	0.02	0.02	0.00	0.	*	2 JAN 0815	388	0.00	0.00	0.00
	1 JAN 1130	139	0.02	0.02	0.00	0.	*	2 JAN 0820	389	0.00	0.00	0.00
	1 JAN 1135	140	0.04	0.04	0.00	0.	*	2 JAN 0825	390	0.00	0.00	0.00
	1 JAN 1140	141	0.07	0.07	0.00	0.	*	2 JAN 0830	391	0.00	0.00	0.00
	1 JAN 1145	142	0.11	0.11	0.01	0.	*	2 JAN 0835	392	0.00	0.00	0.00

	1 JAN 1150	143	0.17	0.15	0.02	0.	*	2 JAN 0840	393	0.00	
0.00	0.00	0.									
	1 JAN 1155	144	0.22	0.17	0.05	1.	*	2 JAN 0845	394	0.00	
0.00	0.00	0.									
	1 JAN 1200	145	0.16	0.12	0.05	2.	*	2 JAN 0850	395	0.00	
0.00	0.00	0.									
	1 JAN 1205	146	0.03	0.02	0.01	3.	*	2 JAN 0855	396	0.00	
0.00	0.00	0.									
	1 JAN 1210	147	0.03	0.02	0.01	5.	*	2 JAN 0900	397	0.00	
0.00	0.00	0.									
	1 JAN 1215	148	0.03	0.02	0.01	8.	*	2 JAN 0905	398	0.00	
0.00	0.00	0.									
	1 JAN 1220	149	0.02	0.02	0.01	11.	*	2 JAN 0910	399	0.00	
0.00	0.00	0.									
	1 JAN 1225	150	0.02	0.01	0.01	15.	*	2 JAN 0915	400	0.00	
0.00	0.00	0.									
	1 JAN 1230	151	0.02	0.01	0.01	18.	*	2 JAN 0920	401	0.00	
0.00	0.00	0.									
	1 JAN 1235	152	0.01	0.01	0.01	22.	*	2 JAN 0925	402	0.00	
0.00	0.00	0.									
	1 JAN 1240	153	0.01	0.01	0.01	25.	*	2 JAN 0930	403	0.00	
0.00	0.00	0.									
	1 JAN 1245	154	0.01	0.01	0.01	28.	*	2 JAN 0935	404	0.00	
0.00	0.00	0.									
	1 JAN 1250	155	0.01	0.01	0.00	30.	*	2 JAN 0940	405	0.00	
0.00	0.00	0.									
	1 JAN 1255	156	0.01	0.01	0.00	31.	*	2 JAN 0945	406	0.00	
0.00	0.00	0.									
	1 JAN 1300	157	0.01	0.01	0.00	32.	*	2 JAN 0950	407	0.00	
0.00	0.00	0.									
	1 JAN 1305	158	0.01	0.01	0.00	32.	*	2 JAN 0955	408	0.00	
0.00	0.00	0.									
	1 JAN 1310	159	0.01	0.01	0.00	32.	*	2 JAN 1000	409	0.00	
0.00	0.00	0.									
	1 JAN 1315	160	0.01	0.01	0.00	31.	*	2 JAN 1005	410	0.00	
0.00	0.00	0.									
	1 JAN 1320	161	0.01	0.01	0.00	30.	*	2 JAN 1010	411	0.00	
0.00	0.00	0.									
	1 JAN 1325	162	0.01	0.01	0.00	29.	*	2 JAN 1015	412	0.00	
0.00	0.00	0.									
	1 JAN 1330	163	0.01	0.00	0.00	27.	*	2 JAN 1020	413	0.00	
0.00	0.00	0.									
	1 JAN 1335	164	0.01	0.00	0.00	26.	*	2 JAN 1025	414	0.00	
0.00	0.00	0.									
	1 JAN 1340	165	0.01	0.00	0.00	24.	*	2 JAN 1030	415	0.00	
0.00	0.00	0.									
	1 JAN 1345	166	0.01	0.00	0.00	23.	*	2 JAN 1035	416	0.00	
0.00	0.00	0.									
	1 JAN 1350	167	0.01	0.00	0.00	21.	*	2 JAN 1040	417	0.00	
0.00	0.00	0.									
	1 JAN 1355	168	0.01	0.00	0.00	20.	*	2 JAN 1045	418	0.00	
0.00	0.00	0.									
	1 JAN 1400	169	0.01	0.00	0.00	19.	*	2 JAN 1050	419	0.00	
0.00	0.00	0.									
	1 JAN 1405	170	0.01	0.00	0.00	18.	*	2 JAN 1055	420	0.00	
0.00	0.00	0.									
	1 JAN 1410	171	0.01	0.00	0.00	17.	*	2 JAN 1100	421	0.00	
0.00	0.00	0.									
	1 JAN 1415	172	0.01	0.00	0.00	16.	*	2 JAN 1105	422	0.00	
0.00	0.00	0.									
	1 JAN 1420	173	0.01	0.00	0.00	16.	*	2 JAN 1110	423	0.00	
0.00	0.00	0.									
	1 JAN 1425	174	0.01	0.00	0.00	15.	*	2 JAN 1115	424	0.00	
0.00	0.00	0.									
	1 JAN 1430	175	0.01	0.00	0.00	14.	*	2 JAN 1120	425	0.00	
0.00	0.00	0.									
	1 JAN 1435	176	0.01	0.00	0.00	14.	*	2 JAN 1125	426	0.00	
0.00	0.00	0.									
	1 JAN 1440	177	0.01	0.00	0.00	13.	*	2 JAN 1130	427	0.00	
0.00	0.00	0.									

	1 JAN 1445	178	0.01	0.00	0.00	12.	*	2 JAN 1135	428	0.00	0.00	0.00
	1 JAN 1450	179	0.01	0.00	0.00	12.	*	2 JAN 1140	429	0.00	0.00	0.00
	1 JAN 1455	180	0.01	0.00	0.00	12.	*	2 JAN 1145	430	0.00	0.00	0.00
	1 JAN 1500	181	0.01	0.00	0.00	11.	*	2 JAN 1150	431	0.00	0.00	0.00
	1 JAN 1505	182	0.01	0.00	0.00	11.	*	2 JAN 1155	432	0.00	0.00	0.00
	1 JAN 1510	183	0.01	0.00	0.00	10.	*	2 JAN 1200	433	0.00	0.00	0.00
	1 JAN 1515	184	0.00	0.00	0.00	10.	*	2 JAN 1205	434	0.00	0.00	0.00
	1 JAN 1520	185	0.00	0.00	0.00	10.	*	2 JAN 1210	435	0.00	0.00	0.00
	1 JAN 1525	186	0.00	0.00	0.00	9.	*	2 JAN 1215	436	0.00	0.00	0.00
	1 JAN 1530	187	0.00	0.00	0.00	9.	*	2 JAN 1220	437	0.00	0.00	0.00
	1 JAN 1535	188	0.00	0.00	0.00	9.	*	2 JAN 1225	438	0.00	0.00	0.00
	1 JAN 1540	189	0.00	0.00	0.00	9.	*	2 JAN 1230	439	0.00	0.00	0.00
	1 JAN 1545	190	0.00	0.00	0.00	9.	*	2 JAN 1235	440	0.00	0.00	0.00
	1 JAN 1550	191	0.00	0.00	0.00	8.	*	2 JAN 1240	441	0.00	0.00	0.00
	1 JAN 1555	192	0.00	0.00	0.00	8.	*	2 JAN 1245	442	0.00	0.00	0.00
	1 JAN 1600	193	0.00	0.00	0.00	8.	*	2 JAN 1250	443	0.00	0.00	0.00
	1 JAN 1605	194	0.00	0.00	0.00	8.	*	2 JAN 1255	444	0.00	0.00	0.00
	1 JAN 1610	195	0.00	0.00	0.00	8.	*	2 JAN 1300	445	0.00	0.00	0.00
	1 JAN 1615	196	0.00	0.00	0.00	7.	*	2 JAN 1305	446	0.00	0.00	0.00
	1 JAN 1620	197	0.00	0.00	0.00	7.	*	2 JAN 1310	447	0.00	0.00	0.00
	1 JAN 1625	198	0.00	0.00	0.00	7.	*	2 JAN 1315	448	0.00	0.00	0.00
	1 JAN 1630	199	0.00	0.00	0.00	7.	*	2 JAN 1320	449	0.00	0.00	0.00
	1 JAN 1635	200	0.00	0.00	0.00	7.	*	2 JAN 1325	450	0.00	0.00	0.00
	1 JAN 1640	201	0.00	0.00	0.00	7.	*	2 JAN 1330	451	0.00	0.00	0.00
	1 JAN 1645	202	0.00	0.00	0.00	7.	*	2 JAN 1335	452	0.00	0.00	0.00
	1 JAN 1650	203	0.00	0.00	0.00	6.	*	2 JAN 1340	453	0.00	0.00	0.00
	1 JAN 1655	204	0.00	0.00	0.00	6.	*	2 JAN 1345	454	0.00	0.00	0.00
	1 JAN 1700	205	0.00	0.00	0.00	6.	*	2 JAN 1350	455	0.00	0.00	0.00
	1 JAN 1705	206	0.00	0.00	0.00	6.	*	2 JAN 1355	456	0.00	0.00	0.00
	1 JAN 1710	207	0.00	0.00	0.00	6.	*	2 JAN 1400	457	0.00	0.00	0.00
	1 JAN 1715	208	0.00	0.00	0.00	6.	*	2 JAN 1405	458	0.00	0.00	0.00
	1 JAN 1720	209	0.00	0.00	0.00	6.	*	2 JAN 1410	459	0.00	0.00	0.00
	1 JAN 1725	210	0.00	0.00	0.00	6.	*	2 JAN 1415	460	0.00	0.00	0.00
	1 JAN 1730	211	0.00	0.00	0.00	6.	*	2 JAN 1420	461	0.00	0.00	0.00
	1 JAN 1735	212	0.00	0.00	0.00	6.	*	2 JAN 1425	462	0.00	0.00	0.00

	1 JAN 1740	213	0.00	0.00	0.00	6.	*	2 JAN 1430	463	0.00	0.00	0.00
	1 JAN 1745	214	0.00	0.00	0.00	5.	*	2 JAN 1435	464	0.00	0.00	0.00
	1 JAN 1750	215	0.00	0.00	0.00	5.	*	2 JAN 1440	465	0.00	0.00	0.00
	1 JAN 1755	216	0.00	0.00	0.00	5.	*	2 JAN 1445	466	0.00	0.00	0.00
	1 JAN 1800	217	0.00	0.00	0.00	5.	*	2 JAN 1450	467	0.00	0.00	0.00
	1 JAN 1805	218	0.00	0.00	0.00	5.	*	2 JAN 1455	468	0.00	0.00	0.00
	1 JAN 1810	219	0.00	0.00	0.00	5.	*	2 JAN 1500	469	0.00	0.00	0.00
	1 JAN 1815	220	0.00	0.00	0.00	5.	*	2 JAN 1505	470	0.00	0.00	0.00
	1 JAN 1820	221	0.00	0.00	0.00	5.	*	2 JAN 1510	471	0.00	0.00	0.00
	1 JAN 1825	222	0.00	0.00	0.00	5.	*	2 JAN 1515	472	0.00	0.00	0.00
	1 JAN 1830	223	0.00	0.00	0.00	5.	*	2 JAN 1520	473	0.00	0.00	0.00
	1 JAN 1835	224	0.00	0.00	0.00	5.	*	2 JAN 1525	474	0.00	0.00	0.00
	1 JAN 1840	225	0.00	0.00	0.00	5.	*	2 JAN 1530	475	0.00	0.00	0.00
	1 JAN 1845	226	0.00	0.00	0.00	5.	*	2 JAN 1535	476	0.00	0.00	0.00
	1 JAN 1850	227	0.00	0.00	0.00	5.	*	2 JAN 1540	477	0.00	0.00	0.00
	1 JAN 1855	228	0.00	0.00	0.00	5.	*	2 JAN 1545	478	0.00	0.00	0.00
	1 JAN 1900	229	0.00	0.00	0.00	5.	*	2 JAN 1550	479	0.00	0.00	0.00
	1 JAN 1905	230	0.00	0.00	0.00	5.	*	2 JAN 1555	480	0.00	0.00	0.00
	1 JAN 1910	231	0.00	0.00	0.00	5.	*	2 JAN 1600	481	0.00	0.00	0.00
	1 JAN 1915	232	0.00	0.00	0.00	5.	*	2 JAN 1605	482	0.00	0.00	0.00
	1 JAN 1920	233	0.00	0.00	0.00	5.	*	2 JAN 1610	483	0.00	0.00	0.00
	1 JAN 1925	234	0.00	0.00	0.00	4.	*	2 JAN 1615	484	0.00	0.00	0.00
	1 JAN 1930	235	0.00	0.00	0.00	4.	*	2 JAN 1620	485	0.00	0.00	0.00
	1 JAN 1935	236	0.00	0.00	0.00	4.	*	2 JAN 1625	486	0.00	0.00	0.00
	1 JAN 1940	237	0.00	0.00	0.00	4.	*	2 JAN 1630	487	0.00	0.00	0.00
	1 JAN 1945	238	0.00	0.00	0.00	4.	*	2 JAN 1635	488	0.00	0.00	0.00
	1 JAN 1950	239	0.00	0.00	0.00	4.	*	2 JAN 1640	489	0.00	0.00	0.00
	1 JAN 1955	240	0.00	0.00	0.00	4.	*	2 JAN 1645	490	0.00	0.00	0.00
	1 JAN 2000	241	0.00	0.00	0.00	4.	*	2 JAN 1650	491	0.00	0.00	0.00
	1 JAN 2005	242	0.00	0.00	0.00	4.	*	2 JAN 1655	492	0.00	0.00	0.00
	1 JAN 2010	243	0.00	0.00	0.00	4.	*	2 JAN 1700	493	0.00	0.00	0.00
	1 JAN 2015	244	0.00	0.00	0.00	4.	*	2 JAN 1705	494	0.00	0.00	0.00
	1 JAN 2020	245	0.00	0.00	0.00	4.	*	2 JAN 1710	495	0.00	0.00	0.00
	1 JAN 2025	246	0.00	0.00	0.00	4.	*	2 JAN 1715	496	0.00	0.00	0.00
	1 JAN 2030	247	0.00	0.00	0.00	4.	*	2 JAN 1720	497	0.00	0.00	0.00

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        1 JAN 2035  248    0.00    0.00    0.00         4.       *        2 JAN 1725  498    0.00
0.00    0.00         0.
        1 JAN 2040  249    0.00    0.00    0.00         4.       *        2 JAN 1730  499    0.00
0.00    0.00         0.
        1 JAN 2045  250    0.00    0.00    0.00         4.       *        2 JAN 1735  500    0.00
0.00    0.00         0.
                                                                *

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     TOTAL RAINFALL =    2.08, TOTAL LOSS =    1.66, TOTAL EXCESS =    0.42


  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                           (CFS)
+      32.     13.08                  14.          5.          3.           3.
                        (INCHES)    0.316       0.421       0.421        0.421
                         (AC-FT)      7.          9.          9.           9.

                         CUMULATIVE AREA =    0.40 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** ***

            **************
            *            *
   38 KK    *        2R  *        CNAME      2C
            *            *
            **************

   39 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           0  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE
                        IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                         IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                        ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                        ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                       TIMINT       0.083  TIME INTERVAL IN HOURS


              HYDROGRAPH ROUTING DATA

   40 RN          NO ROUTING

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                                                HYDROGRAPH AT STATION       2R

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                                  *                                  *                                  *
    DA MON HRMN  ORD      FLOW    *   DA MON HRMN  ORD      FLOW    *   DA MON HRMN  ORD      FLOW    *
DA MON HRMN  ORD      FLOW
                                  *                                  *                                  *
     1 JAN 0000    1        0.    *    1 JAN 1025  126        0.    *    1 JAN 2050  251        4.    *
2 JAN 0715  376        0.
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1 JAN 0005	2	0.	*	1 JAN 1030	127	0.	*	1 JAN 2055	252	4.	*	2 JAN 0720	377	0.			
1 JAN 0010	3	0.	*	1 JAN 1035	128	0.	*	1 JAN 2100	253	4.	*	2 JAN 0725	378	0.			
1 JAN 0015	4	0.	*	1 JAN 1040	129	0.	*	1 JAN 2105	254	4.	*	2 JAN 0730	379	0.			
1 JAN 0020	5	0.	*	1 JAN 1045	130	0.	*	1 JAN 2110	255	4.	*	2 JAN 0735	380	0.			
1 JAN 0025	6	0.	*	1 JAN 1050	131	0.	*	1 JAN 2115	256	4.	*	2 JAN 0740	381	0.			
1 JAN 0030	7	0.	*	1 JAN 1055	132	0.	*	1 JAN 2120	257	4.	*	2 JAN 0745	382	0.			
1 JAN 0035	8	0.	*	1 JAN 1100	133	0.	*	1 JAN 2125	258	3.	*	2 JAN 0750	383	0.			
1 JAN 0040	9	0.	*	1 JAN 1105	134	0.	*	1 JAN 2130	259	3.	*	2 JAN 0755	384	0.			
1 JAN 0045	10	0.	*	1 JAN 1110	135	0.	*	1 JAN 2135	260	3.	*	2 JAN 0800	385	0.			
1 JAN 0050	11	0.	*	1 JAN 1115	136	0.	*	1 JAN 2140	261	3.	*	2 JAN 0805	386	0.			
1 JAN 0055	12	0.	*	1 JAN 1120	137	0.	*	1 JAN 2145	262	3.	*	2 JAN 0810	387	0.			
1 JAN 0100	13	0.	*	1 JAN 1125	138	0.	*	1 JAN 2150	263	3.	*	2 JAN 0815	388	0.			
1 JAN 0105	14	0.	*	1 JAN 1130	139	0.	*	1 JAN 2155	264	3.	*	2 JAN 0820	389	0.			
1 JAN 0110	15	0.	*	1 JAN 1135	140	0.	*	1 JAN 2200	265	3.	*	2 JAN 0825	390	0.			
1 JAN 0115	16	0.	*	1 JAN 1140	141	0.	*	1 JAN 2205	266	3.	*	2 JAN 0830	391	0.			
1 JAN 0120	17	0.	*	1 JAN 1145	142	0.	*	1 JAN 2210	267	3.	*	2 JAN 0835	392	0.			
1 JAN 0125	18	0.	*	1 JAN 1150	143	0.	*	1 JAN 2215	268	3.	*	2 JAN 0840	393	0.			
1 JAN 0130	19	0.	*	1 JAN 1155	144	1.	*	1 JAN 2220	269	3.	*	2 JAN 0845	394	0.			
1 JAN 0135	20	0.	*	1 JAN 1200	145	2.	*	1 JAN 2225	270	3.	*	2 JAN 0850	395	0.			
1 JAN 0140	21	0.	*	1 JAN 1205	146	3.	*	1 JAN 2230	271	3.	*	2 JAN 0855	396	0.			
1 JAN 0145	22	0.	*	1 JAN 1210	147	5.	*	1 JAN 2235	272	3.	*	2 JAN 0900	397	0.			
1 JAN 0150	23	0.	*	1 JAN 1215	148	8.	*	1 JAN 2240	273	3.	*	2 JAN 0905	398	0.			
1 JAN 0155	24	0.	*	1 JAN 1220	149	11.	*	1 JAN 2245	274	3.	*	2 JAN 0910	399	0.			
1 JAN 0200	25	0.	*	1 JAN 1225	150	15.	*	1 JAN 2250	275	3.	*	2 JAN 0915	400	0.			
1 JAN 0205	26	0.	*	1 JAN 1230	151	18.	*	1 JAN 2255	276	3.	*	2 JAN 0920	401	0.			
1 JAN 0210	27	0.	*	1 JAN 1235	152	22.	*	1 JAN 2300	277	3.	*	2 JAN 0925	402	0.			
1 JAN 0215	28	0.	*	1 JAN 1240	153	25.	*	1 JAN 2305	278	3.	*	2 JAN 0930	403	0.			
1 JAN 0220	29	0.	*	1 JAN 1245	154	28.	*	1 JAN 2310	279	3.	*	2 JAN 0935	404	0.			
1 JAN 0225	30	0.	*	1 JAN 1250	155	30.	*	1 JAN 2315	280	3.	*	2 JAN 0940	405	0.			
1 JAN 0230	31	0.	*	1 JAN 1255	156	31.	*	1 JAN 2320	281	3.	*	2 JAN 0945	406	0.			
1 JAN 0235	32	0.	*	1 JAN 1300	157	32.	*	1 JAN 2325	282	3.	*	2 JAN 0950	407	0.			
1 JAN 0240	33	0.	*	1 JAN 1305	158	32.	*	1 JAN 2330	283	3.	*	2 JAN 0955	408	0.			
1 JAN 0245	34	0.	*	1 JAN 1310	159	32.	*	1 JAN 2335	284	3.	*	2 JAN 1000	409	0.			
1 JAN 0250	35	0.	*	1 JAN 1315	160	31.	*	1 JAN 2340	285	3.	*	2 JAN 1005	410	0.			
1 JAN 0255	36	0.	*	1 JAN 1320	161	30.	*	1 JAN 2345	286	3.	*	2 JAN 1010	411	0.			

1 JAN 0300	37	0.	*	1 JAN 1325	162	29.	*	1 JAN 2350	287	3.	*	2 JAN 1015	412	0.	
1 JAN 0305	38	0.	*	1 JAN 1330	163	27.	*	1 JAN 2355	288	3.	*	2 JAN 1020	413	0.	
1 JAN 0310	39	0.	*	1 JAN 1335	164	26.	*	2 JAN 0000	289	3.	*	2 JAN 1025	414	0.	
1 JAN 0315	40	0.	*	1 JAN 1340	165	24.	*	2 JAN 0005	290	3.	*	2 JAN 1030	415	0.	
1 JAN 0320	41	0.	*	1 JAN 1345	166	23.	*	2 JAN 0010	291	3.	*	2 JAN 1035	416	0.	
1 JAN 0325	42	0.	*	1 JAN 1350	167	21.	*	2 JAN 0015	292	3.	*	2 JAN 1040	417	0.	
1 JAN 0330	43	0.	*	1 JAN 1355	168	20.	*	2 JAN 0020	293	3.	*	2 JAN 1045	418	0.	
1 JAN 0335	44	0.	*	1 JAN 1400	169	19.	*	2 JAN 0025	294	3.	*	2 JAN 1050	419	0.	
1 JAN 0340	45	0.	*	1 JAN 1405	170	18.	*	2 JAN 0030	295	3.	*	2 JAN 1055	420	0.	
1 JAN 0345	46	0.	*	1 JAN 1410	171	17.	*	2 JAN 0035	296	3.	*	2 JAN 1100	421	0.	
1 JAN 0350	47	0.	*	1 JAN 1415	172	16.	*	2 JAN 0040	297	3.	*	2 JAN 1105	422	0.	
1 JAN 0355	48	0.	*	1 JAN 1420	173	16.	*	2 JAN 0045	298	2.	*	2 JAN 1110	423	0.	
1 JAN 0400	49	0.	*	1 JAN 1425	174	15.	*	2 JAN 0050	299	2.	*	2 JAN 1115	424	0.	
1 JAN 0405	50	0.	*	1 JAN 1430	175	14.	*	2 JAN 0055	300	2.	*	2 JAN 1120	425	0.	
1 JAN 0410	51	0.	*	1 JAN 1435	176	14.	*	2 JAN 0100	301	2.	*	2 JAN 1125	426	0.	
1 JAN 0415	52	0.	*	1 JAN 1440	177	13.	*	2 JAN 0105	302	2.	*	2 JAN 1130	427	0.	
1 JAN 0420	53	0.	*	1 JAN 1445	178	12.	*	2 JAN 0110	303	2.	*	2 JAN 1135	428	0.	
1 JAN 0425	54	0.	*	1 JAN 1450	179	12.	*	2 JAN 0115	304	1.	*	2 JAN 1140	429	0.	
1 JAN 0430	55	0.	*	1 JAN 1455	180	12.	*	2 JAN 0120	305	1.	*	2 JAN 1145	430	0.	
1 JAN 0435	56	0.	*	1 JAN 1500	181	11.	*	2 JAN 0125	306	1.	*	2 JAN 1150	431	0.	
1 JAN 0440	57	0.	*	1 JAN 1505	182	11.	*	2 JAN 0130	307	1.	*	2 JAN 1155	432	0.	
1 JAN 0445	58	0.	*	1 JAN 1510	183	10.	*	2 JAN 0135	308	1.	*	2 JAN 1200	433	0.	
1 JAN 0450	59	0.	*	1 JAN 1515	184	10.	*	2 JAN 0140	309	1.	*	2 JAN 1205	434	0.	
1 JAN 0455	60	0.	*	1 JAN 1520	185	10.	*	2 JAN 0145	310	1.	*	2 JAN 1210	435	0.	
1 JAN 0500	61	0.	*	1 JAN 1525	186	9.	*	2 JAN 0150	311	1.	*	2 JAN 1215	436	0.	
1 JAN 0505	62	0.	*	1 JAN 1530	187	9.	*	2 JAN 0155	312	0.	*	2 JAN 1220	437	0.	
1 JAN 0510	63	0.	*	1 JAN 1535	188	9.	*	2 JAN 0200	313	0.	*	2 JAN 1225	438	0.	
1 JAN 0515	64	0.	*	1 JAN 1540	189	9.	*	2 JAN 0205	314	0.	*	2 JAN 1230	439	0.	
1 JAN 0520	65	0.	*	1 JAN 1545	190	9.	*	2 JAN 0210	315	0.	*	2 JAN 1235	440	0.	
1 JAN 0525	66	0.	*	1 JAN 1550	191	8.	*	2 JAN 0215	316	0.	*	2 JAN 1240	441	0.	
1 JAN 0530	67	0.	*	1 JAN 1555	192	8.	*	2 JAN 0220	317	0.	*	2 JAN 1245	442	0.	
1 JAN 0535	68	0.	*	1 JAN 1600	193	8.	*	2 JAN 0225	318	0.	*	2 JAN 1250	443	0.	
1 JAN 0540	69	0.	*	1 JAN 1605	194	8.	*	2 JAN 0230	319	0.	*	2 JAN 1255	444	0.	
1 JAN 0545	70	0.	*	1 JAN 1610	195	8.	*	2 JAN 0235	320	0.	*	2 JAN 1300	445	0.	
1 JAN 0550	71	0.	*	1 JAN 1615	196	7.	*	2 JAN 0240	321	0.	*	2 JAN 1305	446	0.	

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    1 JAN 0555   72        0.   *    1 JAN 1620  197        7.   *    2 JAN 0245  322        0.   *
2 JAN 1310  447        0.
    1 JAN 0600   73        0.   *    1 JAN 1625  198        7.   *    2 JAN 0250  323        0.   *
2 JAN 1315  448        0.
    1 JAN 0605   74        0.   *    1 JAN 1630  199        7.   *    2 JAN 0255  324        0.   *
2 JAN 1320  449        0.
    1 JAN 0610   75        0.   *    1 JAN 1635  200        7.   *    2 JAN 0300  325        0.   *
2 JAN 1325  450        0.
    1 JAN 0615   76        0.   *    1 JAN 1640  201        7.   *    2 JAN 0305  326        0.   *
2 JAN 1330  451        0.
    1 JAN 0620   77        0.   *    1 JAN 1645  202        7.   *    2 JAN 0310  327        0.   *
2 JAN 1335  452        0.
    1 JAN 0625   78        0.   *    1 JAN 1650  203        6.   *    2 JAN 0315  328        0.   *
2 JAN 1340  453        0.
    1 JAN 0630   79        0.   *    1 JAN 1655  204        6.   *    2 JAN 0320  329        0.   *
2 JAN 1345  454        0.
    1 JAN 0635   80        0.   *    1 JAN 1700  205        6.   *    2 JAN 0325  330        0.   *
2 JAN 1350  455        0.
    1 JAN 0640   81        0.   *    1 JAN 1705  206        6.   *    2 JAN 0330  331        0.   *
2 JAN 1355  456        0.
    1 JAN 0645   82        0.   *    1 JAN 1710  207        6.   *    2 JAN 0335  332        0.   *
2 JAN 1400  457        0.
    1 JAN 0650   83        0.   *    1 JAN 1715  208        6.   *    2 JAN 0340  333        0.   *
2 JAN 1405  458        0.
    1 JAN 0655   84        0.   *    1 JAN 1720  209        6.   *    2 JAN 0345  334        0.   *
2 JAN 1410  459        0.
    1 JAN 0700   85        0.   *    1 JAN 1725  210        6.   *    2 JAN 0350  335        0.   *
2 JAN 1415  460        0.
    1 JAN 0705   86        0.   *    1 JAN 1730  211        6.   *    2 JAN 0355  336        0.   *
2 JAN 1420  461        0.
    1 JAN 0710   87        0.   *    1 JAN 1735  212        6.   *    2 JAN 0400  337        0.   *
2 JAN 1425  462        0.
    1 JAN 0715   88        0.   *    1 JAN 1740  213        6.   *    2 JAN 0405  338        0.   *
2 JAN 1430  463        0.
    1 JAN 0720   89        0.   *    1 JAN 1745  214        5.   *    2 JAN 0410  339        0.   *
2 JAN 1435  464        0.
    1 JAN 0725   90        0.   *    1 JAN 1750  215        5.   *    2 JAN 0415  340        0.   *
2 JAN 1440  465        0.
    1 JAN 0730   91        0.   *    1 JAN 1755  216        5.   *    2 JAN 0420  341        0.   *
2 JAN 1445  466        0.
    1 JAN 0735   92        0.   *    1 JAN 1800  217        5.   *    2 JAN 0425  342        0.   *
2 JAN 1450  467        0.
    1 JAN 0740   93        0.   *    1 JAN 1805  218        5.   *    2 JAN 0430  343        0.   *
2 JAN 1455  468        0.
    1 JAN 0745   94        0.   *    1 JAN 1810  219        5.   *    2 JAN 0435  344        0.   *
2 JAN 1500  469        0.
    1 JAN 0750   95        0.   *    1 JAN 1815  220        5.   *    2 JAN 0440  345        0.   *
2 JAN 1505  470        0.
    1 JAN 0755   96        0.   *    1 JAN 1820  221        5.   *    2 JAN 0445  346        0.   *
2 JAN 1510  471        0.
    1 JAN 0800   97        0.   *    1 JAN 1825  222        5.   *    2 JAN 0450  347        0.   *
2 JAN 1515  472        0.
    1 JAN 0805   98        0.   *    1 JAN 1830  223        5.   *    2 JAN 0455  348        0.   *
2 JAN 1520  473        0.
    1 JAN 0810   99        0.   *    1 JAN 1835  224        5.   *    2 JAN 0500  349        0.   *
2 JAN 1525  474        0.
    1 JAN 0815  100        0.   *    1 JAN 1840  225        5.   *    2 JAN 0505  350        0.   *
2 JAN 1530  475        0.
    1 JAN 0820  101        0.   *    1 JAN 1845  226        5.   *    2 JAN 0510  351        0.   *
2 JAN 1535  476        0.
    1 JAN 0825  102        0.   *    1 JAN 1850  227        5.   *    2 JAN 0515  352        0.   *
2 JAN 1540  477        0.
    1 JAN 0830  103        0.   *    1 JAN 1855  228        5.   *    2 JAN 0520  353        0.   *
2 JAN 1545  478        0.
    1 JAN 0835  104        0.   *    1 JAN 1900  229        5.   *    2 JAN 0525  354        0.   *
2 JAN 1550  479        0.
    1 JAN 0840  105        0.   *    1 JAN 1905  230        5.   *    2 JAN 0530  355        0.   *
2 JAN 1555  480        0.
    1 JAN 0845  106        0.   *    1 JAN 1910  231        5.   *    2 JAN 0535  356        0.   *
2 JAN 1600  481        0.
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     1 JAN 0850  107        0.   *    1 JAN 1915  232        5.   *    2 JAN 0540  357        0.   *
2 JAN 1605  482        0.
     1 JAN 0855  108        0.   *    1 JAN 1920  233        5.   *    2 JAN 0545  358        0.   *
2 JAN 1610  483        0.
     1 JAN 0900  109        0.   *    1 JAN 1925  234        4.   *    2 JAN 0550  359        0.   *
2 JAN 1615  484        0.
     1 JAN 0905  110        0.   *    1 JAN 1930  235        4.   *    2 JAN 0555  360        0.   *
2 JAN 1620  485        0.
     1 JAN 0910  111        0.   *    1 JAN 1935  236        4.   *    2 JAN 0600  361        0.   *
2 JAN 1625  486        0.
     1 JAN 0915  112        0.   *    1 JAN 1940  237        4.   *    2 JAN 0605  362        0.   *
2 JAN 1630  487        0.
     1 JAN 0920  113        0.   *    1 JAN 1945  238        4.   *    2 JAN 0610  363        0.   *
2 JAN 1635  488        0.
     1 JAN 0925  114        0.   *    1 JAN 1950  239        4.   *    2 JAN 0615  364        0.   *
2 JAN 1640  489        0.
     1 JAN 0930  115        0.   *    1 JAN 1955  240        4.   *    2 JAN 0620  365        0.   *
2 JAN 1645  490        0.
     1 JAN 0935  116        0.   *    1 JAN 2000  241        4.   *    2 JAN 0625  366        0.   *
2 JAN 1650  491        0.
     1 JAN 0940  117        0.   *    1 JAN 2005  242        4.   *    2 JAN 0630  367        0.   *
2 JAN 1655  492        0.
     1 JAN 0945  118        0.   *    1 JAN 2010  243        4.   *    2 JAN 0635  368        0.   *
2 JAN 1700  493        0.
     1 JAN 0950  119        0.   *    1 JAN 2015  244        4.   *    2 JAN 0640  369        0.   *
2 JAN 1705  494        0.
     1 JAN 0955  120        0.   *    1 JAN 2020  245        4.   *    2 JAN 0645  370        0.   *
2 JAN 1710  495        0.
     1 JAN 1000  121        0.   *    1 JAN 2025  246        4.   *    2 JAN 0650  371        0.   *
2 JAN 1715  496        0.
     1 JAN 1005  122        0.   *    1 JAN 2030  247        4.   *    2 JAN 0655  372        0.   *
2 JAN 1720  497        0.
     1 JAN 1010  123        0.   *    1 JAN 2035  248        4.   *    2 JAN 0700  373        0.   *
2 JAN 1725  498        0.
     1 JAN 1015  124        0.   *    1 JAN 2040  249        4.   *    2 JAN 0705  374        0.   *
2 JAN 1730  499        0.
     1 JAN 1020  125        0.   *    1 JAN 2045  250        4.   *    2 JAN 0710  375        0.   *
2 JAN 1735  500        0.
                                *                              *                              *

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  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     41.58-HR
+   (CFS)       (HR)
                          (CFS)
+      32.     13.08                   14.          5.          3.           3.
                       (INCHES)     0.316       0.421       0.421        0.421
                        (AC-FT)        7.          9.          9.           9.

                        CUMULATIVE AREA =    0.40 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** ***


            **************
            *            *
   41 KK    *     NORTH  *
            *            *
            **************

   42 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           0  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE
                        IPNCH           0  PUNCH COMPUTED HYDROGRAPH
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                    IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                   ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                   ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                  TIMINT       0.083  TIME INTERVAL IN HOURS

45 IN          TIME DATA FOR INPUT TIME SERIES
                   JXMIN           6  TIME INTERVAL IN MINUTES
                  JXDATE      1JAN94  STARTING DATE
                  JXTIME           0  STARTING TIME

             SUBBASIN RUNOFF DATA

43 BA          SUBBASIN CHARACTERISTICS
                   TAREA,        1.50  SUBBASIN AREA

               PRECIPITATION DATA

44 PB                STORM        2.08  BASIN TOTAL PRECIPITATION

46 PI            INCREMENTAL PRECIPITATION PATTERN
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.01      0.01
                   0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.01
0.02      0.04
                   0.05      0.08      0.11      0.08      0.02      0.01      0.01      0.01
0.01      0.01
                   0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
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                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

   71 LS          SCS LOSS RATE
                       STRTL        0.67  INITIAL ABSTRACTION
                      CRVNBR       75.00  CURVE NUMBER
                       RTIMP        0.00  PERCENT IMPERVIOUS AREA

   72 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG        1.00  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                     62 END-OF-PERIOD ORDINATES
                 17.       50.       95.      149.      216.      305.      406.      504.      586.
647.
                681.      693.      693.      681.      647.      608.      565.      515.      456.
390.
                334.      291.      255.      223.      195.      175.      154.      136.      119.
102.
                 91.       80.       70.       62.       54.       47.       41.       36.       32.
28.
                 25.       22.       19.       17.       15.       13.       11.       10.        9.
8.
                  7.        6.        6.        5.        4.        4.        3.        3.        2.
1.
                  1.        0.

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                                                  HYDROGRAPH AT STATION    NORTH

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                                                                                  *
        DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q                       *       DA MON HRMN  ORD    RAIN
LOSS  EXCESS     COMP Q
                                                                                  *
         1 JAN 0000    1    0.00    0.00    0.00         0.                       *        1 JAN 2050  251    0.00
0.00    0.00        14.
         1 JAN 0005    2    0.00    0.00    0.00         0.                       *        1 JAN 2055  252    0.00
0.00    0.00        14.
         1 JAN 0010    3    0.00    0.00    0.00         0.                       *        1 JAN 2100  253    0.00
0.00    0.00        14.
         1 JAN 0015    4    0.00    0.00    0.00         0.                       *        1 JAN 2105  254    0.00
0.00    0.00        13.
         1 JAN 0020    5    0.00    0.00    0.00         0.                       *        1 JAN 2110  255    0.00
0.00    0.00        13.
         1 JAN 0025    6    0.00    0.00    0.00         0.                       *        1 JAN 2115  256    0.00
0.00    0.00        13.
         1 JAN 0030    7    0.00    0.00    0.00         0.                       *        1 JAN 2120  257    0.00
0.00    0.00        13.
         1 JAN 0035    8    0.00    0.00    0.00         0.                       *        1 JAN 2125  258    0.00
0.00    0.00        13.
         1 JAN 0040    9    0.00    0.00    0.00         0.                       *        1 JAN 2130  259    0.00
0.00    0.00        13.
         1 JAN 0045   10    0.00    0.00    0.00         0.                       *        1 JAN 2135  260    0.00
0.00    0.00        13.
         1 JAN 0050   11    0.00    0.00    0.00         0.                       *        1 JAN 2140  261    0.00
0.00    0.00        13.
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	1 JAN 0055	12	0.00	0.00	0.00	0.	*	1 JAN 2145	262	0.00	0.00	0.00
	1 JAN 0100	13	0.00	0.00	0.00	0.	*	1 JAN 2150	263	0.00	0.00	0.00
	1 JAN 0105	14	0.00	0.00	0.00	0.	*	1 JAN 2155	264	0.00	0.00	0.00
	1 JAN 0110	15	0.00	0.00	0.00	0.	*	1 JAN 2200	265	0.00	0.00	0.00
	1 JAN 0115	16	0.00	0.00	0.00	0.	*	1 JAN 2205	266	0.00	0.00	0.00
	1 JAN 0120	17	0.00	0.00	0.00	0.	*	1 JAN 2210	267	0.00	0.00	0.00
	1 JAN 0125	18	0.00	0.00	0.00	0.	*	1 JAN 2215	268	0.00	0.00	0.00
	1 JAN 0130	19	0.00	0.00	0.00	0.	*	1 JAN 2220	269	0.00	0.00	0.00
	1 JAN 0135	20	0.00	0.00	0.00	0.	*	1 JAN 2225	270	0.00	0.00	0.00
	1 JAN 0140	21	0.00	0.00	0.00	0.	*	1 JAN 2230	271	0.00	0.00	0.00
	1 JAN 0145	22	0.00	0.00	0.00	0.	*	1 JAN 2235	272	0.00	0.00	0.00
	1 JAN 0150	23	0.00	0.00	0.00	0.	*	1 JAN 2240	273	0.00	0.00	0.00
	1 JAN 0155	24	0.00	0.00	0.00	0.	*	1 JAN 2245	274	0.00	0.00	0.00
	1 JAN 0200	25	0.00	0.00	0.00	0.	*	1 JAN 2250	275	0.00	0.00	0.00
	1 JAN 0205	26	0.00	0.00	0.00	0.	*	1 JAN 2255	276	0.00	0.00	0.00
	1 JAN 0210	27	0.00	0.00	0.00	0.	*	1 JAN 2300	277	0.00	0.00	0.00
	1 JAN 0215	28	0.00	0.00	0.00	0.	*	1 JAN 2305	278	0.00	0.00	0.00
	1 JAN 0220	29	0.00	0.00	0.00	0.	*	1 JAN 2310	279	0.00	0.00	0.00
	1 JAN 0225	30	0.00	0.00	0.00	0.	*	1 JAN 2315	280	0.00	0.00	0.00
	1 JAN 0230	31	0.00	0.00	0.00	0.	*	1 JAN 2320	281	0.00	0.00	0.00
	1 JAN 0235	32	0.00	0.00	0.00	0.	*	1 JAN 2325	282	0.00	0.00	0.00
	1 JAN 0240	33	0.00	0.00	0.00	0.	*	1 JAN 2330	283	0.00	0.00	0.00
	1 JAN 0245	34	0.00	0.00	0.00	0.	*	1 JAN 2335	284	0.00	0.00	0.00
	1 JAN 0250	35	0.00	0.00	0.00	0.	*	1 JAN 2340	285	0.00	0.00	0.00
	1 JAN 0255	36	0.00	0.00	0.00	0.	*	1 JAN 2345	286	0.00	0.00	0.00
	1 JAN 0300	37	0.00	0.00	0.00	0.	*	1 JAN 2350	287	0.00	0.00	0.00
	1 JAN 0305	38	0.00	0.00	0.00	0.	*	1 JAN 2355	288	0.00	0.00	0.00
	1 JAN 0310	39	0.00	0.00	0.00	0.	*	2 JAN 0000	289	0.00	0.00	0.00
	1 JAN 0315	40	0.00	0.00	0.00	0.	*	2 JAN 0005	290	0.00	0.00	0.00
	1 JAN 0320	41	0.00	0.00	0.00	0.	*	2 JAN 0010	291	0.00	0.00	0.00
	1 JAN 0325	42	0.00	0.00	0.00	0.	*	2 JAN 0015	292	0.00	0.00	0.00
	1 JAN 0330	43	0.00	0.00	0.00	0.	*	2 JAN 0020	293	0.00	0.00	0.00
	1 JAN 0335	44	0.00	0.00	0.00	0.	*	2 JAN 0025	294	0.00	0.00	0.00
	1 JAN 0340	45	0.00	0.00	0.00	0.	*	2 JAN 0030	295	0.00	0.00	0.00
	1 JAN 0345	46	0.00	0.00	0.00	0.	*	2 JAN 0035	296	0.00	0.00	0.00

	1 JAN 0350	47	0.00	0.00	0.00	0.	*	2 JAN 0040	297	0.00	0.00	0.00	10.
	1 JAN 0355	48	0.00	0.00	0.00	0.	*	2 JAN 0045	298	0.00	0.00	0.00	9.
	1 JAN 0400	49	0.00	0.00	0.00	0.	*	2 JAN 0050	299	0.00	0.00	0.00	9.
	1 JAN 0405	50	0.00	0.00	0.00	0.	*	2 JAN 0055	300	0.00	0.00	0.00	8.
	1 JAN 0410	51	0.00	0.00	0.00	0.	*	2 JAN 0100	301	0.00	0.00	0.00	7.
	1 JAN 0415	52	0.00	0.00	0.00	0.	*	2 JAN 0105	302	0.00	0.00	0.00	6.
	1 JAN 0420	53	0.00	0.00	0.00	0.	*	2 JAN 0110	303	0.00	0.00	0.00	6.
	1 JAN 0425	54	0.00	0.00	0.00	0.	*	2 JAN 0115	304	0.00	0.00	0.00	5.
	1 JAN 0430	55	0.00	0.00	0.00	0.	*	2 JAN 0120	305	0.00	0.00	0.00	5.
	1 JAN 0435	56	0.00	0.00	0.00	0.	*	2 JAN 0125	306	0.00	0.00	0.00	4.
	1 JAN 0440	57	0.00	0.00	0.00	0.	*	2 JAN 0130	307	0.00	0.00	0.00	4.
	1 JAN 0445	58	0.00	0.00	0.00	0.	*	2 JAN 0135	308	0.00	0.00	0.00	3.
	1 JAN 0450	59	0.00	0.00	0.00	0.	*	2 JAN 0140	309	0.00	0.00	0.00	3.
	1 JAN 0455	60	0.00	0.00	0.00	0.	*	2 JAN 0145	310	0.00	0.00	0.00	2.
	1 JAN 0500	61	0.00	0.00	0.00	0.	*	2 JAN 0150	311	0.00	0.00	0.00	2.
	1 JAN 0505	62	0.00	0.00	0.00	0.	*	2 JAN 0155	312	0.00	0.00	0.00	2.
	1 JAN 0510	63	0.00	0.00	0.00	0.	*	2 JAN 0200	313	0.00	0.00	0.00	2.
	1 JAN 0515	64	0.00	0.00	0.00	0.	*	2 JAN 0205	314	0.00	0.00	0.00	1.
	1 JAN 0520	65	0.00	0.00	0.00	0.	*	2 JAN 0210	315	0.00	0.00	0.00	1.
	1 JAN 0525	66	0.00	0.00	0.00	0.	*	2 JAN 0215	316	0.00	0.00	0.00	1.
	1 JAN 0530	67	0.00	0.00	0.00	0.	*	2 JAN 0220	317	0.00	0.00	0.00	1.
	1 JAN 0535	68	0.00	0.00	0.00	0.	*	2 JAN 0225	318	0.00	0.00	0.00	1.
	1 JAN 0540	69	0.00	0.00	0.00	0.	*	2 JAN 0230	319	0.00	0.00	0.00	1.
	1 JAN 0545	70	0.00	0.00	0.00	0.	*	2 JAN 0235	320	0.00	0.00	0.00	1.
	1 JAN 0550	71	0.00	0.00	0.00	0.	*	2 JAN 0240	321	0.00	0.00	0.00	1.
	1 JAN 0555	72	0.00	0.00	0.00	0.	*	2 JAN 0245	322	0.00	0.00	0.00	0.
	1 JAN 0600	73	0.00	0.00	0.00	0.	*	2 JAN 0250	323	0.00	0.00	0.00	0.
	1 JAN 0605	74	0.00	0.00	0.00	0.	*	2 JAN 0255	324	0.00	0.00	0.00	0.
	1 JAN 0610	75	0.00	0.00	0.00	0.	*	2 JAN 0300	325	0.00	0.00	0.00	0.
	1 JAN 0615	76	0.00	0.00	0.00	0.	*	2 JAN 0305	326	0.00	0.00	0.00	0.
	1 JAN 0620	77	0.00	0.00	0.00	0.	*	2 JAN 0310	327	0.00	0.00	0.00	0.
	1 JAN 0625	78	0.00	0.00	0.00	0.	*	2 JAN 0315	328	0.00	0.00	0.00	0.
	1 JAN 0630	79	0.00	0.00	0.00	0.	*	2 JAN 0320	329	0.00	0.00	0.00	0.
	1 JAN 0635	80	0.00	0.00	0.00	0.	*	2 JAN 0325	330	0.00	0.00	0.00	0.
	1 JAN 0640	81	0.00	0.00	0.00	0.	*	2 JAN 0330	331	0.00	0.00	0.00	0.

	1 JAN 0645	82	0.00	0.00	0.00	0.	*	2 JAN 0335	332	0.00	0.00	0.00	0.
	1 JAN 0650	83	0.00	0.00	0.00	0.	*	2 JAN 0340	333	0.00	0.00	0.00	0.
	1 JAN 0655	84	0.00	0.00	0.00	0.	*	2 JAN 0345	334	0.00	0.00	0.00	0.
	1 JAN 0700	85	0.00	0.00	0.00	0.	*	2 JAN 0350	335	0.00	0.00	0.00	0.
	1 JAN 0705	86	0.00	0.00	0.00	0.	*	2 JAN 0355	336	0.00	0.00	0.00	0.
	1 JAN 0710	87	0.00	0.00	0.00	0.	*	2 JAN 0400	337	0.00	0.00	0.00	0.
	1 JAN 0715	88	0.00	0.00	0.00	0.	*	2 JAN 0405	338	0.00	0.00	0.00	0.
	1 JAN 0720	89	0.00	0.00	0.00	0.	*	2 JAN 0410	339	0.00	0.00	0.00	0.
	1 JAN 0725	90	0.00	0.00	0.00	0.	*	2 JAN 0415	340	0.00	0.00	0.00	0.
	1 JAN 0730	91	0.00	0.00	0.00	0.	*	2 JAN 0420	341	0.00	0.00	0.00	0.
	1 JAN 0735	92	0.00	0.00	0.00	0.	*	2 JAN 0425	342	0.00	0.00	0.00	0.
	1 JAN 0740	93	0.00	0.00	0.00	0.	*	2 JAN 0430	343	0.00	0.00	0.00	0.
	1 JAN 0745	94	0.00	0.00	0.00	0.	*	2 JAN 0435	344	0.00	0.00	0.00	0.
	1 JAN 0750	95	0.00	0.00	0.00	0.	*	2 JAN 0440	345	0.00	0.00	0.00	0.
	1 JAN 0755	96	0.00	0.00	0.00	0.	*	2 JAN 0445	346	0.00	0.00	0.00	0.
	1 JAN 0800	97	0.00	0.00	0.00	0.	*	2 JAN 0450	347	0.00	0.00	0.00	0.
	1 JAN 0805	98	0.00	0.00	0.00	0.	*	2 JAN 0455	348	0.00	0.00	0.00	0.
	1 JAN 0810	99	0.00	0.00	0.00	0.	*	2 JAN 0500	349	0.00	0.00	0.00	0.
	1 JAN 0815	100	0.00	0.00	0.00	0.	*	2 JAN 0505	350	0.00	0.00	0.00	0.
	1 JAN 0820	101	0.00	0.00	0.00	0.	*	2 JAN 0510	351	0.00	0.00	0.00	0.
	1 JAN 0825	102	0.00	0.00	0.00	0.	*	2 JAN 0515	352	0.00	0.00	0.00	0.
	1 JAN 0830	103	0.00	0.00	0.00	0.	*	2 JAN 0520	353	0.00	0.00	0.00	0.
	1 JAN 0835	104	0.00	0.00	0.00	0.	*	2 JAN 0525	354	0.00	0.00	0.00	0.
	1 JAN 0840	105	0.00	0.00	0.00	0.	*	2 JAN 0530	355	0.00	0.00	0.00	0.
	1 JAN 0845	106	0.01	0.01	0.00	0.	*	2 JAN 0535	356	0.00	0.00	0.00	0.
	1 JAN 0850	107	0.01	0.01	0.00	0.	*	2 JAN 0540	357	0.00	0.00	0.00	0.
	1 JAN 0855	108	0.01	0.01	0.00	0.	*	2 JAN 0545	358	0.00	0.00	0.00	0.
	1 JAN 0900	109	0.01	0.01	0.00	0.	*	2 JAN 0550	359	0.00	0.00	0.00	0.
	1 JAN 0905	110	0.01	0.01	0.00	0.	*	2 JAN 0555	360	0.00	0.00	0.00	0.
	1 JAN 0910	111	0.01	0.01	0.00	0.	*	2 JAN 0600	361	0.00	0.00	0.00	0.
	1 JAN 0915	112	0.01	0.01	0.00	0.	*	2 JAN 0605	362	0.00	0.00	0.00	0.
	1 JAN 0920	113	0.01	0.01	0.00	0.	*	2 JAN 0610	363	0.00	0.00	0.00	0.
	1 JAN 0925	114	0.01	0.01	0.00	0.	*	2 JAN 0615	364	0.00	0.00	0.00	0.
	1 JAN 0930	115	0.01	0.01	0.00	0.	*	2 JAN 0620	365	0.00	0.00	0.00	0.
	1 JAN 0935	116	0.01	0.01	0.00	0.	*	2 JAN 0625	366	0.00	0.00	0.00	0.

	1 JAN 0940	117	0.01	0.01	0.00	0.	*	2 JAN 0630	367	0.00	0.00	0.00
	1 JAN 0945	118	0.01	0.01	0.00	0.	*	2 JAN 0635	368	0.00	0.00	0.00
	1 JAN 0950	119	0.01	0.01	0.00	0.	*	2 JAN 0640	369	0.00	0.00	0.00
	1 JAN 0955	120	0.01	0.01	0.00	0.	*	2 JAN 0645	370	0.00	0.00	0.00
	1 JAN 1000	121	0.01	0.01	0.00	0.	*	2 JAN 0650	371	0.00	0.00	0.00
	1 JAN 1005	122	0.01	0.01	0.00	0.	*	2 JAN 0655	372	0.00	0.00	0.00
	1 JAN 1010	123	0.01	0.01	0.00	0.	*	2 JAN 0700	373	0.00	0.00	0.00
	1 JAN 1015	124	0.01	0.01	0.00	0.	*	2 JAN 0705	374	0.00	0.00	0.00
	1 JAN 1020	125	0.01	0.01	0.00	0.	*	2 JAN 0710	375	0.00	0.00	0.00
	1 JAN 1025	126	0.01	0.01	0.00	0.	*	2 JAN 0715	376	0.00	0.00	0.00
	1 JAN 1030	127	0.01	0.01	0.00	0.	*	2 JAN 0720	377	0.00	0.00	0.00
	1 JAN 1035	128	0.01	0.01	0.00	0.	*	2 JAN 0725	378	0.00	0.00	0.00
	1 JAN 1040	129	0.01	0.01	0.00	0.	*	2 JAN 0730	379	0.00	0.00	0.00
	1 JAN 1045	130	0.01	0.01	0.00	0.	*	2 JAN 0735	380	0.00	0.00	0.00
	1 JAN 1050	131	0.01	0.01	0.00	0.	*	2 JAN 0740	381	0.00	0.00	0.00
	1 JAN 1055	132	0.01	0.01	0.00	0.	*	2 JAN 0745	382	0.00	0.00	0.00
	1 JAN 1100	133	0.01	0.01	0.00	0.	*	2 JAN 0750	383	0.00	0.00	0.00
	1 JAN 1105	134	0.01	0.01	0.00	0.	*	2 JAN 0755	384	0.00	0.00	0.00
	1 JAN 1110	135	0.01	0.01	0.00	0.	*	2 JAN 0800	385	0.00	0.00	0.00
	1 JAN 1115	136	0.02	0.02	0.00	0.	*	2 JAN 0805	386	0.00	0.00	0.00
	1 JAN 1120	137	0.02	0.02	0.00	0.	*	2 JAN 0810	387	0.00	0.00	0.00
	1 JAN 1125	138	0.02	0.02	0.00	0.	*	2 JAN 0815	388	0.00	0.00	0.00
	1 JAN 1130	139	0.02	0.02	0.00	0.	*	2 JAN 0820	389	0.00	0.00	0.00
	1 JAN 1135	140	0.04	0.04	0.00	0.	*	2 JAN 0825	390	0.00	0.00	0.00
	1 JAN 1140	141	0.07	0.07	0.00	0.	*	2 JAN 0830	391	0.00	0.00	0.00
	1 JAN 1145	142	0.11	0.11	0.01	0.	*	2 JAN 0835	392	0.00	0.00	0.00
	1 JAN 1150	143	0.17	0.15	0.02	1.	*	2 JAN 0840	393	0.00	0.00	0.00
	1 JAN 1155	144	0.22	0.17	0.05	3.	*	2 JAN 0845	394	0.00	0.00	0.00
	1 JAN 1200	145	0.16	0.12	0.05	6.	*	2 JAN 0850	395	0.00	0.00	0.00
	1 JAN 1205	146	0.03	0.02	0.01	12.	*	2 JAN 0855	396	0.00	0.00	0.00
	1 JAN 1210	147	0.03	0.02	0.01	19.	*	2 JAN 0900	397	0.00	0.00	0.00
	1 JAN 1215	148	0.03	0.02	0.01	29.	*	2 JAN 0905	398	0.00	0.00	0.00
	1 JAN 1220	149	0.02	0.02	0.01	41.	*	2 JAN 0910	399	0.00	0.00	0.00
	1 JAN 1225	150	0.02	0.01	0.01	55.	*	2 JAN 0915	400	0.00	0.00	0.00
	1 JAN 1230	151	0.02	0.01	0.01	69.	*	2 JAN 0920	401	0.00	0.00	0.00

	1 JAN 1235	152	0.01	0.01	0.01	83.	*	2 JAN 0925	402	0.00	0.00	0.00
	1 JAN 1240	153	0.01	0.01	0.01	95.	*	2 JAN 0930	403	0.00	0.00	0.00
	1 JAN 1245	154	0.01	0.01	0.01	105.	*	2 JAN 0935	404	0.00	0.00	0.00
	1 JAN 1250	155	0.01	0.01	0.00	112.	*	2 JAN 0940	405	0.00	0.00	0.00
	1 JAN 1255	156	0.01	0.01	0.00	117.	*	2 JAN 0945	406	0.00	0.00	0.00
	1 JAN 1300	157	0.01	0.01	0.00	120.	*	2 JAN 0950	407	0.00	0.00	0.00
	1 JAN 1305	158	0.01	0.01	0.00	121.	*	2 JAN 0955	408	0.00	0.00	0.00
	1 JAN 1310	159	0.01	0.01	0.00	120.	*	2 JAN 1000	409	0.00	0.00	0.00
	1 JAN 1315	160	0.01	0.01	0.00	118.	*	2 JAN 1005	410	0.00	0.00	0.00
	1 JAN 1320	161	0.01	0.01	0.00	114.	*	2 JAN 1010	411	0.00	0.00	0.00
	1 JAN 1325	162	0.01	0.01	0.00	108.	*	2 JAN 1015	412	0.00	0.00	0.00
	1 JAN 1330	163	0.01	0.00	0.00	102.	*	2 JAN 1020	413	0.00	0.00	0.00
	1 JAN 1335	164	0.01	0.00	0.00	96.	*	2 JAN 1025	414	0.00	0.00	0.00
	1 JAN 1340	165	0.01	0.00	0.00	90.	*	2 JAN 1030	415	0.00	0.00	0.00
	1 JAN 1345	166	0.01	0.00	0.00	85.	*	2 JAN 1035	416	0.00	0.00	0.00
	1 JAN 1350	167	0.01	0.00	0.00	80.	*	2 JAN 1040	417	0.00	0.00	0.00
	1 JAN 1355	168	0.01	0.00	0.00	76.	*	2 JAN 1045	418	0.00	0.00	0.00
	1 JAN 1400	169	0.01	0.00	0.00	72.	*	2 JAN 1050	419	0.00	0.00	0.00
	1 JAN 1405	170	0.01	0.00	0.00	68.	*	2 JAN 1055	420	0.00	0.00	0.00
	1 JAN 1410	171	0.01	0.00	0.00	65.	*	2 JAN 1100	421	0.00	0.00	0.00
	1 JAN 1415	172	0.01	0.00	0.00	62.	*	2 JAN 1105	422	0.00	0.00	0.00
	1 JAN 1420	173	0.01	0.00	0.00	59.	*	2 JAN 1110	423	0.00	0.00	0.00
	1 JAN 1425	174	0.01	0.00	0.00	56.	*	2 JAN 1115	424	0.00	0.00	0.00
	1 JAN 1430	175	0.01	0.00	0.00	53.	*	2 JAN 1120	425	0.00	0.00	0.00
	1 JAN 1435	176	0.01	0.00	0.00	51.	*	2 JAN 1125	426	0.00	0.00	0.00
	1 JAN 1440	177	0.01	0.00	0.00	49.	*	2 JAN 1130	427	0.00	0.00	0.00
	1 JAN 1445	178	0.01	0.00	0.00	47.	*	2 JAN 1135	428	0.00	0.00	0.00
	1 JAN 1450	179	0.01	0.00	0.00	45.	*	2 JAN 1140	429	0.00	0.00	0.00
	1 JAN 1455	180	0.01	0.00	0.00	43.	*	2 JAN 1145	430	0.00	0.00	0.00
	1 JAN 1500	181	0.01	0.00	0.00	42.	*	2 JAN 1150	431	0.00	0.00	0.00
	1 JAN 1505	182	0.01	0.00	0.00	40.	*	2 JAN 1155	432	0.00	0.00	0.00
	1 JAN 1510	183	0.01	0.00	0.00	39.	*	2 JAN 1200	433	0.00	0.00	0.00
	1 JAN 1515	184	0.00	0.00	0.00	38.	*	2 JAN 1205	434	0.00	0.00	0.00
	1 JAN 1520	185	0.00	0.00	0.00	36.	*	2 JAN 1210	435	0.00	0.00	0.00
	1 JAN 1525	186	0.00	0.00	0.00	35.	*	2 JAN 1215	436	0.00	0.00	0.00

	1 JAN 1530	187	0.00	0.00	0.00	34.	*	2 JAN 1220	437	0.00	0.00	0.00
	1 JAN 1535	188	0.00	0.00	0.00	34.	*	2 JAN 1225	438	0.00	0.00	0.00
	1 JAN 1540	189	0.00	0.00	0.00	33.	*	2 JAN 1230	439	0.00	0.00	0.00
	1 JAN 1545	190	0.00	0.00	0.00	32.	*	2 JAN 1235	440	0.00	0.00	0.00
	1 JAN 1550	191	0.00	0.00	0.00	31.	*	2 JAN 1240	441	0.00	0.00	0.00
	1 JAN 1555	192	0.00	0.00	0.00	30.	*	2 JAN 1245	442	0.00	0.00	0.00
	1 JAN 1600	193	0.00	0.00	0.00	30.	*	2 JAN 1250	443	0.00	0.00	0.00
	1 JAN 1605	194	0.00	0.00	0.00	29.	*	2 JAN 1255	444	0.00	0.00	0.00
	1 JAN 1610	195	0.00	0.00	0.00	29.	*	2 JAN 1300	445	0.00	0.00	0.00
	1 JAN 1615	196	0.00	0.00	0.00	28.	*	2 JAN 1305	446	0.00	0.00	0.00
	1 JAN 1620	197	0.00	0.00	0.00	27.	*	2 JAN 1310	447	0.00	0.00	0.00
	1 JAN 1625	198	0.00	0.00	0.00	27.	*	2 JAN 1315	448	0.00	0.00	0.00
	1 JAN 1630	199	0.00	0.00	0.00	26.	*	2 JAN 1320	449	0.00	0.00	0.00
	1 JAN 1635	200	0.00	0.00	0.00	26.	*	2 JAN 1325	450	0.00	0.00	0.00
	1 JAN 1640	201	0.00	0.00	0.00	25.	*	2 JAN 1330	451	0.00	0.00	0.00
	1 JAN 1645	202	0.00	0.00	0.00	25.	*	2 JAN 1335	452	0.00	0.00	0.00
	1 JAN 1650	203	0.00	0.00	0.00	24.	*	2 JAN 1340	453	0.00	0.00	0.00
	1 JAN 1655	204	0.00	0.00	0.00	24.	*	2 JAN 1345	454	0.00	0.00	0.00
	1 JAN 1700	205	0.00	0.00	0.00	23.	*	2 JAN 1350	455	0.00	0.00	0.00
	1 JAN 1705	206	0.00	0.00	0.00	23.	*	2 JAN 1355	456	0.00	0.00	0.00
	1 JAN 1710	207	0.00	0.00	0.00	22.	*	2 JAN 1400	457	0.00	0.00	0.00
	1 JAN 1715	208	0.00	0.00	0.00	22.	*	2 JAN 1405	458	0.00	0.00	0.00
	1 JAN 1720	209	0.00	0.00	0.00	22.	*	2 JAN 1410	459	0.00	0.00	0.00
	1 JAN 1725	210	0.00	0.00	0.00	22.	*	2 JAN 1415	460	0.00	0.00	0.00
	1 JAN 1730	211	0.00	0.00	0.00	21.	*	2 JAN 1420	461	0.00	0.00	0.00
	1 JAN 1735	212	0.00	0.00	0.00	21.	*	2 JAN 1425	462	0.00	0.00	0.00
	1 JAN 1740	213	0.00	0.00	0.00	21.	*	2 JAN 1430	463	0.00	0.00	0.00
	1 JAN 1745	214	0.00	0.00	0.00	21.	*	2 JAN 1435	464	0.00	0.00	0.00
	1 JAN 1750	215	0.00	0.00	0.00	20.	*	2 JAN 1440	465	0.00	0.00	0.00
	1 JAN 1755	216	0.00	0.00	0.00	20.	*	2 JAN 1445	466	0.00	0.00	0.00
	1 JAN 1800	217	0.00	0.00	0.00	20.	*	2 JAN 1450	467	0.00	0.00	0.00
	1 JAN 1805	218	0.00	0.00	0.00	20.	*	2 JAN 1455	468	0.00	0.00	0.00
	1 JAN 1810	219	0.00	0.00	0.00	20.	*	2 JAN 1500	469	0.00	0.00	0.00
	1 JAN 1815	220	0.00	0.00	0.00	19.	*	2 JAN 1505	470	0.00	0.00	0.00
	1 JAN 1820	221	0.00	0.00	0.00	19.	*	2 JAN 1510	471	0.00	0.00	0.00

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         1 JAN 1825  222    0.00    0.00    0.00        19.       *        2 JAN 1515  472    0.00
0.00    0.00         0.
         1 JAN 1830  223    0.00    0.00    0.00        19.       *        2 JAN 1520  473    0.00
0.00    0.00         0.
         1 JAN 1835  224    0.00    0.00    0.00        19.       *        2 JAN 1525  474    0.00
0.00    0.00         0.
         1 JAN 1840  225    0.00    0.00    0.00        18.       *        2 JAN 1530  475    0.00
0.00    0.00         0.
         1 JAN 1845  226    0.00    0.00    0.00        18.       *        2 JAN 1535  476    0.00
0.00    0.00         0.
         1 JAN 1850  227    0.00    0.00    0.00        18.       *        2 JAN 1540  477    0.00
0.00    0.00         0.
         1 JAN 1855  228    0.00    0.00    0.00        18.       *        2 JAN 1545  478    0.00
0.00    0.00         0.
         1 JAN 1900  229    0.00    0.00    0.00        18.       *        2 JAN 1550  479    0.00
0.00    0.00         0.
         1 JAN 1905  230    0.00    0.00    0.00        18.       *        2 JAN 1555  480    0.00
0.00    0.00         0.
         1 JAN 1910  231    0.00    0.00    0.00        17.       *        2 JAN 1600  481    0.00
0.00    0.00         0.
         1 JAN 1915  232    0.00    0.00    0.00        17.       *        2 JAN 1605  482    0.00
0.00    0.00         0.
         1 JAN 1920  233    0.00    0.00    0.00        17.       *        2 JAN 1610  483    0.00
0.00    0.00         0.
         1 JAN 1925  234    0.00    0.00    0.00        17.       *        2 JAN 1615  484    0.00
0.00    0.00         0.
         1 JAN 1930  235    0.00    0.00    0.00        17.       *        2 JAN 1620  485    0.00
0.00    0.00         0.
         1 JAN 1935  236    0.00    0.00    0.00        16.       *        2 JAN 1625  486    0.00
0.00    0.00         0.
         1 JAN 1940  237    0.00    0.00    0.00        16.       *        2 JAN 1630  487    0.00
0.00    0.00         0.
         1 JAN 1945  238    0.00    0.00    0.00        16.       *        2 JAN 1635  488    0.00
0.00    0.00         0.
         1 JAN 1950  239    0.00    0.00    0.00        16.       *        2 JAN 1640  489    0.00
0.00    0.00         0.
         1 JAN 1955  240    0.00    0.00    0.00        16.       *        2 JAN 1645  490    0.00
0.00    0.00         0.
         1 JAN 2000  241    0.00    0.00    0.00        16.       *        2 JAN 1650  491    0.00
0.00    0.00         0.
         1 JAN 2005  242    0.00    0.00    0.00        15.       *        2 JAN 1655  492    0.00
0.00    0.00         0.
         1 JAN 2010  243    0.00    0.00    0.00        15.       *        2 JAN 1700  493    0.00
0.00    0.00         0.
         1 JAN 2015  244    0.00    0.00    0.00        15.       *        2 JAN 1705  494    0.00
0.00    0.00         0.
         1 JAN 2020  245    0.00    0.00    0.00        15.       *        2 JAN 1710  495    0.00
0.00    0.00         0.
         1 JAN 2025  246    0.00    0.00    0.00        15.       *        2 JAN 1715  496    0.00
0.00    0.00         0.
         1 JAN 2030  247    0.00    0.00    0.00        15.       *        2 JAN 1720  497    0.00
0.00    0.00         0.
         1 JAN 2035  248    0.00    0.00    0.00        14.       *        2 JAN 1725  498    0.00
0.00    0.00         0.
         1 JAN 2040  249    0.00    0.00    0.00        14.       *        2 JAN 1730  499    0.00
0.00    0.00         0.
         1 JAN 2045  250    0.00    0.00    0.00        14.       *        2 JAN 1735  500    0.00
0.00    0.00         0.
                                                                 *

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     TOTAL RAINFALL =    2.08, TOTAL LOSS =    1.66, TOTAL EXCESS =    0.42

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR      41.58-HR
+   (CFS)        (HR)
                              (CFS)
+     121.      13.08                    51.         17.         10.          10.
                           (INCHES)    0.316       0.421       0.421        0.421
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                    (AC-FT)        25.         34.         34.         34.

                    CUMULATIVE AREA =    1.50 SQ MI


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*** *** *** *** *** *** *** ***

            **************
            *            *
  73 KK     *        1R  *        CNAME      1C
            *            *
            **************

  74 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           0  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                       IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                        IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                       ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                       ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                      TIMINT       0.083  TIME INTERVAL IN HOURS

              HYDROGRAPH ROUTING DATA

  75 RN          NO ROUTING

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                                                HYDROGRAPH AT STATION       1R

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                                  *                                  *                                  *
    DA MON HRMN  ORD       FLOW   *   DA MON HRMN  ORD       FLOW   *   DA MON HRMN  ORD       FLOW   *
DA MON HRMN  ORD       FLOW
                                  *                                  *                                  *
     1 JAN 0000    1         0.   *    1 JAN 1025  126         0.   *    1 JAN 2050  251        14.   *
2 JAN 0715  376         0.
     1 JAN 0005    2         0.   *    1 JAN 1030  127         0.   *    1 JAN 2055  252        14.   *
2 JAN 0720  377         0.
     1 JAN 0010    3         0.   *    1 JAN 1035  128         0.   *    1 JAN 2100  253        14.   *
2 JAN 0725  378         0.
     1 JAN 0015    4         0.   *    1 JAN 1040  129         0.   *    1 JAN 2105  254        13.   *
2 JAN 0730  379         0.
     1 JAN 0020    5         0.   *    1 JAN 1045  130         0.   *    1 JAN 2110  255        13.   *
2 JAN 0735  380         0.
     1 JAN 0025    6         0.   *    1 JAN 1050  131         0.   *    1 JAN 2115  256        13.   *
2 JAN 0740  381         0.
     1 JAN 0030    7         0.   *    1 JAN 1055  132         0.   *    1 JAN 2120  257        13.   *
2 JAN 0745  382         0.
     1 JAN 0035    8         0.   *    1 JAN 1100  133         0.   *    1 JAN 2125  258        13.   *
2 JAN 0750  383         0.
     1 JAN 0040    9         0.   *    1 JAN 1105  134         0.   *    1 JAN 2130  259        13.   *
2 JAN 0755  384         0.
     1 JAN 0045   10         0.   *    1 JAN 1110  135         0.   *    1 JAN 2135  260        13.   *
2 JAN 0800  385         0.
     1 JAN 0050   11         0.   *    1 JAN 1115  136         0.   *    1 JAN 2140  261        13.   *
2 JAN 0805  386         0.
     1 JAN 0055   12         0.   *    1 JAN 1120  137         0.   *    1 JAN 2145  262        13.   *
2 JAN 0810  387         0.
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1 JAN 0100	13	0.	*	1 JAN 1125	138	0.	*	1 JAN 2150	263	13.	*	2 JAN 0815	388	0.	
1 JAN 0105	14	0.	*	1 JAN 1130	139	0.	*	1 JAN 2155	264	13.	*	2 JAN 0820	389	0.	
1 JAN 0110	15	0.	*	1 JAN 1135	140	0.	*	1 JAN 2200	265	13.	*	2 JAN 0825	390	0.	
1 JAN 0115	16	0.	*	1 JAN 1140	141	0.	*	1 JAN 2205	266	13.	*	2 JAN 0830	391	0.	
1 JAN 0120	17	0.	*	1 JAN 1145	142	0.	*	1 JAN 2210	267	13.	*	2 JAN 0835	392	0.	
1 JAN 0125	18	0.	*	1 JAN 1150	143	1.	*	1 JAN 2215	268	12.	*	2 JAN 0840	393	0.	
1 JAN 0130	19	0.	*	1 JAN 1155	144	3.	*	1 JAN 2220	269	12.	*	2 JAN 0845	394	0.	
1 JAN 0135	20	0.	*	1 JAN 1200	145	6.	*	1 JAN 2225	270	12.	*	2 JAN 0850	395	0.	
1 JAN 0140	21	0.	*	1 JAN 1205	146	12.	*	1 JAN 2230	271	12.	*	2 JAN 0855	396	0.	
1 JAN 0145	22	0.	*	1 JAN 1210	147	19.	*	1 JAN 2235	272	12.	*	2 JAN 0900	397	0.	
1 JAN 0150	23	0.	*	1 JAN 1215	148	29.	*	1 JAN 2240	273	12.	*	2 JAN 0905	398	0.	
1 JAN 0155	24	0.	*	1 JAN 1220	149	41.	*	1 JAN 2245	274	12.	*	2 JAN 0910	399	0.	
1 JAN 0200	25	0.	*	1 JAN 1225	150	55.	*	1 JAN 2250	275	12.	*	2 JAN 0915	400	0.	
1 JAN 0205	26	0.	*	1 JAN 1230	151	69.	*	1 JAN 2255	276	12.	*	2 JAN 0920	401	0.	
1 JAN 0210	27	0.	*	1 JAN 1235	152	83.	*	1 JAN 2300	277	12.	*	2 JAN 0925	402	0.	
1 JAN 0215	28	0.	*	1 JAN 1240	153	95.	*	1 JAN 2305	278	12.	*	2 JAN 0930	403	0.	
1 JAN 0220	29	0.	*	1 JAN 1245	154	105.	*	1 JAN 2310	279	12.	*	2 JAN 0935	404	0.	
1 JAN 0225	30	0.	*	1 JAN 1250	155	112.	*	1 JAN 2315	280	12.	*	2 JAN 0940	405	0.	
1 JAN 0230	31	0.	*	1 JAN 1255	156	117.	*	1 JAN 2320	281	12.	*	2 JAN 0945	406	0.	
1 JAN 0235	32	0.	*	1 JAN 1300	157	120.	*	1 JAN 2325	282	12.	*	2 JAN 0950	407	0.	
1 JAN 0240	33	0.	*	1 JAN 1305	158	121.	*	1 JAN 2330	283	12.	*	2 JAN 0955	408	0.	
1 JAN 0245	34	0.	*	1 JAN 1310	159	120.	*	1 JAN 2335	284	12.	*	2 JAN 1000	409	0.	
1 JAN 0250	35	0.	*	1 JAN 1315	160	118.	*	1 JAN 2340	285	12.	*	2 JAN 1005	410	0.	
1 JAN 0255	36	0.	*	1 JAN 1320	161	114.	*	1 JAN 2345	286	12.	*	2 JAN 1010	411	0.	
1 JAN 0300	37	0.	*	1 JAN 1325	162	108.	*	1 JAN 2350	287	12.	*	2 JAN 1015	412	0.	
1 JAN 0305	38	0.	*	1 JAN 1330	163	102.	*	1 JAN 2355	288	12.	*	2 JAN 1020	413	0.	
1 JAN 0310	39	0.	*	1 JAN 1335	164	96.	*	2 JAN 0000	289	12.	*	2 JAN 1025	414	0.	
1 JAN 0315	40	0.	*	1 JAN 1340	165	90.	*	2 JAN 0005	290	12.	*	2 JAN 1030	415	0.	
1 JAN 0320	41	0.	*	1 JAN 1345	166	85.	*	2 JAN 0010	291	12.	*	2 JAN 1035	416	0.	
1 JAN 0325	42	0.	*	1 JAN 1350	167	80.	*	2 JAN 0015	292	11.	*	2 JAN 1040	417	0.	
1 JAN 0330	43	0.	*	1 JAN 1355	168	76.	*	2 JAN 0020	293	11.	*	2 JAN 1045	418	0.	
1 JAN 0335	44	0.	*	1 JAN 1400	169	72.	*	2 JAN 0025	294	11.	*	2 JAN 1050	419	0.	
1 JAN 0340	45	0.	*	1 JAN 1405	170	68.	*	2 JAN 0030	295	11.	*	2 JAN 1055	420	0.	
1 JAN 0345	46	0.	*	1 JAN 1410	171	65.	*	2 JAN 0035	296	10.	*	2 JAN 1100	421	0.	
1 JAN 0350	47	0.	*	1 JAN 1415	172	62.	*	2 JAN 0040	297	10.	*	2 JAN 1105	422	0.	

1 JAN 0355	48	0.	*	1 JAN 1420	173	59.	*	2 JAN 0045	298	9.	*	2 JAN 1110	423	0.	
1 JAN 0400	49	0.	*	1 JAN 1425	174	56.	*	2 JAN 0050	299	9.	*	2 JAN 1115	424	0.	
1 JAN 0405	50	0.	*	1 JAN 1430	175	53.	*	2 JAN 0055	300	8.	*	2 JAN 1120	425	0.	
1 JAN 0410	51	0.	*	1 JAN 1435	176	51.	*	2 JAN 0100	301	7.	*	2 JAN 1125	426	0.	
1 JAN 0415	52	0.	*	1 JAN 1440	177	49.	*	2 JAN 0105	302	6.	*	2 JAN 1130	427	0.	
1 JAN 0420	53	0.	*	1 JAN 1445	178	47.	*	2 JAN 0110	303	6.	*	2 JAN 1135	428	0.	
1 JAN 0425	54	0.	*	1 JAN 1450	179	45.	*	2 JAN 0115	304	5.	*	2 JAN 1140	429	0.	
1 JAN 0430	55	0.	*	1 JAN 1455	180	43.	*	2 JAN 0120	305	5.	*	2 JAN 1145	430	0.	
1 JAN 0435	56	0.	*	1 JAN 1500	181	42.	*	2 JAN 0125	306	4.	*	2 JAN 1150	431	0.	
1 JAN 0440	57	0.	*	1 JAN 1505	182	40.	*	2 JAN 0130	307	4.	*	2 JAN 1155	432	0.	
1 JAN 0445	58	0.	*	1 JAN 1510	183	39.	*	2 JAN 0135	308	3.	*	2 JAN 1200	433	0.	
1 JAN 0450	59	0.	*	1 JAN 1515	184	38.	*	2 JAN 0140	309	3.	*	2 JAN 1205	434	0.	
1 JAN 0455	60	0.	*	1 JAN 1520	185	36.	*	2 JAN 0145	310	2.	*	2 JAN 1210	435	0.	
1 JAN 0500	61	0.	*	1 JAN 1525	186	35.	*	2 JAN 0150	311	2.	*	2 JAN 1215	436	0.	
1 JAN 0505	62	0.	*	1 JAN 1530	187	34.	*	2 JAN 0155	312	2.	*	2 JAN 1220	437	0.	
1 JAN 0510	63	0.	*	1 JAN 1535	188	34.	*	2 JAN 0200	313	2.	*	2 JAN 1225	438	0.	
1 JAN 0515	64	0.	*	1 JAN 1540	189	33.	*	2 JAN 0205	314	1.	*	2 JAN 1230	439	0.	
1 JAN 0520	65	0.	*	1 JAN 1545	190	32.	*	2 JAN 0210	315	1.	*	2 JAN 1235	440	0.	
1 JAN 0525	66	0.	*	1 JAN 1550	191	31.	*	2 JAN 0215	316	1.	*	2 JAN 1240	441	0.	
1 JAN 0530	67	0.	*	1 JAN 1555	192	30.	*	2 JAN 0220	317	1.	*	2 JAN 1245	442	0.	
1 JAN 0535	68	0.	*	1 JAN 1600	193	30.	*	2 JAN 0225	318	1.	*	2 JAN 1250	443	0.	
1 JAN 0540	69	0.	*	1 JAN 1605	194	29.	*	2 JAN 0230	319	1.	*	2 JAN 1255	444	0.	
1 JAN 0545	70	0.	*	1 JAN 1610	195	29.	*	2 JAN 0235	320	1.	*	2 JAN 1300	445	0.	
1 JAN 0550	71	0.	*	1 JAN 1615	196	28.	*	2 JAN 0240	321	1.	*	2 JAN 1305	446	0.	
1 JAN 0555	72	0.	*	1 JAN 1620	197	27.	*	2 JAN 0245	322	0.	*	2 JAN 1310	447	0.	
1 JAN 0600	73	0.	*	1 JAN 1625	198	27.	*	2 JAN 0250	323	0.	*	2 JAN 1315	448	0.	
1 JAN 0605	74	0.	*	1 JAN 1630	199	26.	*	2 JAN 0255	324	0.	*	2 JAN 1320	449	0.	
1 JAN 0610	75	0.	*	1 JAN 1635	200	26.	*	2 JAN 0300	325	0.	*	2 JAN 1325	450	0.	
1 JAN 0615	76	0.	*	1 JAN 1640	201	25.	*	2 JAN 0305	326	0.	*	2 JAN 1330	451	0.	
1 JAN 0620	77	0.	*	1 JAN 1645	202	25.	*	2 JAN 0310	327	0.	*	2 JAN 1335	452	0.	
1 JAN 0625	78	0.	*	1 JAN 1650	203	24.	*	2 JAN 0315	328	0.	*	2 JAN 1340	453	0.	
1 JAN 0630	79	0.	*	1 JAN 1655	204	24.	*	2 JAN 0320	329	0.	*	2 JAN 1345	454	0.	
1 JAN 0635	80	0.	*	1 JAN 1700	205	23.	*	2 JAN 0325	330	0.	*	2 JAN 1350	455	0.	
1 JAN 0640	81	0.	*	1 JAN 1705	206	23.	*	2 JAN 0330	331	0.	*	2 JAN 1355	456	0.	
1 JAN 0645	82	0.	*	1 JAN 1710	207	22.	*	2 JAN 0335	332	0.	*	2 JAN 1400	457	0.	

1 JAN 0650	83	0.	*	1 JAN 1715	208	22.	*	2 JAN 0340	333	0.	*	2 JAN 1405	458	0.
1 JAN 0655	84	0.	*	1 JAN 1720	209	22.	*	2 JAN 0345	334	0.	*	2 JAN 1410	459	0.
1 JAN 0700	85	0.	*	1 JAN 1725	210	22.	*	2 JAN 0350	335	0.	*	2 JAN 1415	460	0.
1 JAN 0705	86	0.	*	1 JAN 1730	211	21.	*	2 JAN 0355	336	0.	*	2 JAN 1420	461	0.
1 JAN 0710	87	0.	*	1 JAN 1735	212	21.	*	2 JAN 0400	337	0.	*	2 JAN 1425	462	0.
1 JAN 0715	88	0.	*	1 JAN 1740	213	21.	*	2 JAN 0405	338	0.	*	2 JAN 1430	463	0.
1 JAN 0720	89	0.	*	1 JAN 1745	214	21.	*	2 JAN 0410	339	0.	*	2 JAN 1435	464	0.
1 JAN 0725	90	0.	*	1 JAN 1750	215	20.	*	2 JAN 0415	340	0.	*	2 JAN 1440	465	0.
1 JAN 0730	91	0.	*	1 JAN 1755	216	20.	*	2 JAN 0420	341	0.	*	2 JAN 1445	466	0.
1 JAN 0735	92	0.	*	1 JAN 1800	217	20.	*	2 JAN 0425	342	0.	*	2 JAN 1450	467	0.
1 JAN 0740	93	0.	*	1 JAN 1805	218	20.	*	2 JAN 0430	343	0.	*	2 JAN 1455	468	0.
1 JAN 0745	94	0.	*	1 JAN 1810	219	20.	*	2 JAN 0435	344	0.	*	2 JAN 1500	469	0.
1 JAN 0750	95	0.	*	1 JAN 1815	220	19.	*	2 JAN 0440	345	0.	*	2 JAN 1505	470	0.
1 JAN 0755	96	0.	*	1 JAN 1820	221	19.	*	2 JAN 0445	346	0.	*	2 JAN 1510	471	0.
1 JAN 0800	97	0.	*	1 JAN 1825	222	19.	*	2 JAN 0450	347	0.	*	2 JAN 1515	472	0.
1 JAN 0805	98	0.	*	1 JAN 1830	223	19.	*	2 JAN 0455	348	0.	*	2 JAN 1520	473	0.
1 JAN 0810	99	0.	*	1 JAN 1835	224	19.	*	2 JAN 0500	349	0.	*	2 JAN 1525	474	0.
1 JAN 0815	100	0.	*	1 JAN 1840	225	18.	*	2 JAN 0505	350	0.	*	2 JAN 1530	475	0.
1 JAN 0820	101	0.	*	1 JAN 1845	226	18.	*	2 JAN 0510	351	0.	*	2 JAN 1535	476	0.
1 JAN 0825	102	0.	*	1 JAN 1850	227	18.	*	2 JAN 0515	352	0.	*	2 JAN 1540	477	0.
1 JAN 0830	103	0.	*	1 JAN 1855	228	18.	*	2 JAN 0520	353	0.	*	2 JAN 1545	478	0.
1 JAN 0835	104	0.	*	1 JAN 1900	229	18.	*	2 JAN 0525	354	0.	*	2 JAN 1550	479	0.
1 JAN 0840	105	0.	*	1 JAN 1905	230	18.	*	2 JAN 0530	355	0.	*	2 JAN 1555	480	0.
1 JAN 0845	106	0.	*	1 JAN 1910	231	17.	*	2 JAN 0535	356	0.	*	2 JAN 1600	481	0.
1 JAN 0850	107	0.	*	1 JAN 1915	232	17.	*	2 JAN 0540	357	0.	*	2 JAN 1605	482	0.
1 JAN 0855	108	0.	*	1 JAN 1920	233	17.	*	2 JAN 0545	358	0.	*	2 JAN 1610	483	0.
1 JAN 0900	109	0.	*	1 JAN 1925	234	17.	*	2 JAN 0550	359	0.	*	2 JAN 1615	484	0.
1 JAN 0905	110	0.	*	1 JAN 1930	235	17.	*	2 JAN 0555	360	0.	*	2 JAN 1620	485	0.
1 JAN 0910	111	0.	*	1 JAN 1935	236	16.	*	2 JAN 0600	361	0.	*	2 JAN 1625	486	0.
1 JAN 0915	112	0.	*	1 JAN 1940	237	16.	*	2 JAN 0605	362	0.	*	2 JAN 1630	487	0.
1 JAN 0920	113	0.	*	1 JAN 1945	238	16.	*	2 JAN 0610	363	0.	*	2 JAN 1635	488	0.
1 JAN 0925	114	0.	*	1 JAN 1950	239	16.	*	2 JAN 0615	364	0.	*	2 JAN 1640	489	0.
1 JAN 0930	115	0.	*	1 JAN 1955	240	16.	*	2 JAN 0620	365	0.	*	2 JAN 1645	490	0.
1 JAN 0935	116	0.	*	1 JAN 2000	241	16.	*	2 JAN 0625	366	0.	*	2 JAN 1650	491	0.
1 JAN 0940	117	0.	*	1 JAN 2005	242	15.	*	2 JAN 0630	367	0.	*	2 JAN 1655	492	0.

```
     1 JAN 0945  118        0.   *    1 JAN 2010  243       15.   *    2 JAN 0635  368        0.   *
2 JAN 1700  493        0.
     1 JAN 0950  119        0.   *    1 JAN 2015  244       15.   *    2 JAN 0640  369        0.   *
2 JAN 1705  494        0.
     1 JAN 0955  120        0.   *    1 JAN 2020  245       15.   *    2 JAN 0645  370        0.   *
2 JAN 1710  495        0.
     1 JAN 1000  121        0.   *    1 JAN 2025  246       15.   *    2 JAN 0650  371        0.   *
2 JAN 1715  496        0.
     1 JAN 1005  122        0.   *    1 JAN 2030  247       15.   *    2 JAN 0655  372        0.   *
2 JAN 1720  497        0.
     1 JAN 1010  123        0.   *    1 JAN 2035  248       14.   *    2 JAN 0700  373        0.   *
2 JAN 1725  498        0.
     1 JAN 1015  124        0.   *    1 JAN 2040  249       14.   *    2 JAN 0705  374        0.   *
2 JAN 1730  499        0.
     1 JAN 1020  125        0.   *    1 JAN 2045  250       14.   *    2 JAN 0710  375        0.   *
2 JAN 1735  500        0.
                                *                              *                              *

*****************************************************************************************************
*******************************

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR      41.58-HR
+   (CFS)        (HR)
                             (CFS)
+     121.      13.08                    51.         17.         10.          10.
                          (INCHES)     0.316       0.421       0.421        0.421
                           (AC-FT)       25.         34.         34.          34.

                          CUMULATIVE AREA =    1.50 SQ MI
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

MAXIMUM STAGE +	TIME OF OPERATION MAX STAGE	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA
+	HYDROGRAPH AT	SOUTH	32.	13.08	14.	5.	3.	0.40
+	ROUTED TO	2R	32.	13.08	14.	5.	3.	0.40
+	HYDROGRAPH AT	NORTH	121.	13.08	51.	17.	10.	1.50
+	ROUTED TO	1R	121.	13.08	51.	17.	10.	1.50

*** NORMAL END OF HEC-1 ***

peak discharges (cfs)

```
1****************************************
****************************************
 *                                      *
*                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*    U.S. ARMY CORPS OF ENGINEERS       *
 *                MAY   1991            *
*    HYDROLOGIC ENGINEERING CENTER      *
 *            VERSION 4.0.1E            *
*          609 SECOND STREET            *
 *                                      *
*       DAVIS, CALIFORNIA 95616         *
 *  RUN DATE              TIME          *
*           (916) 551-1748              *
 *                                      *
*                                       *
 ****************************************
****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT

PAGE 1

```
          LINE
ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

             1          ID  HEC-1 Analysis using WMS
             2          ID
             3          ID
                        *DIAGRAM
             4          IT      15  1JAN94       0     150
             5          IO       0

             6          KK   CELL2
             7          KO       0       0     0.0       0      22
             8          BA   0.183
             9          PB    2.08
            10          IN       6  1JAN94       0
                        * typeII-24hour
            11          PC     0.0   0.001   0.002  0.0031  0.0041  0.0051  0.0062
0.0073  0.0083  0.0094
            12          PC  0.0105  0.0116  0.0127  0.0138   0.015  0.0161  0.0173
0.0185  0.0196  0.0208
            13          PC   0.022  0.0232  0.0244  0.0256  0.0269  0.0281  0.0294
0.0307  0.0319  0.0332
            14          PC  0.0345  0.0358  0.0371  0.0384  0.0398  0.0411  0.0425
0.0439  0.0452  0.0466
            15          PC   0.048  0.0494  0.0508  0.0523  0.0538  0.0553  0.0568
0.0583  0.0598  0.0614
            16          PC   0.063  0.0646  0.0662  0.0679  0.0696  0.0712   0.073
0.0747  0.0764  0.0782
            17          PC    0.08  0.0818  0.0836  0.0855  0.0874  0.0892  0.0912
0.0931   0.095   0.097
```

```
                18          PC   0.099   0.101   0.103  0.1051  0.1072  0.1093  0.1114
0.1135  0.1156  0.1178
                19          PC    0.12  0.1223  0.1246  0.1271  0.1296  0.1323   0.135
0.1379  0.1408  0.1439
                20          PC   0.147  0.1502  0.1534  0.1566  0.1598   0.163  0.1663
0.1697  0.1733  0.1771
                21          PC   0.181  0.1851  0.1895  0.1941  0.1989   0.204  0.2094
0.2152  0.2214   0.228
                22          PC   0.235  0.2427  0.2513  0.2609  0.2715   0.283  0.3068
0.3544  0.4308  0.5679
                23          PC   0.663   0.682  0.6986   0.713  0.7252   0.735  0.7434
0.7514  0.7588  0.7656
                24          PC   0.772   0.778  0.7836   0.789  0.7942   0.799  0.8036
0.808  0.8122  0.8162
                25          PC    0.82  0.8237  0.8273  0.8308  0.8342  0.8376  0.8409
0.8442  0.8474  0.8505
                26          PC  0.8535  0.8565  0.8594  0.8622  0.8649  0.8676  0.8702
0.8728  0.8753  0.8777
                27          PC    0.88  0.8823  0.8845  0.8868   0.889  0.8912  0.8933
0.8955  0.8976  0.8997
                28          PC  0.9018  0.9038  0.9058  0.9078  0.9097  0.9117  0.9136
0.9155  0.9174  0.9192
                29          PC   0.921  0.9228  0.9245  0.9263   0.928  0.9297  0.9314
0.933  0.9346  0.9362
                30          PC  0.9377  0.9393  0.9408  0.9423  0.9437  0.9452  0.9466
0.948  0.9494  0.9507
                31          PC   0.952  0.9533  0.9546  0.9559  0.9572  0.9584  0.9597
0.961  0.9622  0.9635
                32          PC  0.9648   0.966  0.9672  0.9685  0.9697  0.9709  0.9722
0.9734  0.9746  0.9758
                33          PC   0.977  0.9782  0.9794  0.9806  0.9818  0.9829  0.9841
0.9853  0.9864  0.9876
                34          PC  0.9888  0.9899   0.991  0.9922  0.9933  0.9944  0.9956
0.9967  0.9978  0.9989
                35          PC     1.0
                36          LS     0.0    70.0     0.0
                37          UD     1.3

                38          KK      2R   CNAME      2C
                39          KO       0       0     0.0       0      22
                40          RN      2R

                41          KK   CELL1
                42          KO       0       0     0.0       0      22
                43          BA    0.17
                44          PB    2.08
                45          IN       6  1JAN94       0
                            * typeII-24hour
                46          PC     0.0   0.001   0.002  0.0031  0.0041  0.0051  0.0062
0.0073  0.0083  0.0094
                47          PC  0.0105  0.0116  0.0127  0.0138   0.015  0.0161  0.0173
0.0185  0.0196  0.0208
                48          PC   0.022  0.0232  0.0244  0.0256  0.0269  0.0281  0.0294
0.0307  0.0319  0.0332
                49          PC  0.0345  0.0358  0.0371  0.0384  0.0398  0.0411  0.0425
0.0439  0.0452  0.0466
```

```
            LINE
ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

              50          PC   0.048  0.0494  0.0508  0.0523  0.0538  0.0553  0.0568
0.0583  0.0598  0.0614
              51          PC   0.063  0.0646  0.0662  0.0679  0.0696  0.0712   0.073
0.0747  0.0764  0.0782
              52          PC    0.08  0.0818  0.0836  0.0855  0.0874  0.0892  0.0912
0.0931   0.095   0.097
              53          PC   0.099   0.101   0.103  0.1051  0.1072  0.1093  0.1114
0.1135  0.1156  0.1178
              54          PC    0.12  0.1223  0.1246  0.1271  0.1296  0.1323   0.135
0.1379  0.1408  0.1439
              55          PC   0.147  0.1502  0.1534  0.1566  0.1598   0.163  0.1663
0.1697  0.1733  0.1771
              56          PC   0.181  0.1851  0.1895  0.1941  0.1989   0.204  0.2094
0.2152  0.2214   0.228
              57          PC   0.235  0.2427  0.2513  0.2609  0.2715   0.283  0.3068
0.3544  0.4308  0.5679
              58          PC   0.663   0.682  0.6986   0.713  0.7252   0.735  0.7434
0.7514  0.7588  0.7656
              59          PC   0.772   0.778  0.7836   0.789  0.7942   0.799  0.8036
0.808  0.8122  0.8162
              60          PC    0.82  0.8237  0.8273  0.8308  0.8342  0.8376  0.8409
0.8442  0.8474  0.8505
              61          PC  0.8535  0.8565  0.8594  0.8622  0.8649  0.8676  0.8702
0.8728  0.8753  0.8777
              62          PC    0.88  0.8823  0.8845  0.8868   0.889  0.8912  0.8933
0.8955  0.8976  0.8997
              63          PC  0.9018  0.9038  0.9058  0.9078  0.9097  0.9117  0.9136
0.9155  0.9174  0.9192
              64          PC   0.921  0.9228  0.9245  0.9263   0.928  0.9297  0.9314
0.933  0.9346  0.9362
              65          PC  0.9377  0.9393  0.9408  0.9423  0.9437  0.9452  0.9466
0.948  0.9494  0.9507
              66          PC   0.952  0.9533  0.9546  0.9559  0.9572  0.9584  0.9597
0.961  0.9622  0.9635
              67          PC  0.9648   0.966  0.9672  0.9685  0.9697  0.9709  0.9722
0.9734  0.9746  0.9758
              68          PC   0.977  0.9782  0.9794  0.9806  0.9818  0.9829  0.9841
0.9853  0.9864  0.9876
              69          PC  0.9888  0.9899   0.991  0.9922  0.9933  0.9944  0.9956
0.9967  0.9978  0.9989
              70          PC     1.0
              71          LS     0.0    70.0     0.0
              72          UD     1.0

              73          KK      1R   CNAME      1C
              74          KO       0       0     0.0       0      22
              75          RN      1R
              76          ZZ
```

```
                    SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE       (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.       (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6        CELL2
                  V
                  V
    38           2R
                  .
                  .
    41            .        CELL1
                  .            V
                  .            V
    73            .           1R

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************
****************************************
 *                                      *
*                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*    U.S. ARMY CORPS OF ENGINEERS       *
 *               MAY   1991             *
*    HYDROLOGIC ENGINEERING CENTER      *
 *            VERSION 4.0.1E            *
*          609 SECOND STREET            *
 *                                      *
*       DAVIS, CALIFORNIA 95616         *
 *  RUN DATE            TIME            *
*           (916) 551-1748              *
 *                                      *
*                                       *
 *****************************************
****************************************
```

HEC-1 Analysis using WMS

```
    5 IO          OUTPUT CONTROL VARIABLES
                        IPRNT          0  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                         NMIN         15  MINUTES IN COMPUTATION INTERVAL
                        IDATE     1JAN94  STARTING DATE
                        ITIME       0000  STARTING TIME
                           NQ,        150  NUMBER OF HYDROGRAPH ORDINATES
                       NDDATE     2JAN94  ENDING DATE
                       NDTIME       1315  ENDING TIME
                       ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL    0.25 HOURS
                       TOTAL TIME BASE   37.25 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** *** *** *** ***

              **************
              *            *
    6 KK      *     CELL2  *
```

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

    7 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           0  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE
                        IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                         IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                        ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                        ISAV2         150  LAST ORDINATE PUNCHED OR SAVED
                       TIMINT       0.250  TIME INTERVAL IN HOURS

   10 IN          TIME DATA FOR INPUT TIME SERIES
                        JXMIN           6  TIME INTERVAL IN MINUTES
                       JXDATE      1JAN94  STARTING DATE
                       JXTIME           0  STARTING TIME

                SUBBASIN RUNOFF DATA

    8 BA          SUBBASIN CHARACTERISTICS
                        TAREA,       0.18  SUBBASIN AREA

                  PRECIPITATION DATA

    9 PB                STORM        2.08  BASIN TOTAL PRECIPITATION

   11 PI            INCREMENTAL PRECIPITATION PATTERN
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.01      0.01
                       0.01      0.01      0.01      0.01      0.01      0.01      0.01
0.01      0.01      0.01
                       0.01      0.01      0.01      0.02      0.02      0.03      0.11
0.27      0.04      0.03
                       0.02      0.02      0.01      0.01      0.01      0.01      0.01
0.01      0.01      0.01
                       0.01      0.01      0.01      0.01      0.01      0.01      0.01
0.01      0.01      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00

   36 LS          SCS LOSS RATE
                        STRTL        0.86  INITIAL ABSTRACTION
                       CRVNBR       70.00  CURVE NUMBER
                        RTIMP        0.00  PERCENT IMPERVIOUS AREA

   37 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG        1.30  LAG

                                                                    ***

                                                          UNIT HYDROGRAPH
                                                     28 END-OF-PERIOD ORDINATES
                  5.        16.        32.        51.        61.        62.        56.
48.       36.       26.
                 20.        15.        11.         8.         6.         5.         4.
3.        2.        2.
                  1.         1.         1.         1.         0.         0.         0.
0.

*****************************************************************************************
*******************************************

                                                HYDROGRAPH AT STATION    CELL2

*****************************************************************************************
*******************************************
                                                                    *
        DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q         *       DA MON HRMN
ORD    RAIN    LOSS  EXCESS     COMP Q
                                                                    *
```

	1	JAN	0000	1	0.00	0.00	0.00	0.	*	1 JAN 1845
76	0.01	0.01	0.00		2.					
	1	JAN	0015	2	0.01	0.01	0.00	0.	*	1 JAN 1900
77	0.01	0.01	0.00		2.					
	1	JAN	0030	3	0.01	0.01	0.00	0.	*	1 JAN 1915
78	0.01	0.01	0.00		2.					
	1	JAN	0045	4	0.01	0.01	0.00	0.	*	1 JAN 1930
79	0.01	0.00	0.00		2.					
	1	JAN	0100	5	0.01	0.01	0.00	0.	*	1 JAN 1945
80	0.01	0.00	0.00		2.					
	1	JAN	0115	6	0.01	0.01	0.00	0.	*	1 JAN 2000
81	0.01	0.00	0.00		2.					
	1	JAN	0130	7	0.01	0.01	0.00	0.	*	1 JAN 2015
82	0.01	0.00	0.00		1.					
	1	JAN	0145	8	0.01	0.01	0.00	0.	*	1 JAN 2030
83	0.01	0.00	0.00		1.					
	1	JAN	0200	9	0.01	0.01	0.00	0.	*	1 JAN 2045
84	0.01	0.00	0.00		1.					
	1	JAN	0215	10	0.01	0.01	0.00	0.	*	1 JAN 2100
85	0.01	0.00	0.00		1.					
	1	JAN	0230	11	0.01	0.01	0.00	0.	*	1 JAN 2115
86	0.01	0.00	0.00		1.					
	1	JAN	0245	12	0.01	0.01	0.00	0.	*	1 JAN 2130
87	0.01	0.00	0.00		1.					
	1	JAN	0300	13	0.01	0.01	0.00	0.	*	1 JAN 2145
88	0.01	0.00	0.00		1.					
	1	JAN	0315	14	0.01	0.01	0.00	0.	*	1 JAN 2200
89	0.01	0.00	0.00		1.					
	1	JAN	0330	15	0.01	0.01	0.00	0.	*	1 JAN 2215
90	0.01	0.00	0.00		1.					
	1	JAN	0345	16	0.01	0.01	0.00	0.	*	1 JAN 2230
91	0.01	0.00	0.00		1.					
	1	JAN	0400	17	0.01	0.01	0.00	0.	*	1 JAN 2245
92	0.01	0.00	0.00		1.					
	1	JAN	0415	18	0.01	0.01	0.00	0.	*	1 JAN 2300
93	0.01	0.00	0.00		1.					
	1	JAN	0430	19	0.01	0.01	0.00	0.	*	1 JAN 2315
94	0.01	0.00	0.00		1.					
	1	JAN	0445	20	0.01	0.01	0.00	0.	*	1 JAN 2330
95	0.01	0.00	0.00		1.					
	1	JAN	0500	21	0.01	0.01	0.00	0.	*	1 JAN 2345
96	0.01	0.00	0.00		1.					
	1	JAN	0515	22	0.01	0.01	0.00	0.	*	2 JAN 0000
97	0.01	0.00	0.00		1.					
	1	JAN	0530	23	0.01	0.01	0.00	0.	*	2 JAN 0015
98	0.00	0.00	0.00		1.					
	1	JAN	0545	24	0.01	0.01	0.00	0.	*	2 JAN 0030
99	0.00	0.00	0.00		1.					
	1	JAN	0600	25	0.01	0.01	0.00	0.	*	2 JAN 0045
100	0.00	0.00	0.00		1.					
	1	JAN	0615	26	0.01	0.01	0.00	0.	*	2 JAN 0100
101	0.00	0.00	0.00		1.					
	1	JAN	0630	27	0.01	0.01	0.00	0.	*	2 JAN 0115
102	0.00	0.00	0.00		1.					
	1	JAN	0645	28	0.01	0.01	0.00	0.	*	2 JAN 0130
103	0.00	0.00	0.00		1.					
	1	JAN	0700	29	0.01	0.01	0.00	0.	*	2 JAN 0145
104	0.00	0.00	0.00		0.					
	1	JAN	0715	30	0.01	0.01	0.00	0.	*	2 JAN 0200
105	0.00	0.00	0.00		0.					
	1	JAN	0730	31	0.01	0.01	0.00	0.	*	2 JAN 0215
106	0.00	0.00	0.00		0.					
	1	JAN	0745	32	0.01	0.01	0.00	0.	*	2 JAN 0230
107	0.00	0.00	0.00		0.					
	1	JAN	0800	33	0.01	0.01	0.00	0.	*	2 JAN 0245
108	0.00	0.00	0.00		0.					
	1	JAN	0815	34	0.01	0.01	0.00	0.	*	2 JAN 0300
109	0.00	0.00	0.00		0.					
	1	JAN	0830	35	0.01	0.01	0.00	0.	*	2 JAN 0315
110	0.00	0.00	0.00		0.					
	1	JAN	0845	36	0.01	0.01	0.00	0.	*	2 JAN 0330
111	0.00	0.00	0.00		0.					
	1	JAN	0900	37	0.02	0.02	0.00	0.	*	2 JAN 0345
112	0.00	0.00	0.00		0.					
	1	JAN	0915	38	0.02	0.02	0.00	0.	*	2 JAN 0400
113	0.00	0.00	0.00		0.					
	1	JAN	0930	39	0.02	0.02	0.00	0.	*	2 JAN 0415
114	0.00	0.00	0.00		0.					
	1	JAN	0945	40	0.02	0.02	0.00	0.	*	2 JAN 0430
115	0.00	0.00	0.00		0.					

```
        1 JAN 1000   41    0.02    0.02    0.00          0.        *        2 JAN 0445
116    0.00    0.00    0.00          0.
        1 JAN 1015   42    0.02    0.02    0.00          0.        *        2 JAN 0500
117    0.00    0.00    0.00          0.
        1 JAN 1030   43    0.03    0.03    0.00          0.        *        2 JAN 0515
118    0.00    0.00    0.00          0.
        1 JAN 1045   44    0.03    0.03    0.00          0.        *        2 JAN 0530
119    0.00    0.00    0.00          0.
        1 JAN 1100   45    0.03    0.03    0.00          0.        *        2 JAN 0545
120    0.00    0.00    0.00          0.
        1 JAN 1115   46    0.04    0.04    0.00          0.        *        2 JAN 0600
121    0.00    0.00    0.00          0.
        1 JAN 1130   47    0.06    0.06    0.00          0.        *        2 JAN 0615
122    0.00    0.00    0.00          0.
        1 JAN 1145   48    0.23    0.23    0.00          0.        *        2 JAN 0630
123    0.00    0.00    0.00          0.
        1 JAN 1200   49    0.56    0.51    0.06          0.        *        2 JAN 0645
124    0.00    0.00    0.00          0.
        1 JAN 1215   50    0.09    0.07    0.02          1.        *        2 JAN 0700
125    0.00    0.00    0.00          0.
        1 JAN 1230   51    0.06    0.05    0.01          2.        *        2 JAN 0715
126    0.00    0.00    0.00          0.
        1 JAN 1245   52    0.04    0.03    0.01          4.        *        2 JAN 0730
127    0.00    0.00    0.00          0.
        1 JAN 1300   53    0.04    0.03    0.01          5.        *        2 JAN 0745
128    0.00    0.00    0.00          0.
        1 JAN 1315   54    0.03    0.02    0.01          6.        *        2 JAN 0800
129    0.00    0.00    0.00          0.
        1 JAN 1330   55    0.03    0.02    0.01          6.        *        2 JAN 0815
130    0.00    0.00    0.00          0.
        1 JAN 1345   56    0.02    0.02    0.01          6.        *        2 JAN 0830
131    0.00    0.00    0.00          0.
        1 JAN 1400   57    0.02    0.01    0.01          6.        *        2 JAN 0845
132    0.00    0.00    0.00          0.
        1 JAN 1415   58    0.02    0.01    0.01          5.        *        2 JAN 0900
133    0.00    0.00    0.00          0.
        1 JAN 1430   59    0.02    0.01    0.01          5.        *        2 JAN 0915
134    0.00    0.00    0.00          0.
        1 JAN 1445   60    0.02    0.01    0.01          4.        *        2 JAN 0930
135    0.00    0.00    0.00          0.
        1 JAN 1500   61    0.02    0.01    0.01          4.        *        2 JAN 0945
136    0.00    0.00    0.00          0.
        1 JAN 1515   62    0.02    0.01    0.00          4.        *        2 JAN 1000
137    0.00    0.00    0.00          0.
        1 JAN 1530   63    0.01    0.01    0.00          3.        *        2 JAN 1015
138    0.00    0.00    0.00          0.
        1 JAN 1545   64    0.01    0.01    0.00          3.        *        2 JAN 1030
139    0.00    0.00    0.00          0.
        1 JAN 1600   65    0.01    0.01    0.00          3.        *        2 JAN 1045
140    0.00    0.00    0.00          0.
        1 JAN 1615   66    0.01    0.01    0.00          3.        *        2 JAN 1100
141    0.00    0.00    0.00          0.
        1 JAN 1630   67    0.01    0.01    0.00          3.        *        2 JAN 1115
142    0.00    0.00    0.00          0.
        1 JAN 1645   68    0.01    0.01    0.00          2.        *        2 JAN 1130
143    0.00    0.00    0.00          0.
        1 JAN 1700   69    0.01    0.01    0.00          2.        *        2 JAN 1145
144    0.00    0.00    0.00          0.
        1 JAN 1715   70    0.01    0.01    0.00          2.        *        2 JAN 1200
145    0.00    0.00    0.00          0.
        1 JAN 1730   71    0.01    0.01    0.00          2.        *        2 JAN 1215
146    0.00    0.00    0.00          0.
        1 JAN 1745   72    0.01    0.01    0.00          2.        *        2 JAN 1230
147    0.00    0.00    0.00          0.
        1 JAN 1800   73    0.01    0.01    0.00          2.        *        2 JAN 1245
148    0.00    0.00    0.00          0.
        1 JAN 1815   74    0.01    0.01    0.00          2.        *        2 JAN 1300
149    0.00    0.00    0.00          0.
        1 JAN 1830   75    0.01    0.01    0.00          2.        *        2 JAN 1315
150    0.00    0.00    0.00          0.
                                                                   *

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     TOTAL RAINFALL =     2.08, TOTAL LOSS =     1.81, TOTAL EXCESS =     0.27

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR      37.25-HR
+   (CFS)        (HR)
                                (CFS)
```

```
+       6.      13.50                    4.          1.          1.          1.
                          (INCHES)    0.186       0.271       0.271       0.271
                           (AC-FT)       2.          3.          3.          3.

                          CUMULATIVE AREA =    0.18 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** *** *** *** ***


              **************
              *            *
   38 KK      *        2R  *        CNAME      2C
              *            *
              **************

   39 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           0  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE
                        IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                         IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                        ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                        ISAV2         150  LAST ORDINATE PUNCHED OR SAVED
                       TIMINT       0.250  TIME INTERVAL IN HOURS


                 HYDROGRAPH ROUTING DATA

   40 RN          NO ROUTING
                                                                    ***

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*****************************************
                                                    HYDROGRAPH AT STATION       2R

*************************************************************************************************
*****************************************
                                        *                                   *
*
    DA MON HRMN  ORD      FLOW    *   DA MON HRMN  ORD      FLOW    *   DA MON HRMN  ORD
FLOW    *   DA MON HRMN  ORD       FLOW
                                        *                                   *
*
     1 JAN 0000    1        0.    *    1 JAN 0930   39        0.    *    1 JAN 1900   77
2.   *    2 JAN 0430  115         0.
     1 JAN 0015    2        0.    *    1 JAN 0945   40        0.    *    1 JAN 1915   78
2.   *    2 JAN 0445  116         0.
     1 JAN 0030    3        0.    *    1 JAN 1000   41        0.    *    1 JAN 1930   79
2.   *    2 JAN 0500  117         0.
     1 JAN 0045    4        0.    *    1 JAN 1015   42        0.    *    1 JAN 1945   80
2.   *    2 JAN 0515  118         0.
     1 JAN 0100    5        0.    *    1 JAN 1030   43        0.    *    1 JAN 2000   81
2.   *    2 JAN 0530  119         0.
     1 JAN 0115    6        0.    *    1 JAN 1045   44        0.    *    1 JAN 2015   82
1.   *    2 JAN 0545  120         0.
     1 JAN 0130    7        0.    *    1 JAN 1100   45        0.    *    1 JAN 2030   83
1.   *    2 JAN 0600  121         0.
     1 JAN 0145    8        0.    *    1 JAN 1115   46        0.    *    1 JAN 2045   84
1.   *    2 JAN 0615  122         0.
     1 JAN 0200    9        0.    *    1 JAN 1130   47        0.    *    1 JAN 2100   85
1.   *    2 JAN 0630  123         0.
     1 JAN 0215   10        0.    *    1 JAN 1145   48        0.    *    1 JAN 2115   86
1.   *    2 JAN 0645  124         0.
     1 JAN 0230   11        0.    *    1 JAN 1200   49        0.    *    1 JAN 2130   87
1.   *    2 JAN 0700  125         0.
     1 JAN 0245   12        0.    *    1 JAN 1215   50        1.    *    1 JAN 2145   88
1.   *    2 JAN 0715  126         0.
     1 JAN 0300   13        0.    *    1 JAN 1230   51        2.    *    1 JAN 2200   89
1.   *    2 JAN 0730  127         0.
     1 JAN 0315   14        0.    *    1 JAN 1245   52        4.    *    1 JAN 2215   90
1.   *    2 JAN 0745  128         0.
     1 JAN 0330   15        0.    *    1 JAN 1300   53        5.    *    1 JAN 2230   91
1.   *    2 JAN 0800  129         0.
```

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     1 JAN 0345   16          0.   *    1 JAN 1315   54          6.   *    1 JAN 2245   92
1.   *    2 JAN 0815  130          0.
     1 JAN 0400   17          0.   *    1 JAN 1330   55          6.   *    1 JAN 2300   93
1.   *    2 JAN 0830  131          0.
     1 JAN 0415   18          0.   *    1 JAN 1345   56          6.   *    1 JAN 2315   94
1.   *    2 JAN 0845  132          0.
     1 JAN 0430   19          0.   *    1 JAN 1400   57          6.   *    1 JAN 2330   95
1.   *    2 JAN 0900  133          0.
     1 JAN 0445   20          0.   *    1 JAN 1415   58          5.   *    1 JAN 2345   96
1.   *    2 JAN 0915  134          0.
     1 JAN 0500   21          0.   *    1 JAN 1430   59          5.   *    2 JAN 0000   97
1.   *    2 JAN 0930  135          0.
     1 JAN 0515   22          0.   *    1 JAN 1445   60          4.   *    2 JAN 0015   98
1.   *    2 JAN 0945  136          0.
     1 JAN 0530   23          0.   *    1 JAN 1500   61          4.   *    2 JAN 0030   99
1.   *    2 JAN 1000  137          0.
     1 JAN 0545   24          0.   *    1 JAN 1515   62          4.   *    2 JAN 0045  100
1.   *    2 JAN 1015  138          0.
     1 JAN 0600   25          0.   *    1 JAN 1530   63          3.   *    2 JAN 0100  101
1.   *    2 JAN 1030  139          0.
     1 JAN 0615   26          0.   *    1 JAN 1545   64          3.   *    2 JAN 0115  102
1.   *    2 JAN 1045  140          0.
     1 JAN 0630   27          0.   *    1 JAN 1600   65          3.   *    2 JAN 0130  103
1.   *    2 JAN 1100  141          0.
     1 JAN 0645   28          0.   *    1 JAN 1615   66          3.   *    2 JAN 0145  104
0.   *    2 JAN 1115  142          0.
     1 JAN 0700   29          0.   *    1 JAN 1630   67          3.   *    2 JAN 0200  105
0.   *    2 JAN 1130  143          0.
     1 JAN 0715   30          0.   *    1 JAN 1645   68          2.   *    2 JAN 0215  106
0.   *    2 JAN 1145  144          0.
     1 JAN 0730   31          0.   *    1 JAN 1700   69          2.   *    2 JAN 0230  107
0.   *    2 JAN 1200  145          0.
     1 JAN 0745   32          0.   *    1 JAN 1715   70          2.   *    2 JAN 0245  108
0.   *    2 JAN 1215  146          0.
     1 JAN 0800   33          0.   *    1 JAN 1730   71          2.   *    2 JAN 0300  109
0.   *    2 JAN 1230  147          0.
     1 JAN 0815   34          0.   *    1 JAN 1745   72          2.   *    2 JAN 0315  110
0.   *    2 JAN 1245  148          0.
     1 JAN 0830   35          0.   *    1 JAN 1800   73          2.   *    2 JAN 0330  111
0.   *    2 JAN 1300  149          0.
     1 JAN 0845   36          0.   *    1 JAN 1815   74          2.   *    2 JAN 0345  112
0.   *    2 JAN 1315  150          0.
     1 JAN 0900   37          0.   *    1 JAN 1830   75          2.   *    2 JAN 0400  113
0.   *
     1 JAN 0915   38          0.   *    1 JAN 1845   76          2.   *    2 JAN 0415  114
0.   *
                                  *                                  *
*
*****************************************************************************************
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  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR        72-HR       37.25-HR
+   (CFS)        (HR)
                              (CFS)
+       6.       13.50                    4.           1.           1.           1.
                           (INCHES)    0.186        0.271        0.271        0.271
                            (AC-FT)       2.           3.           3.           3.

                           CUMULATIVE AREA =     0.18 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
*** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
   41 KK    *     CELL1  *
            *            *
            **************

   42 KO          OUTPUT CONTROL VARIABLES
                        IPRNT          0  PRINT CONTROL
                        IPLOT          0  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE
                        IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                         IOUT         22  SAVE HYDROGRAPH ON THIS UNIT
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                    ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2        150  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT      0.250  TIME INTERVAL IN HOURS

  45 IN          TIME DATA FOR INPUT TIME SERIES
                    JXMIN          6  TIME INTERVAL IN MINUTES
                   JXDATE     1JAN94  STARTING DATE
                   JXTIME          0  STARTING TIME

              SUBBASIN RUNOFF DATA

  43 BA          SUBBASIN CHARACTERISTICS
                    TAREA,       0.17  SUBBASIN AREA

                PRECIPITATION DATA

  44 PB              STORM       2.08  BASIN TOTAL PRECIPITATION

  46 PI            INCREMENTAL PRECIPITATION PATTERN
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.01      0.01
                    0.01      0.01      0.01      0.01      0.01      0.01      0.01
0.01      0.01      0.01
                    0.01      0.01      0.01      0.02      0.02      0.03      0.11
0.27      0.04      0.03
                    0.02      0.02      0.01      0.01      0.01      0.01      0.01
0.01      0.01      0.01
                    0.01      0.01      0.01      0.01      0.01      0.01      0.01
0.01      0.01      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00

  71 LS          SCS LOSS RATE
                    STRTL       0.86  INITIAL ABSTRACTION
                   CRVNBR      70.00  CURVE NUMBER
                    RTIMP       0.00  PERCENT IMPERVIOUS AREA

  72 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG       1.00  LAG

                                                                    ***

                                                          UNIT HYDROGRAPH
                                                     22 END-OF-PERIOD ORDINATES
                 9.        28.       56.       72.       72.       61.       45.
30.       20.       15.
                10.        7.        5.        3.        2.        2.        1.
1.        1.        0.
                 0.        0.

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                                                HYDROGRAPH AT STATION    CELL1

*****************************************************************************************
*******************************************
                                                                          *
       DA MON HRMN  ORD    RAIN    LOSS  EXCESS     COMP Q                *       DA MON HRMN
ORD    RAIN    LOSS  EXCESS     COMP Q                                    *
                                                                          *
        1 JAN 0000    1    0.00    0.00    0.00         0.                *        1 JAN 1845
76    0.01    0.01    0.00         2.
        1 JAN 0015    2    0.01    0.01    0.00         0.                *        1 JAN 1900
77    0.01    0.01    0.00         2.
        1 JAN 0030    3    0.01    0.01    0.00         0.                *        1 JAN 1915
78    0.01    0.01    0.00         1.
        1 JAN 0045    4    0.01    0.01    0.00         0.                *        1 JAN 1930
79    0.01    0.00    0.00         1.
        1 JAN 0100    5    0.01    0.01    0.00         0.                *        1 JAN 1945
80    0.01    0.00    0.00         1.
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	1	JAN	0115	6	0.01	0.01	0.00	0.	*	1 JAN 2000
81	0.01	0.00	0.00			1.				
	1	JAN	0130	7	0.01	0.01	0.00	0.	*	1 JAN 2015
82	0.01	0.00	0.00			1.				
	1	JAN	0145	8	0.01	0.01	0.00	0.	*	1 JAN 2030
83	0.01	0.00	0.00			1.				
	1	JAN	0200	9	0.01	0.01	0.00	0.	*	1 JAN 2045
84	0.01	0.00	0.00			1.				
	1	JAN	0215	10	0.01	0.01	0.00	0.	*	1 JAN 2100
85	0.01	0.00	0.00			1.				
	1	JAN	0230	11	0.01	0.01	0.00	0.	*	1 JAN 2115
86	0.01	0.00	0.00			1.				
	1	JAN	0245	12	0.01	0.01	0.00	0.	*	1 JAN 2130
87	0.01	0.00	0.00			1.				
	1	JAN	0300	13	0.01	0.01	0.00	0.	*	1 JAN 2145
88	0.01	0.00	0.00			1.				
	1	JAN	0315	14	0.01	0.01	0.00	0.	*	1 JAN 2200
89	0.01	0.00	0.00			1.				
	1	JAN	0330	15	0.01	0.01	0.00	0.	*	1 JAN 2215
90	0.01	0.00	0.00			1.				
	1	JAN	0345	16	0.01	0.01	0.00	0.	*	1 JAN 2230
91	0.01	0.00	0.00			1.				
	1	JAN	0400	17	0.01	0.01	0.00	0.	*	1 JAN 2245
92	0.01	0.00	0.00			1.				
	1	JAN	0415	18	0.01	0.01	0.00	0.	*	1 JAN 2300
93	0.01	0.00	0.00			1.				
	1	JAN	0430	19	0.01	0.01	0.00	0.	*	1 JAN 2315
94	0.01	0.00	0.00			1.				
	1	JAN	0445	20	0.01	0.01	0.00	0.	*	1 JAN 2330
95	0.01	0.00	0.00			1.				
	1	JAN	0500	21	0.01	0.01	0.00	0.	*	1 JAN 2345
96	0.01	0.00	0.00			1.				
	1	JAN	0515	22	0.01	0.01	0.00	0.	*	2 JAN 0000
97	0.01	0.00	0.00			1.				
	1	JAN	0530	23	0.01	0.01	0.00	0.	*	2 JAN 0015
98	0.00	0.00	0.00			1.				
	1	JAN	0545	24	0.01	0.01	0.00	0.	*	2 JAN 0030
99	0.00	0.00	0.00			1.				
	1	JAN	0600	25	0.01	0.01	0.00	0.	*	2 JAN 0045
100	0.00	0.00	0.00			1.				
	1	JAN	0615	26	0.01	0.01	0.00	0.	*	2 JAN 0100
101	0.00	0.00	0.00			1.				
	1	JAN	0630	27	0.01	0.01	0.00	0.	*	2 JAN 0115
102	0.00	0.00	0.00			0.				
	1	JAN	0645	28	0.01	0.01	0.00	0.	*	2 JAN 0130
103	0.00	0.00	0.00			0.				
	1	JAN	0700	29	0.01	0.01	0.00	0.	*	2 JAN 0145
104	0.00	0.00	0.00			0.				
	1	JAN	0715	30	0.01	0.01	0.00	0.	*	2 JAN 0200
105	0.00	0.00	0.00			0.				
	1	JAN	0730	31	0.01	0.01	0.00	0.	*	2 JAN 0215
106	0.00	0.00	0.00			0.				
	1	JAN	0745	32	0.01	0.01	0.00	0.	*	2 JAN 0230
107	0.00	0.00	0.00			0.				
	1	JAN	0800	33	0.01	0.01	0.00	0.	*	2 JAN 0245
108	0.00	0.00	0.00			0.				
	1	JAN	0815	34	0.01	0.01	0.00	0.	*	2 JAN 0300
109	0.00	0.00	0.00			0.				
	1	JAN	0830	35	0.01	0.01	0.00	0.	*	2 JAN 0315
110	0.00	0.00	0.00			0.				
	1	JAN	0845	36	0.01	0.01	0.00	0.	*	2 JAN 0330
111	0.00	0.00	0.00			0.				
	1	JAN	0900	37	0.02	0.02	0.00	0.	*	2 JAN 0345
112	0.00	0.00	0.00			0.				
	1	JAN	0915	38	0.02	0.02	0.00	0.	*	2 JAN 0400
113	0.00	0.00	0.00			0.				
	1	JAN	0930	39	0.02	0.02	0.00	0.	*	2 JAN 0415
114	0.00	0.00	0.00			0.				
	1	JAN	0945	40	0.02	0.02	0.00	0.	*	2 JAN 0430
115	0.00	0.00	0.00			0.				
	1	JAN	1000	41	0.02	0.02	0.00	0.	*	2 JAN 0445
116	0.00	0.00	0.00			0.				
	1	JAN	1015	42	0.02	0.02	0.00	0.	*	2 JAN 0500
117	0.00	0.00	0.00			0.				
	1	JAN	1030	43	0.03	0.03	0.00	0.	*	2 JAN 0515
118	0.00	0.00	0.00			0.				
	1	JAN	1045	44	0.03	0.03	0.00	0.	*	2 JAN 0530
119	0.00	0.00	0.00			0.				
	1	JAN	1100	45	0.03	0.03	0.00	0.	*	2 JAN 0545
120	0.00	0.00	0.00			0.				

```
        1 JAN 1115   46    0.04    0.04    0.00          0.        *        2 JAN 0600
121    0.00    0.00    0.00          0.
        1 JAN 1130   47    0.06    0.06    0.00          0.        *        2 JAN 0615
122    0.00    0.00    0.00          0.
        1 JAN 1145   48    0.23    0.23    0.00          0.        *        2 JAN 0630
123    0.00    0.00    0.00          0.
        1 JAN 1200   49    0.56    0.51    0.06          0.        *        2 JAN 0645
124    0.00    0.00    0.00          0.
        1 JAN 1215   50    0.09    0.07    0.02          2.        *        2 JAN 0700
125    0.00    0.00    0.00          0.
        1 JAN 1230   51    0.06    0.05    0.01          4.        *        2 JAN 0715
126    0.00    0.00    0.00          0.
        1 JAN 1245   52    0.04    0.03    0.01          6.        *        2 JAN 0730
127    0.00    0.00    0.00          0.
        1 JAN 1300   53    0.04    0.03    0.01          7.        *        2 JAN 0745
128    0.00    0.00    0.00          0.
        1 JAN 1315   54    0.03    0.02    0.01          7.        *        2 JAN 0800
129    0.00    0.00    0.00          0.
        1 JAN 1330   55    0.03    0.02    0.01          6.        *        2 JAN 0815
130    0.00    0.00    0.00          0.
        1 JAN 1345   56    0.02    0.02    0.01          6.        *        2 JAN 0830
131    0.00    0.00    0.00          0.
        1 JAN 1400   57    0.02    0.01    0.01          5.        *        2 JAN 0845
132    0.00    0.00    0.00          0.
        1 JAN 1415   58    0.02    0.01    0.01          4.        *        2 JAN 0900
133    0.00    0.00    0.00          0.
        1 JAN 1430   59    0.02    0.01    0.01          4.        *        2 JAN 0915
134    0.00    0.00    0.00          0.
        1 JAN 1445   60    0.02    0.01    0.01          4.        *        2 JAN 0930
135    0.00    0.00    0.00          0.
        1 JAN 1500   61    0.02    0.01    0.01          3.        *        2 JAN 0945
136    0.00    0.00    0.00          0.
        1 JAN 1515   62    0.02    0.01    0.00          3.        *        2 JAN 1000
137    0.00    0.00    0.00          0.
        1 JAN 1530   63    0.01    0.01    0.00          3.        *        2 JAN 1015
138    0.00    0.00    0.00          0.
        1 JAN 1545   64    0.01    0.01    0.00          3.        *        2 JAN 1030
139    0.00    0.00    0.00          0.
        1 JAN 1600   65    0.01    0.01    0.00          2.        *        2 JAN 1045
140    0.00    0.00    0.00          0.
        1 JAN 1615   66    0.01    0.01    0.00          2.        *        2 JAN 1100
141    0.00    0.00    0.00          0.
        1 JAN 1630   67    0.01    0.01    0.00          2.        *        2 JAN 1115
142    0.00    0.00    0.00          0.
        1 JAN 1645   68    0.01    0.01    0.00          2.        *        2 JAN 1130
143    0.00    0.00    0.00          0.
        1 JAN 1700   69    0.01    0.01    0.00          2.        *        2 JAN 1145
144    0.00    0.00    0.00          0.
        1 JAN 1715   70    0.01    0.01    0.00          2.        *        2 JAN 1200
145    0.00    0.00    0.00          0.
        1 JAN 1730   71    0.01    0.01    0.00          2.        *        2 JAN 1215
146    0.00    0.00    0.00          0.
        1 JAN 1745   72    0.01    0.01    0.00          2.        *        2 JAN 1230
147    0.00    0.00    0.00          0.
        1 JAN 1800   73    0.01    0.01    0.00          2.        *        2 JAN 1245
148    0.00    0.00    0.00          0.
        1 JAN 1815   74    0.01    0.01    0.00          2.        *        2 JAN 1300
149    0.00    0.00    0.00          0.
        1 JAN 1830   75    0.01    0.01    0.00          2.        *        2 JAN 1315
150    0.00    0.00    0.00          0.
                                                                   *

*****************************************************************************************
*****************************************

     TOTAL RAINFALL =    2.08, TOTAL LOSS =    1.81, TOTAL EXCESS =    0.27

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR        72-HR      37.25-HR
+   (CFS)        (HR)
                              (CFS)
+       7.       13.25                    3.           1.           1.           1.
                           (INCHES)    0.191        0.271        0.271        0.271
                            (AC-FT)       2.           2.           2.           2.

                           CUMULATIVE AREA =    0.17 SQ MI
```

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

            ***************
            *             *
  73 KK     *        1R   *        CNAME      1C
            *             *
            ***************

  74 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           0  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                       IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                        IOUT          22  SAVE HYDROGRAPH ON THIS UNIT
                       ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                       ISAV2         150  LAST ORDINATE PUNCHED OR SAVED
                      TIMINT       0.250  TIME INTERVAL IN HOURS

               HYDROGRAPH ROUTING DATA

  75 RN          NO ROUTING
                                                                    ***

*****************************************************************************************
*******************************************

                                                  HYDROGRAPH AT STATION       1R

*****************************************************************************************
*******************************************
                                    *                                   *
*
    DA MON HRMN  ORD       FLOW     *   DA MON HRMN  ORD       FLOW     *   DA MON HRMN  ORD
FLOW    *   DA MON HRMN  ORD         FLOW
                                    *                                   *
*
     1 JAN 0000    1         0.     *    1 JAN 0930   39         0.     *    1 JAN 1900   77
2.   *    2 JAN 0430  115           0.
     1 JAN 0015    2         0.     *    1 JAN 0945   40         0.     *    1 JAN 1915   78
1.   *    2 JAN 0445  116           0.
     1 JAN 0030    3         0.     *    1 JAN 1000   41         0.     *    1 JAN 1930   79
1.   *    2 JAN 0500  117           0.
     1 JAN 0045    4         0.     *    1 JAN 1015   42         0.     *    1 JAN 1945   80
1.   *    2 JAN 0515  118           0.
     1 JAN 0100    5         0.     *    1 JAN 1030   43         0.     *    1 JAN 2000   81
1.   *    2 JAN 0530  119           0.
     1 JAN 0115    6         0.     *    1 JAN 1045   44         0.     *    1 JAN 2015   82
1.   *    2 JAN 0545  120           0.
     1 JAN 0130    7         0.     *    1 JAN 1100   45         0.     *    1 JAN 2030   83
1.   *    2 JAN 0600  121           0.
     1 JAN 0145    8         0.     *    1 JAN 1115   46         0.     *    1 JAN 2045   84
1.   *    2 JAN 0615  122           0.
     1 JAN 0200    9         0.     *    1 JAN 1130   47         0.     *    1 JAN 2100   85
1.   *    2 JAN 0630  123           0.
     1 JAN 0215   10         0.     *    1 JAN 1145   48         0.     *    1 JAN 2115   86
1.   *    2 JAN 0645  124           0.
     1 JAN 0230   11         0.     *    1 JAN 1200   49         0.     *    1 JAN 2130   87
1.   *    2 JAN 0700  125           0.
     1 JAN 0245   12         0.     *    1 JAN 1215   50         2.     *    1 JAN 2145   88
1.   *    2 JAN 0715  126           0.
     1 JAN 0300   13         0.     *    1 JAN 1230   51         4.     *    1 JAN 2200   89
1.   *    2 JAN 0730  127           0.
     1 JAN 0315   14         0.     *    1 JAN 1245   52         6.     *    1 JAN 2215   90
1.   *    2 JAN 0745  128           0.
     1 JAN 0330   15         0.     *    1 JAN 1300   53         7.     *    1 JAN 2230   91
1.   *    2 JAN 0800  129           0.
     1 JAN 0345   16         0.     *    1 JAN 1315   54         7.     *    1 JAN 2245   92
1.   *    2 JAN 0815  130           0.
     1 JAN 0400   17         0.     *    1 JAN 1330   55         6.     *    1 JAN 2300   93
1.   *    2 JAN 0830  131           0.
     1 JAN 0415   18         0.     *    1 JAN 1345   56         6.     *    1 JAN 2315   94
1.   *    2 JAN 0845  132           0.
     1 JAN 0430   19         0.     *    1 JAN 1400   57         5.     *    1 JAN 2330   95
1.   *    2 JAN 0900  133           0.
```

```
     1 JAN 0445   20          0.   *    1 JAN 1415   58          4.   *    1 JAN 2345   96
1.   *    2 JAN 0915  134          0.
     1 JAN 0500   21          0.   *    1 JAN 1430   59          4.   *    2 JAN 0000   97
1.   *    2 JAN 0930  135          0.
     1 JAN 0515   22          0.   *    1 JAN 1445   60          4.   *    2 JAN 0015   98
1.   *    2 JAN 0945  136          0.
     1 JAN 0530   23          0.   *    1 JAN 1500   61          3.   *    2 JAN 0030   99
1.   *    2 JAN 1000  137          0.
     1 JAN 0545   24          0.   *    1 JAN 1515   62          3.   *    2 JAN 0045  100
1.   *    2 JAN 1015  138          0.
     1 JAN 0600   25          0.   *    1 JAN 1530   63          3.   *    2 JAN 0100  101
1.   *    2 JAN 1030  139          0.
     1 JAN 0615   26          0.   *    1 JAN 1545   64          3.   *    2 JAN 0115  102
0.   *    2 JAN 1045  140          0.
     1 JAN 0630   27          0.   *    1 JAN 1600   65          2.   *    2 JAN 0130  103
0.   *    2 JAN 1100  141          0.
     1 JAN 0645   28          0.   *    1 JAN 1615   66          2.   *    2 JAN 0145  104
0.   *    2 JAN 1115  142          0.
     1 JAN 0700   29          0.   *    1 JAN 1630   67          2.   *    2 JAN 0200  105
0.   *    2 JAN 1130  143          0.
     1 JAN 0715   30          0.   *    1 JAN 1645   68          2.   *    2 JAN 0215  106
0.   *    2 JAN 1145  144          0.
     1 JAN 0730   31          0.   *    1 JAN 1700   69          2.   *    2 JAN 0230  107
0.   *    2 JAN 1200  145          0.
     1 JAN 0745   32          0.   *    1 JAN 1715   70          2.   *    2 JAN 0245  108
0.   *    2 JAN 1215  146          0.
     1 JAN 0800   33          0.   *    1 JAN 1730   71          2.   *    2 JAN 0300  109
0.   *    2 JAN 1230  147          0.
     1 JAN 0815   34          0.   *    1 JAN 1745   72          2.   *    2 JAN 0315  110
0.   *    2 JAN 1245  148          0.
     1 JAN 0830   35          0.   *    1 JAN 1800   73          2.   *    2 JAN 0330  111
0.   *    2 JAN 1300  149          0.
     1 JAN 0845   36          0.   *    1 JAN 1815   74          2.   *    2 JAN 0345  112
0.   *    2 JAN 1315  150          0.
     1 JAN 0900   37          0.   *    1 JAN 1830   75          2.   *    2 JAN 0400  113
0.   *
     1 JAN 0915   38          0.   *    1 JAN 1845   76          2.   *    2 JAN 0415  114
0.   *
                                   *                                   *
*

*******************************************************************************************
*******************************************

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR      37.25-HR
+   (CFS)        (HR)
                              (CFS)
+       7.      13.25                     3.          1.          1.           1.
                           (INCHES)   0.191       0.271       0.271        0.271
                            (AC-FT)      2.          2.          2.           2.

                           CUMULATIVE AREA =    0.17 SQ MI
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

BASIN AREA	MAXIMUM OPERATION STAGE	TIME OF MAX STAGE	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR
+								
+ 0.18	HYDROGRAPH AT		CELL2	6.	13.50	4.	1.	1.
+ 0.18	ROUTED TO		2R	6.	13.50	4.	1.	1.
+ 0.17	HYDROGRAPH AT		CELL1	7.	13.25	3.	1.	1.
+ 0.17	ROUTED TO		1R	7.	13.25	3.	1.	1.

*** NORMAL END OF HEC-1 ***

peak discharge (cfs) for largest tributary area in each respective cell.

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APPENDIX 6.4 – Sump Capacity Calculations

Section 6 Engineering Report

6.1 General Cell Design

Cells designs and plans are shown on Exhibits 1 through 5. These plans various elements of landfill and cell design, include slopes, acreages, lined areas, leachate drainage systems, and berms.

6.2 Liners and Leachate Collection

6.2.1 Leachate Generation

During the active life of the landfill, leachate generation rates are primarily related to the precipitation occurring on the landfill cells from individual storm events and annual patterns. The proposed landfill is located in a somewhat arid climate, with 12.5 inches of annual precipitation. The 25-year/24-hour storm event produces approximately 2.08 inches of rainfall. LCRS pipe diameters and spacing are typically designed using either (1) 30 to 50 percent of the annual precipitation, expressed as an intensity (i.e., cm/day), (2) 25 percent of the wettest week rainfall, or (3) waste drainage rates from the Hydrologic Evaluation of Landfill Performance (HELP) model. By considering impingement rates using 40 percent of the annual precipitation as well as the 25-year/24-hour storm intensity, the leachate drainage and removal systems were designed.

6.2.2 Leachate Collection and Removal System (LCRS)

Leachate is formed as precipitation and rainfall infiltrates through the waste. The generated leachate needs to be drained from the landfill cells in a timely fashion throughout the life of the landfill.

Components of the LCRS include slope and sub-floor grading designs; pipe configurations, alignments, sizes, and materials; drainage layer components and configurations; leachate collection evaporation sumps/ponds; and barrier layers as described below.

State regulations and Subtitle D of the Resource Conservation and Recovery Act (RCRA) dictate the minimum requirements for MSW liner systems. Liners and Leachate Collection and Removal Systems will be used to prevent that contamination of underlying groundwater does not occur under the site. Cells requiring lining will be lined and have an LCRS installed. Any leachate evaporation ponds constructed outside of cell unit boundaries will also be lined to prevent intrusion of contaminated leachate into the groundwater.

The exhibits illustrating the subgrade design indicate a longitudinal slope (i.e., in the direction of the perforated leachate collection pipes) of 1 percent. Calculations in Appendix 6.3 demonstrate that this slope is hydraulically

sufficient to convey the required flow rates of leachate towards the sumps and risers. It should be noted that the contours shown on 2A and 2B represent pre-consolidation contours (i.e., constructed contours). This was done so that the appropriate post-consolidation separation between liner and historic high groundwater is provided, and to estimate earth cut/fill volumes and quantities. Since it is the *post-consolidated* slope that needs to be 1 percent (minimum), and since settling magnitudes are a function of fill depth, the *constructed* contours shown on Exhibits 2A and 2B indicate pipe slopes *greater* than 1 percent. In some areas, constructed slopes are actually near 2 percent.

Additionally, and as mentioned in the Groundwater/Liner Clearance portion of this section, the maximum consolidation percent was used to design the subgrade of the unit cells. By using this conservative approach, and since settling is a function of fill depth, consolidations less than the incorporated assumed maximum would produced final grades less than 2 percent, but greater than 1 percent.

Following a more detailed design, it is recommended that a CQA/CQC plan be developed and followed to produced the required constructed slopes such that the post-consolidated slopes will be no less than 1 percent.

A composite liner and liquid barrier system is proposed for the landfill, which will utilize a plastic HDPE Flexible Membrane Liner (FML), also referred to as a geomembrane (GM). This geomembrane will be 60 mils thick. Additionally, a bentonite-based Geosynthetic/Geocomposite Clay Liner (GCL) will be used. GCLs, when hydrated, swell and pinch off potential leaks or pinholes in the GM and help intrusion of leachate into the groundwater. In addition to many key advantages that GCL solutions provide over traditional Compacted Clay Liners (CCL), GCL liners typically result in tested hydraulic conductivities of $5x10^{-9}$ cm/sec, much less than the required $1x10^{-7}$ cm/sec. Several features, product descriptions, and properties of one such recommended GCL manufactured by CETCO (Bentomat SDN) are included in Appendix 6.1. In short, Bentomat SDN is a reinforced needlepunched GCL involving a sodium bentonite layer encased in two nonwoven geotextiles.

Some concern regarding high-TDS soils have been expressed relative to the performance of a GCL. CETCO has performed a permeability test on a standard GCL manufactured by CETCO (i.e., Bentomat SDN). The test was ran for over 30 days with a leachate solution created from an onsite soil sample. This test showed continued performance and sufficiently low permeability, even with a standard GCL product (as opposed to the available "contaminant-resistant" products). A memo issued by CETCO can also be found in Appendix 6.1, and indicates the testing procedures and standards used to evaluate the product performance and suitability for the proposed landfill application. This document indicates that a stable hydraulic conductivity was achieved after 10 days, despite the fact that the test continued to run for 30 days. The CETCO permeability test results can be found in Appendix 6.1. It is noted and understood that the synthetic leachate created was from near-surface soils. Also as stated in the memo, "CETCO understands that the soil tested for compatibility may differ from site soil encountered when excavation at the project begins. Should there be concern regarding the compatibility of these soils, CETCO recommends performing

another compatibility test in the same manner as the first test performed." During correspondence with CETCO, it has been indicated that regardless of the soil types encountered at various depths and in various locations, an appropriate and suitable product match can be made. It is the recommendation and commitment of this permit application that the selection of an appropriate GCL liner product is to be reviewed and approved by the State Division of Solid and Hazardous Waste at such time when representative soils from greater depths can be obtained. At that time, the appropriate criteria for the selection and testing of a potential GCL product will be recommended and approved by both the manufacturer and the Division of Solid and Hazardous Waste.

Geotextile filter fabrics will also be used where appropriate, as shown on the accompanying exhibits, to prevent the intrusion of soil and fines into liner and/or drainage systems. This barrier system to be installed on the sub-floor of the lined unit cells will result in a hydraulic conductivity/permeability of less than $1x10^{-7}$ cm/s (see Section 5 for additional information on the water balance/HELP modeling).

Sumps (low-spots, and eventually risers in their stead), as well as cleanouts, will be located as shown on the plans to allow improved air flow, the collection or pumped elimination of leachate, and cleanout access. Collected leachate will be stored in an interior pond/sump area inside of the unit cell boundaries until such time as evaporation pond needs to be constructed outside of the lined unit boundary. These intra-cell leachate evaporation ponds will collect and evaporate leachate. Potential evaporation in the region is a function of climate, and is estimated at 45 inches per year (McCuen 774, Haan et al 33, Wanielista et al 124). Collected leachate that is not evaporated may be recirculated and used for fugitive dust control inside of the lined areas.

Intra-cell sumps (surface impoundments) have been incorporated into the conceptual design. These sumps are and will be designed to contain 100 percent of the runoff from a 25-year 24-hour storm event (2.08 inches of rainfall, see Exhibit 10 and Appendix 6.4) for 100 percent of the tributary area to each sump. This is appropriate, and perhaps conservative, since in the early stages of site development the entire tributary area will not be lined. Having no or little waste placed at that time, the available volume is in excess of that required. In later phases of waste placement, the full tributary area will drain to the sumps. Additionally, when the sump is covered over with trash, the capacity of the sump will be decreased by 40% to 50% as it will be filled with gravel. However, additional time delays, absorption, abstractions, and evaporation will significantly detain and/or reduce the volume of leachate. These sumps that have been converted to gravel-filled sumps/risers will also have the ability to pump leachate out as necessary for recirculation onto the cells or into another evaporation pond

As a result, it was determined that the volumes listed in Appendix 6.4 are appropriate for the worst-case scenarios, which would include a 25-year 24-hour precipitation event during a Spring warm spell with snow on the ground.

Accumulated leachate in excess of sump capacities will be pumped and used for intra-cell dust control and/or recirculated onto the waste.

Also as shown in Exhibit 9, the intra-cell surface impoundments will be converted to risers and buried at an appropriate time. Leachate will be pumped as necessary from the sumps back onto open portions of the landfill or into surface impoundments outside the cells. Leachate evaporation ponds outside of the lined unit cell boundaries are not anticipated for at least the first permit period of five years. Concepts and details regarding a pond outside the cell is found as Exhibit 11 to this application. The concept includes an allowance for an acceptable leak detection and removal system in the form of a sump at one corner of the pond. Any water leaking through the primary barrier layer is collected in a geonet drainage layer which also functions as a headbreak. Either regular visual inspections and monitoring and/or another electronic system would be necessary to indicate the presence of leakage, and to ensure that they leak detection systems (devices, and pumps) are in proper functioning order. This would apply to both operational and post-closure periods. It is noted that the pond system, along with the leak detection methods, will require review and approval from both the groundwater section of the Division of Water Quality and the Division of Solid and Hazardous Waste.

This drawing illustrates a pond capable of containing over 8 acre-feet at a depth of 4 feet.

Calculations to support the proposed conceptual designs are contained in Appendix 6.3 and 6.4. Exhibits 1, 2, and 7, as well as the maps in Section 4, show the lined unit boundaries of each cell, as well as liner cross-sections, materials, configuration, and sub-grade drainage and pipe slopes. Exhibit 5 and 9 shows the conceptual design for the intra-cell sumps.

6.2.3 Groundwater/Liner Clearance

To comply with the State rules and regulations, the elevations of the lowest liner must be 5 feet higher than the historic high groundwater elevations for areas with TDS lower than 10,000 mg/L. For areas having TDS levels equal to or over 10,000 mg/L, this restriction does not apply. TDS levels were sampled and measured by the geotechnical engineer at a variety of locations and times (from May 2003 to April 2004) (see Appendix 2.7). Based on a GIS-based geostatisitcal analysis using all of these data points, Figure 1 shows the limits and areas both above and below 10,000 mg/L of TDS. The GIS analysis employs the "tension spline" interpolative algorithm which utilized the average TDS levels from the six boreholes containing TDS data. Conceptually, this method of general purpose interpolation fits a minimum-curvature surface through the input points, and ensures that the data points themselves are represented in the surface (similar to bending a sheet of rubber to pass through the specified points).

This specific algorithm is ideally suited for varying surfaces such as elevation, water table, or pollution concentrations. The default GIS values for tension weight and number of points per region of 0.1 and 12 were used respectively.

As per R315-302-1(2)(e)(i)(C), "if the *aquifer* beneath a landfill contains ground water which has a Total Dissolved Solids (TDS) of 10,000 mg/L or greater and the landfill is constructed with a composite liner, the bottom of the lowest liner may be less than five feet above the historical high level of

ground water" (italics added). For this facility, the facility does employ a composite liner and the aquifer (as a whole) beneath the landfill (as a whole) does indeed contain waters exceeding TDS levels of 10,000 mg/L. However, the conservative assumption was made that the should the *areas* beneath any part of the landfill contain waters of less than 10,000 mg/L, then the 5 foot separation would be employed.

Despite the fact that some of the northeast areas of Cell 1 are not below interpolated 10,000 mg/L TDS boundary, a more conservative approach was taken – that is, the entire Cell 1 unit was considered as if the interpolated TDS levels were below 10,000 mg/L.

As a result, the consolidated sub-floor for Cell 1 was set 5 ft higher than historic high groundwater for post-consolidated conditions, and is illustrated on Exhibit 7. It should be noted that the separation between the elevation of the lowest liner and the historic high groundwater is considered conservative for two reasons.

First, as per the geotechnical report, consolidation depths were indicated at 1-2 percent and 2-3 percent of the fill depth for the western and eastern portions of the site respectively. The proposed subgrade elevations use the maximum of these number ranges (i.e., 2 percent for the 1-2 range, and 3 percent for the 2-3 range). Should the ultimate consolidation be less than this maximum, a separation greater than 5 feet between liners and historic high groundwater will exist.

Second, the vast majority of Cell 1 areas have greater separations than 5 feet. It is only in the controlling area(s) where the distance from liner to historic high groundwater is minimal that the 5 foot separation was employed.

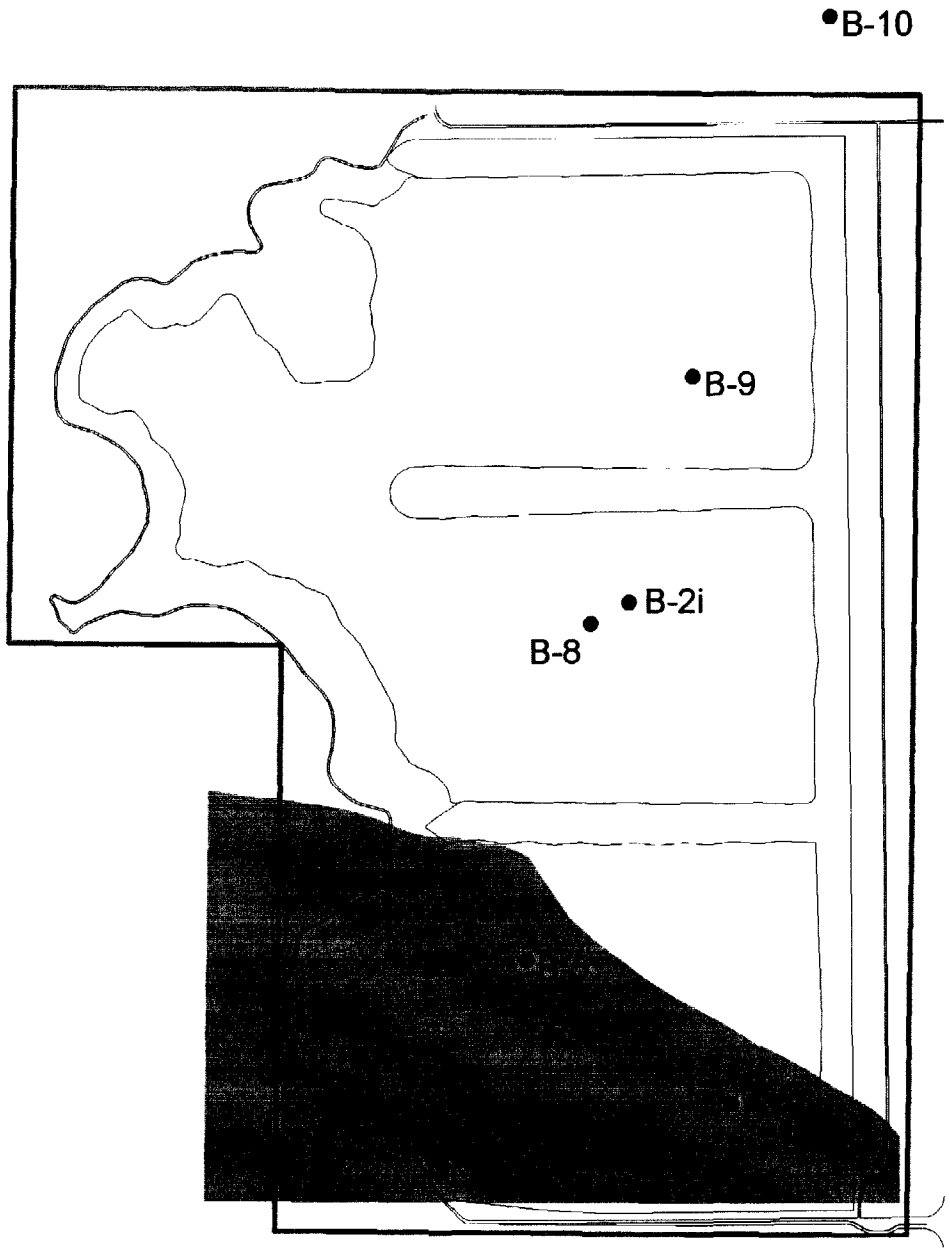


Figure 1. Shading showing portions of site with TDS values 10,000 mg/L and less.

6.3 Storm and Surface Water Management

Utah Administrative Code R315-303, Landfilling Standards, requires:

"...designing the landfill to prevent run-on of all surface waters resulting from a maximum flow of a 25-year storm into the active area of the landfill."

6.3.1 Storm Water Runon and Runoff

The site is located along the base of the Lakeside Mountains and storm water generally would flow into natural drainages observed at the site. Water will flow down the canyons on the west side of the site, and into a perimeter diversion ditch parallel to the proposed western access road (shown on Exhibit 1). This ditch will be designed and constructed to divert and convey this stormwater around the landfill area. To estimate the quantity of surface water run-on to the site a HEC-HMS/HEC-1 Hydrologic Model was used to determine peak flows and total run-on volume for each canyon. HEC-HMS/HEC-1 are precipitation-response models which estimate runoff rates and volumes due to design storm events. Figure 2 shows the location of the drainage basins and drainages that contribute to the storm water run-on to the site. The peak discharge from drainage basins A through C will be diverted using a perimeter diversion ditch. The natural channel for water from drainage basin D concentrates its flows in the southwest corner of the site boundary, and will be diverted as appropriate away from the landfill site.

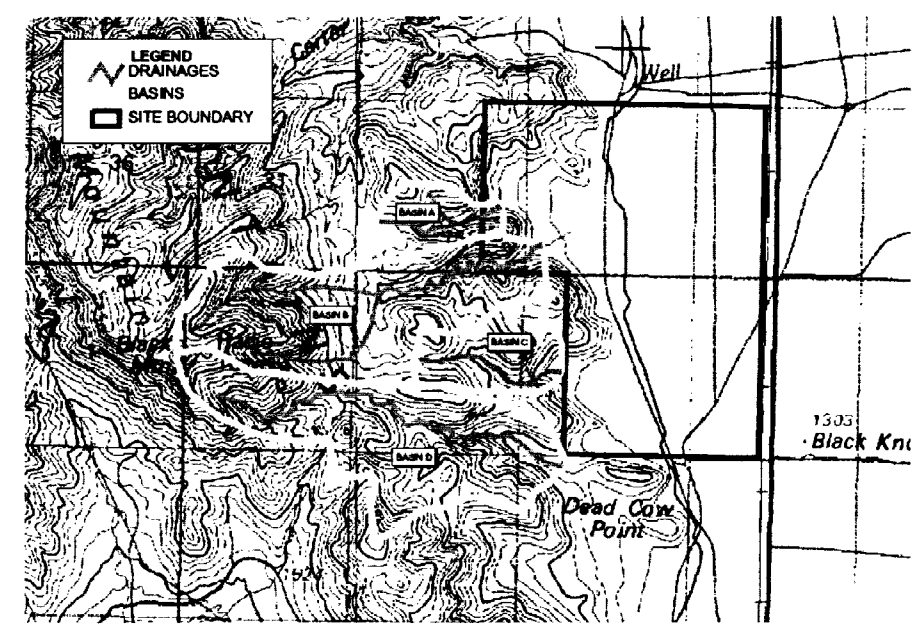


Figure 2. Hydrologic Modeling Areas

The 25-year/24-hour storm event produces 2.08 inches of rainfall. Table 1 shows the hydrologic modeling results for each canyon. Since basins A and B drain northward in the perimeter ditch, and basin C drains south, the HEC-1 model was set up using drainage areas of 919 and 224 acres respectively, and by using a Composite Curve Number (CCN) of 75 and an estimated lagtime of 1-hour (estimated to be conservative). The CCN represents that infiltrative characteristics of the soils, and is the most standard method of estimating how much rainfall infiltrates into the soil and how much becomes excess runoff. The lagtime determines the shape and magnitude of peak discharge associated with the runoff hydrograph. It is related to the time of concentration, which describes how fast the water from the overall watershed is able to make it to the drainage outlets at the perimeter road. Peak discharges of 121 and 32 cfs were reported from the models runs for the north and south areas respectively, with model calculations contained in Appendix 5.7.

Table 1. Hydrologic Modeling Results

Basin	Area (acres)	Peak Discharge (cfs)	Total Volume (ac-ft)
A	149	49	5
B	770	106	24
C	224	63	7
D	734	97	23
Total	**1,877**	**315**	**59**

A stormwater interception and diversion ditch to be located on the west side of the perimeter road was designed to handle flows of up to 140 cfs (hydraulic and hydrologic calculations in Appendix 5.7, with Exhibit 5 showing the proposed cross-sections of this ditch.), dependent on slope. The hydraulic calculations in Appendix 5.7 are based on Manning's equation for uniform flow and normal depth. Uniform flow conditions result in the normal depth, which is the depth of flow that the water tends to flow at given sufficient channel length for the gravitational and friction forces to balance. Uniform flow calculations are standard for most applications. A Manning's roughness value of n = 0.035 was used for ditch sections without riprap, such as the portions near 1 percent slope and hence slower velocities. For the areas with slopes of up to 8 percent, velocities are such that riprap armoring is recommended, and a roughness value of 0.045 was used for these areas. The calculations list the flow rate and velocity for a given cross-section, flow depth, channel material, and channel slope. Other values also reported in Appendix 5.7 include flow area, wetted perimeter, top width, Froude number, and critical values of depth, velocity, and slope. Actual depths above critical depth are considered tranquil or subcritical; depths below critical depth are considered more rapid and supercritical. Actual depths equal to critical depth are best avoided due to instabilities. In this case, this is not an issue. As a result, a ditch such as the one shown in Exhibit 5 is sufficient to divert and convey stormwater from the Lakeside Mountains around and away from the landfill facility.

In order to construct the landfill in a phased fashion, subcells are planned to be constructed as shown in Appendix 3.1 to the Plan of Operations. As such, stormwater flowing from the west will need to be diverted around or away

from entering into the lined cell boundaries. This will be accomplished through the use of smaller temporary berms and diversion ditches.

In order to size the drainage ditch running along the benched terraces for final cover conditions, a HEC-1 hydrologic model was also used. For each cell, tributary areas were delineated based on the assumption that the drainage ditch at each terrace level would effectively intercept all runoff from the terrace above. For purposes of the analysis, the largest tributary area (i.e., how much area is draining to a particular point) for both cells was considered (0.170 mi^2 for Cell 1, 0.183 for Cell 2).

The 25-yr, 24-hr storm event was used (P = 2.08 in.) with a SCS Type II storm distribution applied. The Type II distribution is typical for Utah, and describes the intensity of a typical 24-hour storm at any time during the storm. As with the runon modeling, the SCS Curve Number method was used to estimate infiltration. A CCN of 70 was assumed over a vegetated cap, and therefore converts an appreciable amount of rainfall to runoff.

A V-shaped ditch 1 ft deep and 4 feet wide (2H:1V side slopes) was assumed to convey the flow. Such a channel can convey 8.7 cfs at approximately 4 ft/s, assuming a 1% longitudinal slope and a roughness value (Manning's n) of 0.02. This value was based on published literature for a weathered earthen channel of uniform cross-section. The time of concentration was calculated iteratively using the aforementioned velocity. Dividing the length of the ditch for the area (16,600 ft. for Cell 1, 23,200 ft. for Cell 2) by the velocity yielded the time of concentration. The Lag Time was then calculated by dividing the time of concentration by 1.67.

These parameters were entered in HEC-1, which yielded the following results:

Cell 1: Qp = 6.8 cfs
Cell 2: Qp = 6.3 cfs

Thus, the assumed channel can convey the calculated flow with some degree of excess freeboard.

6.3.2 Stormwater Best Management Practices (BMP)

Best Management Practices will be used onsite to control, contain, and regulate stormwater flows and quality. BMPs may include the following:

- Silt fences,
- Check dams,
- Earth dike/drainage swales and ditches,
- Revegetation,
- Preservation of vegetation on the steep western slopes,
- Straw mulch and soil binders,
- Surface roughening on slopes
- Slope drains,
- Sediment traps,

- Sand bag barriers,
- Fiber rolls,
- A combined vehicle cleaning, fueling and maintenance storage area, and
- Outlet protection/velocity dissipation devices.
- Permanent erosion control seeding and planting;
- Outlet protection/velocity dissipation devices at culvert and/or ditch outlets, and;
- Earth dikes, drainage swales, and ditches.

6.4 Cap and Cover Design

The final grade contours as shown on Exhibit 2A and 2B illustrate the overall plan relative to finish-grade elevations. WRSWMC will use the standard cap/cover design as outlined in the Utah Administrative Code R315-303-3-(a). The standard design cap/cover will include a minimum 18-inch layer consisting of compacted soil with permeability of 1×10^{-5} cm/sec or less. This layer will minimize the infiltration, and in no case will be more permeable than the bottom liner system present in the cell. The grade of surface slopes will range from 4H:1V (25%) to 6H:1V(17%) and will not be less than 2% or more than 33%.

The cap design will include (from top to bottom) a 24" vegetated layer of native soils, which will also act as an evapotranspirative layer; a filter fabric which is part of a geocomposite/geonet drainage layer; a 60 mil HDPE geomembrane (also known as a flexible membrane liner); a sodium-bentonite-based GCL; and 12-inch layer of base soil to provide a foundation for the overall cap structure.

Erosion of the cap will be minimized and/or prevented with the construction of an upper layer consisting of at least 6" of soil capable of sustaining vegetative growth. In addition to this, terraced benches will be constructed every 50 feet of vertical change in elevation. These benches, as they are developed, will also provide for cap access during maintenance activities and/or for continued filling of the landfill. In addition, the terraces will detain stormwater runoff draining off of the cap, by draining it inwards towards the landfill and conveying it slowly though cut ditches (see Exhibit 5). An analysis of the permeability and infiltrative properties of this proposed cap/cover system is a part of the HELP model discussed in Section 5.

6.5 Facility Life and Capacity

The estimated facility life and waste capacity were determined using earthwork calculations in Land Development Destkop 3 (LDT3)/AutoCAD 2002. Digital Terrain Model (DTM) surfaces were created for existing grade, sub-grade (constructed/excavated cells without waste), and for final grade.

In short, the available air space was determined as the difference between the sub-grade and final grade surfaces, minus the estimated volume of the cap. Volume for the cap/cover was subtracted, and a utilization factor of 1,400 lbs MSW/total cy was used (which accounts for daily/intermediate soil as well) to determine capacity on a tonnage basis. These earthwork calculations are contained in Appendix 6.2 are summarized for individual cells in Table 2.

Table 2. Capacity for proposed landfill.

	Waste Capacity[1]	
	cubic yards	tons
Cell 1	96,297,000	67,407,900
Cell 2	304,262,000	212,983,400
Total	400,559,000	280,391,300

[1]Based on grading plans. Cubic yards not adjusted for daily/intermediate cover.

Expected service life depends upon rate at which the solid waste is brought to the landfill. Table 3 lists services life values for various rates.

Table 3. Facility service life estimation.

Rate (tons/day)	Service Life (years)[1]		
	Cell 1	Cell 2	Entire Landfill
2,000	108	341	449
5,000	43	137	180
10,000	22	68	90

[1]Based on 312 operating days per year.

6.6 Soil Balance

Soil needs and availability was also determined through the use of the DTM surfaces discussed above. Due to the gentle existing slopes, the requirement to remain higher than existing or historical high groundwater, and the requirement to maintain slopes for leachate drainage, some fill is required in each cell to prepare subgrade. Soil is also needed for berm construction, cap/cover placement, and daily/intermediate cover. To estimate the soil requirements for daily/intermediate cover, a 5:1 ratio of cover soil to waste (on a volume basis) was used (or one-sixth soil by volume). Each of these items was determined, and are summarized in Table 4 for the landfill footprint, with calculations contained in Appendix 6.2. It should be noted that these soil balance calculations correspond to the grading plans contained in this permit application. If additional soil beyond what can be supplied by the footprint is required, the landfill will be constructed in accordance with available soils, or additional soil needs can be fulfilled by taking soils from nearby borrow areas. Soil may be obtained from an onsite area, or a 640-acre site approximately 1-mile away is available, if and when needed, to fulfill soil needs.

Table 4. Soil requirements and available cut within the proposed cell footprint.

	Cut, to subgrade (cy)	Fill (cy)				Net (cy)[1]
		Berms and intra-cell fill to subgrade	Cap/Cover	Daily/Intermediate Cover	Total	
Cell 1	2,500,000	6,200,000	3,900,000	16,000,000	26,100,000	23,600,000
Cell 2	13,000,000	8,100,000	1,500,000	50,700,000	60,300,000	47,300,000
Total	15,500,000	14,300,000	5,400,000	66,700,000	86,400,000	70,900,000

[1]Negative is net cut requirement; positive is net fill requirement.

Works Cited

Ashcroft, G. L. et.al., 1992. *Utah Climate.* Utah Climate Center, Utah State University, Logan UT.

Haan, C.T., Barfield, B.J., Hayes, J.C., 1994. *Design Hydrology and Sedimentology for Small Catchments,* New York: Academic Press.

McCuen, Richard H. 1998. *Hydrologic Analysis and Design*, Second Edition. New Jersey: Prentice Hall,

Wanielista, Martin, Kersten, Robert, and Eaglin, Ron, 1997. *Hydrology: Water Quantity and Quality Control*, Second Edition. New York: John Wiley & Sons, Inc.

Appendix 6.1
CETCO GCL Properties and Testing

INDEX FLUX AND PERMEABILITY OF GCL's
TEST RESULTS
ASTM D-5887 / D-5084 / EPA 9100

Client	: CETCO		Date	:	03-13-04
Project Location	: Toole Landfill, Utah		Job No.	:	04LG352.01
Sample Number	: Roll : 516 Lot 200405FA		Tested By	:	HT
Description	: Bentomat SDN		Checked By	:	JB
Permeant Fluid	: Leachate Provided by Client				

Physical Property Data

		Initial				Final
Initial Clay Height (in)	:	0.20		Final Height of Clay (in)	:	0.25
Initial Diameter (in)	:	4.00		Final Diameter of Clay (in)	:	4.00
Initial Wet Weight (g)	:	47.20		Final Wet Weight(Clay) (g)	:	69.20
Wet Density (pcf)	:	71.48		Wet Density (pcf)	:	83.84
Moisture Content %	:	22.00	Est	Moisture Content %	:	112.90
Dry Density (pcf)	:	58.59		Dry Density (pcf)	:	39.38

Test Parameters

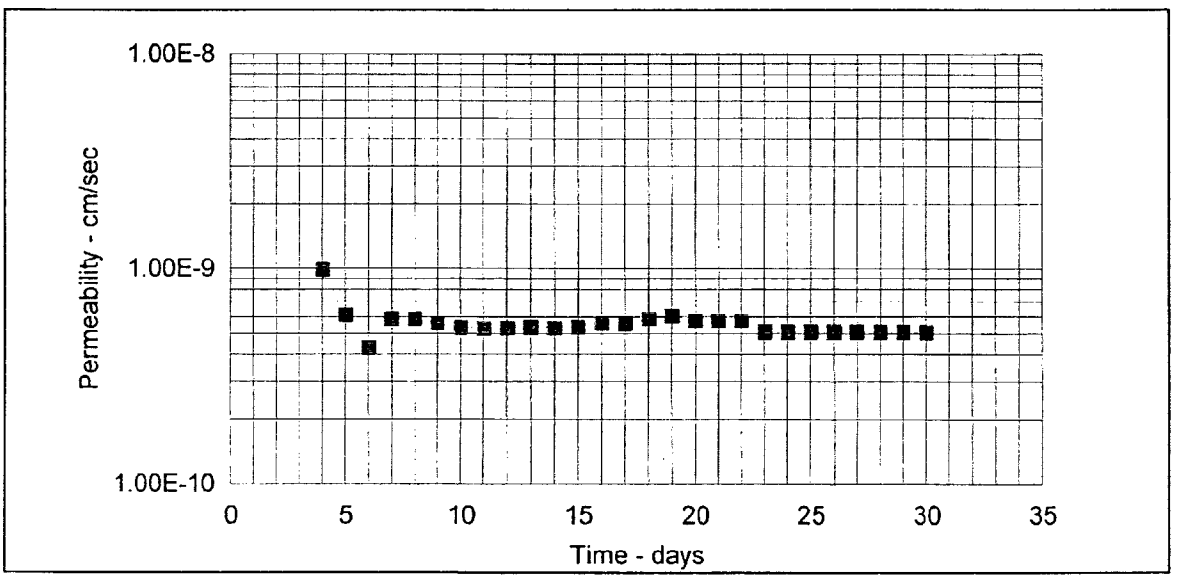
Fluid	:	Site Leachate	**Effective**		
Cell Pressure psi)	:	80.00	**Confining Pressure (psi)**	:	4
Head Water (psi)	:	77.00	Gradient	:	220.80
Tail Water (psi)	:	75.00	Head Differential (psi)	:	2

Flux and Permeability Input Data

Minimum Saturation Time is 48 hours

Area, A = 0.00811 m^2
Thickness, t = 0.25 in

Total Inflow to date : 16.9 cc



JLT Laboratories, Inc. 938 S Central Ave, Canonsburg, Pa. 15317 Tel 724-746-4441 , Fax 724-745-4261

Daily Readings and Computations

Client :	CETCO	Date :	03-13-04
Project Location :	Toole Landfill, Utah	Job No. :	04LG352.01
Sample Number :	Roll : 516 Lot 200405FA	Tested By :	HT
Description :	Bentomat SDN	Checked By :	JB

Days	Date	Flow	Time	Elapsed	Flux	k	Cum Inflow
		cc	min	Time (sec)	(m^3/m^2)/sec	cm/sec	cc
1	02/13/2004	48 hours of hydration per ASTM					
2	02/14/2004						
3	02/15/2004	0.00	0	0			0.0
4	02/16/2004	3.90	1442	86520	5.56E-009	9.89E-010	3.9
5	02/17/2004	2.40	1441	86460	3.42E-009	6.09E-010	6.3
6	02/18/2004	1.70	1445	86700	2.42E-009	4.30E-010	8.0
7	02/19/2004	2.30	1444	86640	3.27E-009	5.82E-010	10.3
8	02/20/2004	2.30	1442	86520	3.28E-009	5.83E-010	12.6
9	02/21/2004	2.20	1443	86580	3.13E-009	5.57E-010	14.8
10	02/22/2004	2.10	1440	86400	3.00E-009	5.33E-010	16.9
11	02/23/2004	2.00	1388	83280	2.96E-009	5.27E-010	18.9
12	02/24/2004	1.90	1310	78600	2.98E-009	5.30E-010	20.8
13	02/25/2004	2.10	1439	86340	3.00E-009	5.33E-010	22.9
14	02/26/2004	2.10	1445	86700	2.99E-009	5.31E-010	25.0
15	02/27/2004	2.20	1501	90060	3.01E-009	5.36E-010	27.2
16	02/28/2004	2.20	1442	86520	3.14E-009	5.58E-010	29.4
17	02/29/2004	2.20	1445	86700	3.13E-009	5.56E-010	31.6
18	03/01/2004	2.30	1442	86520	3.28E-009	5.83E-010	33.9
19	03/02/2004	2.25	1368	82080	3.38E-009	6.01E-010	36.2
20	03/03/2004	2.25	1441	86460	3.21E-009	5.71E-010	38.4
21	03/04/2004	2.30	1475	88500	3.21E-009	5.70E-010	40.7
22	03/05/2004	2.25	1442	86520	3.21E-009	5.70E-010	43.0
23	03/06/2004	2.00	1440	86400	2.86E-009	5.08E-010	45.0
24	03/07/2004	2.00	1441	86460	2.85E-009	5.07E-010	47.0
25	03/08/2004	2.00	1439	86340	2.86E-009	5.08E-010	49.0
26	03/09/2004	2.00	1443	86580	2.85E-009	5.07E-010	51.0
27	03/10/2004	2.00	1437	86220	2.86E-009	5.09E-010	53.0
28	03/11/2004	2.00	1444	86640	2.85E-009	5.06E-010	55.0
29	03/12/2004	2.00	1442	86520	2.85E-009	5.07E-010	57.0
30	03/13/2004	2.00	1447	86820	2.84E-009	5.05E-010	59.0

LINING TECHNOLOGIES
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1500 W. Shure Dr. Arlington Heights, Illinois 60004 USA
Phone: +1-847-392-5800 • Fax: +1-847-506-6150
www.cetco.com

MEMO

To: Brad Hartman

Re: Tooele Landfill GCL

From: Bill Urchik

Fax: 847-506-6150
Ph: 800-527-9948

Company: CETCO

No. Pages: 1 – including cover

Date: August 17, 2004

Dear Brad,

Please accept the following clarification regarding the compatibility testing of the GCL for the proposed Tooele Landfill project.

ASTM D 5887 "Hydraulic Conductivity testing of Saturated GCLs"

This ASTM standard was recently revised in order to report both permeability and index flux of GCLS. This standard replaces ASTM D 5084 which was previously used to test for permeability but not index flux of GCLs. ASTM D 5887 now reports both permeability and index flux. The compatibility testing performed by J& L testing laboratory, used test method ASTM D 5887 and extended the length of the test to 30 days to establish compatibility with the site specific soil. A synthetic leachate was produced from this soil for use in the compatibility testing.

Compatibility testing

CETCO understands that the soil tested for compatibility may differ from site soil encountered when excavation at the project begins. Should there be concern regarding the compatibility of these soils, CETCO recommends performing another compatibility test in the same manner as the first test performed. Please understand that this test can take as long as 30 days, but can be terminated much earlier if a stable hydraulic conductivity is established. For example, when reviewing the initial test data, a stable hydraulic conductivity was established at approximately 10 days at which time the test could have been terminated.

Should you require further information, please do not hesitate to contact me at 1-800-527-9948 x 7939.

Best Regards,

Wm Urchik

William Urchik
Project Engineer
CETCO
Ph: 800.527.9948x7939
Fx: 847.394.7839

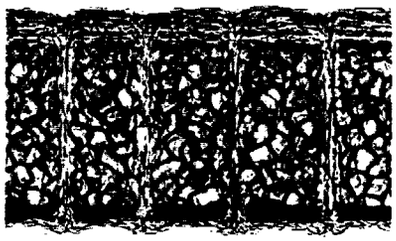
BENTOMAT SDN

REINFORCED

Nonwoven Geotextile

Volclay Sodium Bentonite

Nonwoven Geotextile



Bentomat SDN is a reinforced needlepunched GCL that encapsulates a layer of Volclay sodium bentonite between two nonwoven geotextiles, needlepunched together for high internal shear strength and good interface friction performance. Bentomat SDN is a cost effective alternative for steep slope liner or cover systems where overall liner system stability is important.

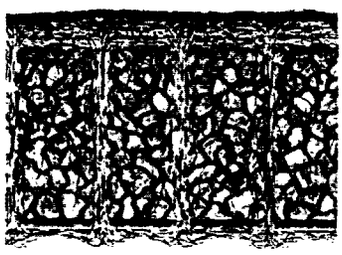
BENTOMAT CL

REINFORCED

Composite Laminate Nonwoven Geotextile

Volclay Sodium Bentonite

Geotextile



Bentomat CL is a reinforced GCL composed of two carrier geotextiles needlepunched together to encapsulate a layer of Volclay sodium bentonite. The composite laminate gives the GCL excellent hydraulic performance and provides puncture and tensile strengths beyond conventional plastic membranes. Bentomat CL is ideal for landfills, ponds, surface impoundments and other containment projects.

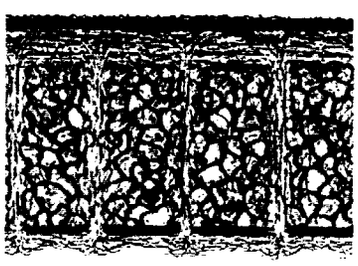
BENTOMAT CLT

REINFORCED

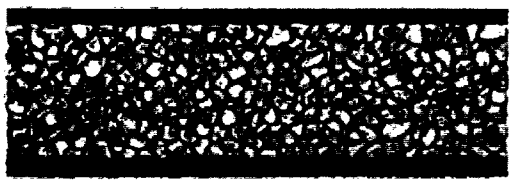
Textured HDPE Nonwoven Geotextile

Volclay Sodium Bentonite

Geotextile

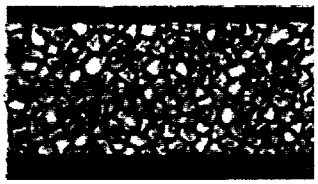


Bentomat CLT is a reinforced GCL consisting of a layer of Volclay sodium bentonite between two geotextiles, which are needlepunched together and laminated with a flexible textured HDPE sheet. The textured surface of the HDPE sheet increases the interface friction between the GCL and adjacent substrate when greater interface friction is required. Bentomat CLT is used in liquid containment and landfill cap applications, and many other applications.

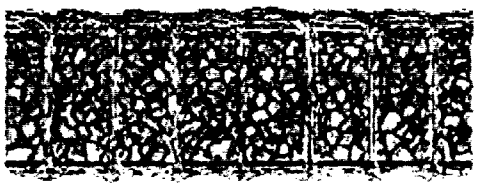


Claymax®200R is a non-reinforced GCL with two lightweight nonwoven geotextiles encapsulating a layer of Volclay® sodium bentonite. Ideally suited for mild slopes, Claymax 200R maximizes both performance and value in one ingeniously straightforward product. A completely self-seaming GCL, there's simply no better GCL than Claymax 200R for lining the flat areas of a landfill.
GCL Properties (66KB) | Panel/Roll Specifications (247KB)

Claymax® 600CL is a non-reinforced GCL consisting of two lightweight geotextiles encapsulating a layer of Volclay sodium bentonite with a composite laminate applied to one of the geotextiles. CLAYMAX 600CL is the ideal solution for flat areas of landfill caps and high hydraulic head conditions in bottom liner applications.

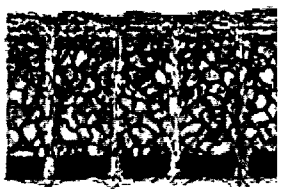


GCL Properties (61KB) | Panel/Roll Specifications (247KB)

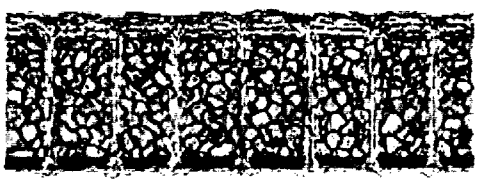


Bentomat® ST is a reinforced GCL consisting of a layer of Vo bentonite encapsulated between two geotextiles, needlepunch maximum performance under a wide variety of field condition: integrated matrix of bentonite and needlepunced fibers provid strength and allows Bentomat to maintain low permeability. B a woven, slit-film upper geotextile for maximizing intimate co composite liner systems.
GCL Properties (63KB) | Panel/Roll Specifications (247KB)

Bentomat® DN is a reinforced needlepunched GCL that not only has high internal shear strength, but also provides excellent interface friction on both sides of the GCL. Bentomat DN is ideally suited for steep-slope liner/cover systems where intimate geomembrane contact is less critical than overall liner system stability.



GCL Properties (63KB) | Panel/Roll Specifications (247KB)

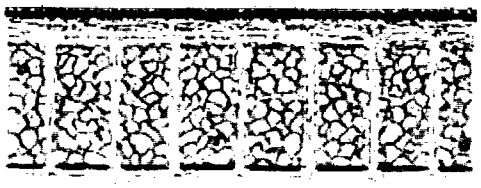


Bentomat® SDN is a reinforced needlepunched GCL that enc layer of Volclay sodium bentonite between two nonwoven geo needlepunched together for high internal shear strength and g friction performances. Bentomat SDN may be a cost effective steep slope liner/cover systems where overall liner system sta important.

GCL Properties (65KB) | Panel/Roll Specifications (247KB)

Bentomat® CL is a reinforced GCL composed of two carrier geotextiles

needlepunched together to encapsulate a layer of Volclay sodium bentonite. A composite laminati GCL excellent hydraulic performance and provides puncture and tensile strengths beyond conventio membranes. Bentomat CL is ideal for landfills, ponds, surface impoundments and other containme GCL Properties (61KB) | Panel/Roll Specifications (247KB)



Bentomat® CLT is a reinforced GCL consisting of a layer of V bentonite between two geotextiles, which are needlepunched laminated with a flexible textured HDPE sheet. The addition o sheet to the GCL increases the hydraulic resistance by an ord over that of standard GCLs. The textured surface of the HDPE increases the interface friction between the GCL and adjacent a greater interface friction is required on certain projects. This product is mainly used in liquid cont landfill cap applications, but the versatility of the product allows it to be considered in many other a GCL Properties (61KB) | Panel/Roll Specifications (247KB)

*Files larger than 1MB may take an extended period of time to download using a standard phone li connection.

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PRODUCT SELECTION CHART

PRODUCT	HYDRAULIC CONDITION	SHEAR
CLAYMAX 200R	For low hydraulic head applications, permeability 5 x 10^{-9} cm/sec*	Most lining applications with slopes ≤10H:1V
CLAYMAX 600CL	For low or high hydraulic head applications, permeability 5 x 10^{-10} cm/sec*	Landfill and liquid containment with slopes ≤10H:1V
BENTOMAT ST	For low hydraulic head applications, permeability 5 x 10^{-9} cm/sec*	Most lining applications with slopes ≤3H:1V
BENTOMAT SDN	For low hydraulic head applications, permeability 5 x 10^{-9} cm/sec*	Most lining applications with slopes ≤3H:1V
BENTOMAT DN	For low hydraulic head applications, permeability 5 x 10^{-9} cm/sec*	Landfill caps and liners with slopes >3H:1V
BENTOMAT CL	For low or high hydraulic head applications, permeability 5 x 10^{-10} cm/sec*	Landfill and liquid containment applications with slopes >10H:1V
BENTOMAT CLT	For low or high hydraulic head applications, permeability 5 x 10^{-10} cm/sec*	Landfill and liquid containment applications with slopes >10H:1V

*ASTM D 5887 @5PSI Confining Pressure

GETCO
LINING TECHNOLOGIES

CETCO LINING TECHNOLOGIES

Certified Properties

BENTOMAT® SDN CERTIFIED PROPERTIES

MATERIAL PROPERTY	TEST METHOD	TEST FREQUENCY $ft^2(m^2)$	REQUIRED VALUES
Bentonite Swell Index[1]	ASTM D 5890	1 per 50 tonnes	24 mL/2g min.
Bentonite Fluid Loss[1]	ASTM D 5891	1 per 50 tonnes	18 mL max.
Bentonite Mass/Area[2]	ASTM D 5993	40,000 ft^2 (4,000 m^2)	0.75 lb/ft^2 (3.6 kg/m^2) min
GCL Grab Strength[3]	ASTM D 4632 ASTM D 6768	200,000 ft^2 (20,000 m^2)	90 lbs (400 N) MARV 22.5 lbs/in (40 N/cm) MARV
GCL Peel Strength[3]	ASTM D 4632 ASTM D 6496	40,000 ft^2 (4,000 m^2)	15 lbs (65 N) min 2.5 lbs/in (4.4 N/cm) min
GCL Index Flux[4]	ASTM D 5887	Weekly	1×10^{-8} $m^3/m^2/sec$ max
GCL Hydraulic Conductivity[4]	ASTM D 5887	Weekly	5×10^{-9} cm/sec max
GCL Hydrated Internal Shear Strength[5]	ASTM D 5321 ASTM D 6243	Periodic	500 psf (24 kPa) typ @ 200 psf 5,500 psf (311 kPa) typ @ 10,800 psf

Bentomat SDN is a reinforced GCL consisting of a layer of sodium bentonite between two nonwoven geotextiles, which are needlepunched together.

Notes

[1] Bentonite property tests performed at a bentonite processing facility before shipment to CETCO's GCL production facilities.

[2] Bentonite mass/area reported at 0 percent moisture content.

[3] All tensile strength and peel strength testing is performed in the machine direction using 4 inch grips per modified ASTM D 4632. Results are reported as minimum average roll values unless otherwise indicated. Upon request, tensile strength can be reported per ASTM D 6768 and peel strength can be reported per ASTM D 6496.

[4] Index flux and permeability testing with deaired distilled/deionized water at 80 psi (551kPa) cell pressure, 77 psi (531 kPa) headwater pressure and 75 psi (517 kPa) tailwater pressure. Reported value is equivalent to 925 gal/acre/day. This flux value is equivalent to a permeability of 5×10^{-9} cm/sec for typical GCL thickness. Actual flux values vary with field condition pressures. The last 20 weekly values prior the end of the production date of the supplied GCL may be provided.

[5] Peak values measured at 200 psf (10 kPa) and 10,800 psf (517 kPa) normal stress for a specimen hydrated for 48 hours. Site-specific materials, GCL products, and test conditions must be used to verify internal and interface strength of the proposed design.

CETCO has developed an edge enhancement system that eliminates the need to use additional granular sodium bentonite within the overlap area of the seams. We call this edge enhancement, SuperGroove™, and it comes standard on both longitudinal edges of Bentomat® SDN. It should be noted that SuperGroove™ does not appear on the end-of-roll overlaps and recommend the continued use of supplemental bentonite for all end-of-roll seams.

CETCO® LINING TECHNOLOGIES

1500 W. Shure Drive Arlington Heights, IL 60004 USA 800.527.9948 Fax 847.577.5571
For the most up-to-date information please visit our website, www.cetco.com
A wholly owned subsidiary of AMCOL International

The information and date contained herein are believed to be accurate and reliable. CETCO makes no warranty of any kind and accepts no responsibility for the results obtained through application of this information.

Revised 09/04
TR 401-BMSDN

Appendix 6.2
Capacity and Earthwork Calculations

Site Volume Table: Unadjusted

Site	Stratum	Surf1	Surf2	Cut cu.yds	Fill cu.yds	Net cu.yds	Method
CELL2							
	capacity	fg_start	fg_end				
				134857	308134543	307999686 (F)	Grid
				138037	308151924	308013887 (F)	Composite
				137551	308153178	308015627 (F)	End area
	earthwork	ex_ground_sitewide	fg_start				
				12964732	8134778	4829954 (C)	Grid
				12968255	8137372	4830882 (C)	Composite
				12968353	8137442	4830912 (C)	End area

Site Volume Table: Unadjusted

Site	Stratum	Surf1	Surf2	Cut cu.yds	Fill cu.yds	Net cu.yds	Method
CELL1							
	capacity	fg_start	fg_end				
				24042	114281591	114257548 (F)	Grid
				19740	114283593	114263853 (F)	Composite
				28521	114284493	114255972 (F)	End area
	earthwork	ex_ground_sitewide	fg_start				
				2464472	6188641	3724169 (F)	Grid
				2466666	6149101	3682435 (F)	Composite
				2468481	6194338	3725857 (F)	End area

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Appendix 6.3
Leachate Drainage Calculations

Circular			
D (in)	8	Area	0.349 ft²
n	0.009	P	2.094 ft
slope (ft/ft)	1.00%	Velocity	5.015 ft/s
		Q	1.750 cfs

qi	0.080 in/hr
Length	1654 ft

$$Q = \frac{1.49}{n} A \cdot R^{2/3} S^{1/2}$$

$$L = \frac{43{,}560}{500} \cdot \frac{Q}{qi}$$

Circular			
D (in)	8	Area	0.349 ft²
n	0.009	P	2.094 ft
slope (ft/ft)	2.00%	Velocity	7.091 ft/s
		Q	2.475 cfs

qi	0.080 in/hr
Length	2336 ft

Circular			
D (in)	8	Area	0.349 ft²
n	0.009	P	2.094 ft
slope (ft/ft)	3.00%	Velocity	8.684 ft/s
		Q	3.031 cfs

qi	0.090 in/hr
Length	2934 ft

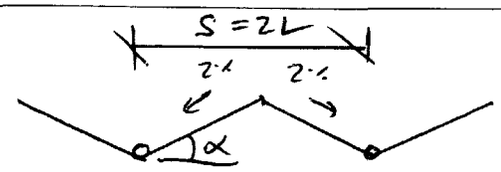
Job No. 8WEC010100 Sheet 1 of ____ Prepared by BRH Date 5/11/2004

Project Name WASATCH REGIONAL Reviewed by ____ Date ____

Title LCRS PIPE SPACING CALCS. FWA No. ____

ASSUME:

12" GRAVEL/SAND DRAINAGE LAYER
SAWTOOTH DESIGN W/ 2% CROSS-SLOPES
max. HEAD = 30 cm (12"), h_{max}



$\tan\alpha = 2\%$

$\alpha = 1.146°$

IMPINGEMENT RATE, q_i

Assume 30 - 50% annual rainfall (12.5") - conservative.

$$q_i = \left(\frac{12.5''}{yr}\right)(0.4)\left(\frac{1\ yr}{365\ days}\right)\left(\frac{1\ day}{24\ hr}\right)\left(\frac{1\ hr}{60\ min.}\right)\left(\frac{1\ min.}{60\ sec.}\right)\left(\frac{2.54\ cm}{1''}\right)$$

$q_i = 4.027 \times 10^{-7}$ cm/s (5.7076×10^{-4} in./hr) or (0.035 cm/day)

also....

NOAA Atlas 14 IDF curve/table.
25-yr storm event

q_i (in./hr)	Storm Duration, days
0.09	1
0.05	2
0.03	4
0.02	7

Hydraulic conductivity/permeability, K = 0.01 cm/sec. for gravel/sand

Transmissivity, T or Θ = KD = $(0.01)\frac{cm}{sec.}(30)\,cm = 0.3\frac{cm^2}{sec}$

Also, $\Theta = q_i$ where $q = \frac{Q}{b}$ or flow per unit width where b = 1 ft (or m) $= 0.3\frac{cm^3}{sec.\cdot cm}$

i = gradient/slope $= 3 \times 10^{-5}\frac{m^3}{sec.\cdot m}$

$= 3.23$ cfs/ft

Job No. _____ Sheet 2 of _____ Prepared by _____ Date _____

Project Name _____ Reviewed by _____ Date _____

Title _____ FWA No. _____

GIROUD'S EQUATION

$$h_{max} = \frac{j S \sqrt{4(q_i/K) + \tan^2\alpha} - \tan\alpha}{2\cos\alpha}$$

where $j = 1 - 0.12\, e^{\left[\left(-\log \frac{8 q_i}{5K \tan^2\alpha}\right)^{5/8}\right]^2}$

≈ 1.0 (conservative)

S = pipe spacing

q_i = infiltrement rate,

K = permeability

$$30 = \frac{(1.0)\, S \sqrt{4(4.027\times10^{-7}/0.01) + \tan^2 1.146^\circ} - \tan 1.146^\circ}{2\cos 1.146^\circ}$$

$$S = \frac{(30)(2)(\cos 1.146^\circ)}{3.686\times10^{-3}}$$

$= 16{,}272$ cm

$= 162.7$ m

$\boxed{S = 534 \text{ ft}}$

Job No. _____ Sheet 3 of _____ Prepared by _____ Date _____

Project Name _____ Reviewed by _____ Date _____

Title _____ FWA No. _____

Moore's Equation

$$h_{max} = S\cos\alpha\left[\sqrt{(q_i/K) + \tan^2\alpha} - \tan\alpha\right]$$

$S = 305$ m

$\boxed{S = 1{,}002 \text{ ft}}$

Mound Model

$$h_{max} = \frac{\cancel{2}L\sqrt{c}}{\cancel{2}}\left[\frac{\tan^2\alpha}{c} + 1 - \frac{\tan\alpha}{c}\sqrt{\tan^2\alpha + c}\right] \quad \text{where } c = \frac{q_i}{K}$$

$2L = S$

$$30 = L\sqrt{q_i/K}\left[\frac{\tan^2 1.146^\circ}{q_i/K} + 1 - \frac{\tan 1.146^\circ}{q_i/K}\sqrt{\tan^2 1.146^\circ + q_i/K}\right]$$

$L = 92.34$ m $= S$

$\boxed{S = 303}$

EPA Guidance (Moore's Equation)

$$h_{max} = L\frac{\cos\alpha}{2}\left[\sqrt{\tan^2\alpha + \frac{q_i}{K}} - \tan\alpha\right]$$

$\boxed{S = 1{,}002'}$

Job No. _____ Sheet 4 of ____ Prepared by _____ Date _____

Project Name _____ Reviewed by _____ Date _____

Title _____ FWA No. _____

EPA (1989)

$$h_{max} = \frac{S}{2}\sqrt{q_i}\,\sin\alpha\left[\frac{i^2}{q_i \sin^2\alpha} + 1 - \frac{i}{q_i \sin^2\alpha}\left(i^2 + q_i \sin^2\alpha\right)^{1/2}\right]$$

$$(2)\ h_{max} = S\left(1.269 \times 10^{-5}\right)\left[2483203.47 + 1 - (12416173)(0.02)\right]$$

$$\frac{(2)(30)}{6.376 \times 10^{-6}} = S$$

$$h_{max} = \left(3.17 \times 10^{-6}\right) S$$

$$S = 94{,}547\ m$$

$$\boxed{S = 310{,}190\ ft\ \ (58.7\ mi.)}$$

∴ FOR GRAVEL/SAND, PIPE SPACING VARIES SUBSTANTIALLY, DEPENDING UPON METHOD & INFINGEMENT RATE.

FOR GEONET/GEOCOMPOSITE, SEE NEXT PAGE

Job No. 8WE01010100 Sheet 5 of ____ Prepared by BRH Date 5/10/2004

Project Name WASATCH REGIONAL LANDFILL Reviewed by ____ Date ____

Title GEONET PIPE SPACING CALCS. FWA No. ____

$q_i = 0.09$ in/hr (25 yr/24 hr)

$L = 500'$

$h_{max} = 0.25''$

$\alpha = 1.146°$ (2% grade)

$$\theta_{req} = \frac{q_i L^2}{4h_{max} + 2L\sin\alpha}$$

$\theta_{req} = 2.41 \times 10^{-3}$ m²/sec.

Available Transmissivity values range from 2×10^{-4} m²/sec to 7.0×10^{-3} m²/sec.

$q = Q/b$ where $q = \theta i$ where $i = 2\%$; $\theta = 3.6\times10^{-3}$ m²/sec. (overcase of above)

$q = 7.2\times10^{-5}$ m³/sec-m (m²/sec.)

$= 7.75\times10^{-4}$ cfs/ft

For 1' strip $Q = CiA$ $C = 1.0$

$i = 0.09$ in./hr

$A = (250)(1)/43560$

$Q = 5.17\times10^{-4}$ cfs OK

Appendix 6.4
Sump Capacity Calculations

The following tables show the sump volume required for the 25-yr, 24-hr storm event (P = 2.08 in.) for each tributary area.

Table 1 - Cell 1

Area No.	Area (square feet)	Area (acre)	Volume Required (acre-ft)
1 - 6	935,147	21.5	3.7
7	866,360	19.9	3.4
8	218,459	5.0	0.9
9	680,809	15.6	2.7
10 - 15	832,855	19.1	3.3
16	834,869	19.2	3.3
17	504,198	11.6	2.0
18	567,864	13.0	2.3
19	468,024	10.7	1.9
20	534,577	12.3	2.1
21	943,623	21.7	3.8

Table 2 - Cell 2

Area No.	Area (square feet)	Area (acre)	Volume Required (acre-ft)
1	337,693	7.8	1.3
2	108,821	2.5	0.4
3	393,720	9.0	1.6
4	395,953	9.1	1.6
5 - 10	962,679	22.1	3.8
11	445,232	10.2	1.8
12	449,297	10.3	1.8
13 - 18	967,321	22.2	3.8
19	472,953	10.9	1.9
20	341,475	7.8	1.4
21	485,627	11.1	1.9
22	534,725	12.3	2.1
23	730,415	16.8	2.9
24	531,885	12.2	2.1
25	387,793	8.9	1.5
26	247,602	5.7	1.0
27	280,933	6.4	1.1
28	239,433	5.5	1.0
29	453,152	10.4	1.8
30	305,373	7.0	1.2
31	289,860	6.7	1.2
32	318,530	7.3	1.3
33	872,179	20.0	3.5
34 - 39	966,909	22.2	3.8
40	449,388	10.3	1.8
41	445,188	10.2	1.8
42 - 46	961,947	22.1	3.8
47	729,967	16.8	2.9
48	943,752	21.7	3.8

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7.1.1 ELEMENTS OF CLOSURE 700
7.1.2 CLOSURE SCHEDULE 700
7.1.3 CLOSURE DESIGN 701
7.1.4 FINAL INSPECTION 701

Section 7 – Closure Plan

7.1 Closure Plan

This Closure Plan was developed in accordance with the Utah Administrative Code (R315-310-3). The closure of the Wasatch Regional Solid Waste Landfill will be completed in accordance with this plan. Closure activities will be performed in such a manner as to accomplish the following goals:

- Minimize the need for further maintenance;
- Minimize or eliminate threats to human health and the environment from post-closure escape of solid waste constituents, leachate, landfill gases, contaminated run-off or waste decomposition products to the ground, groundwater, surface water, or the atmosphere and;
- Adequately prepare the facility for the post-closure period.

This Closure Plan and any future modifications or changes to this plan will be maintained with the landfill's operating record at the Wasatch Regional Solid Waste Management office.

7.1.1 Elements of Closure

Prior to initiating any closure activities, a QA/QC Plan will be submitted to the Executive Secretary for review and approval of the proposed activities. Final cover construction will be completed following completion of filling in each of the disposal areas. All equipment, which will not be used on-site during the post-closure period, will be removed. Structures at the site which remain after the final receipt of waste, and which will not be an integral part of post-closure site maintenance, will be dismantled as appropriate and removed from the site. Following the final receipt of waste, any remaining stockpiles of recyclable or other stored materials will be removed from the site as appropriate.

7.1.2 Closure Schedule

No more than one year prior to the projected final receipt of waste in a given disposal area the Wasatch Regional Landfill will begin to work on the specific unit closure design. At least 6 months prior to the projected final receipt of waste in a given disposal area, the Wasatch Regional Landfill will submit to the Executive Secretary initial specific disposal unit design for approval. The unit-specific plan will detail how the final cover will be constructed and will include a QA/QC document and engineered construction drawings. A minimum of 60 days prior to the projected final receipt of waste in a given disposal area, Wasatch will notify the Executive Secretary of the intent to

close the disposal phase and implement the approved closure plan. Within 30 days after the final receipt of waste, the District will implement the closure plan, and will complete closure activities within 180 days of initiation. Following the completion of final closure activities, Wasatch will submit within 90 days to the Executive Secretary a set of as-built drawings of final closure construction signed by a professional engineer registered in the State of Utah. Wasatch will also provide certification of the compliance of each phase of closure construction with the approved closure plan. A representative of Wasatch and a professional engineer registered in the State of Utah will sign the certification.

Plats and a statement of fact concerning the location of any disposal site shall be recorded as part of the record of title with the County Recorder within 60 days after the completion of all closure activities. The notation will serve to inform any potential purchaser of the property that the land has been used as a landfill, and that its future use may be restricted by local land use or zoning regulations. Wasatch will submit proof of record of title filing within 60 days after certification of closure to the Executive Secretary.

7.1.3 Closure Design

A final cap/cover system will be constructed in accordance with the design standards set forth in UAC R315-303-4 will be sufficient to prevent the substantial infiltration of surface waters into and through the underlying waste mass.

The final cover will be constructed in accordance with UAC R3l5-303-4 (4)(a). Design concepts and other details can be found in the Engineering Report section of this report.

7.1.4 Final Inspection

Following the completion of closure activities, a final report will be prepared and certified by an engineer registered in the State of Utah. The report will present laboratory and field test data that support the conformance of the final cover installation and closure activities with the Utah solid waste regulations and the approved Closure Plan. The report will also include facility closure plan sheets signed by a professional engineer registered in the state of Utah that represent the final, as-built closure construction and the report will confirm that the plats and statement concerning the location and amount of waste will be recorded on the site title. The owner/operator will file the notarized plat with the county recorder of deeds within 60 days of certification of closure. The Executive Secretary will be notified of the completion of closure activities and arrangements will be made for a final inspection by DEQ. Following final approval by DEQ, the post-closure maintenance plan will be initiated pursuant to the approved Post-Closure Plan.

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SECTION 8 – POST-CLOSURE CARE PLAN 800

8.1 POST-CLOSURE CARE PLAN 800
8.1.1 POST-CLOSURE SCHEDULE 800
8.1.2 MONITORING 800
8.1.3 MAINTENANCE ACTIVITIES 801
8.1.4 PLANNED USE OF PROPERTY 801

Section 8 – Post-Closure Care Plan

8.1 Post-Closure Care Plan

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

Wasatch Regional Solid Waste Management Corporation
P.O. Box 681333
Park City, Utah 84068

8.1.1 Post-closure Schedule

The Post-closure maintenance period will begin immediately following the completion of the closure activities. Post-closure activities will continue for a period of thirty years or a period established by the Executive Secretary. If, during the post-closure period, monitoring activities indicate that the site has stabilized and does not pose a threat to human health or the environment, Wasatch may petition the Executive Secretary for a decrease in the length of the post-closure monitoring period. Following completion of the post-closure monitoring period as established by the Executive Secretary, Wasatch will submit to the Executive Secretary a certification, signed by an authorized representative of Wasatch and a professional engineer registered in the State of Utah, which states why post-closure monitoring activities are no longer necessary. After obtaining final approval from the Executive Secretary, post-closure monitoring activities will be discontinued. Any modifications to the post-closure plan will be submitted to the Executive Secretary for approval at least 6 months prior to the implementation of the post-closure plan.

8.1.2 Monitoring

This permit application is submitted with provisions for groundwater monitoring, landfill gas monitoring, surface water monitoring (if necessary), and leachate collection or treatment systems. Monitoring for the post-closure period for the groundwater and gas are discussed in Appendix 3.10 and 3.11 respectively

If continued monitoring at the facility indicates that the waste mass has stabilized and does not pose a threat to human health or the environment, the owner or operator may petition the Executive Secretary for a decrease in the length of the post-closure monitoring period. Records for all monitoring

activities will be stored at the Wasatch Regional Solid Waste Management Corporation Headquarters.

8.1.3 Maintenance Activities

During the post-closure period, personnel from Wasatch will inspect the final cover and drainage systems at the Wasatch Landfill quarterly. The final cover and drainage system will be examined for the effects of erosion, subsidence, settlement, or other indications that the integrity of the final cover or the effectiveness of the drainage system has been compromised. In addition, all groundwater and landfill gas monitoring equipment will be inspected according to the procedures outlined in the groundwater and landfill gas monitoring plans. If the inspection indicates that there is a need for repairs, the appropriate sub-contractor will be immediately contacted. Repairs will be completed as soon as possible following each inspection in order to maintain the effectiveness of the drainage and final cover systems. The site perimeter fence will also be inspected during quarterly inspections. The perimeter fencing will be removed as much as possible to allow grazing.

If applicable, withdrawals from the selected financial assurance mechanism for the costs incurred by the Wasatch Regional Solid Waste Management Corporation for the regularly scheduled quarterly inspections and monitoring will be requested at the end of each post-closure quarter. Withdrawals for any added inspection trips, monitoring and maintenance work performed will also be made at the end of the quarter in which the work was performed.

8.1.4 Planned Use of Property

During the closure period, the site will be seeded and allowed five years to re-establish vegetation. At the end of five years, the site area will be made available for cattle grazing.

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Appendix

Appendix 9.1 – Estimated Closure & Post-Closure Care Costs

Section 9 - Cost Estimates For Closure & Post-Closure

Costs associated with the closure and post-closure period have been calculated for the initial permit term of five years. 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 80 acres of lined area, illustrated on the Phasing Plan in Appendix 3.1). These estimates are based on 2004 dollars. The estimated closure and post-closure maintenance costs for the first five years of operation are presented in Appendix 9.1. One or more financial assurance mechanisms will be approved by the Executive Secretary and effective prior to operation and initial receipt of waste at the facility.

The specific quantities of materials used in calculating the closure/post-closure costs were measured from design plans (see Closure Plan). Unit costs were determined from 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. A ten percent contingency has been included in the cost estimates to cover any unforeseen circumstances or variances in cost or design. 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.

Appendix 9.1
Financial Assurance Cost Estimate

ESTIMATED CLOSURE & POST-CLOSURE CARE COSTS

Closure Cost Estimate

	Item	Units	Unit Cost	Quantity	Total	Source	Note
1.0	Engineering and Preliminary Site Work						
1.1	Topographic Survey	percent	-	-	-	Estimated cost as percent of closure construction	Included in the Technical and Professional Services line item at the end of document as per Oklahoma DEQ Solid Waste Assurance Program Report, 2000 (page 4-56 and 4-57)
1.2	Boundary Survey for Closure	percent	-	-	-	Estimated cost as percent of closure construction	Included in the Technical and Professional Services line item at the end of document as per Oklahoma DEQ Solid Waste Assurance Program Report, 2000(page 4-56 and 4-57)
1.3	Site Evaluation	lump sum	$2,893.00	1	$2,893	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 16 of 20)	
1.4	Development of Plans	percent	-	-	-	Estimated cost as percent of closure construction	Included in the Technical and Professional Services line item at the end of document as per Oklahoma DEQ Solid Waste Assurance Program Report, 2000 (page 4-56 and 4-57)
1.5	Contract Administration Bidding and Award	percent	-	-	-	Estimated cost as percent of closure construction	Included in the Technical and Professional Services line item at the end of document as per Oklahoma DEQ Solid Waste Assurance Program Report, 2000 (page 4-56 and 4-57)
1.6	Administration Costs for the Certification of Final Cover and Closure Notice	percent	-	-	-	Oklahoma Department of Environmental Quality (DEQ) Solid Waste Assurance Program Report,2000 (page 4-56)	Percentage of Total Closure Construction Cost. Included as Administration Cost line item at the end of document as per Oklahoma DEQ Solid Waste Assurance Program Report, 2000 (page 4-56).
1.7	Project Management; Construction Observation and Testing	percent	-	-	-	Estimated cost as percent of closure construction	Included in the Technical and Professional Services line item at the end of document as per Oklahoma DEQ Solid Waste Assurance Program Report, 2000(page 4-56 and 4-57)
1.8	Monitor Well Consultant Cost	lump sum	$25,000.00	1	$25,000	Estimated cost	Cost to design and install monitoring well for pond
1.9	Other Environmental Permit Costs	lump sum	$25,000.00	1	$25,000	Estimated cost	Includes stormwater and air quality permitting during closure
1.10	Disposal of Final Wastes	ton	$10.00	10,000	$100,000	Oklahoma DEQ Financial Assurance Program Report,2000 (page 4-25)	As per the OK document, this figure varies regionally. Also a per the OK document, the neighboring state of Wyoming uses a statutory $10/ton, which is used for this estimate as well. Assumed 5 days of waste at 2,000 tpd.
1.11	Remove Temporary Buildings	lump sum	$2,577.00	1	$2,577	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 16 of 20)	
1.12	Remove Equipment	lump sum	$2,104.00	1	$2,104	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004.(page 16 of 20)	
1.13	Repair/Replace Perimeter Fencing	linear feet	$2.32	4,750	$11,020	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 16 of 20)	19,000 (Total linear feet of perimeter fencing) X 25 % (annual quantity adjustment) X Unit Cost. Fence perimeter is assumed to envelope the entire Cell 1 area. It consists of the southern, eastern, northern boundaries of cell 1, and western part of cell 1 bounded by the access road.
1.14	Clean Leachate Lines	lump sum	$1,315.00	1	$1,315	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 16 of 20)	

Item		Units	Unit Cost	Quantity	Total	Source	Note
2.2	Completion of Top Cover						
2.2.1	Infiltration Layer (Compacted Clay)						
2.2.1a	Soil Placement (Compacted)	cubic yard	$3.36	387,200	$1,300,992	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 17 of 20)	36 inches of cover over 80 acres of onsite clay soils
2.2.1e	Soil Transportation	cubic yard	$2.08	387,200	$805,376	Means, 2000. 02320-200-2050	36" (Total Standard Cap Soil Cover(24inches cap cover soil +12" Base Foundation Layer)) X 134.444 (Conversion Factor) X Unit Cost X 80 acres (Coverage Area). Means Cost Derived using the following method: $2.07 (Total listed cost) X 89.2% (Salt Lake City Location Factor) + 3 Year Inflation (3% per year).
2.2.2	Geosynthetic Clay Layer						
2.2.2a	Geosynthetic Clay Installation	square feet	$0.41	3,484,800	$1,428,768	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004.(page 17 of 20)	80 acres
2.2.3	Flexible Membrane Cover						
2.2.3a	Flexible Membrane Installation	square feet	$0.34	3,484,800	$1,184,832	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004.(page 17 of 20)	80 acres
2.2.4	Drainage Layer						
2.2.4a	Geonet/Geotextile	square feet	$0.28	3,484,800	$975,744	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004.(page 17 of 20)	80 acres
2.4	Revegetation	acre	$421.00	80	$33,680	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 17 of 20)	80 acre (Coverage Area) X Unit Cost.
2.4.1	Seeding	-	-	included in 2.4			
2.4.2	Fertilize	-	-	included in 2.4			
2.4.3	Mulch	-	-	included in 2.4			
2.5	Site Grading and Drainage	$/acre	$1,180.00	80	$94,400	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 17 of 20)	80 acre (Coverage Area) X Unit Cost
2.6	Site Fencing and Security	-	-	-	-		Included in capital construction costs.
2.7	Leachate Collection System Completion	lump sum	$382,000.00	1	$382,000	RS Means 2000 03060-110-1050/1200; 02620-400-0100. Adjustments made for inflation and location. Includes transportation costs.	Assuming two sumps remain to be converted to gravel-filled sump/risers. Includes 3 acre-ft of clean, rounded, washed gravel per sump, 1.8 acres of geotextile per sump, and the riser/pipe structure itself.
2.8	Extracell leachate evaporation pond	lump sum	$188,000.00	1	$188,000	Estimate Based on Unit Costs from Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance 2004 (page 17 of 20), and RS Means 2003.	2.3 acres (Leachate Pond Area) X $1.45 (Sum of Unit Costs of Liner Components) + 3682 cubic yards (12" Liner Soil Cover Volume) X $5.67 (Combined Unit Cost for Soil Placement and Compaction) + $22,000 (Estimated Cost for Berm Construction, based on regional adjusted excavation and fill costs from RS Means 2003)
2.9	Legal Fees	percent	Total Construction Cost	-	-	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page	Included in the Legal Fees Line Item at the end of the Document

Item		Units	Unit Cost	Quantity	Total	Source	Note
3.0	Gas Collection System						
3.3	Equipment and Installation						
3.3.3	Install Passive Vents	acre	$526.00	80	$42,080	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 18 of 20)	80 acre (Coverage Area) X Unit Cost
3.3.4	Install, Rework or Replace Gas Control Equipment	percent of unit cost	5%	1	$2,104	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 18 of 20)	80 acres (Coverage Area) X 5% of Unit Cost

Item		Units	Unit Cost	Quantity	Total	Source	Note
4.0	Monitor Well Installation Cost						
4.1	Ground Water Monitoring Well Installation, Reworking or Replacement	vertical linear feet	$43.54	75	$3,266	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 18 of 20)	Well depths assumed 30'. Quantities estimated for 25% of 6 initial wells, plus construction of 7th well for leachate pond
4.2	Install, Rework, or Replace Methane Probes	vertical linear feet	$37.60	330	$12,408	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 18 of 20)	30' (Probe Depth) X 11 (Initial Gas Monitoring Probes) X Unit Cost
4.3	Monitor Well, or Methane Probe Plugging	vertical linear feet	$16.26	540	$8,780	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 18 of 20)	540' (Sum of Groundwater Well and Gas Monitoring Probe Depths) X Unit Cost. Unit cost has been adjusted for inflation, location, and represents the weighted average of costs for Groundwater Well plugging and Gas Probe plugging).
5.0	Contract Performance Bond	lump sum	-	-	-	RS Means 2000 01300-200-0300/0350 and R01100-080.	Percentage of construction costs. Included in the Contract Performance Services Line Item at the end of the document.

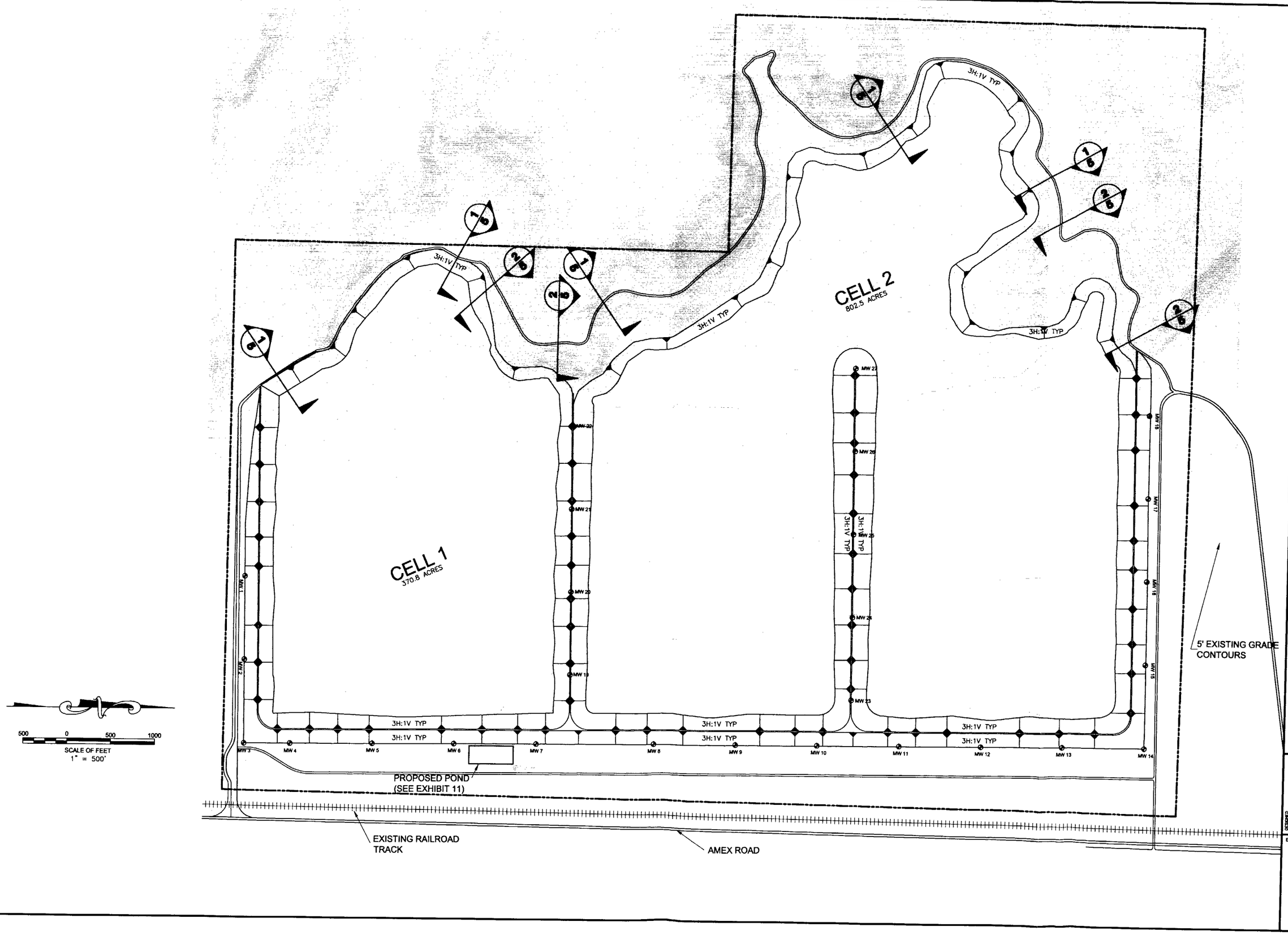
Post-Closure Cost Estimate

Item		Units	Unit Cost	Quantity	Total	Source	Note
1.0	Engineering Cost						
1.1	Post-Closure Plan and Post-Closure Permits	lump sum	included in 1.3	-	-	Estimated Cost	Permit + Renewals
1.2	Site Inspection and Record keeping (annual)	lump sum	$526.00	120	$63,120	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 19 of 20)	30 (Number of Years for the Post-Closure Period) X 4 (Site Inspections performed quarterly) X Unit Cost.
1.3	Post Closure Technical and Professional Services	percent	Total post-closure maintenace and monitoring cost	-	-	Percent of post-closure monitoring and maintenance costs as per Oklahoma Department of Environmental Quality (DEQ) Solid Waste Assurance Program Report,2000 (page 4-78)	Unit cost represents a percentage of total post-closure monitoring and maintenance cost, not including post-closure administrative services. The unit cost includes technical and professional services such as : post-closure and post-closure permits, correctional plans and specifications, final post-closure certification and other technical and professional tasks and services associated with completing postclosure monitoring. The line item cost is listed at the end of the document
1.4	Site Monitoring						
1.4.1	Ground Water Monitoring						
1.4.1a	Ground Water Sample Collection	per sample	$40.00	420	$16,800	Estimated Cost	30 (Years in Post -Closure Period) X 7 (Number of Ground Water Monitoring Wells) X 2 (Samples per Year) X Unit Cost.
1.4.1b	Ground Water Sample Analysis	per sample	$630.00	420	$264,600	American West Analytical Laboratories. Metals Analysis = $177.00 Inorganic Analysis = $253.00 Organic Analysis = $200.00	30 (Years in Post -Closure Period) X 7 (Number of Ground Water Monitoring Wells) X 2 (Samples per Year) X Unit Cost.
1.4.1c	Ground Water Sample Analysis Review and Reporting	per sample per well	$567.62	420	$238,400	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 19 of 20)	7 (Number of Ground Water Monitoring Wells) X 2 (Samples per Year) X Unit Cost X 30 (Years in Post Closure Period)
1.4.2	Landfill Gas Monitoring						
1.4.2a	Gas Monitoring Data Collection	probe per year	$2,412.00	660	$1,591,920	Estimated Cost	11 (Number of Gas Monitoring Probes) X Unit Cost X 2 (semiannual sampling) X 30 (Years in Post -Closure Period)
1.4.2b	Gas Monitoring Data Review and Reporting	per sample	$36.82	660	$24,301	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 19 of 20)	11 (Number of Gas Monitoring Probes) X (semiannual sample) X Unit Cost X 30 (Years in Post-Closure Period)
2.0	Maintenance Costs						
2.1	Cover Maintenance Costs						
2.1.1	Soil Replacement	cubic yard	$2.00	2 cy/acre/yr	$9,600	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004.	30 (Number of Years in the Post -Closure Period) X 80 acres (Coverage Area) X 2 (Quantity Adjustment) X Unit Cost
2.1.2	Vegetation Reseeding	acre	$421.00	20% of area/yr	$202,080	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 19 of 20)	30 (Number of Years in the Post-Closure Period) X 80 acres (Coverage Area) X 20% (Quantity Adjustment) X Unit Cost
2.2	Equipment Maintenance						
2.2.1	Ground Water Well Maintenance and Replacement	vertical linear feet	$43.54	25% of wells	$182,868	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 19 of 20)	30' (Depth of Monitoring Well) X 7 (Initial Ground Water Monitoring Wells) X 25% (Quantity Adjustment) X Unit Cost X 30 (Years in Post-Closure Period)
2.2.2	Methane Probe Maintenance and Replacement	vertical linear feet	$37.60	25% of probes	$248,160	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 19 of 20)	30' (Depth of Gas Monitoring Probes) X 11 (Initial Gas Monitoring Probes) X 25% (Quantity Adjustment) X Unit Cost X 30(Years in the Post-Closure Period)
2.2.5	Leachate Collection System						
2.2.5a	Leachate Collection System Repair and Maintenance	cost per year	$2,103.50	30	$63,105	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 19 of 20)	Unit Cost X 30 (Years in Post-Closure Period)
2.2.5b	Clean Leachate Lines	cost per year	$1,315.00	30	$39,450	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 19 of 20)	Unit Cost X 30 (Years in Post-Closure Period)
2.25c	Leachate Pond Sampling and Analysis	year	$900.00	60	$54,000	Oklahoma Department of Environmental Quality (DEQ) Solid Waste Assurance Program Report,2000 (page 4-71)	Unit Cost/Year X 2 (Samples per Year) X 30 (Years in Post-Closure Period)
3.0	Final Plugging of Monitoring Wells						
3.1	Final Plugging of Methane Probes	vertical linear feet	$14.73	330	$4,861	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 20 of 20)	30' (Depth of Gas Monitoring Probes) X 11 (Initial Gas Monitoring Probes) X Unit Cost
3.2	Final Plugging of Ground Water Monitoring Wells	vertical linear feet	$18.67	210	$3,921	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 20 of 20)	30' (Depth of Ground Water Monitoring Wells) X 7 (Initial Ground Water Monitoring Wells) X Unit Cost
5.0	Roadway Maintenance	linear feet	-	included in 5.3	-		

5.1	Repair of Surface Water Diversion Structures	linear feet	-	included in 5.3	-		
5.2	Repair of Fences and Gates			included in 5.3			
5.3	General Maintenance	per year	$1,577.00	30	$47,310	Utah Division of Solid and Hazardous Waste; Solid Waste Management Program. Guidance, 2004. (page 20 of 20) Oklahoma DEQ Solid Waste Assurance Program Report, 2000 (page 4-60)	30 (Number of Years in the Post-Closure Period) X Unit Cost. Includes: site security and access control measures, utilities, lighting and lamp poles, site access roads, surface water control structures (ditches, berms, terraces, sedimentation ponds, etc.), other on-site improvements and equipment.
6.0	Demonstration of Stability	-	included in 1.3	-	-		

Closure Construction Cost:	$6,632,339
10% Contingency	$663,234
10% Administration Costs	$663,234
12% Technical and Professional Services	$795,881
0.5% Contract Performance Services	$33,162
12.5% Legal Fees	$829,042
Total Closure Cost:	**$9,616,891**
Post-Closure Maintenance and Monitoring Cost:	$3,054,496
10% Contingency	$305,450
6% Administration Costs	$183,270
7% Technical and Professional Services	$213,815
Total Post-Closure Cost:	**$3,757,030**
TOTAL CLOSURE & POST-CLOSURE CARE COSTS:	**$13,373,922**

This estimate is provided as a service to our client for comparative purposes only, and is based on prices current at the time this estimate was prepared. Actual costs and quantities may vary due to a number of circumstances, including but not limited to: changes in field conditions, availability and/or cost of materials, methods and/or timing of construction, economic fluctuations, and inflation. No cost guarantee is expressed or implied. See attached or included assumptions and qualifications.



LICENSED PROFESSIONAL ENGINEER
No. 147727
S. SCOTT CARLSON
STATE OF UTAH

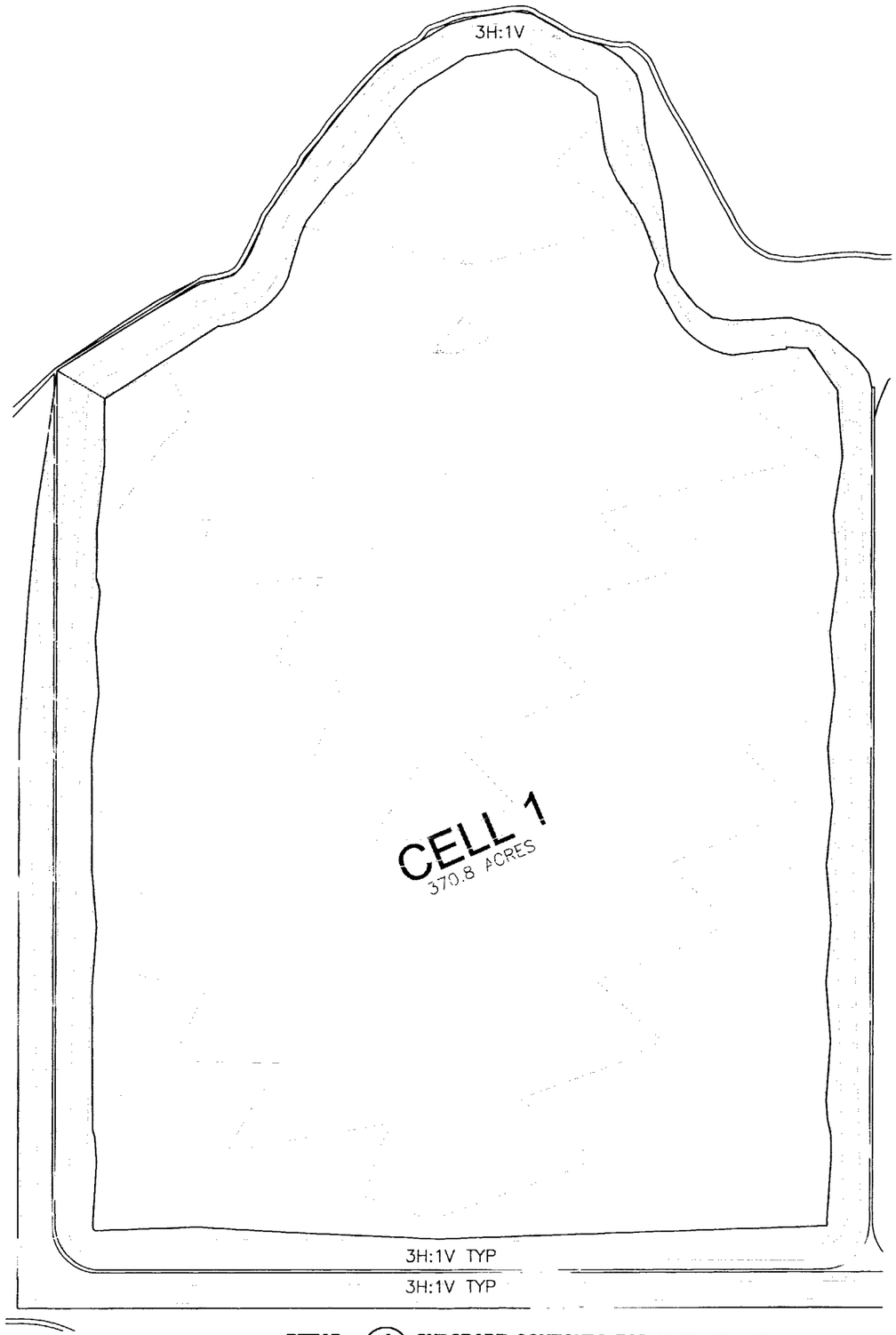
DATE 1-25-2004
SCALE SEE DRAWING
PROJECT NO. 8WEL010100

WASATCH REGIONAL LANDFILL
SITE PLAN

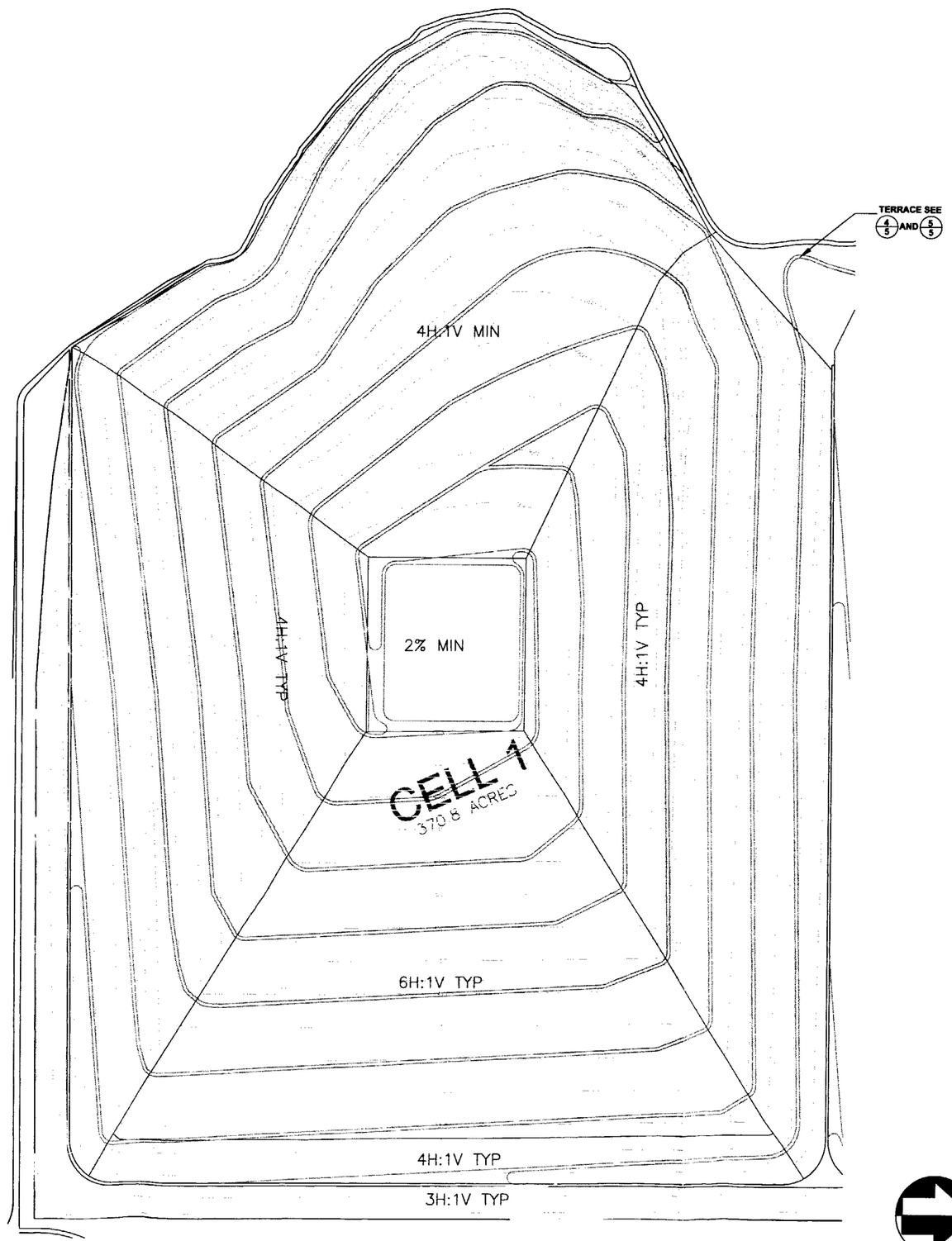
PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED BRH
DRAWN BRH
CHECKED SSC

EXHIBIT 1



DETAIL 1/2A SUBGRADE CONTOURS FOR UNFILLED CELL
5' CONTOUR INTERVAL



DETAIL 2/2A FINISH GRADE CONTOURS FOR CAPPED CELL
5' CONTOUR INTERVAL

300 0 300 600
SCALE OF FEET

NOTES:
1. THE SUBGRADE CONTOURS REPRESENT PRE-CONSOLIDATION CONDITIONS.
2. CONSOLIDATED ELEVATION OF LINER BOTTOM 5 FT HIGHER THAN HISTORIC HIGH GROUNDWATER TABLE.

PROFESSIONAL ENGINEER No. 187241 S. SCOTT CARLSON STATE OF UTAH

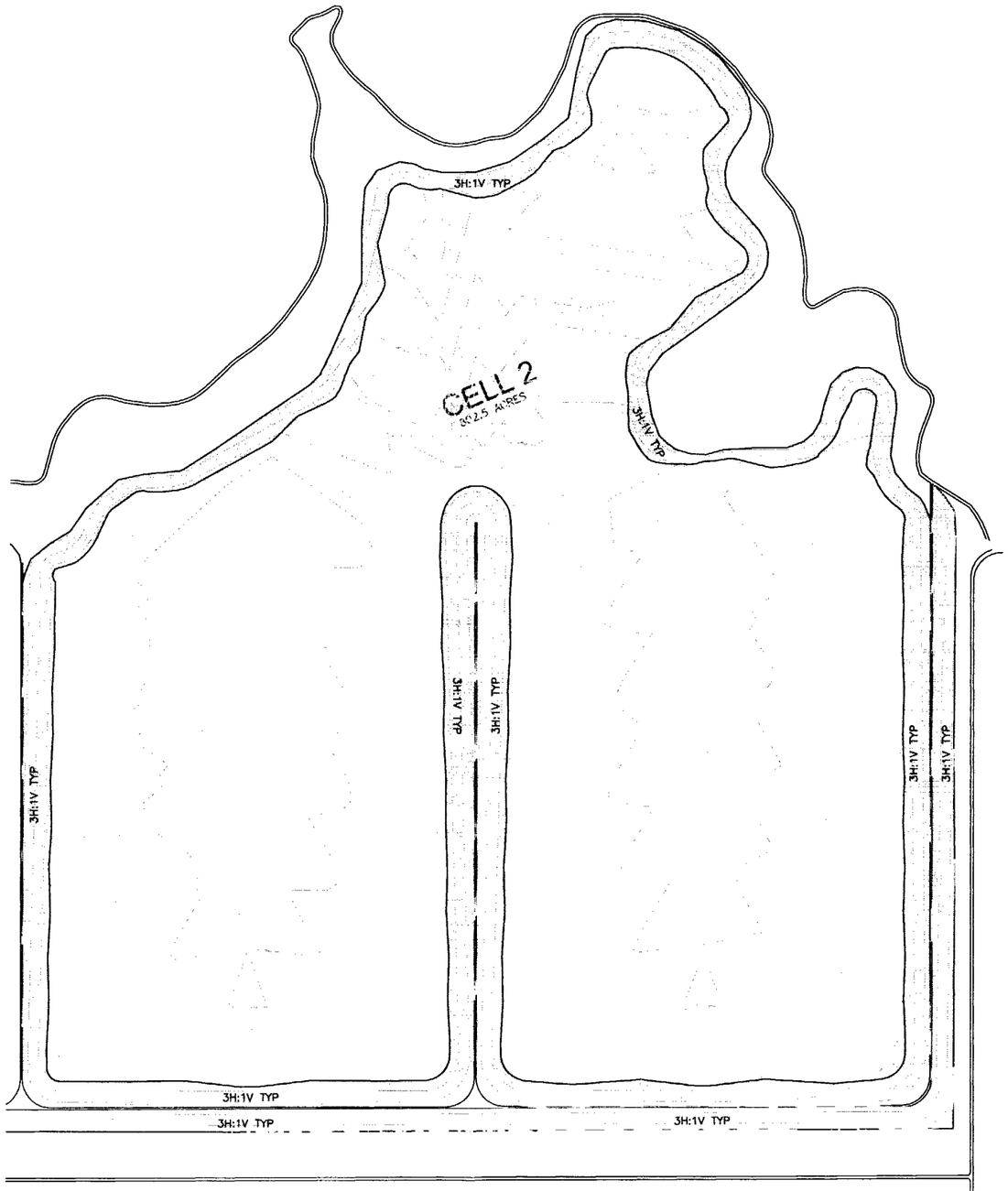
DATE 2-5-2004
SCALE 1" = 300'
PROJECT NO. 8WEL010100

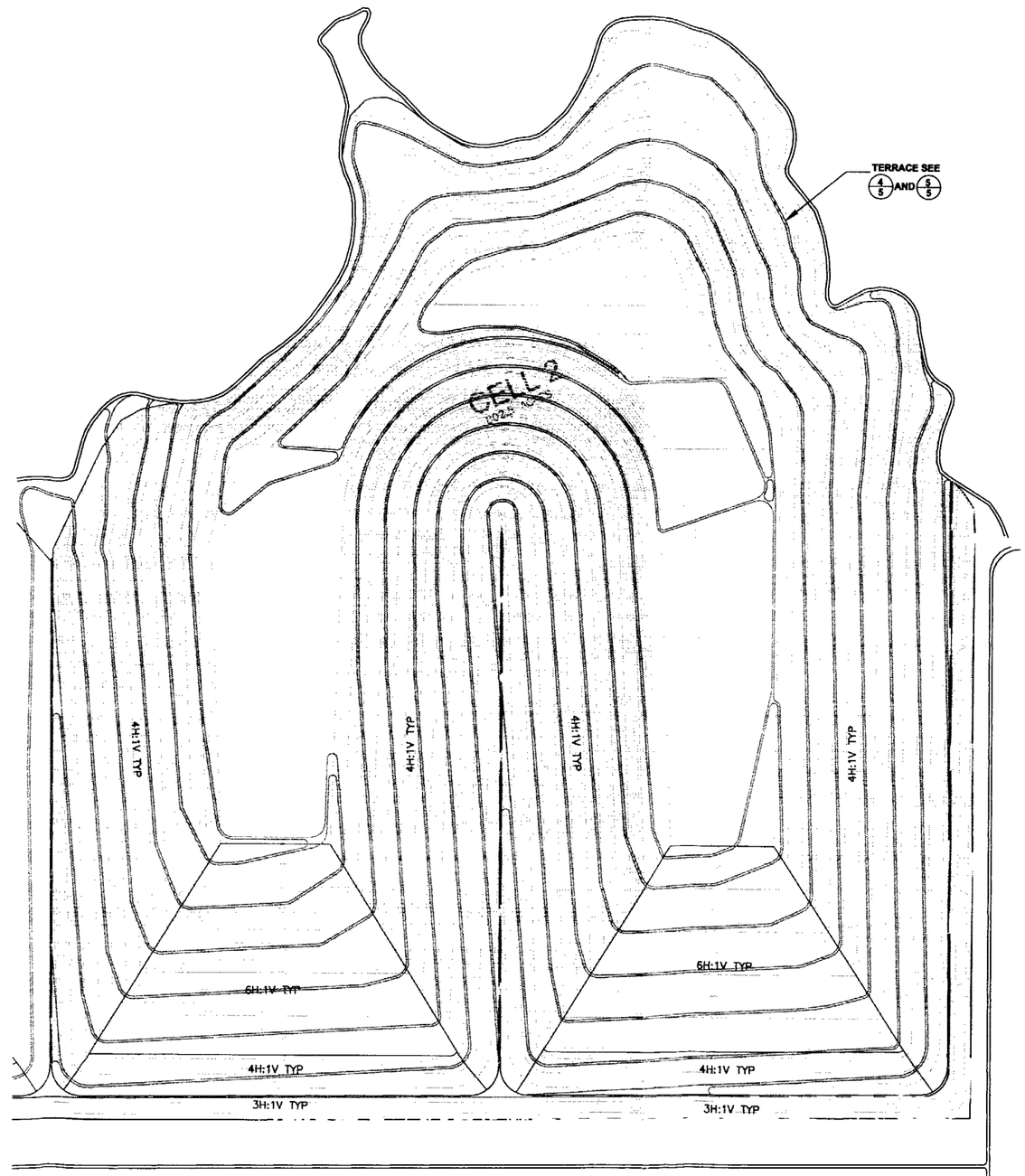
WASATCH REGIONAL LANDFILL
CELL 1
PROPOSED CONTOURS

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED BRH
DRAWN BP
CHECKED SSC

SHEET 2A





500 0 500 1000
SCALE OF FEET

DETAIL 1/2B SUBGRADE CONTOURS FOR UNFILLED CELL
5' CONTOUR INTERVAL

NOTE:
1. THE SUBGRADE CONTOURS REPRESENT PRE-CONSOLIDATION CONDITIONS.

DETAIL 2/2B FINISH GRADE CONTOURS FOR CAPPED CELL
5' CONTOUR INTERVAL

LICENSED PROFESSIONAL ENGINEER
No. 161782
S. SCOTT CARLSON
STATE OF UTAH

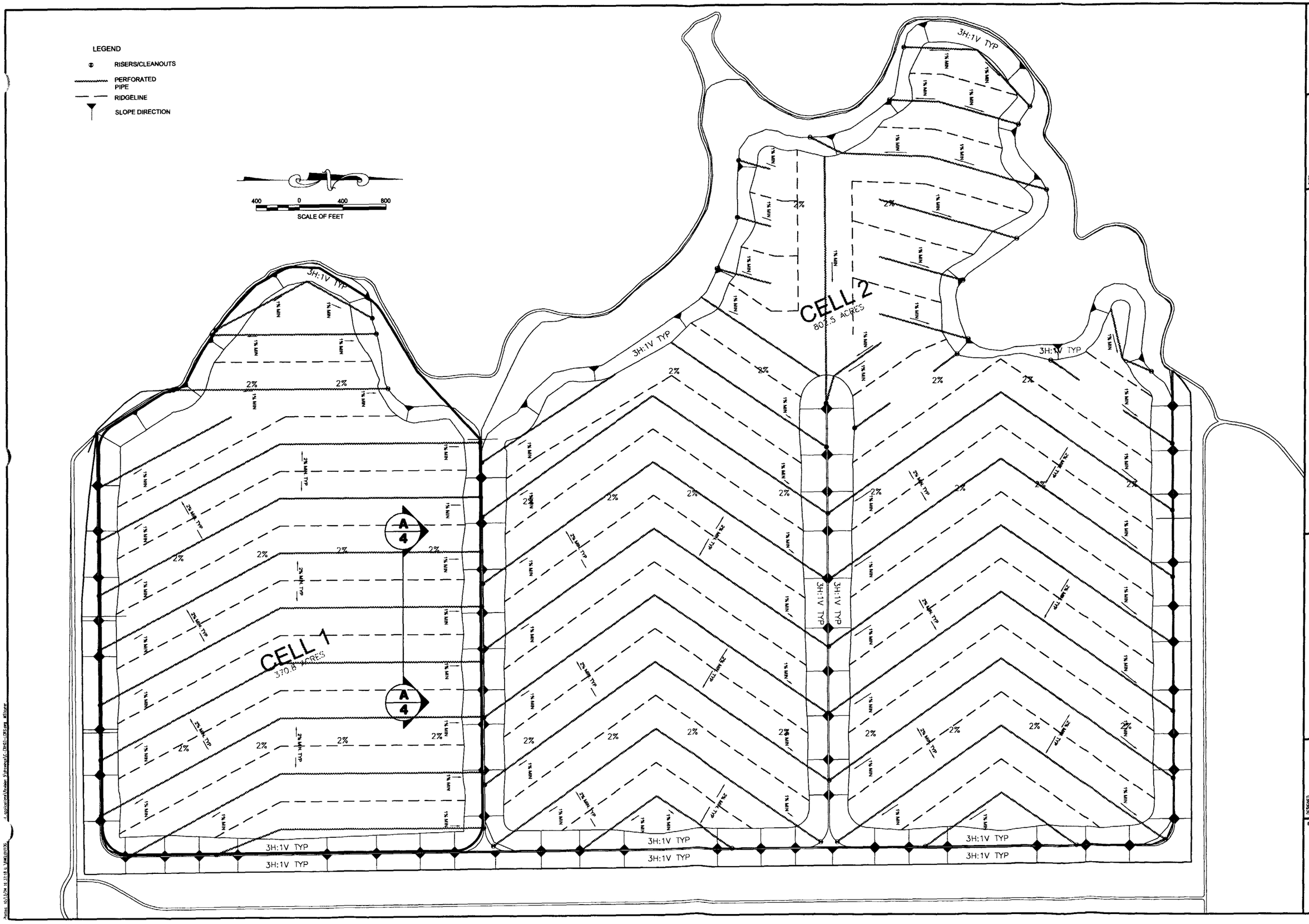
DATE 2-5-2004
SCALE 1" = 500'
PROJECT NO. 8WEL010100

WASATCH REGIONAL LANDFILL
CELL 2
PROPOSED CONTOURS

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED BRH
DRAWN BP
CHECKED SSC

EXHIBIT
2B



DATE 2-5-2004

SCALE SEE DRAWING

PROJECT NO. BWEL010100

WASATCH REGIONAL LANDFILL
CELL 1
LEACHATE COLLECTION SYSTEM

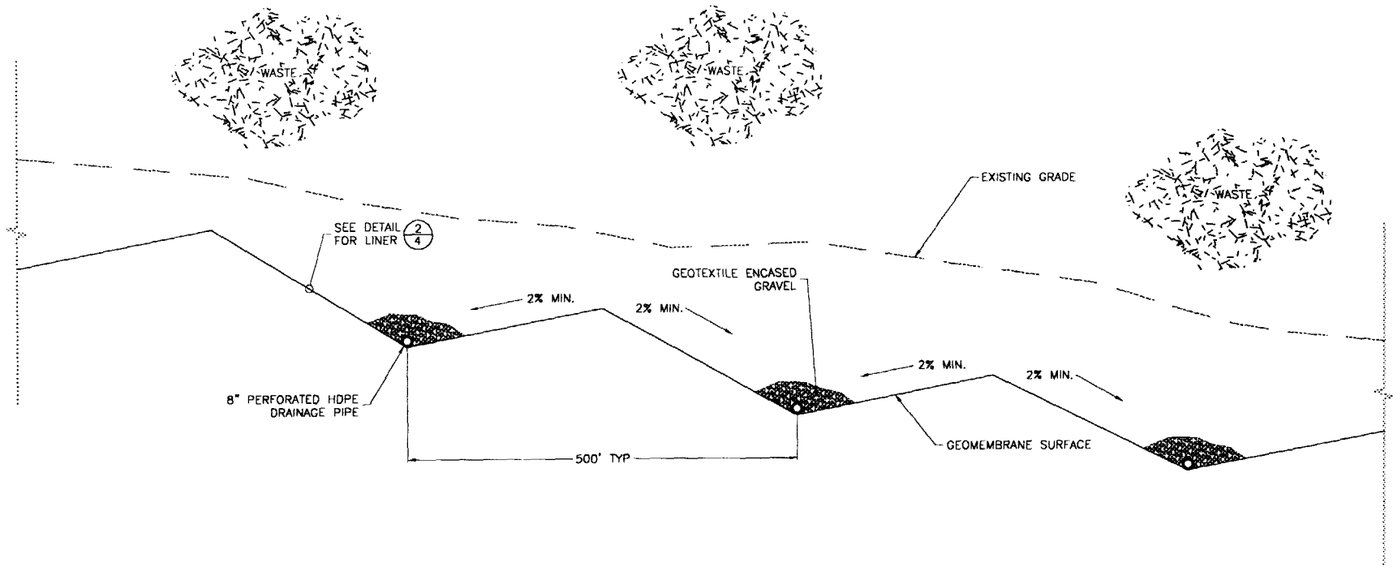
PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED BRH

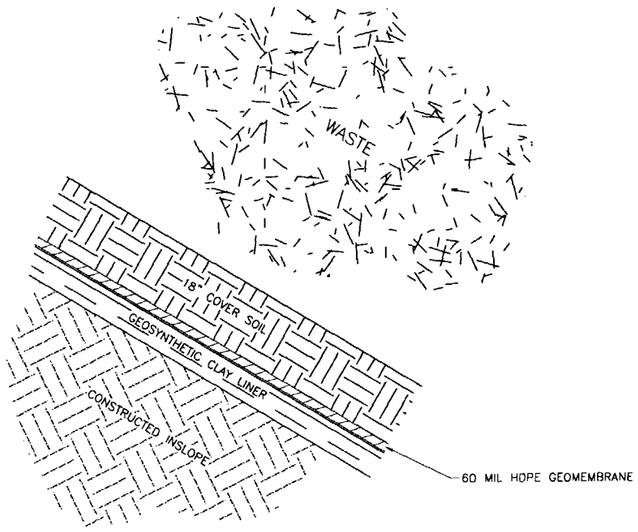
DRAWN BRH

CHECKED SSC

EXHIBIT 3

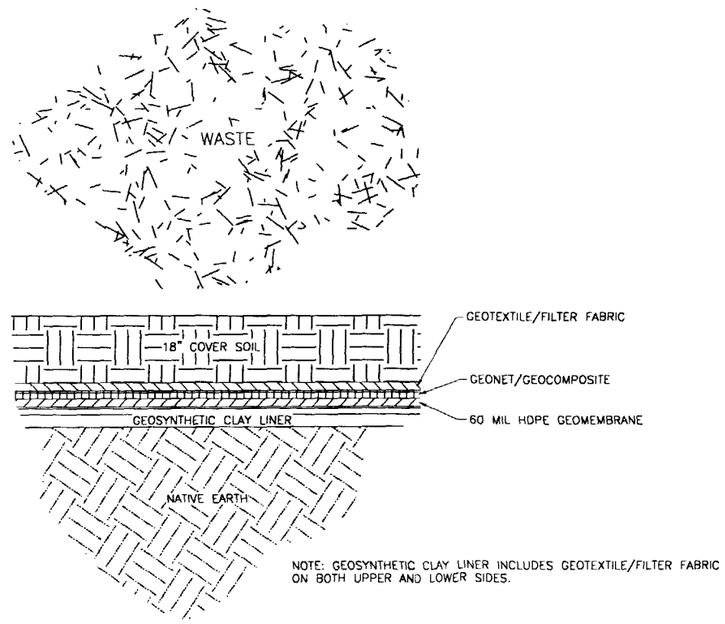


SECTION A/3 LANDFILL CELL CROSS SECTION
NTS



NOTE: GEOSYNTHETIC CLAY LINER INCLUDES GEOTEXTILE/FILTER FABRIC ON BOTH UPPER AND LOWER SIDES.

DETAIL 1/4 BERM AND INSLOPE LINERS
NTS



NOTE: GEOSYNTHETIC CLAY LINER INCLUDES GEOTEXTILE/FILTER FABRIC ON BOTH UPPER AND LOWER SIDES.

DETAIL 2/4 CELL FLOOR LINERS
NTS

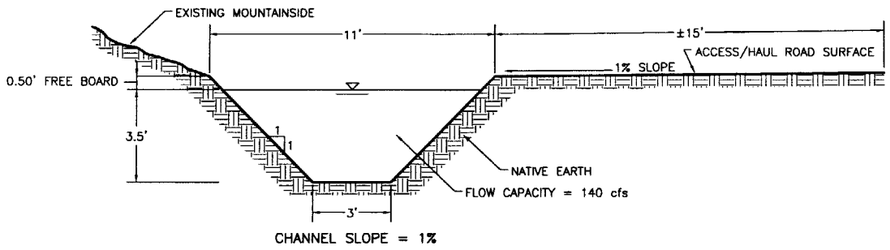
DATE 2-5-2004
SCALE NTS
PROJECT NO. BWEL010100

WASATCH REGIONAL LANDFILL
LINER AND LEACHATE SYSTEM
DETAILS & CROSS-SECTIONS

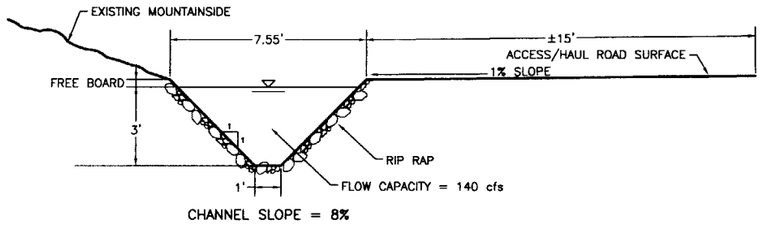
PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED BRH
DRAWN BRH
CHECKED SSC

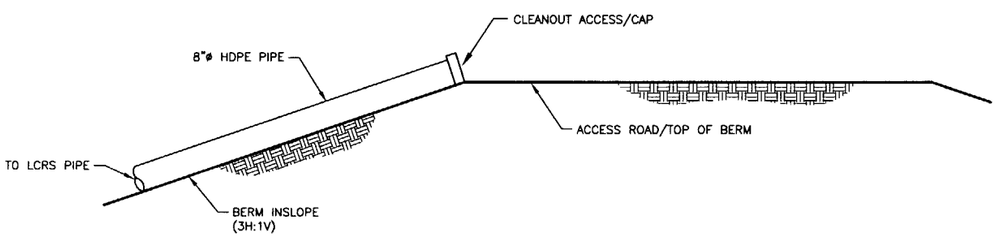
EXHIBIT 4



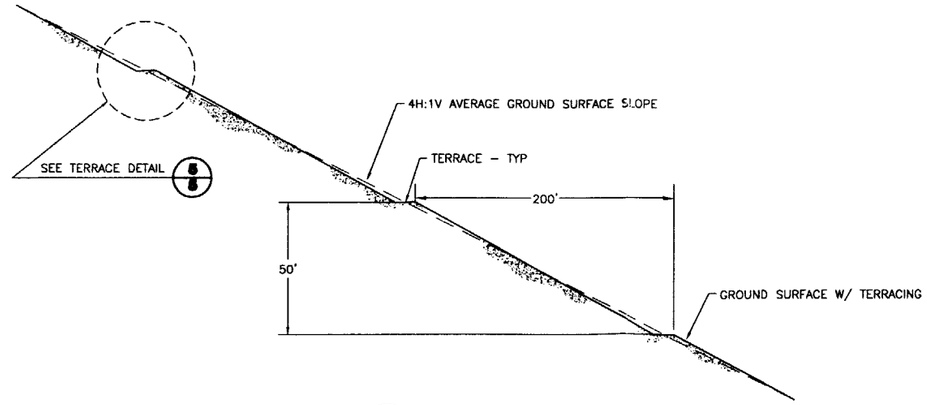
DETAIL 1/1 DRAINAGE DITCH
SCALE: 1"=3'



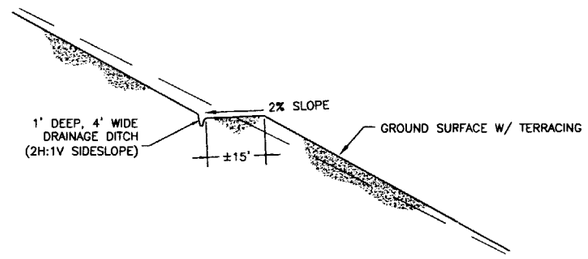
DETAIL 2/1 DRAINAGE DITCH
SCALE: 1"=3'



DETAIL 3/5 CLEANOUT
SCALE: 1"=2'



DETAIL 4/5 SITE TERRACING
HORIZONTAL SCALE: 1"=60'
VERTICAL SCALE: 1"=30'



DETAIL 5/5 TERRACE DETAIL
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=10'

LICENSED PROFESSIONAL ENGINEER
No. 187721
B. CARLSON
STATE OF UTAH

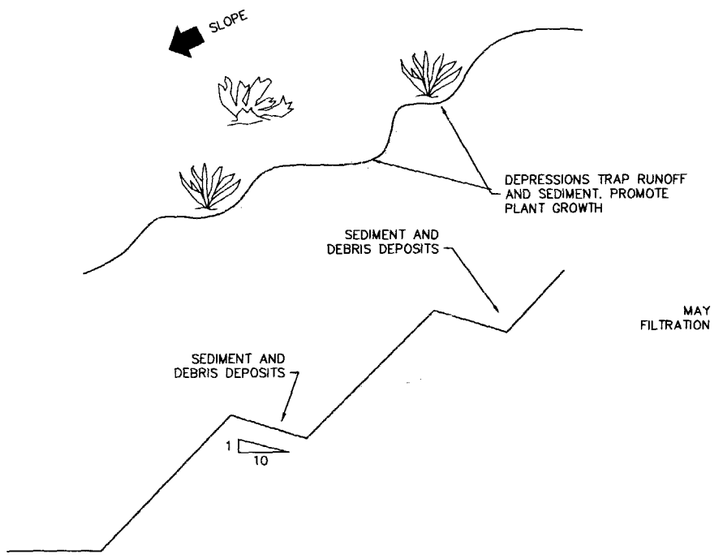
DATE 05-15-04
SCALE SEE DRAWING
PROJECT NO. BWEL010100

WASATCH REGIONAL LANDFILL
CIVIL DETAILS

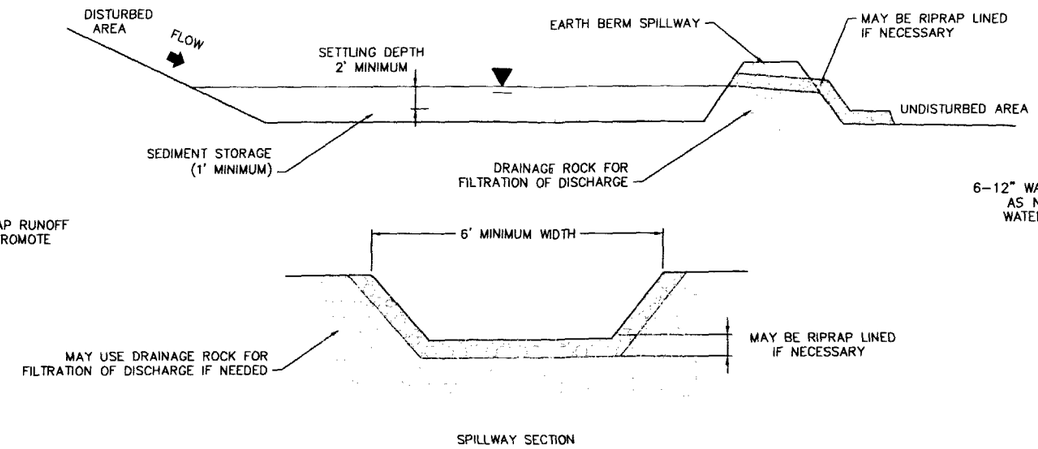
PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED BRH
DRAWN DRC
CHECKED SSC

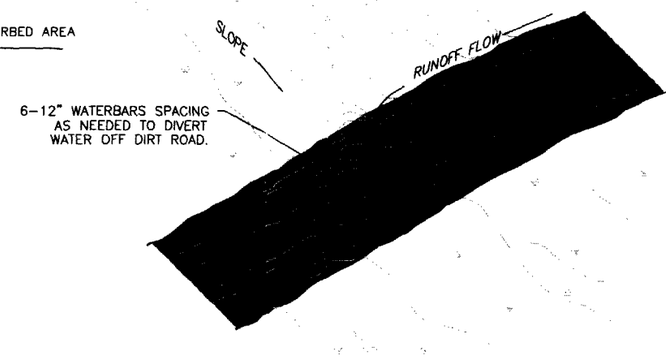
EXHIBIT 5 OF —



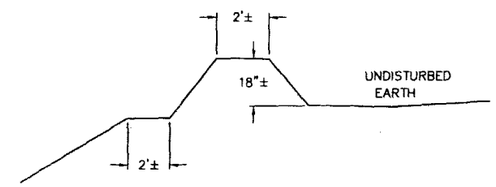
SURFACE ROUGHENING/BENCHING



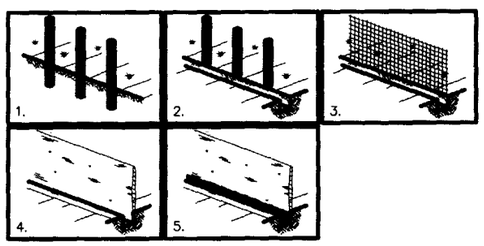
SEDIMENT TRAP



WATER BARS



BERM DETAIL



2- GENERAL NOTES:

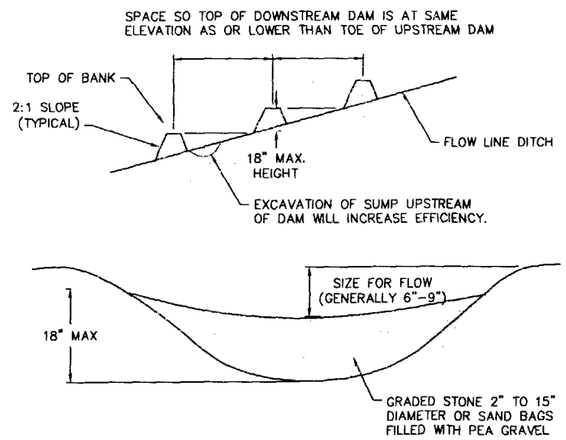
A- FILTER FABRIC: STANDARD BURLAP (7-1/2 OZ. PER SQUARE FOOT) MAY BE USED FOR INSTALLATIONS OF SHORT DURATION. MORE ROT-RESISTANT FABRICS ARE ADVISED FOR INSTALLATION PERIODS IN EXCESS OF 2 TO 3 MONTHS. (NAMES OF SUGGESTED MFRS. AND PRODUCTS ARE AVAILABLE UPON REQUEST.)

B- THE FABRIC IS CUT ON SITE TO THE DESIRED WIDTH, UNROLLED ALONG THE LENGTH OF THE BARRIER AND DRAPED OVER THE BARRIER. THE FABRIC TOE IS SECURED WITH ROCKS OR DIRT AND THE FABRIC COVERING THE BARRIER IS SECURED TO THE BARRIER WITH TWINE, STAPLES, OR SIMILAR DEVICES.

C- AFTER THE CONSTRUCTION AREA IS STABILIZED AND EROSION ACTIVITY CURTAILED, THE SEDIMENT BARRIERS ARE REMOVED AND THE CONTAINED SEDIMENT IS LEVELED, SEEDED, AND MULCHED. SPECIAL PROTECTION OF THE SEED BED MAY BE NECESSARY IF THE LAYERS ARE OVER A FOOT THICK.

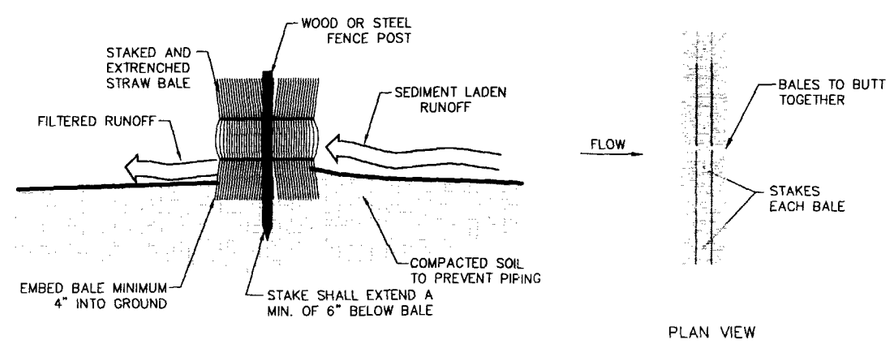
D- FOR EXTRA STRENGTH AND REDUCED MAINTENANCE FENCING MAY BE REINFORCED WITH GALVANIZED STEEL WIRE MESH (14 GAGE MIN., 6" X 6" OPENINGS MAXIMUM).

SILT FENCE DETAIL



ROCK CHECK DAMS

IN DRAINAGE WAYS



CROSS-SECTION OF A PROPERLY PLACED STRAW BALE

STRAW BALES CHECK DAM DETAIL

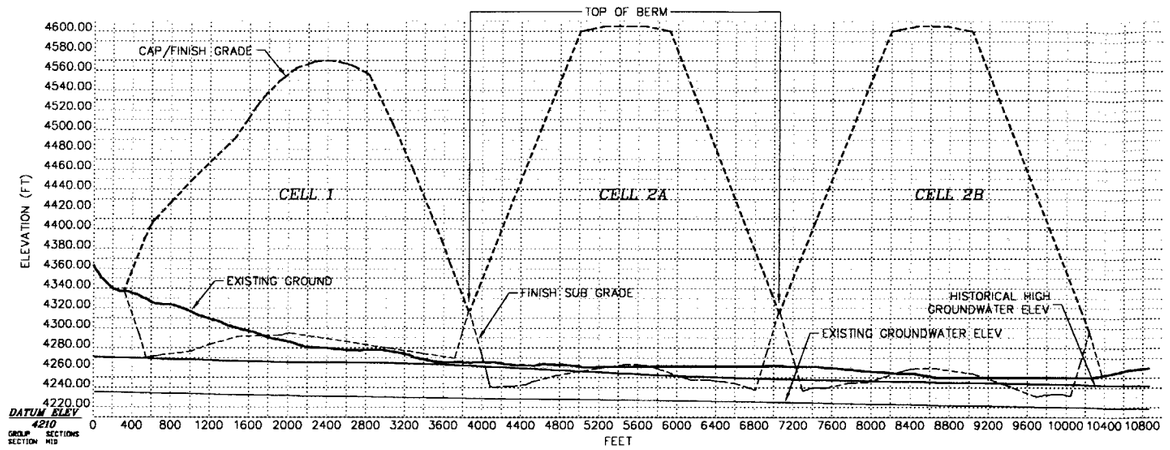
DATE 10-07-2003
PLOT DATE
SCALE SEE DRAWING
PROJECT NUMBER 8WEL010100

WASATCH REGIONAL LANDFILL
BEST MANAGMENT PRACTICES

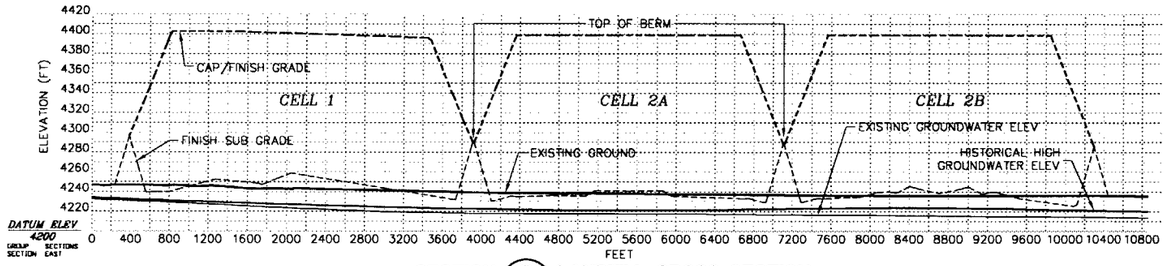
PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, UT 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED CRG
DRAWN CES
CHECKED SSC

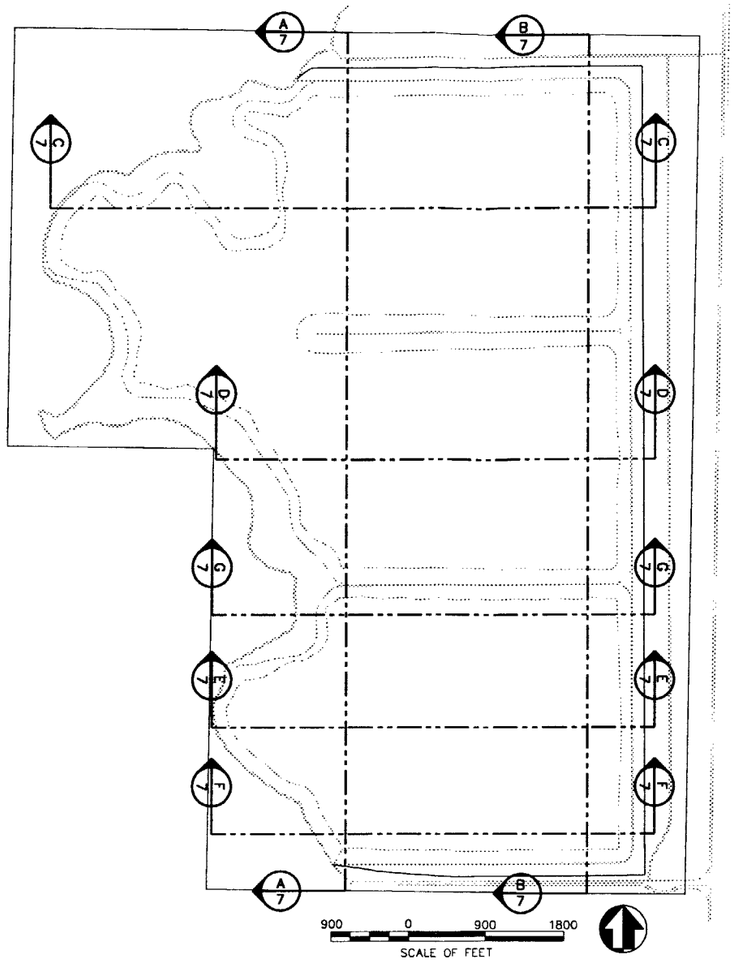
EXHIBIT
6



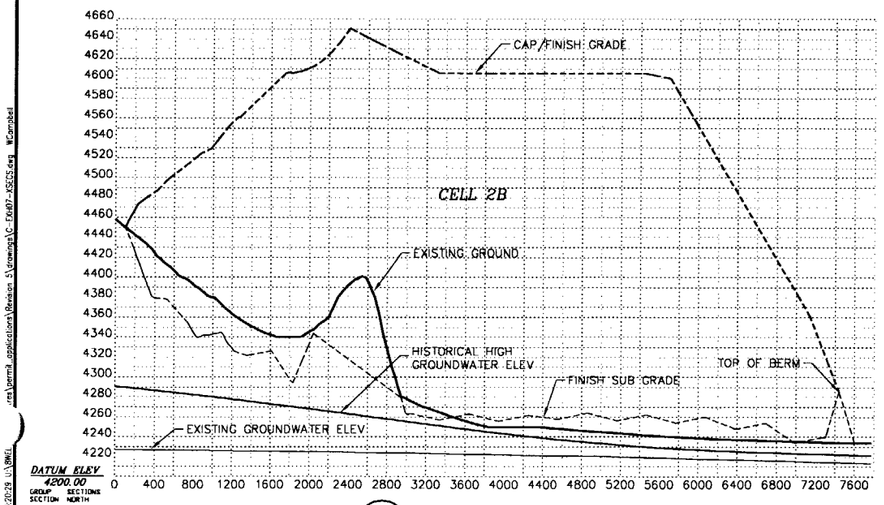
SECTION A/7 LANDFILL CROSS SECTION
HORIZONTAL SCALE: 1"=800'
VERTICAL SCALE: 1"=80'



SECTION B/7 LANDFILL CROSS SECTION
HORIZONTAL SCALE: 1"=800'
VERTICAL SCALE: 1"=80'



DETAIL 1/7 LANDFILL PLAN VIEW
SCALE: 1"=1000' ON ORIGINAL



SECTION C/7 LANDFILL CROSS SECTION
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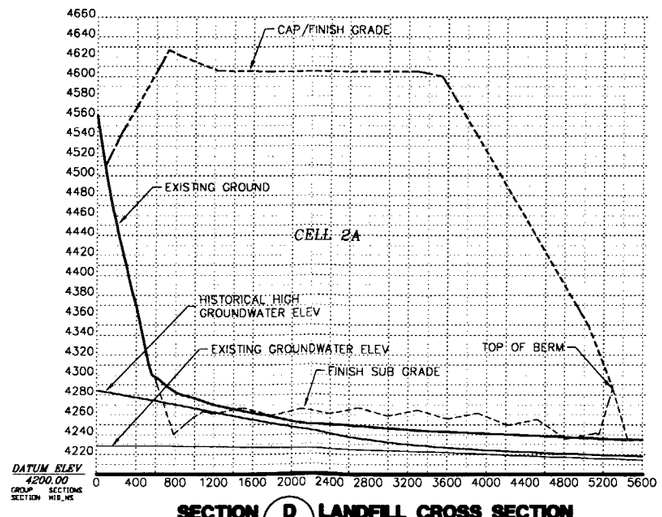
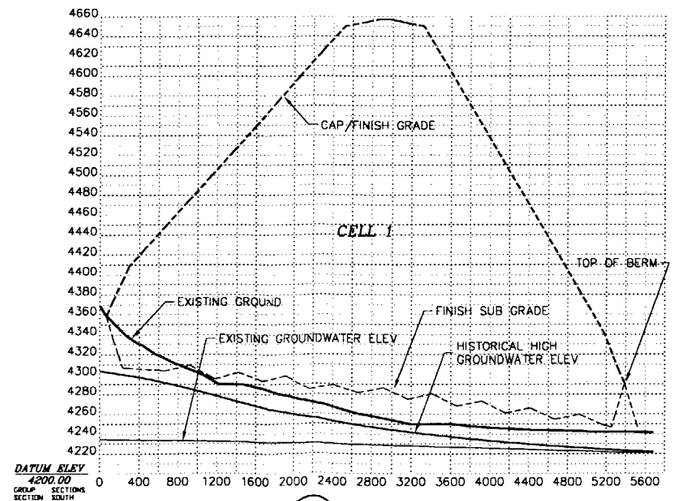
VERTICAL SCALE: 1"=80'



SECTION D/7 LANDFILL CROSS SECTION
HORIZONTAL SCALE: 1"=800'
VERTICAL SCALE: 1"=80'



SECTION E/7 LANDFILL CROSS SECTION
HORIZONTAL SCALE: 1"=800'
VERTICAL SCALE: 1"=80'

LICENSED PROFESSIONAL ENGINEER No. 187727 S. SCOTT CARLSON STATE OF UTAH

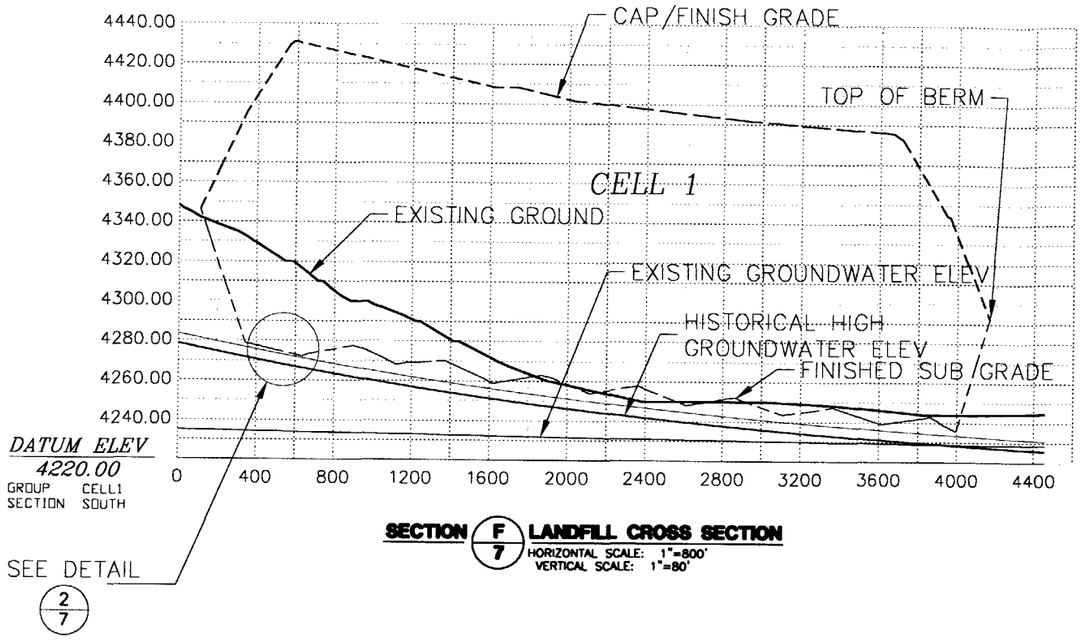
DATE 05-15-04
SCALE SEE DRAWING
PROJECT NO. 8WEL010100

WASATCH REGIONAL LANDFILL CROSS-SECTIONS

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED BRH
DRAWN DRC
CHECKED SSC

EXHIBIT 7A
OF —



SECTION F/7 LANDFILL CROSS SECTION
HORIZONTAL SCALE: 1"=800'
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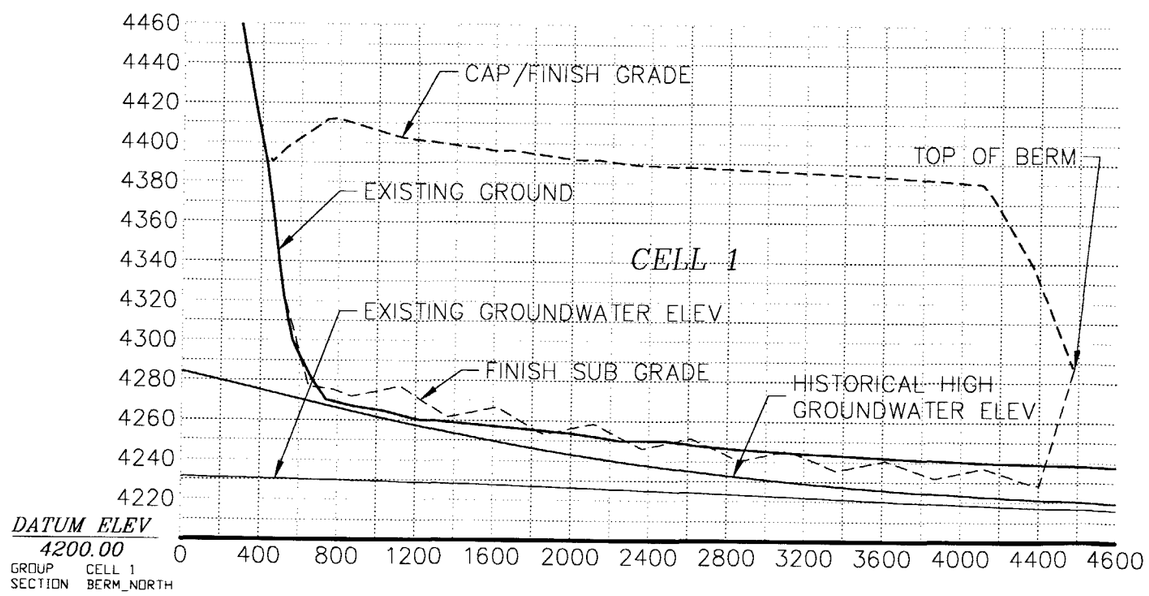
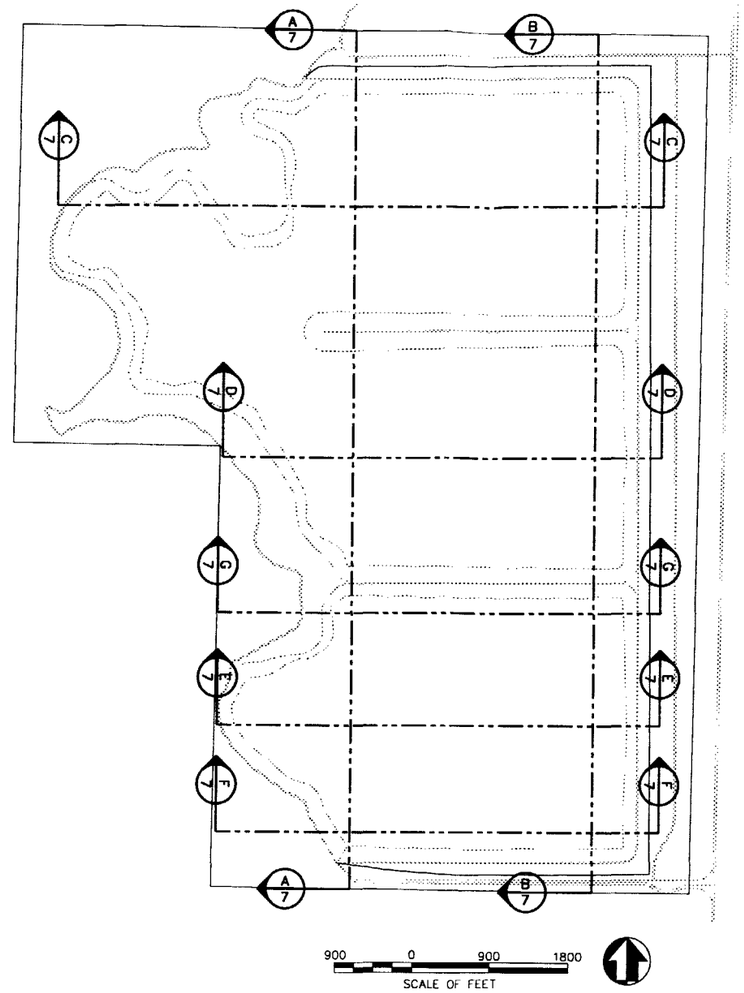
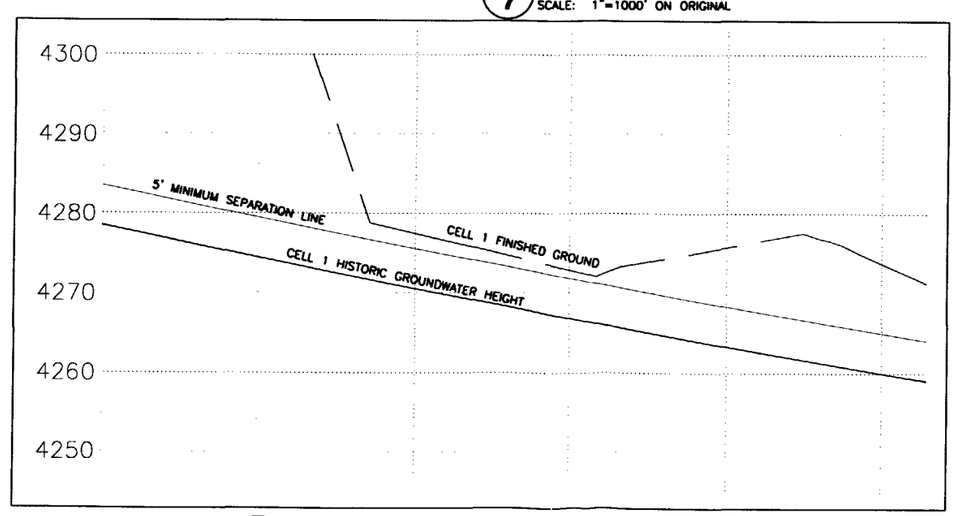


SECTION G/7 LANDFILL CROSS SECTION
HORIZONTAL SCALE: 1"=800'
VERTICAL SCALE: 1"=80'



DETAIL 1/7 LANDFILL PLAN VIEW
SCALE: 1"=1000' ON ORIGINAL



DETAIL 2/7 FINISHED GRADE AND HISTORIC GROUNDWATER SEPERATION
SCALE: 1"=20' VERTICAL

LICENSED PROFESSIONAL ENGINEER
No. 187724
SCOTT D. CARLSON
STATE OF UTAH

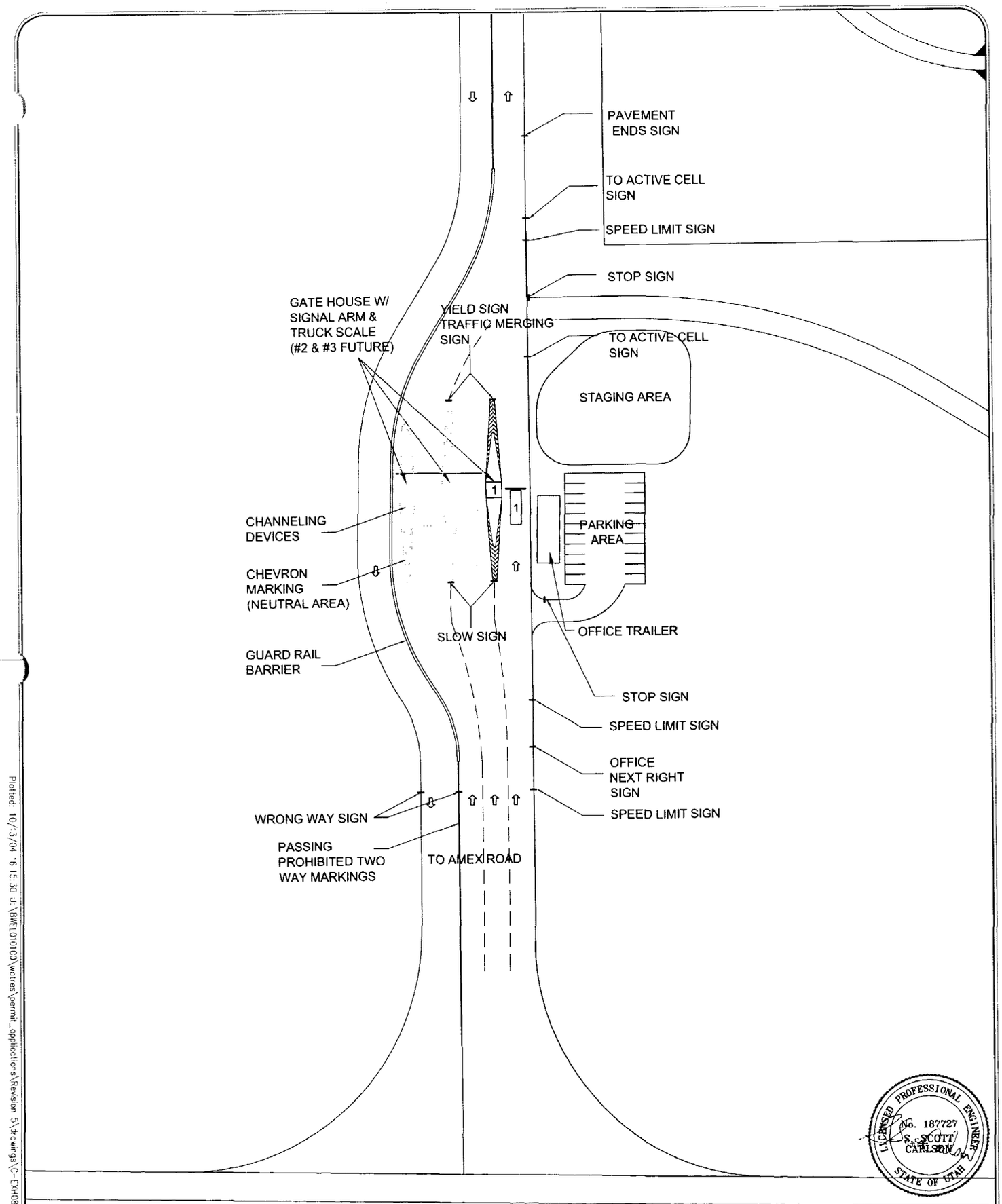
DATE 05-15-04
SCALE SEE DRAWING
PROJECT NO. 8WEL010100

WASATCH REGIONAL LANDFILL
CROSS-SECTIONS

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED BRH
DRAWN DRC
CHECKED SSC

EXHIBIT 7B
OF —

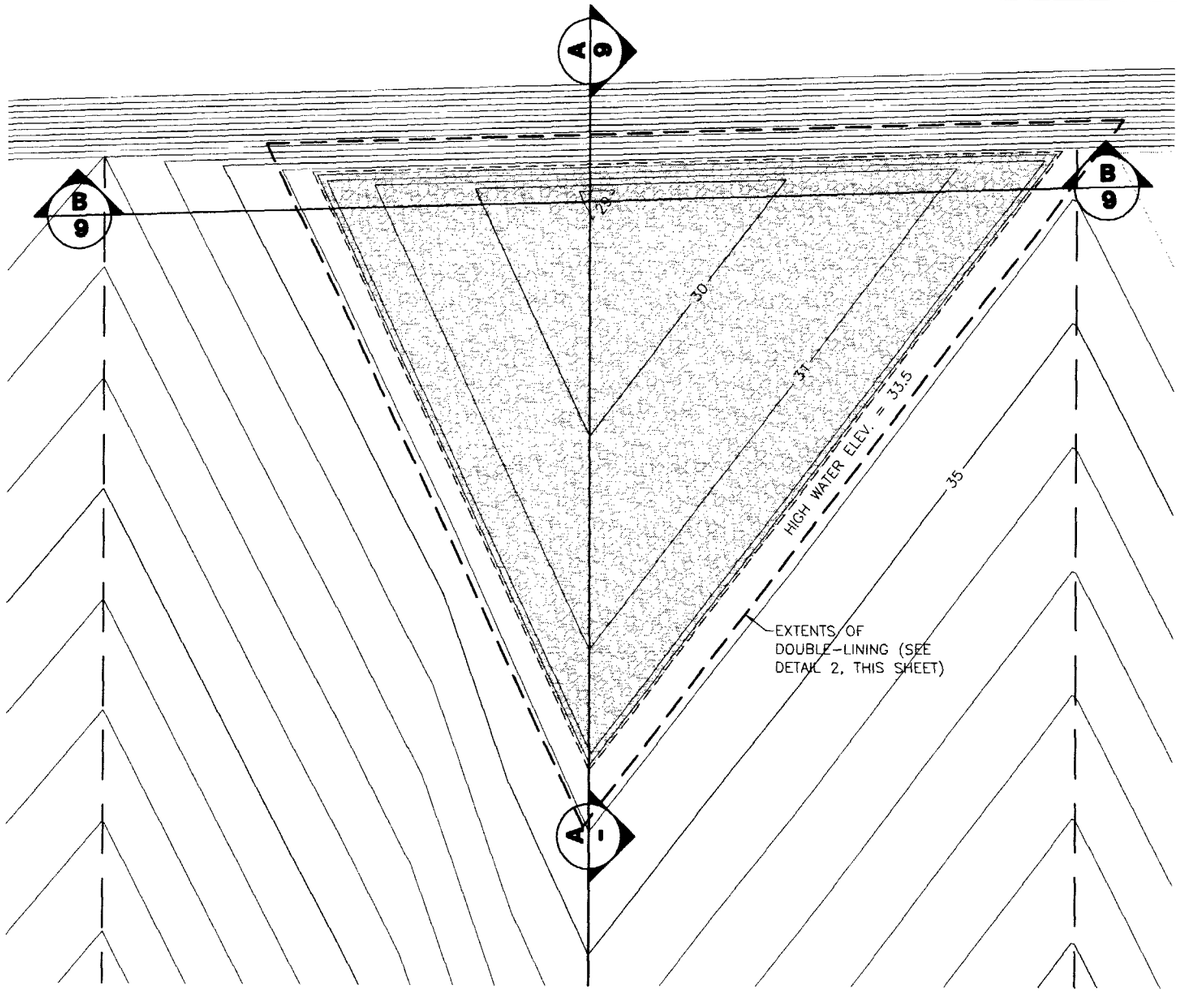


Plotted: 10/13/04 16:15:30 J:\8WEL010100\waters\permit_applications\Revision 5\drawings\C-EXH08-.dwg WCampbell

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

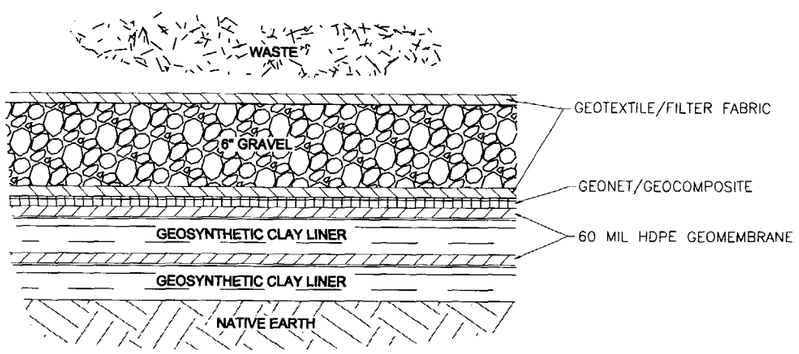
WASATCH REGIONAL LANDFILL
TRAFFIC CONTROL

Scale: 1"=80'	PROJECT NO. 8WEL010100
Drawn by: BP	FIGURE #/EXHIBIT 8
Checked by: BRH	

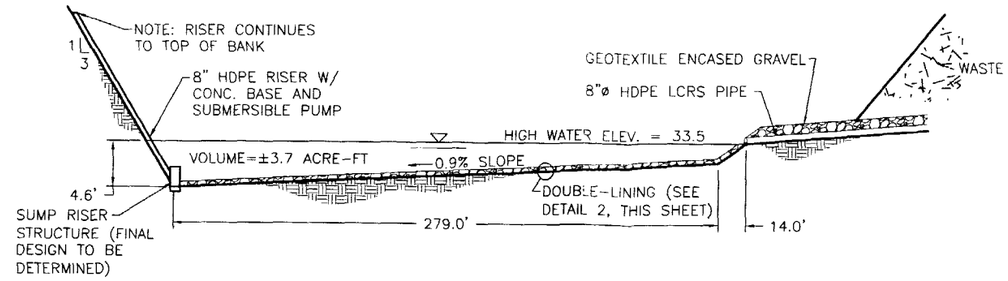


DETAIL 1/9 SUMP/RISER PLAN VIEW
SCALE: 1"=40'

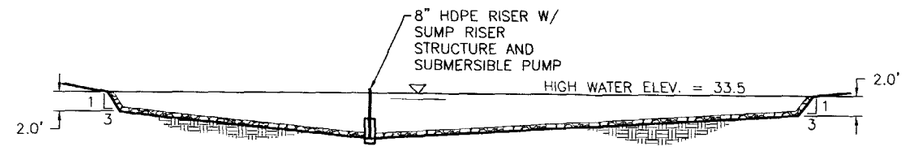
40 0 40 80
SCALE OF FEET



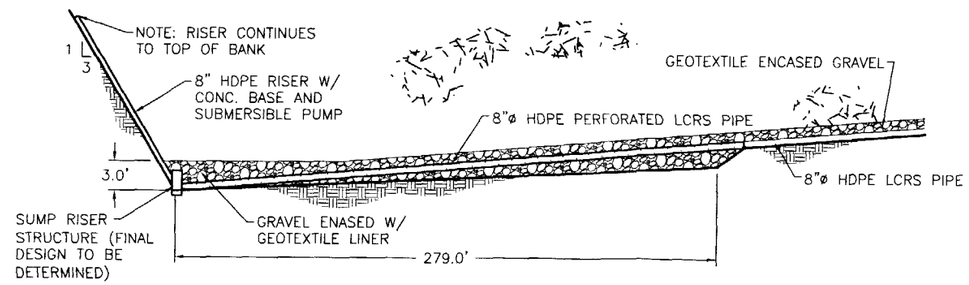
DETAIL 2/9 DOUBLE-LINER DETAIL
SCALE: NTS



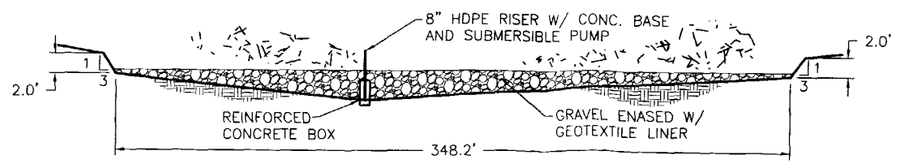
SECTION A/9 DOUBLE-LINED SUMP SECTION
HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=8'



SECTION B/9 DOUBLE-LINED SUMP SECTION
HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=8'



SECTION A/9 DOUBLE-LINED RISER SECTION
HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=8'



SECTION B/9 DOUBLE-LINED RISER SECTION
HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=8'

LICENSED PROFESSIONAL ENGINEER
No. 1[illegible]
S. SCOTT CARLSON
STATE OF UTAH

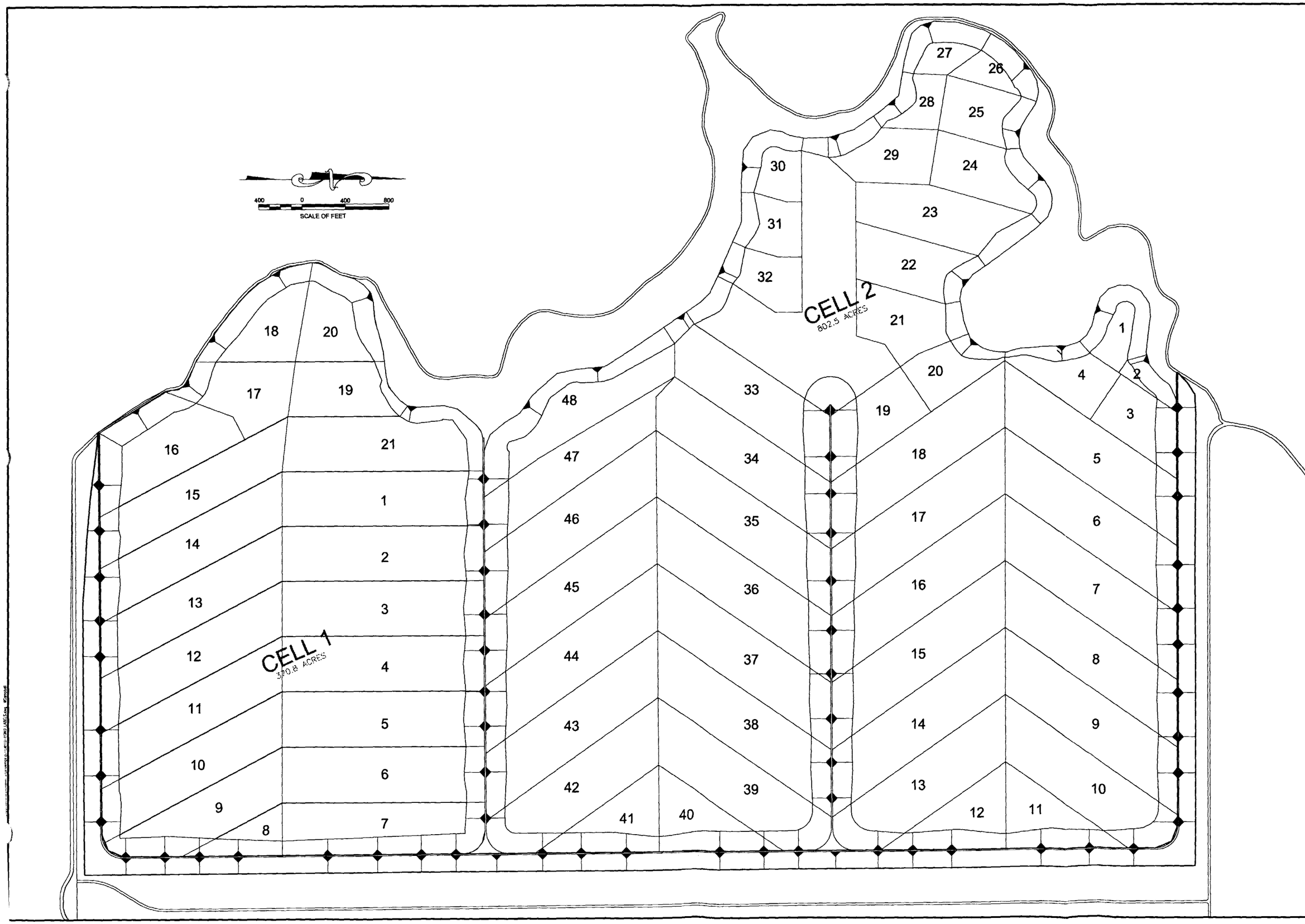
DATE: OCT. 2004
SCALE: SEE DRAWING
PROJECT NO.: 8WEL010100

WASATCH REGIONAL LANDFILL
LCRS SUMP DETAIL

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED: BRH
DRAWN: MHS
CHECKED: SSC

EXHIBIT
9



LICENSED PROFESSIONAL ENGINEER
No. 187787
S. SCOTT CARLSON
STATE OF UTAH

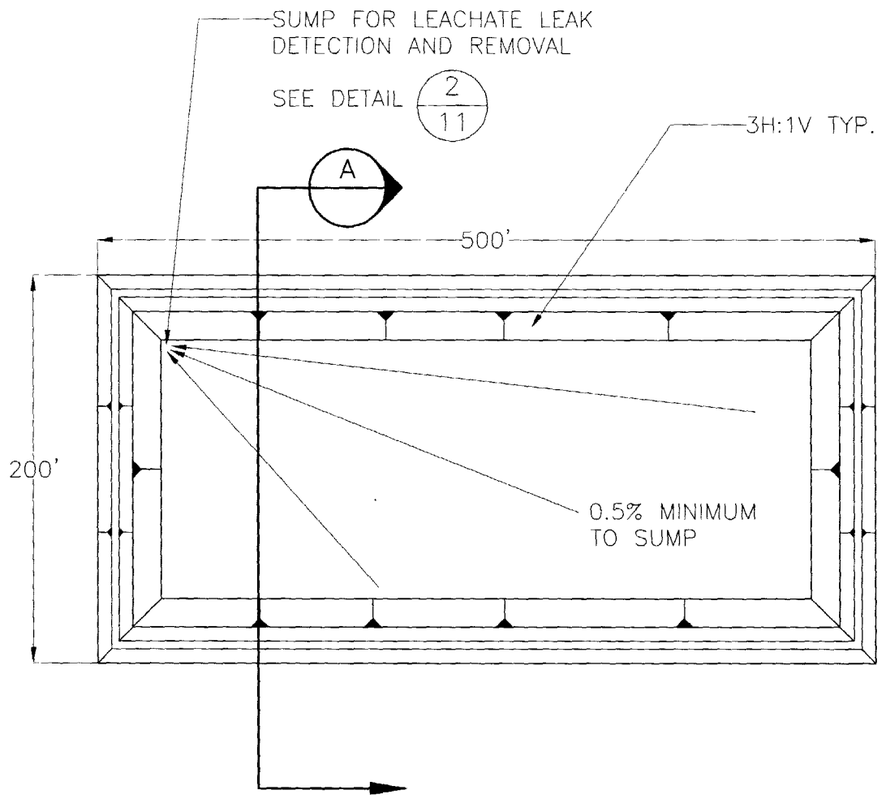
DATE 2-5-2004
SCALE SEE DRAWING
PROJECT NO. BWEL010100

WASATCH REGIONAL LANDFILL
LCRS TRIBUTARY AREAS

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

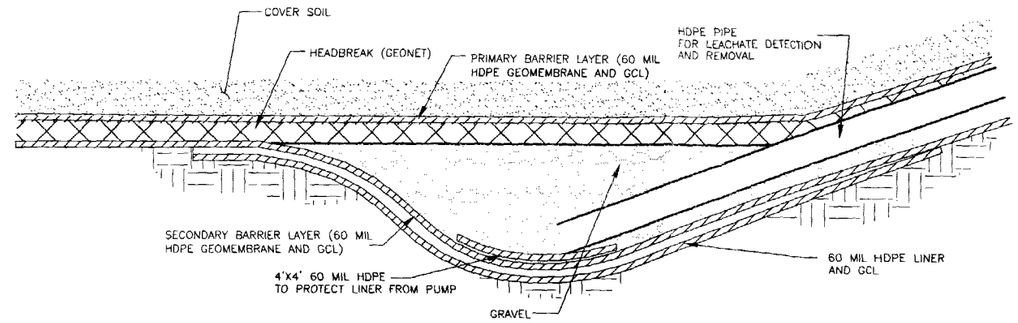
DESIGNED BRH
DRAWN BRH
CHECKED SSC

EXHIBIT 10



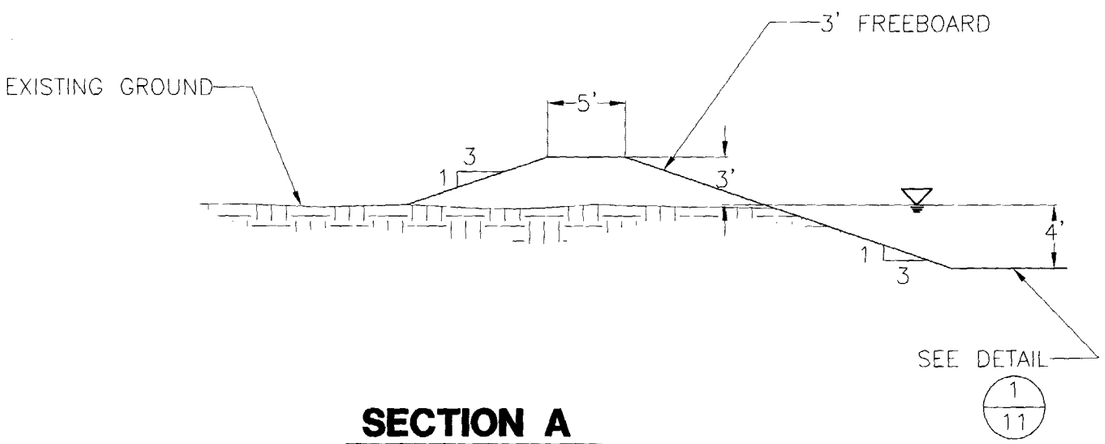
LEACHATE POND

NTS



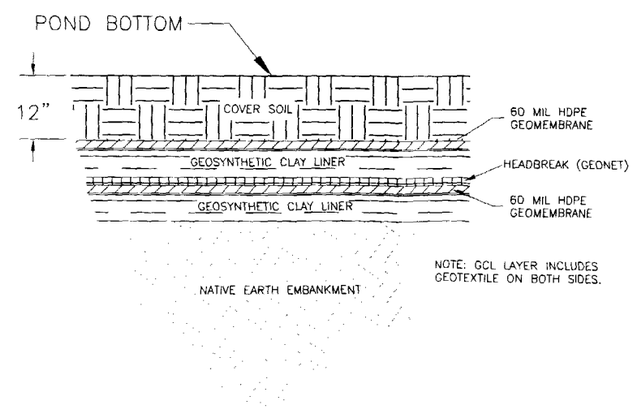
DETAIL 2/11 LEACHATE SUMP

NTS



SECTION A

1"=10'



DETAIL 1/11 POND LINER

NTS

LICENSED PROFESSIONAL ENGINEER
No. 187727
S. SCOTT CARLSON
STATE OF UTAH

DATE: 10-2004
PLOT DATE:
SCALE: SEE DRAWING
PROJECT NUMBER: BWEL010100

WASATCH REGIONAL LANDFILL
SURFACE IMPOUNDMENT CONCEPT

PSOMAS
2825 East Cottonwood Parkway, Suite 120
Salt Lake City, Utah 84121
(801) 270-5777 (801) 270-5782 (FAX)

DESIGNED BRH
DRAWN BRH
CHECKED SSC

EXHIBIT 11

DISPOSAL AGREEMENT

THIS DISPOSAL AGREEMENT (the "Agreement") is made and entered into as of November 19, 2004, between Wasatch Regional Landfill, Inc., a Utah corporation ("Wasatch") and Tooele County, Utah ("Tooele").

RECITALS

A. Wasatch intends to permit and operate a solid waste landfill to be known as the Wasatch Regional Landfill (the "Landfill") in Tooele County, Utah located generally on the real property describe as follows: 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; and Township 2 North, Range 8 West, SLB&M, Section 32: E2E2, Section 33: All, Section 34: W2.

B. The parties desire to enter into an arrangement whereby starting when the Landfill opens, Tooele may deliver Acceptable Waste (as defined below) to the Landfill and Wasatch will accept such waste, all on the terms and conditions set forth in this Agreement.

TERMS AND CONDITIONS

In consideration of the parties' mutual promises, and for other good and valuable consideration, the receipt and sufficiency of which the parties acknowledge, the parties agree as follows:

1. Delivery of Acceptable Waste. Commencing on the date that the Landfill opens for acceptance of waste from third parties, Tooele may deliver Acceptable Waste to the Landfill. "Acceptable Waste" means all waste generated within the limits of Tooele County that is authorized to be delivered to the Landfill under then applicable federal, state and local laws, regulations, ordinances, rules, permits and licenses (collectively "Applicable Laws") and that is not Unacceptable Waste (as defined below).

2. Disposal Fees.

(a) Payment; Fees. Tooele shall pay Wasatch a disposal fee (the "Disposal Fee") as follows: $10 per ton of Acceptable Waste for the first 100 tons of Acceptable Waste Tooele delivers to the Landfill on any given calendar day during the term of this Agreement and $12 per ton of Acceptable Waste for each ton of Acceptable Waste in excess of 100 tons Tooele delivers to the Landfill on such calendar day. Wasatch shall transmit an itemized invoice to Tooele of all Disposal Fees and other charges under this Agreement on a monthly basis. Tooele shall pay all invoices within 30 days after the date of the invoice.

(b) Taxes and Other Charges; Cost Increases. In addition to the Disposal Fee, Tooele shall pay all federal, state, local or other taxes, fees (including host fees), surcharges or similar charges related to the acceptance or disposal of Acceptable Waste or the operations or activities of the Landfill that are imposed by law, ordinance, regulation, agreement with a governmental authority or otherwise. In addition, Wasatch shall have the right to increase the Disposal Fee from time to time by the pro rata amount (determined by relative tonnage of

Acceptable Waste delivered by Tooele and accepted by Wasatch for processing at the Landfill divided by the total tonnage of waste processed at the Landfill) of any increase in operating costs or capital costs of the Landfill as a result of a change in Applicable Laws. Any such increase shall be effective immediately upon written notice by Wasatch to Tooele.

(c) CPI Adjustment. In addition to the adjustments described in Section 2(b), the Disposal Fee shall be increased annually, commencing on the first anniversary of this Agreement and on that same date for each subsequent year during the term of this Agreement, by the percentage increase, if any, in the Consumer Price Index published by the Bureau of Labor Statistics of the United States Department of Labor, All Items, for urban wage earners and clerical workers, 1982-84 = 100 (the "Consumer Price Index"). If the Consumer Price Index ceases to be available, the parties shall use the most closely comparable index then available.

3. Term. Unless sooner terminated pursuant to Section 7, this Agreement shall commence as of the date of this Agreement and shall remain in full force and effect for a period of 10 years. This Agreement shall be renewed for one additional 10 year term upon the mutual agreement of the parties prior to the expiration of the initial term. Upon expiration or termination of this Agreement, the right of Tooele to deliver and the obligation of Wasatch to accept Acceptable Waste shall terminate; provided, however, that all other rights and obligations of the parties under this Agreement shall survive termination and continue until they are fully satisfied or waived.

4. Delivery Procedures; Operation of the Landfill.

(a) Acceptance of Acceptable Waste. Wasatch shall have the right in its sole discretion to reject delivery of any waste offered for acceptance by Tooele that does not constitute Acceptable Waste.

(b) Procedures. Tooele shall deliver Acceptable Waste to the Landfill only on the days, and during the hours, that the Landfill is open for acceptance of waste. Tooele's delivery of Acceptable Waste to the Landfill shall be governed by the procedures applicable generally to customers utilizing the Landfill as Wasatch may modify such procedures from time to time.

(c) Tooele's Delivery Vehicles and Compliance with Applicable Laws. Tooele shall collect, transport and deliver waste to the Landfill in compliance with all Applicable Laws. Without limiting the generality of the foregoing, Tooele shall deliver Acceptable Waste, at its expense, to the Landfill in enclosed container vehicles or enclosed compactor vehicles complying with all Applicable Laws.

(d) Operation of the Landfill. Wasatch shall operate the Landfill in compliance with all Applicable Laws. Notwithstanding anything in this Agreement to the contrary, Wasatch shall have the right, in its sole discretion, to close the Landfill at any time for any reason. Upon any such closure, Wasatch shall have the right, in its sole discretion, to (i) terminate this Agreement or (ii) divert waste from the Landfill to any other disposal site selected by Wasatch and reasonably acceptable to Tooele.

(e) Title to Waste. Title to, and risk of loss and responsibility for, Acceptable Waste delivered to the Landfill by Tooele shall pass at the time such Acceptable Waste is removed from the delivery vehicle at the Landfill. Title to Unacceptable Waste shall remain with Tooele and shall never be deemed to pass to Wasatch.

(f) Authorization. Tooele shall obtain all permits, licenses, authorizations, notifications, approvals, certificates or other similar documents or actions in connection with the transportation, shipment and delivery of waste contemplated by this Agreement, whether Acceptable Waste or Unacceptable Waste.

5. Unacceptable Waste.

(a) Delivery of Unacceptable Waste. Tooele agrees that it shall not deliver any Unacceptable Waste to the Landfill. If Tooele delivers waste that contains both Acceptable Waste and Unacceptable Waste, the entire delivery shall constitute Unacceptable Waste if the Unacceptable Waste cannot be separated from the Acceptable Waste through the reasonable efforts of Wasatch, as Tooele's agent to cause such separation, with the cost of such separation to be paid by Tooele.

(b) Rejection of Unacceptable Waste. If Tooele delivers Unacceptable Waste to the Landfill, Wasatch may, in its sole discretion: (i) reject such Unacceptable Waste at Tooele's expense; or (ii) if Wasatch does not discover such Unacceptable Waste in time to reject and reload such Unacceptable Waste, after giving Tooele telephonic notice thereof and a reasonable opportunity to dispose of such Unacceptable Waste, Wasatch may, as Tooele's agent, dispose of such Unacceptable Waste at a location authorized to accept such Unacceptable Waste in accordance with all Applicable Laws and charge Tooele all direct and indirect costs incurred due to handling, delivery and disposal of such Unacceptable Waste, unless Tooele otherwise elects to arrange for disposal of the Unacceptable Waste. If Tooele elects to dispose of such Unacceptable Waste, it shall do so within such time period as Wasatch reasonably deems necessary or appropriate in connection with the operation of the Landfill, including the preservation of the health and safety of its employees. If after electing to do so Tooele does not dispose of the Unacceptable Waste within such time period, Wasatch may dispose of such Unacceptable Waste as Tooele's agent, without further notice to Tooele, and Tooele shall pay the direct and indirect costs set forth above. Notwithstanding the foregoing, no notice shall be required by Wasatch to Tooele for Wasatch to dispose of Unacceptable Waste as Tooele's agent in emergency situations where in Wasatch's reasonable judgment a delay in such disposal could constitute a hazard to the Landfill or any person on, about or near the premises.

(c) Definition of Unacceptable Waste. For the purposes of this Agreement, "Unacceptable Waste" means:

(i) any material that by reason of its composition, characteristics or quantity is hazardous waste as defined in the Resource Conservation and Recovery Act of 1976, and the regulations thereunder; any material defined as a "hazardous material," "hazardous waste," "hazardous substance," "extremely hazardous waste," "restricted hazardous waste," "toxic substance," "toxic waste," "toxic pollutant," "contaminant," "pollutant," "infectious waste," "medical waste," "radioactive waste," or "sewage sludge" under any Applicable Law; or

any other material that any governmental agency or unit having or claiming appropriate jurisdiction determines from time to time to be harmful, toxic, dangerous or otherwise ineligible for acceptance at the Landfill;

(ii) any material that requires other than normal handling, storage, management, transfer or disposal; or

(iii) any other material that may present a substantial endangerment to public health or safety, may cause applicable air quality or water effluent standards to be violated by the normal operation of the Landfill, or because of its size, durability or composition cannot be disposed of at the Landfill or has a reasonable possibility of otherwise adversely affecting the operation or useful life of the Landfill.

6. Force Majeure. Except for Tooele's obligation to pay Wasatch, either party's obligations under this Agreement may be suspended in the event of: (a) an occurrence beyond the reasonable control of that party which materially adversely affects the party's ability to perform its obligations under this Agreement or to comply with the requirements of any governmental order, permit or other approval; (b) an act of God, landslide, lightning, earthquake, hurricane, tornado, severe weather, fire, explosion, flood, act of a public enemy, war, terrorist act, blockade, insurrection, riot or civil disturbance; (c) a labor dispute, strike, work slowdown or work stoppage; or (d) an order or judgment of any federal, state or local court, administrative agency or governmental body, or other entity, if not the result of (i) willful or negligent action of the party relying thereon or (ii) failure to act in accordance with this Agreement (provided, however, that the contesting in good faith by such party of any such order or judgment shall not constitute or be construed to constitute a willful or negligent action or inaction of such party).

7. Default.

(a) Events of Default of Wasatch. It shall be an event of default by Wasatch if Wasatch fails to perform any material term, covenant or agreement contained in this Agreement on its part to be performed and such failure continues for a period of 30 days after written notice to Wasatch specifying the nature of such failure and requesting that it be remedied.

(b) Events of Default of Tooele. Each of the following shall be an event of default by Tooele under this Agreement:

(i) Tooele fails to pay any amount due as and when the same becomes due under this Agreement; or

(ii) Tooele fails to perform any other material term, covenant or agreement contained in this Agreement on its part to be performed and such failure continues for a period of 30 days after written notice to Tooele specifying the nature of such failure and requesting that it be remedied.

(c) Remedies on Default. Whenever any event of default shall have occurred and be continuing, the nondefaulting party shall have the following rights and remedies:

(i) Upon the end of any applicable grace period in this Section 7, if Wasatch is then in default, Tooele shall have the option to immediately terminate this Agreement unless during such period Wasatch has taken remedial steps the effect of which would be to enable Wasatch to cure such event of default within an additional 15 day period following the expiration of such grace period;

(ii) Upon the end of any applicable grace period in this Section 7, if Tooele is then in default, Wasatch shall have the option to immediately terminate this Agreement unless during such period Tooele has taken remedial steps the effect of which would be to enable Tooele to cure such event of default within an additional 15 day period following the expiration of such grace period; and

(iii) Upon written notice to Tooele, if Tooele has defaulted, Wasatch shall have the option, without terminating this Agreement, to stop accepting Acceptable Waste delivered by Tooele until such default is cured or this Agreement is terminated.

The remedies in this Section 7(c) shall be in addition to any other remedies provided by Applicable Law or this Agreement.

8. Indemnification. Each party agrees to indemnify and hold harmless the other party and its shareholders, partners, officers, directors, divisions, subdivisions, affiliates, agents, employees, successors and assigns (the "Indemnified Parties") from and against any and all liabilities, losses, damages, costs, expenses and disbursements, including reasonable legal fees, expert witness fees, litigation related expenses, and court costs in such litigation or proceeding, whether arising out of a claim or loss of or damage to property or injury to or death of any person, including any Indemnified Party, or otherwise (including liability for environmental remediation), to the extent caused by (a) the breach of this Agreement, or (b) the negligence or willful misconduct of such party.

9. General.

(a) Independent Contractor. Tooele and Wasatch shall perform their obligations under this Agreement as independent contractors, and as such, shall maintain control over their employees, agents and subcontractors during the performance of their obligations. Neither party nor any of its employees, agents or subcontractors shall be, represent, act, purport to act, or be deemed, the agent of the other party.

(b) Assignment; Binding Effect. Tooele may not assign this Agreement without Wasatch's prior written consent, which Wasatch may grant or withhold in its sole discretion. Wasatch may assign this agreement without the consent of Tooele, and Tooele acknowledges and agrees that any such assignment by Wasatch shall release Wasatch from any liability under this Agreement from and after the date of the assignment. Notwithstanding the notice and grace period provisions of Section 7, any assignment or attempted assignment of this Agreement by Tooele without first obtaining the consent of Wasatch shall constitute a default under this Agreement and shall be grounds for immediate termination of the Agreement by Wasatch. This Agreement shall be binding upon and shall inure to the benefit of the parties and their respective successors and permitted assignees.

(c) Entire Agreement. This Agreement supersedes all prior agreements, written or oral, with respect to the subject matter of this Agreement. Only a written instrument signed by both parties hereto may modify this Agreement.

(d) Severability. If any one or more of the provisions contained in this Agreement is, for any reason, held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Agreement, and all other provisions shall remain in full force and effect.

(e) Waiver. No delay or omission by a party in exercising any right under this Agreement will operate as a waiver of that or any other right. A waiver or consent given by a party on any occasion is effective only in that instance and will not be construed as a bar to or waiver of any right on any other occasion.

(f) Notice. Except as provided in Section 5(b), any notice, request, information or other document to be given under this Agreement shall be in writing and shall be given by hand delivery, certified or registered U.S. mail, or a private courier service that provides evidence of receipt as part of the service, to the addresses set forth at the end of this Agreement.

(g) Waiver of Jury Trial. By execution and delivery of this Agreement, each of the parties knowingly, voluntarily and irrevocably: (i) waives any right to trial by jury; (ii) agrees that any dispute arising out of this Agreement shall be decided by court trial without a jury; and (iii) agrees that the other party to this Agreement may file an original counterpart or a copy of this Section 10(g) with any court as written evidence of the consents, waivers and agreements of the parties set forth in this Section.

(h) Construction. The headings in this Agreement are for convenience only, and shall not constitute a part of this Agreement or be used to construe or interpret any of its provisions. If a question of interpretation arises, this Agreement shall be construed as if drafted jointly by the parties, and no presumption or burden of proof shall arise favoring or disfavoring either party by virtue of the authorship of any provision of this Agreement.

(i) Counterparts. This Agreement may be executed in two or more original or facsimile counterparts, each of which shall be deemed an original and all of which together shall constitute but one and the same instrument.

(j) Attorneys' Fees. If any legal action or any other proceeding is brought for the enforcement of this Agreement, or because of an alleged dispute, breach, default, or misrepresentation in connection with any of the provisions of this Agreement, the prevailing party shall be entitled to recover reasonable attorneys' fees and other costs incurred in that action or proceeding, in addition to any other relief to which it may be entitled.

(k) Time of the Essence. Time is of the essence of this Agreement.

[SIGNATURES ARE ON THE FOLLOWING PAGE]

IN WITNESS WHEREOF, the undersigned have entered this Agreement as of the day and year first above written.

WASATCH:

Wasatch Regional Landfill, Inc.

By: Kory Coleman
Its: District Manager

Address:

TOOELE:

Tooele County, Utah

By: Matthew Lawson
Its: Commissioner

Address: 47 South Main
Tooele Utah 84074

APPROVED BY:

Douglas J. Allstrom
County Attorney