

SW121

Division of  
Solid and Hazardous Waste

JUN 14 2012

*draft: 2012-003645*

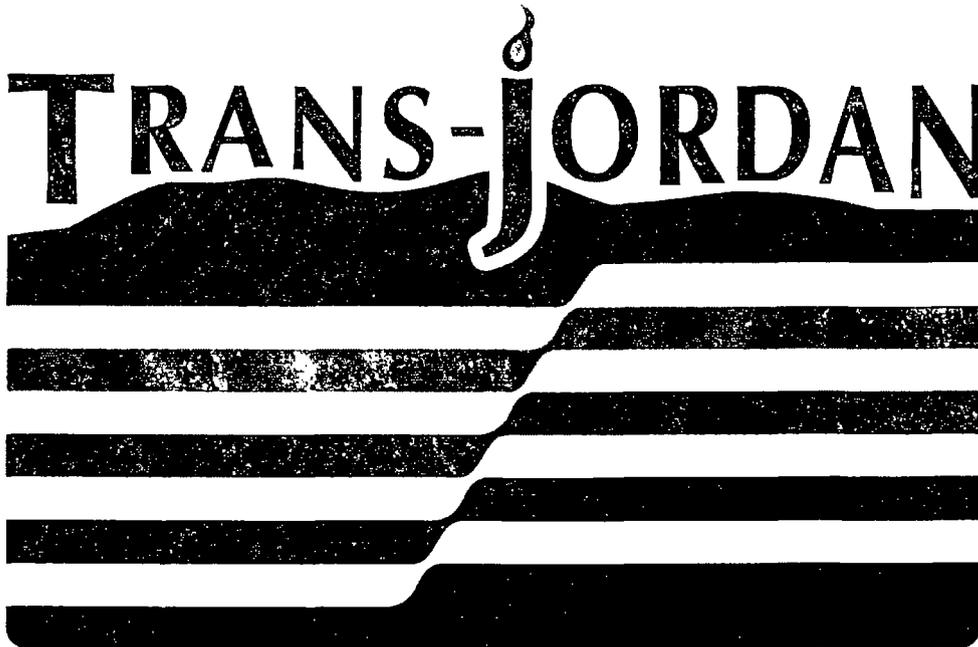
*final: 2012-011451*

## PERMIT RENEWAL APPLICATION

Division of  
Solid and Hazardous Waste

DEC - 5 2012

### TRANS-JORDAN LANDFILL

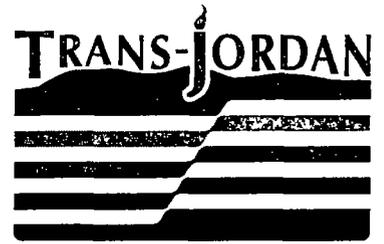


July 1, 2010

(REVISED JUNE 2012)

MEMBER CITIES

DRAPER MIDVALE MURRAY RIVERTON SANDY SOUTH JORDAN WEST JORDAN



June 12, 2012

Scott T. Anderson  
DEQ Solid and Hazardous Waste  
PO Box 144880  
Salt Lake City, Utah 84114-4880

40383  
Division of  
Solid and Hazardous Waste

JUN 14 2012

2012-003645

**RE: Revision of Trans-Jordan Landfill 2010 Permit Renewal Application**

Dear Mr. Anderson,

Trans-Jordan Landfill, having received a request to provide additional information to the previously submitted 2010 permit renewal, is submitting this newly revised permit for review.

We have enclosed an updated electronic copy as well as a hard copy of the permit.

The modifications are found in Appendix H: Other Documents Relating to 2005 Permit

- US Geological Survey topographical map
- Trans-Jordan Landfill Proof of Ownership
- Trans-Jordan Landfill Property Description
- Trans-Jordan Landfill drawings showing sample well boring sites plus bedrock and soil samples
- Trans-Jordan Landfill 2002 Groundwater Monitoring Report
- Trans-Jordan Landfill Modified Corrective Action Plan

Previous changes, submitted November 3, 2011, to Appendix A-Drawings have been included in this submission.

If you have any questions regarding these updates please feel free to call, at your convenience.

Respectfully submitted,

Dwayne J. Woodley  
General Manager

Cc: Brett Mickelson, P.E., IGES

Djw/ed



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State of Utah

GARY HERBERT  
Governor

GREG BELL  
Lieutenant Governor

Department of  
Environmental Quality

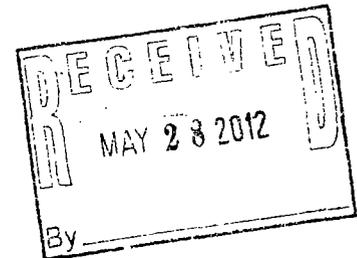
Amanda Smith  
Executive Director

DIVISION OF SOLID AND  
HAZARDOUS WASTE  
Scott T. Anderson  
Director

Solid and Hazardous Waste Control Board  
Kevin Murray, *Chair*  
Kory Coleman, *Vice-Chair*  
Brian E. Brower  
Scott Bruce  
Jeff Coombs, MPH, LEHS  
R. Ryan Dupont, Ph.D.  
Larry A. Ellertson  
Brett Mickelson  
Brad Mertz  
Gary Mossor  
Dennis Riding  
Dwayne Woolley  
Amanda Smith  
Scott T. Anderson  
*Executive Secretary*

May 24, 2012

Dwayne J. Woolley, General Manager  
Trans Jordan Landfill  
10873 South 7200 West  
South Jordan, Utah 84095-0610



RE: Trans Jordan Landfill Permit Modification

Dear Mr. Woolley:

The Division of Solid and Hazardous Waste has completed its review of the permit renewal application for the Trans Jordan Landfill, revised as of November 2, 2011. The application is well prepared. Please provide the following additional information so that we may prepare the draft permit for public comment.

1) Reference to the Previous Permit Application The application states that "duplication of data has not been included" and that documents that did not change have been referenced back to the 2005 permit application (Introduction). Also, the Permit Application Checklist says numerous times for location in document "See Permit Renewal 2005." In the 2012 legislative session, Senate Bill 11 modified the Adjudicative Proceedings Section of the Environmental Quality Code (UCA 19-1-301). For purposes of establishing an administrative record, each permit application must be a complete, stand-alone document. Therefore information in previous permit applications cannot be incorporated by reference. Please revise the application to include the referenced material. This should include the slope stability analysis performed for the steepened slopes in Cell 6, for which a permit modification was approved on August 23, 2011.

2) Closure/Post-Closure Costs Appendix D is titled "Closure/Post Closure Costs" but instead contains only an account statement for the landfill from Western National Trust Company. This account statement is also included again in Appendix F, Financial Assurance. Please provide an estimate of the current closure and post-closure costs for the landfill.

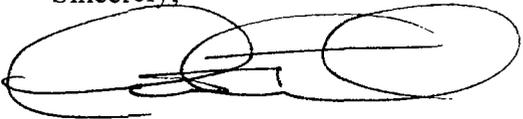
DSHW-2012-003270

Page 2

3) Closure Documentation The application states that a notarized plat will be filed with the county recorder within 60 days following certification of closure (P. 34, Section 4.4). The application should also indicate that proof of this filing will be submitted to the Division Director in accordance with R315-302-2(6)(b) of the Utah Administrative Code.

We appreciate your efforts to operate the facility in compliance with current regulations. If you have any questions, please call Phil Burns at (801) 536-0253.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott T. Anderson", is written over a horizontal line. The signature is stylized with large loops and a long horizontal stroke.

Scott T. Anderson, Director  
Division of Solid and Hazardous Waste

STA/PEB/kk

c: Gary Edwards, Executive Director, Salt Lake Valley Health Department  
Royal DeLegge, MPA, EHS, Environmental Health Director, Salt Lake Valley Health  
Department

**APPLICATION TO RENEW A PERMIT TO  
OPERATE A CLASS I LANDFILL**

**Trans-Jordan Landfill**

**July 20, 2010**

***(Revised November 2012)***

**PART I – GENERAL INFORMATION**

Trans-Jordan Cities  
10873 S. Bacchus Hwy (U-111)  
P.O. Box 95610  
South Jordan, Utah 84095-0610  
Tel: (801) 569-8994  
Fax: (801) 352-0578  
E-mail: [landfill@tranjordan.org](mailto:landfill@tranjordan.org)

# ANNOTATED TABLE OF CONTENTS

<u>PART</u>	<u>TITLE</u>
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	<b>INTRODUCTION</b>
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Includes summary of permit with technical and operation issues highlighted

<b>I.</b>	<b>GENERAL INFORMATION</b>
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Includes State of Utah Solid Waste Permit Application forms

<b>II.</b>	<b>GENERAL REPORT</b>
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Includes information required by Utah Administrative Rule R315-301 through R315-320

<b>III.</b>	<b>TECHNICAL AND ENGINEERING REPORT</b>
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Includes information required by Utah Administrative Rule R315-301 through R315-320

## *APPENDIX A- DRAWINGS*

1. Title Sheet
2. General Arrangement
3. Phase D (Remaining fill)
4. Cell 5 Excavation
5. Phase E MSW Fill
6. Cell 6 Excavation
7. Phase F MSW fill (Final Cover)
8. Elevation View (Sections A & B)
9. Elevation View (Sections C & D)
10. Details

*APPENDIX B- STORM WATER PREVENTION PLAN*

*APPENDIX C- LANDFILL FORMS*

*APPENDIX D- CLOSURE/ POST CLOSURE COSTS*

*APPENDIX E- FUTURE LAND USE*

*APPENDIX F- FINANCIAL ASSURANCE*

*APPENDIX G- TITLE V OPERATING PERMIT*

*APPENDIX H- OTHER DOCUMENTS PER REVISION*

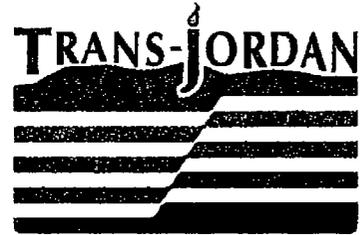
*APPENDIX I- SLOPE STABILITY ANALYSIS*

*APPENDIX J- U.S. GEOLOGICAL SURVEY TOPOGRAPHIC MAP*

MEMBER CITIES

DRAPER MIDVALE MURRAY RIVERTON SANDY SOUTH JORDAN WEST JORDAN

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January 10, 2010

Mr. Dennis R. Downs, Director  
Utah Division of Solid and Hazardous Waste  
Department of Environmental Quality  
State of Utah  
288 North 1460 West  
P.O. Box 144880  
Salt Lake City, Utah 84114-4880

10873 South 7200 West  
PO Box 95610  
South Jordan UT 84095-0610

Phone: 801-569-8994  
Fax: 801-352-0578  
[www.transjordan.org](http://www.transjordan.org)

RE: Trans-Jordan Landfill Class I Permit Renewal

Dear Mr. Downs,

Trans-Jordan is currently preparing the permit renewal for the Class I landfill in South Jordan. Trans-Jordan is cognizant of the existing permits date of July 13 2005 and anticipate the submittal of a full permit package in February of 2010.

If you have any questions, please call at your earliest convenience.

Respectfully submitted,

Dwayne Woolley  
General Manager

Cc: Brett Mickelson, P.E., IGES



Printed on Recycled Paper



Utah Class I and V Landfill Permit Application Form

**Utah Division of Solid and Hazardous Waste  
Solid Waste Management Program**

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

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

Phone (801) 538-6170  
Fax (801) 538-6715  
[www.deq.utah.gov](http://www.deq.utah.gov)

**APPLICATION FOR A PERMIT TO OPERATE A CLASS I OR CLASS V LANDFILL**

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

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

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

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

## Utah Class I and V Landfill Permit Application Form

<b>Part I General Information</b>						APPLICANT: PLEASE COMPLETE ALL SECTIONS.					
<b>I. Landfill Type</b>		<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class V		<b>II. Application Type</b>		<input type="checkbox"/> New Application <input checked="" type="checkbox"/> Renewal Application		<input type="checkbox"/> Facility Expansion <input type="checkbox"/> Modification			
For Renewal Applications, Facility Expansion Applications and Modifications Enter Current Permit Number _____											
<b>III. Facility Name and Location</b>											
Legal Name of Facility Trans-Jordan Landfill											
Site Address (street or directions to site) 10873 South 7200 West (U-111)								County Salt Lake			
City South Jordan				State UT		Zip Code 84095		Telephone 801-569-8994			
Township 3 S		Range 2 W		Section(s) 15		Quarter/Quarter Section		Quarter Section			
Main Gate Latitude degrees minutes seconds				Longitude degrees minutes seconds							
<b>IV. Facility Owner(s) Information</b>											
Legal Name of Facility Owner Trans-Jordan Cities											
Address (mailing) PO Box 95610											
City South Jordan				State UT		Zip Code 84095-0610		Telephone 801-569-8994			
<b>V. Facility Operator(s) Information</b>											
Legal Name of Facility Operator S s (mailing)											
City				State		Zip Code		Telephone			
<b>VI. Property Owner(s) Information</b>											
Legal Name of Property Owner Trans-Jordan Cities											
Address (mailing) PO Box 95610											
City South Jordan				State UT		Zip Code 84095-0610		Telephone 801-569-8994			
<b>VII. Contact Information</b>											
Owner Contact Dwayne J. Woolley						Title General Manager					
Address (mailing) PO Box 95610											
City South Jordan City				State UT		Zip Code 84095-0610		Telephone 801-569-8994x11			
Email Address						Alternative Telephone (cell or other)		801-244-0477			
Operator Contact Same						Title					
Address (mailing)											
City				State		Zip Code		Telephone			
Email Address landfill@transjordan.org						Alternative Telephone (cell or other)					
Property Owner Contact Same						Title					
Address (mailing)											
City				State		Zip Code		Telephone			
Email Address						Alternative Telephone (cell or other)					

## Utah Class I and V Landfill Permit Application Form

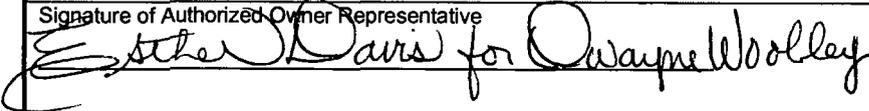
### Part I General Information (Continued)

Waste Types (check all that apply)	IX. Facility Area																																													
<input checked="" type="checkbox"/> All non-hazardous solid waste (see R315-315-7(3) for PCB special requirements) OR the following specific waste types: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Waste Type</th> <th style="text-align: center;">Combined Disposal Unit</th> <th style="text-align: center;">Monofill Unit</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> Municipal Waste</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Construction &amp; Demolition</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Industrial</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Incinerator Ash</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Animals</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Asbestos</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> PCB's (R315-315-7(3) only)</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/> Other _____</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </tbody> </table>	Waste Type	Combined Disposal Unit	Monofill Unit	<input type="checkbox"/> Municipal Waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Construction & Demolition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Industrial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Incinerator Ash	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Animals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Asbestos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PCB's (R315-315-7(3) only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Facility Area.....</td> <td style="width: 10%; text-align: right;">200</td> <td style="width: 10%; text-align: right;">acres</td> </tr> <tr> <td>Disposal Area.....</td> <td style="text-align: right;">10</td> <td style="text-align: right;">acres</td> </tr> <tr> <td>Design Capacity</td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Years.....</td> <td style="text-align: right;">20</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Cubic Yards.....</td> <td style="text-align: right;">_____</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Tons.....</td> <td style="text-align: right;">16.000000</td> <td></td> </tr> </table>	Facility Area.....	200	acres	Disposal Area.....	10	acres	Design Capacity			Years.....	20		Cubic Yards.....	_____		Tons.....	16.000000	
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Cubic Yards.....	_____																																													
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### X. Fee and Application Documents

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

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

Signature of Authorized Owner Representative  _____ Name typed or printed	Title General Manager      Date <del>03/18/2010</del> <span style="margin-left: 150px;">11/16/12</span>
Signature of Authorized Land Owner Representative (if applicable) _____ Name typed or printed	Address 10873 South 7200 West South Jordan UT 84095-0610
Signature of Authorized Operator Representative (if applicable) _____ Name typed or printed	Title _____      Date _____ Address _____

## Utah Class I and V Permit Application Checklist

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

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

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

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

### **Part II Application Checklist**

<b>I. Facility General Information</b>	
Description of Item	Location In Document
<b>1a. Information Required - All Class I and V Landfills</b>	
Completed Part I General information Form (See form above)	PART 1
General description of the facility (R315-310-3(1)(b))	PART 2 PG.1-2
Legal description of property (R315-310-3(1)(c))	PART 2 PG.7-8
Proof of ownership, lease agreement, or other mechanism (R315-310-3(1)(c))	SECTION H
Area served by the facility including population (R315-310-3(1)(d))	PART 2 PG. 2
If the permit application is for a class I landfill a demonstration that the landfill is not a commercial facility	PART 2 PG. 2-3
Waste type and anticipated daily volume (R315-310-3(1)(d))	PART 2 PG. 2-3
<b>1b. Information Required - All New Or Laterally Expanding Class I and V Landfills</b>	
Intended schedule of construction (R315-302-2(2)(a))	N/A
Name and address of all property owners within 1000 feet of the facility boundary (R315-310-3(2)(i))	N/A
Documentation that a notice of intent to apply for a permit has been sent to all property owners listed above (R315-310-3(2)(ii))	N/A
Name of the local government with jurisdiction over the facility site (R315-310-3(2)(iii))	N/A

## Utah Class I and V Permit Application Checklist

<b>I. Facility General information</b>	
Description of Item	Location In Document
<b>Ic. Location Standards - All New Or Laterally Expanding Class I and V Landfills (R315-302-1)</b>	
Documentation that the facility has meet the historical survey requirement of R315-302-1(2)(f)	N/A
Land use compatibility	N/A
Maps showing the existing land use, topography, residences, parks, monuments, recreation areas or wilderness areas within 1000 feet of the site boundary	N/A
Certifications that no ecologically or scientifically significant areas or endangered species are present in site area	N/A
List of airports within five miles of facility and distance to each	N/A
<b>Geology</b>	N/A
Geologic maps showing significant geologic features, faults, and unstable areas	N/A
Maps showing site soils	N/A
<b>Surface water</b>	N/A
Magnitude of 24 hour 25 year and 100 year storm events	N/A
Average annual rainfall	N/A
Maximum elevation of flood waters proximate to the facility	N/A
Maximum elevation of flood water from 100 year flood for waters proximate to the facility	N/A
<b>Wetlands</b>	N/A
<b>Ground water</b>	N/A
<b>Id. Plan of Operations Requirements - All Class I And V Landfills (R315-310-3(1)(e) and R315-302-2(2))</b>	
Forms and other information as required in R315-302-2(3) including a description of on-site waste handling procedures and an example of the form that will be used to record the weights or volumes of waste received (R315-302-2(2)(b) And R315-310-3(1)(f))	SECTION 1
Schedule for conducting inspections and monitoring, and examples of the forms that will be used to record the results of the inspections and monitoring (R315-302-2(2)(c), R315-302-2(5)(a), and R315-310-3(1)(g))	SECTION 2 3.15 APPENDIX C LOAD CHECK FORMS
Contingency plans in the event of a fire or explosion (R315-302-2(2)(d))	SECTION 2 3.16
Corrective action programs to be initiated if ground water is contaminated (R315-302-2(2)(e))	SECTION 2 3.5
Contingency plans for other releases, e.g. explosive gases or failure of run-off collection system (R315-302-2(2)(f))	SECTION 2 3.63
Plan to control fugitive dust generated from roads, construction, general operations, and covering the waste (R315-302-2(2)(g))	SECTION 2 3.9.1

## Utah Class I and V Permit Application Checklist

<b>I. Facility General Information</b>	
Description of Item	Location In Document
Plan for litter control and collection (R315-302-2(2)(h))	SECTION 2 2.3.2
Description of maintenance of installed equipment (R315-302-2(2)(i))	SECTION 2 1.4
Procedures for excluding the receipt of prohibited hazardous or PCB containing wastes (R315-302-2(2)(j))	SECTION 2 3.15
Procedures for controlling disease vectors (R315-302-2(2)(k))	SECTION 2 3.9.3
A plan for alternative waste handling (R315-302-2(2)(l))	SECTION 2 3.7
A general training and safety plan for site operations (R315-302-2(2)(o))	SECTION 2 3.12
Any recycling programs planned at the facility (R315-303-4(6))	SECTION 2 3.11
Closure and post-closure care Plan (R315-302-2(2)(m))	SECTION 5
Procedures for the handling of special wastes (R315-315)	SECTION 2 3.2.4
Plans and operation procedures to minimize liquids (R315-303-3(1)(a) and (b))	SECTION 2 3.3
Plans and procedures to address the requirements of R315-303-3(7)(c) through (i) and R315-303-4	SECTION 2 3.18
Any other site specific information pertaining to the plan of operation required by the Executive Secretary (R315-302-2(2)(p))	N/A
<b>II. Special Requirements - New Or Laterally Expanding Class V Landfill (R315-310-3(2))</b>	
Submit information required by the <i>Utah Solid and Hazardous Waste Act</i> Subsections 19-6-108(9) and 19-6-108(10) (R315-310-3(2)(a))	SECTION 2 3.18
Approval from the local government within which the solid waste facility sits	SECTION 2 3.18

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

## Utah Class I and V Permit Application Checklist

<b>// Facility Technical Information</b>	
Description of Item	Location In Document
Depth to ground water (R315-310-4(2)(b)(iii))	SECTION 2.1.4
Direction and flow rate of ground water (R315-310-4(2)(b)(iv))	APPENDIX H
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Cell design to include liner design, cover design, fill methods, elevation of final cover including plans and drawings signed and sealed by a professional engineer registered in the State of Utah (R315-303-3(3), R315-303-3(6) and (7)(a), R315-310-3(1)(b) and R315-310-4(2)(c)(iii))	APPENDIX A DRAWINGS 7-9
Leachate collection system design and calculations showing system meets the requirements of R315-303-3(2)	Part III – Sect. 2.4.2
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## Utah Class I and V Permit Application Checklist

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Landfill gas monitoring and control plan that meets the requirements of Subsection R315-303-3(5) (R315-310-4(2)(c)(vii))	SECTION 2.4.3
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Capacity of site in volume and tonnage (R315-310-4(2)(d)(ii))	APPENDIX D
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<b>II e. Post-Closure Care Plan - All Class I and V Landfills (R315-310-3(1)(h))</b>	
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Changes to record of title, land use, and zoning restrictions (R315-310-4(2)(e)(ii))	SECTION 2.7
Maintenance activities to maintain cover and run-on/run-off control systems (R315-310-4(2)(e)(iii))	SECTION 2.7
List the name, address, and telephone number of the person or office to contact about the facility during the post-closure care period (R315-310-4(2)(e)(vi))	SECTION 2.7
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Identification of closure costs including cost calculations (R315-310-4(2)(d)(iv)) and (R315-302-2(2)(n))	SECTION 2.9.3
Identification of post-closure care costs including cost calculations (R315-310-4(2)(e)(iv))	SECTION 2.9.2 APPENDIX D
Identification of the financial assurance mechanism that meets the requirements of Rule R315-309 and the date that the mechanism will become effective (R315-309-1(1))	SECTION 2.9.3 APPENDIX D

**APPLICATION TO RENEW A PERMIT TO  
OPERATE A CLASS I LANDFILL**

**Trans-Jordan Landfill**

July 1, 2010  
(rev.11/12)

**PART II - GENERAL REPORT**

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## **SECTION 1 - FACILITY DESCRIPTION**

The Trans Jordan Landfill (TJL) began operation in 1958 and is a cooperatively operated solid waste landfill operated by Trans-Jordan Cities (TJ). TJ was officially formed in 1986 to dispose of the solid wastes generated in the southern half of Salt Lake County as a political subdivision of the State of Utah. The landfill had previously operated as Tri-Cities landfill. TJ is a political subdivision of the State of Utah and operates under an Inter-local Agreement between its' member cities (the Cities of Draper, Midvale, Murray, Riverton, Sandy, South Jordan and West Jordan) with a combined population of about 400,000. Operation of TJ is administered by a board with representatives from each member city. Management of the landfill is coordinated by Mr. Dwayne J. Woolley, General Manager.

Prior to 2008, TJ in conjunction with South Valley Water Reclamation Facility (SVWRF) cooperatively funded the operation and maintenance of a wood products and green waste grinding facility. In 2008 SVWRF withdrew its partnership. TJ has continued with the greenwaste operation. TJ has leased the shop bays and onsite fuel tank from SVWRF to store and fuel the composting machinery.

In 2004, an agreement between TJ and Granger Electric of South Jordan LLC (GESJ) a subsidiary of Granger of Lansing, Michigan was finalized and a landfill gas to energy project began construction. The initial project, Phase A, consisted of 45 wells installed into the closed area of the landfill. The wells are connected together with piping that transports the gas to a flare for proofing and destruction. Phase B consisting of 22 wells was completed in 2006. Phase C consisted of 19 wells and was completed in 2009.

During 2008, TJ leased land north of the operations and maintenance building to GESJ to build a landfill gas to energy plant and electrical power station to transform the landfill gas into electricity. In April of 2009 the GESJ plant went online; processing the landfill gas to fuel three Caterpillar 3520 engines. Each engine is capable of generating up to 1.6 megawatts of electricity (total of 4.8MW). GESJ and Murray City Power have an agreement where Murray City will purchase all power created at the South Jordan plant.

Construction of a small outbuilding for use as an extension of the original scalehouse occurred in 2009. This building was constructed to achieve better customer service to residential customers during demanding summer weekends.

A lease of property is presently being discussed between TJ and Verizon wireless for the installation of a cell phone tower to be located on the TJL site where the present water tank now resides.

TJ continues to provide a citizen drop-off facility (Public Convenience Center (PCC), HHW disposal facility (Partnership with Salt Lake Valley Health Department (SLVHD), and the inline radiation detection system as discussed in previous permits.

The TJL facilities are located on land owned by TJ at 10873 South 7200 West, in Section 15 of Township 3 South, Range 2 West. Drawing 1 (Title Sheet/Area Maps) shows the location of TJL. Appendix A – Drawings include all of the permit renewal drawings.

Access to TJL is provided from U-111 (old State Route 111) with the facility entrance at the landfill's northwest corner. TJL is located within the city of South Jordan, with West Jordan city limits approximately 1 mile northeast. The community of Herriman lies approximately 3 miles south-southeast and Copperton is 1.5 miles to the west. Across U-111 lies a wholesale nursery, Progressive Plants and about 1,500 feet north east of the landfill is a new facility, E-Bay data center.

The TJL has power lines located inside the north boundary of the landfill running across the north side slopes of the unlined landfill and a previously abandoned railroad right-of-way along the north and west sides of the property. All other areas of the landfill utilized for solid waste disposal are free of any utility right-of-way restrictions. Information pertaining to site access, operations, and facility contact information is presented on a sign at the entrance to the landfill.

## **1.1 AREA SERVED**

In addition to waste from the member cities, waste from other municipalities and unincorporated areas of Salt Lake County are disposed of at TJL.

## **1.2 WASTE TYPES**

The waste disposed of at the landfill is solid non-hazardous municipal waste, inert construction debris and landscaping debris with some solid demolition and non-hazardous operations waste from Kennecott Utah Copper (KUC) mining and milling operations. Non-acceptable materials include liquid wastes of any kind, burning materials, radioactive wastes and hazardous wastes. Any vehicle hauling non-acceptable wastes to TJL is refused entrance to the landfill and the appropriate State or County agency is then notified. PCBs are of particular concern and are specifically

called out as not being allowed to enter the landfill; appropriate legal action can be initiated if attempts are made to dispose of these materials. Residential tires, batteries, oil, antifreeze, electronics, solvents and other household liquids are accepted at our HHW facility and disposed of or recycled offsite by SLVHD. Commercial hazardous wastes are not accepted for disposal at TJL.

### **1.2.1 Unlined Landfill**

The unlined landfill cell (as indicated on Drawing 2 – (General Arrangement)) has served parts of Salt Lake County since the mid 1950's. The exact date of first waste acceptance is not clear; data suggests that it is circa 1958. Based on an early topographic survey, the current topography of the site, and the volume of waste recorded since 1986, the estimated volume of waste disposed of in the unlined landfill cell is just over 7.5 million cubic yards.

No records exist that determine the nature and extent of the wastes accepted at the landfill prior to 1986. Therefore, the composition of the wastes disposed of in the unlined landfill is unknown but it is assumed to consist of a combination of residential, agricultural, commercial, and industrial wastes.

Since TJ was formed, the landfill has accepted a variety of non-hazardous wastes from residential, commercial, and industrial sources located within TJ's service boundaries and from neighboring communities. There are no records that indicate TJL has ever knowingly accepted asbestos containing materials. Drawing 2 (General Arrangement) shows the location of the unlined landfill with respect to site structures. Drawing 3 (Sections - Existing) shows the section views of both the lined and unlined landfill. Drawing 4 (Lined/Unlined Landfill Cells) shows the extent of the unlined landfill with regards to the six lined Cells.

### **1.2.2 Lined Landfill Cell**

The landfill currently accepts approximately 1,400 tons per day of municipal solid and C & D waste. This waste consists primarily of: commercial front and side loaders and roll-off containers; and wastes that are self-hauled to the landfill by both private citizens and commercial entities. The quantities of solid wastes accepted at TJL vary seasonally.

## **1.3 HOURS OF SITE OPERATION**

TJL is open to the general public and commercial haulers for solid waste disposal Monday through Saturday from 7:00 a.m. to 6:00 p.m., year-round, excluding four

holidays (New Years, July 4, Thanksgiving Day, and Christmas Day). TJ controls public access to the landfill to prevent illegal dumping of wastes, public exposure to hazards, scavenging, and unauthorized traffic. Access control is a key element in preventing unauthorized scavenging or potential injury. Fences, locked gates, video surveillance, and natural barriers provide the basis of the site's access control system. During operating hours, TJ personnel monitor and control all access to facilities with at least four (4) people on-site (Operation Supervisor, Equipment Operator, Scale House Operator, and Spotter), one of which is always in the scale house and one at the active face.

#### **1.4 LANDFILL EQUIPMENT**

The following equipment is currently utilized at TJL:

- Two (2) diesel generators, 30 hp (light tower)
- Three (3) diesel trash compactors
- One (1) gasoline engine, 5 hp (water pump)
- Three (3) diesel bulldozers
- One (1) smooth drum compactor
- Two (2) diesel front end loaders
- One (1) diesel IT (Integrated Tool Carrier)
- Three (3) diesel scrapers
- One (1) diesel grader
- One (1) diesel tractor
- Two (2) diesel water trucks
- Two (2) diesel hook trucks
- Two (2) diesel service trucks
- Two (2) diesel compressors
- One (1) diesel excavator
- One (1) diesel winrow turner
- One (1) horizontal diesel grinder
- One (1) diesel backhoe
- One (1) diesel screener
- One (1) 45 kV diesel backup generator

- Miscellaneous gasoline lightweight vehicles for transportation

The trash compactors are used to spread and compact solid waste disposed of at the landfill. The smooth drum compactor and grader are used for road and embankment construction and all other dirt work requiring grading and compaction. The bulldozers are used to provide backup waste placement and compaction duties, placement of daily cover soils, loading the scrapers and for general site work. Scrapers are used to excavate and haul daily and final cover materials as well as excavate material within proposed landfill expansion areas. The water trucks are used for dust control and recycle/disposal of leachate as required. The excavator, grinder and screener are used in greenwaste operations. The equipment on site is sufficient for current operations and may be changed at any time to meet changing requirements of the landfill.

## 1.5 PERSONNEL

The following persons are responsible and/or available for on-site landfill operations at TJL:

- General Manager – The General Manager is responsible for all landfill operations including planning, engineering, and site operations. He reports to the Board of TJ. He is supported by both an administrative assistant responsible for human resources, purchasing and general administrative duties and the following personnel:
- Controller – The Controller is responsible for the financial, website, and IT / computer functions at the facility.
- Compliance Coordinator – The Compliance Coordinator is responsible for ensuring that the landfill is in compliance with all rules and regulations regarding the safe operation of the landfill including: permits, personnel training, safety, surveying, and OSHA requirements. The Compliance Coordinator and the Administrative assistant jointly provide education and tours for the public. The Compliance Coordinator reports to the General Manager.
- Operations Manager – The Operations Manager is responsible for all site operations at the Landfill Facility and is assisted by two Operations Supervisor(s). The Operations Manager directs the daily waste placement, equipment operations, and all other activities related to landfilling operations. The Operations Manager or one of the Operations Supervisors is on duty during

all hours of landfill operation. The Operations Manager reports to the General Manager.

- Operation Supervisor(s) – The Operation Supervisor is responsible for all operations relating to the surface operation of the landfill. The Equipment Operators, Mechanic, Spotters, and HHW personnel report to the Operation Supervisor. The Operation Supervisor reports to the Operation Manager.
- Equipment Operator(s) – The Equipment Operators are responsible for daily operations at the working face and excavation sites of the landfill. There are typically four (4), and no less than two (2), Equipment Operators on duty at the landfill at any given time. All Equipment Operators report to the Operation Supervisor.
- Truck Driver(s) – The Truck Drivers are responsible for daily movement of waste bins from the PCC to the working face of the landfill, water truck operations, and transporting of recyclables offsite. There are typically two (2), and no less than one (1), Truck Drivers on duty at the landfill at any given time. All Truck Drivers report to the Operation Supervisor.
- Mechanic(s) – The Mechanics are responsible for routine maintenance of heavy equipment, landfill vehicles and auxiliary equipment located at the landfill. A Mechanic is on duty 8 hours per day Monday through Saturday. The Mechanics report to the Operation Manager.
- Spotter(s) – The Spotters are responsible for inspecting incoming loads to prohibit hazardous and other unacceptable materials from being unloaded at T.J.L. Spotters are also responsible for directing traffic, ensuring public safety and properly diverting recyclable materials to the proper location. The Spotters are trained in the identification of various solid wastes and report to the Operations Supervisor. There are typically four (4) Spotters on duty at any given time.
- HHW Technician/Spotter(s) – The HHW Technicians/Spotters are responsible for accepting and screening incoming HHW loads and bulking those materials. The HHW personnel are specially trained to handle HHW and report to the Operations Supervisor. The SLVHD oversees the operation of all HHW facilities in the County.
- Scale House Supervisor – The Scale House Supervisor is responsible for the overall operations of the scale house and assists the controller in AP and other financial issues. The Scale House Supervisor reports to the General Manager.

- Scale House Operator(s) – The Scale House Operators are responsible for screening incoming loads and collecting tipping fees at the scalehouse. The Scale House Operators report directly to the Scalehouse Supervisor.

Temporary employees or contractors will report directly to the Operations Manager, or his designee. These may include litter control, labor, operators, spotters, surveyors, and inspectors.

## **SECTION 2 - LEGAL DESCRIPTION & PROPERTY OWNERSHIP**

TJ was formed in 1986 by interlocal agreement which designated TJ as responsible for managing the solid wastes generated by the member cities. The landfill originally consisted of approximately 4.95 acres of TJ owned land and approximately 90 acres of leased Kennecott Utah Copper (KUC) land. Additional land was purchased from KUC in 1993 and 1997. Two small property boundary realignments were done in 1999 between KUC and TJ properties to better define the actual landfill boundaries. TJ leased additional KUC property in 2001 as a buffer to the east and south of the landfill.

A copy of the legal description and proof of ownership is included in Appendix B – Legal Description & Property Ownership, Permit Renewal July 15, 2005. The location of TJL is as indicated on Drawing 2 (General Arrangement). TJ has the exclusive right to operate a landfill on the property.

## **SECTION 3 – OPERATION PLAN**

On October 9, 1991, the U.S. Environmental Protection Agency (EPA) announced revisions to the Criteria for Classification of Solid Waste Disposal Facilities. These revisions were developed in response to Subtitle D of the 1984 Hazardous Waste Amendments to the Resource Conservation and Recovery Act (RCRA). The Subtitle D regulations set forth revised minimum federal criteria for municipal solid waste landfills (MSWLFs), including facility design and operating criteria. The Subtitle D regulations set forth differing requirements for existing and new units (e.g., existing units are not required to remove wastes in order to install liners).

Subtitle D established a framework for federal, state, and local government cooperation in controlling the management of non-hazardous solid waste. The federal role in this

arrangement is to establish the regulatory direction by providing minimum nationwide standards for protection of human health and the environment and by providing technical assistance to States for planning and developing their own environmentally sound waste management practices. However, the actual planning, direct implementation, and enforcement of solid waste programs under Subtitle D remain largely a state and local function.

On November 5, 1995, the State of Utah Department of Environmental Quality (UDEQ) issued final Administrative Rules entitled Solid Waste Permitting and Management Rules (R315-301 through 320) implementing Subtitle D at the state level. UDEQ has received authorization from EPA to implement and enforce the solid waste program.

TJ has prepared this Operation Plan to guide the daily operations at TJL. This document provides substantial discussion of operations at the landfill based on the operating criteria outlined in 40 CFR 258, Subpart C, and State of Utah Administrative Rules R315-301 through 320.

Portions of this Operation Plan are subdivided into separate discussions of the unlined landfill and the lined landfill. Since the unlined landfill accepted waste after October 9, 1993, its closure and post-closure care must follow more stringent state and federal regulations than those facilities which were closed prior to October 9, 1993.

### **3.1 SCHEDULE OF CONSTRUCTION**

Future construction of the lined landfill cells will be made according to the methodology presented in the drawings (Appendix A – Drawings). These drawings show the conceptual configuration of the completed landfill and details for selected key elements of future landfill development. The proposed configuration was developed based on geologic/hydrogeologic conditions, geotechnical considerations, environmental assessment data, and operational considerations.

TJ has adopted the following definitions for clarification of the overall development cycle of the landfill:

- Cells – Cells represent the incremental excavation and associated liner construction at the base of the landfill. The lined landfill has been divided into six (6) distinct Cells. The Cells are numbered 1 through 6 and are oriented from west to east.

- Phases – Phases represent the incremental filling and associated final cover construction on the landfill. TJL has been divided into (8) distinct Phases. The Phases are lettered A through G

Drawings, specifications, and QA/QC Plans for Cells 1, 2, 3 and 4 have been previously submitted to Utah State DEQ -Division of Solid and Hazardous Waste (DSHW) for review and approval prior to construction. Cells 1, 2, 3 and 4 have been constructed and have received waste. Each additional landfill Cell will be designed and constructed when the previous operational phase is nearing its intermediate capacity. Detailed drawings, specifications, and QA/QC plans will be developed for each additional Cell construction and submitted to the DSHW for review and approval prior to construction.

Drawings 5 and 6 (Future Landfill Development) illustrate the general sequencing of the remaining lined landfill Cells and closure Phases at TJL. The sequencing drawings show both the excavation of the remaining Cells as well as the placement of waste to final cover contours. Cell 4 is the cell currently being utilized. The construction of Cells 5 and 6 will be completed as required to meet the disposal needs of TJ and are anticipated to occur between 2012 and 2016.

The remaining capacity of Cell 4 plus the future Cells 5 and 6 have airspace for approximately 16-20 years of disposal, based on available fill volume, expected daily waste disposal rates, and an in-place density of 1,400 pounds per cubic yard (ppcy) of waste.

Surplus soil excavated from the development of each additional Cell of the lined landfill area will be used for daily, intermediate, and final cover or strategically stockpiled. At a minimum; enough soil will be stockpiled to construct the final cover for Phases F and G.

As a general rule for the construction of future landfill Cells; the next lined landfill Cell should be planned for availability no less than 12 months prior to the completion of filling in the operational disposal area.

## **3.2 DESCRIPTION OF HANDLING PROCEDURES**

### **3.2.1 General**

All waste entering the landfill is weighed and then monitored continually from the scale to the working face, PCC, or green waste facility by landfill personnel. Usually two and sometimes three individuals will monitor the waste being off-loaded at the working face.

Section 3.10 discusses in detail the inspections of waste loads. Illicit material will be turned away and documented as such (to the SLVHD). Waste delivered to the PCC is continually monitored by Spotters to exclude hazardous waste and to separate recyclable and HHW materials.

After a vehicle leaves the scalehouse, the vehicle will be routed to the appropriate discharge location. Loads will be regularly surveyed at the tipping area by spotters. The waste materials will be placed and compacted in two-foot increments to provide the waste compaction necessary to meet the design landfill capacity. The materials will be placed at the toe of the operational face and spread up slope with a trash compactor to provide relatively uniform sloping (maximum 3H: 1V slopes) lifts.

The daily module will consist of a series of 2-foot increments placed to a height of approximately 8 to 10 feet (lift). At the maximum height of 10 feet of waste material, the daily lift will be covered with 6" of daily cover soil.

Waste delivered to the PCC is placed into roll-off containers by an operator using the Integrated Tool Carrier (IT). Once the roll-off containers are full, a hook truck delivers the roll-off containers to the working face for disposal. Recyclables and green waste delivered to the PCC are placed into designated roll-off containers and routed to the appropriate facility.

Green waste delivered to the Greenwaste area will be accepted by a spotter who will ensure that the load consists of organic materials only. No trash or metal is accepted in this area.

### **3.2.2 Sequence of Development**

The unlined landfill Cell is historic in nature and was consequently constructed without a liner or leachate collection system. Final cover has been placed on portions of the unlined landfill cell as shown on Drawing 9 (Details) the typical section of the north side slope cover. Waste has been added over the unlined landfill Cell historical footprint to bring the elevation of the landfill to the final cover design slopes.

The following paragraphs describe the filling sequence for the remaining Phases of the TJL. This sequencing will result in the planned placement of wastes to maximize the stability of the fill at any time during operation of the landfill. The Operators will not deviate substantially from the sequencing plan without concurrence of the Operations Manager.

The lined landfill has been designed to be constructed in six (6) Cells as shown on the Drawing 4 (Lined/Unlined Landfill). The constructed base of each lined landfill Cell is sloped toward the leachate collection/evaporation pond (LCEP). The LCEP moves with the construction of each Cell of the lined landfill; always being located at the most down gradient point of the lined landfill. A leachate collection pipe (LCP) was installed in Cell 4 to assist with the transport of leachate to the active LCEP. Leachate is held in the LCEP until evaporated. In the event of a period of prolonged above normal precipitation; leachate will be pumped from the collection/evaporation pond and recirculated over the lined landfill to keep the head on the liner less than the required 12" and to maintain a 12" minimum freeboard in the LCEP. The leachate collection/evaporation pond is permanently marked to show the depth of leachate at any given time and to indicate remaining freeboard within the collection/evaporation pond.

### **3.2.2.1 Protective Soil Layer/Select Municipal Solid Waste (MSW) Placement**

After the completion of the liner system installation for each Cell; a one (1) foot thick layer of screened protective soil is placed over the liner components. The screened soil placement extends over the liner installed across the bottom of the Cell to help protect the liner from damage. A second one (1) foot layer of bank run material is then placed over the screened material to complete a two (2) foot protective layer in the base of the lined Cell. Drawing 9 (Details) illustrates the configuration of the bottom liner and the protective soils. The first solid waste placed in a newly constructed Cell will be placed in a layer approximately 6 feet thick using only select MSW (side loader only). Objects capable of damaging the liner (i.e.: rebar, pipe, or other similar objects) are traditionally not in this waste and the solid waste will be compacted as a single lift, with no intermediate compaction to provide a six (6) foot thick protective working surface over the protective soils.

Since the application of select waste over the one (1) foot thick layer of protective soil on the side slopes will take place incrementally as the level of MSW within the Cell raises, specific measures will need to be followed to minimize the potential of liner damage. The following procedure will be followed to ensure protection of the liner over the side slopes:

All spotters and equipment operators involved with the placement of select MSW will have annual training delineating the screening and placement of the select MSW. The annual training documentation will identify the person receiving the training, date of training, and

the name of the person providing the training. All training documents will be included in the operation record.

As the waste is placed, landfill equipment will spread the MSW in a layer approximately 3-4 feet thick. The equipment operator will perform the initial screening of the MSW as he/she spreads the MSW. A dedicated spotter will perform the second screening of the MSW for objects capable of causing damage to the liner (i.e.: rebar, pipe, or other similar objects). All materials with the potential of damaging the liner through the one (1) foot thick soil layer will be removed from the MSW.

The Operations Supervisor will periodically observe the placement of the select MSW layer on the side slopes as a final screening of the select MSW. Drawing 9 (Details) illustrates the configuration of the Cell liner over the side slopes.

### **3.2.2.2 Development of Cells 1, 2, 3 and 4**

#### ***Construction***

Cell 1 construction started the summer of 1997; stopped due to winter weather, and was completed June of 1998. Excavation of Cells 2 and 3 was performed in conjunction with the placement of daily and intermediate cover in the unlined landfill and Cell 1. Additionally; various landscape and soil stockpile berms were constructed with soils from the Cell 2 and Cell 3 excavation. Liner construction of Cell 2 and 3 was started prior to the complete filling of the Cell 1 area with Cell 2 construction being completed October of 2000 and Cell 3 being completed in the fall of 2002 respectfully. Construction of cell four was begun in late 2003 and completed and lined by September 2007; waste placement began in September 2007 with a base layer of trash and soil. Cell four began accepting all trash in April 2008. Cell five is currently in the excavation phase with completion expected in 2011.

#### **Waste Placement**

Cell 1 was filled beginning at the north and working towards the south where possible. Waste was placed in 8 to 10 foot thick lifts depending upon the volume of waste being handled at the facility. Each lift was completed across the entire area of Cell 1 and terminated at the east edge slope for Cell 2.

Cell 2 waste placement began along the western side; where Cell 2 adjoined Cell 1. The landfill operation proceeded in a general west to east fashion with each successive lift

being tied into Cell 1. Cell 3 operations proceeded in a similar fashion to Cell 2 with the MSW being tied into waste previously placed as part of filling Cell 2.

At no time shall waste be placed within the landfill Cells at slopes exceeding 3H:1V. As the operations within each Cell extend in elevation above the existing topography; each lift will extend toward the south slope, where they will coincide with the final cover elevations. Final cover slopes will not exceed 4H:1V as shown on Drawing 7 (Final Cover).

### **3.2.2.3 Development of Cells 5 and 6**

#### ***Construction***

Excavation for daily, intermediate and final cover is being conducted in Cell 5. The construction of Cell 5 will be far enough in advance to ensure that Cell 5 is fully operational prior to the completion of Phase D. Drawings 3 and 4 (Phase D and Cell 5) show the geometry and location of Phase D filling and Cell 5 excavation.

The excavation of Cell 6 will follow once Cell 5 is excavated to final grade. Soil generated from the excavation of Cells 5 and 6 will be used for daily and intermediate cover and also stockpiled in a temporary soil stockpile located outside the perimeter of the main landfill. The stockpiled soil will be used for final cover. The construction of Cells 5 and 6 is scheduled for 2011 and 2016 respectively.

Cells 5 and 6 will be constructed in accordance with detailed construction drawings, specifications, and QA/QC plan which will be developed for each cell and submitted to the DSHW for review and approval before construction begins.

#### **Waste Placement**

Cell 5 will be filled in the same general manner as Cells 1, 2, 3, and 4. Filling will tie into waste already placed in Phase D. In general, each lift will be placed substantially across the bottom of the entire Cell 4 area before the next lift is started.

At no time shall waste be placed within the landfill cell at a slope exceeding 3H:1V. Each lift extends toward the south slope, where they coincide with the final cover elevations. Final cover slopes will not exceed 4H:1V as shown on Drawing 7 (Final Cover).

### **3.2.3 Infectious Wastes**

TJL accepts some residential infectious waste as a consequence of accepting MSW. Residents with medical conditions occasionally dispose of infectious waste with their

normal trash. TJ personnel are instructed to be aware of the possible presence of infectious wastes i.e. sharps and other items. As a general guideline spotters are told to refrain from walking on non-compacted trash.

Commercial infectious waste is not accepted at the TJL facility.

### **3.2.4 Special Wastes**

#### **3.2.4.1 Used Oil and Batteries**

TJL is a "Used Oil Recycle Center". When a customer brings used oil to dispose of they fill out the form "Salt Lake Valley Health Hazardous Waste Survey" provided by the Salt Lake Valley Health Department (SLVHD). The forms are collected by the SLVHD on a monthly basis. Waste oil is bulked and shipped to an oil reclamation facility. Automotive batteries are not accepted at the working face. TJL provides a pallet, within a plastic containment tub, in the PCC area where incoming batteries are stored until a sufficient number is generated to facilitate a pick up by a recycler.

#### **3.2.4.2 Bulky Wastes**

White goods are accepted at the landfill and are separated for recycling. All appliances containing refrigerants are segregated in a separate area. Refrigerant is removed per EPA guidelines and the appliances are loaded into the metal bin for recycling. Used cars are not generally accepted at TJL. TJ will accept automobiles and or parts with proof of ownership and the title. Persons seeking to dispose of used car bodies are encouraged to take the car to a metal recycler.

#### **3.2.4.3 Tires**

TJL accepts small quantities of tires from the general public. Commercial haulers are prohibited from disposing of tires at TJL. Up to four passenger tires are accepted from the public with each load. A base fee is assessed for all passenger car tires with a surcharge for tires larger than a typical passenger size (16" rim). All tires are stored in a designated tire storage area. When sufficient quantities of tires are collected, a tire recycler is called and the tires are removed from the facility for recycling.

#### **3.2.4.4 Dead Animals**

Large dead animals are not accepted at the landfill. When small dead animals are found in the waste; they are incorporated into the bottom of the working face. The incorporation of the carcasses into the landfill is accomplished by pushing up the toe of the face and depositing the animal in the bottom of the toe; waste or a minimum of 12" of cover soil is then pushed over the top of the animal.

#### **3.2.4.5 Asbestos Waste**

Asbestos waste is not accepted at the TJJ facility.

#### **3.2.4.6 Grease Pit and Animal Waste By-Products**

Grease pit and animal waste by-products are not accepted at the TJJ facility.

### **3.3 LIQUIDS RESTRICTIONS**

#### **3.3.1 Bulk or Containerized Liquid Waste**

Bulk or containerized liquid waste will not be disposed of in TJJ. Liquids restrictions are necessary because the disposal of liquids into landfills can be a significant source of leachate generation. By restricting the introduction of free liquids into the landfill, TJJ can minimize the leachate generation potential of the landfill. This should reduce the quantity of free liquids to be managed in the landfill. The ban on containerized free liquids will also minimize the problem of subsidence and possible damage to the final cover upon deterioration of the waste containers. Leachate may be placed onto the lined landfill from the LCEP as a dust suppression technique or when the capacity of the LCEP is near the 12 inch of minimum freeboard level.

#### **3.3.2 Liquid Household Waste**

Restricting certain small volume liquids may be impractical and unnecessary to protect human health and the environment. For example, small amounts of liquid will be present in household wastes and may be difficult to effectively identify, separate, and restrict from disposal. The regulations allow disposal of products normally and reasonably associated with households or household activities that are in household containers (5 gallons or less). Spotters effectively remove all liquid HHW from loads delivered to the PCC.

#### **3.3.3 Leachate and MSWLF Gas Condensate**

Leachate and gas condensate collected as part of the gas recovery operations at TJJ may be re-introduced into the lined landfill as a dust suppression technique or when the capacity of the LCEP nears the 12 inch freeboard levels. Operational experience of the leachate system over the past years indicates that the LCEP has more than adequate capacity to store leachate produced by the landfill during the winter months.

##### **3.3.3.1 Leachate Handling Procedures**

Leachate is to be removed as directed by the Operations Manager. Because of the arid nature of the area, leachate removal has not been a practice. If TJJ removes any leachate in the future, all Equipment Operators likely to be directly involved with the

removal of leachate shall have initial and annual leachate handling training. The training documentation will identify the person receiving the training, date of training, and the name of the person providing the training. All training documents will be included in the operation record. Leachate shall be applied only to lined portions of the landfill only. Once leachate is loaded into the water truck, the entire load of leachate will be discharge onto the MSW located within the lined landfill or disposed of at a POTW. If the water truck is used for regular dust control in unlined areas, a full load of clean water will be placed on a lined cell area to clean the tank before the second clean load is used over unlined areas. The number of full loads of leachate either reintroduced into the landfill or taken to a POTW will be reported to the Operations Supervisor for volume documentation.

### **3.3.4 Containers Holding Liquid Waste**

Containers holding liquid waste will not be disposed of in the landfill unless the container is "household size (less than five (5) gallons).

## **3.4 MONITORING AND INSPECTION SCHEDULE**

### **3.4.1 Groundwater**

TJL has complied fully with the Corrective Action Program found in our 2005 permit, Appendix C – Modified Corrective Action Plan, Permit Renewal July 15, 2005.

### **3.4.2 Surface Water**

Drainage control problems can result in accelerated erosion of a particular area within the landfill. Differential settlement of drainage control structures can limit their usefulness and may result in a failure to properly direct storm water off-site. Drawing 7 (Final Cover) illustrates the location of the surface water drainage control systems designed to incorporate both existing topographical features as well as changes to the overall site layout. TJ staff will inspect the drainage system monthly. Temporary repairs will be made to observed deficiencies until permanent repairs can be scheduled. TJL or a contractor will repair drainage facilities as required. The facility shall not cause a violation of any Utah Pollution Discharge Elimination System permit or standards from the discharges of surface water run-off, leachate or any liquid associated with the facility. The facility shall be in compliance with all provisions of the Clean Water Act.

The Storm Water Pollution Prevention Plan details the inspection and operational requirements. Appendix B contains the Storm Water Pollution Prevention Plan.

### **3.4.3 Leachate Collection**

The leachate collection system, installed in the lined landfill Cells consists of a layer of drainnet (geosynthetic used for lateral flow of liquid) installed over the High Density Polyethylene (HDPE) and Geosynthetic Clay Liner (GCL) liners. The drainnet is covered by protective soils and MSW. No maintenance or inspection of the drainnet is required. The final leachate collection system components for Cell 6 will incorporate leachate collection pipes and the associated cleanouts. Once leachate collection pipes and cleanouts are installed, they will be inspected no less than quarterly by TJL staff for signs of deterioration. TJL or a contractor will make required repairs.

### **3.4.4 Landfill Gas Collection System**

All landfill disposal operations produce some quantity of gas as a result of waste decomposition. However, it has also been shown that by reducing the available water coming in contact with the waste materials the quantity of gas generation is also reduced. For TJL, the semi-arid environment, depth to groundwater and the operational restrictions of no liquid waste disposal will serve to minimize the gas quantities generated. Any future landfill surface facilities will be constructed away from landfilling operations and existing structures have been equipped with methane monitoring equipment.

Gas control and monitoring requirements are detailed in Section 315-303-3. Explosive landfill gasses shall be monitored quarterly and gas concentrations shall not exceed:

- 25% of the lower explosive limit for explosive gases in facility structures, excluding gas control or recovery system components.
- The lower explosive limit for explosive gases at the property boundary or beyond.

The landfill has thirteen gas monitoring wells; all thirteen of the wells presently show no measurable methane at ground level. Three of the wells, which are outside of the currently lined areas of the landfill, are showing methane within the boreholes. It is expected that these will fall below measurable levels as the LCGS and liner systems are installed in these areas.

Landfill Gas inspection forms are included in Appendix C. TJL has installed a Landfill Gas Collection System (LGCS). The system began construction in late 2004 and TJL began flaring gas in June 2005. The landfill gas to energy plant was put online in April 2009. The LGCS system will be inspected quarterly according to those specifications and parameters listed in Utah Administrative Rules R315-303-2, Standards for Performance. The system will be repaired and parts replaced as required to maintain system capabilities.

The program described in Section 5.2.1.4 for inspecting and maintaining the gas monitoring system will be followed throughout the post-closure maintenance period. Quarterly maintenance will include cutting weeds in a 2-foot radius around each monitoring location.

### **3.4.5 Landfill Leachate Collection/Evaporation System**

The LCEP collects the leachate from all lined Cells and holds the leachate until evaporated. The pond has been constructed utilizing liner components identical to the lined landfill Cells with a secondary layer of GCL incorporated beneath the primary GCL layer. The uppermost (primary) liner consists of 60 mil HDPE membrane underlain by a GCL. Drawing 9 (Details) illustrates the materials utilized in the construction of the LCEP.

The LCEP is located at the eastern edge (downgradient side) of the active landfill Cell. As new landfill Cells are constructed the location of the LCEP is moved accordingly. Drawing 2 (General Arrangement) and Drawing 3 (Phase D) show the location of the current LCEP. During the construction of cell four a leachate collection pump was installed atop the HDPE plastic liner. The pump is designed to keep leachate from collecting on top of the plastic liner.

### **3.4.6 Inspection Documentation**

The results of all routine inspections of site facilities will be recorded on inspection forms. The inspection forms will be submitted to the Compliance Coordinator for inclusion in the landfill operating records as required in Section R315-302-2(5) of the Rules. Appendix C – Landfill Forms contains the forms utilized at TJL to document the landfill operations:

## **3.5 CORRECTIVE ACTION PLAN – GROUNDWATER**

TJL entered into a Corrective Action Program as detailed in R315-308. The plan was submitted to DEQ and accepted on December 13, 2003. Appendix C – Modified Corrective Action Plan, Permit Renewal July 15, 2005, contains the approved corrective action plan for TJL.

## **3.6 CONTINGENCY PLANS**

Contingency operations will be implemented should specific or unusual situations occur. The following subsections discuss such contingencies as fire, explosion, release of explosive gases, and failure of run-off containment. The Operations Manager and Operation Supervisors have cellular phones and radios which will serve as the on-site

mobile communications system for use in an emergency to communicate with the management offices and off-site personnel. The telephones located in the scale house and operations office which will serve as the back-up communication system.

### **3.6.1 Fire**

#### **3.6.1.1 Open Burning**

Open burning of solid waste is prohibited except for the infrequent burning of limited items (e.g., agricultural wastes, land clearing debris, diseased trees, and debris from emergency cleanup operations). The open-burning of these materials is not typically an ongoing practice and thus does not present a significant environmental risk.

EPA Subtitle D, Subpart C requires that TJ not violate applicable requirements of State Implementation Plans (SIPs) under Section 110 of the Clean Air Act (CAA). The CAA is the primary statutory authority for addressing air quality concerns. Section 111 of the CAA governs emissions from all MSWLF facilities. TJ understands that these infrequent acts of burning must be in compliance with applicable requirements under State of Utah SIPs and local open burning ordinances.

Open burning may be conducted in areas dedicated for that purpose at a distance from the active face of the landfill so as to preclude the accidental burning of other solid waste or damage to liner systems.

#### **3.6.1.2 Vehicle Fires**

In the event that a disposal vehicle carrying a burning or smoldering load of waste enters the landfill site the following actions will be taken:

- The vehicle will be directed to a designated section of the landfill, away from any exposed waste, and allowed to deposit the material. The designated area will vary depending on operational areas in use. The area will be readily accessible and within 1 or 2 minutes of the tipping area. The designated area will be isolated from the existing tipping area and will either be an excavated area with no underlying fill or at a location with a minimum of 1 foot of soil cover over underlying fill. In no case will a load thought to be burning be allowed to be dumped when the fill over the liner system is less than 10 feet thick.
- Once burning waste is removed from the vehicle, the application of cover soil by landfill earth-moving equipment or the application of water by the on-site water truck to extinguish the fire can be carried out. Smothering the fire with soil is the preferred method.

- Precautions will be taken throughout the entire fire-fighting operation including using a hot spot observer.
- If, at any time, additional assistance is required, local fire-fighting units will be contacted.

### **3.6.1.3 Ground Fire/Below Cover Fire**

In the event that waste placed on the ground or waste that was previously covered erupts into fire the following actions will be taken:

- The waste on fire will be isolated from previously deposited waste as much as possible. This may be done by either moving burning wastes to another area or by concentrating the burning wastes using the landfill earth-moving equipment.
- Once burning material is separated from other exposed waste, the application of cover soil by landfill earth-moving equipment or the application of water by the on-site water tank truck to extinguish the fire can be carried out.
- Any vehicles and any equipment in the "fire zone" will be sprayed with water while working to quell the fire.
- Precautions should be taken throughout the entire fire-fighting operation, including using a hot spot observer.
- If, at any time, additional assistance is required, local fire-fighting units will be contacted.

### **3.6.2 Explosion**

The concentration and subsequent ignition of landfill gas is not expected to be a significant problem at the site. In the event of an explosion at the landfill or in any structure associated with the landfill site the following actions will be taken:

- The affected area will be immediately closed and evacuated. All site equipment will be moved away from the scene, if possible.
- Access to the explosion area will be restricted to all non-emergency persons until cleared for re-entry by local emergency personnel.
- All landfill personnel will be accounted for.
- Local emergency personnel (fire, police) will be contacted and informed of the situation.
- The General Manager will be informed of the situation.
- A determination of the origin of the explosion will be made if possible. If the source of the explosion can be determined, monitors will be set up to help detect the onset of future discharges.

- The TJ General Manager or his designee will act as the Public Spokesman and will be the only employee authorized to make statements regarding the event.

### **3.6.3 Release of Explosive Gases**

In the event that a release of explosive gases should occur at the landfill or in any structure associated with the landfill site the following actions will be taken:

- All personnel in the area, including those in surrounding buildings, will be evacuated immediately. In addition, site equipment will be moved away from the scene, if possible.
- All landfill personnel will be accounted for.
- Local emergency personnel (fire, police) will be contacted and informed of the situation.
- The General Manager will be informed of the situation.
- The release area and surrounding area will be monitored with a combustible gas indicator (CGI) by landfill personnel and readings documented for placement into the operating record.
- The area of the release will be restricted to all non-emergency persons until cleared for re-entry by local emergency personnel.
- Precautions should be taken throughout the entire emergency response operation.
- The TJ General Manager will provide the necessary notices to the Executive Secretary.

### **3.6.4 Failure of Run-Off Containment**

In the event of a failure of the run-off containment system that has been designed to minimize the potential for off-site release of surface water that contacts operational portions of the landfill the following actions will be taken:

- Landfill personnel will immediately suspend filling operations, if containment failure is in an active fill area.
- Landfill personnel will use earth-moving equipment to construct temporary earthen berms in an effort to divert the flow of surface water away from the failure area and toward a holding area.
- The Operations Manager will conduct damage assessment. A decision will be made as to whether the damage can be rectified by on-site personnel.
- If the damaged area cannot be reconstructed by on-site personnel, TJL will contact a contractor to initiate repairs to the existing system.

- The TJ General Manager will provide the necessary notices to the Executive Secretary.

### **3.7 CONTINGENCY PLAN FOR ALTERNATIVE WASTE HANDLING**

It is not anticipated that an alternative waste handling and disposal system will be necessary. Based on historical operations and a history of only closing down the site one time (a fire in the area), landfilling operations should not have to be suspended due to inclement weather conditions or interruption of service. The site soils, including those planned for daily cover, consist of silty to clayey gravel; these soils are easily placed over a wide range of moisture and weather conditions. Additionally, flooding of the disposal area or access road is unlikely as this design has been arranged to provide positive drainage away from the facility at all times.

With the size of the landfill and the quantity of multi-use equipment available to the operators, equipment breakdown that would stop operations is unlikely. Alternate equipment could be hired on a temporary basis within 4 to 8 hours. TJL believes that their past operating experience and cautious operating procedures will negate the need for alternate waste handling plans.

In the event of a major unforeseen circumstance, a reciprocal agreement has been made with the Salt Lake Valley Solid Waste Management Facility to accept each other's waste in the unlikely event of a facility closure so waste could be diverted to their facility.

### **3.8 MAINTENANCE PLAN**

The following subsections offer a description of the maintenance of installed equipment including groundwater monitoring systems and leachate and the landfill gas collection system.

#### **3.8.1 Groundwater Monitoring System**

The groundwater monitoring system that has been monitored since March of 1994 is no longer functional. All five (5) wells have become dry; Appendix C – Modified Corrective Action Plan, Permit Renewal July 15, 2005, summarizes the changes in the groundwater monitoring program at TJL. Well number 4 will be abandoned in 2010 due to the expansion of the landfill into this area. All laws and regulations will be followed with regards to the abandonment of this well. No maintenance of the groundwater wells is planned.

### **3.8.2 Leachate Collection and Recovery System**

The Leachate Collection and Recovery System (LCRS), installed as part of the lined landfill design, must be maintained so that it operates during the operational life and closure and post-closure period. The system will be inspected no less than quarterly by TJJ staff for signs of deterioration. TJJ or a contractor will make required repairs. Future cleanouts can be used to internally inspect the main collection pipe when it is installed using in-line camera equipment. If necessary, these cleanouts can also be used to jet the pipe clean to re-establish flow. The Drainer installed as part of the LCRS is not required to be inspected or maintained.

### **3.8.3 Landfill Gas Collection System (LGCS)**

The LFGC will be inspected no less than quarterly. The gas collection system will be repaired and parts replaced as required to maintain system operation. The program described below for inspecting and maintaining the LFGC will be followed during the post-closure maintenance period.

Quarterly maintenance will include cutting weeds in a 2-foot radius around each well. Preventive maintenance will be performed on all mechanical equipment at manufacturer-recommended intervals. These tasks include cleaning, lubrication, and replacement of worn parts.

### **3.8.4 Facilities**

Signs, roads, fences, etc, will be inspected on a monthly basis and repairs made as necessary.

## **3.9 DUST, LITTER, DISEASE AND VECTOR CONTROL**

### **3.9.1 Dust Control**

Unsightliness, dust, and odor will be controlled by (1) timely placement of daily, intermediate, and final soil cover over the refuse fill; (2) proper maintenance of haul roads (grading and watering); (3) application of water spray or dust palliative on soil-covered work areas, soil excavation areas, and soil stockpile areas where conditions may result in fugitive dust; (4) application of water or planting of temporary vegetation on intermediate soil cover when conditions might create fugitive dust; (5) planting and maintenance of vegetated cover on completed fill slopes; and paving of access roads as appropriate.

While the landfill is in operation, placing daily and intermediate soil cover will control odors from the refuse. The installation of the low-permeability cap layer and the LFGC should effectively control odors.

### **3.9.2 Litter Control**

The Operations Manager will continue the ongoing litter collection program in order to minimize the impacts of litter on and surrounding the site. This program consists of various activities designed to reduce windblown litter, as well as other site features and operations that help to reduce windblown litter.

TJL has instituted the following activities specifically designed to reduce amounts of windblown litter:

- Enforcing the State law requiring all loads of waste delivered to the landfill be fully tarped. Waste loads delivered to the landfill that are not fully tarped are charged at double the standard tipping rate. This requirement to fully tarp and secure loads will minimize the potential for debris blowing out of vehicles.
- Minimizing the size of the active face reduces the area of wastes exposed to wind.
- Maintaining permanent perimeter fencing and maintaining temporary litter fences downwind from the active face. The height and length of the temporary fences can be adjusted to maximize their effectiveness in trapping windblown litter.
- Timely application of daily and intermediate soil cover.
- Compaction of refuse layers at a maximum thickness of 2 feet to hold freshly deposited refuse to underlying landfill layers.

Site and surrounding area inspections will be conducted routinely and any windblown litter will be collected. Debris will continue to be collected from the sides of the roads leading to the landfill. The landfill personnel will continually patrol the fence line both inside and outside to collect windblown debris.

### **3.9.3 Disease and Vector Control**

TJL personnel will use appropriate technologies to prevent or control on-site populations of disease vectors (e.g., rodents, insects) in an effort to protect human health and the environment. TJL personnel will be responsible for maintaining control of vectors at the landfill through continued use of appropriate daily cover procedures. Professional extermination personnel and services may be used to control vectors if it is found that daily operation procedures are insufficient.

The primary method of vector control is to eliminate conditions favorable for the production of vectors through proper compaction and daily covering as described in Part III of this permit application. Should the landfill personnel notice the presence of vectors, cover material will be applied more frequently. Pesticides will only be used as necessary, and very sparingly.

As with vector control, the preliminary method of controlling birds is to eliminate conditions favorable to their existence. This can be accomplished by utilizing, but not limited to, one or more of the following methods:

- Minimizing the size of the fill face; this is the most effective control method. This, along with more frequent and heavier compaction and frequent covering of the waste, will reduce the area available for the birds to feed.
- Avoiding the accumulation of water in depressions, ponds, or holding areas near the fill.
- Using noise-frightening or other techniques that provide a solution.

### **3.10 WASTE INSPECTION/EXCLUSIONS**

A waste control program designed to detect and deter attempts to dispose of hazardous and other unacceptable wastes will continue to be implemented at TJL. The program is designed to protect the health and safety of employees, customers, and the general public, as well as to protect against contamination of the environment.

The landfill is open for public and private disposal. Signs posted near the landfill entrance clearly indicate (1) the types of wastes that are accepted; (2) the types of wastes not accepted at the site; (3) hours of operation; and (4) the emergency phone numbers.

All vehicles delivering wastes to the site must stop at the scalehouse. Waste haulers are required to comply with the rules established by TJL and can lose the right to use the facilities if they violate these rules. Scalehouse personnel will inquire as to the contents of each incoming load to screen for unacceptable materials. Any vehicle suspected of carrying unacceptable materials (liquid waste, sludges, or hazardous waste) will be prevented from entering the disposal site unless the driver can provide evidence that the waste is acceptable for disposal at the site. TJL reserves the right to refuse service to any suspect load. Vehicles carrying unacceptable materials will be required to exit the site without unloading. If a load is suspected of containing unacceptable materials, the following information will be recorded (if possible): date, time, name of the hauler, driver,

telephone number, license plate, and source of waste. The scalehouse will then notify the tipping area attendants by radio that a load is suspect and that load will be further inspected at the landfill tipping area before final disposal is allowed.

After a vehicle leaves the scalehouse, site personnel will route the vehicle to the appropriate discharge location. Loads will be regularly inspected at the tipping area. If a load contains inappropriate or unacceptable material, the driver will be required to reload the material and remove it from the landfill site. If the driver is not immediately identified, the area where the unacceptable material was discharged will be cordoned off. The unacceptable material will be moved to a designated area for identification and preparation for proper disposal. If landfill personnel discover regulated hazardous or PCB waste, TJJ will ensure that the wastes are treated, stored, or disposed of in accordance with RCRA, and/or applicable State of Utah requirements.

TJJ will also conduct detailed inspections of loads delivered to the landfill. The detailed inspections will be conducted on a random basis designed to detect illegal or inadvertent disposal of unacceptable wastes. The working face spotter will visually observe every load during tipping and a minimum of 1% of all loads entering the landfill will be screened in detail. The scalehouse software randomly (approximately every 30 loads) notifies the scalehouse attendant that an inspection is required. The scalehouse attendant notifies the Spotter who notifies the driver of the selected load that an inspection of the load is required. The Spotter will direct the driver to the proper location to discharge the load.

The selected load will be spread using the compactor or dozer to a maximum thickness of 1 foot. TJ personnel trained in waste screening will perform a detailed inspection of the load to determine if unacceptable materials are present in the waste.

If there is unacceptable waste in a load, the inspector will determine whether the driver should have been aware of the unacceptable wastes. If the driver could or should have recognized the unacceptable wastes, the inspector will issue a violation notice; if the unacceptable wastes are camouflaged, no violation notice will be prepared; however, the driver will be consulted and the route will be determined. For commercial haulers, the first violation for unacceptable wastes will result in a warning to the hauler; the second violation will result in suspension of landfill access. TJ will issue a warning to the company on the suspension of any driver(s). In addition, TJ will warn companies if repeated, apparently intentional violations are suspected; the warning will specify the violation under

consideration, the action(s) required by the company, and the penalty(s) for additional violations. TJ may suspend all disposal privileges at TJL facilities of companies that repeatedly violate TJL rules. A suspended driver or company may not use the landfill during the period of the suspension.

The SLVHD and the General Manager will be notified if an unacceptable waste is discovered at the facility. The General Manager will be responsible for notifying the Executive Secretary of the Division of Solid and Hazardous Waste, and the transporter of the waste within 24 hours of discovery. This notification will include the date of discovery, type of unacceptable waste, approximate volume, and depth and location within the landfill. A copy of notification will be retained in the landfill operating record. If hazardous or PCB-containing waste is discovered, the Operations Manager will also restrict the inspection area from public access and from facility personnel, and will assure proper cleanup, transport, and disposal of the waste.

Following is a list of unacceptable wastes:

- Hazardous wastes (excepting those wastes that are normally and reasonably associated with households or household activity that are in household containers (5 gallons or less)). Examples of hazardous wastes include:
  1. Lead acid batteries (automotive, boat, RV).
  2. Paint thinner, degreasing solvents, used oil or kerosene, or un-rinsed container thereof.
  3. Pesticides, herbicides, or un-rinsed containers thereof.
  4. Fluorescent light ballasts (PCB free labeled), electrical transformers, or fluids from these.
  5. Commercial quantities of florescent and CFL tubes.

*(These items listed to this point are directed to the HHW facility if they are of a residential nature. All business hazardous waste generators are directed to the Salt Lake County HHW facility which is equipped to process small generator waste.)*
- Radioactive materials or materials contaminated by radioactive substances.
- Acutely hazardous waste, per 40 CFR 261.33.
- Wastes containing PCBs.
- Friable asbestos containing materials.

### **3.11 RECYCLING PROGRAM**

TJL maintains bins and segregates recyclable materials at the PCC. TJL currently (based on market) maintains bins for segregation of greenwaste, steel, aluminum, tires, batteries, cardboard, plastic, paper, carpet pad and electronics. When the bins are full, they are all hauled from the site for recycling.

A horizontal grinder is used at the greenwaste facility to grind clean material as a feed stock for the composting operation. TJL is actively encouraging all users of the landfill to take all clean green waste to the grinding facility. Incentive for waste diversion is achieved through a reduced tippage for the grinding site. The Scalehouse personnel and site signage directs the appropriate vehicles to the greenwaste drop off area. This material is processed into wood chips and compost that may be purchased by the general public.

### **3.12 TRAINING PROGRAM**

Personnel at the landfill are placed into broad classes based upon the work duties to be performed. In general, all landfill personnel will be required to complete a 40-hour HAZWOPPER equivalency training class and annually complete a landfill specific refresher. TJL personnel will keep First Aid/CPR training current. Operation Supervisors will maintain current SWANA-MOLO training. Operation Supervisors will also attend select classes on landfill monitoring, landfill safety, and general OSHA safety training. Formal job descriptions and work procedures are in place to guide each of the landfill personnel through a job orientation and evaluation process.

TJ personnel are trained on the identification of unacceptable wastes including liquid wastes, sludge, potential regulated hazardous waste, and PCB wastes. The training will emphasize methods of identifying containers and labels typical of hazardous and PCB waste. Training will also address the proper handling of unacceptable waste. All employees will receive on the job training in landfill operations and waste screening. This training will include operations and safety training. New employees will receive initial training before starting work and full HAZWOPPER equivalency training during their first twelve (12) months of employment.

### **3.13 RECORDKEEPING**

TJ personnel will maintain an operating record (pursuant to the State of Utah Administrative Rule R315-302) which is available at the landfill office. The operating record will include at a minimum the following information:

- The weight or volumes of each vehicle, daily number of vehicles entering the landfill and if available, the types of wastes received.
- List of the deviations in operation from the approved Plan of Operation.
- Training and notification procedures.
- Ground water sampling and analysis results.
- Gas monitoring results.
- Site inspection log.
- Other records as indicated in Section R315-302-2.

In addition to the Operating Record, the following data is maintained on site:

- Closure Plan.
- Post-Closure Plan.
- Cost estimates and Financial Assurance.

Records will be kept throughout the life of the facility, including the post-closure care period. Documents will be organized, legible, dated, and signed by the appropriate personnel. The information in the operating record will be available to citizens through the Utah Government Records Access Management Act (GRAMA).

### **3.14 SUBMITTAL OF ANNUAL REPORT**

TJ will submit a copy of its annual report to the Executive Secretary by March 1 of each year for the most recent calendar year of facility operation. The annual report will include facility activities during the previous year and will include, at a minimum, the following information:

- Name and address of the facility.
- Calendar year covered by the report.
- Annual quantity, in tons, and estimated in-place density in pounds per cubic yard of solid waste handled for each type of treatment, storage, or disposal facility, including applicable recycling facilities.
- Update to the financial assurance mechanism.
- Ground water monitoring results.
- Gas monitoring results.
- Results of leachate system monitoring and disposal.
- Training programs completed.
- Statement on changes or modifications to the Corrective Action Plan.

### **3.15 INSPECTIONS**

The Operations Manager, or his/her designee, will inspect the facility to prevent malfunctions and deterioration, operator errors, and discharges that may cause or lead to the release of wastes to the environment or to a threat to human health. These inspections will be conducted on a quarterly basis, at a minimum. An inspection log will be kept as part of the operating record. This log will include at least the date and time of inspection, the printed name and handwritten signature of the inspector, a notation of observations made, and the date and nature of any repairs or corrective actions. Inspection records will be available to the Executive Secretary or an authorized representative upon request.

### **3.16 RECORDING CLOSURE WITH COUNTY RECORDER AND THE STATE OF UTAH DIVISION OF SOLID AND HAZARDOUS WASTE**

Plats and other data, as required by the County Recorder, will be recorded with the Salt Lake County Recorder as part of the record of title no later than 60 days after certification of closure. Additionally, TJ will submit proof of record of title filing to the Executive Secretary.

### **3.17 STATE AND LOCAL REQUIREMENTS**

TJ will maintain compliance with all applicable state and local requirements including zoning, fire protection, water pollution prevention, air pollution prevention, and nuisance control. The South Jordan Current Zoning and Future Land Use Plans are included in Appendix E – Local Zoning.

### **3.18 ASBESTOS CONTAINING MATERIALS**

TJL does not knowingly accept waste materials containing friable asbestos.

## **SECTION 4 - CLOSURE PLAN**

This section describes the final cover construction, site capacity, schedule of closure implementation, estimated costs for closure, and final inspection procedures for the existing and new expansion phases of TJL.

### **4.1 CLOSURE STRATEGY**

The majority of the north slope of the unlined landfill is closed and has been capped with the final soil cover. Appendix G – Test Pit & Boring Info. / Geologic Maps in the Permit to Operate 2005 shows the locations of the test pits excavated to document the depth of the

final soil cover. The thickness of the final soil cover; at all test pit locations indicated, exceeded the 5 foot minimum thickness.

The northwest areas of the unlined landfill (above the side slopes) were capped during Phase A closure. Final cover will be constructed in a series of 8 separate Phases. When sufficient area of the lined landfill Cells has reached final elevation to allow for economical placement of final cover, approximately 20 acres, that portion of the landfill will be closed. Drawings 4 & 5 (Future Landfill Development) shows the approximate extent of each of the closure Phases. Drawing 8 (Final Landfill Section & Landfill Life) shows the section view of the landfill closure Phases and the projected landfill life. The projected date of final closure of the entire landfill, based on current waste streams, is within twenty years. It is projected that approximately 16.1 million tons (24.8 million cubic yards) of municipal solid waste will be placed in the lined and unlined landfill cells at the time of closure.

The Executive Secretary will be notified in writing at least 60 days prior to the anticipated last receipt of waste in accordance with R315-302-3(4)(a). Implementation of the final closure Phase will begin within 30 days after last receipt of waste. Final Closure of the entire landfill will be completed within 180 days of implementation of closure activities, unless an extension has been granted by the Executive Secretary.

## **4.2 FINAL COVER DESIGN AND INSTALLATION**

The Phasing of the final cover system for the unlined landfill and Phases D through G of the lined landfill cells are as indicated on Drawings 4 & 5 (Future Landfill Development). A preliminary design package consisting of drawings, specifications, and QA/QC plan will be prepared and submitted to the State of Utah DSHW for review and approval prior to each cover placement event. A final closure certification package will be issued prior to final closure of the facility to ensure compliance with federal and state regulations effective at the time of closure. The conceptual final cover design described herein is in accordance with current State of Utah regulations and RCRA Subtitle D criteria. The final cover system is designed to control the emission of landfill gas, promote the establishment of vegetative cover, minimize infiltration and percolation of water into the waste, and minimize the erosion of the final cover soils throughout the post-closure care period and beyond. Drawing 7 (Final Cover) shows the final topography for the landfill; Drawing 8 (Final Landfill Section & Landfill Life) shows a section view through the closure Phases of the landfill and Drawing 9 (Details) shows the section view of all final cover systems to be utilized in the closure of the landfill.

#### **4.2.1 Unlined Landfill (Phase A)**

The closure of the unlined landfill consists of the closure of the side slopes (90% of them facing north) and the closure of the top area. The unlined landfill currently extends to an approximate elevation of 5200 feet. The ultimate height of the landfill will be approximately 5250 feet. As stated previously, the north slopes (extreme north edge) of the unlined landfill has received final cover. The final cover for the north slopes of the unlined landfill consists of the following soil layers beginning from bottom to top:

- At minimum of 60 inches of native soil cover.
- Additional 6-12-inch layer of soil cover consisting of native soils suitable for plant growth

The top areas (areas of the unlined landfill above the side slopes) of the unlined landfill will be closed in an incremental manner. Phase A Closure provided final cover to the bulk of the unlined landfills western top area. Closure Phase A is shown on Drawing 2 (General Arrangement) The balance of the unlined landfill will be closed incrementally in Phases B through G.

The area of the landfill that was the old entrance was covered with GCL since the area received waste after the July 15, 1993 date. The installation of the GCL was coincident with the landfill closure (Phase B completed in the summer of 2005). Details of the GCL cover were submitted with the design packages for Phase B and C.

#### **4.2.2 Phases D through G**

The final cover for the remainder of the landfill, which consists of the south portion of the unlined landfill and the area over the lined cells 3 through 6, will be covered in four additional construction phases over the life of the landfill. The following final cover constituents are conceptually planned, beginning from bottom to top:

- A minimum of 12 inches of intermediate native soil cover (which will serve as a gas control layer).
- A reinforced GCL.
- A 60 mil textured HDPE membrane.
- A drainnet drainage layer (geonet sandwiched between two geotextile fabrics).
- A 36-inch protective soil layer, the upper of 6 inches of which will consist of compost enriched site soils suitable for plant growth.

The protective soil layer will consist of native soil materials placed and track compacted to minimize maintenance efforts. The top 24 inches of protective soil layer; in particular the upper 6 inches, will be the vegetative zone of the cover capable of supporting vegetation.

#### **4.2.3 Seed and Mulch**

The 6-inch vegetative layer of the cap will be seeded with a mixture of grasses suitable for fast growth in the region. T.J.L. will utilize the Kennecott seed mixture that has been used in the adjacent Kennecott land reclamation. The recommended seeding and mulching requirements are outlined below:

The final cover area will be seeded using standard seeding techniques. The seed includes an equal mix of western wheatgrass, thickspike wheatgrass, slender wheatgrass, streambank wheatgrass and native wildflowers. This mix is consistent with vegetation currently surrounding the landfill.

Early establishment of vegetation on the landfill's final slope surface will impede soil erosion and promote evapotranspiration. T.J.L. will periodically evaluate vegetative growth, vigor, and color so that the integrity of the final cover system is maintained. If stress signs on vegetation caused by landfill gas and leachate seeps are noted, the problem will be corrected. Corrective procedures will be conducted based on current design recommendations and will be built consistent with construction specifications. T.J. staff or a licensed landscape contractor will make repairs, as necessary.

#### **4.2.4 Landscaping**

The landfill facility, including all surrounding grounds, will be maintained in conjunction with any scheduled maintenance activities (i.e., road improvements, etc.). The landscape of the landfill will be designed to be both functional and aesthetically pleasing.

#### **4.2.5 Contouring**

The landfill's final grades will be inspected and maintained in order to ensure its integrity and conformity with the conceptual final cover plans that are included on Drawing 7 (Final Cover).

Any areas where water has collected (ponded) will be regraded. Erosion damage resulting from extremely heavy rainfall will be repaired. T.J. staff will inspect the final grading no less than quarterly.

#### **4.2.6 Quality Assurance/Quality Control (QA/QC) Procedures**

For construction of the final landfill cover, drawings, specifications and QA/QC procedures will be developed by a Utah licensed Professional Engineer and submitted to the State of Utah DSHW for review and approval prior to construction of each closure Phase.

#### **4.3 CLOSURE COST ESTIMATES**

The current cost estimates for the closure of the TJJ operation is provided in the financial assurance portion of the 2009 annual report. Appendix D – Closure/Post Closure Costs presents the costs anticipated for the closure of the future Phases.

Section 2.9 of Part III details the Financial Assurance considerations for the TJJ facility.

#### **4.4 CERTIFICATION OF CLOSURE AND RECORD KEEPING**

A Utah licensed Professional Engineer will be retained to design closure of each of the closure Phases. The registered engineer will be employed by TJJ, or will be a TJJ-hired consultant and will certify the landfill was closed according to the closure plan. Any amendment or deviation to the closure plan will be approved by the Executive Secretary and any associated permit modifications will be made. Final closure work and documentation will be observed and reviewed by DSHW personnel as necessary.

As part of the certification process, the engineer shall also provide closure as-built drawings to the Executive Secretary within 90 days following completion of closure activities.

Additionally, the final plats and the amount and location of waste will be recorded on the site title. The owner will file the notarized plat with the county recorder within 60 days following certification of closure.

### **SECTION 5 - POST-CLOSURE PLAN**

Post closure activities will begin when closure is approved by the Executive Secretary. The following presents the post-closure plan for TJJ.

#### **5.1 MONITORING PROGRAM**

The following subsections offer a description of the monitoring program, which includes groundwater monitoring, leachate and gas collection systems.

### **5.1.1 Groundwater Unlined and Lined Landfill**

Groundwater is currently monitored as detailed in the approved Groundwater Monitoring Plan (Part III, Section 2). TJ will continue a groundwater monitoring program as detailed in the Modified Corrective Action Plan. Appendix C – Modified Corrective Action Plan, Permit Renewal July 15, 2005, which contains the approved corrective action plan.

### **5.1.2 Surface Water**

Drainage control problems can result in accelerated erosion of a particular area within the landfill. Differential settlement of drainage control structures can limit their usefulness and may result in a failure to properly direct storm water off-site.

Implementation of a post-closure maintenance program will maintain the integrity of the final drainage system throughout the post-closure maintenance period. The final surface water drainage system will be evaluated and inspected, no less than quarterly, for ponded water and blockage of and damage to drainage structures and swales. Where erosion problems are noted or drainage control structures need repair, proper maintenance procedures will be implemented as soon as site conditions permit so that further damage is prevented. Damaged drainage pipes and broken ditch linings will be removed and replaced.

Although no surface water sampling activities are scheduled for the landfill, TJ staff will inspect the drainage system no less than quarterly. Temporary repairs to any observed damage will be made until permanent repairs can be scheduled. TJ or a licensed general contractor will replace drainage facilities, if necessary.

Currently, a semi-annual statement is required to be sent to Utah Department of Water Quality for any discharges. Appendix B – Storm Water Pollution Prevention Plan specifies the storm water handling and documentation requirements.

### **5.1.3 Leachate Collection and Treatment**

#### **5.1.3.1 Unlined Landfill**

A leachate collection system was neither required nor installed during utilization of the unlined landfill.

#### **5.1.3.2 Lined Landfill**

All leachate collection and treatment structures will be monitored no less than quarterly and will be conducted more often if the need arises.

### **5.1.4 Landfill Gas**

Landfill gas monitoring wells have been installed around the north and west perimeter of the landfill site to monitor explosive landfill gas emissions from both the unlined and lined

landfill cells. The gas monitoring wells, as well as all structures at the site, will be monitored quarterly to ensure compliance with State regulations regarding explosive landfill gas.

During post-closure; TJ landfill personnel or a contracted company will be responsible for the inspection and sampling of all methane gas monitoring wells, facility structures, and gas collection system components. Monitoring will occur no less often than quarterly and will be conducted more often if the need arises. In the event that a sample exceeds the regulatory level, TJ personnel will notify the DSHW immediately and undertake appropriate corrective actions.

As outlined in R315-303-3(5), TJ will take all the necessary steps to protect human health and will immediately notify UDEQ of explosive gas levels detected above allowable levels and actions to be taken. Also, within 7 days of incident, TJ will place in the operating record documentation of the explosive gas levels detected and a description of the interim steps taken to protect human health. Within 60 days of detection, TJ personnel will implement a remediation plan for the explosive gas releases, place a copy of the plan in the operating record, and notify UDEQ that the plan has been implemented. The remediation plan will describe the nature and extent of the problem and the proposed remedy.

## **5.2 MAINTENANCE PROGRAM**

The following subsections offer a description of the maintenance of installed equipment, including groundwater monitoring systems and leachate and gas collection systems.

### **5.2.1 Monitoring Systems**

#### **5.2.1.1 Groundwater**

All current and future groundwater monitoring wells will be inspected for signs of failure or deterioration during each sampling event. If damage is discovered, the nature and extent of the problem will be recorded. A decision will be made to replace or repair the well. Possible repairs include redevelopment, chemical treatment, partial casing replacement or repair, sealing the annulus, or pumping and testing. If a well needs to be replaced, it will be properly abandoned. Damaged wells will be scheduled for repair or replacement.

### **5.2.1.2 Surface Water**

Drainage control problems can result in accelerated erosion of a particular area within the landfill. Differential settlement of drainage control structures can limit their usefulness and may result in a failure to properly direct storm water off-site.

Implementation of a post-closure maintenance program will maintain the integrity of the final drainage system throughout the post-closure maintenance period. The final surface water drainage system will be evaluated and inspected, no less than quarterly, for ponded water and blockage of and damage to drainage structures and swales. Where erosion problems are noted or drainage control structures need repair, proper maintenance procedures will be implemented as soon as site conditions permit so that further damage is prevented. Damaged drainage pipes and broken ditch linings will be removed and replaced.

TJ staff will inspect the drainage system no less than quarterly. Temporary repairs will be made until permanent repairs can be scheduled. TJ or a licensed general contractor will replace drainage facilities.

### **5.2.1.3 Leachate Collection and Treatment**

The leachate control and recovery system must be maintained so that it operates during the post-closure maintenance period. The system will be inspected no less than quarterly by TJ staff for signs of deterioration. TJ or a licensed contractor will make required repairs.

TJ will have the leachate control and recovery system reviewed by the Division of Water Quality prior to use in the post-closure maintenance period.

### **5.2.1.4 Landfill Gas**

The LFCS will be regularly inspected in conjunction with the scheduled monitoring tasks. The system will be repaired and parts replaced as required to maintain system capabilities.

The LFCS will be inspected quarterly throughout the post-closure period. Quarterly maintenance will include cutting weeds in a 2-foot radius around each monitoring location.

### **5.2.1.5 Final Grading**

The landfill cover final grade will be inspected no less than quarterly and maintained in order to preserve its integrity. Evaluation and inspection of the cover final grades will include evaluations of vegetation and overall system performance. At the completion of

closure activities, the surface of the cover will be surveyed to provide a reference point for monitoring settlement.

Areas where water has collected (ponded) will be regraded. Erosion damage resulting from extremely heavy rainfall will be repaired.

### **5.2.2 Facility and Facility Structures**

Drawing 2 (General Arrangement) shows the locations of all current and proposed facility structures.

### **5.2.3 Cover and Run-On/Run-Off Systems**

The final cover system will incorporate features to manage storm water, minimize erosion, and provide for efficient removal of storm water collected in the drainage layer. Drawing 7 (Final Cover) shows proposed final grades and illustrates the extent of storm water collection and surface water and erosion control systems on the surface of the cap.

The constructed cap will convey collected water via earthen dikes, piping, swales, and drainage channels to the detention basin.

Placement of all permanent drainage facilities will be completed during, or immediately following, installation of the final soil cover. Permanent drainage facilities will be designed to provide adequate drainage after settlement of the fill area(s). The detention basin will allow settlement of sediments contained in the storm water run-off. Section 2.5 of Part III describes the details of the run-on and run-off control system.

## **5.3 SCHEDULE OF POST-CLOSURE ACTIVITIES**

Post-closure activities, consisting of monitoring and maintaining the final cover and permanent drainage facilities, will be implemented periodically as areas of the landfill are filled to final grade.

## **5.4 POST CLOSURE COST ESTIMATES**

Updated cost estimates for Post Closure care for the TJL facility will be provided in the financial assurance portion of the annual report. Appendix D – Closure/Post Closure Costs presents the costs anticipated for various Closure and Post Closure activities.

Section 2.9 of Part III details the Financial Assurance considerations for the TJL facility.

## **5.5 CHANGES TO RECORD OF TITLE, LAND USE, AND ZONING**

TJ will notify the Salt Lake County Recorder's Office at any such time when there is a change to the Record of Title, land use plan, or zoning restrictions. In addition, TJ will notify the Recorder at that time when the post-closure care period has expired.

TJ will send proof of this filing to the Division Director of DEQ in accordance with R315-302-2(6)(b) of the Utah Administrative Code.

### **POST CLOSURE FACILITY CONTACTS**

TJ will likely maintain a maintenance person responsible for the Post Closure facility operations. However; if TJ does not have a dedicated contact person, the City Administrator of South Jordan will be the designated point of contact for the facility. The telephone number for the City Administrator is (801) 254-3742.

### **POST CLOSURE LAND USE**

Appendix E – Future Land Use contains the current master plan for the lands surrounding the TJL facility.

**APPLICATION TO RENEW A PERMIT TO  
OPERATE A CLASS I LANDFILL**

**Trans-Jordan Landfill**

July 1, 2010  
(Rev. 11/12)

**PART III - TECHNICAL REPORT**

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## **SECTION 1 - GEOHYDROLOGICAL ASSESSMENT**

This section has not changed since the last permit approval, July 15, 2005. TJL's weather station website has changed to:

[http://mesowest.utah.edu/cgi-bin/droman/meso\\_base.cgi?stn=TRJO&product=&time=LOCAL](http://mesowest.utah.edu/cgi-bin/droman/meso_base.cgi?stn=TRJO&product=&time=LOCAL)  
and each of TJL's monitoring wells are dry; mainly due to the ongoing KUC Groundwater Extraction and Treatment Remedial Project in the Southwester Jordan Valley

## **SECTION 2 - ENGINEERING REPORT**

### **2.1 LOCATION STANDARDS - EXISTING AND SCHEDULED LANDFILL EXPANSION**

The following sections present the Solid Waste Facility Locations Standards and discuss the status of TJL's compliance with those requirements though most of these requirements are for new or expanded facilities and this permit is a renewal and not an expansion.

#### **2.1.1 Land Use Compatibility**

The UDEQ Division of Solid and Hazardous Waste's Solid Waste Permitting and Management Rules state that no Class I, Class II or Class V landfill will be located within:

- One thousand feet of a national, state or county park, monument, or recreation area; designated wilderness or wilderness study area; or wild and scenic river area.
- Ecologically and scientifically significant natural areas, including wildlife management areas and habitat for listed or proposed endangered species, as designated pursuant to the Endangered Species Act of 1982.
- Farmland classified or evaluated as prime, unique, or of statewide importance by the U.S. Department of Agriculture, Soil Conservation Service, under the Prime Farmland Protection Act.
- One-quarter mile of existing permanent dwellings, residential areas, and other incompatible structures, such as, schools, churches, and historic structures or properties listed or eligible to be listed in the State or National Register of Historic Places.
- Proximity to an airport.
- Areas with respect to archeological sites.

##### **2.1.1.1 Trans-Jordan Landfill Status**

- The Trans-Jordan Landfill is not located within 1,000 feet of a national, state, or county park, monument, or recreation area; designated wilderness or wilderness study area; or wild and scenic river area.
- Ecologically or scientifically significant natural areas have not been observed within or adjacent to the current site. This site is an active landfill and has been used as such since the late 1950s.

- There are not soils within the landfill property boundaries that are classified prime soil types for farmland use according to the Soil Conservation Service (SCS) maps of Salt Lake County. Therefore, the site is not considered within a unique or important farmland zone.
- There are no schools, churches, historic structures, or properties eligible to be listed in the State or National Register of Historic Places currently located within one-quarter mile of the property line that encloses the area currently being operated as a landfill.
- The Landfill is not located within 10,000 feet of a public-use airport runway used by turbojet aircraft. Salt Lake Municipal Airport #2 is located approximately 5 miles north east of the landfill.
- No archaeologically significant discoveries have been made at the site, nor are any known to exist.

### **2.1.2 Geologic Hazards and Geotechnical Engineering**

The Utah State Regulations indicate “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.”

Neither the unlined landfill nor the lined landfill cells areas are located in a subsidence area, a dam failure flood area, above an underground mine, above a salt dome, or above a salt bed as mentioned in the Utah State Regulations. However, the landfill area is located in the southwest portion of the Salt Lake Basin along the eastern side of the Oquirrh Mountains. Geologic hazards such as debris flows, alluvial fan flooding, liquefaction and faulting can be a potential concern in this area and were therefore assessed in the original expansion permit dated July 15, 2005.

### **2.1.2 Surface Water Requirements**

UDEQ has adopted Subtitle D location restrictions for floodplains, and watersheds. The landfill site does not currently fall within a delineated 100-year flood zone. The scheduled cells are not located in a watershed for a public water system or a location that could cause contamination of a lake, reservoir, or pond. There are no known endangered or threatened species within the landfill area.

#### **2.1.3.1 Floodplain**

The existing landfill is located adjacent to the 100-year floodplain of the Bingham Creek channel. The creek is dry year round because of upstream watershed management performed by KUC. The facility, including all of the future cell construction will not

reduce or restrict the Bingham Creek drainage. The lined landfill area consists of the gently sloping (approximately 2%) eastward drainage plane located along the site's south boundary and bounded on the north by the unlined landfill.

Work related to contaminated soil removal in the Bingham Creek channel was completed by ARCO (west of the landfill) and KUC (north and east) in early 1996. As a result of the remediation work, the former channel was excavated and reconstructed using a uniform trapezoidal section. Flood routing analysis was performed for the reconstructed channel section and shows that for the 100-year, 24-hour flood, Bingham Creek flows would not inundate adjoining portions of either the unlined or lined landfill cells. See Appendix N – Bingham Creek Flow Model presents the analysis of the flood routing of Bingham Creek of the previous permit dated July 15, 2005.

### **2.1.3 Wetlands**

No new facility or lateral expansion of an existing facility shall be located in wetlands unless the owner or operator demonstrates to the Executive Secretary that:

- Where applicable under section 404 of the Clean Water Act or applicable state wetlands laws, the presumption that a practicable alternative to the proposed landfill is available which does not involve wetlands is clearly rebutted;
- The unit will not violate any applicable state water quality standard or Section 307 of the Clean Water Act
- The unit will not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of a critical habitat protected under the Endangered Species Act of 1973.
- The unit will not cause or contribute to significant degradation of wetlands. The owner or operator must demonstrate the integrity of the unit and its ability to protect ecological resources.

#### **2.1.4.1 *Trans-Jordan Landfill Status***

There are no known or designated wetlands within the limits of the landfill boundary and this permit does not include any expansion plans.

### **2.1.4 Groundwater Requirements**

UDEQ location restrictions with respect to groundwater protection include the following:

- No new facility shall be located at a site where the bottom of the lowest liner is less than 5 feet above historical high level of groundwater in the uppermost aquifer.
- No new facility shall be located over a sole source aquifer as designated in 40 CFR 149.
- No new facility shall be located over groundwater classified as IB under Section R317-6-3.3 (an irreplaceable aquifer).
- A new facility located above any aquifer containing groundwater which has total dissolved solids (TDSs) content below 1,000 milligrams per liter (mg/l) and does not exceed applicable groundwater quality standards for any contaminant is permitted only where the depth to groundwater is greater than 100 feet. For a TDS content between 1,000 and 3,000 mg/l, the separation must be 50 feet or greater. These separation distance requirements are waived if the landfill is constructed with a composite liner.
- No new facility shall be located in designated drinking water source protection areas or, if no such protection area is designated, within a distance to existing drinking water wells or springs for public water supplies of 250-day groundwater travel time.

#### **2.1.5.1 *Trans-Jordan Landfill Status***

The lowest point of the bottom of the landfill cell is at least 250 feet above the highest observed groundwater elevation noted in the monitoring wells on and surrounding the site. The bottom liner will be the equivalent of a composite system, using a GCL overlain by a 60-mil HDPE membrane. Groundwater beneath the landfill area is not classified as a sole source or Class IB (irreplaceable aquifer). A groundwater transport study was not conducted as part of this investigation. Based on this information the planned cell construction does meet the requirements of the groundwater protection location restrictions for new facilities and this permit is does not include any expansion plans..

## **2.2 PHASED DESIGN - SCHEDULED LANDFILL DEVELOPEMENT**

This permit application includes provisions for continuing the existing permitted operation on TJJ owned land. The following sections discuss the development of future cells and the incremental filling of the landfill Phases.

### **2.2.1 Estimated Life**

The projected waste stream for TJJ comes from the member cities, KUC, and other southern valley non-member municipalities. Estimated daily waste tons being delivered to the TJJ operations is approximately 1,000 tons based on recent records. Only limited distinction is made in the records between residential and commercial waste disposal. A green waste bypass program coupled with recycling programs by the member cities will,

to a limited extent, offset the population growth in the area. The anticipated future air space consumption has been evaluated based upon a 2% waste stream increase.

All volume calculations were made using Autodesk Civil Design software earthwork package integrated into AutoCAD. Elevations for the ground surface were initially obtained by conventional aerial surveying methods and have been periodically updated using Global Positioning System (G.P.S.) survey methods. As earthwork and ongoing landfilling continues at the site, G.P.S. data will be used to update the base topographic map.

Volume calculations were based on the following assumptions. The quantity of municipal solid waste (MSW) weighed across the scale was approximately 281,577 tons in 2009. At a ratio of 1,300 pounds per cubic yard and a 20% incorporation of cover soils into the waste, the consumption of air space in 2009 was approximately 500,000 cubic yards. The life of the TJL facility; with the annual 2% increase in tonnage, is approximately 17 years. Appendix A – Drawings present the landfill life.

The landfill life projections are only estimates; the actual life of the landfill will depend on several variables including the actual rate of waste being delivered, densities, settlement and the potential use of alternate daily cover materials.

#### **2.2.1.1 Phases A B, and C**

TJL has brought Phases A, B. and C to completion. These phases have been capped with synthetic liners, landfill gas well systems installed and final dirt work completed. Appendix A – Drawings indicate the location of the closed Phases.

#### **2.2.1.3 Phase D**

As Phase D nears completion; waste will be placed into the Phase E area. Due to the geometry of the final cover; it is necessary to partially develop the ensuing closure Phase to allow safe site access. Phase D has approximately 1,400,000 cubic yards of airspace remaining which will provide landfill capacity for approximately 21 months.

#### **2.2.1.4 Phase E**

The capacity of Phase E has approximately 2,400,000 cubic yards of airspace remaining providing approximately 5 years of service.

#### **2.2.1.5 Phase F**

The capacity of Phase F has approximately 8,700,000 cubic yards of airspace remaining providing approximately 12 years of service.

## **2.3 CELL DESIGN**

The design concept for the development of the future lined cells at TJJ includes 2 more cells. The intent of the incremental development of the cells is to spread out the capital investments and minimize the area of the landfill that requires final cover.

The scheduled design allows for the development of future cells while providing soil for daily landfill operations and final cover construction. The approximate location of the remaining lined landfill cells are shown on Drawing 4 (Cell 5 excavation) and Drawing 6 (Cell 6 excavation).

A fundamental landfill design consideration is to minimize the conditions which are conducive to the generation of leachate. The composite liner system utilized at TJJ helps to minimize the potential for leachate to migrate from the bottom of the landfill. The design concept provides for the free drainage of water away from the working face in every cell during each phase of construction and operation. A final, composite sloping soil cover system covering the completed cells will minimize long term rainfall infiltration. Long-term monitoring will be implemented to observe subsidence, and surface ponding and in-turn, reduce the potential for leachate development.

Secondary design considerations include balancing soil cut, fill and stockpile requirements while maximizing the useable disposal space, current facility operational requirements, and long term facility operational concerns. All soils generated from the on-site activities and all soils existing in stockpile locations are required to be used for the operations TJJ.

The final landfill cover will be seeded with drought resistant grasses and native vegetation as each of the cells are completed. The vegetative cover will minimize the water and wind erosion while visually allowing the landfill, once closed, to unobtrusively blend into the surrounding topography.

### **2.3.1 Phased Construction**

Waste is placed in the current landfill closure Phase while cover soils are excavated from the ensuing Cell. Waste is currently being placed in Phase D with the daily and intermediate cover soils coming from the excavation of Cell 5. Waste will continue to be placed in this manner from west to east. Sufficient soil will be stockpiled from the excavation of Cell 5 and Cell 6 to provide adequate daily, intermediate and final cover soils for closure Phase F.

### **2.3.2 Arrangement**

Several factors influenced the geometry of the lined landfill cells. The primary objective was to cost effectively maximize the volume of the landfill while minimizing visual and operational impacts. The height and footprint of the landfill are a result of a balance of these concerns. The depth of the landfill has been modified to accommodate leachate and to provide for the operational cover soils required. Expansion west is limited by the Utah Highway 111. Northward expansion is limited by the Bingham Creek Channel and property boundaries. Expansion to the east and south is also limited by property boundaries. Vertical expansion has been limited by visual impact considerations of raising the landfill too far above the surrounding terrain. No additional lateral expansion is planned for the TJL facility.

The crest of the landfill intentionally varies from a straight line, and the west to east slope of the crest varies, to lessen the "man made" look. The cap will be constructed to maintain a minimum top slope of 3% for ease of construction but will have a greater maximum slope in most areas because the crest also slopes downward to the east. Around most of the landfill perimeter, a 4 horizontal to 1 vertical slope will extend downward from the final cap to the natural ground surface.

### **2.3.3 Liner**

The landfill Cells are designed with environmental controls (both a composite liner and a leachate collection system) that are intended to protect surface water and groundwater from contamination. The previously approved composite liner system consists (from the bottom up) of:

- Prepared subgrade foundation
- A geosynthetic clay liner (GCL)
- A geomembrane liner (textured 60-mil HDPE)
- A geocomposite drainage layer (Drain-net)
- 12" screened soils
- 12" general site soils
- 6' select waste

The select waste layer is specified to be placed directly over the 24" of protective soil as an additional protective measure for the liner components. The select waste is composed of sideloader waste (small residential waste) which by its nature is less likely to contain materials that could damage the liner.

This configuration was selected to provide a composite liner system that closely resembles the standard synthetic-over-clay composite liner system required by State of Utah

Regulations (R315-303-4). This alternative liner system has been previously approved for use at TJL by the DSHW.

The future landfill Cells (5 and 6) will be excavated to the contours indicated on the Drawing 4 and Drawing 6 in Appendix A – Drawings. Design drawings, specifications, and QA/QC packages will be submitted to DSHW for review and approval prior to the construction of each Cell.

### **2.3.4 Fill Methods**

TJL uses an area fill method. In the area fill method, an area is excavated and prepared as a lined landfill cell. During filling of each of the landfill phases, an adjacent area is excavated (for generation of cover soils) in preparation for the next lined cell such that the new cell is ready to receive waste as the previous phase nears capacity. The soils excavated during preparation of the new Cell are used as daily, intermediate, and final cover for the active landfill phase or placed in a soil stockpile for use in the future.

Once the liner system is installed, a 2-foot thick layer of protective soil is placed over the drain net (upper layer of the liner system) to protect the entire liner system. The 1-foot thick layer of soil will be placed on the side slopes incrementally as the waste depth increases. The first solid waste placed in a newly constructed landfill phase will be “select waste” placed in a layer approximately 6 feet thick. This material will also be placed as the first layer against the protective soil cover on the side slopes. Large objects will be removed from the deposited waste and the solid waste will be compacted as a single lift to provide an 8-foot-thick protective working surface over the liner and leachate collection systems. The Operation Plan (Part II, Section 3) details the criteria used and the select waste placement process in greater detail.

The filling of each of the lined cells will be accomplished in typically 250-foot wide, 17-foot deep and 8-foot high daily modules. The sequence will generally proceed west to east and north to south within the cells. A 6-inch thick soil layer (or approved alternate daily cover) will be placed over completed daily modules, isolating each day’s waste placement within individual cells. The surface of the outside (eastern) face of the cell will be covered with a 12-inch thick compacted intermediate soil cover sloped to drain storm water away from the landfill modules and to prevent the ponding of precipitation over in-place waste. The actual geometry (height, width, and length) of the daily operating modules will vary daily due to the total tonnage of waste handled, number of vehicles requiring site access, and weather conditions.

## **2.3.5 Daily and Final Cover**

### **2.3.5.1 Daily and Intermediate Soil Cover**

Daily cover soils must meet the 6-inch State requirements for protection against odors, litter and vectors. The daily 6-inch thick cover will typically be obtained from the excavation of cells being developed for future disposal operations.

Intermediate cover soil requirements are governed by R315-303-4. The outside face of the daily modules and waste areas that are expected to remain inactive for more than 30 days will be protected with a 12-inch intermediate cover. The borrow area for intermediate cover soils is the same for daily cover soils. Based upon the nature of available soil at TJL crushing and screening of on-site soils is not required.

Before the start of waste placement each day, cover soils on top of the previous lift will be stripped back and stockpiled for reuse as soil cover at the end of the day or as needed. These recycled cover soils will be used first; the remainder of daily cover soils will be provided from cell excavation or stockpiled soils.

### **2.3.5.2 Alternate Daily Cover**

TJL has not historically utilized alternate daily cover materials. Due to the nature of the landfilling operation; TJL proposes to utilize the following alternative daily cover materials as the need arises:

- Wood chips – The wood chips created from the grinding of green waste. As wood chips are produced from the grinding operations, some of the chips are utilized at the TJL facility for landscaping with the rest being sold to the public as part of the composting operation. Periodically, the timing of the compost process may result in the generation of excess wood chips. These wood chips may be utilized as an alternative daily cover to minimize the size of the wood chip stockpile.

### **2.3.5.3 Final Cover**

TJL will initiate the placement of the final cover system within 180 days after the disposal ceases in each of the closure phases. Final cover construction will be completed within 180 days after initiation.

TJL is scheduled to construct the composite final cover over the remaining area of the landfill in a series of 3 closure phases; Drawings 3 ,5 and 7( Appendix A) show the extent of each phase.

The composite final cover system will consist (from the bottom up) of:

- Minimum of 12-inches of intermediate cover soils
- Geosynthetic Clay Liner (GCL)
- 60-mil High Density Polyethylene (HDPE) Liner
- Geocomposite (drainage net sandwiched between unwoven geotextiles)
- 30-inches of protective cover soils
- 6-inches of vegetative cover soils

The composite final cover system will minimize surface water infiltration (thereby minimizing leachate generation), gas migration, maintain slope stability, control surface water and erosion, and be capable of supporting vegetative cover. The vegetative cover has been selected with shallow root systems to prevent penetration into the drainage layer or geocomposites. The vegetative cover system is described in detail in Part II Section 4.

The composite final cover design allows for natural watershedding during a normal rainfall or snowmelt with little infiltration into the drainage layer. However, in the case of a temporary low spot created by landfill settlement or during periods of unusually high precipitation, water may infiltrate to the horizontal drainage layer. The geonet geocomposite drainage layer will transport the infiltrated water to the perimeter drain at the edge of the landfill. The perimeter drain will be connected to the stormwater run-off system beyond the final cover perimeter. Surface water runoff will be systematically routed to drop structures for conveyance to the perimeter ditches located outside the final cover. The final cover will be constructed to the general contours as indicated on Drawing 7 (Final Cover) – Appendix A.

#### **2.3.5.4 Elevations of Bottom Liner and Final Cover**

As illustrated on the conceptual Drawings that are included with this permit application (Appendix A), the bottom liner has been designed to be installed at an elevation of between 5,080 and 4,980 feet above mean sea level (msl). The bottom elevation of each cell varies (lower) by several feet proceeding east to accommodate leachate flow. The final cover elevations are also presented on the conceptual drawings and vary between 5,040 and 5,250 feet.

## **2.4 MONITORING SYSTEM – LINED AND UNLINED LANDFILL**

### **2.4.1 Groundwater Monitoring System**

The groundwater monitoring system that has been monitored since March of 1994 is no longer functional. All five (5) wells have become dry – the Modified Corrective Action Plan

in Appendix C(Permit Renewal July 15, 2005) summarizes the changes in the groundwater monitoring at TJL.

### **2.4.2 Slope Stability Analysis**

A slope stability analysis was prepared for cell 6 design and is included in Appendix I: the completed report is indicative to all soil on the TJ site.

### **2.4.3 Leachate Collection and Treatment System**

Among the possible problems created by waste storage in any landfill is the possible contamination of soil and surface or groundwater from water passing through the waste. Due to low precipitation and high evapotranspiration rates associated with the semi-arid climate in the Salt Lake Valley, the quantity of water infiltrating the landfill is predicted to be small and subsequent leachate generation low. The landfill cover is designed to minimize infiltration and promote runoff, and further, liquid waste is not allowed in the landfill. Leachate that is generated will be collected by the leachate collection system (LCS).

The LCS consists of a geocomposite drainage material to provide lateral drainage of leachate directly above the liner system. The geocomposite will be placed over the entire bottom of the lined landfill cell. The grades and materials of the LCS will be designed to maintain functions during landfilling operations. The geocomposite is designed to limit leachate depths on the liner to less than one foot, even when clogged by sediments and biofouling that has been observed at other facilities.

The LCS, as designed, is in operation within Cells 1, 2, 3 and 4 of the lined landfill area. The design appears to function as intended and no operational problems have been experienced with the design to date. Cell 4 construction at TJL incorporated a leachate collection pipe and pump system to enhance the removal of leachate from the liner. The liquid is pumped, within the lined area, of phase C. The leachate collection and header pipe are oversized to allow for periodic maintenance cleaning.

The bottom of the future lined cells will be graded to provide a minimum slope of 2% from the highest point of the graded bottom to the lowest point (west to east). A temporary leachate collection/evaporation pond is designed to be located at the east end of each of the lined landfill cells. As design capacity is reached in each cell, these temporary ponds are abandoned and become part of the next cell. Eventually each cell interconnects and the leachate is transported to a permanent evaporation pond at the east end of the site. A permanent sump will be established in the lowest lined area of the landfill with the leachate being pumped to a permanent evaporation pond located over the lined landfill area.

Any leachate that is collected in the collection pond is evaporated, circulated, or delivered to a POTW for proper handling.

#### **2.4.4 Landfill Gas**

The decomposition of solid waste produces methane, a potentially flammable gas. The accumulation of methane in site structures can result in fire and explosions that can injure employees and property, users of the landfill, and occupants of nearby structures. In accordance with Subtitle D and Utah rules, TJL conducts subsurface and facility structure gas monitoring at least quarterly for methane detection. The concentration of methane gas generated by the landfill must not exceed 25% of the lower explosive limit (LEL) in the facility structures (excluding gas control or recovery system components). The concentration of methane gas generated by the landfill must not exceed the LEL at the facility boundary. As outlined in EPA Subtitle D, Subpart C and the State of Utah Regulations, TJL will take all necessary steps to protect human health and will immediately notify UDEQ of methane levels detected above required limits and actions taken, if any. Within 10 days of an incident, TJL will place documentation of the methane gas levels detected and a description of the interim steps taken to protect human health in the operating record. Within 60 days of detection, TJL personnel will implement a remediation plan for the methane gas releases, place a copy of the plan in the operating record, and notify UDEQ that the plan has been implemented. The remediation plan will describe the nature and extent of the problem and describe the proposed remedy.

The cover soils for the Trans Jordan Landfill site will be predominantly silty to clayey gravels and sands of sufficient porosity such that the small amount of methane which may be produced would typically exit through the soil cover. The inclusion of a 60 mil HDPE membrane in the final cap will tend to limit natural egress of these low volumes of gas. Eighty nine gas collection wells have been installed in the 3 completed Closure Phases. The wells are interconnected and all condensate is reinjected into the closed and active cells and the gas is transported a Gas to Energy Facility operated by Granger Electric of South Jordan. Any non utilized gas is sent to a methane flare located within TJL. .

A copy of TJL's Title V Operating Permit is included as Appendix G – Title V Operating Permit.

## **2.5 DESIGN AND LOCATION OF RUN-ON/RUN-OFF CONTROL SYSTEMS**

The main objectives of surface water management for the landfill is; to provide landfill drainage and to prevent off site run-on, preventing unnecessary surface water infiltration and subsequent leachate production; to contain surface runoff from open areas on-site; and to prevent erosion. Federal regulations require: 1) A run-on control system to prevent flow onto the active portion of the landfill during the peak discharge from a 24-hour, 25-year storm; and 2) Run-off control system from the active portion of the landfill to collect and to control at least the water volume resulting from a 24-hour, 25-year storm.

### **2.5.1 Run-On from a 24-Hour, 25-Year Storm**

Due to the location of the TJJ facility; there is no potential for run-on. TJJ is located higher than the topography to the north, south and east with U-111 providing a drainage break to the west. The only surface water that will require some management is the small volume of storm water run-on that is generated from the site landscape berms.

### **2.5.2 Run-Off from a 24-Hour, 25-Year Storm**

The 25-year, 24-hour storm potential precipitation is 2.69 inches based on information from the Utah Climate Center. This precipitation level was used to size the perimeter channels and detention pond. Also, the final cover will consist of a geomembrane underlying a drain net that will capture any infiltration and direct it into the channels to be managed as run-off. This additional potential flow was considered into the design of the channels and detention areas by increasing run-off values. Realistically, run-off through the drain net will only occur if the storage capacities of the cover soils are exceeded, which would be rare for this type of climate.

Run-off from the final cover will be directed by ditches along the perimeters of the landfill site into a detention basin at the northeast corner of the landfill. The ditches will begin at the west end of the landfill with one ditch circling around the north end of the landfill and the other circling around the south. Using a curve number of 95, type II rainfall and a time of concentration of 42 minutes, with the TR55 computer software, peak flows were obtained for the perimeter drainage channels. A curve number of 95 was selected to represent a higher run-off an a more conservative design.

A value of 0.03 was used for Manning's coefficient of channel roughness, representative of a vegetated channel. The channels will collect the runoff from the side slopes, water transported through the drain net and run-off collected from the flatter sloped top. The top of the cover is variable sloped with an approximately 10 horizontal to 1 vertical (10:1) average. Surface runoff from this area will be diverted by a berm and collected at

several locations and dropped into pipes that will carry the flows down the hill into the perimeter channels at the base of the landfill cover..

When the landfill nears closure, a final design of the channels, drop structures, detention basin and erosion protection will be performed. At this time the use of swales, wattles, erosion control mats and other detail items will be assessed and incorporated into the design. Soil loss potential, flow velocities and other design parameters will be used in this assessment.

#### **2.5.2.1 *Run-off from Active Cells***

Direct precipitation within the operating cells over the existing landfill will not be allowed to pond on or against any waste disposal areas. This will be accomplished by sloping the daily and intermediate soil covers away from the working face and toward the LCEP Direct precipitation within the operating cells of the existing operations will be conducted away from the working disposal areas by using a combination of a 2% eastward sloping cell bottom, and daily and intermediate soil covers. Precipitation coming into direct contact with the open landfill face will be directed to the lined temporary evaporation pond/detention basins at the east end of each cell. Each detention basin is designed to hold all of the storm water runoff for the active waste disposal areas of the lined cells. The detention basins capacities are sized to manage the runoff from a 25-year, 24-hour storm event. Open faces during days of precipitation will be kept to an absolute minimum size.

. A permanent stormwater pond will collect and store the storm waters (run-off) derived from direct precipitation on and around the landfill. These waters will be stored in the detention basin until evaporated. Drawing 2 (General arrangement) details the location of the permanent stormwater pond.

#### **2.5.2.2 *Bingham Creek Flow Model***

Due to the location of Bingham Creek adjacent to TJL, concerns have been raised regarding the impact on the landfall of high flows in the creek. Modeling results indicate that channel flows during the design storm would remain well away from the landfill boundaries, all flows would be contained in the reconstructed Bingham Creek channel. These results were shown in Appendix N – Bingham Creek Flow Model, Permit Renewal July 15, 2005, presents the hydrologic data on the 100-year storm event of the previous permit.

## 2.6 CLOSURE SCHEDULE

Closure will occur incrementally. Each Landfill Phase will be closed once it has been filled to design capacity. The following table summarizes by landfill phases the remaining landfill capacity and projected dates of service starting from May 1 of 2004:

<b>Landfill Phase</b>	<b>Remaining Volume (cubic yards)</b>	<b>Remaining Capacity (tons)</b>	<b>Projected Date of Completion</b>
Phase A (west end, unlined landfill)	Complete	Complete	2005__
Phase B ( Cell No. 1)	Complete	Complete	2005
Phase C ( Cell No. 2)	Completed	Completed	2009
Phase D (Cell No. 3)	2,505,782	1,628,759	2012
Phase E (Cell No. 4)	3,225,154	2,096,350	2013
Phase F (Cell No. 5 & 6)	2,342,454	1,522,595	2030
<b>TOTALS</b>	<b>15,847,579</b>	<b>10,300,926</b>	<b>March 2030</b>

To estimate the landfill life and project the timing of constructed projects; engineering assumptions about the extent of each Phase was made to be able to calculate volumes. The length of time that each Phase will be in service will depend upon the day to day operation of the landfill and will vary from the specific dates of closure presented above. It may be necessary, due to site access requirements, to partially fill future Phases to allow for final waste placement within a particular Phase.

When closure of Phase F is completed, TJJ shall submit the following to the Executive Secretary:

- As-built unit closure plan sheet(s) signed by a professional engineer registered in the State of Utah.
- Certification by Trans-Jordan and a professional engineer registered in the State of Utah that the site has been closed in accordance with the approved closure plan.
- Closure plans and certification of closure will be submitted with the closure of each Landfill Phase.

## **2.7 CLOSURE AND POST-CLOSURE CARE PLANS**

Sections 4 and 5 of Part II detail the methodology for both the Closure and the Post Closure Care plans.

## **2.8 POST-CLOSURE LAND USE - EXISTING AND SCHEDULED LANDFILL OPERATIONS**

TJL staff or a TJL contractor will design a post-closure end use plan for the landfill at the time of final closure. TJL will select an end use that will be limited to those that do not threaten the integrity of the existing control systems. All closure activities will be designed to be consistent with surrounding land use. Typical end uses range from recycling operations (which complement existing operations) to recreational activities. Since the closure of the site may be nearly 20 years away, it is not currently possible to develop those land use plans to be consistent with surrounding land uses and the needs of the area that may be relevant at that future time. Appendix E – Future Land Use indicates the anticipated master plan for the land surrounding TJL.

## **2.9 FINANCIAL ASSURANCE**

### **2.9.1 Closure Costs**

Cost estimates have been developed for the closure Phases at TJL. Appendix D – Closure/Post Closure Costs contains the most recent Closure cost data for the TJL. Closure costs are updated each year and submitted with the Annual Report.

### **2.9.2 Post-Closure Care Costs**

Cost estimates have been developed for the Post-Closure care period at TJL. Appendix D – Closure/Post Closure Costs contains the most recent Post-Closure cost data for the TJL. Post-Closure costs are updated each year and submitted with the Annual Report.

### **2.9.3 Financial Assurance Mechanism**

TJC maintains a trust agreement with Zion's Bank to cover the financial assurance requirements of the TJL. Appendix – F contains a copy of the trust agreement utilized for the financial assurance at TJL.

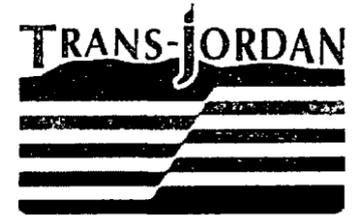
## SECTION 3 - REFERENCES

- Earthquake Hazards Program – National Seismic Hazards Mapping Project, United States Geologic Survey, Golden, Colorado, URL:  
<http://geohazards.cr.usgs.gov/eq/>
- Davis, F.D., 1983, Geologic map of the Central Wasatch Front, Utah: Utah Geological and Mineral Survey Map 54-A, Scale 1:100,000.
- Hecker, S., 1993, Quaternary Tectonics of Utah with Emphasis on Earthquake-Hazard Characterization: Utah Geological Survey Bulletin 127, 157p.
- Hintze, L. F., 1980, Geologic Map of Utah: Utah Geological and Mineral Survey Map-A-1, scale 1:500,000.
- Hintze, L.F. 1993, Geologic History of Utah, Brigham Young University Studies, Special Publication 7, 202p
- Hynes-Griffen, M.E. and Franklin, A.G., 1984, *Rationalizing the Seismic Coefficient Method*, Department of the Army, Miscellaneous Paper GL-84-13.
- Keaton, J.R., and Currey, D.R., 1993, Earthquake hazard evaluation of the West Valley fault zone in the Salt Lake City urban area, Utah: Utah Geological Survey, Contract Report 93-7, p. 69.
- Lund, W., R., 1996, Paleoseismology of Utah, Volume 6, The Oquirrh fault zone, Tooele County, Utah: surficial geology and paleoseismicity: Utah Geological Survey Special Study 88 p. 63.
- Personius, S.F., and Scott, W.E., 1992, Surficial geologic map of the Salt Lake City segment of the Wasatch fault zone, Davis, Salt Lake, and Utah Counties, Utah: U.S. Geological Survey Miscellaneous Investigation Series Map I-2106, scale 1:50,000.
- Salt Lake County Public Works-Planning Division, 1989, Surface Rupture and Liquefaction Potential Special Study Areas, Salt Lake County, Utah.
- Scott, W.E., McCoy, W.D., Shorba, R.R., and Rubin, Meyer, 1983, Reinterpretation of the exposed record of the last two cycles of Lake Bonneville, western United States: Quaternary Research, v.20, p.261-285.
- State of Utah Department of Environmental Quality, Division of Solid and Hazardous Waste, 2000, *R315-301 through R315-311 Utah Solid Waste Permitting and Management Rules*.
- U.S. EPA. 1995. RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities. Richardson and Kavazanjian. EPA/600/R-95-051, April 1995.

## **APPENDIX A – DRAWINGS**

1. Title Sheet
2. General Arrangement
3. Phase D (Remaining fill)
4. Cell 5 Excavation
5. Phase E MSW Fill
6. Cell 6 Excavation
7. Phase F MSW fill (Final Cover)
8. Elevation View (Sections A & B)
9. Elevation View (Sections C & D)
10. Details

# TRANS-JORDAN LANDFILL 2010 PERMIT RENEWAL



10873 South 7200 West (U-111)  
South Jordan, Utah 84095  
(801) 569-8994

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Geotechnical & GeoEnvironmental Engineering

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(801) 270-9400

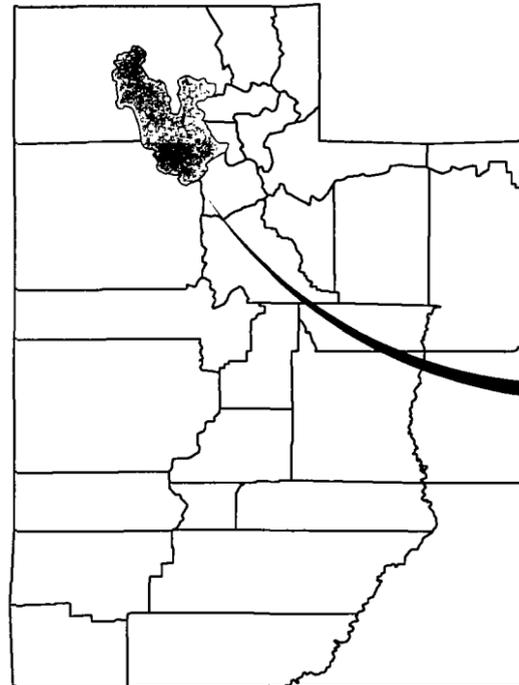
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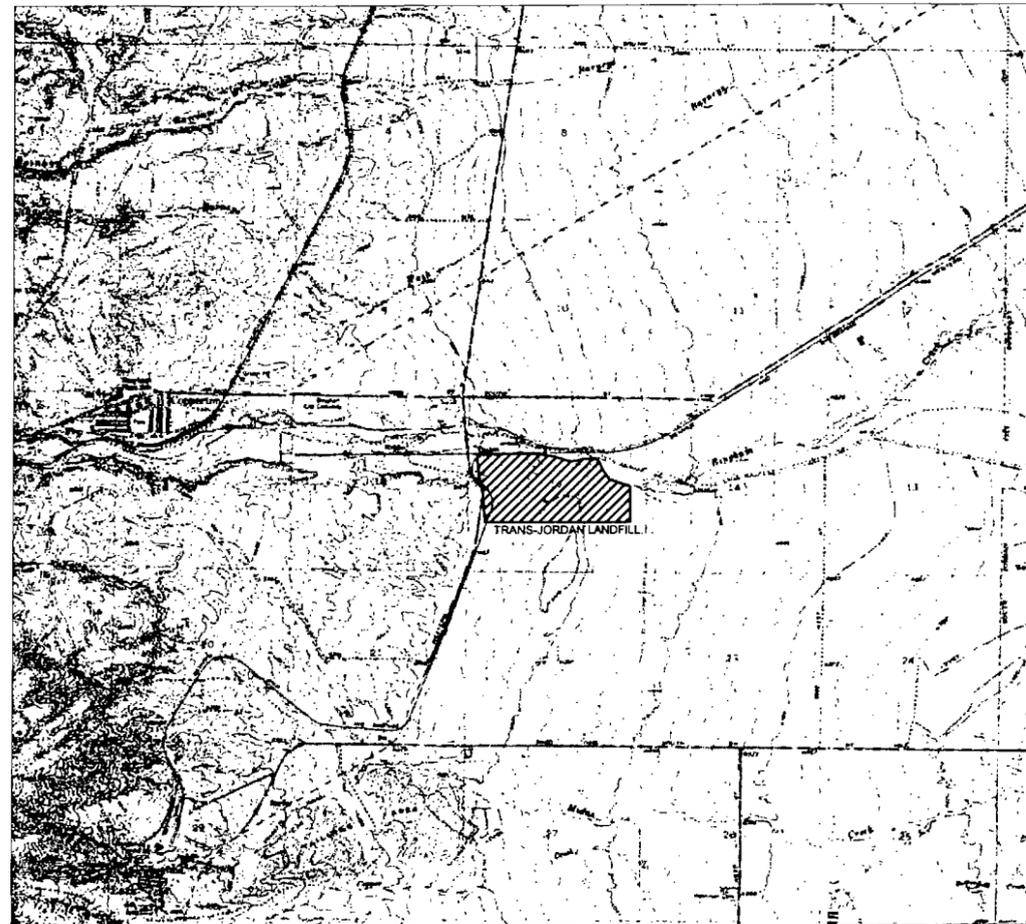
MARK	DATE	DESCRIPTION
-	10/31/11	SIDE SLOPE CHANGE
-	07/16/10	2010 PERMIT UPDATE

ISSUE:

SHEET TITLE  
TRANS-JORDAN LANDFILL  
TITLE  
SHEET



**SITE LOCATION MAP**  
(NOT TO SCALE)



**SITE VICINITY MAP**  
(1" = 2500')

**DRAWING LEGEND**

- 1 TITLE SHEET
- 2 GENERAL ARRANGEMENT
- 3 PHASE E (REMAINING FILL)
- 4 CELL 5 EXCAVATION
- 5 PHASE F FILL
- 6 CELL 6 EXCAVATION
- 7 FINAL COVER
- 8 ELEVATION VIEW (SECTIONS A & B)
- 9 ELEVATION VIEW (SECTIONS C & D)
- 10 DETAILS

REFERENCE:  
USGS 7.5 MIN QUADRANGLE SERIES: COPPERTON, UT



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KEY:

- PROPERTY BOUNDARY
- PERIMETER FENCE\*\*
- ROADS/PARKING (PAVED)
- BUILDING PERMIETER
- LEACHATE/EVAPORATION POND (CELL 4)

NOTES:

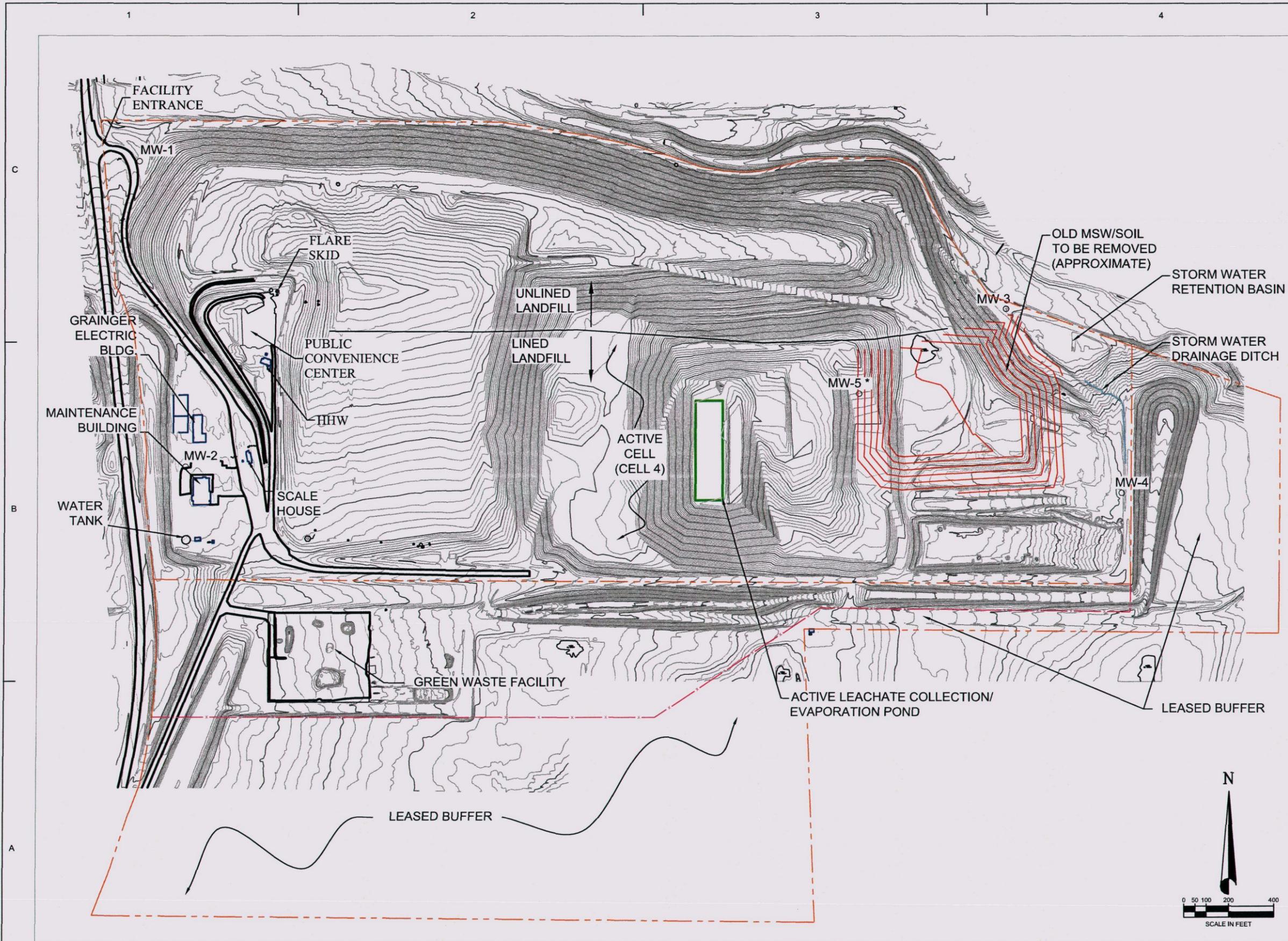
- \* MW-5 TO BE ABANDONED IN 2010
- \*\*PERIMETER FENCE SURROUNDS EXISTING OPERATIONS ON ESTABLISHED PROPERTY BOUNDARY, EXCEPT IN 'LEASED BUFFER' AS SHOWN

MARK	DATE	DESCRIPTION
-	10/31/11	SIDE SLOPE CHANGE
-	07/16/10	2010 PERMIT UPDATE

ISSUE:

SHEET TITLE

TRANS-JORDAN LANDFILL  
 GENERAL  
 ARRANGEMENT



REFERENCE:  
 BASE TOPOGRAPHY PROVIDED BY CLIENT  
 AERIAL SURVEY BY OLYMPUS AERIAL SURVEYS MAY 21, 2005  
 SURVEY UPDATE OF WASTE IN PLACE BY CLIENT: MARCH 18, 2010



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KEY:

- - - PROPERTY BOUNDARY
- · - · - PERIMETER FENCE\*\*
- ROADS/PARKING (PAVED)
- BUILDING PERMIETER
- LEACHATE/EVAPORATION POND (CELL 4)

NOTES:

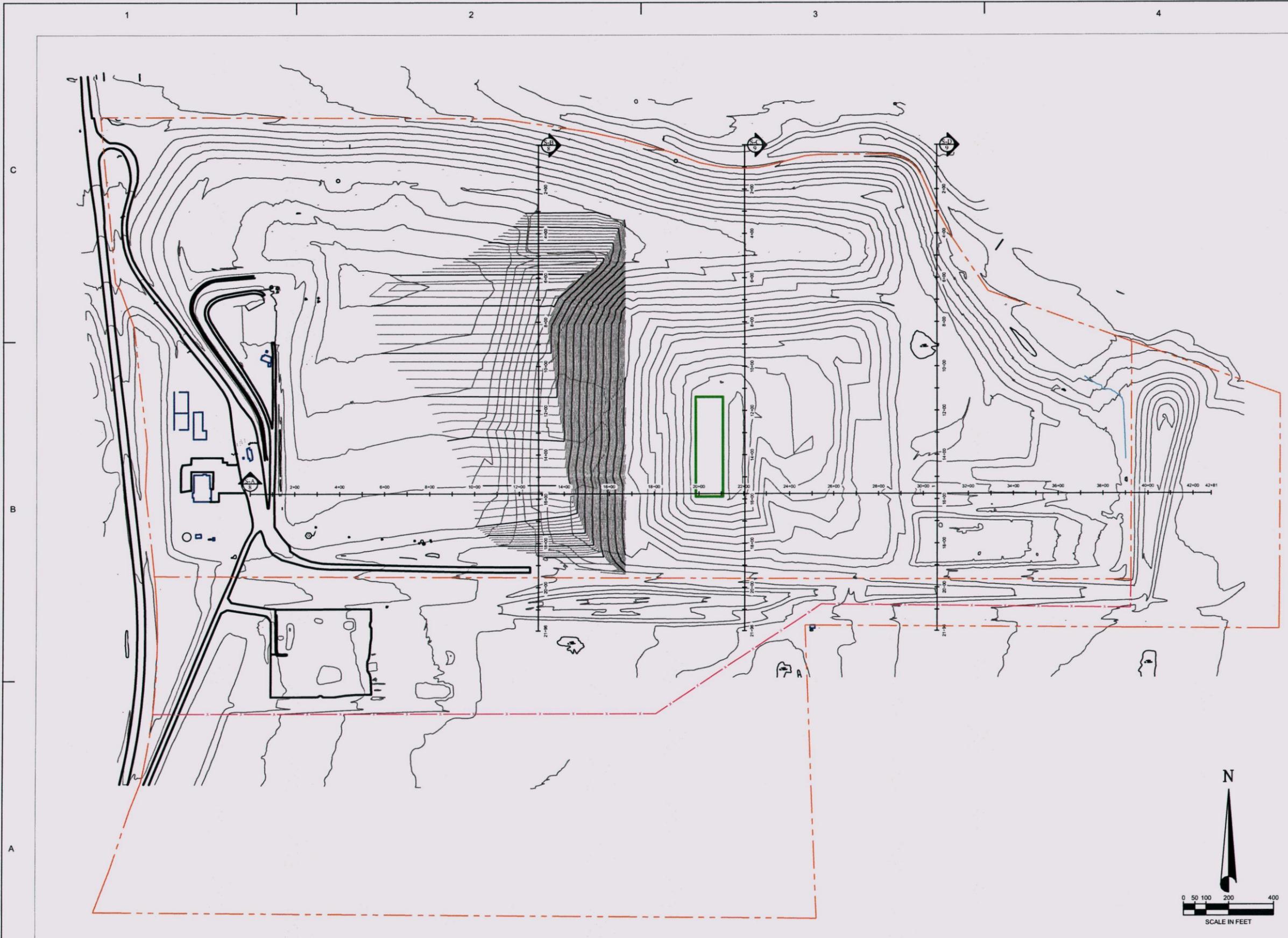
PHASE D REMAINING AIRSPACE:  
 1,347,045 CYD

MARK	DATE	DESCRIPTION
-	10/31/11	SIDE SLOPE CHANGE
-	07/16/10	2010 PERMIT UPDATE

ISSUE:

SHEET TITLE

TRANS-JORDAN LANDFILL  
 PHASE D  
 (REMAINING FILL)



REFERENCE:  
 BASE TOPOGRAPHY PROVIDED BY CLIENT  
 AERIAL SURVEY BY OLYMPUS AERIAL SURVEYS MAY 21, 2005  
 SURVEY UPDATE OF WASTE IN PLACE BY CLIENT: MARCH 18, 2010



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KEY:

- PROPERTY BOUNDARY
- PERIMETER FENCE\*\*
- ROADS/PARKING (PAVED)
- BUILDING PERMIETER
- LEACHATE/EVAPORATION POND (CELL 5)

NOTES:

CELL 5 EXCAVATION  
 (COMPLETED OCT 2011); 671,000 CYD

MARK	DATE	DESCRIPTION
-	10/31/11	SIDE SLOPE CHANGE
-	07/16/10	2010 PERMIT UPDATE

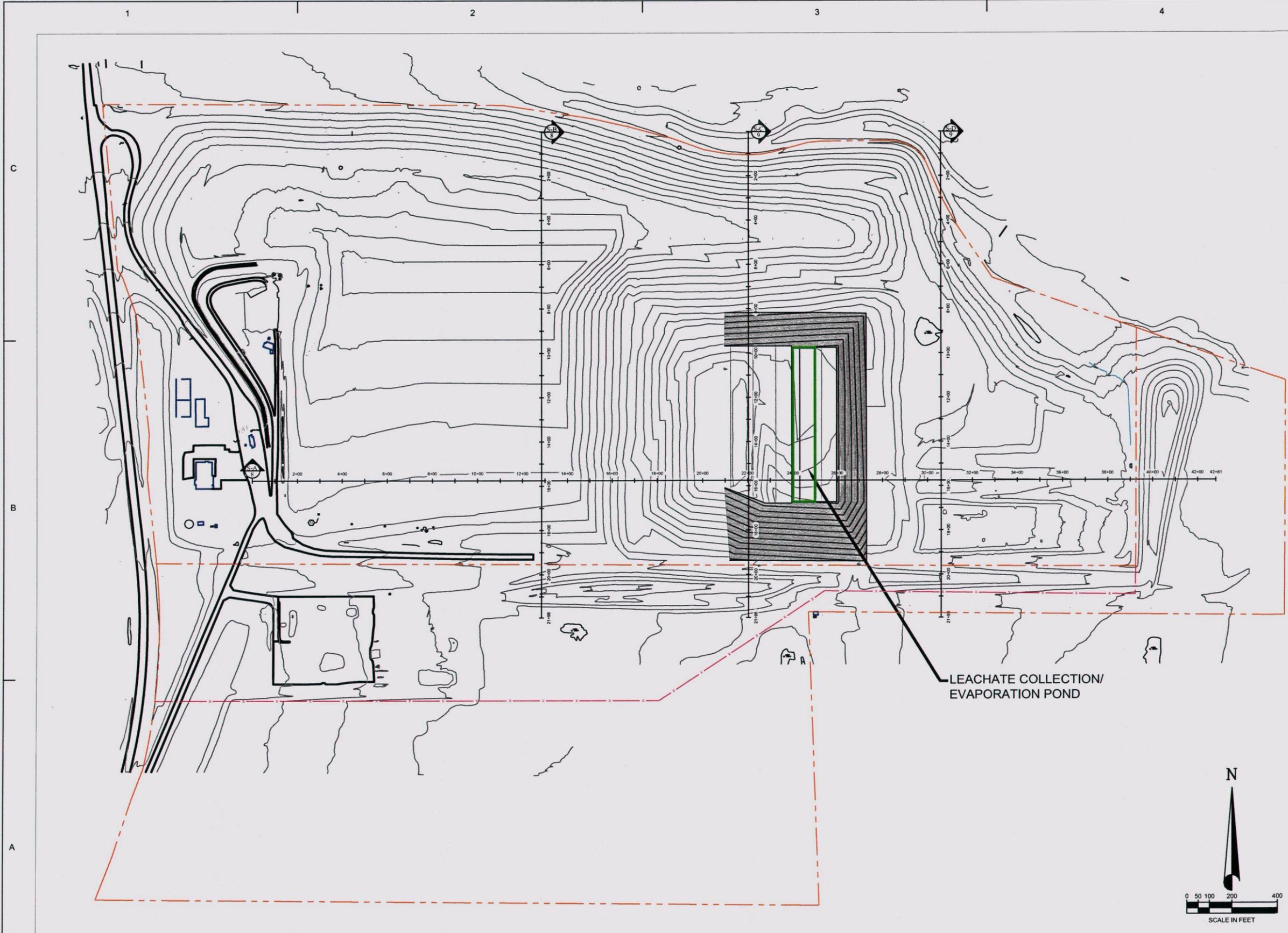
ISSUE:

SHEET TITLE

TRANS-JORDAN LANDFILL

CELL 5

EXCAVATION



REFERENCE:  
 BASE TOPOGRAPHY PROVIDED BY CLIENT  
 AERIAL SURVEY BY OLYMPUS AERIAL SURVEYS MAY 21, 2005  
 SURVEY UPDATE OF WASTE IN PLACE BY CLIENT: MARCH 18, 2010



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KEY:

- PROPERTY BOUNDARY
- PERIMETER FENCE\*\*
- ROADS/PARKING (PAVED)
- BUILDING PERMIETER
- LEACHATE/EVAPORATION POND (CELL 5)

NOTES:

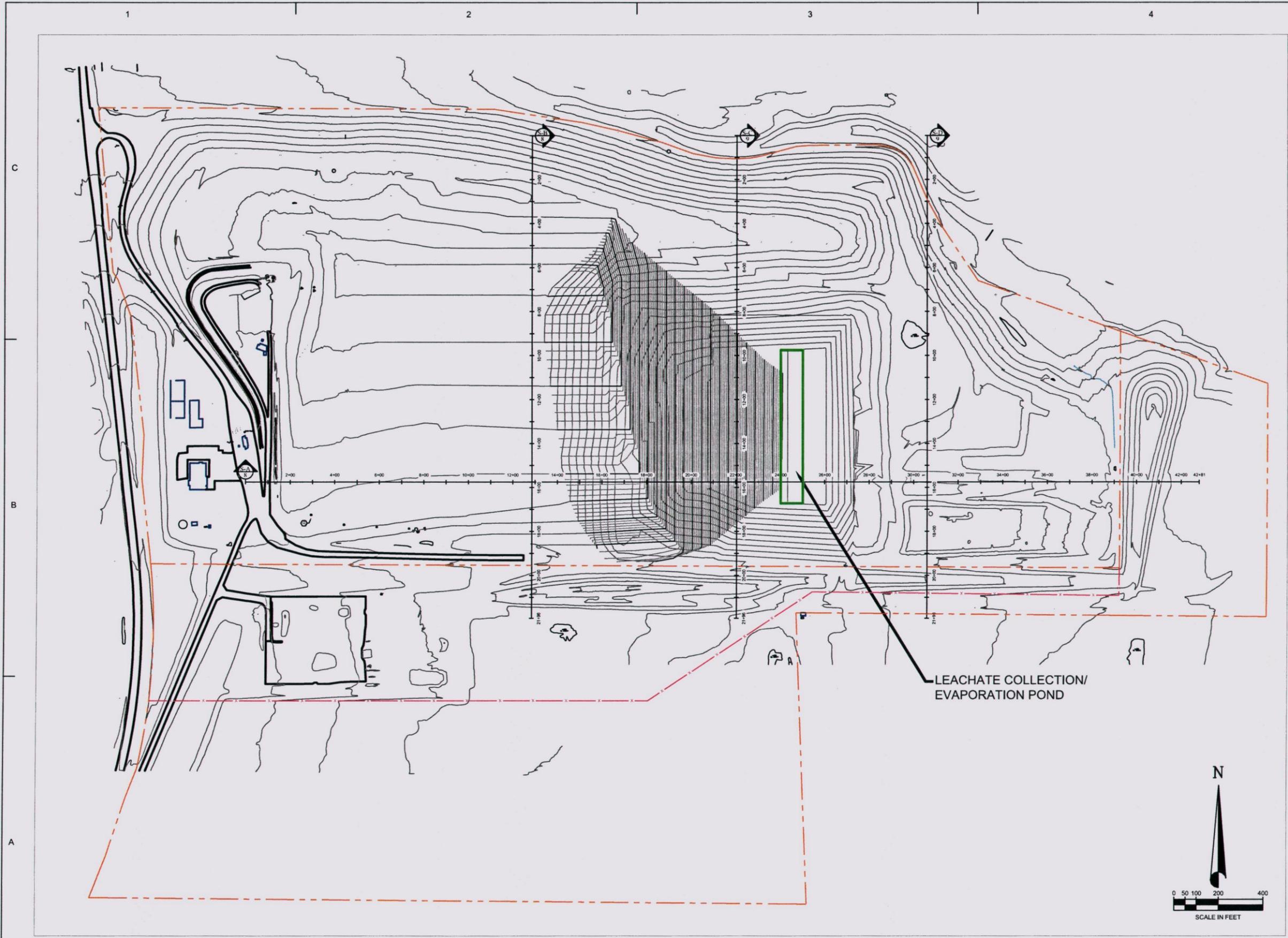
PHASE E AIRSPACE: 2,360,000 CYD

MARK	DATE	DESCRIPTION
-	10/31/11	SIDE SLOPE CHANGE
-	07/16/10	2010 PERMIT UPDATE

ISSUE:

SHEET TITLE

TRANS-JORDAN LANDFILL  
 PHASE E  
 MSW FILL



REFERENCE:  
 BASE TOPOGRAPHY PROVIDED BY CLIENT  
 AERIAL SURVEY BY OLYMPUS AERIAL SURVEYS MAY 21, 2005  
 SURVEY UPDATE OF WASTE IN PLACE BY CLIENT: MARCH 18, 2010



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KEY:

- PROPERTY BOUNDARY
- PERIMETER FENCE\*\*
- ROADS/PARKING (PAVED)
- BUILDING PERMIETER
- LEACHATE/EVAPORATION POND (CELL 6)

NOTES:

OLD MSW/SOIL:  
 895,000 CYD  
 CELL 6 EXCAVATION:  
 1,882,500 CYD  
 TOTAL:  
 2,777,500 CYD

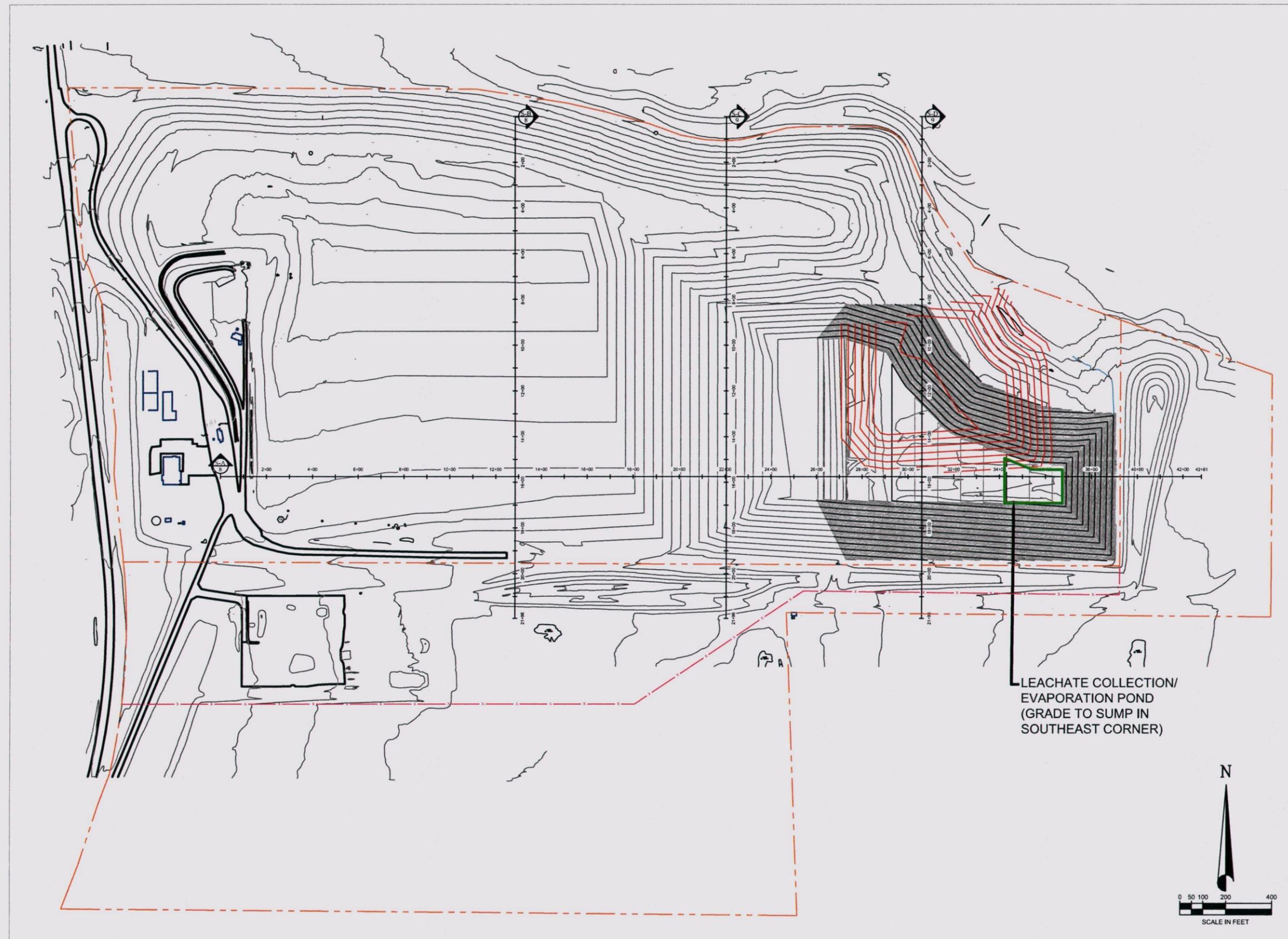
MARK	DATE	DESCRIPTION
-	10/31/11	SIDE SLOPE CHANGE
-	07/16/10	2010 PERMIT UPDATE

ISSUE:

SHEET TITLE

TRANS-JORDAN LANDFILL  
 CELL 6  
 EXCAVATION

6



REFERENCE:  
 BASE TOPOGRAPHY PROVIDED BY CLIENT  
 AERIAL SURVEY BY OLYMPUS AERIAL SURVEYS MAY 21, 2005  
 SURVEY UPDATE OF WASTE IN PLACE BY CLIENT: MARCH 18, 2010



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 (801) 270-9400

KEY:

- PROPERTY BOUNDARY
- PERIMETER FENCE\*\*
- ROADS/PARKING (PAVED)
- BUILDING PERMIETER

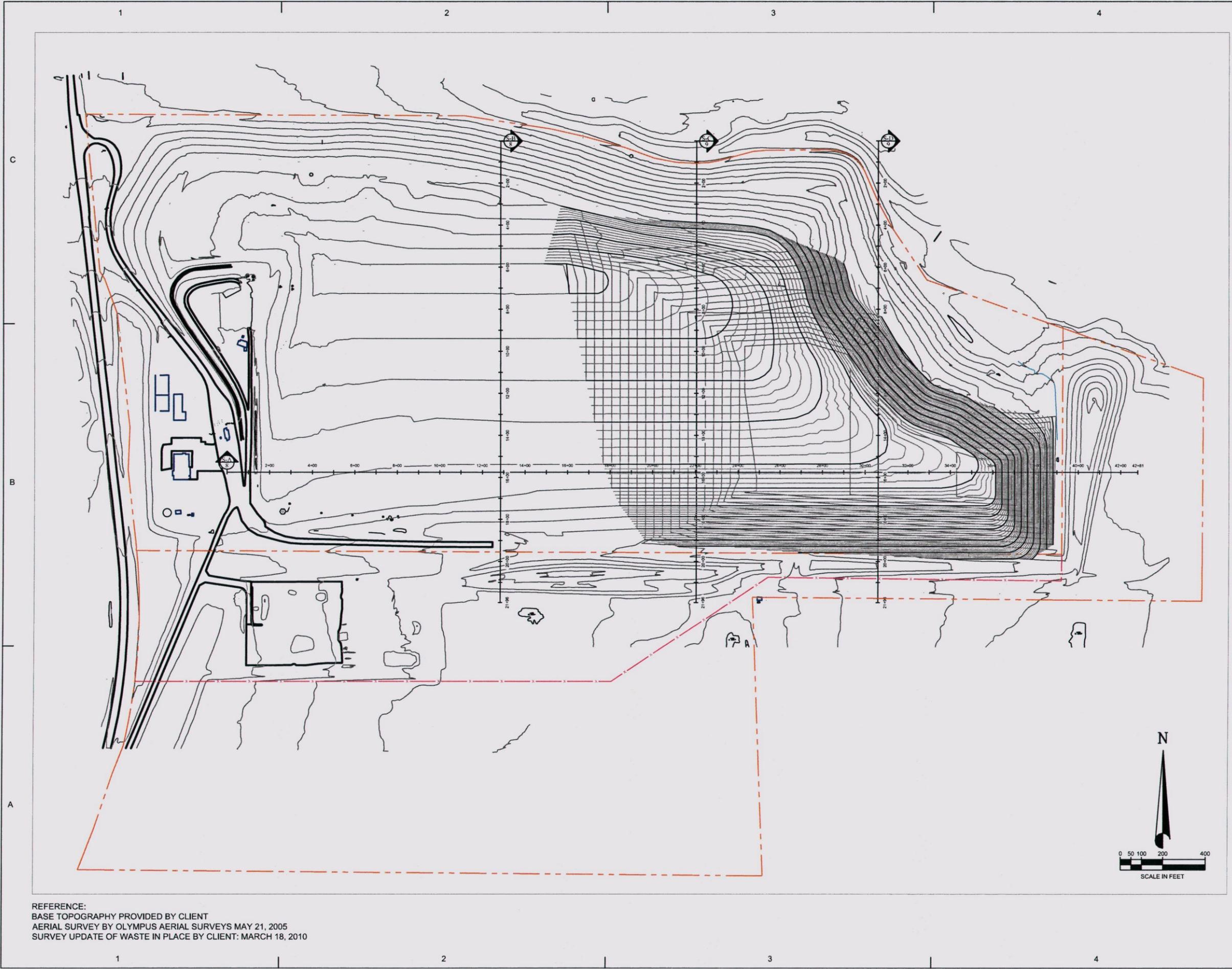
NOTES:

PHASE F AIRSPACE: 9,752,500 CYD

MARK	DATE	DESCRIPTION
-	10/31/11	SIDE SLOPE CHANGE
-	07/16/10	2010 PERMIT UPDATE

ISSUE:

SHEET TITLE  
 TRANS-JORDAN LANDFILL  
 PHASE F MSW FILL  
 (FINAL COVER)



REFERENCE:  
 BASE TOPOGRAPHY PROVIDED BY CLIENT  
 AERIAL SURVEY BY OLYMPUS AERIAL SURVEYS MAY 21, 2005  
 SURVEY UPDATE OF WASTE IN PLACE BY CLIENT: MARCH 18, 2010



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KEY:

- PHASE D REMAINING FILL
- PHASE E FILL
- PHASE F FILL

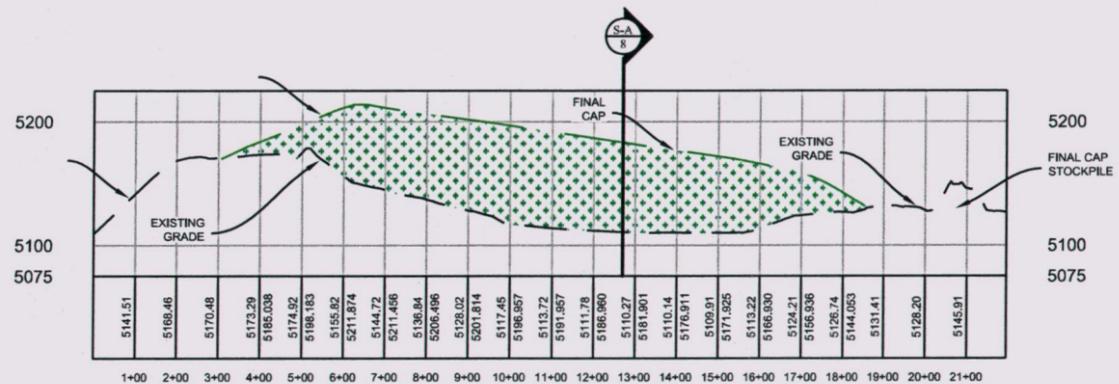
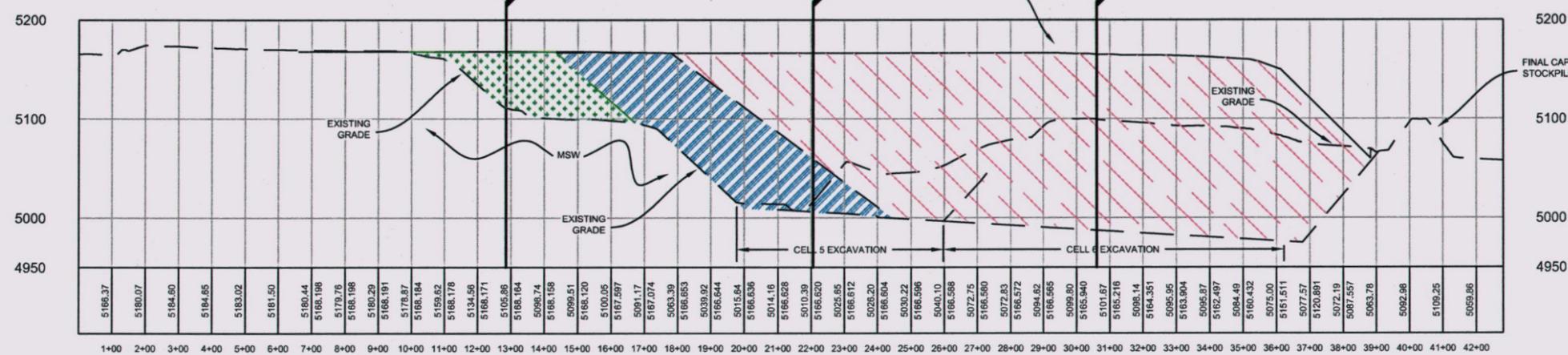
NOTES:

MARK	DATE	DESCRIPTION
-	10/31/11	SIDE SLOPE CHANGE
-	07/16/10	2010 PERMIT UPDATE

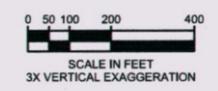
ISSUE:

SHEET TITLE

TRANS-JORDAN LANDFILL  
ELEVATION VIEW  
(SECTIONS A & B)



REFERENCE:  
BASE TOPOGRAPHY PROVIDED BY CLIENT  
AERIAL SURVEY BY OLYMPUS AERIAL SURVEYS MAY 21, 2005  
SURVEY UPDATE OF WASTE IN PLACE BY CLIENT: MARCH 18, 2010





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KEY:

-  PHASE E FILL
-  PHASE F FILL

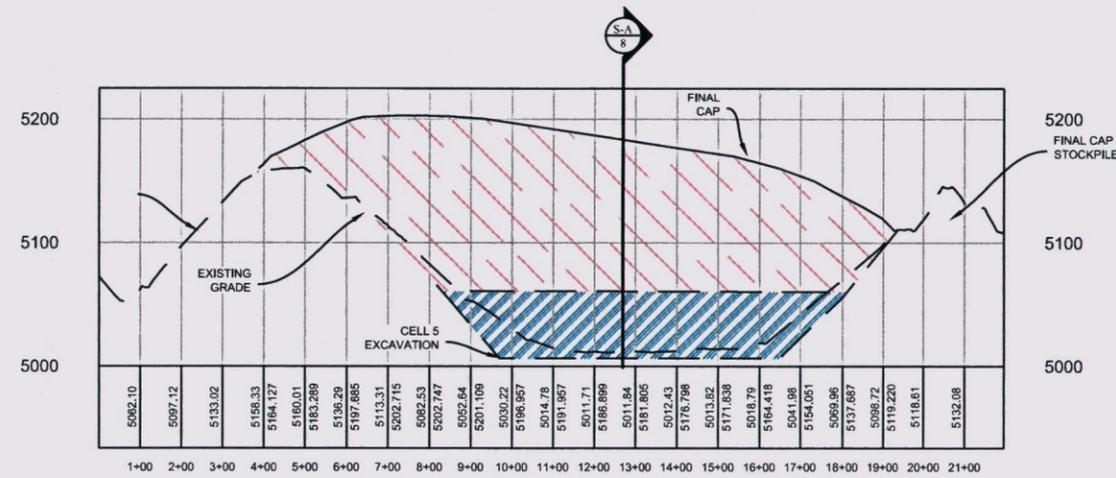
NOTES:

MARK	DATE	DESCRIPTION
-	10/31/11	SIDE SLOPE CHANGE
-	07/16/10	2010 PERMIT UPDATE

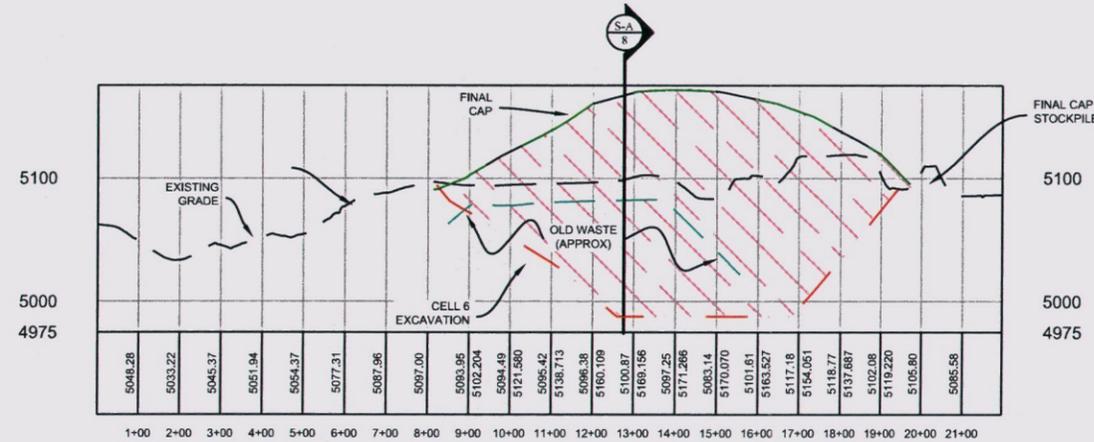
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SHEET TITLE

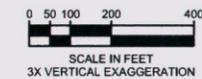
TRANS-JORDAN LANDFILL  
 ELEVATION VIEW  
 (SECTIONS C & D)



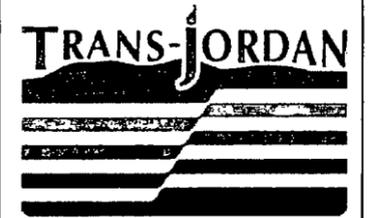
**S-C**  
 3-7  
 ELEVATION VIEW - SECTION C  
 1" = 200' (3X VERTICAL EXAGGERATION)



**S-D**  
 3-7  
 ELEVATION VIEW - SECTION D  
 1" = 200' (3X VERTICAL EXAGGERATION)



REFERENCE:  
 BASE TOPOGRAPHY PROVIDED BY CLIENT  
 AERIAL SURVEY BY OLYMPUS AERIAL SURVEYS MAY 21, 2005  
 SURVEY UPDATE OF WASTE IN PLACE BY CLIENT: MARCH 18, 2010



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 (801) 270-9400

KEY:

NOTES:

1. POND LINER TO REMAIN AS PORTION OF LANDFILL CELL BASE LINER, PROTECTIVE COVER SOILS TO BE ADDED PRIOR TO PLACEMENT OF WASTE (SEE DT-5).

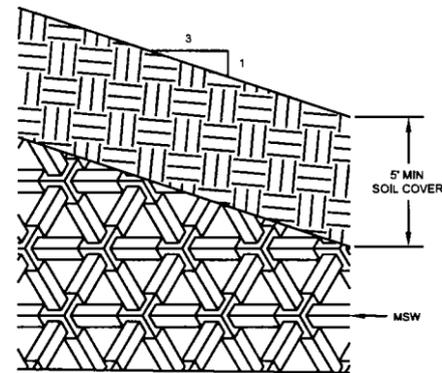
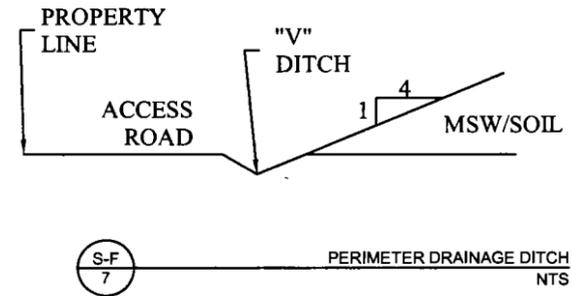
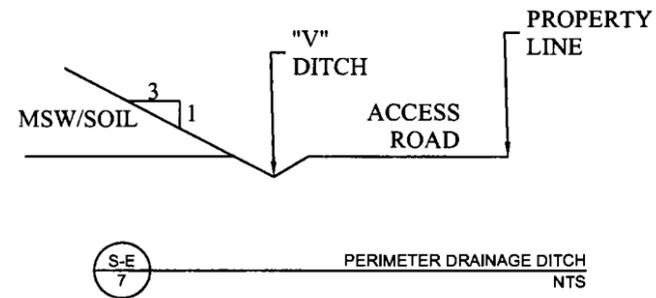
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-	07/16/10	2010 PERMIT UPDATE

ISSUE:

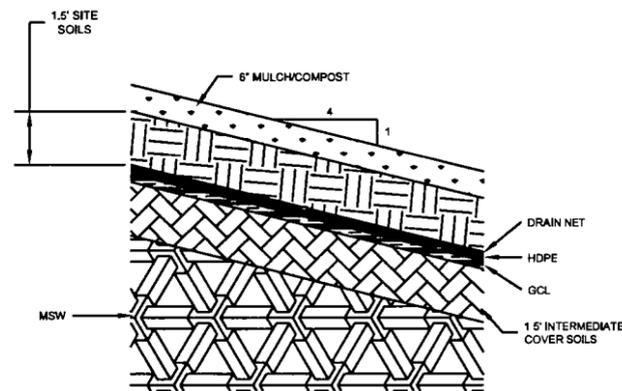
SHEET TITLE  
 TRANS-JORDAN LANDFILL

DETAILS

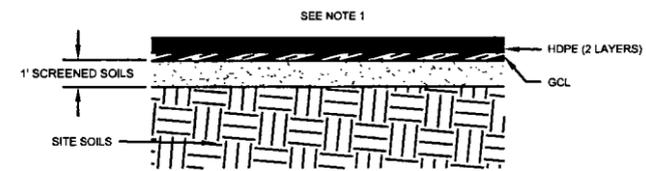
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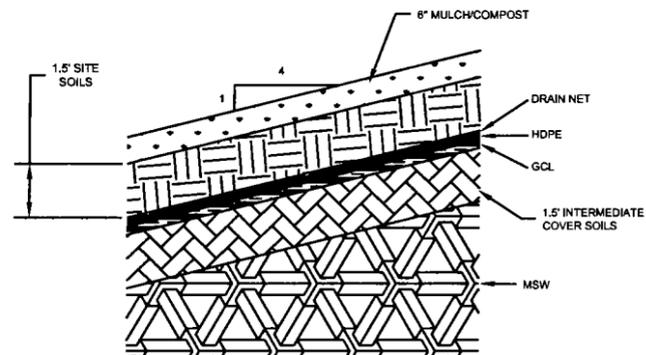
DT-1 8-9 NORTH SLOPE PROTECTIVE COVER NTS



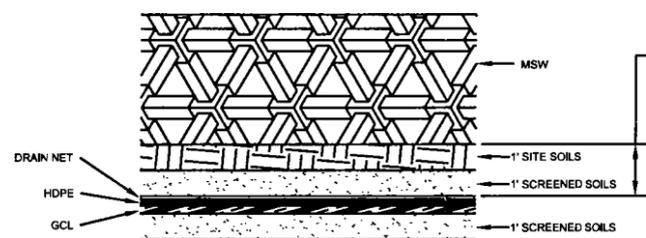
DT-2 8-9 UNLINED LANDFILL COVER NTS



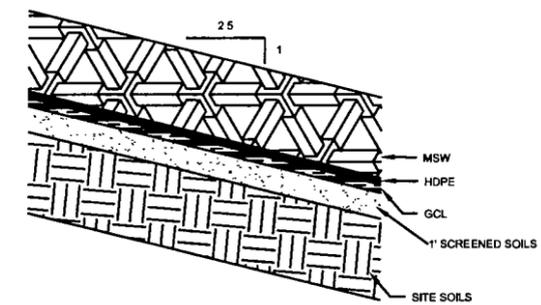
DT-3 8-9 LEACHATE COLLECTION/ EVAPORATION POND LINER NTS



DT-4 8-9 LINED LANDFILL COVER NTS



DT-5 8-9 LANDFILL CELL BASE LINER NTS



DT-6 8-9 LANDFILL SLOPE LINER NTS



10875 South 7200 West (U-111)  
 South Jordan, Utah 84095  
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KEY:

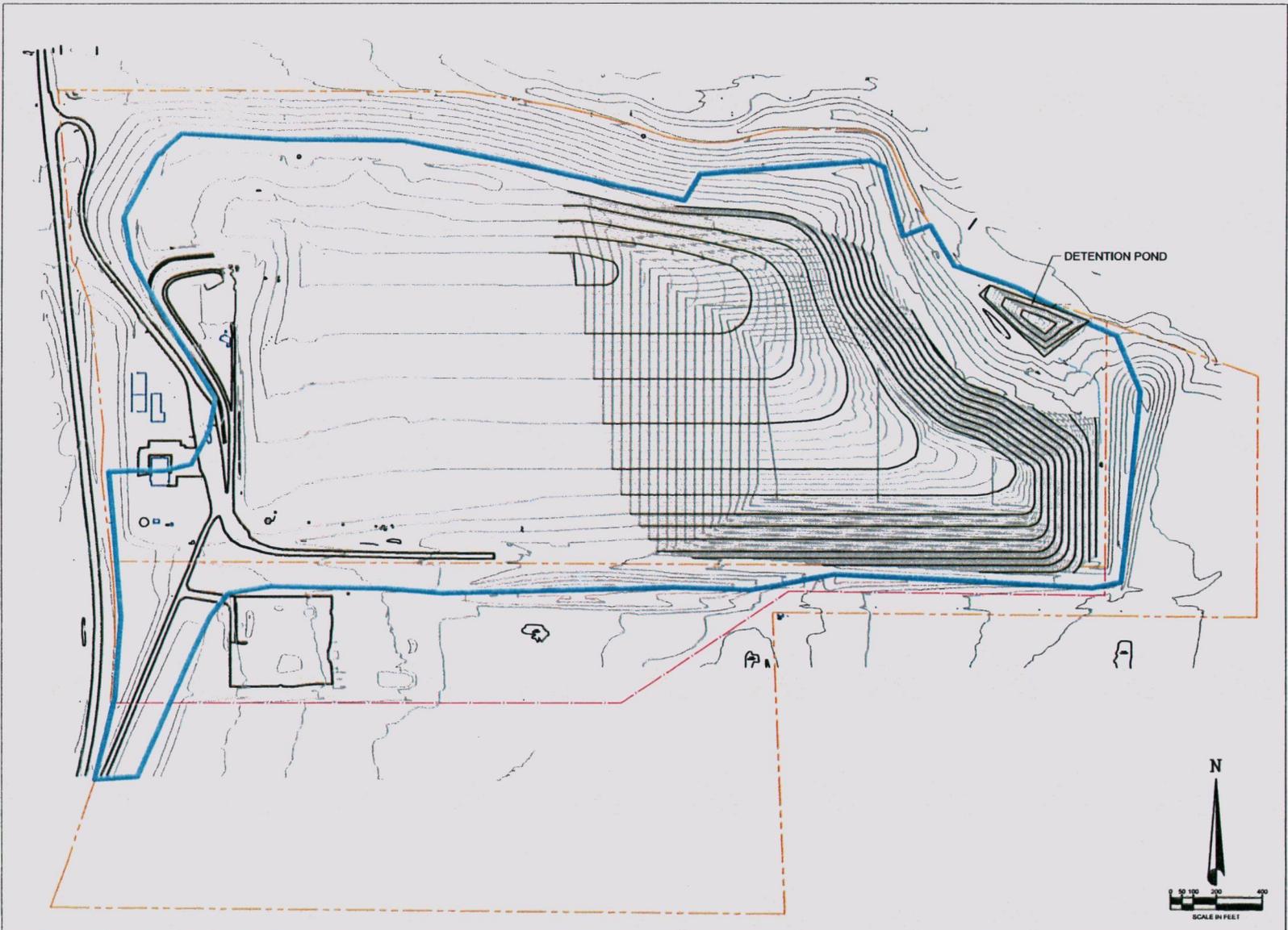
- PROPERTY BOUNDARY
- PERIMETER FENCE\*\*
- ROADS/PARKING (PAVED)
- BUILDING PERIMETER

NOTES:

DETENTION POND CAPACITY: 9.48 AC-FT

MARK	DATE	DESCRIPTION
-	10/31/11	SIDE SLOPE CHANGE
-	07/16/10	2010 PERMIT UPDATE

SHEET TITLE  
 TRANS-JORDAN LANDFILL  
 FINAL COVER  
 RUN-OFF



REFERENCE:  
 BASE TOPOGRAPHY PROVIDED BY CLIENT  
 AERIAL SURVEY BY OLYMPUS AERIAL SURVEYS MAY 21, 2005  
 SURVEY UPDATE OF WASTE IN PLACE BY CLIENT: MARCH 18, 2010

Trans-Jordan Landfill

Total Area        169 acres  
 Pond Volum        9.48 acre-ft

Design Storm		Precip. (in)	Antecedent Moisture Condition					
Frequency (yr)	Duration (hr)		I - Dry		II - Normal		III - Wet	
			Direct Runoff (in)	Volume (acre-ft)	Direct Runoff (in)	Volume (acre-ft)	Direct Runoff (in)	Volume (acre-ft)
25	24	2.2	0.036	0.51	0.292	4.12	0.945	13.30
100	24	2.68	0.12	1.66	0.51	7.12	1.32	18.64

Runoff Curve Number and Runoff

Project:	Trans Jordan Landfill	By:	JAH	Date:	9/6/2012
Location:	South Jordan, Utah	Checked:	BDM	Date:	9/6/2012
Condition:	Developed	Comments:	Total run-off from final cap (25 yr storm) partially vegetated		

**1. Runoff Curve Number**

Soil Name and Hydrologic Soil Group	Cover Description	CN			Area (acres)	CNxArea
		Table 2-2	Table 2-3	Table 2-4		
B-sandy loam	New Seeding	77			69	5313
B-sandy loam	Previously Reclaimed - Vegetation Established	60			90	5400
	Paved Areas	98			5	490
A-Sandy and Well Drained	Native, vegetated	68			15	1020
						0
						0
						0
						0
						0
						0
						0
						0

CN Weighted:		$\frac{\Sigma(CNxArea)}{\Sigma(Area)}$	=	$\frac{12223}{179}$	=	$\frac{68.284916}{179}$	Use CN	→	<b>69</b>
						TOTALS:	→	179	12223

**2. Runoff**

		Storm #1 -Dry		Storm #2		Storm #3-Wet	
		ARI (Year)	Duration	ARI (Year)	Duration	ARI (Year)	Duration
		25	24-hr	25	24-hr	25	24-hr
Rainfall, P	in	2.2		2.2		2.2	
S	in	8.1818182		4.4927536		1.7647059	
$I_a$	in	1.6363636		0.8985507		0.3529412	
Runoff (Q)	in	0.0363258		0.2923215		0.9445871	



***APPENDIX B-***

***STORM WATER PREVENTION PLAN***



State of Utah

Department of  
Environmental Quality

Richard W. Sprott  
*Executive Director*

DIVISION OF WATER QUALITY  
Walter L. Baker, P.E.  
*Director*

**Water Quality Board**  
Joe Piccolo, *Chair*  
Paula Doughty, *Vice-Chair*  
David F. Echols  
Merritt K. Frey  
Darrell H. Mensel  
Leland J. Myers  
Richard W. Sprott  
Jay Ivan Olsen  
Gregory L. Rowley  
Steven P. Simpson  
Daniel C. Snarr  
Walter L. Baker,  
*Executive Secretary*

JON M. HUNTSMAN, JR.  
*Governor*

GARY HERBERT  
*Lieutenant Governor*

RECEIVED  
MAR 20 2008

March 11, 2008

Mr. Dwayne J. Woolley  
General Manager  
Trans-Jordan Cities  
10873 South 7200 West  
P.O. Box 95610  
South Jordan, Utah 84095-0610

Dear Mr. Woolley:

Subject: Utah Pollutant Discharge Elimination System (UPDES)  
Multi-Sector General Permit for Storm Water Discharges Associated with Industrial  
Activity, Coverage No. **UTR000109**.

Our office received your "notice of intent" (NOI) for **Trans-Jordan Cities** to obtain coverage under the *UPDES Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity, General Permit No. UTR000000* on December 07, 2007. The received NOI is for the Trans-Jordan Landfill facility located at, 10873 South 7200 West, South Jordan, Utah, Salt Lake County. This letter confirms your coverage under the general permit; the permit coverage number for the facility is **No. UTR000109**. Please use this number in any future correspondence associated with this project.

This coverage is effective **March 01, 2008** and expires at midnight, **December 31, 2012**. There was no lapse in coverage because the old permit was extended until the new permit was issued.

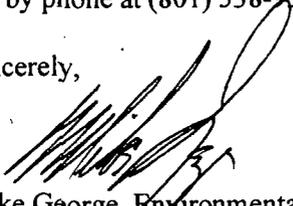
The permit requires a Storm Water Pollution Prevention Plan (SWP3). Maintaining a current copy of the SWP3 at the site is a requirement of the permit. Monitoring is also required as outlined in appendix II requirements. Please review these requirements if you are not familiar with them. A copy of the general permit and appendix requirements can be found on our website at <http://www.waterquality.utah.gov/updes/stormwater.htm>.

Storm water discharge monitoring report (SWDMR) forms are enclosed for your convenience. These forms may be used to record visual and/or analytical monitoring results.

As the agency charged with the administration of issuing UPDES Permits, we are continuously looking for ways to improve our quality of service to you. Please take a few moments to complete the enclosed questionnaire, and return it in the enclosed, self-addressed, postage paid, envelope. The results will be used to improve our quality and responsiveness and give us feed back on customer satisfaction.

If you have any questions concerning this letter or your permit coverage please do not hesitate to contact me by phone at (801) 538-9325 or by e-mail at [mmgeorge@utah.gov](mailto:mmgeorge@utah.gov). Thank you.

Sincerely,



Mike George, Environmental Scientist  
UPDES IES Section

Enclosure

**TRANS-JORDAN CITIES  
TRANS-JORDAN LANDFILL  
10873 S. 7200 West  
PO Box 95610  
South Jordan, Utah 84095-0610**

**STORM WATER POLLUTION PREVENTION PLAN  
(SWPPP)**

Utah Division of Water Quality General Permit UTR000109  
March 1, 2008

Authorization to Discharge Under the Utah Pollutant Discharge Elimination System  
(UPDES), General Multi-Sector Permit for Storm Water Discharges Associated with  
Industrial Activity

Dwayne J. Woolley  
General Manager

February 29, 2008

# STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

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### FIGURE 1

    Site Map (end of document).

1.0 SWPPP INTRODUCTION

A. PURPOSE OF THE PLAN

As set forth in the "General Multi-Sector Permit" issued by the Utah Division of Water Quality, a storm water pollution prevention plan (SWPPP) "Plan" has to be developed for all facilities covered by the above permit. The "Plan" should be prepared in accordance with good engineering practices and should:

1. Identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with industrial activities at the facility.
2. Describe and implement practices used to reduce the pollutants in storm water discharges.
3. Assure Compliance with the terms and conditions of the "Permit".

In addition, an annual comprehensive review of the "plan" and facility shall be used to maintain ongoing compliance with the "National Pollutant Discharge Elimination system" storm water regulations.

The requirements of SARA 313 do not apply to this facility because there are no materials stored that are above reportable quantities of listed chemicals.

B. PLAN CERTIFICATION

1. Company Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision and the information submitted 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 imprisonments for knowing violations."

Signature: Dwayne J. Woolley Date: March 4, 2008  
Dwayne J. Woolley - General Manager

## C. POLLUTION PREVENTION TEAM

The pollution prevention team member's positions and responsibilities are listed below.

### General Manager

- Overall responsibility for supervising the development, implementation, maintenance, coordination, and revision of the "Plan"

### Operations Manager

- Leader in Spill Cleanup
- Overall responsibility for implementation of the "Plan"
- Preventive maintenance
- Alternate leadership and spill reporting
- Inspections
- Housekeeping

### Operations Supervisor

- Reaction team member for spill cleanup
- Alternate spill cleanup leader, inspections, housekeeping, preventative maintenance.

### Scalehands Supervisor

- Reaction team member for spills on or around scales  
Inspection, housekeeping and preventative maintenance of scales

### Compliance Coordinator

- Record keeping
- Inspection and monitoring
- Housekeeping
- Storm water sample collector
- Employee training
- Spill reporting
- Plan Updating

### Spotters

- Spot inspection of vehicles entering the landfill
- Random load inspections

## D. CONSISTENCY WITH OTHER PLANS

This "Plan" is consistent with the Plan of Operations and will be consistent with and may reflect requirements of other plans as may be required such as Emergency Response Plan.

## 2.0 DESCRIPTION OF POTENTIAL POLLUTION SOURCES

### A. DRAINAGE

The landfill is located on generally granular soil with some silt, clay, gravel and cobbles that tend to absorb the limited amount of precipitation. There is generally little run off from the side slopes of the landfill cells that would impact any surface water or storm water drainage. Bingham Creek is located to the north of the landfill and is generally dry with the exception of major run off. Isolated erosion of soils along the side slopes of the cells does not appear to contribute to the impact of the amount of run off. Figure 1 is a site map of the landfill with features including topography contours, drainages including Bingham Creek, property boundary, well locations, and the detention pond where surface and run off water could accumulate.

The paved access road from the entrance of the landfill to the scale house and office forms a barrier that delineates the facility and the adjacent highway drainage. The ditch to the east also collects run off from the west cell slopes and directs this water to the detention basin while the western ditch directs the run off to the adjacent highway drainage.

With the construction of the "lateral expansion" in 1997 - 1998, all run off from the facility to the east of the access road is directed to the detention basin. This basin is located in the north eastern part of the property. At this point Bingham Creek is located about 100-125 feet to the north. Along the north edge of the basin, a low spot on the berms is designated as the authorized discharge point for the facility. Due to the size of the basin it is unlikely that any run off within a typical storm precipitation would overflow the basin and make it to the creek. The pooled water evaporates over time.

### B. EXPOSED INVENTORY OF MATERIALS

Landfill vehicles, earth moving equipment, employee parking area, de-icing salt pile, and trucks hauling solid waste materials are the only exposed material in areas of possible drainages.

### C. SPILLS AND LEAKS

There have been no known spills or leaks of reportable quantities in the drainage area or on the landfill property. There are no known areas where leachate has leaked from failures in the landfill.

### D. SAMPLING DATA

There is no existing discharge sampling data to date as there has not been a discharge from the site.

## E. RISK IDENTIFICATION AND SUMMARY OF POTENTIAL POLLUTANT SOURCES

The only expected source of additional pollution aside from the landfill is from leaks or spills from vehicles, which includes earth moving equipment, and bird droppings from scavenging seagulls. The expected contaminants would be metals, oil and grease, anti-freeze (ethylene glycol), and fecal coli forms (bird droppings).

Soil used for landfill compaction and slope building is continuously transported around on the property. The soil is typically excavated and stockpiled to cover the solid waste in sections of the landfill cells. The landfill excavation and compaction activity at times creates dust and particulate matter that covers the drainage areas. This particulate matter is from existing soils that may contain metals from past mining operations at Kennecott's copper mine. Other than the metals in the existing soils, no additional hazardous substances from the landfill operations would be added to the Bingham Creek drainage area.

The landfill is located in an historic agricultural area that may have had fertilizer, herbicide and pesticide application onto crops which have been primarily wheat.

Waste such as sewage sludge, sewage liquids, liquid wastes, and hazardous materials have been formally prohibited from disposal at the landfill since 1977. This is enforced and monitored through inspection prior and after dumping by landfill personnel. All waste hauling and unloading occurs at the "face" which is within the leachate collection area and has no possibility of run off to the detention pond.

A leachate collection system has been installed as part of the construction of each cell. All new cell construction at the landfill will include a leachate collection system. There are no areas of standing water that are used for storage on the property.

A portable 3000 gallon above ground double wall diesel tank is used to fuel the larger equipment. A second above ground double wall 1000 gallon gasoline tank is used to fuel the facility support vehicles.

## 3.0 MEASURES AND CONTROLS

### A. GOOD HOUSEKEEPING

A daily inspection of the drainage area will be performed, any potential contaminate sources will be removed and reported, and maintenance will be performed as required.

### B. PREVENTIVE MAINTENANCE

There are no devices in the storm water collection system that requires routine maintenance. The runoff ditches that direct all surface runoff to the designated detention pond located in the north eastern most corner of the property are graded as needed to ensure an open and unrestricted flow.

Salt used for de-icing is placed in a natural high area and covered to prevent exposure to precipitation except during actual use of the pile.

The yearly compliance inspection will evaluate the integrity of the roads and curbs as well as any erosion in the drainages. Repairs will be preformed as needed.

Each vehicle that enters the landfill is visually inspected as it passes the inspection/scale house and is inspected before it dumps at the landfill for leaks, prohibited items and unsafe loads. Entry and or dumping will be denied for any violation.

The vehicles and equipment that are owned by the landfill are under a preventative maintenance and inspection program. Maintenance is performed on site and a log is kept for each vehicle or piece of equipment. The routine maintenance of the earth moving equipment is preformed on site while major repairs are preformed off site.

Measures to scare away the seagull such as noise guns have been implemented at the property.

The leachate system is a closed system and contains all storm water that falls on the "face".

## C. SPILL PREVENTION AND RESPONSE PROCEDURES

In the event of a spill, cleanup procedures will be activated and implemented by the pollution prevention team. The response will depend on the nature of the spill, the weather conditions, and toxicity of the contaminate.

Solid materials will be removed using shovels and, if the spill is large enough, a front end loader. Residuals will be swept up with a broom where feasible. The material will be, removed to the active landfill.

Liquid spills of materials that could affect water quality will be confined using earth berms made from locally available soils. The berms will be shoveled into place or pushed into place by available equipment. If possible, the liquids will be pumped into drums for containment. Liquids absorbed into soils will be contained in a drum. Empty drums are currently stored in the Household Hazardous Waste (HHW) area and are available for containment purposes. Once the spilled material is contained it will be stored until proper disposal can be arranged.

The amount of any spill will be estimated and compared to the reportable quantities listed in 40 CFR 117.3 and 40 CFR 302.4. A copy of these lists are

included as Appendix A and B. If the quantity exceeds the reportable level the pollution prevention team leader will notify the National Response Center (800-424-8802) and the Utah Division of Water Quality (801-538-6146).

The team leader will be responsible for preparation of a written description of the release, date and time, circumstances, and mitigations undertaken within 14 days of the spill.

#### D. MONITORING

Trans-Jordan is required to only sample any outfall discharge. There has been no known discharge to this date. In the event of a discharge, sampling will occur and a storm water discharge monitoring report (SWDMR) will be filed per the reporting requirements.

#### E. REPORTING

Signed copies of any SWDMRs will be sent to the *Executive Secretary of the Water Quality Board* at the address listed below.

Department of Environmental Quality  
Division of Water Quality  
Attention Storm Water Coordinator  
PO Box 144870  
Salt Lake City, Utah 84114-4870

#### F. EMPLOYEE TRAINING

All employees will be trained on landfill operations upon employment. Members of the pollution prevention team will read this pollution prevention plan, attend an annual team orientation, and sign the acknowledgment in the back of this plan as an indication that they have done so. The compliance coordinator is responsible for insuring that the acknowledgment sheet is up to date. Topics addressed during both types of employee training shall include pollution control laws and regulations, the storm water pollution prevention plan and the particular features of the facility, inspections, spill response, good housekeeping, and material management practices.

#### G. INSPECTIONS

As required by the Solid Waste Permit pertaining to landfills, site conditions are inspected every seven days. The inspector which is a member of the pollution prevention team, inspects areas of the landfill that have not yet been finally stabilized, active land application areas, areas used for storage of materials/wastes that are exposed to precipitation, and locations where equipment and waste trucks enter and exit the site. In areas of the landfill that have been finally stabilized, inspections will be conducted once a month for erosion and sediment control measures to insure that they are operating correctly. A set of tracking or follow-up procedures is used to ensure that the

appropriate actions are taken in response to the inspections. The pollution prevention plan will be revised to address any problems found during inspections. Records of the inspections will be maintained on file at the landfill office. The retention pond will be monitored during all significant rainfall episodes.

#### H. RECORD KEEPING AND REPORTING PROCEDURES

The Trans-Jordan Landfill will maintain a storm water file at the landfill office. The file contents will be:

- The Pollution Prevention Plan
- SWDMR (if any)
- Analysis (if any)
- Inventory of spill response equipment and its location

The following are maintained at the landfill office in each respective file.

- Inspections and maintenance activities
- Tracking system for types of waste disposed of in each cell of the landfill
- Tracking of quantities of waste

#### I. NON-STORM WATER DISCHARGES

All of the storm water system is open and drains to areas that do not have any other source of water discharge. There have been no known discharges of leachate or vehicle wash waters at the landfill property.

#### J. SEDIMENT AND EROSION CONTROL

Because of the granular nature of the soil, the low average rainfall (<16 inches per year) and the gentle slope of the landfill surface, erosion within the watershed and on the pavement is not likely. All areas of the landfill will be stabilized using native vegetation. As a sediment pond has been constructed to contain all run off from the site, it is anticipated no sediment will be released at the discharge point.

#### K. SECURITY

A six (6) foot chain link fence has been installed completely surrounding the facility and is locked during non business hours. The main access road from the highway entrance to the main structures has adequate lighting for traffic. Both the Operations and Maintenance building and the Scalehouse have outside night lighting and security systems installed which will notify the proper authorities of any unauthorized entry.

## APPENDIX A

### Reportable Quantities for the CWA (40 CFR 117.3)

# APPENDIX B

## Reportable Quantities for CERCLA (40 CFR 302.4.)

## CWA (40 CFR 117.3)

**Table 117.3 -- Reportable Quantities of Hazardous Substances Designated Pursuant to Section 311 of the Clean Water Act**

Table 117.3--Reportable Quantities of Hazardous Substances Designated Pursuant to Section 311 of the Clean Water Act

Material	Category	RQ in pounds (kilograms)
Acetaldehyde.....	C.....	1,000 (454)
Acetic acid.....	D.....	5,000 (2,270)
Acetic anhydride.....	D.....	5,000 (2,270)
Acetone cyanohydrin.....	A.....	10 (4.54)
Acetyl bromide.....	D.....	5,000 (2,270)
Acetyl chloride.....	D.....	5,000 (2,270)
Acrolein.....	X.....	1 (0.454)
Acrylonitrile.....	B.....	100 (45.4)
Adipic acid.....	D.....	5,000 (2,270)
Aldrin.....	X.....	1 (0.454)
Allyl alcohol.....	B.....	100 (45.4)
Allyl chloride.....	C.....	1,000 (454)
Aluminum sulfate.....	D.....	5,000 (2,270)
Ammonia.....	B.....	100 (45.4)
Ammonium acetate.....	D.....	5,000 (2,270)
Ammonium benzoate.....	D.....	5,000 (2,270)
Ammonium bicarbonate.....	D.....	5,000 (2,270)
Ammonium bichromate.....	A.....	10 (4.54)
Ammonium bifluoride.....	B.....	100 (45.4)
Ammonium bisulfite.....	D.....	5,000 (2,270)
Ammonium carbamate.....	D.....	5,000 (2,270)
Ammonium carbonate.....	D.....	5,000 (2,270)
Ammonium chloride.....	D.....	5,000 (2,270)
Ammonium chromate.....	A.....	10 (4.54)
Ammonium citrate dibasic.....	D.....	5,000 (2,270)
Ammonium fluoborate.....	D.....	5,000 (2,270)
Ammonium fluoride.....	B.....	100 (45.4)
Ammonium hydroxide.....	C.....	1,000 (454)
Ammonium oxalate.....	D.....	5,000 (2,270)
Ammonium silicofluoride.....	C.....	1,000 (454)
Ammonium sulfamate.....	D.....	5,000 (2,270)
Ammonium sulfide.....	B.....	100 (45.4)
Ammonium sulfite.....	D.....	5,000 (2,270)
Ammonium tartrate.....	D.....	5,000 (2,270)
Ammonium thiocyanate.....	D.....	5,000 (2,270)
Amyl acetate.....	D.....	5,000 (2,270)
Aniline.....	D.....	5,000 (2,270)
Antimony pentachloride.....	C.....	1,000 (454)
Antimony potassium tartrate.....	B.....	100 (45.4)
Antimony tribromide.....	C.....	1,000 (454)
Antimony trichloride.....	C.....	1,000 (454)
Antimony trifluoride.....	C.....	1,000 (454)
Antimony trioxide.....	C.....	1,000 (454)
Arsenic disulfide.....	X.....	1 (0.454)
Arsenic pentoxide.....	X.....	1 (0.454)
Arsenic trichloride.....	X.....	1 (0.454)
Arsenic trioxide.....	X.....	1 (0.454)
Arsenic trisulfide.....	X.....	1 (0.454)

Barium cyanide.....	A.....	10 (4.54)
Benzene.....	A.....	10 (4.54)
Benzoic acid.....	D.....	5,000 (2,270)
Benzonitrile.....	D.....	5,000 (2,270)
Benzoyl chloride.....	C.....	1,000 (454)
Benzyl chloride.....	B.....	100 (45.4)
Beryllium chloride.....	X.....	1 (0.454)
Beryllium fluoride.....	X.....	1 (0.454)
Beryllium nitrate.....	X.....	1 (0.454)
Butyl acetate.....	D.....	5,000 (2,270)
Butylamine.....	C.....	1,000 (454)
n-Butyl phthalate.....	A.....	10 (4.54)
Butyric acid.....	D.....	5,000 (2,270)
Cadmium acetate.....	A.....	10 (4.54)
Cadmium bromide.....	A.....	10 (4.54)
Cadmium chloride.....	A.....	10 (4.54)
Calcium arsenate.....	X.....	1 (0.454)
Calcium arsenite.....	X.....	1 (0.454)
Calcium carbide.....	A.....	10 (4.54)
Calcium chromate.....	A.....	10 (4.54)
Calcium cyanide.....	A.....	10 (4.54)
Calcium dodecylbenzenesulfonate.	C.....	1,000 (454)
Calcium hypochlorite.....	A.....	10 (4.54)
Captan.....	A.....	10 (4.54)
Carbaryl.....	B.....	100 (45.4)
Carbofuran.....	A.....	10 (4.54)
Carbon disulfide.....	B.....	100 (45.4)
Carbon tetrachloride.....	A.....	10 (4.54)
Chlordane.....	X.....	1 (0.454)
Chlorine.....	A.....	10 (4.54)
Chlorobenzene.....	B.....	100 (45.4)
Chloroform.....	A.....	10 (4.54)
Chlorosulfonic acid.....	C.....	1,000 (454)
Chlorpyrifos.....	X.....	1 (0.454)
Chromic acetate.....	C.....	1,000 (454)
Chromic acid.....	A.....	10 (4.54)
Chromic sulfate.....	C.....	1,000 (454)
Chromous chloride.....	C.....	1,000 (454)
Cobaltous bromide.....	C.....	1,000 (454)
Cobaltous formate.....	C.....	1,000 (454)
Cobaltous sulfamate.....	C.....	1,000 (454)
Coumaphos.....	A.....	10 (4.54)
Cresol.....	B.....	100 (45.4)
Crotonaldehyde.....	B.....	100 (45.4)
Cupric acetate.....	B.....	100 (45.4)
Cupric acetoarsenite.....	X.....	1 (0.454)
Cupric chloride.....	A.....	10 (4.54)
Cupric nitrate.....	B.....	100 (45.4)
Cupric oxalate.....	B.....	100 (45.4)
Cupric sulfate.....	A.....	10 (4.54)
Cupric sulfate, ammoniated.....	B.....	100 (45.4)
Cupric tartrate.....	B.....	100 (45.4)
Cyanogen chloride.....	A.....	10 (4.54)
Cyclohexane.....	C.....	1,000 (454)
2,4-D Acid.....	B.....	100 (45.4)
2,4-D Esters.....	B.....	100 (45.4)
DDT.....	X.....	1 (0.454)
Diazinon.....	X.....	1 (0.454)
Dicamba.....	C.....	1,000 (454)
Dichlobenil.....	B.....	100 (45.4)
Dichlone.....	X.....	1 (0.454)

Dichlorobenzene.....	B.....	100 (45.4)
Dichloropropane.....	C.....	1,000 (454)
Dichloropropene.....	B.....	100 (45.4)
Dichloropropene-Dichloropropane (mixture).	B.....	100 (45.4)
2,2-Dichloropropionic acid.....	D.....	5,000 (2,270)
Dichlorvos.....	A.....	10 (4.54)
Dicofol.....	A.....	10 (4.54)
Dieldrin.....	X.....	1 (0.454)
Diethylamine.....	B.....	100 (45.4)
Dimethylamine.....	C.....	1,000 (454)
Dinitrobenzene (mixed).....	B.....	100 (45.4)
Dinitrophenol.....	A.....	10 (45.4)
Dinitrotoluene.....	A.....	10 (4.54)
Diquat.....	C.....	1,000 (454)
Disulfoton.....	X.....	1 (0.454)
Diuron.....	B.....	100 (45.4)
Dodecylbenzenesulfonic acid.....	C.....	1,000 (454)
Endosulfan.....	X.....	1 (0.454)
Endrin.....	X.....	1 (0.454)
Epichlorohydrin.....	B.....	100 (45.4)
Ethion.....	A.....	10 (4.54)
Ethylbenzene.....	C.....	1,000 (454)
Ethylenediamine.....	D.....	5,000 (2,270)
Ethylenediamine-tetraacetic acid (EDTA).	D.....	5,000 (2,270)
Ethylene dibromide.....	X.....	1 (0.454)
Ethylene dichloride.....	B.....	100 (45.4)
Ferric ammonium citrate.....	C.....	1,000 (454)
Ferric ammonium oxalate.....	C.....	1,000 (454)
Ferric chloride.....	C.....	1,000 (454)
Ferric fluoride.....	B.....	100 (45.4)
Ferric nitrate.....	C.....	1,000 (454)
Ferric sulfate.....	C.....	1,000 (454)
Ferrous ammonium sulfate.....	C.....	1,000 (454)
Ferrous chloride.....	B.....	100 (45.4)
Ferrous sulfate.....	C.....	1,000 (454)
Formaldehyde.....	B.....	100 (45.4)
Formic acid.....	D.....	5,000 (2,270)
Fumaric acid.....	D.....	5,000 (2,270)
Furfural.....	D.....	5,000 (2,270)
Guthion.....	X.....	1 (0.454)
Heptachlor.....	X.....	1 (0.454)
Hexachlorocyclopentadiene.....	A.....	10 (4.54)
Hydrochloric acid.....	D.....	5,000 (2,270)
Hydrofluoric acid.....	B.....	100 (45.4)
Hydrogen cyanide.....	A.....	10 (4.54)
Hydrogen sulfide.....	B.....	100 (45.4)
Isoprene.....	B.....	100 (45.4)
Isopropanolamine dodecylbenzenesulfonate.	C.....	1,000 (454)
Kepone.....	X.....	1 (0.454)
Lead acetate.....	A.....	10 (4.54)
Lead arsenate.....	X.....	1 (0.454)
Lead chloride.....	A.....	10 (4.54)
Lead fluoborate.....	A.....	10 (4.54)
Lead fluoride.....	A.....	10 (4.54)
Lead iodide.....	A.....	10 (4.54)
Lead nitrate.....	A.....	10 (4.54)
Lead stearate.....	A.....	10 (4.54)
Lead sulfate.....	A.....	10 (4.54)

Lead sulfide.....	A.....	10 (4.54)
Lead thiocyanate.....	A.....	10 (4.54)
Lindane.....	X.....	1 (0.454)
Lithium chromate.....	A.....	10 (4.54)
Malathion.....	B.....	100 (45.4)
Maleic acid.....	D.....	5,000 (2,270)
Maleic anhydride.....	D.....	5,000 (2,270)
Mercaptodimethur.....	A.....	10 (4.54)
Mercuric cyanide.....	X.....	1 (0.454)
Mercuric nitrate.....	A.....	10 (4.54)
Mercuric sulfate.....	A.....	10 (4.54)
Mercuric thiocyanate.....	A.....	10 (4.54)
Mercurous nitrate.....	A.....	10 (4.54)
Methoxychlor.....	X.....	1 (0.454)
Methyl mercaptan.....	B.....	100 (45.4)
Methyl methacrylate.....	C.....	1,000 (454)
Methyl parathion.....	B.....	100 (45.4)
Mevinphos.....	A.....	10 (4.54)
Mexacarbate.....	C.....	1,000 (454)
Monoethylamine.....	B.....	100 (45.4)
Monomethylamine.....	B.....	100 (45.4)
Naled.....	A.....	10 (4.54)
Naphthalene.....	B.....	100 (45.4)
Naphthenic acid.....	B.....	100 (45.4)
Nickel ammonium sulfate.....	B.....	100 (45.4)
Nickel chloride.....	B.....	100 (45.4)
Nickel hydroxide.....	A.....	10 (4.54)
Nickel nitrate.....	B.....	100 (45.4)
Nickel sulfate.....	B.....	100 (45.4)
Nitric acid.....	C.....	1,000 (454)
Nitrobenzene.....	C.....	1,000 (454)
Nitrogen dioxide.....	A.....	10 (4.54)
Nitrophenol (mixed).....	B.....	100 (45.4)
Nitrotoluene.....	C.....	1,000 (454)
Paraformaldehyde.....	C.....	1,000 (454)
Parathion.....	A.....	10 (4.54)
Pentachlorophenol.....	A.....	10 (4.54)
Phenol.....	C.....	1,000 (454)
Phosgene.....	A.....	10 (4.54)
Phosphoric acid.....	D.....	5,000 (2,270)
Phosphorus.....	X.....	1 (0.454)
Phosphorus oxychloride.....	C.....	1,000 (454)
Phosphorus pentasulfide.....	B.....	100 (45.4)
Phosphorus trichloride.....	C.....	1,000 (454)
Polychlorinated biphenyls.....	X.....	1 (0.454)
Potassium arsenate.....	X.....	1 (0.454)
Potassium arsenite.....	X.....	1 (0.454)
Potassium bichromate.....	A.....	10 (4.54)
Potassium chromate.....	A.....	10 (4.54)
Potassium cyanide.....	A.....	10 (4.54)
Potassium hydroxide.....	C.....	1,000 (454)
Potassium permanganate.....	B.....	100 (45.4)
Propargite.....	A.....	10 (4.54)
Propionic acid.....	D.....	5,000 (2,270)
Propionic anhydride.....	D.....	5,000 (2,270)
Propylene oxide.....	B.....	100 (45.4)
Pyrethrins.....	X.....	1 (0.454)
Quinoline.....	D.....	5,000 (2,270)
Resorcinol.....	D.....	5,000 (2,270)
Selenium oxide.....	A.....	10 (4.54)
Silver nitrate.....	X.....	1 (0.454)

Sodium.....	A.....	10 (4.54)
Sodium arsenate.....	X.....	1 (0.454)
Sodium arsenite.....	X.....	1 (0.454)
Sodium bichromate.....	A.....	10 (4.54)
Sodium bifluoride.....	B.....	100 (45.4)
Sodium bisulfite.....	D.....	5,000 (2,270)
Sodium chromate.....	A.....	10 (4.54)
Sodium cyanide.....	A.....	10 (4.54)
Sodium dodecylbenzenesulfonate..	C.....	1,000 (454)
Sodium fluoride.....	C.....	1,000 (454)
Sodium hydrosulfide.....	D.....	5,000 (2,270)
Sodium hydroxide.....	C.....	1,000 (454)
Sodium hypochlorite.....	B.....	100 (45.4)
Sodium methylate.....	C.....	1,000 (454)
Sodium nitrite.....	B.....	100 (45.4)
Sodium phosphate, dibasic.....	D.....	5,000 (2,270)
Sodium phosphate, tribasic.....	D.....	5,000 (2,270)
Sodium selenite.....	B.....	100 (45.4)
Strontium chromate.....	A.....	10 (4.54)
Strychnine.....	A.....	10 (4.54)
Styrene.....	C.....	1,000 (454)
Sulfuric acid.....	C.....	1,000 (454)
Sulfur monochloride.....	C.....	1,000 (454)
2,4,5-T acid.....	C.....	1,000 (454)
2,4,5-T amines.....	D.....	5,000 (2,270)
2,4,5-T esters.....	C.....	1,000 (454)
2,4,5-T salts.....	C.....	1,000 (454)
TDE.....	X.....	1 (0.454)
2,4,5-TP acid.....	B.....	100 (45.4)
2,4,5-TP acid esters.....	B.....	100 (45.4)
Tetraethyl lead.....	A.....	10 (4.54)
Tetraethyl pyrophosphate.....	A.....	10 (4.54)
Thallium sulfate.....	B.....	100 (45.4)
Toluene.....	C.....	1,000 (454)
Toxaphene.....	X.....	1 (0.454)
Trichlorfon.....	B.....	100 (45.4)
Trichloroethylene.....	B.....	100 (45.4)
Trichlorophenol.....	A.....	10 (4.54)
Triethanolamine	C.....	1,000 (454)
dodecylbenzenesulfonate.		
Triethylamine.....	D.....	5,000 (2,270)
Trimethylamine.....	B.....	100 (45.4)
Uranyl acetate.....	B.....	100 (45.4)
Uranyl nitrate.....	B.....	100 (45.4)
Vanadium pentoxide.....	C.....	1,000 (454)
Vanadyl sulfate.....	C.....	1,000 (454)
Vinyl acetate.....	D.....	5,000 (2,270)
Vinylidene chloride.....	B.....	100 (45.4)
Xylene (mixed).....	B.....	100 (45.4)
Xylenol.....	C.....	1,000 (454)
Zinc acetate.....	C.....	1,000 (454)
Zinc ammonium chloride.....	C.....	1,000 (454)
Zinc borate.....	C.....	1,000 (454)
Zinc bromide.....	C.....	1,000 (454)
Zinc carbonate.....	C.....	1,000 (454)
Zinc chloride.....	C.....	1,000 (454)
Zinc cyanide.....	A.....	10 (4.54)
Zinc fluoride.....	C.....	1,000 (454)
Zinc formate.....	C.....	1,000 (454)
Zinc hydrosulfite.....	C.....	1,000 (454)
Zinc nitrate.....	C.....	1,000 (454)

Zinc phenolsulfonate.....	D.....	5,000 (2,270)
Zinc phosphide.....	B.....	100 (45.4)
Zinc silicofluoride.....	D.....	5,000 (2,270)
Zinc sulfate.....	C.....	1,000 (454)
Zirconium nitrate.....	D.....	5,000 (2,270)
Zirconium potassium fluoride....	C.....	1,000 (454)
Zirconium sulfate.....	D.....	5,000 (2,270)
Zirconium tetrachloride.....	D.....	5,000 (2,270)

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[50 FR 13513, Apr. 4, 1985, as amended at 51 FR 34547, Sept. 29, 1986; 54 FR 33482, Aug. 14, 1989; 58 FR 35327, June 30, 1993; 60 FR 30937, June 12, 1995]

**Note:** The first number under the column headed "RQ" is the reportable quantity in pounds. The number in parentheses is the metric equivalent in kilograms. For convenience, the table contains a column headed "Category" which lists the code letters "X", "A", "B", "C", and "D" associated with reportable quantities of 1, 10, 100, 1000, and 5000 pounds, respectively.

## APPENDIX B

### Reportable Quantities for CERCLA (40 CFR 302.4.)

## CERCLA (40 CFR 302.4)

Table 302.4.--List of Hazardous Substances and Reportable Quantities  
 [Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Statutory code[dagger]	RCRA waste No.	Final RQ pounds (Kg)
Acenaphthene.....	83-32-9	2	.....	100 (45.4)
Acenaphthylene.....	208-96-8	2	.....	5000 (2270)
Acetaldehyde.....	75-07-0	1,3,4	U001	1000 (454)
Acetaldehyde, chloro-.....	107-20-	4	P023	1000 (454)
Acetaldehyde, trichloro-.....	75-87-6	4	U034	5000 (2270)
Acetamide.....	60-35-5	3	.....	100 (45.4)
Acetamide, N-(aminothioxomethyl)-.....	591-08-2	4	P002	1000 (454)
Acetamide, N-(4-ethoxyphenyl)-.....	62-44-2	4	U187	100 (45.4)
Acetamide, N-9H-fluoren-2-yl-.....	53-96-3	3,4	U005	1 (0.454)
Acetamide, 2-fluoro-.....	6417-640-19-7	4	P057	100 (45.4)
Acetic acid.....	64-19-7	1	.....	5000 (2270)
Acetic acid, (2,4-dichlorophenoxy)-, salts & esters.	94-75-7	1,3,4	U240	100 (45.4)
Acetic acid, ethyl ester.....	141-78-6	4	U112	5000 (2270)
Acetic acid, fluoro-, sodium salt.....	62-74-8	4	P058	10 (4.54)
Acetic acid, lead(2+) salt.....	301-04-2	1,4	U144	10 (4.54)
Acetic acid, thallium(1+) salt.....	563-68-8	4	U214	100 (45.4)
Acetic acid, (2,4,5-trichlorophenoxy)-	93-76-5	1,4	See F027	1000 (454)
Acetic anhydride.....	108-24-7	1	.....	5000 (2270)
Acetone.....	67-64-1	4	U002	5000 (2270)
Acetone cyanohydrin.....	75-86-5	1,4	P069	10 (4.54)
Acetonitrile.....	75-05-8	3,4	U003	5000 (2270)
Acetophenone.....	98-86-2	3,4	U004	5000 (2270)
2-Acetylaminofluorene.....	53-96-3	3,4	U005	1 (0.454)
Acetyl bromide.....	506-96-7	1	.....	5000 (2270)
Acetyl chloride.....	75-36-5	1,4	U006	5000 (2270)
1-Acetyl-2-thiourea.....	591-08-2	4	P002	1000 (454)
Acrolein.....	107-02-8	1,2,3,4	P003	1 (0.454)
Acrylamide.....	79-06-1	3,4	U007	5000 (2270)
Acrylic acid.....	79-10-7	3,4	U008	5000 (2270)
Acrylonitrile.....	107-13-1	1,2,3,4	U009	100 (45.4)
Adipic acid.....	124-04-9	1	.....	5000 (2270)
Aldicarb.....	116-06-3	4	P070	1 (0.454)
Aldrin.....	309-00-2	1,2,4	P004	1 (0.454)
Allyl alcohol.....	107-18-6	1,4	P005	100 (45.4)
Allyl chloride.....	107-05-1	1,3	.....	1000 (454)
Aluminum phosphide.....	20859-73-8	4	P006	100 (45.4)
Aluminum sulfate.....	10043-01-3	1	.....	5000 (2270)
4-Aminobiphenyl.....	92-67-1	3	.....	1 (0.454)

5-(Aminomethyl)-3-isoxazolol.....	2763-96-4	4	P007	1000 (454)
4-Aminopyridine.....	504-24-5	4	P008	1000 (454)
Amitrole.....	61-82-5	4	U011	10 (4.54)
Ammonia.....	7664-41-7	1	.....	100 (45.4)
Ammonium acetate.....	631-61-8	1	.....	5000 (2270)
Ammonium benzoate.....	1863-63-4	1	.....	5000 (2270)
Ammonium bicarbonate.....	1066-33-7	1	.....	5000 (2270)
Ammonium bichromate.....	7789-09-5	1	.....	10 (4.54)
Ammonium bifluoride.....	1341-49-7	1	.....	100 (45.4)
Ammonium bisulfite.....	10192-30-0	1	.....	5000 (2270)
Ammonium carbamate.....	1111-78-0	1	.....	5000 (2270)
Ammonium carbonate.....	506-87-6	1	.....	5000 (2270)
Ammonium chloride.....	12125-02-9	1	.....	5000 (2270)
Ammonium chromate.....	7788-98-9	1	.....	10 (4.54)
Ammonium citrate, dibasic.....	3012-65-5	1	.....	5000 (2270)
Ammonium fluoborate.....	13826-83-0	1	.....	5000 (2270)
Ammonium fluoride.....	12125-01-8	1	.....	100 (45.4)
Ammonium hydroxide.....	1336-21-6	1	.....	1000 (454)
Ammonium oxalate.....	6009-70-7	1	.....	5000 (2270)
	5972-73-6			
	14258-49-2			
Ammonium picrate.....	131-74-8	4	P009	10 (4.54)
Ammonium silicofluoride.....	16919-19-0	1	.....	1000 (454)
Ammonium sulfamate.....	7773-06-0	1	.....	5000 (2270)
Ammonium sulfide.....	12135-76-1	1	.....	100 (45.4)
Ammonium sulfite.....	10196-04-0	1	.....	5000 (2270)
Ammonium tartrate.....	14307-43-8	1	.....	5000 (2270)
	3164-29-2			
Ammonium thiocyanate.....	1762-95-4	1	.....	5000 (2270)
Ammonium vanadate.....	7803-55-6	4	P119	1000 (454)

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Amyl acetate.....	628-63-7	1	.....	5000 (2270)
iso-Amyl acetate.....	123-92-2			
sec-Amyl acetate.....	626-38-0			
tert-Amyl acetate.....	625-16-1			
Aniline.....	62-53-3	1,3,4	U012	5000 (2270)
o-Anisidine.....	90-04-0	3	.....	100 (45.4)
Anthracene.....	120-12-7	2	.....	5000 (2270)
Antimony[dagger][dagger].....	7440-36-0	2	.....	5000 (2270)
ANTIMONY AND COMPOUNDS.....	N.A.	2,3	.....	**
Antimony Compounds.....	N.A.	2,3	.....	**
Antimony pentachloride.....	7647-18-9	1	.....	1000 (454)
Antimony potassium tartrate.....	28300-74-5	1	.....	100 (45.4)
Antimony tribromide.....	7789-61-9	1	.....	1000 (454)
Antimony trichloride.....	10025-91-9	1	.....	1000 (454)

Antimony trifluoride.....	7783-56-4	1	.....	1000 (454)
Antimony trioxide.....	1309-64-4	1	.....	1000 (454)
Argentate(1-), bis(cyano-C)-, potassium.	506-61-6	4	P099	1 (0.454)
Aroclor 1016.....	12674-11-2	1,2,3	.....	1 (0.454)
Aroclor 1221.....	11104-28-2	1,2,3	.....	1 (0.454)
Aroclor 1232.....	11141-16-5	1,2,3	.....	1 (0.454)
Aroclor 1242.....	53469-21-9	1,2,3	.....	1 (0.454)
Aroclor 1248.....	12672-29-6	1,2,3	.....	1 (0.454)
Aroclor 1254.....	11097-69-1	1,2,3	.....	1 (0.454)
[dagger]Aroclor 1260.....	11096-82-5	1,2,3	.....	1 (0.454)
Aroclors.....	1336-36-3	1,2,3	.....	1 (0.454)
Arsenic[dagger][dagger].....	7440-38-2	2,3	.....	1 (0.454)
Arsenic acid H3AsO4.....	7778-39-4	4	P010	1 (0.454)
ARSENIC AND COMPOUNDS.....	N.A.	2,3	.....	**
Arsenic Compounds (inorganic including arsine).	N.A.	2,3	.....	**
Arsenic disulfide.....	1303-32-8	1	.....	1 (0.454)
Arsenic oxide As2O3.....	1327-53-3	1,4	P012	1 (0.454)
Arsenic oxide As2O5.....	1303-28-2	1,4	P011	1 (0.454)
Arsenic pentoxide.....	1303-28-2	1,4	P011	1 (0.454)
Arsenic trichloride.....	7784-34-1	1	.....	1 (0.454)
Arsenic trioxide.....	1327-53-3	1,4	P012	1 (0.454)
Arsenic trisulfide.....	1303-33-9	1	.....	1 (0.454)
Arsine, diethyl.....	692-42-2	4	P038	1 (0.454)
Arsinic acid, dimethyl.....	75-60-5	4	U136	1 (0.454)
Arsonous dichloride, phenyl.....	696-28-6	4	P036	1 (0.454)
Asbestos[dagger][dagger][dagger].....	1332-21-4	2,3	.....	1 (0.454)
Auramine.....	492-80-8	4	U014	100 (45.4)
Azaserine.....	115-02-6	4	U015	1 (0.454)
Aziridine.....	151-56-4	3,4	P054	1 (0.454)
Aziridine, 2-methyl.....	75-55-8	3,4	P067	1 (0.454)
Azirino[2',3':3,4]pyrrolo[1,2-a]indole- 4,7-dione, 6-amino-8-[[ aminocarbonyl)oxy]methyl]- 1,1a,2,8,8a,8b- hexahydro-8a-methoxy- 5- methyl-, [1aS- (1aalpha,8beta,8alpha, 8balph)]-.	50-07-7	4	U010	10 (4.54)
Barium cyanide.....	542-62-1	1,4	P013	10 (4.54)
Benz[j]aceanthrylene, 1,2-dihydro-3- methyl-.	56-49-5	4	U157	10 (4.54)
Benz[c]acridine.....	225-51-4	4	U016	100 (45.4)
Benzal chloride.....	98-87-3	4	U017	5000 (2270)
Benzamide, 3,5-dichloro-N-(1,1- dimethyl-2-58-5 propynyl)-.	23950-58-5	4	U192	5000 (2270)
Benz[a]anthracene.....	56-55-3	2,4	U018	10 (4.54)
1,2-Benzanthracene.....	56-55-3	2,4	U018	10 (4.54)
Benz[a]anthracene, 7,12-dimethyl.....	57-97-6	4	U094	1 (0.454)

Benzenamine.....	62-53-3	1,3,4	U012	5000 (2270)
Benzenamine, 4,4'-carbonimidoylbis (N,N dimethyl)-.	492-80-8	4	U014	100 (45.4)
Benzenamine, 4-chloro-.....	106-47-8	4	P024	1000 (454)
Benzenamine, 4-chloro-2-methyl-, hydrochloride.	3165-93-3	4	U049	100 (45.4)
Benzenamine, N,N-dimethyl-4- (phenylazo)-.	60-11-7	3,4	U093	10 (4.54)
Benzenamine, 2-methyl-.....	95-53-4	3,4	U328	100 (45.4)
Benzenamine, 4-methyl-.....	106-49-0	4	U353	100 (45.4)
Benzenamine, 4,4'-methylenebis [2- chloro-.	101-14-4	3,4	U158	10 (4.54)
Benzenamine, 2-methyl-,hydrochloride..	636-21-5	4	U222	100 (45.4)
Benzenamine, 2-methyl-5-nitro-.....	99-55-8	4	U181	100 (45.4)
Benzenamine, 4-nitro-.....	100-01-6	4	P077	5000 (2270)
Benzene *.....	71-43-2	1,2,3,4	U019	10 (4.54)
Benzeneacetic acid, 4-chloro-[alpha]- (4-chlorophenyl)- [alpha]-hydroxy-, ethyl ester.	510-15-6	3,4	U038	10 (4.54)
Benzene, 1-bromo-4-phenoxy-.....	101-55-3	2,4	U030	100 (45.4)

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Benzenebutanoic acid, 4-[bis(2- chloroethyl)amino]-.	305-03-3	4	U035	10 (4.54)
Benzene, chloro-.....	108-90-7	1,2,3,4	U037	100 (45.4)
Benzene, (chloromethyl)-.....	100-44-7	1,3,4	P028	100 (45.4)
Benzenediamine, ar-methyl-.....	95-80-7	3,4	U221	10 (4.54)
	496-72- 0			
	823-40- 5			
	25376- 45-8			
1,2-Benzenedicarboxylic acid, bis(2- ethylhexyl) ester.	117-81-7	2,3,4	U028	100 (45.4)
1,2-Benzenedicarboxylic acid, dibutyl ester.	84-74-2	1,2,3,4	U069	10 (4.54)
1,2-Benzenedicarboxylic acid, diethyl ester.	84-66-2	2,4	U088	1000 (454)
1,2-Benzenedicarboxylic acid, dimethyl ester.	131-11-3	2,3,4	U102	5000 (2270)
1,2-Benzenedicarboxylic acid, dioctyl ester.	117-84-0	2,4	U107	5000 (2270)
Benzene, 1,2-dichloro-.....	95-50-1	1,2,4	U070	100 (45.4)
Benzene, 1,3-dichloro-.....	541-73-1	2,4	U071	100 (45.4)
Benzene, 1,4-dichloro-.....	106-46-7	1,2,3,4	U072	100 (45.4)
Benzene, 1,1'-(2,2-dichloroethylidene) bis[4-chloro-.	72-54-8	1,2,4	U060	1 (0.454)
Benzene, (dichloromethyl)-.....	98-87-3	4	U017	5000 (2270)

Benzene, 1,3-diisocyanatomethyl-.....	91-08-7	3, 4	U223	100 (45.4)
	584-84-9			
	26471-62-5			
Benzene, dimethyl-.....	1330-20-7	1, 3, 4	U239	100 (45.4)
1,3-Benzenediol.....	108-46-3	1, 4	U201	5000 (2270)
1,2-Benzenediol, 4-[1-hydroxy-2-(methyl amino)ethyl]-.	51-43-4	4	P042	1000 (454)
Benzeneethanamine, alpha, alpha-dimethyl-.	122-09-8	4	P046	5000 (2270)
Benzene, hexachloro-.....	118-74-1	2, 3, 4	U127	10 (4.54)
Benzene, hexahydro-.....	110-82-7	1, 4	U056	1000 (454)
Benzene, methyl-.....	108-88-3	1, 2, 3, 4	U220	1000 (454)
Benzene, 1-methyl-2,4-dinitro-.....	121-14-2	1, 2, 3, 4	U105	10 (4.54)
Benzene, 2-methyl-1,3-dinitro-.....	606-20-2	1, 2, 4	U106	100 (45.4)
Benzene, (1-methylethyl)-.....	98-82-8	3, 4	U055	5000 (2270)
Benzene, nitro-.....	98-95-3	1, 2, 3, 4	U169	1000 (454)
Benzene, pentachloro-.....	608-93-5	4	U183	10 (4.54)
Benzene, pentachloronitro-.....	82-68-8	3, 4	U185	100 (45.4)
Benzenesulfonic acid chloride.....	98-09-9	4	U020	100 (45.4)
Benzenesulfonyl chloride.....	98-09-9	4	U020	100 (45.4)
Benzene, 1,2,4,5-tetrachloro-.....	95-94-3	4	U207	5000 (2270)
Benzenethiol.....	108-98-5	4	P014	100 (45.4)
Benzene, 1,1'-(2,2,2-trichloroethylidene) bis[4-chloro-.	50-29-3	1, 2, 4	U061	1 (0.454)
Benzene, 1,1'-(2,2,2-trichloroethylidene) bis[4-methoxy-.	72-43-5	1, 3, 4	U247	1 (0.454)
Benzene, (trichloromethyl)-.....	98-07-7	3, 4	U023	10 (4.54)
Benzene, 1,3,5-trinitro-.....	99-35-4	4	U234	10 (4.54)
Benzidine.....	92-87-5	2, 3, 4	U021	1 (0.454)
1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts.	81-07-2	4	U202	100 (45.4)
Benzo[a]anthracene.....	56-55-3	2, 4	U018	10 (4.54)
1,3-Benzodioxole, 5-(1-propenyl)-1....	120-58-1	4	U141	100 (45.4)
1,3-Benzodioxole, 5-(2-propenyl)-.....	94-59-7	4	U203	100 (45.4)
1,3-Benzodioxole, 5-propyl-.....	94-58-6	4	U090	10 (4.54)
1,3-Benzodioxol-4-ol, 2,2-dimethyl-,	22961-82-6	4	U364	
Benzoquinone.....	106-51-4	3, 4	U197	10 (4.54)
Benzotrichloride.....	98-07-7	3, 4	U023	10 (4.54)
Benzoyl chloride.....	98-88-4	1	--	1000 (454)
Benzyl chloride.....	100-44-7	1, 3, 4	P028	100 (45.4)
Beryllium [dagger][dagger].....	7440-41-7	2, 3, 4	P015	10 (4.54)

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BERYLLIUM AND COMPOUNDS.....	N.A.	2, 3		**
Beryllium chloride.....	7787-47-5	1		1 (0.454)
Beryllium compounds.....	N.A.	2, 3		**

Beryllium fluoride.....	7787-49-7	1		1 (0.454)
Beryllium nitrate.....	13597-99-4	1		1 (0.454)
	7787-55-5			
Beryllium powder [dagger][dagger].....	7440-41-7	2,3,4	P015	10 (4.54)
alpha-BHC.....	319-84-6	2		10 (4.54)
beta-BHC.....	319-85-7	2		1 (0.454)
delta-BHC.....	319-86-8	2		1 (0.454)
gamma-BHC.....	58-89-9	1,2,3,4	U129	1 (0.454)
2,2'-Bioxirane.....	1464-53-5	4	U085	10 (4.54)
Biphenyl.....	92-52-4	3		100 (45.4)
[1,1'-Biphenyl]-4,4'-diamine.....	92-87-5	2,3,4	U021	1 (0.454)
[1,1'-Biphenyl]-4,4'-diamine,3,3'- dichloro-.	91-94-1	2,3,4	U073	1 (0.454)
[1,1'-Biphenyl]-4,4'-diamine,3,3'- dimethoxy-.	119-90-4	3,4	U091	100 (45.4)
[1,1'-Biphenyl]-4,4'-diamine,3,3'- dimethyl-.	119-93-7	3,4	U095	10 (4.54)
Bis(2-chloroethoxy) methane.....	111-91-1	2,4	U024	1000 (454)
Bis(2-chloroethyl) ether.....	111-44-4	2,3,4	U025	10 (4.54)
Bis(chloromethyl) ether.....	542-88-1	2,3,4	P016	10 (4.54)
Bis(2-ethylhexyl) phthalate.....	117-81-7	3,4	U028	100 (45.4)
Bromoacetone.....	598-31-2	4	P017	1000 (454)
Bromoform.....	75-25-2	2,3,4	U225	100 (45.4)
Bromomethane.....	74-83-9	2,3,4	U029	1000 (454)
4-Bromophenyl phenyl ether.....	101-55-3	2,4	U030	100 (45.4)
Brucine.....	357-57-3	4	P018	100 (45.4)
1,3-Butadiene.....	106-99-0	3		10 (4.54)
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87-68-3	2,3,4	U128	1 (0.454)
1-Butanamine, N-butyl-N-nitroso-.....	924-16-3	4	U172	10 (4.54)
1-Butanol.....	71-36-3	4	U031	5000 (2270)
2-Butanone.....	78-93-3	3,4	U159	5000 (2270)
2-Butanone, 3,3-dimethyl-1(methylthio)- , O-[(methylamino)carbonyl] oxime.	39196-18-4	4	P045	100 (45.4)
2-Butanone peroxide.....	1338-23-4	4	U160	10 (4.54)
2-Butenal.....	123-73-9	1,4	U053	100 (45.4)
	4170-30-3			
2-Butene, 1,4-dichloro-.....	764-41-0	4	U074	1 (0.454)
2-Butenoic acid, 2-methyl-, 7-[[2,3- dihydroxy-2-(1-methoxyethyl)-3- methyl-1-oxobutoxy] methyl]-2,3, 5,7a- tetrahydro- 1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z), 7(2S*,3R*),7aalpha]]-.	303-34-4	4	U143	10 (4.54)
Butyl acetate.....	123-86-4	1		5000 (2270)
iso-Butyl acetate.....	110-19-0			
sec-Butyl acetate.....	105-46-4			
tert-Butyl acetate.....	540-88-5			
n-Butyl alcohol.....	71-36-3	4	U031	5000 (2270)
Bu' mine.....	109-73-9	1		1000 (45.4)

iso-Butylamine.....	78-81-9			
sec-Butylamine.....	513-49-5			
	13952-84-6			
tert-Butylamine.....	75-64-9			
Butyl benzyl phthalate.....	85-68-7	2		100 (45.4)
n-Butyl phthalate.....	84-74-2	1,2,3,4	U069	10 (4.54)
Butyric acid.....	107-92-6	1		5000 (2270)
iso-Butyric acid.....	79-31-2			
Cacodylic acid.....	75-60-5	4	U136	1 (0.454)
Cadmium [dagger][dagger].....	7440-43-9	2		10 (4.54)
Cadmium acetate.....	543-90-8	1		10 (4.54)
CADMIUM AND COMPOUNDS.....	N.A.	2,3		**
Cadmium bromide.....	7789-42-6	1		10 (4.54)
Cadmium chloride.....	10108-64-2	1		10 (4.54)
Cadmium compounds.....	N.A.	2,3		**
Calcium arsenate.....	7778-44-1	1		1 (0.454)
Calcium arsenite.....	52740-16-6	1		1 (0.454)
Calcium carbide.....	75-20-7	1		10 (4.54)
Calcium chromate.....	13765-19-0	1,4	U032	10 (4.54)
Calcium cyanamide.....	156-62-7	3		1000 (454)
Calcium cyanide Ca(CN) <sub>2</sub> .....	592-01-8	1,4	P021	10 (4.54)
Calcium dodecylbenzenesulfonate.....	26264-06-2	1		1000 (454)
Calcium hypochlorite.....	7778-54-3	1		10 (4.54)
Captan.....	133-06-2	1,3		10 (4.54)

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Carbamic acid, 1H-benzimidazol-2-yl, b.....	10605-21-7 72-55-9	4 2	U372	1 (0.454)
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DDE <sup>b</sup> .....	3547-04-4	3		5000 (2270)
4,4'-DDE.....	72-55-9	2		1 (0.454)
DDT.....	50-29-3	1,2,4	U061	1 (0.454)
4,4'-DDT.....	50-29-3	1,2,4	U061	1 (0.454)
DDT AND METABOLITES.....	N.A.	2		**
DEHP.....	117-81-7	2,3,4	U028	100 (45.4)
Diallate.....	2303-16-4	4	U062	100 (45.4)
Diazinon.....	333-41-5	1		1 (0.454)
Diazomethane.....	334-88-3	3		100 (45.4)
Dibenz[a,h]anthracene.....	53-70-3	2,4	U063	1 (0.454)
1,2:5,6-Dibenzanthracene.....	53-70-3	2,4	U063	1 (0.454)
Dibenzo[a,h]anthracene.....	53-70-3	2,4	U063	1 (0.454)
Dibenzofuran.....	132-64-9	3		100 (45.4)
Dibenzo[a,i]pyrene.....	189-55-9	4	U064	10 (4.54)

1,2-Dibromo-3-chloropropane.....	96-12-8	3,4	U066	1 (0.454)
Dibromoethane.....	106-93-4	1,3,4	U067	1 (0.454)
Dibutyl phthalate.....	84-74-2	1,2,3,4	U069	10 (4.54)
Di-n-butyl phthalate.....	84-74-2	1,2,3,4	U069	10 (4.54)
Dicamba.....	1918-00-9	1	.....	1000 (454)
Dichlobenil.....	1194-1-65-6	1	.....	100 (45.4)
Dichlone.....	117-80-6	1	.....	1 (0.454)
Dichlorobenzene.....	25321-22-6	1	.....	100 (45.4)
1,2-Dichlorobenzene.....	95-50-1	1,2,4	U070	100 (45.4)
1,3-Dichlorobenzene.....	541-73-1	2,4	U071	100 (45.4)
1,4-Dichlorobenzene.....	106-46-7	1,2,3,4	U072	100 (45.4)
m-Dichlorobenzene.....	541-73-1	2,4	U071	100 (45.4)
o-Dichlorobenzene.....	95-50-1	1,2,4	U070	100 (45.4)
p-Dichlorobenzene.....	106-46-7	1,2,3,4	U072	100 (45.4)
DICHLOROBENZIDINE.....	N.A.	2	.....	**
3,3'-Dichlorobenzidine.....	91-94-1	2,3,4	U073	1 (0.454)
Dichlorobromomethane.....	75-27-4	2	.....	5000 (2270)
1,4-Dichloro-2-butene.....	764-41-0	4	U074	1 (0.454)
Dichlorodifluoromethane.....	75-71-8	4	U075	5000 (2270)
1,1-Dichloroethane.....	75-34-3	2,3,4	U076	1000 (454)
1,2-Dichloroethane.....	107-06-2	1,2,3,4	U077	100 (45.4)
1,1-Dichloroethylene.....	75-35-4	1,2,3,4	U078	100 (45.4)
1,2-Dichloroethylene.....	156-60-5	2,4	U079	1000 (454)
Dichloroethyl ether.....	111-44-4	2,3,4	U025	10 (4.54)
Dichloroisopropyl ether.....	108-60-1	2,4	U027	1000 (454)
Dichloromethane.....	75-09-2	2,3,4	U080	1000 (454)
Dichloromethoxyethane.....	111-91-1	2,4	U024	1000 (454)
Dichloromethyl ether.....	542-88-1	2,3,4	P016	10 (4.54)
2,4-Dichlorophenol.....	120-83-2	2,4	U081	100 (45.4)
2,6-Dichlorophenol.....	87-65-0	4	U082	100 (45.4)
Dichlorophenylarsine.....	696-28-6	4	P036	1 (0.454)
Dichloropropane.....	26638-19-7	1	.....	1000 (454)
1,1-Dichloropropane.....	78-99-9			
1,3-Dichloropropane.....	142-28-9			
1,2-Dichloropropane.....	78-87-5	1,2,3,4	U083	1000 (454)
Dichloropropane--Dichloropropene (mixture).	8003-19-8	1	.....	100 (45.4)
Dichloropropene.....	26952-23-8	1	.....	100 (45.4)
2,3-Dichloropropene.....	78-88-6			
1,3-Dichloropropene.....	542-75-6	1,2,3,4	U084	100 (45.4)
2,2-Dichloropropionic acid.....	75-99-0	1	.....	5000 (2270)
Dichlorvos.....	62-73-7	1,3	.....	10 (4.54)
Dicofol.....	115-32-2	1	.....	10 (4.54)
Dieldrin.....	60-57-1	1,2,4	P037	1 (0.454)
1,2:3,4-Diepoxybutane.....	1464-53-5	4	U085	10 (4.54)
Diethanolamine.....	111-42-2	3	.....	100 (45.4)
Diethylamine.....	109-89-7	1	.....	100 (45.4)
N,N-Diethylaniline.....	91-66-7	3	.....	1000 (45.4)

Diethylarsine.....	692-42-2	4	P038	1 (0.454)
1,4-Diethyleneoxide.....	123-91-1	3,4	U108	100 (45.4)
Diethylhexyl phthalate.....	117-81-7	2,3,4	U028	100 (45.4)
N,N'-Diethylhydrazine.....	1615-80-1	4	U086	10 (4.54)
O,O-Diethyl S-methyl dithiophosphate..	3288-58-2	4	U087	5000 (2270)
Diethyl-p-nitrophenyl phosphate.....	311-45-5	4	P041	100 (45.4)
Diethyl phthalate.....	84-66-2	2,4	U088	1000 (454)

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O,O-Diethyl O-pyrazinyl phosphorothioate.	297-97-2	4	P040	100 (45.4)
Diethylstilbestrol.....	56-53-1	4	U089	1 (0.454)
Diethyl sulfate.....	64-67-5	3	.....	10 (4.54)
Dihydrosafrole.....	94-58-6	4	U090	10 (4.54)
Diisopropylfluorophosphate (DFP).....	55-91-4	4	P043	100 (45.4)
1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro- 1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5alpha, 8alpha,8abeta)-.	309-00-2	1,2,4	P004	1 (0.454)
1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro- 1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta, 5beta,8beta,8abeta)-.	465-73-6	4	P060	1 (0.454)
2,7:3,6-Dimethanonaphth[2,3- b]oxirene,3,4,5,6,9,9- hexachloro- 1a,2,2a,3,6,6a,7,7a- octahydro- , (1aalpha,2beta, 2aalpha,3beta,6beta,6aalpha, 7beta,7aalpha)-.	60-57-1	1,2,4	P037	1 (0.454)
2,7:3,6-Dimethanonaphth[2,3- b]oxirene,3,4,5,6,9,9- hexachloro- 1a,2,2a,3,6,6a,7,7a- octahydro- , (1aalpha,2beta, 2abeta,3alpha,6alpha, 6abeta,7beta,7aalpha)-, & metabolites.	72-20-8	1,2,4	P051	1 (0.454)
Dimethoate.....	60-51-5	4	P044	10 (4.54)
3,3'-Dimethoxybenzidine.....	119-90-4	3,4	U091	100 (45.4)
Dimethylamine.....	124-40-3	1,4	U092	1000 (454)
Dimethyl aminoazobenzene.....	60-11-7	3,4	U093	10 (4.54)
p-Dimethylaminoazobenzene.....	60-11-7	3,4	U093	10 (4.54)
N,N-Dimethylaniline.....	121-69-7	3	.....	100 (45.4)
7,12-Dimethylbenz[a]anthracene.....	57-97-6	4	U094	1 (0.454)
3,3'-Dimethylbenzidine.....	119-93-7	3,4	U095	10 (4.54)
alpha, alpha-	80-15-9	4	U096	10 (4.54)

Dimethylbenzylhydroperoxide.				
Dimethylcarbonyl chloride.....	79-44-7	3,4	U097	1 (0.454)
Dimethylformamide.....	68-12-2	3	.....	100 (45.4)
1,1-Dimethylhydrazine.....	57-14-7	3,4	U098	10 (4.54)
1,2-Dimethylhydrazine.....	540-73-8	4	U099	1 (0.454)
alpha, alpha-Dimethylphenethylamine....	122-09-8	4	P046	5000 (2270)
2,4-Dimethylphenol.....	105-67-9	2,4	U101	100 (45.4)
Dimethyl phthalate.....	131-11-3	2,3,4	U102	5000 (2270)
Dimethyl sulfate.....	77-78-1	3,4	U103	100 (45.4)
Dinitrobenzene (mixed).....	25154-54-5	1	.....	100 (45.4)
m-Dinitrobenzene.....	99-65-0			
o-Dinitrobenzene.....	528-29-0			
p-Dinitrobenzene.....	100-25-4			
4,6-Dinitro-o-cresol, and salts.....	534-52-1	2,3,4	P047	10 (4.54)
Dinitrophenol.....	25550-58-7	1	.....	10 (4.54)
2,5-Dinitrophenol.....	329-71-5			
2,6-Dinitrophenol.....	573-56-8			
2,4-Dinitrophenol.....	51-28-5	1,2,3,4	P048	10 (4.54)
Dinitrotoluene.....	25321-14-6	1,2	.....	10 (4.54)
3,4-Dinitrotoluene.....	610-39-9			
2,4-Dinitrotoluene.....	121-14-2	1,2,3,4	U105	10 (4.54)
2,6-Dinitrotoluene.....	606-20-2	1,2,4	U106	100 (45.4)
Dinoseb.....	88-85-7	4	P020	1000 (454)
Di-n-octyl phthalate.....	117-84-0	2,4	U107	5000 (2270)
1,4-Dioxane.....	123-91-1	3,4	U108	100 (45.4)
DIPHENYLHYDRAZINE.....	N.A.	2	.....	**
1,2-Diphenylhydrazine.....	122-66-7	2,3,4	U109	10 (4.54)
Diphosphoramidate, octamethyl.....	152-16-9	4	P085	100 (45.4)
Diphosphoric acid, tetraethyl ester...	107-49-3	1,4	P111	10 (4.54)
Dipropylamine.....	142-84-7	4	U110	5000 (2270)
Di-n-propylnitrosamine.....	621-64-7	2,4	U111	10 (4.54)
Diquat.....	85-00-7	1	.....	1000 (454)
	2764-72-9			
Disulfoton.....	298-04-4	1,4	P039	1 (0.454)
Dithiobiuret.....	541-53-7	4	P049	100 (45.4)
1,3-Dithiolane-2- carboxaldehyde, 2,4-	26419-73-8	4	P185	
c.....	N.A.	3	.....	**
Fluoranthene.....	206-44-0	2,4	U120	100 (45.4)
Fluorene.....	86-73-7	2	.....	5000 (2270)
Fluorine.....	7782-41-4	4	P056	10 (4.54)
Fluoroacetamide.....	640-19-7	4	P057	100 (45.4)
Fluoroacetic acid, sodium salt.....	62-74-8	4	P058	10 (4.54)
Formaldehyde.....	50-00-0	1,3,4	U122	100 (45.4)
Formic acid.....	64-18-6	1,4	U123	5000 (2270)
Fulminic acid, mercury(2+) salt.....	628-86-4	4	P065	10 (4.54)
Fumaric acid.....	110-17-8	1	.....	5000 (2270)
Furan.....	110-00-9	4	U124	100 (45.4)
2-Furancarboxaldehyde.....	98-01-1	1,4	U125	5000 (2270)

2,5-Furandione.....	108-31-6	1,3,4	U147	5000 (2270)
Furan, tetrahydro.....	109-99-9	4	U213	1000 (454)
Furfural.....	98-01-1	1,4	U125	5000 (2270)
Furfuran.....	110-00-9	4	U124	100 (45.4)
Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-,D-.	18883-66-4	4	U206	1 (0.454)
D-Glucose, 2-deoxy-2-[[ (methylnitrosoamino)-carbonyl]amino]-.	18883-66-4	4	U206	1 (0.454)
Glycidylaldehyde.....	765-34-4	4	U126	10 (4.54)
Glycol ethers <sup>d</sup> .....	N.A.	3	.....	**
Guanidine, N-methyl-N'-nitro-N-nitroso-	70-25-7	4	U163	10 (4.54)
Guthion.....	86-50-0	1	.....	1 (0.454)
HALOETHERS.....	N.A.	2	.....	**
HALOMETHANES.....	N.A.	2	.....	**
Heptachlor.....	76-44-8	1,2,3,4	P059	1 (0.454)
HEPTACHLOR AND METABOLITES.....	N.A.	2	.....	**
Heptachlor epoxide.....	1024-57-3	2	.....	1 (0.454)
Hexachlorobenzene.....	118-74-1	2,3,4	U127	10 (4.54)
Hexachlorobutadiene.....	87-68-3	2,3,4	U128	1 (0.454)
HEXACHLOROCYCLOHEXANE (all isomers)...	608-73-1	2	.....	**
Hexachlorocyclopentadiene.....	77-47-4	1,2,3,4	U130	10 (4.54)
Hexachloroethane.....	67-72-1	2,3,4	U131	100 (45.4)
Hexachlorophene.....	70-30-4	4	U132	100 (45.4)
Hexachloropropene.....	1888-71-7	4	U243	1000 (454)
Hexaethyl tetraphosphate.....	757-58-4	4	P062	100 (45.4)
Hexamethylene-1,6-diisocyanate.....	822-06-0	3	.....	100 (45.4)
Hexamethylphosphoramide.....	680-31-9	3	.....	1 (0.454)
Hexane.....	110-54-3	3	.....	5000 (2270)
Hexone.....	108-10-1	3,4	U161	5000 (2270)
Hydrazine.....	302-01-2	3,4	U133	1 (0.454)
Hydrazinecarbothioamide.....	79-19-6	4	P116	100 (45.4)
Hydrazine, 1,2-diethyl-.....	1615-80-1	4	U086	10 (4.54)
Hydrazine, 1,1-dimethyl-.....	57-14-7	3,4	U098	10 (4.54)
Hydrazine, 1,2-dimethyl-.....	540-73-8	4	U099	1 (0.454)
Hydrazine, 1,2-diphenyl-.....	122-66-7	2,3,4	U109	10 (4.54)
Hydrazine, methyl-.....	60-34-4	3,4	P068	10 (4.54)
Hydrochloric acid.....	7647-01-0	1,3	.....	5000 (2270)
Hydrocyanic acid.....	74-90-8	1,4	P063	10 (4.54)
Hydrofluoric acid.....	7664-39-3	1,3,4	U134	100 (45.4)
Hydrogen chloride.....	7647-01-0	1,3	.....	5000 (2270)
Hydrogen cyanide.....	74-90-8	1,4	P063	10 (4.54)
Hydrogen fluoride.....	7664-39-3	1,3,4	U134	100 (45.4)
Hydrogen phosphide.....	7803-51-2	3,4	P096	100 (45.4)
Hydrogen sulfide H2S.....	7783-06-4	1,4	U135	100 (45.4)
Hydroperoxide, 1-methyl-1-phenylethyl-	80-15-9	4	U096	10 (4.54)
Hydroquinone.....	123-31-9	3	.....	100 (45.4)

2-Imidazolidinethione.....	96-45-7	3,4	U116	10 (4.54)
Indeno(1,2,3-cd)pyrene.....	193-39-5	2,4	U137	100 (45.4)
Iodomethane.....	74-88-4	3,4	U138	100 (45.4)
1,3-Isobenzofurandione.....	85-44-9	3,4	U190	5000 (2270)
Isobutyl alcohol.....	78-83-1	4	U140	5000 (2270)
Isodrin.....	465-73-6	4	P060	1 (0.454)
Isophorone.....	78-59-1	2,3	.....	5000 (2270)
Isoprene.....	78-79-5	1	.....	100 (45.4)

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Isopropanolamine	42504-46-1	1	.....	1000 (454)
dodecylbenzenesulfonate.				
Isosafrole.....	120-58-1	4	U141	100 (45.4)
3(2H)-Isoxazolone, 5-(aminomethyl)-...	2763-96-4	4	P007	1000 (454)
Kepone.....	143-50-0	1,4	U142	1 (0.454)
Lasiocarpine.....	303-34-4	4	U143	10 (4.54)
Lead[Dagger][Dagger].....	7439-92-1	2	.....	10 (4.54)
Lead acetate.....	301-04-2	1,4	U144	10 (4.54)
LEAD AND COMPOUNDS.....	N.A.	2,3	.....	**
Lead arsenate.....	7784-40-9	1	.....	1 (0.454)
	7645-25-2			
	10102-48-4			
Lead, bis(acetato-O)tetrahydroxytri-..	1335-32-6	4	U146	10 (4.54)
Lead chloride.....	7758-95-4	1	.....	10 (4.54)
Lead compounds.....	N.A.	2,3	.....	**
Lead fluoborate.....	13814-96-5	1	.....	10 (4.54)
Lead fluoride.....	7783-46-2	1	.....	10 (4.54)
Lead iodide.....	10101-63-0	1	.....	10 (4.54)
Lead nitrate.....	10099-74-8	1	.....	10 (4.54)
Lead phosphate.....	7446-27-7	4	U145	10 (4.54)
Lead stearate.....	1072-35-1	1	.....	10 (4.54)
	7428-48-0			
	52652-59-2			
	56189-09-4			
Lead subacetate.....	1335-32-6	4	U146	10 (4.54)
Lead sulfate.....	7446-14-2	1	.....	10 (4.54)
	15739-80-7			
Lead sulfide.....	1314-87-0	1	.....	10 (4.54)
Lead thiocyanate.....	592-87-0	1	.....	10 (4.54)
Lindane.....	58-89-9	1,2,3,4	U129	1 (0.454)
Lindane (all isomers).....	58-89-9	1,2,3,4	U129	1 (0.454)
Lithium chromate.....	14307-35-8	1	.....	10 (4.54)
Malathion.....	121-75-5	1	.....	100 (45.4)
Maleic acid.....	110-16-7	1	.....	5000 (2270)
Maleic anhydride.....	108-31-6	1,3,4	U147	5000 (2270)
Maleic hydrazide.....	123-33-1	4	U148	5000 (2270)

Malononitrile.....	109-77-3	4	U149	1000 (454)
Manganese,	15339-36-3	4	P196	e.....
N.A.	3 .....	**		
POLYNUCLEAR AROMATIC HYDROCARBONS.....	N.A.	2		**
Potassium arsenate.....	7784-41-0	1		1 (0.454)
Potassium arsenite.....	10124-50-2	1		1 (0.454)
Potassium bichromate.....	7778-50-9	1		10 (4.54)
Potassium chromate.....	7789-00-6	1		10 (4.54)
Potassium cyanide K(CN).....	151-50-8	1,4	P098	10 (4.54)
Potassium hydroxide.....	1310-58-3	1		1000 (454)
Potassium permanganate.....	7722-64-7	1		100 (45.4)
Potassium silver cyanide.....	506-61-6	4	P099	1 (0.454)
Pronamide.....	23950-58-5	4	U192	5000 (2270)

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Propanal, 2-methyl-2-(methylsulfonyl)- f.....	1646-88-4	4	P203	
Crude oil storage tank sediment from petroleum refining operations.		4	K169	10 (4.54)
K170 <sup>f</sup> .....		4	K170	1 (0.454)
Clarified slurry oil tank sediment and/ or in-line filter/separation solids from petroleum refining operations.		4	K171	1 (0.454)
K171 <sup>f</sup> .....		4	K171	1 (0.454)
Spent hydrotreating catalyst from petroleum refining operations. (This listing does not include inert support media.)		4	K172	1 (0.454)
K172 <sup>f</sup> .....		4	K172	1 (0.454)
Spent hydrorefining catalyst from petroleum refining operations. (This listing does not include inert support media.)		4	K174	1 (0.454)
K174 <sup>f</sup> .....		4	K175	1 (0.454)
K175 <sup>f</sup> .....		4		
K176.....		4	K176	1 (0.454)
Baghouse filters from the production of antimony oxide, including filters from the production of intermediates (e.g., antimony metal or crude antimony oxide)		4		
K177.....		4	K177	5,000 (2270)
Slag from the production of antimony oxide that is speculatively accumulated or disposed, including slag from the production of		4		

intermediates (e.g., antimony metal or crude antimony oxide)			
K178.....	.....	.....	.....
Residues from manufacturing and manufacturing-site storage of ferric chloride from acids formed during the production of titanium dioxide using the chloride ilmenite process	.....	4 K178	1 (0.454)

[dagger] Indicates the statutory source defined by 1,2,3, and 4, as described in the note preceding Table 302.4.

[dagger][dagger] No reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is larger than 100 micrometers (0.004 inches).

[dagger][dagger][dagger] The RQ for asbestos is limited to friable forms only.

The Agency may adjust the statutory RQ for this hazardous substance in a future rulemaking; until then the statutory one-pound RQ applies.

Sec. The adjusted RQs for radionuclides may be found in Appendix B to this table.

\*\* Indicates that no RQ is being assigned to the generic or broad class.

<sup>a</sup> Benzene was already a CERCLA hazardous substance prior to the CAA Amendments of 1990 and received an adjusted 10-pound RQ based on potential carcinogenicity in an August 14, 1989, final rule (54 FR 33418). The CAA Amendments specify that ``benzene (including benzene from gasoline)'' is a hazardous air pollutant and, thus, a CERCLA hazardous substance.

<sup>b</sup> The CAA Amendments of 1990 list DDE (3547-04-4) as a CAA hazardous air pollutant. The CAS number, 3547-04-4, is for the chemical, p,p'-dichlorodiphenylethane. DDE or p,p'-dichlorodiphenyldichloroethylene, CAS number 72-55-9, is already listed in Table 302.4 with a final RQ of 1 pound. The substance identified by the CAS number 3547-04-4 has been evaluated and listed as DDE to be consistent with the CAA section 112 listing, as amended.

<sup>c</sup> Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.

<sup>d</sup> Includes mono- and di-ethers of ethylene glycol, diethylene glycol, and triethylene glycol R-(OCH<sub>2</sub>CH<sub>2</sub>)<sub>n</sub>-OR' where:

n = 1, 2, or 3;

R = alkyl C7 or less; or

R = phenyl or alkyl substituted phenyl;

R' = H or alkyl C7 or less; or

OR' consisting of carboxylic acid ester, sulfate, phosphate, nitrate, or sulfonate.

<sup>e</sup> Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100 deg.C.

<sup>f</sup> See 40 CFR 302.6(b)(1) for application of the mixture rule to this hazardous waste.

# APPENDIX C

## Acknowledgment Sheet

## **SWPP Acknowledgment Agreement**

I have read and understand the Tran-Jordan Landfill's Storm Water Pollution Prevention Plan (SWPP). I acknowledge and agree that I am responsible for knowing the information contained in the SWPP in case of an incident associated to the specifications in the plan.

I understand that by signing this document it certifies that I have examined the SWPP and have been prepared in case of an incident.

---

Print Name and Title

---

Employee's Signature

---

Date

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***APPENDIX C-***

***LANDFILL FORMS***

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# DAILY INSPECTION FORM

Date: \_\_\_\_\_

<b>SITE SECURITY</b>		
<i>Item</i>	<i>Item Operational</i>	<i>Comments / Action (if not operational)</i>
Fences	Yes / No	
Gates	Yes / No	
Lights	Yes / No	
Security System	Yes / No	
<b>SITE CONTROLS</b>		
<i>Item</i>	<i>Item Operational</i>	<i>Comments / Action (if not operational)</i>
Signs	Yes / No	
Access Roads	Yes / No	
Run-on Controls	Yes / No	
Run-off Controls	Yes / No	
Litter Fences	Yes / No	
Bird Control Devices	Yes / No	
Leachate Compliance	Yes / No	
<b>MISCELLANEOUS</b>		
<i>Item</i>	<i>Item</i>	<i>Comments / Action (if not operational)</i>
Excessive Wind Blown Litter	Yes / No	
Vectors	Yes / No	
Fires	Yes / No	
Fuel Tank Leaks	Yes / No	
Radio Communications	Yes / No	
Vehicle Keys	Yes / No	
Equipment Keys	Yes / No	
HHW Sump Pump	Yes / No	
<b>OTHER (Describe):</b>		
<b>Inspector:</b>		<b>Date:</b>



Monthly Inspection Form      Month \_\_\_\_\_

Main Office				
Item	Location	#	Functional	Comments (If item not functional / damaged- give location and problem)
Elevator		1	Yes / No	
Elevator Phone	Elevator	1	Yes / No	
GFCI Outlets	Bathrooms	3	Yes / No	
	Outside	4	Yes / No	
	Garage	6	Yes / No	
	Kitchen	4	Yes / No	
Central Air Filters	Roof	2	Yes / No	
	Note: Replace Quarterly	Last Replaced:		
Signs	Information	1	Yes/No	
	Handicapped	1	Yes/No	
	Water Warning (south of building)	3	Yes/No	
Fire Extinguishers	Bldg / Elev Room	1	Yes / No	
Used Oil Tank Alarm in Shop		1	Yes / No	
Safety Devices	Garage Doors	4	Yes / No	
Peak Alarm System	Monthly	2	Yes / No	
	Security Cameras	6	Yes/No	
Generator Test (power shut down)	Quarterly	1	Yes / No	
Scalehouse				
Scale H <sub>2</sub> O Drains	Under Scale	6	Yes/No	CC checks quarterly
GFCI Outlets	Bathroom	2	Yes/No	
	Outside	5	Yes/No	
Central Air Filters	Roof	1	Yes / No	
	Note: Replace Quarterly	Last Date Replaced:		
Signs	Outside Bldg.	12	Yes/No	
Fire Extinguishers	Inside Bldg	2	Yes/No	
Scale vent	Southwest roof top	1	Yes/No	

<b>PUBLIC CONVENIENCE CENTER (PCC)</b>				
<i>Item</i>	<i>Location</i>	<i>#</i>	<i>Functional</i>	<i>Comments (If item not functional / damaged- give location and problem)</i>
GFCI Outlets	HHW	3	Yes / No	
	Middle Wall	3	Yes / No	
Signs	Informational	6	Yes / No	
	Warning	9	Yes / No	
Eyewash Station	HHW Shed	1	Yes / No	
Heater		1	Yes / No	
Fire Extinguisher	Outside	2	Yes / No	
<b>Greenwaste</b>				
Lights		13	Yes / No	
Shack		1	Yes / No	
GFI on poles		12 X 3	Yes / No	
<b>LANDFILL ROAD &amp; WARNING SIGNS</b>				
<i>Item</i>	<i>Location</i>	<i>#</i>	<i>Functional</i>	<i>Comments (If item not functional / damaged- give location and problem)</i>
Greenwaste access road	Water Monitoring	5	Yes / No	
	Information (green)	5	Yes / No	
	Stop	1	Yes / No	
From entrance to gravel road	Informational / Warning	22	Yes / No	
Road to new & old cell dumping face (gravel)	Informational / Warning	3	Yes / No	
<b>WATER MONITORING WELLS</b>				
<i>Well #</i>	<i>Location</i>	<i>Functional</i>	<i>Comments (If item not functional / damaged- give location and problem)</i>	
Well 1	Northwest	Yes / No		
Well 2	Northeast	Yes / No		
Well 3	Southeast	Yes / No		
Well 4	West of Cell #6	Yes / No		
Well 5	West of O&M	Yes / No		
<b>MISCELLANEOUS WATER SAMPLING</b>				
Ground Water Sampling	Quarterly Feb., May, Aug., Nov.	Yes / No		
Leachate Water Sampling	Bi-annually May and Nov.	Yes / No		

Monthly Inspection Form      Month \_\_\_\_\_

MISCELLANEOUS				
Item	Located	#	Functional	Comments (If item not functional / damaged- give location and problem)
Methane Flare Station			Yes / No	
Condensate Pumps			Yes / No	
Gas Collection Valves			Yes / No	
Fire Extinguishers	Various	48	Yes / No	Inspection Date by State Fire:
Fire Suppression	Equipment	6	Yes / No	Inspection Date by State Fire :
	HHW		Yes/No	Inspection Date by State Fire :
	O&M Building		Yes/No	Inspection Date by State Fire :
First Aid Supplies	Lunchroom & Vehicles		Yes / No	Inspection Date by Xpect:
MSDS Books	Lunchroom / Shop/Scalehouse	3	Yes / No	
Fire Pump Bldg	Water Softener		Yes /No	
Spill Containment Kit	Outside East Garage Doors		Yes/No	Quarterly: Feb., May, Aug., Nov. Inspected by CC
Methane Well Monitoring	Completed:		Yes/No	Last test date: (to be done qrtly.)
Service Truck Crane Inspection			Yes/No	Inspected by Compliance Coordinator with Mechanic
Ladder Inspection			Yes/No	Quarterly: Feb., May, Aug., Nov. Inspected by Compliance Coordinator
Radio Frequency Alarm on IT	Completed:		Yes/No	
AED Inspection			Yes/No	Inspected monthly by Compliance Coordinator
Adopt-A-Highway			Yes/No	
Visual Emission Observation			Yes/No	
SWPPP Inspection			Yes/No	
Snow Removal/Salt Use				

Inspector(s): \_\_\_\_\_

Date: \_\_\_\_\_



Load Check Form

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Company: \_\_\_\_\_

Driver: \_\_\_\_\_ Truck # / License #: \_\_\_\_\_

TJ Area:  PCC  Cell  HHW  Greenwaste

Origin: \_\_\_\_\_

**Waste Description**

**HHW**

- Appliances
- Auto Parts
- Barrels (ends cut)
- Cardboard
- Carpet
- Carpet Pad
- Cloth
- Concrete
- Containers
  - Empty
  - Full
- Dirt
- Rock
- Electrical
- Food
- Furniture
- Glass
- Insulation
- Metals
- Paper
- Paint Cans (empty)
- Pipe
- Plastic
- Roofing Material
- Rubber
- Sheetrock
- Sod
- Toys
- Wire
- Wood
- Yard Waste
- Miscellaneous

- Acids
- Antifreeze
- Rechargeable Batteries
- Fluorescent Lights
- Fuels
- Oil
- Paint Cans (Full / Wet)
- Pesticides / Poisons
- Solvents
- Miscellaneous

**Unacceptable Waste**

- Asbestos
- Dead Animals
- Freon Based Systems
- PCB's
- Medical Waste (Red Bags)
- Wet Loads
- 55 Gallon Drums

Action Taken: \_\_\_\_\_

Comments: \_\_\_\_\_

TJ Employee: \_\_\_\_\_



Load Check Form

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Company: \_\_\_\_\_

Driver: \_\_\_\_\_ Truck # / License #: \_\_\_\_\_

TJ Area:  PCC  Cell  HHW  Greenwaste

Origin: \_\_\_\_\_

**Waste Description**

**HHW**

- Appliances
- Auto Parts
- Barrels (ends cut)
- Cardboard
- Carpet
- Carpet Pad
- Cloth
- Concrete
- Containers
  - Empty
  - Full
- Dirt
- Rock
- Electrical
- Food
- Furniture
- Glass
- Insulation
- Metals
- Paper
- Paint Cans (empty)
- Pipe
- Plastic
- Roofing Material
- Rubber
- Sheetrock
- Sod
- Toys
- Wire
- Wood
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- Miscellaneous

- Acids
- Antifreeze
- Rechargeable Batteries
- Fluorescent Lights
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- Oil
- Paint Cans (Full / Wet)
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- Solvents
- Miscellaneous

**Unacceptable Waste**

- Asbestos
- Dead Animals
- Freon Based Systems
- PCB's
- Medical Waste (Red Bags)
- Wet Loads
- 55 Gallon Drums

Action Taken: \_\_\_\_\_

Comments: \_\_\_\_\_

TJ Employee: \_\_\_\_\_



# Methane Quarterly Maintenance Log

Date \_\_\_\_\_

Channel	Physical condition of sensor	Calibration of sensor pass/fail	% of remaining life of sensor	Action required
#1 Inside north		pass/fail		
#2 Inside south		pass/fail		
#3 Outbound scale		pass/fail		
#4 Autoscale		pass/fail		
#5 Inbound scale		pass/fail		
# 6 Not in use				

Signed \_\_\_\_\_  
Name and Title

Date \_\_\_\_\_



**APPENDIX D-**

**CLOSURE/ POST CLOSURE COSTS**

Trans-Jordan Landfill  
 Trans-Jordan Cities  
 South Jordan, Utah

CLOSURE COST ESTIMATE (2010 dollars)  
 CELL 6 AREA

ITEM	UNIT	UNIT COST	QUANTITY	TOTAL
Final Cover				
Foundation Layer	cy	6.00	25,000	\$150,000
Low Permeability Layer	cy	11.50	20,000	\$230,000
Vegetative Layer	cy	5.75	25,000	\$143,750
Drainage System	1	25,000.00	1	\$25,000
Revegetation	acres	2,500.00	10	\$25,000
<b>SUBTOTAL</b>				<b>\$573,750</b>
Engineering and QA (10% of subtotal)				\$57,375
Contingency (20% of subtotal)				\$114,750
<b>CLOSURE COSTS</b>				<b>\$745,875</b>

POST CLOSURE MAINTENANCE COST ESTIMATE (2010 DOLLARS)  
 OLD CELL AND LATERAL EXPANSION AREA

ITEM	UNIT	UNIT COST	QUANTITY	TOTAL
Leachate management	1	30,000.00	1	\$30,000
Treatment				
Monitoring				
Environmental Monitoring	1	12,500.00	1	\$12,500
Ground water				
Landfill Gas System				
Landfill Gas System Operation	1	20,000.00	1	\$20,000
Drainage System	1	15,000.00	1	\$15,000
Inspection	1	10,000.00		\$10,000
<b>Subtotal</b>		<b>87,500.00</b>		<b>\$87,500</b>
Engineering/QA (10% of total)		8,750.00		\$8,750
Contingency (20% of total)		17,500.00		\$17,500
<b>TOTAL ANNUAL POST CLOSURE MAINTENANCE COST</b>		<b>113,750.00</b>		<b>\$113,750</b>
<b>30 YEAR POST CLOSURE MAINTENANCE CARE (30 times annual cost)</b>		<b>3,412,500.00</b>		<b>\$3,412,500</b>

<b>Closure/Post Closure Liability</b>	1			<b>\$4,158,375</b>
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**Trans-Jordan Landfill  
Closure and Postclosure Care Cost Liability**

As of 2/19/2010  
1100 ton/day and  
310 days per year

1300 #/cu yd.

(1)	(2)	(3)	(4) 3+4p <small>p = previous line</small>	(5)	(6)	(7) 5+6	(8) 4/2*7	(9) 8-8prior yr	(10)
YEAR	TOTAL WASTE CAPACITY IN TONS	WASTE CAPACITY USED IN TONS (At 2% for Future growth)	CUMULATIVE WASTE CAPACITY USED IN TONS	Cell 6 CLOSURE ESTIMATED TOTAL COST (Now Using BEA Future Inflation)	POST CLOSURE ESTIMATED TOTAL COST (Now Using BEA Future Inflation)	TOTAL ESTIMATED CURRENT CLOSURE AND POSTCLOSURE CARE COSTS	TOTAL ACCRUED LIABILITY	TOTAL ADDITIONAL LIABILITY	YEAR
1999	14,750,000	280,372	4,400,932	507,000	2,340,000	2,847,000	849,454	849,454	1999
2000	14,750,000	279,877	4,680,809	522,210	2,410,200	2,932,410	930,580	81,125	2000
2001	15,300,000	305,813	4,986,622	537,876	2,482,506	3,020,382	984,412	53,832	2001
2002	16,000,000	296,988	5,283,610	623,700	2,730,000	3,353,700	1,107,478	123,066	2002
2003	16,000,000	304,902	5,588,512	642,411	2,811,900	3,454,311	1,206,529	99,051	2003
2004	16,000,000	302,835	5,891,348	661,683	2,896,257	3,557,940	1,310,066	103,538	2004
2005	16,000,000	312,697	6,204,045	663,000	3,003,000	3,666,000	1,421,502	111,435	2005
2006	16,000,000	400,464	6,604,508	683,000	3,100,000	3,783,000	1,561,553	140,052	2006
2007	16,000,000	348,815	6,953,323	702,000	3,198,000	3,900,000	1,694,873	133,319	2007
2008	16,000,000	319,348	7,272,671	716,889	3,265,830	3,982,719	1,810,313	115,440	2008
2009	16,000,000	281,513	7,554,184	732,085	3,335,098	4,067,192	1,920,270	109,957	2009
2010	16,000,000	287,143	7,841,328	745,875	3,412,500	4,158,375	2,037,949	117,679	2010
2011	16,000,000	292,886	8,134,214	757,072	3,484,879	4,241,951	2,156,559	118,610	2011
2012	16,000,000	298,744	8,432,958	768,437	3,558,793	4,327,231	2,280,710	124,151	2012
2013	16,000,000	304,719	8,737,677	779,973	3,634,275	4,414,248	2,410,642	129,933	2013
2014	16,000,000	310,813	9,048,490	791,682	3,711,358	4,503,040	2,546,607	135,965	2014
2015	16,000,000	317,030	9,365,520	803,567	3,790,076	4,593,643	2,688,866	142,259	2015
2016	16,000,000	323,370	9,688,890	815,630	3,870,464	4,686,094	2,837,690	148,824	2016
2017	16,000,000	329,838	10,018,727	827,874	3,952,556	4,780,430	2,993,364	155,674	2017
2018	16,000,000	336,434	10,355,162	840,302	4,036,390	4,876,692	3,156,184	162,819	2018
2019	16,000,000	343,163	10,698,325	852,917	4,122,002	4,974,919	3,326,456	170,272	2019
2020	16,000,000	350,026	11,048,351	865,721	4,209,430	5,075,150	3,504,503	178,047	2020
2021	16,000,000	357,027	11,405,378	878,717	4,298,712	5,177,429	3,690,658	186,155	2021
2022	16,000,000	364,167	11,769,545	891,908	4,389,887	5,281,795	3,885,271	194,613	2022
2023	16,000,000	371,451	12,140,996	905,298	4,482,997	5,388,294	4,088,704	203,433	2023
2024	16,000,000	378,880	12,519,875	918,888	4,578,081	5,496,969	4,301,335	212,632	2024
2025	16,000,000	386,457	12,906,332	932,682	4,675,182	5,607,864	4,523,560	222,225	2025
2026	16,000,000	394,186	13,300,519	946,684	4,774,343	5,721,026	4,755,789	232,229	2026
2027	16,000,000	402,070	13,702,589	960,895	4,875,607	5,836,502	4,998,449	242,660	2027
2028	16,000,000	410,112	14,112,701	975,320	4,979,018	5,954,339	5,251,987	253,538	2028
2029	16,000,000	418,314	14,531,014	989,962	5,084,623	6,074,585	5,516,868	264,880	2029
2030	16,000,000	426,680	14,957,694	1,004,823	5,192,468	6,197,291	5,793,574	276,707	2030
2031	16,000,000	435,214	15,392,908	1,019,907	5,302,600	6,322,508	6,082,611	289,037	2031
2032	16,000,000	443,918	15,836,826	1,035,218	5,415,069	6,450,287	6,384,504	301,893	2032
2033	16,000,000	452,796	16,289,622	1,050,759	5,529,922	6,580,681	6,699,801	315,296	2033

Column 1 Based on Calendar year  
 Column 2 revised in 2001 to reflect deepening and additional space to the south  
 Column 2 updated in 2002 using current capping plan  
 Column 3 revised in 2006 to reflect actual landfilled values (recycled material was removed from totals)  
 Columns 5 & 6 updated in 2007 using 2007 Dollars

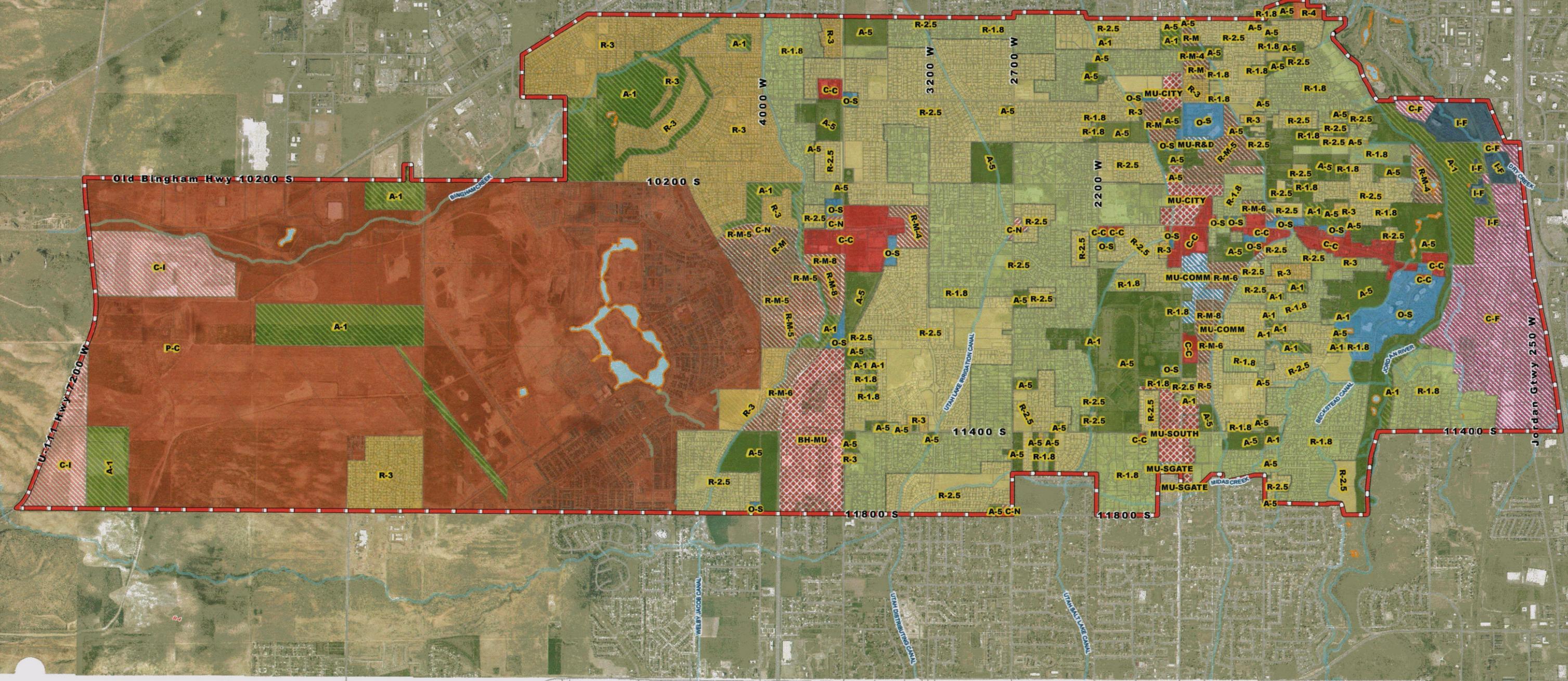
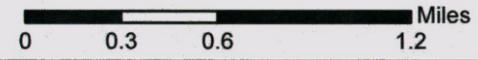
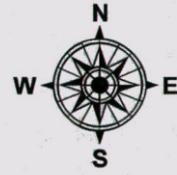
Tonnage for 2006 included the Daybreak transfer from an abandoned "dump"

***APPENDIX E-***

***FUTURE LAND USE***

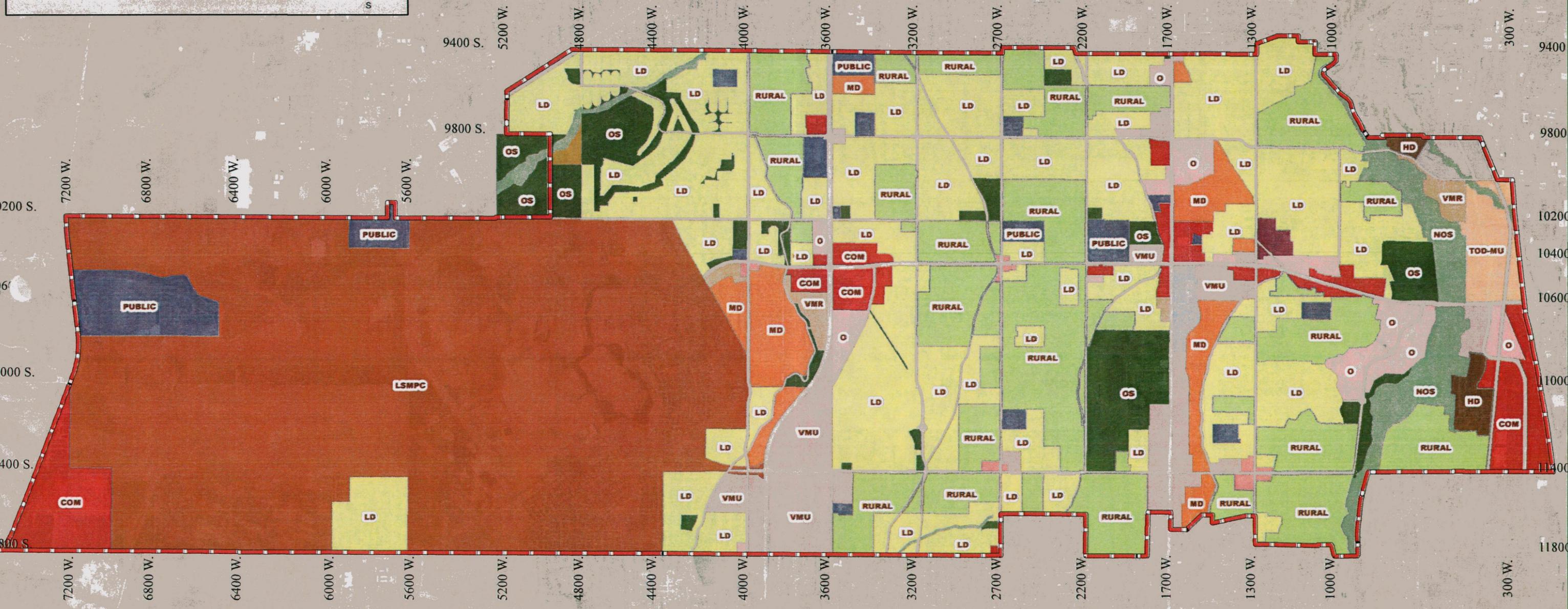
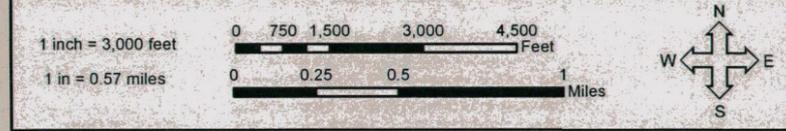
# SOUTH JORDAN

## Official Zoning Map

# CITY OF SOUTH JORDAN - Future Land Use Map

CITY BOUNDARY	HD - HIGH DENSITY RESIDENTIAL (UP TO 20 UNITS / ACRE)
TC-MU - TOWN CENTER MIXED USE	LSMPC - LARGE SCALE MASTER PLANNED COMMUNITY
COM - COMMERCIAL	VMR - VILLAGE MIXED RESIDENTIAL
VM - VILLAGE COMMERCIAL	NOS - NATURAL OPEN SPACE
OFFICE USE	OS - OPEN SPACE
J - VILLAGE MIXED USE	PUBLIC - PUBLIC USE
RURAL - RURAL RESIDENTIAL (UP TO 1.8 UNITS / ACRE)	HIST - HISTORICAL AREA
LD - LOW DENSITY RESIDENTIAL (UP TO 3 UNITS / ACRE)	TOD-MU - TRANSIT ORIENTED DEVELOPMENT / MIXED USE
MD - MEDIUM DENSITY RESIDENTIAL (UP TO 8 UNITS / ACRE)	IND - INDUSTRIAL PARKWAY
MHD - MEDIUM HIGH DENSITY RESIDENTIAL (UP TO 12 UNITS / ACRE)	



## ***APPENDIX F***

### ***FINANCIAL ASSURANCE***



## Statement of Account

October 1, 2009 Through December 31, 2009

**Trans-Jordan Cities/Dept Enviro Quality**

**Account Number : 8521000**

**Trans-Jordan Cities**

**Attn: James Scott**

**P. O. Box 95610**

**South Jordan, UT 84095-0610**

Please contact your administrator - Denisha Harris (801) 844-7083  
with any questions concerning your account.

***Confidential And Privileged Information***

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**Disclosures and Other Information**

It is important for you to review the enclosed data and direct any questions to your account manager(s)

**Investment Brokerage Services-** Customers with account relationships may select brokerage services from any source. In the event that a customer does not direct brokerage services, trade orders will be processed at institutional rates utilizing the best execution possible. This may include affiliate divisions of the bank, i.e., Zions Investment Securities Inc. (ZISI) and Zions First National Bank Capital Markets Group (CMG), which are wholly owned subsidiaries of Zions Bancorporation.

**Year-to-date income** information reflects trust accounting income and in most cases cannot be used for income tax purposes. It does not necessarily reflect the taxable nature of the income. You will receive annual tax information that will advise you on the taxability of the amounts you should include on your tax return. Estimated income is based on current market values and returns as of the statement date. Changes in asset composition may change these estimates and are not a guarantee of income.

**Pricing-** Securities prices may vary from actual liquidation value. Prices should only be used as a general guide to portfolio value. Prices are received from various pricing services. However, pricing services are sometimes unable to provide timely information. Where pricing sources are not readily available, particularly on certain debt securities, estimated prices may be generated by a matrix system taking various factors into consideration. Where securities have not been priced, such securities have not been included in the Asset Valuation information at the beginning of this statement.

**Mutual Funds** involve financial risk and could result in principal loss.

**California Accounts Only:**

California probate code section 16063 requires that certain information be supplied to parties interested in accounts where the bank acts as trustee or co-trustee. Our account statements supply the required information. In addition, we are required to advise beneficiaries of the following:  
"The recipient of the account may petition the court pursuant to probate code section 17200 to obtain a court review of the account and of the acts of the trustee. Claims against the trustee for breach of trust may not be made after expiration of three (3) years from the date the beneficiary receives an account or report disclosing facts giving rise to the claim."

**Utah Accounts Only:**

Section 75-7-1005, Subsection (1) of the Utah Uniform Trust Code (as amended), states that "A beneficiary may not commence a proceeding against a trustee for breach of trust more than six months after the date that the beneficiary or a person who may represent and bind the beneficiary was sent a report that adequately disclosed the existence of a potential claim for breach of trust and informed the beneficiary of the time allowed for commencing a proceeding." This statement or report is intended to supply you with the required information for you to exercise your right under this section of the Utah Uniform Trust Code. If Subsection (1) does not apply, a judicial proceeding by a beneficiary against a trustee for breach of trust must be commenced within one year after the first to occur of: (a) the removal, resignation, or death of the trustee; (b) the termination of the beneficiary's interest in the trust, or (c) the termination of the trust. Section 75-7-1005 does not preclude an action to recover for fraud or misrepresentation related to this report.

**Unlawful Internet Gambling Act (Reg GG):**

In compliance with Reg GG, the Bank and its affiliates will not process transactions derived from Internet bets or wagers where such bet or wager is unlawful under Federal or State law in the State or Tribal lands in which it is initiated, received, or otherwise made. The Bank and its affiliates have elected to not offer accounts to organizations that offer or sponsor Internet gambling. Commercial accounts receiving or processing Internet gambling transactions are subject to closures.

# Account Summary

<i>Beginning Market Value</i>		\$ 4,446,439.84
<i>Receipts</i>		
Cash Deposits	0.00	
Asset Deposits	0.00	
Total Receipts		0.00
<i>Payments To/For Beneficiaries</i>		
Disbursements	0.00	
Withdrawals and Distributions	0.00	
Administrative Expenses	0.00	
Total Disbursements		0.00
<i>Investment Income</i>		
Tax Free Income	0.00	
Interest Income	20,925.63	
Dividends	0.00	
Rents	0.00	
Other Income	0.00	
Total Investment Income		20,925.63
<i>Investment Change</i>	-21,895.65	
Total Investment Change		-21,895.65
<i>Ending Market Value</i>		\$ 4,445,469.82

# Portfolio Summary

December 31, 2009

	Portfolio %	Cost Basis	Market Value	Estimated Ann Inc	Current Yield
Govt. Obligations	78.76%	3,449,086.25	3,501,149.90	105,836.25	3.02%
Cash & Equivalents	21.24%	949,696.07	944,319.92	12,064.97	1.28%
<b>Total Portfolio</b>	<b>100.00 %</b>	<b>4,398,782.32</b>	<b>4,445,469.82</b>	<b>117,901.22</b>	<b>2.65%</b>
<b>Net Cash</b>			<b>0.00</b>		
<b>Total Market Value</b>			<b>4,445,469.82</b>		

Portfolio Components May Not Equal 100% Due To Rounding

#1 4,398,782.32  
 4,377,324.19  


---

 F 21,458.13  
 11600 21,458.13  
 42250 21,458.13  
  
 #2 4,445,469.82  
 4,398,782.32  


---

 46,687.50  
 69,115.65  
 - 22,428.15  


---

 = 46,687.50  
 55352 22,428.15  
 11610 22,428.15

## Summary Of Investment Holdings

Shares or Par Value	Investment Category			Cost Basis	Unit Value	Market Value	Estimated Ann Inc	Curr Yield	% Port
<b><u>U.S. Obligations</u></b>									
150,000	FHLB	4.210%	03/02/2010	155,692.50	100.66	150,984.38	6,315.00	4.18%	3.40%
350,000	FFCB	2.250%	01/12/2012	350,000.00	100.03	350,109.38	7,875.00	2.25%	7.88%
200,000	FFCB	2.350%	03/19/2012	200,000.00	100.38	200,750.00	4,700.00	2.34%	4.52%
150,000	FHLB	4.400%	07/09/2012	150,000.00	102.00	153,000.00	6,600.00	4.31%	3.44%
200,000	FHLB	2.050%	09/21/2012	200,000.00	100.41	200,812.50	4,100.00	2.04%	4.52%
250,000	FFCB	1.850%	09/28/2012	249,750.00	100.09	250,234.38	4,625.00	1.85%	5.63%
100,000	FFCB	2.000%	10/22/2012	99,875.00	99.75	99,750.00	2,000.00	2.01%	2.24%
150,000	FHLB	4.000%	09/06/2013	151,146.00	106.19	159,281.25	6,000.00	3.77%	3.58%
250,000	FHLB	4.000%	09/12/2013	250,000.00	106.19	265,468.75	10,000.00	3.77%	5.97%
150,000	FFCB	2.700%	10/07/2013	149,887.50	99.81	149,718.75	4,050.00	2.71%	3.37%
<b>Totals</b>				<b>1,956,351.00</b>		<b>1,980,109.39</b>	<b>56,265.00</b>	<b>2.84%</b>	<b>44.55%</b>
<b><u>Government Agencies</u></b>									
400,000	FNMA	4.750%	12/15/2010	397,904.00	103.94	415,750.00	19,000.00	4.57%	9.35%
75,000	FHLMC	4.125%	02/24/2011	74,831.25	103.75	77,812.50	3,093.75	3.98%	1.75%
250,000	FNMA	2.125%	09/09/2011	250,000.00	100.25	250,625.00	5,312.50	2.12%	5.64%
150,000	FHLMC	2.000%	10/14/2011	150,000.00	100.34	150,514.95	3,000.00	1.99%	3.39%
450,000	FHLMC	3.050%	08/27/2013	450,000.00	101.07	454,803.30	13,725.00	3.02%	10.23%
170,000	FHLMC	3.200%	12/30/2013	170,000.00	100.90	171,534.76	5,440.00	3.17%	3.86%
<b>Totals</b>				<b>1,492,735.25</b>		<b>1,521,040.51</b>	<b>49,571.25</b>	<b>3.26%</b>	<b>34.22%</b>
<b><u>Temp Invstmnt Fnds - Taxable</u></b>									
149,696.07	Federated Treasury Ob #68 (TOIXX)			149,696.07	100.00	149,696.07	14.97	0.01%	3.37%
<b>Totals</b>				<b>149,696.07</b>		<b>149,696.07</b>	<b>14.97</b>	<b>0.01%</b>	<b>3.37%</b>
<b><u>Certificates Of Dep - Other</u></b>									
150,000	Ally Bank CD	0.900%	09/10/2010	150,000.00	1.00	150,000.00	1,350.00	0.90%	3.37%

## Summary Of Investment Holdings

Shares or Par Value	Investment Category			Cost Basis	Unit Value	Market Value	Estimated Ann Inc	Curr Yield	% Port
150,000	American Express Bank CD	1.750%	11/25/2011	150,000.00	99.39	149,088.15	2,625.00	1.76%	3.35%
	American Express Bank CD	1.75%	11/25/11						
150,000	American Express Centurion C	1.750%	11/25/2011	150,000.00	99.39	149,088.15	2,625.00	1.76%	3.35%
	American Express Centurion CD	1.75%	11/25/2011						
100,000	American Express Centurion B	1.700%	12/02/2011	100,000.00	99.25	99,250.80	1,700.00	1.71%	2.23%
250,000	Wright Express CD	1.500%	12/02/2011	250,000.00	98.88	247,196.75	3,750.00	1.52%	5.56%
<b>Totals</b>				<b>800,000.00</b>		<b>794,623.85</b>	<b>12,050.00</b>	<b>1.52%</b>	<b>17.86%</b>
<b>Total Investments</b>				<b>4,398,782.32</b>		<b>4,445,469.82</b>	<b>117,901.22</b>	<b>2.65%</b>	<b>100.00%</b>
<b>Plus Net Cash</b>						<b>0.00</b>			
<b>Total Market Value</b>						<b>4,445,469.82</b>			

***APPENDIX G***

*TITLE V OPERATING PERMIT.*



state of Utah

JON M. HUNTSMAN, JR.  
*Governor*

GARY HERBERT  
*Lieutenant Governor*

Department of  
Environmental Quality

William J. Sinclair  
*Acting Executive Director*

DIVISION OF AIR QUALITY  
Cheryl Heying  
*Director*

11977

## Title V Operating Permit

**PERMIT NUMBER:** 3500535002

**DATE OF PERMIT:** February 17, 2009

**Date of Last Revision:** February 17, 2009

This Operating Permit is issued to, and applies to the following:

**Name of Permittee:**

Trans-Jordan Cities  
10873 S. 7200 W.  
PO Box 95610  
South Jordan UT 84095-0610

**Permitted Location:**

Trans-Jordan Cities: Trans-Jordan Landfill  
10873 South 7200 West  
South Jordan UT 84095-0610

UTM coordinates: 410,879 m Easting, 4,490,492 m Northing  
SIC code: 4953 (Refuse Systems)

### UTAH AIR QUALITY BOARD

By:

\_\_\_\_\_  
M. Cheryl Heying, Executive Secretary

Prepared By:

\_\_\_\_\_  
James Chapman

## **ENFORCEABLE DATES AND TIMELINES**

The following dates or timeframes are referenced in  
Section I: General Provisions of this permit.

Annual Certification Due: April 15 and on that date of every calendar year that this permit is in force.

Renewal application due: August 17, 2013

Permit expiration date: February 17, 2014

Definition of "prompt": written notification within 14 days.

### **ABSTRACT**

Trans-Jordan Cities operates the Trans-Jordan Landfill, a municipal solid waste (MSW) landfill source located in Salt Lake County, Utah. The facility accepts municipal and commercial solid waste. Three 1,600 Kw generators are installed to burn landfill gas emissions. Trans-Jordan Landfill is a Title V source and is subject to 40 CFR 60 (New Source Performance Standards, or NSPS), Subpart A - General Provisions and to Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills. Trans-Jordan Landfill is also subject to Subpart M of the National Emission Standards for Hazardous Air Pollutants (NESHAP) -National Emission Standards for Asbestos: Standards for Active Waste Disposal Sites (40 CFR 61.154) as well as to Subpart A - General Provisions of the National Emission Standards for Hazardous Air Pollutants (NESHAP).

## OPERATING PERMIT HISTORY

<b>Permit/Activity</b>	<b>Date Issued</b>	<b>Recorded Changes</b>
Title V renewal application (Project #OPP0119770003)	2/17/2009	Renewal of Title V Permit and Incorporation of requirements from new AO (DAQE-AN0119770006-08) for installation of three landfill gas fueled engines.
Title V initial application (Project #OPP0119770001)	5/21/2002	Title V Issued

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**Issued under authority of Utah Code Ann. Section 19-2-104 and 19-2-109.1, and in accordance with Utah Administrative Code R307-415 Operating Permit Requirements.**

All definitions, terms and abbreviations used in this permit conform to those used in Utah Administrative Code R307-101 and R307-415 (Rules), and 40 Code of Federal Regulations (CFR), except as otherwise defined in this permit. Unless noted otherwise, references cited in the permit conditions refer to the Rules.

Where a permit condition in Section I, General Provisions, partially recites or summarizes an applicable rule, the full text of the applicable portion of the rule shall govern interpretations of the requirements of the rule. In the case of a conflict between the Rules and the permit terms and conditions of Section II, Special Provisions, the permit terms and conditions of Section II shall govern except as noted in Provision I.M, Permit Shield.

**SECTION I: GENERAL PROVISIONS**

**I.A Federal Enforcement.**

All terms and conditions in this permit, including those provisions designed to limit the potential to emit, are enforceable by the EPA and citizens under the Clean Air Act of 1990 (CAA) except those terms and conditions that are specifically designated as "State Requirements". (R307-415-6b)

**I.B Permitted Activity(ies).**

Except as provided in R307-415-7b(1), the permittee may not operate except in compliance with this permit. (See also Provision I.E, Application Shield)

**I.C Duty to Comply.**

**I.C.1** The permittee must comply with all conditions of the operating permit. Any permit noncompliance constitutes a violation of the Air Conservation Act and is grounds for any of the following: enforcement action; permit termination; revocation and reissuance; modification; or denial of a permit renewal application. (R307-415-6a(6)(a))

**I.C.2** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. (R307-415-6a(6)(b))

**I.C.3** The permittee shall furnish to the Executive Secretary, within a reasonable time, any information that the Executive Secretary may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. Upon request, the permittee shall also furnish to the Executive Secretary copies of records required to be kept by this permit or, for information claimed to be confidential, the permittee may furnish such records directly to the EPA along with a claim of confidentiality. (R307-415-6a(6)(e))

**I.C.4** This permit may be modified, revoked, reopened, and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance shall not stay any permit condition, except as provided under R307-415-7f(1) for minor permit modifications. (R307-415-6a(6)(c))

**I.D Permit Expiration and Renewal.**

I.D.1 This permit is issued for a fixed term of five years and expires on the date shown under "Enforceable Dates and Timelines" at the front of this permit. (R307-415-6a(2))

I.D.2 Application for renewal of this permit is due on or before the date shown under "Enforceable Dates and Timelines" at the front of this permit. An application may be submitted early for any reason. (R307-415-5a(1)(c))

I.D.3 An application for renewal submitted after the due date listed in I.D.2 above shall be accepted for processing, but shall not be considered a timely application and shall not relieve the permittee of any enforcement actions resulting from submitting a late application. (R307-415-5a(5))

I.D.4 Permit expiration terminates the permittee's right to operate unless a timely and complete renewal application is submitted consistent with R307-415-7b (see also Provision I.E, Application Shield) and R307-415-5a(1)(c) (see also Provision I.D.2). (R307-415-7c(2))

**I.E Application Shield.**

If the permittee submits a timely and complete application for renewal, the permittee's failure to have an operating permit will not be a violation of R307-415, until the Executive Secretary takes final action on the permit renewal application. In such case, the terms and conditions of this permit shall remain in force until permit renewal or denial. This protection shall cease to apply if, subsequent to the completeness determination required pursuant to R307-415-7a(3), and as required by R307-415-5a(2), the applicant fails to submit by the deadline specified in writing by the Executive Secretary any additional information identified as being needed to process the application. (R307-415-7b(2))

**I.F Severability.**

In the event of a challenge to any portion of this permit, or if any portion of this permit is held invalid, the remaining permit conditions remain valid and in force. (R307-415-6a(5))

**I.G Permit Fee.**

I.G.1 The permittee shall pay an annual emission fee to the Executive Secretary consistent with R307-415-9. (R307-415-6a(7))

I.G.2 The emission fee shall be due on October 1 of each calendar year or 45 days after the source receives notice of the amount of the fee, whichever is later. (R307-415-9(4)(a))

**I.H No Property Rights.**

This permit does not convey any property rights of any sort, or any exclusive privilege. (R307-415-6a(6)(d))

**I.I Revision Exception.**

No permit revision shall be required, under any approved economic incentives, marketable permits, emissions trading and other similar programs or processes for changes that are provided for in this permit. (R307-415-6a(8))

**I.J Inspection and Entry.**

I.J.1 Upon presentation of credentials and other documents as may be required by law, the permittee shall allow the Executive Secretary or an authorized representative to perform any of the following:

- I.J.1.a Enter upon the permittee's premises where the source is located or emissions related activity is conducted, or where records are kept under the conditions of this permit. (R307-415-6c(2)(a))
- I.J.1.b Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit. (R307-415-6c(2)(b))
- I.J.1.c Inspect at reasonable times any facilities, equipment (including monitoring and air pollution control equipment), practice, or operation regulated or required under this permit. (R307-415-6c(2)(c))
- I.J.1.d Sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with this permit or applicable requirements. (R307-415-6c(2)(d))
- I.J.2 Any claims of confidentiality made on the information obtained during an inspection shall be made pursuant to Utah Code Ann. Section 19-1-306. (R307-415-6c(2)(e))

**I.K Certification.**

Any application form, report, or compliance certification submitted pursuant to this permit shall contain certification as to its truth, accuracy, and completeness, by a responsible official as defined in R307-415-3. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. (R307-415-5d)

**I.L Compliance Certification.**

Permittee shall submit to the Executive Secretary an annual compliance certification, certifying compliance with the terms and conditions contained in this permit, including emission limitations, standards, or work practices. This certification shall be submitted no later than the date shown under "Enforceable Dates and Timelines" at the front of this permit; and that date each year following until this permit expires. The certification shall include all the following (permittee may cross-reference this permit or previous reports): (R307-415-6c(5))

- I.L.1.a The identification of each term or condition of this permit that is the basis of the certification;
- I.L.1.b The identification of the methods or other means used by the permittee for determining the compliance status with each term and condition during the certification period, and whether such methods or other means provide continuous or intermittent data. Such methods and other means shall include, at a minimum, the monitoring and related recordkeeping and reporting requirements in this permit. If necessary, the permittee also shall identify any other material information that must be included in the certification to comply with section 113(c)(2) of the Act, which prohibits knowingly making a false certification or omitting material information;
- I.L.1.c The status of compliance with the terms and conditions of the permit for the period covered by the certification, based on the method or means designated in Provision I.L.1.b. The certification shall identify each deviation and take it into account in the compliance certification. The certification shall also identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance as defined under 40 CFR Part 64 occurred; and
- I.L.1.d Such other facts as the Executive Secretary may require to determine the compliance status.

I.L.2 The permittee shall also submit all compliance certifications to the EPA, Region VIII, at the following address or to such other address as may be required by the Executive Secretary: (R307-415-6c(5)(d))

Environmental Protection Agency, Region VIII  
Office of Enforcement, Compliance and Environmental Justice  
(mail code 8ENF)  
1595 Wynkoop Street  
Denver, CO 80202-1129

**I.M Permit Shield.**

I.M.1 Compliance with the provisions of this permit shall be deemed compliance with any applicable requirements as of the date of this permit, provided that:

I.M.1.a Such applicable requirements are included and are specifically identified in this permit, or (R307-415-6f(1)(a))

I.M.1.b Those requirements not applicable to the source are specifically identified and listed in this permit. (R307-415-6f(1)(b))

I.M.2 Nothing in this permit shall alter or affect any of the following:

I.M.2.a The emergency provisions of Utah Code Ann. Section 19-1-202 and Section 19-2-112, and the provisions of the CAA Section 303. (R307-415-6f(3)(a))

I.M.2.b The liability of the owner or operator of the source for any violation of applicable requirements under Utah Code Ann. Section 19-2-107(2)(g) and Section 19-2-110 prior to or at the time of issuance of this permit. (R307-415-6f(3)(b))

I.M.2.c The applicable requirements of the Acid Rain Program, consistent with the CAA Section 408(a). (R307-415-6f(3)(c))

I.M.2.d The ability of the Executive Secretary to obtain information from the source under Utah Code Ann. Section 19-2-120, and the ability of the EPA to obtain information from the source under the CAA Section 114. (R307-415-6f(3)(d))

**I.N Emergency Provision.**

I.N.1 An "emergency" is any situation arising from sudden and reasonably unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under this permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventive maintenance, careless or improper operation, or operator error. (R307-415-6g(1))

I.N.2 An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if the affirmative defense is demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:

I.N.2.a An emergency occurred and the permittee can identify the causes of the emergency. (R307-415-6g(3)(a))

I.N.2.b The permitted facility was at the time being properly operated. (R307-415-6g(3)(b))

- I.N.2.c During the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in this permit. (R307-415-6g(3)(c))
- I.N.2.d The permittee submitted notice of the emergency to the Executive Secretary within two working days of the time when emission limitations were exceeded due to the emergency. This notice must contain a description of the emergency, any steps taken to mitigate emissions, and corrective actions taken. This notice fulfills the requirement of Provision I.S.2.c below. (R307-415-6g(3)(d))
- I.N.3 In any enforcement proceeding, the permittee seeking to establish the occurrence of an emergency has the burden of proof. (R307-415-6g(4))
- I.N.4 This emergency provision is in addition to any emergency or upset provision contained in any other section of this permit. (R307-415-6g(5))
- I.O **Operational Flexibility.**  
Operational flexibility is governed by R307-415-7d(1).
- I.P **Off-permit Changes.**  
Off-permit changes are governed by R307-415-7d(2).
- I.Q **Administrative Permit Amendments.**  
Administrative permit amendments are governed by R307-415-7e.
- I.R **Permit Modifications.**  
Permit modifications are governed by R307-415-7f.
- I.S **Records and Reporting.**
  - I.S.1 Records.
    - I.S.1.a The records of all required monitoring data and support information shall be retained by the permittee for a period of at least five years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records, all original strip-charts or appropriate recordings for continuous monitoring instrumentation, and copies of all reports required by this permit. (R307-415-6a(3)(b)(ii))
    - I.S.1.b For all monitoring requirements described in Section II, Special Provisions, the source shall record the following information, where applicable: (R307-415-6a(3)(b)(i))
      - I.S.1.b.1 The date, place as defined in this permit, and time of sampling or measurement.
      - I.S.1.b.2 The date analyses were performed.
      - I.S.1.b.3 The company or entity that performed the analyses.
      - I.S.1.b.4 The analytical techniques or methods used.
      - I.S.1.b.5 The results of such analyses.

- I.S.1.b.6 The operating conditions as existing at the time of sampling or measurement.
- I.S.1.c Additional record keeping requirements, if any, are described in Section II, Special Provisions.
- I.S.2 Reports.
- I.S.2.a Monitoring reports shall be submitted to the Executive Secretary every six months, or more frequently if specified in Section II. All instances of deviation from permit requirements shall be clearly identified in the reports. (R307-415-6a(3)(c)(i))
- I.S.2.b All reports submitted pursuant to Provision I.S.2.a shall be certified by a responsible official in accordance with Provision I.K of this permit. (R307-415-6a(3)(c)(i))
- I.S.2.c The Executive Secretary shall be notified promptly of any deviations from permit requirements including those attributable to upset conditions as defined in this permit, the probable cause of such deviations, and any corrective actions or preventative measures taken. Prompt, as used in this condition, shall be defined as written notification within the number of days shown under "Enforceable Dates and Timelines" at the front of this permit.. Deviations from permit requirements due to unavoidable breakdowns shall be reported in accordance with the provisions of R307-107. (R307-415-6a(3)(c)(ii))
- I.S.3 Notification Addresses.
- I.S.3.a All reports, notifications, or other submissions required by this permit to be submitted to the Executive Secretary are to be sent to the following address or to such other address as may be required by the Executive Secretary:
- Utah Division of Air Quality  
P.O. Box 144820  
Salt Lake City, UT 84114-4820  
Phone: 801-536-4000
- I.S.3.b All reports, notifications or other submissions required by this permit to be submitted to the EPA should be sent to one of the following addresses or to such other address as may be required by the Executive Secretary:
- For annual compliance certifications:
- Environmental Protection Agency, Region VIII  
Office of Enforcement, Compliance and Environmental Justice  
(mail code 8ENF)  
1595 Wynkoop Street  
Denver, CO 80202-1129
- For reports, notifications, or other correspondence related to permit modifications, applications, etc.:
- Environmental Protection Agency, Region VIII  
Office of Partnerships & Regulatory Assistance Air & Radiation Program (mail code 8P-AR)  
1595 Wynkoop Street  
Denver, CO 80202-1129  
Phone: 303-312-6440

**LT Reopening for Cause.**

I.V A permit shall be reopened and revised under any of the following circumstances:

I.T.1.a New applicable requirements become applicable to the permittee and there is a remaining permit term of three or more years. No such reopening is required if the effective date of the requirement is later than the date on which this permit is due to expire, unless the terms and conditions of this permit have been extended pursuant to R307-415-7c(3), application shield. (R307-415-7g(1)(a))

I.T.1.b The Executive Secretary or EPA determines that this permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of this permit. (R307-415-7g(1)(c))

I.T.1.c EPA or the Executive Secretary determines that this permit must be revised or revoked to assure compliance with applicable requirements. (R307-415-7g(1)(d))

I.T.1.d Additional applicable requirements are to become effective before the renewal date of this permit and are in conflict with existing permit conditions. (R307-415-7g(1)(e))

I.T.2 Additional requirements, including excess emissions requirements, become applicable to a Title IV affected source under the Acid Rain Program. Upon approval by EPA, excess emissions offset plans shall be deemed to be incorporated into this permit. (R307-415-7g(1)(b))

I.T.3 Proceedings to reopen and issue a permit shall follow the same procedures as apply to initial permit issuance and shall affect only those parts of this permit for which cause to reopen exists. (R307-415-7g(2))

**I.U Inventory Requirements.**

An emission inventory shall be submitted in accordance with the procedures of R307-150, Emission Inventories. (R307-150)

**I.V Title IV and Other, More Stringent Requirements**

Where an applicable requirement is more stringent than an applicable requirement of regulations promulgated under Title IV of the Act, Acid Deposition Control, both provisions shall be incorporated into this permit. (R307-415-6a(1)(b))

## **SECTION II: SPECIAL PROVISIONS**

- II.A **Emission Unit(s) Permitted to Discharge Air Contaminants.**  
(R307-415-4(3)(a) and R307-415-4(4))
- II.A.1 **Permitted Source (Source-wide)**
- II.A.2 **Municipal Solid Waste Landfill**  
Class I Sanitary Landfill with a 10.5 million Mg capacity. Opened in 1958, lateral expansion in 1997/98. NSPS WWW and NESHAP M applies to this unit.
- II.A.3 **Miscellaneous Tanks**  
2 above ground tanks. 1,000 gallon unleaded gasoline and 3,000 gallon diesel. No unit-specific applicable requirements.
- II.A.4 **Cold Cleaning Unit**  
Parts vapor cleaner, serviced by off-site manufacturer.
- II.A.5 **Emergency Generators**  
Diesel generators used for emergency back-up and light poles, less than 50 Hp. No unit-specific applicable requirements.
- II.A.6 **Landfill Gas Engines**  
Three 1,600 Kw landfill gas only fired engines.
- II.A.7 **Landfill Gas Bypass Flare**  
Emergency backup flare, candle stick type flare
- II.A.8 **Composting Operation**  
Green waste is separated and composted. No unit-specific applicable requirements.
- II.B **Requirements and Limitations**

The following emission limitations, standards, and operational limitations apply to the permitted facility as indicated:

II.B.1 **Conditions on Permitted Source (Source-wide).**

II.B.1.a **Condition:**

Visible emissions caused by fugitive dust shall not exceed 10% at the property boundary, and 20% onsite except during periods when wind speeds exceed 25 miles per hour and control measures in the most recently approved fugitive dust control plan are being taken. [Authority granted under (R307-309-3(1)); condition originated in R307-309-5].

II.B.1.a.1

**Monitoring:**

In lieu of monitoring via visible emissions observations, adherence to the most recently approved fugitive dust control plan shall be maintained in order to demonstrate that appropriate measures are being implemented to control fugitive dust.

II.B.1.a.2

**Recordkeeping:**

Records of measures taken to control fugitive dust shall be maintained to demonstrate adherence to the most recently approved fugitive dust control plan. If wind speeds are measured to establish an exception from the above visible emissions limits, records of those measurements shall be maintained. Records shall be maintained as described in Provision I.S.1 of this permit.

II.B.1.a.3

**Reporting:**

There are no reporting requirements for this provision except those specified in Section I of this permit.

II.B.1.b

**Condition:**

Visible emissions shall be no greater than 20 percent opacity. [Authority granted under R307-201-3; condition originated in R307-201-3].

II.B.1.b.1

**Monitoring:**

A visual opacity survey of each affected emission unit shall be performed on a quarterly basis by an individual trained on the observation procedures of 40 CFR 60, Appendix A, Method 9. If visible emissions other than steam are observed from an emission unit, an opacity determination of that emission unit shall be performed by a certified observer within 24 hours of the initial survey. The opacity determination shall be performed in accordance with 40 CFR 60, Appendix A, Method 9 for point sources, and in accordance with 58 FR 61640 Method 203C for fugitive emission sources.

II.B.1.b.2

**Recordkeeping:**

The permittee shall record the date of each visual opacity survey and keep a list of the emission points checked during the visual opacity survey. The permittee shall also keep a log of the following information for each observed visual emission: date and time visual emissions observed, emission point location and description, time and date of opacity test, and percent opacity. The records required by this provision and all data required by 40 CFR 60, Appendix A, Method 9 shall be maintained in accordance with Provision I.S.1 of this permit.

II.B.1.b.3

**Reporting:**

There are no reporting requirements for this provision except those specified in Section I of this permit.

II.B.1.c

**Condition:**

Sulfur content of any fuel oil combusted shall be no greater than 0.85 lb/MMBtu heat input. [Authority granted under R307-203-1; condition originated in R307-203-1].

II.B.1.c.1

**Monitoring:**

For each delivery of oil, the permittee shall either:

(1) Determine the fuel sulfur content expressed as lb/MMBtu in accordance with the methods of the American Society for Testing Materials (ASTM) and Equation 1; or

(2) Inspect documentation provided by the vendor that has demonstrated compliance with (1) above, or indirectly demonstrates compliance with this provision.

Equation 1:

Fuel Sulfur Content, lb/MMBtu = [(Weight percent sulfur/100) x Density (lb/gal)] / [(gross heating value (Btu/gal)) x (1 MMBtu/1,000,000 Btu)].

II.B.1.c.2

**Recordkeeping:**

Results of monitoring shall be maintained as described in Provision I.S.1 of this permit.

II.B.1.c.3

**Reporting:**

There are no reporting requirements for this provision except those specified in Section I of this permit.

II.B.1.d

**Condition:**

The permittee shall comply with the applicable requirements for recycling and emission reduction for class I and class II refrigerants pursuant to 40 CFR 82, Subpart F - Recycling and Emissions Reduction. [Authority granted under 40 CFR 82.150(b); condition originated in 40 CFR 82 Subpart F].

II.B.1.d.1

**Monitoring:**

Records required for this permit condition will serve as monitoring.

II.B.1.d.2

**Recordkeeping:**

All records required in 40 CFR 82, Subpart F shall be maintained consistent with the requirements of Provision S.1 in Section I of this permit.

II.B.1.d.3

**Reporting:**

All reports required in 40 CFR 82, Subpart F shall be submitted as required. The permittee shall certify, in the annual compliance statement required in Section I of this permit, its compliance status with the requirements of 40 CFR 82, Subpart F. There are no additional reporting requirements except as outlined in Section I of this permit.

II.B.1.e

**Condition:**

Records shall be maintained of the material (salt, crushed slag, or sand) applied to the roads. [Authority granted under R307-307; condition originated in R307-307].

II.B.1.e.1

**Monitoring:**

Records required for this permit condition will serve as monitoring.

**II.B.1.e.2 Recordkeeping:**

The following records shall be maintained as outlined in Provision I.S.1 of this permit:

For Salt - the quantity applied, and the percent by weight of insoluble solids in the salt.

For Sand or Crushed Slag - the quantity applied and the percent by weight of fine material which passes the number 200 sieve in a standard gradation analysis.

**II.B.1.e.3 Reporting:**

There are no reporting requirements for this provision except those specified in Section I of this permit.

**II.B.2 Conditions on Municipal Solid Waste Landfill.**

**II.B.2.a Condition:**

(a) The permittee shall calculate a nonmethane organic compounds (NMOC) emission rate for the landfill using the procedures specified in monitoring. The NMOC emission rate shall be recalculated annually, except as provided in paragraph (b)(1)(i) of reporting.

(1) If the calculated NMOC emission rate is less than 50 megagrams per year, the permittee shall:

(i) Submit an annual emission report to the Executive Secretary, except as provided for in paragraph (b)(1)(i) of reporting; and

(ii) Recalculate the NMOC emission rate annually using the procedures specified in (a) of monitoring until such time as the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, or the landfill is closed.

(A) If the NMOC emission rate, upon recalculation required in paragraph (a)(1)(ii), is equal to or greater than 50 megagrams per year, the permittee shall install a collection and control system in compliance with 40 CFR 60.752(b)(2).

(B) If the landfill is permanently closed, a closure notification shall be submitted to the Executive Secretary as provided for in (d) of reporting.

(2) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, the permittee shall:

(i) Submit a collection and control system design plan prepared by a professional engineer to the Executive Secretary within 1 year:

(A) The collection and control system as described in the plan shall meet the design requirements of paragraph 40 CFR 60.752(b)(2)(ii).

(B) The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of 40 CFR 60.753 through 60.758 proposed by the permittee.

(C) The collection and control system design plan shall either conform with specifications for active collection systems in 40 CFR 60.759 or include a demonstration to the Executive Secretary's satisfaction of the sufficiency of the alternative provisions to 40 CFR 60.759.

(ii) The permittee shall install a collection and control system capable of meeting emissions standards in 40 CFR 60.750 within 30 months of the date when the landfill has an emission rate of NMOC of 50 megagrams per year or more.

(b) When the MSW landfill is closed, the permittee is no longer subject to the requirement to maintain an operating permit under 40 CFR 70 for the landfill if the landfill is not otherwise subject to the requirements of either 40 CFR 70 and if either of the following conditions are met:

(1) The landfill was never subject to the requirement for a control system under paragraph (a)(2);  
or

(2) The permittee meets the conditions for control system removal specified in 40 CFR 60.752(b)(2)(v). [40 CFR 60.752(d), Authority granted under 40 CFR 60.750; condition originated in 40 CFR 60.750].

## II.B.2.a.1

### Monitoring:

The permittee shall monitor the NMOC emission rate by using the equations in (a) and following the three tier process outlined in (b), (c), and (d).

(a) The permittee shall calculate the NMOC emission rate using either the equation provided in paragraph (a)(1) or the equation provided in paragraph (a)(2). Both equations may be used if the actual year to year solid waste acceptance rate is known, as specified in paragraph (a)(1) for part of the life of the landfill and the actual year to year solid waste acceptance rate is unknown, as specified in paragraph (a)(2), for part of the life of the landfill. The values to be used in both equations are 0.02 per year for k, 170 cubic meters per megagram for LO, and 4,000 parts per million by volume as hexane for the CNMOC. For either (a)(1) or (a)(2) below, the mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for Mi if documentation of the nature and amount of such wastes is maintained.

(1) The following equation shall be used if the actual year to year solid waste acceptance rate is known.

$$MNOC = \sum_{i=1}^n (k L_o M_i (e^{-kt_i}) (CNMOC) (3.6 \times 10^{-9}))$$

where,

MNOC=Total NMOC emission rate from the landfill, megagrams per year

k=methane generation rate constant, per year

Lo=methane generation potential, cubic meters per megagram solid waste

Mi=mass of solid waste in the ith section, megagrams

ti=age of the ith section, years

CNMOC=concentration of NMOC, parts per million by volume as hexane

$3.6 \times 10^{-9}$ =conversion factor

(2) The following alternative equation shall be used if incremental (tenths of one year) solid waste acceptance rate is known.

(Equation 2)

Where:

i = 1 year

j = one tenth of one year

MNOC=Total NMOC emission rate from the landfill, megagrams per year

k=methane generation rate constant, per year

Lo=methane generation potential, cubic meters per megagram solid waste

Mi=mass of solid waste in the ith section, megagrams

tij=age of the ith section, tenths

CNMOC=concentration of NMOC, parts per million by volume as hexane

$3.6 \times 10^{-9}$ =conversion factor

(b) Tier 1. The permittee shall compare the calculated NMOC mass emission rate to the standard of 50 megagrams per year.

(1) If the NMOC emission rate calculated in (a) is less than 50 megagrams per year, then the permittee shall submit an emission rate report as provided in paragraph (b)(1) of reporting, and shall recalculate the NMOC mass emission rate annually as required under paragraph (a)(1) of this condition.

(2) If the calculated NMOC emission rate is equal to or greater than 50 megagrams per year, then the permittee shall either comply with paragraph (a)(2) of this condition, or determine a site specific NMOC concentration and recalculate the NMOC emission rate using the procedures provided in (c).

(c) Tier 2. The permittee shall determine the site-specific NMOC concentration using the following sampling procedure.

The permittee shall install at least two sample probes per hectare of landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The sample probes should be located to avoid known areas of nondegradable solid waste.

The permittee shall collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using 40 CFR 60, Appendix A Method 25 or 25C. Method 18 of Appendix A may be used to analyze the samples collected by the Method 25 or 25C sampling procedure. Taking composite samples from different probes into a single canister is allowed; however, equal sample volumes must be taken from each probe. For each composite sample, the sampling rate, collection times, beginning and ending canister vacuums, or alternative volume measurements must be recorded to verify that composite volumes are equal. Composite sample volumes should not be less than one liter unless evidence can be provided to substantiate the accuracy of smaller volumes. Terminate compositing before the canister approaches ambient pressure where measurement accuracy diminishes.

If using Method 18, the permittee must identify all compounds in the sample and, as a minimum, test for those compounds published in the most recent Compilation of Air Pollutant Emission Factors (AP 42), minus carbon monoxide, hydrogen sulfide, and mercury. As a minimum, the instrument must be calibrated for each of the compounds on the list.

Convert the concentration of each Method 18 compound to CNMOC as hexane by multiplying by the ratio of its carbon atoms divided by six. If more than the required number of samples are taken, all samples must be used in the analysis. The permittee must divide the NMOC concentration from 40 CFR 60 Appendix A Method 25 or 25C by six to convert from CNMOC as carbon to CNMOC as hexane.

If the landfill has an active or passive gas removal system in place, Method 25 or 25C samples may be collected from these systems instead of surface probes provided the removal system can be shown to provide sampling as representative as the two sampling probe per hectare requirement. For active collection systems, samples may be collected from the common header pipe before the gas moving or condensate removal equipment. For these systems, a minimum of three samples must be collected from the header pipe.

(1) The permittee shall recalculate the NMOC mass emission rate using the equations provided in (a)(1) or (a)(2) of this monitoring section, using the average NMOC concentration from the collected samples instead of the default value in the equations provided in (a).

(2) If the resulting mass emission rate calculated using the site specific NMOC

concentration is equal to or greater than 50 megagrams per year, then the permittee shall either comply with paragraph (a)(2) of this condition, or determine the site specific methane generation rate constant and recalculate the NMOC emission rate using the site specific methane generation rate using the procedure specified in (d).

(3) If the resulting NMOC mass emission rate is less than 50 megagrams per year, the permittee shall submit a periodic estimate of the emission rate report as provided in paragraph (b)(1) of reporting and retest the site specific NMOC concentration every 5 years using the methods specified in monitoring.

(d) Tier 3. The site specific methane generation rate constant shall be determined using the procedures provided in 40 CFR 60, Appendix A, Method 2E . The permittee shall estimate the NMOC mass emission rate using equations in (a) and using a site specific methane generation rate constant  $k$ , and the site specific NMOC concentration as determined in (c) instead of the default values provided in (a). The permittee shall compare the resulting NMOC mass emission rate to the standard of 50 megagrams per year.

(1) If the NMOC mass emission rate as calculated using the site specific methane generation rate and concentration of NMOC is equal to or greater than 50 megagrams per year, the permittee shall comply with paragraph (a)(2) of this condition.

(2) If the NMOC mass emission rate is less than 50 megagrams per year, then the permittee shall submit a periodic emission rate report as provided in paragraph (b)(1) of reporting and shall recalculate the NMOC mass emission rate annually, as provided in paragraph (a)(1) of reporting using the equations in (a)(1) or (a)(2) and using the site specific methane generation rate constant and NMOC concentration obtained in (c). The calculation of the methane generation rate constant is performed only once, and the value obtained from this test shall be used in all subsequent annual NMOC emission rate calculations.

#### II.B.2.a.2

##### **Recordkeeping:**

(a) Except as provided in paragraph (a)(2)(i)(B) of this condition when subject to (a) of this condition, the permittee shall keep for at least 5 years up to date, readily accessible, on site records of the design capacity report which triggered (a) of this condition, the current amount of solid waste in place, and the year by year waste acceptance rate. Off site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(b) Results of monitoring shall also be maintained in accordance with provision I.S.1 of this permit.

#### II.B.2.a.3

##### **Reporting:**

Except as provided in paragraph (a)(2)(i)(B) of this condition,

(a) An amended design capacity report shall be submitted to the Executive Secretary providing notification of any increase in the design capacity of the landfill, whether the increase results from an increase in the permitted area or depth of the landfill, a change in the operating procedures, or any other means which results in an increase in the maximum design capacity of the landfill. The amended design capacity report shall be submitted within 90 days of the earliest of the following events:

- (1) the issuance of an amended operating permit;
- (2) submittal of application for a solid waste permit under R315-310; or
- (3) the change in operating procedures which will result in an increase in design capacity.

(b) The permittee shall submit an NMOC emission rate report to the Executive Secretary initially and annually thereafter, except as provided for in paragraph (b)(1)(i). The Executive Secretary may request such additional information as may be necessary to verify the reported NMOC emission rate.

(1) The NMOC emission rate report shall contain an annual or 5 year estimate of the NMOC emission rate calculated using the formula and procedures provided in monitoring.

(i) If the estimated NMOC emission rate as reported in the annual report to the Executive Secretary is less than 50 megagrams per year in each of the next 5 consecutive years, the permittee may elect to submit an estimate of the NMOC emission rate for the next 5 year period in lieu of the annual report. This estimate shall include the current amount of solid waste in place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based shall be provided to the Executive Secretary. This estimate shall be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5 year estimate, a revised 5 year estimate shall be submitted to the Executive Secretary. The revised estimate shall cover the 5 year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.

(2) The NMOC emission rate report shall include all the data, calculations, sample reports and measurements used to estimate the annual or 5 year emissions.

(c) Each permittee subject to the provisions of paragraph (a)(2)(i) of this condition shall submit a collection and control system design plan to the Executive Secretary within 1 year of the first report required under (b) in which the emission rate equals or exceeds 50 megagrams per year, except as follows:

(1) If the permittee elects to recalculate the NMOC emission rate after Tier 2 NMOC sampling and analysis as provided in (c) of monitoring and the resulting rate is less than 50 megagrams per year, annual periodic reporting shall be resumed, using the Tier 2 determined site specific NMOC concentration, until the calculated emission rate is equal to or greater than 50 megagrams per year or the landfill is closed. The revised NMOC emission rate report, with the recalculated emission rate based on NMOC sampling and analysis, shall be submitted within 180 days of the first calculated exceedance of 50 megagrams per year.

(2) If the permittee elects to recalculate the NMOC emission rate after determining a site specific methane generation rate constant (k), as provided in Tier 3 in (d) of monitoring, and the resulting NMOC emission rate is less than 50 Mg/yr, annual periodic reporting shall be resumed. The resulting site specific methane generation rate constant (k) shall be used in the emission rate calculation until such time as the emissions rate calculation results in an exceedance. The revised NMOC emission rate report based on the provisions of (d) of monitoring and the resulting site specific methane generation rate constant (k) shall be submitted to the Executive Secretary within 1 year of the first calculated emission rate exceeding 50 megagrams per year.

(d) Each permittee of a landfill shall submit a closure report to the Executive Secretary within 30 days of waste acceptance cessation. The Executive Secretary may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of 40 CFR 258.60. If a closure report has been submitted to the Executive Secretary, no additional wastes may be placed into the landfill without filing a notification of modification as described under 40 CFR 60.7(a)(4).

(e) The permittee shall notify the Executive Secretary of the awarding of contracts for the



**II.B.2.b.3 Reporting:**  
There are no reporting requirements for this provision except those specified in Section I of this permit.

**II.B.2.c Condition:**  
Unless a natural barrier adequately deters access by the general public, the permittee shall comply with one of the following:

- (a) the fencing and warning sign requirements of 40 CFR 61.154 (b), or
- (b) at the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material that has been deposited at the site during the operating day or previous 24-hour period shall be covered with at least 15 centimeters (6 inches) of compacted nonasbestos-containing material. [Authority granted under 40 CFR 61.154; condition originated in 40 CFR 61.154].

**II.B.2.c.1 Monitoring:**  
If the permittee chooses to comply with the fencing and warning sign provisions of this condition, a visual inspection of the property line including all entrances to the site and/or sections of the site where asbestos containing waste material is deposited shall be conducted quarterly to verify compliance with the fencing and warning sign requirements of 40 CFR 61.154 (b)

If the permittee chooses to comply with the daily cover provisions of this condition, a visual inspection of the site(s) where asbestos containing waste material is deposited shall be conducted the day of deposit, and weekly thereafter to verify compliance with this condition.

**II.B.2.c.2 Recordkeeping:**  
Results of all inspections shall be recorded in a log and maintained as described in Provision S.1 in Section I of this permit.

**II.B.2.c.3 Reporting:**  
There are no reporting requirements for this provision except those specified in Section I of this permit.

**II.B.2.d Condition:**  
The permittee shall maintain waste shipment records of all asbestos-containing waste material received. In addition to routine shipment-tracking information, the waste shipment records shall document instances of improperly enclosed or uncovered waste, or any asbestos-containing waste material not sealed in leak-tight containers. [Authority granted under 40 CFR 61.154 (e); condition originated in 40 CFR 61.154].

**II.B.2.d.1 Monitoring:**  
Records required for this permit condition will serve as monitoring.

B.2.d.2

**Recordkeeping:**

For all asbestos-containing waste material received, the permittee shall maintain waste shipment records, using a form similar to that shown in 40 CFR 61.149, Figure 4, and include the following information:

- (i) The name, address, and telephone number of the waste generator. Waste generator is defined as any owner or operator of a source covered by 40 CFR 61, Subpart M whose act or process produces asbestos-containing waste material.
- (ii) The name, address, and telephone number of the transporter(s).
- (iii) The quantity of the asbestos-containing waste material in cubic meters (cubic yards).
- (iv) The presence of any improperly enclosed or uncovered waste, or any asbestos-containing waste material not sealed in leak-tight containers.
- (v) The date of the receipt.

All Records shall be maintained as described in Provisions I.S.1 of this permit.

B.2.d.3

**Reporting:**

As soon as possible and no longer than 30 days after receipt of the asbestos-containing waste material, the permittee shall send a copy of the signed waste shipment record to the waste generator. The permittee shall report in writing to the Executive Secretary, by the following working day, the presence of a significant amount (either nine (9) or more drums/barrels (35 gallon each) or of seventeen (17) or more plastic bags) of improperly enclosed or uncovered waste and submit a copy of the waste shipment record along with the report.

Upon discovering a discrepancy between the quantity of waste designated on the waste shipment records and the quantity actually received, the permittee shall attempt to reconcile the discrepancy with the waste generator. If the discrepancy is not resolved within 15 days after receiving the waste, the permittee shall immediately submit a written report to the Executive Secretary describing the discrepancy and attempts to reconcile it, and submit a copy of the waste shipment record along with the report. The permittee shall retain a copy of all records and reports required by this condition for at least 5 years. All reports shall be in accordance with Provision I.S.2 of this permit.

B.2.e

**Condition:**

The permittee shall maintain, until closure, records of the location, depth and area, and quantity in cubic meters (cubic yards) of asbestos-containing waste material within the disposal site on a map or diagram of the disposal area. [Authority granted under 40 CFR 61.154 (f); condition originated in 40 CFR 61.154].

B.2.e.1

**Monitoring:**

Records required for this permit condition will serve as monitoring.

B.2.e.2

**Recordkeeping:**

Maintain, records of the location, depth and area, and quantity in cubic meters (cubic yards) of asbestos-containing waste material within the disposal site on a map or diagram of the disposal area. All Records shall be maintained as described in Provisions I.S.1 of this permit

**Reporting:**

Notify the Executive Secretary in writing at least 45 days prior to excavating or otherwise disturbing any asbestos-containing waste material that has been deposited at a waste disposal site and is covered. If the excavation will begin on a date other than the one contained in the original notice, notice of the new start date must be provided to the Executive Secretary at least 10 working days before excavation begins and in no event shall excavation begin earlier than the date specified in the original notification. Include the following information in the notice:

- (1) Scheduled starting and completion dates.
- (2) Reason for disturbing the waste.
- (3) Procedures to be used to control emissions during the excavation, storage, transport, and ultimate disposal of the excavated asbestos-containing waste material. If deemed necessary, the Executive Secretary may require changes in the emission control procedures to be used.
- (4) Location of any temporary storage site and the final disposal site.

All reports shall be in accordance with Provision I.S.2 of this permit.

**Condition:**

Upon closure of an asbestos-containing waste disposal site, the permittee shall submit a copy of records of asbestos waste disposal locations and quantities and shall:

- (a) Comply with one of the following:
  - (1) Either discharge no visible emissions to the outside air from an inactive asbestos-containing waste disposal site or
  - (2) Cover the asbestos-containing waste material with at least 15 centimeters (6 inches) of compacted non-asbestos containing material, and grow and maintain a cover of vegetation on the area adequate to prevent exposure of the asbestos-containing waste material. In desert areas where vegetation would be difficult to maintain, at least 8 additional centimeters (3 inches) of well-graded, nonasbestos crushed rock may be placed on top of the final cover instead of vegetation and maintained to prevent emissions; or
  - (3) Cover the asbestos-containing waste material with at least 60 centimeters (2 feet) of compacted non-asbestos containing material, and maintain it to prevent exposure of the asbestos-containing waste; or
  - (4) For inactive waste disposal sites for asbestos tailings, a resinous or petroleum-based dust suppression agent that effectively binds dust to control surface air emissions may be used instead of the methods in paragraphs (a) (1), (2), and (3) of this section. Use the agent in the manner and frequency recommended for the particular asbestos tailings by the manufacturer of the dust suppression agent to achieve and maintain dust control. Obtain prior written approval of USEPA to use other equally effective dust suppression agents. For purposes of this paragraph, any used, spent, or other waste oil is not considered a dust suppression agent.
- (b) Unless a natural barrier adequately deters access by the general public, install and maintain warning signs and fencing as follows, or comply with paragraph (a)(2) or (a)(3) of this condition:
  - (1) Display warning signs at all entrances and at intervals of 100 m (328 ft) or less along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited. The warning signs must:
    - (i) Be posted in such a manner and location that a person can easily read the legend; and
    - (ii) Conform to the requirements for 51 cm×36 cm (20"×14") upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph; and
    - (iii) Display the following legend in the lower panel with letter sizes and styles of a visibility at least equal to those specified in this paragraph.



perpetuity notify any potential purchaser of the property that:

- (1) The land has been used for the disposal of asbestos-containing waste material;
- (2) The survey plot and record of the location and quantity of asbestos-containing waste disposed of within the disposal site required in 40 CFR 61.154(f) have been filed with the USEPA; and
- (3) The site is subject to 40 CFR 61, Subpart M.

**II.B.3 Conditions on Cold Cleaning Unit.**

**II.B.3.a Condition:**

The permittee shall ensure that the following conditions are met:

- (1) The solvent degreaser is designed to control fugitive emissions by storing fresh solvent in an airtight dispenser tank, and containing used solvent in a sealed canister. The cover shall be designed so that it can be easily operated if:
  - (a) the volatility of the solvent is greater than 2 kPa (15 mm Hg or 0.3 psi) measured at 38 degrees C (100 degrees F),
  - (b) the solvent is agitated, or
  - (c) the solvent is heated.
- (2) An internal draining rack for cleaned parts shall be installed on which parts shall be drained until all dripping ceases. If the volatility of the solvent is greater than 4.3 kPa (32 mm Hg at 38 degrees C (100 degrees F)), the drainage facility must be internal, so that parts are enclosed under the cover while draining. The drainage facility may be external for applications where an internal type cannot fit into the cleaning system.
- (3) Waste or used solvent shall be stored in covered containers. Waste solvents or waste materials which contain solvents shall be disposed of by recycling, reclaiming, by incineration in an incinerator approved to process hazardous materials, or by an alternate means approved by the executive secretary.
- (4) Tanks, containers and all associated equipment shall be maintained in good operating condition and leaks shall be repaired immediately or the degreaser shall be shutdown.
- (5) Written procedures for the operation and maintenance of the degreasing or solvent cleaning equipment shall be permanently posted in an accessible and conspicuous location near the equipment.
- (6) If the solvent volatility is greater than 4.3 kPa (33 mm Hg or 0.6 psi) measured at 38 degrees C (100 degrees F), or if solvent is heated above 50 degrees C (120 degrees F), then one of the following control devices shall be used:
  - (a) freeboard that gives a freeboard ratio greater than 0.7;
  - (b) water cover if the solvent is insoluble in and heavier than water;
  - (c) other systems of equivalent control, such as a refrigerated chiller or carbon absorption.
- (7) If used, the solvent spray shall be a solid fluid stream at a pressure which does not cause excessive splashing and may not be a fine, atomized or shower type spray. [Authority granted under R307-335-4; condition originated in R307-335-4].

**II.B.3.a.1 Monitoring:**

A visual observation shall be conducted monthly for all equipment and applicable work practices.

**II.B.3.a.2 Recordkeeping:**

Results of monthly inspections and the volatility of the solvent(s) being used shall be recorded and maintained as described in Provision I.S.1 of this permit.

II.B.3.a.3

**Reporting:**

There are no reporting requirements for this provision except those specified in Section I of this permit.

II.B.4

**Conditions on Landfill Gas Engines.**

II.B.4.a

**Condition:**

Emissions of NO<sub>x</sub> shall be no greater than 1.97 lb/hr.[Authority granted under R307-401-8(1)(a) [BACT]; condition originated in DAQE-AN0119770006-08].

II.B.4.a.1

**Monitoring:**

Stack testing shall be performed as specified here:

(a) Frequency. The source shall be tested every three years based on the date of the last stack test.

(b) Notification. At least 30 days before the test, the source shall notify the Executive Secretary of the date, time, and place of testing and provide a copy of the test protocol. The source shall attend a pretest conference if determined necessary by the Executive Secretary.

(c) The emission sample point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1. In addition, Occupational Safety and Health Administration (OSHA) approved access shall be provided to the test location. (R307-165-2)

(d) Methods to be used:

(1) To determine stack volumetric flow rate - 40 CFR 60, Appendix A, Method 2.

(2) To test for NO<sub>x</sub> emissions - 40 CFR 60, Appendix A, Method 7, 7A, 7B, 7C, 7D, or 7E.

(e). Calculations. To determine mass emission rates (g/kW-hr) the pollutant concentration as determined by the appropriate methods above shall be multiplied by the volumetric flow rate, divided by the engine's power output during the test and multiplied by any necessary conversion factors.

(f). Production Rate During Testing. The production rate during all compliance testing shall be no less than 90% of the maximum production achieved in the previous three (3) years.

II.B.4.a.2

**Recordkeeping:**

Results of monitoring shall be maintained in accordance with Provision I.S.1 of this permit.

II.B.4.a.3

**Reporting:**

The results of stack testing shall be submitted to the Executive Secretary within 60 days of completion of the testing. Reports shall clearly identify results as compared to permit limits and indicate compliance status. There are no additional reporting requirements for this provision except those specified in Section I of this permit.

II.B.5

**Conditions on Landfill Gas Bypass Flare.**

**II.B.5.a Condition:**

The landfill gas bypass flare shall only be operated for control of landfill gas emissions and only during periods when the landfill gas generators are offline. During the periods that the generators are offline, all potential emissions of landfill gas shall be routed through the landfill gas bypass flare for control prior to being released to the atmosphere.[Authority granted under R307-401-8(1)(a) [BACT]; condition originated in DAQE-AN0119770006-08].

**II.B.5.a.1 Monitoring:**

Records shall serve as monitoring.

**II.B.5.a.2 Recordkeeping:**

Records shall be kept for all times when the landfill gas flare is in operation. Records shall include date, time, and the reason that the landfill gas generators are offline.

**II.B.5.a.3 Reporting:**

There are no additional reporting requirements other than those found in section 1 of this permit.

**II.C Emissions Trading  
(R307-415-6a(10))**

Not applicable to this source.

**II.I Alternative Operating Scenarios.  
(R307-415-6a(9))**

Not applicable to this source.

### **SECTION III: PERMIT SHIELD**

A permit shield was not granted for any specific requirements.

**SECTION IV: ACID RAIN PROVISIONS**

## REVIEWER COMMENTS

This operating permit incorporates all applicable requirements contained in the following documents:

---

Incorporates DAQE-AN0119770006-08 dated September 23, 2008

---

1. Comment on an item originating in 40 CFR 64 regarding Permitted Source (Source-wide)  
Compliance Assurance Monitoring Applicability: CAM applicability has been evaluated. There are no CAM requirements in this permit. [Last updated February 9, 2009]
2. Comment on an item originating in R307-307 regarding Permitted Source (Source-wide)  
Salting and Sanding Requirements: R307-307 requires that any person who applies salt, crushed slag or sand to roads in Salt Lake, Davis, or Utah Countys shall maintain records of material applied as outlined in the permit. It also requires the salt to be at least 92% sodium chloride (NaCl) unless they vacuum sweep every arterial roadway within three days of the end of the storm. Since the landfill does not salt or sand any roadways that meet the definition of arterial as shown on the local Urbanized Area map specified in the rule, they are not subject to the 92% limit and are only required to keep the records required by the rule. [Last updated February 9, 2009]
3. Comment on an item originating in DAQE-AN0119770006-08 regarding Landfill Gas Engines  
Stack installation parameters: Condition I.L.B.4.a of DAQE-AN0119770006-08 requires that the stacks shall vent vertically and be no less than 36 feet as measured from the base of the stack. These are installation requirements and have been met and verified by inspection. They are not being carried forward into the operating permit. [Last updated February 9, 2009]
4. Comment on an item originating in 40 CFR 60.154 regarding Municipal Solid Waste Landfill  
Definition of Significant Amount for asbestos shipments received: A significant amount of waste is hereby defined as one cubic meter of asbestos-containing waste material. Based on EPA standard conversion factors for typical asbestos-waste containers, one cubic meter of material is approximately equal to 9.8 drums or barrels (35 gallon each) or 17.4 plastic bags. [Last updated February 9, 2009]
5. Comment on an item originating in DAQE-AN0119770006-08 regarding Municipal Solid Waste Landfill  
Landfill gas generators and WWW applicability: Trans-Jordan Landfill is voluntarily installing landfill gas generators. NSPS subpart WWW is applicable but they are not required to install a gas collection and control system until the NMOC levels have reached 50 Mg/yr. [Last updated February 9, 2009]

## Final Permit Review Checklist

This checklist is to be used to review all final operating permits prior to signing.  
The completed checklist is to be submitted to the Operating Permit section manager.

**Source name:** Trans-Jordan Cities: Trans-Jordan Landfill      **Permit ID:** 3500535002  
OPP0119770003

- \_\_\_\_\_ 1. Cover page only is on letterhead paper
- \_\_\_\_\_ 2. Permit ID is valid (not missing, not "1", ends in "00x" where "x" is the revision number)
- \_\_\_\_\_ 3. Permit date and revision date (if applicable) are correct      **Issue / revision date:** \_\_\_\_\_
- \_\_\_\_\_ 4. Source name, address and SIC are correct
- \_\_\_\_\_ 5. Abstract includes brief description of process and states why the source is subject to Part 70 (NSPS equipment, pollutants for which the source is major, etc.)
- \_\_\_\_\_ 6. Operating permit history shows correct action, date and description of action
- \_\_\_\_\_ 7. Table of contents is accurate
- \_\_\_\_\_ 8. Permit footer information matches cover page
- \_\_\_\_\_ 9. Permit renewal date is correct      **Renewal Date:** \_\_\_\_\_
- \_\_\_\_\_ 10. Annual compliance certification date is correct      **First certification due date:** \_\_\_\_\_
- \_\_\_\_\_ 11. Definition of "prompt" for deviation reporting is correct      **Prompt means** \_\_\_\_\_ days
- \_\_\_\_\_ 12. All required emission units are included, and grandfathered units identified
- \_\_\_\_\_ 13. Permit text is complete and legible, and superscripts/subscripts are correct
- \_\_\_\_\_ 14. List of supporting approval orders and documents is included and is complete and accurate
- \_\_\_\_\_ 15. If title IV applies, acid rain portion of permit is included
- \_\_\_\_\_ 16. Reviewer comments are included as required to show basis for monitoring, etc.
- \_\_\_\_\_ 17. Permit has been spell-checked and read for grammatical errors
- \_\_\_\_\_ 18. OPP peer review completed
- \_\_\_\_\_ 19. NSR review completed (N/A if no NSR review needed)
- \_\_\_\_\_ 20. Compliance review completed
- \_\_\_\_\_ 21. Draft Permit was sent to public comment      (y / n)      **Public review start date:** \_\_\_\_\_
- \_\_\_\_\_ 22. Proposed Permit submitted for EPA review      (y / n)      **EPA review start date:** \_\_\_\_\_
- \_\_\_\_\_ 23. Other comments on this permit:

This permit has been prepared in accordance with current administrative requirements as provided in R307-415 and with current OPP policy and guidance.

Permit writer signature: \_\_\_\_\_

Date: \_\_\_\_\_

Section manager signature: \_\_\_\_\_

Date: \_\_\_\_\_

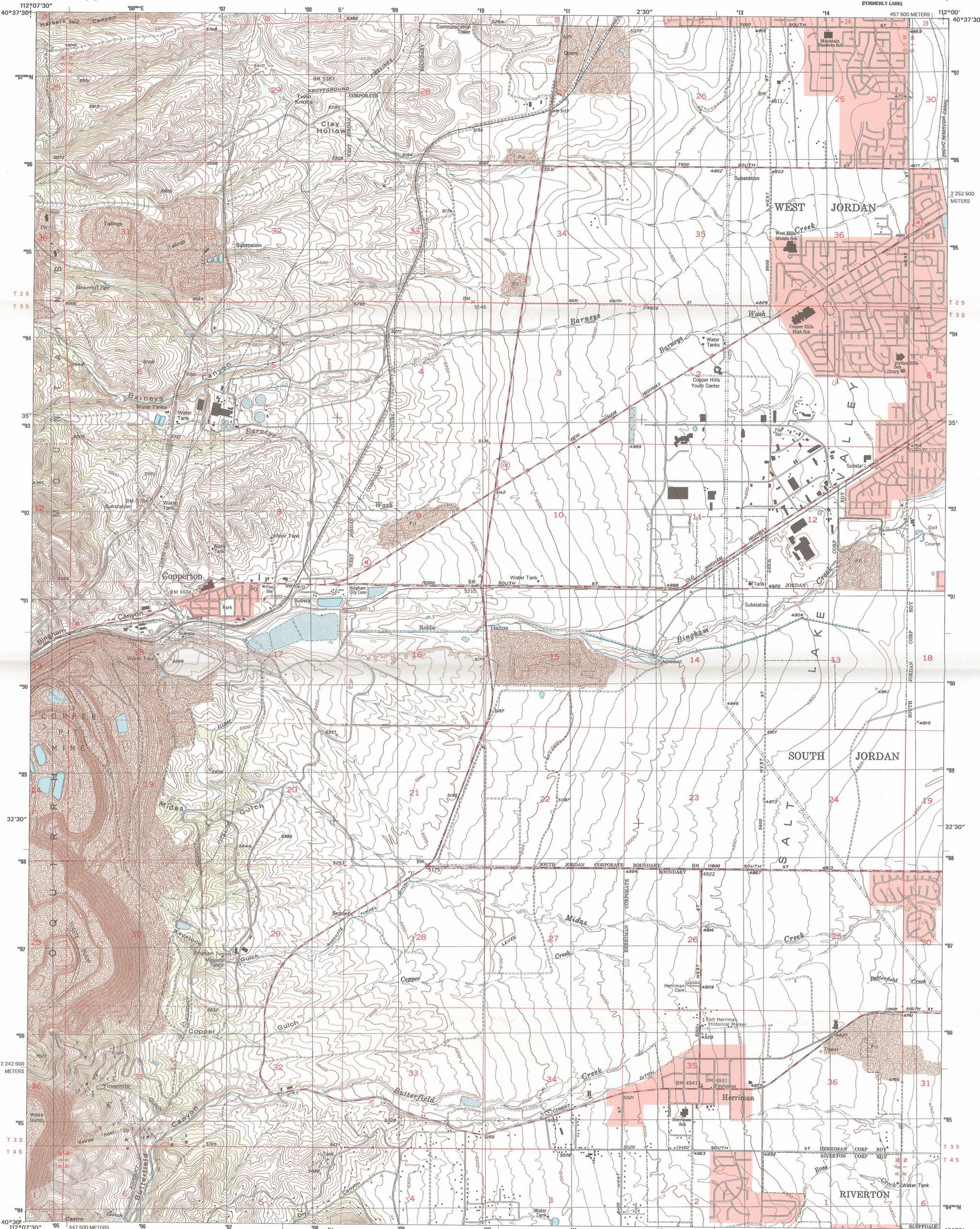
## Operating Permit Source File Checklist

- \_\_\_\_\_ 1. **Receipt letter (if source-initiated permit action) or  
Source notification (if DAQ initiated permit action)**
  
- \_\_\_\_\_ 2. **EPA / Affected state(s) notice of modification (minor modification only)**
  
- \_\_\_\_\_ 3. **Completeness determination (initial app, significant mod, renewal only)**
  - \_\_\_\_\_ A) Checklist
  - \_\_\_\_\_ B) "Complete" notification
  - \_\_\_\_\_ C) "Incomplete" notification (if any)
  
- \_\_\_\_\_ 4. **Public comment paperwork (initial app, significant mod, renewal only)**
  - \_\_\_\_\_ A) Draft permit checklist
  - \_\_\_\_\_ B) DRAFT permit
  - \_\_\_\_\_ C) Notice to paper(s)
  - \_\_\_\_\_ D) Receipt from paper(s) (i.e., affidavit of publication)
  - \_\_\_\_\_ E) Public hearing information (if any)
  - \_\_\_\_\_ F) Comments received (if any)
  - \_\_\_\_\_ G) Responses to comments (if any)
  
- \_\_\_\_\_ 5. **Affected state notifications (initial app, significant mod, renewal only)**
  
- \_\_\_\_\_ 6. **EPA comment paperwork (initial app, significant mod, renewal only)**
  - \_\_\_\_\_ A) Submittal to EPA
    - \_\_\_\_\_ i) Letter
    - \_\_\_\_\_ ii) PROPOSED permit
    - \_\_\_\_\_ iii) Other info sent to EPA that is not already in file
  - \_\_\_\_\_ B) Receipt of delivery to EPA, stapled to submittal letter
  - \_\_\_\_\_ C) EPA comments (if any)
  - \_\_\_\_\_ D) Response to EPA comments (if any)
  
- \_\_\_\_\_ 7. **Final permits**
  - \_\_\_\_\_ A) Final permit checklist completed
  - \_\_\_\_\_ B) FINAL permit with letter of transmittal
  - \_\_\_\_\_ C) Reviewer comments
  - \_\_\_\_\_ D) Initial Permit Application
  - \_\_\_\_\_ E) Update letters/packages (if any)
  - \_\_\_\_\_ F) Other working file contents (RO designations, etc)
  - \_\_\_\_\_ G) Disk with telecommute data for source and WP file of permit
  - \_\_\_\_\_ H) Copy of letter of transmittal to EPA

## **APPENDIX H**

### **OTHER DOCUMENTS RELATING TO 2005 PERMIT**

- US Geological Survey topographical map
- Trans-Jordan Landfill Proof of Ownership
- Trans-Jordan Landfill Property Description
- Trans-Jordan Landfill drawings showing sample well boring sites plus bedrock and soil samples
- Trans-Jordan Landfill 2002 Groundwater Monitoring Report
- Trans-Jordan Landfill Modified Corrective Action Plan



Produced by the United States Geological Survey  
Topography compiled 1997. Planimetry derived from imagery taken 1997 and other sources. Major planimetric features revised 1999. Public Land Survey System and survey control current as of 1992. Boundaries current as of 1999 North American Datum of 1983 (NAD 83). Projection and 1 000-meter grid: Universal Transverse Mercator, zone 12 2 500-meter ticks: Utah Coordinate System of 1983 (control zone)

North American Datum of 1927 (NAD 27) is shown by dashed corner ticks. The values of the shift between NAD 83 and NAD 27 for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software  
Schools and other labeled buildings verified 2000. Houses of worship verified 1952

UTM GRID AND 2001 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929  
TO CONVERT FROM FEET TO METERS, MULTIPLY BY .3048

FOR SALE BY U.S. GEOLOGICAL SURVEY, P.O. BOX 25286, DENVER, COLORADO 80225  
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

- Primary highway hard surface
- Secondary highway hard surface
- Light-duty road, hard or improved surface
- Unimproved road
- Interstate Route
- U.S. Route
- State Route

QUADRANGLE LOCATION

1	2	3	1 Fernsworth Peak
4	5	6	2 Magna
7	8	9	3 Salt Lake City South
			4 Bingham Canyon
			5 Midvale
			6 Lone Peak
			7 Tickville Spring
			8 Jordan Narrows

ADJOINING 7.5' QUADRANGLE NAMES

**COPPERTON, UT**  
(FORMERLY LARK)  
1999  
NIMA 3565 II SE-SERIES V897

ISBN 0-607-98049-4  
9 780607 980493

### Trans-Jordan Landfill Property Description

A parcel of land in Section 15, Township 3 South, Range 2 West, Salt Lake Base and Meridian, Salt Lake County, Utah, containing 190.0468 acres and being more particularly described as follows.

Beginning at a point S89°41'17"E 183.50 feet from a rock monument at the West quarter corner of said Section 15, said rock monument bears N0°04'19"E 2643.87 feet (basis of bearing) from a brass cap monument at the Southwest corner of said Section 15, said point also being on the Easterly line of Salt Lake County Road 111 (formerly U-111); thence N19°44'29"W 213.44 and N6°11'36"W 753.84 feet along said Easterly line of County Road 111; thence S89°45'42"E 1783.29 feet; thence S81°14'37"E 402.07 feet; thence S77°13'31"E 165.34 feet; thence S74°37'58"E 201.08 feet; thence S70°00'29"E 148.20 feet; thence S79°19'04"E 107.15 feet; thence S87°07'45"E 89.27 feet; thence N86°30'28"E 63.83 feet; thence N79°00'30"E 49.95 feet; thence 74°47'30"E 162.12 feet; thence N85°06'53"E 59.90 feet; thence N89°26'10"E 304.89 feet; thence S81°15'35"E 50.02 feet; thence S68°45'39"E 49.96 feet; thence S51°41'10"E 49.91 feet; thence S32°01'58"E 50.11 feet; thence S23°33'11"E 169.05 feet; thence S28°07'40"E 138.34 feet; S33°25'02"E 290.94 feet; thence S70°13'26"E 679.75 feet; thence S0°14'18"W 1075.58 feet; thence N89°45'42"W 4348.02 feet to a point on said Easterly line of County Road 111; thence along said Easterly line of County Road 111 the following four courses, (1) Northwesterly 33.15 feet along the arc of a 2934.90 foot radius curve to the left through a central angle of 0°38'50" (chord bears N5°52'10"W 33.15 feet). (2) N6°11'36"W 353.2 feet. (3) N2°20'14"E 202.24 feet. (4) N6°11'36"W 542.50 feet to the point of beginning.

Recorded at the Request of \_\_\_\_\_  
at \_\_\_\_\_ M. Fee Paid \$ \_\_\_\_\_

Mail tax notice to: Trans-Jordan Cities

Address: 10873 South 7200 West, P. O. Box 95610, South Jordan, Utah 84095-0610

**QUIT-CLAIM DEED**

TRANS-JORDAN CITIES, a political subdivision of the State of Utah, hereby QUIT-CLAIMS to GRANTEE, TRANS-JORDAN CITIES, a political subdivision of the State of Utah, for the sum of TEN DOLLARS, (\$10.00), and other good and valuable consideration, the following tract of land located in Salt Lake County, State of Utah for the purpose of consolidating three separate parcels of property into a single parcel of land described as follows:

A parcel of land located in Section 15, Township 3 South, Range 2 West, Salt Lake Base and Meridian, Salt Lake County, Utah, containing 190.0470 acres and being more particularly described as follows.

Beginning at a point on the east line of Highway 111, said point being N0°02'33"E 949.46 feet along the section line and S89°45'42"E 29.37 from a stone monument at the West quarter corner of said Section 15, said stone monument bears S0°02'33"W 2644.02 feet (basis of bearing) from a stone monument at the northwest corner of said section 15;

thence S89°45'42"E 1783.29 feet;	thence S81°14'37"E 402.07 feet;
thence S77°13'31"E 165.34 feet;	thence S74°37'58"E 201.08 feet;
thence S70°00'29"E 148.20 feet;	thence S79°19'04"E 107.15 feet;
thence S87°07'45"E 89.27 feet;	thence N86°30'28"E 63.83 feet;
thence N79°00'30"E 49.95 feet;	thence N74°47'30"E 162.12 feet;
thence N85°06'53"E 59.90 feet;	thence N89°26'10"E 304.89 feet;
thence S81°15'35"E 50.02 feet;	thence S68°45'39"E 49.96 feet;
thence S51°41'10"E 49.10 feet;	thence S32°01'58"E 50.11 feet;
thence S23°33'11"E 169.05 feet;	thence S28°07'40"E 138.34 feet;
thence S33°25'02"E 290.94 feet;	thence S70°13'26"E 679.73 feet;
thence S0°14'17"W 1075.58 feet;	
thence N89°45'42"W 4348.03 feet to the east line of said Highway 111;	
thence continuing along said east line of Highway 111 the following six courses;	

1. Northwesterly 33.14 feet along the arc of a 2934.90 foot radius curve to the left through a central angle of 0°38'49" (chord bears N5°52'31"W 33.14 feet);
2. N6°11'33"W 353.20 feet.
3. N2°20'17"E 202.24 feet.
4. N6°11'35"W 542.50 feet.
5. N19°44'29"W 213.44 feet.
6. N6°11'36"W 753.84 feet to the point of beginning.

Containing Parcel Nos.:

26-15-300004	4.51 ac
26-15-300013	184.19 ac
26-15-300011	.96 ac
	<u>190.05 ac</u>

8726492  
 07/10/2003 01:53 PM NO FEE  
 Book - 8838 Pg - 3270-3271  
**GARY W. OTT**  
 RECORDER, SALT LAKE COUNTY, UTAH  
 TRANS JORDAN CITIES  
 10873 S 7200 W  
 PO BOX 95610  
 SOUTH JORDAN UT 84095-0610  
 BY: SBM, DEPUTY - WI 2 F.



NAME TRANS-JORDAN CITIES NEW/UPDT N TAX DIST OK 38.  
 CONT ASR DATE 03/16/2004  
 C/O, AT ACREAGE 190.05  
 STREET EDIT  
 CITY  
 LO# 3 EDIT CERTIFY ASSR BATCH NO 268 SEQ 504  
 UNKNOWN EDIT N PLAT

PROPERTY DESCRIPTION  
 DESC 1 BEG N 0-02'33" E 949.46 FT & S 89-45'42" E 29.37 FT FR W 1/4 WORK CRD  
 DESC 2 COR OF SEC 15, T 3S, R 2W, SLM; S 89-45'42" E 1783.29 FT; S PRINTED  
 DESC 3 81-14'37" E 402.07 FT; S 77-13'31" E 165.34 FT; S 74-37'58"  
 DESC 4 E 201.08 FT; S 70-00'29" E 148.20 FT; S 79-19'04" E 107.15  
 DESC 5 FT; S 87-07'45" E 89.27 FT; N 86-30'28" E 63.83 FT; N  
 DESC 6 79-00'30" E 49.95 FT; N 74-47'30" E 162.12 FT; N 85-06'53" E  
 DESC 7 59.90 FT; N 89-26'10" E 304.89 FT; S 81-15'35" E 50.02 FT; S 15 DESC  
 DESC 8 68-45'39" E 49.96 FT; S 51-41'10" E 49.10 FT; S 32-01'58" E LINES  
 DESC 9 50.11 FT; S 23-33'11" E 169.05 FT; S 28-07'40" E 138.34 FT;  
 DESC 10 S 33-25'02" E 290.94 FT; S 70-13'26" E 679.73 FT; S 0-14'17" MORE

OLD PARCEL NUMBERS  
 26-15-300-004-0000 26-15-300-013-0000 26-15-300-011-0000

MORE TOTAL 3

NAME TRANS-JORDAN CITIES NEW/UPDT N TAX DIST OK 38  
 CONT ASR DATE 03/16/2004  
 C/O, AT ACREAGE 190.05  
 STREET EDIT  
 CITY  
 LC E EDIT CERTIFY ASSR BATCH NO 268 SEQ 504  
 UN .WN EDIT N PLAT

PROPERTY DESCRIPTION

DESC 11 W 1075.58 FT; N 89-45'42" W 4348.03 FT TO EAST LINE OF WORK CRD  
 DESC 12 HIGHWAY 111; NW'LY ALG A 2934.90 FT RADIUS CURVE TO L 33.14 PRINTED  
 DESC 13 FT (CHORD N 5-52'31" W 33.14 FT); N 6-11'33" W 353.20 FT; N  
 DESC 14 2-20'17" E 202.24 FT; N 6-11'35" W 542.50 FT; N 19-44'29" W  
 DESC 15 213.44 FT; N 6-11'36" W 753.84 FT TO BEG. 190.05 AC.

15 DESC  
LINES

MORE

OLD PARCEL NUMBERS

26-15-300-004-0000 26-15-300-013-0000 26-15-300-011-0000

MORE TOTAL 3

# SOUTH JORDAN CITY REQUEST FOR CITY COUNCIL ACTION

**TO:** Honorable Mayor, Members of the City Council

**FROM:** Jodi Ketelsen, Long Range Planner

**DATE:** November 5, 1996

**SUBJECT:** **CONDITIONAL USE-SITE PLAN: TRANS JORDAN  
TRANS JORDAN LANDFILL, LOCATED AT  
APPROXIMATELY 7200 WEST BETWEEN 10900 SOUTH  
& 11100 SOUTH, 107 ACRES, COMMERCIAL-  
INDUSTRIAL (C-I) ZONING DISTRICT, TRANS-JORDAN  
TRANS JORDAN LANDFILL (APPLICANT).**

## RECOMMENDATION:

Planning staff recommends APPROVAL of the site plan and the Conditional Use Permit contingent upon issues outlined herein.

## BACKGROUND:

The Trans Jordan Landfill is before the City Council tonight after long torturous negotiations with the Trans Jordan Board and involved communities. The City of South Jordan hired Eckhoff, Watson and Preator Engineering to review the Trans Jordan Landfill environmental study and development documents. The findings were not significant and the summary report is attached. In addition, there are several binders of information, including engineering documents, the land purchase contract with Kennecott and other correspondences available at City Hall for further review if desired. South Jordan City has committed to approving a conditional use permit with an agreement to comply with the site planning application process. The following is a review of the site planning issues and then secondly a list of the conditions for the Conditional Use Permit.

## SITE PLANNING ISSUES

Staff has worked with Dames & Moore, the Landfill Consultant, on the site plan development. Planning staff's primary concerns relate to circulation, recycling and aesthetic issues. The entrance will be at its currently location, on Highway 111. The Landfill is expanding with land purchased from Kennecott property. The Landfill was

intended to be larger than that which is proposed, but Kennecott has reserved a band of right-of-way on three side of the Landfill, where the north side adjoins the existing Landfill facilities. This has impacted site plan development with regard to shielding visual impacts of the Landfill from future development. However, the site plan does include several improvements that should be acknowledged by the Planning Commission and the City Council and forwarded to the Trans Jordan Board to insure proper improvements are made.

### **Transportation issues**

On any current site plan submittal, staff obtains, through dedication by the owner the needed right-of-way along all roadways that are projected to be widened. Often, staff requires right-of-way and improvements completed as part of the development. Staff recognizes the necessary improvements to Highway 111 are not within a five year plan. Staff recommends dedication of right-of-way(53 feet from the center line as a minimum but this right-of-way may need to be increased due to the acceleration and deceleration lanes) and that improvements are implemented at such time as Highway 111 is be widened or when future development occurs within 230 feet of the Landfill, whichever happens first. The east half of Highway 111 is the responsibility of South Jordan.

Due to the increasing volumes on Highway 111, several changes should be made to the Landfill entrance. Dames and Moore has suggested a center turn lane and acceleration/deceleration lanes for distances of 150 feet before and after the Landfill entrance. Staff concurs. At the entrance, staff has worked with Dames and Moore to push the gate 25 feet back from the property line for an area 80 feet long, so that early cueing could be accommodated off Highway 111 before opening hours. Once the gates are opened, there will be adequate stacking distance because the scale house will be set back almost 1,000 feet from the gate. Eventually, over 1,800 feet of asphalt will be placed from the entry, well into the Landfill property. There are future plans that could eliminate the need for private residents to enter beyond this asphalt area. (see the recycling plan).

### **Recycling plan**

Staff's concerns about enforcing recycling have been addressed in three measures. First, there are plans for recycling bins to be placed just after the scale housing entry for private individuals. Second, South Jordan is making it a requirement that all communities wishing to use the Trans Jordan Landfill shall be obligated to implement a recycling program. Thirdly, a study should be conducted within the next three years to evaluate the transformations in Landfill flows and material dumping. The study should consider the potential benefit to provide a roll off dumping area. This allows the non-contract haulers to drive on an elevated pad, dump into a larger truck and avoid interaction with the actual Landfill cavities. This has significant safety and convenience gains for the Landfill. This will also make separating between load materials more convenient. Staff feels this study and cost benefit analysis should be a requirement of the site plan approval.

## Landscape treatment

Primary landscaping and aesthetic concerns involve the views from Highway 111. Concerns about the future views from the south border are virtually impossible to mitigate, due to Kennecott's sudden 200' right of way retention along the south border. A road and drainage system is tightly accommodated along the south side of the Trans Jordan Landfill cells. Re-engineering the Landfill cell area would cause a great expense-not only in terms of engineering time, but also in Landfill capacity loss. Therefore, staff feels that mitigating views of the Landfill from the south should be a condition to development along the south border. Visual impact mitigation from Highway 111 should be in the form of a landscape plan, where plant materials are called out in scientific and common name along with size caliper and finally, identifications of the watering treatment.

Along Highway 111, staff suggests the entry fence comply with the City fence standard for 100 feet to either side of the entry. Only one monument sign shall be allowed outside the gated area, with all instructional signs inside the gate. There will be two (2) lights at the entry and each building structure (2 buildings) will receive lighting and a fire hydrant. Also, along the south west corner area, berming and natural vegetation should be designed into the site plan. Natural vegetation should include scrub oak, junipers and other xeriscaping plant materials.

The site plan allows for adequate parking and ADA approved standards.

**The Planning Commission voted to APPROVE the TransJordan Landfill (with four approving and one abstention) site plan and conditional use permit contingent upon complying with the following site planning issues and conditions on the Conditional Use Permit:**

### SITE PLANNING ISSUES:

1. A 53 foot right of way shall be dedication from centerline of Highway 111.
2. Agreement to implement road improvements at the time that development is with in 230 feet or when Highway 111 requires widening, whichever happens first.
3. A center turn lane and acceleration/deceleration lanes for distances of 150 feet before and after the Landfill entrance shall be part of the first phase of development.
4. The gate should be pushed back 25 feet from the property line for an area 80 feet long, to provide for early cueing .
5. Recycling bins shall be placed just past the scale house.

6. A study shall be conducted to illustrate the potential benefit to provide a roll off dumping area.
7. A landscape plan shall be prepared with plant materials called out in scientific and common name along with size caliper, and required watering treatment.
8. Entry fence shall comply with the City fence standard for 100 feet to either side of the entry.
9. Only one monument sign shall be allowed outside the gated area, with all instructional signs inside the gate.

#### CONDITIONS FOR THE CONDITIONAL USE PERMIT

**As discussed with the Consultant, Dames & Moore**

- |                 |   |
|-----------------|---|
| Condition No. 1 | The Trans Jordan Cities Landfill shall require each of its member cities and non-member municipal entities, who dispose of waste at the Trans Jordan Landfill to develop, adopt and implement recycling programs with eighteen months of approval of this permit in order to continue to dispose of waste at the landfill facilities.   |
| Condition No. 2 | The Trans Jordan Cities Landfill shall develop and implement a greenwaste by-pass program to promote the use of greenwaste for the development of mulch and compost products.   |
| Condition No. 3 | The Trans Jordan Cities landfill shall require that all loads being brought to the landfill be tarped and covered. Loads arriving at the gate that do not meet this criteria, shall be charged a tippage fee at twice the normal rate. Additionally, license plate numbers of first time offenders shall be recorded and maintained in a permanent file at the landfill gate. Repeat offenders shall be refused entrance to the landfill. |
| Condition No. 4 | The Trans Jordan Cities Landfill shall, within 12 months of the approval of this plan, develop a site plan that includes visual mitigation along the U-111 boundary of the Landfill. The plan shall include incorporation of trees and other vegetative cover to enhance the visual appearance of the Landfill facility from selected viewpoints along the Hwy U-111.   |
| Condition No. 5 | In concert with developing the State Landfill Permit Application, Trans Jordan Cities shall develop a plan for future use of the landfill property, within six months of the conditional use plan.  |

- Condition No. 6      Future expansion of the Trans Jordan Landfill shall be performed in an environmentally conscious and technically sound manner. Lateral expansion of the landfill shall include the use of a constructed liner leachate management system consistent with the requirements imposed by the Department of Environmental Quality, Division of Solid Waste.
- Condition No. 7      The Trans Jordan Cities Landfill shall implement a program to periodically and regularly collect windblown debris that may emanate from the Landfill property.
- Condition No. 8      The Trans Jordan Cities Landfill shall construct a security fence to control access at the perimeter of the Landfill property boundary. This fence shall be constructed within twelve months of approval of the Conditional Use Permit.
- Condition No. 9      The Trans Jordan Landfill shall comply with all State and Federal regulations with regard to landfill development and maintenance.

Respectfully submitted,

  
\_\_\_\_\_  
Jodi Ketelsen  
Long Range Planner

Reviewed and concur,

  
\_\_\_\_\_  
Dave Millheim  
City Administrator

Jack Peck also noted that the Economic Development Committee is working towards a Chamber of Commerce. The Chamber of Commerce Planning Committee is currently in the process of developing bylaws.

**D. Flag Lots**

Community Development Director Larkin said the Land Development Regulations, Section 11-5-102 (Lots), Item B, reads--All lots or parcels created by the subdivision shall have frontage on a dedicated street, improved to standards hereinafter required, equal to at least 50% of its minimum required width except for a flag lot which shall have a minimum frontage as specified in the Zoning ordinance. Land designated as public right-of-way shall be separate and distinct from lots adjoining such right-of-way and not be included in the area of such lots. The zoning ordinance does not talk about flag lots. Community Development Director Larkin would like direction on flag lots and feels there can be some exceptions in a subdivision being built because of topography. He noted there are inconsistencies in the zoning ordinances.

City Administrator Millheim said the problem is there is not a standard for a flag lot, or when exceptions should be considered or not considered.

Councilman Warne said he feels there are a lot of problems with flag lots, i.e., public safety issues. He does not feel it is a good way to develop.

Council felt the section in the subdivision ordinance referring to flag lots should be eliminated.

City Administrator Millheim said the Tateoka property (2700 West and 9800 South) was rezoned, and they now want to have two homes and are upset that this is not allowed. City Council confirmed only one house should be allowed.

**Trans Jordan Landfill**

Councilman Christensen said his questions are related to future land use (what it will look like, how it will be vegetated, possible uses in the future). He said he also has questions on buffering from residential (distance, buffering, future development). He said he is uncomfortable with giving approval without having a plan in hand. He also wanted information on the status of the synthetic liner, and questioned how the methane gas problem will be controlled.

Councilman Money noted the Trans Jordan Landfill Board met and discussed site planning issues. One issue discussed was a 53 foot

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planted; use of ponds, wildlife? He would like to see some use for the open space (bike or horse trails).

A Landfill Board representative said the geometry will not change, it will stay the 3-1 slope, site plan specifics will not change, and vegetation issues have not all been addressed. The representative noted some decisions will depend on the projected future use of the area. Methane gas will be programmed into the cap; will be affected by green waste diversion; will be developed in conjunction with the liner and the cap; and will be addressed.

Cell number one will only be about 10 acres, and the expansion will be current with the federal and state mandate regulations. The State and County Board of Health also inspect periodically.

Councilman Christensen asked about the buffering and how much land is separating the Landfill from future development? The State mandates a 100 ft. setback from property boundaries for an active Landfill on all of the expansion. Councilman Warne said Kennecott kept 200 ft. and we will essentially have 300 ft. between the cell and potential development. Councilman Carlile said if we have 100 ft. on several sides, poplar trees could be planted to make a solid buffer, so there are some options to make it look nice.

City Administrator Millheim said Long Range Planner Ketelsen has been working with Dames & Moore to help create design types and the conditions have been put together with the cooperation of consultants, and presented to the Landfill Board for their input.

Councilman Christensen said when this item is presented, later in the meeting, he would like to see the surface plan with the buffers and landscaping shown in greater detail. He said he does not believe the plan is developed enough for conditional use approval. He said he was told there would be a future meeting to address the issues, and the Summary Action Calendar does not accommodate discussion. He said he has received some of his answers and still has some minor issues, i.e., debris control, and a Landfill representative stated debris control was done every day.

Long Range Planner Ketelsen said she would like to add one more recommendation--to recommend the approval of the Conditional Use Permit based on our conditions, but we also want the opportunity for it to come back for review to add specific details. Councilman Christensen said we would not rescind the Conditional Use Permit if we don't like the plan, after it has been approved.

Councilman Money said this process has gone on for many months and these are conditions we (South Jordan) came up with, and if we start changing things tonight he wonders what kind of signal we would be sending. Councilman Carlile feels now that South Jordan

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unanimous in favor.

F. CONDITIONAL USE SITE PLAN - Trans Jordan Landfill

Councilman Money said on issue number 1--A 53 foot right of way shall be dedicated from centerline of Highway 111.--he would like to add Since Trans Jordan does not own this property, if they are able to obtain the property necessary to meet this condition, and the State of Utah is willing to accept the dedication, Trans Jordan shall make a good faith effort to contact and request the affected owner(s) to dedicate the required property as a public right of way. This is a safety issue and he thinks the Landfill Board concurs that they would work this out, but since they did not own the land they felt they needed that additional verbiage.

Councilman Money said on Condition No. 3--The Trans Jordan Cities Landfill shall require that all loads being brought to the Landfill be tarped and covered. Loads arriving at the gate that do not meet this criteria, shall be charged a tippage fee at twice the normal rate. Additionally, license plate numbers of first time offenders shall be recorded and maintained in a permanent file at the Landfill gate and will be refused entrance to the Landfill. The Board would like additional verbiage that the Trans Jordan City Landfill shall require that all loads being brought to the Landfill be completely tarped and covered from front to back, from side board to side board, so there is greater definition of how we expect those loads to be covered.

Councilman Christensen wanted to make a couple additional recommendations, on Condition 4--The Trans Jordan Cities Landfill shall, within 12 months of the approval of this plan, develop a site plan that includes visual mitigation along the U-111 boundary of the Landfill. The plan shall include incorporation of trees and other vegetative cover to enhance the visual appearance of the Landfill facility from selected viewpoints along the Hwy. U-111. He would like to add a clause at the end of the first sentence--that meets the Cities approval. His second recommendation is on Condition No. 5--In concert with developing the State Landfill Permit Application, Trans Jordan Cities shall develop a plan (add which meets the Cities approval) for future use of the Landfill property, within six months of the conditional use plan.

Councilman Christensen made a motion to approve the Conditional Use-Site Plan: Trans Jordan Landfill, located at approximately 7200 West between 10900 South and 11100 South, 107 acres, Commercial-Industrial (C-I) zoning district, Trans Jordan Landfill (Applicant), including his additional language noted above, and all of the conditions and site plan issues listed in the Staff Report. Councilman Money felt Councilman Christensen's conditions are issues that the Landfill Board and Long Range Planner Ketelsen are

working on with regard to the site plan, and that he and Councilman Christensen will be able to work with the Board, over a period of time, to enhance the aesthetics of the Landfill with proper buffering and trees, when the water resources are in place. He finds the Landfill Board workable, and other than the changes he mentioned, the Planning Commission of South Jordan City has agreed with the conditional use permit as drafted by Staff; Dames and Moore; and Eckhoff, Watson and Preator Engineering. He feels the long term usage of the Landfill is up in the air, it may be an open area and does not know if we will be able to define in a six month period of time what will ultimately be done with the Landfill and would like the flexibility of South Jordan as a member of the Landfill to work with the Board and resolve some of the issues. Councilman Christensen's motion died for lack of a second.

Councilman Money made a motion to approve the Conditional Use-Site Plan: Trans Jordan Landfill, located at approximately 7200 West between 10900 South and 11100 South, 107 acres, Commercial-Industrial (C-I) zoning district, Trans-Jordan Landfill (applicant), as outlined, including all of the conditions and site plan issues listed in the Staff Report, with his two additional suggestions (outlined above). He feels South Jordan will continue to work as a member of the Landfill Board, being very concerned how the Landfill looks in the future and how the property is treated as far as this particular use. Councilman Carlile seconded the motion believing that being represented on the Landfill Board will protect South Jordan's interests. The vote was 4-1 in favor, by a roll call vote--Councilman Christensen voted no.

Councilman Christensen said he is not against the Landfill, but feels there needs to be protection for what will eventually be 200 acres of Landfill. He believes the City at this point in time can work with the Board in developing an appropriate plan for the use of the open space. He noted the present provision is OK if we are willing to work together, but the conditional use process gives us the opportunity just once to dictate for our own City the characteristics of the Landfill. At this point the plan is not complete (very little detail on the uses that will be permitted after the Landfill is covered and vegetation is growing). His concern is that this is a very visible corridor in the City with development eventually surrounding it, and said buffering issues next to the Landfill are very critical. He congratulated Councilman Money on the good things that have gone into the conditional use permitted requirements to date, but feels we need to see what the Landfill is going to be used for, and the buffering issues around the Landfill should be addressed.

Councilman Money said he appreciates Councilman Christensen's concerns and believes the member and non member entities are very concerned about the Landfill over the long duration of time. He

feels if something is not done that is compatible with development out there, development will shut it down, and cautions the Landfill Board to keep in mind that what is done out there must be done in a way that we are prepared, when development comes, to be as compatible as possible with development, or he has grave concerns for the future of the Landfill.

Councilman Warne said the Landfill issue has gone on for several years and we are now reaching the conclusion and this is not something that the Council has taken lightly. This issue has been carefully studied, and the City has retained consulting engineers to make sure the interests of South Jordan are protected. He feels comfortable with the direction the City is going in because of the time spent on this issue.

Councilman Money noted that Sandy City is looking at the property west of the freeway and that is an issue on which the approval of this conditional use permit is dedicated upon. City Administrator Millheim said the Sandy representative and Chairman of the Landfill Board noted this item is on Sandy City's agenda tonight and will be approved. City Administrator Millheim said this subject has always been part of the negotiations of the total settlement since Sandy City tied the two issues together.

#### VIII. PUBLIC HEARINGS

- A. PUBLIC HEARING: Amended Final Subdivision Plat, South Jordan Estates #2 Subdivision, 3600 West 11800 South Street, 13.55 Acres, 26 Lots, Residential (R-1.8) Zone District. (S.K. Development, Inc.)

Community Development Director Larkin noted this is an amended final subdivision plat for South Jordan Estates #2. The original plat had the street at the southern edge parallel to 11800 South and created double frontage lots. The Developer has agreed to eliminate the double frontage lots, and in so doing received an extra lot, and was able to eliminate the building of another roadway. The number of lots permitted is now a discrepancy in the legal description, and the number of lots in Phase 3 will be adjusted to keep in conformance (preliminary plat for Phase 3 is currently in the approval process and the exact number of lots will be determined).

Mayor Hutchings opened the Public Hearing, at this time. There was no public comment. Mayor Hutchings closed the Public Hearing.

Councilman Money asked how the R-1.8 zoning works with the 1/2 acre and 1/3 acre lots. Community Development Director Larkin said before the zoning ordinance amendment in 1994, the R-1.8 allowed flexibility in lots down to 1/3 acre (but they average out to R-



MAJOR DIVISIONS		GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS  MORE THAN 50% OF COARSE FRACTION RETAINED ON No. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS  MORE THAN 50% OF COARSE FRACTION PASSING No. 4 SIEVE	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS  LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SAND, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS  LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

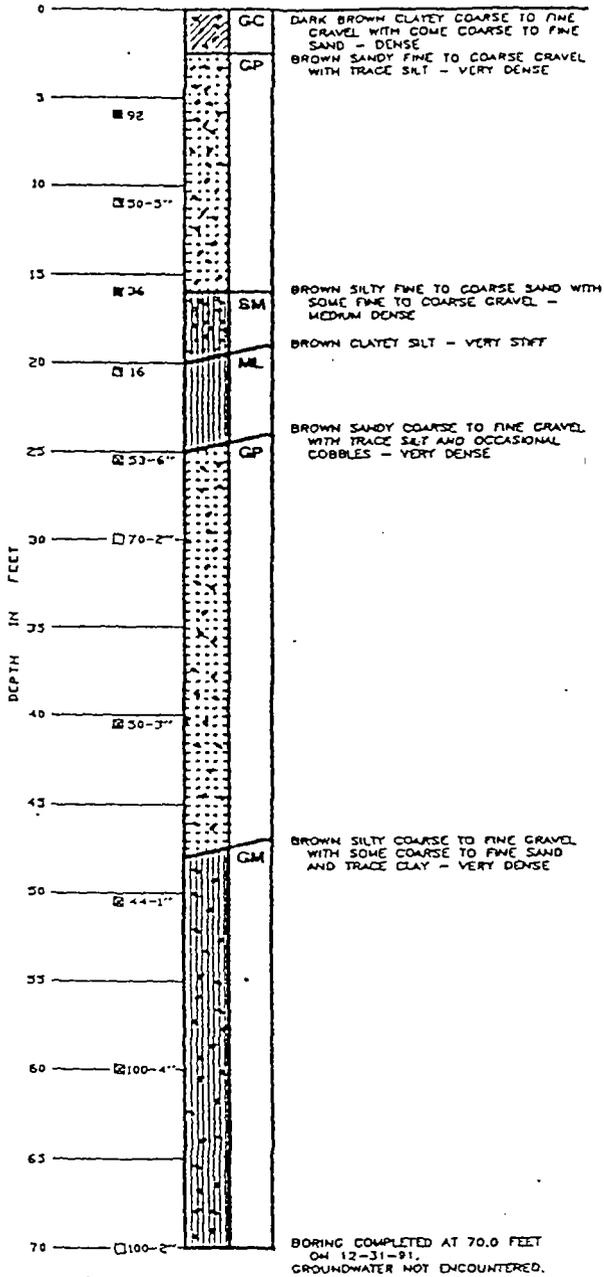
NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

# UNIFIED SOIL CLASSIFICATION SYSTEM

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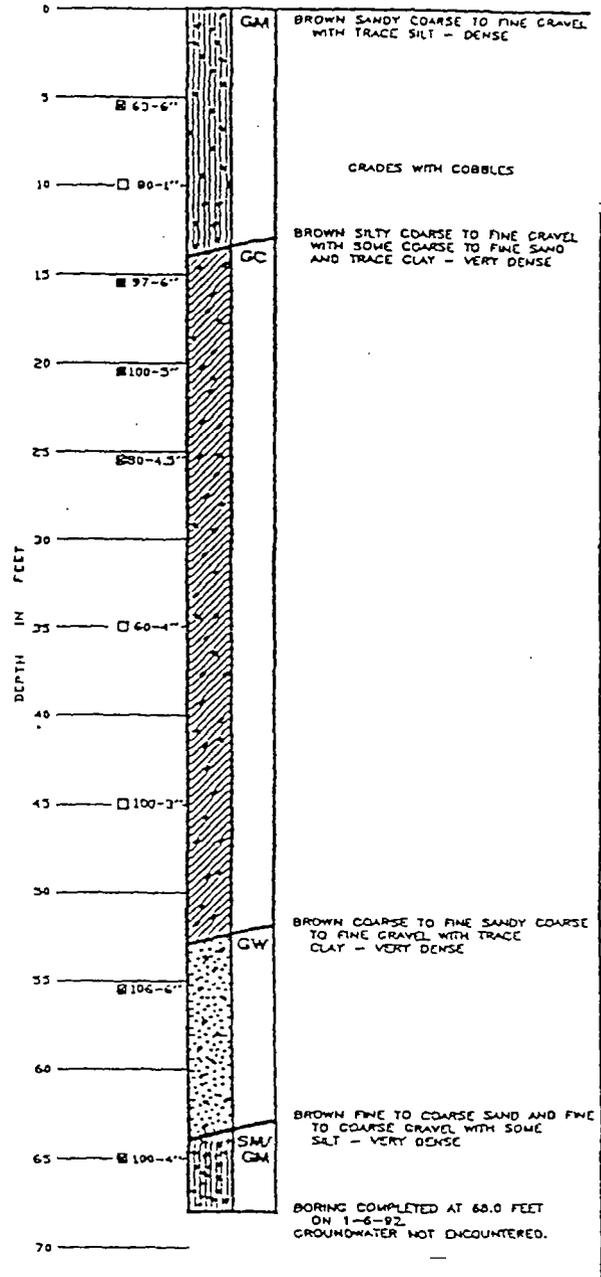
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ELEVATION: 5109.13



### BORING TJ-2

ELEVATION: 5100.91



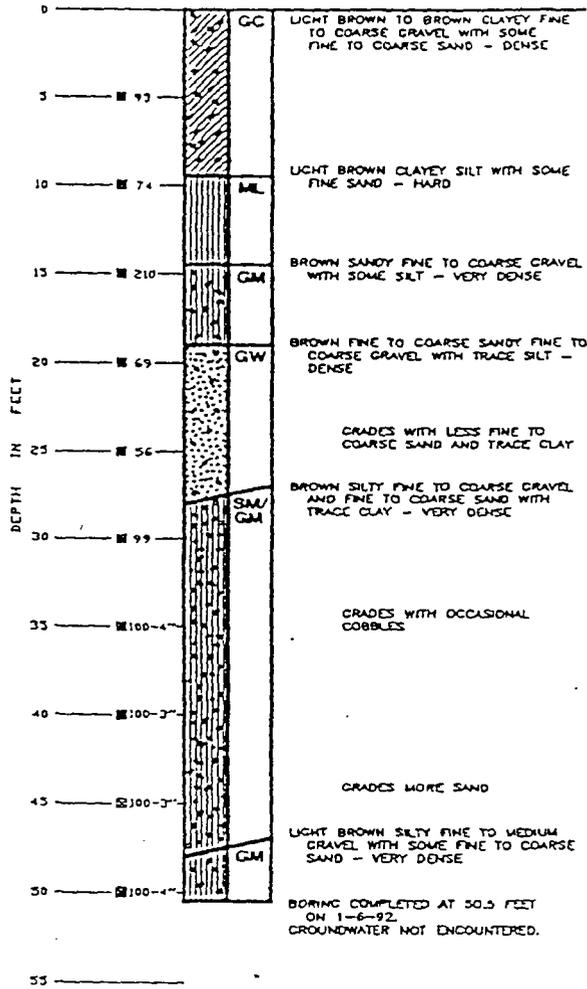
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Dames & Moore

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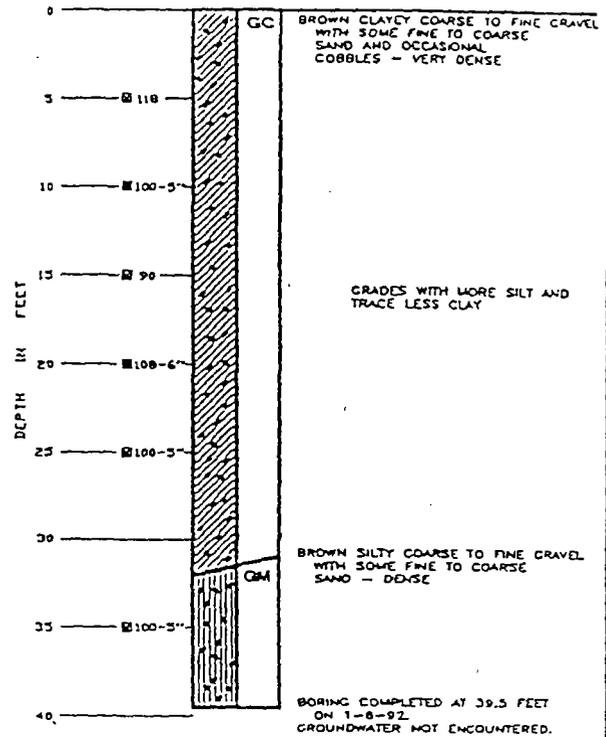
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ELEVATION 3090.34



**BORING TJ-4**

ELEVATION 3046.01



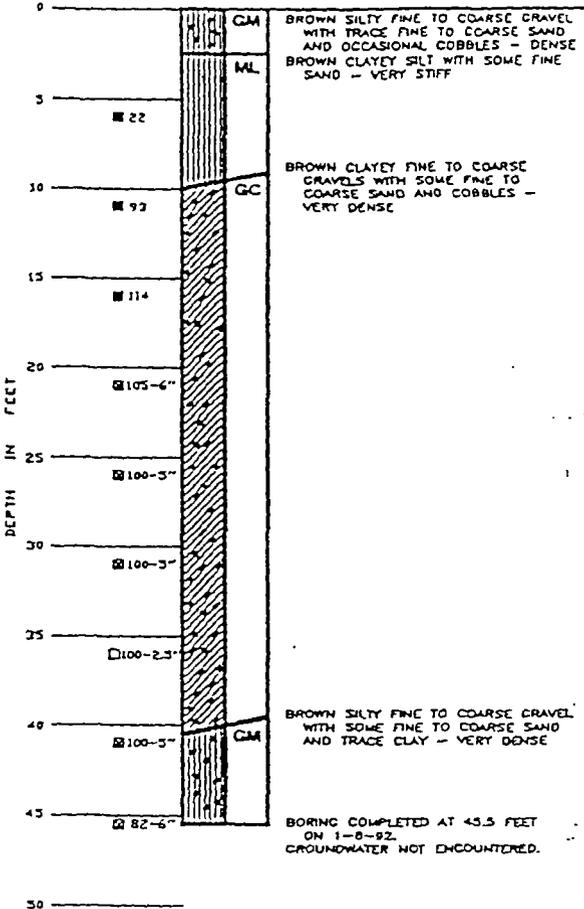
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- A - B - C
- A FIELD MOISTURE EXPRESSED AS A PERCENTAGE OF THE DRY WEIGHT OF SOIL
  - B DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT
  - C BLOWS REQUIRED TO DRIVE A 2 1/4" TYPE U SAMPLER ONE FOOT WITH A 140 LB. HAMMER DROPPING 30 INCHES
  - DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED
  - ▣ DEPTH AT WHICH DISTURBED SAMPLE WAS EXTRACTED
  - SAMPLING ATTEMPT WITH NO RECOVERY

**LOG OF BORINGS**

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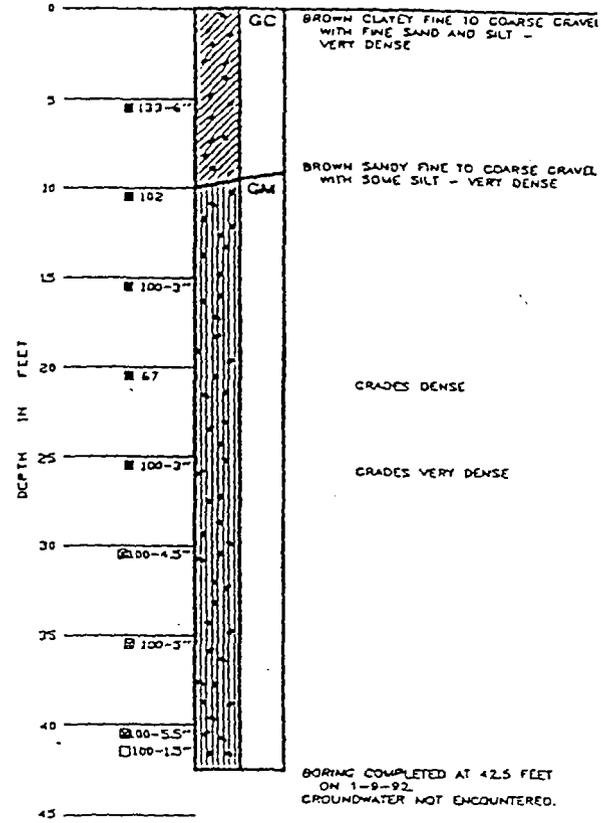
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ELEVATION 5027.10



### BORING TJ-6

ELEVATION 5016.89



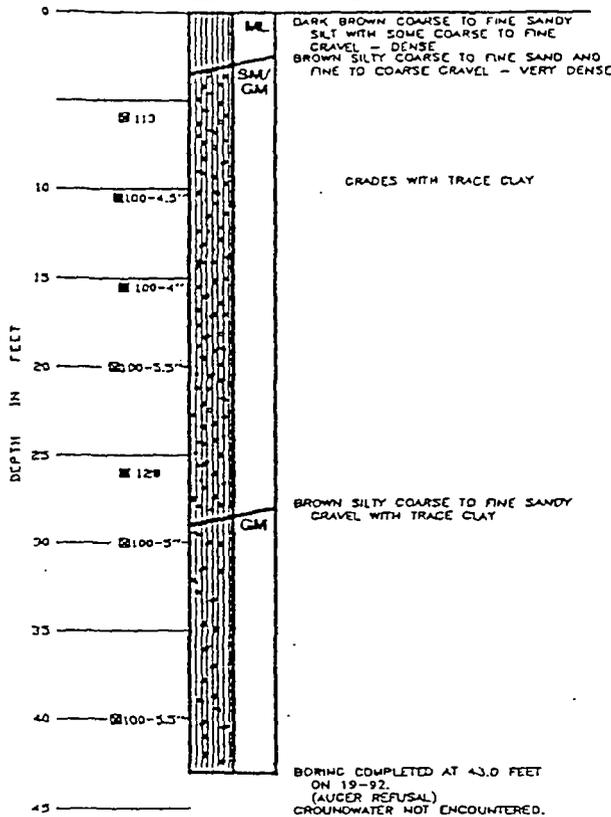
- KEY**
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  - B DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT
  - C BLOVS REQUIRED TO DRIVE A 6IN TYPE U SAMPLER ONE FOOT WITH A 140 LB. HAMMER DROPPING 30 INCHES
  - DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED
  - DEPTH AT WHICH DISTURBED SAMPLE WAS EXTRACTED
  - SAMPLING ATTEMPT WITH NO RECOVERY

## LOG OF BORINGS

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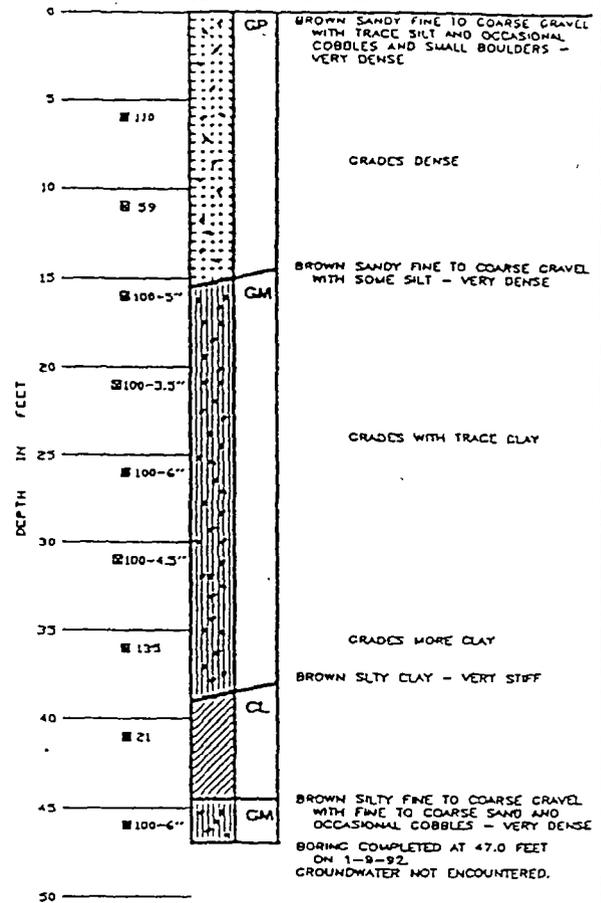
### BORING TJ-7

ELEVATION: 5127.27



### BORING TJ-8

ELEVATION: 5112.28



KEY

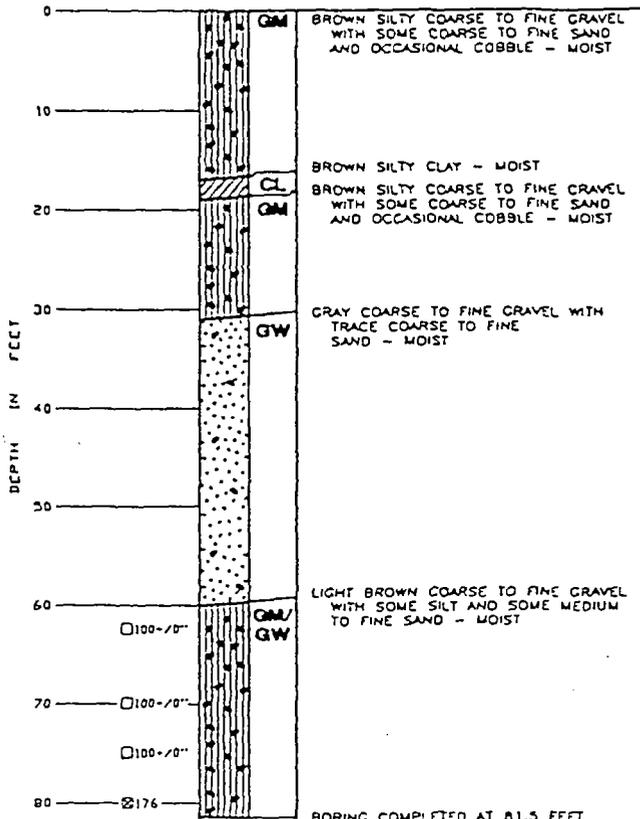
- A - B ■ C
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- B DRY DENSITY EXPRESSED IN LBS. PER CUBIC FOOT
- C BLOWS REQUIRED TO DRIVE A DUM TYPE U SAMPLER ONE FOOT WITH A 140 LB. HAMMER DROPPING 30 INCHES
- DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED
- ▣ DEPTH AT WHICH DISTURBED SAMPLE WAS EXTRACTED
- SAMPLING ATTEMPT WITH NO RECOVERY

## LOG OF BORINGS

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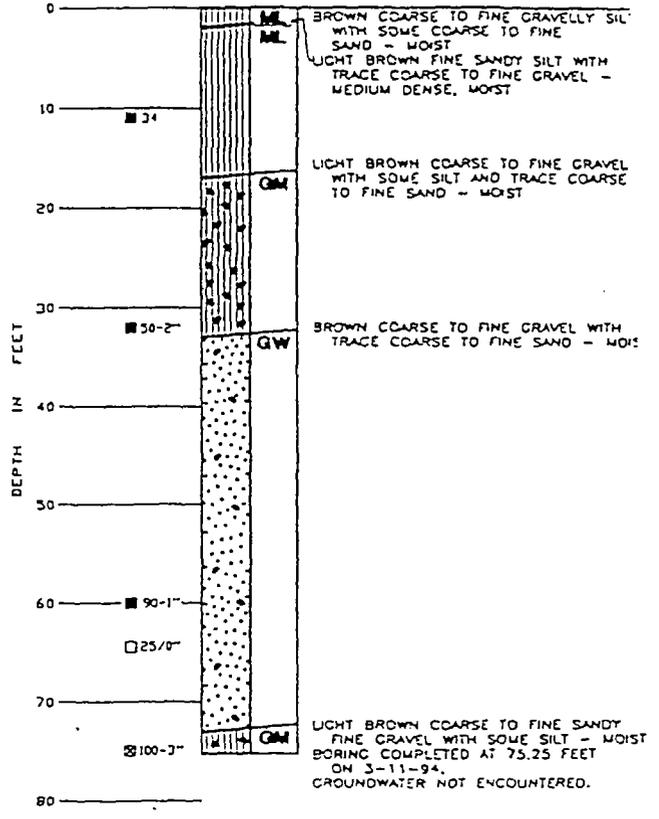
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### BORING TJE-3

EL: S106±



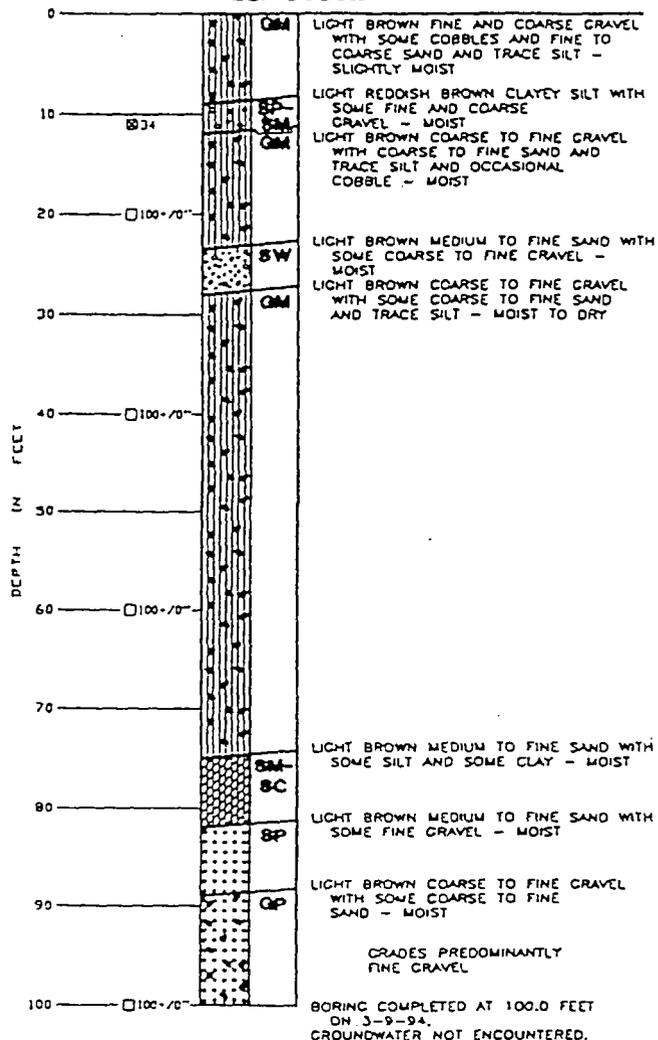
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  - C BLOWS REQUIRED TO DRIVE A DLM TYPE U SAMPLER ONE FOOT WITH A 140 LB. HAMMER DROPPING 30 INCHES
  - DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED
  - ⊗ DEPTH AT WHICH DISTURBED SAMPLE WAS EXTRACTED
  - SAMPLING ATTEMPT WITH NO RECOVERY

# LOG OF BORINGS

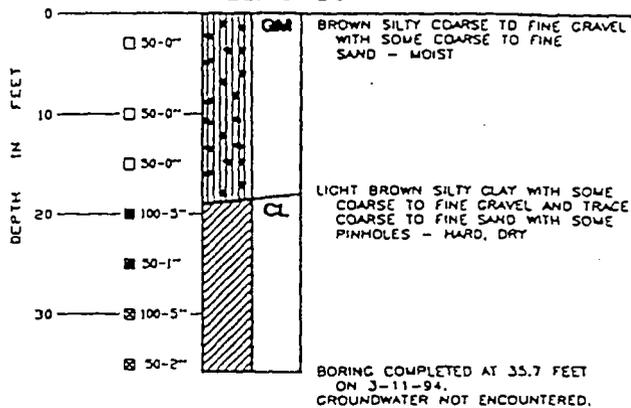
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EL: 5058±



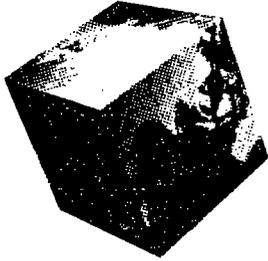
## BORING TJE-6

EL: 5156



- KEY
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  - C BLOWS REQUIRED TO DRIVE A D&M TYPE U SAMPLER ONE FOOT WITH A 140 LB. HAMMER DROPPING 30 INCHES
  - DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED
  - ⊠ DEPTH AT WHICH DISTURBED SAMPLE WAS EXTRACTED
  - SAMPLING ATTEMPT WITH NO RECOVERY

# LOG OF BORINGS



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## **Trans-Jordan Landfill 2002 Groundwater Monitoring Report**

IGES Job No. 00102-001

February 20, 2003

Prepared for:

**Trans-Jordan Cities**  
c/o Mr. Dwayne Woolley  
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P.O. Box 95610-0610  
South Jordan, Utah 84095

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## APPENDICES

- A** Plate A-1 – Statistical Analysis Flowchart  
Analysis of Variance Summary Table
- B** Time Series Graphs for Measurable Constituents
- C** Confidence Interval Analysis Results
- D** Groundwater Contour Maps and Field Sampling Data Summary Sheets

## 1.0 INTRODUCTION

### 1.1 PURPOSE AND SCOPE OF WORK

The purpose of this report is to present the results of recent groundwater analysis, including groundwater chemistry, depth to water and direction of flow under the Trans Jordan Landfill (TJL). This report summarizes any statistical changes that may have occurred during 2002. The period of review for this assessment is generally limited to the readings over the past year; however, the statistical assessment extends through the entire history of the sampling rounds.

The scope of work performed for this assessment includes a review of the 2002 sampling data, a statistical assessment of the readings, and the preparation of this report.

The recommendations contained in this report are subject to the limitations presented in the "Limitations" section of this report.

### 1.2 PROJECT DESCRIPTION

TJL is a municipal solid waste landfill located at 10873 South 7200 West, South Jordan, Utah, in Salt Lake County. TJL is located in Section 15, Township 3 South, Range 2 West.

TJL currently has one up gradient and three down gradient monitoring wells on the property that are utilized for groundwater monitoring and sampling. The up gradient well is identified as TJMW-2 while the down gradient wells are TJMW-3, TJMW-4 and TJMW-5. These sampling wells were originally installed based on the predominant groundwater flow being west to east. However, the construction of a groundwater cutoff wall completed by Kennecott Utah Corporation (KUC), several years of below average precipitation, and down gradient water usage all have contributed to the drop in water levels and have altered the groundwater gradient at the site. Because of these activities and possible other unknown conditions, the TJL monitoring wells are drying up and the groundwater gradient appears to be trending south. The Groundwater Contour Maps and Field Sampling Data Summary Sheets located in Appendix D show the apparent flow direction and groundwater elevations over time.

TJMW-1 was originally installed as an up gradient well but is currently no longer used for groundwater sampling. However, groundwater elevations are measured in TJMW-1 quarterly. This well did not accurately represent general background water conditions as compared to other historic groundwater quality data from monitoring wells in the area. TJMW-2 was installed in January of 1995 and has since served as the up gradient well for the landfill.

In 2002, four sampling rounds were completed for TJMW-4 and TJMW-5. One sampling round was completed for TJMW-2 and no rounds were completed for TJMW-3. TJMW-2 dried up and could not be sampled during the final three rounds in 2002 and TJMW-3 dried up and could not be sampled at all during the year 2002. The dates, wells sampled and analysis performed for these rounds are summarized below:

**Table 1 – Summary of 2002 Groundwater Sampling Events**

<b>Sampling Date</b>	<b>Well(s) Sampled</b>	<b>Analysis Performed</b>
3/05/02	TJMW-2, TJMW-4 & TJMW-5	Complete
6/28/02	TJMW-4 & TJMW-5	Complete
9/24/02	TJMW-4 & TJMW-5	Complete
12/10/02	TJMW-4 & TJMW-5	Complete

The results of the analyses performed on the groundwater samples were reviewed and constituents of concern were identified. To aid in identifying constituents of concern, the following steps were implemented in our assessment:

- Step 1 Identify constituents with laboratory detectable concentrations for each of the wells.
- Step 2 Perform ANOVA statistical assessments on groundwater quality data for each constituent identified in Step 1, comparing down gradient to up gradient wells.

- Step 3 Identify constituents with higher down gradient concentrations than upgradient for data sets identified as ANOVA significant in Step 2.
- Step 4 Identify constituents of concern, i.e., those identified in Step 3 with concentrations higher than the Groundwater Protection Standards.
- Step 5 Perform confidence interval analyses on constituents of concern identified in Step 4.

The following sections of the report provide information on the analytical results for each well, a discussion of the statistical evaluation of the analytical results and conclusions and recommendations based on the analytical test results, statistical evaluation and constituents of concern assessment.

## 2.0 MONITORING WELL SUMMARIES

### 2.1 MONITORING WELL TJMW-2

Monitoring Well TJMW-2 is completed to a depth of 455 feet below ground surface (Elevation 4814.16) and was drilled and installed in January 1995. The well serves the TJJ as the site up gradient well.

#### Summary of Analytical Results for 2002 sampling period

One groundwater-sampling round was completed for this well in 2002. This sampling round was performed on March 5, 2002 and constituted the 34<sup>th</sup> round for this particular well.

Several constituents have historically had concentrations higher than the groundwater protection standards presented on the list of Constituents for Detection Monitoring (Table R315-308-4 in The Manual for Solid Waste Permitting and Management Rules R315-301 through 320, Utah Administrative Code). That trend continues and many of the constituents remain consistent with historical values. However, Arsenic, which measured slightly above the standard (0.05 mg/l) on one occasion in 2000 and did not measure above the standard in 2001 was non-detectable (<0.005 mg/l) in 2002. Also, for the first time, a hit of Tetrachloroethylene (Tetrachloroethene) was obtained. A concentration of 0.0036 mg/l was detected, which is below the groundwater protection standard of 0.005 mg/l.

The list of constituents having measured concentrations at or above the groundwater protection standards for Well TJMW-2 in the single 2002 sampling round are listed in the following table:

*Well TJMW-2 (continued on the next page)*

Constituent	Groundwater Protection Standard (mg/l)	Sampling Round 34 (mg/l)
Beryllium	0.004	0.086
Cadmium	0.005	0.390
Cobalt	2.0	3.6
Copper	1.3	21.0

Constituent	Groundwater Protection Standard (mg/l)	Sampling Round 34 (mg/l)
Lead	0.015	0.024
Nickel	0.1	5.4
Thallium	0.002	0.0056
Zinc	5.0	31.0

## 2.2 MONITORING WELL TJMW-3

Monitoring well TJMW-3 is completed to a depth of 319 feet below ground surface (Elevation 4710.77) and was drilled and installed in December of 1995 as a down gradient well.

### **Summary of Analytical Results for 2002 sampling period**

Due to the lack of water in well TJMW-3, analytical testing could not be conducted. However, just enough water was present to obtain a water level reading. The groundwater levels are shown in The Field Data Sampling Summary Sheet in Appendix D.

As a summary for well TJMW-3, during the 2001 analytical results three of the heavy metals analyzed were above the groundwater protection standard. It should be noted that throughout the well's history, as many as 15 constituents have been above the reporting limits. Several of these constituent levels dropped below the standards over time and an overall trend of these constituents reducing with time was apparent.

## 2.3 MONITORING WELL TJMW-4

Monitoring well TJMW-4 is completed to a depth of 365 feet below ground surface and was drilled and installed in November of 1997 as a down gradient well.

### **Summary of Analytical Results for 2002 sampling period**

Four groundwater-sampling rounds were completed for this well in 2002. Dates for the sampling rounds are summarized in Table 1. These sampling rounds constitute the 16<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup> and 19<sup>th</sup> rounds for this particular well.

Based on the results of the 2002 chemical analysis, two of the heavy metals analyzed were above the groundwater protection standards, Lead and Thallium. In general, Lead was lower than previous years but still exceeded the standards. Thallium was just slightly above this standard with one reading of 0.0021 mg/l in March of 2002, while the other rounds were all non-detect (<0.001 mg/l). Arsenic, Chromium and Nickel, which were above the groundwater protection standards in 2001, did not exceed the standards in 2002.

No organic constituents were observed above the groundwater protection standards in Well TJMW-4.

The list of constituents having measured concentrations at or above the groundwater protection standards for Well TJMW-4 in the 2002 sampling rounds are listed in the following table:

***Well TJMW-4***

<b>Constituent</b>	<b>Groundwater Protection Standard (mg/l)</b>	<b>Sampling Round 16 (mg/l)</b>	<b>Sampling Round 17 (mg/l)</b>	<b>Sampling Round 18 (mg/l)</b>	<b>Sampling Round 19 (mg/l)</b>
Lead	0.015	0.061	0.065	0.044	0.033
Thallium	0.002	0.0021	<0.001	<0.001	<0.001

**2.4 MONITORING WELL TJMW-5**

Monitoring well TJMW-5 is completed to a depth of 365 feet below ground surface (Elevation 4705.9) and was drilled and installed in July of 1998 as a down gradient well.

**Summary of Analytical Results for 2002 sampling period**

Four groundwater-sampling rounds were completed for this well in 2002. Dates for the sampling rounds are summarized in Table 1. These sampling rounds constitute the 16<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup> and 19<sup>th</sup> rounds for this particular well.

Based on the results of the 2002 chemical analysis, two of the heavy metals are above the groundwater protection standards, Lead and Thallium. In general, Lead was lower than previous years but still exceeded the standards. Thallium was just slightly above the

standard (0.002 mg/l) with one reading of 0.0021 mg/l in March of 2002, while the other rounds were lower than groundwater protection standards or non-detect (<0.001 mg/l). Arsenic, which measured above the standard in 2001, measured below the standard in 2002.

Of the organic constituents analyzed, Tetrachloroethene continued to be above the groundwater protection standard in Well TJMW-5 and has generally increased from historical values. Also, 1,1,1-Trichloroethane, even though it is below the groundwater protection standard, has also shown an increase over time.

The list of constituents having measured concentrations at or above the groundwater protection standards for Well TJMW-5 in the 2002 sampling rounds are listed in the following table:

***Well TJMW-5***

<b>Constituent</b>	<b>Groundwater Protection Standard (mg/l)</b>	<b>Sampling Round 16 (mg/l)</b>	<b>Sampling Round 17 (mg/l)</b>	<b>Sampling Round 18 (mg/l)</b>	<b>Sampling Round 19 (mg/l)</b>
Lead	0.015	<b>0.10</b>	<b>0.045</b>	<b>0.087</b>	<b>0.022</b>
Thallium	0.002	<b>0.0021</b>	<0.001	0.0017	<0.001
Tetrachloroethene	0.005	<b>0.016</b>	<b>0.011</b>	<b>0.015</b>	<b>0.014</b>

### 3.0 STATISTICAL EVALUATION OF ANALYTICAL RESULTS

The statistical analysis was performed on all constituents returning a measurable concentration in any of the 2002 sampling rounds. Statistical analyses recommended by the EPA (1989, 1992) were performed on groundwater quality data for monitoring wells TJMW-2 (background) TJMW-3, TJMW-4 and TJMW-5 (down gradient). Further statistical analysis of Tetrachloroethene concentrations observed in well TJMW-5 was performed since it was reported above the groundwater protection standards and was not observed in the up gradient well at similar concentrations.

The "Sanitas" software package was used to perform the statistical assessment of the data. Sanitas is a statistical package that follows the EPA process and performs the type of analysis allowed. A flowchart depicting the steps used in the statistical analyses is presented as Plate 1 of Appendix A.

Generally, the analysis completed for the constituents was an interwell Parametric Analysis of Variance (ANOVA). Where the data for a particular constituent had greater than 15% non-detects, a non-parametric ANOVA was completed.

Several cases were encountered where outliers in the data were encountered. Removal of these points would change the data from a non-normal or non-log normal distribution to a normal or log normal distribution. This type of distribution is more appropriate for a statistical assessment. However, EPA recommends that where sufficient reason for removal of the outliers is not available, the data should be kept in the assessment. Since there was no evidence to support the removal of collected data, none of the identified outlier data was removed from the statistical assessment.

Several constituents had results that were ANOVA significant, indicating that the down gradient wells had a statistically different distribution than the up gradient well. A summary table presenting the ANOVA significant results of all constituents with measurable concentrations is presented in Appendix A. Time series graphs for all constituents in this summary table are presented in Appendix B of this report. A review of the data for the constituents listed was completed to identify any unusual characteristics and any suspicious data was checked against the original records.

To continue progressing towards identifying constituents of concern, the time series graphs in Appendix B were also used to compare concentrations in the down gradient wells to the up gradient well for those constituents identified as being ANOVA significant. The following ANOVA significant constituents were identified as having higher measured concentrations down gradient than up gradient in the 2002 sampling rounds:

- Nitrate
- Bicarbonate
- Calcium
- Potassium
- Arsenic
- Barium
- 1,1 Dichloroethene
- Tetrachloroethene
- 1,1,1 Trichloroethane
- Trichloroflouromethane
- Dichlorodiflouromethane

To define the constituents of concern, the constituents listed above were compared to the groundwater protection standards. Only Tetrachloroethene in TJMW-5 was above the groundwater protection standards and was identified as a constituent of concern.

Confidence intervals were performed on this constituent over the last 10 sampling rounds. Based on the Non-Parametric Confidence Interval analysis, the compliance limit of 0.005 mg/l for Tetrachloroethene was not exceeded. The results of this analysis are included in Appendix C.

## 4.0 GROUNDWATER ELEVATIONS

Groundwater elevations in the four monitoring wells have been decreasing over the past few years. As noted previously, wells TJMW-2 and TJMW-3 have dried up to the point that analytical samples can no longer be taken. Also mentioned previously, it is suspected that an up gradient groundwater cutoff wall completed by Kennecott Utah Corporation (KUC), several years of below average precipitation, and down gradient water usage all have contributed to the drop in water levels.

It should also be noted that Kennecott will begin an extensive groundwater recovery/remediation program immediately adjacent to the Trans Jordan site. This process will have an even greater impact to the groundwater elevations and direction of flow at the site. As the impacts from the Kennecott project become evident, modifications to the Trans Jordan groundwater monitoring program will be necessary.

A summary of the change in groundwater elevation and water column height in the wells are provided below:

### *Summary of Groundwater Elevations and Water Column Heights*

<b>Well Identification</b>	<b>Initial GW Elevation</b>	<b>Initial Height of Water Column</b>	<b>Dec. 2002 GW Elevation</b>	<b>Dec. 2002 Height of Water Column</b>
TJMW-1	4852.96	38.80	4828.32	14.16
TJMW-2	4747.27	34.50	4712.82	DRY
TJMW-3	4741.04	30.27	4710.09	DRY
TJMW-4	4728.28	21.85	4710.59	4.16
TJMW-5	4727.09	21.19	4710.44	4.54

These new groundwater elevations for 2002 reflect a general decrease of over three feet from the past year with groundwater elevations in the wells having dropped between 17 and 34 feet since the initial well construction. As noted previously, these new groundwater elevations reflect a change in the direction of the groundwater flow from generally east to generally south, which impacts the up gradient/down gradient well status and ultimately the statistical analysis. Plots of the groundwater contours and complete records, including graphs, of the groundwater elevations over time in all the wells are included in Appendix D.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

In general, organic constituents that have been a concern in the past appear to be decreasing in concentration with time with the exception being Tetrachloroethene. Tetrachloroethene continues to be measured in concentrations above groundwater protection standards in well TJMW-5 and has trended slightly higher in recent years.

Based on a confidence interval analysis of the ten most recent measured concentrations of Tetrachloroethene in well TJMW-5, concentrations currently do not exceed the groundwater protection standard of 0.005 mg/l. However, based on our projections, it is likely the confidence interval for Tetrachloroethene in well TJMW-5 will be exceeded with the next sampling round.

As discussed, Lead and Thallium are metals that have measurable concentrations above groundwater protection standards in the down gradient wells. However, measured concentrations of these metals and others are consistently higher in the up gradient well or are not ANOVA significant and therefore are not considered to be caused by TJL.

Nitrate, Bicarbonate, Calcium, Potassium, 1,1 Dichloroethene, 1,1,1 Trichloroethane, Trichlorofluoromethane and Dichlorodifluoromethane were observed to have higher measured concentrations down gradient than up gradient but either they did not exceed the groundwater protection standards or are not currently regulated under the groundwater protection standards.

The Sampling and Analysis Plan has not been finalized due to the dropping water levels and their impact to the groundwater monitoring system.

## 6.0 LIMITATIONS

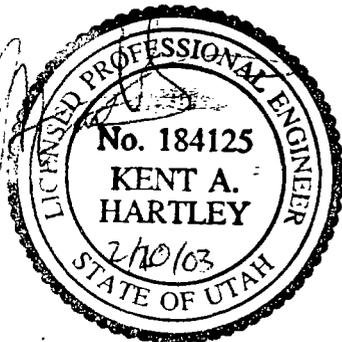
The recommendations contained in this report are based, in part, on historical sampling data that was performed by others and on ongoing data collected by IGES. IGES assumes no liability as to the accuracy of the historical data used in this assessment.

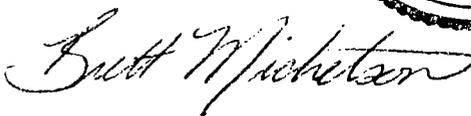
This report was prepared in accordance with the generally accepted standard of practice at the time this report was written. No warranty, expressed or implied, is made.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report, please do not hesitate to contact us at your convenience (801) 521-1800.

Respectfully submitted,  
**IGES, Inc.**

  
Kent A. Hartley, P.E.  
Associate





Brett D. Mickelson, P.E.  
Principal

Run

Done

stop

n>?

nd

resid. normal?

transform

continue?

eq. of var.

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stop

p anova

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stop

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Rev	
Revised/Issue	Date

TRANS-JORDAN LANDFILL  
2002 GROUNDWATER MONITORING

Project Number 00102-001

# SANITAS DECISION FLOWCHART

Drawing Notes

PLATE

A-1

# Analysis of Variance Summary

Date: 2/20/03, 4:22:11 PM

Facility: Trans-Jordan-Cities/

Data File: 2002gw

Client: IGES

Constituent	CAS#	Well	Calculated	Critical	Signif	Alpha	Bg Wells	Transform	ANOVA Sig.	Alpha	Method
Ammonia (mg/l)	7664-41-7	MW-3	-33.006	15.247	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Ammonia (mg/l)	7664-41-7	MW-4	-36.433	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Ammonia (mg/l)	7664-41-7	MW-5	-33.960	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Nitrate (mg/l)	n/a	MW-3	42.976	15.126	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Nitrate (mg/l)	n/a	MW-4	49.187	15.395	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Nitrate (mg/l)	n/a	MW-5	24.837	15.126	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Bicarbonate (mg/l)	n/a	MW-3	40.605	15.247	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Bicarbonate (mg/l)	n/a	MW-4	23.944	15.498	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Bicarbonate (mg/l)	n/a	MW-5	60.000	15.498	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
pH (pH-units)	n/a	MW-3	45.684	15.247	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (equality of variance)
pH (pH-units)	n/a	MW-4	45.583	15.498	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (equality of variance)
pH (pH-units)	n/a	MW-5	33.000	15.498	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (equality of variance)
Calcium (mg/l)	n/a	MW-3	2.47	0.571	Yes	0.01667	MW-2	square root(x)	Yes	0.05	Parametric
Calcium (mg/l)	n/a	MW-4	1.25	0.581	Yes	0.01667	MW-2	square root(x)	Yes	0.05	Parametric
Calcium (mg/l)	n/a	MW-5	4.79	0.581	Yes	0.01667	MW-2	square root(x)	Yes	0.05	Parametric
Potassium (mg/l)	n/a	MW-3	2.785	15.247	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Potassium (mg/l)	n/a	MW-4	14.788	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Potassium (mg/l)	n/a	MW-5	36.371	15.498	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Chloride (mg/l)	n/a	MW-3	-40.075	15.247	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Chloride (mg/l)	n/a	MW-4	-28.786	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Chloride (mg/l)	n/a	MW-5	-15.536	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Sodium (mg/l)	n/a	MW-3	6.344	15.247	No	0.01667	MW-2	n/a	No	0.05	NP (normality)
Sodium (mg/l)	n/a	MW-4	-3.810	15.498	No	0.01667	MW-2	n/a	No	0.05	NP (normality)
Sodium (mg/l)	n/a	MW-5	-2.393	15.498	No	0.01667	MW-2	n/a	No	0.05	NP (normality)
Iron (mg/l)	7439-89-6	MW-3	-2.33	1.43	No	0.01667	MW-2	square root(x)	Yes	0.05	Parametric
Iron (mg/l)	7439-89-6	MW-4	-1.27	1.46	No	0.01667	MW-2	square root(x)	Yes	0.05	Parametric
Iron (mg/l)	7439-89-6	MW-5	-2.31	1.46	No	0.01667	MW-2	square root(x)	Yes	0.05	Parametric
Sulfate (mg/l)	n/a	MW-3	-39.737	15.247	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Sulfate (mg/l)	n/a	MW-4	-56.694	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Sulfate (mg/l)	n/a	MW-5	-28.167	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Magnesium (mg/l)	n/a	MW-3	-45.474	15.247	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Magnesium (mg/l)	n/a	MW-4	-54.444	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Magnesium (mg/l)	n/a	MW-5	-24.361	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
TDS (mg/l)	n/a	MW-3	-46.237	15.247	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
TDS (mg/l)	n/a	MW-4	-51.417	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
TDS (mg/l)	n/a	MW-5	-26.583	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Manganese (mg/l)	7439-96-5	MW-3	-42.132	15.247	No	0.01667	MW-2	n/a	Yes	0.05	NP (no

# Analysis of Variance Summary

Date 2/20/03, 4  
Data File 2002gw

Facility Trans-Jordan-Cities/  
Client IGES

Constituent	CAS#	Well	Calculated	Critical	Signif	Alpha	Bg Wells	Transform	ANOVA Sig	Alpha	Method
Manganese (mg/l)	7439-96-5	MW-4	-40.583	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Manganese (mg/l)	7439-96-5	MW-5	-37.139	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
TOC (mg/l)	n/a	MW-3	-1.667	15.049	No	0.01667	MW-2	n/a	No	0.05	NP (non-detects)
TOC (mg/l)	n/a	MW-4	0.667	15.049	No	0.01667	MW-2	n/a	No	0.05	NP (non-detects)
TOC (mg/l)	n/a	MW-5	12.039	15.312	No	0.01667	MW-2	n/a	No	0.05	NP (non-detects)
Arsenic (mg/l)	7440-38-2	MW-3	13.133	15.575	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Arsenic (mg/l)	7440-38-2	MW-4	24.293	16.719	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Arsenic (mg/l)	7440-38-2	MW-5	11.285	17.011	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Barium (mg/l)	7440-39-3	MW-3	0.138	0.157	No	0.01667	MW-2	square root(x)	Yes	0.05	Parametric
Barium (mg/l)	7440-39-3	MW-4	0.263	0.16	Yes	0.01667	MW-2	square root(x)	Yes	0.05	Parametric
Barium (mg/l)	7440-39-3	MW-5	0.109	0.16	No	0.01667	MW-2	square root(x)	Yes	0.05	Parametric
Beryllium (mg/l)	7440-41-7	MW-3	-45.854	15.575	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Beryllium (mg/l)	7440-41-7	MW-4	-42.658	16.719	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Beryllium (mg/l)	7440-41-7	MW-5	-53.111	17.011	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Cadmium (mg/l)	7440-43-9	MW-3	-45.542	15.575	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Cadmium (mg/l)	7440-43-9	MW-4	-49.921	16.719	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Cadmium (mg/l)	7440-43-9	MW-5	-45.861	17.011	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Chromium (mg/l)	n/a	MW-3	-12.165	15.575	No	0.01667	MW-2	n/a	No	0.05	NP (normality)
Chromium (mg/l)	n/a	MW-4	-4.447	16.719	No	0.01667	MW-2	n/a	No	0.05	NP (normality)
Chromium (mg/l)	n/a	MW-5	-17.699	17.011	No	0.01667	MW-2	n/a	No	0.05	NP (normality)
Cobalt (mg/l)	7440-48-4	MW-3	-44.816	15.247	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Cobalt (mg/l)	7440-48-4	MW-4	-40.556	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Cobalt (mg/l)	7440-48-4	MW-5	-38.944	15.498	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Copper (mg/l)	7440-50-8	MW-3	-48.208	15.575	No	0.01667	MW-2	n/a	Yes	0.05	NP (equality of variance)
Copper (mg/l)	7440-50-8	MW-4	-41.553	16.719	No	0.01667	MW-2	n/a	Yes	0.05	NP (equality of variance)
Copper (mg/l)	7440-50-8	MW-5	-51.139	17.011	No	0.01667	MW-2	n/a	Yes	0.05	NP (equality of variance)
Lead (mg/l)	n/a	MW-3	-1.273	15.575	No	0.01667	MW-2	n/a	No	0.05	NP (equality of variance)
Lead (mg/l)	n/a	MW-4	1.113	16.719	No	0.01667	MW-2	n/a	No	0.05	NP (equality of variance)
Lead (mg/l)	n/a	MW-5	-17.439	17.011	No	0.01667	MW-2	n/a	No	0.05	NP (equality of variance)
Nickel (mg/l)	7440-02-0	MW-3	-41.750	15.410	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Nickel (mg/l)	7440-02-0	MW-4	-44.778	16.831	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Nickel (mg/l)	7440-02-0	MW-5	-54.556	16.831	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Silver (mg/l)	7440-22-4	MW-3	-15.172	15.575	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Silver (mg/l)	7440-22-4	MW-4	-17.371	16.719	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Silver (mg/l)	7440-22-4	MW-5	-17.929	17.011	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Thallium (mg/l)	n/a	MW-3	-19.951	15.575	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Thallium (mg/l)	n/a	MW-4	-34.181	16.719	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)

# Analysis of Variance Summary

Date: 2/20/03, 4:22:41 M

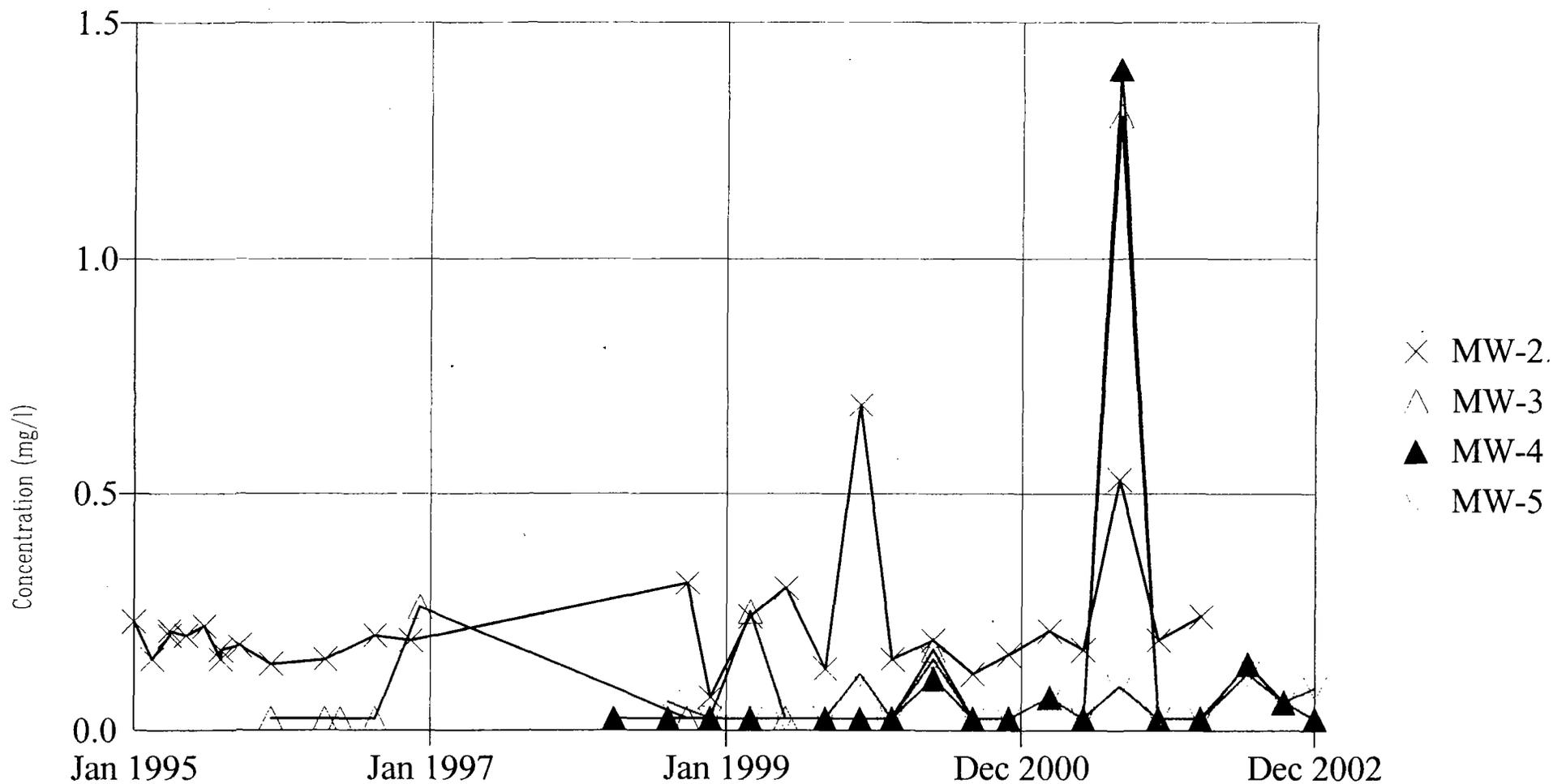
Facility: Trans-Jordan-Cities/

Data File: 2002gw

Client: IGES

Constituent	CAS#	Well	Calculated	Critical	Signif.	Alpha	Bq Wells	Transform	ANOVA Sig	Alpha	Method
Thallium (mg/l)	n/a	MW-5	-42.159	17.011	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Vanadium (mg/l)	7440-62-2	MW-3	-15.852	15.247	No	0.01667	MW-2	n/a	No	0.05	NP (normality)
Vanadium (mg/l)	7440-62-2	MW-4	-10.450	15.498	No	0.01667	MW-2	n/a	No	0.05	NP (normality)
Vanadium (mg/l)	7440-62-2	MW-5	-17.034	15.498	No	0.01667	MW-2	n/a	No	0.05	NP (normality)
Zinc (mg/l)	7440-66-6	MW-3	-47.625	15.575	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Zinc (mg/l)	7440-66-6	MW-4	-44.605	16.719	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Zinc (mg/l)	7440-66-6	MW-5	-48.694	17.011	No	0.01667	MW-2	n/a	Yes	0.05	NP (normality)
Chloroethane (ug/l)	75-00-3	MW-3	-3.554	15.674	No	0.01667	MW-2	n/a	No	0.05	NP (non-detects)
Chloroethane (ug/l)	75-00-3	MW-4	-17.306	16.923	No	0.01667	MW-2	n/a	No	0.05	NP (non-detects)
Chloroethane (ug/l)	75-00-3	MW-5	-0.329	16.629	No	0.01667	MW-2	n/a	No	0.05	NP (non-detects)
1,1-Dichloroethene (ug/l)	75-35-4	MW-3	1.848	15.508	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
1,1-Dichloroethene (ug/l)	75-35-4	MW-4	0.000	16.744	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
1,1-Dichloroethene (ug/l)	75-35-4	MW-5	28.639	16.744	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Tetrachloroethene (ug/l)	127-18-4	MW-3	32.701	15.642	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Tetrachloroethene (ug/l)	127-18-4	MW-4	-1.132	17.102	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Tetrachloroethene (ug/l)	127-18-4	MW-5	46.604	16.805	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
1,1,1-Trichloroethane (ug/	71-55-6	MW-3	22.271	15.314	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
1,1,1-Trichloroethane (ug/	71-55-6	MW-4	2.063	17.415	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
1,1,1-Trichloroethane (ug/	71-55-6	MW-5	50.895	16.453	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Trichlorofluoromethane (ug	75-69-4	MW-3	36.957	15.642	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Trichlorofluoromethane (ug	75-69-4	MW-4	-1.397	17.102	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Trichlorofluoromethane (ug	75-69-4	MW-5	10.156	16.805	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Dichlorodifluoromethane (u	75-71-8	MW-3	13.407	15.141	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Dichlorodifluoromethane (u	75-71-8	MW-4	-5.785	15.995	No	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)
Dichlorodifluoromethane (u	75-71-8	MW-5	22.810	15.753	Yes	0.01667	MW-2	n/a	Yes	0.05	NP (non-detects)

# TIME SERIES



Constituent: Ammonia (mg/l)

Facility: Trans-Jordan-Cities/

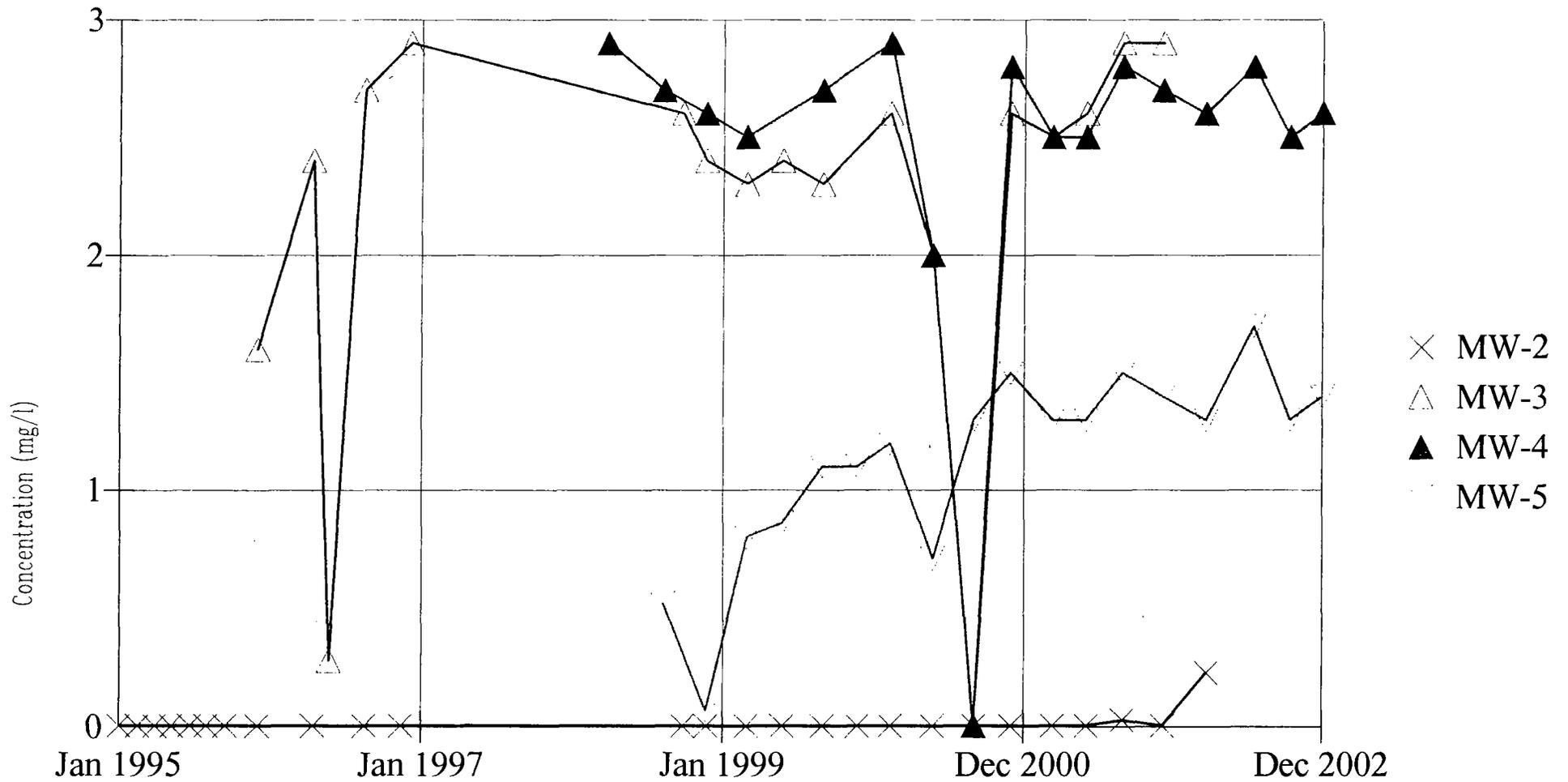
Data File: 2002gw

Date: 2/20/03, 4:34 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: Nitrate (mg/l)

Date: 2/20/03, 4:36 PM

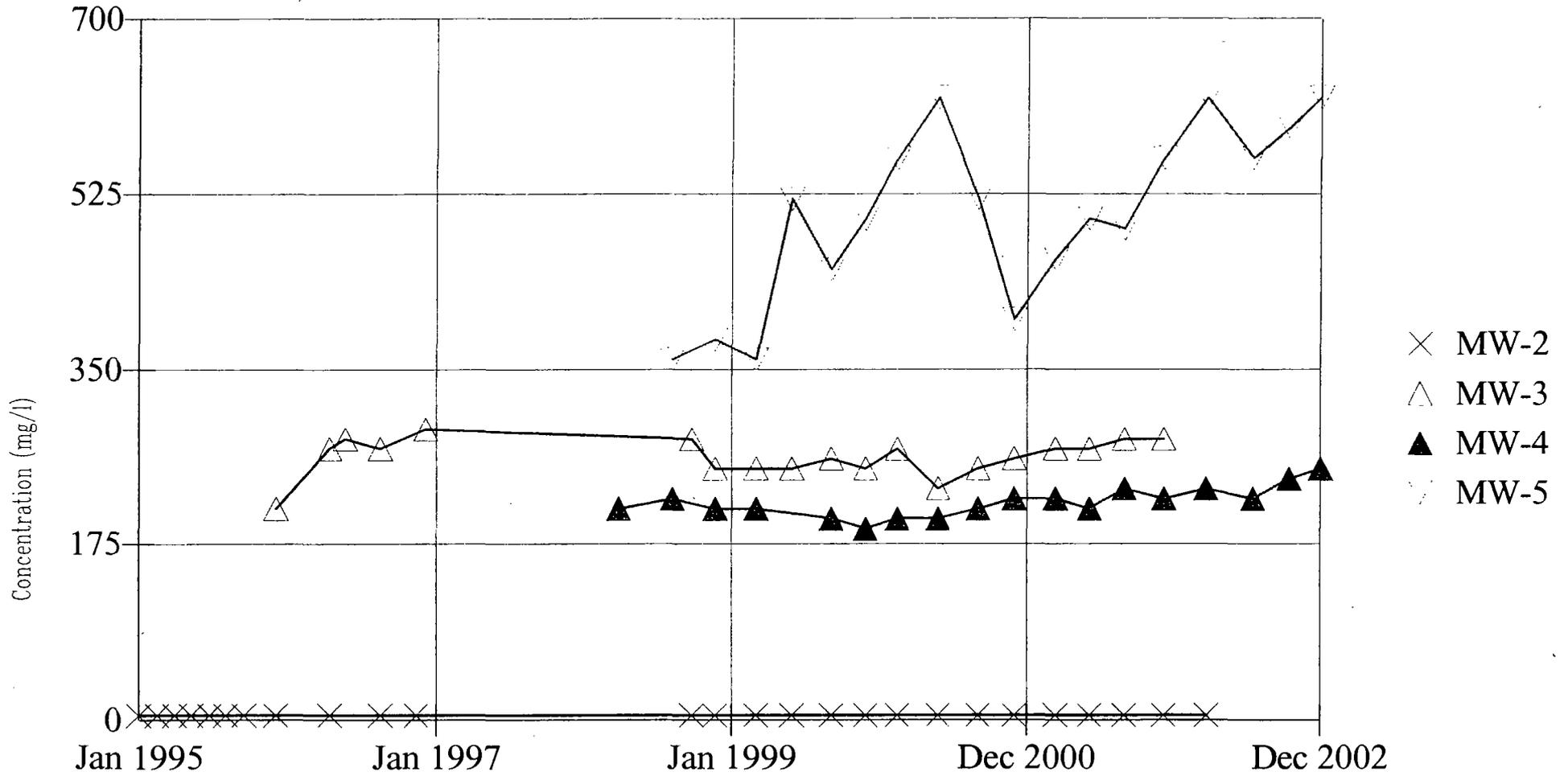
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Bicarbonate (mg/l)

Date: 2/20/03, 4:37 PM

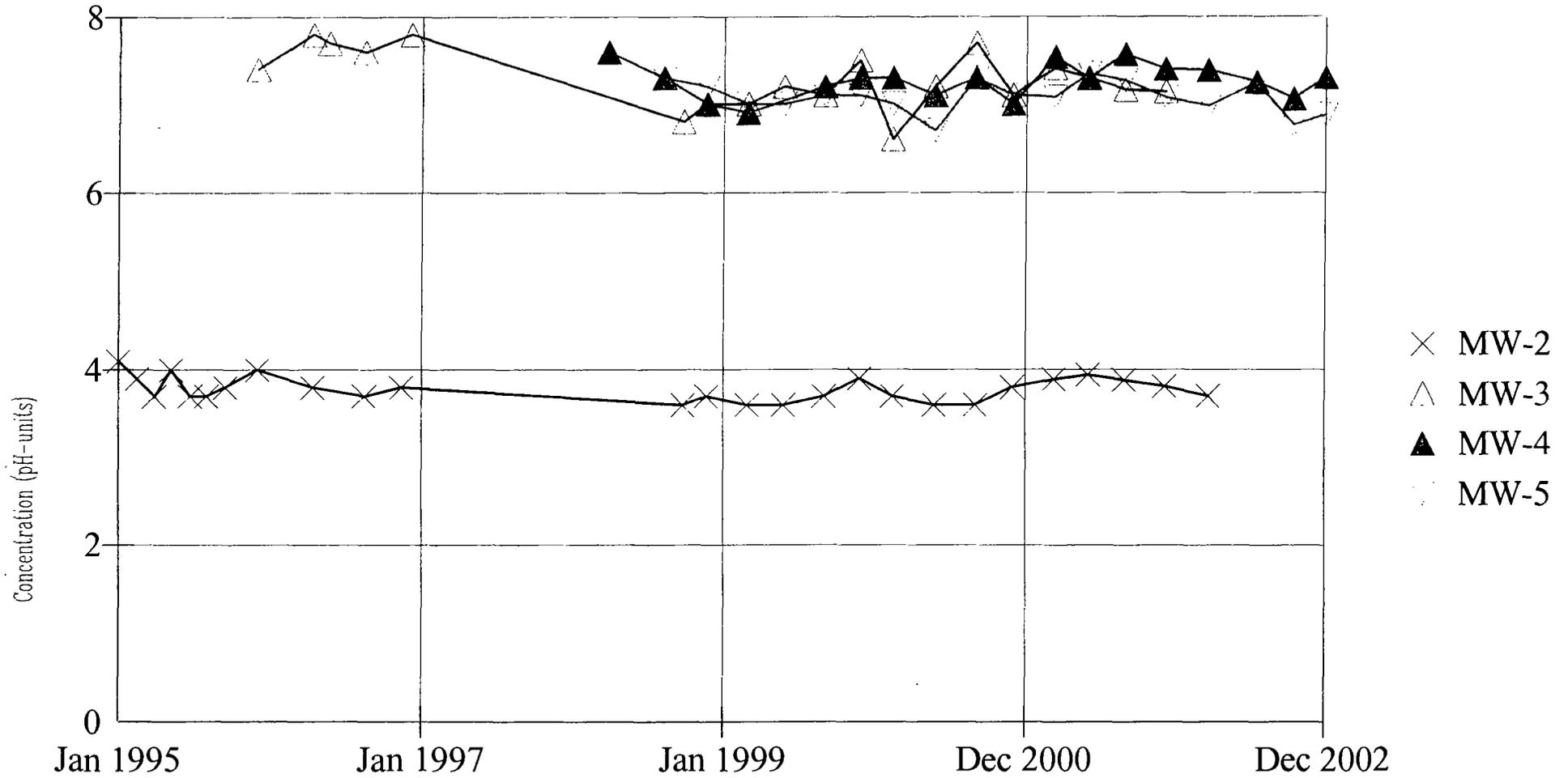
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: pH (pH-units)

Date: 2/20/03, 4:38 PM

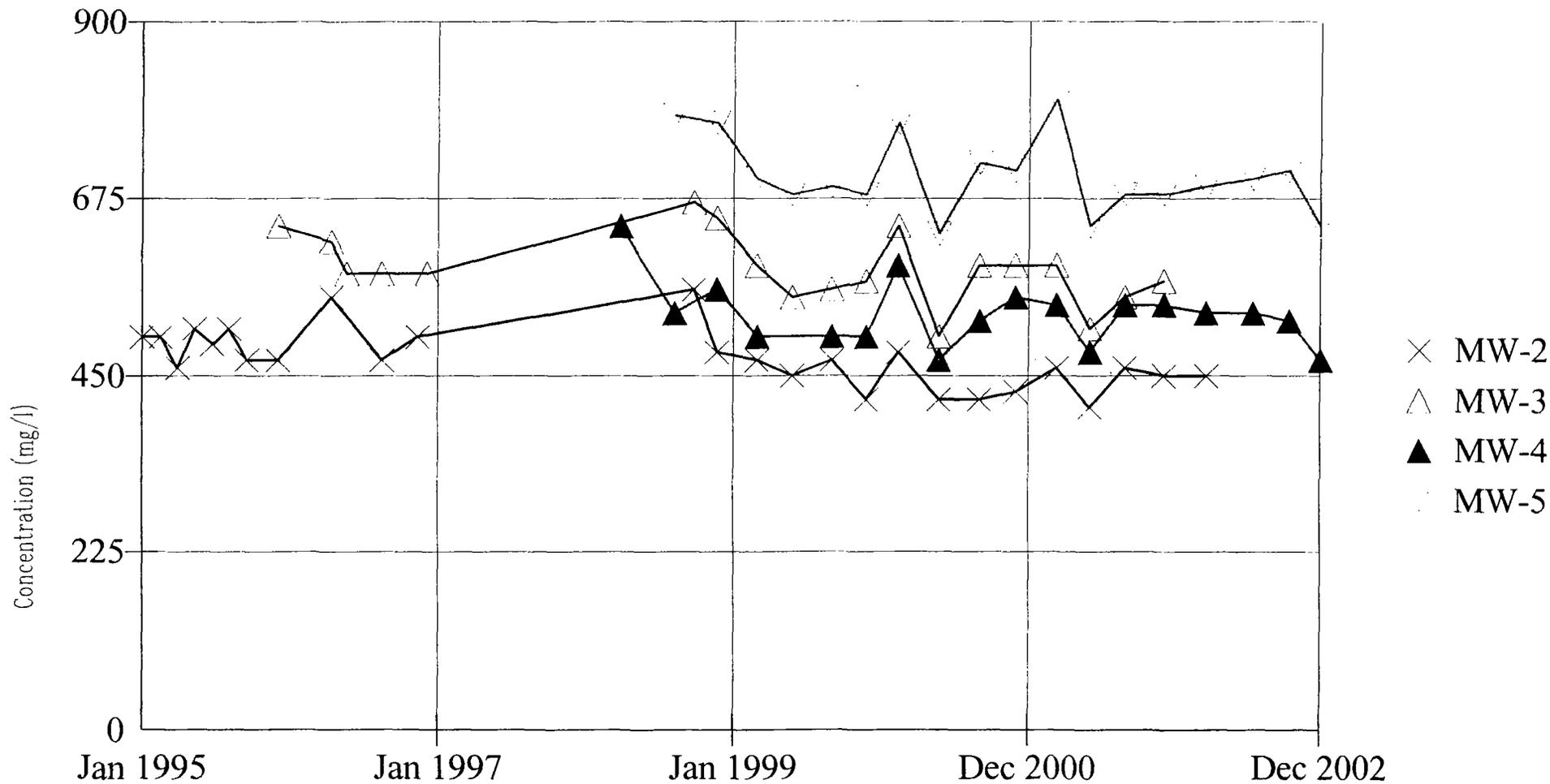
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Calcium (mg/l)

Facility: Trans-Jordan-Cities/

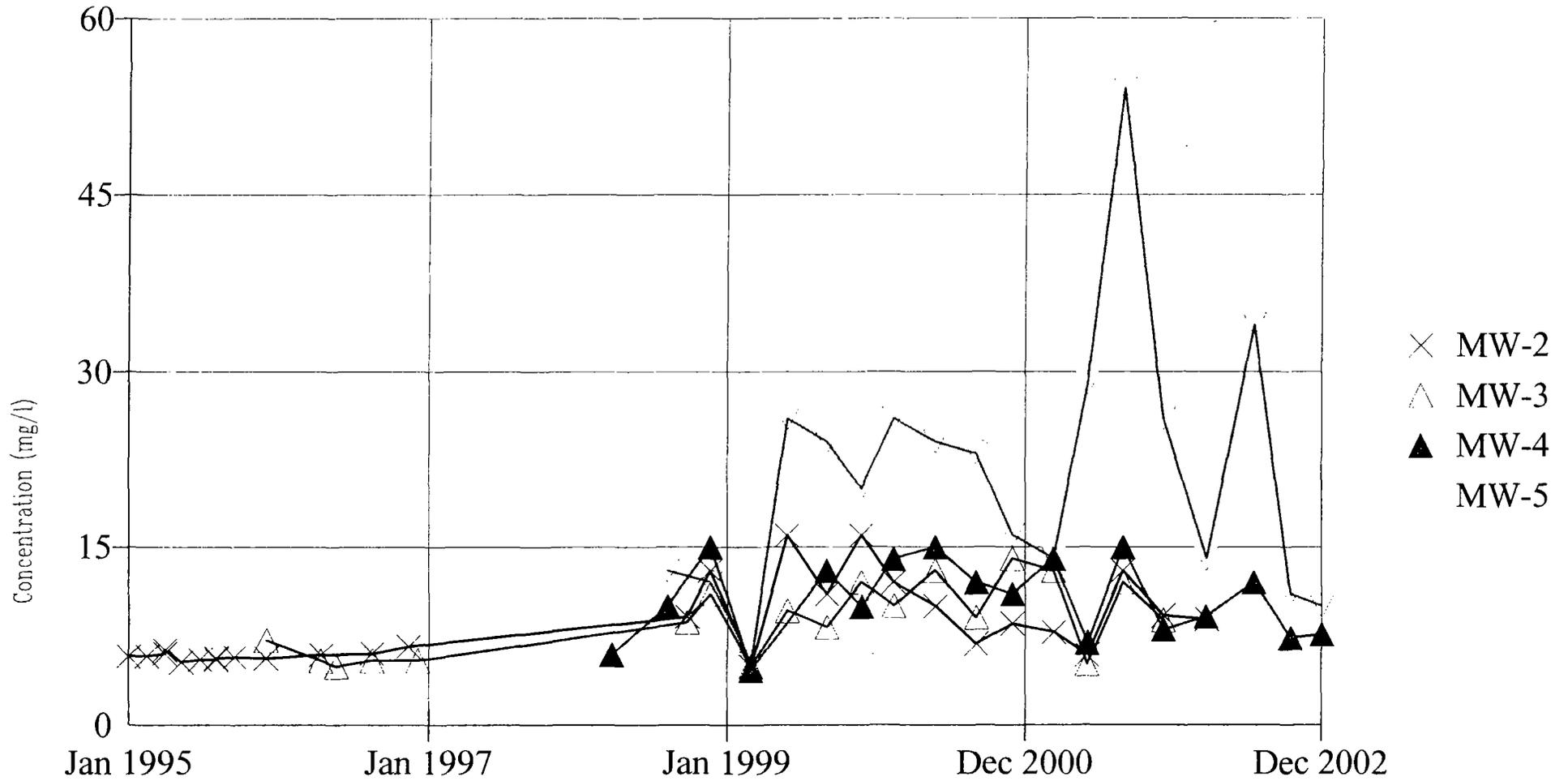
Data File: 2002gw

Date: 2/20/03, 4:39 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: Potassium (mg/l)

Date: 2/20/03, 4:40 PM

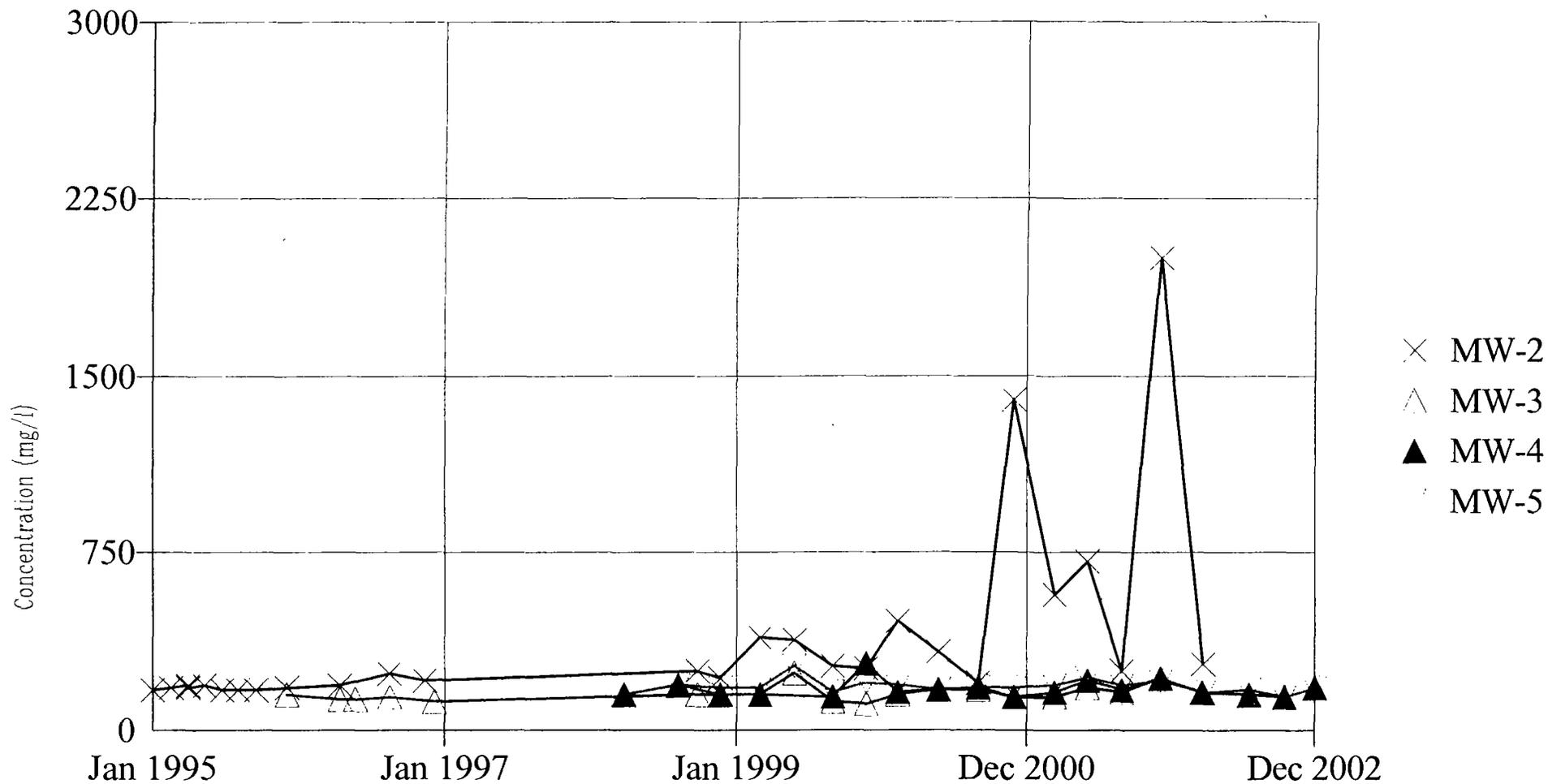
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Chloride (mg/l)

Facility: Trans-Jordan-Cities/

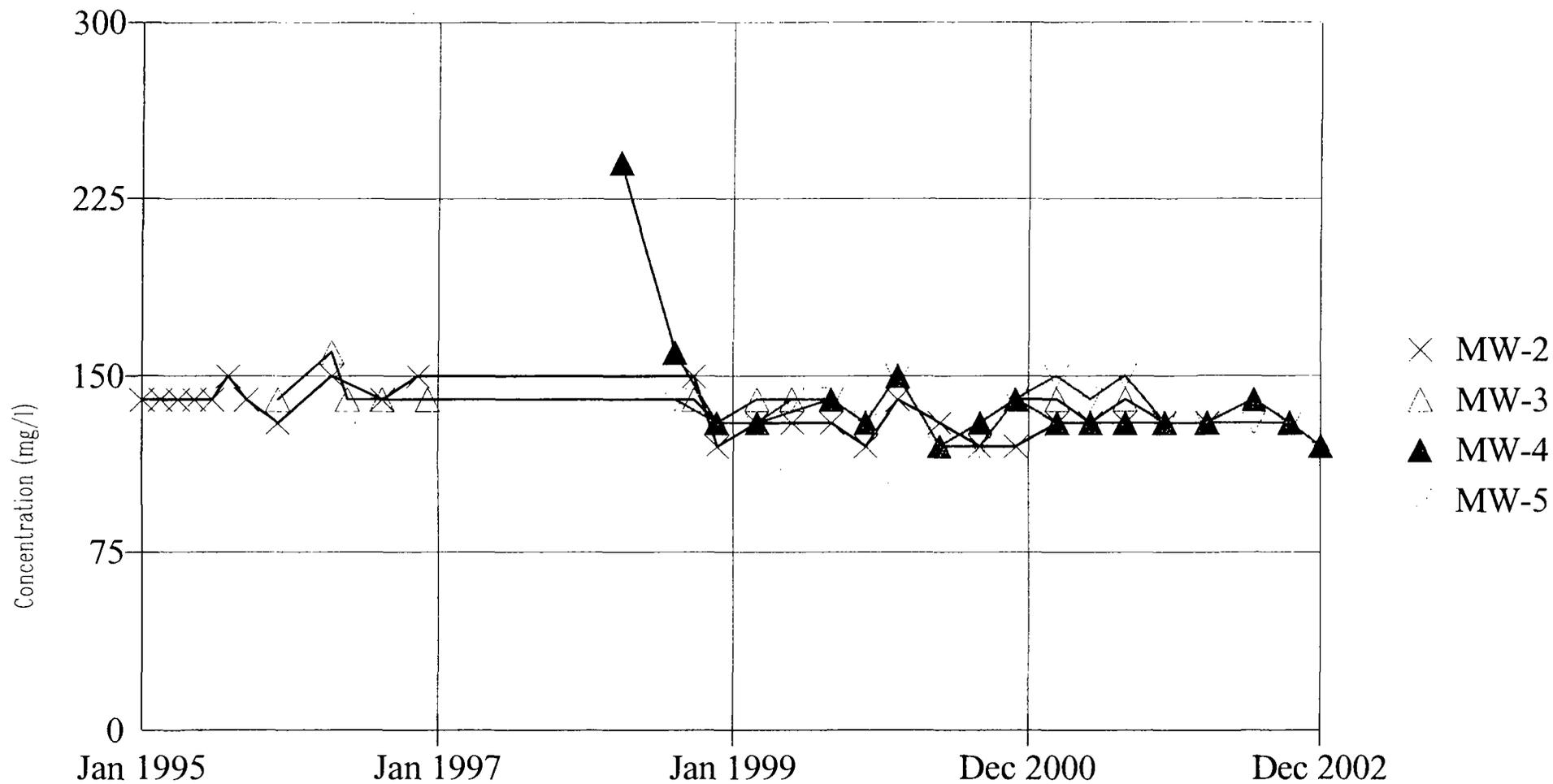
Data File: 2002gw

Date: 2/20/03, 4:42 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: Sodium (mg/l)

Facility: Trans-Jordan-Cities/

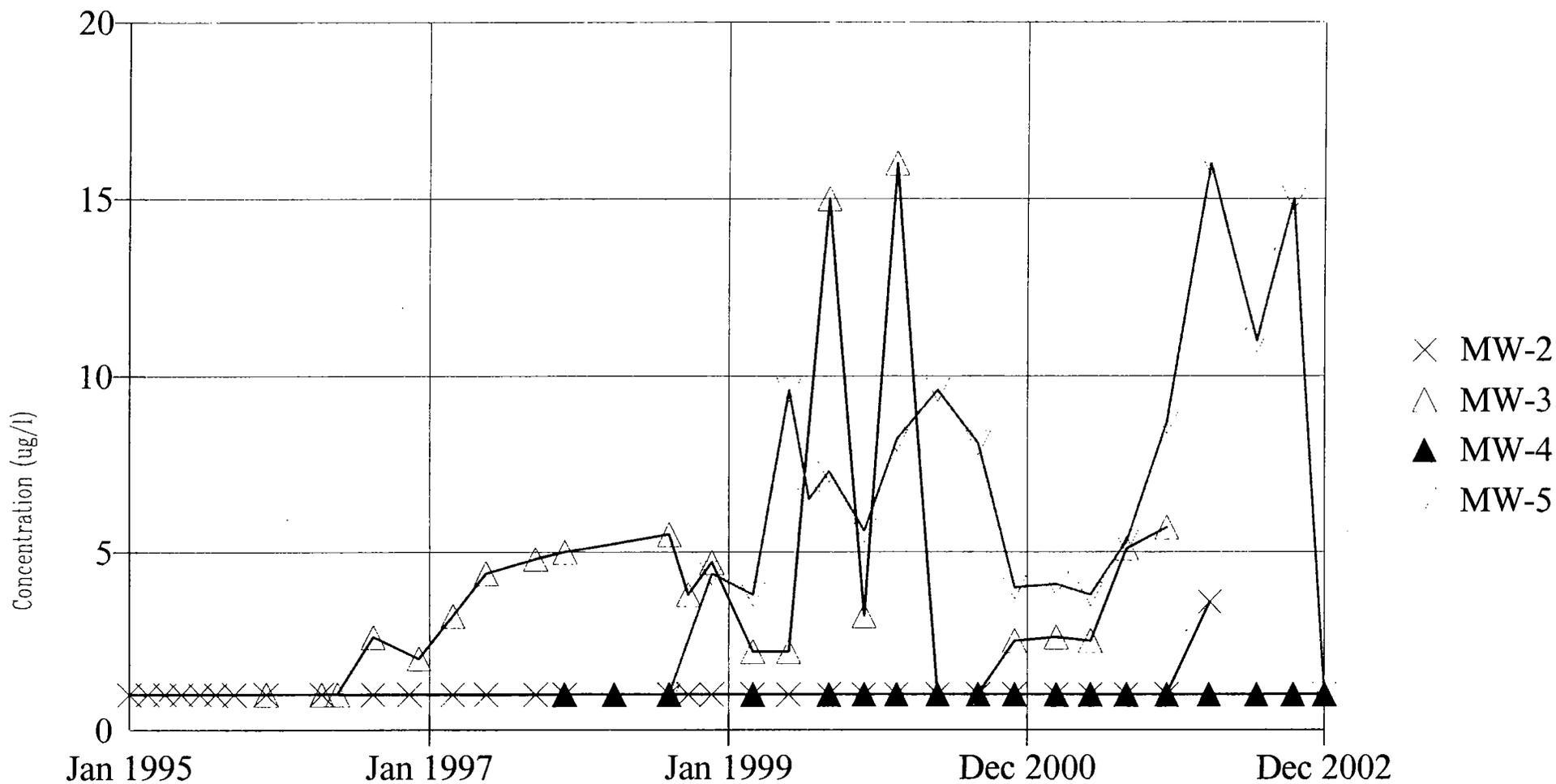
Data File: 2002gw

Date: 2/20/03, 4:43 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: Tetrachloroethene (ug/l)

Facility: Trans-Jordan-Cities/

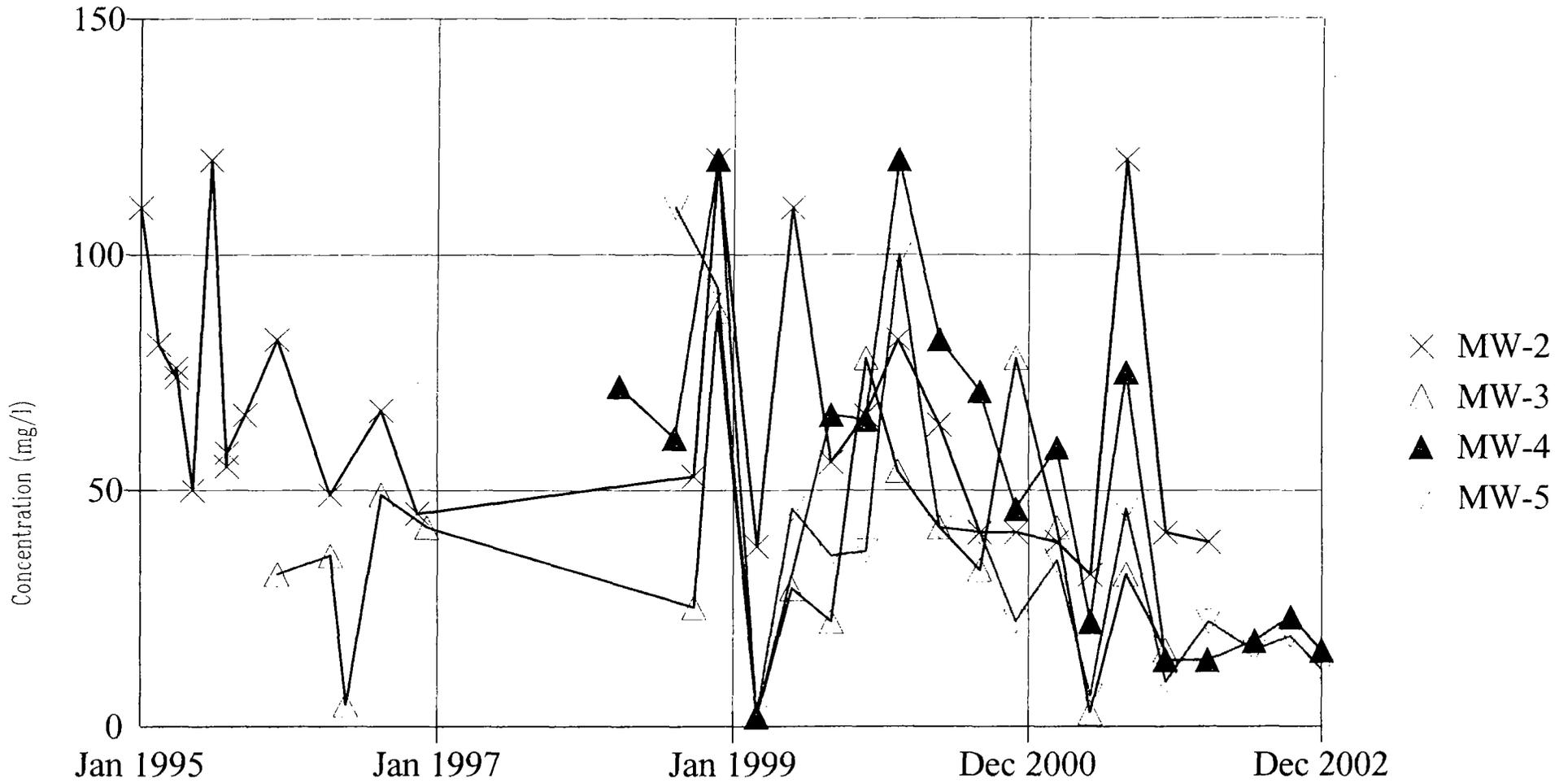
Data File: 2002gw

Date: 2/20/03, 4:58 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: Iron (mg/l)

Date: 2/20/03, 4:43 PM

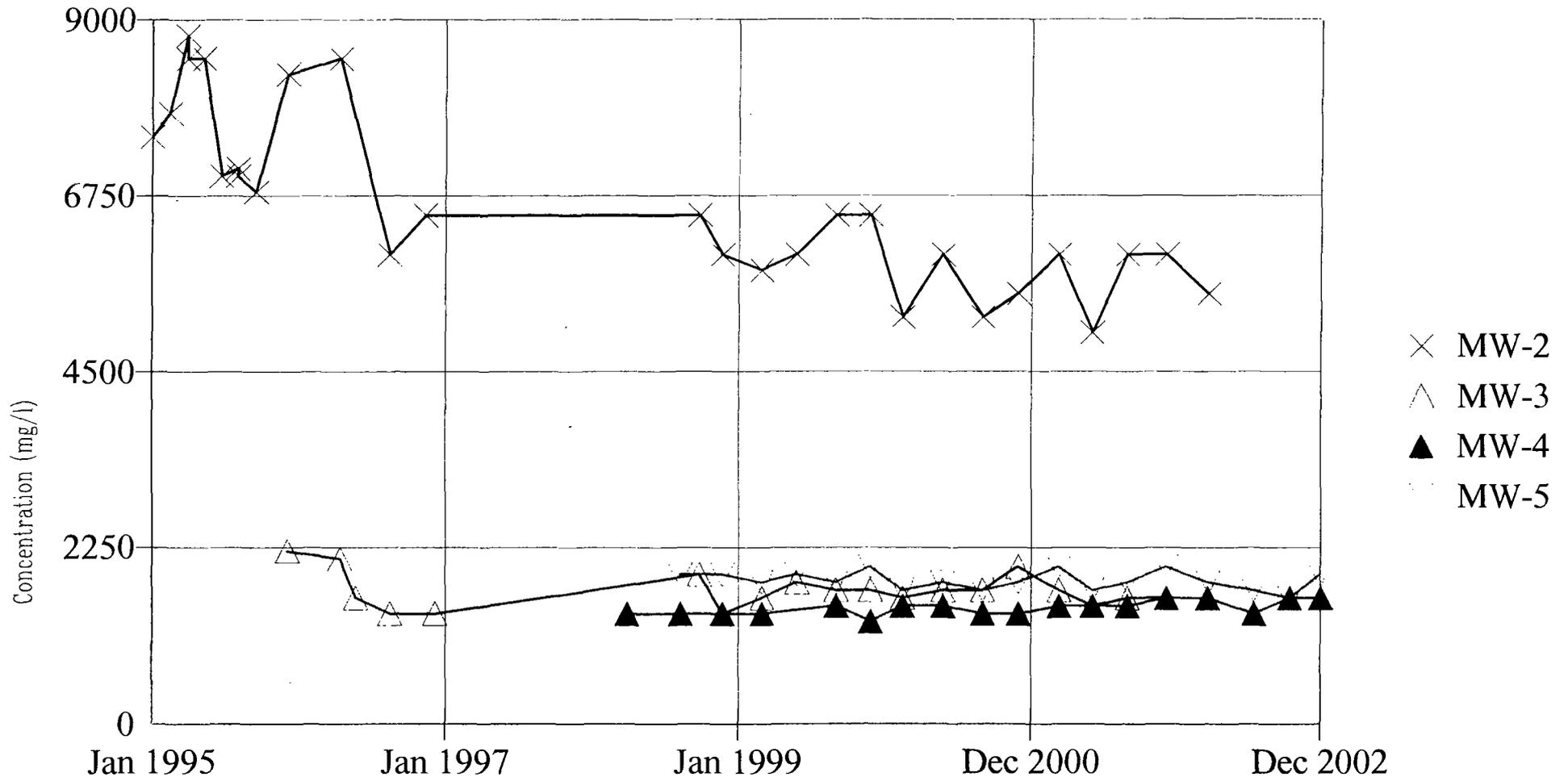
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Sulfate (mg/l)

Date: 2/20/03, 4:44 PM

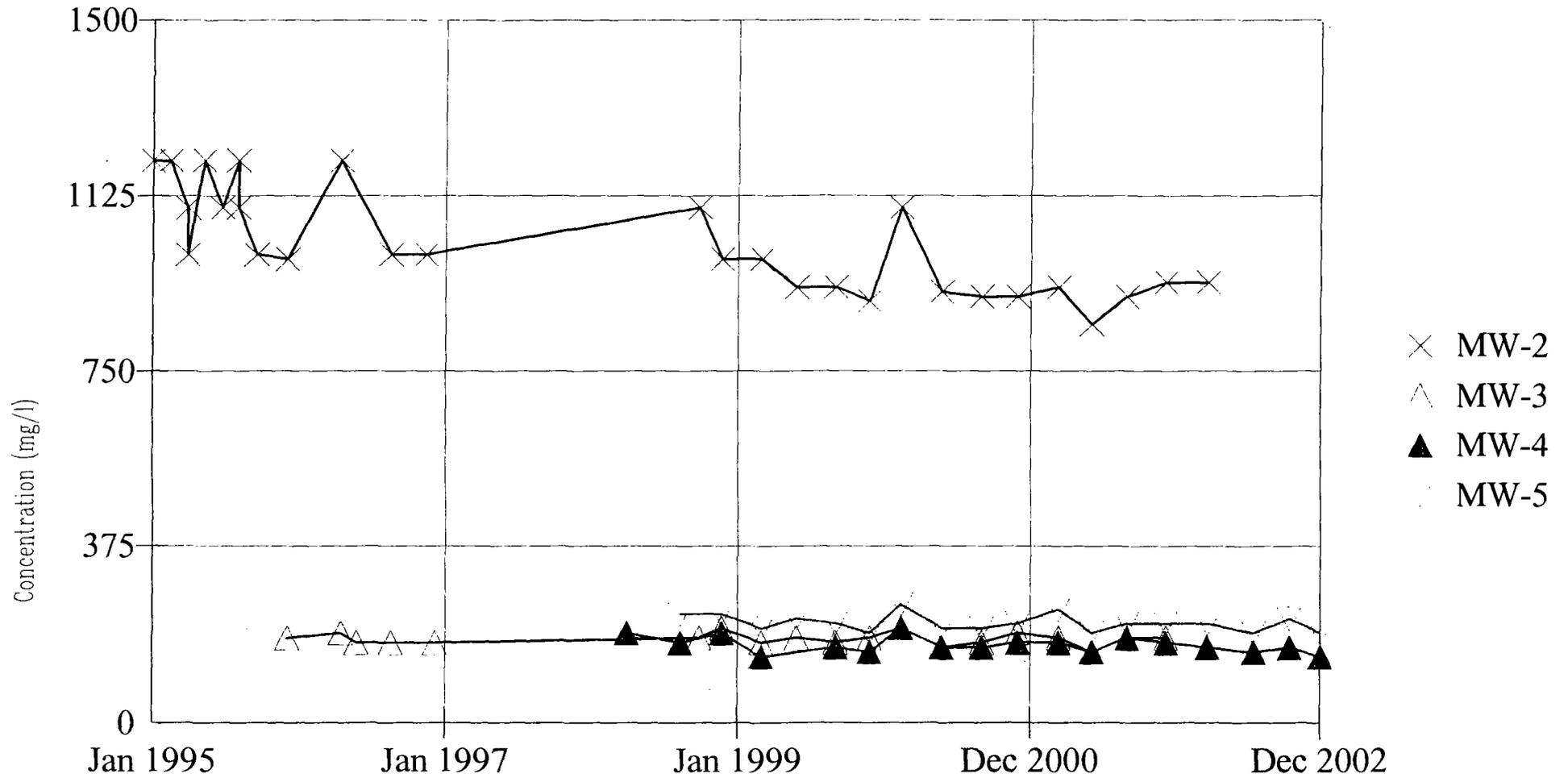
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Magnesium (mg/l)

Date: 2/20/03, 4:44 PM

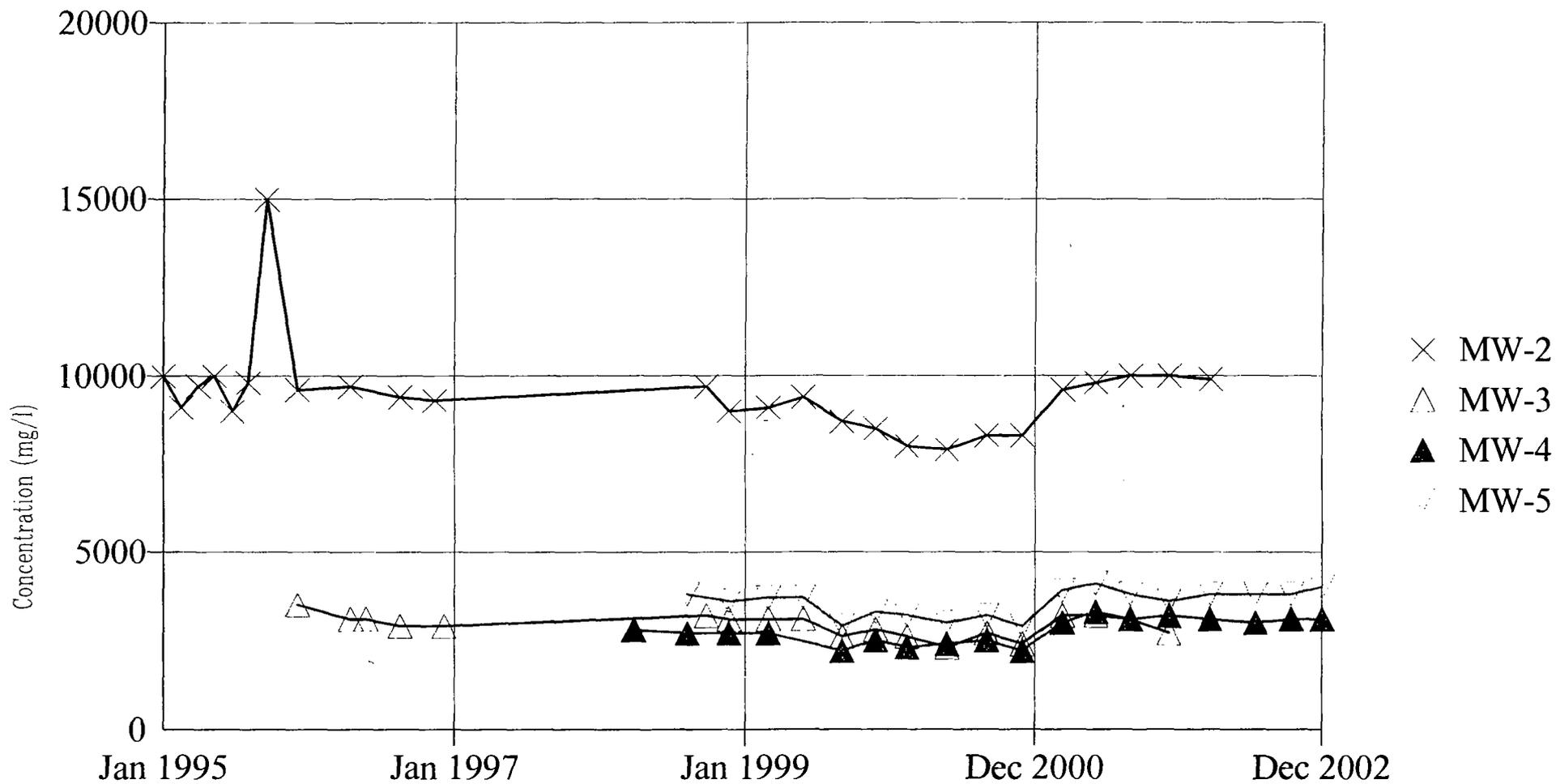
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: TDS (mg/l)

Date: 2/20/03, 4:45 PM

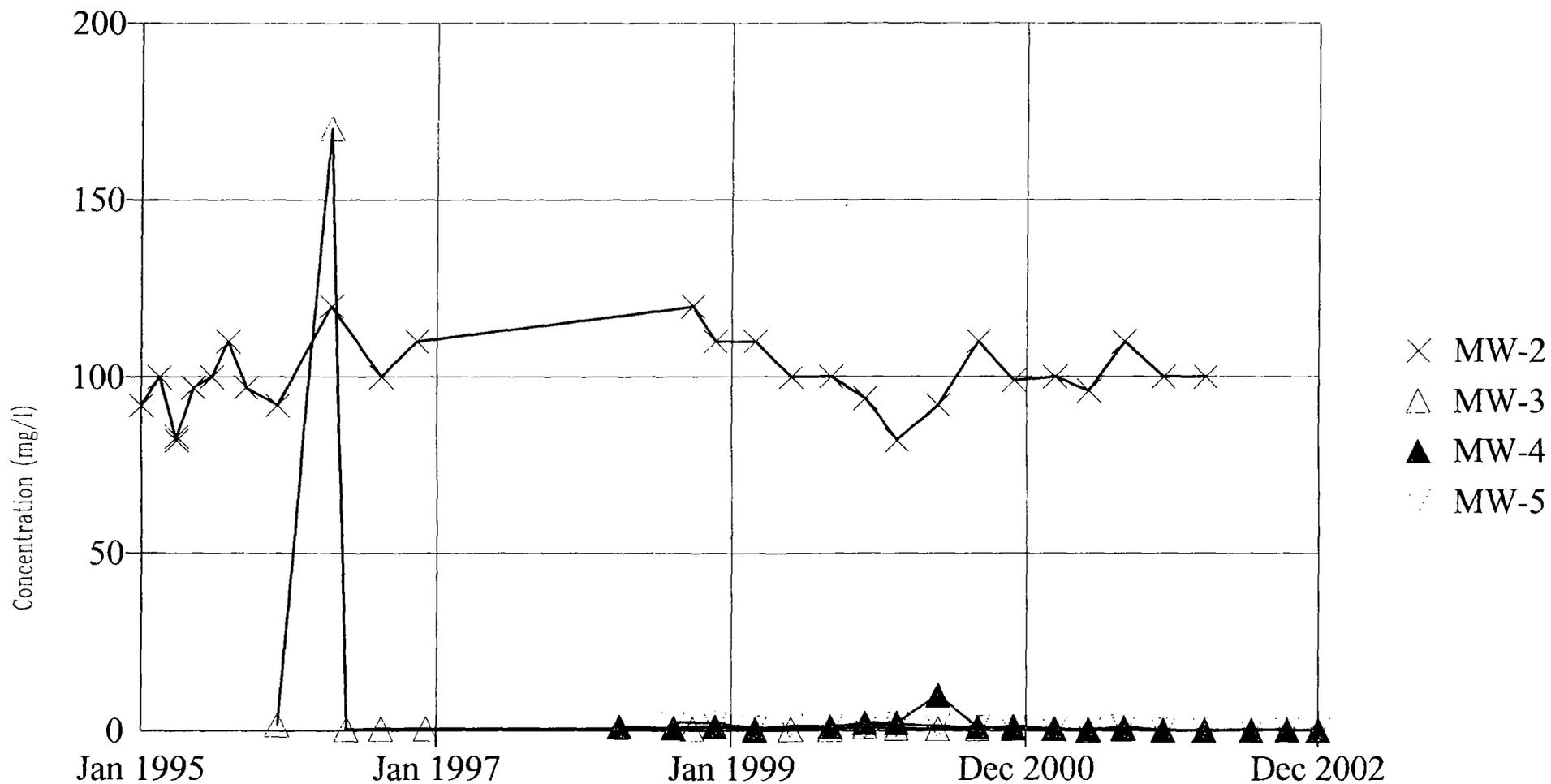
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Manganese (mg/l)

Facility: Trans-Jordan-Cities/

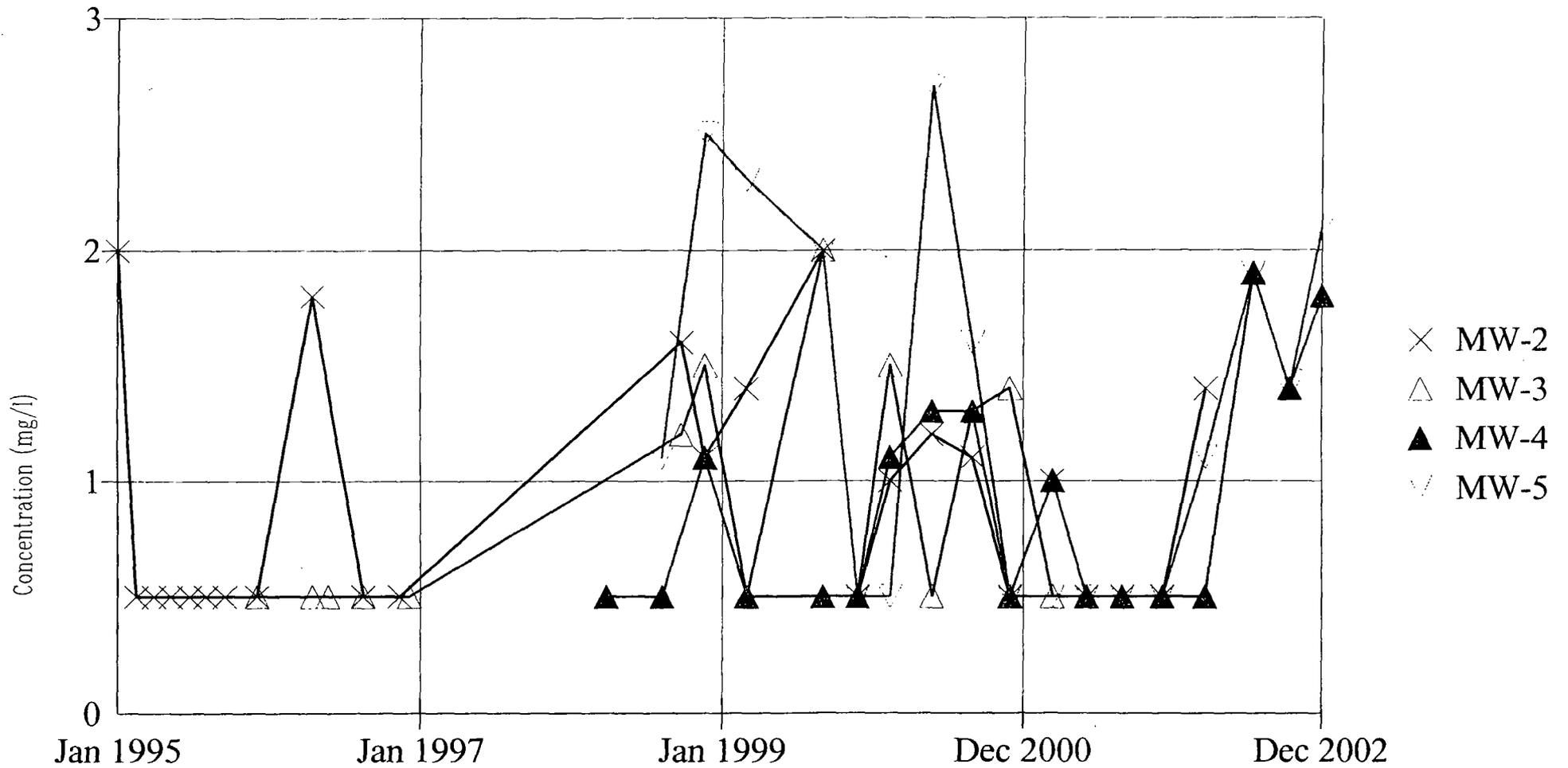
Data File: 2002gw

Date: 2/20/03, 4:46 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: TOC (mg/l)

Date: 2/20/03, 4:46 PM

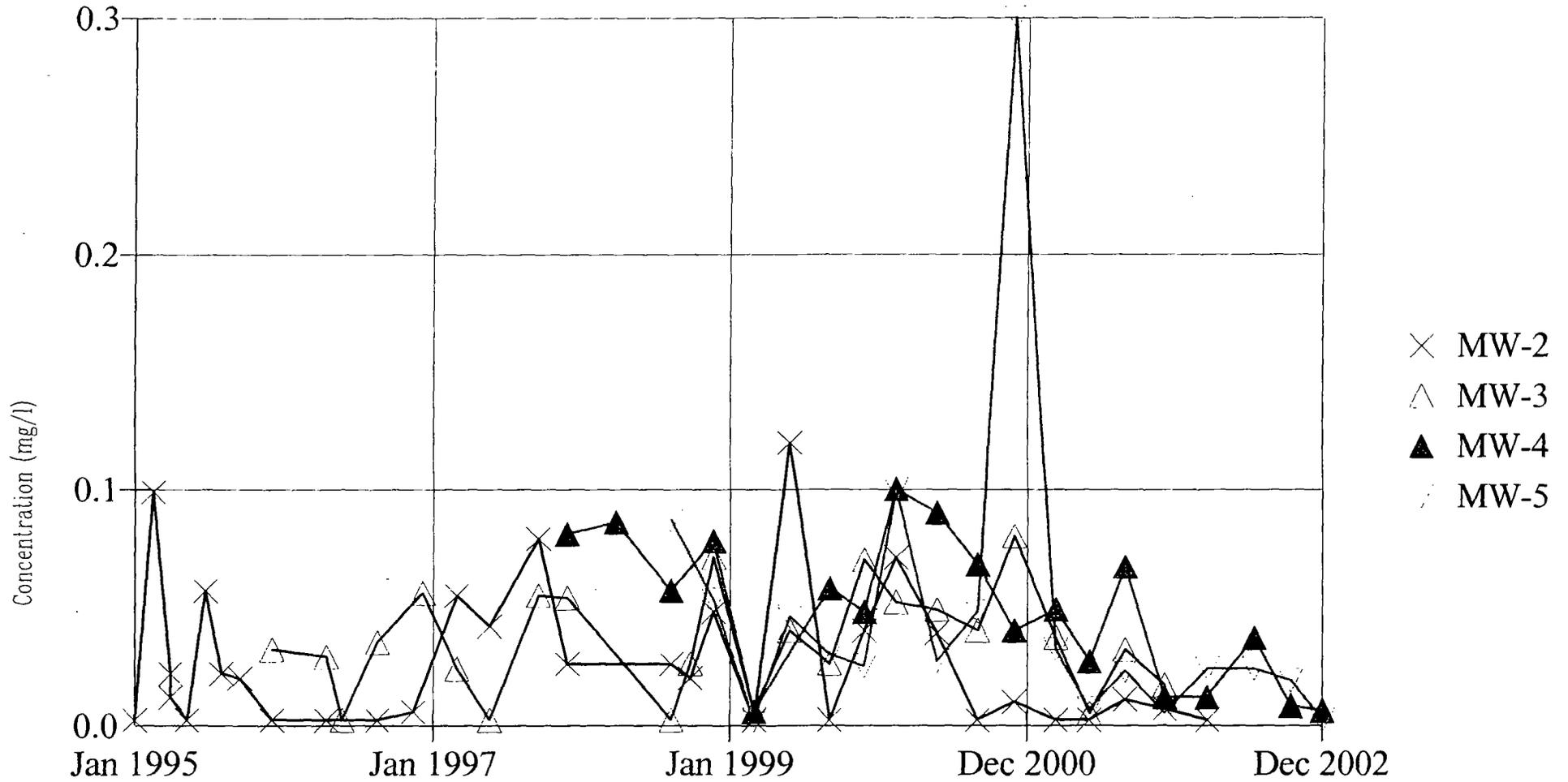
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Arsenic (mg/l)

Date: 2/20/03, 4:47 PM

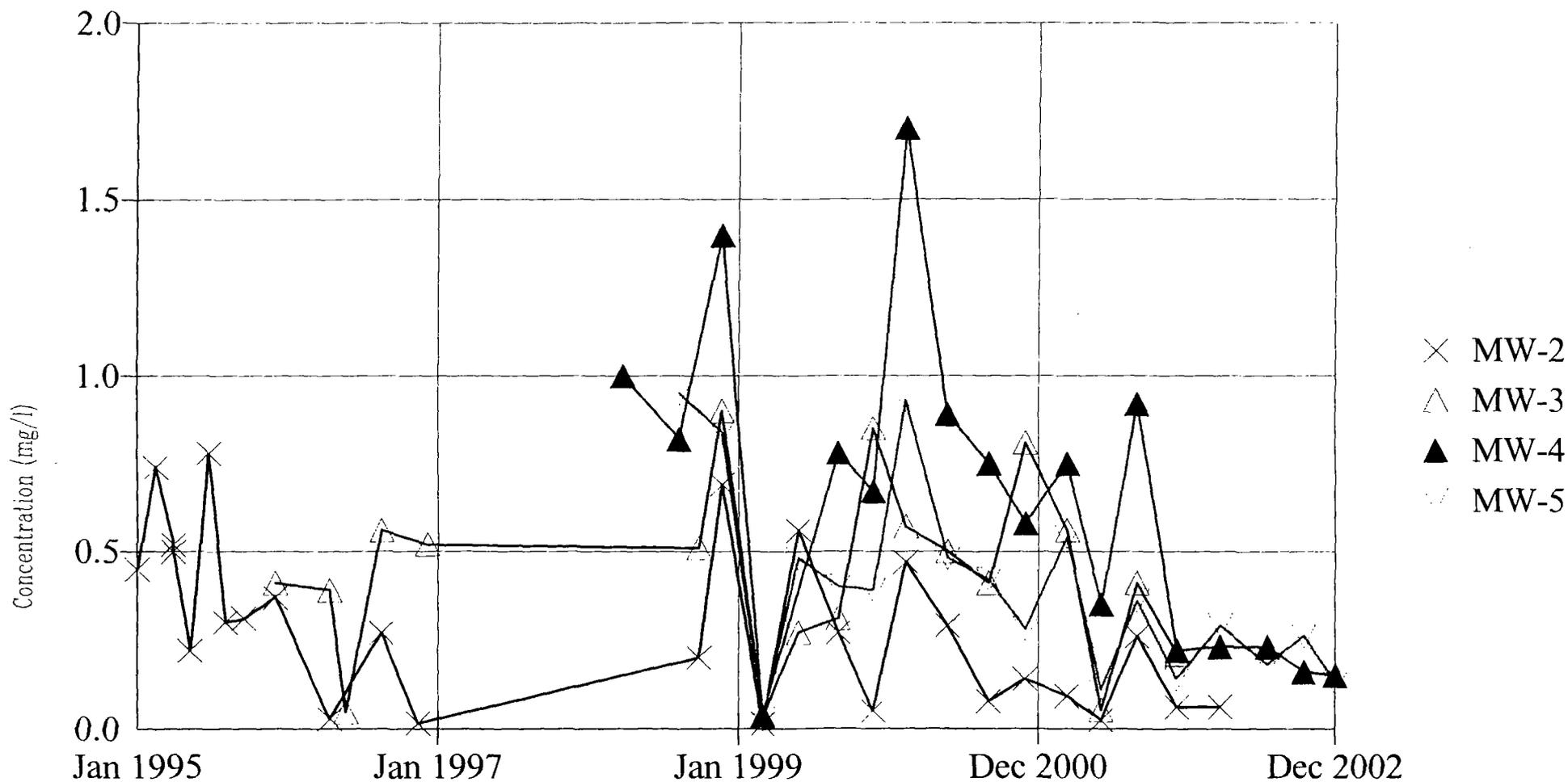
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Barium (mg/l)

Date: 2/20/03, 4:48 PM

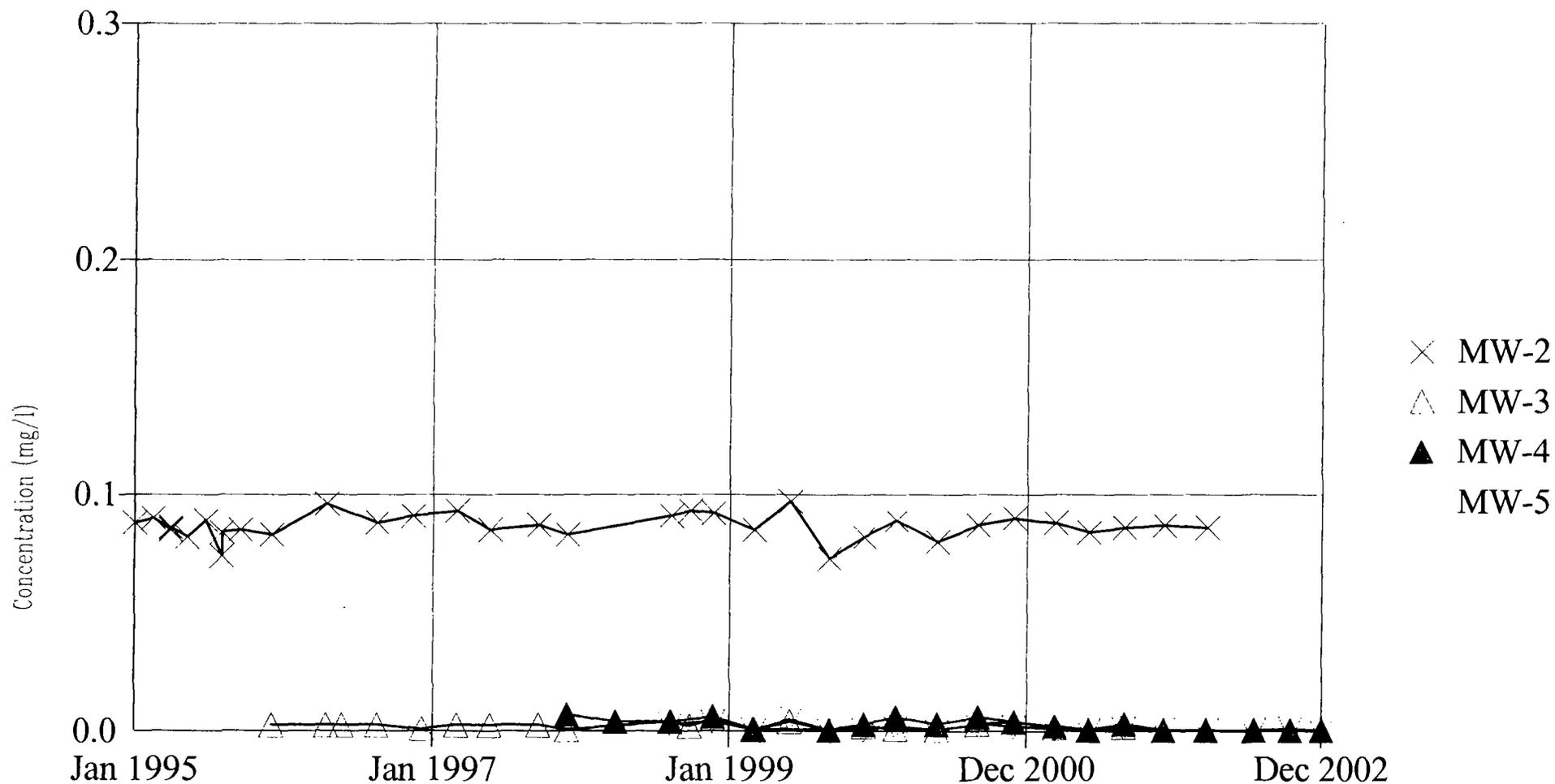
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Beryllium (mg/l)

Facility: Trans-Jordan-Cities/

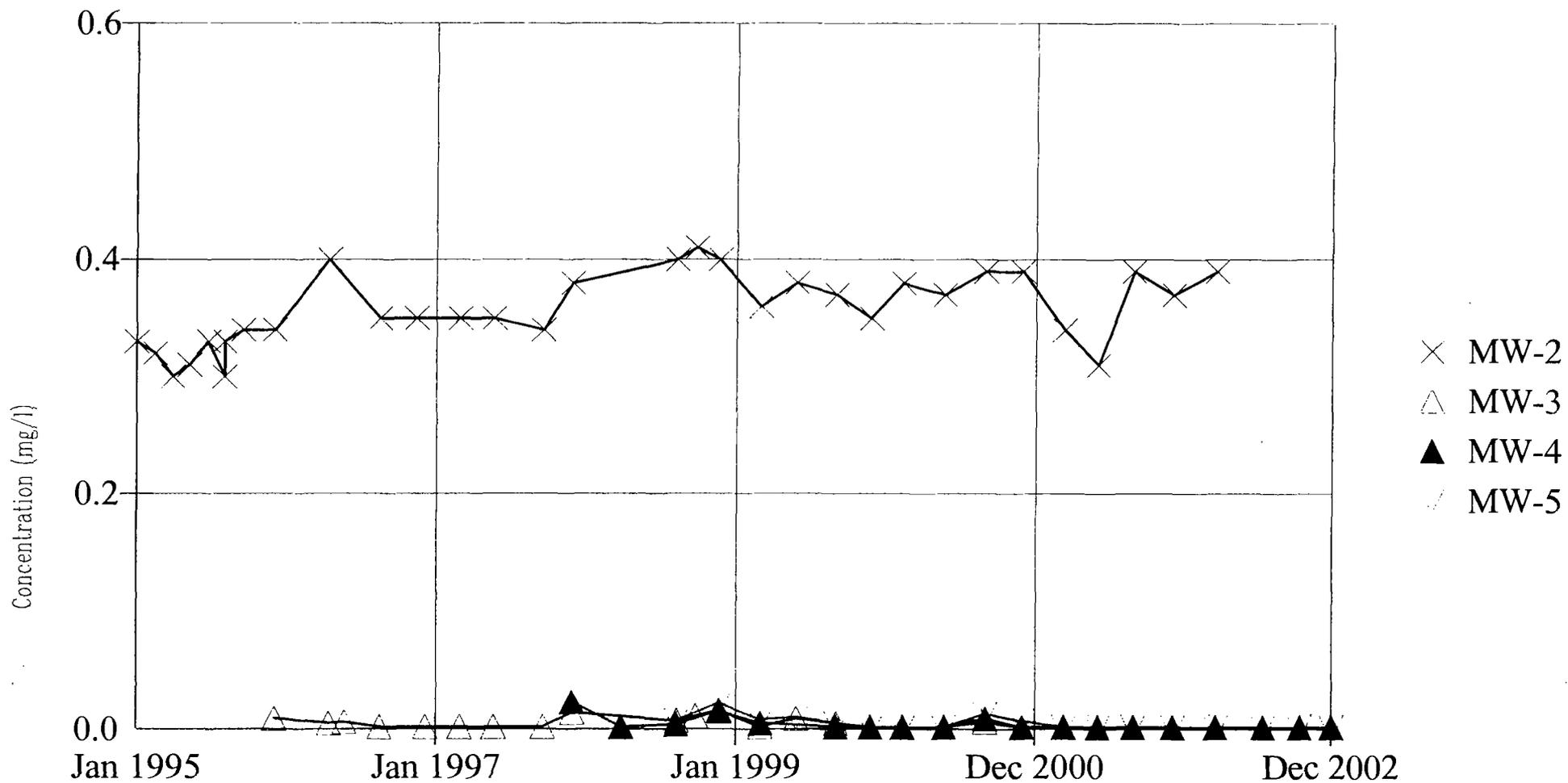
Data File: 2002gw

Date: 2/20/03, 4:49 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: Cadmium (mg/l)

Date: 2/20/03, 4:50 PM

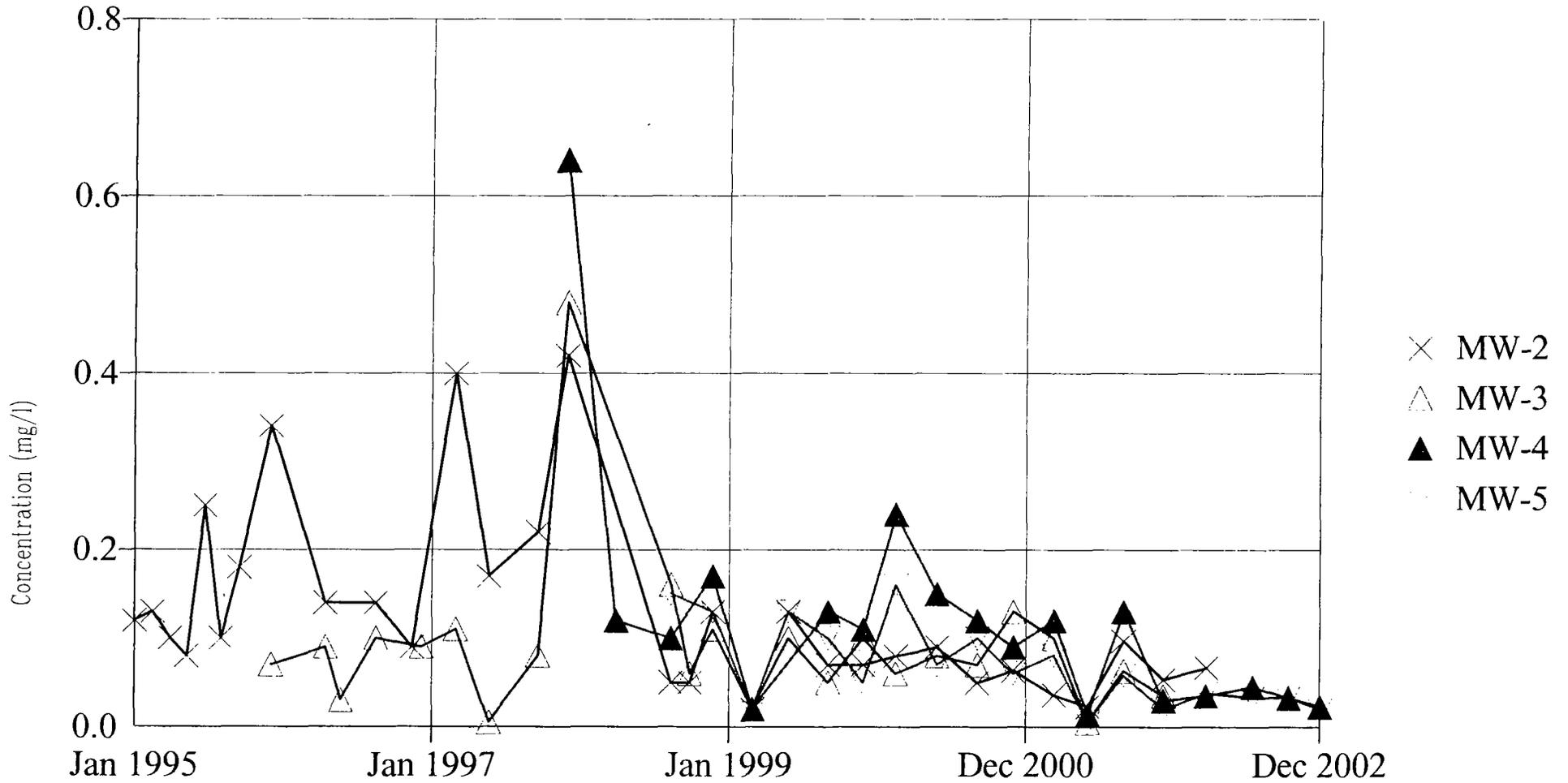
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Chromium (mg/l)

Facility: Trans-Jordan-Cities/

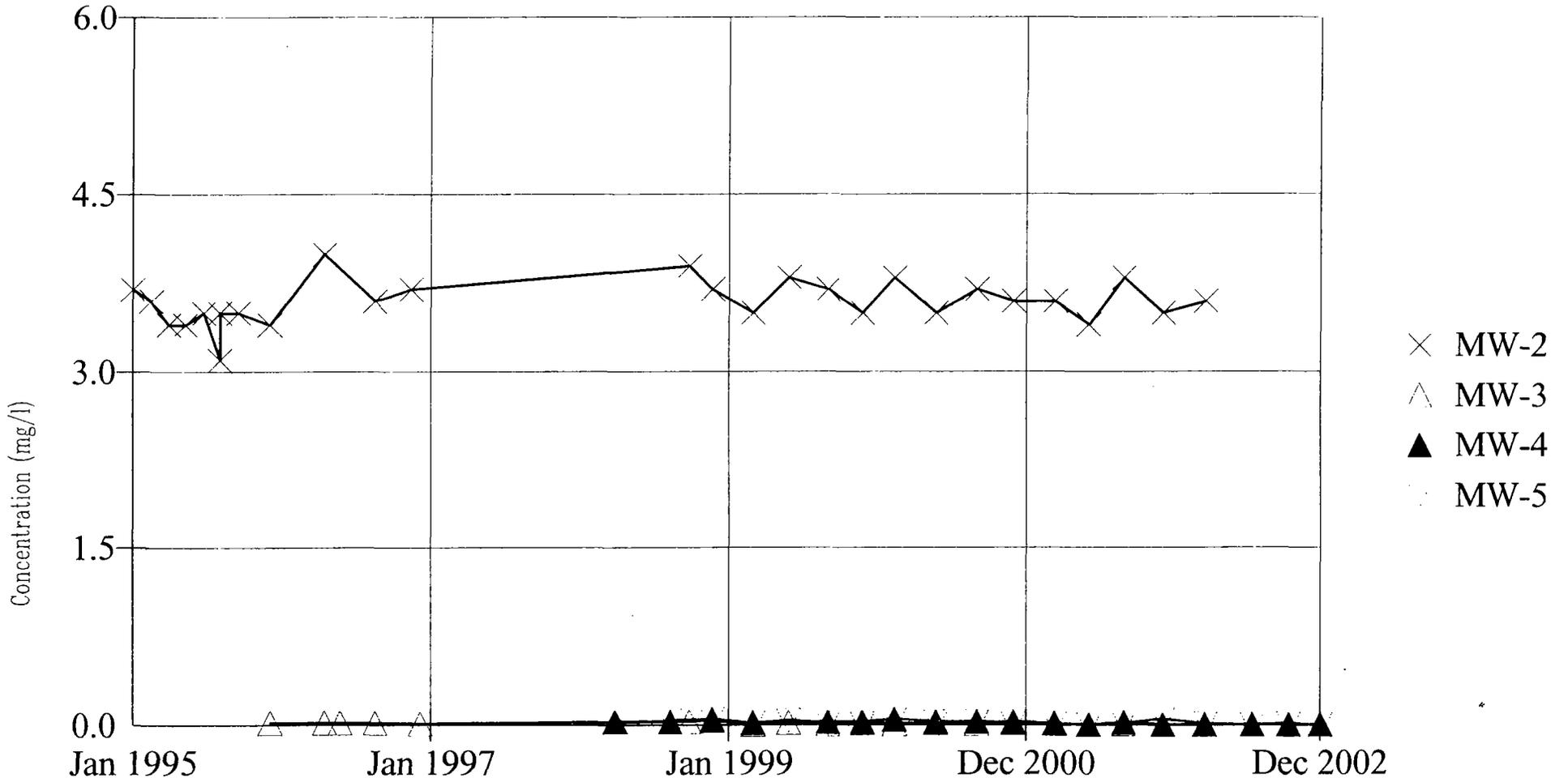
Data File: 2002gw

Date: 2/20/03, 4:51 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: Cobalt (mg/l)

Facility: Trans-Jordan-Cities/

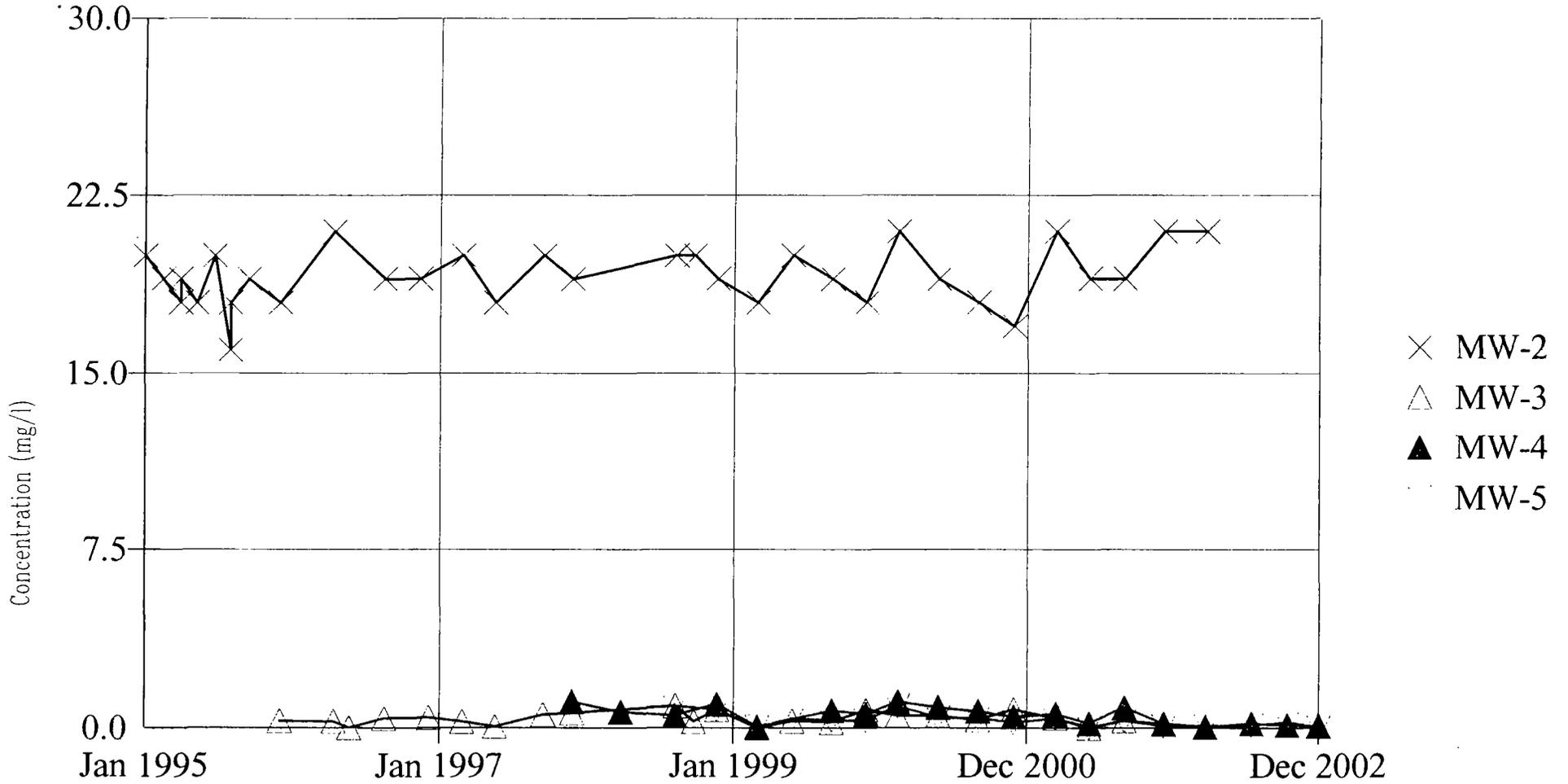
Data File: 2002gw

Date: 2/20/03, 4:51 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: Copper (mg/l)

Date: 2/20/03, 4:52 PM

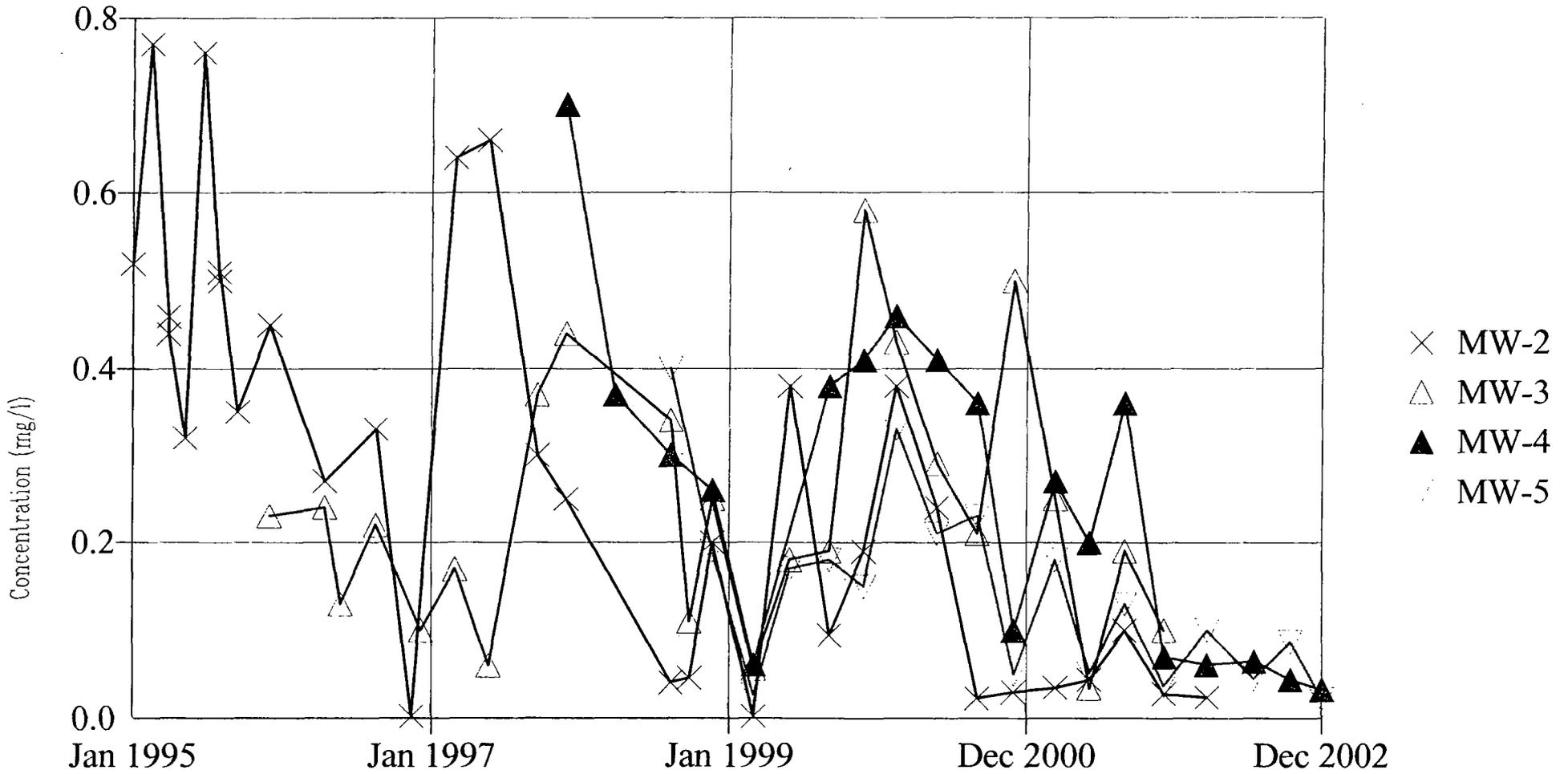
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Lead (mg/l)

Date: 2/20/03, 4:53 PM

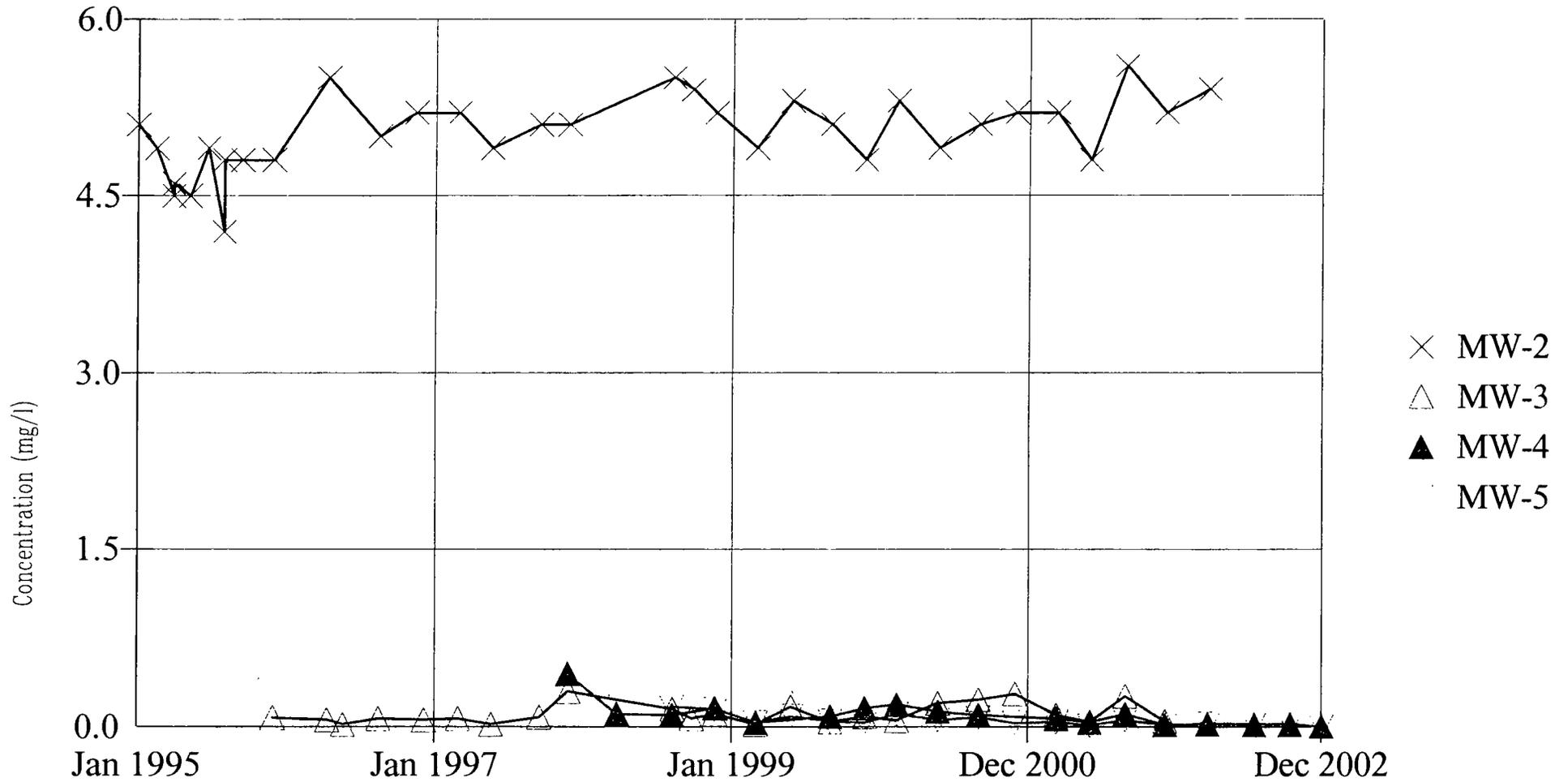
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Nickel (mg/l)

Date: 2/20/03, 4:53 PM

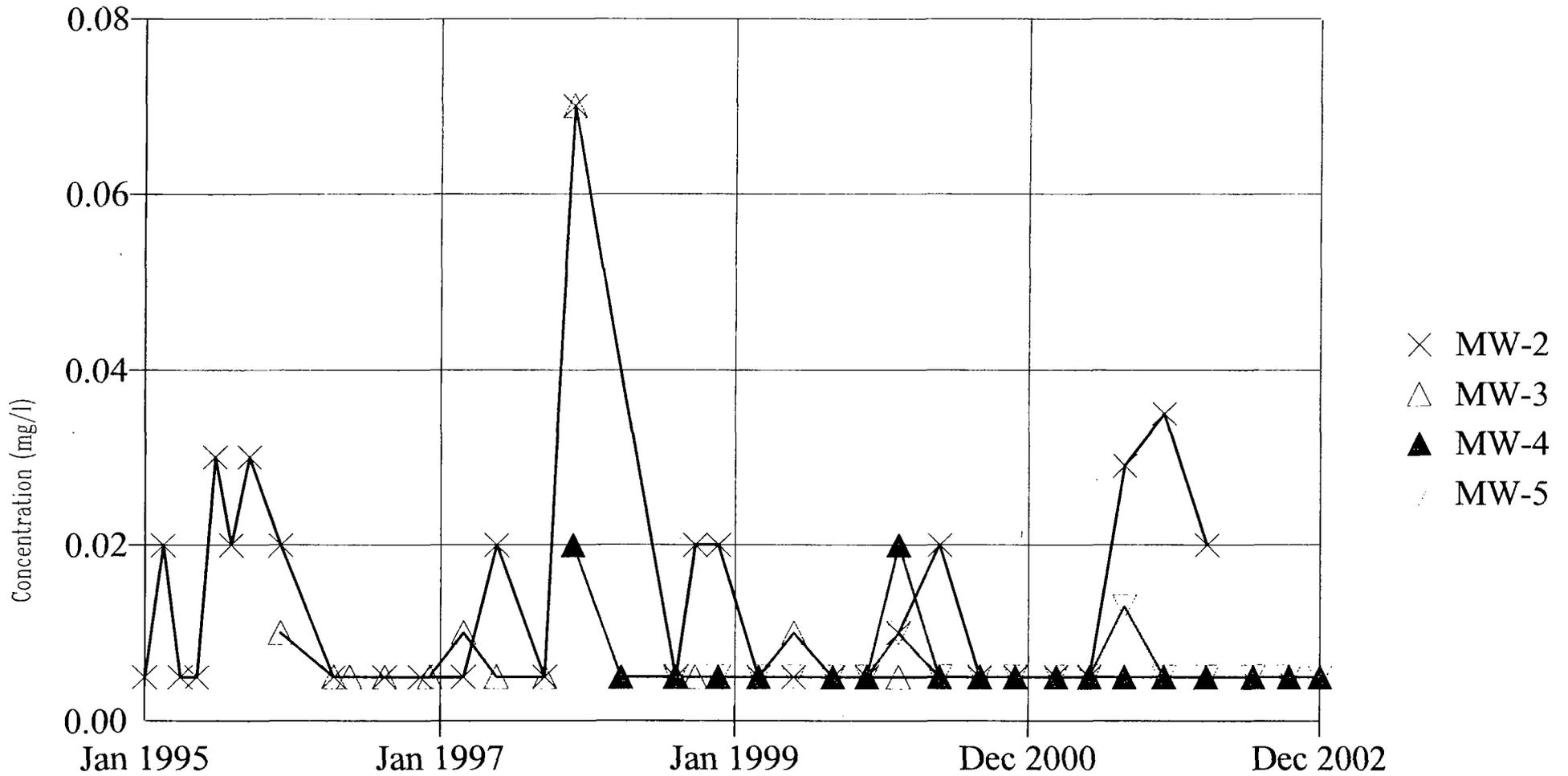
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Silver (mg/l)

Date: 2/20/03, 4:54 PM

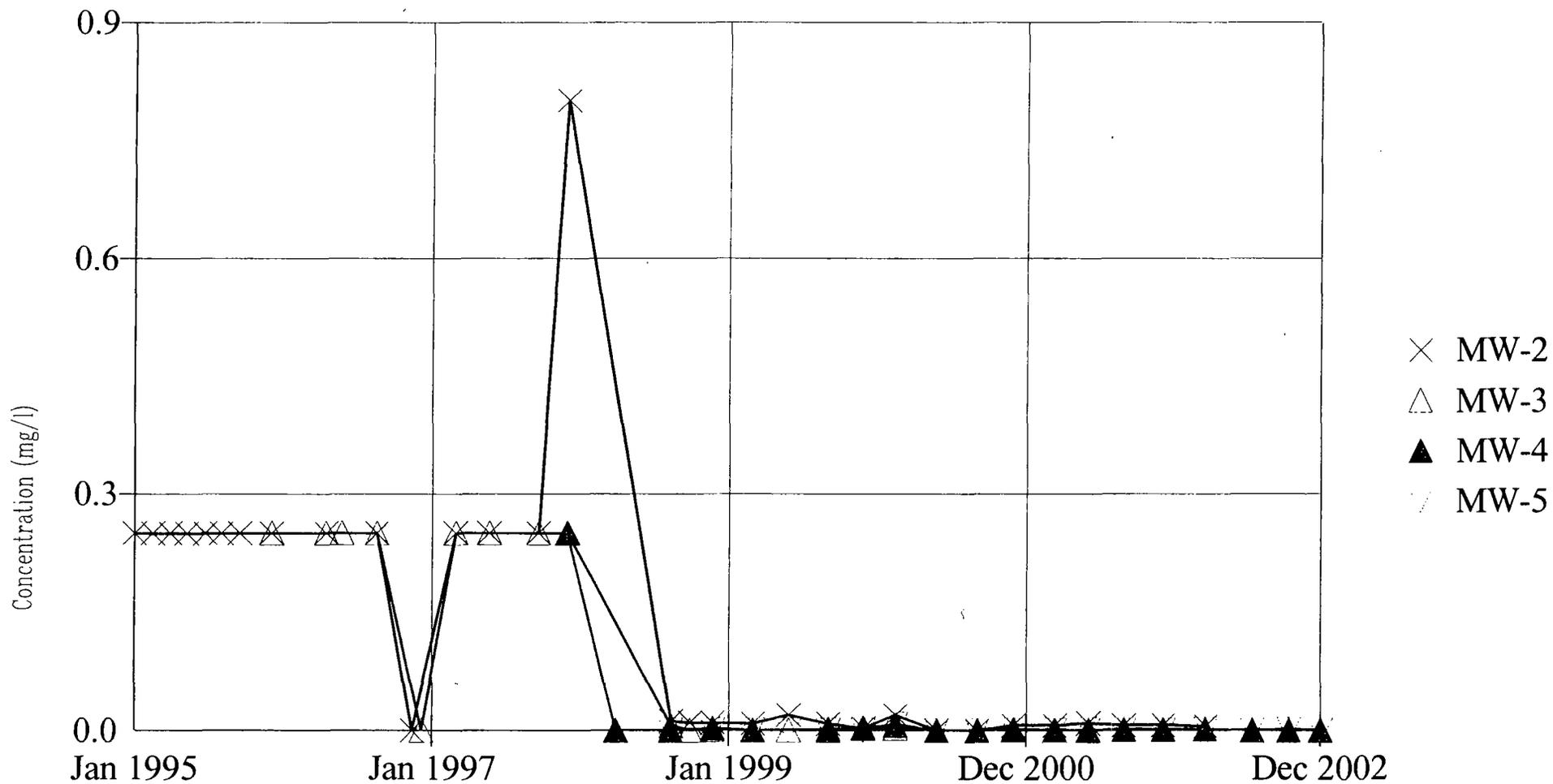
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Thallium (mg/l)

Date: 2/20/03, 4:54 PM

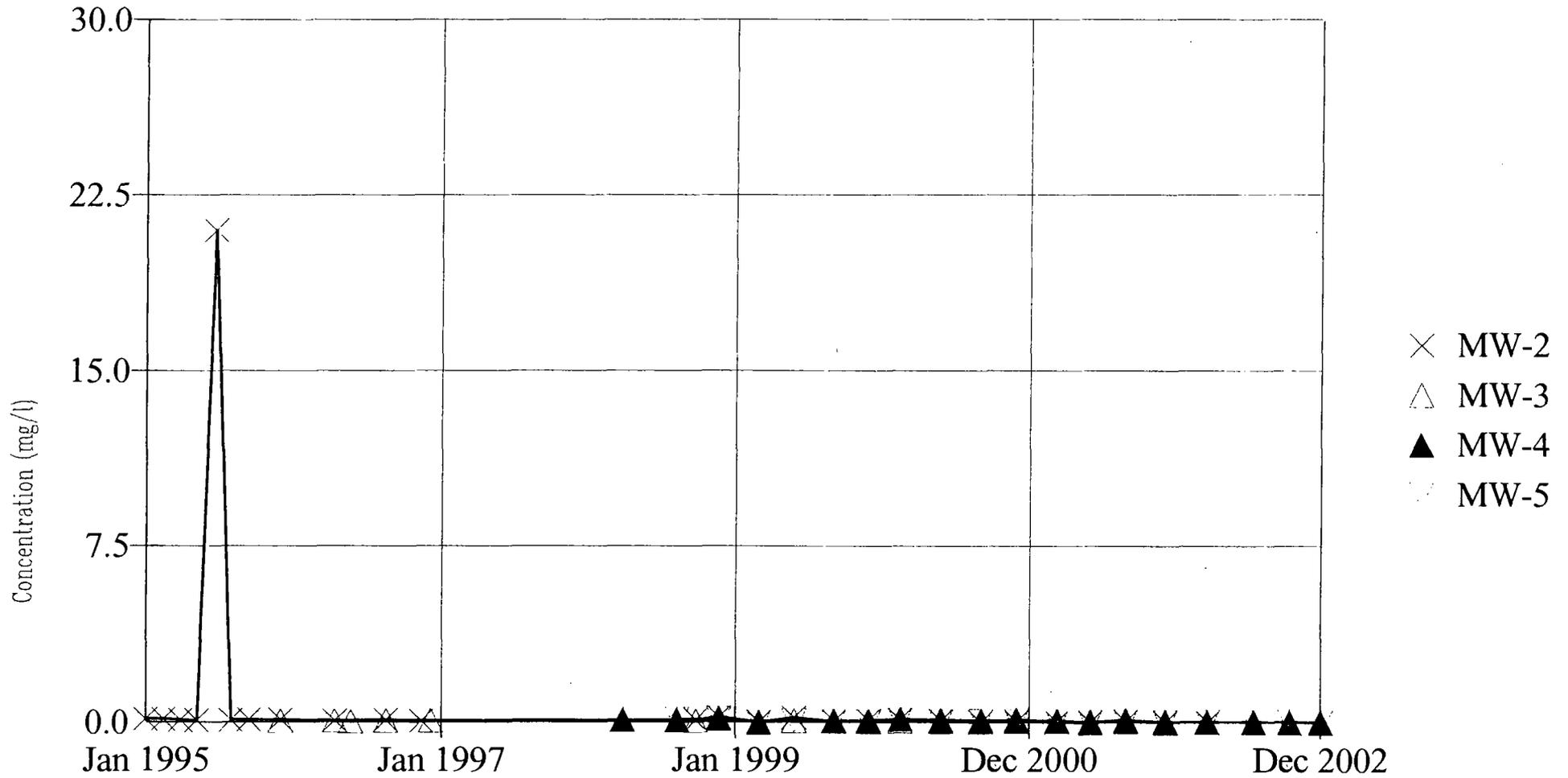
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Vanadium (mg/l)

Date: 2/20/03, 4:55 PM

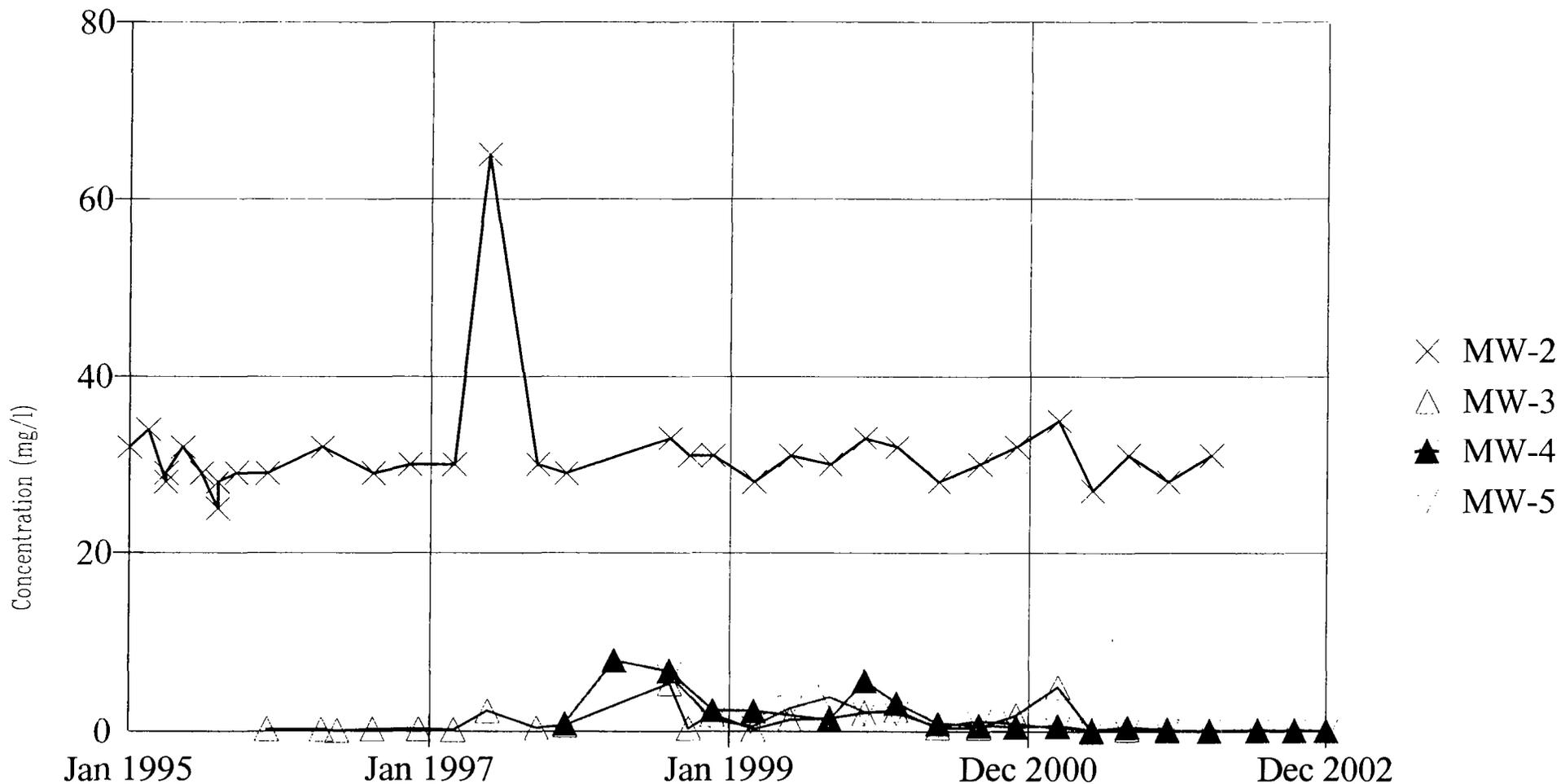
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Zinc (mg/l)

Date: 2/20/03, 4:56 PM

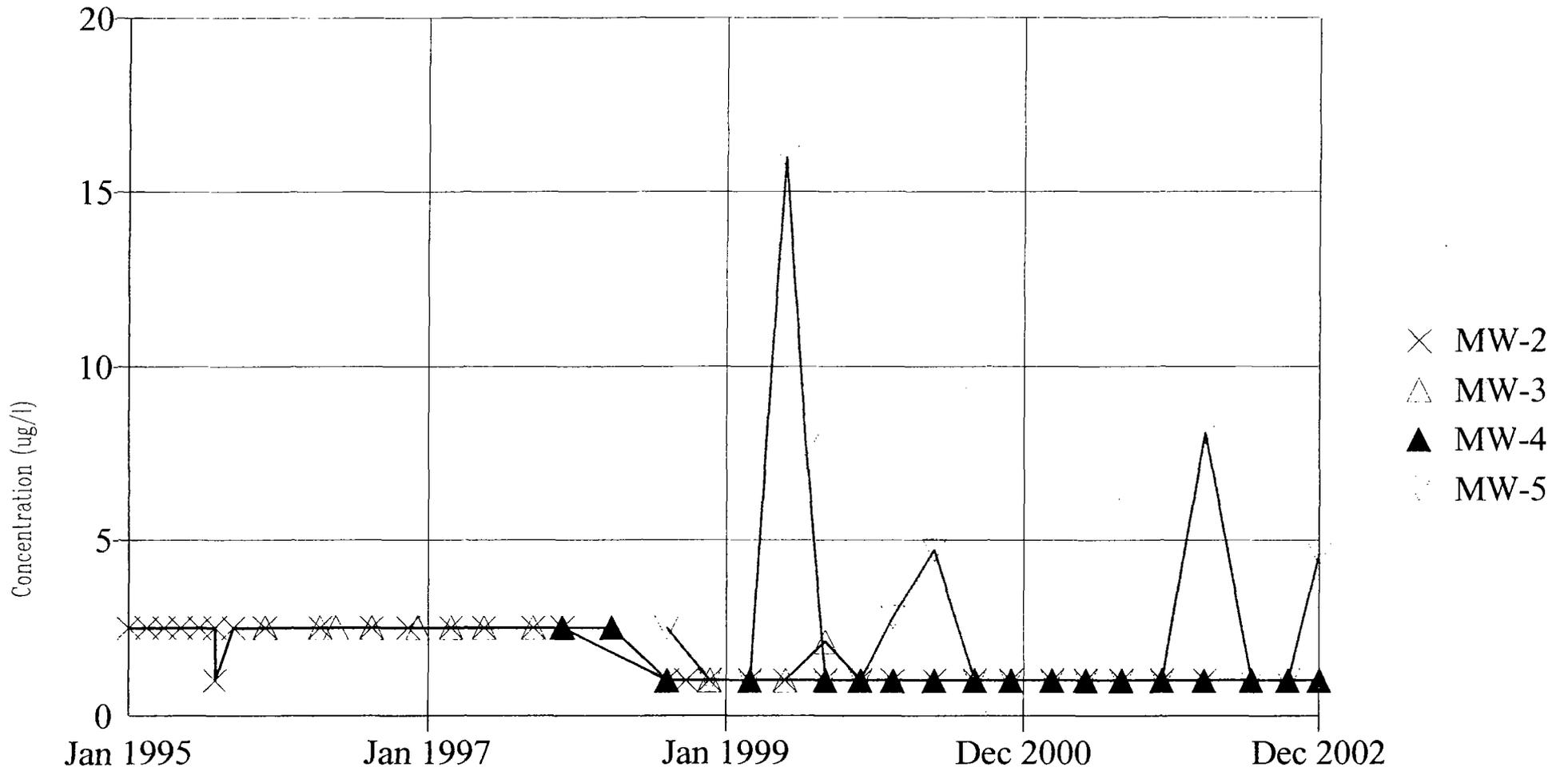
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: Chloroethane (ug/l)

Date: 2/20/03, 4:57 PM

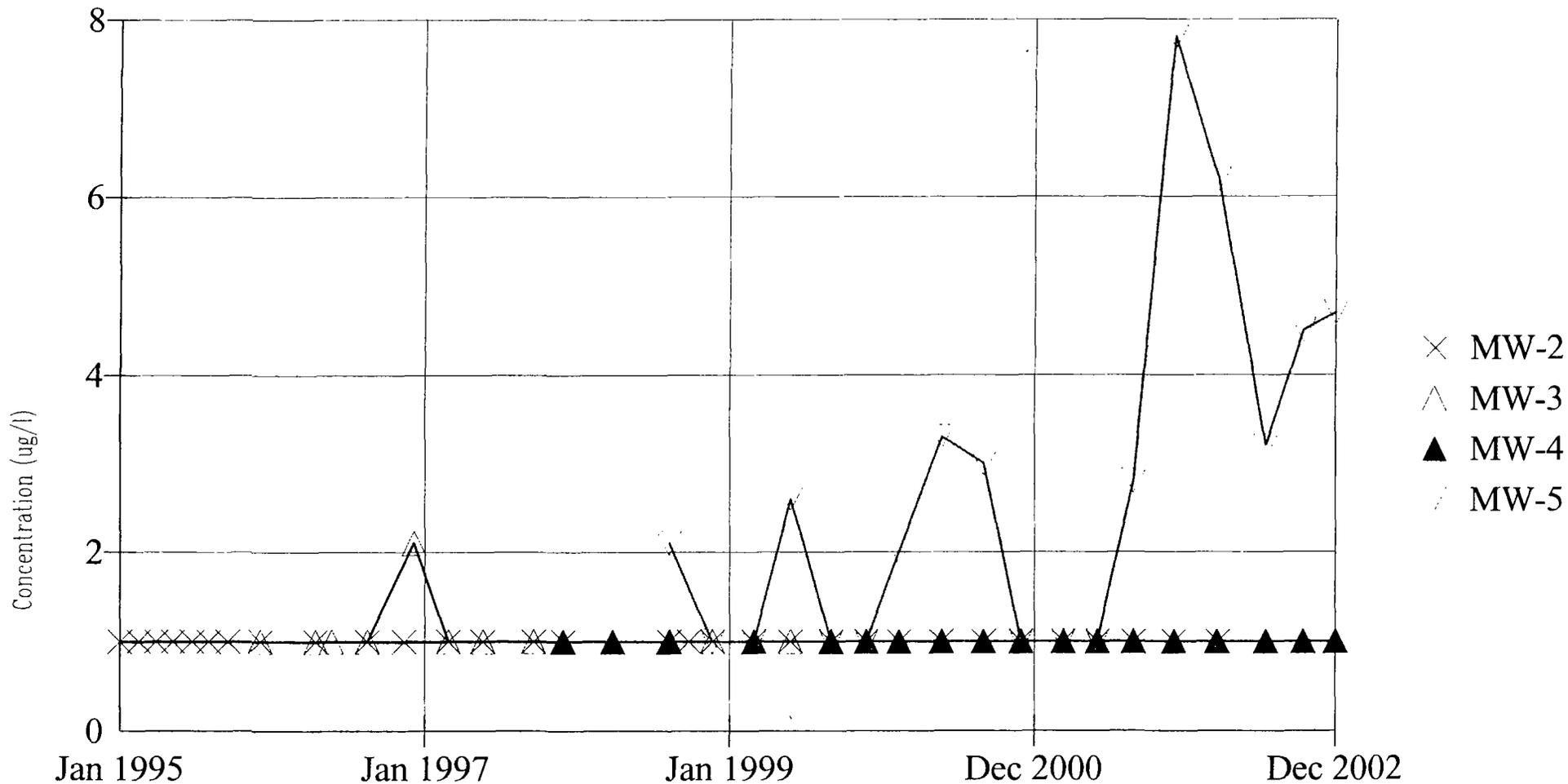
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: 1,1-Dichloroethene (ug/l)

Date: 2/20/03, 4:58 PM

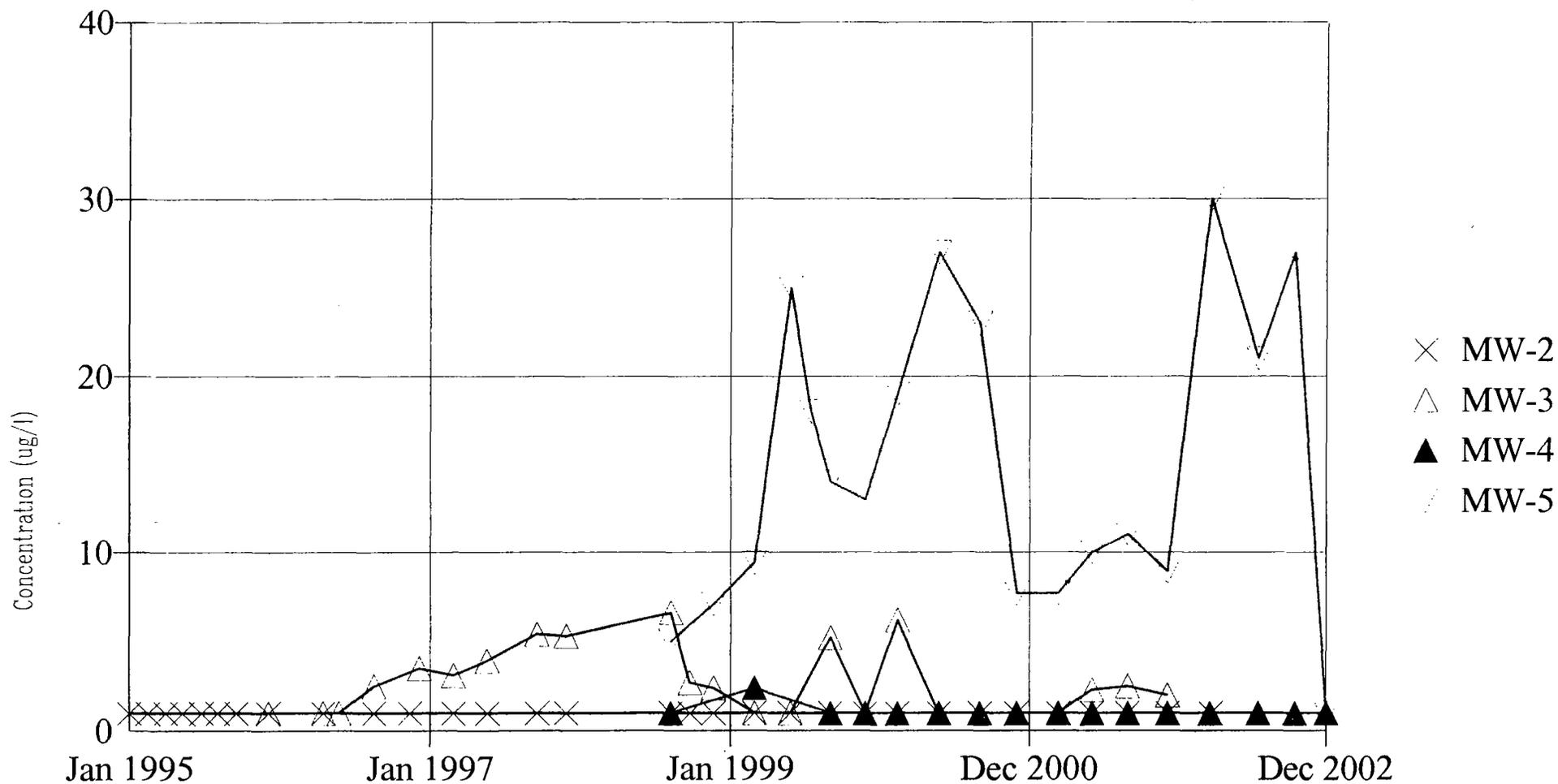
Facility: Trans-Jordan-Cities/

Client: IGES

Data File: 2002gw

View: 2002a

# TIME SERIES



Constituent: 1,1,1-Trichloroethane (ug/l)

Facility: Trans-Jordan-Cities/

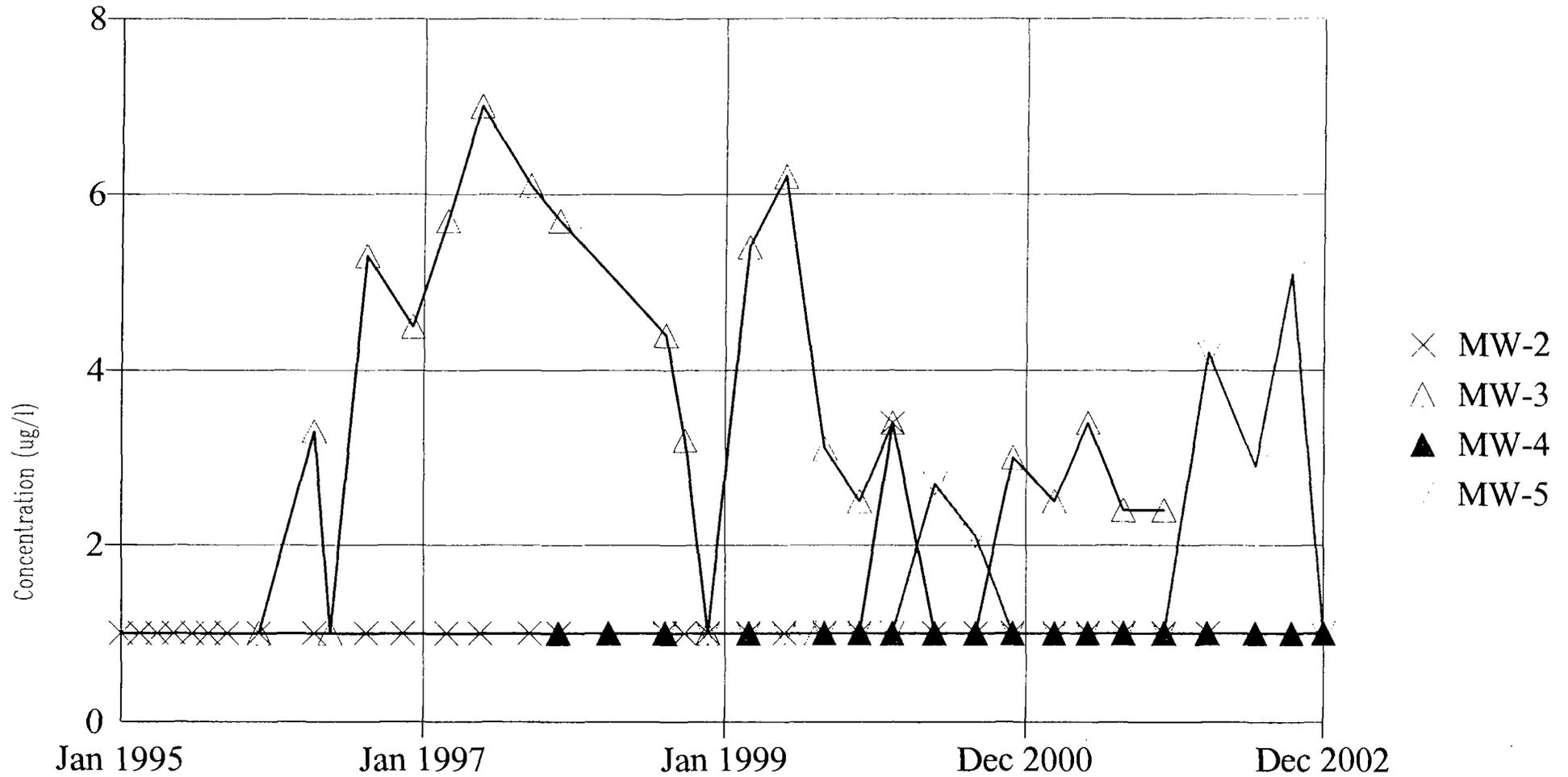
Data File: 2002gw

Date: 2/20/03, 4:59 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: Trichlorofluoromethane (ug/l)

Facility: Trans-Jordan-Cities/

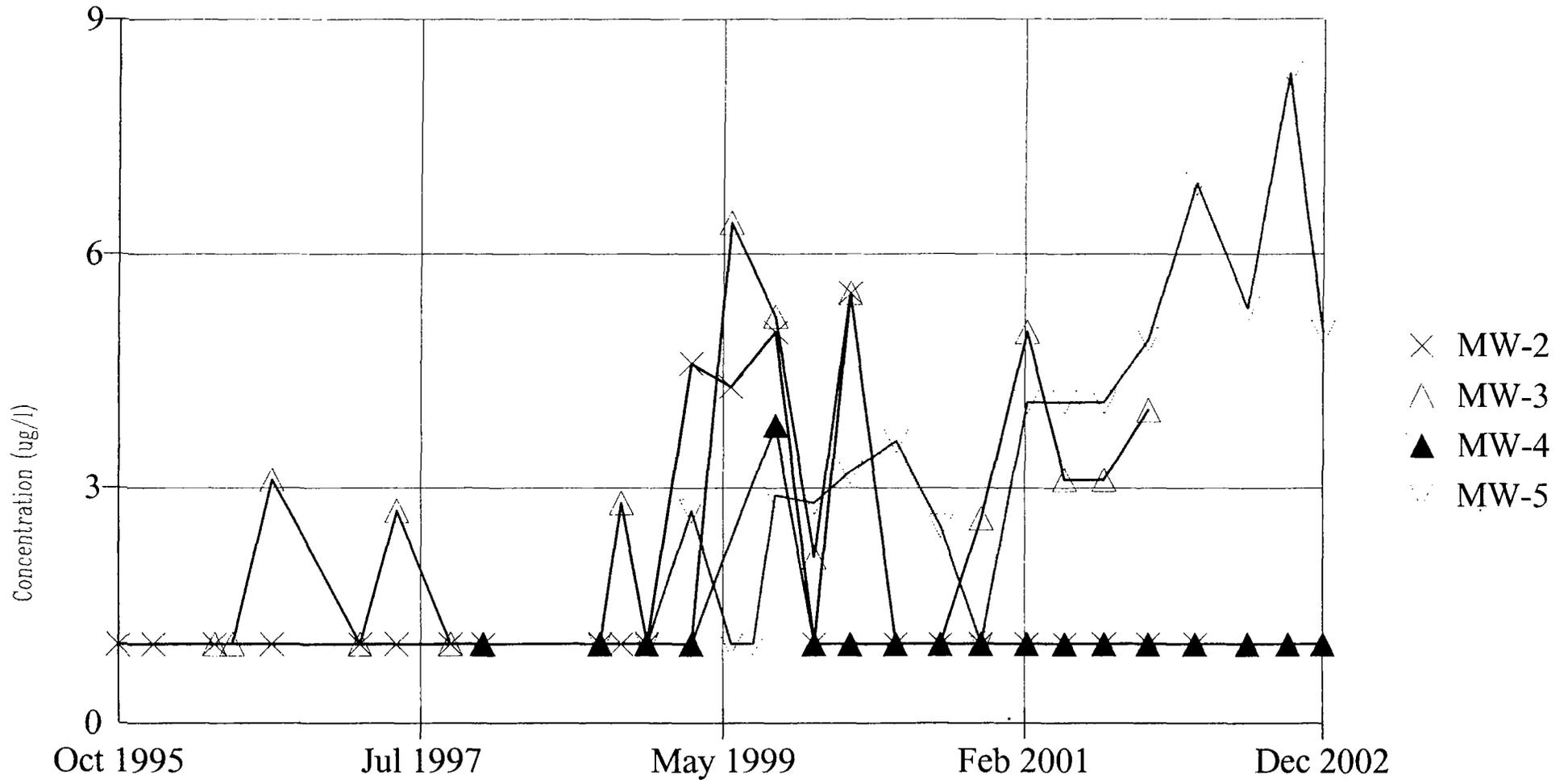
Data File: 2002gw

Date: 2/20/03, 4:59 PM

Client: IGES

View: 2002a

# TIME SERIES



Constituent: Dichlorodifluoromethane (ug/l)

Facility: Trans-Jordan-Cities/

Data File: 2002gw

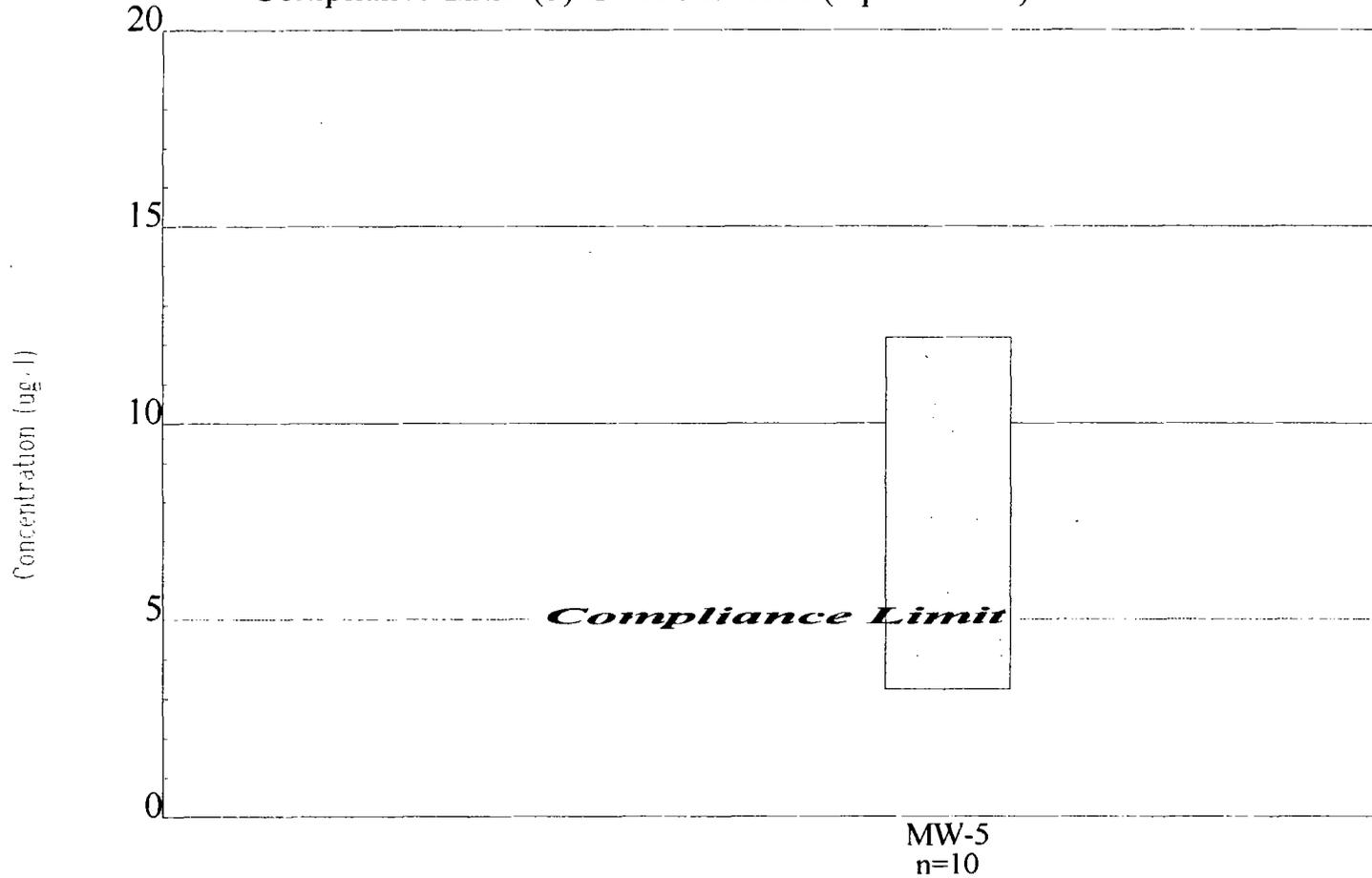
Date: 2/20/03, 5:00 PM

Client: IGES

View: 2002a

# CONFIDENCE INTERVAL

Compliance Limit (5) is not exceeded (alpha = 0.01).



**LEGEND**  
■ Limit Exceeded  
□ Limit Not Exceeded

Data were shown to be normally distributed by the Shapiro Wilk normality test at alpha = 0.05.

W Statistic = 0.9232  
W Quantile = 0.842

Constituent: Tetrachloroethene (ug/l)

Facility: Trans-Jordan-Cities/

Data File: 2002gw

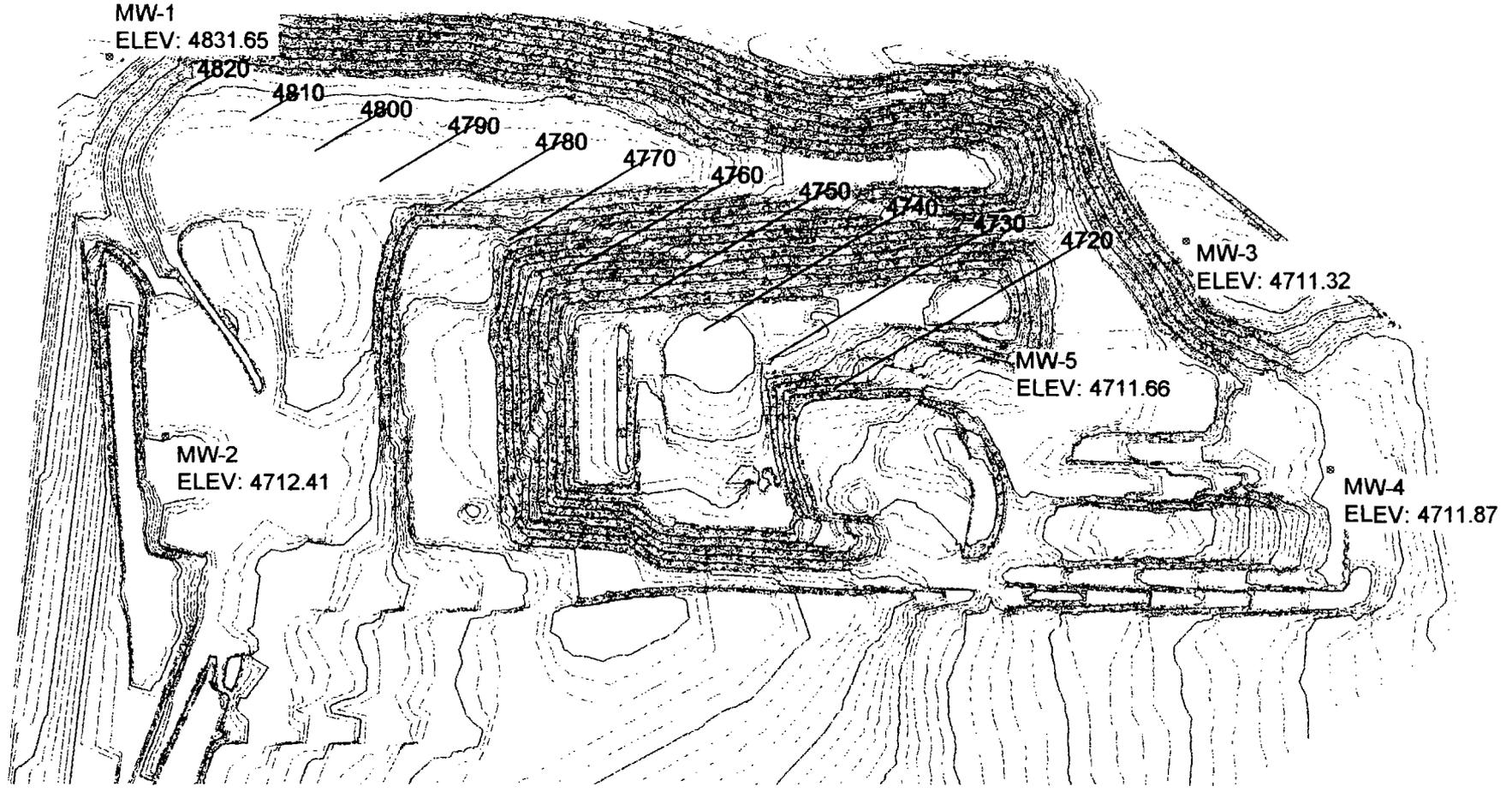
Date: 2/20/03, 4:29 PM

Client: IGES

View: 2002a



Scale: 1" = 600'



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02/19/02

JAH



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TRANS-JORDAN LANDFILL  
2002 GROUNDWATER MONITORING  
GROUNDWATER CONTOUR MAP

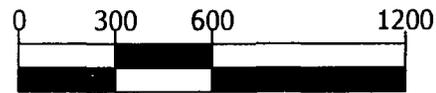
Project Number 00102-001

MARCH 2002

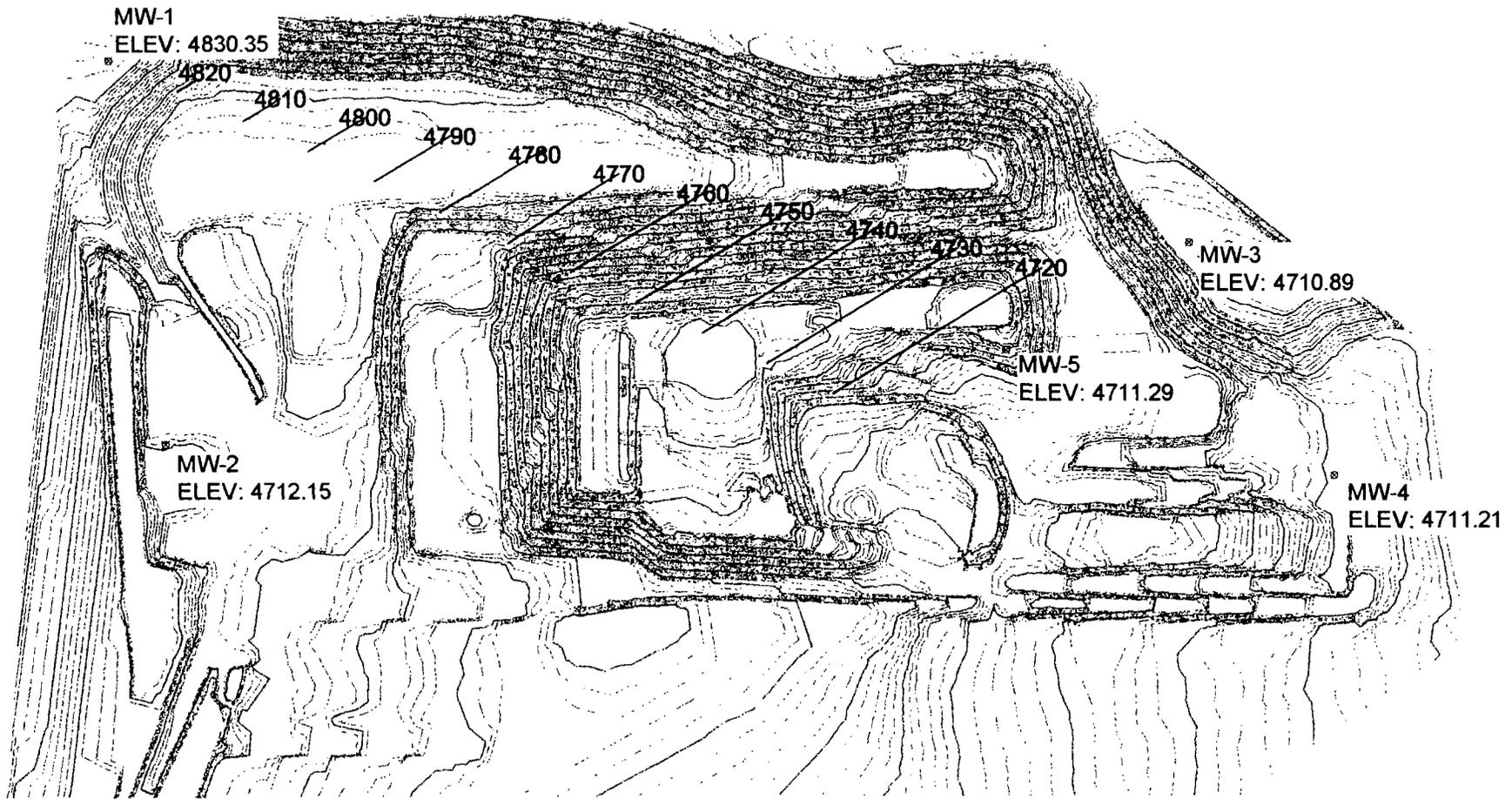
Drawing Notes

PLATE

D-1



Scale: 1" = 600'



I:\Projects\00102\2002\June\_2002.DWG

JAH 02/20/03



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DATE	
BY	
CHECKED	
APPROVED	

TRANS-JORDAN LANDFILL  
 2002 GROUNDWATER MONITORING  
 GROUNDWATER CONTOUR MAP

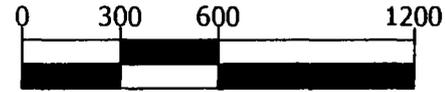
Project Number 00102-001

Drawing Index

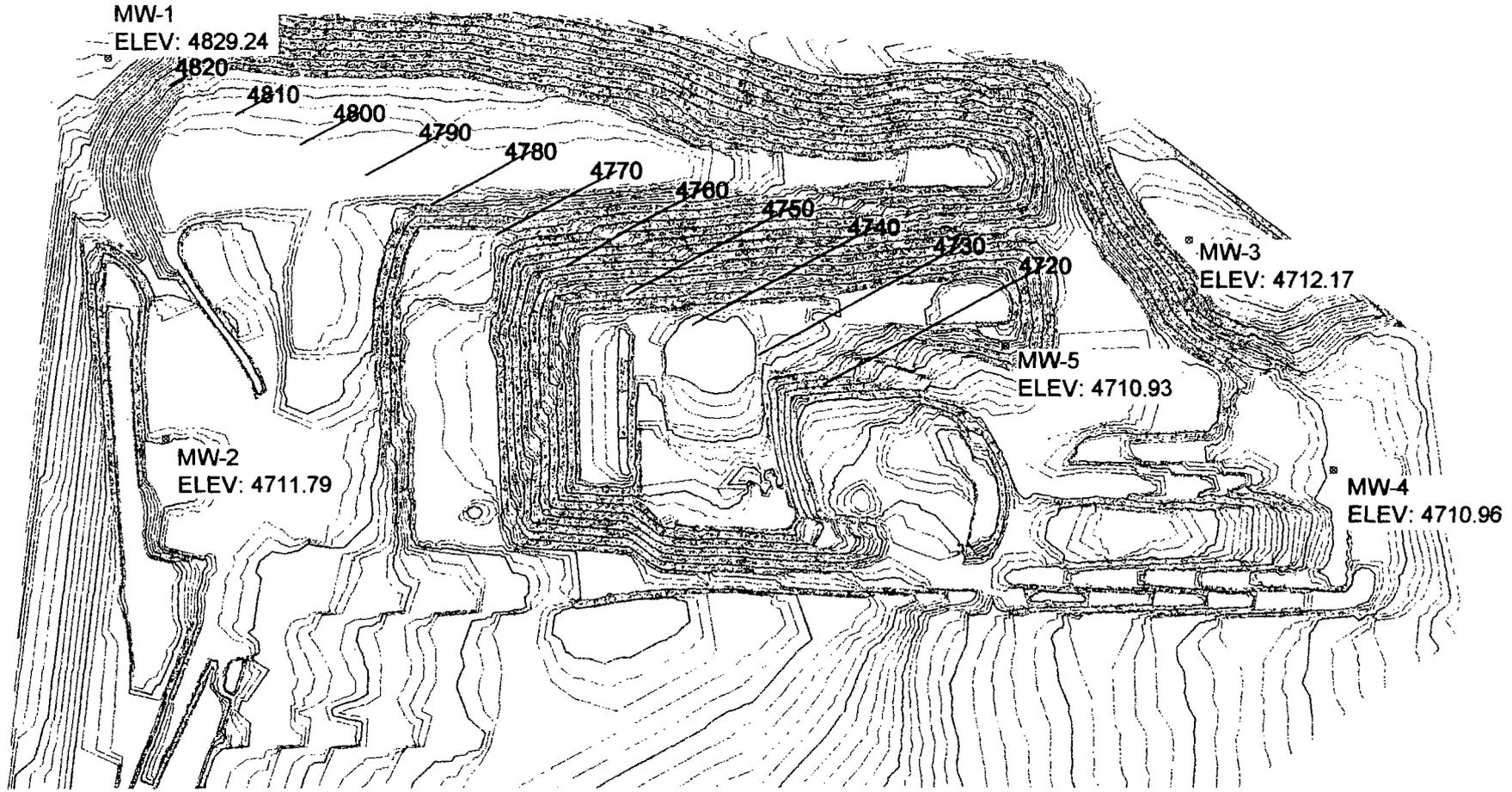
PLATE

D-2

JUNE 2002



Scale: 1" = 600'



I:\Projects\00102\SEPT\_2002.DWG

JAH 02/19/02



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NO.	DATE	BY	DESCRIPTION

**TRANS-JORDAN LANDFILL  
2002 GROUNDWATER MONITORING  
GROUNDWATER CONTOUR MAP**

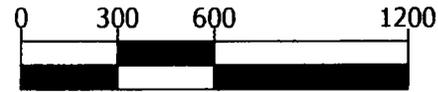
Project Number 00102-001

**SEPTEMBER 2002**

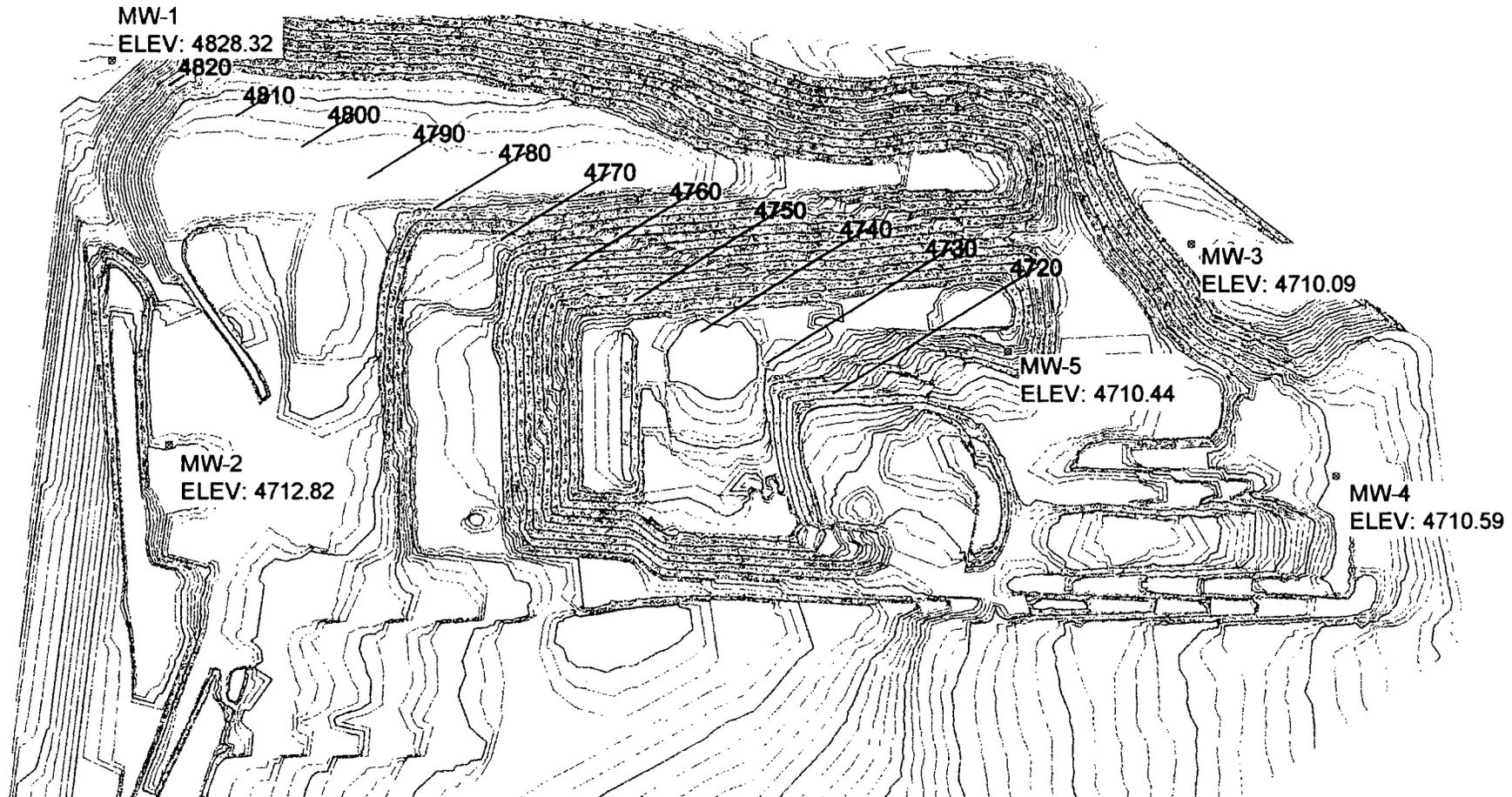
Drawing Index

PLATE

**D-3**



Scale: 1" = 600'



I:\Project\01\02\DEC 2002.DWG

JAH 02/19/02



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File	
Number	
Name	
Date	

**TRANS-JORDAN LANDFILL  
2002 GROUNDWATER MONITORING  
GROUNDWATER CONTOUR MAP**

Project Number 00102-001

Drawing Notes

PLATE

**D-4**

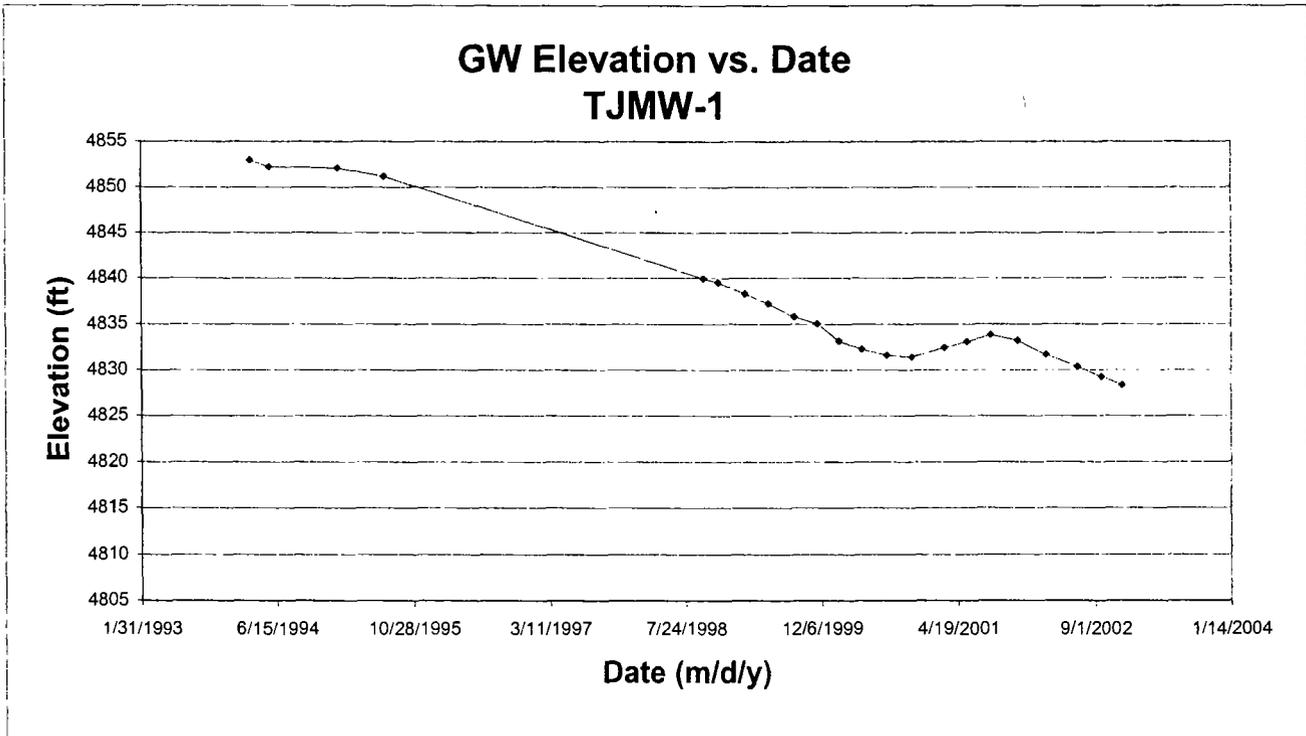
**DECEMBER 2002**



**FIELD SAMPLING DATA SUMMARY SHEET**

**Well Identification:** TJMW-1  
**Northing:** 811,849.27  
**Easting:** 1,844,080.58  
**Well Casing Elevation (ft):** 5129.16  
**Well Depth (ft):** 315.00  
**Well Bottom Elevation (ft):** 4814.16

Measurement Date (m/d/y)	Groundwater Depth (ft)	Groundwater Elevation (ft)	Column of Water (ft)	Purge Volume (gals)	Final pH (pH units)	Final Conductivity (mmhos)	Final Temperature (°C)
3/11/1994	276.20	4852.96	38.80	375	7.37	1800	12.6
5/20/1994	276.94	4852.22	38.06	75	7.15	1600	12.3
1/25/1995	277.10	4852.06	37.90	75	6.99	1800	11.3
7/14/1995	278.00	4851.16	37.00	80	6.87	2000	16.7
9/28/1998	289.21	4839.95	25.79	-	-	-	-
11/23/1998	289.63	4839.53	25.37	-	-	-	-
3/1/1999	290.85	4838.31	24.15	-	-	-	-
5/26/1999	291.92	4837.24	23.08	-	-	-	-
8/30/1999	293.37	4835.79	21.63	-	-	-	-
11/22/1999	294.10	4835.06	20.90	-	-	-	-
2/8/2000	295.98	4833.18	19.02	-	-	-	-
5/1/2000	296.92	4832.24	18.08	-	-	-	-
8/1/2000	297.55	4831.61	17.45	-	-	-	-
11/1/2000	297.75	4831.41	17.25	-	-	-	-
2/28/2001	296.73	4832.43	18.27	-	-	-	-
5/21/2001	296.09	4833.07	18.91	-	-	-	-
8/15/2001	295.32	4833.84	19.68	-	-	-	-
11/20/2001	295.95	4833.21	19.05	-	-	-	-
3/5/2002	297.51	4831.65	17.49	-	-	-	-
6/28/2002	298.81	4830.35	16.19	-	-	-	-
9/24/2002	299.92	4829.24	15.08	-	-	-	-
12/10/2002	300.84	4828.32	14.16	-	-	-	-

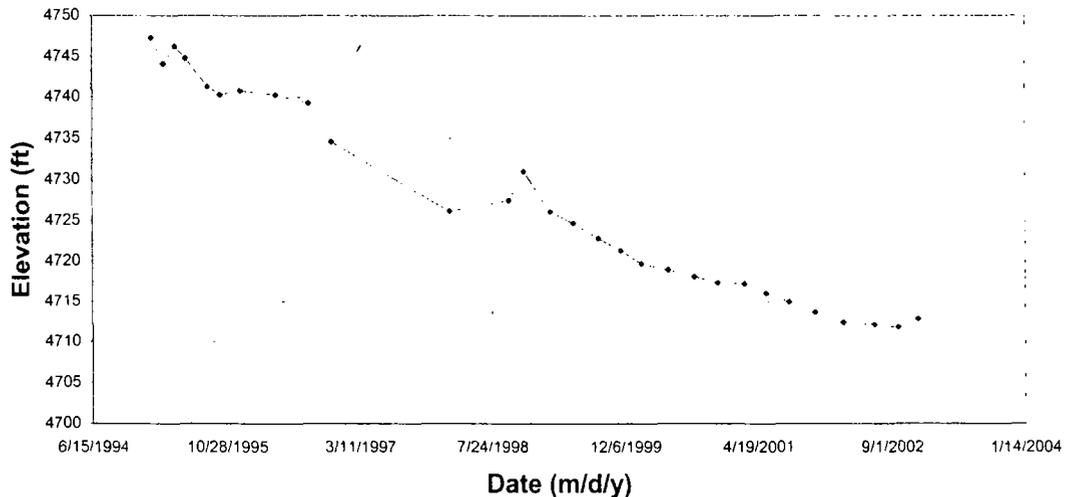


**FIELD SAMPLING DATA SUMMARY SHEET**

Well Identification: TJMW-2  
 Northing: 810.469 10  
 Easting: 1.844.286 68  
 Well Casing Elevation (ft): 5167 77      5170 10      (Well Casing Extended, 2/8/00)  
 Well Depth (ft): 455      457 33  
 Well Bottom Elevation (ft): 4712 77      4712 77

Measurement Date (m/d/y)	Groundwater Depth (ft)	Groundwater Elevation (ft)	Column of Water (ft)	Purge Volume (gals)	Final pH (pH units)	Final Conductivity (mmhos)	Final Temperature (°C)
1/24/1995	420 50	4747 27	34 50	350	3 89	7400	11 5
3/9/1995	423 70	4744 07	31 30	90	3 45	6900	12 9
4/21/1995	421 50	4746 27	33 50	85	3 57	8300	16 7
5/31/1995	423 00	4744 77	32 00	85	3 61	7400	17 6
8/22/1995	426 50	4741 27	28 50	80	3 6	6900	19 8
10/5/1995	427 50	4740 27	27 50	90	3 48	7200	13 7
12/20/1995	427 00	4740 77	28 00	75	3 71	6600	11 2
4/29/1996	427 50	4740 27	27 50	75	3 51	7200	16 5
8/30/1996	428 50	4739 27	26 50	70	3 53	4900	22 8
11/25/1996	433 20	4734 57	21 80	60	3 42	3600	10 0
2/15/1998	441 57	4726 20	13 43	45	4 04	6900	14 5
9/28/1998	440 28	4727 49	14 72	48	3 87	6950	15 0
11/23/1998	436 75	4731 02	18 25	30	3 96	6900	14 8
3/1/1999	441 62	4726 15	13 38	30	3 96	6900	14 8
5/26/1999	443 05	4724 72	11 95	45	3 96	6925	15 2
8/30/1999	444 92	4722 85	10 08	30	3 71	6640	15 3
11/22/1999	446 43	4721 34	8 57	50	3 86	7015	11 7
2/8/2000	450 37	4719 73	6 96	36	3 68	6920	14 4
5/18/2000	451 16	4718 94	6 17	33	3 61	6920	15 0
8/24/2000	451 98	4718 12	5 35	50	3 61	6710	15 8
11/20/2000	452 77	4717 33	4 56	38	3 76	6620	12 8
2/28/2001	452 88	4717 22	4 45	50	3 51	6580	13 7
5/21/2001	454 07	4716 03	3 26	47	3 59	6110	14 7
8/15/2001	455 15	4714 95	2 18	44	3 64	5950	16 1
11/20/2001	456 45	4713 65	0 88	9 (dry)	3 12	6240	13 8
3/5/2002	457 69	4712 41	-0 36	7 75 (dry)	4 61	6440	14 2
6/28/2002	457 95	4712 15	-0 62	dry			
9/24/2002	458 31	4711 79	-0 98	dry			
12/10/2002	457 28	4712 82	0 05	dry			

**GW Elevation vs. Date**  
**TJMW-2**





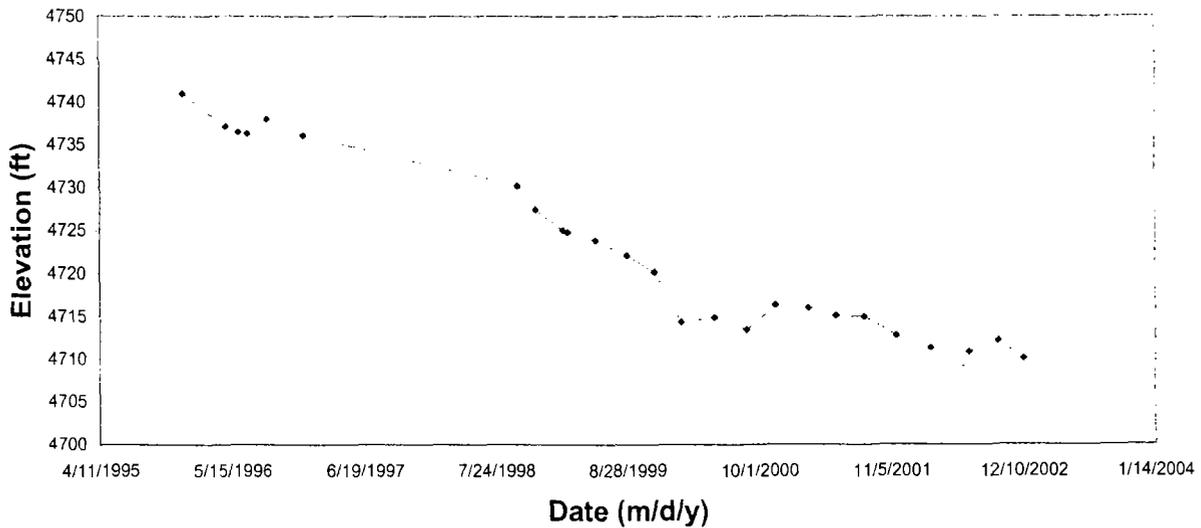
Intermountain GeoEnvironmental Services Inc

FIELD SAMPLING DATA SUMMARY SHEET

Well Identification: TJMW-3  
 Northing: 811,183.26  
 Easting: 1,847,938.86  
 Well Casing Elevation (ft): 5029.77      5033.63      (Well Casing Extended 2/8/00)  
 Well Depth (ft): 319      322.86  
 Well Bottom Elevation (ft): 4710.77      4710.77

Measurement Date (m/d/y)	Groundwater Depth (ft)	Groundwater Elevation (ft)	Column of Water (ft)	Purge Volume (gals)	Final pH (pH units)	Final Conductivity (mmhos)	Final Temperature (°C)
12/20/1995	288.73	4741.04	30.27	80	7.59	2800	9.5
4/29/1996	292.65	4737.12	26.35	75	7.25	3200	12.8
6/6/1996	293.28	4736.49	25.72	75	7.4	3100	19.8
7/3/1996	293.44	4736.33	25.56	75	7.34	2400	18.3
8/30/1996	291.75	4738.02	27.25	75	7.14	2200	17.5
12/18/1996	293.64	4736.13	25.36	70	7.21	2100	11.5
9/28/1998	299.55	4730.22	19.45	72	6.79	3270	13.6
11/23/1998	302.32	4727.45	16.68	53	7.33	3280	12.4
2/15/1999	304.72	4725.05	14.28	55	7.47	3250	12.2
3/1/1999	304.96	4724.81	14.04	34	7.48	3260	12.1
5/26/1999	305.88	4723.89	13.12	55	7.49	3230	12.9
8/30/1999	307.64	4722.13	11.36	45	7.11	3190	13.2
11/22/1999	309.54	4720.23	9.46	45	6.89	3270	11.7
2/8/2000	315.37	4718.26	7.49	22 (dry)	7.15	3240	12.2
5/18/2000	314.85	4718.78	8.01	26	7.21	3260	13.1
8/24/2000	316.34	4717.29	6.52	25	7.68	3130	14.8
11/20/2000	317.27	4716.36	5.59	25	6.57	3140	11.7
2/28/2001	317.58	4716.05	5.28	50	6.87	3130	11.7
5/21/2001	318.47	4715.16	4.39	39	6.81	3000	12.7
8/15/2001	318.63	4715.00	4.23	3 (dry)	7.01	3040	16.7
11/20/2001	320.84	4712.79	2.02	15 (dry)	7.23	3025	12.4
3/5/2002	322.31	4711.32	0.55	dry			
6/28/2002	322.74	4710.89	0.12	dry			
9/24/2002	321.46	4712.17	1.40	dry			
12/10/2002	323.54	4710.09	-0.68	dry			

GW Elevation vs. Date  
TJMW-3



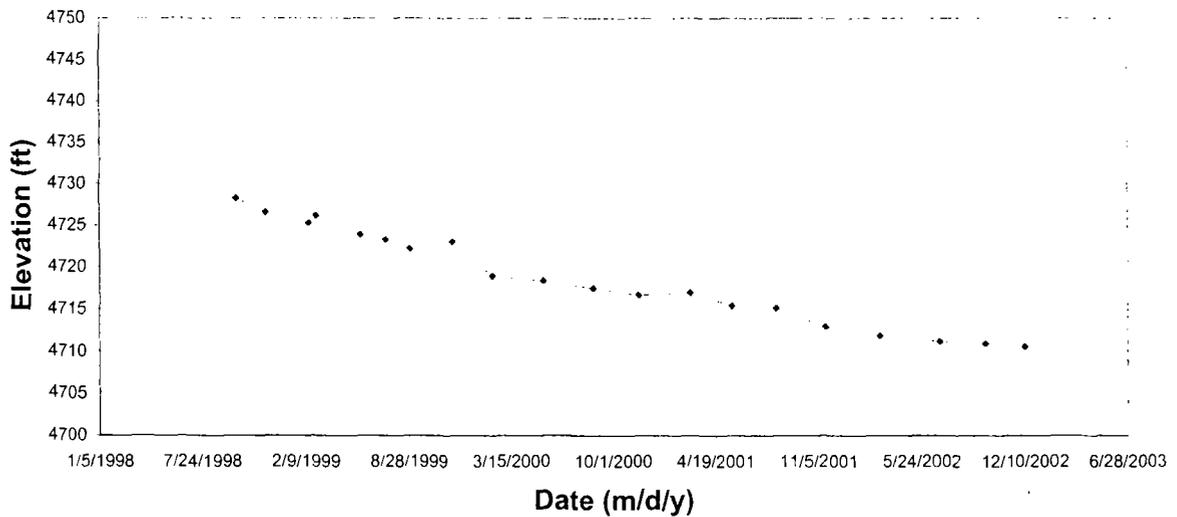


**FIELD SAMPLING DATA SUMMARY SHEET**

**Well Identification:** TJMW-4  
**Northing:** 810,352.05  
**Easting:** 1,848,456.17  
**Well Casing Elevation (ft):** 5071.43  
**Well Depth (ft):** 365  
**Well Bottom Elevation (ft):** 4706.43

Measurement Date (m/d/y)	Groundwater Depth (ft)	Groundwater Elevation (ft)	Column of Water (ft)	Purge Volume (gals)	Final pH (pH units)	Final Conductivity (mmhos)	Final Temperature (°C)
9/28/1998	343.15	4728.28	21.85				
11/23/1998	344.84	4726.59	20.16	55	6.71	3110	12.5
2/15/1999	346.15	4725.28	18.85	45	7.47	3000	12.3
3/1/1999	345.21	4726.22	19.79	44	6.54	3260	12.5
5/26/1999	347.53	4723.90	17.47	-	-	-	-
7/14/1999	348.12	4723.31	16.88	-	-	-	-
8/30/1999	349.21	4722.22	15.79	36	6.50	2870	13.4
11/22/1999	348.37	4723.06	16.63	38	6.09	2830	11.9
2/8/2000	352.48	4718.95	12.52	44	7.02	2970	12.6
5/18/2000	353.03	4718.40	11.97	38	6.13	3000	13.0
8/24/2000	353.91	4717.52	11.09	52	7.17	3030	13.6
11/20/2000	354.71	4716.72	10.29	38	6.77	3040	12.6
2/28/2001	354.45	4716.98	10.55	55	6.88	3030	12.3
5/21/2001	355.96	4715.47	9.04	38	6.69	2900	13.2
8/15/2001	356.28	4715.15	8.72	50	7.16	2890	14
11/20/2001	358.47	4712.96	6.53	38	7.2	2925	13
3/5/2002	359.56	4711.87	5.44	29	7.22	2970	12.3
6/28/2002	360.22	4711.21	4.78	25	7.16	2890	15.1
9/24/2002	360.47	4710.96	4.53	19	7.19	3000	13.1
12/10/2002	360.84	4710.59	4.16	36	7.13	2840	12.1

**GW Elevation vs. Date  
TJMW-4**



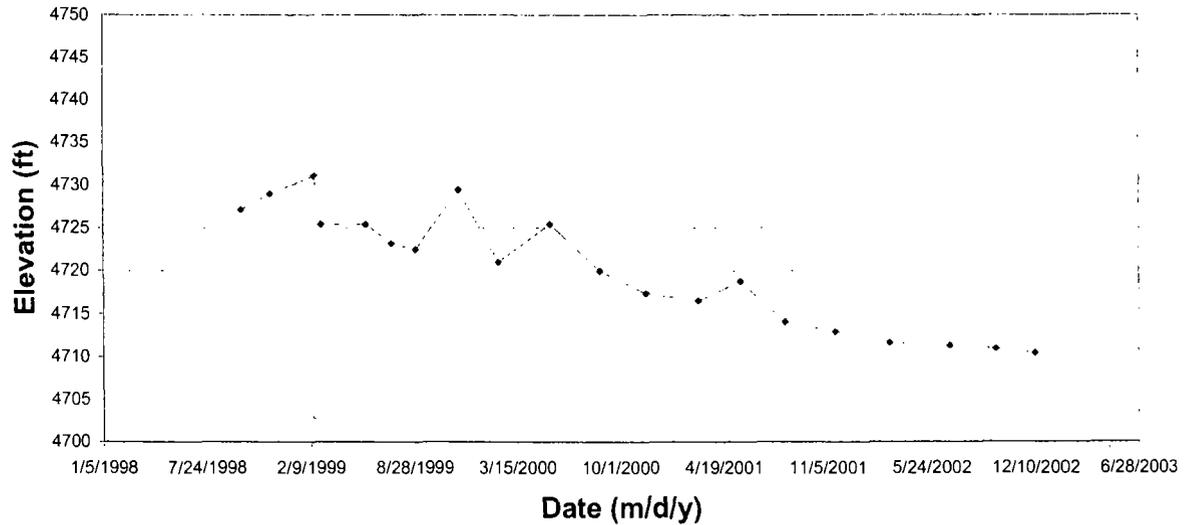


**FIELD SAMPLING DATA SUMMARY SHEET**

**Well Identification:** TJMW-5  
**Northing:** 810,800 56  
**Easting:** 1,847,286 96  
**Well Casing Elevation (ft):** 5070 9  
**Well Depth (ft):** 365  
**Well Bottom Elevation (ft):** 4705 9

Measurement Date (m/d/y)	Groundwater Depth (ft)	Groundwater Elevation (ft)	Column of Water (ft)	Purge Volume (gals)	Final pH (pH units)	Final Conductivity (mmhos)	Final Temperature (°C)
9/28/1998	343 81	4727 09	21 19				
11/23/1998	341 96	4728 94	23 04	52	7 11	3730	12 5
2/15/1999	339 85	4731 05	25 15	53	6 88	3710	12 2
3/1/1999	345 51	4725 39	19 49	42	7 13	3760	12 2
5/26/1999	345 51	4725 39	19 49	52	6 98	3760	12 9
7/14/1999	347 72	4723 18	17 28	45	6 97	3760	13 2
8/30/1999	348 46	4722 44	16 54	52	7 08	3750	13 0
11/22/1999	341 47	4729 43	23 53	52	6 59	3730	11 8
2/8/2000	349 92	4720 98	15 08	48	6 75	3775	12 0
5/18/2000	345 47	4725 43	19 53	52	6 63	3780	12 8
8/24/2000	350 92	4719 98	14 08	55	6 94	3710	14 7
11/20/2000	353 53	4717 37	11 47	55	6 16	3600	12 0
2/28/2001	354 41	4716 49	10 59	48	6 37	3590	11 7
5/21/2001	352 14	4718 76	12 86	50	6 7	3500	12 1
8/15/2001	356 81	4714 09	8 19	52	6 23	3420	13 3
11/20/2001	357 97	4712 93	7 03	38	6 82	3420	12 7
3/5/2002	359 24	4711 66	5 76	38	7 46	3570	12 9
6/28/2002	359 61	4711 29	5 39	35	6 82	3590	13 4
9/24/2002	359 97	4710 93	5 03	32	7	3650	13 1
12/10/2002	360 46	4710 44	4 54	53	6 99	3500	12 1

**GW Elevation vs. Date  
TJMW-5**





State of Utah

Department of  
Environmental  
Quality

Dianne R. Nielson, Ph.D.  
*Executive Director*

DIVISION OF SOLID &  
HAZARDOUS WASTE  
Dennis R. Downs  
*Director*

OLENE S. WALKER  
*Governor*

GAYLE F. McKEACHNIE  
*Lieutenant Governor*

RECEIVED  
JAN 23 2004

January 23, 2004

Dwayne J. Woolley, General Manager  
Trans Jordan Landfill  
10873 South 7200 West  
South Jordan, Utah 84095-5610

RE: Modified Corrective Action Plan Approval

Dear Mr. Woolley:

We have reviewed the Modified Corrective Action Plan submitted January 9, 2004 by Trans-Jordan Cities (TJC). The plan is approved, with the stipulation that an update on the implementation and status of the plan be included in TJC's Solid Waste Facility Annual Report and whenever changes to or deviations from the plan are made. We appreciate your efforts in addressing this issue.

If you have any questions please call Ralph Bohn or Phil Burns at 801-538-6170.

Sincerely,

Dennis R. Downs, Executive Secretary  
Utah Solid and Hazardous Waste Control Board

DRD/PEB/kk

c: Patti Pavey, M.S., Executive Director, Salt Lake Valley Health Department

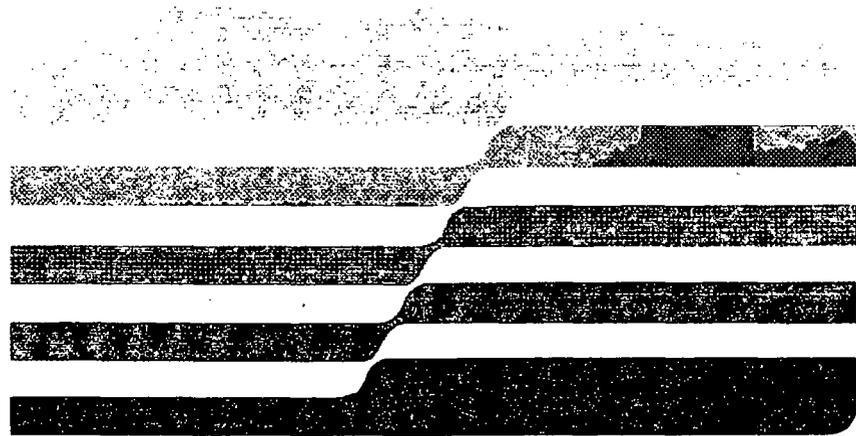
TN200400066  
Salt Lake County/Trans Jordan LF

**MODIFIED CORRECTIVE ACTION PLAN**

**Trans-Jordan Cities**

**FOR**

**TRANS-JORDAN LANDFILL**



**TRANS JORDAN**

**December 19, 2003**

**GENERAL MANAGER: DWAYNE J. WOOLLEY**

**ENGINEER: IGES, BRETT MICKELSON, P.E.**

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<i>Modifications to the ground water recharge regime (by KUC), several years of below average precipitation and increased demand on downgradient wells have all contributed to the drop in ground water elevations, drying up 2 of TJL monitor wells. The groundwater elevations in the two remaining downgradient monitoring wells (MW-4 and MW-5) have dropped by over 1 foot in the last 3 months. The following graphs illustrate the decreasing water levels for the last 4 years for each of the monitoring wells. The bottom of each of the graphs corresponds to the bottom elevation of each well:</i> ..	<i>4</i>
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<i>TJC is in contact with KUC and discussing the potential of accessing adjacent KUC wells for potential groundwater sampling. If KUC grants access, TJC will analyze the water sampled from the production well for a list of constituents mutually agreeable to the State Department of Solid and Hazardous Waste (DSHW), TJC and KUC.</i> .....	14

## **EXECUTIVE SUMMARY**

### ***General***

Pursuant to Regulation R315-308-3 (1) V of the Solid Waste Permitting and Management Rules, Trans-Jordan Cities (TJC) solicited input from affected and /or interested parties with regard to potential Ground Water impacts from Trans-Jordan Landfill (TJL).

### ***Public Comment***

The public comment meeting was conducted as part of a larger public comment period where TJC solicited input from interested or affected parties. The public comment period ran from September 29, 2003 to October 29, 2003 as stated in the attached advertisement published in the local newspapers. The only comments received by TJC during the course of the public comment period were from Mr. Jonathan Cherry of Kennecott Utah Copper (KUC).

### ***Response to Public Comment***

On December 9, 2003, TJC issued a written response to the State of Utah DSHW, regarding all questions and comments received during the Public Comment Period. A copy of this letter and KUC comments are included as Attachment 1.

### ***Changes to Plan***

Based on comments received, review of recent and existing data, TJC sees no compelling reason to significantly modify the previously submitted plan. Comments from Attachment 1 are referenced where appropriate. Minor editorial changes have also been made to the original submitted Corrective Action Plan. These are updates that do not change the intent of the original plan.

## **TRANS-JORDAN LANDFILL GROUND WATER REVIEW**

### ***General***

The TJL began operation in 1958 and is a cooperatively operated solid waste landfill operated by TJC. TJC was officially formed as a political subdivision of the State of Utah in 1986 to dispose of solid wastes generated in the southern half of Salt Lake County. TJC operates under an Interlocal Agreement between its' member cities (the Cities of Draper, Midvale, Murray, Riverton, Sandy, South Jordan, and West Jordan) with a combined population of 307,000 (2000 census). The TJL is overseen by a Board of Directors with each member city having one board position. Daily operations and management of the Landfill is coordinated by Mr. Dwayne J. Woolley, General Manager.

TJL in conjunction with South Valley Water Reclamation Facility (SVWRF) cooperatively fund the operation and maintenance of a wood products and green waste grinding facility established in 1996. SVWRF is the operator of this facility located immediately south and adjacent to the landfill.

During 1999, TJL constructed and placed on-line, a citizen drop-off facility at the landfill. The citizen drop-off facility is comprised of two areas, one area provides a safe area for citizen unloading of residential wastes, and a second area is used to separate Household Hazardous Waste (HHW) and recyclables from the waste stream. The HHW program is a joint operation with Salt Lake Valley Health Department (SLVHD).

The existing landfill facility is located on TJC owned land in Section 15 of Township 3 South, Range 2 West. The street address for the landfill is 10873 South 7200 West, South Jordan Utah.

Landfill access is provided from U-111 (old State Route 111) at the landfill site's northwest corner. TJL is located within the city of South Jordan and West Jordan city limits are approximately 1/2 mile northeast. The community of Herriman lies approximately 3 miles south-southeast and Copperton is 1.5 miles to the west. Drawing 1 (Attachment 2) shows the general arrangement of the TJL site.

### ***Ground Water Monitoring Requirements***

The State of Utah Department of Environmental Quality Division of Solid and Hazardous Waste (DSHW) in conjunction with (SLVHD) regulate the design, construction and operation of municipal solid waste (MSW) landfills in Salt Lake County. Section R315-308 of the State regulations and Health Regulation #1 of Salt Lake County stipulate requirements required for ground water monitoring at MSW facilities.

#### **Detection Monitoring:**

Each facility must have at least one upgradient well and two downgradient wells. During the first year of facility operation after the wells are installed, a minimum of eight independent samples from the upgradient and four independent samples from each downgradient well are analyzed for the constituents in Section R315-308-4 to establish

background water quality. The detection monitoring program requires the owner or operator of the facility to semiannually determine ground water quality at each monitoring well during the operation, closure and post-closure care period of the facility.

If, during the performance of the detection monitoring, a constituent is detected in the downgradient wells that has a statistically significant increase over the upgradient (background) water quality, the facility owner or operator must:

- Enter the information in the operating record of the facility.
- Notify the Executive Secretary (DSHW) and Director (SLVHD) of the findings.
- Immediately resample all wells to further evaluate the water quality.

If there is a statistically significant increase over background of any constituent, the owner or operator of the facility has 90 days to demonstrate that the source of the contamination is not associated with the facility. If the facility does not establish that the contamination is not associated with the facility, the ground water monitoring program moves into assessment monitoring.

#### **Assessment Monitoring:**

Assessment monitoring starts with sampling all downgradient wells and analyzing the water for all constituents listed in Appendix II of 40 CFR Part 258. For any constituent detected in the Appendix II list, a minimum of four independent samples must be collected, analyzed, and statistically analyzed to establish background concentrations. The owner or operator of the facility shall sample quarterly and compare the concentrations to ground water protection standards.

If after two consecutive sampling events, the concentrations of all constituents being analyzed are shown to be at or below established background values, the owner or operator must notify the Executive Secretary and upon approval return to detection monitoring.

If concentrations of any of the constituents are statistically measured at concentrations exceeding the protection standards, the owner or operator must notify the Executive Secretary, local health officials, and adjacent landowners, then characterize the nature and extent of the release. If the owner or operator cannot demonstrate that the source of the contamination is other than the landfill, then the facility enters into a corrective action phase.

#### **Corrective Action:**

As a facility enters into corrective action, the owner or operator of the facility takes any interim measures to protect human health and the environment and assesses possible corrective actions. Based upon the corrective action assessment and public comment, the

owner or operator must select a remedy, which shall be submitted to the Executive Secretary.

Upon approval of the selected corrective action, the Executive Secretary will notify the owner or operator of such approval and will require that the corrective action plan proceed according to the approved schedule.

### ***TJL Ground Water Monitoring Program***

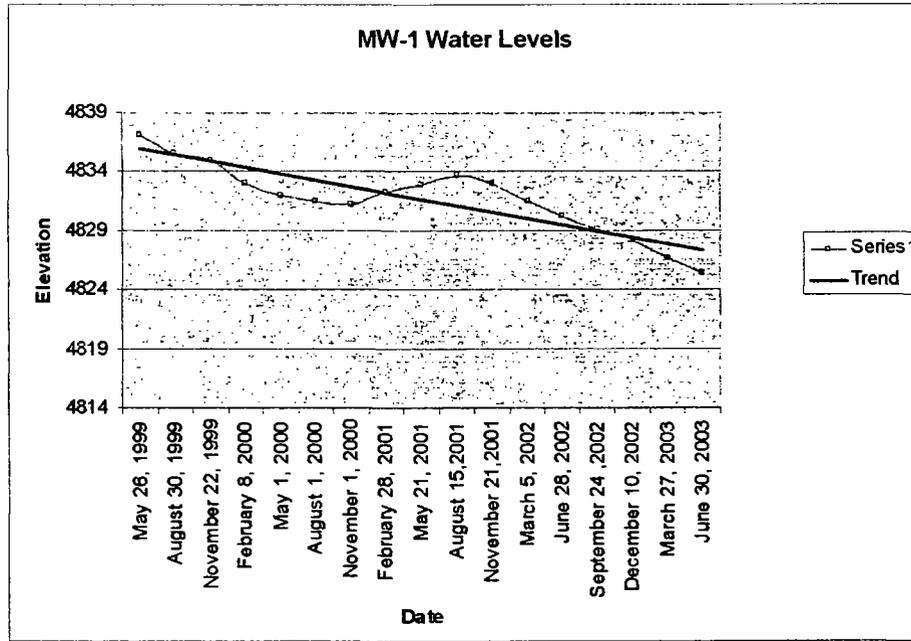
A ground water monitoring program was initiated in March of 1994 with the installation of monitor well one (MW-1). Water from MW-1 was compared with water well data in the vicinity of the landfill and it was determined that MW-1 was completed in a perched water system not representative of the documented low pH water known to be found in surrounding Kennecott Utah Copper (KUC) wells. As a result MW-1 has not been used as an upgradient well. Installation of monitor well two (MW-2) was performed in January of 1995 to serve as the upgradient monitor well for water quality evaluations. Monitor well three (MW-3) was installed in December of 1995 and served as the initial downgradient well for water quality evaluations.

Monitor well four (MW-4) was installed in November of 1997 to function as the second downgradient well. Monitor well five (MW-5) was installed in August of 1998 to monitor ground water closer to the active cell.

These sampling wells were originally located based on the predominant groundwater flow being west to east. However, down gradient pumping and the recent construction of a surface and alluvial cutoff system by KUC and other activities related to the Copper Mine located up gradient from the site, have each altered the groundwater conditions at the landfill. Drawing 2 (Attachment 2) shows the location of the five TJL monitoring wells.

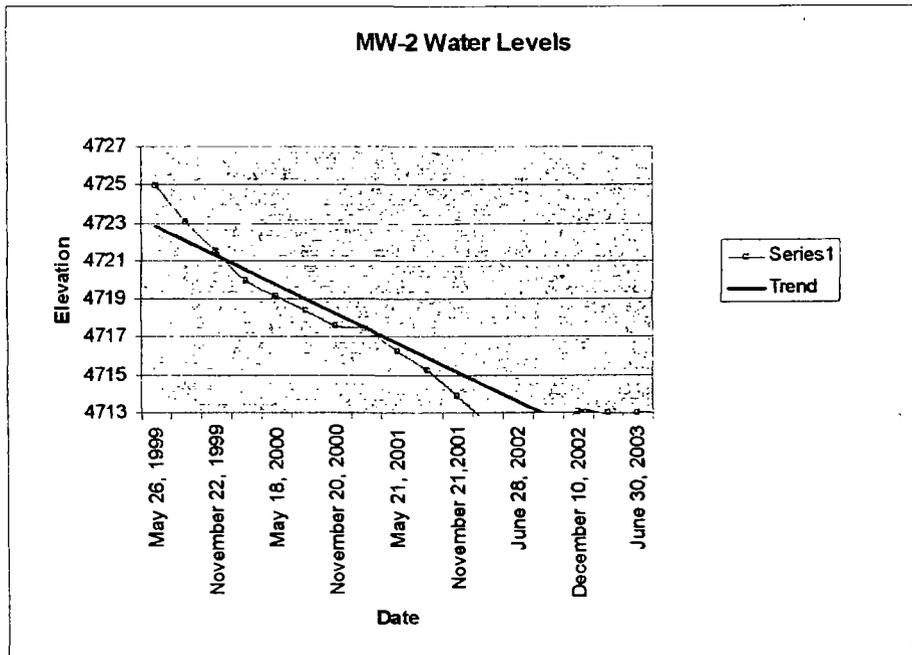
### ***Ground Water Elevations***

Modifications to the ground water recharge regime (by KUC), several years of below average precipitation and increased demand on downgradient wells have all contributed to the drop in ground water elevations, drying up 2 of TJL monitor wells. The groundwater elevations in the two remaining downgradient monitoring wells (MW-4 and MW-5) have dropped by over 1 foot in the last 3 months. The following graphs illustrate the decreasing water levels for the last 4 years for each of the monitoring wells. The bottom of each of the graphs corresponds to the bottom elevation of each well:



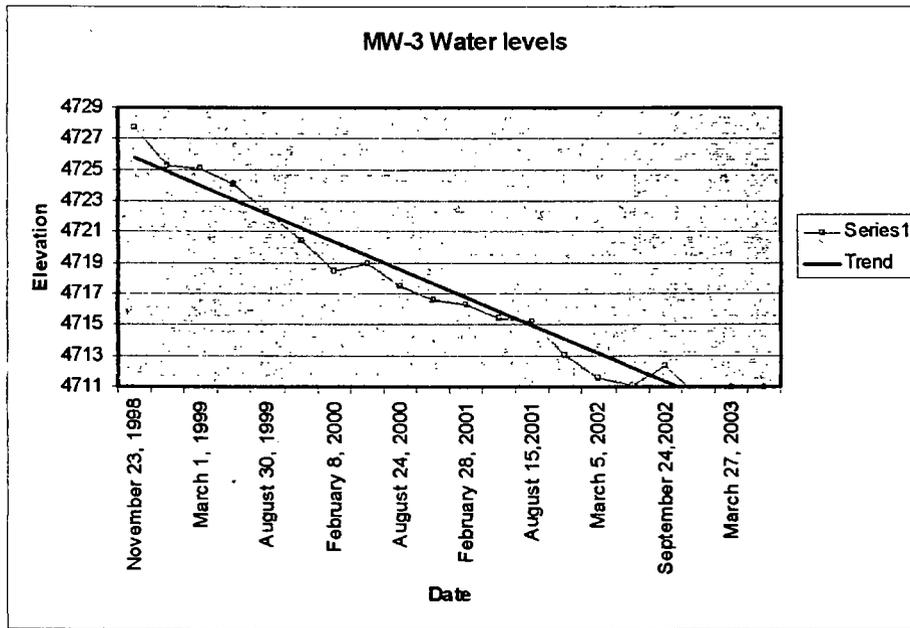
Well #1 Data: Well Depth = 365'  
 Bottom Elev. = 4814'  
 Initial Water Column = 39'  
 Water Column Remaining = 11'

Well #1 Status: Not currently utilized for groundwater analysis.



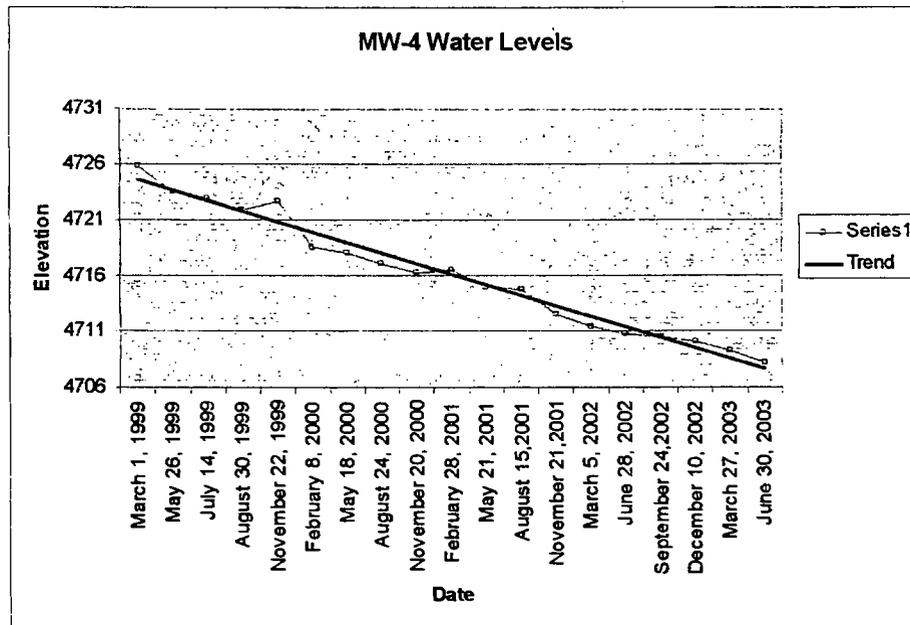
Well #2 Data: Total Depth = 455'  
 Bottom Elev. = 4713'  
 Initial Water Column = 34.5'  
 Water Column Remaining = 0

Well #2 Status: No viable sample since June 2002



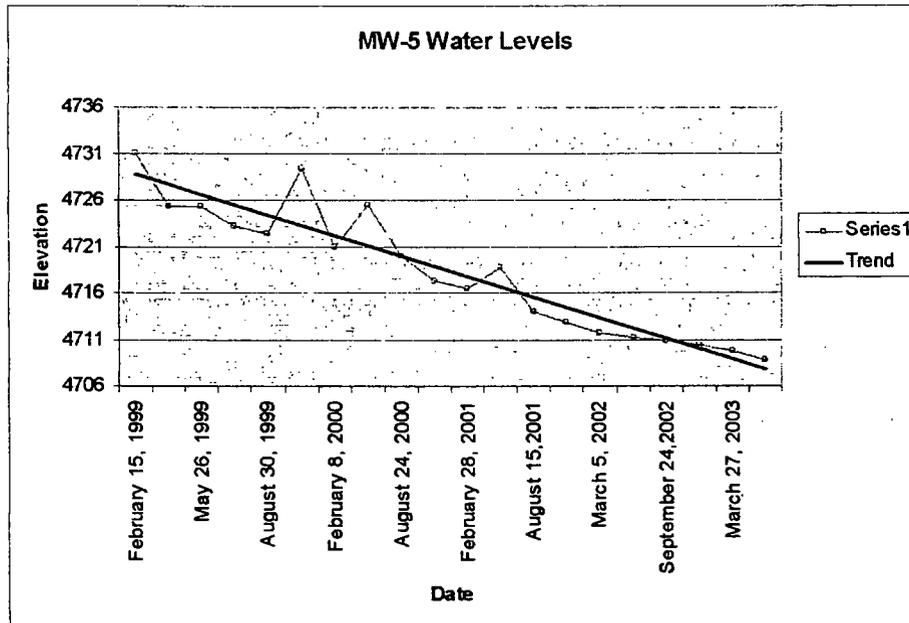
Well #3 Data: Total Depth = 319'  
 Bottom Elev. = 4711'  
 Initial Water Column = 30.5'  
 Water Column Remaining = 0'

Well #3 Status: No viable sample since June of 2002



Well #4 Data: Total Depth = 365',  
 Bottom Elev. = 4706'  
 Initial Water Column = 22'  
 Water Column Remaining = 2'

Well #4 Status: Operational (Projected date being dry: 1<sup>st</sup> quarter 2004)



Well #5 Data: Total Depth = 365',  
Bottom Elev. = 4706'  
Initial Water Column = 21'  
Water Column Remaining = 3'

Well #5 Status: Operational (Projected date being dry: 1<sup>st</sup> quarter 2004)

### Ground Water Quality

The most recent summary of the ground water quality at the TJL is presented in the 2002 Ground Water Monitoring Report, which was part of the annual landfill report submitted to DSHW in February of 2002. This Ground Water Monitoring Report presents the results of recent ground water analysis, including ground water chemistry, depth to water and the interpreted direction of ground water flow under the TJL. The "*Trans-Jordan Landfill 2002 Ground Water Monitoring Report*" is included as Attachment 3.

### Potential Constituents of Concern

The 2002 Ground Water Monitoring Report details the procedures for analyzing the concentration of constituents in ground water. The ground water at TJL is analyzed for ground water constituents as prescribed by the DSHW regulations. Most of the chemicals analyzed for are either non-detect or are present at low enough concentrations to not exceed ground water standards. Statistical analysis is performed on all measurable constituents to determine if ground water is potentially being impacted from landfilling operations.

Potential Constituents of Concern for TJL are the following organic compounds:

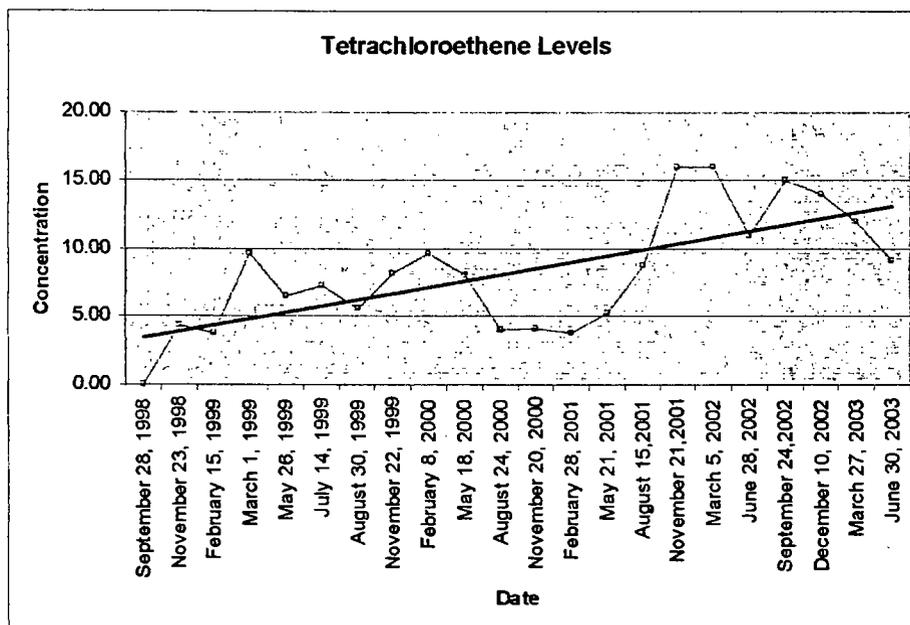
- 1,1 Dichloroethene

- Tetrachloroethene
- 1,1,1 Trichloroethane
- Trichloroflouromethane
- Dichlorodiflouromethane

Of the five potential constituents of concern listed above, four (1,1 Dichloroethene, 1,1,1 Trichloroethane, Trichloroflouromethane, and Dichlorodiflouromethane) have been measured in the ground water at TJL at concentrations lower than the ground water protection standards.

Only Tetrachloroethene in TJMW-5 was identified as a constituent of concern, which is identified as having concentrations higher than the groundwater protection standards and having higher concentrations downgradient than upgradient.

The following chart shows the concentration of Tetrachloroethene over time in well #5:



Confidence Interval analysis for Tetrachloroethene utilizing the data through March 2003 showed that Tetrachloroethene has exceeded the ground water protection standard of 5 parts per billion with all data subsets.

### **CORRECTIVE ACTION #1 – ACCELERATED CLOSURE OF UNLINED LANDFILL**

#### ***General***

Tetrachloroethene (PCE) is a dense non-aqueous phase liquid (DNAPL). One problem with the chlorinated solvents is that they are heavier than water and can result in deep

contamination. PCE can migrate under the influence of gravity as a liquid, or can volatilize and migrate in a vapor phase. Due to the nature of PCE, depth to ground water, and the inherent challenges in investigating the source and mechanism of the PCE transport, TJC proposes to mitigate both of the primary mechanisms for transport.

The first of the corrective actions summarized in this plan will be to minimize the potential for liquid based solute transport by constructing a landfill cover system that will reduce the infiltration of liquid into the landfill. TJC has modified the landfilling operations to accelerate the closure of the unlined landfill. The active landfill face has been moved from the lined cells and located over the unlined landfill to bring the unlined area to a final grade sooner. Bringing the unlined landfill to grade sooner will allow for the installation of a synthetic cover over the top of the unlined area in the most time efficient manner and minimize the potential infiltration of water into the MSW. TJC has elected to incorporate synthetic materials for cover construction rather than a monolithic soil cover to improve methane collection, storm water management and infiltration reduction efforts. Reducing the infiltration of water in the landfill will minimize the generation of leachate which will reduce the potential for additional PCE transport in a liquid medium.

To accomplish the accelerated closure of the unlined landfill, while maintaining a manageable landfill operation, TJC has developed a phased closure plan for the entire landfill operation. The following presents the scheduled closure phases at the Landfill:

### ***Side Slopes Closure***

Drawing 3 (Attachment 2) indicates the areas of the landfill to be covered with a minimum of 5 feet of acceptable soil cover. Drawing 3 also shows the locations that test pits have been excavated to document soil depth and the locations of future test pits. Once final cover soils have been placed on the remaining side slopes, test pits will be excavated to document the remaining side slopes soil thickness. All side slopes will have received final cover by late fall of 2003. The side slopes indicated on the drawing are slopes that in general bound the unlined areas of the landfill.

TJL has accelerated the side slope closure, as previously discussed with DSHW personnel, to aid in the implementation of the first corrective action. All side slopes will receive a minimum of 5 feet of site soils. All test pits excavated to date showed the minimum 5-foot cover thickness. Once test pits are excavated in the remaining areas to document cover thickness, topsoil and/or compost will be placed on all side slopes and the areas revegetated.

All areas of the landfill will be closed in accordance with applicable final cover requirements in the regulations.

### ***Closure Phases A through H***

Phases A through H as indicated on Drawings 4, 5, 6, and 7 (Attachment 2) represent the future closure phases of the landfill. The cover system utilized in Phases A through H will incorporate synthetic materials designed to the lower liner permeability criteria of the lined cells. The utilization of synthetic materials in the cover design will aid in the design and operation of a future landfill gas recovery system.

The approximate closure schedule and associated area for each Phase is as follows:

<b>Phase</b>	<b>Cover Area</b>	<b>Date of Closure</b>
North side slopes	26 acres	Summer 2003
Phase A	11 acres	Summer 2004
Phase B	7 acres	Summer 2005
Phase C	10 acres	Summer 2007
Phase D	15 acres	Summer 2011
Phase E	17.5 acres	Summer 2016
Phase F	18.5 acres	Summer 2021
Phase H	30.5 acres	Summer 2030

### ***Duration of Corrective Action #1***

All landfill covers will be maintained from initial installations through the closure, and through the post-closure care periods.

## **CORRECTIVE ACTION #2 – INSTALLATION OF A GAS COLLECTION SYSTEM**

### ***General***

The second of the corrective actions summarized in this plan will be to install a landfill gas collection system that will depressurize the landfill while recovering methane, thus minimizing the potential for a vapor phase transport of the PCE.

The installation of a gas recovery system is part of a comprehensive waste management plan that is being implemented at the landfill. Installation of the system allows for the safe, long-term methane management that will help to minimize the potential for further environmental impacts to the ground water.

### ***Existing Gas Recovery Design***

As part of the New Source Review program of the State of Utah Division of Air Quality, TJC had a methane collection system designed. The design of the methane collection system met the requirements of the Air Quality Regulations and, at the time of the design, represented the anticipated closure sequence of the landfill.

The existing gas collection system design was prepared by HDR Engineering, Inc. in 1999 and had provisions for some 45 vertical wells uniformly distributed across the landfill. The design package included all requisite engineering details and specifications to support a bid package.

### ***Gas to Energy Project***

TJC is negotiating a final contract to partner with a developer in support of a Landfill Gas-to-Energy Project (LGEP). The LGEP is a proactive partnership in the beneficial use of landfill gas.

The contract is a culmination of a RFP process where TJC received 6 competitive proposals in April of 2003. Trans-Jordan personnel reviewed and ranked all 6 proposals based upon landfill gas-to-energy experience, project approach, schedule and proposed fee. Out of the 6 proposals, 3 were selected to prepare presentations to Trans-Jordan's personnel. The 3 remaining bidders were given additional information reflecting the change in closure sequence and additional site-specific data. Final presentations to TJC were conducted the 21<sup>st</sup> of August 2003. As this contract is finalized, TJC will proceed with the LGEP early next year.

TJL will install a gas collection system as part of its methane management plan, but with the price of natural gas steadily increasing, the prospects of a viable gas-to-energy project increase substantially.

### ***System Construction***

The construction of any gas collection system or gas-to-energy system will be of a phased nature. The system will be installed concurrent with or just subsequent to the closure of each of the Phases outlined previously.

### ***Duration of Corrective Action #2***

Landfill gas will be continually collected from the initial system installation through closure and post-closure care periods or until landfill gas is measured below 25% of the LEL for Methane in the system.

## **CORRECTIVE ACTION #3 – KUC GROUND WATER RECOVERY SYSTEM**

### ***General***

The third and final portion of the proposed corrective actions summarized in this plan is a ground water recovery system being implemented by KUC. Though KUC is responsible for the aspects of their ground water recovery program, TJC appears to be an indirect beneficiary of KUC's actions. KUC actions, independent of the Corrective Actions #2 and #3 may mitigate TJL impact to the ground water.

### ***Geologic Background***

The TJL is located in the southwestern portion of the Jordan River Valley, usually called the Salt Lake Valley, east of the northern Oquirrh Range and the mouth of Bingham Canyon. Bingham Creek flows from the Oquirrh Range eastward down Bingham Creek (immediately north of the landfill) and out into the Salt Lake Valley to the Jordan River. West of the landfill area are the mining operations of the Bingham Canyon Mine that is located at the confluence of Bingham and Carr Fork Canyons. The Bingham Mining District has been developed in intrusive and meta-sedimentary rocks.

### ***KUC Ground Water Impacts***

Kennecott Utah Copper has been conducting mining operations west of the landfill location for decades. As part of the mining operations, a reservoir (Bingham Canyon Reservoir) has been operated in the Bingham Creek drainage to serve as storage for process waters. The reservoir is located hydraulically upgradient from the TJL, approximately 8,900 feet to the west. Seepage losses from the historic operation of the Bingham Creek Reservoir have been estimated at over 1,000,000 gallons per day since construction in 1965. The Bingham Creek Reservoir (unlined) has since been decommissioned and replaced with a lined reservoir, but the residual downgradient acid and sulfate waters still remain. Additionally, KUC has installed several groundwater cutoff walls.

The affected ground waters have been estimated to extend over 20,000 feet downgradient to the east and about 10,000 feet wide, fully encompassing the landfill. The sulfate concentration in some of the monitor wells within the plume has historically exceeded 50,000 mg/l with some pH values less than 3.0.

Previous hydrogeologic work has delineated a 10,000 mg/l TDS contour line running beneath the landfill. The wide range in TDS concentrations in the study area reflects the impact of historic mining operations on the groundwater.

### ***KUC Ground Water Treatment***

KUC has been working with the State of Utah Division of Water Quality for several years to implement a groundwater recovery and treatment plan. KUC's recovery effort involves pumping impacted groundwater from a network of wells designed and installed to recover both the low pH water and the high TDS waters. "The Southwest Jordan Valley Ground Water Cleanup Project" is currently undergoing a public comment period while preliminary work has already been started. A new acid recovery well has been installed within 200 feet of the TJL boundary. The volume of water pumped from this well and others located near the landfill will drastically alter the groundwater elevations under the landfill. KUC has shared information on two of the possible pumping scenarios.

Scenario #1 pumping rates:	Scenario #2 pumping rates:
<p><b>Zone A:</b>                      Acid Well 1146 (950 gpm)                      New Acid Well (750gpm)                      Jordan Wells (2600 acre feet/yr)                      Lark Well (200 gpm)                      Sulfate Well (1000 gpm)                      Sulfate Well B2G1193 (1100gpm)                      Sulfate Well B2G1200 (1100gpm)                      Riverton Wells (4308 acre feet/yr)</p>	<p><b>Zone A:</b>                      Acid Well 1146 (950 gpm)                      New Acid Well (750gpm)                      W. Jordan Wells (2600 acre feet/yr)                      Lark Well (200 gpm)                      Sulfate Well (1000 gpm)                      Sulfate Well B2G1193 (1700gpm)                      Sulfate Well B2G1200 (1700gpm)                      Riverton Wells (4308 acre feet/yr)</p>
<p><b>Zone B:</b>                      Wells 1-6 (235gpm each)                      Well 7 (1200 gpm)</p>	<p><b>Zone B:</b>                      Wells 1-6 (235gpm each)                      Well 7 (1200 gpm)</p>

**10, 20, and 40 Year Drawdowns**

KUC’s drawdown data for each of the above scenarios is presented on Drawings 8, 9, 10, 11, 12 and 13 (Attachment 2). Drawings 8, 9, and 10 represent the predicted groundwater drawdown for scenario #1 at 10, 20, and 40 years. Drawings 11, 12, and 13 represent the predicted groundwater drawdown for scenario #2 for the same 10, 20, and 40 year periods.

The predicted 10-year groundwater drawdown for the groundwater in the vicinity of the landfill ranges from 30 to 60 feet. The predicted 20 and 40-year groundwater drawdowns for the landfill areas are from 50 to 80 feet and 70 to 90 feet respectively.

**KUC Water Destinations**

Water from the acid wells will be directed to the KUC tailings ponds north of Magna and water recovered from wells B2G1193 and BFG1200 will be sent to a reverse osmosis plant for treatment to drinking water standards for public use.

**Duration of Corrective Action #3**

The duration of the KUC recovery actions is scheduled for the next 40 years. When the groundwater under TJL has reached equilibrium, groundwater will be sampled and analyzed to document that the Corrective Action was successful.

## **FUTURE GROUND WATER MONITORING**

### ***Impacts to Trans-Jordan Landfill's Ground Water Monitoring***

As previously detailed, the groundwater under the landfill is dropping. Two of the five monitoring wells are now dry and the two remaining downgradient wells are anticipated to become dry within 9 months. The predicted drop of ground water and subsequent drying out of MW-4 and MW-5 does not include an increase in the rate of ground water drop due to the upcoming pumping plan. If water recovery efforts start soon, the entire groundwater monitoring system at the landfill may be rendered useless.

### ***New Well Installation***

These two pumping scenarios may not be the only variations in a KUC plan, but are only the scenarios shared with TJC. The impacts to the groundwater elevations under and surrounding the landfill might be enormous. Based upon the magnitude of the groundwater elevation change, the level of accuracy of the modeling, and the numerous scenarios being considered, the true impact to the groundwater elevations are still unknown.

The anticipated drawdown of the ground water surface may result in the change of direction of flow of the groundwater under the landfill. The effects of the change in direction of flow are also an unknown.

The magnitude of these unknowns (final depth to groundwater and final direction of flow) are such that the location selection for and the installation of a new monitor well is extraordinarily difficult. Without knowing the steady state conditions associated with the remediation efforts, the installation of a new well will have a low likelihood of providing useful water quality data. As a result, TJC proposes to not install a new groundwater monitoring well.

Once the ground water regime stabilizes, TJC will assess the long-term ground water monitoring requirements of the landfill and install monitoring wells if deemed necessary.

### ***Proposed Ground Water Monitoring***

TJC is in contact with KUC and discussing the potential of accessing adjacent KUC wells for potential groundwater sampling. If KUC grants access, TJC will analyze the water sampled from the production well for a list of constituents mutually agreeable to the State Department of Solid and Hazardous Waste (DSHW), TJC and KUC.

# **APPENDIX I**



Intermountain GeoEnvironmental Services, Inc.  
 4153 S. Commerce Drive, Salt Lake City, Utah (801) 270-9400 T (801) 270-9401 F

May 9, 2011

Mr. Dwayne Woolley  
 Trans Jordan Landfill  
 10873 South 7200 West  
 P.O. Box 95610  
 South Jordan, Utah 84095-0610

RE: Cell 6 Cut Slope Evaluation

Mr. Woolley:

This report presents the results of our geotechnical analysis of three different slope configurations proposed for use in excavation of Cell 6 at your facility. To this point, all cells have been constructed with 3H: 1V side (cut) slopes. It is our understanding that Trans-Jordan wishes to explore the feasibility of maximizing their available airspace by excavating all or part of Cell 6 using steeper side slopes (2.5H: 1V or 2H: 1V).

**Airspace and Revenue**

Under the current excavation plan the Cell 6 excavation would remove approximately 2.08 Mcyd of soil. The first step in our evaluation was to determine how much additional volume and revenue would be available in Cell 6 by excavating the side slopes at a steeper angle. Initially IGES looked at the volume increase if only the north side of Cell 6 was steepened, leaving the east and south sides excavated with the "standard" 3H: 1V side slope. The following table shows the projected volume and revenue increase associated with steeper excavation on the north slope only of Cell 6:

Cell 6 North Slope Only	Approx. Quantity				Increase from Base		
	Total Ex. (yd <sup>3</sup> )	Old Waste (yd <sup>3</sup> )	Soil/Additional Airspace (yd <sup>3</sup> )	New Waste (ton)	(yd <sup>3</sup> )	(ton)	Revenue
3.0:1	3,340,550	1,257,600	2,082,950	1,458,065	-	-	\$0
2.5:1	3,408,580	1,257,600	2,150,980	1,505,686	68,030	47,621	\$1,142,904
2.0:1	3,492,840	1,257,600	2,235,240	1,564,668	152,290	106,603	\$2,558,472

The potential increase in revenue show is based on an assumed average density of 0.7 ton/cyd and tipping fees of \$24/ton.

The next table shows the volume/revenue increase if the entire Cell 6 Excavation is performed with steeper side slopes. The same assumptions regarding waste density and tipping fees were applied in this assessment.

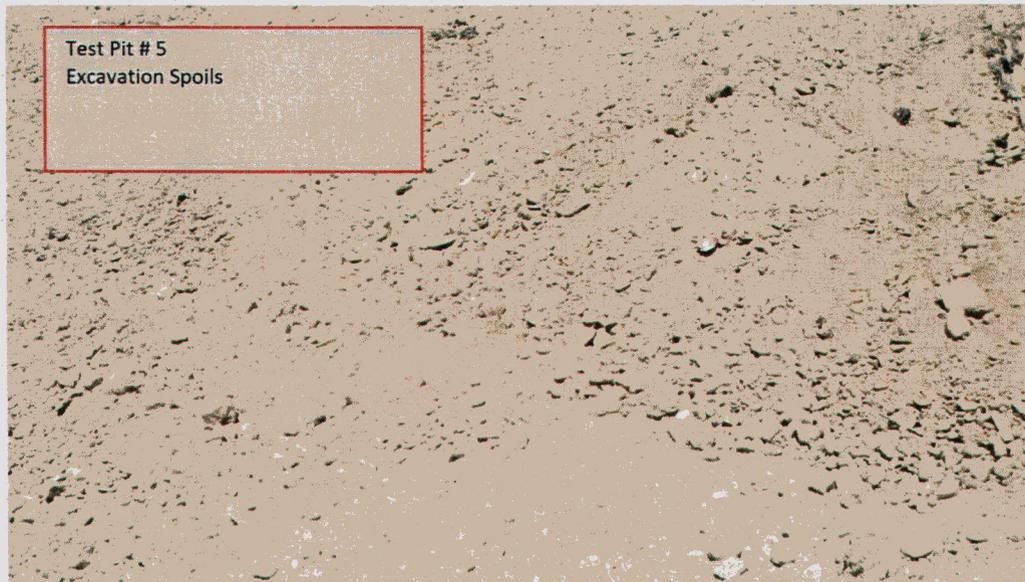
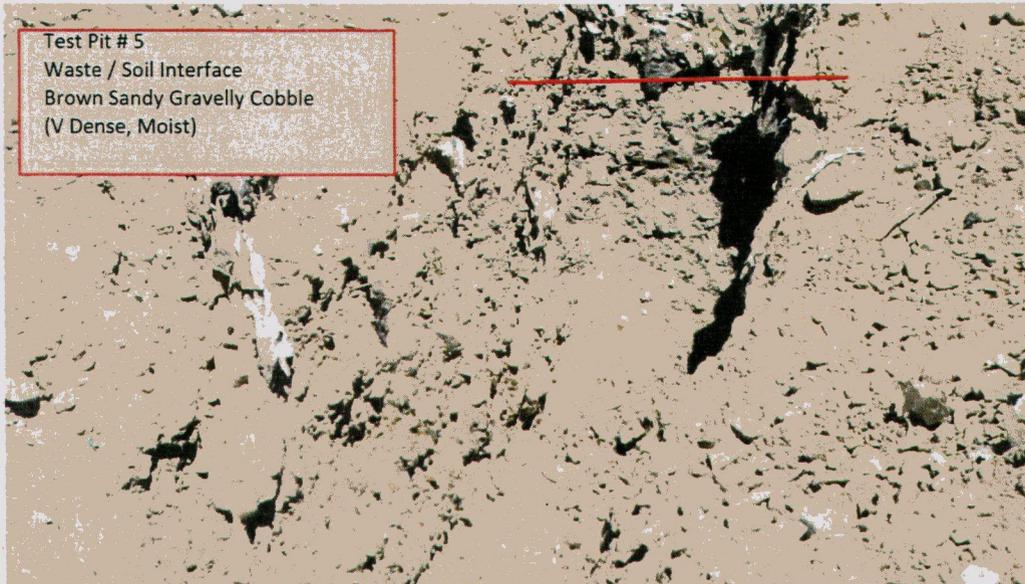
Cell 6 Entire Excavation	Approx. Quantity				Increase from Base		
	Total Ex. (yd <sup>3</sup> )	Old Waste (yd <sup>3</sup> )	Soil/Additional Airspace (yd <sup>3</sup> )	(ton)	(yd <sup>3</sup> )	(ton)	Revenue
3.0:1	3,340,550	1,257,600	2,082,950	1,458,065	0	0	\$0
2.5:1	3,585,000	1,257,600	2,327,400	1,629,180	244,450	171,115	\$4,106,760
2.0:1	3,882,200	1,257,600	2,624,600	1,837,220	541,650	379,155	\$9,099,720

As shown in the table a portion of the Cell 6 excavation will encounter some old waste that will need to be relocated within other lined cells of the landfill. We do not anticipate that this waste volume will vary with steeper slope excavation, but in any case it will not produce revenue for the landfill. The exact volume is not known, but it has been estimated to be ~1.26 Mcyd for all slope angles.

### Stability Analysis

The excavation of Cell 6 will result in a maximum cut height of approximately 105 feet on both the north and south sides of the cell. Slopes of 3H:1V, 2.5H:1V, and 2H:1V were analyzed for static stability.

Because of the nature of site soils, meaningful sampling and laboratory testing are not feasible. Test pit excavations in the area reveal that site soils are granular and composed mainly of sandy subrounded gravel and cobbles. Deposits were also observed to be cemented. The observed characteristics are similar to soils that have been encountered in previous cell excavations at the site. Based on visual material classification and empirical correlations these soils are anticipated to have a friction angle of approximately 38 degrees. The following photographs show the conditions encountered in some of the test pit excavations.



Stability analysis was performed at each of the proposed slope angles using the expected friction angle,  $\phi=38^\circ$ . Sensitivity analysis was also performed to determine what friction angle would result in a safety factor equal to 1.5 for each slope angle. Embankment stability was analyzed using the global stability program Slide 6.0 developed by Rocscience. Results of the analysis are presented as attachments to this document. The following table summarizes the results of stability modeling and sensitivity analysis.

Slope	$\phi=38^\circ$ Factor of Safety	Factor of Safety=1.5 $\phi$
3.0:1	2.37	26.3
2.5:1	1.98	30.6
2.0:1	1.65	35.4

While a safety factor greater than 1.0 indicates a stable slope, this assumes that the model created provides a fairly accurate representation of material when evaluating slope stability. In most cases a safety factor of 1.5 or greater is sought under static conditions to account for some unknowns in stratigraphy and soil strength. Seismic loading was not considered in our stability analyses since the excavation is considered temporary and impacts of failure would be limited. For all three slope angles an acceptable static factor of safety against failure was shown using the assumed  $\phi=38^\circ$ .

As previously mentioned, prior cell excavation at the site and test pit exploration performed for this stability assessment showed that site soils are typically cemented together. Given the nature of the material the strength of this cementation/cohesion could not be readily quantified via laboratory testing. Rather than assuming a value for use in our analysis, cohesion was conservatively omitted from all analyses. Affects from groundwater are not anticipated and have not been accounted for in the model. It is possible that the soils encountered will have  $\phi < 38^\circ$ ; however based on our observations, previous experience at the site and the conservative assumptions used in stability modeling we believe that the Cell 6 excavation will be stable at cut slopes as steep as 2.0H: 1V.

### Composite Liner Stability

The stability of the slope liner was analyzed assuming a 2.5H: 1V slope. As per Trans-Jordan Landfill details liner construction will consist of a lower layer of compacted screened soil (6-inches thick to protect liner from native cobbles/boulders), a Geosynthetic Clay Liner (GCL), and a HDPE liner covered by another layer of loosely compacted screened soil (6-inches thick to protect liner from waste). The screened soil is expected to be a Poorly Graded SAND with silt (SP-SM) generated through processing of site soils to remove oversized materials. A friction angle of  $33^\circ$  was assumed for these screened soils. For the purpose of stability analysis the sand below the GCL is expected to be compacted resulting in an unit weight of approximately 120 pcf. Above the HPDE liner the soil is expected to be loosely compacted, yielding an expected unit weight of approximately 110 pcf.

Factors of safety for the layers of soil in the liner construction are above 1.5. After construction of the liner, the failure planes with the minimum factor of safety passed through the screened soil. The factor of safety in the compacted screened soil below the GCL is expected to be 1.665. The factor of safety of the layer of soil placed on the HDPE liner is expected to be 1.641. The models indicate the liner and surrounding protective soils will be stable at a slope of 2.5H: 1V.

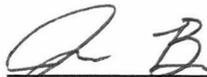
## Limitations

The recommendations contained in this report are based on limited field exploration, empirical correlations and understanding of the proposed construction. The subsurface data used in the preparation of this report were obtained from the explorations made for this investigation. It is possible that variations in the soil and groundwater conditions could exist between and beyond the points explored. The nature and extent of variations may not be evident until construction occurs. If any conditions are encountered at this site that are different from those described in this report, we should be immediately notified so that we may make any necessary revisions to recommendations contained in this report. In addition, if the scope of the proposed construction changes from that described in this report, we should be notified.

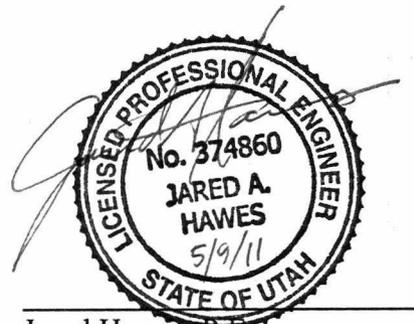
This report was prepared in accordance with the generally accepted standard of practice at the time the report was written. No warranty, expressed or implied, is made.

We appreciate the opportunity to provide you with our services. If you have any questions, please contact us at your convenience.

Respectfully submitted,  
**IGES, Inc.**



Joan Brown, P.E.I.  
Staff Engineer



Jared Hawes, P.E.  
Project Engineer

Attachments:

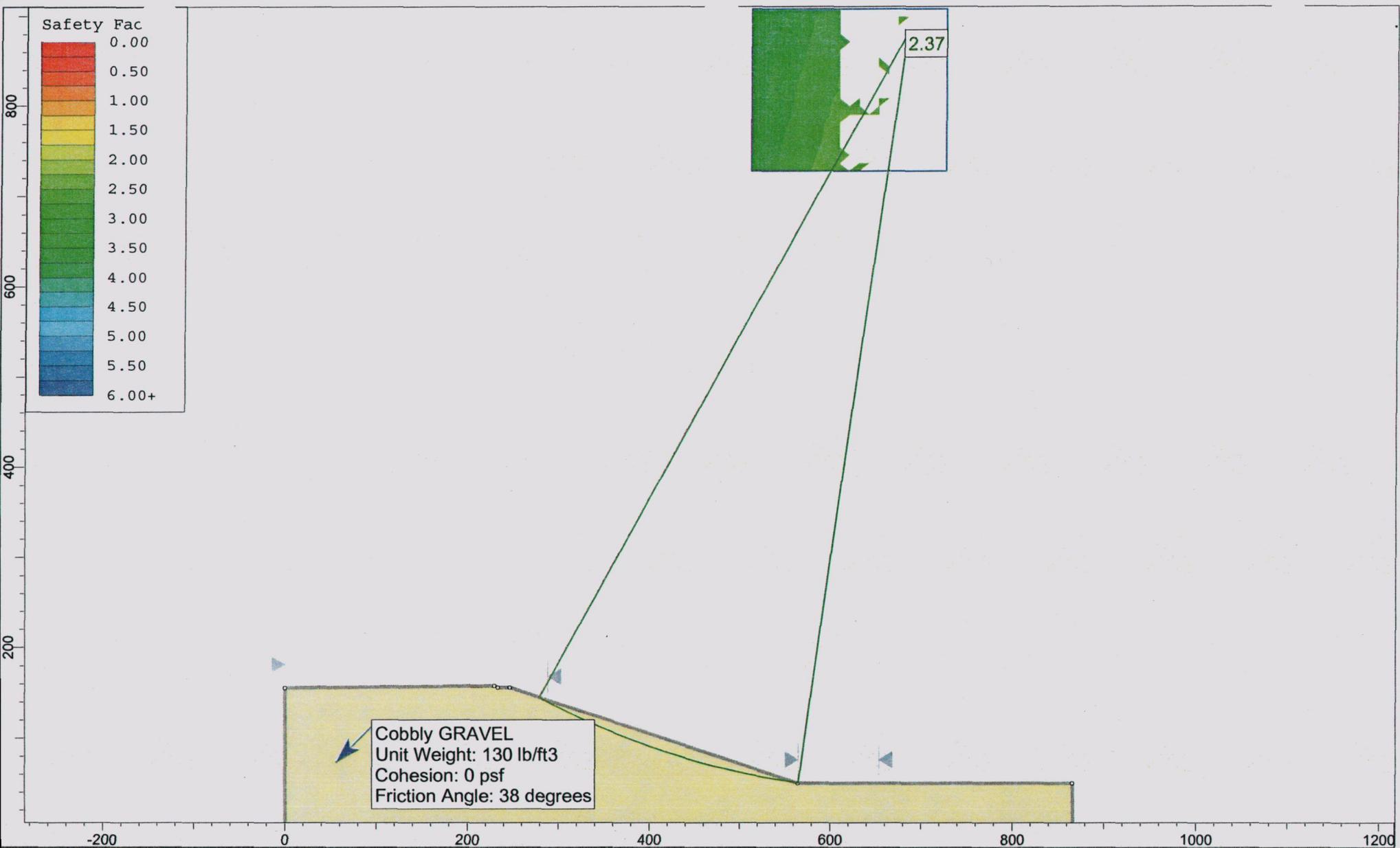
### Appendix A

- 1 Cell 6 Excavation Plan (3.0: 1 Cut)
- 2a Cell 6 Excavation Plan (2.5: 1 Cut-North)
- 2b Cell 6 Excavation Plan (2.0: 1 Cut-North)
- 3a Cell 6 Excavation Plan (2.5: 1 Cut)
- 3b Cell 6 Excavation Plan (2.0: 1 Cut)

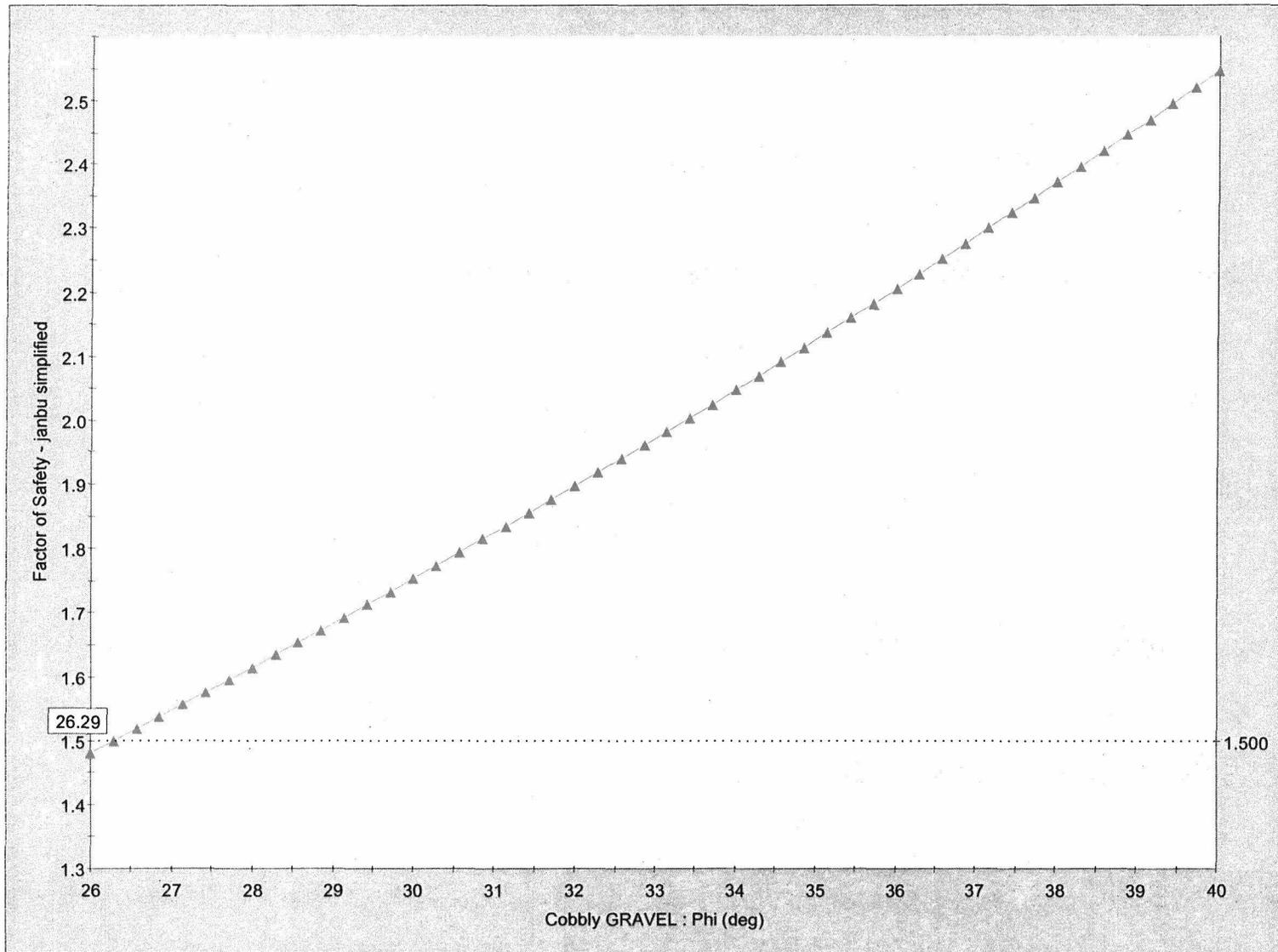
### Appendix B

Stability Analysis





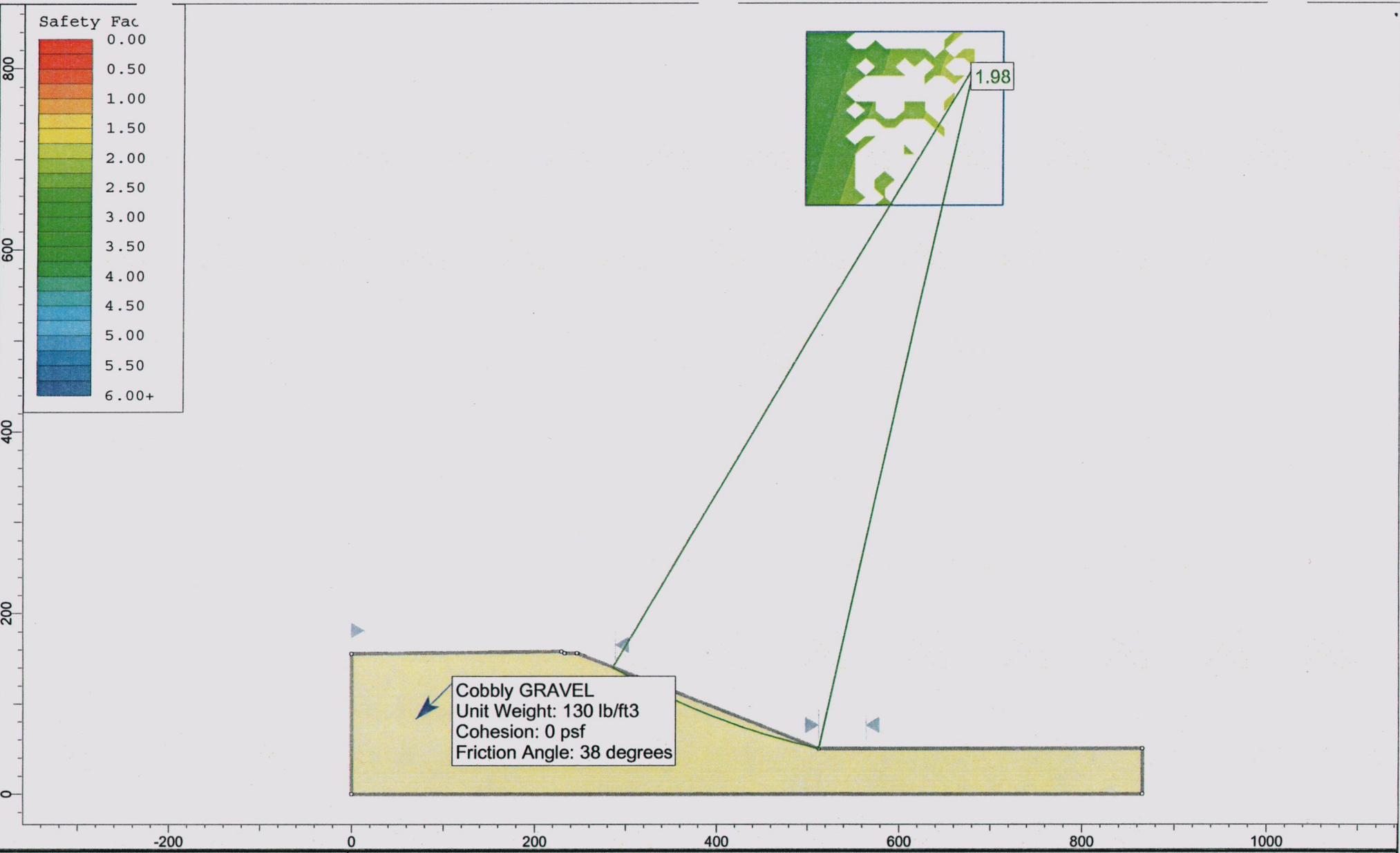
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Landfill 3H to 1V slope stability			
<i>Analysis Description</i>			
Janbu - no cohesion			
<i>Drawn By</i>	JB	<i>Scale</i>	1:1750
<i>Company</i>	IGES, Inc		
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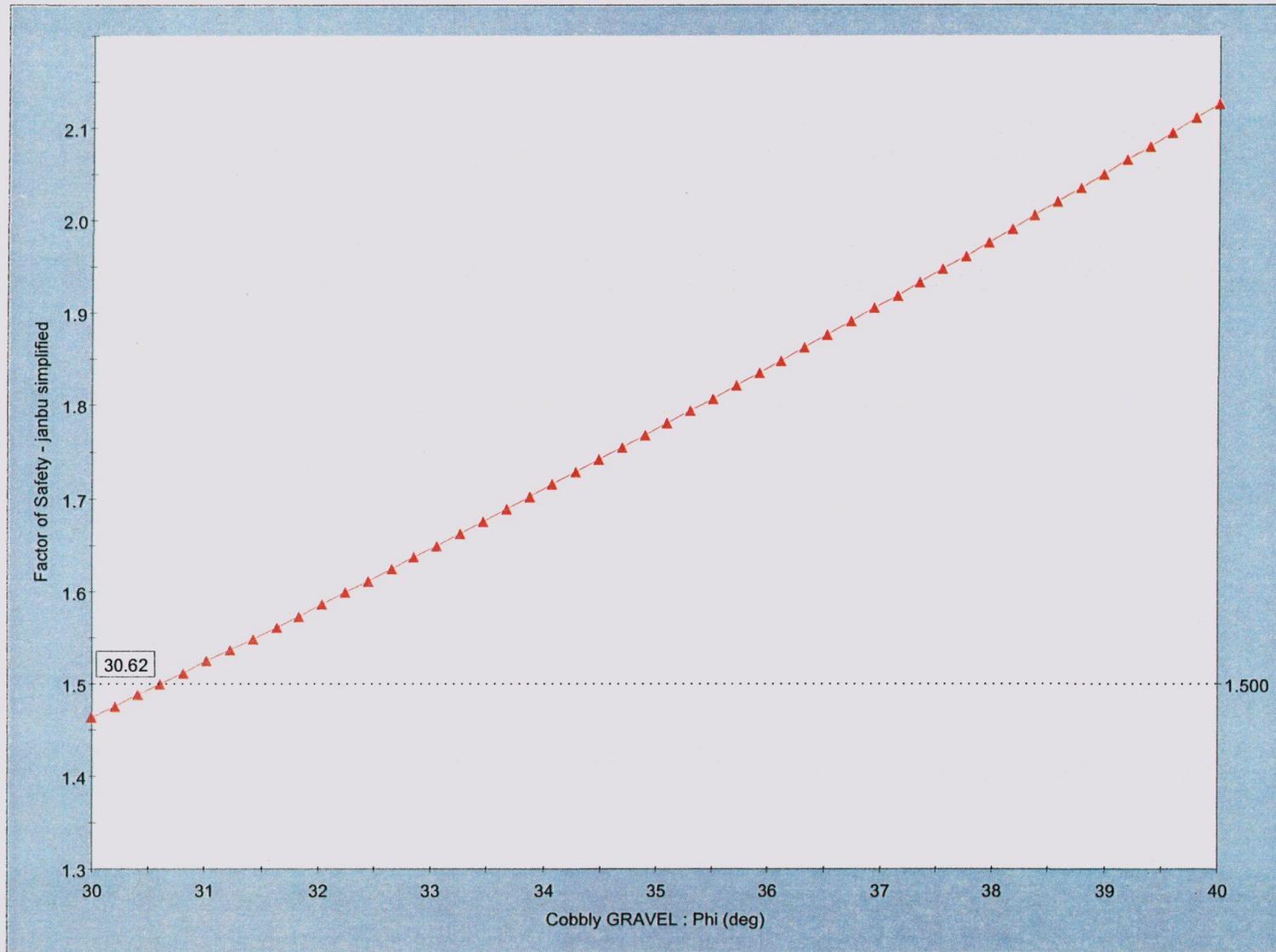
▲ Cobbly GRAVEL : Phi (deg)



<i>Project</i>		Landfill 3H to 1V slope stability	
<i>Analysis Description</i>		Janbu - no cohesion	
<i>Drawn By</i>	JB	<i>Scale</i>	<i>Company</i>
<i>Date</i>	2/11/11	<i>File Name</i>	landfill_3_to_1sensitivity.sli
		IGES, Inc	



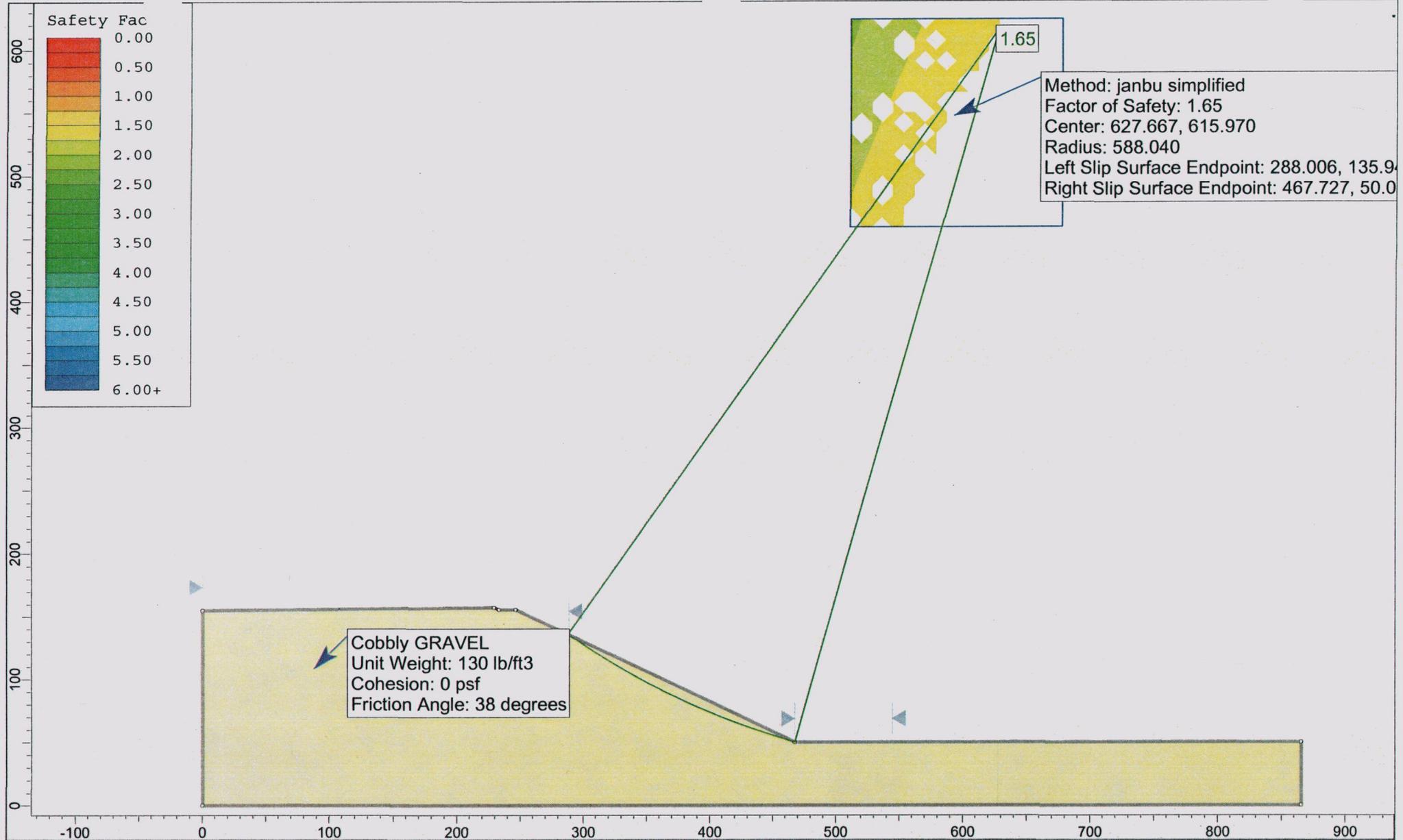
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	<b>Analysis Description</b> Janbu - no cohesion		
	<b>Drawn By</b> JB	<b>Scale</b> 1:1750	<b>Company</b> IGES, Inc
	<b>Date</b> 2/11/11	<b>File Name</b> landfill_2.5_to_1sensitivity.sli	



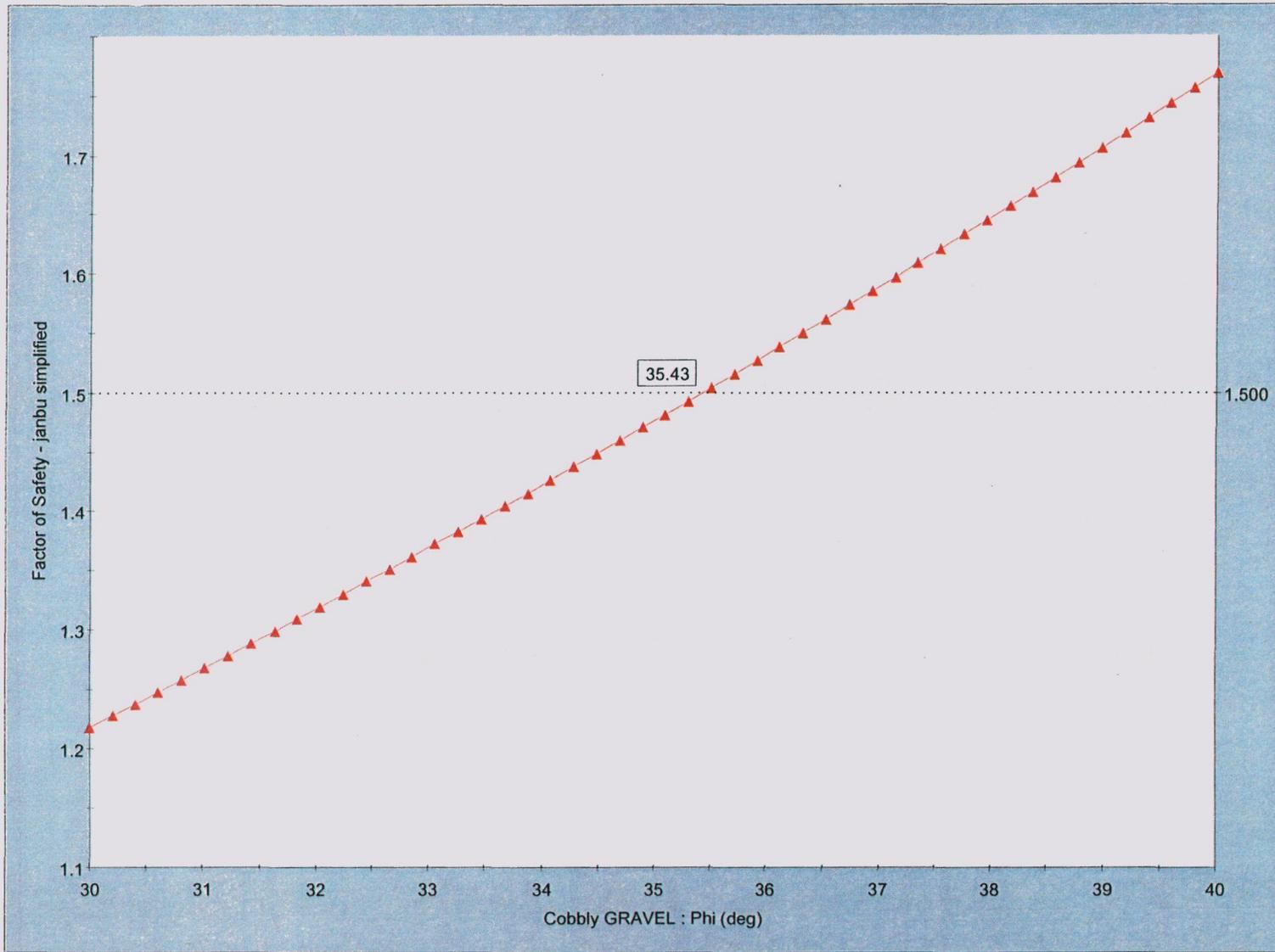
—▲— Cobbly GRAVEL : Phi (deg)



<i>Project</i>		Landfill 2.5H to 1V slope stability	
<i>Analysis Description</i>		Janbu - no cohesion	
<i>Drawn By</i>	JB	<i>Scale</i>	<i>Company</i>
<i>Date</i>	2/11/11	<i>File Name</i>	landfill_2.5_to_1sensitivity.sli
		IGES, Inc	



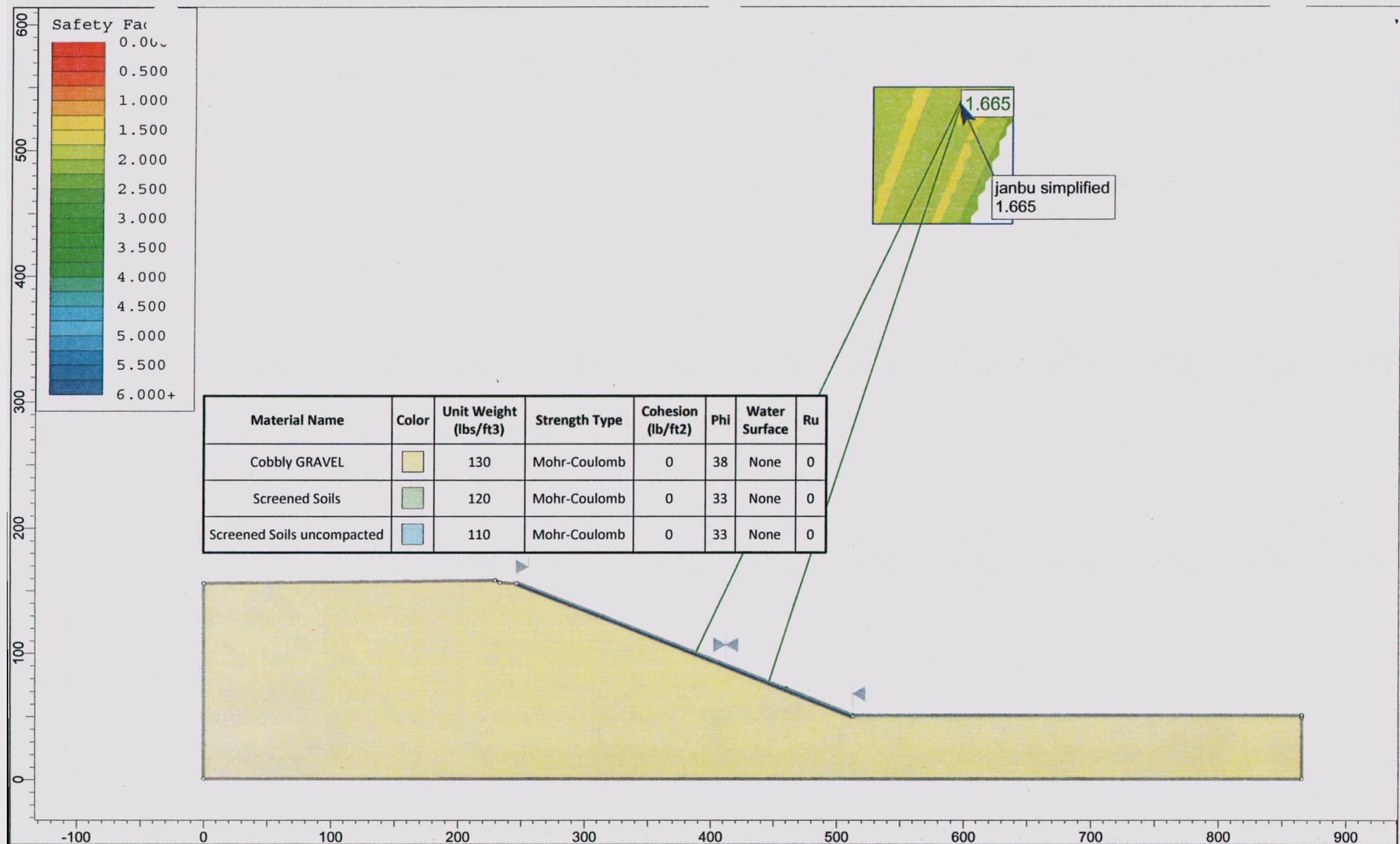
<i>Project</i>			
Landfill 2H to 1V slope stability			
<i>Analysis Description</i>			
Janbu - no cohesion			
<i>Drawn By</i>	JB	<i>Scale</i>	1:1250
<i>Company</i>	IGES, Inc		
<i>Date</i>	2/11/11	<i>File Name</i>	landfill_2_to_1sensitivity.sli



—▲— Cobbly GRAVEL : Phi (deg)

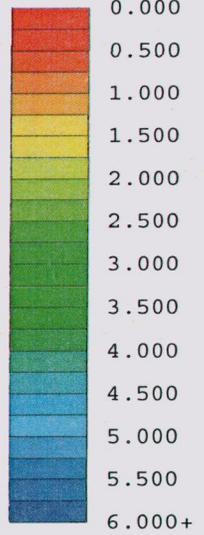


<i>Project</i>		Landfill 2H to 1V slope stability	
<i>Analysis Description</i>		Janbu - no cohesion	
<i>Drawn By</i>	JB	<i>Scale</i>	<i>Company</i>
<i>Date</i>	2/11/11	<i>File Name</i>	landfill_2_to_1sensitivity.sli
		IGES, Inc	

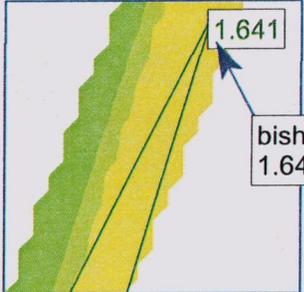


<i>Project</i>				Landfill 2.5H to 1V slope stability - Veneer stability			
<i>Analysis Description</i>				Failure through sand layer and GCL			
<i>Drawn By</i>		JB		<i>Scale</i>		1:1250	
<i>Date</i>				5/2/11		<i>Company</i>	
						IGES, Inc	
						<i>File Name</i>	
						landfill_2.5_to_1 with sand_textile.sli	

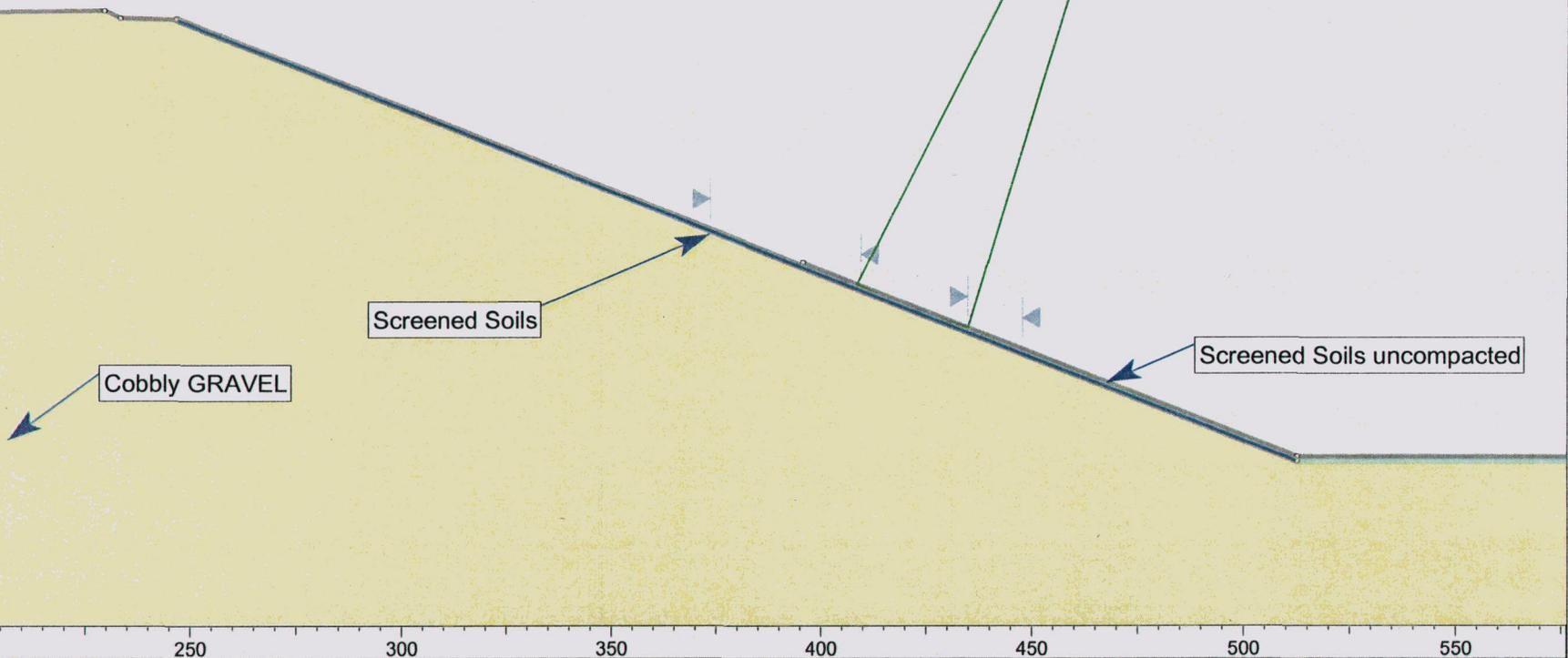
Safety Fac



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Cobbly GRAVEL		130	Mohr-Coulomb	0	38	None	0
Screened Soils		120	Mohr-Coulomb	0	33	None	0
Screened Soils uncompacted		110	Mohr-Coulomb	0	33	None	0



bishop simplified  
1.641



Project				Landfill 2.5H to 1V slope stability - Veneer stability			
Analysis Description				Failure through sand veneer on HDPE			
Drawn By	JB	Scale	1:500	Company	IGES, Inc		
Date	5/2/11			File Name	landfill_2.5_to_1 with sand_textile_sand.sli		