

cert.
RECEIVED

AUG 16 2010

UTAH DIVISION OF
SOLID & HAZARDOUS WASTE

2010.02857



ENVIRONMENTAL DEPARTMENT

*SW097
39631*

City of Logan

Environmental Department

450 North 1000 West

Logan, UT 84321

E-mail

[Issa Hamud@loganutah.org](mailto:Issa.Hamud@loganutah.org)

Phone (435) 716-9752

Fax (435) 716-9751

**City of Logan
Class IVb Landfill
Permit Renewal Application**

August 2010

cert.
RECEIVED

AUG 16 2010

**UTAH DIVISION OF
SOLID & HAZARDOUS WASTE**

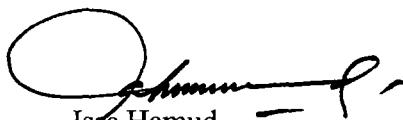
2010.02857

August 9, 2010

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

Included with this transmittal letter is the Class IVb Pennut Application for renewal for the Logan City Construction and Demolition Debris Landfill. It has been prepared in accordance with Utah Administrative Code R315-301 through 320 of the Utah Solid Waste Permitting and Management Rules.

Please feel free to contact me at (435) 716-9752 if you have any questions or concerns.



Issa Hamud
Director

Utah Class IV and VI Landfill Permit Application Form

Part I General Information							APPLICANT: PLEASE COMPLETE ALL SECTIONS.				
I. Landfill Type	<input type="checkbox"/> Class IVa	<input checked="" type="checkbox"/> Class IVb	II. Application Type	<input type="checkbox"/> New Application	<input type="checkbox"/> Facility Expansion	<input type="checkbox"/> Class VI	<input checked="" type="checkbox"/> Renewal Application	<input type="checkbox"/> Modification			
For Renewal Applications, Facility Expansion Applications and Modifications Enter Current Permit Number _____											
III. Facility Name and Location											
Legal Name of Facility Logan City Class IVb Landfill											
Site Address (street or directions to site) 200 N 1400 W								County Cache			
City Logan				State UT		Zip Code 84321		Telephone (435) 716-9752			
Township 12N		Range 1E		Section(s) 31, 32		Quarter/Quarter Section			Quarter Section		
Main Gate Latitude degrees minutes seconds				Longitude degrees minutes seconds							
IV. Facility Owner(s) Information											
Legal Name of Facility Owner City of Logan											
Address (mailing) 290 N 100 W											
City Logan				State UT		Zip Code 84321		Telephone (435) 716-9000			
V. Facility Operator(s) Information											
Legal Name of Facility Operator City of Logan											
Address (mailing) 290 N 100 W											
City Logan				State UT		Zip Code 84321		Telephone (435) 716-9000			
VI. Property Owner(s) Information											
Legal Name of Property Owner City of Logan											
Address (mailing) 290 N 100 W											
City Logan				State UT		Zip Code 84321		Telephone (435) 716-9000			
VII. Contact Information											
Owner Contact Issa Hamud						Title Environmental Director					
Address (mailing) 450 N 1000 W											
City Logan				State UT		Zip Code 84321		Telephone (435) 716-9752			
Email Address Issa.Hamud@loganutah.org						Alternative Telephone (cell or other)			(435) 716-9755		
Operator Contact Issa Hamud						Title Environmental Director					
Address (mailing) 450 N 1000 W											
City Logan				State UT		Zip Code 84321		Telephone (435) 716-9752			
Email Address Issa.Hamud@loganutah.org						Alternative Telephone (cell or other)			(435) 716-9755		
Property Owner Contact Issa Hamud						Title Environmental Director					
Address (mailing) 450 N 1000 W											
City Logan				State UT		Zip Code 84321		Telephone (435) 716-9752			
Email Address Issa.Hamud@loganutah.org						Alternative Telephone (cell or other)			(435) 716-9755		

Utah Class IV and VI Landfill Permit Application Form

Part I General Information (Continued)																																								
VIII. Waste Types (check all that apply) <input type="checkbox"/> Landfill will accept all wastes allowed in Class IV or VI landfills Or landfill will accept only the following wastes <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Waste Type</th> <th style="text-align: center; border-bottom: 1px solid black;">Combined Disposal Unit</th> <th style="text-align: center; border-bottom: 1px solid black;">Monofill Unit</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> Construction & 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"/> Tires</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"/> Yard 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"/> 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"/> Contaminated Soil</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> <p style="font-size: small;">Note: Disposal of dead animals must be approved by the Executive Secretary</p>	Waste Type	Combined Disposal Unit	Monofill Unit	<input checked="" type="checkbox"/> Construction & Demolition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Tires	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yard Waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Animals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Contaminated Soil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other _____	<input type="checkbox"/>	<input type="checkbox"/>	IX. Facility Area <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black;">Facility Area.....</td> <td style="text-align: right; border-bottom: 1px solid black;">350 +</td> <td style="text-align: right; border-bottom: 1px solid black;">acres</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Disposal Area.....</td> <td style="text-align: right; border-bottom: 1px solid black;">10</td> <td style="text-align: right; border-bottom: 1px solid black;">acres</td> </tr> <tr> <td colspan="3">Design Capacity</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Years.....</td> <td style="text-align: right; border-bottom: 1px solid black;">12</td> <td></td> </tr> <tr> <td style="border-bottom: 1px solid black;">Cubic Yards.....</td> <td style="text-align: right; border-bottom: 1px solid black;">697,669</td> <td></td> </tr> <tr> <td style="border-bottom: 1px solid black;">Tons.....</td> <td style="text-align: right; border-bottom: 1px solid black;">697,669</td> <td></td> </tr> </table>	Facility Area.....	350 +	acres	Disposal Area.....	10	acres	Design Capacity			Years.....	12		Cubic Yards.....	697,669		Tons.....	697,669	
Waste Type	Combined Disposal Unit	Monofill Unit																																						
<input checked="" type="checkbox"/> Construction & Demolition	<input type="checkbox"/>	<input type="checkbox"/>																																						
<input type="checkbox"/> Tires	<input type="checkbox"/>	<input type="checkbox"/>																																						
<input type="checkbox"/> Yard Waste	<input type="checkbox"/>	<input type="checkbox"/>																																						
<input type="checkbox"/> Animals	<input type="checkbox"/>	<input type="checkbox"/>																																						
<input type="checkbox"/> Contaminated Soil	<input type="checkbox"/>	<input type="checkbox"/>																																						
<input type="checkbox"/> Other _____	<input type="checkbox"/>	<input type="checkbox"/>																																						
Facility Area.....	350 +	acres																																						
Disposal Area.....	10	acres																																						
Design Capacity																																								
Years.....	12																																							
Cubic Yards.....	697,669																																							
Tons.....	697,669																																							
X. Fee and Application Documents																																								
Indicate Documents Attached To This Application <table style="width: 100%; border-collapse: collapse;"> <tr> <td><input checked="" type="checkbox"/> Facility Map or Maps</td> <td><input checked="" type="checkbox"/> Facility Legal Description</td> <td><input checked="" type="checkbox"/> Plan of Operation</td> <td><input checked="" type="checkbox"/> Waste Description</td> <td rowspan="2" style="vertical-align: top; padding-left: 20px;">Class VI Special Requirements <input type="checkbox"/> Documents required by UCA 19-6-108(9) and (10)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Ground Water Report</td> <td><input checked="" type="checkbox"/> Closure Design</td> <td><input checked="" type="checkbox"/> Cost Estimates</td> <td><input checked="" type="checkbox"/> Financial Assurance</td> </tr> </table>	<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	Class VI Special Requirements <input type="checkbox"/> Documents required by UCA 19-6-108(9) and (10)	<input checked="" type="checkbox"/> Ground Water Report	<input checked="" type="checkbox"/> Closure Design	<input checked="" type="checkbox"/> Cost Estimates	<input checked="" type="checkbox"/> Financial Assurance	<input type="checkbox"/> Application Fee: Amount \$																														
<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	Class VI Special Requirements <input type="checkbox"/> Documents required by UCA 19-6-108(9) and (10)																																				
<input checked="" type="checkbox"/> Ground Water Report	<input checked="" type="checkbox"/> Closure Design	<input checked="" type="checkbox"/> Cost Estimates	<input checked="" type="checkbox"/> Financial Assurance																																					
I HEREBY CERTIFY THAT THIS INFORMATION AND ALL ATTACHED PAGES ARE CORRECT AND COMPLETE.																																								
Signature of Authorized Owner Representative _____ Randy Watts Name typed or printed	Title Mayor	Date 8-9-10																																						
Signature of Authorized Land Owner Representative (if applicable) _____ Randy Watts Name typed or printed	Title Mayor	Date 8-9-10																																						
Signature of Authorized Operator Representative (if applicable) _____ Issa Hamud Name typed or printed	Title Environmental Director	Date 8-9-10																																						
Address 290 N 100 W																																								
Address 290 N 100 W																																								
Address 290 N 100 W																																								

CLASS IV_b LANDFILL
PERMIT APPLICATION

City of Logan
Environmental Department
450 N 1000 W
Logan, UT 84321
(435) 716 9755

August 2010

TABLE OF CONTENTS

CONTENTS OF AN APPLICATION FOR A CLASS IVB PERMIT RENEWAL (R315-310-3)		6
1 1	General Description of the Facility (R315-310-3(1)(b))	6
1 2	Legal Description of Property (R315-310-3(1)(c)) ..	7
1 3	Proof of Ownership (R315-310-3(1)(c))	7
1 4	Waste Type and Anticipated Daily Volume (R315-310-3(1)(d)) ..	7
1 5	Plan of Operation (R315-310-3(1)(e))	8
1 5 1	Intended Schedule of Construction (R315-302-2(2)(a))	9
1 5 2	On-site Waste Handling Procedures (R315-302-2(2)(b)) and Example Form (R315-310-3(1)(i))	9
1 5 3	Inspections and Monitoring Schedule (R315-302-2(2)(c), R315-302-2(5)(a), and R315-302-3(1)(g))	10
1 5 4	Contingency Plans (R315-302-2(2)(d))	11
1 5 5	Corrective Action Program for Ground Water Contamination (R315-302-2(2)(e))	12
1 5 6	Plan to Control Fugitive Dust Generated from Roads, Construction, General Operations, and Covering the Waste (R315-302-2(2)(g))	12
1 5 7	Plan for Litter Control and Collection (R315-302-2(2)(h))	13
1 5 8	Description of Maintenance of Installed Equipment (R315-302-2(2)(i))	13
1 5 9	Procedures for Excluding the Receipt of Prohibited Hazardous or PCB Containing Waste (R315-302-2(2)(j))	13
1 5 10	Procedures for Controlling Disease Vectors (R315-302-2(2)(k))	13
1 5 11	A Plan for Alternative Waste Handling (R315-302-2(2)(l))	14
1 5 12	Closure Plan (R315-302-2(m))	14
1 5 12	Post Closure Plan (R315-302-2(m))	15
1 5 13	Financial Assurance (R315-302-2(n))	15
1 5 14	A General Training and Safety Plan for Site Operations (R315-302-2(2)(o))	15
1 5 15	Recycling Programs Planned at the Facility (R315-303-4(6))	15
1 6	Form for Recording Weights and Volumes of Waste Received (R315-310-3(1)(f))	15
1 7	Inspection Schedule and Inspection Log (R315-310-3(1)(g))	15
1 8	Closure and Post Closure Plans (R315-310-3(1)(h))	15
1 9	Wastewater Treatment System Review by Division of Water Quality (R315-310-3(1)(i)) ..	17
1 10	Financial Assurance Plan (R315-310-3(1)(j) & R315-302-2(n))	17
CONTENTS OF AN APPLICATION FOR A CLASS IVB PERMIT RENEWAL (R315-310-4)		19
2 1	Topographic Map (R315-310-4(2)(a)(i))	19
2 2	USGS 7-1/2 Minute Series Map (R315-310-4(2)(a)(u))	19
2 3	Closure Plan (R315-310-4(2)(d))	19

2 4	Post Closure Plan (R315-310-4(2)(e))	..	19
▪	Groundwater (R315-310-4(2)(e)(i)(B))		19
▪	Surface Water (R315-310-4(2)(e)(i)(C))		19
CONTENTS OF AN APPLICATION FOR A CLASS IVB PERMIT RENEWAL (R315-310-5)			20
3 1	Design and Location of Run-off and Run-on Control System (R315-310-5(2)(b))		20
3 2	Requirements for Operation (R315-305-5)		21
3 2 1	Wastes Accepted (R315-305-5(1))		21
3 2 2	Unauthorized Waste Disposal (R315-305-5(2))		21
3 2 3	Emission of Fugitive Dust Prevention (R315-305-5(3))		21
3 2 4	Waste Placement and Cover Construction Schedule (R315-305-5(4))		21
3 2 5	Cover Matenal Sources (R315-305-5(5))		21
3 2 6	Final Cover (R315-305-5(5)(ii))		22
GENERAL FACILITY REQUIREMENTS (R315-302-2)			23
4 1	Record Keeping (R315-302-2(3))		23
4 1 1	Daily Operating Record		23
4 2	Reporting (R315-302-2(4))		23
4 3	Inspections (R315-302-2(5))		23
REFERENCES			25
APPENDIX A			26
Figure A-1 Land Use Zoning Map for Logan City Class I and Class IVb Landfills			27
Figure A-2 Warranty Deed for existing Class IVb landfill			28
Figure A-3 Warranty Deed for proposed Class IVb landfill			29
Figure A-4 Plat map for C&D parcels (Tract B and a portion of Tract C)			30
Table A-1 Logan City landfill life projection			31
APPENDIX B			32
Form B-1 Sample daily operatmg record (front page)			33
Form B-1 Sample daily operatmg record (second page)			34
Form B-1 Sample daily operatmg record (third page)			.. 35
Form B-2 Sample scale house inspection form			36
Form B-3 Sample landfill quarterly report			37
Form B-4 Sample mspection form			38

APPENDIX C	..	39
Figure C-1 Final grading plan for the Class I and IVb landfills	..	40
Table C-1 Estimated immediate closure costs		41
Table C-2 Closure costs for phases I and II		42
Table C-3 Closure costs for phases III & IV		43
Table C-4 Post-closure cost estimate	..	44
APPENDIX D		45
Figure D-1 Topographic Map of Class I and Class IVb landfills (major contours at 5 ft, minor contours at 1 ft)		46
Figure D-2 Location of groundwater monitoring wells Topsoil storage location shown in red hatch, soil received from local construction project. Additional topsoil borrow areas located directly west of the landfill on city property		47
APPENDIX E		49
Run-on/Run-off Control		49

Contents of an Application for a Class IVb Permit Renewal (R315-310-3)

1.1 General Description of the Facility (R315-310-3(1)(b))

The City of Logan is seeking a permit renewal for a Class IVb landfill. The Class IVb landfill is located directly north of the existing class I landfill, in the southeast quarter of Section 31 and into Section 32, Range 1 East Township 12 North (see Figure 1). The landfill is accessed via Highway 30 on 1500 west, which is approximately 1.8 miles west of Highway 89 and 91 in the center of Logan City.

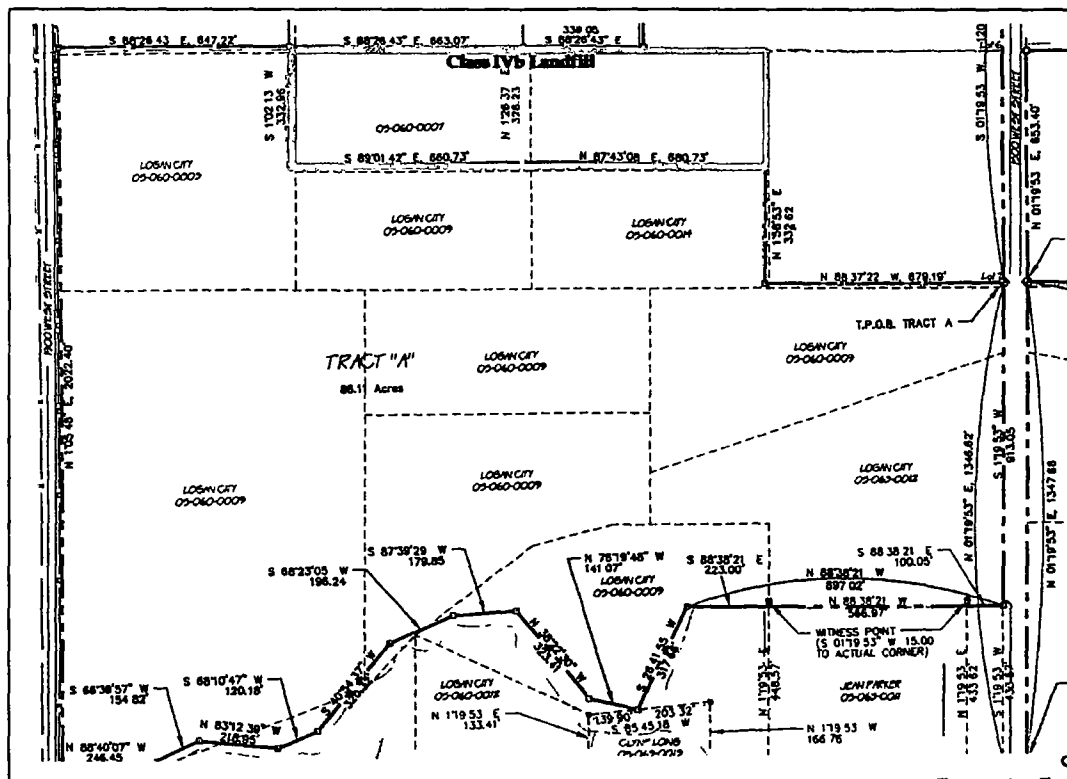


Figure 1. Detailed Plat map of existing C & D Class IVb landfill

1.2 Legal Description of Property (R315-310-3(1)(c))

The existing site is owned by the City of Logan, a municipality operating under the laws of the State of Utah. The following description identifies the limits of waste deposits at the Logan City Construction and Demolition Debris Landfill.

Commencing at the Southwest Corner of Lot 5, Block 27, Plat "E" Logan Farm Survey and running thence S 88° 26'43" E, 647.22 feet along an existing fence line to a fence corner, thence S 1° 26'37" W, 326.23 feet along an existing fence line to a fence corner, thence N 89° 01'42" W, 660.73 feet along an existing fence line to a fence corner, thence N 1° 02'13" E, 332.96 feet along an existing fence line to the True Point of Beginning, containing 5.01 acres.

Commencing at the Northeast Corner of Lot 7, Block 27, Plat "E" Logan Farm Survey and running thence N 1° 26'37" E, 326.23 feet to a fence corner, thence N 87° 43'08" E, 680.73 feet to a fence corner, thence N 1° 58'53" E, 326.23 feet to a fence corner, thence S 88° 26'43" E, 680.73 feet to the True Point of Beginning, containing 4.95 acres.

The facility's front gate is located at longitude 111° 52' 06" and latitude 41° 43' 54". The landfill is within the City of Logan zoning boundaries and is designated as public (PUB) and industrial (IND). The landfill is surrounded by industrial and commercial land. Use of the site for land filling purposes is consistent with the PUB and IND zoning classification. For a complete zoning boundary map, see Figure A-1 (Appendix A).

1.3 Proof of Ownership (R315-310-3(1)(c))

Proof of ownership for C&D parcels is located in Appendix A, Figures A-2 and A-3, while Figure A-4 contains a plat map of the landfill.

1.4 Waste Type and Anticipated Daily Volume (R315-310-3(1)(d))

The City of Logan serves approximately 115,000 persons and 35,000 households in Cache County (U.S. Census Bureau, 2010). Last year Logan City Construction and Demolition Landfill recorded approximately 17,932 tons of construction and demolition waste that equates to approximately 58 tons per day. Appendix A, Table A-1 shows the volume of construction and demolition waste entering the class IVb landfill. A growth increase of 4% is being used to project the life of the Class IVb landfill (Logan City Sanitary Landfill Waste Projection).

The City of Logan accepts construction and demolition debris in the Class IVb as defined in Rule R315-301-2(10). This includes bricks, concrete, asphalt, rock, roofing shingles (non-asbestos), tree roots, building materials, sheet rock, remodeling or building repair, demolition materials from pavement, houses, commercial buildings, and other structures. Excluded wastes, include, but are not limited to, dead animals, foam insulation, asbestos (tape floor tiles,

siding, shingles, etc), contaminated soil, remediation or cleanup tanks, waste paints solvents, sealers, adhesives, small quantity generator hazardous wastes, contaminated liquids, noncontaminated liquids, or sludge containing free liquids (R315-303-3(1)(b))

The quantity of incoming waste is weighed and recorded in a computerized system by waste code. Daily logs are maintained, monthly reports are completed, and an annual report summarizes the waste characteristics for the year. Class IVb wastes will be coded as either construction debris (CD), asphalt (AS), or concrete (CN)

The Logan City landfill serves the Cache County Service Area No. 1. The Cache County Service Area No. 1 was established on June 18, 1974, to promote safe and sanitary handling of solid waste materials. At that time, all other existing dump sites within the county were closed and the Cache County Service Area No. 1 was formed. Each participating community signed a contract with the service area to allow solid waste collection and disposal. The Cache County Service District contracted with the City of Logan to provide collection and disposal services for all municipal solid waste generated in the county. Cache County Service Area No. 1 is composed of 19 cities and towns along with the unincorporated area of the county. There are no Indian reservations within Cache County. The names of Cache County communities are listed below.

Amalga	Nibley	Lewiston	River Heights
Clarkston	North Logan	Logan	Smithfield
Cornish	Paradise	Mendon	Trenton
Hyde Park	Providence	Millville	Wellsville
Hyrum	Richmond	Newton	Unincorporated

1.5 Plan of Operation (R315-310-3(1)(e))

In compliance with the requirements of Rule 315-302-2(2), General Facility Requirements for Plan of Operation, the landfill will be operated in accordance with the Plan of Operation contained below. The Plan of Operation includes the following elements:

- Intended Schedule of Construction
- On-site Solid Waste Handling Procedures
- Inspection Schedule and Plan
- Contingency Plans Preventative and Corrective Measures
- Corrective Action Program if Groundwater is contaminated
- Dust Control Plan
- Plan to Control Wind Blown Litter
- Description of Maintenance of Installed Equipment
- Procedures for Handling PCB Wastes
- Disease Vector Control
- Alternative Waste Handling

- Closure Plan
- Post-Closure Plan
- Financial Assurance
- Training and Safety Plan
- Recycling Programs

1.5.1 Intended Schedule of Construction (R315-302-2(2)(a))

All materials brought to the landfill are being disposed at or above original surface elevations. There are no plans to expand the landfill footprint (lateral expansion) therefore all landfill will occur only in areas previously permitted.

1.5.2 On-site Waste Handling Procedures (R315-302-2(2)(b)) and Example Form (R315-310-3(1)(f))

- Hours of Operation

The Logan City Landfill is open Monday through Friday 8:00-6:30 from April 1-September 30, 8:00-5:30 from October 1-March 31, and Saturday 8:00-5:30 year round. The landfill is closed on all major holidays including Civil Rights Day, Presidents Day, Memorial Day, Independence Day, Pioneer Day, Labor Day, Veterans Day, Thanksgiving Day, the day after Thanksgiving, Christmas Day, and New Years Day. Signs are posted at the entrance for public notification of hours of operation, owner and operator of the site, material accepted and excluded, and fees charged.

- Site Personnel and Equipment

The Class IVb landfill has at least one scale house attendant and one heavy equipment operator on site during all public hours of operation along with one full time sanitary landfill enforcement agent who conducts daily inspections. Equipment currently used daily at the Logan Construction and Demolition Debris Landfill includes the 826H compactor, 963 track loader, 621B scraper, and 744H John Deere track loader.

- Form for Recording Weights and Volumes of Waste Received (R315-310-3(1)(f))

This form is included with the inspection forms that will be described later (see Appendix B, Form B-1)

- Inspection Schedule and Inspection Log (R315-310-3(1)(g))

These forms are included with the inspection forms that will be described later (see Appendix B, Form B-2, and B-4)

1.5.3 Inspections and Monitoring Schedule (R315-302-2(2)(c), R315-302-2(5)(a), and R315-302-3(1)(g))

Inspections are conducted in accordance with Rule R315-302-2(5)(a). A visual inspection on each incoming construction and demolition debris load are conducted by the landfill scale house attendant. The load is visually inspected at the scale to identify unacceptable and excluded wastes. If a landfill attendant identifies a construction and demolition debris load as contaminated with municipal, unacceptable, and/or excluded wastes, the load is coded as commercial waste (CW), circled, signed by the landfill attendant to indicate identified contamination, and sent to the Class I landfill. In the case of excluded wastes, the load will be rejected and/or the Cache Valley HAZMAT team will be called. Random detailed inspections are also conducted at the tipping face to identify unacceptable, excluded wastes, and liquids as defined by Environmental Protection Agency (EPA) Method 9095, paint filter test. Any loads failing the inspection will be rejected. The Environmental Department plans to conduct 10 additional random inspections at the face on a weekly basis. The waste inspection forms are shown in Appendix B.

With the addition of a Class IVb landfill, the Environmental Department began a small quantity generator hazardous waste program for Cache County. A county-wide education program was launched to insure residents and businesses understand the difference between municipal and construction and demolition wastes. Pamphlets which outline acceptable and nonacceptable wastes for Class IVb landfills have been distributed throughout the County, specifically to the known contractors. The Landfill provides separate containers located at the Class IVb landfill working face so contractors may separate unacceptable wastes and metals during disposal.

If a construction and demolition debris load from a contractor is identified with unacceptable wastes during a scale house or face inspection:

- **First Offense** The driver will be warned, educated with the Construction and Demolition Debris pamphlet, and urged to pass along the information to the owner/project manager.
- **Second Offense** The owner will be notified by the Environmental Department and the name of the contractor will be put on the 'Class IVb probation' list.
- **Third Offense** The contractor will not longer be permitted to dispose of wastes in the Class IVb landfill and forced to pay the municipal waste rate.

If a construction and demolition debris load is identified with excluded wastes during or after a scale house or face inspection:

- **First Offense** The driver will be warned, educated and the owner/project manager will be notified regarding the identification of excluded wastes.

- **Second Offense** An investigation will be conducted on the contractor, who will need to show correct disposal of excluded wastes to the Environmental Department hazardous waste inspection

1 5.4 Contingency Plans (R315-302-2(2)(d))

The following contingency plans will be observed for fire and explosion. These guidelines are analogous to the contingency plans for the Class I permit (Montgomery Watson, 1997)

- **Preventative Measures for Fire and Explosion**

The City of Logan will implement the following preventative measures to prevent fire and explosion at the C&D landfill

- 1 Implementation of the Waste Placement and Cover Construction Schedule

- 2 Not collecting, accepting or delivering hot materials to the landfill, isolation of fire due to spontaneous combustion inside waste delivery trucks during unloading operations at the landfill

- 3 Dust control, equipment maintenance, and equipment cleaning to avoid excessive buildup of oil, dust, and debris that may result in excessive operating temperatures or equipment overload

- 4 Providing and maintaining fire extinguishers on landfill equipment and vehicles

- 5 Providing a tank/sprayer alternative cover machine that may be substituted as a water sprayer in emergencies

- 6 Access to a fire hydrant located on 1400 West at approximately 50 North

- **Corrective Measures for Fires**

The City of Logan will implement the following corrective measures when fires are identified at the site

- 1 **Notification** Call 911 and report. All fires at the landfill will be reported immediately to the City Environmental Director

- 2 **Combat** The primary means for extinguishing fires will be placing additional cover material to deprive the source of oxygen. Extinguishing burning materials will be given immediate priority at the landfill

- 3 **Support Equipment and Personnel** When required, support equipment and personnel from other city programs will be diverted to help extinguish the fire. When required, and as appropriate, support also will be given by the Logan City Fire Department. In circumstances where additional support is required, such

support will be obtained from other government agencies and through the acquisition of contracted services

- **Corrective Measures for Explosions**

The City of Logan will implement the following corrective measures when explosions occur at the site

- 1 Call 911

- 2 Evacuation of personnel from the affected area

- 3 Rendering assistance to injured personnel

- 4 Engineering evaluation and implementation of other appropriate corrective actions to vent, reduce, or otherwise control gas generation and/or leakage

- 5 Relocation of operation to an unaffected area of the landfill

- **Corrective Measures for Equipment Breakdown**

The City of Logan will implement the following corrective measures for equipment breakdown

- 1 Spares of the specific equipment may be located at the Logan Landfill

- 2 Commercial repair facility will be notified

- 3 Backup equipment will be provided by the City of Logan Streets and Water Departments, if necessary

- 4 Auxiliary equipment may be leased from private contractors, borrowed from other County departments, or other nearby landfills, if necessary

1.5.5 Corrective Action Program for Ground Water Contamination (R315-302-2(2)(e))

The City of Logan's C&D Landfill status exempts the landfill from this rule according to R315-302-1(2)(e)(vi) and R315-305-4(4)

1.5.6 Plan to Control Fugitive Dust Generated from Roads, Construction, General Operations, and Covering the Waste. (R315-302-2(2)(g))

Access roads within the landfill footprint will be watered at appropriate intervals to prevent dust from escaping the operating area of the landfill

1.5.7 Plan for Litter Control and Collection (R315-302-2(2)(h))

The City of Logan's landfill has several established preventative measures to control windblown litter. Such measures include cover material, litter control fences, and temporary workers. The cover schedule for the Class IVb Landfill is that 6 inches of compacted earthen material be placed at a minimum of once every 30 days (see page 22 of this report). Around the perimeter of the landfill, exists a permanent fence that assists in containing windblown litter within the site. Landfill personnel routinely clean up the perimeter of the site to prevent litter spreading outside the boundary. In extreme cases temporary workers are hired to clean the perimeter and the affected areas.

1.5.8 Description of Maintenance of Installed Equipment (R315-302-2(2)(j))

The City of Logan's landfill status exempts the landfill from this rule according to R315-303-3(2)(a) and R315-305-4(4).

1.5.9 Procedures for Excluding the Receipt of Prohibited Hazardous or PCB Containing Waste (R315-302-2(2)(i))

A visual inspection on each incoming construction and demolition debris load will be conducted by the landfill scale house attendant. The load will be visually inspected at the scale to identify unacceptable and excluded wastes. Random inspections are also conducted at the tipping face to identify unacceptable, excluded wastes, and liquids as defined by Environmental Protection Agency (EPA) Method 9095, paint filter test. Any loads failing the inspection will be rejected. The Environmental Department plans to conduct 10 additional random inspections at the face every week. As stated earlier, See Appendix B, Forms B-2 and B-4 for sample inspection forms. If load inspections reveal the presence of regulated quantities of PCB wastes on incoming haul vehicles, the landfill attendant, the hazardous waste inspector, or the operator will refuse to accept the load and UDSHW will be notified. If regulated quantities of PCB wastes are identified during secondary load checks, random inspections, or at any other time and cannot be traced to the original hauler, the Cache County HAZMAT team will be called and will implement their Hazardous Materials Response Plan. Following notification, it will be the Cache County HAZMAT team's responsibility to ensure the PCB wastes are removed or reclaimed, handled, stored, contained, and/or transported in accordance with applicable federal and state regulations.

1.5.10 Procedures for Controlling Disease Vectors (R315-302-2(2)(k))

In accordance with Rule R315-302-2(2)(k), the City of Logan plans to control disease vectors by maintaining sufficient cover, daily inspections, quarterly inspections and implementing corrective action when needed.

- **Cover** Prompt application of cover will be the primary means of vector control. Cover will be placed to deny vectors of food sources, burrows, and other habitat. The current plan includes covering the waste once every 30 days. If necessary, the city will cover more frequently than once every 30 days.
- **Daily Inspections** The Landfill Inspector shall conduct daily inspections for disease vectors, as specified under schedule and plan section of this permit.
- **Quarterly Inspections** The Landfill manager shall conduct quarterly inspections for disease vectors, as specified under schedule and plan section of this permit.
- **Corrective Action** If disease vectors are detected, the landfill shall notify the Environmental Department Director who shall initiate appropriate procedures. Control of persistent vectors will be coordinated with county and/or state public health officials. When wildlife may be impacted, Utah State Fish and Wildlife agency officials will be contacted prior to any extermination procedures.

1.5.11 A Plan for Alternative Waste Handling (R315-302-2(2)(l))

As required by rule 315-302-2(2)(l) in case of equipment breakdown or adverse conditions such as inclement weather, the construction and demolition waste will be landfilled at the southeast corner of the existing Class I landfill. This area has been designated as a wet weather and alternative disposal area. This area is reserved for disposal of waste when inclement weather or implementation of contingency plans requires discontinuation of operations in the normal operating area of the landfill. The area will be excluded from use for normal disposal operations until the other areas of the landfill have been closed, and will have the following:

- Immediate access from paved access road to the working area
- All-weather roads from paved access road to the tipping face
- A 60-day supply of daily cover or alternative daily cover for full-time use as a disposal area
- A stockpile of cover material reserved for fire suppression in the area that is equal to 30 days supply of normal daily operations cover
- A 2-foot soil barrier between the alternative area and waste materials in the normal operating area that is constructed to the standards of final cover

1.5.12 Closure Plan (R315-302-2(m))

See section 1.8

1.5.12 Post Closure Plan (R315-302-2(m))

See Section 1 8

1 5.13 Financial Assurance (R315-302-2(n))

See Section 1 10

1.5.14 A General Training and Safety Plan for Site Operations (R315-302-2(2)(o))

All facility personnel involved in management, inspections, and waste disposal operations will be trained in the identification of containers and labels used for hazardous wastes. Hazardous waste screening classes will be offered periodically to all personnel and documentation of training will be included with the operation records for the facility. Records will be maintained and will be held in the record keeping files.

1.5.15 Recycling Programs Planned at the Facility (R315-303-4(6))

To date there is no established recycling program for the Class IVb landfill working face. Current procedures include taking appropriate measures when large amounts of recyclable materials are deposited in the Class IVb landfill.

1.6 Form for Recording Weights and Volumes of Waste Received (R315-310-3(1)(f))

This form is included with the inspection forms that will be described later (see Appendix B, Form B-1)

1.7 Inspection Schedule and Inspection Log (R315-310-3(1)(g))

These forms are included with the inspection forms that will be described later (see Appendix B, Form B-2, and B-4)

1.8 Closure and Post Closure Plans (R315-310-3(1)(h))

▪ **Closure Plan (R315-302-2(m))**

The following closure plan has been prepared for the Logan City Class IVb landfill in accordance with UAC 315-302-3. Closure of the landfill will be performed in accordance with this plan and in such a manner as to

- minimize the need for further maintenance,
- minimize or eliminate threats to human health and the environment from post-closure escape of solid waste constituents, leachate, landfill gases, contaminated run-off or waste decomposition products to the ground, ground water, surface water, or the atmosphere, and adequately prepare the facility for the post-closure period

- **Cell Design**

The daily working face cells within the Class IVb landfill will be consticted with an approximate maximum area of 45'(w)X45'(l) in order to minimize the size of the unloading area and also the working face as required by R315-303-3(7)(g) Figure C-1 (Appendix C) presents the final grading plan for the Class IVb landfill as it extends into the existing Class I landfill. Prior to the depositing Class IVb debris, the overlay zones of the Class I landfill will be closed in accordance with the Class I permit.

- **Closure Construction**

The final cover will be consticted in accordance with UAC R315-302-3(4). The final cover will consist of 6 inches of topsoil, 18 inches of a vegetative support layer, 18 inches of a low permeability soil over the 6 inches of existing cover (see Figure 4 on the following page). The final cover will be vegetated with native plants and grasses according to a plan developed or recommended by a representative of the U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) and graded to the appropriate slope, prevent ponding, and minimize infiltration of run-off waters.

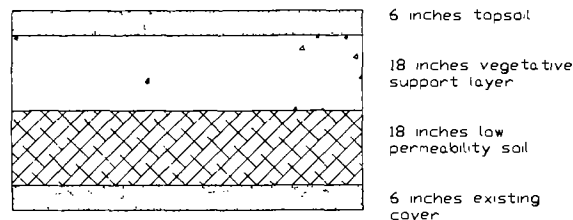


Figure 4 Final cover profile

- **Site Capacity**

The capacity of the Class IVb landfill is approximately 697,669 cubic yards (cy) of waste disposal lasting until the year 2022 (number calculated by adding the annual C&D waste from 1994 to 2022). Assuming 1 ton of C&D waste is equal to 1 cubic yard, approximately 697,669 tons construction debris will be accepted at the Class IVb landfill. Table A-1 (Appendix A) shows the landfill life projection.

- **Final Inspection**

In accordance with UAC 315-310-4 (2)(d)(m), a final report will be prepared, submitted to the Executive Secretary, and entered into the operating record of the facility. Because the closure of the Class IVb landfill will be subsequent with the closure of the Class I landfill, the final report will be included as a subsection to the Class I landfill permit. Thereafter, a final

inspection by regulatory agencies will be arranged and after approval by the UDEQ, the post-closure maintenance plan outlined in this permit will be initiated

▪ **Post Closure Plan (R315-302-2(m))**

The post-closure plan shall proceed as outlined in UAC R315-302-3(6) and more specifically, the Class IVb landfill will be monitored as explained below

At final closure, the boundary markers used to designate closed areas of the landfill will be used to measure settlement of refuse materials. Additional survey markers will be placed as necessary to monitor areas of suspected movement. Ground elevation will be measured at the base of each boundary marker.

The post-closure cost estimate may be found as Table C-4 (Appendix C). Again, it is assumed that most of the monitoring costs will be shared between the Class I and Class IVb closures, therefore the costs have been adjusted as additional costs to the existing Class I post-closure estimate. A ten percent contingency built into the final estimate to account for unforeseen variances in costs.

1.9 Wastewater Treatment System Review by Division of Water Quality (R315-310-3(1)(i))

This section is not applicable.

1.10 Financial Assurance Plan (R315-310-3(1)(j) & R315-302-2(n))

The City of Logan has already applied and been approved with the Local Government Financial Test as the financial mechanism to cover the costs of closure and post-closure care of the Class I landfill. The City of Logan will continue to use the financial assurance mechanism for the Class IVb landfill.

▪ **Closure Cost Estimate**

The closure cost estimate may be found in Tables C-1, C-2, C-3, and C-4 (Appendix C) and has been prepared using predicted engineering and construction costs from the approved Class I landfill permit and private contractors within Cache Valley, UT. It is assumed that some of the costs will be shared between the Class I and Class IVb closures, therefore the costs have been adjusted as additional costs to the existing Class I closure estimate. Three percent inflation was used for future costs as well as a ten percent contingency built into the final estimate to account for unforeseen variances in costs.

In the closure cost estimate no costs are listed regarding the cost of removing any stored items or materials, buildings, equipment, or other items or materials not needed at the closed facility. This is due to the fact that the green waste facility, scale houses (2), maintenance shop, and household hazardous waste facility will remain on-site when the landfill is closed. All of the landfill facilities are outside the landfill boundaries and the city plans to continue waste processing at the current site after the landfill is closed. A transfer station will be built and the aforementioned buildings will be supplemental to the station. The landfill compactors and

scraper will be hauled to the new North Valley landfill by the City and costs will be minimal
The rest of the existing equipment will remain on-site

Contents of an Application for a Class IVb Permit Renewal (R315-310-4)

2.1 Topographic Map (R315-310-4(2)(a)(i))

In Appendix D of this report, Figure D-1, is a topographic map of the Class I and IVb Landfills showing the existing elevations at the site. Figure D-2 shows the location of the groundwater monitoring wells and the topsoil storage location shown in red hatch. Additional topsoil borrow areas are located directly west of the landfill on city property.

2.2 U.S.G.S. 7-1/2 Minute Series Map (R315-310-4(2)(a)(ii))

In Appendix D of this report, Figure D-3, is a U.S.G.S. 7 1/2 series map of the Logan and Wellsville quadrangle. The Class I Landfill and the Class IVb Landfill are delineated in Figure D-3.

2.3 Closure Plan (R315-310-4(2)(d))

See sections 1.8 and 1.10.

2.4 Post Closure Plan (R315-310-4(2)(e))

See section 1.8.

- **Groundwater (R315-310-4(2)(e)(i)(B))**

The City of Logan's C&D Landfill status exempts the landfill from this rule.

- **Surface Water (R315-310-4(2)(e)(i)(C))**

Logan City will follow a surface water management plan to minimize run-off water that has been in contact with the C&D waste. The City will apply an intermediate cover over the inactive C&D landfill areas and will operate the facility working face such that any storm water that comes in contact with the waste will be retained within the landfill area and allowed to evaporate. Furthermore, the City or operator of the facility will not cause a violation of any Utah Pollution Discharge Elimination System permit or standard from discharges of surface run-off, leachate or any liquid associated with the facility. Also, the City or operator of the facility will remain in compliance under the Clean Water Act for any discharge as well as in compliance with any area-wide or state-wide plan under Section 208 or 319 of the Clean Water Act.

Contents of an Application for a Class IVb Permit Renewal (R315-310-5)

3.1 Design and Location of Run-off and Run-on Control System (R315-310-5(2)(b))

The design for the landfill will incorporate a run-off control system that will divert the surface flows resulting from a 24-hour, 25-year storm (2.48 inches/hour intensity, - Utah State University Climatology Center) that falls on the landfill cover. The proposed final cover surface was divided into five sub-areas for peak flow calculations (see Appendix E). Three of the five sub-areas are on the north side of the Class I landfill involve the Class IVb landfill, specifically areas 2, 3, and a portion of 1.

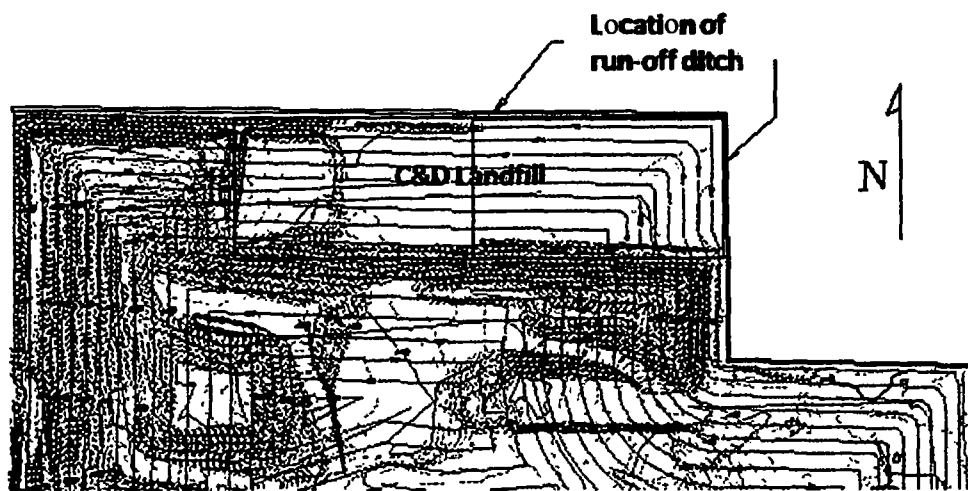


Figure 5. Location of Run-on/off Ditch

Collection ditches located along the road(s) will collect surface runoff and transport it via the road/drop structures to the perimeter of the landfill where it will travel westward via the run-on diversion channels. The road(s) and accompanying channels will also serve to reduce the volume of sheet flow and erosion on the surface cover. Runoff generated below the roads will be collected in the run-on diversion channels. Preliminary calculations of the flow rates from the predicted runoff used for initial design of the storm water collection ditches are provided in Appendix F.

During construction, the landfill will implement control measures which keep storm water from the working face within the landfill. The working face will be graded such that run-off

will be retained within the landfill. The landfill will maintain a minimum of one foot cover soil (intermediate layer) on the perimeter of all existing slopes and areas not receiving refuse. The intermediate cover thickness will be repaired after every major storm event.

3.2 Requirements for Operation (R315-305-5)

3.2.1 Wastes Accepted (R315-305-5(1))

The City of Logan accepts construction and demolition debris in the Class IVb as defined in Rule R315-301-2(10). This includes bricks, concrete, asphalt, rock, roofing shingles (non-asbestos), tree roots, building materials, sheet rock, remodeling or building repair, demolition materials from pavement, houses, commercial buildings, and other structures. Excluded wastes, include, but are not limited to, dead animals, foam insulation, asbestos (tape floor tiles, siding, shingles, etc.), contaminated soil, remediation or cleanup tanks, waste paints, solvents, sealers, adhesives, small quantity generator hazardous wastes, containerized liquids, noncontainerized liquids, or sludge containing free liquids (R315-303-3(1)(b)).

3.2.2 Unauthorized Waste Disposal (R315-305-5(2))

The Class IVb landfill has at least one scale house attendant and one heavy equipment operator on site during all public hours of operation along with one full time sanitary landfill enforcement agent who conducts daily inspections.

3.2.3 Emission of Fugitive Dust Prevention (R315-305-5(3))

Access roads within the landfill footprint will be watered at appropriate intervals to prevent dust from escaping the operating area of the landfill.

3.2.4 Waste Placement and Cover Construction Schedule (R315-305-5(4))

The Class IVb Landfill uses the area fill disposal method. Side slopes at the perimeter of the landfill will be maintained at 3:1 or more moderate. Waste will be compacted by a mobile compactor designed specifically for compacting waste materials on a 3:1 slope. Bulky waste materials will be separated prior to compaction, reduced to the minimum practical volume and covered with compactable waste before the soil cover is placed. Separate piles will be established within the Class IVb landfill for the purpose of concrete and asphalt grinding for recycling.

3.2.5 Cover Material Sources (R315-305-5(5))

Soil is utilized as the primary cover material. Soil is imported in from sources outside the landfill boundaries. Some soil comes from overburden from construction projects around the Cache Valley area with the majority of cover soil imported from property west of the landfill. The property west of the landfill is

owned by Logan City and is being converted to planned wetland by the removal of soil for landfill use. Soil excavated in the wetland development is excavated during the summer months when the ground is dry enough to work and hauled to the landfill for use during the year.

3.2.6 Final Cover (R315-305-5(5)(ii))

Following the placement of the final cell of construction debris and daily cover, the area will be covered by a minimum of twelve inches of intermediate soil. The final cover will consist of the following: a minimum of 6-inches of topsoil, 18-inches of a vegetative support layer, 18-inches of a low permeability soil over the 6-inches of existing cover (see Figure 4 on page 16 of this report). The topsoil will be seeded with grass, shallow-rooted vegetation, or other native vegetation. The final cover will be installed within 30 days after the final elevation is attained in accordance with Rule R315-302-3 (4)(b).

General Facility Requirements (R315-302-2)

4.1 Record Keeping (R315-302-2(3))

In accordance with rule R315-302-2(3), the City of Logan will maintain and keep all records for at least three years in an approved location. A copy of the face and scale inspection forms, as described earlier, can be found in Appendix B, Forms B-2 and B-4 respectively.

4.1.1 Daily Operating Record

A daily operating record is completed at the end of each day of operation according to R315-302-2(3)(a). This record is completed electronically and then printed out for filing purposes (see Appendix B, Form B-1 for sample record). Any deviations from the approved plan of operation are noted in the summary section of the record.

4.2 Reporting (R315-302-2(4))

The Class IVb landfill will submit an annual report containing all required information to the Executive Secretary by March 1st of each year. The Class IVb report will be included as an attachment to the Class I Logan City Sanitary Landfill, Solid Waste Facility Annual Report.

4.3 Inspections (R315-302-2(5))

The City of Logan will inspect the Class IVb landfill quarterly to prevent malfunctions and deterioration, operator errors, and discharges, which may cause or lead to the release of wastes or contaminated materials to the environment or create a threat to human health. These inspections shall cover the following areas:

- Waste placement, compaction, and cover
- Fences
- Roads and access roads
- Run-on/run-off controls
- Final and intermediate cover
- Litter controls
- Records

The City of Logan will keep a record of the inspections and place it in the daily operating record on the day of the inspection. Areas needing correction, as noted on the inspection report, shall be corrected. The corrective actions shall be documented in the daily operating record. Appendix B contains sample forms for the daily operating record (Form B-1), scale house inspections (Form B-2), quarterly operating records (Form B-3), and landfill face inspections (Form B-4).

REFERENCES

City of Logan Department of Environmental Health Solid Waste Facility Annual Report
2009 December 31, 2009

City of Logan 2007 Class I Landfill Permit Renewal September 2007

U S Census Bureau (2010, April 22) *State and County Quickfacts Cache County, UT*
Retrieved July 22, 2010, from <http://qmckfacts.census.gov>

Utah Department of Environmental Quality Utah Administrative Code Solid Waste
Permitting and Management Rules R315-301 through 320 J

APPENDIX A

Facility Information

City of Logan Zoning Map

February 2008

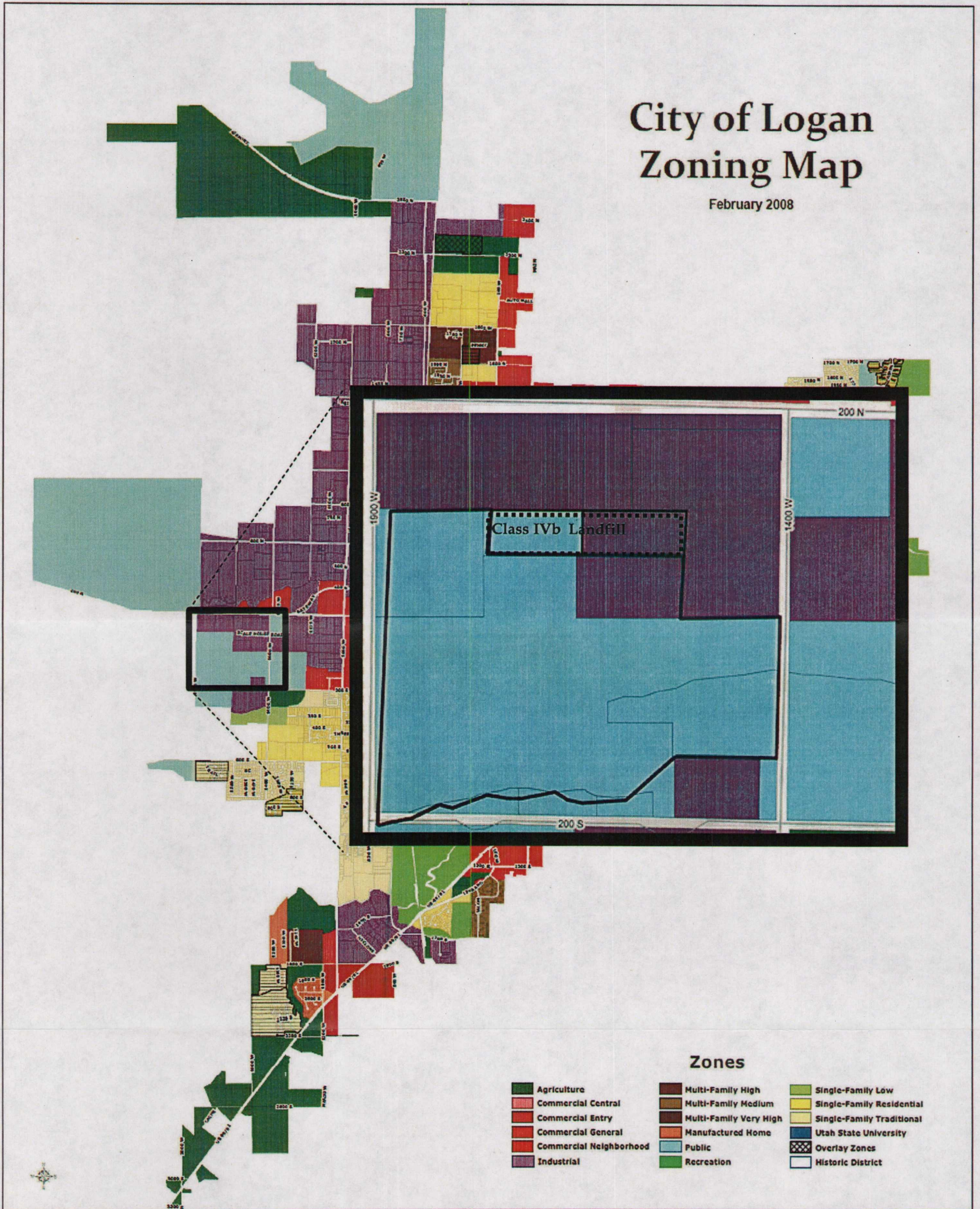


Figure A-1. Land Use Zoning Map for Logan City Class I and Class IVb Landfills

WHEN RECORDED, MAIL TO:

City of Logan
P.O. Box 527
Logan, UT 84321
ATT: Ray Hogle

Space above for Recorder's Use

Warranty Deed

JOSEPH DEWAIN BERGER and BARBARA F. BERGER, husband and wife, grantor,
of North Logan, County of Cache, State of Utah,

hereby CONVEY and WARRANT to
CITY OF LOGAN, a municipal corporation, grantee,
of Logan, County of Cache, State of Utah,
for the sum of Ten and no/100...and other valuable consideration..... DOLLARS,

the following described tract of land in Cache County, State of Utah, to-wit:

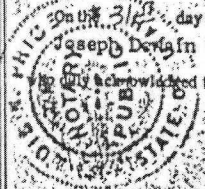
The North Half of the East Half of Lot 4, Block 27, Plat
"E" Logan Farm Survey; located in the Southeast quarter,
Section 31, Township 12 North, Range 1 East, Salt Lake Base
and Meridian.

ENT 521427 Bk 447 Pg 553
DATE 6-APR-1989 2:10PM FEE 0.00
MICHAEL L GLEED, RECORDER
** CACHE COUNTY, UTAH ** RECORDED BY MG
FOR CITY OF LOGAN

WITNESS the hand of said grantor, this 31st day of March, 19 89.
Signed in the presence of

Joseph Dewain Berger
Barbara F. Berger

STATE OF UTAH }
COUNTY OF Cache } ss.



On this 31st day of March, 19 89, personally appeared before me
Joseph Dewain Berger and Barbara F. Berger, the signers of the above instrument,
and they acknowledged to me that they executed the same.

Lawrence
Notary Public

My Commission Expires: 3/15/90

Residing at: Logan, UT

FORM 121.1 - WARRANTY DEED - Kelly Co., 16 W. Ninth South, S.L.C., Utah

BOOK 447 PAGE 553

Figure A-2. Warranty Deed for existing Class IVb landfill.

WARRANTY DEED

WILLARD K. HILL and MARJORIE N. HILL, husband and wife,

grantors of Logan County of Cache State of Utah, hereby CONVEY and WARRANT to

THE CITY OF LOGAN, a municipal corporation

Grantors of 255 North Main Street, Logan, Utah 84321
for the sum of \$10.00 and other valuable consideration
the following described tract of land in Cache County, State of Utah:
The South half of the West half of Lot 7, Block 27, Plat "E" LOGAN FARM SURVEY, being
situate in Section 31, Township 12 North, Range 1 East of the Salt Lake Base and Meridian.
Together with all rights in and to the flowing well on the premises, Permit NO.
25-6849, and together with all rights in and to any rights of way established
by easement or by record.

Beginning at the Southeast corner of Lot 4, Block 27, Plat "A" or "E" Logan Farm
Survey; thence running West 1 rod; thence North 20 rods; thence East 1 rod; thence
South 20 rods to the place of beginning, and further described as situated in
Section 31, Township 12 North, Range 1 East of the Salt Lake Base and Meridian.

A right-of-way in common with others over the following:

Beginning one rod West of the Southeast corner of Lot 4, Block 27, Plat "E" LOGAN
FARM SURVEY, and running thence South 1 rod; thence East 21 rods; thence North 1 rod;
thence West 21 rods to the place of beginning.

Together with 4 shares of water in the Logan Cow Pasture Irrigation Company.

Also, User's Claim code no. 25, Serial No. 3193, the point of diversion being North
1230 feet West 4 feet from the Southeast corner of Section 31, Township 12 North,
Range 1 East of the Salt Lake Base and Meridian, with application filed with the
State Engineer's office under no. 23586 and Cert. of App. No. 5516.

WITNESSE, the hand of said grantors, this 19th day of December A.D. 19 86

Witness in the presence of

Willard K. Hill
Willard K. Hill

Marjorie N. Hill
Marjorie N. Hill

STATE OF UTAH

County of Cache
On this 19th day of December
A.D. 19 86 personally appeared before me

Willard K. Hill and Marjorie N. Hill,
husband and wife.

the signed the other part hereof, who duly
asked me to act as Notary Public, and that they executed the same.

Michael J. Alford
Notary Public
Commission Expires 4/1/88
Residing in Hyde Park, Utah

RECORDING DATA

Entry No. 497053 Fee \$ 6.00

RECORDED INDEXED
PLATTED ABSTRACTED
COMPARED DELIVERED

STATE OF UTAH
(63)
COUNTY OF CACHE
FILED & RECORDED FOR
HICKMAN LAND TITLE CO.
Dec 19 4 35 PM '86

MICHAEL J. ALFORD
COUNTY CLERK
BY DEPUTY SA

LAND TITLE COMPANY

BOOK 393 PAGE 52

Figure A-3. Warranty Deed for proposed Class IVb landfill.

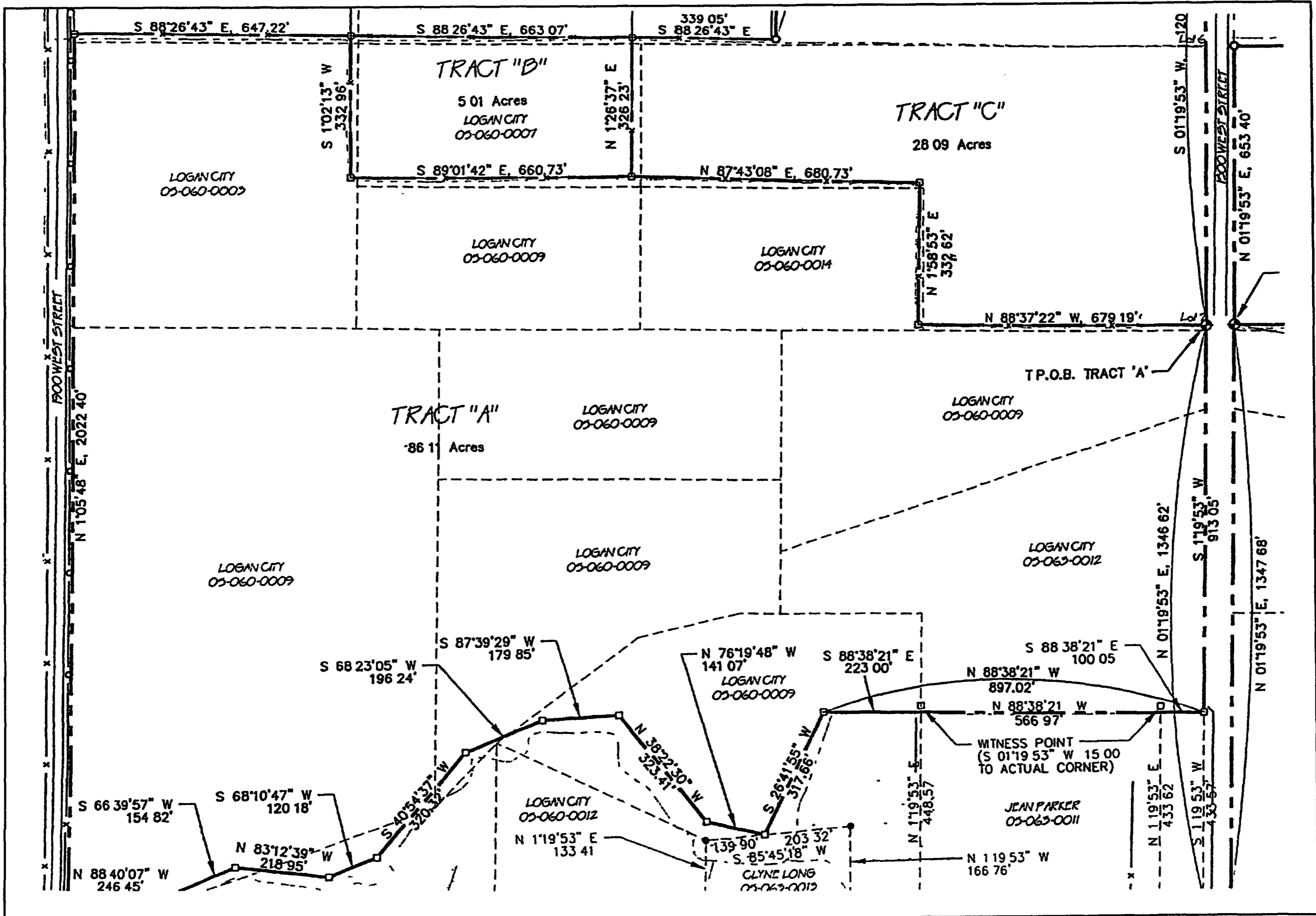


Figure A-4 Plat map for C&D parcels (Tract B and a portion of Tract C)

APPENDIX B

Inspection Forms and Recordkeeping



Logan City Landfill Daily Operating Record

Page ___ of ___

Monday July5, 2010

Load and Quantity Summary

Class I Landfill (Municipal Solid Waste)

Waste Code	Waste Description	Loads	Tons
AB	ANIMAL BYPRODUCT	0	0
CCD	CONTAMINATED C AND D	0	0
COW	COWS THAT BYPRODUCTS BRING IN	0	0
CW	COMMERCIAL WASTE	0	0
CWC	COMMERCIAL WASTE(CITY)	0	0
CWS	COMMERCIAL WASTE	0	0
DAF	DEAD ANIMALS (PER TON)	0	0
DAS	DEAD ANIMAL SMALL (NO CHARGE)	0	0
HW	HOUSEHOLD WASTE	0	0
HWC	HOUSEHOLD WASTE NO CHARGE	0	0
HWS	HOUSEHOLD WASTE	0	0
IW1	INFECTIOUS WASTE UNDER 1/2 YAR	0	0
IW2	INFECTIOUS WASTE OVER 1/2 YARD	0	0
Total:		0	0

Class IVb Landfill (Construction and Demolition Waste)

Waste Code	Waste Description	Loads	Tons
CC	COMMUNITY CLEAN UP(PER TON)	0	0
CCS	COMUNITY CLEAN UP	0	0
CD	CONSTRUCTION DEBRIS	0	0
CDC	CONSTRUCTION DEBRIS(CITY)	0	0
CDS	CONSTRUCTION DEBRIS	0	0
CGW	CONTAMINATED GREENWASTE	0	0
CN	CONCRETE	0	0
CNC	CONCRETE(CITY)	0	0
CNS	CONCRETE	0	0
GL	GLASS drop-off Recycling	0	0
GWH	GW HSHLD GARB.**ADD CONTAINER#	0	0
SCU	SPRING CLEAN-UP	0	0
ST	STUMPS AND ROOT BALLS	0	0
STC	Stumps and Rootballs from CITY	0	0
Total:		0	0

Cover Material

Waste Code	Waste Description	Loads	Tons
CF	CLEAN FILL	0	0
CM	COVER MATERIAL	0	0
CMC	COVER MATERIAL(CITY)	0	0
CMS	COVER MATERIAL	0	0
CS	CONTAMINATED SOIL	0	0
Total:		0	0

Road Building Material

Waste Code	Waste Description	Loads	Tons
AS	ASPHALT	0	0
ASC	ASPHALT(CITY)	0	0
Total:		0	0

Asbestos Cell

Waste Code	Waste Description	Loads	Tons
AA	ASBESTOS	0	0
Total:		0	0

Form B-1. Sample daily operating record (front page).

Logan City Landfill Daily Operating Record

Monday July 5, 2010

Page ____ of ____

Load and Quantity Summary - Continued

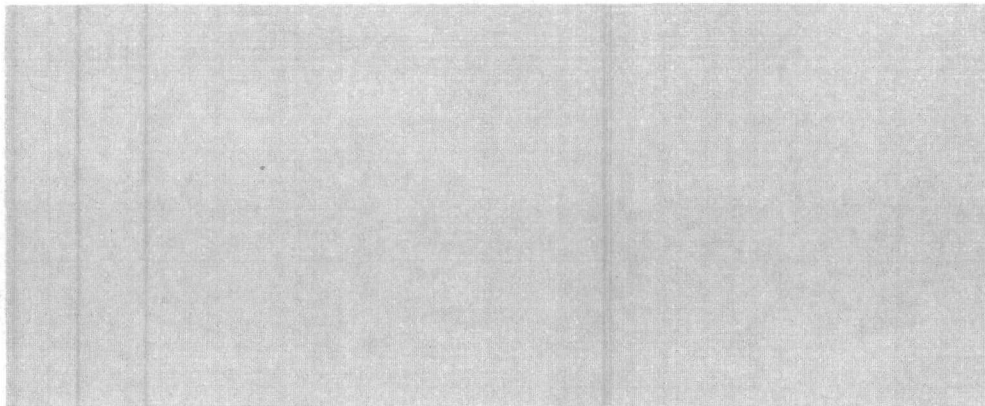
Green Waste Facility (Receiving)

Waste Code	Waste Description	Loads	Tons
CBS	GREENWASTE (CURBSIDE PICKUP)	0	0
GW	GREENWASTE	0	0
GWC	green waste city (ton)	0	0
GWF	GREENWASTE FIRE WOOD	0	0
GWS	GREENWASTE	0	0
LOG	FIREWOOD DROPPED OFF (PER TON)	0	0
PA	PALLETS	0	0
PAS	PALLETS	0	0
XTC	CHRISTMAS TREES (CITY)	0	0
XTD	EVERGREEN CHIPS DONATION	0	0
Total:		0	0

Green Waste Facility (Departing)

Waste Code	Waste Description	Loads	Yards
CP	COMPOST	0	0
CPC	COMPOST FOR CITY	0	0
CPD	COMPOST, DONATION	0	0
FPD	PALLET CHIPS, DONATION	0	0
FPL	FINE PALLET CHIPS	0	0
MD	MEDIUM WOOD CHIPS	0	0
MDC	MEDIUM WOOD CHIPS FOR CITY	0	0
MDD	MEDIUM WOOD CHIPS, DONATION	0	0
PM	PREMIUM (MULCH)	0	0
PMC	PREMIUM MULCH FOR CITY	0	0
PMD	PREMIUM WOOD CHIPS, DONATION	0	0
SHD	SHREDDED TREE DONATION	0	0
SHT	COARSE SHREDDED TREES	0	0
XT	CHRISTMAS TREE CHIPS	0	0
XTD	EVERGREEN CHIP DONATION	0	0
Total:		0	0
Waste Code	Waste Description	Loads	Cords
FW	FIREWOOD	0	0
PP	PALLET PICK-UP	0	0
Total:		0	0

Notes and/or Deviations Regarding Loads and Quantities



Form B-1. Sample daily operating record (second page).

Logan City Landfill Daily Operating Record

Monday July 6, 2010

Page ___ of ___

Waste Inspections

Class I Landfill (Municipal Solid Waste)

Number of Inspections Conducted:	
Percentage of Loads Inspected (Minimum = 1%):	#DIV/0!

* Field Note Reference No.	Problems (Yes/No)	Corrective Actions Taken	Inspector

Class IVb Landfill (Construction and Demolition Waste)

Number of Inspections Conducted:	
----------------------------------	--

* Field Note Reference No.	Problems (Yes/No)	Corrective Actions Taken	Inspector

* Complete Field Inspection Notes can be found on file at the landfill. They can be referenced by the date and the Field Note Reference Number.

Logan City Landfill Vehicle Inspection Form

Date _____		Time _____		Inspected By _____		Vehicle License # _____	
VEHICLE TYPE	Load Description	Waste Description					
Pickup <input type="checkbox"/>	Household Waste <input type="checkbox"/>	Anti Freeze <input type="checkbox"/>	Infectious Waste <input type="checkbox"/>	Other Hazardous Waste _____ _____ _____			
Pickup w/ Trailer <input type="checkbox"/>	Commercial Waste <input type="checkbox"/>	Batteries <input type="checkbox"/>	Pesticides <input type="checkbox"/>				
Dump Truck <input type="checkbox"/>	Compostable Material <input type="checkbox"/>	PCB s <input type="checkbox"/>	Propane Tanks <input type="checkbox"/>				
1 Ton Truck <input type="checkbox"/>	Recyclable Material <input type="checkbox"/>	Motor Oil <input type="checkbox"/>	Refrigeration Units <input type="checkbox"/>				
Farm Truck <input type="checkbox"/>	Construction Debris <input type="checkbox"/>	Paint <input type="checkbox"/>	Tires <input type="checkbox"/>				
Car <input type="checkbox"/>							
Inspector Informed Of Waste Rex Macey <input type="checkbox"/> Tony Douglass <input type="checkbox"/> Other <input type="checkbox"/> _____							
Date _____		Time _____		Inspected By _____		Vehicle License # _____	
VEHICLE TYPE	Load Description	Waste Description					
Pickup <input type="checkbox"/>	Household Waste <input type="checkbox"/>	Anti-Freeze <input type="checkbox"/>	Infectious Waste <input type="checkbox"/>	Other Hazardous Waste _____ _____ _____			
Pickup w/ Trailer <input type="checkbox"/>	Commercial Waste <input type="checkbox"/>	Batteries <input type="checkbox"/>	Pesticides <input type="checkbox"/>				
Dump Truck <input type="checkbox"/>	Compostable Material <input type="checkbox"/>	PCB s <input type="checkbox"/>	Propane Tanks <input type="checkbox"/>				
1 Ton Truck <input type="checkbox"/>	Recyclable Material <input type="checkbox"/>	Motor Oil <input type="checkbox"/>	Refrigeration Units <input type="checkbox"/>				
Farm Truck <input type="checkbox"/>	Construction Debris <input type="checkbox"/>	Paint <input type="checkbox"/>	Tires <input type="checkbox"/>				
Car <input type="checkbox"/>							
Inspector Informed Of Waste Rex Macey <input type="checkbox"/> Tony Douglass <input type="checkbox"/> Other <input type="checkbox"/> _____							
Date _____		Time _____		Inspected By _____		Vehicle License # _____	
VEHICLE TYPE	Load Description	Waste Description					
Pickup <input type="checkbox"/>	Household Waste <input type="checkbox"/>	Anti Freeze <input type="checkbox"/>	Infectious Waste <input type="checkbox"/>	Other Hazardous Waste _____ _____ _____			
Pickup w/ Trailer <input type="checkbox"/>	Commercial Waste <input type="checkbox"/>	Batteries <input type="checkbox"/>	Pesticides <input type="checkbox"/>				
Dump Truck <input type="checkbox"/>	Compostable Material <input type="checkbox"/>	PCB s <input type="checkbox"/>	Propane Tanks <input type="checkbox"/>				
1 Ton Truck <input type="checkbox"/>	Recyclable Material <input type="checkbox"/>	Motor Oil <input type="checkbox"/>	Refrigeration Units <input type="checkbox"/>				
Farm Truck <input type="checkbox"/>	Construction Debris <input type="checkbox"/>	Paint <input type="checkbox"/>	Tires <input type="checkbox"/>				
Car <input type="checkbox"/>							
Inspector Informed Of Waste Rex Macey <input type="checkbox"/> Tony Douglass <input type="checkbox"/> Other <input type="checkbox"/> _____							
Date _____		Time _____		Inspected By _____		Vehicle License # _____	
VEHICLE TYPE	Load Description	Waste Description					
Pickup <input type="checkbox"/>	Household Waste <input type="checkbox"/>	Anti Freeze <input type="checkbox"/>	Infectious Waste <input type="checkbox"/>	Other Hazardous Waste _____ _____ _____			
Pickup w/ Trailer <input type="checkbox"/>	Commercial Waste <input type="checkbox"/>	Batteries <input type="checkbox"/>	Pesticides <input type="checkbox"/>				
Dump Truck <input type="checkbox"/>	Compostable Material <input type="checkbox"/>	PCB s <input type="checkbox"/>	Propane Tanks <input type="checkbox"/>				
1 Ton Truck <input type="checkbox"/>	Recyclable Material <input type="checkbox"/>	Motor Oil <input type="checkbox"/>	Refrigeration Units <input type="checkbox"/>				
Farm Truck <input type="checkbox"/>	Construction Debris <input type="checkbox"/>	Paint <input type="checkbox"/>	Tires <input type="checkbox"/>				
Car <input type="checkbox"/>							
Inspector Informed Of Waste Rex Macey <input type="checkbox"/> Tony Douglass <input type="checkbox"/> Other <input type="checkbox"/> _____							
Date _____		Time _____		Inspected By _____		Vehicle License # _____	
VEHICLE TYPE	Load Description	Waste Description					
Pickup <input type="checkbox"/>	Household Waste <input type="checkbox"/>	Anti Freeze <input type="checkbox"/>	Infectious Waste <input type="checkbox"/>	Other Hazardous Waste _____ _____ _____			
Pickup w/ Trailer <input type="checkbox"/>	Commercial Waste <input type="checkbox"/>	Batteries <input type="checkbox"/>	Pesticides <input type="checkbox"/>				
Dump Truck <input type="checkbox"/>	Compostable Material <input type="checkbox"/>	PCB s <input type="checkbox"/>	Propane Tanks <input type="checkbox"/>				
1 Ton Truck <input type="checkbox"/>	Recyclable Material <input type="checkbox"/>	Motor Oil <input type="checkbox"/>	Refrigeration Units <input type="checkbox"/>				
Farm Truck <input type="checkbox"/>	Construction Debris <input type="checkbox"/>	Paint <input type="checkbox"/>	Tires <input type="checkbox"/>				
Car <input type="checkbox"/>							
Inspector Informed Of Waste Rex Macey <input type="checkbox"/> Tony Douglass <input type="checkbox"/> Other <input type="checkbox"/> _____							
Date _____		Time _____		Inspected By _____		Vehicle License # _____	
VEHICLE TYPE	Load Description	Waste Description					
Pickup <input type="checkbox"/>	Household Waste <input type="checkbox"/>	Anti Freeze <input type="checkbox"/>	Infectious Waste <input type="checkbox"/>	Other Hazardous Waste _____ _____ _____			
Pickup w/ Trailer <input type="checkbox"/>	Commercial Waste <input type="checkbox"/>	Batteries <input type="checkbox"/>	Pesticides <input type="checkbox"/>				
Dump Truck <input type="checkbox"/>	Compostable Material <input type="checkbox"/>	PCB s <input type="checkbox"/>	Propane Tanks <input type="checkbox"/>				
1 Ton Truck <input type="checkbox"/>	Recyclable Material <input type="checkbox"/>	Motor Oil <input type="checkbox"/>	Refrigeration Units <input type="checkbox"/>				
Farm Truck <input type="checkbox"/>	Construction Debris <input type="checkbox"/>	Paint <input type="checkbox"/>	Tires <input type="checkbox"/>				
Car <input type="checkbox"/>							
Inspector Informed Of Waste Rex Macey <input type="checkbox"/> Tony Douglass <input type="checkbox"/> Other <input type="checkbox"/> _____							

Form B-2 Sample scale house inspection form



Logan City Landfill Class IVb

C&D Landfill Quarterly Inspection

Record ID _____

ENVIRONMENTAL DEPARTMENT

Inspector _____

Date: _____ Time: _____

Quarter _____

Inspection Checklist

Dust Control Poor Fair Good Excellent

Describe problems if any and locations _____

Litter Control Poor Fair Good Excellent

Describe problems if any and locations _____

Cover Material Condition Poor Fair Good Excellent

Depth of cover inatnal _____

Describe problems if any and locations _____

Waste Control Poor Fair Good Excellent

Unacceptable waste YES NO

Type of unacceptable waste _____

Describe problems if any and locations _____

Inspector's signature _____ Manager signature _____ Date _____

Revised 9/29/2008

Form B-3 Sample landfill quarterly report

Suspicious Waste	
Reason for Suspicion	
Sesled Container <input type="checkbox"/>	Unknown Chemical <input type="checkbox"/> Unknown Liquid <input type="checkbox"/>
Radioactive <input type="checkbox"/>	Gas Cylinder <input type="checkbox"/> Possible PCB <input type="checkbox"/>
Commercial Placards <input type="checkbox"/>	Type _____
Other Reasons _____	
Field Tests _____	
Tested By _____	
Test Results _____	
Follow up Action / Disposal Method _____	

Regulated Waste	
What part of the load? Front <input type="checkbox"/> Middle <input type="checkbox"/> Back <input type="checkbox"/>	
Photos taken? <input type="checkbox"/> By _____	
Was Generator/ Hauler notified? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Was State Regulating Agency notified? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Regulator _____	Date _____
Instructions given by Regulator _____	

Notes / Follow up _____	

Driver's Description of Load	

Driver's Signature _____	
Was Load Accepted Yes <input type="checkbox"/> No <input type="checkbox"/>	
Supervisor Signature _____	

Field Inspection			
Field Notes No _____			
Random <input type="checkbox"/> Non Random <input type="checkbox"/> Suspect <input type="checkbox"/> Repeat Offender <input type="checkbox"/>			
Fate <input type="checkbox"/> C&D <input type="checkbox"/> Green Waste <input type="checkbox"/> Recycling <input type="checkbox"/> Transfer Station <input type="checkbox"/>			
Date _____	Time _____ AM / PM		
Lic # _____ State _____			
Vehicle Description _____ Trailer Type _____			
Gross _____	Tare _____ Net _____		
Owner _____ Phone (____) _____			
Address _____ City _____ Zip _____			
Waste Generator _____ Job Location _____			
Waste Type			
Household <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> C&D <input type="checkbox"/>			
Educational <input type="checkbox"/> Government <input type="checkbox"/> Other _____			
Driver's Name _____			
Waste Composition			
Cardboard <input type="checkbox"/> Plastic <input type="checkbox"/> Metal <input type="checkbox"/> Paper <input type="checkbox"/> Wood <input type="checkbox"/>			
Other _____ Notes _____			

Household Hazardous Waste			
Characteristic	Description	Quantity	Units
Corrosive	_____	_____	_____
Flammable	_____	_____	_____
Reactive	_____	_____	_____
Toxic	_____	_____	_____
Other	_____	_____	_____
Notes _____			

Special / Restricted Wastes			
Asbestos <input type="checkbox"/> Animals <input type="checkbox"/> Ash <input type="checkbox"/> Auto <input type="checkbox"/> C&D <input type="checkbox"/>			
Cont Soil <input type="checkbox"/> Medical <input type="checkbox"/> White Goods <input type="checkbox"/> Ref Units <input type="checkbox"/> Tires <input type="checkbox"/>			
Other _____			
Note _____			

Form B-4 Sample inspection form

APPENDIX C

Final Grading, Closure Costs, and Post-Closure Costs

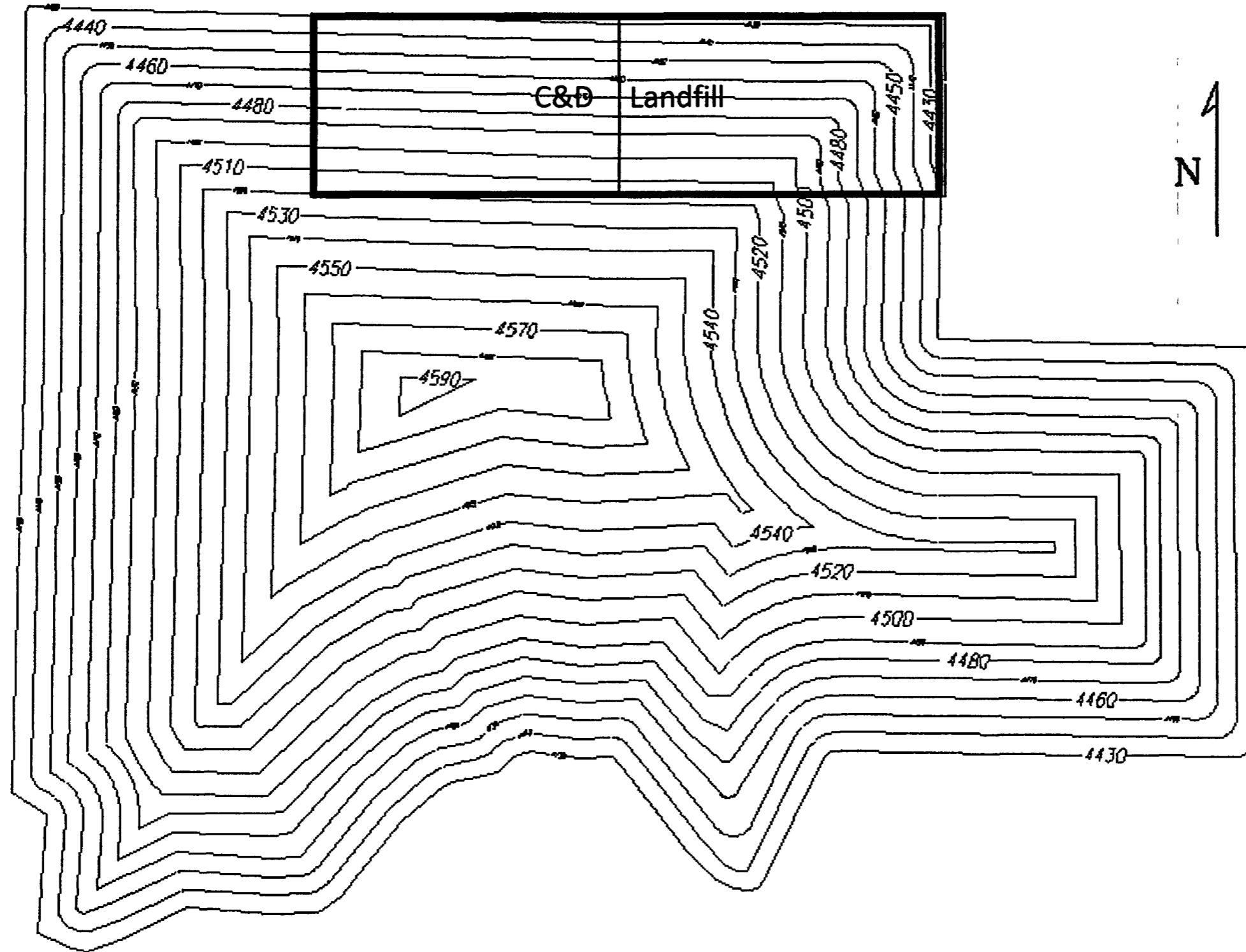


Figure C-1 Final grading plan for the Class I and IVb landfills

Table C-1 Estimated immediate closure costs

CLOSURE COSTS (IMMEDIATE CLOSURE)

Section 1.0 Engineering		CLOSURE NOW		
ESTIMATED DATE OF CLOSURE		NOW		
APPROXIMATE CLOSURE AREA		4100 000		
Item	Description	Unit Measure	Cost/Unit	Total Cost
1.1	Topographic Survey	LS	\$7,500	\$7,500
1.3	Boundary Survey for Closure	NA		
1.3	Site Evaluation	LS	\$2,800	\$2,800
1.4	Development of Plans	LS	\$25,000	\$25,000
1.5	Contract Administration (Middle East Law 4)	LA	\$7,500	\$7,500
1.6	Certification of Final Closure (No. 1)	LS	\$10,000	\$10,000
1.7	Project Management (Construction Oversight of Top)	LS	\$40,000	\$40,000
1.8	Vendor Well Consultant Cost	NA		\$0
1.9	Other Environmental Permit Costs	NA		\$0
			Digestory Subtotal	\$92,500

Section 2.0 Construction		CLOSURE NOW		
Item	Description	Unit Measure	Cost/Unit	Total Cost
2.1	Liner Cover System			
2.1.1	Site Preparation and Site Remediation	ACRE	\$1,500	\$141,185
2.1.2	Gas Collection Layer (GCL)	NA		\$0
2.1.3	Leachate Collection Layer (Soil II Available)			\$0
a	Soil Purchase	NA		\$0
b	Soil Processing (load)	CY	\$1.00	227,778
c	Soil Transportation	CY	\$2.00	227,778
d	Soil Placement	CY	\$1.00	227,778
e	Soil Amendment (compact)	ICY	\$7.00	227,778
2.1.4	Leachate Collection Layer (Synthetic If Available)			\$0
a	Geotextile	NA		\$0
b	GCL	NA		\$0
c	Leachate Collection Layer (Synthetic If Available)	NA		\$0
2.1.5	Drainage Layer (Soil If Available)			\$0
a	Geotextile	NA		\$0
b	Sand/Gravel	NA		\$0
2.1.6	Drainage Layer (Synthetic If Available)			\$0
a	Geotextile	NA		\$0
b	Geo-Membrane	NA		\$0
2.1.7	Crest Protection of Soil Layer			\$0
a	Soil Purchase	NA		\$0
b	Soil Processing (load)	CY	\$1.00	227,778
c	Soil Transportation	CY	\$7.00	227,778
d	Soil Placement	CY	\$1.00	227,778
e	Soil Amendment (compact)	CY		\$0
2.1.8	Final Layer			\$0
a	Soil Purchase	NA		\$0
b	Soil Processing (DOM)	CY	\$1.00	75,920
c	Soil Transportation	CY	\$2.00	75,920
d	Soil Placement	CY	\$1.00	75,920
e	Soil Amendment	NA		\$0
2.1.9	Revegetation			\$0
a	Seeding	ACRE	\$1,200	\$412,048
b	Planting	ACRE	\$300	\$47,061
c	Mulch	ACRE	\$700	\$18,825
d	Turf	ACRE	\$200	\$18,825
2.2	Structural Protection Structures			
a	Culvert	EA	\$1,500	\$9,000
b	Wall	NA		\$12,000
c	Ditch/Bank	FT	\$12,000	\$60,000
d	Debris Basin	NA		\$0
2.3	Gas Collection System			
a	Design	NA		\$0
b	Additional Equipment/Installation	NA		\$0
2.4	Leachate Collection System			
a	Design	NA		\$0
b	Additional Equipment/Installation	NA		\$0
2.5	Groundwater Monitoring System			
a	Monitor Well Installation	NA		\$0
b	Monitor Well Abandonment	NA		\$0
2.6	Site Security			
a	Lighting, Signs, etc.	NA		\$0
b	Fencing and Gates	NA		\$0
2.7	Miscellaneous			
a	Permittees Bonds	LS	\$10,000	\$10,000
b	Contract/Lease Fees	LS	\$5,000	\$5,000
			Construction Subtotal	\$415,213

LS	LUM SUM	Total	\$424,713
NA	NOT APPLICABLE	10% Contingency	\$42,471
EA	EAC	Subtotal Construction	\$467,184
CY	CUBIC YARD		
FT	FEET		

Table C-2 Closure costs for phases I and II

CLOSURE COSTS (PHASE I & PHASE II)

Section 10 Engineering

PHASE I

PHASE II

Section 10 Engineering					PHASE I			PHASE II		
Item	Description	Unit Measure	ESTIMATED DATE OF CLOSURE		Total Cost	Unit Measure	ESTIMATED DATE OF CLOSURE		Total Cost	
			APPROXIMATE CLOSURE AREA	93/000			APPROXIMATE CLOSURE AREA	1/154/000		
1.1	Topographic Survey	LS		\$1,000	\$1,000	LS		\$5,000	\$5,000	
1.2	Boundary Survey for Closure	NA				NA				
1.3	Site Evaluation	LS		\$1,500	\$1,500	LS		\$2,500	\$2,500	
1.4	Development of Plans	LS		\$15,000	\$15,000	LS		\$33,000	\$33,000	
1.5	Contract Administration (initial 9 months)	LA		\$7,500	\$7,500	LA		\$7,500	\$7,500	
1.6	Administrative Costs (10% of Total Cost)	LS		\$5,500	\$7,500	LS		\$7,500	\$7,500	
1.7	Project Management (Contract Administration)	LS		\$23,000	\$23,000	LS		\$23,000	\$23,000	
1.8	Monitor and Control Equivalent Cost	NA			\$3	NA		\$3	\$3	
1.9	Obtain Environmental Permit Cost	NA			\$3	NA		\$3	\$3	
					\$62,500					

Section 20 Construction					PHASE I			PHASE II		
Item	Description	Unit Measure	ESTIMATED DATE OF CLOSURE		Total Cost	Unit Measure	ESTIMATED DATE OF CLOSURE		Total Cost	
			APPROXIMATE CLOSURE AREA	93/000			APPROXIMATE CLOSURE AREA	1/154/000		
2.1	Thin Clay System									
1.1	Site Preparation/Initial Remediation	ACRE		\$5,500	\$5,500	ACRE		\$21,000	\$21,000	
2.1.1	Gas Collection Layer/Plac	NA			\$3	NA		\$3	\$3	
2.1.2	Low permeability Layer (Cost if Available)									
a	Soil Purchase	NA			\$0	NA		\$0	\$0	
b	Soil Processing (load)	CY		\$1.00	\$2,000	CY		\$52,000	\$52,000	
c	Soil Transportation	CY		\$2.00	\$7,000	CY		\$101,000	\$101,000	
d	Soil Placement	CY		\$1.00	\$7,000	CY		\$31,000	\$31,000	
e	Soil Amendment (cement)	CY		\$7.00	\$12,000	CY		\$164,000	\$164,000	
1.1.1	Low permeability Layer (Site Specific if Available)									
a	Gas	NA			\$0	NA		\$0	\$0	
b	Gravel	NA			\$0	NA		\$0	\$0	
c	Compacted concrete (VOC LLDPE)	NA			\$0	NA		\$0	\$0	
1.1.2	Drainage Layer (Site Specific if Available)									
a	Concrete	NA			\$0	NA		\$0	\$0	
b	Sand/Gravel	NA			\$0	NA		\$0	\$0	
1.6	Drainage Layer (Site Specific if Available)									
a	Gas	NA			\$0	NA		\$0	\$0	
b	Geotextile membrane	NA			\$0	NA		\$0	\$0	
1.7	Drainage Production Soil Layer									
a	Soil Purchase	NA			\$0	NA		\$0	\$0	
b	Soil Processing (load)	CY		\$6.00	\$2,000	CY		\$3,000	\$3,000	
c	Soil Transportation	CY		\$2.00	\$2,000	CY		\$104,000	\$104,000	
d	Soil Placement	CY		\$1.00	\$2,000	CY		\$51,000	\$51,000	
e	Soil Amendment (cement)	CY				CY		\$3	\$3	
1.8	Topsoil Layer									
a	Soil Purchase	NA			\$0	NA		\$0	\$0	
b	Soil Processing (load)	CY		\$1.00	\$7,333	CY		\$1,333	\$1,333	
c	Soil Transportation	CY		\$2.00	\$7,333	CY		\$2,000	\$2,000	
d	Soil Placement	CY		\$1.00	\$7,333	CY		\$1,333	\$1,333	
e	Soil Amendment (cement)	NA			\$0	NA		\$0	\$0	
1.9	Remediation Systems									
a	Permeable Barrier	ACRE		\$1,200	\$2,178	ACRP		\$1,200	\$2,178	
b	Material	ACRE		\$1500	\$2,178	ACRE		\$580	\$1,144	
c	Material	ACRE		\$400	\$2,178	ACRE		\$200	\$2,178	
d	Material	ACRE		\$200	\$2,178	ACRU		\$200	\$2,178	
2.2	Stormwater Protection System									
a	Construction	GA		\$1,500	\$5	GA		\$1,500	\$5	
b	Perimeter	NA			\$5	NA		\$1,100	\$5	
c	Drainage	FT		\$2.00	\$12,500	FT		\$4,000	\$12,500	
d	Detention Basin	NA			\$0	NA		\$0	\$0	
2.3	Gas Collection System									
a	Design	NA			\$0	NA		\$0	\$0	
b	Additional Equipment/Installation	NA			\$0	NA		\$0	\$0	
2.4	Leachate Collection System									
a	Design	NA			\$0	NA		\$0	\$0	
b	Additional Equipment/Installation	NA			\$0	NA		\$0	\$0	
2.5	Groundwater Monitoring System									
a	Monitor Well Installation	NA			\$0	NA		\$0	\$0	
b	Monitor Well Abandon	NA			\$0	NA		\$0	\$0	
2.6	Site Security									
a	Lighting, signs, etc.	NA			\$0	NA		\$0	\$0	
b	Fencing and Gates	NA			\$0	NA		\$0	\$0	
2.7	Miscellaneous									
a	Permitting Costs	LS		\$10,000	\$10,000	LS		\$10,000	\$10,000	
b	Construction Fees	LS		\$5,000	\$5,000	LS		\$5,000	\$5,000	
					\$60,680					

LS LUMP SUM		Total	\$1,232,180		Total	\$1,232,180
NA NOT APPLICABLE		10% Contingency	\$103,119		10 A C Incentive	\$23,272
LA LOCAL		Subtotal Closure Cost	\$1,235,508		Subtotal Closure Cost	\$1,355,991
CY CUBIC YARD		1.1040		1.1040	1.1040	
FT FT		Total Construction Cost	\$1,242,560		Total Construction Cost	\$1,824,493

Table C-3 Closure costs for phases III & IV

CLOSURE COSTS (PHASE III & PHASE IV)

PHASE III						PHASE IV			
ESTIMATED DATE OF CLOSURE APPROXIMATE CLOSURE AREA						ESTIMATED DATE OF CLOSURE APPROXIMATE CLOSURE AREA			
2010 1,210,000						202 617,000			
Item	Description	U	Measure	Cost/Unit	No. Units	Unit Measure	Cost/Unit	No. Units	Total Cost
1.1	Topographic Surveys	LS		\$5,000	1	LS	\$5,000	1	\$5,000
1.2	Boundary Surveys for Closure	NA				LS	\$7,500	1	\$7,500
1.3	Site Evaluation	LS		\$2,500	1	LS	\$7,500	1	\$3,500
1.4	Development of Plans	LS		\$11,000	1	LS	\$11,000	1	\$15,000
1.5	Contract Administration (Other than legal)	LA		\$7,500	1	LA	\$7,300	1	\$7,300
1.6	Administrative Costs (Per diem, Travel, Lodging, Office, etc.)	LS		\$7,200	1	LS	\$7,500	1	\$7,500
1.7	Project Management (Construction Observers, etc.)	LS		\$25,000	1	LS	\$25,000	1	\$25,000
1.8	Minimum Liability Costs	NA				NA			\$0
1.9	Other Items (Insurance, Permits, etc.)	NA				NA			\$0
Subtotal of Phase III						Subtotal of Phase IV			
\$625,000						\$700,000			

PHASE III						PHASE IV			
ESTIMATED DATE OF CLOSURE APPROXIMATE CLOSURE AREA						ESTIMATED DATE OF CLOSURE APPROXIMATE CLOSURE AREA			
2010 1,210,000						202 617,000			
Item	Description	U	Measure	Cost/Unit	No. Units	Unit Measure	Cost/Unit	No. Units	Total Cost
2.1	Final Cover Systems								
1.1.1	Site Preparation Site Rest. etc.	ACRE		\$1,000	27.5	ACRE	\$1,000	14.2	\$14,164
2.1.2	Disturbance Control Systems	NA				NA			\$0
1.1.3	Land Reclamation Layers (Soil, Fertilizer, etc.)								
a	Soil Purchase	N				NA			\$0
b	Soil Processing (by qt)	CY		\$1.00	61,222	CY	\$1.00	34,275	\$34,275
c	Soil Treatment (by qt)	CY		\$2.00	67,222	CY	\$2.00	34,275	\$68,550
d	Soil PI Centre	CV		\$1.00	67,122	CV	\$1.00	31,278	\$31,278
e	Soil Amendment	CV		\$7.00	67,222	CV	\$7.00	34,278	\$239,946
1.4	Land Reclamation Layers (Synthetic Liners, etc.)								
a	Geotextile	NA				NA			\$0
b	GCL	NA				NA			\$0
c	Geomembrane (HDPE, PVC, etc.)	NA				NA			\$0
1.5	Drainage Layers (Soil, etc.)								
a	Geotextile	NA				NA			\$0
o	Sand/Gravel	NA				NA			\$0
1.6	Drainage Layers (Synthetic Liners, etc.)								
a	Geotextile	NA				NA			\$0
b	Geo-Composite	NA				NA			\$0
1.7	Final Preparation Soil Layer								
a	Soil Purchase	NA				NA			\$0
b	Soil Processing (by qt)	CV		\$1.00	67,122	CV	\$1.00	34,275	\$34,278
c	Soil Treatment	CV		\$2.00	67,222	CV	\$2.00	34,275	\$68,556
d	Soil Placement	CV		\$1.00	61,222	CV	\$1.00	34,278	\$34,275
e	Soil Amendment	CV				CV			\$0
1.1	Topsoil Layer								
a	Soil Purchase	NA				NA			\$0
b	Soil Processing (by qt)	CV		\$1.00	2,407	CV	\$1.00	11,426	\$11,426
c	Soil Treatment	CV		\$2.00	21,407	CV	\$2.00	11,420	\$22,840
d	Soil Placement	CV		\$1.00	2,407	CV	\$1.00	11,430	\$11,428
e	Soil Amendment	NA				NA			\$0
1.9	Site Preparation								
a	Site Prep	ACRE		\$1,200	27.5	ACRE	\$1,200	14.2	\$16,957
b	Final Prep	ACRE		\$500	27.5	ACRE	\$500	14.2	\$7,021
c	Final Prep	ACRE		\$200	27.5	ACRE	\$200	14.2	\$2,833
d	Final Prep	ACRE		\$0	27.5	ACRE	\$0	14.2	\$0
2.8	Structure Preparation Structures								
a	Culverts	EA		\$1,500	1	EA	\$1,500	1	\$1,500
b	Piers	EA		\$9,000	10	EA	\$9,000	10	\$90,000
c	Ditch Reconnection	FT		\$3,500	1	FT	\$5,000	5	\$50,000
d	Detention Basin	NA				NA			\$0
2.3	Construction of Final System								
a	Design	NA				NA			\$0
b	Additional Construction	NA				NA			\$0
2.4	Leakage Control System								
a	Design	NA				NA			\$0
b	Additional Construction	NA				NA			\$0
2.5	Closure of Water Monitoring System								
a	Maintenance	NA				NA			\$0
b	Maintenance	NA				NA			\$0
2.6	Site Security								
a	Lighting	EA				EA			\$0
b	Fencing and Other	EA				EA			\$0
2.7	Miscellaneous								
a	Performance Bonds	LS		\$10,000	1	LS	\$10,000	1	\$10,000
b	Construction Bond	LS		\$5,000	1	LS	\$5,000	1	\$5,000
Total Phase III						Total Phase IV			
\$1,227,074						\$628,780			

<p style="text-align: right;">Total</p> <p style="text-align: right;">10% Contingency</p> <p style="text-align: right;">Subtotal</p> <p style="text-align: right;">Final Estimate</p> <p style="text-align: right;">Total of Closure Costs (2% Inflation)</p>	<p>\$1,209,374</p> <p>1120,957</p> <p>\$1,419,531</p> <p>1,4889</p> <p>\$7,107,796</p>
<p style="text-align: right;">Total</p> <p style="text-align: right;">10% Contingency</p> <p style="text-align: right;">Subtotal</p> <p style="text-align: right;">Final Estimate</p> <p style="text-align: right;">Total of Closure Costs (2.4% Inflation)</p>	<p>\$628,780</p> <p>\$68,778</p> <p>\$748,658</p> <p>1,54</p> <p>\$1,189,268</p>

Table C-4 Post-closure cost estimate

POST-CLOSURE COSTS (30 YEARS)

Section 1.0 Engineering						
Item	Description	Unit Measure	Cost/Unit	No Units	Total Cost	
1.1	Post Closure Plan	LS	\$5,000	1	\$5,000	
1	Annual Report on how the site will be managed for sampling during future operations	LS	\$3,000	30	\$150,000	
	Site Map	LS	\$400	30	\$12,000	
1	Plan Update	LS	\$200	30	\$6,000	
	Report on the site				\$18,000	
	Engineering Subtotal					\$183,000
Section 2.0 Gas Collection System Sampling						
Item	Description	Unit Measure	Cost/Unit	No Units	Total Cost	
2.1	Sample Collection	LS	\$250	43	\$11,000	
2.2	Sample Analysis	NA			\$0	
2.3	Report (Part 1A) (1 Report)				\$0	
	Gas Collection System Sampling Subtotal					\$11,000
Section 3.0 Leachate Collection System Sampling						
Item	Description	Unit Measure	Cost/Unit	No Units	Total Cost	
3.1	Sample Collection	NA			\$0	
3.2	Sample Analysis	NA			\$0	
3.3	Report (Part 1A) (1 Report)				\$0	
	Leachate Collection System Sampling Subtotal					\$0
Section 4.0 Ground Water Monitoring System Sampling						
Item	Description	Unit Measure	Cost/Unit	No Units	Total Cost	
4.1	Sample Collection	LS	\$960	60	\$57,600	
4.3	Sample Analysis	LS	\$7,000	30	\$210,000	
4.3	Report (Part 1A) (1 Report)				\$0	
	Ground Water Monitoring System Sampling Subtotal					\$267,600
Section 5.0 Facility Operations and Maintenance						
Item	Description	Unit Measure	Cost/Unit	No Units	Total Cost	
5.1	Collection					
1	Roll Palletment	LS	\$1,000	30	\$30,000	
1	Vehicle Maintenance	LS	\$500	30	\$15,000	
4.2	Site Worker Protection Supplies					
a	Personal Protective Equipment	LS	\$500	30	\$15,000	
b	Hand and Body Protection	LS	\$500	30	\$15,000	
4	Gas Collection System					
a	System Operation	NA		10	\$0	
b	System Repair	LS	\$200	10	\$6,000	
4.4	Leachate Collection System					
a	System Operation	NA		30	\$0	
b	System Repair	NA		30	\$0	
4.5	Ground Water Monitoring System					
a	System Operation	NA		30	\$0	
b	System Repair	LS	\$500	30	\$15,000	
4.6	Site Security					
a	Lighting and Security	LS	\$50	30	\$15,000	
b	Security and Gate	LS	\$50	30	\$15,000	
4.7	Miscellaneous					
b						
	Facility Operations and Maintenance Subtotal					\$260,000
Total					\$103,600	
10% Contingency					\$80,360	
Total Post-Closure Costs					\$183,960	

APPENDIX D

Maps and Drawings

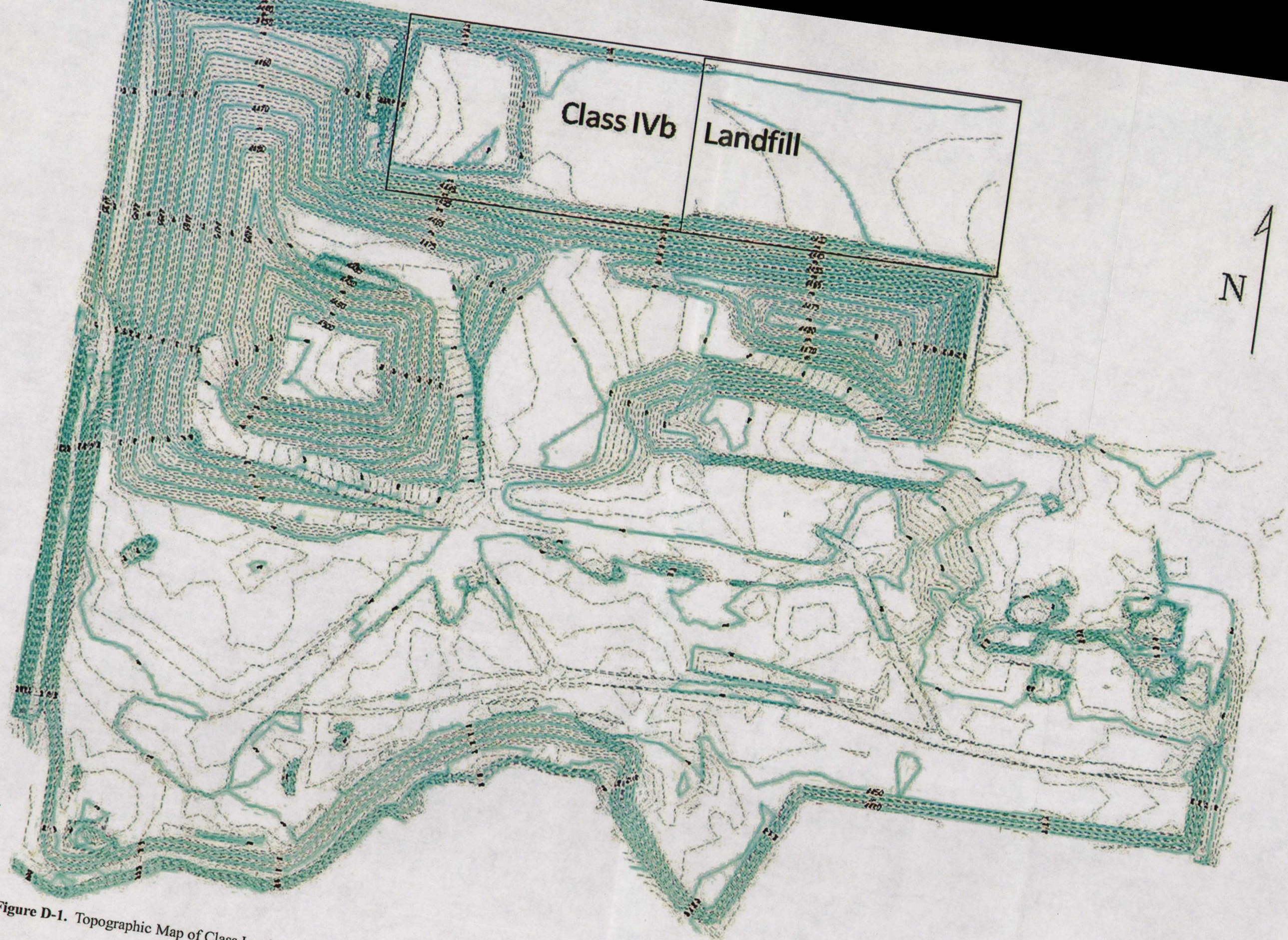


Figure D-1. Topographic Map of Class I and Class IVb landfills (major contours at 5 ft, minor contours at 1 ft).

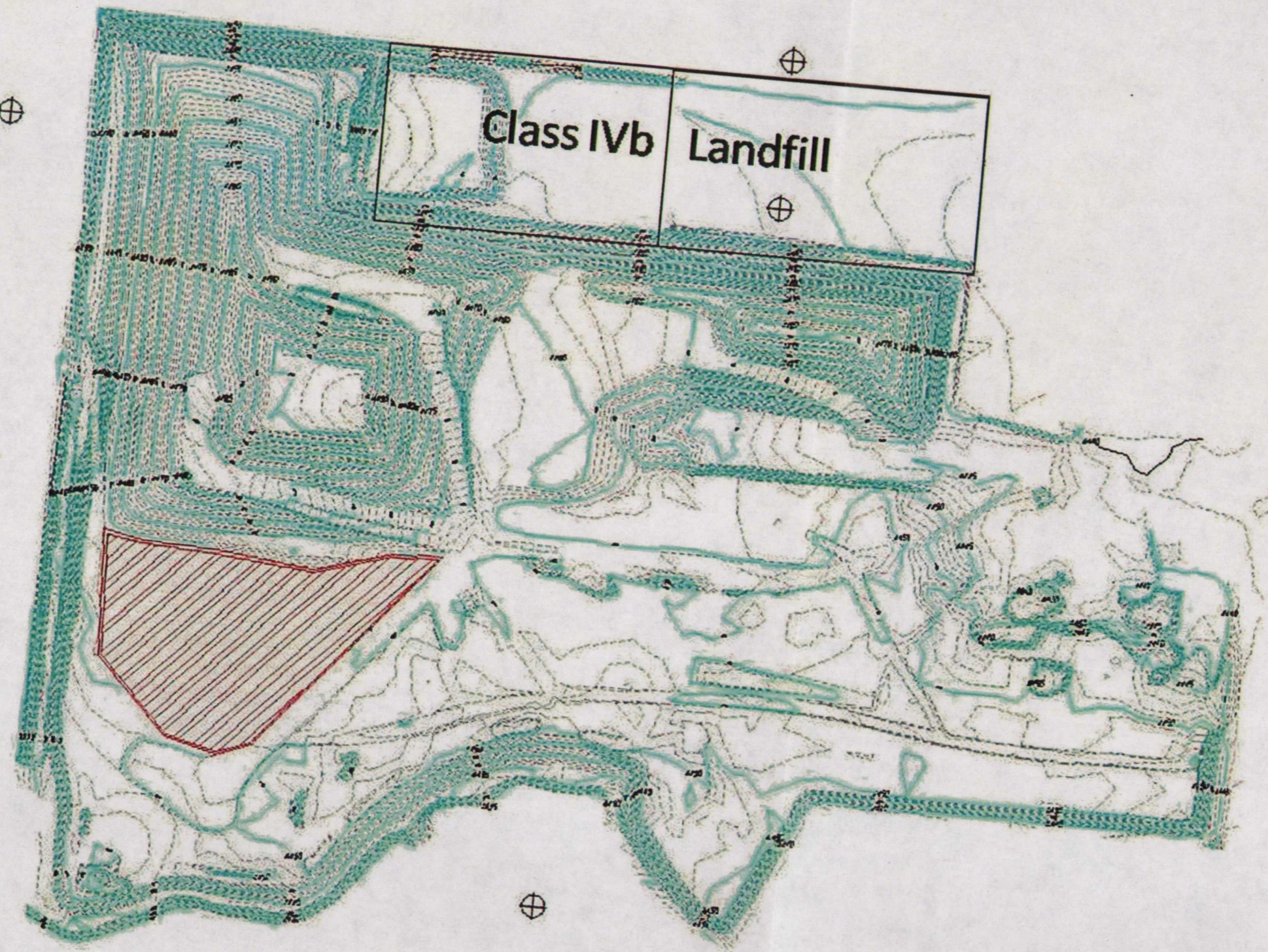


Figure D-2. Location of groundwater monitoring wells. Topsoil storage location shown in red hatch, soil received from local construction project. Additional topsoil borrow areas located directly west of the landfill on city property.

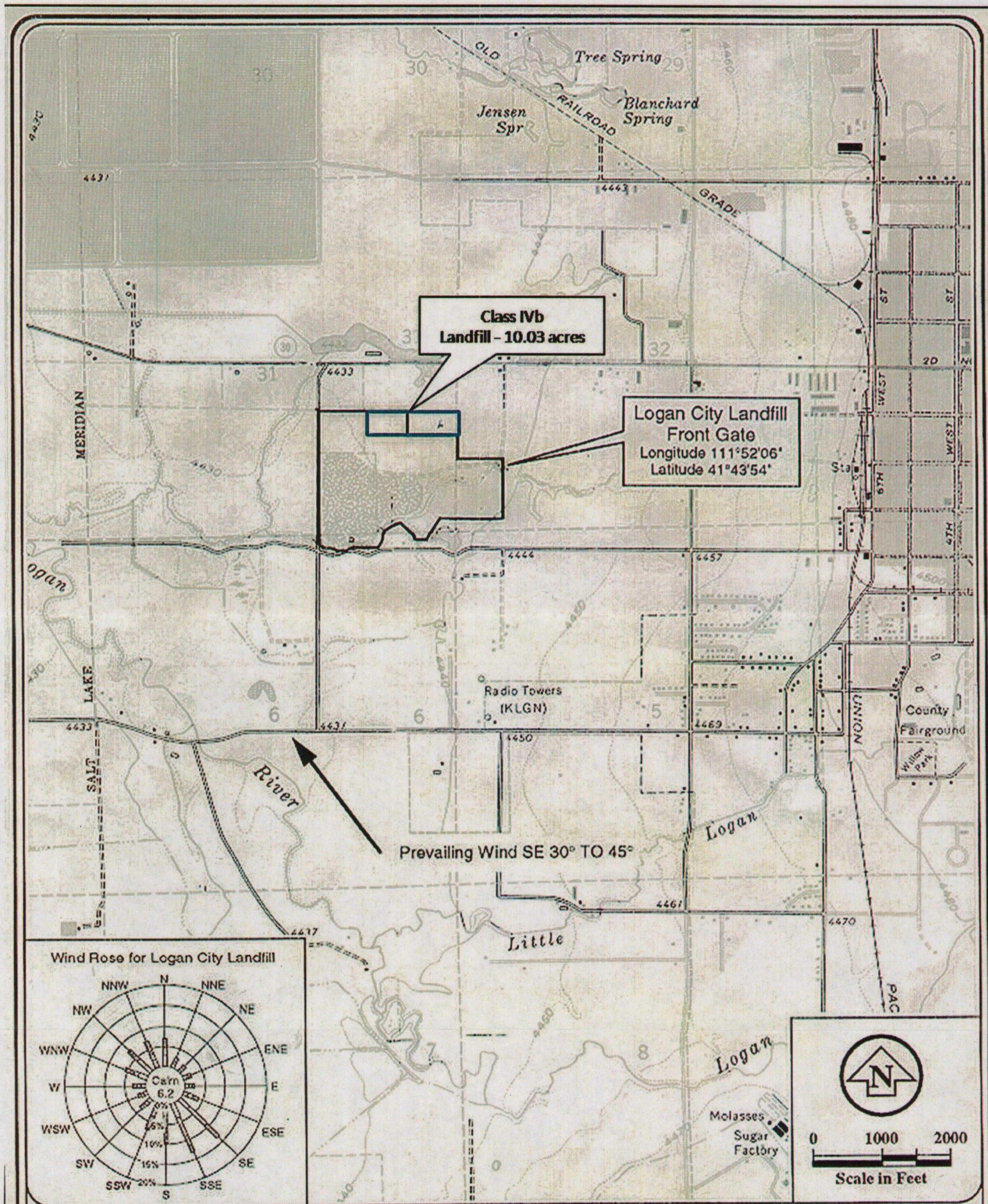


Figure D-3. U.S.G.S. Map, 7 1/2 series: Logan City Class I and Class IVb Landfill location map.

APPENDIX E

Run-on/Run-off Control



Mountain GeoEnvironmental Services, Inc.

Project No. 00386-002
Logan Landfill
 Date 12/4/02 by JH
 Ckd by _____ on _____

Run-off control ditches

Rational Method $Q_p = C_i A$

$i \Rightarrow 2.5 \text{ yr} / 24 \text{ hour storm} = 2.48 \text{ in/hr from Logan U.S.M station}$

$C_i = 0.30$

Area ① = 12.36 acres $Q_p = 0.30(2.48)(12.36) = \underline{9.20 \text{ cfs}}$

Area ② = 16.60 acres $Q_p = 0.30(2.48)(16.60) = \underline{12.85 \text{ cfs}}$

Area ③ = 12.60 acres $Q_p = 0.30(2.48)(12.60) = \underline{9.37 \text{ cfs}}$

Area 4 & 5 = 17.98 acres $Q_p = 0.30(2.48)(17.98) = \underline{13.11 \text{ cfs}}$

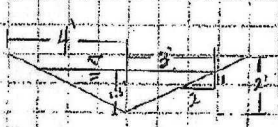
① $Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$

Manning $n = (0.02 + 0.0005 + \dots) \therefore 0.025 + 0.010 (1.15) = 0.0575$

Slope $\rightarrow S = 3.5\% = 0.035 \text{ ft/ft}$ (avg for channels)

$Q = \frac{1.49}{0.0575} A R^{2/3} (0.035)^{1/2} = 4.85 A R^{2/3}$

$R = A / W_p$



$A = 4.5 \text{ ft}^2$

$W_p = 6.71 \text{ ft}$

$R = 0.67 \text{ ft}$

$Q = 4.85(4.5)(0.67)^{2/3}$

$= 16.7 \text{ cfs Max}$

$V = \frac{Q}{A} = \frac{16.7}{4.5} = 3.71 \text{ ft/sec}$

\Rightarrow for 1.3 ft deep

$A = 3.28 \text{ ft}^2$

$W_p = 5.81 \text{ ft}$

$R = 0.58 \text{ ft}$

$Q = 11.41 \text{ cfs}$

$V = 3.4 \text{ ft/sec}^*$

2 ft deep, 2:1 (H:V) side slopes

leaves at least 0.5' free board on longest area (1, 4.5)

Velocity decreases w/ smaller d flows

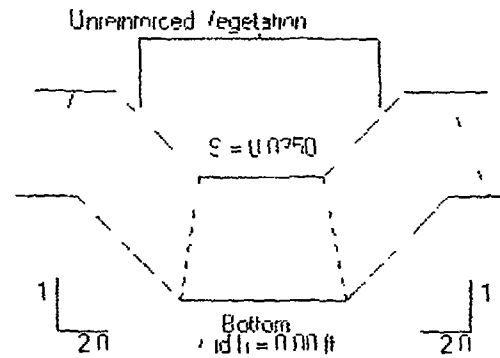
use same channel w/ for all

* Check erosion w/ NAG 4.11

North American Green Erosion Control Material Design Software ver 4.11 Channel 2/5/02 10:13 PM COMPUTED 6.1 ft
 PROJECT NAME Logan Landfill PROJECT NO 110386 002
 FROM STATION REACH Area 1 TO STATION REACH un lined DRAINAGE AREA 12.36 acres DESIGN FREQUENCY 25 year

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq ft)	Hydraulic Radius (ft)	Normal Depth (ft)
92	20	3.4	240	0.49	1.05



Not to Scale

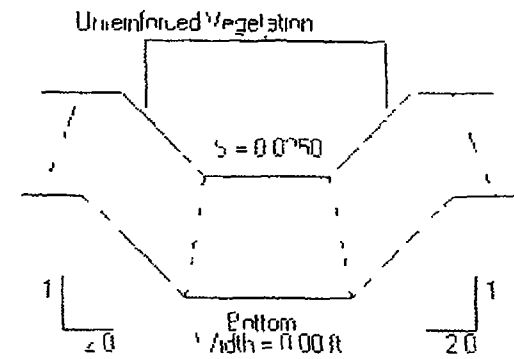
LINER RESULTS

Reach	Material Type	Flow	veg Type	Soil Type	Manning's n	Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Grapple Pattern	Class	veg Density						
Straight	Unreinforced		Mix		0.045	2.33	2.33	1.54	UN TOELE
		D	50.75%	Class Loam		0.1150	0.115	0.44	UN TOELE

North American Green Erosion Control Materials Design Software Ver 4.11 Channel 2/5/02 10310F11 COMPUTED BY jh
 PROJECT NAME Logan Landfill PROJECT NO. 0026002
 FROM STATION/REACH Area 2 TO STATION/REACH un lined DRAINAGE AREA 166 acres DESIGN FREQUENCY 25 year

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq ft)	Hydraulic Radius (ft)	Normal Depth (ft)
1124	2.0	4.14	100	0.55	1.22



LINER RESULTS

Not to Scale

Reach	Material Type	Phase	veg Type	Soil Type	Manning's n	Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Sample Pattern	Class	veg Density						
Straight	Unreinforced		Mi		0.045	3.53	2.67	1.25	STABLE
		D	50.75%	Clay Loam					

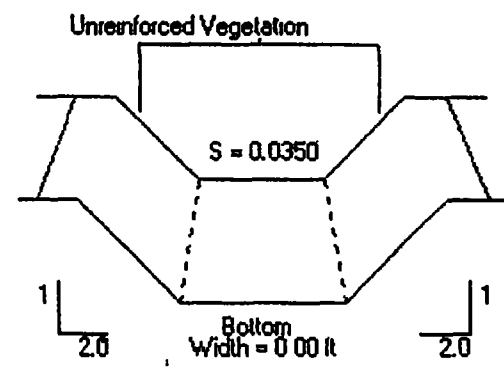
North American Green Erosion Control Materials Design Software Ver. 4.11 Channel 2/5/02 10:03:07 PM COMPUTED BY jh

PROJECT NAME Logan Landfill PROJECT NO. 00386-002

FROM STATION/REACH Area 3 TO STATION/REACH DRAINAGE AREA 126 DESIGN FREQUENCY 25-year

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq.ft)	Hydraulic Radius (ft)	Normal Depth (ft)
β 4	20	3.86	2.44	0.49	1.10



UNER RESULTS

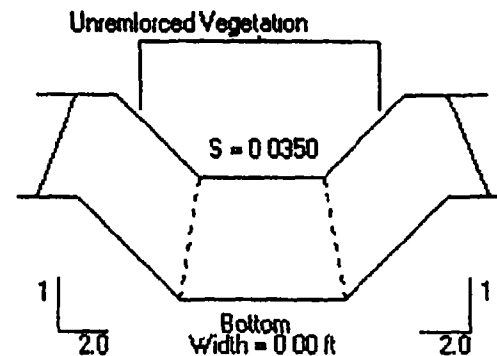
Not to Scale

Reach	Material Type	Phase	Veg. Type	Soil Type	Manning's 'n'	Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern	Class	Veg. Density						
Straight	Unreinforced		Mix		0.045	3.33	2.41	1.38	STABLE
		D	50-75%	Clay Loam		0.050	0.118	0.43	UNSTABLE

North American Green Erosion Control Materials Design Software Ver. 4.11 Channel 12/5/02 10:30:01 PM COMPUTED BY: jh
 PROJECT NAME Logan Landfill PROJECT NO 00386-002
 FROM STATION/REACH Area 4 5 TO STATION/REACH DRAINAGE AREA 17.98 acres DESIGN FREQUENCY 25-year

HYDRAUIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq ft)	Hydraulic Radius (ft)	Normal Depth (ft)
13.1	2.0	4.19	3.12	0.56	1.25



Not to Scale

LINER RESULTS

Reach	Material Type	Phase	Veg. Type	Soil Type	Manning's 'n'	Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern	Class	Veg. Density						
Straight	Unreinforced		Mix		0.045	2.33	2.73	1.22	STABLE
		D	50-75%	Clay Loam		0.050	0.131	0.38	UNSTABLE

