2063-42

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL AFFAIRS
SOLID WASTE DIVISION
PERMITS SECTION

PERMIT RENEWAL APPLICATION

FOR

RIVER BIRCH LANDFILL

D-051-6 741/P-0321
AIN 32219

PREPARED BY:

PLM

PAUL L. MIERS ENGINEERING, LLC

SUBMITTED FOR:

RIVER BIRCH, INC.

VOLUME II of IV

June 13, 2005
Revised: March 2007

TABLE OF CONTENTS
for
PERMIT RENEWAL APPLICATION
for
RIVER BIRCH LANDFILL
D-051-6741/P-0321
AIN 32219

VOLUME I

SUBMITTAL LETTER

SECTION I TABLE OF CONTENTS

SECTION II EXISTING PERMIT DOCUMENTS

SECTION III RESPONSE TO LAC 33:VII-REGULATIONS

PART I – LAC 33:VII.519

PART II – LAC 33:VII.521

A.	LAC 33:VII.521.A	LOCATION CHARACTERISTICS	
1.	A.1.a	Area Master Plans	1
1.	A.1.b.	Access Road Adequacy	2
2.	A.1.c.	Existing Land Use	3
3.	A.1.d.	Aerial Photograph	4
4.	A.1.e.i.	List of Sensitive Ecologic Areas	5
5.	A.1.e.ii.	Documentation from Agencies	6
6.	A.1.e.iii.	Measures Planned to Protect Areas	7
7.	A.1.f.	Wetlands Demonstration	8
8.	A.1.g.	Demographic Information	9
9.	A.2.a	Wells	10
10.	A.2.b.i.	Faults	11
11.	A.2.b.ii.	Fault set-back Distance	12
12.	A.2.c.	Utilities	13
B.	LAC 33:VII.521.B.	FACILITY CHARACTERISTICS	
1.	B.1.a.	Elements of Disposal System	14
2.	B.1.b.	Perimeter Barrier	15
3.	B.1.c.	Buffer Zone	16
4.	B.1.d.	Fire-Protection Measures	17

5.	B.1.e.	Landscaping	18
6.	B.1.f.	Devices to Monitor Incoming Waste	19
7.	B.1.g.	NPDES Discharge Points	20
8.	B.1.h.	Other Features	21
9.	B.2.a.	Areas for Isolating Waste	22
10.	B.2.b.	Location of Leachate System	23
C.	LAC 33:VII.521.C	FACILTIY SURFACE HYDROLOGY	
1.	C.1.a.	Prevent Surface Drainage	24
2.	C.1.b.	Runoff/Run-on	25
3.	C.1.c.	Maximum Rainfall	26
4.	C.1.d.	Aquifer Recharge Areas	27
5.	C.1.e.	Restriction of Flood Plain	28
D.	LAC 33:VII.521.D.	FACILITY GEOLOGY	
1.	D.1.a.	Cross-section of Soils	29
2.	D.1.b.	Soil Boring Logs	30
3.	D.1.c.	Soil Classification Tests	31
4.	D.1.d.	Geologic Cross-section	32
5.	D.1.e.	Fault Verification	33
6.	D.1.f.	Seismic Impact Zone Calculations	33
7.	D.1.g.	Unstable Area Demonstration	33
8.	D.2.	Type III Facility	34
E.	LAC 33:VII.521.E.	FACILITY SUBSURFACE HYDROLOGY	
1.	E.1.a.i.	Areal Extent Beneath Facility	35a-35c
2.	E.1.a.ii.	Thickness and Depth Permeable Zones	36
3.	E.1.a.iii.	Groundwater Flow Directions and Rate	37a-37b
4.	E.1.a.iv.	Change in Groundwater Flow	38a-38b
5.	E.1.b.i.	Areal Extent Recognized Aquifers	39
6.	E.1.b.ii.	Thickness and Depth Recognized Aquifer	40
7.	E.1.b.iii.	Interconnection of Aquifer	41
8.	E.1.b.iv.	Groundwater low	42
9.	E.2.	Type II Landfarms	43
F.	LAC 33.VII.521.F.	FACILITY PLANS AND SPECIFICATIONS	
1.	F.1.	Certification	44
2.	F.2.a.	Detailed Plan View Drawings	45
3.	F.2.b.	Pertinent Features Drawings	46
4.	F.2.c.	Levee Material and Source	47
5.	F.3.a.	Dimensions of Daily Fill & Cover	48
6.	F.3.b.	Type of Cover Material and Source	49

	7.	F.4.a.	Geologic Cross-sections 50
	8.	F.4.b.	Description of Liner System 51a-51b
	9.	F.4.c.	Description of Leachate System 52a-52b
	10.	F.5.a.	Groundwater Flow Direction 53
	11.	F.5.b.	Groundwater Monitoring Wells 54
	12.	F.5.c.	Groundwater Monitoring Program 55
	13.	F.5.d.	Monitoring Well Data 56
	14.	F.5.e.	Groundwater Plan 57
	15.	F.5.f.	Monitoring Well Abandonment 58
	16.	F.6.	Gas Collection System 59
G.	LAC 33:VII.521.G.		FACILITY ADMINISTRATIVE PROCEDURES
	1.	G.1.a.	Recordkeeping System 60
	2.	G.1.b.	Minimum Personnel 61
	3.	G.1.c.	Days of Operation 62
	4.	G.2.	Certified Facility Operators 63
H.	LAC 33:VII.521.H.		FACILITY OPERATIONAL PLANS
	1.	H.1.a.	Type and Quantity of Waste 64a-64b
	2.	H.1.b.	Waste Handling Procedure 64a-64b
	3.	H.1.c.	Minimum Equipment 64a-64b
	4.	H.1.d.	Plan to Segregate Waste 65
	5.	H.1.e.	Inclement Weather Procedures 66
	6.	H.1.f.	Safety Contingency Plan 67
	7.	H.1.g.	Vector Control 68
	8.	H.2.a.	Operational Plan 69
	9.	H.2.b.	Salvaging Procedures 70
	10.	H.2.c.	Scavenging Control 71
	11.	H.3.	Type I and II Landfarms 72
	12.	H.4.	Type I-A and II-A Facilities 73
	13.	H.5.	Type I-A and II-A Facilities 74
	14.	H.6.	Type I-A and II-A Facilities 75
	15.	H.7.	Air Monitoring Plan 76
I.	LAC 33:VII.521.I.		IMPLEMENTATION SCHEDULE
	1.	I.1.a.	Construction Schedule 77
	2.	I.1.b.	Details of Phased Implementation 78
	3.	I.2.	Closing or Upgrading Areas 79
J.	LAC 33:VII.521.J.		FACILITY CLOSURE
	1.	J.1.a.	Date of Final Closure 80
	2.	J.1.b.	Method of Closing Facility 81

	3.	J.1.C.	Closure Costs 82
	4.	J.2.a.	Description of Final Cover 83
	5.	J.2.b.	Largest Area Requiring Final Cover..... 84
	6.	J.2.c.	Estimate of Maximum Inventory 85
	7.	J.2.d.	Closure Schedule 86
	8.	J.3.a.	Sequence of Final Closure..... 87
	9.	J.3.b.	Drawing Showing Final Contours..... 88
	10.	J.3.c.	Closure Document (filed with Clerk of Court ... 89
K.	LAC 33:VII.521.K.		FACILITY POST-CLOSURE
	1.	K.1.a.	Long-term Use of Facility 90
	2.	K.1.b.	Cost of Post-Closure..... 91
	3.	K.2.a.	Post Closure-Plan 92
	4.	K.2.b.	Collection System Abandonment 93
	5.	K.2.c.	Public Safety Measures 94
	6.	K.2.d.	Facility Post-Closure Use..... 95
L.	LAC 33:VII.521.L.		FINANCIAL RESPONSIBILITY
	1.	L.1.	Current Land Owner 96
	2.	L.2.	Agency Requesting Permit 97
	3.	L.3.	Evidence of Liability Coverage..... 98
	4.	L.4.	Financial Assurance Mechanism 99
M.	LAC 33:VII.521.M		SPECIAL REQUIREMENTS
	1.	M.	Special Requirements.....100

PART III-LAC 33:VII.523:ADDITIONAL SUPPLEMENTARY INFOMRATION

Memorandum outlining changes to Permit which affect LAC 33:VII.523.
Supplemental response to the "IT Decision" Questions

VOLUME II

SECTION I TABLE OF CONTENTS
SECTION IV ATTACHMENTS AND APPENDICES
ATTACHMENT 1 PURCHASE AGREEMENTS & LEGAL DESCRIPTIONS
Original Landfill Site
Western Portion of Landfill
ATTACHMENT 2 NOTIFICATION TO FAA
1993 Notification
2003 Notification
ATTACHMENT 3 LETTERS FROM TRANSPORTATION AGENCIES

ATTACHMENT 4 DEMOGRAPHIC INFORMATION
1993 Notification
Updated 2003 Information
ATTACHMENT 5 LETTERS FROM ENVIRONMENTAL AGENCIES
2003 Letters
1993 Letters
ATTACHMENT 6 WETLAND DETERMINATIONS
2006 Determination Original Site
1999 Determination Original Site
1994 Determination Original Site
ATTACHMENT 7 WELL DOCUMENTATIONS
2003 Information
1993 Information
ATTACHMENT 8 BUFFER WAIVERS
Updated Buffer Zone Correspondence
Waiver for Original Site
Waiver for Western Portion of Site
ATTACHMENT 9 ZONING CLASSIFICATIONS
2003 Zoning Ordinance
1993 and 1994 Zoning Letters
ATTACHMENT 10 LETTERS FROM EMERGENCY RESPONDERS
ATTACHMENT 11 METEOROLOGICAL DATA AND WIND ROSE
ATTACHMENT 12 PREVIOUS PERMIT APPLICATION CERTIFICATIONS
ATTACHMENT 13 CERTIFICATE OF LIABILITY INSURANCE, AND CLOSURE NOTIFICATION TO BE FILED CLERK OF COURT
ATTACHMENT 14 EXEMPTION REQUEST FOR CONE PENTROMETER/ BORINGS AND EXEMPTION APPROVAL LETTER
ATTACHMENT 15 PROOF OF PUBLIC NOTICE
ATTACHMENT 16 PROOF OF AUTHORITY TO SIGN PERMIT

APPENDIX A OPERATIONAL PLAN
APPENDIX B GROUNDWATER MONITORING PLAN
APPENDIX C ENGINEERING CALCULATIONS
APPENDIX D CONSTRUCTION QUALITY ASSURANCE
APPENDIX E CLOSURE/POST-CLOSURE PLAN AND COST
APPENDIX F LANDFILL GAS COLLECTION SYSTEM PHASE I

VOLUME III

SECTION I	TABLE OF CONTENTS
SECTION V	GEOTECHNICAL REPORTS & INVESTIGATION

PART I	Preliminary Geotechnical Investigation (Eustis Engineering), 5-5-1990
PART II	Cone Pentrometer Results-Fugro Geosciences, Inc., 1993-1995
PART III	Borings-Soil Testing Engineers, 1993 & Boring-Engineering Associates, Inc., 2006
PART IV	Soil Test Results
PART V	LDEQ-SWD Correspondence, 1993-1995
PART VI	Plots of Geotechnical Results
PART VII	Geologic Cross Sections and Figures from Woodward Clyde Consultants From Original Permit Application and Groundwater Elevation Contour Map (Nov. 29-30, 2005)
PART VIII	Geotechnical Report Landfill Expansion Soil Testing Engineers, Jan. 1999
PART IX	Monitoring Well Plans, Excavation Stability and Consolidation Figures And settlement Plan for Cells 1-30 from Soil Testing Engineering Geotechnical Report and Letter of Explanation for Well Spacing Between Wells MW-9 and MW-10
PART X	Eustis Engineering Geotechnical Investigation January 6, 2003 and Table 1-Relationship of Subsurface Stratigraphic Units
PART XI	Figures from Eustis Engineering Geotechnical Investigation January 6, 2003 and Monitoring Well Cross-Sections
PART XII	Log of Boring and Test Results Eustis Engineering Geotechnical Investigation January 6, 2003
PART XIII	Log of Cone Penetrometer Test Results Eustis Engineering Geotechnical Investigation January 6, 2003
PART XIV	Well Report for Piezometers P1 through P6 Eustis Engineering Geotechnical Investigation January 6, 2003 and Boring Logs for EA-1-P-01-06 and EAI-P-03-06
PART XV	Supplemental Geotechnical Information Eustis Engineering January 10, 2003
PART XVI	Supplemental Enclosures from Eustis Engineering Geotechnical Information January 10, 2003
PART XVII	Existing Monitoring Well Data

VOLUME IV

SECTION I TABLE OF CONTENTS
SECTION VI FIGURES
FIGURE 1 Site Location Map
FIGURE 2 Property Map Eastern Portion of Site
FIGURE 2.1 Property Map Western Portion of Site
FIGURE 3 Land Usage
FIGURE 4 Flood Plain Map
FIGURE 5R1 Location of Wells
FIGURE 6 Aerial Photograph
FIGURE 7 Fault Location Map
FIGURE 8.1 Topographic Map
FIGURES 9 - 29 Relocated to Volume III
Geologic Cross Sections and Figures from Woodward Clyde Consultants From Original Permit Application (See Volume III Section V Part VII for Figures)
FIGURE 30C Initial Site Plan
FIGURE 31 Overall Site Plan
FIGURE 32 Overall Site Excavation Plan
FIGURE 33 Overall Site Top of Clay Liner Plan
FIGURE 34 Leachate Collection System
FIGURE 35 Finished Grading Plan
FIGURE 36 Typical Landfill Section East-West Section A
FIGURE 37 Typical Landfill Section North-South Section B
FIGURE 38 Typical Landfill Section Filling Sequence
FIGURE 39 Typical Liner, Access Road & Landfill Details
FIGURE 40 Leachate Collection and Liner Details
FIGURE 40A Leachate Collection Pipe & Vertical Riser Details for Cells 13-25, 37, 29, 31
FIGURE 41 Typical Landfill Details
FIGURE 42 Finish Site Plan
FIGURE 43 Operations Site Plan
FIGURE 44 Typical Details Interior Perimeter Ditch
FIGURE 45 Project Implementation Schedule
FIGURE 46 Drainage Area Map
FIGURE 47 Site Grid System
FIGURE 48 Leachate Treatment Pond Site Plan
FIGURE 49 Leachate Treatment Pond Typical Details
FIGURE 50 Miscellaneous Details and Sections
FIGURE 51 Miscellaneous Details and Sections
FIGURE 52 Typical Details for Reconstruction of Existing Leachate Treatment Pond to Waste Disposal Cell

FIGURE 53 Reserved for Future Drawing
FIGURE 54 – 70 Relocated in Volume III
Monitoring Well Plans, Excavation Stability and Consolidation Figures and Settlement Plan for Cells 1-30 from Soil Testing Engineers Geotechnical Report (See Volume III Section V Part IX for Figures)
FIGURE J 1 Gas Extraction System
FIGURE J 2 Typical Landfill Section Gas Extraction System

ATTACHMENT 1

Purchase Agreement
and
Legal Description

River Birch Landfill

LEGAL DESCRIPTION

ORIGINAL LANDFILL SITE

DUFRENE SURVEYING & ENGINEERING INC.

P.O. BOX 753 • 1624 MANHATTAN BLVD. • HARVEY, LA 70058
TELEPHONE (504) 368-6390 • FAX (504) 368-6394

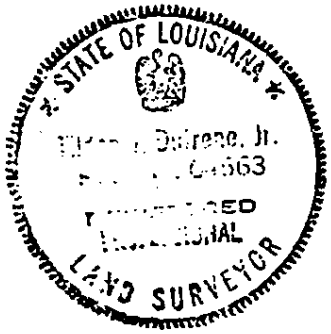
Ri

February 7, 1994

A certain portion of ground located in Sections 4, 6, 36 and 37, T13S, R22E, Southeastern Land District Of Louisiana, West of the Mississippi River, in an area bounded by South Kenner Avenue, Southern Pacific Railroad, and the Kelvin Tract, designated as Portion of Tract W and Portion of Parcel H-4 of Live Oak Plantation, and a Portion of Tract Y, and described as follows:

Begin at the intersection of the line between Tract Y (part of Section 37) and Section 38 and the easterly right of way line of South Kenner Avenue and go North 3 degrees 30 minutes 25 seconds East along the easterly right of way line of South Kenner Avenue a distance of 762.40 feet; thence go North 25 degrees 58 minutes 04 seconds East a distance of 6338.20 feet to the southerly right of way line of the Southern Pacific Railroad; thence go South 63 degrees 19 minutes 39 seconds East along the railroad right of way a distance of 3101.34 feet; thence go South 48 degrees 06 minutes 37 seconds West a distance of 313.50 feet to the 40 arpent line; thence go South 23 degrees 48 minutes 39 seconds East along the 40 arpent line a distance of 664.00 feet to the line between Sections 37 and 38; thence go South 52 degrees 56 minutes 21 seconds West along the section line a distance of 7052.54 feet to the POINT OF BEGINNING.

The above described property is shown on a survey by Dufrene Surveying & Engineering Inc. dated May 25, 1993, last revised January 10, 1994



PURCHASE AGREEMENTS
FOR
WESTERN PORTION
OF
LANDFILL

On joint motion of all Councilmen present, the following ordinance was offered:

SUMMARY NO. 20750 ORDINANCE NO. 21731

An ordinance authorizing the exchange of Lot SK-2, being a portion of Section 4, T13S, R24E, Waggaman, Jefferson Parish, for a portion of Willswood Plantation, being a portion of Sections 8 and 39, T13S, R22E, and to provide for related matters. (Council District No. 3).

WHEREAS, Jefferson Parish is the owner of Lot SK-2, Section 4, Township 13 South, Range 24 East, Southeastern Land District of Louisiana, West of the Mississippi River, situated in the Parish of Jefferson, created pursuant to a Plan of Re-subdivision depicted on a survey by Landmark Surveying, Inc. dated June 17, 2002, Jefferson Parish, measuring approximately 78.598 acres, and having acquired said property by judgment rendered in the expropriation proceeding entitled Parish of Jefferson vs. Marsh Investment Corporation, Proceeding No. 11639 of the Fourth Circuit Court of Appeal, State of Louisiana, an appeal from the Twenty-Fourth Judicial District Court for the Parish of Jefferson, Proceeding No. 222-306, which judgment was registered under Instrument Number 981145, and in COB 1009, Folio 619, of the records of Jefferson Parish, Louisiana; and

WHEREAS, Jefferson Parish is also the owner of certain property located in Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River, situated in the Parish of Jefferson, known as the "Jefferson Parish Landfill" (hereinafter referred to as "JP Landfill Property"); and

WHEREAS, HWY-90, LLC is the owner of property located in Sections 8 and 39, T 13 S, R 22 E, as more fully described and designated as parcel "WP-3" on a survey by Landmark Surveying, Inc., dated October 30, 2002, measuring 78.58 acres, situated in the Parish of Jefferson, State of Louisiana (such properties are hereinafter referred to collectively as the "HWY 90 Property"); and

WHEREAS, the HWY 90 Property abuts the JP Landfill Property; and

WHEREAS, Lot SK-2, owned by Jefferson Parish, does not abut the JP Landfill Property and is not currently being used by the Parish in connection with its landfill operations, and is no longer needed for a public purpose; and

WHEREAS, River Birch Corporation owns Lots SK-1 and SK-3, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River, which lots abut Parcel SK-2; and

WHEREAS, River Birch Corporation also owns the reversionary rights to acquire the Lot SK-2 if the same is no longer needed for public purposes; and

WHEREAS, Jefferson Parish desires to acquire a portion of HWY 90 Property which adjoins the JP Landfill Property in order to expand the capacity of the JP Landfill Property; and

WHEREAS, the Jefferson Parish Council has determined that Parcel SK-2 is no longer needed for public purposes and that the Parish would realize significant benefits by exchanging Parcel SK-2 for a portion of the HWY 90 Property adjoining the JP Landfill Property; and

WHEREAS, Wayne Sandoz, a certified real estate appraiser, has appraised said Lot SK-2 for the sum of [redacted] dollars per acre, or a total appraised value equal to the sum of $[redacted]; and

WHEREAS, Wayne Sandoz has appraised the HWY 90 Property for the sum of [redacted] dollars per acre, or a total appraised value equal to the sum of $[redacted]; and

WHEREAS, HWY-90, LLC desires to acquire Lot SK-2 by exchanging a portion of the HWY 90 Property having an appraised value slightly higher than that of the Expropriation Property; and

WHEREAS, Jefferson Parish desires to enter into an exchange of properties with HWY-90, LLC, pursuant to which such exchange, HWY-90, LLC will acquire Lot SK-2 and Jefferson Parish will acquire a portion of the HWY 90 Property consisting of 78.58 acres, the total value of which is greater than the appraised value of Lot SK-2; and

WHEREAS, HWY-90, LLC and the Parish of Jefferson desire River Birch Corporation to waive and relinquish its reversionary rights to acquire the Expropriation Property in order to allow the Parish of Jefferson to exchange the same for the Hwy 90 Property; and

WHEREAS, the portion of the HWY 90 Property to be acquired by Jefferson Parish

is more fully described and designated as parcel "WP-3" on a survey by Landmark Surveying, Inc., dated October 30, 2002; and

WHEREAS, River Birch Corporation has agreed to relinquish its reversionary rights to acquire Lot SK-2 and River Birch Corporation and Highway 90, LLC agree to reduce the customary two hundred foot (200') buffer zone to one hundred feet (100') between any boundaries between any property owned by River Birch Corporation and/or Highway 90, LLC, and Parcel "WP-3" and any other property which is owned by Jefferson Parish, in return for the Parish of Jefferson agreeing to reduce the customary two hundred foot (200') buffer zone to one hundred feet (100') between any boundaries between any roadway and/or other property owned by the Parish of Jefferson and Lots SK-1 and SK-3, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River and any other property owned by River Birch Corporation.

THE JEFFERSON PARISH COUNCIL HEREBY ORDAINS:

SECTION 1. That the Jefferson Parish Council's hereby declares that Lot SK-2, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River, situated in the Parish of Jefferson, created pursuant to a Plan of Re-subdivision depicted on a survey by Landmark Surveying, Inc. dated June 17, 2002, Jefferson Parish, measuring approximately 78.598 acres, is no longer needed for public purposes.

SECTION 2. That the exchange of properties between Jefferson Parish and HWY-90, LLC, pursuant to which such exchange, HWY-90, LLC will acquire Lot SK-2 and Jefferson Parish will acquire a portion of the HWY 90 Property consisting of 78.58 acres, which property is designated as parcel "WP-3"more fully described on a survey by Landmark Surveying, Inc., dated October 30, 2002, having an appraised value greater than Lot SK-2, is hereby authorized.

SECTION 3. That in consideration for the exchange and as consideration to River Birch Corporation for its release of the reversionary right to acquire Lot SK-2, and River Birch Corporation and Highway 90, LLC agreeing to reduce the customary two hundred foot (200') buffer zone to one hundred feet (100') between any boundaries between any property owned by River Birch Corporation and/or Highway 90, LLC, and Parcel "WP-3" and any other property which is owned by Jefferson Parish the Parish of Jefferson hereby reduces the necessity of having or requiring the customary two hundred foot (200') buffer zone to one hundred feet (100') between the boundaries of any roadways and/or other property owned by the Parish of Jefferson common to (a) Lot SK-2 and other property owned by Hwy 90, L.L.C and (b) Lots SK-1 and SK-3, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River and any other property owned by River Birch Corporation which such waiver shall be effective immediately upon the exchange of properties authorized herein.

SECTION. 4. That the Council Chairman, or in his absence, the Vice Chairman, is hereby authorized to sign any and all documents required to carry out the provisions of this Ordinance.

The foregoing Ordinance having been submitted to a vote, the vote thereon was as follows:

YEAS: 5 NAYS: None ABSENT: (1) Muniz ABSTAIN:(1)Ward

This ordinance was declared to be adopted on the 11th day of December, 2002, and shall become effective as follows, if signed forthwith by the Parish President, ten (10) days after adoption, thereafter, upon signature by the Parish President or, if not signed by the Parish President, upon expiration of the time of the ordinances to be considered finally adopted without the signature of the Parish President, as provided in Section 2.07 of the Charter. If vetoed by the Parish President and subsequently approved by the Council, this Ordinance shall become effective on the day of such approval.

01-00212

THE FOREGOING IS CERTIFIED
TO BE A TRUE & CORRECT COPY

Terrie T. Rodrigue

TERRIE T. RODRIGUE
PARISH CLERK
JEFFERSON PARISH COUNCIL

10259664 CB 3084 540

00.LST

10/01/2002 02:26:24 PM JEFF PAR 1 Pg(s) 10259664 MAL 007 191808

ACT OF CASH SALE	*	UNITED STATES OF AMERICA
BY	*	STATE OF LOUISIANA
MARSH INVESTMENT CORPORATION	*	PARISH OF ORLEANS
TO	*	
RIVER BIRCH INCORPORATED	*	

* * * * * * *

BE IT KNOWN, that on this 1st day of October, 2002;

BEFORE ME, the undersigned, a Notary Public, duly commissioned and qualified, in and for the Parish of and State aforesaid, and in the presence of the undersigned competent witnesses:

PERSONALLY CAME AND APPEARED:

MARSH INVESTMENT CORPORATION, a Louisiana corporation, whose mailing address is 3117 7th Street, Suite 100, Metairie, Louisiana 70002, and whose federal taxpayer identification number is 72-0701127, appearing herein by and through Stephen I. Dwyer, its authorized representative, duly authorized pursuant to a resolution of the Board of Directors of said corporation attached hereto (hereinafter sometimes referred to as "Seller"); and

RIVER BIRCH INCORPORATED, a Louisiana corporation, whose mailing address is 1400 Lapalco Boulevard, Building 2, Harvey, Louisiana 70058, and whose federal taxpayer identification number is 72-1217525, appearing herein by and through Albert J. Ward, Jr., its President, duly authorized pursuant to a resolution of the Board of Directors of said corporation attached hereto(hereinafter sometimes referred to as "Purchaser")

who declared as follows:

Seller does by these presents grant, bargain, sell, convey, transfer, assign, set over, abandon and deliver with all legal warranties, and with full substitution and subrogation in and to all the rights and actions of warranty which said Seller has or may have against all preceding owners and vendors, unto Purchaser, here present accepting, and purchasing for itself, its heirs, successors and assigns, and acknowledging due delivery and possession thereof, all and singular the immovable property located in the State of Louisiana, Parish of Jefferson, described on Exhibit "A" attached hereto and made a part hereof, together with all improvements, buildings, structures, other constructions, and attached fixtures located thereon, and including any and all rights, privileges, easements, servitudes, and appurtenances, if any, thereunto belonging (collectively, the "Property"), including all of Seller's remaining right, title and interest in and to that certain tract of property described on Exhibit "B" attached hereto and made a part hereof which was expropriated from Seller by the Parish of Jefferson, Louisiana pursuant to that opinion rendered by the Fourth Circuit Court of Appeal in that matter styled *Parish of Jefferson v. Marsh Investment Corporation*, bearing the citation 398 So.2d 27 (La. App. 4 Cir. 1981) filed on August 11, 1981, under Instrument No. 981145, in COB 1009, folio 619, of the records of Jefferson Parish, Louisiana (hereinafter referred to as the "Condemnation Parcel"), including particularly, but without limitation, to any right of Seller to retain and/or exercise a right of first refusal to reacquire the Condemnation Parcel upon the sale or transfer or intended sale or transfer of the same by the Parish pursuant to the provisions of La. Rev. Statutes 41:1338(A)(1), *et seq.* or pursuant to any other provisions of law (the Property and the Condemnation Parcel are collectively the "Entire Property"). Seller and Purchaser do hereby authorize the Clerk of Court for the Parish of Jefferson, State of Louisiana, to cross-index this Act of Cash Sale with the condemnation order recorded under Instrument No. 981145 in COB 1009, folio 619.

To have and to hold the above described Entire Property unto the said Purchaser, its heirs, successors and assigns forever.

This sale and transfer is made and accepted for and in consideration of the price and sum of [redacted] and [redacted] Dollars Cash, all of which the said Purchaser has well and truly paid, in ready and current money to the said Seller who hereby acknowledges the receipt thereof and grants full acquittance and discharge therefor.

This sale and transfer of the Property is subject only to the matters of record shown on Exhibit "C" attached hereto and made a part hereof (the "Permitted Exceptions"). Purchaser and Seller acknowledge and agree that the inclusion of the Permitted Exceptions is for informational purposes only and shall not serve to (i) acknowledge, revive or reinscribe any of such Permitted Exceptions that may have prescribed under Louisiana law; (ii) interrupt or suspend the running of prescription as to any of the Permitted Exceptions; or (iii) renounce the benefits of prescription that may have accrued under Louisiana law with respect to any of the Permitted Exceptions.

The Seller further declares that there are no State, Parish or City taxes due or payable as of the date hereof on the Property. All ad valorem taxes payable on the Property shall be prorated by the Seller and the Purchaser.

In accordance with La. R.S. 9:2721(B), from and after the date of this Act of Cash Sale, (a) the name of the person responsible for all property taxes and assessments is River Birch Incorporated, and (b) all property tax and assessment notices should be mailed to the following address: 1400 Lapalco Boulevard, Building 2, Harvey, Louisiana 70058, Attention Albert J. Ward, Jr., President

The parties hereto waive the production of tax, mortgage, conveyance and other certificates and relieve and release the undersigned Notary from any and all responsibility and/or liability in connection therewith.

In so far as they bear upon and affect the Property, the Seller binds and obligates itself to have the inscriptions described on Exhibit "D" attached hereto and made a part hereof canceled and erased immediately by obtaining a complete cancellation of the same, and the parties hereto do accordingly agree to relieve and release the undersigned Notary Public from any and all responsibilities and/or liabilities in connection therewith.

The parties hereto agree and acknowledge that the undersigned Notary has not been required to examine title to the Entire Property conveyed herein, or render an opinion of title with respect thereto, and the Purchaser hereby relieves and releases the undersigned Notary from any and all responsibility and or liability in connection therewith.

This Act of Cash Sale may be executed in multiple counterparts, each of which shall be an original, and all of which shall together constitute one and the same instrument.

THUS DONE AND PASSED in multiple originals in my office on the day and date aforesaid, in the presence of the undersigned competent witnesses, who hereunto sign their names with the said appearer and me, Notary, after reading of the whole.

WITNESSES (as to all signatures):

SELLER:

MARSH INVESTMENT CORPORATION

By: _____
Name: Stephen I. Dwyer
Title: Authorized representative

PURCHASER:

RIVER BIRCH INCORPORATED

By: _____
Name: Albert J. Ward, Jr.
Title: President

_____
NOTARY PUBLIC

EXHIBIT "A"

A certain undesignated portion of ground containing 30.9962 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads (side), and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 3,313.95 feet to the POINT OF BEGINNING: thence continue North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 2,766.11 feet to a point; thence go South 63 degrees 58 minutes 35 seconds East a distance of 1,056.31 feet title 1,056.80 feet actual to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 2,555.25 feet to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 30.9962 acres.

AND

A certain undesignated portion of ground containing 64.6855 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads, and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 7,242.19 feet to a point of curvature; thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet, an arc length of 1,258.84 feet, a chord bearing of North 09 degrees 50 minutes 03 seconds East, and a chord distance of 1,256.28 feet to the POINT OF BEGINNING: thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet an arc length of 965.07 feet, a chord bearing of North 21 degrees 00 minutes 43 seconds East and a chord distance of 963.92 feet to a point of tangency; thence continue along the Easterly right of way line of South Kenner Avenue North 25 degrees 51 minutes 46 seconds East a distance of 388.10 feet to a point; thence go in an Easterly direction along the Southern Pacific, Texas and Pacific Railroad right of way on a curve to the right with a radius of 5,679.58 feet, and arc length of 1,419.69 feet, a chord bearing of South 70 degrees 29 minutes 18 seconds East and a chord distance of 1,416.00 feet to a point of tangency; thence go South 63 degrees 19 minutes 39 seconds East a distance of 526.90 feet to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 1,502.95 feet to a point; thence go North 63 degrees 58 minutes 35 seconds West a distance of 1,850.23 feet title 1,849.89 feet actual to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 64.6855 acres.

Being further described as that certain parcel of ground being the part of Section 4, Township 13 South, Range 22 East, Southeastern Land District, West of the Mississippi River, Jefferson Parish, Louisiana, acquired by MARSH INVESTMENT CORPORATION, pursuant to Credit Sale of Property with Mortgage by Highway Land Co., Inc., in Liquidation to Marsh Investment Corporation dated April 3, 1969, recorded as Entry No. 455066 in COB 695, folio 231, MOB 528, folio 99 on April 7, 1969; less and except that portion of Section 4 conveyed in Act of Credit Sale by Marsh Investment Corporation to Southern Recovery Management, Inc. dated August 18, 1993, recorded as Entry No. 93-54441 in COB 2881, folio 80 on October

1, 1993; as amended by Act of Correction to Act of Credit Sale dated March 6, 1996, recorded as Entry No. 96-17102 in COB 2935, folio 548 on April 3, 1996; and less and except that portion of Section 4 expropriated by Jefferson Parish in Parish of Jefferson versus Marsh Investment Corporation, #11639 Court of Appeal, Fourth Circuit, State of Louisiana, Appeal from the Twenty-Fourth Judicial District Court for the Parish of Jefferson, Proceeding #222-306, Division B, recorded as Entry No. 981145 in COB 1009, folio 619 on August 11, 1981.

EXHIBIT "B"

A certain undesignated portion of ground containing 78.5853 located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads (side), and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 6,080.06 feet to the POINT OF BEGINNING: thence continue North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 1,162.13 feet to a point of curvature; thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet, an arc length of 1,258.84 feet, a chord bearing of North 09 degrees 50 minutes 03 seconds East and a chord distance of 1,256.28 feet to a point; thence go South 63 degrees 58 minutes 35 seconds East a distance of 1,850.23 feet title 1,849.89 feet actual to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 2,280.00 feet to a point; thence go North 63 degrees 58 minutes 35 seconds West a distance of 1,056.31 feet title 1,056.80 feet actual to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 78.5853 acres.

EXHIBIT "C"

1. Right of Way Agreement by Marsh Investment Corporation to LGS Natural Gas Company dated June 25, 1984, recorded as Entry No. 84-33574 in COB 1079, folio 463 on July 11, 1984; as amended by Act of Amendment, Correction and Clarification to Redefine Right of Way Route dated June 21, 1985, recorded as Entry No. 8527507 in COB 1267, folio 277 on June 21, 1985.

2. Oil, Gas and Mineral Lease as evidenced by Notice of Oil, Gas and Mineral Lease by Marsh Investment Corporation to Merlin Oil and Gas, Inc. dated March 14, 2002, recorded as Entry No. 10217432 in ML 137, folio 879 on March 21, 2002.

3. Waiver of Surface Rights dated April 18, 2002, by Merlin Oil and Gas, Inc. in favor of Marsh Investment Corporation recorded on August 21, 2002, under Instrument No. 10251061, in Mineral Lease Book 138, page 60.

EXTRACT OF THE MINUTES OF A MEETING
OF THE BOARD OF DIRECTORS OF
MARSH INVESTMENT CORPORATION

I, the undersigned secretary of MARSH INVESTMENT CORPORATION (hereinafter referred to as the "Corporation"), do hereby certify that I am the duly elected secretary of the Corporation and the keeper of the corporate records and minutes of the proceedings of the Board of Directors of said Corporation, and that on the 30 day of September, 2002, a meeting (or other action in lieu of a meeting) of the said Board of Directors was held in accordance with the law and the bylaws of the Corporation, at which meeting a quorum of the Board of Directors was present throughout, and at which meeting the following resolution was duly and lawfully adopted:

> **RESOLVED**, that the Corporation, bargain, sell, transfer, convey and deliver to River Birch Incorporated, or its assigns, all of its right, title and interest in the property more fully described on Exhibit "A" attached hereto and made a part hereof (the "Property"), and that, Stephen I. Dwyer, be and he is hereby authorized, empowered and directed to execute an act of cash sale for and on behalf of, and in the name of this Corporation, for such price or consideration and on such terms and conditions as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purpose of this resolution.

BE IT FURTHER RESOLVED, that Stephen I. Dwyer is authorized, empowered and directed to execute whatever other documents or instruments and to perform whatever other acts by, for, on behalf of, and in the name of this Corporation, as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purposes of the foregoing resolutions.

BE IT FURTHER RESOLVED, that any and all acts authorized pursuant to these resolutions and performed by said officer and/or his attorneys prior to the passage of these resolutions are hereby ratified and approved.

I further certify the above and foregoing to be a true and accurate copy of the resolutions adopted by the Corporation at a meeting (or other action in lieu of a meeting) held on the date set forth above, at which a quorum was present, and that said resolutions have not been rescinded, altered, modified, or changed and remain in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand as Secretary of the Corporation on this 30 day of September, 2002.

Joseph C. Marcello

Joseph C. Marcello, Secretary

EXHIBIT "A"

A certain undesignated portion of ground containing 30.9962 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads (side), and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 3,313.95 feet to the POINT OF BEGINNING: thence continue North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 2,766.11 feet to a point; thence go South 63 degrees 58 minutes 35 seconds East a distance of 1,056.31 feet title 1,056.80 feet actual to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 2,555.25 feet to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 30.9962 acres.

AND

A certain undesignated portion of ground containing 64.6855 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads, and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 7,242.19 feet to a point of curvature; thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet, an arc length of 1,258.84 feet, a chord bearing of North 09 degrees 50 minutes 03 seconds East, and a chord distance of 1,256.28 feet to the POINT OF BEGINNING: thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet an arc length of 965.07 feet, a chord bearing of North 21 degrees 00 minutes 43 seconds East and a chord distance of 963.92 feet to a point of tangency; thence continue along the Easterly right of way line of South Kenner Avenue North 25 degrees 51 minutes 46 seconds East a distance of 388.10 feet to a point; thence go in an Easterly direction along the Southern Pacific, Texas and Pacific Railroad right of way on a curve to the right with a radius of 5,679.58 feet, and arc length of 1,419.69 feet, a chord bearing

of South 70 degrees 29 minutes 18 seconds East and a chord distance of 1,416.00 feet to a point of tangency; thence go South 63 degrees 19 minutes 39 seconds East a distance of 526.90 feet to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 1,502.95 feet to a point; thence go North 63 degrees 58 minutes 35 seconds West a distance of 1,850.23 feet title 1,849.89 feet actual to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 64.6855 acres.

Being further described as that certain parcel of ground being the part of Section 4, Township 13 South, Range 22 East, Southeastern Land District, West of the Mississippi River, Jefferson Parish, Louisiana, acquired by MARSH INVESTMENT CORPORATION, pursuant to Credit Sale of Property with Mortgage by Highway Land Co., Inc., in Liquidation to Marsh Investment Corporation dated April 3, 1969, recorded as Entry No. 455066 in COB 695, folio 231, MOB 528, folio 99 on April 7, 1969; less and except that portion of Section 4 conveyed in Act of Credit Sale by Marsh Investment Corporation to Southern Recovery Management, Inc. dated August 18, 1993, recorded as Entry No. 93-54441 in COB 2881, folio 80 on October 1, 1993; as amended by Act of Correction to Act of Credit Sale dated March 6, 1996, recorded as Entry No. 96-17102 in COB 2935, folio 548 on April 3, 1996; and less and except that portion of Section 4 expropriated by Jefferson Parish in Parish of Jefferson versus Marsh Investment Corporation, #11639 Court of Appeal, Fourth Circuit, State of Louisiana, Appeal from the Twenty-Fourth Judicial District Court for the Parish of Jefferson, Proceeding #222-306, Division B, recorded as Entry No. 981145 in COB 1009, folio 619 on August 11, 1981.

EXTRACT OF THE MINUTES OF A MEETING
OF THE BOARD OF DIRECTORS OF
RIVER BIRCH INCORPORATED

I, the undersigned secretary of **RIVER BIRCH INCORPORATED** (hereinafter referred to as the "Corporation"), do hereby certify that I am the duly elected secretary of the Corporation and the keeper of the corporate records and minutes of the proceedings of the Board of Directors of said Corporation, and that on the 1st day of October, 2002, a meeting (or other action in lieu of a meeting) of the said Board of Directors was held in accordance with the law and the bylaws of the Corporation, at which meeting a quorum of the Board of Directors was present throughout, and at which meeting the following resolution was duly and lawfully adopted:

RESOLVED, that the Corporation, purchase from Marsh Investment Corporation the property more fully described on Exhibit "A" attached hereto and made a part hereof (the "Property"), and that, Albert J. Ward, Jr., the President, be and he is hereby authorized, empowered and directed to execute an Act of Cash Sale for and on behalf of, and in the name of this Corporation, for cash or credit or both or either, for a purchase price of $1,961,474.85 or for such other price or consideration and on such terms and conditions as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purpose of this resolution.

BE IT RESOLVED, that in conformity with the terms and conditions of an Amended and Restated Credit Agreement dated July 10, 2002, between the Corporation and Hibernia National Bank, New Orleans, Louisiana, Albert J. Ward, Jr., the President of this Corporation, be and he is hereby authorized, empowered and directed to act for and on behalf of said Corporation and to execute for and on behalf of and in the name of said Corporation any and all documents and instruments necessary to borrow funds from Hibernia National Bank, New Orleans, Louisiana, upon such terms and in the amount of the purchase price of the Property or such other amounts that may be necessary and/or appropriate in connection with the purchase of the Property, in said representative's sole discretion, including, but not limited to executing by, for and on behalf of and in the name of said Corporation any promissory notes, bonds, securities, mortgages or leasehold mortgages, security agreements, deeds of trust and leasehold deeds of trust, guaranty agreements, indemnity agreements, pledges and/or other instruments or documents evidencing or securing such indebtedness and in such amounts and upon such terms as said representative, in his sole discretion, deems necessary and/or appropriate, and to encumber the property of said Corporation as security for the same, whether such property is immovable, movable or mixed, such instruments, mortgages, security agreements and/or other documents to contain, if applicable, waivers of appraisement, confessions of judgment, authorizations of expedited foreclosure procedures (including executory process in connection with any collateral property in Louisiana), and other waivers of procedural rights and defenses, all of which are expressly consented to by said Corporation and this Board of Directors.

BE IT FURTHER RESOLVED, that Albert J. Ward, Jr., the President of this Corporation, is authorized, empowered and directed to execute whatever other documents or instruments and to perform whatever other acts by, for, on behalf of, and in the name of this Corporation, as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purposes of the foregoing resolutions.

BE IT FURTHER RESOLVED, that any and all acts authorized pursuant to these resolutions and performed prior to the passage of these resolutions are hereby ratified and approved.

I further certify the above and foregoing to be a true and accurate copy of the resolutions adopted by the Corporation at a meeting (or other action in lieu of a meeting) held on the date set forth above, at which a quorum was present, and that said resolutions have not been rescinded, altered, modified, or changed and remain in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand as Secretary of the Corporation on this 1st day of October 2002.

Adrea D. Heebe, Secretary

EXHIBIT "A"

A certain undesignated portion of ground containing 30.9962 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads (side), and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 3,313.95 feet to the POINT OF BEGINNING: thence continue North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 2,766.11 feet to a point; thence go South 63 degrees 58 minutes 35 seconds East a distance of 1,056.31 feet title 1,056.80 feet actual to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 2,555.25 feet to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 30.9962 acres.

AND

A certain undesignated portion of ground containing 64.6855 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads, and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 7,242.19 feet to a point of curvature; thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet, an arc length of 1,258.84 feet, a chord bearing of North 09 degrees 50 minutes 03 seconds East, and a chord distance of 1,256.28 feet to the POINT OF BEGINNING: thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet an arc length of 965.07 feet, a chord bearing of North 21 degrees 00 minutes 43 seconds East and a chord distance of 963.92 feet to a point of tangency; thence continue along the Easterly right of way line of South Kenner Avenue North 25 degrees 51 minutes 46 seconds East a distance of 388.10 feet to a point; thence go in an Easterly direction along the Southern Pacific, Texas and Pacific Railroad right of way on a curve to the right with a radius of 5,679.58 feet, and arc length of 1,419.69 feet, a chord bearing

of South 70 degrees 29 minutes 18 seconds East and a chord distance of 1,416.00 feet to a point of tangency; thence go South 63 degrees 19 minutes 39 seconds East a distance of 526.90 feet to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 1,502.95 feet to a point; thence go North 63 degrees 58 minutes 35 seconds West a distance of 1,850.23 feet title 1,849.89 feet actual to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 64.6855 acres.

Being further described as that certain parcel of ground being the part of Section 4, Township 13 South, Range 22 East, Southeastern Land District, West of the Mississippi River, Jefferson Parish, Louisiana, acquired by MARSH INVESTMENT CORPORATION, pursuant to Credit Sale of Property with Mortgage by Highway Land Co., Inc., in Liquidation to Marsh Investment Corporation dated April 3, 1969, recorded as Entry No. 455066 in COB 695, folio 231, MOB 528, folio 99 on April 7, 1969; less and except that portion of Section 4 conveyed in Act of Credit Sale by Marsh Investment Corporation to Southern Recovery Management, Inc. dated August 18, 1993, recorded as Entry No. 93-54441 in COB 2881, folio 80 on October 1, 1993; as amended by Act of Correction to Act of Credit Sale dated March 6, 1996, recorded as Entry No. 96-17102 in COB 2935, folio 548 on April 3, 1996; and less and except that portion of Section 4 expropriated by Jefferson Parish in Parish of Jefferson versus Marsh Investment Corporation, #11639 Court of Appeal, Fourth Circuit, State of Louisiana, Appeal from the Twenty-Fourth Judicial District Court for the Parish of Jefferson, Proceeding #222-306, Division B, recorded as Entry No. 981145 in COB 1009, folio 619 on August 11, 1981.

PURCHASE AGREEMENT

THIS PURCHASE AGREEMENT (this "Agreement") is made as of the Effective Date, between Marsh Investment Corporation, a Louisiana corporation, appearing herein through Joseph C. Marcello, its duly authorized officer (hereinafter "Seller") and A. J. Ward, Jr., or his assigns ("Purchaser").

IN CONSIDERATION of the mutual obligations contained in this Agreement, and other good and valuable consideration, the receipt and sufficiency of which are acknowledged by each of the parties hereto, the parties agree as follows:

ARTICLE 1: AGREEMENT TO SELL AND TO PURCHASE

Section 1.1: Seller agrees to sell and Purchaser agrees to purchase all of Seller's right, title and interest in the property bounded by the railroad tracks to the north, the River Birch Landfill to the east, and South Kenner Road right of way to the southwest, which such property is outlined and depicted on Exhibit "A" attached hereto (with such property to be acquired to be created, if necessary, through a subdivision of a larger tract of property formerly owned by the Seller (the "Parent Tract")). The Parent Tract is also described on Exhibit "A", attached hereto and consists of the Condemnation Parcel (defined below) and the Property being acquired herein. The property described above and which is to be purchased and sold, together with all improvements and other constructions, if any, located on such property, and together with all rights, ways, privileges, hereditaments, easements, servitudes, appurtenances, advantages, and intangibles belonging and appertaining thereto is hereinafter referred to as the "Property", and the actual area of the Property is to be determined by the Boundary Survey, as provided below. As additional consideration for the acquisition of the Property by Purchaser, the act of sale of Property will also include all of the Seller's remaining right, title and interest in and to that certain tract of property which was expropriated from Seller by the Parish of Jefferson, Louisiana pursuant to that opinion rendered by the Fourth Circuit Court of Appeal in that matter styled *Parish of Jefferson v. Marsh Investment Corporation*, bearing the citation 398 So.2d 27 (La. App. 4 Cir. 1981) (hereinafter the "Condemnation Parcel"), including particularly, but without limitation, to any right of Seller to retain and/or exercise a right of first refusal to reacquire the Condemnation Parcel upon the sale or transfer or intended sale or transfer of the same by the Parish pursuant to the provisions of La. Rev. Statutes 41:1338(A)(1), et seq, or pursuant to any other provisions of law. The Condemnation Parcel is more fully described on Exhibit "B", attached hereto, and shown cross-hatched on Exhibit "A."

ARTICLE 2: DEPOSIT AND PURCHASE PRICE

Section 2.1: Purchase Price and Deposit. The purchase price for the Property ("Purchase Price") shall be equal to [redacted] per acre multiplied by the actual number of acres comprising the Property as determined by the Boundary Survey. The Purchase Price shall be payable on the terms and conditions stated herein. Within three (3) business days following the execution of this Agreement by Seller, and as security for the performance of its obligations hereunder, Purchaser shall deposit the sum of [redacted] (the "Deposit") with the Title Agent (defined below) to be deposited in its escrow account at a national bank in New Orleans, Louisiana. The Deposit shall not be considered to be earnest money.

ARTICLE 3: TITLE

Section 3.1: Title Examinations. Within thirty (30) business days from the Effective Date, Purchaser shall obtain a copy of an ALTA title insurance commitment (the "Commitment") from Capdevielle Title Corporation (the "Title Agent") underwritten by First American Title Insurance Company or other title insurance company selected by Purchaser, proposing to insure good,

merchantable and marketable fee simple title to the Property in the name of Purchaser and in the amount of the Purchase Price. Within ten (10) days from receipt thereof by Purchaser, Purchaser shall give Seller a statement of those matters affecting Seller's title to the Property that are disclosed by the Commitment and to which Purchaser objects (the "Title Objections"). Any matters affecting Seller's title to the Property that are disclosed by the Commitment and to which Purchaser fails to object in writing to Seller within the aforesaid ten (10) day period shall be deemed accepted by Purchaser ("Permitted Exceptions"). Further, that certain Oil, Gas and Mineral Lease between Seller and Merlin Oil Company attached as Exhibit "B" shall be a Permitted Exception. The Property will be sold and purchased subject only to Permitted Exceptions.

Section 3.2: Correction of Title Objections. Upon receipt of notice of Title Objections, Seller shall cure or remove the Title Objections at its sole cost and expense, provided however that Seller shall not be required to spend more than [redacted] in connection with such curative efforts. Seller shall have thirty (30) days following receipt of such notice to cure such Title Objections (such period to cure, as the same may be extended, the "Title Curative Period") and to cause the Title Company to deliver endorsements to the Commitment reflecting such satisfaction, cure or removal. Seller agrees that any monetary encumbrances bearing against the Property which can be satisfied out of the proceeds of the Purchase Price due to Seller at Closing, shall be satisfied by Seller prior to Closing, or otherwise, discharged at Closing out of such proceeds. If Seller notifies Purchaser within ten (10) business days of Seller's receipt of notice of Title Objections that Seller is unable to satisfy the Title Objections within the Title Curative Period, at Purchaser's option, and in its sole discretion, the Title Curative Period may be extended for an additional period of up to sixty (60) days, during which period, Seller shall continue to use its best efforts to cure any remaining Title Objections. If Seller is unable to cure all of the Title Objections within the Title Curative Period, as the same may be extended, Purchaser, at its option, may either (i) terminate this Agreement or (ii) waive its objections to the uncured Title Objections and proceed to the Closing. Purchaser shall be deemed to have elected to terminate this Agreement if Purchaser does not elect to waive such Title Objections prior the close of business ten (10) days after Seller notifies Purchaser, in writing, of its inability to cure such Title Objections.

ARTICLE 4: SURVEY, LEGAL DESCRIPTION

Section 4.1: Survey. Within thirty (30) days following the Effective Date, Purchaser shall have the Property surveyed by a duly licensed surveyor with all of the boundaries of the Property staked and monumented and with the area of the Property calculated (the "Boundary Survey"). If required by the Title Agent as a condition to insuring the merchantability of the Property, the Purchaser shall also require the surveyor to prepare a survey proposing to resubdivide the Parent Tract to create the Property (the "Resubdivision Survey") at the Purchaser's expense. Within ten (10) days from receipt of such Boundary Survey and Resubdivision Survey, if required, Purchaser shall give Seller the surveys, and a statement of those matters that are disclosed by the surveys to which Purchaser objects. Any exceptions or impairments of title disclosed by the Boundary Survey shall be treated as Title Objections in the manner described above.

ARTICLE 5: CLOSING

Section 5.1: Closing Date. Unless extended pursuant to the terms of this Agreement, the transfer of title to the Property (the "Closing") shall occur at 10:00 A.M., on the later of (i) thirty (30) days following the end of the Inspection Period described in Section 12.1 below, or (ii) ten (10) days following the end of the Title Curative Period described in Section 3.2, if applicable, or (iii) fifteen (15) days following the date that the Parish of Jefferson approves the resubdivision of the Property pursuant to the Resubdivision Survey, if a resubdivision is required, or at such other time and date agreed to by Purchaser and Seller. The Closing shall be held in the offices of Sher Garner Cahill Richter Klein McAlister & Hilbert, L.L.C., Twenty Eighth Floor, New Orleans, La. 70112, or at the offices of Purchaser, or at such other location in New Orleans, Louisiana, as Purchaser or its lender shall elect.

Section 5.2: Closing and Other Costs.

(a) At Closing, Seller shall pay the expense of (1) curing any Title Objections up to the amount set forth in Section 3.2 above, (2) Seller's attorneys; (3) any mortgage, conveyance and/or tax researches; and (4) any other items agreed to be paid by Seller herein.

(b) At Closing, Purchaser shall pay any costs, fees or expenses associated with (1) recording of the Sale; (2) the Commitment and any title policy issued in connection therewith, (3) Purchaser's attorneys; (4) any other items agreed to be paid by Purchaser herein, and (5) the expense of the Boundary Survey and of the Resubdivision Survey, if required.

Section 5.3: Prorations. All ad valorem and similar taxes and assessments and any rentals due with respect to the Property for the calendar year of the Closing shall be prorated between Purchaser and Seller as of the Closing Date, based on the most current and accurate billing information available.

ARTICLE 6: REPRESENTATIONS AND WARRANTIES

Section 6.1: In General. The undersigned represents to Purchaser as follows:

(a) Seller owns the Property and has the power and authority to enter into and to perform fully the transactions contemplated in this Agreement;

(b) Seller has received no notice of, nor is Seller aware of, any pending, threatened or contemplated action by any governmental authority or agency having the power of eminent domain, that might result in all or any part of the Property being taken by condemnation or conveyed in lieu of such taking;

(c) Seller has not used the Property, and, to the best of Seller's knowledge and belief, the Property has not been used for the use, manufacture, generation, disposal, storage, or release of Hazardous Substances or Waste, and to the best of Seller's knowledge and belief, the Property does not contain any of such materials, nor are there any underground storage tanks located on the Property. "Hazardous Substances or Waste" means any substance identified as a hazardous substance or waste in the Environmental Assessment, described in Section 12.1, below, or in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, the Superfund Amendment and Reauthorization Act, the Resource Conservation and Recovery Act, the Louisiana Environmental Quality Act, or any other state or municipal legislation or ordinances.

ARTICLE 7: AGREEMENTS AFFECTING THE PROPERTY

Section 7.1: Seller's and Purchaser's Agreements. Subsequent to the date hereof and prior to Closing or the termination of this Agreement, whichever first occurs, Seller agrees as follows:

(a) Seller shall not sell, contract to sell, option, assign, rent, lease, convey (absolutely or as security), grant a security interest in or otherwise encumber, restrict or dispose of all or any part of or estate or interest in all or any part of the Property;

(b) If required, the Seller shall submit the Resubdivision Application as provided above. Purchaser shall be responsible for any expenses incurred in obtaining the resubdivision of the Parent Tract in accordance with the Resubdivision Survey. Following the filing of the Resubdivision Application, the Seller, at Purchaser's expense, shall use its best efforts to secure the Resubdivision Approval, as defined below, prior to the end of the Inspection Period, and if the Resubdivision Approval is not obtained before the Inspection Period ends, the Inspection Period shall be extended one (1) day for each day of delay in obtaining the Resubdivision

Approval. The Purchaser shall cooperate fully with the Seller to obtain the Resubdivision Approval, and the parties agree that the Resubdivision Survey will not be recorded if Closing does not occur for any reason.

(c) The Property shall be sold "as is" and "where is" with a waiver of redhibition and without any warranty whatsoever except as to title.

ARTICLE 8: EXAMINATION OF THE PROPERTY

Section 8.1: Examination of the Property. Seller hereby grants Purchaser, its agents, employees or representatives a period of forty-five (45)days from the Effective Date (the "Inspection Period") to conduct such feasibility analyses, studies and investigations and to enter upon the Property at any time, and from time to time, to conduct soil tests, borings, percolation tests and any other tests, inspections or examinations which Purchaser deems necessary or advisable, it its sole discretion. Purchaser shall indemnify and hold Seller harmless from any damages to the Property or claims of third parties resulting from the actions of Purchaser, its agents, employees or representatives in the conduct of such tests, inspections or examinations. If Purchaser's investigations or inspections reveal any condition or information about the Property, the Boundary Survey or the Commitment, any environmental matters, or other matters which are not satisfactory to Purchaser, in its sole discretion, Purchaser may terminate this Agreement by notice to Seller within (5) days following the expiration of the Inspection Period, and in such event, the Seller shall direct Title Agent to return the Deposit promptly to the Purchaser.

ARTICLE 9: CASUALTY AND CONDEMNATION

Section 9.1: Intentionally Omitted

ARTICLE 10: BROKERAGE COMMISSION

Section 10.1: Broker Commissions. Purchaser and Seller represent and warrant to each other that neither has dealt with a real estate broker or agent in connection with the subject matter of this Agreement other than Don Randon Real Estate, Inc. (the "Broker"), agent for Purchaser. If any claims arise for any real estate commissions, fees or compensations in connection with this Agreement or the transaction it contemplates other than those due to the Broker, then the party through which such claims arise shall indemnify and hold harmless the other party from any loss or damage suffered because of such claims. Seller and Purchaser acknowledge that the Broker is entitled to a commission in the amount of four percent (4%) of the Purchase Price in return for its services hereunder, and the Purchaser agrees to pay the Broker the above commission if and when the Act of Sale occurs.

ARTICLE 11: EVENTS OF TERMINATION AND DEFAULT

Section 11.1: Seller's Default. If Seller fails to comply with its obligations under this Agreement, or if any of Seller's representations and warranties contained herein shall be false then, Purchaser may demand the return of the Deposit, plus an equal amount, together with Purchaser's out-of-pocket expenses incurred in connection with this Agreement and the transaction contemplated herein, as fully liquidated damages and in lieu of any other remedy, or Purchaser may demand specific performance.

Section 11.2: Purchaser's Default. If Purchaser defaults under this Agreement, or should any of its representations or warranties hereunder prove to be false, then notwithstanding any other terms or conditions of this Agreement, the Seller may demand the Deposit, together with Seller's out-of-pocket expenses incurred in connection with this Agreement and the transaction contemplated herein, as fully liquidated damages and in lieu of any other remedy, and upon

payment thereof, this Agreement shall be null and void and neither of the parties shall have any further liabilities to the other hereunder, or Seller may demand specific performance.

Section 11.3: Effect of Termination of Agreement Due to Inability to Remove Title Objections or Environmental Contamination. In the event that Purchaser elects to terminate this Agreement due to the inability of Seller to cure or satisfy any Title Objections within the Curative Period(s) described above, Purchaser shall receive a complete refund of the Deposit, after which, neither Seller nor Purchaser shall have any further rights, duties or obligations under this Agreement.

Section 11.4: Attorney's Fees. If Seller or Purchaser incurs any attorneys' fees or other litigation expenses in any action for enforcement of this Agreement, then the party prevailing in such enforcement action shall be entitled to reimbursement from the other for such costs.

ARTICLE 12: CONDITIONS PRECEDENT

Section 12.1: Conditions Precedent. Notwithstanding anything herein to the contrary, Purchaser's obligation to purchase the Property is conditioned upon fulfillment of each and every one of the following terms and conditions:

(a) Resubdivision Approval. If the resubdivision of the Parent Tract to create the Property is required by the ordinances and regulations of Jefferson Parish, Jefferson Parish shall have approved the subdivision of the Parent Tract in accordance with the Resubdivision Survey, and on or before the Closing, the Seller shall have delivered to the Purchaser, a original of the Resubdivision Survey duly executed by appropriate persons within Jefferson Parish Property in recordable form, together with signed ordinance of the Parish of Jefferson approving the same, dated not less than five (5) days prior to the Closing Date. "Resubdivision Approval" shall be deemed to occur when both of the foregoing conditions have been satisfied.

(b) Title Matters. All Title Objections described in Article 3 shall have been satisfied or removed.

ARTICLE 13: MISCELLANEOUS PROVISIONS

Section 13.1: Exhibits. Each exhibit referred to in this Agreement is attached to and incorporated by reference in this Agreement.

Section 13.2: Entire Agreement; Modification. This Agreement contains the sole and entire understanding between Seller and Purchaser with respect to the Property. All promises, inducements, offers, letters of intent, solicitations, agreements, commitments, representations and warranties made between such parties prior to this Agreement are merged into this Agreement. This Agreement shall not be modified or amended in any respect except by a written instrument executed by or on behalf of each of the parties to this Agreement.

Section 13.3: Assignment; Binding Effect. The Purchaser may assign its rights and delegate its duties under this Agreement at any time and from time to time, and the Purchaser shall be released from any obligations under this Agreement after the date of such assignment This Agreement shall be binding upon and inure to the benefit of the parties to this Agreement and their respective heirs, successors and assigns.

Section 13.4: Notices. Any notices, requests or other communications required or permitted to be given under this Agreement shall be in writing and shall be delivered by hand or courier (including Federal Express and other such services) or mailed by United States registered or certified mail, return receipt requested, postage prepaid and addressed to each party at its address as set forth below. Any such notice, request or other communication shall be considered given on the date of such hand or courier delivery or deposit in the United States mail, and shall

be considered received on the date of hand or courier delivery or on the third (3rd) day following deposit in the United States mail as provided above. Rejection or other refusal to accept or inability to deliver because of changed address of which no notice was given shall be deemed to be receipt of the notice, request or other communication. By giving at least five (5) days prior written notice, any party may from time to time and at any time change its mailing address under this Agreement.

Seller's Address:
Marsh Investment Corporation
3117 7th Street, 1st Floor
Metairie, Louisiana
Attn.: Joseph C. Marcello, Authorized Representative

with a copy to:

Stephen I. Dwyer
Dwyer & Cambre
33421 North Causeway Blvd., Suite 707
Metairie, LA 70002

Purchaser's Address:
A. J. Ward, Jr.
1400 Lapalco Boulevard, Building #2
Harvey, Louisiana 70056

with a copy to:

Richard Richter
Sher, Garner, Cahill, Richter,
Klein, McAlister & Hilbert
909 Poydras Street, 28th Floor
New Orleans, LA 70112-1033

Section 13.5: Counterparts. This Agreement may be executed in multiple counterparts, each of which shall constitute an original and all of which together shall constitute one and the same instrument.

Section 13.6: Rights Cumulative; Waiver. Except as expressly limited by the terms of this Agreement, all rights, powers and privileges conferred under this Agreement shall be cumulative and not restrictive of those given by law. Any condition or right of termination, cancellation or rescission granted by this Agreement to Purchaser may be waived by Purchaser, and any such waiver, in writing, may be relied upon or asserted by Seller.

Section 13.7: Date of Agreement. The later of the dates on which Seller and Purchaser executed this Agreement, as evidenced by the date below their respective executions, shall be the "Effective Date" of this Agreement for all purposes.

Section 13.8: Offer. This Agreement constitutes an offer by Seller open for acceptance by Purchaser until 5:00 p.m., on April 12, 2002, by which time an unaltered counterpart of this Agreement, duly executed by Seller, must have been actually received by Purchaser. If such written acceptance is not so received, then this Agreement, unless the period for acceptance is extended in writing by Purchaser, shall be deemed withdrawn.

IN WITNESS WHEREOF, the parties have executed and delivered this Agreement, to be effective the later of the dates of execution by Seller and Purchaser below.

OFFERED BY:

PURCHASER:

By: A. J. Ward, Jr.
Date of Execution:
April 12, 2002

ACCEPTED BY:

SELLER:

MARSH INVESTMENT CORPORATION

By: Joseph C. Marcello
Title: Authorized Representative
Date of Execution: April 10, 2002

G:\Marcello\6597\Marshpurchaseagreement.clean.040202.wpd

ACKNOWLEDGMENT

STATE OF LOUISIANA

PARISH OF Jefferson

BEFORE ME, the undersigned Notary Public, duly commissioned and qualified within and for the State and Parish aforesaid,

PERSONALLY CAME AND APPEARED, Joseph C. Marcello, a person of the full age of majority, who declared that he is the Authorized Representative of Marsh Investment Corporation (the "Company"), and that he signed and executed the above and foregoing instrument, by , for and on behalf of and in the name of the Company, as the free act and deed of the Company, for the purposes and considerations therein expressed.

Stephen L. Dwyer

NOTARY PUBLIC

My Commission Expires: AT DEATH

ACKNOWLEDGMENT

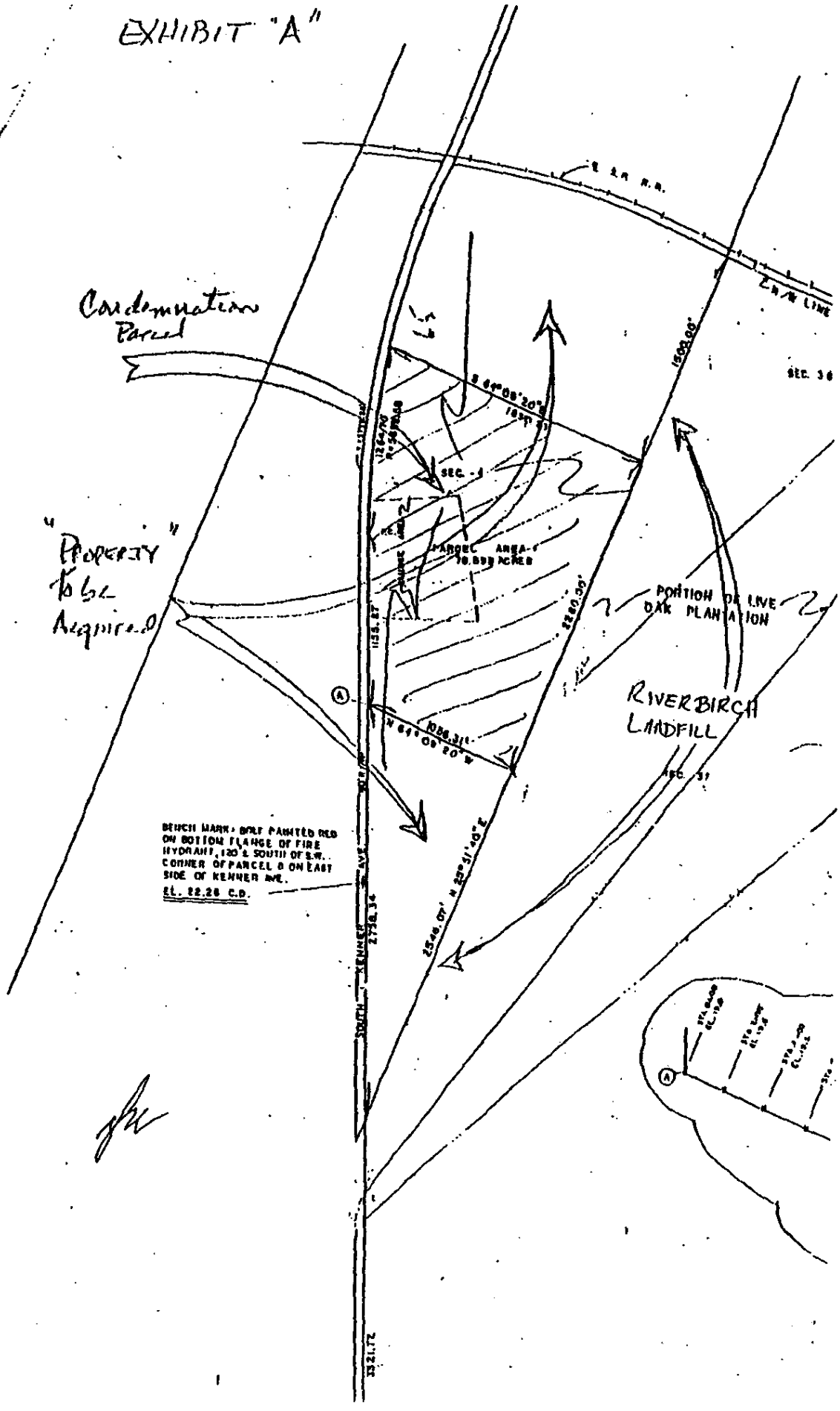
STATE OF LOUISIANA
PARISH OF Orleans

BEFORE ME, the undersigned Notary Public, duly commissioned and qualified within and for the State and Parish aforesaid,

PERSONALLY CAME AND APPEARED, A. J. Ward, Jr., a person of the full age of majority, who declared that he signed and executed the above and foregoing instrument as his free act and deed, for the purposes and considerations therein expressed.

Richard P. Whitten
NOTARY PUBLIC
My Commission Expires: at death
4/12/82

EXHIBIT "A"



Condemnation Parcel
"Property" to be Acquired
PARCEL AREA-1
PORTION OF LIVE OAK PLANTATION
RIVERBIRCH LANDFILL
SEC. 36
SEC. 37
1500.00'
2280.00'
1155.87
1086.31'
2548.07' N 25°51'40" E
2758.34
3321.72
BENCH MARK: BOLT PAINTED RED ON BOTTOM FLANGE OF FIRE HYDRANT, 120' ± SOUTH OF S.W. CORNER OF PARCEL 8 ON EAST SIDE OF KENNER AVE.
EL. 22.26 C.D.
SOUTH KENNER AVE

EXHIBIT "B"
CONDEMNATION PARCEL

A certain piece or portion of ground situated in the State of Louisiana, Parish of Jefferson, and being a portion of Section 4, Township 13 South, Range 22 East, and more fully described as follows:

Commence at a railroad rail marking the intersection of the northerly right of way line of U.S. Highway 90 and the line common to Sections 30 and 38, T13S, R22E. Measure thence N 86°37'20" W along the northerly right of way line of U.S. Highway 90 a distance of 544.71 feet to a point on the easterly right of way line of South Kenner Avenue a distance of 6,080.06 feet to the point of beginning. Thence from the point of beginning continue N 3°20'40" E along the easterly right of way line of South Kenner Avenue a distance of 1155.87 feet to a point; thence in a northerly direction, along the arc of a curve to the right having a radius of 5699.58 feet, along said right of way line, a distance of 1264.70 feet to a point; thence S 64°08'20" E a distance of 1050.23 feet to a point; thence S 25°51'40" W a distance of 2280.00 feet to a point; thence N 64°08'20" W a distance of 1056.31 feet to the point of beginning, said parcel containing 78.598 acres, more or less.

EXHIBIT
WCA

OIL, GAS AN... ...NERAL LEASE

THIS AGREEMENT, entered into effective as of March 14 2002

and between MARSH INVESTMENT CORPORATION, Represented herein by Joseph C. Marcello,

its Secretary, whose mailing address for the purposes herein shall be

3117 7th Street, Suite 100, Metairie, Louisiana 70002

...rein called "Lessor" (whether one or more) and MERLIN OIL AND GAS, INC.,

310 Lafayette Street, Houma, Louisiana 70360

...reinafter called "Lessee", witnesseth, that:

Lessor, in consideration of the sum of One Hundred Dollars and Other Valuable Consideration ($ 100.00 & OVC), ...reby lease and lets unto Lessee, the exclusive right to enter upon and use the land hereinafter described for the exploration for, and produc... of oil, gas, sulphur and all other minerals, together with the use of the surface of the land for all purposes incident to the exploration for and ...roduction, ownership, possession, storage and transportation of said minerals (either from said land or acreage pooled therewith), and the right ...dispose of salt water, with the right of ingress and egress to and from said lands at all times for such purposes, including the right to con...ruct, maintain and use roads, pipelines and/or canals thereon for operations hereunder or in connection with similar operations on adjoining ...nd, and including the right to remove from the land any property placed by Lessee thereon and to draw and remove casing from wells drilled ...y Lessee on said land; the land to which this lease applies and which is affected hereby being situated in St. Charles & Jefferson ...arish, Louisiana, and described as follows, to-wit:

EE EXHIBIT "A" FOR THE DESCRIPTION OF THE LANDS LEASED HEREIN

EE EXHIBIT "B" FOR ADDITIONAL PROVISIONS TO THIS LEASE

COPY

Lease Option

Any and all prior Oil, Gas and Mineral Lease(s) executed by and between "Lessor(s)" and "Lessee" shall, in all respects, be treated as novated, replaced and superseded by this Oil, Gas and Mineral Lease.

All land owned by the Lessor in the above mentioned Section or Sections or Surveys, all property acquired by prescription and all accretion ...r alluvion attaching to and forming a part of said land are included herein, whether properly or specifically described or not. Whether or not ...y reduction in rentals shall have previously been made, this lease, without further evidence thereof, shall immediately attach to and affect any ...d all rights, titles, and interests in the above described land, including reversionary mineral rights, hereafter acquired by or inuring to Lessor ...d Lessor's successors and assigns.

For the purpose of calculating the rental payments hereinafter provided for, the above described land is estimated to comprise 796.98 ...ses, whether it actually comprises more or less.

This lease shall be for a term of Three (3) years and Twelve (12) months from the date hereof (called ...primary term") and so long thereafter as oil, gas or some other mineral is being produced or drilling operations are conducted either on this ...nd or on acreage pooled therewith (or with any part thereof), all as hereinafter provided for; all subject to the following conditions and ...greements:

1. This lease shall terminate on March 14 2003 unless on or before ...id date the Lessee either (1) commences operations for the drilling of a well on the land, or on acreage pooled therewith (or with any part ...hereof), in search of oil, gas or other minerals and thereafter continues such operations and drilling to completion or abandonment; or (2) ...ays to the Lessor a rental of One Hundred Fifty Dollars and 00/100********** Dollars ($ 150.00) ...er acre for all or that part of the land which Lessee elects to continue to hold hereunder, which payment shall maintain Lessee's rights in effect ...to such land without drilling operations for one year from the date last above mentioned; and Lessee may continue to maintain the rights ...rented without drilling operations for successive twelve months' periods (during the primary term) by paying Lessor, on or before the begin...ing of such respective periods One Hundred Fifty Dollars and 00/100********** Dollars ($ 150.00) ...er acre for all or that part of the land held hereunder. Payments may be made to the Lessor or may be mailed or delivered for deposit to ...essor's credit in the Mail Direct to Lessor at the above listed address ...which Bank or its successor shall continue to be the depository for such rentals as the representative of Lessor and Lessor's successors and

assigns; and the death or incapacity of Lessor shall not terminate . . . Lessee's right to continue to deposit all payments in said bank or its successor. The mailing of the check or draft of Lessee or Lessee's successors to Lessor at the address set forth above or in the same bank on or before the rental paying date shall be considered as payment of rental and operate to maintain Lessee's rights in force and effect. Should said Bank fail or liquidate, or if it should for any reason fail or refuse to accept Lessee's check or draft, the attempted payment in the manner above provided shall not be thereby rendered ineffective and Lessee shall not be in default for failure to pay said rental until thirty (30) days after Lessor shall have furnished Lessee with a recordable instrument naming a new depository; and this provision shall apply to all such new and subsequently named depositories. Wherever used in this lease, "operations for drilling", "drilling operations" and "operations" shall be deemed to have been commenced when work is commenced or materials placed on the ground at or near the well site preparatory to the drilling of a well.

2. Lessee, at its option, is hereby given the right and power without any further approval from Lessor, at any time and from time to time, to pool or combine the land or mineral interest covered by this lease, or any portion thereof, with other land, lease or leases and mineral interests in the immediate vicinity thereof, when, in Lessee's judgment, it is necessary or advisable to do so in order to properly explore or develop or operate said premises so as to promote the conservation of oil, gas or other minerals in and under and that may be produced from said premises or to prevent waste or to avoid the drilling of unnecessary wells or to comply with the spacing or unitization order of any Regulatory Body of the State of Louisiana or the United States having jurisdiction. The term "Regulatory Body" shall include any governmental officer, tribunal or group (civil or military) issuing orders governing the drilling of wells or the production of minerals. Such pooling shall be of adjacent tracts which will form a reasonably compact (but not necessarily contiguous) body of land for each unit, and the unit or units so created shall not exceed substantially forty (40) acres each for each well for oil exploration or production and substantially one hundred sixty (160) acres each for each well for gas and gas-condensate exploration or production unless a larger spacing pattern or larger drilling or production units (including a field or pool unit) shall have been fixed and established by an order of a Regulatory Body of the State of Louisiana or of the United States, in which event the unit or units shall be the same as fixed by said order. Lessee shall execute and file for record in the Conveyance Records of the Parish in which the land herein leased is situated a declaration describing the pooled acreage; and upon such filing, the unit or units shall thereby become effective, except that when a unit is created by order of a Regulatory Body the pooling shall be effective as of the effective date of such order, and no declaration shall be required in connection therewith. The royalties herein elsewhere specified, and subject to the provisions of Paragraph 10 hereof, shall be computed only on the proportionate part of the production from any pooled unit that is allocated to the land herein described; and unless otherwise allocated by order of a Regulatory Body, the amount of production to be so allocated from each pooled unit shall be that proportion of such total production that the surface area of the land affected hereby and included in the unit bears to the total surface area of all the lands included in such pooled unit. Drilling or reworking operations on or production of oil, gas or other minerals from land included in such pooled unit shall have the effect of continuing this lease in force and effect during or after the primary term as to all of the land covered hereby (including any portion of said land not included in said unit) and as to all strata underlying said land, whether or not such operations be on or such production be from land covered hereby. Any unit formed by Lessee hereunder may be created either prior to or during or after the drilling of the well which is then or thereafter becomes the unit well. Separate units may be created for oil and for gas, or for separate stratum or strata of oil or gas, even though the areas thereof overlap, and the creation of a unit as to one mineral or strata or stratum shall not exhaust the right of Lessee (even as to the same well) to create different or additional units for other minerals or for other strata or stratum of the same or other minerals. The failure of the leasehold title (in whole or in part) to any tract or interest therein included in a pooled unit shall not affect the validity of said unit as to the tracts or interests not subject to such failure, but the unit may thereafter be revised as hereinafter provided. Lessee shall have the right and power to reduce and diminish the extent of any unit created under the terms of this paragraph so as to eliminate from said unit any interest or lease to which title has failed or upon which there is or may be an adverse claim. Such revision of the unit shall be evidenced by an instrument in writing executed by Lessee, which shall describe the lands included in the unit as revised and shall be filed for record in the Conveyance Records of the Parish where the lands herein leased are situated. The revised declaration shall not be retroactive but shall be effective as of the date that it is filed for record. Any unit created by Lessee hereunder shall also be revised so as to conform with an order of a Regulatory Body issued after said unit was originally established; such revision shall be effective as of the effective date of such order without further declaration by Lessee, but such revision shall be limited to the stratum or strata covered by said order and shall not otherwise affect the unit originally created.

3. Lessee, may, at any time prior to or after the discovery and production of minerals on the land, execute and deliver to Lessor or file for record a release or releases of any portion or portions of the lands or any stratum or strata and be relieved of all requirements hereof as to the land, stratum or strata so released; and, in the event of a release of all strata under a portion of the land during the primary term, the rental shall be reduced proportionately, according to acreage. In the event of the forfeiture of this lease for any cause, Lessee shall have the right to retain around each well then producing oil, gas or other minerals or being drilled or worked on the number of acres fixed and located by or in accordance with the spacing or unit or proration allowable order of any Regulatory Body of the State of Louisiana or of the United States under which said well is being drilled or produced, or if said well has been or is being drilled on a unit pooled by Lessee as provided herein, then Lessee may retain all of the acreage comprising said pooled unit and if no spacing or proration allowable order has been issued nor any pooled unit established, then Lessee shall have the right to retain forty (40) acres surrounding each oil well then producing or being drilled or worked on, and one hundred sixty (160) acres around each gas or gas condensate well then producing, or being drilled or worked on or shut in under Paragraph 6 hereof, each of such tracts to be in as near a square form as is practicable. Lessee shall have such rights of way or servitudes affecting the acreage released or forfeited as are necessary for Lessee's operations on the land retained hereunder.

4. Prior to the time that oil, gas or some other mineral is being produced from the leased land or land pooled therewith (or with any part thereof), Lessee may maintain the rights granted during and after the primary term by carrying on operations on said lands or land pooled therewith (or with any part thereof) without the lapse of more than ninety (90) days between abandonment of work on one well and the commencement of operations for drilling or reworking another; and during the primary term such operations may be discontinued and the rights granted maintained by commencing or resuming rental payments, by paying within ninety (90) days from the discontinuance of operations (regardless of the fixed rental paying date) the proportion of the fixed yearly rental that the number of days between the end of said ninety (90) days and the next ensuing rental paying date or the expiration of the primary term bears to the twelve months' period; but, if said ninety (90) days should expire prior to the initial rental paying date or during any year for which rental or other payment has been made, no rental shall be due until the next fixed rental paying date, or, as the case may be, for the balance of the last year of the primary term.

5. If, prior to or after the discovery of oil or gas on the lands held hereunder, a well producing oil or gas in paying quantities for 30 consecutive days should be brought in on adjacent lands not owned by Lessor and not included in a pooled unit containing all or a portion of the lands herein described, Lessee shall drill such offset well to protect the land held hereunder from drainage as and within the time that a reasonable and prudent operator would drill under the same or similar circumstances; it being provided, however, that Lessee shall not be required to drill any such offset well unless the well on adjacent land is within 330 feet of any line of the lands held hereunder, nor shall such offset well be necessary when said lands are being reasonably protected by a well on the leased premises or land pooled therewith (or with any part thereof).

6. After the production of oil, gas or any other mineral in paying quantities, either on the leased premises or on lands pooled therewith (or with any part thereof), the rights granted shall be maintained in effect during and after the primary term and without the payment of the rentals hereinabove provided for so long as oil, gas, or some other mineral is being produced in paying quantities. It is provided, however, that if, after the production of oil, gas or other minerals in paying quantities, the production thereof should cease from any cause, and Lessee is not then engaged in drilling or reworking operations, this lease shall terminate unless Lessee resumes or restores such production, or commences additional drilling, reworking or mining operations within ninety (90) days thereafter and continues such operations without the lapse of more than ninety (90) days between abandonment of work on one well and commencement of reworking operations or operations for the drilling of another, in an effort to restore production of oil, gas or other minerals, or (if during the primary term) commences or resumes the payment of rentals in the manner hereinabove provided for in connection with the abandonment of wells drilled. Lessee shall not be required to produce more than one mineral, the production of any one mineral in paying quantities and with reasonable diligence being sufficient to maintain all of Lessee's rights. In the event that any well on the land or on property pooled therewith (or with any part thereof), is capable of producing gas or gaseous substances in paying quantities but such minerals are not being produced, then Lessee's rights may be maintained, in the absence of production or drilling operations, by commencing or resuming rental payments as hereinabove provided for in connection with the abandonment of wells drilled. Should such conditions occur or exist at the end of or after the primary term, or within ninety (90) days prior to the expiration thereof, Lessee's rights may be extended beyond and after the primary term by the commencement, resumption or continuance of such payments at the rate and in the manner herein provided for rental payments during the primary term, and for the purpose of computing and making such payments the expiration date of the primary term and each anniversary date thereof shall be considered as a fixed rental paying date; provided, however, that in no event shall Lessee's rights be so extended by rental payments and without drilling operations or production of oil, gas or some other mineral for more than five consecutive years.

7. Subject to the provisions of Paragraphs 2 and 10 hereof the royalties to be paid by Lessee are: (a) on oil (which includes condensate and other liquid hydrocarbons when separated by lease separator units), one-eighth (1/8) of that produced and saved from the land and not used for fuel in conducting operations on the property (or on acreage pooled therewith or with any part thereof), or in treating such liquids to make them marketable; (b) on gas, one-eighth (1/8) of the market value at the well of the gas used by Lessee in operations not connected with the land leased or any pooled unit containing all or a part of said land; the royalty on gas sold by Lessee to be one-eighth (1/8) of the amount realized at the well from such sales; (c) one-eighth (1/8) of the market value at the mouth of the well of gas used by Lessee in manufacturing gasoline or other by-products, except that in computing such value, there shall be excluded all gas or components thereof used in lease or unit operations, or injected into subsurface strata as hereinafter provided; (d) One Dollar ($1.00) for each ton of 2240 pounds of sulphur, payable when marketed; and (e) one-eighth (1/8) of the market value at the well or mine of all other minerals produced and saved or mined and marketed. Oil royalties shall be delivered to Lessor free of expense at Lessor's option in tanks furnished by Lessor at the well or to Lessor's credit in any pipe line connected therewith. In the event Lessor does not furnish tanks for such royalty oil and no pipe line is connected with the well, Lessee may sell Lessor's such oil at the best market price obtainable and pay Lessor the price received f.o.b. the leased property, less any severance or production tax imposed thereon. Lessee shall have the right to inject gas, water, brine or other fluids into subsurface strata, and no royalties shall be due or computed on any gas or component thereof produced by Lessee and injected into subsurface stratum or strata through a well or wells located either on the land or on a pooled unit containing all or a part of the land.

8. The Lessee shall be responsible for all damages to timber and growing crops of Lessor caused by Lessee's operations.

9. All provisions hereof shall inure to the benefit of and bind the successors and assigns (in whole or in part) of Lessor and Lessee, (whether by sale, inheritance, assignment, sub-lease or otherwise), but regardless of any actual or constructive notice thereof, no change in the ownership of the land or any interest therein or change in the capacity or status of Lessor or any other owner of rights hereunder, whether resulting from sale or other transfer, inheritance, interdiction, emancipation, attainment of majority or otherwise, shall impose any additional burden on Lessee, or be binding on Lessee for making any payments hereunder unless, at least forty-five (45) days before any such payment is due, the record owner of this lease shall have been furnished with certified copy of recorded instrument or judgment evidencing such sale, transfer or inheritance, or with evidence of such change in status or capacity of Lessor or other party owning rights hereunder. The furnishing of such evidence shall not affect the validity of payments theretofore made in advance. A sublessee may, as to the Lessor, exercise the rights and dis-

charge the obligations of the Lessee, without joinder of any [illegible] in the event of an assignment of the lease as to a segregated [illegible] the land, delay rentals shall be apportioned among the several leasehold owners according to the surface area of each, and default in payment by one shall not affect the rights of others. Any owner of rights under this lease may pay the entire rental payable hereunder and such payment shall be for the benefit of those holding leasehold rights hereunder. If at any time two or more persons are entitled to participate in the rental payable hereunder, Lessee may pay or tender said rental jointly to such persons or to their joint credit in the depository named herein; or, at Lessee's election, the proportionate part of said rental to which each participant is entitled may be paid or tendered to him separately or to his separate credit in said depository and payment or tender to any participant of his portion of the rentals hereunder shall maintain this lease as to such participant.

10. Lessor hereby warrants and agrees to defend the title to said land and agrees that Lessee may, at its option, discharge any tax, mortgage or other lien upon the land and be subrogated thereto and have the right to apply to the repayment of Lessee any rentals and/or royalties accruing hereunder. If Lessor owns less than the entire undivided interest in all or any portion of the lands or mineral rights relating thereto (whether such interest is herein specified or not) rentals and royalties as to the land to which an interest is outstanding in others shall be reduced proportionately to the interest of the Lessor therein, but the failure of Lessee to reduce rentals shall not affect Lessee's rights to reduce royalties, and all outstanding royalty rights shall be deducted from the royalties herein provided for. Lessee shall have the right to purchase a lease or leases from others to protect its leasehold rights and shall not thereby be held to have disputed Lessor's title; and in the event Lessor's title or an interest therein is claimed by others, Lessee shall have the right to withhold payment of royalties or to deposit such royalties in the registry of the Court until final determination of Lessor's rights.

11. In the event the Lessor at any time considers that operations are not being conducted in compliance with this lease, Lessor shall notify Lessee in writing of the facts relied upon as constituting a breach hereof, and Lessee shall have sixty (60) days after receipt of such notice in which to commence any operations that are then legally necessary to comply with the requirements hereof. The service of said notice and the lapse of sixty (60) days without Lessee meeting or commencing to meet the alleged breaches shall be a condition precedent to any action by Lessor for any cause hereunder. It is provided, however, that after production of oil, gas, sulphur, or other mineral has been obtained from the land covered hereby or land pooled therewith (or with any part thereof), this lease shall not be subject to forfeiture or loss, either in whole or in part, for failure to comply with the express or implied obligations of this contract except after final judicial ascertainment of such failure and Lessee has been given a period of sixty (60) days after such final judicial ascertainment to prevent such loss or forfeiture by complying with and discharging the obligations as to which Lessee has been judicially determined to be in default.

12. If the land herein described is owned in divided or undivided portions by more than one party, this instrument may be signed in any number of counterparts, each of which shall be binding on the party or parties so signing regardless of whether all of the owners join in the granting of this lease; and the failure of any party named herein as Lessor to sign this lease shall not affect its validity as to those whose signatures appear hereon or on a counterpart hereof.

13. The requirements hereof shall be subject to any State and/or Federal law or order regulating operations on the land. It is further agreed that should Lessee be prevented from complying with any expressed or implied covenants of this lease, from conducting drilling or reworking operations thereon, or from producing oil, gas or other mineral therefrom by reason of scarcity or inability, after effort made in good faith, to obtain equipment or material or authority to use same, or by failure of carriers to transport or furnish facilities for transportation, or by operation of force majeure, any Federal or State law, or any order, rule or regulation of governmental authority, or other cause beyond Lessee's control, then while so prevented, Lessee's obligation to comply with such covenant shall be suspended and Lessee shall not be liable for damages for failure to comply therewith; and this lease shall be extended while and so long as Lessee is prevented by any such cause from conducting drilling or reworking operations on or from producing oil, gas or other mineral from the leased premises and the time while Lessee is so prevented shall not be counted against Lessee.

The consideration paid by Lessee to Lessor is accepted as full and adequate consideration for all rights, options and privileges herein granted.

IN WITNESS WHEREOF, this instrument is executed as of the date first above written.

WITNESSES:

MARSH INVESTMENT CORPORATION

COPY

JOSEPH C. MARCELLO-Secretary
Tax I. D. No.: 72-0701127

STATE OF _____ }
PARISH (OR COUNTY) OF _____ }

On this _____ day of _____, _____ before me personally appeared _____

to me known to be the person described in and who executed the foregoing instrument, and acknowledged that _____ executed the same as _____ free act and deed.

_____
Notary Public.

STATE OF _____ }
PARISH (OR COUNTY) OF _____ }

On this _____ day of _____, _____ before me personally appeared _____

to me known to be the person described in and who executed the foregoing instrument, and acknowledged that _____ executed the same as _____ free act and deed.

_____
Notary Public.

STATE OF LOUISIANA }
PARISH OF _____ }

BEFORE ME, the undersigned Notary Public, on this day personally appeared _____ who, being by me duly sworn, stated under oath that _____ was one of the subscribing witnesses to the foregoing instrument and that the same was signed by _____

_____

(Lessor, as above mentioned) in _____ presence and in the presence of the other subscribing witness(es).

_____

SWORN TO AND SUBSCRIBED before me _____, _____

_____
Notary Public in and for _____ Parish, Louisiana.

STATE OF LOUISIANA }
PARISH OF _____ }

BEFORE ME, the undersigned Notary Public, on this day personally appeared _____ who, being by me duly sworn, stated under oath that _____ was one of the subscribing witnesses to the foregoing instrument and that the same was signed by _____

_____

(Lessor, as above mentioned) in _____ presence and in the presence of the other subscribing witness(es).

_____

SWORN TO AND SUBSCRIBED before me _____, _____

_____
Notary Public in and for _____ Parish, Louisiana.

CORPORATION ACKNOWLEDGMENT

STATE OF LOUISIANA }
PARISH (OR COUNTY) OF Terrebonne }

ON THIS _____ day of _____, 2002 before me, appeared JOSEPH C. MARCELLO

to me personally known, who, being by me duly sworn, did say that he is the Secretary

of the Marsh Investment Corporation and that said instrument was signed in behalf of said corporation by

authority of its Board of Directors and said Joseph C. Marcello acknowledged said instrument to

be the free act and deed of said corporation.

_____
Notary Public.

No. _____

Oil, Gas and Mineral Lease
(LOUISIANA)

From _____

To _____

Dated _____

No. of Acres _____

_____ Parish, Louisiana

Term _____

This instrument was filed for record on the _____ day of _____, _____ at _____ o'clock _____ M., and duly recorded in Book _____, Page _____ of the records of this office.

_____, Deputy

By _____

Attached hereto and made a part hereof that certain Oil, Gas and Mineral Lease and Sub-Surface Servitude covering 796.98 acres, more or less, situated in St. Charles and Jefferson Parishes, dated March 14, 2002 by and between Marsh Investment Corporation, as "Lessor" and Merlin Oil and Gas, Inc., as "Lessee".

EXHIBIT "A"

Tract 1: All of that portion of Section 4, Township 13 South, Range 22 East, situated in St. Charles and Jefferson Parishes, situated between the Northern most Right-of-Way of Louisiana Highway 90 and the Union Pacific Railroad Northern most Right-of-Way, formerly known as the Texas and Pacific Railroad, LESS AND EXCEPT: That portion of Section 4, Township 13 South, Range 22 East, situated in St. Charles and Jefferson Parishes as described on that certain Act of Sale dated August 18, 1993 filed in Conveyance Book 2881, at Page 80, under Entry No.: 9354441 and that Act of Correction filed April 3, 1996 in Conveyance Book 2935, at Page 548, under Entry No.: 9617102 both of the Conveyance Records of Jefferson Parish, Louisiana and leaving in aggregate 328.31 acres, more or less.

Tract 2: That certain tract or parcel of land situated in Sections 12 and 65, Township 13 South, Range 22 East, Jefferson Parish, Louisiana and being more particularly described as follows, to-wit: Said tract being that part thereof what is known as the DeWeese Tract and designated by the Letter "A" on a plan of re-subdivision prepared by J. J. Krebs and Son, Surveyors, dated February 28, 1961 and approved by Ordinance No.: 5002 of the Jefferson Parish Council and according to said plan, said Lot "A" measures 250.00 feet front on the South side of U. S. Highway 90, measures 218.92 feet in width in the rear, by a depth on its side line along Willswood Plantation of 250.00 feet and by a depth on its opposite side line of 371.35 feet, containing 1.559 acres, more or less and being the same property as described on that certain Act of Sale dated December 28, 1992 filed in Conveyance Book 2835, at Page 193, under Entry No.: 9303035 of the Conveyance Records of Jefferson Parish, Louisiana.

Tract 3: That certain tract or parcel of land situated in Sections 12 and 65, Township 13 South, Range 22 East, Jefferson Parish, Louisiana and being more particularly described as follows, to-wit: Said tract or parcel of land being a part of the Herman G. DeWeese property, in Sections 12 and 65, Township 13 South, Range 22 East and which said tract of land according to a map prepared by S. K. Landry, Surveyor, dated January 9, 1973, comprises 48.461 acres, more or less and according to said map is more particularly described as follows, to-wit: Commencing at a point which lies South 53 degrees East, 296.17 feet from the division line between Sections 12 and 14, Township 13 South, Range 22 East, measured along the 40 Arpent Line, being the Point of Beginning; thence proceed North 30 degrees 01 minutes 05 seconds East a distance of 2,322.84 feet to the South Line of U. S. Highway No. 90; thence North 85 degrees 36 minutes 26 seconds West along the South Line of U. S. Highway No. 90 905.47 feet to a point; thence turn and proceed South 33 degrees 30 minutes West 371.61 feet and thence proceed North 56 degrees 30 minutes West 218.43 feet to the boundary line between the DeWeese Property and Willswood Plantation; then turn and proceed South 33 degrees 30 minutes West along said boundary line 1,424.36 feet to the 40 Arpent Line; thence turn and run in an Easterly direction along the line which runs North 53 degrees West a distance of 1,053.85 feet to the Point of Beginning and being the same property as described on that certain Act of Sale dated December 28, 1992 filed in Conveyance Book 2835, at Page 193, under Entry No.: 9303035 of the Conveyance Records of Jefferson Parish, Louisiana.

Tract 4: That certain tract or parcel of land situated in and being all of Section 39, Township 13 South, Range 22 East, Jefferson Parish, Louisiana; LESS AND EXCEPT: That portion of Section 39 as described on that certain agreement dated August 22, 1928, filed in Conveyance Book 95, at Page 379 of the Conveyance Records of Jefferson Parish, Louisiana; that certain tract or parcel of land containing 10.45 acres, more or less, as described on that certain Sale dated October 12, 1978 filed in Conveyance Book 942, at Page 389, under Entry No.: 848248 of the Conveyance Records of Jefferson Parish, Louisiana; that certain tract or parcel of land containing 5.00 acres, more or less, as described on that certain Sale dated November 14, 1979 filed in Conveyance Book 970, at Page 889, under Entry No.: 900858 of the Conveyance Records of Jefferson Parish, Louisiana; that certain tract or parcel of land containing 33.688 acres, more or less, as described on that certain Credit Sale dated January 12, 1983 filed in Conveyance Book 1041, at Page 3, under Entry No.: 8303967 of the Conveyance Records of Jefferson Parish, Louisiana And that certain tract or parcel of land containing 138.235 acres, more or less, as described on that certain Cash Sale of Property dated October 15, 1986 filed in Conveyance Book 1585, at Page 253, under Entry No.: 8653436 of the Conveyance Records of Jefferson Parish, Louisiana and leaving in aggregate 229.12 acres, more or less.

Tract 5: That certain tract or parcel of land situated and being all of Section 40, Township 13 South, Range 22 East, Jefferson Parish, Louisiana; LESS AND EXCEPT: That portion of Section 40 as described on that certain agreement dated August 22, 1928, filed in Conveyance Book 95, at Page 379 of the Conveyance Records of Jefferson Parish, Louisiana and leaving in aggregate 189.53 acres, more or less.

The above described tracts or parcels of land contain in aggregate 796.98 acres, more or less.

Attached hereto and made a part hereof that certain Oil, Gas and Mineral Lease and Sub-Surface Servitude covering 796.98 acres, more or less, situated in St. Charles and Jefferson Parishes, dated March 14, 2002, by and between Marsh Investment Corporation, as "Lessor" and Merlin Oil and Gas, Inc., as "Lessee".

EXHIBIT "B"

14. As a further material consideration for this lease, "Lessee" agrees that no drilling operations for the exploration of or in search of oil, gas or other minerals are to be conducted on the herein leased premises for a period of Twelve (12) months from the effective date of this lease.

15. Notwithstanding anything herein contained to the contrary, and in particular, anything contained in Paragraph 1 and 14 of this lease, "Lessee" shall have the right and privilege at any time between the effective date of this lease and twelve (12) months thereafter of pre-paying the first delay rental provided for in Paragraph 1 above, as to all or that part of the land which "Lessee" elects to hold hereunder. Should "Lessee" elect to prepay such delay rental, the prohibition against conducting drilling operations as provided in Paragraph 14 above shall no longer be applicable.

16. In the event a portion or portions of the lands herein leased are pooled or unitized with other land so as to form a pooled unit or units, operations on or production from such unit or units will maintain this lease in force only as to the land included in such unit or units in any manner provided for herein; provided, that if it be by rental payments, rentals shall be reduced in proportion to the number of acres covered hereby and included in such unit or units. If at or after the end of the primary term, this lease is being maintained as to part of said lands by operations on or production from a pooled unit or units embracing lands covered hereby and other lands, and if at such time there be land covered hereby which is not situated in such unit or units and as to which the lease is not being maintained by operations or production, Lessee shall have the right to maintain the lease as to such land by rental payments exactly as if it were during the primary term, provided that this lease may not be so maintained in force by rental payments more that Two (2) years beyond the end of the primary term.

17. Wherever the designation "One-Eighth (1/8)" appears herein, the designation "Twenty-two Percent (22.0%)" shall be substituted therefor.

18. This lease covers and includes all servitudes, rights of way, streets, alleys, roads, canals, bayous, lakes, streams, ditches, etc., public or private, traversing or adjoining the lands leased herein, whether specifically described herein or not.

19. Upon termination of this "Lease", cessation of operations or abandonment of any well drilled on the lands leased herein, the surface of the land appurtenant to said well shall be leveled and all excavations shall be back filled by "Lessee" and the surface of said lands shall be restored to as near their original condition as is reasonably possible.

SUB-SURFACE SERVITUDE

1. In addition to the Oil, Gas and Mineral Lease granted, the party or parties who have signed the instrument (who is (are) referred to as "Lessor" in the foregoing Oil, Gas and Mineral Lease and is (are) now referred to as "Grantor" (whether one or more) for the purpose of granting this Sub-Surface Servitude) hereby grants to Merlin Oil and Gas Inc., whose address is 310 Lafayette Street, Houma, LA 70360 (who is referred to as "Lessee" in the foregoing Oil, Gas and Mineral Lease and now referred to as "Grantee" for the purpose of this Sub-Surface Servitude) a Sub-Surface Right-of-Way, Servitude and Easement across the property leased in the foregoing Oil, Gas and Mineral Lease, for the purpose of drilling, operation, producing, reworking and maintaining a directional or sidetrack well or wells from a surface location situated off said property, to such bottomhole location as "Grantee" may deem appropriate.

   Notwithstanding anything herein contained to the contrary, this Sub-Surface Servitude shall for all purposes hereof, be considered as a separate and independent contract between each undersigned "Grantor", and "Grantee", covering and affecting the property hereinafter described beneath such "Grantor's" signature, with the effect as if each of said "Grantors" had executed a separate servitude thereon, on the same terms and provisions embodied herein. "Grantee" will indemnify and hold "Grantor" harmless from any and all damages to "Grantor's" property caused by the use of this Sub-Surface Servitude and will protect and hold "Grantor" harmless against any and all claims or demands, whether personal injury or otherwise, by third parties arising out of or resulting from "Grantee's" use of the Sub-Surface Servitude herein granted.

e. The rights granted in this Sub-Surface Servitude will remain in full force and effect for so long as "Grantee" may continue to use these rights, but in the event "Grantee" ceases to use the rights herein granted for one year, this Sub-Surface Servitude will terminate. It is specifically understood by the parties hereto, and it is their intention that the rights granted in the forgoing Oil, Gas and Mineral Lease and the rights granted in this Sub-Surface Servitude shall not survive the Oil, Gas and Mineral Lease, in the event said Oil, Gas and Mineral Lease should terminate.

Any and all prior Oil, Gas and Mineral Lease(s) executed by and between "Lessor(s)" and "Lessee" shall, in all respects, be treated as novated, replaced and superseded by this Oil, Gas and Mineral Lease.

SIGNED FOR IDENTIFICATION:

MARSH INVESTMENT CORPORATION

_____

JOSEPH C. MARCELLO-Secretary

AMENDMENT TO PURCHASE AGREEMENT

THIS AMENDMENT TO PURCHASE AGREEMENT (this "Amendment") is made as of the Effective Date, between Marsh Investment Corporation, a Louisiana corporation, appearing herein through Joseph C. Marcello, its duly authorized officer (hereinafter "Seller") and A. J. Ward, Jr., or his assigns ("Purchaser").

WITNESSETH

WHEREAS, on April 10, 2002 and on April 12, 2002, the Seller and the Purchaser, respectively, signed a Purchase Agreement providing for the sale, by Seller, and the purchase, by Purchaser of the property more fully described in Section 1.1 of said agreement (hereinafter the "Original Purchase Agreement"), upon terms and conditions, and for the considerations more fully set forth therein; and

WHEREAS, the Seller and the Purchaser desire to make certain amendments to the Original Purchase Agreement (such agreement, as amended hereby, is hereinafter sometimes referred to as the "Purchase Agreement").

NOW THEREFORE, IN CONSIDERATION of the premises, and for the same considerations set forth in the Original Purchase Agreements, the mutual obligations contained in this Amendment, and other good and valuable considerations, the receipt and sufficiency of which are acknowledged by each of the parties hereto, and for which acquittance is hereby give, the parties agree as follows:

1. Section 7.1 of the Original Purchase Agreement is amended by adding thereto subsections 7.1 (d) and (e) to read as follows:

(d) Seller hereby acknowledges: (i) that Purchaser has this date entered into a Purchase Agreement with Marco, Inc. to purchase a parcel of property owned by Marco, Inc. and located in the vicinity of the Property (such agreement is hereinafter the "Marco Purchase Agreement" and such property is hereinafter the "Marco Property") and other property owned by Seller, (ii) that Purchaser, through its affiliate, River Birch, Incorporated ("River Birch") operates a landfill on certain property owned by River Birch (hereinafter the "River Birch Property") which such property is also located in the vicinity of the Property and in the vicinity of other property owned by the Seller and/or by Marco, Inc. and (iii) that Purchaser, River Birch, or its or their affiliate(s) intends to construct and operate a landfill on the Property which is the subject of this Purchase Agreement and on the Marco Property. In cognizance of the foregoing, and for the same considerations set forth herein, and for the considerations to be received by Seller under the Marco Purchase Agreement, the Seller hereby waives the necessity of having or requiring the customary two hundred (200') foot buffer zone between the boundaries of the Property and/or the Marco Property and/or the River Birch Property and any other property which Seller owns, which such waiver shall be effective immediately upon the conveyance of the Property. When called upon to do so, the Seller agrees to execute, in recordable form, whatever agreements, documents or waivers as may be appropriate to more fully evidence and memorialize the foregoing agreement and waiver, and if applicable, Seller will cause Marco, Inc. to do likewise.

4-19-02 AJW for Seller

(e) Prior to the end of the Inspection Period, the Seller will obtain an amendment to the Oil, Gas and Mineral Lease entered into between Marsh Investment Corporation and Merlin Oil and Gas, Inc., dated March 14,

2002, adding a last paragraph to such lease which should substantially read as follows:

> "Merlin Oil and Gas, Inc. recognizes that Marsh Investment Corporation, or its transferee(s), intends to construct and operate a landfill on the property which is the subject of this Lease. Accordingly, and notwithstanding anything otherwise contained in this Oil, Gas and Mineral Lease and Exhibit "A" containing additional terms and provisions and notwithstanding that section in said Mineral Lease entitled 'Sub-Surface Servitude', Marsh Investment Corporation and Merlin Oil and Gas, Inc. now agree as follows:
>
> a. Merlin Oil and Gas, Inc., hereby agrees that it will have no surface rights whatsoever with respect to the property which is the subject of this Lease;
>
> b. Merlin Oil and Gas, Inc., and Marsh Investment Corporation agree that the subsurface Right-of-Way Servitude and Easement referred to herein shall only be effective from a depth of one thousand (1,000') feet underneath the surface of the property which is the subject of this Lease and below said one (1,000') feet depth; and
>
> c. No seismic or other testing will be permitted in, on, beneath or otherwise with respect to the property which is the subject of this Lease."

Seller shall also cause similar language to be incorporated into an Amendment to the Notice of Oil, Gas and Mineral Lease which was previously executed between Marsh Investment Corporation and Merlin Oil and Gas, Inc., and to cause such Amended Notice to be recorded in conveyance offices of St. Charles and Jefferson Parishes prior to the end of the Inspection Period. Seller agrees that if Merlin Oil and Gas, Inc. assigned the subject Mineral Lease prior to the date of the execution of the Mineral Lease Amendment and the recordation date of the Amended Notice contemplated in this paragraph, Seller will cause the assignee of such lease or mineral rights to enter into the amendment and amended notice required herein prior to the end of the Inspection Period.

2. The Inspection Period is hereby extended from forty five (45) days to sixty (60) days. In furtherance, thereof, the first sentence of Section 8.1 of the Original Purchase Agreement is amended in pertinent part to provide as follows:

> "Seller hereby grants Purchaser, its agents, employees or representatives a period of sixty (60) days from the Effective Date .....which Purchaser deems necessary or advisable, it its sole discretion."

3. The second to last sentence of Section 3.1 of the Original Purchase Agreement is hereby amended to read as follows:

> "Further, that certain Oil, Gas and Mineral Lease between Seller and Merlin Oil Company attached as Exhibit "B" shall

be a Permitted Exception, but only if it is amended so that it will not interfere with the construction and operation of a landfill on the Property, which amendment must be acceptable in content and form to Purchaser."

4. Except as amended hereby, all of the terms and conditions of the Original Purchase Agreement shall remain unchanged and in full force and effect. Seller and Purchaser hereby agree that the Original Purchase Agreement will not be effective unless and until this Amendment is executed by both of the parties.

MISCELLANEOUS PROVISIONS

Notices. Any notices, requests or other communications required or permitted to be given under this Amendment shall be in writing and shall be delivered by hand or courier in the manned set forth in the Original Purchase Agreement.

Counterparts. This Amendment may be executed in multiple counterparts, each of which shall constitute an original and all of which together shall constitute one and the same instrument.

Date of Amendment. This Amendment and the Purchase Agreement shall be effective, for all purposes, on the later of the dates on which Seller and Purchaser have executed this Amendment, as evidenced by the date below their respective executions; and notwithstanding anything to the contrary in the Original Purchase Agreement such date shall be the "Effective Date" of this Amendment and the Purchase Agreement, regardless of the dates on which Seller and Purchaser signed the Original Purchase Agreement.

IN WITNESS WHEREOF, the parties have executed and delivered this Amendment as their free acts and deeds for the purposes set forth above.

PURCHASER:

By: A. J. Ward, Jr.
Date of Execution:
April 21, 2002

SELLER:

MARSH INVESTMENT CORPORATION

By: Joseph C. Marcello
Title: Authorized Representative
Date of Execution: April 19, 2002

ACKNOWLEDGMENT

STATE OF LOUISIANA

PARISH OF Jefferson

BEFORE ME, the undersigned Notary Public, duly commissioned and qualified within and for the State and Parish aforesaid,

PERSONALLY CAME AND APPEARED, Joseph C. Marcello, a person of the full age of majority, who declared that he is the Authorized Representative of Marsh Investment Corporation (the "Company"), and that on the date set forth above, he signed and executed the above and foregoing instrument, by, for and on behalf of and in the name of the Company, as the free act and deed of the Company, for the purposes and considerations therein expressed.

NOTARY PUBLIC

My Commission Expires: At Death

ACKNOWLEDGMENT

STATE OF LOUISIANA

PARISH OF ORLEANS

BEFORE ME, the undersigned Notary Public, duly commissioned and qualified within and for the State and Parish aforesaid,

PERSONALLY CAME AND APPEARED, A. J. Ward, Jr., a person of the full age of majority, who declared that he signed and executed the above and foregoing instrument on the date set forth above as his free act and deed, for the purposes and considerations therein expressed.

Ronald P. Austin

NOTARY PUBLIC
My Commission Expires: at death
4/21/02

SECOND AMENDMENT TO PURCHASE AGREEMENT

THIS SECOND AMENDMENT TO PURCHASE AGREEMENT (this "Second Amendment") made as of the Effective Date (as defined below), is between Marsh Investment Corporation, a Louisiana corporation, appearing herein through Joseph C. Marcello, its duly authorized officer (hereinafter "Seller") and A. J. Ward, Jr., or his assigns ("Purchaser").

WITNESSETH

WHEREAS, on April 10, 2002, and on April 12, 2002, the Seller and the Purchaser, respectively, signed a Purchase Agreement providing for the sale, by Seller, and the purchase, by Purchaser of the property more fully described in Section 1.1 of said agreement (hereinafter the "Original Purchase Agreement"), upon terms and conditions, and for the considerations more fully set forth therein; and

WHEREAS, on April 19, 2002, and on April 21, 2002, the Seller and the Purchaser, respectively, signed an Amendment to Purchase Agreement (the "First Amendment") (the Original Purchase Agreement and the First Amendment are collectively referred to herein as the "Purchase Agreement").

WHEREAS, the Seller and the Purchaser desire to make certain amendments to the Purchase Agreement (such agreement, as amended hereby, is hereinafter sometimes referred to as the "Purchase Agreement").

NOW THEREFORE, IN CONSIDERATION of the premises, and for the same considerations set forth in the Purchase Agreement, the mutual obligations contained in this Second Amendment, and other good and valuable considerations, the receipt and sufficiency of which are acknowledged by each of the parties hereto, and for which acquittance is hereby give, the parties agree as follows:

1. The Purchase Price is hereby amended to $[redacted] per acre. In furtherance thereof, the first sentence of Section 2.1 of the Purchase Agreement is amended in pertinent part to provide as follows:

   "The purchase price for the Property ("Purchase Price") shall be equal to $[redacted] per acre ...".

2. Purchaser and Seller hereby acknowledge and agree that all references to "Marco Purchase Agreement", "Marco, Inc.", and /or "Marco Property" in Section 7.1(d) or elsewhere in the Purchase Agreement are hereby deleted.

3. Notwithstanding anything to the contrary in the Purchase Agreement, the "Effective Date" of this Second Amendment and of the Purchase Agreement for all purposes shall be the later of the dates on which Seller and Purchaser have executed this Second Amendment, as evidenced by the date beneath their respective signatures below, and regardless of the dates on which Seller and Purchaser signed the Original Purchase Agreement or the First Amendment.

4. Except as amended hereby, all of the terms and conditions of the Purchase Agreement shall remain unchanged and in full force and effect.

MISCELLANEOUS PROVISIONS

Notices. Any notices, requests or other communications required or permitted to be given under this Second Amendment shall be in writing and shall be delivered by hand or courier in the manned set forth in the Purchase Agreement.

Counterparts. This Second Amendment may be executed in multiple counterparts, each of which shall constitute an original and all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed and delivered this Second Amendment as their free acts and deeds for the purposes set forth above.

PURCHASER:

A. J. Ward

By: A. J. Ward, Jr.
Date of Execution: June 21, 2002

SELLER:

MARSH INVESTMENT CORPORATION

Joseph C. Marcello

By: Joseph C. Marcello
Title: Authorized Representative
Date of Execution: June 21, 2002

ACKNOWLEDGMENT

STATE OF LOUISIANA

PARISH OF JEFFERSON

ON June 21, 2002, BEFORE ME, the undersigned Notary Public, duly commissioned and qualified within and for the State and Parish aforesaid,

PERSONALLY CAME AND APPEARED, Joseph C. Marcello, a person of the full age of majority, who declared that he is the Authorized Representative of Marsh Investment Corporation (the "Company"), and that on the date set forth above, he signed and executed the above and foregoing instrument, by, for and on behalf of and in the name of the Company, as the free act and deed of the Company, for the purposes and considerations therein expressed.

NOTARY PUBLIC
My Commission is for Life.

ACKNOWLEDGMENT

STATE OF LOUISIANA

PARISH OF JEFFERSON

ON June 21, 2002, BEFORE ME, the undersigned Notary Public, duly commissioned and qualified within and for the State and Parish aforesaid,

PERSONALLY CAME AND APPEARED, A. J. Ward, Jr., a person of the full age of majority, who declared that he signed and executed the above and foregoing instrument on the date set forth above as his free act and deed, for the purposes and considerations therein expressed.

NOTARY PUBLIC
My Commission is for Life.

Adrea D. Heebe
Heebe and Heebe (PLC)
P.O. Box 697
Harvey, LA 70059-0697
95-1501-LOP

05/26/1995-11695 01:33:33 PM JEFF PAR 382308 004 CLK 47.00

****

CREDIT SALE

BY

WILLIE D. BARNES WARD

TO

RIVER BIRCH INCORPORATED

UNITED STATES OF AMERICA

STATE OF LOUISIANA

PARISH OF JEFFERSON

****

BE IT KNOWN, that on this 20th day of March, 1995, before me, Adrea D. Heebe, a Notary Public, duly commissioned and qualified in and for the State and Parish aforesaid, and in the presence of the undersigned competent witnesses,

PERSONALLY CAME AND APPEARED

WILLIE D. BARNES WARD, (Willie Dee Barnes Ward), a person of the full age of majority and a resident of the Parish of Jefferson, State of Louisiana, whose social security number is 434-32-3294, who declared unto me, Notary, that she has been married but twice, first to Frederick J.R. Heebe, from whom she was divorced by Judgment dated October 19, 1973, Proceedings number 156-270 in the Twenty-Fourth Judicial District Court for the Parish of Jefferson, and second to Albert James Ward, Jr., with whom she is presently living and residing, but with whom she is separate in property per Marriage Contract dated December 12, 1973, recorded and registered in the Parish of Jefferson in COB 805, folio 273, and MOB 625 folio 871, in the Parish of Orleans in COB 803 folio 144 and MOB 2492 folio 639, and in the Parish of St. Tammany in COB 1172 folio 014 and MOB 1022 folio 409, a copy of which is made a part hereof by reference;

MAILING ADDRESS: #9 Colony Road, Gretna, Louisiana 70056

(hereinafter referred to as "Vendor", whether one or more)

who declares that Vendor does by these presents grant, bargain, sell, convey, transfer, assign, set over, abandon and deliver without warranty but with full substitution and subrogation in and to all the rights and actions of warranty which Vendor has or may have against all preceding owners and vendors unto:

RIVER BIRCH INCORPORATED, a Louisiana Corporation, domiciled in the Parish of Jefferson, State of Louisiana, bearing Tax I.D. Number 72-1217525 created by act before Adrea D. Heebe, Notary Public, dated September 24, 1991, filed and recorded in the Secretary of State's office in Charters Book 343; and recorded in the Clerk of Court's office for the Parish of Jefferson on October 11, 1991, in Charter Book 302 folio 171; represented herein by its duly authorized President, by virtue of a resolution adopted at a meeting of the Board of Directors dated March 20, 1995, a copy of which is attached hereto and made a part hereof;

MAILING ADDRESS: P.O. Box 697, Harvey, LA 70059-0697

(hereinafter referred to as "Purchaser", whether one or more)

here present, accepting, and purchasing for Purchaser, and Purchaser's successors, heirs and assigns, and acknowledging due delivery and possession thereof, all and singular the following described property (hereinafter the "Property"), to-wit:

THOSE CERTAIN PIECES OR PORTIONS OF GROUND, together with all the buildings and improvements thereon, and all the rights, ways, privileges,

servitudes, advantages and appurtenances thereunto belonging or in anywise appertaining, situated in the Parish of Jefferson, State of Louisiana, in that part thereof known as **Live Oak Plantation**, located and measuring all as per plan of resubdivision made by J.J. Krebs & Sons, Inc., C.E. & S., dated October 12, 1982, approved by the Jefferson Parish Council on November 17, 1982, under Ordinance No. 15340 and recorded in COB 1036 folio 824, and said portions of ground are more fully described as follows, to-wit:

PARCEL H-5: Commence at the intersection of the westerly right of way line of South Kenner Avenue and the southerly line of Parcel H-5 a point, the point of beginning. Measure thence from the point of beginning along said southerly line S 48 degrees 00 minutes 49 seconds W a distance of 650.56 feet to a point on the northerly line of Parcel H-5; thence along said northerly line N 41 degrees 06 minutes 40 seconds E a distance of 746.76 feet to a point on the westerly right of way line of South Kenner Avenue; thence along said westerly line S 3 degrees 20 minutes 40 seconds W a distance of 127.66 feet to a point on the southerly line of Parcel H-5 a point, the point of beginning, and said Parcel H-5 contains approximately 0.670 acres.

PARCEL H-4: Commence at the intersection of the easterly right of way line of South Kenner Avenue and the northerly line of Parcel H-4 a point, the point of beginning. Measure thence from the point of beginning along said northerly line N 41 degrees 06 minutes 40 seconds E a distance of 7082.55 feet to a point on the southerly line of R.R. R/W; thence along said southerly line S 63 degrees 27 minutes 24 seconds E a distance of 1023.74 feet to a point on the southerly line of Parcel H-4; thence along said southerly line S 48 degrees 00 minutes 49 seconds W a distance of 7508.63 feet to a point on the easterly right of way line of South Kenner Avenue; thence along said easterly line N 3 degrees 20 minutes 40 seconds E a distance of 144.41 feet to a point on the northerly line of Parcel H-4, the point of beginning, and said Parcel H-4 contains approximately 89.301 acres.

All in accordance with the above referenced plan of resubdivision by J.J. Krebs & Sons, Inc., C.E.&S., dated October 12, 1982, a copy of which is made a part hereof by reference.

Being the same property acquired by Willie D. Barnes Ward from The Tierco Group, Inc. by act before Kathryn L. Kendrick, Notary Public, on December 7, 1982, recorded in the Clerk of Court's office for the Parish of Jefferson, in COB 1037 folio 627.

This sale is made and accepted for and in consideration of the price and sum of **TWO HUNDRED THOUSAND AND NO/100 ($200,000.00) DOLLARS**, for which the said Purchaser has furnished the following described promissory note (the "Note"), to-wit:

One (1) certain promissory note in the principal amount of TWO HUNDRED THOUSAND AND NO/100 ($200,000.00) DOLLARS, made by River Birch Incorporated, payable to the order of Bearer at 9 Colony Road, Gretna, LA 70056, with said principal being due and payable March 20, 1997. In the event said outstanding principal is not paid on or before March 20, 1997, interest will accrue at the rate of ten (10%) percent per annum from the date of March 20, 1997 until paid.

No delay on the part of the Vendor in exercising any rights hereunder shall operate as a waiver of such rights.

The Note, after having been paraphed "Ne Varietur" by me, Notary, for identification herewith, was delivered to the Vendor, who hereby acknowledges the receipt thereof.

And now in order to secure the full and punctual payment of the Note, together with all interest, keeper's fees, costs, attorney's fees and premiums of insurance, a special first mortgage and vendor's lien and privilege are hereby granted and retained on the Property herein conveyed in favor of Vendor and/or any future holder or holders of the Note (the term "Vendor" shall include any future holder or holders of the Note).

In case the Note should be placed in the hands of an attorney-at-law after maturity to institute legal proceedings to recover the amount thereof, or any part thereof, in principal or interest, or to protect the interests of the Vendor, or in case the same should be placed in the hands of any attorney for collection, compromise or other action, the Purchaser hereby agrees to pay the fees of the attorney who may be employed for that purpose, which fees are hereby fixed at ten (10.0%) percent on the amount due or sued for, or claimed or sought to be protected, preserved or enforced.

For the purposes of executory process, Purchaser does by these presents confess judgment for the amount of the Note in principal, interest, attorney's fees, keeper's fees, insurance and all other costs and charges and does consent, agree and stipulate that in the event the Note or any interest thereon is not punctually paid at maturity or upon Purchaser's death, suspension, failure, liquidation or insolvency, or upon application for Purchaser's adjudication in bankruptcy, or upon the application by or against Purchaser for respite, assignment, composition, extension, reorganization, or receivership, or in the event the Property or any part or parcel thereof be seized in the execution of a writ of executory process, attachment, fieri facias or any other legal process, or if the Property or any substantial part or parcel thereof be condemned under power of eminent domain, and/or in the event of Purchaser's failure to comply with any obligation by Purchaser herein undertaken, anything contained herein to the contrary notwithstanding, it shall be lawful for, and Purchaser does hereby authorize Vendor, without making a demand for payment or putting Purchaser in default, such demand for payment and putting in default being hereby expressly waived, to cause all and singular the Property to be seized and sold under executory process or any other legal process at the option of Vendor. Purchaser hereby expressly waives the benefit of any and all laws or parts of laws relative to the appraisement of the Property seized and sold under executory or other legal process, and consents to the sale of the Property without appraisement to the highest bidder for cash or on such terms as the plaintiff in such proceedings may direct and further waives all pleas of division or discussion with respect to any indebtedness or obligations secured hereby.

And the Purchaser further agrees that in the event any proceedings are taken under this mortgage by way of executory process of otherwise, any and all declarations of the facts made by authentic act before a notary public and in the presence of two witnesses by a person declaring that such facts lie within his knowledge shall constitute authentic evidence of such facts for the purpose of executory process.

And here the Purchaser agrees that the Property is to remain so specially mortgaged, affected, and hypothecated unto and in favor of the Vendor until the full and final payment of the Note, the Purchaser being hereby obligated not to sell, alienate, deteriorate or otherwise encumber any of the Property to the prejudice of this act nor to permit or suffer the same to be sold, alienated, encumbered or deteriorated to the prejudice of this act.

The Purchaser further binds himself to comply with all laws, ordinance and regulations of all legally-constituted authorities respecting the Property or the use thereof and to keep said premises, with all improvements, in good repair, working order, and condition and from time to time make or cause to be made all needful and proper replacements, repairs, renewals, and improvements, so that the efficiency and value of the Property shall not at any time be impaired. Purchaser further binds and obligates himself not to structurally alter, demolish or remove, or cause or permit to be structurally altered, demolished or removed, any building or buildings erected or to be erected upon the Property, without the prior written consent of the Vendor.

The Vendor declares all taxes due and exigible on the Property herein sold have been paid up to and including the year 1994. Taxes for the current year have been prorated as of this date. The Purchaser hereby agrees to pay the 1995 taxes and all subsequent taxes as they become due and payable. In the event the taxes are unpaid as of the 1st day of February of each year, the Purchaser hereby authorizes the Vendor to cause said taxes to be paid at the cost of Purchaser, and the reimbursement of all sums paid for that purpose plus interest at the rate of ten (10%) per annum shall be secured by the privilege and mortgage aforesaid.

The Purchaser hereby waives and relinquishes any and all homestead rights or exemptions which the Purchaser has under the laws of the State of Louisiana or the Constitution thereof.

The Vendor declares that there are no judgments, general or particular, of record or otherwise against the Vendor, which may affect the Property, and there are no liens, privileges, mortgages, pledges or other encumbrances of record or otherwise which may affect or burden the Property.

The Purchaser declares that there are no judgments, general or particular, of record or otherwise against the Purchaser, which may affect the Property, and there are no liens, privileges, mortgages, pledges or other encumbrances of record or otherwise which may affect or burden the Property.

The parties hereto waive production of mortgage and conveyance certificates and relieve and release me, Notary, harmless in connection therewith.

THUS DONE AND PASSED, in multiple original, in my office in Harvey, Louisiana, on the day, month, and year herein first above written, in the presence of the undersigned competent witnesses, who hereunto sign their names with the said appearers and me, Notary.

WITNESSES:

WILLIE DEE BARNES WARD, Vendor

RIVER BIRCH INCORPORATED

By:
ALBERT J. WARD, JR., President
Purchaser

ADREA D. HEEBE, Notary Public

ACT OF CASH SALE

BY: THE AMERICAN NATIONAL RED CROSS

TO: RIVER BIRCH INCORPORATED

UNITED STATES OF AMERICA

STATE OF LOUISIANA

PARISH OF ORLEANS

DISTRICT OF COLUMBIA

CITY OF WASHINGTON

04/22/1996-20659 03:57:25 PM JEFF PAR 432049 004 CLK 29.50

BE IT KNOWN, that on the dates set forth hereinbelow;

BEFORE US, the undersigned Notaries Public, duly commissioned and qualified, and in the presence of the undersigned witnesses:

PERSONALLY CAME AND APPEARED:

THE AMERICAN NATIONAL RED CROSS, (TIN: 53-0196605), a corporation organized under and by virtue of an Act of Congress of the United States of America, with its domicile in the City of Washington, District of Columbia, represented herein by John D. Campbell, its Vice President, Finance, by virtue of the authority conferred upon by the Board of Governors of The American National Red Cross, attached hereto and made a part hereof, whose mailing address is 17th & D Streets, N.W., Washington, D.C. 20006,

(hereinafter "**Seller**");

who declares that it does by these presents, grant, bargain, sell, convey, transfer, assign, set over, abandon and deliver, with all legal warranties, and with full substitution and subrogation in and to all the rights and actions of warranty which it has or may have against all preceding owners and vendors unto:

RIVER BIRCH INCORPORATED, (TIN: 72-1217525), a Louisiana corporation, domiciled in the Parish of Jefferson, State of Louisiana, created by act before Adrea D. Heebe, Notary Public, dated September 24, 1991, recorded in the Secretary of State's office in Charters Book 343; and recorded in the Clerk of Court's office for the Parish of Jefferson under Entry No. 91-45261, in Charter Book 302, folio 171, represented herein by Albert James Ward, Jr., its President, whose mailing address is #9 Colony Road, Gretna, Louisiana 70056,

(hereinafter "**Purchaser**");

here present, accepting and purchasing for itself, its successors and assigns, and acknowledging due delivery and possession thereof, the following described property, to-wit:

A CERTAIN PORTION OF GROUND, together with all the buildings and improvements thereon and all of the rights, ways, privileges, servitudes, appurtenances and advantages thereunto belonging or in anywise appertaining, being a part of the Live Oak Plantation in Jefferson Parish, Louisiana, TOWNSHIP 13 SOUTH, RANGE 22 EAST, Southeastern District of Louisiana, west of the Mississippi River. Said land is a part of Section 37 and is described by the letter "Y" on the map or plan of survey made by Corwin A. Robert, Surveyor, on the 12th day of August, 1946. According to said survey, said portion commences at the intersection of Sections 37 and 38 and 6 and 8 at the Forty Arpent Line, running at a constant bearing North 23 degrees 15 minutes west, a distance of 664 feet to a point marked "M", thence at a constant bearing South 48 degrees 40 minutes west, a distance of 7,913 feet to a point marked "D", thence at a constant bearing North 53 degrees 30 minutes east, a distance of 7,268 feet to the point of beginning (hereinafter the "Property").

Being the same property acquired by Seller in an act passed before Corinne Lee Wiener, Notary Public on December 27, 1971, recorded in the Parish of Jefferson, State of Louisiana on January 5, 1972, Entry No. 543929, COB 752, folio 110.

All as more fully shown on survey by Tilden J. Dufrene, Jr., Registered Professional Land Surveyor, Dufrene Surveying & Engineering, Inc. dated April 1, 1996, attached hereto and made a part hereof.

The parties hereto are aware that the Property is being sold subject to the following encumbrances:

1. Right of Way permit in favor of Louisiana Power & Light, dated September 11, 1929 and recorded at COB 105, folio 534.

2. Right of Way permit in favor of Louisiana Power & Light, dated October 1, 1932 and recorded at COB 115, folio 579.

3. Right of Way permit recorded at COB 335, folio 201.

4. Servitude in favor of Jefferson Parish, recorded at COB 635, folio 438.

5. Mineral Lease in favor of Davis Oil Company dated November 30, 1977, recorded at MLB 34, folio 204, and the assignment thereof from Davis Oil Company to others recorded at MLB 34, folio 246, to ENI in MLB 34, folio 600, and to American Petrofina at MLB 34, folio 614.

6. Waiver of Buffer Zone, passed before Larry Radosta, Sr., N.P., dated September 12, 1994 and recorded at COB 2902, folio 890 and MOB 3710, folio 429.

The parties hereto declare that by the execution of this act, they do not intend to interrupt or suspend the running of any prescription or peremption which has run or may run in connection with the foregoing encumbrances.

To have and to hold the above described Property unto the Purchaser, its successors and assigns forever.

This sale is made and accepted for and in consideration of the price and sum of ONE HUNDRED NINETY-FOUR THOUSAND TWO HUNDRED FIFTY and NO/100 DOLLARS ($194,250.00), of which Purchaser has well and truly paid to Seller, which hereby

acknowledges the sufficiency and receipt thereof and grants Purchaser full acquittance and discharge therefor.

Seller declares that the Property is exempt from ad valorem taxes and that there are no taxes due and exigible therefor.

The parties to this act are aware of the fact that the Mortgage and Conveyance Certificates which were obtained in connection with this sale remain open, and hereby relieve and release me, Notary, from all responsibility and liability in connection therewith.

THUS DONE AND PASSED, in my office at Washington, D.C. on the 18th day April 1996, in the presence of the two undersigned competent witnesses, who hereunto sign their names with The American National Red Cross and me, Notary, after due reading of the whole.

WITNESSES:

Donald E. Miller
Donald C. Miller

Loretha Gray
Loretha Gray

SELLER:

THE AMERICAN NATIONAL RED CROSS

By: John D Campbell
Name: John D.Campbell
Title: Vice President, Fiance/Comptroller

M. Bonnie Ramsey
NOTARY PUBLIC
My commission expires: February 14, 1999.

THUS DONE AND PASSED, in my office at New Orleans, Louisiana, on the 8th day of April 1996, in the presence of the two undersigned competent witnesses, who hereunto sign their names with River Birch Incorporated and me, Notary, after due reading of the whole.

WITNESSES:

PURCHASER:

RIVER BIRCH INCORPORATED

By: Albert James Ward Jr.
Name: Albert James Ward, Jr.
Title:

NOTARY PUBLIC
My commission is issued for life.

American Red Cross

National Headquarters
Washington, DC 20006

April 15, 1996

I hereby certify that the following is a true and correct copy of a resolution duly adopted by the Board of Governors of the American National Red Cross at its meeting held June 16, 1955, which resolution is still in full force and effect:

That the President, the Executive Vice President, or any Vice President of the Corporation is hereby authorized and empowered to sell, assign, and transfer any and all real property owned by the corporation or in which it has any interest and to execute and deliver any and all deeds and conveyances with or without covenants of warranty, mortgages, satisfactions, extensions, releases and instruments of partial release of mortgages, contracts for the sale or purchase of real property; leases, licenses, and all other instruments pertaining to real property owned or to be acquired by the corporation; and the Secretary or any Assistant Secretary is hereby authorized and empowered to attest under the seal of the corporation, if necessary, all such documents and instruments of title.

I further certify that the following persons have been duly appointed and are now exercising the functions and authorities of the offices of the American National Red Cross hereafter stated:

Gene Dyson, Acting President; Jennifer L. Dorn, Senior Vice President; William H. Reno, Senior Vice President; Sharon L. Ritter Smith, Senior Vice President; John D. Campbell, Vice President; Donald W. Jones, Vice President; Sue A. Richter, Vice President; James E. Thomas, III, Vice President; Susan Livingstone, Vice President.

Donald E. Miller
Assistant Secretary

Adrea D. Heebe
Heebe & Heebe (PLC)
P.O. Box 408
Gretna, LA 70054
H&H 92-1501-LOP

ACT OF SALE SUBJECT TO MORTGAGES **UNITED STATES OF AMERICA**

BY: MANOR HEIGHTS CO. INC. **STATE OF LOUISIANA**

TO: RIVER BIRCH INCORPORATED **PARISH OF JEFFERSON**

BE IT KNOWN, that on this 14th day of August, Nineteen Hundred Ninety-Two (1992),

BEFORE ME, ADREA D. HEEBE, Notary Public, duly commissioned and qualified in and for the Parish of Jefferson, State of Louisiana, and an attorney licensed to practice law in the State of Louisiana, and in the presence of the witnesses hereinafter named and undersigned,

PERSONALLY CAME AND APPEARED

> **MANOR HEIGHTS CO. INC.,** a Louisiana corporation, domiciled in the Parish of Jefferson, State of Louisiana, bearing tax I.D. number 72-0594345, created by act before George B. Richard, N.P., dated July 15, 1955, recorded in Charter Book 6 folio 556, represented herein by the undersigned, duly authorized per resolution dated August 4, 1980, adopted at a meeting of the Board of Directors; a copy of which is on file in the Office of the Clerk of Court for the Parish of Jefferson, COB 987 folio 96, and a copy of which is on file in the Office of Custodian of Notarial Archives for the Parish of Orleans under Notarial Archives for the Parish of Orleans under Notarial Archives No. 381818, which is made a part hereof by reference, hereinafter referred to as Vendor;
>
> **MAILING ADDRESS:** 701 Madison Street, Gretna, Louisiana 70053

who declared that it does by these presents, grant, bargain, sell, assign, convey, transfer and set over, with all legal warranties and a full guarantee against all troubles, debts, claims, mortgages, privileges, liens, taxes, donations, alienation, evictions and all encumbrances whatsoever, unto:

> **RIVER BIRCH INCORPORATED,** a Louisiana corporation, domiciled in the Parish of Jefferson, State of Louisiana, bearing Tax I.D. number 72-1217525, created by act before Adrea D. Heebe, N.P., dated September 24, 1991, filed and recorded with the Louisiana Secretary of State in the Records of Charters Book 343, and in the Parish of Jefferson under Entry number 91-45261, in Charter Book 302 folio 171, on October 11, 1991, represented herein by the undersigned duly authorized representative, hereinafter referred to as Purchaser;
>
> **MAILING ADDRESS:** 9 Colony Road, Gretna, Louisiana 70056

here present, accepting, and purchasing for its heirs and assigns, and acknowledging due delivery and possession thereof all of Vendor's right, title and interest in and to the following described property, to-wit:

> **THAT CERTAIN PIECE OR PORTION OF GROUND,** together with all the buildings and improvements thereon and all of the rights, ways, privileges, servitudes, appurtenances and advantages thereunto belonging or in anywise appertaining, situated in the State of Louisiana, Parish of Jefferson, Sections 4, 36, & 37, Township 13 S., Range 22 E., being a portion of **Live Oak Plantation** designated by the letter "W" on a survey by Corwin A. Robert, C.E. and Surveyor,

INSTR. #9240265

14AUG9209:41 W12 264852 REG3 $21.50NET

MINUTES OF A SPECIAL MEETING OF
THE BOARD OF DIRECTORS OF RIVER BIRCH INCORPORATED
HELD AT THE OFFICE OF THE CORPORATION ON AUGUST 13, 1992
AT WHICH A QUORUM WAS PRESENT PURSUANT TO NOTICES PREVIOUSLY GIVEN

The meeting was called to order by the President. Upon motion duly made, seconded and adopted, the following was adopted:

RESOLVED that Willie Dee Barnes Ward, President of this corporation, be and she is hereby authorized and empowered to appear before a Notary Public to execute on behalf of this corporation, as Vendee, such acts as are necessary to acquire the ownership of this Corporation in and to the following described portion of real property:

TRACT W, LIVE OAK PLANTATION
WAGGAMAN, LA 70094
JEFFERSON PARISH, LOUISIANA

Said property and any improvements located thereon shall be acquired for whatever price and consideration the aforesaid agent in her sole and exclusive discretion, shall deem proper.

The said agent is further authorized to sign any and all documentation necessary and proper to accomplish the foregoing and to include within such documentation such terms and provisions as the said agent should deem necessary and appropriate and which are not inconsistent with the terms set forth herein.

There being no further business, the meeting was adjourned.

CERTIFICATE

I, the undersigned Secretary of River Birch Incorporated hereby certify that the above and foregoing is a true and correct copy of a resolution adopted by the Board of Directors of said corporation on the 13th day of August, 1992, at a meeting called pursuant to proper notice, at which a quorum was present and voting and said resolution remains in full force and effect.

Gretna, Louisiana this 13th day of August, 1992.

Adrian B. Bynum
ADRIAN B. BYNUM, Secretary

ATTEST:

Willie Dee Barnes Ward
WILLIE DEE BARNES WARD, President

dated January 23, 1953, said property designated as **TRACT W,** more fully described as follows to-wit:

TRACT W: Commence at the intersection of the lower line of Live Oak Plantation and the westerly right of way line of La. Highway 18 (River Road). Measure thence N 18 degrees 29 minutes W along the westerly right of way line of La Highway 18 a distance of 1633 feet; thence N 31 degrees 05 minutes W along the westerly right of way line of La. Highway 18 a distance of 505.7 feet to a point on the easterly line of a parcel designated by the Letter "V", said point being indicated as "E", thence S 41 degrees 46 minutes W along said line a distance of 8542.5 feet to a point indicated as "D", said point being on the northerly line of a 199 foot railroad right of way; thence continue S 41 degrees 46 minutes W a distance of 205.5 feet to a point indicated as "L", said point being on the southerly right of way line of the 199 foot railroad right of way and further being the point of beginning. Thence from the point of beginning measure S 41 degrees 46 minutes W a distance of 7909 feet to a point indicated as "K", thence N 26 degrees 30 minutes E a distance of 7659 feet to a point indicated as "J", said point being on the southerly right of way line of the 199 foot railroad right of way line; thence S 62 degrees 42 minutes E along said southerly line of the 199 foot railroad right of way a distance of 2081.2 feet to a point indicated as "L", to the point of beginning. Said Tract W contains approximately 182.95 acres.

All located and measured in accordance with the aforesaid survey by Corwin A. Robert, C.E. and Surveyor, dated January 23, 1953, a copy of which is made a part hereof by reference.

Being a portion of the same property acquired by Manor Heights Co. Inc. by Act of Exchange with Sinclair and Ward Realty Company before William D. McArthur, N.P., dated December 5, 1972, registered in the Parish of Jefferson under Entry No. 582359 in COB 777 folio 636, and further acquired by Manor Heights Co. Inc. by purchase from Sinclair and Ward Realty Company, by act before William D. McArthur, N.P., dated December 5, 1972, registered in the Parish of Jefferson under Entry No. 582360, in COB 777 folio 638.

The aforesaid property is conveyed subject to all servitudes, restrictions, and mineral reservations which may be of record in Vendor's chain of title.

To have and to hold the said property and appurtenance unto the said purchaser, its successors and assigns, forever.

And the said Vendor binds itself and its heirs forever to warrant and defend the said property herein conveyed to the said Purchaser against all legal claims and demand whatsoever. The said Vendor moreover does hereby transfer unto the said Purchaser, all and singular, the rights and actions of warranty to which the said Vendor has or may be entitled, against any and all former owners and proprietors of the property herein conveyed, hereby subrogating said Purchaser to all the said rights and actions, to be by them enjoyed and exercised in the same manner as they might have been by the said Vendor.

This sale is made and accepted for and in consideration of the price and sum of ONE MILLION ONE HUNDRED THOUSAND AND NO/100 ($1,100,000.00) DOLLARS, which purchaser has paid by accepting said property subject to the following:

1) That Collateral Mortgage in the amount of $500,000.00, executed by Manor Heights Co. Inc. by act dated February 11, 1988, before Brian D. Zeringer, Notary Public, made

payable to the order of Bearer, due on demand at First National Bank of Commerce, 210 Baronne St., N.O., LA 70112; recorded in the Parish of Jefferson under MOB 2161 folio 118, under Entry No. 88-05718.

2) That Collateral Mortgage in the amount of $1,000,000.00, executed by Manor Heights Co, Inc. by act dated January 6, 1992, before R. Lewis McHenry, Notary Public, made payable to the order of Bearer, due on demand at First National Bank of Commerce, 210 Baronne St., N.O., LA 70112, recorded in the Parish of Jefferson under MOB 3115 folio 191, under Entry No. 92-00766.

The parties hereto waive procurement of certificates and relieve and release me, Notary, harmless in connection therewith.

Vendor hereby acknowledges receipt of all consideration for the transfer of the above described property to Purchaser and specifically releases and waives any rights he may have to a vendor's lien and privilege and any right he may have to rescind the transfer of the above property for failure of payment of the purchase price.

THUS DONE AND SIGNED in my office in the City of Gretna, Parish of Jefferson, on the day, month, and year first above written and in the presence of the undersigned competent witnesses of lawful age, who have signed their names with the said Appearers, and me, Notary, after due reading of the whole.

MANOR HEIGHTS CO. INC.

Lena Norton

BY: _____
A. J. WARD, JR., President

Pinky Faccio

RIVER BIRCH INCORPORATED

BY: _____
WILLIE DEE BARNES WARD, President

_____
ADREA D. HEEBE, Notary Public

09/07/1999-53655 01:11:29 PM JEFF PAR 622656 005 TSF 44.40
9953655 CB 3015 656

ACT OF CASH SALE

BY: MARGARET PHILLIP, WIFE OF/AND DEWAYNE J. HUNTER, ET AL

TO: RIVER BIRCH INCORPORATED

UNITED STATES OF AMERICA

STATE OF LOUISIANA

* * * * * * * * * * * * * * * * *

BE IT KNOWN, that on the following respective dates, and in the presence of the witnesses hereinafter undersigned,

BEFORE ME, CHARLES E. MCHALE, JR., a Notary Public, duly commissioned and qualified, in and for the City of New Orleans, and the Parish of Orleans, State of Louisiana,

PERSONALLY CAME AND APPEARED:

MARGARET PHILLIP, WIFE OF/AND DEWAYNE J. HUNTER, both persons of age and residents of the Parish of Jefferson, State of Louisiana, who declared under oath unto me, Notary, that the said Margaret Phillip Hunter has been married twice: first to Clinton A. Ordone, Jr., from whom she was divorced by judgment dated June 5, 1979 in proceedings No. 210-662 of the 24th Judicial District Court for the Parish of Jefferson, and secondly to Dewayne J. Hunter, with whom she is presently living and residing; and the said Dewayne J. Hunter has been married three times: first to Jo Womack, from whom he was divorced by judgment dated February 24, 1977 in proceedings No. 162-180 of the Court of Contra Costa County, California; secondly to Susanne Drent, from whom he was divorced by judgment dated March 6, 1981 in proceedings No. 80-35-242 of the 310th Judicial District Court, Harris County, Texas; and third to Margaret Phillip, with whom is presently living and residing; and whose respective Social Security Numbers are 438-62-4715 and 439-44-1865;

SANDRA MELERINE, WIFE OF/AND VICTOR S. PHILLIP, both persons of age and residents of Waggaman, Louisiana, who declared under oath unto me, Notary that they have each been married but once and then to each other and they are presently living and residing together, and whose respective Social Security Numbers are 436-76-5470 and 439-74-1969;

THERESA ANN PHILLIP, a person of age and resident of Waggaman, Louisiana, who declared under oath unto me, Notary, that she is single, having never been married in her lifetime; and her Social Security No. is 438-29-3760;

PAUL ANTHONY PHILLIP, a person of age and resident of Waggaman, Louisiana, who declared under oath unto me, Notary, that he is single, having never been married in his lifetime; and his Social Security No. is 438-29-3744; and

PAULINE PHILLIP, WIFE OF/AND JOSEPH LYNCH, both persons of age and residents of Luling, Louisiana, who declared under oath unto me, Notary that they have each been married but once and then to each other and they are presently living and residing together, and whose respective Social Security Numbers are 438-02-5922 and 433-90-1730;

who declared that they do, by these presents, grant, bargain, sell, convey, transfer, assign, set over, abandon and deliver, with all legal warranties and with full substitution and subrogation in and

to all the rights and actions of warranty which they have, or may have, against all preceding owners and vendors, unto:

RIVER BIRCH INCORPORATED, a Louisiana corporation domiciled in the Parish of Jefferson, bearing Tax ID No. 72-1217525, created by act before Adrea D. Hebee, Notary Public, dated September 24, 1991, filed and recorded in the Secretary of State's Office in Charters Book 343; and recorded in the Office of the Clerk of Court for the Parish of Jefferson on October 11, 1991 in Charter Book 302, folio 171; represented herein by its duly authorized agent, by virtue of a resolution adopted at a meeting of the Board of Directors dated June 22, 1999, a copy of which is attached hereto and made a part hereof, and whose mailing address is P.O. Box 1938, Gretna, LA 70054-1938;

here present, accepting and purchasing for and on behalf of said corporation, its successors and assigns, and acknowledging due delivery and possession thereof, all and singular, the following described property, to-wit:

THAT CERTAIN PIECE OR PORTION OF GROUND, located in Section 6, T13S, R22E, Southeastern Land District of the State of Louisiana, in the Parish of Jefferson, West of the Mississippi River, and designated as **PORTION OF LOT 10-A2 of LIVE OAK PLANTATION AND MODERN FARM SUBDIVISION UNIT 1,** and described more specifically as that portion of Lot 10-A2 lying South of the Texas & Pacific Railroad, as shown on the plan of resubdivision by Gerald Swanson, L.S., dated January 30, 1984, approved by the Jefferson Parish Council under Ordinance No. 16039 on May 23, 1984, and registered in the office of the Clerk of Court for the Parish of Jefferson under Entry No. 8425669 in COB 1076, folio 68, made a part hereof by reference, and more fully described as follows:

From the Southwest corner of the Texas & Pacific Railroad right-of-way, go S 48 degrees 45 minutes 49 seconds W a distance of 289.21 feet to a point; thence go S 23 degrees 15 minutes E a distance of 148.80 feet to a point; thence go N 50 degrees 12 minutes 56 seconds E a distance of 395.15 feet to a point; thence go N 62 degrees 47 minutes 33 seconds W a distance of 162.93 feet to a point, the point of beginning. Said property contains approximately 50,097 square feet. All as shown on the above referenced plan of resubdivision by Gerald Swanson, L.S., dated January 30, 1984, a copy of which is made a part hereof by reference.

Notwithstanding the foregoing, it is specifically acknowledged that it is the intent of the parties hereto that the property transferred and duly received is all of Lot 10-A2 South of the Texas & Pacific Railroad.

Being a part of the same property acquired by vendors from John T. Pender, Trustee, as per act before Marcus L. Giusti, Notary Public, dated June 4, 1992, Entry No. 9227499, COB 2706, folio 240.

Being the same property further acquired by Margaret Phillip, wife of/and Dewayne J. Hunter from Marie Phillip wife of/and Allen Hogh, as per act before Charles E. McHale, Jr., Notary Public, dated January 28, 1997, Entry No. 9705046, COB 2954, folio 694.

TO HAVE AND TO HOLD the above described property unto the said purchaser, its successors and assigns forever.

This sale is made and accepted for and in consideration of the price and sum of FOUR THOUSAND AND 00/100 ($4,000.00) DOLLARS, cash, which the said purchaser has well and truly paid, in ready and current money, to the said vendors, who hereby acknowledge the receipt thereof and grant full acquittance and discharge therefor.

All State and Parish taxes up to and including the taxes due and exigible in 1998 are paid as per declaration of the parties hereto. Taxes for 1999 are assumed by the vendors.

The parties hereby waive the production of the mortgage and conveyance certificates of the Clerk of Court for the Parish of Jefferson, and hereby relieve and release me, Notary, from any and all liability and responsibility in connection therewith.

THUS DONE AND SIGNED on this 7th day of September, 1999 in the presence of the undersigned competent witnesses, who hereunder sign their names with the said appearers and me, Notary, after due reading of the whole.

WITNESSES:

MARGARET PHILLIP HUNTER

DEWAYNE J. HUNTER

CHARLES E. MCHALE, JR., NOTARY PUBLIC

THUS DONE AND SIGNED on this 1st day of September, 1999 in the presence of the undersigned competent witnesses, who hereunder sign their names with the said appearers and me, Notary, after due reading of the whole.

WITNESSES:

SANDRA MELERINE PHILLIP

VICTOR S. PHILLIP

CHARLES E. MCHALE, JR., NOTARY PUBLIC

THUS DONE AND SIGNED on this 1st day of September, 1999 in the presence of the undersigned competent witnesses, who hereunder sign their names with the said appearer and me, Notary, after due reading of the whole.

WITNESSES:

THERESA ANN PHILLIP

CHARLES E. MCHALE, JR., NOTARY PUBLIC

THUS DONE AND SIGNED on this 31 day of August, 1999 in the presence of the undersigned competent witnesses, who hereunder sign their names with the said appearer and me, Notary, after due reading of the whole.

WITNESSES:

Paul Anthony Phillip
PAUL ANTHONY PHILLIP

Pauline Phillip Lynch

Joseph Lynch

CHARLES E. MCHALE, JR., NOTARY PUBLIC

THUS DONE AND SIGNED on this 31 day of August, 1999 in the presence of the undersigned competent witnesses, who hereunder sign their names with the said appearers and me, Notary, after due reading of the whole.

WITNESSES:

Pauline Phillip Lynch
PAULINE PHILLIP LYNCH

Joseph Lynch
JOSEPH LYNCH

Paul Anthony Phillip

CHARLES E. MCHALE, JR., NOTARY PUBLIC

THUS DONE AND SIGNED on this 7th day of September, 1999 in the presence of the undersigned competent witnesses, who hereunder sign their names with the said appearer and me, Notary, after due reading of the whole.

WITNESSES:

RIVER BIRCH, INCORPORATED

BY: Adrea D. Heebe
ADREA D. HEEBE, Secretary

CHARLES E. MCHALE, JR., NOTARY PUBLIC

10259664 CB 3084 540

10/01/2002-53664 02:26:24 PM JEFF PAR 803167 007 MAL 137.00

ACT OF CASH SALE	*	UNITED STATES OF AMERICA
BY	*	STATE OF LOUISIANA
MARSH INVESTMENT CORPORATION	*	PARISH OF ORLEANS
TO	*	
RIVER BIRCH INCORPORATED	*	

* * * * * * *

BE IT KNOWN, that on this 1st day of October, 2002;

BEFORE ME, the undersigned, a Notary Public, duly commissioned and qualified, in and for the Parish of and State aforesaid, and in the presence of the undersigned competent witnesses:

PERSONALLY CAME AND APPEARED:

MARSH INVESTMENT CORPORATION, a Louisiana corporation, whose mailing address is 3117 7th Street, Suite 100, Metairie, Louisiana 70002, and whose federal taxpayer identification number is 72-0701127, appearing herein by and through Stephen I. Dwyer, its authorized representative, duly authorized pursuant to a resolution of the Board of Directors of said corporation attached hereto (hereinafter sometimes referred to as "Seller"); and

RIVER BIRCH INCORPORATED, a Louisiana corporation, whose mailing address is 1400 Lapalco Boulevard, Building 2, Harvey, Louisiana 70058, and whose federal taxpayer identification number is 72-1217525, appearing herein by and through Albert J. Ward, Jr., its President, duly authorized pursuant to a resolution of the Board of Directors of said corporation attached hereto(hereinafter sometimes referred to as "Purchaser")

who declared as follows:

Seller does by these presents grant, bargain, sell, convey, transfer, assign, set over, abandon and deliver with all legal warranties, and with full substitution and subrogation in and to all the rights and actions of warranty which said Seller has or may have against all preceding owners and vendors, unto Purchaser, here present accepting, and purchasing for itself, its heirs, successors and assigns, and acknowledging due delivery and possession thereof, all and singular the immovable property located in the State of Louisiana, Parish of Jefferson, described on Exhibit "A" attached hereto and made a part hereof, together with all improvements, buildings, structures, other constructions, and attached fixtures located thereon, and including any and all rights, privileges, easements, servitudes, and appurtenances, if any, thereunto belonging (collectively, the "Property"), including all of Seller's remaining right, title and interest in and to that certain tract of property described on Exhibit "B" attached hereto and made a part hereof which was expropriated from Seller by the Parish of Jefferson, Louisiana pursuant to that opinion rendered by the Fourth Circuit Court of Appeal in that matter styled *Parish of Jefferson v. Marsh Investment Corporation,* bearing the citation 398 So.2d 27 (La. App. 4 Cir. 1981) filed on August 11, 1981, under Instrument No. 981145, in COB 1009, folio 619, of the records of Jefferson Parish, Louisiana (hereinafter referred to as the "Condemnation Parcel"), including particularly, but without limitation, to any right of Seller to retain and/or exercise a right of first refusal to reacquire the Condemnation Parcel upon the sale or transfer or intended sale or transfer of the same by the Parish pursuant to the provisions of La. Rev. Statutes 41:1338(A)(1), et seq, or pursuant to any other provisions of law (the Property and the Condemnation Parcel are collectively the "Entire Property"). Seller and Purchaser do hereby authorize the Clerk of Court for the Parish of Jefferson, State of Louisiana, to cross-index this Act of Cash Sale with the condemnation order recorded under Instrument No. 981145 in COB 1009, folio 619.

To have and to hold the above described Entire Property unto the said Purchaser, its heirs, successors and assigns forever.

This sale and transfer is made and accepted for and in consideration of the price and sum of ONE MILLION NINE HUNDRED SIXTY-ONE THOUSAND FOUR HUNDRED SEVENTY-FOUR and 85/100 ($1,961,474.85) Dollars Cash, all of which the said Purchaser has well and truly paid, in ready and current money to the said Seller who hereby acknowledges the receipt thereof and grants full acquittance and discharge therefor.

This sale and transfer of the Property is subject only to the matters of record shown on Exhibit "C" attached hereto and made a part hereof (the "Permitted Exceptions"). Purchaser and Seller acknowledge and agree that the inclusion of the Permitted Exceptions is for informational purposes only and shall not serve to (i) acknowledge, revive or reinscribe any of such Permitted Exceptions that may have prescribed under Louisiana law; (ii) interrupt or suspend the running of prescription as to any of the Permitted Exceptions; or (iii) renounce the benefits of prescription that may have accrued under Louisiana law with respect to any of the Permitted Exceptions.

The Seller further declares that there are no State, Parish or City taxes due or payable as of the date hereof on the Property. All ad valorem taxes payable on the Property shall be prorated by the Seller and the Purchaser.

In accordance with La. R.S. 9:2721(B), from and after the date of this Act of Cash Sale, (a) the name of the person responsible for all property taxes and assessments is River Birch Incorporated, and (b) all property tax and assessment notices should be mailed to the following address: 1400 Lapalco Boulevard, Building 2, Harvey, Louisiana 70058, Attention Albert J. Ward, Jr., President

The parties hereto waive the production of tax, mortgage, conveyance and other certificates and relieve and release the undersigned Notary from any and all responsibility and/or liability in connection therewith.

In so far as they bear upon and affect the Property, the Seller binds and obligates itself to have the inscriptions described on Exhibit "D" attached hereto and made a part hereof canceled and erased immediately by obtaining a complete cancellation of the same, and the parties hereto do accordingly agree to relieve and release the undersigned Notary Public from any and all responsibilities and/or liabilities in connection therewith.

The parties hereto agree and acknowledge that the undersigned Notary has not been required to examine title to the Entire Property conveyed herein, or render an opinion of title with respect thereto, and the Purchaser hereby relieves and releases the undersigned Notary from any and all responsibility and or liability in connection therewith.

This Act of Cash Sale may be executed in multiple counterparts, each of which shall be an original, and all of which shall together constitute one and the same instrument.

THUS DONE AND PASSED in multiple originals in my office on the day and date aforesaid, in the presence of the undersigned competent witnesses, who hereunto sign their names with the said appearer and me, Notary, after reading of the whole.

WITNESSES (as to all signatures):

SELLER:

MARSH INVESTMENT CORPORATION

By: _____
Name: Stephen I. Dwyer
Title: Authorized representative

PURCHASER:

RIVER BIRCH INCORPORATED

By: _____
Name: Albert J. Ward, Jr.
Title: President

_____
NOTARY PUBLIC

EXHIBIT "A"

A certain undesignated portion of ground containing 30.9962 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads (side), and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 3,313.95 feet to the POINT OF BEGINNING: thence continue North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 2,766.11 feet to a point; thence go South 63 degrees 58 minutes 35 seconds East a distance of 1,056.31 feet title 1,056.80 feet actual to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 2,555.25 feet to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 30.9962 acres.

AND

A certain undesignated portion of ground containing 64.6855 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads, and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 7,242.19 feet to a point of curvature; thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet, an arc length of 1,258.84 feet, a chord bearing of North 09 degrees 50 minutes 03 seconds East, and a chord distance of 1,256.28 feet to the POINT OF BEGINNING: thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet an arc length of 965.07 feet, a chord bearing of North 21 degrees 00 minutes 43 seconds East and a chord distance of 963.92 feet to a point of tangency; thence continue along the Easterly right of way line of South Kenner Avenue North 25 degrees 51 minutes 46 seconds East a distance of 388.10 feet to a point; thence go in an Easterly direction along the Southern Pacific, Texas and Pacific Railroad right of way on a curve to the right with a radius of 5,679.58 feet, and arc length of 1,419.69 feet, a chord bearing of South 70 degrees 29 minutes 18 seconds East and a chord distance of 1,416.00 feet to a point of tangency; thence go South 63 degrees 19 minutes 39 seconds East a distance of 526.90 feet to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 1,502.95 feet to a point; thence go North 63 degrees 58 minutes 35 seconds West a distance of 1,850.23 feet title 1,849.89 feet actual to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 64.6855 acres.

Being further described as that certain parcel of ground being the part of Section 4, Township 13 South, Range 22 East, Southeastern Land District, West of the Mississippi River, Jefferson Parish, Louisiana, acquired by MARSH INVESTMENT CORPORATION, pursuant to Credit Sale of Property with Mortgage by Highway Land Co., Inc., in Liquidation to Marsh Investment Corporation dated April 3, 1969, recorded as Entry No. 455066 in COB 695, folio 231, MOB 528, folio 99 on April 7, 1969; less and except that portion of Section 4 conveyed in Act of Credit Sale by Marsh Investment Corporation to Southern Recovery Management, Inc. dated August 18, 1993, recorded as Entry No. 93-54441 in COB 2881, folio 80 on October

1, 1993; as amended by Act of Correction to Act of Credit Sale dated March 6, 1996, recorded as Entry No. 96-17102 in COB 2935, folio 548 on April 3, 1996; and less and except that portion of Section 4 expropriated by Jefferson Parish in Parish of Jefferson versus Marsh Investment Corporation, #11639 Court of Appeal, Fourth Circuit, State of Louisiana, Appeal from the Twenty-Fourth Judicial District Court for the Parish of Jefferson, Proceeding #222-306, Division B, recorded as Entry No. 981145 in COB 1009, folio 619 on August 11, 1981.

EXHIBIT "C"

1. Right of Way Agreement by Marsh Investment Corporation to LGS Natural Gas Company dated June 25, 1984, recorded as Entry No. 84-33574 in COB 1079, folio 463 on July 11, 1984; as amended by Act of Amendment, Correction and Clarification to Redefine Right of Way Route dated June 21, 1985, recorded as Entry No. 8527507 in COB 1267, folio 277 on June 21, 1985.

2. Oil, Gas and Mineral Lease as evidenced by Notice of Oil, Gas and Mineral Lease by Marsh Investment Corporation to Merlin Oil and Gas, Inc. dated March 14, 2002, recorded as Entry No.10217432 in ML 137, folio 879 on March 21, 2002.

3. Waiver of Surface Rights dated April 18, 2002, by Merlin Oil and Gas, Inc. in favor of Marsh Investment Corporation recorded on August 21, 2002, under Instrument No. 10251061, in Mineral Lease Book 138, page 60.

EXTRACT OF THE MINUTES OF A MEETING
OF THE BOARD OF DIRECTORS OF
MARSH INVESTMENT CORPORATION

I, the undersigned secretary of MARSH INVESTMENT CORPORATION (hereinafter referred to as the "Corporation"), do hereby certify that I am the duly elected secretary of the Corporation and the keeper of the corporate records and minutes of the proceedings of the Board of Directors of said Corporation, and that on the 30 day of September, 2002, a meeting (or other action in lieu of a meeting) of the said Board of Directors was held in accordance with the law and the bylaws of the Corporation, at which meeting a quorum of the Board of Directors was present throughout, and at which meeting the following resolution was duly and lawfully adopted:

> **RESOLVED,** that the Corporation, bargain, sell, transfer, convey and deliver to River Birch Incorporated, or its assigns, all of its right, title and interest in the property more fully described on Exhibit "A" attached hereto and made a part hereof (the "Property"), and that, Stephen I. Dwyer, be and he is hereby authorized, empowered and directed to execute an act of cash sale for and on behalf of, and in the name of this Corporation, for such price or consideration and on such terms and conditions as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purpose of this resolution.

BE IT FURTHER RESOLVED, that Stephen I. Dwyer is authorized, empowered and directed to execute whatever other documents or instruments and to perform whatever other acts by, for, on behalf of, and in the name of this Corporation, as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purposes of the foregoing resolutions.

BE IT FURTHER RESOLVED, that any and all acts authorized pursuant to these resolutions and performed by said officer and/or his attorneys prior to the passage of these resolutions are hereby ratified and approved.

I further certify the above and foregoing to be a true and accurate copy of the resolutions adopted by the Corporation at a meeting (or other action in lieu of a meeting) held on the date set forth above, at which a quorum was present, and that said resolutions have not been rescinded, altered, modified, or changed and remain in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand as Secretary of the Corporation on this 30 day of September, 2002.

EXHIBIT "A"

A certain undesignated portion of ground containing 30.9962 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads (side), and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 3,313.95 feet to the POINT OF BEGINNING: thence continue North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 2,766.11 feet to a point; thence go South 63 degrees 58 minutes 35 seconds East a distance of 1,056.31 feet title 1,056.80 feet actual to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 2,555.25 feet to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 30.9962 acres.

AND

A certain undesignated portion of ground containing 64.6855 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads, and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 7,242.19 feet to a point of curvature; thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet, an arc length of 1,258.84 feet, a

of South 70 degrees 29 minutes 18 seconds East and a chord distance of 1,416.00 feet to a point of tangency; thence go South 63 degrees 19 minutes 39 seconds East a distance of 526.90 feet to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 1,502.95 feet to a point; thence go North 63 degrees 58 minutes 35 seconds West a distance of 1,850.23 feet title 1,849.89 feet actual to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 64.6855 acres.

Being further described as that certain parcel of ground being the part of Section 4, Township 13 South, Range 22 East, Southeastern Land District, West of the Mississippi River, Jefferson Parish, Louisiana, acquired by MARSH INVESTMENT CORPORATION, pursuant to Credit Sale of Property with Mortgage by Highway Land Co., Inc., in Liquidation to Marsh Investment Corporation dated April 3, 1969, recorded as Entry No. 455066 in COB 695, folio 231, MOB 528, folio 99 on April 7, 1969; less and except that portion of Section 4 conveyed in Act of Credit Sale by Marsh Investment Corporation to Southern Recovery Management, Inc. dated August 18, 1993, recorded as Entry No. 93-54441 in COB 2881, folio 80 on October 1, 1993; as amended by Act of Correction to Act of Credit Sale dated March 6, 1996, recorded as Entry No. 96-17102 in COB 2935, folio 548 on April 3, 1996; and less and except that portion of Section 4 expropriated by Jefferson Parish in Parish of Jefferson versus Marsh Investment Corporation, #11639 Court of Appeal, Fourth Circuit, State of Louisiana, Appeal from the Twenty-Fourth Judicial District Court for the Parish of Jefferson, Proceeding #222-306, Division B, recorded as Entry No. 981145 in COB 1009, folio 619 on August 11, 1981.

EXTRACT OF THE MINUTES OF A MEETING OF THE BOARD OF DIRECTORS OF RIVER BIRCH INCORPORATED

I, the undersigned secretary of **RIVER BIRCH INCORPORATED** (hereinafter referred to as the "Corporation"), do hereby certify that I am the duly elected secretary of the Corporation and the keeper of the corporate records and minutes of the proceedings of the Board of Directors of said Corporation, and that on the 1st day of October, 2002, a meeting (or other action in lieu of a meeting) of the said Board of Directors was held in accordance with the law and the bylaws of the Corporation, at which meeting a quorum of the Board of Directors was present throughout, and at which meeting the following resolution was duly and lawfully adopted:

RESOLVED, that the Corporation, purchase from Marsh Investment Corporation the property more fully described on Exhibit "A" attached hereto and made a part hereof (the "Property"), and that, Albert J. Ward, Jr., the President, be and he is hereby authorized, empowered and directed to execute an Act of Cash Sale for and on behalf of, and in the name of this Corporation, for cash or credit or both or either, for a purchase price of $1,961,474.85 or for such other price or consideration and on such terms and conditions as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purpose of this resolution.

BE IT RESOLVED, that in conformity with the terms and conditions of an Amended and Restated Credit Agreement dated July 10, 2002, between the Corporation and Hibernia National Bank, New Orleans, Louisiana, Albert J. Ward, Jr., the President of this Corporation, be and he is hereby authorized, empowered and directed to act for and on behalf of said Corporation and to execute for and on behalf of and in the name of said Corporation any and all documents and instruments necessary to borrow funds from Hibernia National Bank, New Orleans, Louisiana, upon such terms and in the amount of the purchase price of the Property or such other amounts that may be necessary and/or appropriate in connection with the purchase of the Property, in said representative's sole discretion, including, but not limited to executing by, for and on behalf of and in the name of said Corporation any promissory notes, bonds, securities, mortgages or leasehold mortgages, security agreements, deeds of trust and leasehold deeds of trust, guaranty agreements, indemnity agreements, pledges and/or other instruments or documents evidencing or securing such indebtedness and in such amounts and upon such terms as said representative, in his sole discretion, deems necessary and/or appropriate, and to encumber the property of said Corporation as security for the same, whether such property is immovable, movable or mixed, such instruments, mortgages, security agreements and/or other documents to contain, if applicable, waivers of appraisement, confessions of judgment, authorizations of expedited foreclosure procedures (including executory process in connection with any collateral property in Louisiana), and other waivers of procedural rights and defenses, all of which are expressly consented to by said Corporation and this Board of Directors.

BE IT FURTHER RESOLVED, that Albert J. Ward, Jr., the President of this Corporation, is authorized, empowered and directed to execute whatever other documents or instruments and to perform whatever other acts by, for, on behalf of, and in the name of this Corporation, as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purposes of the foregoing resolutions.

BE IT FURTHER RESOLVED, that any and all acts authorized pursuant to these resolutions and performed prior to the passage of these resolutions are hereby ratified and approved.

IN WITNESS WHEREOF, I have hereunto set my hand as Secretary of the Corporation on this 1st day of October 2002.

Adrea D. Heebe, Secretary

EXHIBIT "A"

A certain undesignated portion of ground containing 30.9962 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads (side), and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 3,313.95 feet to the POINT OF BEGINNING: thence continue North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 2,766.11 feet to a point; thence go South 63 degrees 58 minutes 35 seconds East a distance of 1,056.31 feet title 1,056.80 feet actual to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 2,555.25 feet to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and contains 30.9962 acres.

AND

A certain undesignated portion of ground containing 64.6855 acres located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East. Said undesignated portion of ground is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and is bounded to the South by U.S. Highway 90 (side), to the West by South Kenner Avenue, to the North by the Southern Pacific and Texas and Pacific Railroads, and to the East by Live Oak Plantation and is described as follows:

Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 7,242.19 feet to a point of curvature; thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet, an arc length of 1,258.84 feet, a

of South 70 degrees 29 minutes 18 seconds East and a chord distance of 1,416.00 feet to a point of tangency; thence go South 63 degrees 19 minutes 39 seconds East a distance of 526.90 feet to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 1,502.95 feet to a point; thence go North 63 degrees 58 minutes 35 seconds West a distance of 1,850.23 feet title 1,849.89 feet actual to the POINT OF BEGINNING.

All of which is shown on a survey by Dufrene Surveying & Engineering Inc. dated June 17, 2002 and *contains 64.6855 acres.*

Being further described as that certain parcel of ground being the part of Section 4, Township 13 South, Range 22 East, Southeastern Land District, West of the Mississippi River, Jefferson Parish, Louisiana, acquired by MARSH INVESTMENT CORPORATION, pursuant to Credit Sale of Property with Mortgage by Highway Land Co., Inc., in Liquidation to Marsh Investment Corporation dated April 3, 1969, recorded as Entry No. 455066 in COB 695, folio 231, MOB 528, folio 99 on April 7, 1969; less and except that portion of Section 4 conveyed in Act of Credit Sale by Marsh Investment Corporation to Southern Recovery Management, Inc. dated August 18, 1993, recorded as Entry No. 93-54441 in COB 2881, folio 80 on October 1, 1993; as amended by Act of Correction to Act of Credit Sale dated March 6, 1996, recorded as Entry No. 96-17102 in COB 2935, folio 548 on April 3, 1996; and less and except that portion of Section 4 expropriated by Jefferson Parish in Parish of Jefferson versus Marsh Investment Corporation, #11639 Court of Appeal, Fourth Circuit, State of Louisiana, Appeal from the Twenty-Fourth Judicial District Court for the Parish of Jefferson, Proceeding #222-306, Division B, recorded as Entry No. 981145 in COB 1009, folio 619 on August 11, 1981.

ACT OF CASH SALE AND EXCHANGE	*	UNITED STATES OF AMERICA
	*	
BETWEEN PARISH OF JEFFERSON	*	STATE OF LOUISIANA
AND	*	
HWY-90, L.L.C.	*	PARISH OF JEFFERSON
	*	

****

BEFORE the undersigned Notaries Public, duly qualified in and for the States as indicated below, and in the presence of the witnesses hereinafter named and undersigned, personally came and appeared:

> **PARISH OF JEFFERSON (TIN 72-6013920),** appearing herein through Aaron F. Broussard, Chairman of the Jefferson Parish Council, on authority of Ordinance No. 21731, adopted on the 11th day of December, 2002 after being duly advertised in accordance with law;

hereinafter referred to as **"VENDOR"**, who declared and said that for the price and consideration, and on the terms and conditions hereinafter expressed, **VENDOR** does by these presents, grant, bargain, sell, convey, transfer, assign, set over and deliver, unto:

> **HWY-90, L.L.C., (TIN 72-1508973),** a Louisiana limited liability company, represented herein by Albert J. Ward, Jr., Manager, pursuant to a Unanimous Consent of Members and Managers, a copy of which is attached hereto, whose mailing address is P. O. Box 697, Harvey, Louisiana 70059;

hereinafter referred to as **"VENDEE"**, here present accepting and purchasing for itself, its heirs, successors and assigns, and acknowledging delivery and possession thereof, the properties described on Exhibit "A" attached hereto and made a part hereof (the "Parish Property").

As consideration for and in consideration of the act of sale of the Parish Property, **VENDEE** does transfer grant, bargain, sell, convey, assign, set over and deliver to **VENDOR**, here present accepting and purchasing for itself, its heirs, successors and assigns, and acknowledging delivery and possession thereof the property more fully described on Exhibit "B" attached hereto and made a part hereof (the "Company Property; " the Parish Property and the Company Property are collectively, the "Property").

TO HAVE AND TO HOLD, the said described Property herein conveyed unto the said

any former owner of the Parish Property.

The **VENDEE** does hereby sell, convey, transfer, assign, set over, abandon and deliver, the above described Company Property, with warranty of title only (subject to the waivers below), but with full substitution and subrogation in and to all the rights and actions of warranty which they have or may have against all preceding owners and vendors, unto **VENDOR**. Notwithstanding the foregoing, Vendor does hereby acknowledges that the Company Property being conveyed to Vendor has not been legally subdivided and Vendor hereby waives any claim or cause of action against Vendee arising out of or related to the failure of the Company Property conveyed to Vendor to constitute a legal lot of record pursuant to the Jefferson Comprehensive Zoning Ordinance or any merchantability or marketability of title claims or causes of action related thereto.

This sale, transfer and conveyance is made "as is-where is" without any warranty, guaranty, or representations by Vendor or Vendee as to the condition of the Property conveyed. Each party hereby expressly disclaims and the other party hereby expressly waives any and all warranties whatsoever, either oral or written, expressed or implied, made by Seller or any other person or entity or implied by law with respect to the condition of the Property conveyed, with the warranties waived herein including, without limitation, any and all warranties as to zoning or restrictions affecting the Property conveyed, any and all warranties as to the condition of the property conveyed or any of its components or parts or contents or any buildings, improvements, fixtures, or equipment forming a part thereof, any and all warranties with respect to the fitness or suitability of the Property conveyed for either party's business or any other particular or general use or purpose, any and all warranties with respect to the existence of any asbestos and/or any other Hazardous Materials (as defined below) in, on or under the Property conveyed, any and all warranties that the Property conveyed complies with any laws, and any and all warranties under La. Civ. Code art. 2475, and La. Civ. Code arts. 2477 through 2548 or any other provision of law. Each party expressly acknowledges the foregoing and waives any and all right or cause of action that each party has or may have to rescind or resolve this transfer or to demand a reduction in purchase price based upon the existence of any redhibitory or other vices, defects, or other

the essence of this transaction and the same would not otherwise have been entered into or consummated without them.

The parties acknowledging and agreeing that the properties exchanged herein are of the same value, **VENDOR** and **VENDEE** hereby transfer the properties to each other and waive any additional compensation from either party.

AND NOW INTERVENES RIVER BIRCH INCORPORATED, (TIN #72-1217525), a Louisiana corporation, whose mailing address is P. O. Box 697, Harvey, LA 70059, represented herein by Albert J. Ward, Jr., its President, duly authorized pursuant to corporate resolution, a copy of which is attached hereto, appearing herein for the purpose of waiving its rights and relinquishing its reversionary rights and right of first refusal to the Parish Property that it acquired pursuant to that certain Act of Sale by and between Marsh Investment Corporation, as seller, and River Birch Incorporated, as buyer, dated October 1, 2002 and filed October 1, 2002 under Entry Number 10259664 at COB 3084, folio 540 of the conveyance records of Jefferson Parish, Louisiana.

Further, the parties waive conveyance and mortgage certificates and tax research hereto and the parties hereby relieve and release me, Notary, from any responsibility in the non-production thereof.

Each party, shall be responsible for all taxes on the Property that they are transferring to the other for the year 2003, as well any past due amounts.

In accordance with La. R.S. 9:2721(B), from and after the date of this Act of Cash Sale and Exchange, (a) the name of the person responsible for all property taxes and assessments on the Parish Property is Hwy-90, LLC on behalf of Vendee, and (b) all property tax and assessment notices for the Parish Property should be mailed to the following address: 1400 Lapalco Boulevard, Building #2, Harvey, Louisiana 70056, Attention: Anthony Licciardi on behalf of Vendee.

VENDOR and **VENDEE** agree that **VENDOR** and **VENDEE** shall each reserve all right, title and interest in and to all oil, gas and other minerals and into the respective parcels that they are transferring.

VENDOR and **VENDEE** further agree that they waive and relinquish any right to use the

and all existing environmental conditions (including the presence of Hazardous Materials, if any), and any and all pending enforcement actions by any governmental agency, if any. For purposes of this Act, "Hazardous Materials" means any substance or substances: (i) the presence of which requires investigation or remediation under any federal, state or local statue, regulation, ordinance, order, action, policy or law; or (ii) which is or becomes defined as a "hazardous waste," hazardous substance," pollutant or contaminant under any federal, state or local statute, regulation, rule or ordinance or amendments thereto including, without limitation, the Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. section 9601 et seq.) and/or the Resource Conservation and Recovery Act (42 U.S.C. section 6901 et seq.); and/or the Louisiana Environmental Quality Act (La. R.S. " 30:2001 et seq.); or (iii) which is toxic, explosive, corrosive, flammable, infectious, radioactive, carcinogenic, mutagenic, or otherwise hazardous and is or becomes regulated by any governmental authority, agency, department, commission, board, agency or instrumentality of the United States, the State of Louisiana or any political subdivision thereof.

The parties hereto take cognizance that no title examination on the herein described Property in connection with this act of sale has been made by the undersigned notaries public, and the parties do hereby relieve and release me, Notary, from any liability in connection with any title defects which might have been disclosed by such title examination.

[SIGNATURES TO FOLLOW ON NEXT PAGE]

THUS DONE AMD PASSED BEFORE ME, the undersigned, Notary Public, duly qualified in the Parish of Jefferson, State of Louisiana, on this the 22nd day of August, 2003, and in the presence of the undersigned competent witnesses of lawful age, domiciled in the Parish of Jefferson, who hereunto sign their names with the said parties and me, Notary, after due reading of the whole.

WITNESSES:

VENDOR,
PARISH OF JEFFERSON

Kim Freward

Joann B Cesso

BY:

AARON F. BROUSSARD,
CHAIRMAN, JEFFERSON PARISH COUNCIL

NOTARY PUBLIC

THUS DONE AND PASSED BEFORE ME, the undersigned, Notary Public, duly qualified in the Parish of Jefferson, State of Louisiana, on this the 8th day of August, 2003, and in the presence of the undersigned competent witnesses of lawful age, domiciled in the Parish of Jefferson, who hereunto sign their names with the said parties and me, Notary, after due reading of the whole.

WITNESSES:

Peggy Passegard

Donna Petrie

VENDEE
HWY-90, L.L.C.

BY: Albert J. Ward

Albert J. Ward, Jr., Manager

INTERVENOR
RIVER BIRCH INCORPORATED

BY: Albert J. Ward Jr.

Albert J. Ward, Jr., President

Adrea D'Aleo

NOTARY PUBLIC

EXHIBIT "A"

A CERTAIN PIECE OR PORTION OF GROUND, together with all improvements, buildings, structures, other constructions, and attached fixtures located thereon, and including any and all rights, privileges, easements, servitudes, and appurtenances, if any, thereunto belonging or anywise appertaining, located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East, located in an area bounded by U.S. Highway 90, South Kenner Avenue, the Southern Pacific and Texas and Pacific Railroads, and Live Oak Plantation, designated as Lot SK-2 and is described as follows:

> Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 6,080.06 feet to the **POINT OF BEGINNING**: thence continue North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 1,162.13 feet to a point of curve; thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet, an arc length of 1,258.84 feet, a chord of 1,256.28 feet bearing North 09 degrees 50 minutes 03 seconds East to a point; thence go South 63 degrees 58 minutes 35 seconds East a distance of 1,849.89 feet to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 2,280.00 feet to a point; thence go North 63 degrees 58 minutes 35 seconds West a distance of 1,056.80 feet to the POINT OF BEGINNING.

All of which is shown on Re-subdivision of a Portion of Section 4, Township 13 South, Range 22 East, Southeastern District of Louisiana, West of the Mississippi River, Waggaman into Lots SK-1, SK-2 and SK-3 by Dufrene Surveying & Engineering Inc. dated June 17, 2002, recorded under Instrument No. 10264641 in Map Book 127, Plan 229, and contains 78.5853 acres.

EXHIBIT "B"

A CERTAIN PIECE OR PORTION OF GROUND, together with all improvements, buildings, structures, other constructions and attached fixtures located thereon, and including any and all rights, privileges, easements, servitudes, and appurtenances, if any, thereunto belonging or anywise appertaining, situated in parts of Sections 8 and 39, Township 13 South, Range 22 East in the Parish of Jefferson, State of Louisiana, on the right bank of the Mississippi River above the City of New Orleans, and designated as Proposed Lot WP-3 on a survey by Landmark Surveying, Inc. prepared by Steven M. Runnebaum dated October 30, 2002, revised August 14, 2003 (to add the word "Proposed" Lots WP-1, WP-2 and WP-3), bearing Job No. 02-0157, Dwg No. EE-3496 more fully described as follows:

Commence at the intersection of the North right of way line of U.S. Highway 90 and the West right of way line of Live Oak Boulevard; thence along the North right of way line of U.S. Highway 90, N85°31'00"W, a distance of 10005.13' to a point; point being marked by a railroad rail found; thence N55°45'03"E, a distance of 625.00' to the Point of Beginning; thence continue N55°45'03"E, a distance of 7351.30' to a point; thence S62°22'15"E, a distance of 684.04' to a point; thence S55°45'03"W, a distance of 4696.52' to a point; thence N35°34'53"W, a distance of 171.34' to a point; thence N55°45'03"E, a distance of 2530.64' to a point; thence N22°14'34"W, a distance of 98.16' to a point; thence S55°45'03"W, a distance of 5105.37' to a point; thence N85°31'00"W, a distance of 537.00' to the Point of Beginning.

On joint motion of all Councilmen present, the following ordinance was offered:

SUMMARY NO. 20750 ORDINANCE NO. 21731

An ordinance authorizing the exchange of Lot SK-2, being a portion of Section 4, T13S, R24E, Waggaman, Jefferson Parish, for a portion of Willswood Plantation, being a portion of Sections 8 and 39, T13S, R22E, and to provide for related matters. (Council District No. 3).

WHEREAS, Jefferson Parish is the owner of Lot SK-2, Section 4, Township 13 South, Range 24 East, Southeastern Land District of Louisiana, West of the Mississippi River, situated in the Parish of Jefferson, created pursuant to a Plan of Re-subdivision depicted on a survey by Landmark Surveying, Inc. dated June 17, 2002, Jefferson Parish, measuring approximately 78.598 acres, and having acquired said property by judgment rendered in the expropriation proceeding entitled Parish of Jefferson vs. Marsh Investment Corporation, Proceeding No. 11639 of the Fourth Circuit Court of Appeal, State of Louisiana, an appeal from the Twenty-Fourth Judicial District Court for the Parish of Jefferson, Proceeding No. 222-306, which judgment was registered under Instrument Number 981145, and in COB 1009, Folio 619, of the records of Jefferson Parish, Louisiana; and

WHEREAS, Jefferson Parish is also the owner of certain property located in Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River, situated in the Parish of Jefferson, known as the "Jefferson Parish Landfill" (hereinafter referred to as "JP Landfill Property"); and

WHEREAS, HWY-90, LLC is the owner of property located in Sections 8 and 39, T 13 S, R 22 E, as more fully described and designated as parcel "WP-3" on a survey by Landmark Surveying, Inc., dated October 30, 2002, measuring 78.58 acres, situated in the Parish of Jefferson, State of Louisiana (such properties are hereinafter referred to collectively as the "HWY 90 Property"); and

WHEREAS, the HWY 90 Property abuts the JP Landfill Property; and

WHEREAS, Lot SK-2, owned by Jefferson Parish, does not abut the JP Landfill Property and is not currently being used by the Parish in connection with its landfill operations, and is no longer needed for a public purpose; and

WHEREAS, River Birch Corporation owns Lots SK-1 and SK-3, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River, which lots abut Parcel SK-2; and

WHEREAS, River Birch Corporation also owns the reversionary rights to acquire the Lot SK-2 if the same is no longer needed for public purposes; and

WHEREAS, Jefferson Parish desires to acquire a portion of HWY 90 Property which adjoins the JP Landfill Property in order to expand the capacity of the JP Landfill Property; and

WHEREAS, the Jefferson Parish Council has determined that Parcel SK-2 is no longer needed for public purposes and that the Parish would realize significant benefits by exchanging Parcel SK-2 for a portion of the HWY 90 Property adjoining the JP Landfill Property; and

WHEREAS, Wayne Sandoz, a certified real estate appraiser, has appraised said Lot SK-2 for the sum of $9,500.00 dollars per acre, or a total appraised value equal to the sum of $747,000.00; and

WHEREAS, Wayne Sandoz has appraised the HWY 90 Property for the sum of $10,000.00 dollars per acre, or a total appraised value equal to the sum of $786,000.00; and

WHEREAS, HWY-90, LLC desires to acquire Lot SK-2 by exchanging a portion of

Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River and any other property owned by River Birch Corporation.

THE JEFFERSON PARISH COUNCIL HEREBY ORDAINS:

SECTION 1. That the Jefferson Parish Council's hereby declares that Lot SK-2, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River, situated in the Parish of Jefferson, created pursuant to a Plan of Re-subdivision depicted on a survey by Landmark Surveying, Inc. dated June 17, 2002, Jefferson Parish, measuring approximately 78.598 acres, is no longer needed for public purposes.

SECTION 2. That the exchange of properties between Jefferson Parish and HWY-90, LLC, pursuant to which such exchange, HWY-90, LLC will acquire Lot SK-2 and Jefferson Parish will acquire a portion of the HWY 90 Property consisting of 78.58 acres, which property is designated as parcel "WP-3"more fully described on a survey by Landmark Surveying, Inc., dated October 30, 2002, having an appraised value greater than Lot SK-2, is hereby authorized.

SECTION 3. That in consideration for the exchange and as consideration to River Birch Corporation for its release of the reversionary right to acquire Lot SK-2, and River Birch Corporation and Highway 90, LLC agreeing to reduce the customary two hundred foot (200') buffer zone to one hundred feet (100') between any boundaries between any property owned by River Birch Corporation and/or Highway 90, LLC, and Parcel "WP-3" and any other property which is owned by Jefferson Parish the Parish of Jefferson hereby reduces the necessity of having or requiring the customary two hundred foot (200') buffer zone to one hundred feet (100') between the boundaries of any roadways and/or other property owned by the Parish of Jefferson common to (a) Lot SK-2 and other property owned by Hwy 90, L.L.C and (b) Lots SK-1 and SK-3, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River and any other property owned by River Birch Corporation which such waiver shall be effective immediately upon the exchange of properties authorized herein.

SECTION. 4. That the Council Chairman, or in his absence, the Vice Chairman, is hereby authorized to sign any and all documents required to carry out the provisions of this Ordinance.

The foregoing Ordinance having been submitted to a vote, the vote thereon was as follows:

YEAS: 5 NAYS: None ABSENT: (1) Muniz ABSTAIN:(1)Ward

This ordinance was declared to be adopted on the 11th day of December, 2002, and shall become effective as follows, if signed forthwith by the Parish President, ten (10) days after adoption, thereafter, upon signature by the Parish President or, if not signed by the Parish President, upon expiration of the time of the ordinances to be considered finally adopted without the signature of the Parish President, as provided in Section 2.07 of the Charter. If vetoed by the Parish President and subsequently approved by the Council it

Unanimous Written Consent of the Members and Managers of
HWY-90, LLC

The undersigned, constituting all of the members and managers of Hwy-90, LLC, (the Company), a limited liability company organized under the laws of the State of Louisiana, do hereby consent, pursuant to Section 1318 of the Louisiana Limited Liability Company Law (La. R.S. 12:1301 et seq.), to the adoption of the following resolutions, effective immediately:

WHEREAS, the Company owns certain immovable property located in Jefferson Parish, more fully described on Exhibit "A" attached hereto (the "Company Property");

WHEREAS, the Parish of Jefferson (the "Parish") owns certain immovable property located in Jefferson Parish, more fully described on Exhibit "B" attached hereto (the "Parish Property"); and

WHEREAS, the Parish and the Company desire to enter into an exchange of property wherein the Company would convey the Company Property to the Parish and in exchange the Parish would convey the Parish Property to the Company (this transaction is collectively, the "Exchange");

RESOLVED, that the Company consents to the Exchange and in furtherance thereof, Albert J. Ward, Jr., the Manager of this Company (the "Authorized Officer"), is hereby authorized, empowered and directed to execute any documents or instruments, for and on behalf of, this Company, within his sole discretion, to be necessary and advisable to fulfill the purpose of this resolution and to accomplish the Exchange.

BE IT FURTHER RESOLVED, that the Authorized Officer, acting on behalf of the Company, is authorized, empowered and directed to execute whatever other documents or instruments and to perform whatever other acts by, for, on behalf of, and in the name of this Company, as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purposes of the foregoing resolutions.

BE IT FURTHER RESOLVED, that any and all acts authorized pursuant to these resolutions and performed prior to the passage of these resolutions are hereby ratified and approved.

This Unanimous Written Consent may be executed in multiple counterparts each of which is considered an original and together comprise one and the same instrument.

EXHIBIT "A"

A CERTAIN PIECE OR PORTION OF GROUND, together with all improvements, buildings, structures, other constructions and attached fixtures located thereon, and including any and all rights, privileges, easements, servitudes, and appurtenances, if any, thereunto belonging or anywise appertaining, situated in parts of Sections 8 and 39, Township 13 South, Range 22 East in the Parish of Jefferson, State of Louisiana, on the right bank of the Mississippi River above the City of New Orleans, and designated as Proposed Lot WP-3 on a survey by Landmark Surveying, Inc. prepared by Steven M. Runnebaum dated October 30, 2002, revised August 14, 2003 (to add the word "Proposed" Lots WP-1, WP-2 and WP-3), bearing Job No. 02-0157, Dwg No. EE-3496 more fully described as follows:

Commence at the intersection of the North right of way line of U.S. Highway 90 and the West right of way line of Live Oak Boulevard; thence along the North right of way line of U.S. Highway 90, N85°31'00"W, a distance of 10005.13' to a point; point being marked by a railroad rail found; thence N55°45'03"E, a distance of 625.00' to the Point of Beginning; thence continue N55°45'03"E, a distance of 7351.30' to a point; thence S62°22'15"E, a distance of 684.04' to a point; thence S55°45'03"W, a distance of 4696.52' to a point; thence N35°34'53"W, a distance of 171.34' to a point; thence N55°45'03"E, a distance of 2530.64' to a point; thence N22°14'34"W, a distance of 98.16' to a point; thence S55°45'03"W, a distance of 5105.37' to a point; thence N85°31'00"W, a distance of 537.00' to the Point of Beginning.

EXHIBIT "B"

A CERTAIN PIECE OR PORTION OF GROUND located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East, located in an area bounded by U.S. Highway 90, South Kenner Avenue, the Southern Pacific and Texas and Pacific Railroads, and Live Oak Plantation, designated as **Lot SK-2** and is described as follows:

> Commence from where the Northerly right of way line of U.S. Highway 90 intersects the Easterly right of way line of South Kenner Avenue and go North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 6,080.06 feet to the **POINT OF BEGINNING**: thence continue North 03 degrees 30 minutes 25 seconds East along the Easterly right of way line of South Kenner Avenue a distance of 1,162.13 feet to a point of curve; thence continue in a Northerly direction along the Easterly right of way line of South Kenner Avenue on a curve to the right with a radius of 5,699.65 feet, an arc length of 1,258.84 feet, a chord of 1,256.28 feet bearing North 09 degrees 50 minutes 03 seconds East to a point; thence go South 63 degrees 58 minutes 35 seconds East a distance of 1,849.89 feet to a point on the Westerly line of Live Oak Plantation; thence go South 25 degrees 58 minutes 04 seconds West along the Westerly line of Live Oak Plantation a distance of 2,280.00 feet to a point; thence go North 63 degrees 58 minutes 35 seconds West a distance of 1,056.80 feet to the POINT OF BEGINNING.

All of which is shown on Re-subdivision of a Portion of Section 4, Township 13 South, Range 22 East, Southeastern District of Louisiana, West of the Mississippi River, Waggaman into Lots SK-1, SK-2 and SK-3 by Dufrene Surveying & Engineering Inc. dated June 17, 2002, recorded under Instrument No. 10264641 in Map Book 127, Plan 229, and contains 78.5853 acres.

EXTRACT OF THE MINUTES OF A MEETING OF THE BOARD OF DIRECTORS OF RIVER BIRCH INCORPORATED

I, the undersigned secretary of **RIVER BIRCH INCORPORATED** (hereinafter referred to as the "Corporation"), do hereby certify that I am the duly elected secretary of the Corporation and the keeper of the corporate records and minutes of the proceedings of the Board of Directors of said Corporation, and that on the 6th day of August 2003, a meeting (or other action in lieu of a meeting) of the said Board of Directors was held in accordance with the law and the bylaws of the Corporation, at which meeting a quorum of the Board of Directors was present throughout, and at which meeting the following resolution was duly and lawfully adopted:

> **RESOLVED,** that the Corporation, waive any and all reversionary rights that it possesses in, on or over Lot SK-2, which lot is located in the State of Louisiana, Southeastern Land District, West of the Mississippi River, Parish of Jefferson in Waggaman and being a part of Section 4, Township 13 South, Range 22 East and is bounded by U.S. Highway 90, South Kenner Avenue, the Southern Pacific and Texas and Pacific Railroads, and Live Oak Plantation, and that, Albert J. Ward, Jr., the President, be and he is hereby authorized, empowered and directed to intervene into an Act of Cash Sale and Exchange by and between the Parish of Jefferson and HWY-90, LLC for and on behalf of, and in the name of this Corporation on such terms and conditions as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purpose of this resolution and to otherwise waive such reversionary right.
>
> **BE IT FURTHER RESOLVED,** that Albert J. Ward, Jr., the President of this Corporation, is authorized, empowered and directed to execute whatever other documents or instruments and to perform whatever other acts by, for, on behalf of, and in the name of this Corporation, as he may deem, within his sole discretion, to be necessary and advisable to fulfill the purposes of the foregoing resolutions.
>
> **BE IT FURTHER RESOLVED,** that any and all acts authorized pursuant to these resolutions and performed prior to the passage of these resolutions are

ATTACHMENT 2

NOTIFICATION TO FAA

21140

NETWORK
ENVIRONMENTAL SERVICES
INCORPORATED

April 22, 2007

Project No. 21140

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Bob Hutchins
Federal Aviation Administration
ASW 623
2601 Meacham Blvd.
Fort Worth, Texas 76137-4298

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Roy Williams
Director of Aviation
New Orleans Aviation Board
P.O. Box 20007
New Orleans, LA 70141

Notification to FAA and Airport Operator Pursuant to LAC 33:VII.709A.2 and 40 CFR 258.10;
RiverBirch Landfill Application for Permit Renewal and Expansion;
Jefferson Parish, Louisiana

Dear Sirs:

Enclosed please find a copy of correspondence dated March 10, 2003 that was previously submitted to you by Mr. R. Charles Ellis of Breazeale, Sachse, and Wilson, L.L.P. A copy of a map referenced by the March 10, 2003 correspondence has also been attached.

At the request of the Louisiana Department of Environmental Quality (LDEQ), we are hereby providing a clarification to the above-referenced correspondence. Please be advised that the RiverBirch Landfill permit renewal application currently being reviewed by the LDEQ includes both the renewal of their existing solid waste landfill permit application as well as expansion of the landfill to include an additional 164 acre tract located immediately west of the existing landfill. While this clarification to the March 10, 2003 correspondence may have been unnecessary, we are providing it to ensure that applicable agencies remain properly informed regarding the activities of RiverBirch Landfill.

Should you have any questions or if we can provide additional clarification regarding this matter, please give us a call.

Sincerely,

Network Environmental Services

Rick Michaels

cc: Mr. Fred Heebe, RiverBirch, Inc.
cc: Mr. Vic Culpepper, RiverBirch, Inc.
cc: Mr. John King, Breazeale, Sachse and Wilson

2124 Fairfield Avenue
Shreveport, Louisiana 71104
(318) 221-1600

ORIGINAL NOTIFICATION FOR NEW ORLEANS INTERNATIONAL AIRPORT 1993

New Orleans International Airport

Sidney J. Barthelemy
Mayor
City of New Orleans

BOX 20007 · NEW ORLEANS, LOUISIANA 70141
(504) 464-2650 · FAX (504) 465-1264

Edward Levell, Jr.
Director of Aviation

October 28, 1993

Mr. Jay Smeltzer
Gulf Engineers and Consultants, Inc.
Post Office Box 84010
Baton Rouge, Louisiana 70884-4010

SUBJECT: Comments on Proposed Landfill
Westbank of Jefferson Parish

Dear Mr. Smeltzer:

We are in receipt of your letter dated September 29, 1993, regarding a proposal to construct a landfill on the Westbank of the Mississippi River, in Jefferson Parish. As I am sure you are aware, one of the most prevalent and persistent hazards to air operations at airports is the presence of birds. Birds congregating at airports cause numerous aircraft accidents each year, and are responsible for millions of dollars of damage to aircraft operating in and around airports. This problem is so pervasive that aircraft manufacturers are mandated to design aircraft to withstand the ingestion of small birds without damage, and airports are required to conduct routine patrols on their airfields to ensure that birds do not congregate.

One facility that attracts birds more than others is a landfill. Because of that, landfills are not allowed in the vicinity of airports. Several years ago, a landfill was located approximately three (3) miles southwest of the airport, and was operational during our worst bird congregation problem in memory. Upon review by the Louisiana Wildlife and Fisheries, it was determined that the landfill played a direct role in the bird problem we were experiencing at that time.

The New Orleans International Airport has had several near disasters due to aircraft ingesting birds. Two years ago, for instance, a fully loaded B-767 aircraft departed on Runway 01 when it ingested several birds into each engine. The aircraft initially lost power, and the pilot prepared to land in Lake Pontchartrain. Ultimately, one of the engines was stabilized enough to make an emergency landing at the airport. This near disaster was caused solely by the presence of birds in the vicinity of the airport.

New Orleans Aviation Board: *Joseph E. Berrigan, Jr., Chairman • D. Douglas Howard, Jr., Vice Chairman*
Douglas M. Evans • Joe Knecht • Jimmie Martinez • Joseph Maselli • Henry A. Smith, Jr. • Albert E. Stevenson • Betty Washington

The New Orleans Aviation Board has made great strides over the last several years to eliminate hazards and obstructions to air operations at the airport. We view this proposed landfill project as a potential detriment to safe aircraft operations, compounding a problem which has recently been improving. As such, we must state our objections to the proposed landfill project located on the Westbank of the Mississippi River in Jefferson Parish.

By copy of this letter, I am forwarding our comments to the Federal Aviation Administration, the Louisiana Department of Wildlife and Fisheries, and the Louisiana Department of Environmental Quality. Thank you for allowing us the opportunity to comment on this proposed action, and please do not hesitate to contact me if I can provide you with any additional information.

Sincerely,

Edward Levell, Jr.
Director of Aviation

ELJr/ddb

cc: Mr. Bradley Kutchins, FAA
Mr. Bill Mitchell, FAA
Mr. Dwight LeBlanc, LWF
Mr. Butch Steigel, LDEQ

U.S. Department of Transportation
Federal Aviation Administration

Southwest Region
Arkansas, Louisiana
New Mexico, Oklahoma,
Texas

Fort Worth, Texas 76193-0000

November 18, 1993

Mr. Kirby A. Larpenter
Gulf Engineers and Consultants, Inc.
P.O. Box 84010
Baton Rouge, LA 70884-4010

Dear Mr. Larpenter:

Thank you for providing the additional information we needed to complete our review of the proposed landfill location on the west bank of the Mississippi River in Jefferson Parish. Based on the information provided, the landfill would be located approximately 1,000 feet east of the centerline of New Orleans International/Moisant Airport Runway 1 and approximately 16,000 feet from the runway threshold. This proposed site is considered to be a potential hazard to aircraft operations.

Our review has determined that, by virtue of its location, the landfill site is in conflict with our criteria for landfills located near airports. The site would place the landfill within the traffic patterns for Category C aircraft. Category C aircraft require a minimum distance of 10,633 feet for traffic pattern approach and include aircraft that range from small business jet aircraft, such as Lear Jets, to B727's. In addition, Category B aircraft, which include some small twin engine aircraft, require a minimum of 6,073 feet for an approach pattern.

The landfill site is considered to be in conflict with Federal Aviation Administration Order 5200.5A, Paragraph 7(c). We, therefore, object to the location of this proposed landfill.

Sincerely,

William E. Mitchell
Airport Certification Safety Inspector

cc:
Mr. Edward Levell, Jr.
Director of Aviation
New Orleans International Airport
P.O. Box 20007
New Orleans, LA 70141

Division of Aviation
Department of Transportation and Development
P.O. Box 94245
Baton Rouge, LA 70804-9245

Mr. William Mollere
Administrator Solid Waste Division
Louisiana Department of Environmental
P.O. Box 82178
Baton Rouge, LA 70884-2178

Mr. Dwight LeBlanc
State Director
USDA/APHIS/Animal Damage Control
P.O. Box 589
Port Allen, LA 70767

NOTIFICATION TO FAA
FOR
WESTERN PORTION OF SITE
2003

BREAZEALE, SACHSE & WILSON, L.L.P.

GORDON A. PUGH
[illegible] E. TOUPS, JR.[1]
M. HEBERT, JR.[2]
R. MAYHALL, JR.[3]
[illegible]ALDE F. REYNAUD, JR.
[illegible]PHY J. FOSTER, III
[illegible]ID R. CASSIDY[4]
ROBERT T. BOWSHER[5]
CHRISTINE LIPSEY
DAVID R. KELLY
ROBERT L. ATKINSON
DAVID M. CHARLTON[6]
DOUGLAS K. WILLIAMS
STEPHEN F. CHICCARELLI
EMILE C. ROLFS, III
RICHARD D. LEIBOWITZ
MICHAEL R. HUBBELL
JOHN W. BARTON, JR.
JUDE C. BURSAVICH
JOSEPH E. FRIEND
PETER J. BUTLER, JR.

SPECIAL COUNSEL
PETER J. BUTLER
L. LINTON MORGAN

STEVEN B. LOEB
FRANK S. CRAIG, III[7]
TRENTON J. OUBRE
JERRY L. STOVALL, JR.[8]
LEO C. HAMILTON
LUIS A. LEITZELAR
JAMES R. ALSTIN
RICHARD G. PASSLER
JAMES L. WILLIAMS, IV
JEANNE C. COMEAUX
CULLEN J. DUPUY
JOSEPH P. TITONE
MICHAEL C. LUQUET
STEPHEN R. WHALEN[9]
DAVID C. VOSS
W. BRETT MASON[10]
R. CHARLES ELLIS[11]
SCOTT N. HENSGENS
MELISSA M. SHIRLEY
LANCE J. KINCHEN[12]
TARA L. FOTO

OF COUNSEL
VICTOR A. SACHSE, III

ATTORNEYS AT LAW
ONE AMERICAN PLACE, SUITE 2300
POST OFFICE BOX 3197
BATON ROUGE, LOUISIANA 70821-3197
(225) 387-4000
FAX (225) 381-8029

LL&E TOWER, SUITE 1500
909 POYDRAS STREET
NEW ORLEANS, LOUISIANA 70112-4004
(504) 619-1800
FAX (504) 584-5452

BANK ONE PLACE, SUITE 206
3500 HIGHWAY 190
MANDEVILLE, LOUISIANA 70471-3124
(985) 674-4020
FAX (985) 727-7255

Writer's Direct Dial No.
(225) 381-3164

Writer's E-Mail:
rce@bswllp.com

H. PAYNE BREAZEALE (1886-1990)
VICTOR A. SACHSE, JR. (1903-1979)
MAURICE J. WILSON (1919-1990)
HOPKINS P. BREAZEALE, JR. (1920-1979)

RALPH T. RABALAIS
A. TODD CARUSO
BEN B. HU
THOMAS R. TEMPLE, JR.
JOHN T. ANDRISHOK
JEFFREY C. VAUGHAN
YVONNE I. REED
MANVILLE F. BORNE
MICHAEL P. FRUGE[1]
PETER A. KOPFINGER
WENDI B. LOUP
JOHN M. MADISON, III[2]
VAN R. MAYHALL, III
LAUREN S. COENEN
BRENT P. FREDERICK
REBECCA J. BECKER
CADE A. EVANS
ANTHONY P. PALERMO
LERVETTE R. JONES
KAYE M. CABALLERO

[illegible] CERTIFIED ESTATE PLANNING AND ADMINISTRATION SPECIALIST
[illegible] CERTIFIED FAMILY LAW SPECIALIST
[illegible] LAWS IN TAXATION
[illegible] CERTIFIED TAX ATTORNEY
[illegible] ADMITTED IN TEXAS
[illegible] LAWS IN ADMIRALTY
[illegible] LAWS IN ENERGY AND ENVIRONMENTAL
[illegible] ADMITTED IN MISSISSIPPI

March 10, 2003

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED
Mr. Bob Hutchins
Federal Aviation Administration
ASW 623
2601 Meacham Blvd.
Fort Worth, Texas 76137-4298

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED
Mr. Roy Williams
Director of Aviation
New Orleans Aviation Board
P.O. Box 20007
New Orleans, LA 70141

RE: Application for Modification of Solid Waste Permit to Accommodate Expansion of River Birch Landfill; Notification to FAA and Airport Operator Pursuant to LAC 33:VII.709.A.2 and 40 CFR 258.10
BS&W File No.: 8471/33836

Dear Mr. Hutchins and Mr. Williams:

We are assisting River Birch, Inc. ("River Birch") in the preparation of an application for modification of its solid waste permit, to accommodate the expansion of River Birch's existing Type I and Type II solid waste landfill, located in Jefferson Parish, Louisiana. This letter serves as the notice to the Federal Aviation Administration (FAA) and the operator of the New Orleans International Airport (NOIA) required under LAC 33VII..709.A.2[1] Under this regulation, permit

[1]LAC 33VII..709.A.2 is Louisiana's corollary of 40 CFR 258.10. The federal regulation was promulgated by the United States Environmental Protection Agency (EPA) under the authority of the Solid Waste Disposal Act (SWDA), 42 USC 6901, *et seq.*. The State of Louisiana and, particularly, the Louisiana Department of Environmental Quality (LDEQ), has been delegated authority to implement Subtitle D of the SWDA in the State. Thus, permitting of municipal solid waste landfills in Louisiana is performed by the LDEQ.

applicants for a proposed Type II (residential and commercial waste) landfill, to be located within a five mile radius of any airport runway end, must notify the affected airport and the FAA of the application. Pursuant to LAC 33:VII.521.A.1.a., proof of the notification must be included within the permit application. Notification was previously given to the FAA and NOIA in connection with the original permitting of the River Birch facility.

We emphasize that the present notification is provided in connection with a permit modification and expansion of an existing facility, and is not related to a an application for a new facility. Additionally, we emphasize that the permit for the existing River Birch facility was originally issued by LDEQ on May 8, 1997 and that the facility began operations and first received putrescible waste in July of 1999. Thus, the landfill is not subject to the limitations set forth in 49 USC 44718(d), as amended by section 503of the Wendell H. Ford Aviation Investment and Reform Act, as discussed in the FAA's Advisory Circular No. 150/5200-34.

Facts related to the proposed expansion of the existing River Birch facility are as follows: The proposed expansion of the River Birch facility will involve the use of the approximately 164 acre tract of land located between the existing River Birch landfill and the now closed Greater New Orleans Landfill. Enclosed you will find a map depicting the location of the existing River Birch landfill and the area of the proposed expansion. As reflected on the map, the nearest point of the property boundary of the expansion area tract is 15,820 feet from the nearest runway end at NOIA - well outside of the 10,000 feet limit set forth in LAC 33:VII..709.A.1 and the federal corollary at 40 CFR 258.10. The highest point of the proposed expanded landfill will be 197 feet above ground level. The facility currently complies with the regulatory requirements related to vector control and the use of daily and interim cover. After the modification, the facility will continue to operate in compliance with these regulatory requirements, all of which act to minimize the attraction of wildlife at the landfill.

Should you have any questions or need additional information or clarification related to the modification of the River Birch permit, please do not hesitate to contact our office at (225) 387-4000.

Sincerely,

BREAZEALE, SACHSE & WILSON, L.L.P.

R. Charles Ellis

RCE/rdr

ATTACHMENT 3

LETTERS
FROM
TRANSPORTATION AGENCIES

JEFFERSON PARISH
LOUISIANA

DEPARTMENT OF PUBLIC WORKS

AARON F. BROUSSARD
PARISH PRESIDENT

JOSE GONZALEZ
DIRECTOR

May 17, 2007

Mr. Steve Burnham, P.E.
Engineering Associates, Inc.
1415 Delplaza Drive, Suite B
Baton Rouge, LA 70815

Re: River Birch Landfill Solid Waste Permit Renewal
Jefferson Parish, Louisiana

Dear Mr. Burnham:

In response to your inquiry regarding River Birch Landfill's solid waste permit renewal, please be advised that South Kenner Road provides access to River Birch Landfill via U.S. Highway 90. South Kenner Road has provided adequate service to the landfill for the past approximately nine years and would be expected to continue to provide adequate service in conjunction with the landfill's solid waste permit removal.

Should you have any questions or require additional information, please give us a call.

Sincerely,

José González

Jose' A. Gonzalez, Director
Department of Public Works

JAG/bc

1221 ELMWOOD PARK BOULEVARD – JEFFERSON, LOUISIANA 70123
POST OFFICE BOX 10242 – JEFFERSON, LOUISIANA 70181-0124
(504) 736-6784 - FAX (504) 731-4499

Printed on Recycled Paper.

KATHLEEN BABINEAUX BLANCO
GOVERNOR

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
P.O. Box 94245
Baton Rouge, Louisiana 70804-9245
www.dotd.louisiana.gov
(225) 379-1234

JOHNNY B. BRADBERRY
SECRETARY

May 17, 2007

Mr. Steve Burnham, P.E.
Engineering Associates, Inc.
1415 Delplaza Drive, Ste.B
Baton Rouge, LA 70815

RE: RIVER BIRCH LANDFILL SOLID WASTE PERMIT RENEWAL
JEFFERSON PARISH LOUISIANA

Dear Mr. Burnham:

This is in response to your recent letter, concerning the adequacy of state highways which provide access to the proposed River Birch Solid Waste Landfill facility in Jefferson Parish.

Please be advised that US 90 appears to be the only nearby state route affected by this facility. Please note that US 90 is designed to accommodate the legal gross vehicular weight of 80,000 lbs., single axle 22,000 lbs.; and tandem axle 37,000 lbs. As long as solid waste haulers do not exceed these legal limits, we foresee no problem with the existing state highways.

Sincerely,

William H. Temple, P.E.
Chief Engineer

Cc: Mr. Johnny B. Bradberry
Mr. Mike Stack
Mr. Denny Silvio

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
P. O. Box 94245
Baton Rouge, Louisiana 70804-9245

EDWIN W. EDWARDS
GOVERNOR

JUDE W. P. PATIN
SECRETARY

August 2, 1995

Mr. Charles E. Hinton
Vice President
Gulf Engineers & Consultants
Post Office Box 84010
Baton Rouge, Louisiana 70884-4010

RE: River Birch Landfill

Dear Mr. Hinton:

This is in response to your recent letter, concerning the adequacy of State highways which provide access to the proposed River Birch Solid Waste Landfill facility in Jefferson Parish..

Please be advised that U.S. 90 appears to be the only nearby State route affected by this facility. Please note that U.S. 90 is designed to accommodate the legal gross vehicular weight of 80,000 lbs.; single axle 22,000 lbs.; and tandem axle 37,000 lbs. As long as solid waste haulers do not exceed these legal limits, we foresee no problem with the existing State highways.

Very truly yours,

R. E. DILLON, JR., P.E.
CHIEF ENGINEER

REDjr:MAP:jhh

cc: Mr. John Basilica
Mr. Merlin A. Pistorius
Mr. John Evanco

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
P. O. Box 94245
Baton Rouge, Louisiana 70804-9245

EDWIN W. EDWARDS
GOVERNOR

JUDE W. P. PATIN
SECRETARY

December 30, 1993

Mr. Charles E. Hinton
Vice President
Gulf Engineers and Consultants, Inc.
Post Office Box 84010
Baton Rouge, Louisiana 70884-4010

Dear Mr. Hinton:

This is in response to your recent letter concerning the impact on traffic flow in the vicinity of the proposed River Birch commercial landfill.

An investigation was made by our District Maintenance and District Traffic Operations Engineers. It has been determined that turn-lanes are required to facilitate traffic flow at the intersection at US 90 and South Kenner Avenue. These turn-lanes will be incorporated into the upcoming overlay project on US 90. This project is scheduled for letting in July 1994.

If I can be of further assistance, please contact me at (504) 379-1501.

Very truly yours,

EUGENE P. WAGUESPACK
DIRECTOR OF CONSTRUCTION AND MAINTENANCE

EPW:mab

JEFFERSON PARISH
LOUISIANA

DEPARTMENT OF ENGINEERING

MICHAEL J. YENNI
PARISH PRESIDENT

TRAFFIC ENGINEERING DIVISION

January 24, 1994

Mr. Michael S. Loden
Gulf Engineer & Consultant
1 Galleria Blvd.
Suite 1810
Metairie, LA 70001

Re: Proposed River Birch Landfill
U. S. 90 near S. Kenner Rd.

Dear Mr. Loden:

Reference is made to your correspondence of November 2, 1993 which has been forwarded to this office for reply.

Based on the information provided in your correspondence the following comments are offered:

1. Since the only vehicle access to the proposed site appears to be at U. S. 90 the Department of Transportation & Development Office of Highways must be contacted for any comments since that agency has responsibility for U. S. 90.

2. Based on recent experiences with the large number of waste hauling vehicles at the adjacent landfill operation it is strongly recommended that the access at U. S. 90 be signalized using traffic actuated equipment and further that exclusive left and right turn lanes be constructed of sufficient length to accommodate the expected volumes.

3. Further, it would be a requirement of Jefferson Parish that any gate or weight measuring facility be located sufficiently north of U. S. 90 to allow and accommodate the storage of waiting vehicles.

4. Road lighting sufficient to provide full night time visibility of the intersection of the access and U. S. 90 should also be provided by the operation of the landfill.

2100 DICKORY AVENUE - HARAHAN, LOUISIANA 70123 - (504) 736-6530 - FAX (504) 736-6256

Details of these points can be addressed when construction plans are prepared. It should also be noted here that these comments are restricted to traffic operations as mentioned in the correspondence. Comments on other matters related to the landfill should be addressed to the appropriate agencies.

I trust this information is sufficient. Should there be further questions regarding this matter do not hesitate to call.

Sincerely,

Lee Daspit

LD/nbe

cc: B. K. Sneed
W. M. Lavelle
John Evanco
Douglas B. Robert

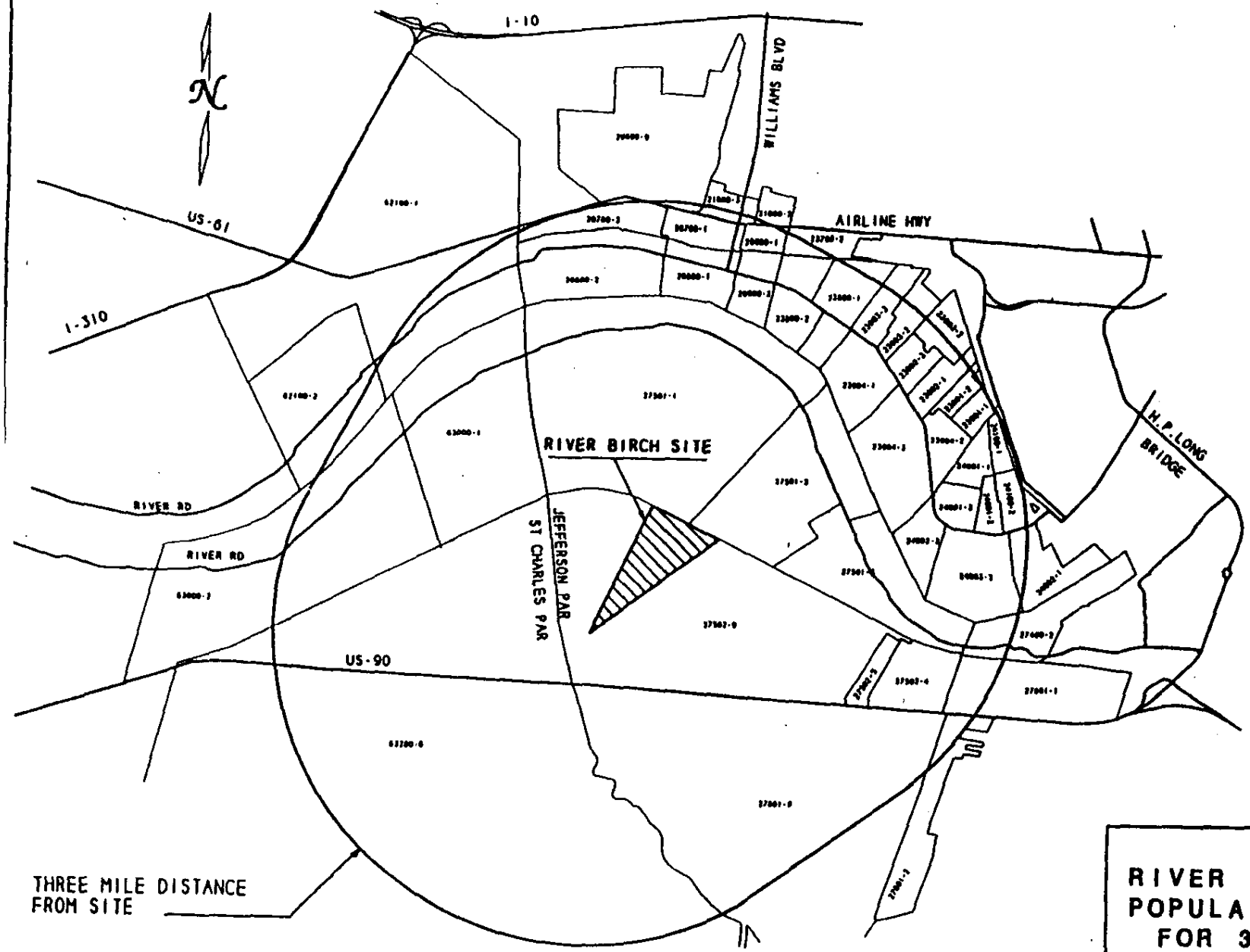
ATTACHMENT 4

DEMOGRAPHIC INFORMATION

ORIGINAL
DEMOGRAPHIC INFORMATION
1993

Table 1
RIVER BIRCH LANDFILL SITE
POPULATION DENSITY WITHIN 3 MILES

CENSUS BLOCK GROUP	POPULATION	AREA (SQ MILES)	DENSITY (PERS/SQ.MI)
20600-9	0	1.631	0.00
20700-1	441	0.211	2,091.04
20700-2	795	0.310	2,565.20
20800-1	591	0.197	2,995.67
20800-2	1,335	0.448	2,977.25
20900-1	468	0.096	4,875.00
20900-2	906	0.140	6,476.52
21000-3	25	0.030	839.71
23700-2	1,322	0.190	6,966.98
23800-1	2,353	0.373	6,301.44
23800-2	1,884	0.246	7,656.41
23901-1	691	0.093	7,466.67
23901-2	406	0.085	4,755.74
23902-1	757	0.153	4,953.99
23901-2	731	0.180	4,067.69
23902-3	520	0.133	3,896.99
23903-2	574	0.108	5,316.36
23903-3	776	0.139	5,575.69
23904-2	1,496	0.198	7,541.80
23904-3	1,530	0.367	4,169.50
23904-4	1,203	0.212	5,674.75
24001-1	1,159	0.157	7,393.85
24001-2	878	0.107	8,213.85
24001-3	1,033	0.164	6,287.87
24002-1	440	0.095	4,628.87
24002-1	1,517	0.432	3,509.95
24002-3	416	0.129	3,212.59
24100-1	622	0.091	6,853.91
27400-2	1,088	0.310	3,510.62
27501-1	2,371	3.497	677.95
27501-2	2,047	1.386	1,476.89
27501-3	413	0.783	527.19
27502-4	2,876	0.439	6,550.52
27502-5	1,306	0.105	12,473.73
27502-9	284	3.537	80.28
27601-1	1,366	0.811	1,683.55
27601-2	580	0.524	1,107.50
27601-9	28	5.380	5.20
62100-1	1,024	0.556	1,841.78
63000-1	940	1.455	645.94
63000-2	343	1.659	206.75
63200-6	0	0.009	0.00
TOTAL	39,535	27.167	1,455.24



NOTES:

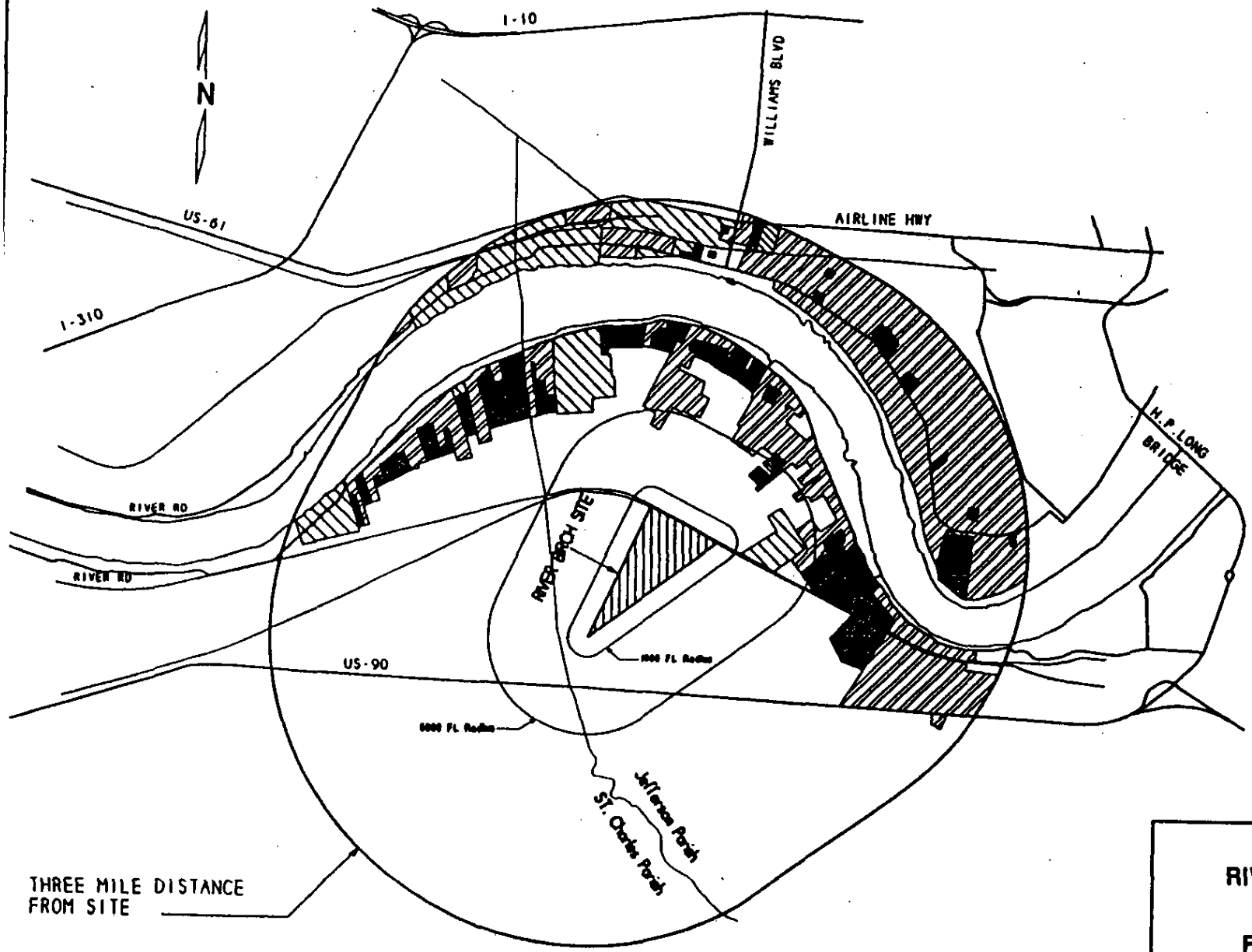
THIS MAP IS LABELLED WITH U.S.CENSUS BLOCK-GROUP NUMBERS. REFER TO THE ACCOMPANYING TABLE FOR POPULATIONS AND DENSITIES.

WHERE THE 3 MILE LINE ENCLOSES PART OF A GROUP AREA, THE TOTAL FOR THE AREA IS THE SUM OF ONLY THE BLOCKS WHICH ARE WHOLLY OR PARTIALLY WITHIN THE 3 MILE RADIUS.

FIGURE 2
RIVER BIRCH LANDFILL POPULATION DENSITIES FOR 3 MILE RADIUS

DATE: 11-04-93 SCALE: N.T.S.

GULF ENGINEERS & CONSULTANTS INC
BATON ROUGE, LOUISIANA



LEGEND

- INDUSTRIAL
- RESIDENTIAL
- RECREATIONAL
- EDUCATIONAL
- AGRICULTURAL

FIGURE 1
RIVER BIRCH LANDFILL
LANDUSE MAP
FOR 3 MILE RADIUS

DATE: 05/05/94 SCALE: N.T.S.

GULF ENGINEERS & CONSULTANTS INC
BATON ROUGE, LOUISIANA

UPDATED
DEMOGRAPHIC INFORMATION
2003

JEFFERSON PARISH
LOUISIANA

PLANNING DEPARTMENT

TIM P. COULON
PARISH PRESIDENT

EDWIN J. DURABB
DIRECTOR

RECEIVED
FEB 04 2003

January 30, 2003

Mr. Paul L. Miers
Madeux-Miers Engineering, Inc.
3909 W. Congress St
Suite 101
Lafayette, LA 70506

Re: Population Density

Dear Mr. Miers:

This letter is in response to the recent inquiry concerning population density within a three-mile radius of the proposed River Birch Landfill in Jefferson Parish. Enclosed is an area map and table with the appropriate 2000 census track and block data for the portion of the area that is located within Jefferson Parish.

Sincerely,

Joe Perret
Planner III

Cc: B. K. Sneed

Population Within 3-Mile Radius of River Birch Landfill on US Hwy. 90

CENSUS TRACT	BLOCK GROUP	BLOCK	TOT POP	AREA (SQ MI)
23901	1	1013	43	0
23901	2	2000	81	0
23901	2	2001	39	0
23901	2	2004	23	0
23901	2	2006	38	0
23901	2	2009	15	0
23901	2	2010	18	0
23901	2	2011	91	0
23901	2	2012	89	0
23901	2	2013	63	0
23901	2	2015	56	0
23901	2	2017	225	0
23902	1	1006	191	0
23904	3	3003	71	0
23904	3	3005	25	0
23904	3	3007	23	0
23904	3	3999	0	0.3
23904	4	4999	0	0.1
24001	1	1005	52	0
24001	1	1006	61	0
24001	1	1008	55	0
24001	1	1009	63	0
24001	1	1010	54	0
24001	1	1011	12	0
24001	1	1012	63	0
24001	1	1014	52	0
24001	1	1015	153	0
24001	1	1017	47	0
24001	2	2001	98	0
24001	2	2002	70	0
24001	2	2005	0	0
24001	2	2007	88	0
24001	3	3001	72	0
24001	3	3002	105	0
24001	3	3005	40	0
24001	3	3006	52	0
24001	3	3008	52	0
24002	1	1004	57	0
24002	1	1005	20	0
24002	1	1007	41	0
24002	1	1010	102	0
24002	1	1011	67	0
24002	1	1013	142	0
24002	1	1014	51	0
24002	1	1015	0	0
24002	1	1017	53	0
24002	1	1019	50	0
24002	1	1022	40	0
24002	1	1999	0	0.2
24002	2	2001	65	0
24002	2	2002	87	0
24002	2	2005	44	0
24002	2	2007	28	0
24002	2	2009	69	0

Population Within 3-Mile Radius of River Birch Landfill on US Hwy. 90

CENSUS TRACT	BLOCK GROUP	BLOCK	TOT POP	AREA (SQ MI)
24002	2	2010	50	0
24002	2	2016	78	0
24002	2	2999	0	0.1
24002	3	3000	84	0
24002	3	3003	58	0
24002	3	3005	64	0
24002	3	3998	0	0.1
24002	3	3999	0	0.1
24100	1	1017	50	0
24100	1	1018	49	0
24100	1	1023	46	0
24100	1	1024	44	0
24100	1	1025	18	0
24100	1	1026	48	0
24100	1	1028	32	0
24100	2	2003	83	0
24100	2	2005	101	0
24100	2	2007	109	0
24100	2	2011	81	0
24100	2	2013	55	0
24100	2	2015	7	0
24100	2	2017	49	0
24100	2	2018	56	0
24100	2	2020	46	0
24100	2	2021	67	0
24200	2	2045	30	0.4
24200	2	2075	0	0
24200	2	2077	0	0
27400	2	2015	0	0
27400	2	2016	0	0
27400	2	2017	0	0.2
27501	1	1000	0	0.1
27501	1	1006	123	0
27501	1	1008	255	0
27501	1	1010	136	0
27501	1	1012	108	0
27501	1	1013	218	0
27501	1	1016	38	0
27501	1	1019	87	0
27501	1	1025	147	0
27501	1	1026	63	0
27501	2	2001	143	0.1
27501	2	2002	49	0
27501	2	2003	72	0
27501	2	2004	75	0
27501	2	2005	82	0
27501	2	2006	69	0
27501	2	2010	28	0
27501	2	2016	132	0
27501	2	2018	69	0
27501	2	2019	67	0
27501	2	2021	38	0
27501	2	2022	41	0
27501	3	3001	133	0.3

Population Within 3-Mile Radius of River Birch Landfill on US Hwy. 90

CENSUS TRACT	BLOCK GROUP	BLOCK	TOT POP	AREA (SQ MI)
27501	3	3002	46	0
27501	3	3005	59	0
27501	3	3006	21	0
27502	4	4000	0	0
27502	4	4003	385	0
27502	4	4005	113	0
27502	4	4007	0	0
27502	4	4008	23	0
27502	4	4010	58	0
27502	4	4011	87	0
27502	4	4013	97	0
27502	4	4015	210	0
27502	4	4016	41	0
27502	4	4019	103	0
27502	4	4022	21	0
27502	4	4025	115	0
27502	4	4026	54	0
27502	4	4027	117	0
27502	4	4032	82	0
27502	4	4033	64	0
27502	4	4034	38	0
27502	5	5001	56	0
27502	5	5002	54	0
27502	5	5003	59	0
27502	5	5004	67	0
27502	5	5005	56	0
27502	5	5010	80	0
27502	5	5011	166	0
27502	5	5012	87	0
27502	5	5014	37	0
27502	5	5015	22	0
27502	5	5016	43	0
27502	6	6000	0	0
27502	6	6002	0	0
27502	6	6006	0	0.8
27502	6	6008	0	0.2
27502	6	6009	4	0.1
27502	6	6010	284	0.3
27502	6	6011	0	0
27502	6	6013	0	0
27502	6	6999	0	0.2
27601	1	1004	116	0
27601	1	1005	117	0
27601	1	1006	116	0
27601	1	1007	104	0
27601	1	1008	54	0
27601	2	2000	575	0.7
27601	2	2003	103	0
27601	2	2004	115	0
27601	2	2007	132	0
27601	2	2009	120	0
27601	2	2012	132	0
27601	2	2013	141	0
27601	2	2015	141	0

Population Within 3-Mile Radius of River Birch Landfill on US Hwy. 90

CENSUS TRACT	BLOCK GROUP	BLOCK	TOT POP	AREA (SQ MI)
27601	2	2016	80	0
27601	2	2019	110	0
27601	2	2021	112	0
27601	3	3000	21	0.1
27601	3	3004	36	0
27601	3	3005	125	0
27601	3	3007	128	0
27601	3	3009	33	0.1
27601	3	3011	0	0.1
27601	4	4001	0	0
27601	4	4002	0	0
27601	4	4003	0	0.1
27601	4	4004	4	0
27601	4	4996	0	0
27601	4	4997	0	0
27601	4	4999	0	0.6
27602	1	1009	0	0.1
27602	4	4005	0	0.1
27602	4	4006	27	5
27602	4	4991	0	0
27602	4	4992	0	0.1
24001	1	1004	32	0
24002	1	1009	69	0
24002	2	2008	132	0
27501	1	1021	98	0
27501	2	2008	68	0
27502	4	4006	89	0
27502	4	4029	0	0
27502	5	5006	82	0
27601	2	2005	105	0
23904	3	3004	49	0
27501	1	1011	100	0
27501	2	2009	33	0
27501	2	2015	137	0
27501	2	2017	29	0
27502	6	6004	0	0
27502	5	5007	63	0
27502	5	5013	46	0
27502	4	4018	104	0
27502	4	4030	32	0
27601	2	2011	51	0
27601	2	2017	109	0
27601	3	3003	110	0
24001	3	3003	34	0
24100	1	1022	45	0
24100	2	2001	60	0
24002	3	3008	108	0
24002	2	2014	34	0
24002	2	2003	61	0
24002	1	1006	12	0
27601	3	3006	105	0
23904	3	3001	54	0
24100	2	2008	59	0
24200	2	2078	7	0

Population Within 3-Mile Radius of River Birch Landfill on US Hwy. 90

CENSUS TRACT	BLOCK GROUP	BLOCK	TOT POP	AREA (SQ MI)
27502	4	4023	57	0
27601	2	2008	114	0
27501	1	1018	37	0
27502	4	4004	66	0
24001	3	3004	63	0
24100	1	1015	33	0
27501	3	3004	3	0
23901	2	2008	211	0
27601	2	2022	116	0
23901	1	1022	64	0
23901	2	2003	17	0
23901	2	2005	42	0
23901	2	2007	61	0
23901	2	2016	40	0
23902	1	1010	35	0
23904	3	3002	1,143	0.3
24001	1	1007	52	0
24001	1	1013	52	0
24001	1	1016	22	0
24001	2	2000	69	0
24001	2	2003	38	0
24001	3	3007	33	0
24002	1	1000	32	0.1
24002	1	1003	137	0
24002	1	1008	45	0
24002	1	1012	56	0
24002	1	1016	54	0
24002	1	1020	3	0
24002	1	1023	13	0
24002	2	2004	60	0
24002	2	2006	45	0
24002	2	2011	65	0
24002	2	2015	49	0
24002	2	2017	0	0
24002	3	3001	119	0
24002	3	3006	53	0
24100	1	1019	72	0
24100	1	1021	42	0
24100	1	1027	35	0
24100	2	2000	86	0
24100	2	2004	64	0
24100	2	2009	78	0
24100	2	2012	182	0
24100	2	2019	115	0
24100	2	2022	11	0
24200	2	2067	0	0.2
24200	2	2076	3	0
27400	2	2012	0	0.4
27400	2	2013	2	0.1
27501	1	1002	129	1.9
27501	1	1005	34	0
27501	1	1007	139	0
27501	1	1015	21	0
27501	1	1017	37	0

Population Within 3-Mile Radius of River Birch Landfill on US Hwy. 90

CENSUS TRACT	BLOCK GROUP	BLOCK	TOT POP	AREA (SQ MI)
27501	1	1022	90	0
27501	1	1024	127	0
27501	1	1027	2	0.2
27501	2	2000	0	0.3
27501	2	2007	73	0
27501	2	2011	2	0
27501	2	2999	0	0.1
27501	3	3003	61	0.2
27501	3	3007	81	0
27501	3	3999	0	0.4
27502	4	4001	0	0
27502	4	4009	40	0
27502	4	4012	55	0
27502	4	4014	68	0
27502	4	4017	37	0
27502	4	4021	23	0
27502	4	4024	45	0
27502	4	4028	132	0
27502	4	4031	2	0.1
27502	4	4036	39	0
27502	5	5000	255	0
27502	5	5008	73	0
27502	6	6001	0	0
27502	6	6007	0	1.1
27502	6	6012	0	0.4
27502	6	6998	0	0.4
27601	2	2001	72	0
27601	2	2006	135	0
27601	2	2010	219	0
27601	2	2014	144	0
27601	2	2018	101	0
27601	2	2020	164	0
27601	3	3001	0	0.5
27601	3	3008	142	0
27601	3	3010	0	0.3
27601	4	4005	0	0.7
27601	4	4006	0	0.3
27601	4	4998	0	0.4
27602	4	4016	0	0.1
27602	4	4017	0	1
27602	4	4993	0	1.1
24001	2	2006	456	0.1
24002	3	3004	243	0.1
24100	1	1016	107	0
27501	1	1009	128	0
27502	4	4020	46	0
27601	1	1001	12	0
27601	3	3002	308	0.5
23901	2	2002	47	0
23901	2	2014	216	0
27501	1	1020	84	0
27501	2	2023	106	0.1
27400	2	2999	0	0.4
27502	4	4002	0	0

Population Within 3-Mile Radius of River Birch Landfill on US Hwy. 90

CENSUS TRACT	BLOCK GROUP	BLOCK	TOT POP	AREA (SQ MI)
27601	1	1003	135	0
24001	1	1002	128	0
24001	2	2004	58	0
24100	2	2010	200	0
24002	1	1018	37	0
24100	2	2016	29	0
24002	2	2012	69	0
27501	2	2012	70	0
24002	1	1001	59	0
24001	1	1003	53	0
24002	3	3002	102	0.2
23904	3	3006	88	0
24002	1	1002	54	0
24002	1	1998	0	0
24002	2	2013	58	0
24002	3	3007	31	0
24100	1	1020	33	0
24100	2	2002	2	0
24100	2	2014	41	0
27400	2	2014	0	0.1
27501	1	1003	429	1.3
27501	1	1023	125	0
27501	2	2014	0	0.1
27501	2	2024	30	0
27501	3	3008	29	0
27502	4	4035	41	0
27502	5	5009	63	0
27502	6	6003	0	0
27601	1	1002	109	0
27601	4	4007	0	0.3
24002	1	1021	66	0
24100	1	1029	9	0
27601	2	2002	67	0
23904	4	4000	884	0.2
24001	3	3000	752	0.2
24002	2	2000	24	0
24002	3	3009	46	0
24100	2	2006	91	0
27501	2	2013	516	0.8
27501	3	3000	29	0.1
27502	6	6005	0	0.8
27601	1	1000	508	0.8
27601	4	4000	23	4.6
27602	4	4995	0	0.3
27501	2	2020	268	0
27602	4	4004	2	0.7
27602	1	1008	0	0.1
TOTAL			**27,624**	**33**

Population per Square Mile =	**837**

3 MI

CENSUS00.CENSUS_2000_BLOCKS

PLANI.KEYMAP

Labels of CENSUS00.CENSUS_2000_BLOCKS

Labels of CENSUS00.TRACT

CENSUS00.TRACT

ST. CHARLES PARISH

OFFICE OF THE PARISH PRESIDENT

P.O. BOX 302 • HAHNVILLE, LOUISIANA 70057
(985) 783-5000 • FAX (985) 783-5015

ALBERT D. LAQUE
PARISH PRESIDENT

January 22, 2003

Mr. Paul Miers
Mader-Miers Engineering, Inc.
3909 West Congress Street
Suite 101
Lafayette, LA 70506

Re: River Birch Landfill West Expansion

Dear Mr. Miers:

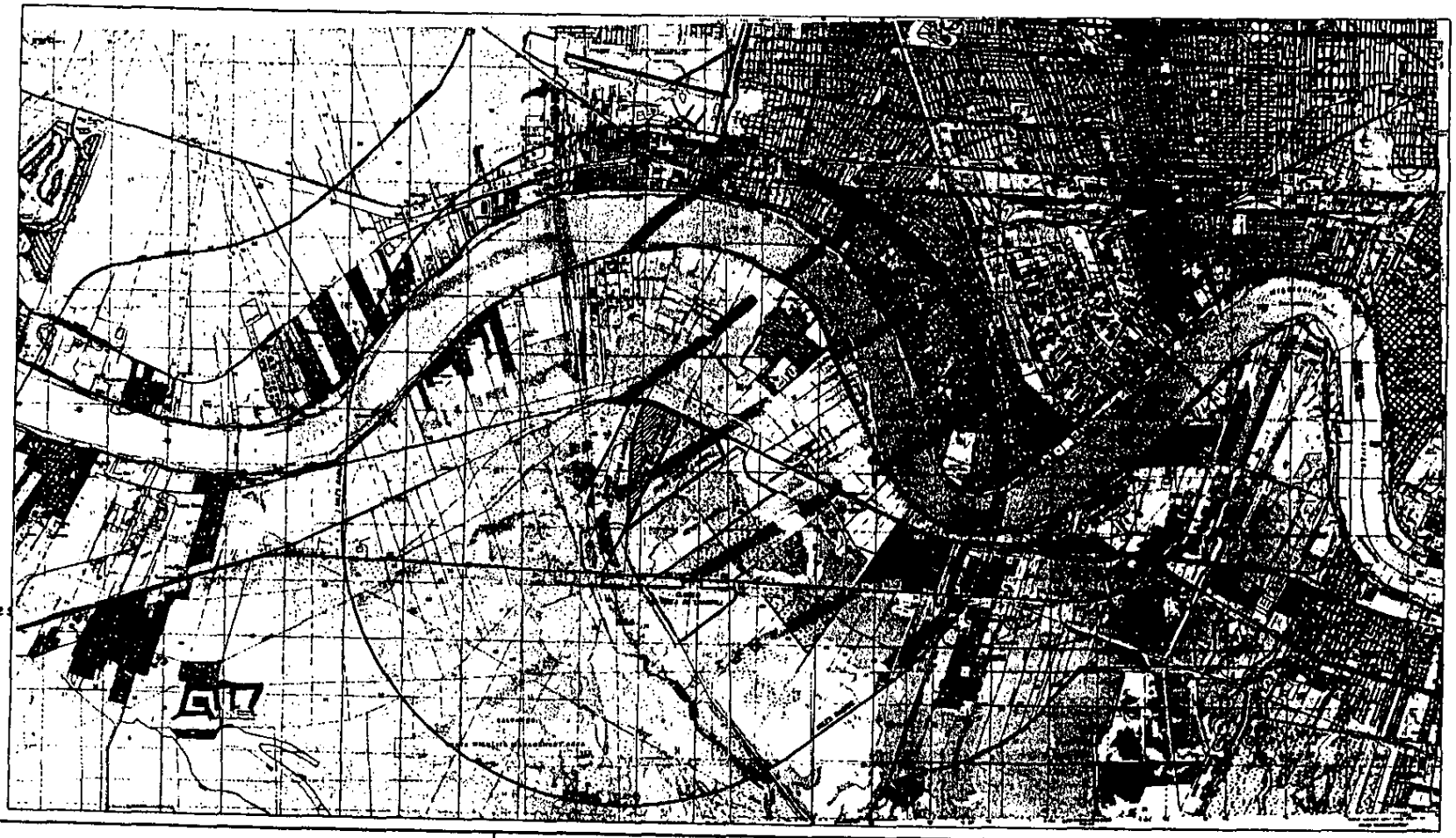
Pursuant to your request, the approximate population in the highlighted area of St. Charles Parish, within 3 miles of River Birch Landfill West Expansion, is 4,277. This information is based on the 2000 US Census.

Yours truly,

Timothy J. Vial

Timothy J. Vial
Chief Administrative Officer

TJV/kr



mader-miers
ENGINEERING, INC
3909 W CONGRESS ST., SUITE 101 - LAFAYETTE, LOUISIANA 70506
PHONE NO (337) 989-8047 FAX (337) 988-3219

PROPOSED EXPANSION
RIVER BIRCH LANDFILL

LOCATED IN SECTIONS 4, 36 AND 37
T13S, R22E,
JEFFERSON PARISH, LOUISIANA

0 3000' 6000' 12000'
SCALE: 1" = 6000'

DATE: SEPTEMBER 18, 2002

BPN 2063	SPN 12	FILE 8	DWG

ATTACHMENT 5

LETTERS
FROM
ENVIRONMENTAL AGENCIES

State of Louisiana

KATHLEEN BABINEAUX BLANCO
GOVERNOR

DEPARTMENT OF WILDLIFE & FISHERIES
POST OFFICE BOX 98000
BATON ROUGE, LA 70898-9000
(225) 765-2800

BRYANT O. HAMMETT, JR.
SECRETARY

Date	May 18, 2007
Name	Rick Michaels
Company	
Street Address	2124 Fairfield
City, State, Zip	Shreveport, LA 71104
Project	River Birch Landfill
Invoice Number	07051801

Personnel of the Habitat Section of the Fur and Refuge Division have reviewed the preliminary data for the captioned project. After careful review of our database, no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. No state or federal parks, wildlife refuges, scenic streams, or wildlife management areas are known at the specified site within Louisiana's boundaries.

The Louisiana Natural Heritage Program (LNHP) has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. LNHP requires that this office be acknowledged in all reports as the source of all data provided here. If at any time Heritage tracked species are encountered within the project area, please contact the LNHP Data Manager at 225-765-2643. If you have any questions, or need additional information, please call 225-765-2357.

Sincerely,

Gary Lester, Coordinator
Natural Heritage Program

2003 LETTERS
FROM
ENVIRONMENTAL AGENCIES

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

February 10, 2003

R. Charles Ellis
Breazeale, Sachse & Wilson, L.L.P.
Post Office Box 3197
Baton Rouge, Louisiana 70821

Dear Mr. Ellis:

Please reference your January 24, 2003, letter requesting our review of River Birch Inc.'s proposal to expand their existing Type I and Type II solid waste landfill. The project area is located near Waggaman in Jefferson Parish, Louisiana. The U.S. Fish and Wildlife Service has reviewed the information you provided, and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

Our records indicate that no Federally listed threatened or endangered species presently occur within the proposed project area. Therefore, no further consultation will be required unless there are changes in the scope or location of the project, or construction has not been initiated within 1 year. If the project has not been initiated within 1 year, follow-up consultation should be accomplished with this office prior to making expenditures for construction. If the scope or location of the proposed work is changed, consultation should occur as soon as such changes are made.

The proposed project may impact wetlands. For a complete jurisdictional wetland delineation of the proposed project, please contact Mr. John Bruza (504/862-1288) at the New Orleans District Corps of Engineers (Corps). If the Corps determines that the proposed project is within their regulatory jurisdiction, official U.S. Fish and Wildlife Service comments will be provided in response to the corresponding Public Notice.

We appreciate the opportunity to provide comments in the planning stages of this proposed activity. If you need further assistance, please contact Angela Culpepper (337/291-3137) of this office.

Sincerely,

Russell C. Watson
Acting Supervisor
Louisiana Field Office

cc: Corps of Engineers, New Orleans, LA
LDWF, Natural Heritage Program, Baton Rouge, LA

REC'D MAR 1 2 2003

HLEEN BABINEAUX BLANCO
LIEUTENANT GOVERNOR

State of Louisiana
OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF STATE PARKS

PHILLIP J. JONES
SECRETARY

DWIGHT LANDRENEAU
ASSISTANT SECRETARY

March 11, 2003

Mr. R. Charles Ellis
Breazeale, Sachse & Wilson, L.L.P.
Attorneys At Law
P. O. Box 3197
Baton Rouge, LA 70821-3197

Re: River Birch Landfill
Jefferson Parish
Application for Modification of River Birch Landfill's
Solid Waste Permit No. D-051-6741/P-0321
BS&W File No.: 8471/33836

Dear Mr. Ellis:

The Office of State Parks has reviewed your permit application. We do not currently own any properties within a 1000' of the above-mentioned project. Consequently, it does not directly affect any of our facilities.

Sincerely,

Kenny Lang
Land Officer

KL:dr

State of Louisiana

James H. Jenkins, Jr.
Secretary

Department of Wildlife & Fisheries
Post Office Box 98000
Baton Rouge, LA 70898-9000
(225) 765-2800

M.J. "Mike" Foster, Jr.
Governor

March 18, 2003

Network Environmental Concerns
PO BOX 540
Scottsville, TX 75688

To Whom It May Concern:

I am writing this letter to state that in the opinion of LNHP there will not be an impact on the rookery in question on the River Birch Expansion project. The rookery was located by the company involved and the rookery is far enough away that it will be protected and unaffected by the proposed activities. If you have any questions please feel free to call me at (225) 765-2976.

Sincerely,

Nancy Higginbotham
Nongame Biologist, LNHP
LA Dept of Wildlife & Fisheries

State of Louisiana

James H. Jenkins, Jr.
Secretary

Department of Wildlife & Fisheries
Post Office Box 98000
Baton Rouge, LA 70898-9000
(225) 765-2800

M.J. "Mike" Foster, Jr.
Governor

Name	R. Charles Ellis
Company	Breazeale, Sachse & Wilson, LLP
Street Address	One American Place, Suite 2300
City, State, Zip	Baton Rouge, LA 70821-3197
Project	River Birch Landfill, Jefferson Parish, Application for Modification of River Birch Landfill's Solid Waste Permit No. D-051-6741/P-0321 BS&W File No.: 8471/33836
Date	March 5, 2003
Invoice Number	03030514

Personnel of the Habitat Section of the Fur and Refuge Division have reviewed the preliminary data for the captioned project. Your project area is in the coastal zone. Contact the State of Louisiana Department of Natural Resources Coastal Management Division to determine if a coastal use permit is required. Our database indicated a 1999 observation of a rookery. Rookeries can move from year to year and no current information is available on the status of this rookery. You will need to survey the area prior to any activity. No activity is permitted within 300 meters around rookeries during the breeding season which is generally March 15-July 15. If you have any questions please call LNHP Non-game Biologist Nancy Higginbotham at 225-765-2976. In reviewing our database, no other rare, threatened, or endangered species or critical habitats were found within the area of the captioned project that lies in Louisiana. No state or federal parks, wildlife refuges, scenic streams, or wildlife management areas are known at the specified site within Louisiana's boundaries.

The Louisiana Natural Heritage Program has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The Louisiana Natural Heritage Program requires that this office be acknowledged in all reports as the source of all data provided here. If you have any questions or need additional information, please call Louisiana Natural Heritage Program Data Manger Jill Kelly at (225) 765-2643.

Sincerely,

Gary Lester, NHP Coordinator

An Equal Opportunity Employer

03/05/03 WED 15:56 [TX/RX NO 5676]

BREAZEALE, SACHSE & WILSON, L.L.P.

ATTORNEYS AT LAW
ONE AMERICAN PLACE, SUITE 2300
POST OFFICE BOX 3197
BATON ROUGE, LOUISIANA 70821-3197
(225) 387-4000
FAX (225) 381-8029

1100 POYDRAS STREET, SUITE 1500
NEW ORLEANS, LOUISIANA 70163-1501
(504) 582-1800
FAX (504) 582-1555

BANK ONE PLAZA, SUITE 206
1500 HIGHWAY 190
MANDEVILLE, LOUISIANA 70471-3124
(985) 674-1020
FAX (985) 727-7255

Writer's Direct Dial No.
(225) 381-3164

Writer's E-Mail:
rec@bswllp.com

January 24, 2003

VIA HAND-DELIVERY
Ms. Rachel Watson
State of Louisiana
Department of Culture, Recreation & Tourism
Office of Cultural Development
P.O. Box 44247
Baton Rouge, LA 70804-4247

Date: 3-12-03
No known archaeological sites or historic properties will be affected by this undertaking. This effect determination could change should new information come to our attention.
Laurel Wyckoff: Laurel Wyckoff
State Historic Preservation Officer

RE: River Birch Landfill
Jefferson Parish
Application for Modification of River Birch Landfill's
Solid Waste Permit No. D-051-6741/P-0321
BS&W File No.: 8471/33836

Dear Ms. Watson:

We are assisting River Birch, Inc. ("River Birch") in the preparation of an application for modification of its solid waste permit for submittal to the Louisiana Department of Environmental Quality for the expansion of River Birch's existing Type I and Type II solid waste landfill. The existing River Birch facility is located in Sections 4, 36 and 37, Township 13S, Range 22E in Jefferson Parish, Louisiana. Enclosed you will find a map depicting the location of the existing River Birch landfill and the area of the proposed expansion. The area on the map designated as "Proposed Expansion River Birch Landfill" is the specific area involved with this request and is hereinafter referred to as the "Site". Note that the Site is located between the existing portion of the River Birch landfill and the now closed Greater New Orleans Landfill.

RECEIVED
JAN 24 2003
OF ARCHAEOLOGY

BR:464857.1

In accordance with LAC 33:VII.521.A.I.e.ii and to complete the application for permit modification, we are requesting that the Site, and the area within 1000' of the Site, be reviewed to determine if any known archaeological or historic sites or structures are located therein.

We appreciate your assistance with this request, should you have any questions or need additional information or clarification, please contact our office at (225) 387-4000.

With warmest wishes, we are

Sincerely yours,

BREAZEALE, SACHSE & WILSON, L.L.P.

R. Charles Ellis

RCE/rdr

Enclosures

1993 LETTERS
FROM
ENVIRONMENTAL AGENCIES

Edwin W. Edwards
Governor

Melinda Schwegmann
Lieutenant Governor
and Commissioner

State of Louisiana
Department of Culture, Recreation and Tourism
OFFICE OF CULTURAL DEVELOPMENT

Mark H. Hilzim
Secretary

Gerri Hobdy
Assistant Secretary

December 7, 1993

Mr. Leonard H. Guilbeau
Gulf Engineers & Consultants Inc.
P.O. Box 84010
Baton Rouge, Louisiana 70884-4010

Re: Solid Waste Permit Application
River Birch Landfill
Jefferson Parish, Louisiana

Dear Mr. Guilbeau:

Reference is made to your letter dated November 15, 1993, concerning the above solid waste permit application. A review of our site file data reveals that there are no known archaeological sites or historical structures located within 1000' of the permit site.

If we may be of further assistance, do not hesitate to contact my staff in the Divisions of Archaeology and Historic Preservation.

Sincerely,

Gerri Hobdy

Gerri Hobdy
State Historic Preservation Officer

GH:PR:rw

Division of Archaeology
P.O. Box 44247 (1051 N. Third Street)
Baton Rouge, LA 70804
(504) 342-8170
Fax: (504) 342-3207

"An Equal Opportunity Employer"

SURVEYS UNLIMITED RESEARCH ASSOCIATES, INC.
P.O. Box 14414
Baton Rouge, LA 70898-4414
TEL (504) 346-8072
*FAX (504) 346-8072*51*

October 25, 1993

Mr. Leonard Gilbeau
Gulf Engineers & Consultants, Inc.
P.O. Box 2996
Baton Rouge, LA 70821

Dear Leonard:

I have examined the site maps in the Louisiana Division of Archaeology relative to the proposed River Birch Landfill. These maps (Laling and New Orleans West 7.5' Quads) do not show any archaeological/historic sites to be on record within 1,000 feet of the area proposed for the landfill. This, of course, does not necessarily mean that no archaeological sites are present, only that the state has no record of them.

Sincerely,

Malcolm K. Shuman, Ph.D.

Edwin W. Edwards
Governor

Melinda Schwegmann
Lieutenant Governor
and Commissioner

State of Louisiana
Department of Culture, Recreation and Tourism
OFFICE OF STATE PARKS

Mark H. Hilzim
Secretary

Jim Ball
Assistant Secretary

October 1, 1993

Mr. Jay Smeltzer
Gulf Engineers & Consultants, Inc.
P. O. Box 84010
Baton Rouge, LA 70884-4010

Re: Future Landfill Site in Jefferson Parish

Dear Mr. Smeltzer:

We have reviewed the location map for the above mentioned proposed landfill in Jefferson Parish and have identified three recreation sites in the area of the site. We could not determine whether or not they are within 1000 feet of the site. The parks are Waggeman Playground, Kennedy Heights and Thomas Jefferson Park. Both Kennedy and Thomas Jefferson are recipients of federal Land and Water Conservation Fund monies (L&WCF projects 22-00183 and 22-00645). We recommend that you contact the local governing bodies in the area of the project and the Jefferson Parish Parks and Recreation Department. They will be able to provide further comments on this subject.

If the L&WCF sites are within 1000 feet then a possible Section 6(f)(3) situation may exist. Please take the necessary steps to insure that no adverse impacts are made to the L&WCF projects.

If you have any questions concerning this matter, please call on us.

Sincerely,

Elinor M. Craven
Director of Outdoor Recreation

EMC:rm

JEFFERSON PARISH
LOUISIANA

PARKS AND RECREATION

MICHAEL J. YENNI
PARISH PRESIDENT

CHARLIE DOMINO
DIRECTOR

October 6, 1993

Mr. Jay Smeltzer
Gulf Engineers & Consultants, Inc.
P.O. Box 84010
Baton Rouge, LA 70884-4010

Dear Mr. Smeltzer:

We've received your September 29, 1993 inquiry in regard to the location of a recreational area within a 1,000 foot radius of a proposed landfill site in Jefferson Parish. We know of no recreational area within a 1,000 foot radius of this site. I am attaching a copy of the map that you had sent to us for verification purposes.

Yours truly,

CHARLIE DOMINO, DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

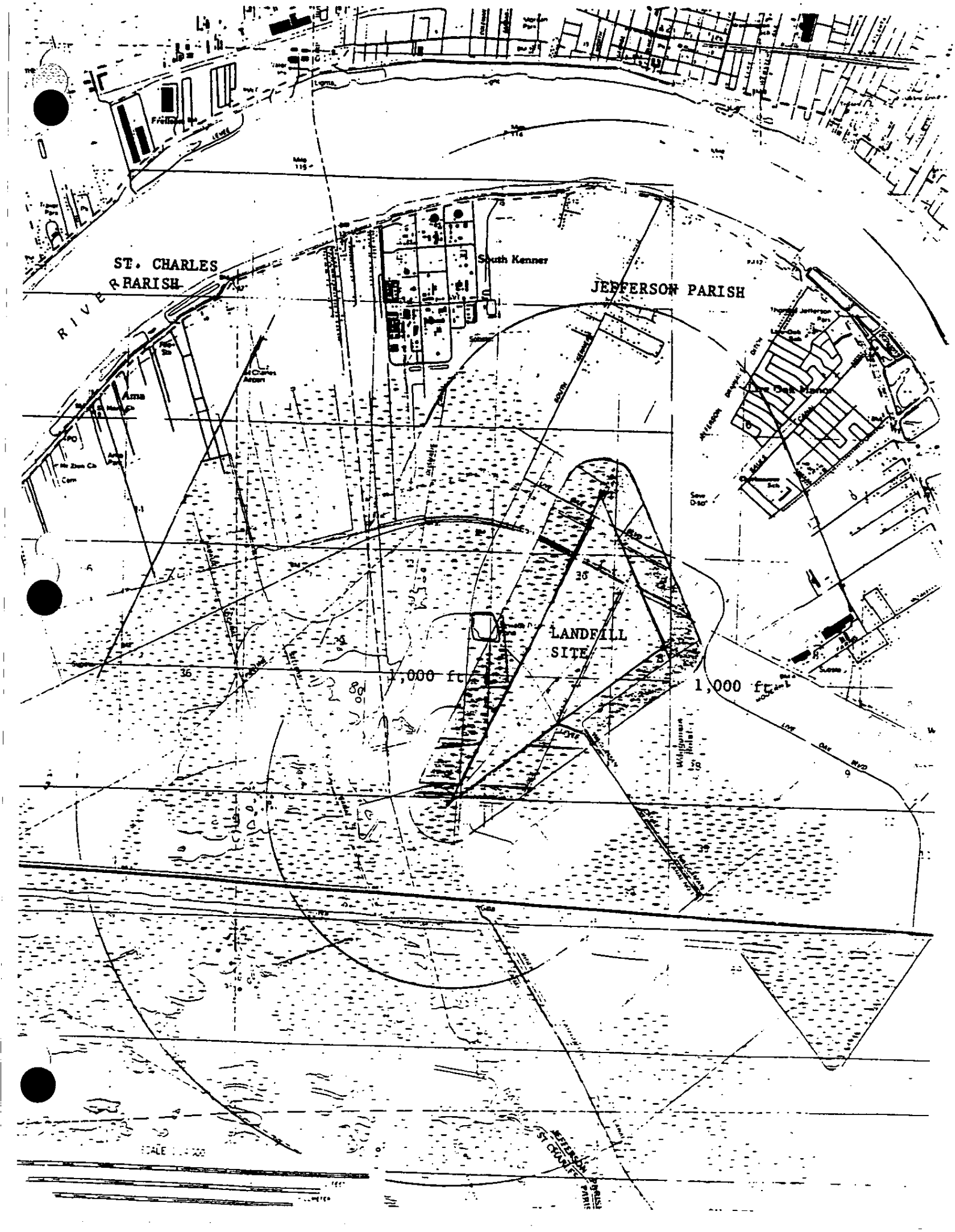
CD/plp

Attachment

EAST BANK
6921 SAINTS DR
METAIRIE LA 70003
(504) 736-6999

LAFRENIERE PARK
3000 DOWNS BLVD.
METAIRIE LA 70003
(504) 838-4389

WEST BANK
7437 LAPALCO BLVD.
MARRERO, LA 70072
(504) 349-5000


ST. CHARLES
PARISH
JEFFERSON PARISH
South Kenner
LANDFILL
SITE
1,000 ft
1,000 ft

United States Department of the Interior

FISH AND WILDLIFE SERVICE
825 Kaliste Saloom Road
Brandywine Bldg. II, Suite 102
Lafayette, Louisiana 70508

October 29, 1993

Mr. Howard Nass
Gulf Engineers and Consultants Inc.
P.O. Box 84010
Baton Rouge, LA 70884-4010

Dear Mr. Nass:

Thank you for your letter dated October 26, 1993, requesting an review of the proposed River Birch Landfill, to be located in Jefferson Parish, Louisiana. The following information is provided on a technical assistance basis.

The U.S. Fish and Wildlife Service does not own or administer National Wildlife Refuge System lands within the proposed project area. However, it should be noted that the proposed landfill site may be located in wetlands. For a complete wetland delineation of the proposed project, please contact Thom Davidson (504-862-2270) of the New Orleans District Corps of Engineers (Corps). If the Corps determines that the proposed project is within their regulatory jurisdiction, official U.S. Fish and Wildlife Service comments will be provided in response to the corresponding Public Notice.

We appreciate the opportunity to provide comments during this early stage of project planning. Should you have any further questions, please contact Brian T. Vogl (318-262-6630) of this office.

Sincerely,

Russell C. Watson
Acting Field Supervisor

cc: LA Dept. of Wildlife and Fisheries, Baton Rouge, LA
New Orleans District Corps of Engineers, Surveillance & Enforcement

State of Louisiana

Joe L. Herring
Secretary

Department of Wildlife and Fisheries
Post Office Box 98000
Baton Rouge, LA 70898-9000
(504) 765-2800

Edwin W. Edwards
Governor

29 October 1993

Gulf Engineers & Consultants, Inc.
ATTN: Howard Nass
P.O. Box 84010
Baton Rouge, LA 70884-4010

RE: Rare, threatened or endangered species assessment for River Birch Landfill project.

Dear Mr. Nass:

Personnel of the Natural Heritage Program have reviewed the captioned project. In reviewing our data base, no rare, threatened or endangered species or critical habitat were found within the project area.

The Louisiana Natural Heritage Program has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. They should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments.

Sincerely,

Gary D. Lester, Coordinator
Louisiana Natural Heritage Program

GDL:klt

State of Louisiana

Joe L. Herring
Secretary

Department of Wildlife and Fisheries
Post Office Box 98000
Baton Rouge, LA 70898-9000
(504) 765-2800

Edwin W. Edwards
Governor

1 November 1993

Gulf Engineers & Consultants, Inc.
ATTN: Howard Nass
P.O. Box 84010
Baton Rouge, LA 70884-4010

RE: River Birch Landfill

Dear Mr. Nass:

Personnel from our staff have reviewed the above mentioned project and have determined that there are no known Wildlife Refuges, endangered species, or ecologically sensitive areas in the vicinity of the project area.

We appreciate the opportunity to review this project.

Sincerely,

Lee Caubarreaux
Assistant Secretary

LC/dm

ATTACHMENT 6

WETLAND DETERMINATIONS

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF:

June 15, 2006

Operations Division
Surveillance and Enforcement Section

Dr. Dana R. Sanders
D.R. Sanders and Associates, Inc.
4017 Lake Wilma Road
Moss Point, MS 39562

Dear Dr. Sanders:

Reference is made to your request, on behalf of Mr. Fred Heebe, for a U.S. Army Corps of Engineers' (Corps) jurisdictional determination on property located in Section 4, Township 13 South, Range 22 East, Jefferson Parish, Louisiana (enclosed map). Specifically, this property is identified as the River Birch Landfill expansion site north of Highway 90, adjacent and south of the railroad right-of-way.

Based on review of recent maps, aerial photography, soils data, information provided with your request, and a brief field investigation on June 15, 2006, we have determined that this property is not in a wetland subject to Corps' jurisdiction. A Department of the Army permit under Section 404 of the Clean Water Act will not be required for the deposition or redistribution of dredged or fill material on this site.

You and your client are advised that this approved jurisdictional determination is valid for a period of 5 years from the date of this letter unless new information warrants revision prior to the expiration date.

Please be advised that this property is in the Louisiana Coastal Zone. For additional information regarding coastal use permit requirements, contact Mr. William Pittman, Coastal Management Division, Louisiana Department of Natural Resources at (225) 342-7591.

Should there be any questions concerning these matters, please contact Mr. Rob Heffner at (504) 862-2274 and reference our Account No. MVN-2006-1442-SU. If you have specific questions regarding the permit process or permit applications, please contact our Eastern Evaluation Section at (504) 862-2766.

Sincerely,

Ronald J. Ventola
Chief, Regulatory Branch

Enclosures

USACE

FI 15 JUN 06

R. HEFFNER

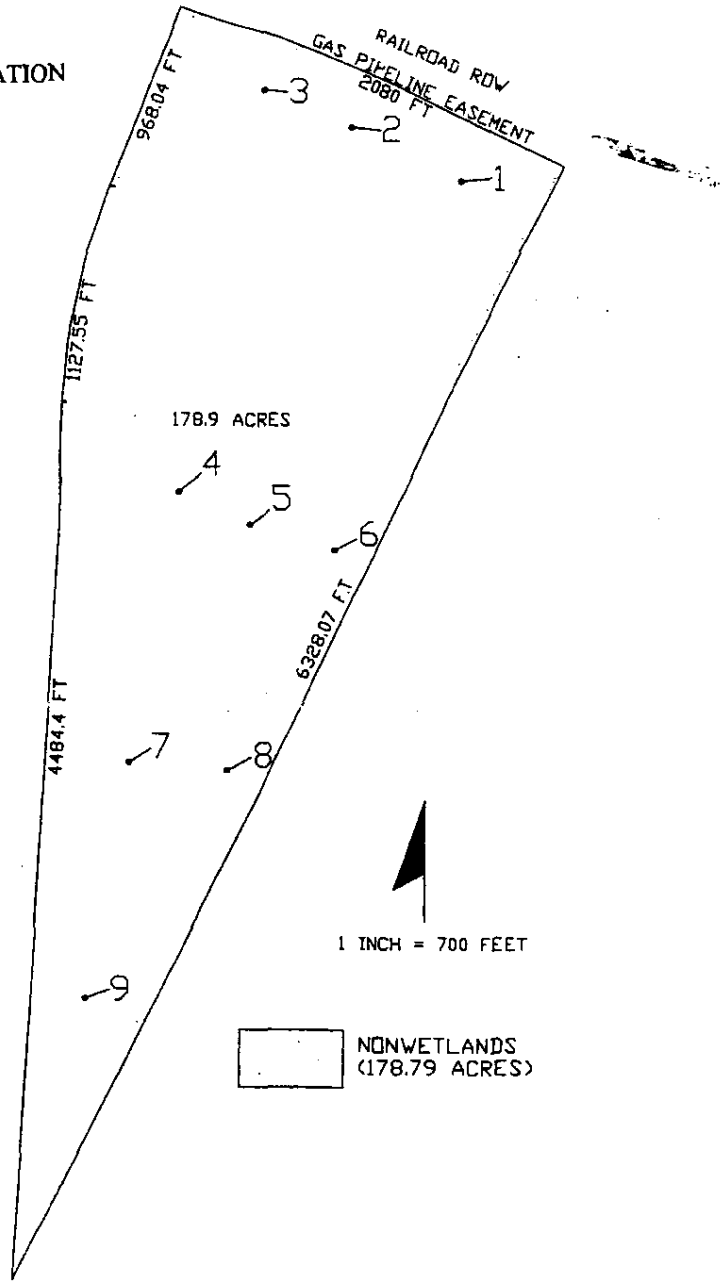
FOR D. SANDERS for RIVER BIRCH LANDFILL

(#MVN 2006-1442)

☐ = NON-WETLAND

FIGURE 2. LOCATION OF MONITORING WELLS

APPROVED
JURISDICTIONAL DETERMINATION



JURISDICTIONAL DETERMINATION Revised 8/13/04
U.S. Army Corps of Engineers

DISTRICT OFFICE: New Orleans
FILE NUMBER: MVN-2006-1442-SU

PROJECT LOCATION INFORMATION:
State: Louisiana
Parish: Jefferson
Center coordinates of site (latitude/longitude): NAD-83 29.93471N / 90.26343W
Approximate size of area (parcel) reviewed, including uplands: 178.79 acres.
Name of nearest waterway:
Name of watershed:

JURISDICTIONAL DETERMINATION
Completed: Desktop determination ☐ Date:
Site visit(s) ☒ Date(s): 15 Jun 06

Jurisdictional Determination (JD):

☐ Preliminary JD - Based on available information, ☐ *there appear to be* (or) ☐ *there appear to be no* "waters of the United States" and/or "navigable waters of the United States" on the project site. A preliminary JD is not appealable (Reference 33 CFR part 331).

☒ Approved JD – An approved JD is an appealable action (Reference 33 CFR part 331).
Check all that apply:

☐ *There are* "navigable waters of the United States" (as defined by 33 CFR part 329 and associated guidance) within the reviewed area. Approximate size of jurisdictional area:

☐ *There are* "waters of the United States" (as defined by 33 CFR part 328 and associated guidance) within the reviewed area. Approximate size of jurisdictional area:

☐ *There are "isolated, non-navigable, intra-state* waters or wetlands" within the reviewed area.
☐ Decision supported by SWANCC/Migratory Bird Rule Information Sheet for Determination of No Jurisdiction.

BASIS OF JURISDICTIONAL DETERMINATION:

A. Waters defined under 33 CFR part 329 as "navigable waters of the United States":
☐ The presence of waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

B. Waters defined under 33 CFR part 328.3(a) as "waters of the United States":
☐ (1) The presence of waters, which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.
☐ (2) The presence of interstate waters including interstate wetlands[1].
☐ (3) The presence of other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate commerce including any such waters (check all that apply):
☐ (i) which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ (ii) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ (iii) which are or could be used for industrial purposes by industries in interstate commerce.
☐ (4) Impoundments of waters otherwise defined as waters of the US.
☐ (5) The presence of a tributary to a water identified in (1) – (4) above.
☐ (6) The presence of territorial seas.
☐ (7) The presence of wetlands adjacent[2] to other waters of the US, except for those wetlands adjacent to other wetlands.

Rationale for the Basis of Jurisdictional Determination (applies to any boxes checked above).

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Mr. Fred Heebe	**File No.:** MVN-2006-1442-SU	**Date:** JUN 21 2006

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
x	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

(over)

REVISED WETLAND DETERMINATION ORIGINAL LANDFILL SITE

NOVEMBER 20, 2006

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF:

November 20, 2006

Operations Division
Surveillance and Enforcement Section

Mr. Stephen J. Burnham
Engineering Associates, Inc.
1415 Delplaza Drive, Suite B
Baton Rouge, Louisiana 70815

Dear Mr. Burnham

Reference is made to your request for a U.S. Army Corps of Engineers' (Corps) jurisdictional determination on property located in Sections 4, 6, 36, and 37, Township 13 South, Range 22 East, Jefferson Parish, Louisiana (enclosed map). Specifically, this property is identified as the River Birch Landfill in South Kenner, LA.

Based on review of recent maps, aerial photography, soils data, and a previous determination, we have determined that this property is not in a wetland subject to Corps' jurisdiction. A Department of the Army permit under Section 404 of the Clean Water Act will not be required for the deposition or redistribution of dredged or fill material on this site.

You are advised that this approved jurisdictional determination is valid for a period of 5 years from the date of this letter unless new information warrants revision prior to the expiration date.

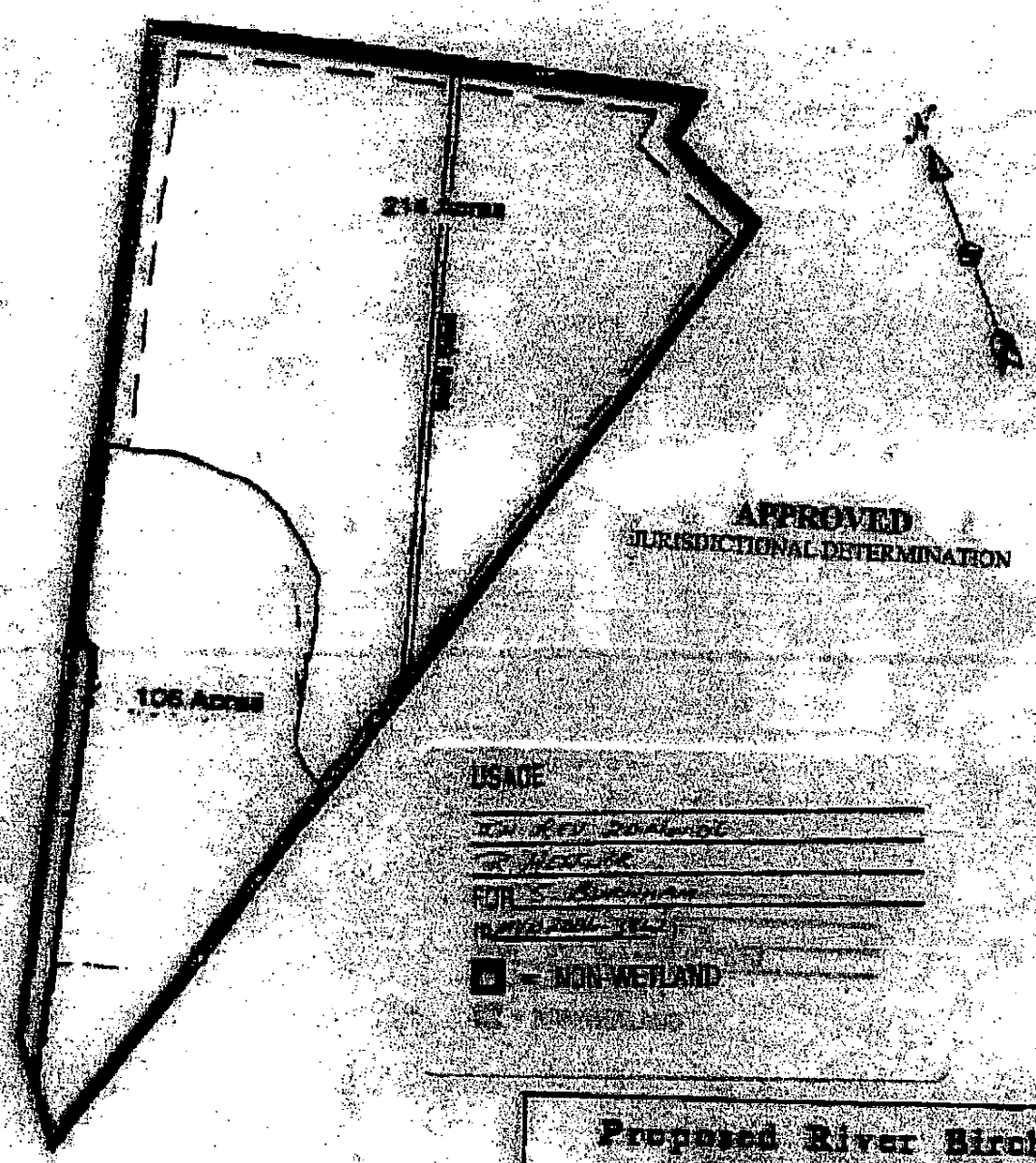
Please be advised that this property is in the Louisiana Coastal Zone. For additional information regarding coastal use permit requirements, contact Mr. William Pittman, Coastal Management Division, Louisiana Department of Natural Resources at (225) 342-7591.

Should there be any questions concerning these matters, please contact Mr. Rob Heffner at (504) 862-2274 and reference our Account No. MVN-2006-3862-SU.

Sincerely,

for Ronald J. Ventola
Chief, Regulatory Branch

Enclosures



APPROVED
JURISDICTIONAL DETERMINATION

USAGE

= NON-WETLAND

Proposed River Birch
Landfill Site
Jefferson Parish, LA

GULF ENGINEERS &
CONSULTANTS, INC.

Mod 6
8-2000

Lateral Extent of Jurisdiction: (Reference: 33 CFR parts 328 and 329)

☒ Ordinary High Water Mark indicated by:
- ☐ clear, natural line impressed on the bank
- ☐ the presence of litter and debris
- ☐ changes in the character of soil
- ☐ destruction of terrestrial vegetation
- ☐ shelving
- ☐ other:

☒ High Tide Line indicated by:
- ☐ oil or scum line along shore objects
- ☐ fine shell or debris deposits (foreshore)
- ☐ physical markings/characteristics
- ☐ tidal gages
- ☐ other:

☒ Mean High Water Mark indicated by:
☐ survey to available datum; ☐ physical markings; ☐ vegetation lines/changes in vegetation types.

☒ Wetland boundaries, as shown on the attached wetland delineation map and/or in a delineation report prepared by:

Basis For Not Asserting Jurisdiction:

☒ The reviewed area consists entirely of uplands.
☒ Unable to confirm the presence of waters in 33 CFR part 328(a)(1, 2, or 4-7).
☒ Headquarters declined to approve jurisdiction on the basis of 33 CFR part 328.3(a)(3).
☒ The Corps has made a case-specific determination that the following waters present on the site are not Waters of the United States:
- ☐ Waste treatment systems, including treatment ponds or lagoons, pursuant to 33 CFR part 328.3.
- ☐ Artificially irrigated areas, which would revert to upland if the irrigation ceased.
- ☐ Artificial lakes and ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.
- ☐ Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons.
- ☐ Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States found at 33 CFR 328.3(a).
- ☐ Isolated, intrastate wetland with no nexus to interstate commerce.
- ☐ Prior converted cropland, as determined by the Natural Resources Conservation Service. Explain rationale:
- ☐ Non-tidal drainage or irrigation ditches excavated on dry land. Explain rationale:
- ☐ Other (explain):

DATA REVIEWED FOR JURISDICTIONAL DETERMINATION (mark all that apply):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant.
☒ Data sheets prepared/submitted by or on behalf of the applicant.
- ☐ This office concurs with the delineation report, dated , prepared by (company):
- ☐ This office does not concur with the delineation report, dated , prepared by (company):

☒ Data sheets prepared by the Corps.
☒ Corps' navigable waters' studies:
☒ U.S. Geological Survey Hydrologic Atlas:
☒ U.S. Geological Survey 7.5 Minute Topographic maps:
☒ U.S. Geological Survey 7.5 Minute Historic quadrangles:
☒ U.S. Geological Survey 15 Minute Historic quadrangles:
☒ USDA Natural Resources Conservation Service Soil Survey:
☒ National wetlands inventory maps:
☒ State/Local wetland inventory maps:
☒ FEMA/FIRM maps (Map Name & Date):
☒ 100-year Floodplain Elevation is: (NGVD)
☒ Aerial Photographs (Name & Date): '95, '98, & '04 aerial infrared
☒ Other photographs (Date):
☒ Advanced Identification Wetland maps:
☒ Site visit/determination conducted on: see Jurisdictional Determination Section at top of previous page
☒ Applicable/supporting case law:
☒ Other information (please specify): previous determination (Wharton, 1999-2707)

[1]Wetlands are identified and delineated using the methods and criteria established in the Corps Wetland Delineation Manual (87 Manual) (i.e., occurrence of hydrophytic vegetation, hydric soils and wetland hydrology).

[2]The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the U.S. by man-made dikes or barriers, natural river berms, beach dunes, and the like are also adjacent.

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Mr. Stephen Burnham	**File No.:** MVN-2006-3862-SU	**Date:** NOV 21 2006

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
x	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

(over)

REVISED
WETLAND DETERMINATION
ORIGINAL LANDFILL SITE
JUNE 18, 1999

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

June 18, 1999

REPLY TO ATTENTION OF:
Operations Division
Surveillance and Enforcement Section

Mr. Tre' Wharton
G.E.C.
Post Office Box 84010
Baton Rouge, Louisiana 70884-4010

Dear Mr. Wharton:

Reference is made to our letter dated August 18, 1994, concerning the wetland status of property located in Sections 4, 6, 36 and 37, Township 13 South, Range 22 East, Jefferson Parish, Louisiana. Specifically, this property is identified as the site of the proposed River Birch Landfill in south Kenner, Louisiana.

Pursuant to your request, we conducted an additional field investigation on June 8, 1999. Based on the results of this investigation and a review of the previous data collected, our determination is that this property is not in a wetland and subject to U.S. Army Corps of Engineers' jurisdiction. A Department of the Army permit under Section 404 of the Clean Water Act will not be required prior to the deposition or redistribution of dredged or fill material on this site.

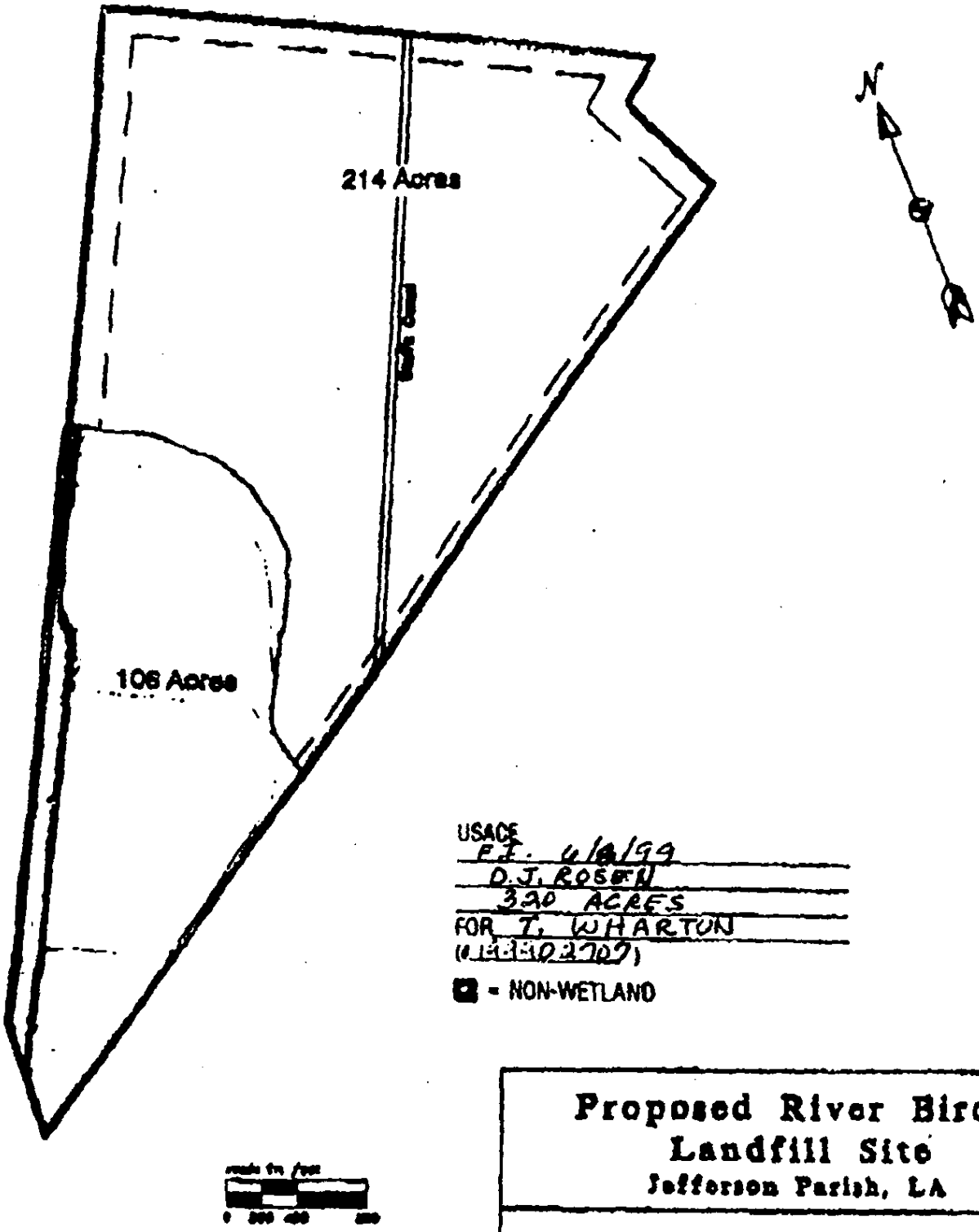
You are advised that this determination is valid for a period of 5 years from the date of this letter, unless new information warrants revision of the delineation before the expiration date.

Should you have any questions concerning this determination, please contact Mr. David Rosen at (504) 862-1273 and reference our Account No. 199902707. If you have specific questions regarding the permit process or permit applications, please contact our Eastern Evaluation Section at (504) 862-2277.

Sincerely,

for Ronald J. Ventola
Chief, Regulatory Branch

ENCLOSURE



Proposed River Birch Landfill Site
Jefferson Parish, LA

GULF ENGINEERS & CONSULTANTS, INC.

WETLAND DETERMINATION
ORIGINAL LANDFILL SITE
AUGUST 18, 1994

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF

August 18, 1994

Operations and Readiness Division
Surveillance and Enforcement Section

Dr. Mike Loden
Gulf Engineers and Consultants, Inc.
Post Office Box 84010
Baton Rouge, Louisiana 70884

Dear Dr. Loden:

Reference is made to your request for a U.S. Army Corps of Engineers jurisdictional determination on the site of a proposed landfill in Sections 4, 6, 36, and 37, T. 13 S., R. 22 E., Jefferson Parish, Louisiana (map enclosed).

Based on the results of field investigations and information provided with your request, we have determined that part of the property is wetland and subject to Corps' jurisdiction. The approximate limit of the wetland is designated in red on the map. A Department of the Army Permit under Section 404 of the Clean Water Act will be required prior to the deposition of dredged or fill material in this wetland.

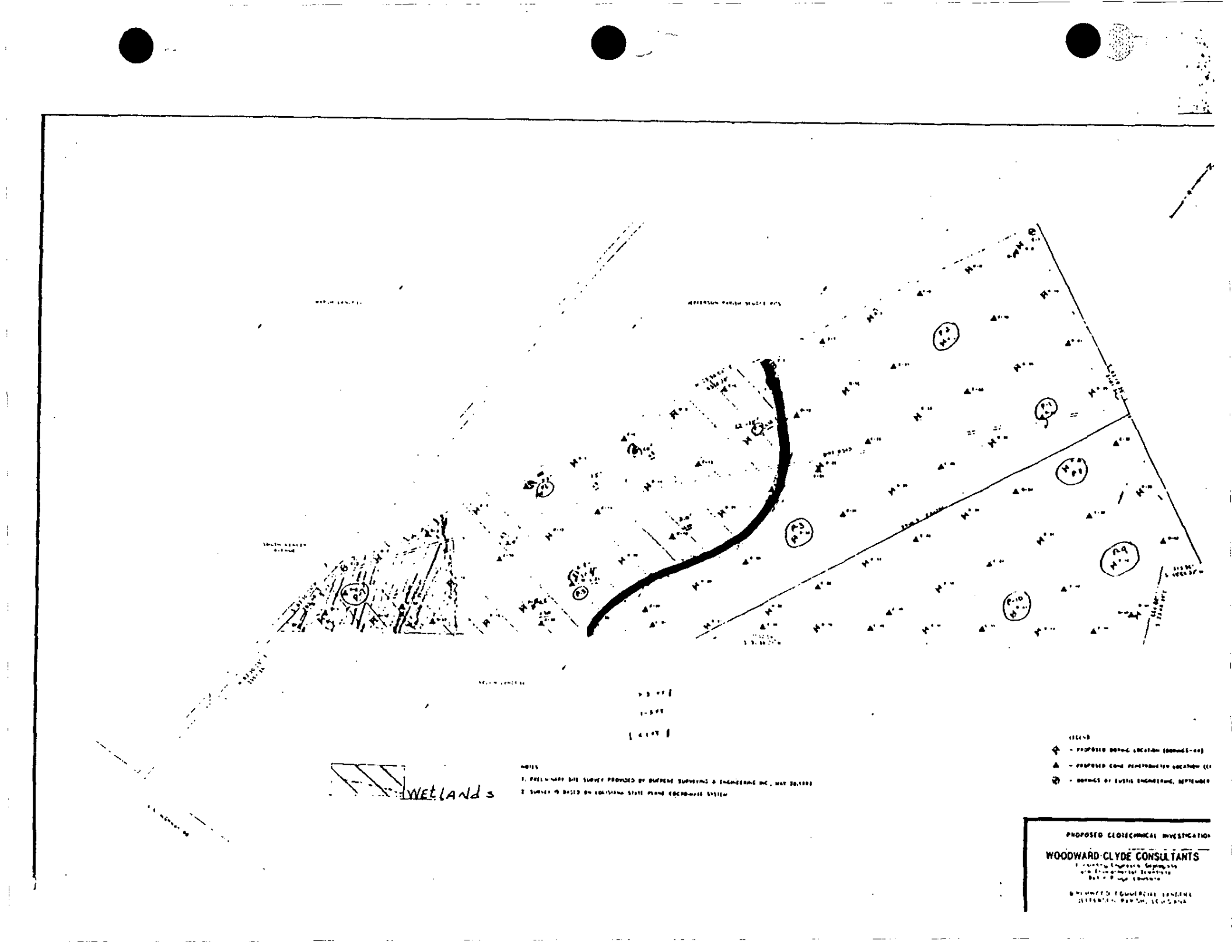
Your client should be advised that this determination is valid for a period of five years from the date of this letter unless new information warrants revision of the delineation before the expiration date. Also, this determination supersedes any previous wetland delineations made by the Corps on this tract.

We apologize for any inconvenience you may have incurred as a result of our delay in responding to your request. Should you have questions concerning these matters, please contact Dr. John Bruza at (504) 862-1288.

Sincerely,

Ronald J. Ventola
Chief, Regulatory Functions Branch
Operations and Readiness Division

Enclosure



PROPOSED GEOTECHNICAL INVESTIGATION

WOODWARD-CLYDE CONSULTANTS

ATTACHMENT 7

WELL DOCUMENTATION

UPDATED
WELL DOCUMENTATION
2003

There are 153 wells within a 2 mile radius of (lat/long) 29:55:09, -90:16:14

Wells Listing

Parish	DOTD Well #	Owner Name	Well Owner #	Driller's Name	Well Depth	Well Use	Casing Size (in)	Drill Date	Latitude	Longitude	Geologic Unit	Available Info
Jefferson	-5240Z	WASTE MANAGE	8N	SOIL TESTING	10	MONITOR	2	09/87	29:55:11	-90:15:25	111NORLC	D W
Jefferson	-5241Z	WASTE MANAGE	9N	SOIL TESTING	20	MONITOR	2	09/87	29:55:11	-90:15:25	111NORLC	D W
Jefferson	-5242Z	WASTE MANAGE	10N	SOIL TESTING	20	MONITOR	2	08/87	29:55:11	-90:15:25	111NORLC	D W
Jefferson	-5243Z	WASTE MANAGE	11N	SOIL TESTING	20	MONITOR	2	08/87	29:55:11	-90:15:25	111NORLC	D W
Jefferson	-5244Z	WASTE MANAGE	12N	SOIL TESTING	10	MONITOR	2	08/87	29:55:11	-90:15:25	111NORLC	D W
St. Charles	-5880Z	SOUTH RECOVERY	F-1	EUSTIS	21	MONITOR	2	12/95	29:54:54	-90:16:29	111NORLC	D W
St. Charles	-5881Z	SOUTH RECOVERY	F-2	EUSTIS	21	MONITOR	2	12/95	29:55:03	-90:16:33	111NORLC	D W
St. Charles	-5882Z	SOUTH RECOVERY	F-3	EUSTIS	19	MONITOR	2	12/95	29:55:33	-90:16:32	111NORLC	D W
Jefferson	-6213Z	SOUTH RECOVERY	F-4	EUSTIS	28	MONITOR	2	01/96	29:56:19	-90:16:04	111NORLC	D W
Jefferson	-6214Z	SOUTH RECOVERY	F-5	EUSTIS	26	MONITOR	2	12/95	29:56:28	-90:15:57	111NORLC	D W
Jefferson	-6215Z	SOUTH RECOVERY	F-6	EUSTIS	24	MONITOR	2	12/95	29:56:17	-90:15:57	111NORLC	D W
Jefferson	-6225Z	SOUTH RECOVERY	F-7	EUSTIS	20	MONITOR	2	12/95	29:55:27	-90:16:03	111NORLC	D W
Jefferson	-6216Z	SOUTH RECOVERY	F-8	EUSTIS	25	MONITOR	2	01/96	29:55:06	-90:16:14	111NORLC	D W
Jefferson	-5282Z	BFI	N-1	EUSTIS	30	PLUGGED	2	10/87	29:54:40	-90:15:40	111NORLC	D W
Jefferson	-5328Z	BFI	N-2	EUSTIS	41	PLUGGED	2	08/87	29:54:38	-90:15:33	111NORLC	D W
Jefferson	-5329Z	BFI	N-3	EUSTIS	38	PLUGGED	2	08/87	29:54:38	-90:15:30	111NORLC	D W
Jefferson	-5330Z	BFI	N-4	EUSTIS	41	PLUGGED	2	08/87	29:54:38	-90:15:27	111NORLC	D W
Jefferson	-5394Z	BFI	N-5	EUSTIS	30	PLUGGED	2	08/87	29:54:38	-90:15:09	111NORLC	D W
Jefferson	-5397Z	BFI	N-7	EUSTIS	30	PLUGGED	2	08/87	29:54:29	-90:15:22	111NORLC	D W

Jefferson	-5805Z	BFI	N-8	EUSTIS	30	PLUGGED	2	09/87	29:54:20	-90:15:34	111NORLC	D W
Jefferson	-5719Z	BFI	N-9	EUSTIS	30	PLUGGED	2	09/87	29:54:29	-90:15:40	111NORLC	D W
Jefferson	-6071Z	RIVER BIRCH INC	P-1	SOIL TESTING	3	PLUGGED	2	01/94	29:56:06	-90:15:22	111NORLC	D W
Jefferson	-6072Z	RIVER BIRCH INC	P-2	SOIL TESTING	3	PLUGGED	2	01/94	29:56:06	-90:15:34	111NORLC	D W
Jefferson	-6327Z	JF LANDFILL	P-2	EUSTIS	25	PLUGGED	2	02/95	29:55:33	-90:15:42	111NORLC	
Jefferson	-6073Z	RIVER BIRCH INC	P-3	SOIL TESTING	3	PLUGGED	2	01/94	29:55:46	-90:15:33	111NORLC	D W
Jefferson	-6074Z	RIVER BIRCH INC	P-4	SOIL TESTING	3	PLUGGED	2	01/94	29:55:51	-90:15:43	111NORLC	D W
Jefferson	-6075Z	RIVER BIRCH INC	P-5	SOIL TESTING	3	PLUGGED	2	01/94	29:55:32	-90:15:47	111NORLC	D W
Jefferson	-6076Z	RIVER BIRCH INC	P-6	SOIL TESTING	3	PLUGGED	2	01/94	29:55:36	-90:15:55	111NORLC	D W
Jefferson	-6077Z	RIVER BIRCH INC	P-7	SOIL TESTING	3	PLUGGED	2	01/94	29:55:20	-90:16:03	111NORLC	D W
Jefferson	-6078Z	RIVER BIRCH INC	P-8	SOIL TESTING	3	PLUGGED	2	01/94	29:56:04	-90:15:18	111NORLC	D W
Jefferson	-6079Z	RIVER BIRCH INC	P-9	SOIL TESTING	3	PLUGGED	2	01/94	29:56:00	-90:15:08	111NORLC	D W
Jefferson	-6322Z	JEFFERSON PAR	R-1	UNKNOWN	25	PLUGGED	2		29:55:10	-90:15:42	111NORLC	
Jefferson	-6328Z	JF LANDFILL	R-2	EUSTIS	24	PLUGGED	2		29:55:10	-90:15:23	111NORLC	
Jefferson	-6528Z	RIVERBIRCH LAND	T-1	SOIL TESTING	20	MONITOR	4	06/99	29:55:59	-90:15:11	111NORLC	D W
Jefferson	-6529Z	RIVERBIRCH LAND	T-2	SOIL TESTING	25	MONITOR	4	06/99	29:56:02	-90:15:18	111NORLC	D W
Jefferson	-6530Z	RIVERBIRCH LAND	T-3	SOIL TESTING	25	MONITOR	4	06/99	29:56:07	-90:15:26	111NORLC	D W
Jefferson	-6607Z	RIVER BIRCH INC	T-7	AQUATERRA, INC.	25	PLUGGED	4	06/00	29:55:48	-90:15:25	111NORLC	D W
Jefferson	-6608Z	RIVER BIRCH INC	T-8	AQUATERRA, INC.	25	PLUGGED	4	06/00	29:55:52	-90:15:32	111NORLC	D W
Jefferson	-6609Z	RIVER BIRCH INC	T-9	AQUATERRA, INC.	25	PLUGGED	4	06/00	29:55:54	-90:15:39	111NORLC	D W
Jefferson	-5039Z	BFI	W-1	EUSTIS	30	PLUGGED	2	08/87	29:54:46	-90:15:31	111NORLC	W
Jefferson	-5040Z	BFI	W-2	EUSTIS	30	PLUGGED	2	08/87	29:54:46	-90:15:26	111NORLC	D W

Jefferson	-5041Z	BFI	W-3	EUSTIS	46	PLUGGED	2	08/87	29:54:40	-90:15:27	111NORLC	D W
Jefferson	-5045Z	BFI	W-4	EUSTIS	31	PLUGGED	2	08/87	29:54:40	-90:15:30	111NORLC	D W
Jefferson	-5260Z	BFI	W-5	EUSTIS	40	PLUGGED	2	08/87	29:54:40	-90:15:33	111NORLC	D W
Jefferson	-6507Z	JF LANDFILL	BW-1	EUSTIS	22	MONITOR	2	05/99	29:55:43	-90:14:33	111NORLC	D W
Jefferson	-6508Z	JF LANDFILL	BW-2	EUSTIS	21	MONITOR	2	05/99	29:55:37	-90:14:42	111NORLC	D W
St. Charles	-5934Z	SOUTH RECOVERY	F-2A	EUSTIS	20	MONITOR	2	10/96	29:55:19	-90:16:37	111NORLC	D W
Jefferson	-6264Z	SOUTH RECOVERY	F-3A	EUSTIS	25	MONITOR	2	10/96	29:55:51	-90:16:21	111NORLC	D W
Jefferson	-6265Z	SOUTH RECOVERY	F-6A	EUSTIS	27	MONITOR	2	10/96	29:55:50	-90:16:01	111NORLC	D W
Jefferson	-5852Z	WESTERN WASTE	MW-1	ENVIRO DRILL	89	MONITOR	4	02/92	29:54:59	-90:15:21	111NORLC	D W
Jefferson	-6522Z	RIVERBIRCH LAND	MW-1	SOIL TESTING	25	MONITOR	4	06/99	29:56:15	-90:15:32	111NORLC	D W
Jefferson	-5853Z	WESTERN WASTE	MW-2	ENVIRO DRILL	87	MONITOR	4	01/92	29:54:47	-90:15:20	111NORLC	D W
Jefferson	-6523Z	RIVERBIRCH LAND	MW-2	SOIL TESTING	25	MONITOR	4	06/99	29:56:14	-90:15:21	111NORLC	D W
Jefferson	-5854Z	SOUTH RECOVERY	MW-3	ENVIRO DRILL	89	PLUGGED	4	02/92	29:54:38	-90:15:22	111NORLC	D W
Jefferson	-6524Z	RIVERBIRCH LAND	MW-3	SOIL TESTING	25	MONITOR	4	06/99	29:56:09	-90:15:14	111NORLC	D W
Jefferson	-5855Z	SOUTH RECOVERY	MW-4	ENVIRO DRILL	89	PLUGGED	4	02/92	29:54:41	-90:15:22	111NORLC	D W
Jefferson	-6525Z	RIVERBIRCH LAND	MW-4	SOIL TESTING	20	MONITOR	4	06/99	29:56:06	-90:15:06	111NORLC	D W
Jefferson	-6526Z	RIVERBIRCH LAND	MW-5	SOIL TESTING	20	MONITOR	4	06/99	29:55:53	-90:15:08	111NORLC	D W
Jefferson	-6527Z	RIVERBIRCH LAND	MW-6	SOIL TESTING	30	MONITOR	4	06/99	29:56:02	-90:15:42	111NORLC	D W
Jefferson	-6558Z	RIVERBIRCH LAND	MW-7	SOIL TESTING	28	MONITOR	4	12/99	29:55:58	-90:15:02	111NORLC	D W
Jefferson	-6559Z	RIVERBIRCH LAND	MW-8	SOIL TESTING	25	MONITOR	4	12/99	29:55:48	-90:15:16	111NORLC	D W
Jefferson	-6560Z	RIVERBIRCH LAND	MW-9	SOIL TESTING	33	MONITOR	4	12/99	29:55:44	-90:15:23	111NORLC	D W
Jefferson	-5815Z	BFI	N-10	EUSTIS	30	PLUGGED	2	09/87	29:54:40	-90:15:45	111NORLC	D W

Jefferson	-5790Z	BFI	N-1R	SOIL TESTING	22	MONITOR	4	09/91	29:54:40	-90:15:40	111NORLC	D W
Jefferson	-5792Z	BFI	N-2R	SOIL TESTING	30	MONITOR	4	09/91	29:54:38	-90:15:33	111NORLC	D W
Jefferson	-5794Z	BFI	N-3R	SOIL TESTING	32	MONITOR	4	09/91	29:54:38	-90:15:30	111NORLC	D W
Jefferson	-5796Z	BFI	N-4R	SOIL TESTING	34	MONITOR	4	09/91	29:54:38	-90:15:27	111NORLC	D W
Jefferson	-5798Z	BFI	N-5R	SOIL TESTING	32	MONITOR	4	09/91	29:54:38	-90:15:09	111NORLC	D W
Jefferson	-5396Z	BFI	N-6I	EUSTIS	30	PLUGGED	2	08/87	29:54:33	-90:15:17	111NORLC	D W
Jefferson	-5395Z	BFI	N-6A	EUSTIS	30	PLUGGED	2	08/87	29:54:36	-90:15:13	111NORLC	D W
Jefferson	-5398Z	BFI	N-7I	EUSTIS	30	PLUGGED	2	09/87	29:54:25	-90:15:28	111NORLC	D W
Jefferson	-5804Z	BFI	N-7R	SOIL TESTING	22	MONITOR	4	09/91	29:54:29	-90:15:22	111NORLC	D W
Jefferson	-5885Z	BFI	N-8I	EUSTIS	30	PLUGGED	2	09/87	29:54:43	-90:15:37	111NORLC	D W
Jefferson	-5801Z	BFI	N-8R	SOIL TESTING	30	MONITOR	4	09/91	29:54:20	-90:15:34	111NORLC	D W
Jefferson	-5720Z	BFI	N-9I	EUSTIS	30	PLUGGED	2	09/87	29:54:35	-90:15:43	111NORLC	D W
Jefferson	-5803Z	BFI	N-9R	SOIL TESTING	22	MONITOR	4	09/91	29:54:29	-90:15:40	111NORLC	D W
Jefferson	-5238Z	WASTE MANAGE	NR-1	SOIL TESTING	20	MONITOR	2	09/87	29:55:11	-90:15:25	111NORLC	D W
Jefferson	-5239Z	WASTE MANAGE	NR-2	SOIL TESTING	20	MONITOR	2	09/87	29:55:11	-90:15:25	111NORLC	D W
Jefferson	-6080Z	RIVER BIRCH INC	P-10	SOIL TESTING	3	PLUGGED	2	01/94	29:55:52	-90:15:13	111NORLC	D W
St. Charles	-5848Z	SOUTH RECOVERY	P-1G	EUSTIS	15	PLUGGED	2	03/95	29:55:24	-90:16:37	111NORLC	D W
St. Charles	-5852Z	SOUTH RECOVERY	P-1G	EUSTIS	15	PLUGGED	4	08/95	29:55:24	-90:16:37	111NORLC	D W
Jefferson	-6181Z	SOUTH RECOVERY	P-2G	EUSTIS	10	PLUGGED	2	03/95	29:56:12	-90:16:00	111NORLC	D W
Jefferson	-6182Z	SOUTH RECOVERY	P-3G	EUSTIS	14	PLUGGED	2	03/95	29:55:18	-90:16:21	111NORLC	D W
Jefferson	-6183Z	SOUTH RECOVERY	P-4G	EUSTIS	8	PLUGGED	2	03/95	29:55:22	-90:16:05	111NORLC	D W
St. Charles	-5849Z	SOUTH RECOVERY	P-5G	EUSTIS	10	PLUGGED	2	03/95	29:55:05	-90:16:34	111NORLC	D W
Jefferson	-6331Z	JF LANDFILL	T-1S	EUSTIS	45	PLUGGED	2	01/93	29:55:14	-90:15:33	111NORLC	
Jefferson	-6330Z	JF LANDFILL	T-7D	EUSTIS	73	PLUGGED	2	09/94	29:55:20	-90:15:27	111NORLC	
Jefferson	-6329Z	JF LANDFILL	T-7S	EUSTIS	43	PLUGGED	2	12/89	29:55:20	-90:15:27	111NORLC	
Jefferson	-5921Z	AMERICAN WASTE	W-01	WOODWARD-CLYDE	11	PLUGGED	2	05/82	29:55:09	-90:15:45	111NORLC	
Jefferson	-5922Z	AMERICAN	W-02	WOODWARD-	9	PLUGGED	2	05/82	29:54:53	-90:15:59	111NORLC	

		WASTE		CLYDE								
Jefferson	-5823Z	AMERICAN WASTE	W-03	WOODWARD-CLYDE	9	PLUGGED	2	05/82	29:55:05	-90:16:04	111NORLC	
Jefferson	-5824Z	AMERICAN WASTE	W-04	WOODWARD-CLYDE	20	PLUGGED	2	05/82	29:55:04	-90:16:04	111NORLC	
Jefferson	-5825Z	AMERICAN WASTE	W-05	WOODWARD-CLYDE	18	PLUGGED	2	05/82	29:54:53	-90:15:49	111NORLC	
Jefferson	-5826Z	AMERICAN WASTE	W-06	WOODWARD-CLYDE	20	PLUGGED	2	05/82	29:55:14	-90:16:03	111NORLC	
Jefferson	-5791Z	BFI	W-1R	SOIL TESTING	28	MONITOR	4	09/91	29:54:46	-90:15:31	111NORLC	D W
Jefferson	-5793Z	BFI	W-2R	SOIL TESTING	30	MONITOR	4	09/91	29:54:46	-90:15:26	111NORLC	D W
Jefferson	-5795Z	BFI	W-3R	SOIL TESTING	28	MONITOR	4	09/91	29:54:40	-90:15:27	111NORLC	D W
Jefferson	-5797Z	BFI	W-4R	SOIL TESTING	40	MONITOR	4	09/91	29:54:40	-90:15:30	111NORLC	D W
Jefferson	-5799Z	BFI	W-5R	SOIL TESTING	27	MONITOR	4	09/91	29:54:40	-90:15:33	111NORLC	D W
Jefferson	-6306Z	JF LANDFILL	GW-1D	WARE LIND	23	MONITOR	2	09/97	29:55:22	-90:15:54	111NORLC	D W
Jefferson	-6307Z	JF LANDFILL	GW-2D	WARE LIND	23	MONITOR	2	09/97	29:55:33	-90:15:51	111NORLC	D W
Jefferson	-6561Z	RIVERBIRCH LAND	MW-10	SOIL TESTING	23	MONITOR	4	12/99	29:55:38	-90:15:33	111NORLC	D W
Jefferson	-6562Z	RIVERBIRCH LAND	MW-11	SOIL TESTING	23	MONITOR	4	12/99	29:55:47	-90:15:50	111NORLC	D W
Jefferson	-6563Z	RIVERBIRCH LAND	MW-12	SOIL TESTING	22	MONITOR	4	12/99	29:55:33	-90:15:39	111NORLC	D W
Jefferson	-6564Z	RIVERBIRCH LAND	MW-13	SOIL TESTING	23	MONITOR	4	12/99	29:55:29	-90:15:46	111NORLC	D W
Jefferson	-6565Z	RIVERBIRCH LAND	MW-14	SOIL TESTING	23	MONITOR	4	12/99	29:55:24	-90:15:54	111NORLC	D W
Jefferson	-6566Z	RIVERBIRCH LAND	MW-15	SOIL TESTING	23	MONITOR	4	12/99	29:55:31	-90:15:58	111NORLC	D W
Jefferson	-5802Z	BFI	N-10R	SOIL TESTING	24	MONITOR	4	09/91	29:54:40	-90:15:45	111NORLC	D W
Jefferson	-5805Z	BFI	N-61R	SOIL TESTING	22	MONITOR	4	09/91	29:54:33	-90:15:17	111NORLC	D W
Jefferson	-5800Z	BFI	N-6AR	SOIL TESTING	24	MONITOR	4	09/91	29:54:36	-90:15:13	111NORLC	D W
Jefferson	-5806Z	BFI	N-71R	SOIL TESTING	22	MONITOR	4	09/91	29:54:25	-90:15:28	111NORLC	D W
Jefferson	-5807Z	BFI	N-81R	SOIL TESTING	24	MONITOR	4	09/91	29:54:23	-90:15:37	111NORLC	D W
Jefferson	-5808Z	BFI	N-91R	SOIL TESTING	24	MONITOR	4	09/91	29:54:35	-90:15:43	111NORLC	D W
Jefferson	-5862Z	AMERICAN WASTE	W-01R	SOILS	11	MONITOR	2	03/92	29:55:11	-90:15:47	111NORLC	D W
Jefferson	-5863Z	AMERICAN	W-02R	SOILS	10	MONITOR	2	03/92	29:54:53	-90:15:39	111NORLC	D W

		WASTE										
Jefferson	-5864Z	AMERICAN WASTE	W-03R	SOILS	10	MONITOR	2	03/92	29:55:06	-90:16:04	111NORLC	D W
Jefferson	-5865Z	AMERICAN WASTE	W-04R	SOILS	20	MONITOR	2	03/92	29:55:05	-90:16:04	111NORLC	D W
Jefferson	-5866Z	AMERICAN WASTE	W-05R	SOILS	18	MONITOR	2	03/92	29:54:53	-90:15:48	111NORLC	D W
Jefferson	-5867Z	AMERICAN WASTE	W-06R	SOILS	19	MONITOR	2	03/92	29:55:18	-90:15:59	111NORLC	D W
Jefferson	-6147Z	WASTE MANAGE	W-31T	SOILS	10	MONITOR	2	02/95	29:54:56	-90:15:45	111NORLC	D W
Jefferson	-6148Z	WASTE MANAGE	W-32T	SOILS	20	MONITOR	2X2	02/95	29:54:56	-90:15:45	111NORLC	D W
Jefferson	-6149Z	WASTE MANAGE	W-33T	SOILS	20	MONITOR	2	02/95	29:54:54	-90:15:41	111NORLC	D W
Jefferson	-6150Z	WASTE MANAGE	W-34T	SOILS	13	MONITOR	2	02/95	29:54:54	-90:15:41	111NORLC	D W
Jefferson	-6151Z	WASTE MANAGE	W-35T	SOILS	20	MONITOR	2	02/95	29:54:52	-90:15:45	111NORLC	D W
Jefferson	-6152Z	WASTE MANAGE	W-36T	SOILS	12	MONITOR	2	02/95	29:54:52	-90:15:45	111NORLC	D W
Jefferson	-6308Z	JF LANDFILL	GW-15U	WARE LND	24	MONITOR	2	09/97	29:55:10	-90:15:41	111NORLC	D W
St. Charles	-5843Z	SOUTH RECOVERY	MMW-01	EUSTIS	55	PLUGGED	4	05/95	29:55:24	-90:16:37	111NORLC	D W
St. Charles	-5850Z	SOUTH RECOVERY	MMW-01	EUSTIS	55	PLUGGED	4	06/95	29:55:24	-90:16:37	111NORLC	D W
Jefferson	-6173Z	SOUTH RECOVERY	MMW-02	EUSTIS	48	PLUGGED	4	03/95	29:56:12	-90:16:00	111NORLC	D W
Jefferson	-6174Z	SOUTH RECOVERY	MMW-03	EUSTIS	50	PLUGGED	4	03/95	29:55:18	-90:16:21	111NORLC	D W
Jefferson	-6175Z	SOUTH RECOVERY	MMW-04	EUSTIS	58	PLUGGED	4	03/95	29:55:22	-90:16:05	111NORLC	D W
St. Charles	-5845Z	SOUTH RECOVERY	MMW-05	EUSTIS	50	PLUGGED	4	05/95	29:55:05	-90:16:34	111NORLC	D W
St. Charles	-5846Z	SOUTH RECOVERY	SMW-01	EUSTIS	23	PLUGGED	4	02/95	29:55:24	-90:16:37	111NORLC	D W
St. Charles	-5851Z	SOUTH RECOVERY	SMW-01	EUSTIS	27	PLUGGED	4	06/95	29:55:24	-90:16:37	111NORLC	D W
Jefferson	-6176Z	SOUTH	SMW-02	EUSTIS	22	PLUGGED	4	02/95	29:56:12	-90:16:00	111NORLC	D W

		RECOVERY										
Jefferson	-6177Z	SOUTH RECOVERY	SMW-03	EUSTIS	28	PLUGGED	4	02/95	29:56:18	-90:16:21	111NORLC	D W
Jefferson	-6178Z	SOUTH RECOVERY	SMW-04	EUSTIS	22	PLUGGED	4	02/95	29:55:22	-90:16:05	111NORLC	D W
St. Charles	-5847Z	SOUTH RECOVERY	SMW-05	EUSTIS	23	PLUGGED	4	02/95	29:55:05	-90:16:34	111NORLC	D W
Jefferson	-6179Z	SOUTH RECOVERY	SMW-06	EUSTIS	14	MONITOR	4	02/95	29:54:49	-90:15:05	111NORLC	D W
Jefferson	-6180Z	SOUTH RECOVERY	SMW-07	EUSTIS	23	PLUGGED	4	02/95	29:54:51	-90:14:53	111NORLC	D W
Jefferson	-6487Z	JEFFERSON PAR	T 76 D	UNKNOWN	45	PLUGGED	2	.	29:55:54	-90:15:05	111NORLC	
Jefferson	-6486Z	JEFFERSON PAR	T 76 S	UNKNOWN	75	PLUGGED	2	.	29:55:54	-90:15:05	111NORLC	
St. Charles	-5342Z	ORYX ENERGY	MARSH 1	GUICHARD	180	PLUGGED	4	08/90	29:54:49	-90:16:47	112GRMC	D W
St. Charles	-5844Z	SOUTH RECOVERY	MMW-01B	EUSTIS	55	PLUGGED	2	04/95	29:55:24	-90:16:37	111NORLC	D W
Jefferson	-6485Z	JEFFERSON PAR	T 76 20	UNKNOWN	25	PLUGGED	2	.	29:55:55	-90:15:04	111NORLC	
Jefferson	-6115Z	RIVER BIRCH INC	B-4; P-1	SOIL TESTING	71	PIEZOMETER	2	08/94	29:55:41	-90:15:48	111NORLC	D W
Jefferson	-6116Z	RIVER BIRCH INC	B-4; P-2	SOIL TESTING	42	PIEZOMETER	2	08/94	29:55:42	-90:15:52	111NORLC	D W
Jefferson	-6117Z	RIVER BIRCH INC	B-4; P-3	SOIL TESTING	20	PIEZOMETER	2	08/94	29:55:41	-90:15:51	111NORLC	D W
Jefferson	-6118Z	RIVER BIRCH INC	B-24; P-1	SOIL TESTING	32	PIEZOMETER	2	08/94	29:56:08	-90:15:24	111NORLC	D W
Jefferson	-6119Z	RIVER BIRCH INC	B-24; P-2	SOIL TESTING	18	PIEZOMETER	2	08/94	29:56:11	-90:15:23	111NORLC	D W
Jefferson	-6120Z	RIVER BIRCH INC	B-31; P-1	SOIL TESTING	38	PIEZOMETER	2	08/94	29:55:38	-90:15:38	111NORLC	D W
Jefferson	-6121Z	RIVER BIRCH INC	B-31; P-2	SOIL TESTING	18	PIEZOMETER	2	08/94	29:55:39	-90:15:30	111NORLC	D W
Jefferson	-5816Z	BFI		UNKNOWN	31	PLUGGED	2	.	29:54:31	-90:15:18	111NORLC	

ORIGINAL
WELL DOCUMENTATION
1993

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
P. O. Box 94245
Baton Rouge, Louisiana 70804-9245

Water Resources Section

(504) 379-1434

EDWIN W. EDWARDS
GOVERNOR

JUDE W. P. PATIN
SECRETARY

September 29, 1993

Mr. Leonard H. Guilbeau
Gulf Engineers & Consultants, Inc.
Post Office Box 84010
Baton Rouge, Louisiana 70884-4010

Re: Water Well Listing
Your Request of: 9-24-93
Single Site

Dear Mr. Guilbeau:

As per your request, we are herewith enclosing the following for your information:

1) Computer printout listing registered water wells and pertinent information about the wells.

2) An explanation of the codes used on the printout.

Please be advised that this list does not include every possible water well which may have been drilled within the referenced coordinates. The list represents only those wells which have been registered with this Department, including those scheduled by the U. S. Geological Survey, and does not include those which are presently being processed.

This information is made available through our cooperative water resources program with the U. S. Geological Survey.

If we may be of any further assistance, please do not hesitate to contact this office.

Very truly yours,

Z. Bolourchi

Zahir "Bo" Bolourchi, P.E.
Chief, Water Resources Section

ZB:mql
5.003
Enclosures (2)

WELL0040
DATE: 09/27/93

LOUISIANA DOTD - WATER WELL REGISTRATION SYSTEM
WATER WELL REPORT SELECTION CRITERIA

		PARISH BOUNDARIES MAX-N	MIN-S	MIN-E	MAX-W
PARISH(ES) REQUESTED	: 051 - JEFFERSON	300301	290942	895313	901648
USES REQUESTED	: ALL - ALL USES				
AQUIFERS REQUESTED	: ALL - ALL AQUIFERS				
WITHIN A	1.0000 MILE RADIUS OF LATITUDE 295546 LONGITUDE 901532				
COMMENTS	: REQUESTED BY:GULF ENGINEERS & CONSULTANTS, INC.				

NUMBER OF RECORDS SELECTED = 18

9/27/93 — LOUISIANA DOTD - WATER WELL REGISTRATION SYSTEM — PAGE 1

WELLRQ01 - REGISTERED WATER WELLS IN JEFFERSON -- SORTED BY WELL NUMBER
REQUESTED BY:GULF ENGINEERS & CONSULTANTS, INC.
WITHIN A 1.0000 MILE RADIUS OF LATITUDE 295646 LONGITUDE 901832

IDENTIFICATION NUMBER	OWNER'S NAME	WELL NUMBER	OWNR NO.	GEOLOGIC UNIT / DRILLER	TOWN SECT	SHIP	RANGE	WELL USE	DEPTH	SUB USE	CASING DIAMETER	MATERIAL	SCREEN DIAMETER	INTERVAL	DATE COMPL	AVAIL INFO	
295511090152501	WASTE MANAGE	-5238Z	NR-1	S.E. LA. AQ. SYSTEM SOIL TESTING	038	13S	22E	SURFICIAL CONFINING UNIT MONITOR	20	--	2	PLASTIC	2	15-20	0987	D	W
295511090152502	WASTE MANAGE	-5239Z	NR-2	S.E. LA. AQ. SYSTEM SOIL TESTING	038	13S	22E	SURFICIAL CONFINING UNIT MONITOR	20	--	2	PLASTIC	2	15-20	0987	D	W
295511090152503	WASTE MANAGE	-5240Z	8N	S.E. LA. AQ. SYSTEM SOIL TESTING	038	13S	22E	SURFICIAL CONFINING UNIT MONITOR	10	--	2	PLASTIC	2	7-10	0987	D	W
295511090152504	WASTE MANAGE	-5241Z	9N	S.E. LA. AQ. SYSTEM SOIL TESTING	038	13S	22E	SURFICIAL CONFINING UNIT MONITOR	20	--	2	PLASTIC	2	15-20	0987	D	W
295511090152505	WASTE MANAGE	-5242Z	10N	S.E. LA. AQ. SYSTEM SOIL TESTING	038	13S	22E	SURFICIAL CONFINING UNIT MONITOR	20	--	2	PLASTIC	2	15-20	0887	D	W
295511090152506	WASTE MANAGE	-5243Z	11N	S.E. LA. AQ. SYSTEM SOIL TESTING	038	13S	22E	SURFICIAL CONFINING UNIT MONITOR	20	--	2	PLASTIC	2	15-20	0887	D	W
295511090152507	WASTE MANAGE	-5244Z	12N	S.E. LA. AQ. SYSTEM SOIL TESTING	038	13S	22E	SURFICIAL CONFINING UNIT MONITOR	10	--	2	PLASTIC	2	7-10	0887	D	W
295612090160001	WESTERN WASTE	-5853Z	MW-2	S.E. LA. AQ. SYSTEM ENVIRO DRILL	004	13S	22E	SURFICIAL CONFINING UNIT MONITOR	87	--	4	PLASTIC	4	77-87	0192	D	W
295549090160201	WESTERN WASTE	-5864Z	MW-3	S.E. LA. AQ. SYSTEM ENVIRO DRILL	004	13S	22E	SURFICIAL CONFINING UNIT MONITOR	88	--	4	PLASTIC	4	78-88	0292	D	W
295522090160501	WESTERN WASTE	-5855Z	MW-4	S.E. LA. AQ. SYSTEM ENVIRO DRILL	004	13S	22E	SURFICIAL CONFINING UNIT MONITOR	89	--	4	PLASTIC	4	79-89	0292	D	W
295511090154701	AMERICAN WASTE	-5862Z	W 01R	S.E. LA. AQ. SYSTEM SOILS	038	12S	22E	SURFICIAL CONFINING UNIT MONITOR	11	--	2	PLASTIC	2	6-11	0392	D	W
295506090160401	AMERICAN WASTE	-5864Z	W 03R	S.E. LA. AQ. SYSTEM SOILS	038	12S	22E	SURFICIAL CONFINING UNIT MONITOR	10	--	2	PLASTIC	2	5-10	0392	D	W
295505090160401	AMERICAN WASTE	-5865Z	W 04R	S.E. LA. AQ. SYSTEM SOILS	038	12S	22E	SURFICIAL CONFINING UNIT MONITOR	20	--	2	PLASTIC	2	15-20	0392	D	W
295518090155901	AMERICAN WASTE	-5867Z	W 06R	S.E. LA. AQ. SYSTEM SOILS	038	12S	22E	SURFICIAL CONFINING UNIT MONITOR	19	--	2	PLASTIC	2	14-19	0392	D	W
295508090154501	AMERICAN WASTE	-5921Z	W 01	S.E. LA. AQ. SYSTEM WOODWARD-CLYDE	038	12S	22E	SURFICIAL CONFINING UNIT MONITOR	11 PA		2				0582		
295505090160402	AMERICAN WASTE	-5923Z	W 03	S.E. LA. AQ. SYSTEM WOODWARD-CLYDE	038	12S	22E	SURFICIAL CONFINING UNIT MONITOR	9 PA		2				0582		
295504090160401	AMERICAN WASTE	-5924Z	W 04	S.E. LA. AQ. SYSTEM WOODWARD-CLYDE	038	12S	22E	SURFICIAL CONFINING UNIT MONITOR	20 PA		2				0582		

BEST COPY

LOUISIANA DOTD - WATE. ELL REGISTRATION SYSTEM
WELLR001 - REGISTERED WATER WELLS IN JEFFERSON -- SORTED BY WELL NUMBER
REQUESTED BY:GULF ENGINEERS & CONSULTANTS, INC.
WITHIN A 1.0000 MILE RADIUS OF LATITUDE 295546 LONGITUDE 901632

IDENTIFICATION NUMBER	OWNER'S NAME	WELL NUMBER	OWNR NO.	GEOLOGIC UNIT DRILLER	TOWN SECT SHIP RANGE	WELL USE	DEPTH SUB USE	CASING DIAMETER MATERIAL	SCREEN DIAMETER INTERVAL	DATE COMPL	AVAIL INFO
295514090160301	AMERICAN WASTE	-59262	W 06	S.E. LA. AQ. SYSTEM SURFICIAL CONFINING UNIT WOODWARD-CLYDE	038 12S 22E	MONITOR	20 PA	2		0582	

NUMBER OF WELLS SELECTED IN PARISH = 18

State of Louisiana

EDWIN W. EDWARDS
GOVERNOR

JOHN F. ALES
SECRETARY

DEPARTMENT OF NATURAL RESOURCES

October 7, 1993

Mr. Leonard Guilbeau
Gulf Engineers and Consultants
Post Office Box 84010
Baton Rouge, Louisiana 70884

Re: Sections 36 and 37
Township 13 South
Range 22 East
Jefferson Parish

Dear Mr. Guilbeau:

Our computer records do not indicate any past or present drilling activity within the above referenced area. However, we do not express any opinion as to the accuracy of these records or as to their completeness. If your inquiry is directed for purposes of a title search, we recommend that you conduct a thorough review of our files.

Should you require additional information concerning the possible participation of the subject acreage in units established by the Office of Conservation, our files are available for review in this regard as well.

Sincerely yours,

H. W. THOMPSON, COMMISSIONER
OFFICE OF CONSERVATION

Charles G. King, Director
Geological Oil and Gas Division

CGK:PFL:ncs

State of Louisiana

EDWIN W. EDWARDS
GOVERNOR

JOHN F. ALES
SECRETARY

H. W. THOMPSON
COMMISSIONER AND
ASSISTANT SECRETARY

DEPARTMENT OF NATURAL RESOURCES

October 5, 1993

Mr. Leonard Guilbeau
Gulf Engineers and Consultants
Post Office Box 84010
Baton Rouge, Louisiana 70884

Re: Sections 2, 6, 29, 33, 34 & 57
Township 13 South
Range 22 East
Jefferson and St. Charles Parishes

Dear Mr. Guilbeau:

Our computer records do not indicate any past or present drilling activity within the above referenced area. However, we do not express any opinion as to the accuracy of these records or as to their completeness. If your inquiry is directed for purposes of a title search, we recommend that you conduct a thorough review of our files.

Should you require additional information concerning the possible participation of the subject acreage in units established by the Office of Conservation, our files are available for review in this regard as well.

Sincerely yours,

H. W. THOMPSON, COMMISSIONER
OFFICE OF CONSERVATION

Charles G. King, Director
Geological Oil and Gas Division

CGK:DPE:rld

State of Louisiana

EDWIN W. EDWARDS
GOVERNOR

JOHN F. ALES
SECRETARY

H. W. THOMPSON
COMMISSIONER AND
ASSISTANT SECRETARY

DEPARTMENT OF NATURAL RESOURCES

October 5, 1993

Mr. Leonard Guilbeau
Gulf Engineers and Consultants
9357 Interline
Baton Rouge, Louisiana 70806

Re: Sections 3, 4, 8, 30 and 38
Township 13 South
Range 22 East
Jefferson and St. Charles
Parishes

Dear Mr. Guilbeau:

Enclosed is a copy of a computer printout indicating drilling activity for the above referenced areas. However, we do not express any opinion as to the accuracy of these records or as to their completeness. If your inquiry is directed for purposes of a title search, we recommend that you conduct a thorough review of our files.

Should you require additional information concerning the possible participation of the subject acreage in units established by the Office of Conservation, our files are available for review in this regard as well.

Sincerely yours,

H. W. THOMPSON, COMMISSIONER
OFFICE OF CONSERVATION

Charles G. King, Director
Geological Oil and Gas Division

CGK:DPE:rld

Enclosures

FACTRD SECTION 003 TOWNSHIP 13S RANGE 22E ( ) ( )
(003) (13S) (22E) DATE: 09/29/93

PAR	SERIAL	ST	FIELD	OPER	WELL NAME	WELL NO	UPPER	LOWER	T-DE
026	970863	61	9739	0158	WASTE DISPOSAL (AMA)	005	3120	3180	490
5	970880	61	9739	0158	WASTE DISPOSAL (AMA)	001	2435	3200	328
.6	970881	61	9739	0158	WASTE DISPOSAL (AMA)	002	3120	3160	330
026	970884	61	9739	0158	WASTE DISPOSAL (AMA)	003	3068	3200	481
026	971014	61	9739	0158	WASTE DISPOSAL (AMA)	004	2415	2480	501
026	971419	03	9739	0158	WASTE DISPOSAL (AMA)	006			

10-6-93

All these Disposal Wells are within American Cyanamid property boundary, over 2000' from River Birch boundary

FASTRD SECTION 004 TOWNSHIP 13S RANGE 22E ( ) ( )
(004) (13S) (22E) DATE: 09/29/93

R	SERIAL	ST	FIELD	OPER	WELL NAME	WELL NO	UPPER	LOWER	T-DEP
5	158556	29	0181	1569	MARSH INVESTMENT CORP 2-28-78	001			11282
5	068215	30	0181	9999	WATERFORD OIL COMPANY	001	10044	10046	10220
045	069983	30	0181	9999	WATERFORD OIL CO	001-D	10001	10007	10220
045	073972	29	0181	9999	WATERFORD	002			10120
045	076499	29	0181	9999	WATERFORD OIL CO	001			9825
045	205669	29	0181	5533	MARSH INVESTMENT CORP	001			15000
045	~~210081~~	03	0181	5804	MARSH INVESTMENT CORP	001- permitted not drilled			13500
045	211210	29	0181	5804	MARSH INVESTMENT CORP	001			14612

FASTRD SECTION 008 TOWNSHIP 13S RANGE 22E ( ) ( )
(008) (13S) (22E) DATE: 09/29/93

AR	SERIAL	ST	FIELD	OPER	WELL NAME	WELL NO	UPPER	LOWER	T-DEP
S	088127	29	9739	6160	JOFFRE P MERCIER	001			10012

FASTRD SECTION 030 TOWNSHIP 13S RANGE 22E ( ) ( )
(030) (13S) (22E) DATE: 09/29/93

R	SERIAL	ST	FIELD	OPER	WELL NAME	WELL NO	UPPER	LOWER	T-DEP
3	093101	09	9721	9999	JOHN L SELLERS ETAL	001			7600
6	145929	29	0181	5875	MARCO INC	001			9797

FASTRD SECTION 038 TOWNSHIP 13S RANGE 22E ( ) ( )
(038) (13S) (22E) DATE: 09/29/93

R	SERIAL	ST	FIELD	OPER	WELL NAME	WELL NO	UPPER	LOWER	T-DEP
	041706	29	9739	5582	MERCIER-MCDONOGH	001			9940

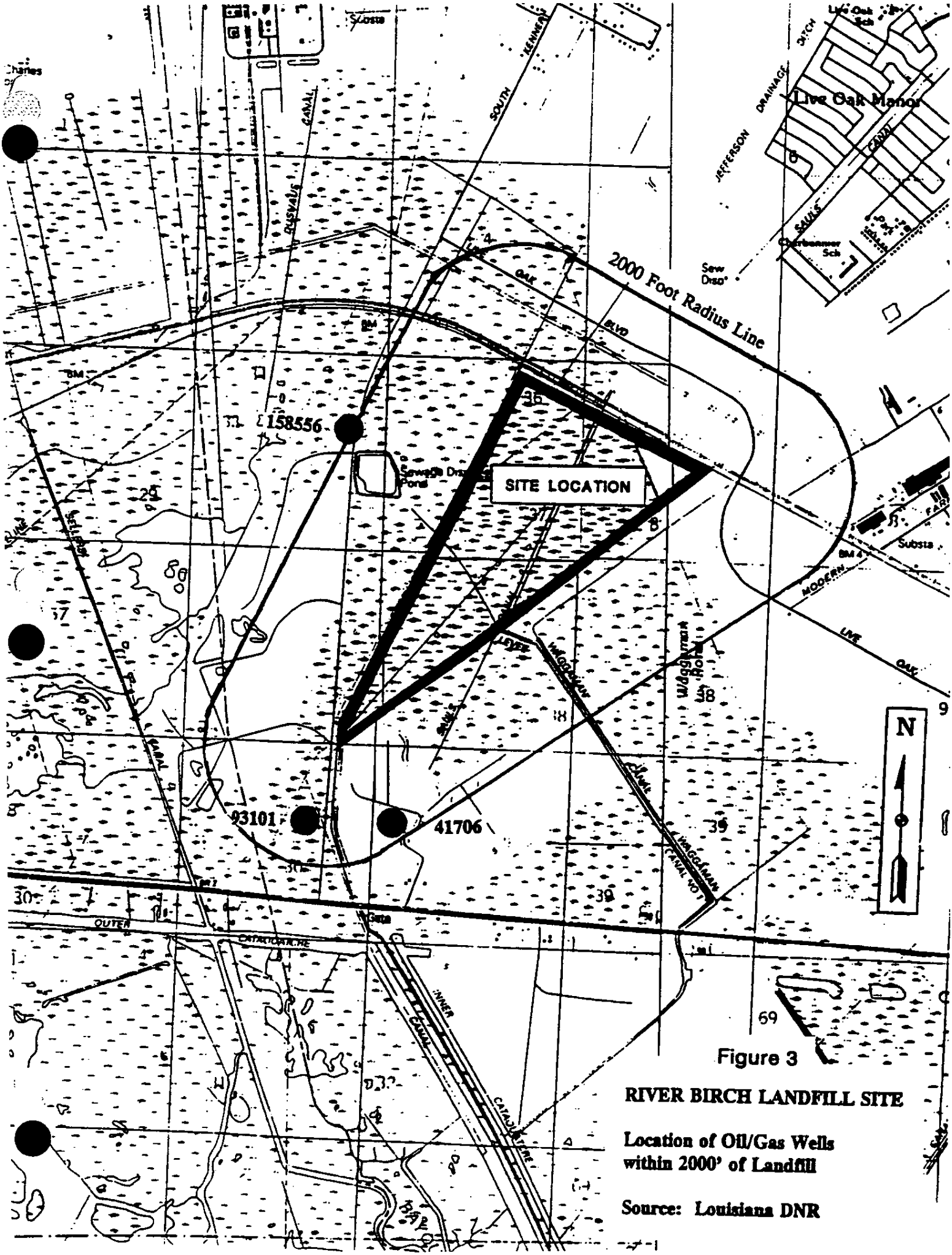


Figure 3

RIVER BIRCH LANDFILL SITE

Location of Oil/Gas Wells within 2000' of Landfill

Source: Louisiana DNR

ATTACHMENT 8

BUFFER WAIVERS

UPDATED BUFFER ZONE CORRESPONDENCE

JEFFERSON PARISH
LOUISIANA

OFFICE OF THE PARISH ATTORNEY

AARON F. BROUSSARD
PARISH PRESIDENT

THOMAS G. WILKINSON
PARISH ATTORNEY
LOUIS G. GRUNTZ, JR.
DEPUTY PARISH ATTORNEY
DEBRA MILLER YENNI
DEPUTY PARISH ATTORNEY

September 29, 2006

Mr. Albert J. Ward, Jr., President
River Birch Incorporated
Post Office Box 1938
Gretna, Louisiana

Re: Resolution No. 76330 adopted by Jefferson Parish Council on March 9, 1994

Dear Mr. Ward:

As the duly appointed attorney for the Parish of Jefferson, State of Louisiana, I am familiar with Resolution No. 76330 adopted by the Parish of Jefferson on March 9, 1994. This Resolution is part of the permanent records of the Parish of Jefferson.

As said Resolution reflects, the Parish of Jefferson waived a two hundred (200') foot buffer zone with respect to the property described therein and adopted a one hundred (100') foot buffer zone in lieu thereof, all in accordance with the Environmental Regulatory Code of the State of Louisiana. Enclosed is a copy of this Resolution.

This Resolution has not expired. To the contrary, it remains in full force and effect and will continue to remain in full force and effect for an indefinite period of time.

Sincerely,

Thomas G. Wilkinson
Parish Attorney

Enclosure
cc: Hon. Aaron F. Broussard, Parish President
Hon. John F. Young, Jr., Council Chairman
Hon. Thomas Capella, Councilman at Large, Dist. "B"
Hon. Chris Roberts, Councilman, Dist. 1
Hon. Elton Lagasse, Councilman, Dist. 2
Hon. Byron Lee, Councilman, Dist. 3
Hon. Louis Congemi, Councilman, Dist. 4
Hon. Jennifer Sneed, Councilwoman, Dist. 5
Ms. Nancy Cassagne, CAA
Mr. Tim Whitmer, Director, Research & Budget

BUFFER ZONE WAIVERS
ORIGINAL SITE

American Red Cross

Office of the General Counsel
National Headquarters
Washington, DC 20006

June 15, 1994

I hereby certify that the following is a true and correct copy of a resolution duly adopted by the Board of Governors of the American National Red Cross at its meeting held June 16, 1955, which resolution is still in full force and effect:

That the President, the Executive Vice President, or any Vice President of the Corporation is hereby authorized and empowered to sell, assign, and transfer any and all real property owned by the corporation or in which it has any interest and to execute and deliver any and all deeds and conveyances with or without covenants of warranty, mortgages, satisfactions, extensions, releases and instruments of partial release of mortgages, contracts for the sale or purchase of real property; leases, licenses, and all other instruments pertaining to real property owned or to be acquired by the corporation; and the Secretary or any Assistant Secretary is hereby authorized and empowered to attest under the seal of the corporation, if necessary, all such documents and instruments of title.

I further certify that the following persons have been duly appointed and are now exercising the functions and authorities of the offices of the American National Red Cross hereafter stated:

Elizabeth H. Dole, President; Jennifer L. Dorn, Senior Vice President; William H. Reno, Senior Vice President; Sharon L. Ritter Smith, Senior Vice President; John Wm. Thomas, Senior Vice President; John D. Campbell, Vice President; Donald W. Jones, Vice President; Sue A. Richter, Vice President; James E. Thomas, III, Vice President; Susan Livingstone, Vice President.

Donald E. Miller
Assistant Secretary

MINUTES OF A SPECIAL MEETING OF
THE BOARD OF DIRECTORS OF RIVER BIRCH INCORPORATED
HELD AT THE OFFICE OF THE CORPORATION ON JULY 6, 1994
AT WHICH A QUORUM WAS PRESENT PURSUANT TO NOTICES PREVIOUSLY GIVEN

The meeting was called to order by the President. Upon motion duly made, seconded and adopted, the following was adopted:

RESOLVED that Willie Dee Barnes Ward, Agent of this corporation, be and she is hereby authorized and empowered to execute any and all documents relative to a Waiver of Buffer Zone relative to the Corporation's property located in Waggaman, Louisiana, designated as Tract W, Live Oak Plantation, which property is intended to be the site of a landfill.

The said agent is further authorized to sign any and all documentation necessary and proper to accomplish the foregoing and to include within such documentation such terms and provisions as the said agent should deem necessary and appropriate and which are not inconsistent with the terms set forth herein.

There being no further business, the meeting was adjourned.

CERTIFICATE

I, the undersigned Secretary of River Birch Incorporated hereby certify that the above and foregoing is a true and correct copy of a resolution adopted by the Board of Directors of said corporation on the 6th day of July, 1994, at a meeting called pursuant to proper notice, at which a quorum was present and voting and said resolution remains in full force and effect.

Gretna, Louisiana this 6th day of July, 1994.

ADREA D. HEEBE, Secretary

ATTEST:

ALBERT J. WARD, JR., President

09/14/1994-51132 02:35:30 PM JEFF PAR 359653 004 CB 2902 890
9451132 CB 2902 890

WAIVER OF BUFFER ZONE

STATE OF LOUISIANA

PARISH OF JEFFERSON

ENTERED INTO, on this the 13th day of September, 1994.

BEFORE ME, LARRY LADOSTA SR, a Notary Public, in and for the Parish of Jefferson, State of Louisiana, duly commissioned and qualified, and in the presence of the witnesses hereinafter named and undersigned, personally came and appeared:

> **PARISH OF JEFFERSON**, a subdivision of the State of Louisiana, (hereinafter referred to as "the Parish") represented herein by Robert B. Evans, Jr., Chairman, Jefferson Parish Council, authorized to appear and act herein under and by virtue of Resolution No. 76330, adopted on the 9th day of March, 1994, a certified copy of which is annexed hereto;

and

BEFORE ME, ADREA D. HEEBE, a Notary Public, in and for the Parish of Jefferson, State of Louisiana, duly commissioned and qualified, and in the presence of the witnesses hereinafter named and undersigned, personally came and appeared:

> **WILLIE DEE BARNES WARD**, a person of the full age of majority and a resident of the Parish of Jefferson, State of Louisiana, whose social security number is 434-32-3294, who declared unto me, Notary, that she has been married but twice, first to Frederick J.R. Heebe, from whom she was divorced by Judgment dated October 19, 1973, Proceedings number 156-270 in the Twenty-Fourth Judicial District Court for the Parish of Jefferson, and second to Albert James Ward, Jr., with whom she is presently living and residing, but with whom she is separate in property per Marriage Contract dated December 12, 1973, recorded and registered in the Parish of Jefferson in COB 805, folio 273, and MOB 625 folio 871, in the Parish of Orleans in COB 803 folio 144 and MOB 2492 folio 639, and in the Parish of St. Tammany in COB 1172 folio 014 and MOB 1022 folio 409, a copy of which is made a part hereof by reference, whose mailing address is #9 Colony Road, Gretna, Louisiana 70056;

and

BEFORE ME, ADREA D. HEEBE, a Notary Public, in and for the Parish of Jefferson, State of Louisiana, duly commissioned and qualified, and in the presence of the witnesses hereinafter named and undersigned, personally came and appeared:

> **RIVER BIRCH INCORPORATED**, a Louisiana Corporation, domiciled in the Parish of Jefferson, State of Louisiana, bearing Tax I.D. Number 72-1217525, created by act before Adrea D. Heebe, Notary Public, dated September 24, 1991, recorded in the Secretary of State's office in Charters Book 343; and recorded in the Clerk of Court's office for the Parish of Jefferson under Entry No. 91-45261, in Charter Book 302 folio 171, represented herein by its duly authorized Agent, Willie Dee Barnes Ward, by virtue of a resolution dated 7-6-94, attached hereto and made a part hereof, whose mailing address is #9 Colony Road, Gretna, Louisiana 70056;

and

BEFORE ME, M. Bonnie Ramsey, a Notary Public, in and for the City of Washington, District of Columbia, duly commissioned and qualified, and in the presence of the witnesses hereinafter named and undersigned, personally came and appeared:

THE AMERICAN NATIONAL RED CROSS, a corporation organized under and by virtue of an Act of Congress of the United States of America, with its domicile in the City of Washington, District of Columbia, herein represented by John D. Campbell, its Vice President Finance/Comptroller, by virtue of the authority conferred upon by the Board of Governors of The American National Red Cross, attached hereto and made a part hereof, whose mailing address is 17th & D Streets, N.W., Washington, D.C. 20006;

who after being duly sworn, did depose and state:

(1) That the Parish of Jefferson is the owner of property, the Jefferson Parish Sludge Lagoon Site, located on Section 4, T13S, R22E, West of the Mississippi River, Parish of Jefferson, Louisiana, and acquired by judgment of expropriation dated March 10, 1981, recorded in COB 1007, folio 619;

(2) That River Birch Incorporated is the owner of property abutting the Jefferson Parish Sludge Lagoon Site, and located on Tract W, Live Oak Plantation, Section 4, T13S, R22E, West of the Mississippi, Jefferson Parish, Louisiana, having acquired same by act dated August 14, 1992, recorded in COB 2750, folio 350;

(3) That the Parish of Jefferson is the owner of property, the Jefferson Parish Kelvin Landfill Site, located on Modern Farms Subdivision, T13S, R22E, West of the Mississippi River, Parish of Jefferson, Louisiana, acquired by act dated July 6, 1979, recorded in COB 961, folio 150;

(4) That Mrs. Willie Dee Barnes Ward is the owner of property abutting the Jefferson Parish Kelvin Landfill Site and located on Parcel H-4, Live Oak Plantation, Section 37, T13S, R22E, West of the Mississippi River, Parish of Jefferson, Louisiana, having acquired same by act dated December 7, 1982, recorded in COB 1037, folio 627;

(5) That the American National Red Cross is the owner of property abutting the Jefferson Parish Kelvin Landfill Site, and located on Tract Y, Section 37, T13S, R22E, West of the Mississippi River, Parish of Jefferson, Louisiana, acquired by act dated December 27, 1971, recorded in COB 752, folio 110;

(6) That all parties hereto agree to waive the 200-foot buffer zone that exists on the Jefferson Parish Sludge Lagoon Site and on the abutting property owned by River Birch, Inc. and the 200-foot buffer zone that exists on the Jefferson Parish Kelvin Landfill Site and on the

abutting properties owned by The American National Red Cross and Mrs. Willie Dee Barnes Ward, all pursuant to the Environmental Regulatory Code of the State of Louisiana 33:VII.7098.2 (1993);

(7) That all parties hereto agree to the creation of 100-foot buffer zones located on the Jefferson Parish Sludge Lagoon Site, the Jefferson Parish Kelvin Landfill Site, and on the abutting properties, which 100 foot buffer zones are more particularly described as:

> A certain 200 foot buffer strip located in Sections 37 and 38, T13S, R22E, southeastern Land District of Louisiana, West of the Mississippi River, and described as follows:
>
> Begin at the intersection of the line between Tract Y (part of Section 37) and Section 38 and the easterly right-of-way line of South Kenner Avenue and go North 3 degrees 30 minutes 25 seconds East along the easterly right of way line of South Kenner Avenue a distance of 131.64 feet; thence go North 52 degrees 58 minutes 21 seconds East along a line 100 feet north of the line between Sections 37 and 38 a distance of 6785.01 feet; thence go South 23 degrees 48 minutes 39 seconds East a distance of 205.48 feet; thence go South 52 degrees 56 minutes 21 seconds West along a line 100 feet south of the line between Sections 37 and 38 a distance of 6909.14 feet to the easterly right of way line of South Kenner Avenue; thence go North 3 degrees 30 minutes 25 seconds East along the easterly right of way line of South Kenner Avenue a distance of 131.64 feet to the POINT OF BEGINNING.
>
> Said 200 foot buffer strip is shown on a survey by Dufrene Surveying & Engineering, Inc. dated May 25, 1993, last revised January 10, 1994.
>
> AND
>
> A certain 200 foot buffer strip located in Section 4, T13S, R22E, southeastern Land District of Louisiana, West of the Mississippi River, and described as follows:
>
> Commence from the intersection of the northwesterly line of Tract W and the easterly right of way line of South Kenner Avenue and go North 25 degrees 58 minutes 04 seconds East along the northwesterly line of Tract W a distance of 2255.24 feet to the southerly line of the Jefferson Parish Sludge Lagoon Property, said point being the POINT OF BEGINNING. Thence go North 63 degrees 58 minutes 35 seconds West along the southerly line of the Jefferson Parish Sludge Lagoon Property a distance of 100 feet; thence go North 25 degrees 58 minutes 04 seconds East along a line 100 feet west of the northwesterly line of Tract W a distance of 2280.00 feet to the northerly line of the Jefferson Parish Sludge Lagoon Property; thence go South 63 degrees 58 minutes 35 seconds East a distance of 200.00 feet; thence go South 25 degrees 58 minutes 04 seconds West along a line 100 feet east of northwesterly line of Tract W a distance of 2280.00; feet to the northerly line of, thence go to the North 63 degrees 58 minutes 35 seconds West a distance of 100.00 feet to the POINT OF BEGINNING.
>
> Said 200 foot buffer strip is shown on a survey by Dufrene Surveying & Engineering, Inc., dated May 25, 1993, last revised January 10, 1994.

(8) That this agreement takes effect only upon the notarized signatures of the duly authorized representatives, as evidenced by certified copies of resolutions attached hereto, of each party to this agreement, and upon River Birch Incorporated obtaining a permit to operate a landfill on their property.

WITNESSES:

Terrie T. Rodrigue

Lupe Dickelmann

SWORN TO AND SUBSCRIBED
before me, Notary, this 12
day of September, 1994.

Larry Radosta Sr.
Notary Public

PARISH OF JEFFERSON

BY: Robert B. Evans Jr.
ROBERT B. EVANS, JR.
CHAIRMAN, JEFFERSON PARISH

WITNESSES:

Emily Barrow

Lena Norton

SWORN TO AND SUBSCRIBED
before me, Notary, this 6th
day of July, 1994.

Adrea D. Heebe
Notary Public
ADREA D. HEEBE

MRS. WILLIE DEE BARNES WARD

BY: Willie Dee Barnes Ward
MRS WILLIE DEE BARNES WARD

WITNESSES:

Emily Barrow

Lena Norton

SWORN TO AND SUBSCRIBED
before me, Notary, this 6th
day of July, 1994.

Adrea D. Heebe
Notary Public
ADREA D. HEEBE

RIVER BIRCH INCORPORATED

BY: Willie Dee Barnes Ward
MRS. WILLIE DEE BARNES WARD
Agent

WITNESSES:

Donald G. Miller

Dorothy Gray

DISTRICT OF COLUMBIA, CITY OF WASHINGTON:

SWORN TO AND SUBSCRIBED
before me, Notary, this 15th
day of June, 1994.

M. Bonnie Ramsey
Notary Public

My Commission Expires February 14, 1998

THE AMERICAN NATIONAL RED CROSS

BY: John D. Campbell
John D. Campbell
(Vice President Finanee/Comptroller

On motion of Mr. Jones, seconded by Mr. Lawson, the following resolution was offered:

RESOLUTION NO. 76330

A resolution authorizing the waiver of 200-foot buffer zones located on property owned by the Parish of Jefferson and on property of abutting landowners, and authorizing the creation of 100-foot buffer zones, all as more fully shown on survey made by Dufrene Survey & Engineering Inc., dated May 25, 1993, revised January 10, 1994, to show 100-foot buffer zones.

WHEREAS, The Parish of Jefferson is the owner of property, the Jefferson Parish Sludge Lagoon site, located on Section 4, T13S, R22E, West of the Mississippi River, Parish of Jefferson, Louisiana, and acquired by judgment of expropriation dated March 10, 1981, and recorded in COB 1007, folio 619; and

WHEREAS, River Birch Incorporated, a Louisiana corporation whose President is Mrs. Willie Dee Barnes Ward, is the owner of property abutting the Jefferson Parish Sludge Lagoon site, and located on Tract W, Live Oak Plantation, Section 4, T13S, R22E, West of the Mississippi River, Parish of Jefferson, Louisiana, acquired by act dated August 14, 1992, and recorded in COB 2750, folio 350; and

WHEREAS, The Parish of Jefferson is the owner of property, the Jefferson Parish Kelven Landfill site, located on Modern Farms Subdivision, T13S, R22E, West of the Mississippi River, Parish of Jefferson, Louisiana, and acquired by act dated July 6, 1979, and recorded in COB 961, folio 150; and

WHEREAS, The American National Red Cross, a corporation organized under and by virtue of an Act of Congress of the United States of America, with its domicile in the City of Washington, District of Columbia, is the owner of property abutting the Jefferson Parish Kelven Landfill site, and located on Tract Y, Live Oak Plantation, Section 37, T13S, R22E, West of the Mississippi River, Parish of Jefferson, Louisiana, acquired by act dated December 27, 1971, and recorded in COB 752, folio 110: and,

WHEREAS, Mrs. Willie Dee Barnes Ward is the owner of property abutting the Jefferson Parish Kelven Landfill site, and located on Parcel H-4, Live Oak Plantation, Section 37, T13S, R22E, West of the Mississippi River, Jefferson Parish, Louisiana, acquired by act dated December 7, 1982, and recorded in COB 1037, folio 627; and,

WHEREAS, a 200-foot buffer zone exists on the Jefferson Parish Sludge Lagoon site and on the abutting property owned by River Birch Inc., and a 200-foot buffer zone exists on the Jefferson Parish Kelven Landfill site and on the abutting properties owned by the American National Red Cross and Mrs. Willie Dee Barnes Ward, all pursuant to the Environmental Regulatory Code of the State of Louisiana 33: VII.709B.2 (1993); and

WHEREAS, All parties desire to waive said 200-foot buffer zones pursuant to the Environmental Regulatory Code of the State of Louisiana 33:VII.709B.2.a (1993), and create 100-foot buffer zones on either side of the abutting property lines.

THE JEFFERSON PARISH COUNCIL HEREBY RESOLVES:

SECTION I. That the Parish of Jefferson authorizes waiver of the 200-foot buffer zones located on the Jefferson Parish Sludge Lagoon site, the Jefferson Parish Kelven Landfill site, and the abutting properties.

SECTION II. That the Parish of Jefferson authorizes creation of 100-foot buffer zones located on the Jefferson Parish Sludge Lagoon site, the Jefferson Parish Kelven Landfill site, and the abutting properties, all as more fully shown on survey made by Dufrene Survey & Engineering Inc., dated May 25, 1993, revised January 10, 1994, to show 100-foot buffer zones.

SECTION III. That this agreement takes effect if and only upon the notarized signatures, of the duly authorized representatives of each abutting property owner required by the Environmental Regulatory Code of the State of Louisiana to sign the Affidavit of Waiver of Buffer Zone.

SECTION IV. That the Council Chairman or in his absence the Vice-Chairman is authorized to sign any and all documents required to carry out the provisions of this resolution.

The foregoing resolution having been submitted to a vote, the vote thereon was as follows:

YEAS: 6 NAYS: None ABSENT: None ABSTAINING: (1) Ward

The resolution was declared adopted on the 9th day of March, 1994. DRD/gl 10362

THE FOREGOING IS CERTIFIED
TO BE A TRUE & CORRECT COPY

Terrie T. Rodrigue

TERRIE T. RODRIGUE
PARISH CLERK
JEFFERSON PARISH COUNCIL

FILED AND RECORDED, JEFFERSON PARISH, LOUISIANA

CB 2902 890 (Inst. #94-51132)

09540534 DATE 95/08/17 AT TUE 11:29:09 MB BOOK 3710 FOL 429

JOHN A. GEDENGEIMER CLERK OF COURT & RECORDER

CERTIFIED TRUE COPY

BY _____ DEPUTY CLERK & RECORDER

BUFFER ZONE WAIVERS
WESTERN PORTION OF SITE

On joint motion of all Councilmen present, the following ordinance was offered:

SUMMARY NO. 20750 ORDINANCE NO. 21731

An ordinance authorizing the exchange of Lot SK-2, being a portion of Section 4, T13S, R24E, Waggaman, Jefferson Parish, for a portion of Willswood Plantation, being a portion of Sections 8 and 39, T13S, R22E, and to provide for related matters. (Council District No. 3).

WHEREAS, Jefferson Parish is the owner of Lot SK-2, Section 4, Township 13 South, Range 24 East, Southeastern Land District of Louisiana, West of the Mississippi River, situated in the Parish of Jefferson, created pursuant to a Plan of Re-subdivision depicted on a survey by Landmark Surveying, Inc. dated June 17, 2002, Jefferson Parish, measuring approximately 78.598 acres, and having acquired said property by judgment rendered in the expropriation proceeding entitled Parish of Jefferson vs. Marsh Investment Corporation, Proceeding No. 11639 of the Fourth Circuit Court of Appeal, State of Louisiana, an appeal from the Twenty-Fourth Judicial District Court for the Parish of Jefferson, Proceeding No. 222-306, which judgment was registered under Instrument Number 981146, and in COB 1009, Folio 619, of the records of Jefferson Parish, Louisiana; and

WHEREAS, Jefferson Parish is also the owner of certain property located in Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River, situated in the Parish of Jefferson, known as the "Jefferson Parish Landfill" (hereinafter referred to as "JP Landfill Property"); and

WHEREAS, HWY-90, LLC is the owner of property located in Sections 8 and 39, T 13 S, R 22 E, as more fully described and designated as parcel "WP-3" on a survey by Landmark Surveying, Inc., dated October 30, 2002, measuring 78.58 acres, situated in the Parish of Jefferson, State of Louisiana (such properties are hereinafter referred to collectively as the "HWY 90 Property"); and

WHEREAS, the HWY 90 Property abuts the JP Landfill Property; and

WHEREAS, Lot SK-2, owned by Jefferson Parish, does not abut the JP Landfill Property and is not currently being used by the Parish in connection with its landfill operations, and is no longer needed for a public purpose; and

WHEREAS, River Birch Corporation owns Lots SK-1 and SK-3, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River, which lots abut Parcel SK-2; and

WHEREAS, River Birch Corporation also owns the reversionary rights to acquire the Lot SK-2 if the same is no longer needed for public purposes; and

WHEREAS, Jefferson Parish desires to acquire a portion of HWY 90 Property which adjoins the JP Landfill Property in order to expand the capacity of the JP Landfill Property; and

WHEREAS, the Jefferson Parish Council has determined that Parcel SK-2 is no longer needed for public purposes and that the Parish would realize significant benefits by exchanging Parcel SK-2 for a portion of the HWY 90 Property adjoining the JP Landfill Property; and

WHEREAS, Wayne Sandoz, a certified real estate appraiser, has appraised said Lot SK-2 for the sum of [redacted] dollars per acre, or a total appraised value equal to the sum of [redacted]; and

WHEREAS, Wayne Sandoz has appraised the HWY 90 Property for the sum of [redacted] dollars per acre, or a total appraised value equal to the sum of [redacted]; and

WHEREAS, HWY-90, LLC desires to acquire Lot SK-2 by exchanging a portion of the HWY 90 Property having an appraised value slightly higher than that of the Expropriation Property; and

WHEREAS, Jefferson Parish desires to enter into an exchange of properties with HWY-90, LLC, pursuant to which such exchange, HWY-90, LLC will acquire Lot SK-2 and Jefferson Parish will acquire a portion of the HWY 90 Property consisting of 78.58 acres, the total value of which is greater than the appraised value of Lot SK-2; and

WHEREAS, HWY-90, LLC and the Parish of Jefferson desire River Birch Corporation to waive and relinquish its reversionary rights to acquire the Expropriation Property in order to allow the Parish of Jefferson to exchange the same for the Hwy 90 Property; and

WHEREAS, the portion of the HWY 90 Property to be acquired by Jefferson Parish

is more fully described and designated as parcel "WP-3" on a survey by Landmark Surveying, Inc., dated October 30, 2002; and

WHEREAS, River Birch Corporation has agreed to relinquish its reversionary rights to acquire Lot SK-2 and River Birch Corporation and Highway 90, LLC agree to reduce the customary two hundred foot (200') buffer zone to one hundred feet (100') between any boundaries between any property owned by River Birch Corporation and/or Highway 90, LLC, and Parcel "WP-3" and any other property which is owned by Jefferson Parish, in return for the Parish of Jefferson agreeing to reduce the customary two hundred foot (200') buffer zone to one hundred feet (100') between any boundaries between any roadway and/or other property owned by the Parish of Jefferson and Lots SK-1 and SK-3, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River and any other property owned by River Birch Corporation.

THE JEFFERSON PARISH COUNCIL HEREBY ORDAINS:

SECTION 1. That the Jefferson Parish Council's hereby declares that Lot SK-2, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River, situated in the Parish of Jefferson, created pursuant to a Plan of Re-subdivision depicted on a survey by Landmark Surveying, Inc. dated June 17, 2002, Jefferson Parish, measuring approximately 78.598 acres, is no longer needed for public purposes.

SECTION 2. That the exchange of properties between Jefferson Parish and HWY-90, LLC, pursuant to which such exchange, HWY-90, LLC will acquire Lot SK-2 and Jefferson Parish will acquire a portion of the HWY 90 Property consisting of 78.58 acres, which property is designated as parcel "WP-3"more fully described on a survey by Landmark Surveying, Inc., dated October 30, 2002, having an appraised value greater than Lot SK-2, is hereby authorized.

SECTION 3. That in consideration for the exchange and as consideration to River Birch Corporation for its release of the reversionary right to acquire Lot SK-2, and River Birch Corporation and Highway 90, LLC agreeing to reduce the customary two hundred foot (200') buffer zone to one hundred feet (100') between any boundaries between any property owned by River Birch Corporation and/or Highway 90, LLC, and Parcel "WP-3" and any other property which is owned by Jefferson Parish the Parish of Jefferson hereby reduces the necessity of having or requiring the customary two hundred foot (200') buffer zone to one hundred feet (100') between the boundaries of any roadways and/or other property owned by the Parish of Jefferson common to (a) Lot SK-2 and other property owned by Hwy 90, L.L.C and (b) Lots SK-1 and SK-3, Section 4, Township 13 South, Range 22 East, Southeastern Land District of Louisiana, West of the Mississippi River and any other property owned by River Birch Corporation which such waiver shall be effective immediately upon the exchange of properties authorized herein.

SECTION. 4. That the Council Chairman, or in his absence, the Vice Chairman, is hereby authorized to sign any and all documents required to carry out the provisions of this Ordinance.

The foregoing Ordinance having been submitted to a vote, the vote thereon was as follows:

YEAS: 5 NAYS: None ABSENT: (1) Muniz ABSTAIN:(1)Ward

This ordinance was declared to be adopted on the 11th day of December, 2002, and shall become effective as follows, if signed forthwith by the Parish President, ten (10) days after adoption, thereafter, upon signature by the Parish President or, if not signed by the Parish President, upon expiration of the time of the ordinances to be considered finally adopted without the signature of the Parish President, as provided in Section 2.07 of the Charter. If vetoed by the Parish President and subsequently approved by the Council, this Ordinance shall become effective on the day of such approval.

01-00212

THE FORGOING IS CERTIFIED
TO BE A TRUE & CORRECT COPY

Terrie T. Rodrigue

TERRIE T. RODRIGUE
PARISH CLERK
JEFFERSON PARISH COUNCIL

ATTACHMENT 9

ZONING CLASSIFICATION

2003
ZONING ORDINANCE

RECEIVE
MAR 0 6 2003

On motion of Mr. Jones, seconded by Mr. Broussard, the following ordinance was offered as amended:

SUMMARY NO. 20810 ORDINANCE NO. 21787

A ordinance amending Ordinance No. 3813, as amended by Ordinance No. 7530 of the Parish of Jefferson, adopted by the Jefferson Parish Council on the 28th day of August, 1958, more particularly creating a new ARTICLE XXXIII INDUSTRIAL DISTRICT M-4, and amending the zoning text to permit landfills and other related uses only in Industrial District M-4, and the subsequent subsections re-lettered accordingly and to reclassify that property in the area as indicated on the map dated 10/28/02 by Coastal Engineering and Environmental Consultants, Inc. **(PARISHWIDE)**

WHEREAS, Jefferson Parish retained the services of Coastal Engineering and Environmental Consultants, Inc. to conduct a text study of the Comprehensive Zoning Ordinance to review landfill regulations and other related uses and a zoning area study to reclassify that property in the area as indicated on a map dated 10/28/02 by Coastal Engineering and Environmental Consultants, Inc; and

WHEREAS, Coastal Engineering and Environmental Consultants, Inc. has recommended the creation of a new Article XXXII.5 Industrial District M-4 to permit landfills and other related uses; and

WHEREAS, Coastal Engineering and Environmental Consultants, Inc. has recommended that property in the area as indicated on a map dated 10/28/02 by Coastal Engineering and Environmental Consultants, Inc. be reclassified from S-1, OW-1, and U-1 to C-1, OW-1, M-1, and M-4, and

WHEREAS, the Planning Director of the Parish of Jefferson has caused to be duly advertised, as prescribed by law, a public hearing in connection with the proposed text amendments to the Jefferson Parish Comprehensive Zoning Ordinance and zoning reclassification of that property in the area as indicated on the map dated 10/28/02 by Coastal Engineering and Environmental Consultants, Inc.; and

WHEREAS, a public hearing was held by the Planning Advisory Board in accordance with law. Now, therefore,

THE JEFFERSON PARISH COUNCIL HEREBY ORDAINS:

SECTION I. That Article I In General, Sec. 40-3 Definitions, of the Jefferson Parish Code of Ordinances is hereby amended to add the following to read as follows:

Composting facility shall mean a facility where organic matter is processed by natural or mechanical means to aid the microbial decomposition of the organic matter. Composting facility as defined in this section shall not include small-scale residential composting for use by the resident.

Solid waste landfill shall mean an establishment primarily engaged in operating landfills for the disposal of nonhazardous solid waste or the combined activity of collecting and/or hauling nonhazardous waste materials within a local area and operating landfills for the disposal of nonhazardous solid waste.

SECTION II. That Article XXXII Industrial District M-3, Secs. 40-607—40-620 Reserved, of the Jefferson Parish Code of Ordinances is hereby amended to read as follows:

Secs. 40-607--40-610. Reserved.

SECTION III. That Chapter 40 Zoning of the Jefferson Parish Code of Ordinances be amended by adding Article XXXII.5 Industrial District M-4 to read as follows:

ARTICLE XXXII.5 INDUSTRIAL DISTRICT M-4

Sec. 40-611. Description.

This district is intended solely for industrial activities relating to or involving waste collection, handling and disposal facilities. The purpose of this district is to allow the normal operation of state permitted landfills and other waste handling, recycling and disposal establishments under such conditions as will protect adjacent land uses. Whenever practical, this district should be buffered from nearby residential areas by more restrictive zoning.

Sec. 40-612. Permitted uses.

(1) Any existing use shall be considered a conforming use and may continue to operate, provided it does not discontinue such use for a period of more than one (1) year.

(2) Unless otherwise provided for in this section, the following uses, as defined and listed in the 2002 North American Industrial Classification System, shall be permitted:

a. Solid Waste Collection (NAICS Code 562111). This industry comprises establishments primarily engaged in one or more of the following:
   1. Collecting and/or hauling nonhazardous solid waste (i.e. garbage) within a local area;
   2. Operating nonhazardous solid waste transfer stations; and
   3. Collecting and/or hauling mixed recyclable materials within a local area.

b. Other Waste Collection (NAICS Code 562119). This industrial classification comprises establishments primarily engaged in collecting and/or hauling waste (except nonhazardous solid waste and hazardous waste) within a local area. Establishments engaged in brush or rubble removal services are included in this industry.

c. Solid Waste Landfill (NAICS Code 562212). This industrial classification comprises establishments engaged in operating landfills for the disposal of nonhazardous solid waste or the combined activity of collecting and/or hauling nonhazardous solid waste materials within a local area and operating landfills for the disposal of nonhazardous solid waste.

d. Other Nonhazardous Waste Treatment and Disposal (NAICS Code 562219). This industrial classification comprises establishments primarily engaged in operating nonhazardous waste treatment and disposal facilities (except landfills, combustors, incinerators and sewer systems or sewage treatment facilities) or the combined activity of collecting and/or hauling of nonhazardous waste materials within a local area and operating waste treatment or disposal facilities (except landfills, combustors, incinerators and sewer systems, or sewage treatment facilities). Compost facilities are included in this industry.

e. Material recovery facilities (NAICS Code 562920). This industrial classification comprises establishments primarily engaged in operating facilities for separating and sorting recyclable materials from nonhazardous waste streams (i.e., garbage) and/or operating facilities where commingled recyclable materials, such as paper, plastics, used beverage cans, and metals, are sorted into distinct categories.

f. Other facilities or activities involving the treatment, storage, disposal or handling of wastes regulated by the United States Environmental Protection Agency, the Louisiana Department of Environmental Quality, the Louisiana Department of Health and Hospitals and the Louisiana Department of Natural Resources, which uses shall require appropriate permits from the above listed agencies.

(3) Hazardous, nuclear or radioactive waste treatment, storage, or disposal facilities shall not be permitted.

(4) Uses described in Sec. 40-612(2) shall not be allowed in any area of Jefferson Parish except the M-4 Industrial District.

(5) Development within the M-4 Industrial District shall meet all federal, state and local fire, safety and building codes, and all other applicable codes.

(6) Approval from the Jefferson Parish Council, as provided for in Article XL (Special Permitted Uses) shall not be required in the M-4 District for those uses described in Section 40-612(2).

Sec. 40-613. Height regulations.

Height limits shall be in accordance with all applicable federal and state regulations.

Sec. 40-614. Area regulations.

(1) Setbacks.

a. All uses must comply with any perimeter setbacks, buffering and security requirements mandated by federal and/or state law.

b. Required setbacks between M-4 uses shall be in accordance with federal and state regulations.

c. There shall be a minimum two hundred (200) foot setback between M-4 uses and other nonresidential zoning districts or public streets and a minimum five hundred (500) foot setback between M-4 uses and any residential zoning district. Private service roads may be located within the required setback area provided they are not used for any waste hauling of any kind or used by any vehicles to discharge waste. The setbacks may also include any drainage or private driveways necessary to access a permitted use.

d. Variances to the minimum setback requirements between M-4 uses and other zoning districts shall not be granted, except upon a finding by the Jefferson Parish Council that granting the variance will not be detrimental to the public welfare or seriously affect or be injurious to other property or improvements in the area in which the property or improvements in the area in which the property for which the variance is sought is located.

e. In the event any of the above regulations related to setbacks are in conflict with other local, state, or federal regulations, the more restrictive shall govern.

(2) Lot area.

a. All uses shall have a minimum size of thirty (30) acres.

Sec. 40-615. Landscape and buffer requirements.

(1) The first twenty (20) feet from any property line which abuts an improved public street shall be landscaped and buffered by trees, shrubs, earth berms, or a combination of the same. In no event shall such buffer be less than seven (7) feet in height.

(2) Within the required setback areas, existing vegetation shall not be disturbed or removed except for paved access areas, landscaping, and security fencing.

(3) A minimum seven (7) foot solid fence shall be provided around the operations. The fence shall not be located within the required setback area.

(4) In the event any of the above regulations related to landscaping and buffering are in conflict with other local, state, or federal regulations, the more restrictive shall govern.

Sec. 40-616. Site plan review.

(1) Variances to the requirements in Sec. 40-615, Landscape and Buffer Requirements, may be granted by the Jefferson Parish Council, upon recommendation by the Planning Department and Planning Advisory Board, provided the following criteria are met:

a. Variances to the fencing provisions may be granted provided the applicant can demonstrate that sufficient tree cover exists in the setback area and will be an adequate substitute for the required solid fence. Tree cover must be at least fifty (50) feet in depth.

b. Other variances to the landscape and buffer requirements may be granted provided that:

1. The applicant can demonstrate a demonstrable hardship in meeting such requirements.

2. An alternative means of satisfying the requirements is proposed to mitigate the variance.

c. Site plans detailing the variances and proposed mitigation shall be submitted to the Planning Department along with

any other information deemed necessary to process that variance request.

d. The applicant shall deposit with the Jefferson Parish Council, through the Planning Department, a fee in the sum of two hundred dollars ($200.00) for each acre of land or portion thereof upon which the variance is requested, the maximum fee for acreage or portion thereof shall not exceed five thousand dollars ($5,000.00) to cover the approximate cost of processing such application.

e. Upon receipt of complete site plans, the Planning Department shall process the request in accordance with Article XLVIII, Changes and Amendments, for general procedures not specified in this section.

Sec. 40-617. Compliance for uses existing at the time of passage of ordinance.

(1) Landfills and other uses permitted under the M-4 Industrial District that existed prior to the passage of the requirements in this ordinance shall be brought into compliance with all provisions of this ordinance under the following condition:

a. Application and receipt of a permit from any state or federal agency to expand existing operations.

Sec. 40-618. Off-street parking requirements.

Shall be provided as set forth in Article XXXV, Off-street Parking and Loading Regulations.

Sec. 40-619. Loading zone requirements.

Shall be provided as set forth in Article XXXV, Off-street Parking and Loading Regulations.

Sec. 40-620. Reserved.

SECTION IV. That Article XXXIV Unrestricted District U-1, Sec. 40-642(1) of the Jefferson Parish Code of Ordinances is hereby amended to read as follows:

Sec. 40-642. Permitted uses.

In U-1 Districts only the following uses of property shall be permitted:

(1) A building or land may be used for any purpose whatsoever not in conflict with any ordinance of the Parish of Jefferson, with the exception of hazardous, radioactive or nuclear waste treatment, storage, or disposal facilities, and uses described in Sec. 40-612(2), which shall not be permitted under any condition and the following uses which shall be permitted only with the approval of the Jefferson Parish Council, and only when not located within three hundred (300) feet of any use other than commercial or industrial.

(11)

Delete Sec. 40-642(11) in its entirety.

SECTION V. That the zoning classification of that property in the area indicated on a map entitled Waggaman Study Area Proposed Zoning, dated 2/13/03, prepared by the Planning Department be reclassified from S-1, OW-1, and U-1 to C-1, OW-1, M-1, M-4, and CPZ, all more clearly shown on said map which is hereby attached and made part of this ordinance.

SECTION VI. That the Planning Director of the Parish of Jefferson is hereby directed, authorized and empowered to make the necessary and appropriate changes and amendments to the Jefferson Parish Comprehensive Zoning Ordinance, more particularly Sec. 40-3, Secs. 40-607—40-620, and Sec. 40-642, and Sheet No. 5 of the Official Zoning Map thereof, designating the above mentioned and described property as being reclassified to C-1, OW-1, M-1, M-4, and CPZ.

SECTION VI. That the Chairman or in his absence, the Vice-Chairman of the Parish Council of Jefferson Parish is hereby empowered, authorized and directed to sign all documents and acts necessary and proper in the premises to give full force and effect to this ordinance.

The foregoing ordinance having been submitted to a vote, the vote thereon was as follows:

YEAS: 7 NAYS: None ABSENT: None

The ordinance was declared to be adopted on this the 26th day of February, 2003, and shall become effective as follows, if signed by the Parish President, ten (10)

days after adoption; thereafter, upon the signature by the Parish President, or, if not signed by the Parish President, upon expiration of the time for ordinances to be considered finally adopted without the signature of the Parish President, as provided in Section 2.07 of the Charter. If vetoed by the Parish President and subsequently approved by the Council, this ordinance shall become effective on the day of such approval.

THE FOREGOING IS CERTIFIED
TO BE A TRUE & CORRECT COPY

Terrie T. Rodrigue

TERRIE T. RODRIGUE
PARISH CLERK
JEFFERSON PARISH COUNCIL

TOTAL P.06

1993 & 1994
ZONING LETTERS

JEFFERSON PARISH
LOUISIANA

PLANNING DEPARTMENT

MICHAEL J YENNI
PARISH PRESIDENT

EDWIN J. DURABB
DIRECTOR

January 31, 1993

Dr. Michael S. Loden,
Gulf Engineers & Consultants, Inc.
1 Galleria Boulevard, Suite 1810
Metairie, Louisiana 70001

Dear Dr. Loden:

The proposed solid waste landfill site to be located on the west bank of Jefferson Parish in Sections 6, 8, 36 and 37 of Township 13 South, Range 22 East, as shown on your enclosed map, which proposed site is located between the existing Kelven Landfill and the Marsh Landfill, north of U. S. Highway 90, is currently zoned U-1, Unrestricted District.

The above-described property may be used for any permitted uses specified under this classification in the Comprehensive Zoning Ordinance of Jefferson Parish, No. 3813, as amended.

Information regarding whether or not the proposed facility violates the zoning restrictions for the area and any documentation stating that the proposed use does not violate existing land-use requirements may be obtained from the Department of Inspection and Code Enforcement, 1221 Elwmood Park Boulevard, Suite 101, Harahan, Louisiana, 70123.

Since your inquiry has been submitted to this office, I will forward your request to the appropriate department for their response. Be advised that separate inquiries should be submitted to the above department in the future.

Sincerely,

Ed Durabb,
Director of Planning

cc: Pete Schneckenburger, Director
Inspection and Code Enforcement

dwh

P.O. BOX 10242. JEFFERSON. LOUISIANA 70181-0242
SUITE 601. 1221 ELMWOOD PARK BOULEVARD. HARAHAN. LOUISIANA 70123 (504) 736-6320

JEFFERSON PARISH
LOUISIANA
INSPECTION & CODE ENFORCEMENT

MICHAEL J. YENNI
PARISH PRESIDENT

ANTHONY J. GIUSTI
DIRECTOR

April 19, 1994

Dr. Michael S. Loden
Gulf Engineers & Consultants, Inc.
1 Galleria Boulevard, Suite 1810
Metairie, Louisiana 70001

Dear Dr. Loden:

Be advised that Section XVII, Sub-Section 2 L) of the Jefferson Parish Comphrensive Zoning Ordinance generally permits a landfill in the U-1 Zoning Classification. It is understood that such landfill can not dispose of hazardous, radioactive, nuclear, infectious or potentially infectious biomedical waste.

Additionally, this use can not be within 300' of any residential use and will require approval of the Jefferson Parish Council.

Sincerely,

Anthony J. Giusti, Director

JC/jv

1221 ELMWOOD PARK BOULEVARD, ROOM 101, HARAHAN, LOUISIANA 70123
P.O. BOX 10242, JEFFERSON, LOUISIANA 70181-0242

ATTACHMENT 10

LETTERS
FROM
EMERGENCY RESPONDERS

Herbert Wallace Memorial Volunteer Fire Company

4040 Hwy 90 Avondale, LA 70094
(504) 349-5576

March 14, 2003

Mr. Albert J. Ward, Jr.
President, River Birch, Inc.
PO BOX 1938
Gretna, LA 70054

Re: Application for Modification of Solid Waste Permit to Accommodate Expansion of River Birch Landfill: Certification of Ability to Meet Response Requirements of the National Fire Protection Association (NFPA 472)

Dear Mr. Ward,

This letter is in response to your request concerning the response capabilities of the Herbert Wallace Memorial Volunteer Fire Department, as related to the planned expansion of the River Birch Landfill located at 2000 South Kenner Road in Waggaman, Louisiana. As you are aware, the Herbert Wallace Memorial Volunteer Fire Department is the closest fire department to River Birch Landfill.

We have been advised that the contemplated expansion of River Birch Landfill will involve the use of the approximately 164-acre tract of land between the current location of River Birch Landfill and the site of the now closed Greater New Orleans Landfill. We have also been advised that the contemplated expansion in this area will increase the permitted capacity of River Birch Landfill from approximately 14 million to approximately 47 million tons. We further understand that the proposed modification will not alter the waste types accepted, but will result in a change in the weekly acceptance rates for various categories of waste and increase the days of operation to include Sunday.

The Herbert Wallace Memorial Volunteer Fire Department has hazardous material incident response personnel who meet the competency levels specified in the National Fire Protection Association (NFPA 472) and who can respond properly and timely to potential hazardous materials and/or emergency incidents at River Birch Landfill. Having assessed the planned expansion, we have determined that it will not adversely affect the ability of the Herbert Wallace Memorial Volunteer Fire Department to respond to a hazardous material and/or emergency incidents at River Birch Landfill and hereby certify that the Herbert Wallace Memorial Volunteer Fire Department has the ability to meet the response requirements set forth in the National Fire Protection Association (NFPA 472). Finally, the Herbert Wallace Memorial Volunteer Fire Department has no objection to being designated as an emergency responder for any hazardous materials incident at the River Birch Landfill, as expanded, pursuant to La.R.S. 30:2157.

Sincerely,

Scott Berthelot
Acting Chief
Herbert Wallace Memorial VFD

West Jefferson Medical Center

1101 Medical Center Boulevard
Marrero, LA 70072
(504) 347-5511

A. Gary Muller, F.A.C.H.E.
President/CEO

Board of Directors:
Steve J. Theriot
Chairman
Jack Owens
Vice-Chairman
Anthony S. Penn, Sr.
Secretary-Treasurer
Richard L. Bagnetto, M.D.
Larry Barnett
Frank C. Di Vincenti, M.D.
Gary V. Hamilton
B. H. Miller, Jr.
Charlotte Roussel
Jim Ward

January 15, 2003

Mr. Albert J. Ward, Jr.
Manager, River Birch Landfill
1400 LaPalco Blvd, Bldg 2
Harvey, Louisiana 70058

RE: Certification of Ability to Meet Response Requirements of Section 473 of the Life Safety Code of the National Fire Protection Association and Certification of Ability to Accept and Treat Patients who are Contaminated With Hazardous Materials.

Dear Mr. Ward:

This letter is in response to your request concerning the emergency medical services ("EMS") response capabilities of West Jefferson Medical Center, as well as the ability of West Jefferson Medical Center to accept and treat patients who are contaminated with hazardous materials, as related to the planned expansion of the River Birch Landfill located at 2000 South Kenner Road in Waggaman, Louisiana. As you know, West Jefferson Medical Center serves as the EMS provider for the River Birch Landfill area. Additionally, West Jefferson Medical Center is the closest community hospital to River Birch Landfill.

We have been advised that the contemplated expansion of River Birch Landfill will involve the use of the approximately 164 acre tract of land between the current location of River Birch Landfill and the site of the now closed Greater New Orleans Landfill. We have also been advised that the contemplated expansion in this area will increase the permitted capacity of River Birch Landfill from 14 million tons to 47 million tons. We further understand that the proposed modification will not alter the waste types accepted, but will result in a change in the weekly acceptance rates for various categories of waste and increase the days of operation to include Sunday.

West Jefferson Medical Center has EMS personnel who meet the competency levels specified in Section 473 of the Life Safety Code of the National Fire Protection Association and who can respond properly and timely to potential hazardous materials and/or emergency incidents at River Birch Landfill. Having assessed the planned expansion, we have determined that it will not adversely affect the ability of West Jefferson Medical Center or its EMS personnel to respond to a hazardous material and/or emergency incident at River Birch Landfill and hereby certify that the West Jefferson Medical Center and its EMS personnel have the ability to meet

the response requirements set forth in section 473 of the Life Safety Code of the National Fire Protection Association. Additionally, West Jefferson Medical Center has no objection to being designated as an emergency responder for any hazardous materials incident at the River Birch Landfill, as expanded, pursuant to La.R.S. 30-2157.

Finally, pursuant to 30:2157.B., West Jefferson Medical Center hereby certifies that it is able to accept and treat patients who are contaminated with hazardous materials. West Jefferson Medical Center offers comprehensive programs and services and was recently recognized by U. S. News and World Report as one of America's Best Hospitals for 2002. West Jefferson Medical Center has the equipment, supplies, facilities, response staff and expertise to properly assess and treat patients due to any potential hazardous materials and/or emergency incident at River Birch Landfill.

Sincerely,

A. Gary Muller, FACHE
President and Chief Executive Officer

AGM/el

ATTACHMENT 11

METEOROLOGICAL DATA
AND
WIND ROSE
FOR
NEW ORLEANS AREA

METEOROLOGICAL DATA FOR 1992

NEW ORLEANS, LOUISIANA

LATITUDE: 29°59' N LONGITUDE: 90°15' W ELEVATION: FT. GRND 4 BARO 20 TIME ZONE: CENTRAL WBAN: 12916

	JAN	FEB	MAR	APR	MAY	JUNE	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	59.6	67.5	71.6	77.0	84.3	89.9	92.2	88.4	85.2	78.7	66.6	60.5	77.1
-Daily Minimum	42.7	49.7	53.3	58.7	67.3	72.6	73.9	73.7	71.9	55.3	48.1	43.9	58.9
-Monthly	51.1	58.3	62.0	68.4	72.8	80.6	83.1	79.6	78.5	69.5	57.4	58.2	68.7
-Monthly Departure	43.0	50.2	53.4	57.4	62.7	72.7	74.2	71.8	71.3	60.8	49.8	52.1	59.9
Extremes													
-Highest	73	79	80	86	91	95	97	95	92	85	82	77	97
-Date	13	18	27	13	24	19	11	10	11	31	1	4	JUL 11
-Lowest	27	33	37	38	48	66	70	62	64	49	31	35	27
-Date	21	10	14	4	9	9	18	30	30	12	30	12	JAN 21
DEGREE DAYS BASE 65 °F:													
Heating	426	203	128	54	5	0	0	0	0	2	240	218	1276
Cooling	0	18	41	103	258	472	568	459	408	149	20	14	2510
% OF POSSIBLE SUNSHINE	38	47	51	55	65	52	60	50	41	63	55	28	51
AVG. SKY COVER (tenths)													
Sunrise - Sunset	7.2	6.2	6.3	5.8	5.4	6.2	5.6	6.6	6.9	4.6	6.5	7.8	6.3
Midnight - Midnight	6.6	6.2	6.4	5.2	5.1	6.0	5.0	6.2	6.5	3.8	6.4	7.7	5.9
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	4	8	8	8	10	8	8	4	3	14	5	3	83
-Partly Cloudy	11	6	7	10	11	10	13	13	14	9	11	6	121
-Cloudy	16	15	16	12	10	12	10	14	13	8	14	22	162
Precipitation .01 inches or more	11	10	9	8	9	11	13	18	17	4	10	14	134
Snow, Ice pellets, hail 1.0 inches or more	0	0	0	0	0	0	0	0	0	0	0	0	0
Thunderstorms	3	5	3	4	5	10	17	13	10	1	1	2	80
Heavy Fog, visibility 1/4 mile or less	0	3	8	2	1	0	0	0	0	2	4	9	29
Temperature °F													
-Maximum													
90° and above	0	0	0	0	3	18	26	14	8	0	0	0	69
32° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
-Minimum													
32° and below	3	0	0	0	0	0	0	0	0	0	2	0	5
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)	1019.0	1015.9	1016.6	1015.6	1015.9	1010.8	1016.9	1015.9	1015.6	1016.9	1017.8	1020.0	1016.4
RELATIVE HUMIDITY (%)													
Hour 00	81	84	87	84	87	89	90	91	88	89	87	90	87
Hour 06 (Local Time)	85	88	86	89	92	93	95	94	92	92	85	90	90
Hour 12	66	64	64	60	56	65	65	66	73	59	65	74	65
Hour 18	71	66	67	64	60	69	71	75	78	74	81	85	72
PRECIPITATION (inches):													
Water Equivalent													
-Total	9.94	8.73	6.69	2.52	0.95	9.52	5.75	9.64	6.63	0.55	15.27	5.68	81.87
-Greatest (24 hrs)	2.28	3.26	3.27	0.71	0.30	3.25	2.14	4.96	2.62	0.37	3.95	2.32	4.96
-Date	22	4- 5	5- 6	6	21	11	24	25-26	25-26	30	23-24	16-17	AUG 25-26
Snow, Ice pellets, hail													
-Total	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T
-Greatest (24 hrs)	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T
-Date			25										MAR 25
WIND:													
Resultant													
-Direction (!!!)	029	054	176	124	137	231	241	086	077	057	054	071	078
-Speed (mph)	3.4	0.9	1.2	2.7	0.9	2.0	3.6	1.5	3.8	3.3	3.5	3.5	1.3
Average Speed (mph)	8.4	8.9	9.8	9.0	7.9	7.2	5.8	7.1	8.0	8.1	9.4	8.6	8.2
Fastest Obs. 1 Min.													
-Direction (!!!)	29	11	31	12	29	36	23	15	34	31	27	30	15
-Speed (mph)	30	25	26	25	29	32	26	39	22	23	33	26	39
-Date	13	4	25	6	24	20	16	26	22	30	22	15	AUG 26
Peak Gust													
-Direction (!!!)	E	N	NW	S	W	W	NE	SE	N	N	S	S	SE
-Speed (mph)	40	33	41	38	36	54	51	66	32	35	40	37	66
-Date	18	17	25	18	24	13	13	26	22	30	21	15	AUG 26

(!!!) See Reference Notes on Page 68

METEOROLOGICAL DATA FOR 1991

NEW ORLEANS, LOUISIANA

LATITUDE: 29°59' N LONGITUDE: 90°15' W ELEVATION: FT GRND [illegible] 20 TIME ZONE: CENTRAL [illegible]

	JAN	FEB	MAR	APR	MAY	JUNE	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	59.1	67.6	72.6	78.8	84.0	89.9	92.5	90.8	87.0	80.0	67	60.3	78.4
-Daily Minimum	46.4	48.8	55.8	63.6	71.0	72.7	74.3	73.5	69.3	61.2	46.3	50.3	62.1
-Monthly	52.8	58.2	64.2	71.2	77.5	81.3	83.4	81.7	78.2	71.6	56.9	55.3	70.3
-Monthly Dewpt.	47.5	48.1	53.8	65.2	71.7	73.1	73.9	73.8	69.2	61.4	45.4	49.3	61.0
Extremes													
-Highest	70	77	84	85	91	97	98	95	95	91	83	83	98
-Date	15	19	27	9	14	5	19	21	13	12	19		[illegible]
-Lowest	33	30	39	45	64	67	68	69	55	44	29	32	29
-Date	14	16	11	2	7	8	26	17	28	18	5	3	NOV
DEGREE DAYS BASE 65 °F:													
Heating	371	196	105	8	0	0	0	0	0	22	312	262	1276
Cooling	2	12	88	202	396	496	580	524	402	233	47	40	3022
% OF POSSIBLE SUNSHINE	23	45	46	29	32	48	46	38	43	56	63	28	42
AVG. SKY COVER (tenths)													
Sunrise - Sunset	8.1	6.6	7.1	8.0	8.4	6.9	6.6	7.1	5.8	5.0	4.7	7.6	6.8
Midnight - Midnight	8.0	6.3	6.9	7.8	7.8	6.9	6.3	6.4	5.2	4.8	4.6	7.2	6.3
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	3	7	7	3	0	3	2	3	9	12	12	3	64
-Partly Cloudy	7	5	4	4	8	13	20	14	9	8	11	9	112
-Cloudy	21	16	20	23	23	14	9	14	12	11	7	19	189
Precipitation .01 inches or more	14	7	7	14	19	17	15	12	9	7	4	8	133
Snow, Ice pellets, hail 1.0 inches or more	0	0	0	0	0	0	0	0	0	0	0	0	0
Thunderstorms	5	1	4	14	12	15	16	13	9	1	0	1	93
Heavy Fog, visibility 1/4 mile or less	7	3	3	0	1	0	0	0	0	2	3	2	21
Temperature °F													
-Maximum													
90° and above	0	0	0	0	2	17	25	22	10	3	0	0	80
32° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
-Minimum													
32° and below	0	1	0	0	0	0	0	0	0	0	6	1	8
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)	1020.0	1019.6	1013.2	1013.9	1013.9	1014.6	1015.7	1015.6	1016.9	1016.3	1021.3	1022.0	1016.9
RELATIVE HUMIDITY (%)													
Hour 00	86	81	80	91	91	91	89	94	86	86	83	85	87
Hour 06 (Local Time)	90	84	84	93	94	92	91	97	91	87	89	88	90
Hour 12	78	62	60	72	76	67	62	66	64	57	53	66	65
Hour 18	81	65	64	79	77	73	71	74	71	73	71	75	73
PRECIPITATION (inches):													
Water Equivalent													
-Total	19.25	5.42	6.27	15.29	14.28	10.71	13.15	7.86	3.44	1.88	2.19	2.63	102.37
-Greatest (24 hrs)	4.26	2.68	2.61	4.07	3.54	2.68	3.38	3.12	1.51	0.77	1.35	1.26	4.26
-Date	10-11	21-22	1	25	8- 9	24-25	6- 7	27-28	PM- 1	28	20-21	27	JAN 10-11
Snow, Ice pellets, hail													
-Total	0.0	0.0	T	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T
-Greatest (24 hrs)	0.0	0.0	T	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T
-Date			2	25									APR 25
WIND:													
Resultant													
-Direction (!!!)	030	038	167	132	122	164	287	231	079	108	068	088	100
-Speed (mph)	5.0	0.7	1.8	6.4	5.4	1.4	1.7	0.1	4.3	4.4	2.8	3.4	2.2
Average Speed (mph)	9.9	10.1	11.9	10.6	9.1	7.0	6.1	5.9	7.4	9.0	9.2	9.4	8.8
Fastest Obs. 1 Min.													
-Direction (!!!)	29	17	19	06	30		14	12	01	17	33	13	
-Speed (mph)	32	24	26	35	35		28	23	23	23	25	24	
-Date	15	19	22	9	9		18	30	24	25	20	20	
Peak Gust													
-Direction (!!!)	W	S	NW	NE	NW		NW	S	N	NE	NW	SW	
-Speed (mph)	48	36	40	47	53		38	39	33	35	35	36	
-Date	15	19	3	9	9		26	30	24	6	20	2	

(!!!) See Reference Notes on Page 68

METEOROLOGICAL DATA FOR 1990

NEW ORLEANS, LOUISIANA

LATITUDE: 29 [illegible] LONGITUDE: 90 [illegible] ELEVATION: [illegible] FT GRND [illegible] FT TIME ZONE: CENTRAL WBAN: 12916

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Max	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
-Daily Min	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
-Monthly	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
-Monthly Depart	[illegible]	[illegible]	[illegible]	[illegible]	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.8	30.8	60
Extremes													
-Highest	79	81	80	86	91	99	[illegible]	101	96	92	84	81	100
-Date	18	3	14	22	27	19	[illegible]	[illegible]	16	9	3	30	AUG [illegible]
-Lowest	23	43	39	45	55	65	[illegible]	74	53	42	41	30	30
-Date	31	26	31	4	7	24	[illegible]	[illegible]	26	27	4	25	DEC 25
DEGREE DAYS BASE 65 °F:													
Heating	253	136	101	41	0	0	0	0	0	22	122	244	959
Cooling	17	40	56	127	353	538	648	597	448	186	50	62	2969
% OF POSSIBLE SUNSHINE	36	34	40	47	38	54	60	61	58	66	61	27	47
AVG. SKY COVER (tenths)													
Sunrise - Sunset	7.0	7.2	7.3	6.5	7.5	5.5	5.6	4.7	4.8	4.2	4.6	7.5	6.1
Midnight - Midnight	6.4	7.0	6.7	5.9	7.2	5.1	5.1	4.6	4.4	3.7	3.8	7.0	5.7
NUMBER OF DAYS:													
Sunrise to Sunset:													
-Clear	4	5	6	4	3	6	11	11	12	15	13	6	92
-Partly Cloudy	8	4	7	12	9	20	20	20	11	8	11	3	119
-Cloudy	19	19	18	14	18	4	[illegible]	[illegible]	7	8	6	22	154
Precipitation .01 inches or more	10	10	8	7	7	4	13	7	7	7	4	8	92
Snow, Ice pellets 1.0 inches or more	0	0	0	0	0	0	0	0	0	0	0	0	0
Thunderstorms	8	6	5	5	5	6	[illegible]	[illegible]	8	4	1	2	69
Heavy Fog, visibility 1/4 mile or less	6	6	0	1	0	0	0	0	0	0	3	6	24
Temperature °F:													
-Maximum													
90° and above	0	0	0	0	3	26	28	28	20	7	0	0	108
32° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
-Minimum													
32° and below	0	0	0	0	0	0	0	0	0	0	0	3	3
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)	1020.0	1019.6	1020.0	1016.9	1013.9	1015.6	1016.3	1015.9	1015.9	1017.3	1020.0	1020.7	1017.6
RELATIVE HUMIDITY (%)													
Hour 00	87		84	84	86	88	[illegible]	86	89	87	84	84	
Hour 06	89		92	88	88	92	[illegible]	94	94	90	90	87	
Hour 12 (Local Time)	66		64	60	64	58	[illegible]	56	59	57	59	66	
Hour 18	73	72	69	63	69	64	[illegible]	62	67	67	71	73	68
PRECIPITATION (inches):													
Water Equivalent													
-Total	7.59	11.45	5.98	4.59	5.87	1.01	2.30	2.45	4.55	2.38	3.21	9.67	61.05
-Greatest (24 hrs)	2.82	3.44	2.49	0.99	2.55	0.60	0.53	0.94	2.50	1.50	1.84	6.81	6.81
-Date	5	21	15-16	27	13	22-23	4- 5	18	11-12	21-22	9	2- 3	DEC 2- 3
Snow, Ice pellets													
-Total	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T
-Greatest (24 hrs)	0.0	0.0	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T
-Date				22									APR 22
WIND:													
Resultant													
-Direction (!!!)	110	105	103	113	137	185	338	297	083	020	064	110	104
-Speed (mph)	1.4	2.5	3.2	2.8	4.4	3.0	0.6	2.2	1.6	3.3	3.0	2.9	1.5
Average Speed (mph)	8.9	11.5	9.6	8.8	9.6	6.7	6.3	6.4	6.0	7.6	8.6	10.4	8.4
Fastest Obs. 1 Min.													
-Direction (!!!)	30	21	15	24	33	04	05	03	05	33	28	25	05
-Speed (mph)	23	28	29	35	37	28	25	30	40	22	28	29	40
-Date	29	21	14	1	27	23	8	30	4	10	9	3	SEP 4
Peak Gust													
-Direction (!!!)	SW	S	SE	SW	NW	NE	W	NE	NE	N	NW	SW	NE
-Speed (mph)	33	41	41	48	52	41	36	52	58	35	37	48	58
-Date	29	15	14	1	27	23	8	30	4	10	9	3	SEP 4

(!!!) See Reference Notes on Page 68

METEOROLOGICAL DATA FOR 1989

NEW ORLEANS, LOUISIANA

LATITUDE: 29°59' N LONGITUDE: 90°15' W ELEVATION: FT GRND BARO TIME ZONE CENTRAL WBAN 12916

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	68.9	64.7	72.2	77.6	86.1	87.1	91.1	91.1	86.5	78.6	71.7	65.7	78.5
-Daily Minimum	51.5	47.1	53.2	59.5	67.9	73.6	75.1	75.1	69.2	58.3	51.1	47.2	60.5
-Monthly	60.2	55.9	62.7	68.5	77.0	80.4	83.1	83.1	77.9	68.4	61.4	56.4	69.5
-Monthly Depot	54.5	47.2	54.6	64.9	68.1	73.5	75.5	75.5	69.2	58.3	51.1	47.2	60.5
Extremes													
-Highest	80	82	83	87	93	91	94	99	88	84	78	78	99
-Date	12	15	28	26	28	20	12	27	3	15	1	1	AUG 27
-Lowest	33	28	33	40	58	62	69	63	58	36	26	17	17
-Date	17	24	6	12	12	17	24	10	30	20	17	23	DEC 23
DEGREE DAYS BASE 65 °F:													
Heating	186	292	155	60	0	0	0	0	0	53	192	559	1497
Cooling	46	43	95	124	363	439	515	525	365	137	70	6	2728
% OF POSSIBLE SUNSHINE	69	70	69	75	86	64	65	73	51	60	39	38	63
AVG. SKY COVER (tenths)													
Sunrise - Sunset	7.8	6.8	6.7	5.4	6.3	7.8	7.5	5.2	5.8	4.4	6.6	6.5	6.4
Midnight - Midnight	7.0	6.3	6.5	5.0	5.8	7.0	7.0	4.6	5.6	4.1	6.1	6.5	5.9
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	2	5	6	10	7	1	1	9	6	17	7	7	79
-Partly Cloudy	9	9	7	8	10	9	15	15	16	5	9	4	116
-Cloudy	20	14	18	12	14	20	15	7	8	9	14	20	170
Precipitation .01 inches or more	9	4	7	10	10	16	18	7	11	4	13	12	121
Snow, Ice pellets 1.0 inches or more	0	0	0	0	0	0	0	0	0	0	0	0	0
Thunderstorms	1	0	3	8	8	17	14	7	7	1	8	2	76
Heavy Fog, visibility 1/4 mile or less	5	5	4	3	0	0	0	0	0	0	4	1	22
Temperature °F													
-Maximum													
90° and above	0	0	0	0	6	5	18	23	8	0	0	0	60
32° and below	0	0	0	0	0	0	0	0	0	0	1	0	1
-Minimum													
32° and below	0	3	0	0	0	0	0	0	0	0	0	10	13
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)	1020.7	1022.4	1016.6	1015.9	1014.8	1013.9	1015.8	1014.6	1013.5	1018.3	1018.0	1020.7	1016.9
RELATIVE HUMIDITY (%)													
Hour 00	91	81	87	87	88	93	93	92	89	91	84	80	88
Hour 06 (Local Time)	91	88	92	91	92	95	96	97	92	92	89	81	92
Hour 12	73	67	68	58	63	71	72	65	69	61	67	62	66
Hour 18	79	69	69	63	68	75	75	69	76	73	77	68	72
PRECIPITATION (inches):													
Water Equivalent													
-Total	2.47	0.15	7.14	3.20	3.50	8.22	8.34	3.31	4.53	0.51	19.81	6.28	67.46
-Greatest (24 hrs)	1.06	0.09	3.69	1.16	1.34	1.90	2.86	1.81	1.82	0.25	12.66	3.14	12.66
-Date	19-20	21	21-22	30	PM- 1	5- 6	23-24	PM- 1	29-30	8	6- 7	7- 8	NOV 6- 7
Snow, Ice pellets													
-Total	0.0	0.0	T	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
-Greatest (24 hrs)	0.0	0.0	T	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
-Date			7		4							22	DEC 22
WIND:													
Resultant													
-Direction (!!!)	084	360	156	123	172	174	215	044	025	041	064	346	083
-Speed (mph)	2.7	2.2	0.9	1.9	3.8	5.3	2.9	0.3	4.9	3.7	2.2	3.4	0.8
Average Speed (mph)	9.0	10.4	10.6	8.9	9.3	8.3	7.2	6.2	7.6	7.2	8.9	9.9	8.6
Fastest Obs. 1 Min.													
-Direction (!!!)	22	18	35	04	27	18	13	02	36	34	29	01	27
-Speed (mph)	23	25	26	26	44	22	28	32	21	23	24	25	44
-Date	14	13	21	29	4	14	31	7	23	19	15	22	MAY 4
Peak Gust													
-Direction (!!!)	SW	S	N	W	W	SE	SE	N	SE	NW	NW	N	W
-Speed (mph)	32	35	38	35	60	32	41	43	37	31	41	36	60
-Date	14	20	21	4	4	27	31	7	12	19	22	22	MAY 4

(!!!) See Reference Notes on Page 68

METEOROLOGICAL DATA FOR 1988

NEW ORLEANS, LOUISIANA

LATITUDE 29°59' N LONGITUDE 90°15' W ELEVATION: FT GRND 4 BARO 20 TIME ZONE CENTRAL WBAN: 12916

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	[illegible]	62.8	70.0	78.1	85.0	87.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
-Daily Minimum	[illegible]	43.5	51.8	58.7	67.5	69.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	56.9
-Monthly	[illegible]	53.[illegible]	60.9	68.4	73.3	78.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	68.[illegible]
-Month's Departure	[illegible]	44.6	50.9	58.9	61.0	70.9	76.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Extremes													
-Highest	79	76	81	90	92	96	95	95	93	88	84	81	96
-Date	18	3	30	24	17	28	1	15	21	12	10	22	JUN 28
-Lowest	29	25	37	47	50	60	69	71	65	48	38	29	25
-Date	25	7	20	11	2	12	28	26	7	15	29	10	FEB 7
DEGREE DAYS BASE 65 °F:													
Heating	490	351	166	23	0	0	0	0	0	12	92	301	1435
Cooling	14	15	49	131	263	411	523	513	448	213	118	30	2628
% OF POSSIBLE SUNSHINE	44	48	55	68	82	68	65	68	72	75	79	74	67
AVG. SKY COVER (tenths)													
Sunrise - Sunset	6.6	6.2	5.9	5.8	3.2	5.9	7.0	6.6	6.2	4.4	5.6	5.6	5.8
Midnight - Midnight	6.3	6.1	5.5	5.5	2.7	5.4	6.2	5.8	5.5	3.8	5.1	5.2	5.3
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	10	10	11	8	18	5	3	3	8	13	6	9	104
-Partly Cloudy	3	5	6	12	7	16	15	15	7	10	15	10	121
-Cloudy	18	14	14	10	6	9	13	13	15	8	9	12	141
Precipitation													
.01 inches or more	10	11	12	7	2	9	14	18	13	5	7	9	117
Snow, Ice pellets													
1.0 inches or more	0	0	0	0	0	0	0	0	0	0	0	0	0
Thunderstorms	0	3	7	5	2	8	13	13	6	3	0	1	61
Heavy Fog, visibility													
1/4 mile or less	3	5	3	0	1	0	0	0	1	0	0	7	20
Temperature °F													
-Maximum													
90° and above	0	0	0	1	5	10	18	16	4	0	0	0	54
32° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
-Minimum													
32° and below	6	4	0	0	0	0	0	0	0	0	0	4	14
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)	1023.4	1021.0	1018.3	1012.5	1014.6	1014.2	1016.9	1013.2	1014.2	1018.6	1016.3	1022.0	1017.1
RELATIVE HUMIDITY (%)													
Hour 00	74	80	82	87	86	92	93	96	90	83	86	86	86
Hour 06	82	87	84	90	92	96	97	98	93	89	89	90	91
Hour 12 (Local Time)	60	65	63	59	48	66	70	74	73	59	64	63	64
Hour 18	66	66	64	65	51	70	77	81	79	73	76	76	70
PRECIPITATION (inches):													
Water Equivalent													
-Total	3.74	11.31	8.90	9.25	1.68	11.28	6.78	7.53	5.86	2.87	1.26	3.94	74.40
-Greatest (24 hrs)	1.67	3.89	2.96	8.08	0.94	7.40	1.72	1.95	1.95	1.46	0.62	2.20	8.08
-Date	24	17-18	3	1- 2	24	9-10	17	18	3- 4	1- 2	16	23	APR 1- 2
Snow, Ice pellets													
-Total	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T
-Greatest (24 hrs)	0.0	T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T
-Date		5- 6											FEB 5- 6
WIND:													
Resultant													
-Direction (!!!)	040	049	134	204	178	119	193	071	068	036	148	060	081
-Speed (mph)	3.3	0.8	2.1	1.2	1.1	1.2	1.7	0.9	3.8	4.0	1.5	2.3	1.2
Average Speed (mph)	10.1	9.5	10.2	9.5	8.4	7.9	7.0	7.0	8.8	8.3	10.2	9.0	8.8
Fastest Obs. 1 Min.													
-Direction (!!!)	19	29	16	27	27	23	08	02	36	04	18	33	36
-Speed (mph)	29	29	28	23	29	30	30	25	39	20	28	28	39
-Date	19	15	3	12	21	19	5	8	10	5	26	28	SEP 10
Peak Gust													
-Direction (!!!)	S	W	S	W	W	W	E	NW	N	NE	S	NW	N
-Speed (mph)	41	37	35	37	41	40	36	39	53	28	41	37	53
-Date	19	15	29	11	21	19	5	23	10	5	26	28	SEP 10

(!!!) See Reference Notes on Page 68

METEOROLOGICAL DATA FOR 1987

NEW ORLEANS, LOUISIANA

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
TEMPERATURE °F:													
Averages													
-Daily Max.													
-Daily Min.													
-Monthly													
-Monthly Dewpt.													
Extremes													
-Highest	76	76	82				96	96		85	81	80	96
-Date	29	14	28								16	26	AUG 27
-Lowest	22	12	34							41	36	19	19
-Date	29	10	31							29	22	4	JAN 29
DEGREE DAYS BASE 65 °F:													
Heating	464	242	168	78	0	0	0	0	1	58	149	333	1378
Cooling	3	4	30	120	372	456	562	580	472	48	53	42	2673
% OF POSSIBLE SUNSHINE	50	43	68	86	83	66	72	68	77	84	56	37	67
AVG. SKY COVER (tenths)													
Sunrise - Sunset	6.4	7.9	5.6	3.2	3.3	3.9	3.7	3.1	4.6	2.5	5.4	7.4	5.0
Midnight - Midnight	6.2	7.8	5.3	3.5	4.3	4.2	3.0	3.5	4.6	3.1	5.0	7.0	5.6
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	9	3	11	13	6	2	1	3	10	23	13	8	103
-Partly Cloudy	6	6	7	7	8	8	13	12	6	4	6	7	104
-Cloudy	16	19	13	10	17	20	16	16	14	4	11	15	158
Precipitation													
.01 inches or more	12	14	8	8	12	20	14	16	8	7	7	8	123
Snow,Ice pellets													
.1 inches or more	0	0	0	1	0	0	0	0	0	0	0	0	0
Thunderstorms	3	4	4	2	10	15	18	14	4	1	3	1	79
Heavy Fog, Visibility 1/4 mile or less	2	2	1	1	1	0	0	0	0	1	1	5	14
Temperature °F													
-Maximum													
90° and above	0	0	0	0	0	23	28	13	0	0	0	0	75
32° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
-Minimum													
32° and below	5	1	0	0	0	0	0	0	0	0	0	0	6
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)	1018.0	1015.6	1014.6	1015.6	1016.2	1014.9	1016.6	1015.6	1014.6	1020.0	1018.6	1018.3	1016.6
RELATIVE HUMIDITY (%)													
Hour 00	82	85	81	79	83	90	91	90	85	81	82	84	85
Hour 06 (Local Time)	89	89	86	87	89	93	94	95	90	84	85	86	90
Hour 12	66	70	58	46	65	62	66	57	57	46	58	64	61
Hour 18	72	74	60	52	75	77	77	76	66	59	71	75	69
PRECIPITATION (inches):													
Water Equivalent													
-Total	8.88	7.38	4.39	2.27	3.46	15.01	6.38	5.05	1.29	0.72	2.92	2.88	60.63
-Greatest (24 hrs)	2.11	2.07	1.81	1.96	1.20	2.55	1.45	1.30	0.90	0.72	1.50	1.89	2.55
-Date	24-25	21-22	23	13-14	25	4- 5	3- 4	26-27	29	26	16	20-21	JUN 4- 5
Snow,Ice pellets													
-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-Greatest (24 hrs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-Date													
WIND:													
Resultant													
-Direction (!!!)	337	060	044	288	147	133	134	239	020	034	061	098	057
-Speed (mph)	2.6	2.5	2.0	2.6	3.3	2.3	1.0	1.2	1.7	4.6	3.3	1.6	1.1
Average Speed (mph)	9.2	10.3	9.2	8.4	6.3	6.7	5.9	5.9	6.4	7.7	9.5	9.4	7.9
Fastest Obs. 1 Min.													
-Direction (!!!)	13	21	16	26	16	23	12	25	24	01	14	28	16
-Speed (mph)	28	31	38	23	23	25	23	24	23	23	31	30	38
-Date	3	28	17	15	25	18	30	11	17	21	16	15	MAR 17
Peak Gust													
-Direction (!!!)	SE	S	S	N	SW	SW	S	W	SW	N	S	W	S
-Speed (mph)	38	44	47	37	36	39	38	31	30	31	39	38	47
-Date	3	28	17	3	12	18	4	11	17	21	16	15	MAR 17

(!!!) See Reference Notes on Page 68

METEOROLOGICAL DATA FOR 1986

NEW ORLEANS, LOUISIANA

LATITUDE: 29°59' N LONGITUDE: 90°15' W ELEVATION: [illegible] GMT [illegible] BARO [illegible] TIME ZONE: CENTRAL ABOVE [illegible]

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	61.8	68.7	[illegible]	78.6	86.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
-Daily Minimum	40.5	49.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
-Monthly	51.2	59.2	60.8	[illegible]	76	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
-Monthly Depart.	40.9	50.3	48.[illegible]	57.7	67.4	5.[illegible]	[illegible]	6.[illegible]	2.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Extremes													
-Highest	76	80	82	86	91	92	100	[illegible]	93	[illegible]	[illegible]	[illegible]	[illegible]
-Date	21	20	10	7	31	29	30	[illegible]	6	[illegible]	[illegible]	[illegible]	[illegible]
-Lowest	26	29	33	41	57	69	70	[illegible]	67	48	39	[illegible]	[illegible]
-Date	28	12	1	11	21	18	9	31	15	18	14	[illegible]	[illegible]
DEGREE DAYS BASE 65 °F:													
Heating	421	195	160	28	0	0	0	0	0	28	88	[illegible]	[illegible]
Cooling	0	40	32	99	370	487	[illegible]	524	488	203	127	9	2952
% OF POSSIBLE SUNSHINE	57	49	77	76	70	64	74	67	71	63	31	36	63
AVG. SKY COVER (tenths)													
Sunrise - Sunset	5.2	6.5	4.4	5.9	6.6	7.7	[illegible]	6.8	6.9	6.0	9.0	[illegible]	[illegible]
Midnight - Midnight	4.5	6.1	4.0	5.0	6.0	6.9	[illegible]	6.3	5.9	5.4	8.7	[illegible]	[illegible]
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	12	8	15	6	3	[illegible]	[illegible]	7	1	9	0	[illegible]	[illegible]
-Partly Cloudy	7	5	6	14	15	[illegible]	20	7	17	8	[illegible]	[illegible]	[illegible]
-Cloudy	12	15	10	10	13	18	10	17	12	14	26	21	178
Precipitation .01 inches or more	7	9	6	4	8	13	10	11	10	7	13	11	109
Snow, Ice pellets 1.0 inches or more	0	0	0	0	0	0	0	0	0	0	0	0	0
Thunderstorms	1	6	[illegible]	2	6	[illegible]	[illegible]	[illegible]	[illegible]	2	3	[illegible]	[illegible]
Heavy Fog, visibility 1/4 mile or less	3	3	3	2	0	0	0	0	0	0	3	3	17
Temperature °F													
-Maximum													
90° and above	0	0	0	0	[illegible]	18	31	20	21	6	0	[illegible]	[illegible]
32° and below	0	0	0	0	0	0	0	0	0	0	0	[illegible]	0
-Minimum													
32° and below	6	3	0	0	0	0	0	0	0	0	0	0	9
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)	1021.7	1015.2	1019.0	1016.5	1013.9	1014.9	[illegible]	[illegible]	[illegible]	1018.0	1017.3	1020.0	[illegible]
RELATIVE HUMIDITY (%)													
Hour 00	80	85	81	86	88	94	[illegible]	[illegible]	89	88	90	87	87
Hour 06	83	86	87	90	93	[illegible]	[illegible]	[illegible]	95	91	92	88	91
Hour 12 (Local Time)	57	64	50	[illegible]	61	[illegible]	[illegible]	[illegible]	63	62	78	72	63
Hour 18	64	68	54	62	67	[illegible]	[illegible]	[illegible]	74	77	84	82	71
PRECIPITATION (inches):													
Water Equivalent													
-Total	3.49	2.93	1.88	1.50	1.61	8.87	3.60	6.74	1.42	2.87	7.90	5.05	47.86
-Greatest (24 hrs)	1.32	1.50	0.92	1.23	0.71	2.92	1.37	1.83	0.38	1.14	2.86	2.36	2.92
-Date	25	4- 5	19-20	19-20	18-19	9	6	26	12	12-13	10-11	22-23	JUN 9
Snow, Ice pellets													
-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-Greatest (24 hrs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-Date													
WIND:													
Resultant													
-Direction (!!!)	008	234	103	149	148	178	238	328	125	076	052	028	100
-Speed (mph)	3.1	0.6	1.7	2.4	4.2	2.3	3.4	0.9	3.2	2.2	2.5	5.1	0.9
Average Speed (mph)	9.1	10.8	9.2	9.0	9.1	6.7	6.7	6.6	6.8	7.5	9.8	8.6	8.3
Fastest Obs. 1 Min.													
-Direction (!!!)	32	20	16	35	18	24	16	35	06	18	18	06	35
-Speed (mph)	23	29	30	28	20	30	24	33	23	23	29	26	33
-Date	27	14	18	12	25	16	14	2	20	12	25	22	AUG 2
Peak Gust													
-Direction (!!!)	N	SW	S	N	S	W	NW	N	NE	S	S	NE	N
-Speed (mph)	37	43	43	36	32	45	35	51	33	39	39	39	51
-Date	5	14	18	12	18	19	15	2	20	12	25	22	AUG 2

(!!!) See Reference Notes on Page 68

METEOROLOGICAL DATA FOR 1985

NEW ORLEANS, LOUISIANA

LATITUDE [illegible] LONGITUDE: [illegible] ELEVATION: FT. GRND 4 BARO 00020 TIME ZONE: CENTRAL WBAN: 12916

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	[illegible]	61.0	70.1	[illegible]	84.1	86.3	88.2	89.6	84.1	[illegible]	[illegible]	[illegible]	[illegible]
-Daily Minimum	[illegible]	43.6	56.8	[illegible]	65.2	70.3	72.1	73.5	69.3	[illegible]	[illegible]	[illegible]	[illegible]
-Monthly	46.2	52.3	63.5	[illegible]	74.7	79.3	80.2	81.6	77.0	72.6	[illegible]	[illegible]	[illegible]
-Monthly Dewpt.	34.9	41.5	53.2	[illegible]	63.4	68.8	70.9	71.0	65.8	63.2	50.6	[illegible]	[illegible]
Extremes													
-Highest	76	78	82	87	91	94	92	93	91	87	84	81	94
-Date	30	23	13	30	31	5	23	10	12	12	26	11	JUN 5
-Lowest	14	26	42	44	55	63	68	68	58	48	42	23	13
-Date	21	2	19	10	2	30	1	26	28	7	6	26	JAN 21
DEGREE DAYS BASE 65 °F:													
Heating	505	359	62	28	0	0	0	0	0	12	49	443	1558
Cooling	0	10	78	154	308	437	480	521	366	251	124	13	2742
% OF POSSIBLE SUNSHINE	44	42	61	71	74	66	56	70	66	47	55	58	60
AVG. SKY COVER (tenths)													
Sunrise - Sunset	6.2	7.1	6.3	5.8	5.9	7.2	7.9	6.5	5.7	7.3	5.8	5.3	6.4
Midnight - Midnight	5.6	6.8	5.9	5.3	4.9	6.3	7.1	5.8	5.1	6.7	5.6	4.9	5.9
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	9	5	5	9	9	3	0	4	10	5	7	12	77
-Partly Cloudy	6	7	14	6	12	9	13	14	10	8	12	8	119
-Cloudy	16	16	12	15	11	18	18	13	10	18	11	11	169
Precipitation .01 inches or more	12	10	9	8	7	12	11	13	9	14	7	7	119
Snow, Ice pellets .1 inches or more	0	0	0	0	0	0	0	0	0	0	0	0	0
Thunderstorms	4	3	4	3	4	6	13	10	5	5	0	3	60
Heavy Fog, visibility 1/4 mile or less	2	5	2	0	0	0	0	0	0	3	6	3	21
Temperature °F													
-Maximum													
90° and above	0	0	0	0	1	12	15	20	2	0	0	0	50
32° and below	1	0	0	0	0	0	0	0	0	0	0	0	1
-Minimum													
32° and below	10	7	0	0	0	0	0	0	0	0	0	8	25
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)	1020.7	1021.0	1017.3	1016.4	1012.9	1014.6	1015.8	1014.6	1015.9	1013.2	1016.9	1021.8	1016.6
RELATIVE HUMIDITY (%)													
Hour 00	73	73	74	73	82	82	83	80	77	81	89	80	79
Hour 06 (Local Time)	78	77	80	76	86	86	87	85	79	82	92	85	83
Hour 12	60	61	56	51	53	59	64	61	60	65	67	60	60
Hour 18	64	66	59	55	58	62	71	67	67	74	81	69	66
PRECIPITATION (inches):													
Water Equivalent													
-Total	4.83	9.28	7.07	2.11	1.16	4.56	6.92	6.37	5.74	13.20	0.96	4.78	66.98
-Greatest (24 hrs)	1.71	3.69	2.87	0.85	0.66	1.87	2.73	2.91	1.54	4.51	0.60	2.94	4.51
-Date	27-28	5- 6	20	24	21	9-10	23	11-12	2- 3	27-28	27-28	12	OCT 27-28
Snow, Ice pellets													
-Total	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
-Greatest (24 hrs)	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
-Date	20												JAN 20
WIND:													
Resultant													
-Direction (!!!)	337	043	140	132	204	193	232	105	080	076	092	017	089
-Speed (mph)	2.9	4.1	2.4	3.3	2.0	2.4	2.5	0.7	4.0	5.3	2.3	2.5	1.3
Average Speed (mph)	9.4	10.1	9.7	9.2	8.3	7.8	6.1	7.3	8.6	9.6	8.1	8.2	8.5
Fastest Obs. 1 Min.													
-Direction (!!!)	35	28	19	22	22	35	32	22	13	13	01	35	13
-Speed (mph)	28	29	24	29	23	26	18	35	31	35	18	22	35
-Date	20	11	28	15	21	9	25	11	10	28	20	25	OCT 28
Peak Gust													
-Direction (!!!)	N	W	NW	SW	SW	W	S	SW	SE	NE	N	NW	SW
-Speed (mph)	41	46	36	41	54	52	31	61	37	49	30	35	61
-Date	20	11	20	15	21	9	23	11	10	27	20	14	AUG 11

(!!!) See Reference Notes on Page 68

METEOROLOGICAL DATA FOR 1984

NEW ORLEANS, LOUISIANA

LATITUDE: 29°59' N LONGITUDE: 90°15' W ELEVATION: FT. (grnd) TIME ZONE: CENTRAL WBAN: 12916

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	55.4	61.9	69.9	77.0	82.5	88.4	91.1	91.0	86.6	80.2	69.8	61.2	76.3
-Daily Minimum	37.1	40.5	48.2	54.5	63.5	68.6	72.1	72.1	66.5	56.4	48.1	39.5	55.2
-Monthly	46.3	51.2	59.1	65.8	73.0	78.5	81.6	81.6	76.6	68.3	59.0	50.4	65.7
-Month / Dewpt.	35.3	40.9	49.7	56.5	65.5	68.4	69.8	70.6	65.8	54.2	46.9	38.0	55.1
Extremes													
-Highest:	70	75	83	86	89	94	92	96	91	87	85	80	96
-Date	9	11	14	28	14	20	21	21	14	16	1	30	AUG 21
-Lowest:	21	27	31	43	50	50	65	68	56	45	31	27	21
-Date	1	7	7	6	9	1	1	31	30	3	29	8	JAN 1
DEGREE DAYS BASE 65 °F:													
Heating	564	321	197	48	2	0	0	0	2	14	214	146	1508
Cooling	0	6	31	130	281	379	436	448	351	286	33	71	2452
% OF POSSIBLE SUNSHINE	45	57	69	74	76	69	65	54	63	58	55	38	62
AVG. SKY COVER (tenths)													
Sunrise - Sunset	7.5	5.7	5.6	5.3	5.9	6.5	7.5	7.5	5.2	6.9	5.5	7.7	6.4
Midnight - Midnight	7.1	5.1	5.3	5.2	5.1	5.7	6.5	6.9	4.8	6.0	5.1	6.8	5.8
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	6	9	8	10	8	3	3	3	11	6	11	1	79
-Partly Cloudy	5	8	13	8	10	15	9	9	10	9	6	11	113
-Cloudy	20	12	10	12	13	12	19	19	9	16	13	19	174
Precipitation .01 inches or more	10	9	7	5	6	11	16	19	5	10	6	7	111
Snow, Ice pellets 1.0 inches or more	0	0	0	0	0	0	0	0	0	0	0	0	0
Thunderstorms	0	3	5	2	5	8	16	16	4	3	1	2	65
Heavy Fog, visibility 1/4 mile or less	5	4	8	1	0	0	0	0	0	0	0	11	29
Temperature °F													
-Maximum													
90° and above	0	0	0	0	0	9	4	6	3	0	0	0	22
32° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
-Minimum													
32° and below	9	4	2	0	0	0	0	0	0	0	2	2	19
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)	1022.0	1016.9	1015.6	1011.9	1015.6	1015.6	1015.6	1015.9	1016.3	1017.6	1020.0	1021.0	1016.9
RELATIVE HUMIDITY (%)													
Hour 02	72	69	80	82	77	86	85	87	77	85	71	85	80
Hour 08 (Local Time)	77	72	84	87	84	89	90	89	83	87	74	88	84
Hour 14	58	54	59	54	57	63	64	66	62	60	56	67	60
Hour 20	62	56	61	62	59	66	70	73	67	73	63	77	66
PRECIPITATION (inches):													
Water Equivalent													
-Total	4.10	5.27	4.90	1.72	3.54	7.21	3.86	9.51	3.79	2.84	2.80	2.53	52.07
-Greatest (24 hrs)	0.90	1.32	2.31	0.86	2.30	2.45	1.01	3.33	1.60	1.05	1.23	1.01	3.33
-Date	9	26	19-20	8	20	11-12	8	3	8	9-10	27	4-5	AUG 3
Snow, Ice pellets													
-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-Greatest (24 hrs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-Date													
WIND:													
Resultant													
-Direction (!!!)	032	084	164	183	143	170	130	183	057	133	044	117	115
-Speed (mph)	4.0	0.3	2.2	3.9	3.0	1.8	0.3	0.8	4.8	4.9	2.9	3.2	1.6
Average Speed (mph)	8.0	8.7	7.8	9.4	8.2	4.7	4.1	5.8	9.2	7.6	9.6	8.8	7.7
Fastest Obs. 1 Min.													
-Direction (!!!)	33	22	28	18	12	10	21	11	10	22	18	22	22
-Speed (mph)	23	32	24	24	22	22	21	29	24	28	24	25	32
-Date	10	26	28	20	22	16	4	2	20	14	18	31	FEB 26
PEAK GUST													
-direction (!!!)	NW	S	N	SE	S	E	SE	E	SE	N	NW	SW	S
-Speed (mph)	31	49	37	36	30	31	31	45	31	36	36	39	49
-Date	10	26	28	20	3	23	28	2	21	15	27	31	FEB 26

(!!!) See Reference Notes on Page 68

Meteorological Data For The Current Year

Station: NEW ORLEANS, LOUISIANA — NEW ORLEANS INT'L AIRPORT — Standard time used: CENTRAL — Latitude: 29° 59' N — Longitude: 90° 15' W — Elevation (ground): 4 feet — Year: 1981

Month	Temperature °F: Average daily maximum	Average daily minimum	Average monthly	Extremes: Highest	Date	Lowest	Date	Degree days base 65 °F: Heating	Cooling	Precipitation in inches: Water equivalent: Total	Greatest in 24 hrs.	Date	Snow, ice pellets: Total	Greatest in 24 hrs.	Date	Relative humidity, pct: Hour 00 (Local time)	Hour 06 (Local time)	Hour 12 (Local time)	Hour 18 (Local time)	Wind: Resultant direction	Resultant speed m.p.h.	Average speed m.p.h.	Fastest mile: Speed m.p.h.	Direction	Date	Percent of possible sunshine	Average sky cover, tenths, sunrise to sunset	Number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, ice pellets 1.0 inch or more	Thunderstorms	Heavy fog, visibility 1/4 mile or less	Temperature °F: Maximum 90 and above	32 and below	Minimum 32 and below	0 and below	Average station pressure mb: Elev 39 feet msl
JAN	59.3	41.0	50.2	72	30	24	17	623	0	5.31	1.73	19-20	0.0	0.0		84	86	53	69	35	2.1	9.0	26	16	21	68	6.2	7	11	13	10	0	0	0	0	0	0	0	0	1018.9
FEB	61.7	43.8	52.8	78	28	26	6	568	0	12.59	4.88	1	0.0	0.0		81	81	54	67	28	3.1	10.6	35	19	26	68	5.3	13	9	6	3	2	0	0	0	0	0	0	0	1014.2
MAR	68.4	48.1	58.3	81	7	38	12	317	16	4.84	1.59	26	0.0	0.0		78	84	54	66	28	2.0	8.8	35	19	26	68	5.3	10	9	12	3	2	0	0	0	0	0	0	0	1012.7
APR	73.5	54.4	64.0	85	25	43	17	81	43	10.80	3.63	6-7	0.0	0.0		78	84	54	69	18	2.0	10.4	28	19	26	67	5.4	9	9	12	3	1	0	0	0	0	0	0	0	1013.9
MAY	82.6	65.3	74.0	88	27	58	6	0	266	3.71	1.73	15	0.0	0.0		84	84	62	75	15	2.2	7.0	23	26	3	67	5.4	9	11	11	10	1	0	0	0	0	0	0	0	1013.2
JUN	85.5	69.7	77.6	96	30	63	20	0	382	10.64	3.98	21-22	0.0	0.0		85	87	67	78	12	2.5	6.3	20	08	30	62	5.4	9	11	10	11	0	0	0	0	0	0	0	0	
JUL	90.3	72.7	81.5	94	26	68	11	0	516	9.95	1.82	31	0.0	0.0		84	89	63	84	10	1.2	5.8	23	08	30	78	6.6	9	15	12	10	1	0	0	20	0	0	0	0	1016.9
AUG	90.5	74.3	82.4	96	30	71	21	0	548	6.29	1.82	31-1	0.0	0.0		85	87	65	84	15	1.2	5.1	23	05	29	69	6.5	9	12	11	11	1	0	0	21	0	0	0	0	1015.9
SEP	83.9	65.8	74.9	93	4	53	23	0	317	5.12	1.88	5-6	0.0	0.0		78	87	65	80	07	1.0	6.0	21	20	6	69	5.9	9	9	12	9	1	0	0	3	0	0	0	0	1016.8
OCT	78.8	60.2	69.5	89	4	43	29	27	172	4.88	2.87	11-12	0.0	0.0		75	78	59	69	05	1.2	6.8	21	21	12	68	5.2	10	9	13	9	0	0	0	2	0	0	0	0	1015.6
NOV	70.8	50.8	60.8	85	16	33	29	103	42	4.32	2.28	19-20	0.0	0.0		80	82	61	78	10	1.2	6.1	21	15	15	53	4.8	9	8	13	9	0	0	0	7	1	0	0	0	1020.7
DEC	59.1	39.9	49.5	78	8	24	28	603	10	9.11	5.46	21-22	0.0	0.0		73	76	59	66	03	2.3	10.0	30	21	27	62	5.8	6	7	18	14	0	0	0	7	0	0	0	0	
YEAR	75.5	57.3	66.4	96	AUG 31	24	DEC 29	2766	2357	85.30	7.63	APR 6-7	0.0	0.0		81	83	61	74	04	1.5	7.5	35	19	MAR 26	68	6.3	91	109	166	122	6	15	14	47	2	12	0	1015.6

Normals, Means, And Extremes

Month	Temperature °F: Normal: Daily maximum	Daily minimum	Monthly	Extremes: Record highest	Year	Record lowest	Year	Normal Degree days base 65 °F: Heating	Cooling	Precipitation in inches: Water equivalent: Normal	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hr.	Year	Snow, ice pellets: Maximum monthly	Year	Maximum in 24 hr.	Year	Relative humidity pct: Hour 00 (Local time)	Hour 06 (Local time)	Hour 12 (Local time)	Hour 18 (Local time)	Wind: Mean speed m.p.h.	Prevailing direction	Fastest mile: Speed m.p.h.	Direction	Year	Pct. of possible sunshine	Mean sky cover, tenths, sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, ice pellets 1.0 inch or more	Thunderstorms	Heavy fog, visibility 1/4 mile or less	Temperature °F: Max 90 and above	32 and below	Min 32 and below	0 and below	Average station pressure mb: Elev 39 feet msl
JAN	61.0	43.0	52.0	83	1982	14	1963	623	32	4.97	11.43	1978	0.59	1956	6.08	1978	0.1	1973	0.1	1973	82	85	67	72	9.0		46	21	1978	48	6.1	7	7	17	10	0	5	0	1019.6
FEB	64.6	46.6	55.7	88	1972	19	1978	318	38	5.83	12.59	1981	1.02	1962	5.60	1961	2.0	1958	2.0	1958	81	84	61	67	9.0		43	26	1970	52	6.2	6	6	16	9	0	4	0	1019.0
MAR	71.2	51.6	61.4	89	1962	28	1980	171	59	4.73	10.89	1946	0.26	1955	3.61	1946	T	1980	T	1980	82	84	60	65	10.0		37	16	1969	56	6.5	9	6	16	9	0	4	1	1015.2
APR	78.6	58.8	68.7	91	1960	32	1971	55	136	4.50	16.12	1980	0.26	1976	7.05	1980	0.0		0.0		84	88	60	65	9.8		35	28	1980	62	5.8	11	7	12	8	0	3	0	1013.6
MAY	84.5	65.3	74.9	96	1962	43	1968	0	387	5.07	14.13	1950	0.99	1949	9.66	1950	0.0		0.0		86	89	60	65	8.1		55	34	1973	59	5.9	10	7	14	9	0	3	1	1012.9
JUN	89.5	70.7	80.1	100	1954	55	1972	0	489	6.63	12.28	1973	0.23	1979	6.10	1953	0.0		0.0		86	89	62	67	6.9		48	05	1971	67	5.2	10	12	8	11	0	3	1	1011.6
JUL	90.7	73.5	82.1	101	1981	68	1967	0	530	6.73	13.07	1982	1.92	1981	6.10	1966	0.0		0.0		89	91	66	71	6.1		44	13	1979	61	5.3	5	5	15	5	0	2	0	1015.7
AUG	90.3	73.1	81.7	102	1980	68	1966	0	514	6.82	16.12	1977	1.68	1980	6.02	1975	0.0		0.0		86	91	66	73	5.9		42	33	1969	61	5.2	8	5	14	9	0	2	0	1015.6
SEP	86.6	70.1	78.4	101	1980	52	1967	0	405	5.87	14.74	1971	0.24	1951	6.10	1971	0.0		0.0		87	89	66	70	7.2		49	06	1965	63	5.4	10	10	10	8	0	2	0	1019.6
OCT	79.4	59.0	69.2	92	1977	35	1966	55	163	2.66	6.95	1959	0.00	1978	3.44	1975	0.0		0.0		84	87	59	62	7.5		40	17	1964	68	5.2	15	9	8	6	0	2	1	1017.4
NOV	70.1	49.7	60.0	86	1979	24	1978	106	36	4.04	14.66	1963	0.21	1969	6.72	1978	T	1950	T	1950	84	86	61	74	8.45		32	21	1980	58	5.2	11	7	12	7	0	2	0	1016.4
DEC	60.9	40.8	50.4	84	1965	14	1983	336	13	5.29	10.77	1967	1.46	1958	5.72	1962	2.7	1963	2.7	1963	83	85	66	74	9.1		46	28	1973	55	6.2	6	8	15	10	0	3	1	1019.5
YR	77.7	58.1	68.2	102	AUG 1980	14	DEC 1983	1998	2886	59.76	29.89	MAR 1980	0.00	OCT 1970	9.66	MAY 1959	2.7	DEC 1963	2.7	DEC 1963	85	87	65	70	6.3		49	00	SEP 1965	50	5.7	106	110	139	110	4	49	20	11	4	11	0	1016.5

NOTE: NORMAL COOLING DEGREE DATA PUBLISHED IN THE 1982 ANNUAL WERE FOR THE 1951-1980 PERIOD.

NORMALS, MEANS, AND EXTREMES TABLE NOTE(S):

(a) Length of record, years, through the current year unless otherwise noted, based on January data.
(b) 70° and above at Alaskan stations.
- Less than one half.
T Trace.
BLANK entries denote missing or unreported data.

NORMALS - Based on record for the 1951-1980 period.
MEANS - Length of record in (a) is for complete data years.
EXTREMES - Length of record in (a) may be for other than complete or consecutive data years. Date is the most recent in cases of multiple occurrence.
WIND DIRECTION - Numerals indicate tens of degrees clockwise from true north. 00 indicates calm.
FASTEST MILE WIND - Speed is fastest observed 1-minute value when direction is in tens of degrees.

Means and extremes above are from existing and comparable exposures. Annual extremes have been recorded at other sites in the locality as follows:

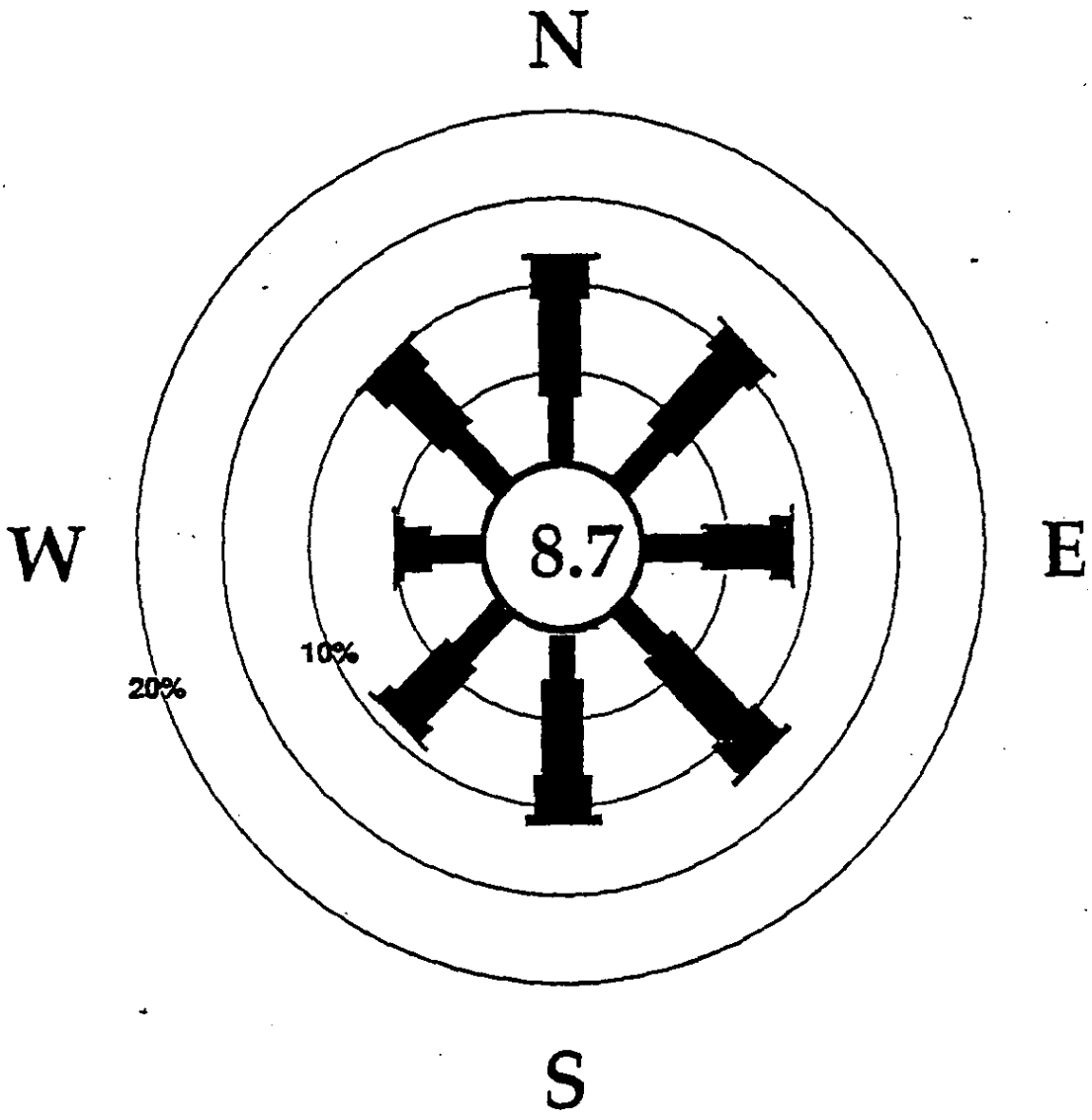
Temperature
Highest: 102 in Aug. 1980.
Lowest: 7 in Feb. 1899.

Precipitation
Maximum monthly : 23.11 in Oct. 1927.
Maximum in 24 hours: 14.01 in Apr. 1927.

Snowfall
Maximum monthly : 8.2 in Feb. 1895.
Maximum in 24 hours: 8.2 in Feb. 1895.

NEW ORLEANS WSCMO AP
Annual Summary Wind Rose
1961-1980

Anemometer Ht.: 20.0 ft



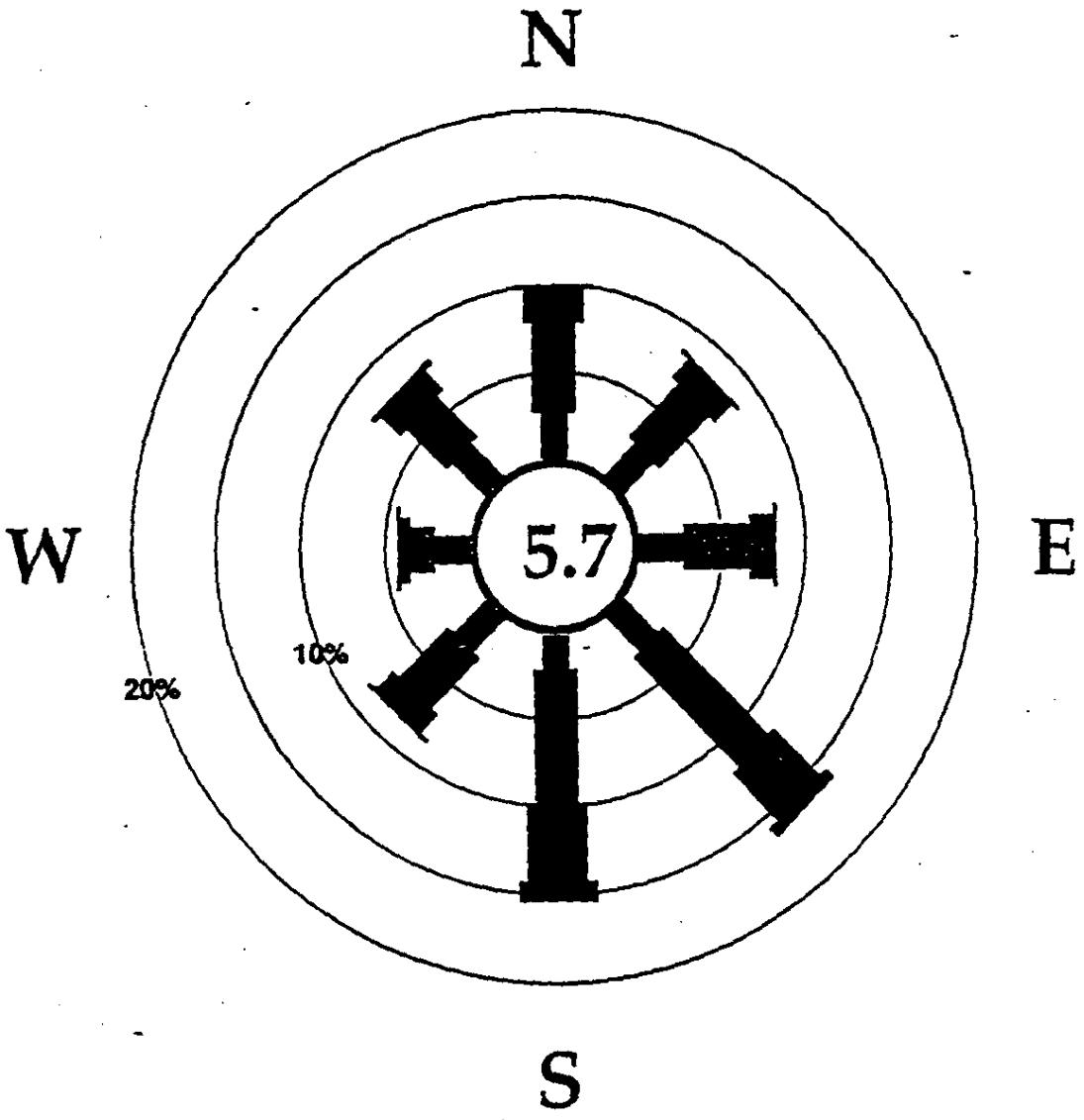
Windspeed Class Designations

1-5 knots 6-10 knots 11-15 knots > 15 knots

SOUTHERN REGIONAL CLIMATE CENTER / LOUISIANA OFFICE OF STATE CLIMATOLOGY

NEW ORLEANS WSCMO AP
Spring Wind Rose
1961-1980

Anemometer Ht.: 20.0 ft



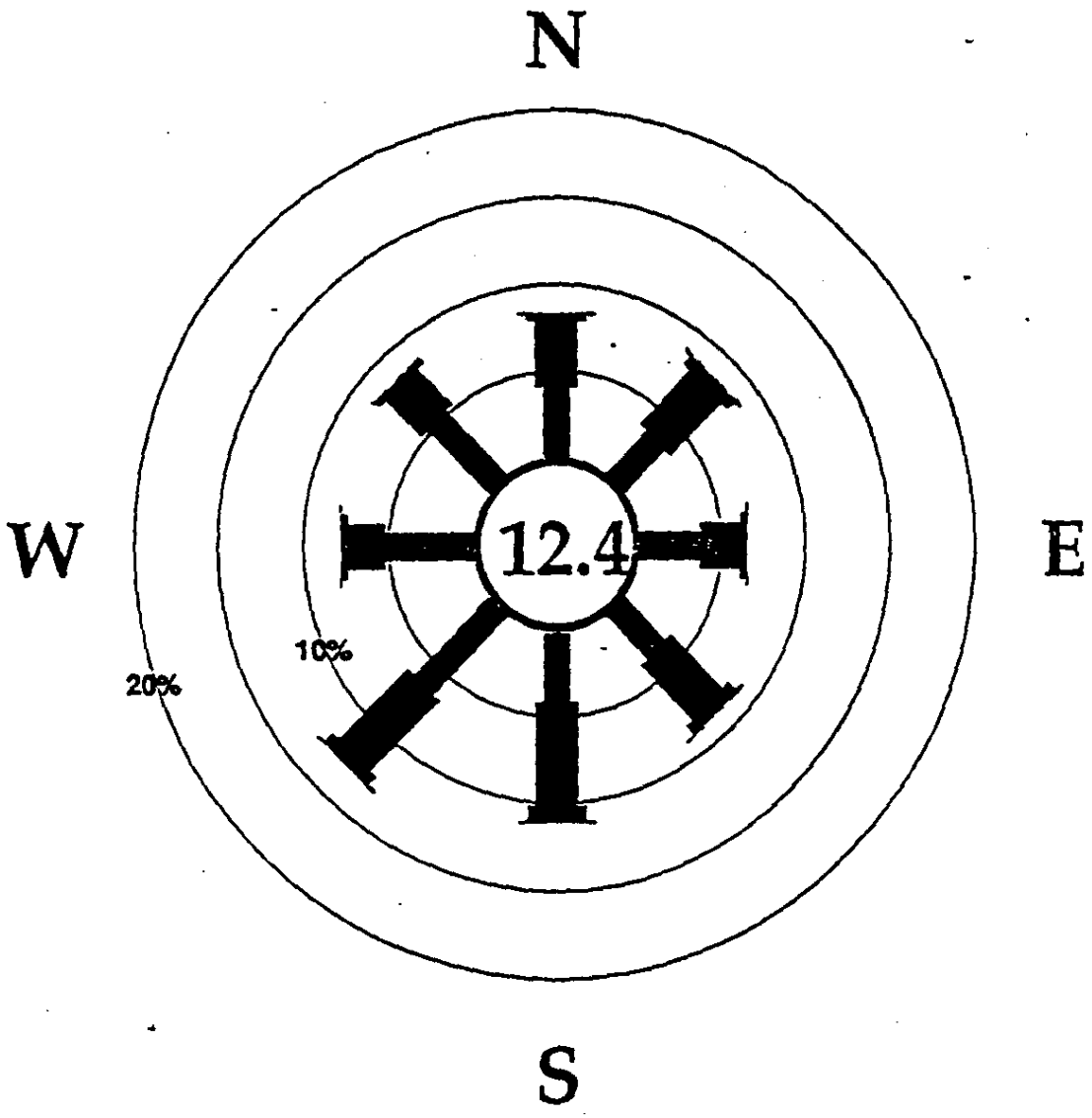
Windspeed Class Designations

1-5 knots 6-10 knots 11-15 knots > 15 knots

SOUTHERN REGIONAL CLIMATE CENTER / LOUISIANA OFFICE OF STATE CLIMATOLOGY

NEW ORLEANS WSCMO AP
Summer Wind Rose
1961-1980

Anemometer Ht.: 20.0 ft

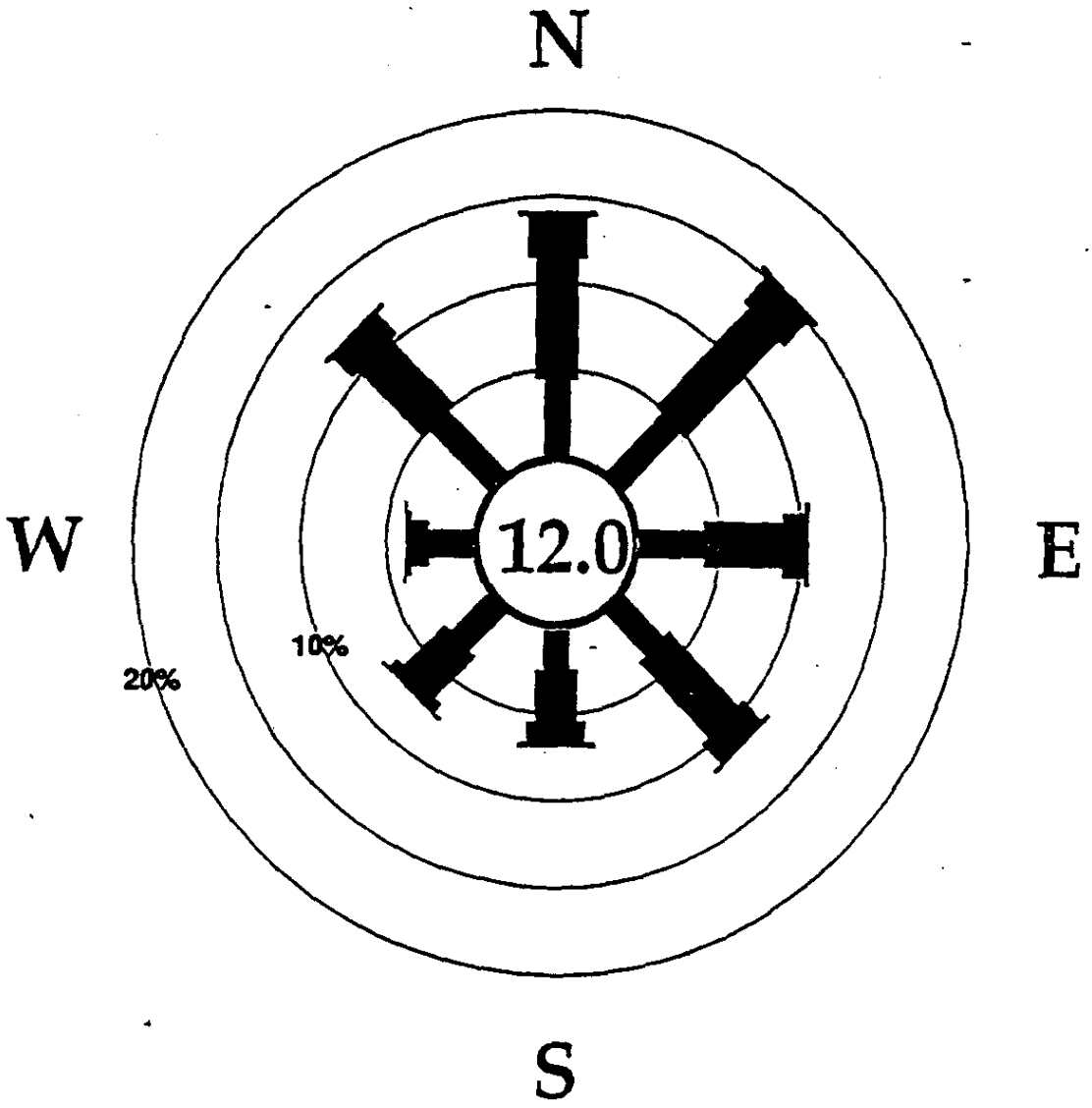


Windspeed Class Designations

1-5 knots 6-10 knots 11-15 knots > 15 knots

NEW ORLEANS WSCMO AP
Fall Wind Rose
1961-1980

Anemometer Ht.: 20.0 ft

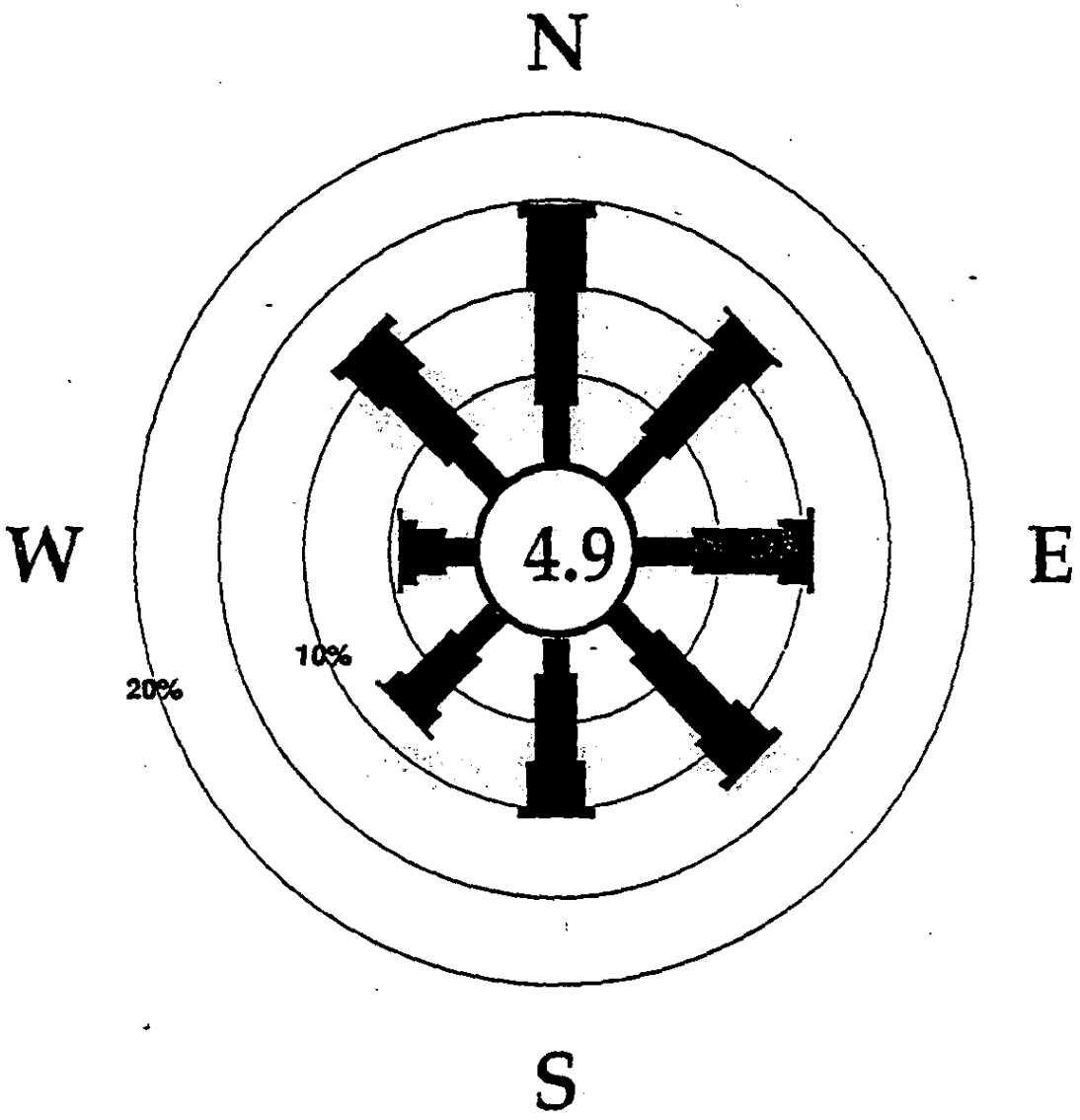


Windspeed Class Designations

1-5 knots 6-10 knots 11-15 knots > 15 knots

NEW ORLEANS WSCMO AP
Winter Wind Rose
1961-1980

Anemometer Ht.: 20.0 ft



Windspeed Class Designations

1-5 knots 6-10 knots 11-15 knots > 15 knots

ATTACHMENT 12

PREVIOUS PERMIT APPLICATION CERTIFICATIONS

ORIGINAL PERMIT CERTIFICATION SIGNED BY MR. ARA ARMAN, P.E. LA LICENSE NO. 5269

PERMIT APPLICATION CERTIFICATION

I certify under penalty of law that I have personally examined and I am familiar with the information submitted in this permit application and that the facility as described in this permit application meets the requirements of the Solid Waste Rules and Regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment.

Ara Arman, P.E.
Louisiana Registration Number 5269
Woodward-Clyde Consultants
2822 O'Neal Lane
Baton Rouge, Louisiana 70816

STATE OF LOUISIANA
ARA ARMAN
Reg. No. 5269
REGISTERED
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

PERMIT MODIFICATION NO. 7

GEOTECHNICAL CERTIFICATION SIGNED BY MR. CHRIS L. SAUCIER, P.E. LA LICENSE NO. 26121

ENVIRONMENTAL CERTIFICATION SIGNED BY MR. PAUL L. MIERS, P.E. LA LICENSE NO. 20741

521.F.1.

F. Facility Plans and Specifications. Standards governing facility plans and specifications are contained in LAC 33:VII.711.B (Type I and II landfills), LAC 33:VII.713.B (Type I and II surface impoundments), LAC 33:VII.715.B (Type I and II landfarms), LAC 33:717.E (Type I-A and II-A facilities), LAC 33:VII.721.A (Type III construction and demolition debris and woodwaste landfills), LAC 33:VII.723.A (Type III composting facilities), and LAC 33:VII.725.A (Type III separation facilities). Standards for groundwater monitoring are contained in LAC 33:MI.709.E (Type I and II facilities).

1. Certification–The person who prepared the permit application must provide the following certification:

"I certify under penalty of law that I have personally examined and I am familiar with the information submitted in the below referenced permit modifications and that the facility as described in this permit application meets the requirements of the Solid Waste Rules and Regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment."

Response:

The permit application certification is provided by Mr. Ara Arman, P.E., Louisiana Registration Number 5269. The certification is included as Exhibit 12.

Permit Modification Numbers 3, 4, 5, 6 and 7 were prepared by Mader-Miers Engineering, Inc. Any changes made by these modifications were made under the direction of Paul L. Miers, P.E., Louisiana Registration No. 20741.

"I certify under penalty of law that I have personally examined and I am familiar with the information submitted in the above referenced permit modifications and that the facility as described in this permit application meets the requirements of the Solid Waste Rules and Regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment."

STATE OF LOUISIANA ★ PAUL L. MIERS REG. No. 20741 ★ REGISTERED PROFESSIONAL ENGINEER IN ENVIRONMENTAL ENGINEERING 9-15-03

Paul L. Miers, P.E.
La. Reg. No. 20741

Sections 521.D.1.a through 521.E.2, a portion of Section 521.E.4.a, Section 521.F.3.a, and Section 521.F.5.f of Permit Modification Number 2 were prepared by Elstar Engineering Company, Inc. Any changes made by these modifications were made under the direction of Chris E. Sanner, P.E., Louisiana Registration No. 26121.

"I certify under penalty of law that I have personally examined and I am familiar with the information submitted in the above referenced permit modifications and that the facility as described in this permit application meets the requirements of the Solid Waste Rules and Regulations. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment."

STATE OF LOUISIANA ★ CHRIS E. SANNER ★ REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING

Chris E. Sanner, P.E. / La. Reg. No. 26121

ATTACHMENT 13

CERTIFICATE OF LIABILITY INSURANCE

ACORD CERTIFICATE OF LIABILITY INSURANCE

CSR PE RIVE-13 | DATE (MM/DD/YYYY) 02/14/08

PRODUCER
Powell Insurance Agency
Metairie Branch
131 Airline Drive, Suite 300
Metairie LA 70001
Phone: 504-835-5000 Fax: 504-837-3147

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED
River Birch Incorporated
Attn: Dominick Fazzio
P O Box 697
Harvey LA 70059

INSURERS AFFORDING COVERAGE		NAIC #
INSURER A:	Bridgefield Casualty Ins Co.	
INSURER B:	A I Specialty Lines Ins. Co.	26883
INSURER C:	Commerce & Industry Insurance	
INSURER D:	American Internati. Companies	
INSURER E:		

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
B		GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS MADE X OCCUR X Pollution $10M Limit GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC	EG2191258 EG2191258	01/27/08 01/27/08	01/27/09 01/27/09	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1000000 $100000 $5000 $1000000 $2000000 $2000000
C		AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS	CA6530488	01/27/08	01/27/09	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1000000 $ $ $
		GARAGE LIABILITY ANY AUTO				AUTO ONLY - EA ACCIDENT OTHER THAN AUTO ONLY: EA ACC AGG	$ $ $
D		EXCESS/UMBRELLA LIABILITY OCCUR CLAIMS MADE DEDUCTIBLE X RETENTION $10000	EGU2191266	01/27/08	01/27/09	EACH OCCURRENCE AGGREGATE	$5000000 $5000000 $ $ $
A		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below	19802409	01/11/08	01/11/09	X WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $1000000 $1000000 $1000000
		OTHER					

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

CERTIFICATE HOLDER

DEQ

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 10 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE Kathy G Gambrino

© ACORD CORPORATION 1988

AIG Environmental
A Division of American International Companies®

SOLID WASTE FACILITY

CERTIFICATE OF LIABILITY INSURANCE

Secretary
Louisiana Department of Environmental Quality
Post Office Box 4313
Baton Rouge, Louisiana 70821-4313
Attention: Office of Environmental Services,
Waste Permits Division

RE: River Birch Landfill, D-051-6741/P-0321

Dear Sir:

1. American International Specialty Lines Insurance Company, the "insurer" of 70 Pine Street, New York, N.Y. 10270 hereby certifies that it has issued liability insurance covering bodily injury and property damage to River Birch Incorporated, the "insured", of P.O. Box 697, Harvey, La 70059 in connection with the insured's obligation to demonstrate financial responsibility under LAC 33:VII.1301. The coverage applies at D-051-6741/P-0321, River Birch Landfill, 2000 S. Kenner Ave. Avondale, La 70094 for sudden and accidental occurrences. The limits of liability are $1,000,000 per each occurrence and $1,000,000 annual aggregate, per site, exclusive of legal-defense costs. The coverage is provided under policy number EG 2191258, issued on 1/27/2008. The effective date of said policy is 1/27/2008.

2. The insurer further certifies the following with respect to the insurance described in Paragraph 1:

(a). Bankruptcy or insolvency of the insured shall not relieve the insurer of its obligations under the policy.

(b). The insurer is liable for the payment of amounts within any deductible applicable to the policy, with a right of reimbursement by the insured for any such payment made by the insurer. This provision does not apply with respect to that amount of any deductible for which coverage is demonstrated as specified in LAC 33:VII.1301.B.2, 3, or 4.

(c). Whenever requested by the administrative authority, the insurer agrees to furnish to him a signed duplicate original of the policy and all endorsements.

(d). Cancellation of the insurance, whether by the insurer or the insured, will be effective only upon written notice and upon lapse of 60 days after a copy of such written notice is received by the administrative authority.

(e). Any other termination of the insurance will be effective only upon written notice and upon lapse of 30 days after a copy of such written notice is received by the administrative authority.

A Division of Southern Risk Specialists, Inc.
8144 Walnut Hill Lane, Ste. 1600, Dallas, Texas 75231
Ph. 214-932-2310; Fax 214-932-2153

3. I hereby certify that the wording of this certificate is identical to the wording specified in LAC 33:VII.1399.Appendix B as such regulations were constituted on the date first written above, and that the insurer is licensed to transact the business of insurance, or eligible to provide insurance as an excess or surplus lines insurer, in one or more states, and is admitted, authorized, or eligible to conduct insurance business in the state of Louisiana.

Tammy Clausen

Tammy Clausen

Regional Manager, AIG Environmental

8144 Walnut Hill Lane, Suite 1600; Dallas, Texas 75231

PIERRE

SOLID WASTE FACILITY TRUST AGREEMENT/STANDBY TRUST AGREEMENT

Trust Agreement, the "Agreement" entered into as of Apr. 17, 1997 by and between River Birch Incorporated, a Louisiana corporation, the "Grantor," and Regions Bank, a national bank, the "Trustee."

WHEREAS, the Department of Environmental Quality of the State of Louisiana, an agency of the state of Louisiana, has established certain regulations applicable to the Grantor, requiring that a permit holder or applicant for a permit of a solid waste processing or disposal facility shall provide assurance that funds will be available when needed for closure and/or post-closure care of the facility;

WHEREAS, the Grantor has elected to establish a trust to provide all or part of such financial assurance for the facility identified herein;

WHEREAS, the Grantor, acting through its duly authorized officers, has selected Regions Bank to be the trustee under this Agreement, and Regions Bank is willing to act as trustee.

NOW, THEREFORE, the Grantor and the Trustee agree as follows:

SECTION 1. DEFINITIONS

As used in this Agreement:

(a). The term "Grantor" means the permit holder or applicant who enters into this Agreement and any successors or assigns of the Grantor.

(b) The term "Trustee" means the Trustee who enters into this Agreement and any successor trustee.

(c). The term "Secretary" means the Secretary of the Louisiana Department of Environmental Quality.

(d). The term "administrative authority" means the Secretary or a person designated by him to act therefore.

I certify this is a true copy of the original.

Notary Public

SECTION 2. IDENTIFICATION OF FACILITIES AND COST ESTIMATES

This Agreement pertains to the facilities and cost estimates identified on attached Schedule A.

SECTION 3. ESTABLISHMENT OF FUND

The Grantor and the Trustee hereby establish a trust fund, the "Fund", for the benefit of the Louisiana Department of Environmental Quality. The Grantor and the Trustee intend that no third party shall have access to the Fund except as herein provided. The Fund is established initially as consisting of the property, which is acceptable to the Trustee, described in Schedule B attached hereto. Such property and any other property subsequently transferred to the Trustee is referred to as the Fund, together with all earnings and profits thereon, less any payments or distributions made by the Trustee pursuant to this Agreement. The Fund shall be held by the Trustee, in trust, as hereinafter provided. The Trustee shall not be responsible nor shall it undertake any responsibility for the amount or adequacy of, nor any duty to collect from the Grantor, any payments necessary to discharge any liabilities of the Grantor established by the administrative authority.

SECTION 4. PAYMENT FOR CLOSURE AND/OR POST-CLOSURE CARE OR LIABILITY COVERAGE

The Trustee shall make payments from the Fund as the administrative authority shall direct, in writing, to provide for the payment of the costs of closure and/or post-closure care of the facility covered by this Agreement. The Trustee shall reimburse the Grantor or other persons as specified by the administrative authority from the Fund for closure and/or post-closure expenditures in such amounts as the administrative authority shall direct in writing. In addition, the Trustee shall refund to the Grantor such amounts as the administrative authority specifies in writing. Upon refund, such funds shall no longer constitute part of the Fund as defined herein.

SECTION 5. PAYMENTS COMPRISED BY THE FUND

Payments made to the Trustee for the Fund shall consist of cash or securities acceptable to the Trustee.

SECTION 6. TRUSTEE MANAGEMENT

The Trustee shall invest and reinvest the principal and income of the Fund and keep the Fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the Grantor may communicate in writing to the Trustee from time to time, subject,

however, to the provisions of this Section. In investing, reinvesting, exchanging, selling, and managing the Fund, the Trustee shall discharge his duties with respect to the trust fund solely in the interest of the beneficiary and with the care, skill, prudence, and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters, would use in the conduct of an enterprise of like character and with like aims, except that:

(a). Securities or other obligations of the Grantor, or any owner of the facility or any of their affiliates as defined in the Investment Company Act of 1940, as amended, 15 U.S.C. 80a-2. (a) shall not be acquired or held, unless they are securities or other obligations of the federal or a state government.

(b). The Trustee is authorized to invest the Fund in time or demand deposits of the Trustee, to the extent insured by an agency of the federal or state government; and

(c). The Trustee is authorized to hold cash awaiting investment or distribution uninvested for a reasonable time and without liability for the payment of interest thereon.

SECTION 7. COMMINGLING AND INVESTMENT

The Trustee is expressly authorized, at its discretion:

(a). To transfer from time to time any or all of the assets of the Fund to any common, commingled, or collective trust fund created by the Trustee in which the Fund is eligible to participate, subject to all provisions thereof, to be commingled with the assets of other trusts participating therein; and

(b). To purchase shares in any investment company registered under the Investment Company Act of 1940, 15 U.S.C. 80a-1, et seq., including one which may be created, managed, or underwritten, or one to which investment advice is rendered or the shares of which are sold by the Trustee. The Trustee may vote such shares at its discretion.

SECTION 8. EXPRESS POWERS OF TRUSTEE

Without in any way limiting the powers and discretion conferred upon the Trustee by the other provisions of this Agreement or by law, the Trustee is expressly authorized and empowered:

(a). To sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale. No person dealing with the Trustee shall be bound to see to the application of the purchase money or to inquire into the validity or expediency of any such sale or other disposition;

(b). To make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;

(c). To register any securities held in the Fund in its own name or in the name of a nominee and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the Trustee in other fiduciary capacities, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee of such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the United States Government, or any agency or instrumentality thereof, with a Federal Reserve Bank, but the books and records of the Trustee shall at all times show that all securities are part of the Fund;

(d). To deposit any cash in the Fund in interest-bearing accounts maintained or savings certificates issued by the Trustee, in its separate corporate capacity, or in any other banking institution affiliated with the Trustee, to the extent insured by an agency of the federal or state government; and

(e). To compromise or otherwise adjust all claims in favor of, or against, the Fund.

SECTION 9. TAXES AND EXPENSES

All taxes of any kind that may be assessed or levied against or in respect of the Fund and all brokerage commissions incurred by the Fund shall be paid from the Fund. All other expenses incurred by the Trustee in connection with the administration of this Trust, including fees for legal services rendered to the Trustee, the compensation of the Trustee to the extent not paid directly by the Grantor, and other proper charges and disbursements of the Trustee shall be paid from the Fund.

SECTION 10. ANNUAL VALUATION

The Trustee shall annually, at least 30 days prior to the anniversary date of establishment of the Fund, furnish to the Grantor and to the administrative authority a statement confirming the value of the Trust. Any securities in the Fund shall be valued at market value as of no more than 60 days prior to the anniversary date of establishment of the Fund. The failure of the Grantor to object in writing to the Trustee, within 90 days after the statement has been furnished to the Grantor and the administrative authority, shall constitute a conclusively binding assent by the Grantor, barring the Grantor from asserting any claim or liability against the Trustee with respect to matters disclosed in the statement.

SECTION 11. ADVICE OF COUNSEL

The Trustee may from time to time consult with counsel, who may be counsel to the Grantor, with respect to any questions arising as to the construction of this Agreement or any action to be taken hereunder. The Trustee shall be fully protected, to the extent permitted by law, in acting upon the advice of counsel.

SECTION 12. TRUSTEE COMPENSATION

The Trustee shall be entitled to reasonable compensation for its services as agreed upon in writing from time to time with the Grantor.

SECTION 13. SUCCESSOR TRUSTEE

The Trustee may resign or the Grantor may replace the Trustee, but such resignation or replacement shall not be effective until the Grantor has appointed a successor or trustee and this successor accepts the appointment. The successor trustee shall have the same powers and duties as those conferred upon the Trustee hereunder. Upon the successor trustee's acceptance of the appointment, the Trustee shall assign, transfer, and pay over to the successor trustee the funds and properties then constituting the Fund. If for any reason the Grantor cannot or does not act in the event of the resignation of the Trustee, the Trustee may apply to a court of competent jurisdiction for the appointment of a successor trustee or for instructions. The successor trustee shall in writing specify to the Grantor, the administrative authority, and the present Trustee by certified mail 10 days before such change becomes effective the date on which it assumes administration of the trust. Any expenses incurred by the Trustee as a result of any of the acts contemplated by this Section shall be paid as provided in Section 9.

SECTION 14. INSTRUCTIONS TO THE TRUSTEE

All orders, requests, and instructions by the Grantor to the Trustee shall be in writing, signed by the persons designated in the attached Exhibit A or such other persons as the Grantor may designate by amendment to Exhibit A. The Trustee shall be fully protected in acting without inquiry in accordance with the Grantor's orders, requests, and instructions. All orders, requests, and instructions by the administrative authority to the Trustee shall be in writing and signed by the administrative authority. The Trustee shall act and shall be fully protected in acting in accordance with such orders, requests, and instructions. The Trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or termination of the authority of any person to act on behalf of the Grantor or administrative authority hereunder has occurred. The Trustee shall have no duty to act in the absence of such orders, requests, and instructions from the Grantor and/or administrative authority, except as provided for herein.

SECTION 15. NOTICE OF NONPAYMENT

The Trustee shall notify the Grantor and the administrative authority, by certified mail, within 10 days following the expiration of the 30-day period after the anniversary of the establishment of the Trust, if no payment is received from the Grantor during that period. After the pay-in period is completed, the Trustee shall not be required to send a notice of nonpayment.

SECTION 16. AMENDMENT OF AGREEMENT

This Agreement may be amended by an instrument in writing executed by the Grantor, the Trustee, and the administrative authority, or by the Trustee and the administrative authority, if the Grantor ceases to exist.

SECTION 17. IRREVOCABILITY AND TERMINATION

Subject to the right of the parties to amend this Agreement as provided in Section 16, this Trust shall be irrevocable and shall continue until terminated at the written agreement of the Grantor, the Trustee, and the administrative authority, or by the Trustee and the administrative authority, if the Grantor ceases to exist. Upon termination of the Trust, all remaining trust property, less final trust administration expenses shall be delivered to the Grantor.

SECTION 18. IMMUNITY AND INDEMNIFICATION

The Trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this Trust, or in carrying out any direction by the Grantor or the administrative authority issued in accordance with this Agreement. The Trustee shall be indemnified and saved harmless by the Grantor or from the Trust Fund, or both, from and against any personal liability to which the Trustee may be subjected by reason of any act or conduct in its official capacity, including all reasonable expenses incurred in its defense in the event that the Grantor fails to provide such defense.

SECTION 19. CHOICE OF LAW

This Agreement shall be administered, construed, and enforced according to the laws of the state of Louisiana.

SECTION 20. INTERPRETATION

As used in this Agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each Section of this Agreement shall not affect the interpretation or the legal efficacy of this Agreement.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their respective officers duly authorized and attested to as of the date first above written. The parties below certify that the wording of this Agreement is identical to the wording specified in LAC 33:VII.727.A.2.d.ix, on the date first written above.

WITNESSES:
Michael J Sonnier

Its: President
(Seal)

GRANTOR:
RIVER BIRCH

By:

TRUSTEE:
Regions Bank

By:
Its: Vice President
(Seal)

THUS DONE AND PASSED in my offices in Harvey, LA.,
On the 7th day of April, 1999, in the presence of Michael J. Sonnier and Jeff Claunch, competent witnesses, who hereunto sign their names with the said appearers and me, Notary, after reading the whole.

Notary Public

STATE OF LOUISIANA
PARISH OF Jefferson

BE IT KNOWN, that on this 7th day of April, 19 99, before me, the undersigned Notary Public, duly commissioned and qualified within the State and Parish, aforesaid, and in the presence of the witnesses hereinafter named and undersigned, personally came and appeared Albert J. Ward, Jr., to me well known, who declared and acknowledged that he had signed and executed the foregoing instrument as his act and deed, and as the act and deed of River Birch Incorporated, a corporation, for the consideration, uses, and purposes and on terms and conditions therein set forth.

And the said appearer, being by me first duly sworn, did depose and say that he is the President of said corporation and that he signed and executed said instrument in his said capacity, and under authority of the Board of Directors of said corporation.

Thus done and passed in the State and Parish aforesaid, on the day and date first hereinabove written, and in the presence of Michael J. Sonnier and Jeffrey L. Claunch, competent witnesses, who have hereunto subscribed their name as such, together with said appearer and me, said authority, after due reading of the whole.

WITNESSES:

Michael J. Sonnier

J. Claunch

NOTARY PUBLIC

SCHEDULE A

Site Identification Number:	D-051-6741
Site Name:	River Birch Landfill
Facility Name:	River Birch Landfill
Facility Permit Number:	P-0321
Closure & Post-Closure Cost Estimates:	As provided in permit application

SCHEDULE B

Solid Waste Facility Trust Agreement / Standby Trust Agreement
by and between River Birch Incorporated and Regions Bank dated April 7, 1999
with Hibernia National Bank as Successor Trustee

SCHEDULE of FEES

TRUSTEE:

Annual Fee: *(Account level)*	\$8.00 per \$1,000 of market value on the first \$6.50 per \$1,000 of market value on the next \$5.00 per \$1,000 of market value on excess of	\$ 5,000,000 (80 bp), \$ 5,000,000 (65bp), \$10,000,000 (50bp).
	(Subject to a minimum annual fee of \$3,500.)	
Transaction Charges:	None.	
Non-DTC Eligible Charges:	None anticipated.	
Remote On-Line Access Charges:	None.	
Extraordinary Services:	Typically we charge a reasonable hourly rate for such time incurred. Out-of-pocket disbursements are reimbursable.	
Billing Frequency:	Fees can be assessed monthly or quarterly and billed or charged directly to the account, as desired.	
Use of Hibernia Mutual Funds:	Whenever shares of any mutual fund within the Hibernia Funds family is used, all management fees taken at the fund level are returned to the client. Only the 12b-1 fees that may be applicable to any such fund would be retained and be in addition to fees quoted above at the account level.	

RiverBirch
INCORPORATED

Post Office Box 1938 • Gretna, Louisiana 70054
504.364.1140 • 504.364.1120 FAX

February 14, 2000

Mr. Pierre F. Lapeyre
Hibernia Trust
P.O. Box 61540
New Orleans, LA 70161

Dear Pierre:

Enclosed please find the amended Exhibit A. The new exhibit reflects either Jim Ward or Fred Heebe can authorize actions on the trust.

Please call if you have additional questions.

Sincerely,

Michael J. Sonnier

Michael J. Sonnier
CFO

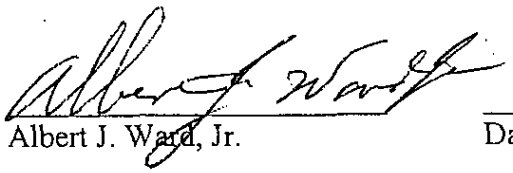
Exhibit A

All orders, requests and instructions by the Grantor to the Trustee shall be in writing, signed by either of the following persons:

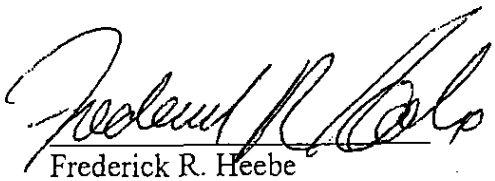
Albert J. Ward, Jr. – President

Frederick R. Heebe – Vice President

This Exhibit A is made part of the Solid Waste Facility Trust Agreement / Standby Trust Agreement signed April 7, 1999.



Albert J. Ward, Jr. 2/19/00
Date



Frederick R. Heebe 2/19/00
Date

ATTACHMENT 13

CLOSURE NOTIFICATION TO BE FILED OFFICE OF JEFFERSON PARISH CLERK OF COURT

RIVER BIRCH, INC. CLOSURE NOTIFICATION
JEFFERSON PARISH CLERK OF COURT

River Birch, Inc. hereby notifies the public that the following described property was used for disposal of solid waste. This site was closed on (date facility was closed) in accordance with the Louisiana Administrative Code, Title 33, Part VII. Inquiries regarding the contents of River Birch Landfill may be directed to Jim Ward at P.O. Box 1938, Gretna, Louisiana 70054.

Property Description

The proposed River Birch Landfill is to be located on a 497 acre tract of land in Jefferson Parish, Louisiana, approximately 1.5 miles south of the Mississippi River. The site is located in T13S, R22E, Sections 4, 6, 36, and 37.

_____
Signature of Person Filing Parish Record

_____
Typed Name and Title of Person Filing
Parish Record

_____
Date

(A true copy of the document certified by the parish clerk of court must be sent to the Solid Waste Division, Post Office Box 82178, Baton Rouge, Louisiana 70884-2178).

ATTACHMENT 14

EXEMPTION REQUEST FOR USE OF CONE PENETROMETERS AND BORING DEPTHS

EXEMPTION REQUEST
FOR
CONE PENETROMETERS
FOR
WESTERN HALF OF SITE
DECEMBER 11, 2002

RiverBirch
INCORPORATED

Post Office Box 1938 • Gretna, Louisiana 70054
504 364.1140 • 504 364.1120 FAX

December 11, 2002

Ms. Linda Levy
Assistant Secretary
Office of Environmental Services
Louisiana Dept of Environmental Quality
PO Box 82135
Baton Rouge, LA 70884-2135

Re: Request for Exemption Pursuant to LAC 33:VII..307; River Birch Landfill, Jefferson Parish, Louisiana; Solid Waste Permit No. D-051-6741/P-0321.

Dear Ms. Levy:

Please consider this latter as a request for exemption from otherwise applicable provisions of the Solid Waste Regulations, LAC 33:VII.Subpart 1 and, particularly, the requirements of LAC 33:VII.709.C.1. related to the use of soil borings for characterization of subsurface soils and groundwater conditions at Type I and Type II solid waste disposal facilities. This request for exemption is submitted pursuant to the authority of LAC 33:VII.307, governing exemptions, in anticipation of the filing of an application for modification of River Birch Landfill's (RBL) existing Solid Waste Permit (No. D-051-6741/P-0321) to accommodate a planned expansion of the landfill.

The expansion, if permitted, will include a horizontal component which will occur in the area between the currently permitted RBL facility and the site of the now closed Greater New Orleans Landfill. The planned expansion also involves a vertical component, which includes increasing excavation depths for landfill cells within the currently permitted outlines of the facility. The requested exemption addresses the otherwise applicable requirement of utilizing borings, at specified spacings, for characterizing the subsurface conditions in connection with both the horizontal and vertical components of the planned expansion. As part of the requested exemption, RBL proposes the use of an electronic piezocone penetrometer (CPTu). The particulars of the proposal for use of CPTu technology is described in the attached letter from Eustiss Engineering Company, Inc., dated December 5, 2002, which is enclosed as Exhibit "A" and incorporated herein by reference as if reproduced in full.

As explained in Exhibit "A", CPTu technology qualifies as a satisfactory "innovative or alternate technology" under LAC 33:VII.307 and, hence, its approved use as part of an overall plan for assessing subsurface conditions in the areas of the planned expansion forms the justification for the requested exemption. In further support of the requested exemption, RBL refers the Louisiana Department of Environmental Quality (LDEQ) to its prior determination, dated September 19, 1995, wherein the use of electronic cone penetrometer technology was approved as the basis for granting a similar exemption request by RBL. The LDEQ's September 19, 1995 letter approving the requested exemption is enclosed as Exhibit "B".

As noted in Exhibit "A", the use of CPTu technology (and a corresponding exemption from the requirements of LAC 33:VII.709.C.1) is particularly justified in the present case due to the nature of the subsurface conditions in the area, which have been extensively studied and were characterized by the LDEQ as "not conducive to the potential migration of contamination". The LDEQ also noted the favorable groundwater gradient in the area (upward flow) and characterized additional borings, at that time, as a "significant" fiscal cost which was unnecessary. In the present case, the known subsurface conditions at the site, coupled with the demonstrated performance of CPTu and its ability to provide equivalent or superior performance to that of borings, shows that the proposed plan for characterization of the subsurface conditions at the site of the proposed expansion will not adversely impact public health, safety, welfare or the environment.

Finally, in connection with this exemption request, RBL shall cause a public notice to be published which satisfies the requirements of LAC 33:VII.307.C.1.

Please contact the undersigned in the event additional information is required for the processing of this request. Thanking you for your consideration, I remain,

Sincerely,

Albert J. Ward

Mr. Albert J. Ward, Jr.
President, River Birch, Inc.

enclosures

EUSTIS ENGINEERING COMPANY, INC.
3011 28TH STREET
METAIRIE, LOUISIANA 70002-6019
PH 504-834-0157 / FX 504-834-0364
EMAIL: INFO@EUSTISENG.COM / SITE: WWW.EUSTISENG.COM

5 December 2002

River Birch, Inc.
Post Office Box 1938
Gretna, Louisiana 70054

Attention Mr. A.J. Ward

Gentlemen:

River Birch Landfill
West Expansion
Jefferson Parish, Louisiana
Eustis Engineering Project No. 17543

At your request, Eustis Engineering Company, Inc., has completed an evaluation of existing data as it affects your proposed plans for increasing the volume of the existing landfill and for expanding the landfill to the west. Specifically, you have requested that we investigate the possibility of you obtaining exemptions from the requirements of the Louisiana Administrative Code, Title 33, Part VII, Subchapter B, Sections 709.C.1.c.i-iv as they would apply to the River Birch Solid Waste Disposal Facility in West Avondale, Louisiana. Specifically, you are seeking:

1. A deviation that would allow the use of an electronic piezocone penetrometer for subsurface exploration within the footprint of a proposed expansion of the existing landfill, and

2. A modification to the current operating permit that would allow excavations to a maximum depth of 40 feet below the existing ground surface.

Request for Exemption from Requirements of
LAC:33.709.C.1.c.i-iv Applied to Expansion of Existing Landfill

We understand that you are currently assembling a permit application for expansion of the landfill to incorporate approximately 205 additional acres situated on the west side of the existing landfill. Subsurface investigations for this expansion will include continuous

EXHIBIT
A

sampling in bore holes extending a minimum of 70 feet below the existing ground surface. This depth will accommodate the requirement for continuous sampling within a minimum depth of 30 feet below the base of a 40-ft excavation.

The exemption that you are seeking is related to the type of equipment proposed for the subsurface exploration undertaken for the landfill. We are proposing to use an electronic piezocone penetrometer (CPTu) as a substitute for half of the soil borings required to meet the spacing requirements of LAC:33.709.C.1.c.i. It is our opinion that the CPTu qualifies as a satisfactory "innovative or alternate technology" described by the provisions of LAC 33:VII.307.D.

The CPTu is ideally suited for determining the lithology of the site. Numerous research studies have demonstrated that different soil types exhibit typical combinations of the three parameters measured by the CPTu (cone tip resistance, sleeve friction, and pore pressure during shear). With a knowledge of all three parameters, determination of the soil type corresponding to a given probing depth can be made with a high degree of certainty. These capabilities have been well documented and are generally accepted in geotechnical engineering practice.

To further eliminate the possibility of erroneous classifications which may be associated with naturally occurring organic materials (roots and stumps) at the site, we intend to develop site-specific correlations between soil classifications and strength parameters obtained via the CPTu and those obtained from continuously sampled bore holes. This site-specific correlation will permit correct interpretation of the CPTu measurements and translation of these parameters into soil classification. The CPTu will then provide a continuous record of soil types for the entire depth of the cone penetration test hole.

It should be noted that conventional wet rotary drilling rarely provides a perfectly continuous record of soils encountered at the bore hole location. Even with the best drilling techniques, a portion of the sample record is lost due to procedures required to maintain the sides and bottom of the bore hole. In addition, sample descriptions provided with boring logs are subjective and do not always indicate the presence or size of all sample features (e.g., lenses and layers) interbedded within the larger sample mass. In this respect, the resolution provided by the CPTu log is generally higher than that which is commonly provided by the logging of continuously sampled bore holes. For this reason, the CPTu should be considered at least as useful as conventional soil borings for providing an accurate record of the subsurface stratification.

In addition to providing continuous record of data for site characterization, the CPTu provides the additional benefit of minimizing disturbance to the subsurface. No drilling fluids are introduced during the testing, and the hole diameter is significantly smaller than that associated with a conventional drilled bore hole. Finally, the CPTu is generally regarded as safer than conventional drilling because worker exposure is minimized by

12/06/02 FRI 07:42 [TX/RX NO 7690]

considered an unreasonable burden to your company considering the utility of the CPTu for accomplishing similar results.

Based on this concern, we propose that 37 CPTu be completed to a depth of 70 feet in lieu of soil borings in these areas. The technical merits of the CPTu in site characterization have been described previously in this letter. In addition, a uniform geology has consistently been defined by all previous investigations for the existing River Birch Landfill, the proposed west expansion of the River Birch Landfill, the adjacent Greater New Orleans Landfill, and the adjacent Kelvin Landfill. For this reason, we anticipate that the CPTu will correlate well with existing borings and CPTu without the extended time and expense associated with a drilling and sampling program.

As you are aware, we further intend to drill two additional soil borings along the western edge of the existing landfill to a depth of 160 feet below the ground surface. The intent of these borings is to gain additional information regarding soil strengths at depths between 70 and 150 feet below the ground surface. Soils within these depths become more important to stability of the landfill during construction to heights greater than 100 feet above the ground surface. These borings should provide the secondary benefit of additional confirmation of the site lithology.

Summary

In consideration of these facts, it is our opinion that the proposed expansion site can be suitably characterized by use of the CPTu in combination with a program of conventional bore hole drilling and sampling. In addition, it is our opinion that, given the uniformity of the site geology, the CPTu will provide suitable site characterization for deeper excavation within portions of the existing landfill.

If we may be of further assistance in this manner, or if you require any additional information, please do not hesitate to contact us.

Yours very truly,

EUSTIS ENGINEERING COMPANY, INC.

CHRIS L. SAUCIER, P.E.

CLS:ken/mcp

TOTAL P.06
12/06/02 FRI 07:42 [TX/RX NO 7690]

abbreviated subsurface access times and the practical elimination of return waste from the bore hole.

For these reasons, the CPTu has gained wide acceptance as a tool for subsurface site characterization. The technology is currently used by the U.S. Army Corps of Engineers Waterways Experiment Station, the U.S. Department of Energy's Office of Environmental Management, and the Subsurface Protection and Remediation Division of the U.S. Environmental Protection Agency.

To meet the requirements for boring spacing at the site of the landfill expansion, a strict interpretation of LAC:33.709.C.1.c.i would require 44 soil borings at a maximum grid spacing of 450 feet. The majority of these borings would extend to depths of 70 feet below the existing ground surface to accommodate a maximum excavation depth of 40 feet below the existing ground surface. Five of these borings would be required to extend to 100 feet below the existing ground surface.

In lieu of the program described above, we propose to drill 22 soil borings at the site and complete 24 CPTu tests. Twenty of the soil borings will extend 70 feet below the existing ground surface, and two will extend to depths of 100 feet. Nineteen of the CPTu tests will extend to depths of 70 feet, and three will extend to depths of 100 feet. Two CPTu tests (beyond the minimum exploration requirements stated above) will be completed immediately adjacent to continuously sampled soil borings to provide the site-specific calibration of the penetrometer's soil classification capabilities. Finally, the CPTu tests will alternate with soil borings within the 450-ft grid pattern, such that soil borings will be present at all grid points surrounding any one penetrometer test location. All CPTu tests will be performed in accordance with the requirements of ASTM D 5778.

While the benefits of the CPTu for site characterization have been demonstrated in test programs and frequent use, current regulations do not explicitly reference the CPTu as a tool for site characterization. This may be attributed to the fact that the CPTu technology was developed (and gained acceptance) after the vast majority of the regulations were promulgated. It is our understanding that the CPTu has been previously authorized as a replacement technology for subsurface exploration during site characterization for the existing landfill. Based on this information and that presented above regarding the technology, a strong justification exists for use of the CPTu in subsurface characterization of your site.

Request for Exemption from Requirements of
LAC:33.709.C.1.c.ii-iii Applied to Existing River Birch Landfill

The second exemption request involves the existing portion of the landfill, hereafter referred to as the "active" or "permitted" landfill area. In 1996, the active landfill was granted a permit to operate on approximately 332 acres with a maximum depth of excavation approximately 11 feet below the existing ground surface. The application for

an operating permit was filed on your behalf by Woodward-Clyde Engineers, Inc. on 24 October 1995. This permit application included the results of several soil borings and CPTu which were found to satisfy the spacing, depth, and sampling requirements of LAC:33.709.C.1.c.i-iii. At that time, the intended depth of excavation for the landfill was approximately 10 feet below the ground surface, so that the majority of the soil borings completed for the project were drilled to depths of 40 feet below the existing ground surface.

In May 1999, Mader-Meier Engineers filed a request for a permit modification that would allow River Birch to excavate to levels approximately 15 feet below the existing ground surface. The ramifications of the proposed modification were that the majority of the borings and cone penetrometer tests used to characterize the site would penetrate approximately 25 feet below the base of the landfill excavation, instead of the 30-ft penetration required by the LAC:33.709.C.1.c.ii-iii. The proposed permit modification was granted by the Louisiana Department of Environmental Quality on 10 June 1999, based on the following factors:

1. Geologic conditions at the site, as revealed by all subsurface exploration programs conducted prior to that time, were found to be essentially uniform and were not conducive to the potential migration of contamination. Soils present within the uppermost 60 to 70 feet consisted of massive Holocene deposits of clay and silty clay below the depth of landfill excavation. The uppermost 40 feet of these soils was characterized as the first water-bearing zone, though very low hydraulic conductivities were consistently measured in laboratory samples of these soils (as expected for normally consolidated, intact clay strata). No continuous permeable zones were identified within the Holocene formations.

2. Ground water gradients at the site were demonstrated to flow upward in a way that could not conduct potential contaminants toward more permeable Pleistocene deposits underlying the Holocene soils.

3. The subsurface exploration program associated with extending all borings by a length of approximately 5 feet was judged to yield little, if any, new or valuable information regarding subsurface conditions, despite the significant fiscal costs associated with the program.

During subsequent operation of the landfill, you have identified potential advantages associated with increasing excavations for the landfill to a maximum depth approximately 40 feet below the existing ground surface. Strict adherence to the requirements of LAC:33.709.C.1.c.i-ii would require additional soil borings between 40 and 70 feet below the existing ground surface to accommodate the increased depth of excavation. To meet regulatory requirements for boring spacing, approximately 37 borings would be required. The fiscal costs of this program and the delays associated with its completion may be

RF

State of Louisiana

Department of Environmental Quality

Edwin W. Edwards
Governor

September 19, 1995

William A. Kucharski
Secretary

CERTIFIED MAIL Z 442 016 357
RETURN RECEIPT REQUESTED

Mr. A.J. Ward, Jr.
River Birch, Incorporated
Post Office Box 1938
Gretna, Louisiana 70054

RE: Alternate Technology Exemption Request
Proposed River Birch Landfill
D-051-6741/PA #439
Jefferson Parish

Dear Mr. Ward:

We are in receipt of your submittal dated July 14, 1995, regarding a request for an exemption from the Solid Waste Rules and Regulations to utilize electronic cone penetrometer testing (CPT) instead of thin-wall and or split-spoon devices to sample all borings.

Your exemption request has been reviewed by the Solid Waste Division, and it has been determined that all the requirements of LAC 33.VII.307 have been met.

By way of this letter, an exemption is hereby granted to utilize CPT at the above-referenced facility.

Should you have any questions concerning this matter, please contact Ms. Valerie Lege or Mr. Robert Frischhertz of the Solid Waste Division at (504) 765-0249.

Sincerely,

[redacted] MILLER
Assistant Secretary

GAM:VEL:jd

EXHIBIT
B

OFFICE OF SOLID AND HAZARDOUS WASTE SOLID WASTE DIVISION P.O. BOX 82178 BATON ROUGE, LOUISIANA 70884-2178
TELEPHONE (504) 765-0249 FAX (504) 765-0299

Louisiana

EXEMPTION REQUEST
FOR
BORING DEPTH REQUIREMENTS
FOR
ORIGINAL SITE
JANUARY 11, 1999

RiverBirch
INCORPORATED

Post Office Box 1938 • Gretna, Louisiana 70054
504 364.1140 • 504 364.1120 FAX

January 11, 1999

Mr. William J. Mollere
Office of Waste Services
Louisiana Department of Environmental Quality
P.O. Box 82178
Baton Rouge, LA 70884-2178

Re: Exemption Request
Boring Depth Requirement – LAC 33:VII.709.C.1.c.ii-iii
River Birch Landfill – Facility No. D-051-6741 / PA #439

Dear Mr. Mollere:

River Birch Landfill is considering deepening its maximum excavation depths for future phases by about 5 feet, from –11 feet MSL to –16 feet MSL. The subsurface investigation contained in the approved Permit Application dated October, 1995, has many 40-foot borings and CPT soundings that would need to be deepened some 5 to 6 feet in order to meet the "30 feet below base of excavation" guideline in the cited Solid Waste Regulations.

The attached document demonstrates that deepening the borings / CPT's by 6 feet would neither improve the environmental soundness of the facility nor add any significant understanding of the site geology. All available information shows that the soils critical for stability of the landfill are above the 40-foot depth and that there are no new pervious strata in the 40-46 foot depth range that would require changes to the groundwater monitoring system. The approved "Uppermost Aquifer" is at the 16-40 foot depth range and groundwater flow has an *upwards* component.

Therefore, River Birch respectfully requests an exemption to the "30 feet below base of excavation" (only) portions of LAC 33:VII.709.C.1.c.ii-iii for bottom excavations not below Elevation – 16 feet, MSL.

Sincerely,
River Birch, Inc.

A.J. Ward, Jr.
President

STE
Soil Testing Engineers, Inc.

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA
FACILITY NO. D-051-6741/PA#439

REQUEST FOR EXEMPTION
LAC 33:VII.521.D / 709.C.1.c.ii-iii

Background. The Permit for this facility includes the geosciences data in Volumes III and IV of its Application dated October, 1995. These Volumes contain the logs of 90 borings and CPT soundings, 80 of which terminated at 40 feet below ground surface (bottom elevations -39 to -43 feet MSL). For details, see the attached Tables 1 (Borings) and 2 (CPT Soundings). The permitted minimum bottom excavation elevation is -11 feet MSL (see Fig. 32A, Vol. II, Application dated October, 1995) but as deep as -14 to -16 feet MSL at the sumps (Response to LAC 33:VII.521.F.4.b). RiverBirch wants to deepen the minimum bottom elevation to -16 feet MSL (sump to -19 feet MSL). A strict interpretation of LAC 33:VII.709.C.1.c.ii-iii would require deepening these 40-foot borings by 5 to 6 feet on average.

Since the subsurface soils and groundwater conditions at this site have been adequately characterized, RiverBirch requests an exemption from deepening its existing boreholes.

Regulation. The RiverBirch Landfill is a Type I and Type II facility. LAC 33:VII.521.D refers to Section 709.C for geologic standards for such facilities. The pertinent parts of 709.C.1.c are reproduced below:

> *ii. all boreholes shall extend to a depth of at least 30 feet below the lowest point of the excavation. At least 10 percent of the borings (minimum of three borings) shall extend to 100 feet below grade level to characterize the shallow geology;*
>
> *iii. all borings shall be continuously sampled to at least 30 feet below the base of excavation, with the use of thin-wall and/or split-spoon devices or similar coring devices. After 30 feet, samples shall be at five-foot intervals;*

The geoscience investigation contained in the approved Permit Application meets all other guidelines of LAC 33:VII.709.C.1.c, even for the proposed somewhat deeper configuration. The only item which the existing investigation does not meet for the proposed configuration is the "*30 feet below the lowest point of the excavation*" guideline.

Justification. While deepening the borings by a few feet may appear simple, it would actually require redrilling to the 40 foot depth, sampling for, say, 6 feet, then grouting the resulting hole. Even using a combination of half CPT soundings and half push technology ("Geoprobe"), the cost would be almost $100,000.00. This expense would not add to the environmental security of the facility, for the reasons outlined below.

Waste Mass Stability. The facility must be safe against mass movements (slides) which could disrupt the liner system. The soil property which governs stability against mass movements is its shear

STE Soil Testing Engineers, Inc.

strength. Volume III of the Permit Application dated October, 1995, contains plots of soil shear strength vs. depth. These plots clearly demonstrate that the minimum strengths occur well above the 40 foot depths. Below about the 20 foot level, the soil strengths increase with depth. Since the critical soils for stability are above the 40 foot level, additional data below 40 feet would not add to the confidence level in stability.

Groundwater Monitoring. LAC 33:VII.709.E.1.a requires that the "Uppermost Aquifer" have a groundwater monitoring system. The approved Permit Application of October, 1995, defines the "Uppermost Aquifer" at this site as "two units, i.e., 0-to-16 feet bgs and 16-to-40 feet bgs." These units are composed of clays with interbedded silts and organic matter. For details, see the Response to LAC 33:VII.521.E.1.a.i in the cited Application. Furthermore, the approved groundwater monitoring plans had no wells with screen bottoms deeper than 20 feet bgs (see the Response to LAC 33:VIII.521.F.5.c in the approved Permit Application).

A review of the ten on-site borings deeper than 40 feet indicated no pervious zones in the 40-46 foot depth range which were not part of the "Uppermost Aquifer" as defined above. Seven of the ten such borings did not indicate any pervious materials in the 40-46 foot depth range. Similarly, the deep borings at the adjacent Jefferson Parish Landfill do not indicate any new pervious zones in the 40-46 foot depth range.

Furthermore, there is a strong *upwards* gradient from the deeper Zone "B" to the shallower Zone "A", as described in the Response to LAC 33:VII.521.E.1.a.iii in the approved Permit Application dated October, 1995. As stated in the Response to LAC 33:VII.521.F.5.c in the cited application *"the top of the uppermost aquifer* (is) *the most likely contaminant pathway."* The 40-46 foot depth range is near or below the bottom of the uppermost aquifer, Zone "A".

The above discussions demonstrate that there would be no increase in confidence in the groundwater monitoring system as a result of deepening the borings by some 6 feet.

LDEQ Staff Comments. The adequacy of the existing site characterization for a proposed 5 foot deepening of the excavations was discussed with LDEQ geologic and engineering staff in early October, 1998. The LDEQ staff members stated that the characterization was technically adequate for deepening the excavations.

Summary. The soils exploration program contained in the approved Permit Application dated October, 1995, meets all the regulatory guidelines for the deepened excavations except for depth. The existing borings/CPT soundings would have to be extended some 6 feet to meet the depth guideline. Neither RiverBirch nor LDEQ staff see a technical reason for this slight but very expensive deepening. It would not add to the confidence level in either waste mass stability or groundwater monitoring, or to understanding the site geology, the primary reasons for site exploration. Therefore, RiverBirch respectfully requests an exemption from the "30 feet below base of excavation" guidelines in LAC33:VII.709.C.1.c.ii - iii for bottom excavations as low as -16 feet MSL and sumps as low as -19 feet MSL.

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA
FACILITY NO. D-051-6741/PA#439

REQUEST FOR EXEMPTION
LAC 33:VI.521.D / 709.C.1.c.ii-iii

TABLE 1
SOIL BORING DATA

Boring No.	Surface Elev. (ft. MSL)	Total Depth (feet)	Continuous Sampling (feet)	Bottom Elevations (feet MSL)	
				Boring	Cont. Splg.
E-1	-0.2	80.0	40.0	-80.2	-40.2
E-2	+0.3	80.0	40.0	-79.7	-39.7
E-3	-0.8	80.0	15.0?	-80.8	-15.8?
B-1	-0.2	40.0	40.0	-40.2	-40.2
B-2	-2.0	40.0	40.0	-42.0	-42.0
B-3	-2.5	40.0	40.0	-42.5	-42.5
B-4	-1.4	100.0	40.0	-101.4	-41.4
B-5	-1.0	40.0	40.0	-41.0	-41.0
B-6	-1.0	100.0	40.0	-101.0	-41.0
B-7	-0.7	40.0	40.0	-40.7	-40.7
B-8	-0.3	40.0	40.0	-40.3	-40.3
B-9	-0.2	40.0	40.0	-40.2	-40.2
B-10	+0.1	40.0	40.0	-39.9	-39.9
B-11	-0.5	100.0	40.0	-100.5	-40.5
B-12	-1.1	40.0	40.0	-41.1	-41.1
B-13	-1.2	40.0	40.0	-41.2	-41.2
B-14	-1.4	40.0	40.0	-41.4	-41.4
B-15	-2.9	40.0	40.0	-42.9	-42.9
B-16	-1.7	40.0	40.0	-41.7	-41.7
B-17	-1.0	40.0	40.0	-41.0	-41.0
B-18	-1.5	40.0	40.0	-41.5	-41.5
B-19	-2.0	40.0	40.0	-42.0	-42.0
B-20	-1.6	40.0	40.0	-41.6	-41.6

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA
FACILITY NO. D-051-6741/PA#439

REQUEST FOR EXEMPTION
LAC 33:VI.521.D / 709.C.1.c.ii-iii

TABLE 1
SOIL BORING DATA

Boring No.	Surface Elev. (ft. MSL)	Total Depth (feet)	Continuous Sampling (feet)	Bottom Elevations (feet MSL)	
				Boring	Cont. Spig.
B-21	-1.5	100.0	40.0	-101.5	-41.5
B-22	-1.3	40.0	40.0	-41.3	-41.3
B-23	-1.2	40.0	40.0	-41.2	-41.2
B-24	-0.1	40.0	40.0	-40.1	-40.1
B-25	+0.3	40.0	40.0	-39.7	-39.7
B-26	-0.8	40.0	40.0	-40.8	-40.8
B-27	-1.5	40.0	40.0	-41.5	-41.5
B-28	-1.4	40.0	40.0	-41.4	-41.4
B-29	-1.4	40.0	40.0	-41.4	-41.4
B-30	-1.8	100.0	40.0	-101.8	-41.8
B-31	-1.9	40.0	40.0	-41.9	-41.9
B-32	-1.4	40.0	40.0	-41.4	-41.4
B-33	-1.7	100.0	40.0	-101.7	-41.7
B-34	-1.5	40.0	40.0	-41.5	-41.5
B-35	-0.7	40.0	40.0	-40.7	-40.7
B-36	+0.1	40.0	40.0	-39.9	-39.9
B-37	-0.7	100.0	40.0	-100.7	-40.7
B-38	-0.9	40.0	40.0	-40.9	-40.9
B-39	-0.8	40.0	40.0	-40.8	-40.8
B-40	-1.2	40.0	40.0	-41.2	-41.2
B-41	-0.6	40.0	40.0	-40.6	-40.6
B-42	-0.3	40.0	40.0	-40.3	-40.3
B-43	-0.6	40.0	40.0	-40.6	-40.6
B-44	-0.3	40.0	40.0	-40.3	-40.3

Source: Permit Application dated October, 1995 Volume III.

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA
FACILITY NO. D-051-6741/PA439

REQUEST FOR EXEMPTION
LAC 33:VII.521.D / 709.C.1.c.ii-iii

TABLE 2
CONE PENETROMETER SOUNDING DATA

Sounding No.	Surface Elev. (ft. MSL)	Sounding Depth (feet)	Bottom Elev. of Sounding (ft. MSL)
C-1	-0.2	40.4	-40.6
C-2	-0.7	40.7	-41.4
C-3	-2.0	39.3	-41.3
C-4	-2.2	39.9	-42.1
C-5	-1.6	40.6	-42.2
C-6	-0.9	40.9	-41.8
C-7	-0.7	40.0	-40.7
C-8	-0.5	40.9	-41.4
C-9	+0.1	39.8	-39.7
C-10	-0.1	40.3	-40.4
C-11	-1.0	40.0	-41.0
C-12	-1.5	40.0	-41.5
C-13	-1.3	40.4	-41.7
C-14	-1.6	38.1	-39.7
C-15	None	None	None
C-16	-0.9	40.3	-41.2
C-17	-1.2	38.8	-40.0
C-18	-1.8	39.8	-41.6
C-19	-1.7	39.5	-41.2
C-20	-1.1	40.5	-41.6
C-21	-1.2	40.5	-41.7
C-22	-1.7	40.0	-41.7
C-23	-0.5	40.3	-40.8
C-24	+0.5	40.1	-39.6
C-25	-0.3	39.8	-40.1

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA
FACILITY NO. D-051-6741/PA439

REQUEST FOR EXEMPTION
LAC 33:VII.521.D / 709.C.1.c.ii-iii

TABLE 2
CONE PENETROMETER SOUNDING DATA

Sounding No.	Surface Elev. (ft. MSL)	Sounding Depth (feet)	Bottom Elev. of Sounding (ft. MSL)
C-26	-1.1	40.4	-41.5
C-27	-1.5	40.0	-41.5
C-28	-1.6	40.0	-41.6
C-29	-1.4	40.0	-41.4
C-30	-2.0	40.1	-42.1
C-31	-1.1	39.5	-40.6
C-32	-1.2	40.4	-41.6
C-33	-1.6	40.0	-41.6
C-34	-0.7	39.9	-40.6
C-35	+1.3	40.0	-38.7
C-36	-0.3	40.3	-40.6
C-37	-0.1	39.6	-39.7
C-38	-1.4	40.3	-41.7
C-39	-1.3	39.8	-41.1
C-40	-1.2	39.6	-40.8
C-41	-0.7	40.0	-40.7
C-42	-0.5	40.0	-40.5
C-43	+0.3	40.0	-39.7
C-44	-0.4	40.0	-39.6

Source: Permit Application dated October, 1995 Volumes III and IV.

State of Louisiana

Department of Environmental Quality

M.J. "MIKE" FOSTER, JR.
GOVERNOR

May 3, 1999

J. DALE GIVENS
SECRETARY

CERTIFIED MAIL P 531 457 698
RETURN RECIPT REQUESTED

Mr. A. L. Ward, Jr.
President
River Birch Landfill
Post Office Box 1938
Gretna, Louisiana 70054

RE: Exemption Request
River Birch Landfill
D-051-6741/P-0321
Jefferson Parish

Dear Mr. Ward:

The Solid Waste Division is in receipt of your submittal dated January 11, 1999, requesting an exemption regarding the boring depth requirements of LAC 33:VII.709.C.1.c.ii-iii for the above-referenced facility.

As we understand, River Birch Landfill plans to deepen the excavation in future cells by five (5) to six (6) feet. As a result, the existing borings will not be thirty (30) feet below the base of the deepened excavation as required by the above-referenced regulation.

Based on our review of your submittal, we have found that deepening the borings in accordance with LAC 33:VII.709.C will not provide additional useful information with respect to the groundwater monitoring program at the facility. This is based on the fact that the existing geologic/hydrogeologic characterizations data at the site along with the information obtained from the Greater New Orleans and Kelvin Landfills are sufficient for proper monitoring well placement. Additionally, the Department finds the exemption will not pose any adverse impact to public health, safety, welfare, or the environment.

Considering all these facts, your request for an exemption in accordance with LAC 33:VII.307 is hereby approved.

If you have any questions concerning this matter, please contact Ms. Thea Johnson of the Solid Waste Division at (225) 765-0249.

Sincerely,

J. Dale Givens
Secretary

JDG:TJ:mo

EXEMPTION REQUEST
FOR
CONE PENETROMETERS
FOR
ORIGINAL SITE BORINGS
SEPTEMBER 19, 1995

State of Louisiana

Department of Environmental Quality

Edwin W. Edwards
Governor

September 19, 1995

William A. Kucharski
Secretary

CERTIFIED MAIL Z 442 016 357
RETURN RECEIPT REQUESTED

Mr. A.J. Ward, Jr.
River Birch, Incorporated
Post Office Box 1938
Gretna, Louisiana 70054

RE: Alternate Technology Exemption Request
Proposed River Birch Landfill
D-051-6741/PA #439
Jefferson Parish

Dear Mr. Ward:

We are in receipt of your submittal dated July 14, 1995, regarding a request for an exemption from the Solid Waste Rules and Regulations to utilize electronic cone penetrometer testing (CPT) instead of thin-wall and or split-spoon devices to sample all borings.

Your exemption request has been reviewed by the Solid Waste Division, and it has been determined that all the requirements of LAC 33.VII.307 have been met.

By way of this letter, an exemption is hereby granted to utilize CPT at the above-referenced facility.

Should you have any questions concerning this matter, please contact Ms. Valerie Lege or Mr. Robert Frischhertz of the Solid Waste Division at (504) 765-0249.

Sincerely,

GLENDA A. MILLER
Assistant Secretary

GAM:VEL:jd

Woodward-Clyde Consultants
Engineering & science applied to the earth & its environment

May 28, 1993

Mr. William Mollere
La. Department of Environmental Quality
P. O. Box 44307
Baton Rouge, Louisiana 70804

RE: Birchwood Commercial Landfill
Geotechnical Investigations
Our File No. 93B248C

Dear Mr. Mollere:

On May 26, 1993, Mr. Leonard Guilbeau and the undersigned met with Messrs. Bijan Sharafkhani, Roger Gingles, Robert Frischertz, and Brett LeBlanc of LDEQ to discuss the geotechnical investigation for the proposed Birchwood Commercial Landfill.

The proposed landfill will be located on the West bank of the Mississippi River in Jefferson Parish. The site is adjacent to two existing landfills (Kelvin and Marsh Landfills) and to the Jefferson Parish sludge pit.

The proposed landfill will be built on a triangular plot occupying about 320 acres. Attached we are forwarding copies of the site plan and two proposed boring schemes; one is with a 200 ft. buffer zone surrounding the property, and another one with a 100 ft. buffer zone on two sides and 200 ft. buffer zone on the other sides. The latter land development scheme is under consideration and its use depends on pending agreements with adjacent landowners and approval from LDEQ. Gulf Engineers Inc. and Woodward-Clyde Consultants (WCC) of Baton Rouge have been asked to prepare the solid waste landfill permit application.

Presently, we are in the process of planning the execution of the geotechnical investigation. The topic of discussion at our meeting in your offices was the techniques to be used for the geotechnical investigation. We propose to use a 50/50 mixture of conventional drilling and electronic cone penetrometer (CPT) for the subgrade investigation.

Following some discussion and review, it was agreed upon by all present that WCC would proceed with its plans to perform the geotechnical investigation using the proposed plan of 50 percent of borings done using conventional methods and the balance done with the CPT. Additionally, it was recommended by LDEQ staff and was agreed

2822 O'Neal Lane (70816) • P.O. Box 66317 (70896) • Baton Rouge, Louisiana
(504) 751-1873 • Fax (504) 753-3616

by all that a boring and CPT be located within 10 feet of each other at each corner of the triangle and the approximate center of the property for correlation purposes. These borings will be done in addition to the number of borings to satisfy the Subtitle D requirements.

WCC will proceed with the geotechnical investigation as agreed above. We will keep your staff informed of the progress of this project.

We appreciate the opportunity afforded to us to discuss this matter.

Sincerely,

Ara Arman, P.E.

Robert A. SeGall, P.E.

AA:jr

Attachments

cc: Mr. Charles Hinton, Gulf Engineers Inc.
Mr. Leonard Guilbeau, Gulf Engineers Inc.

EXEMPTION APPROVAL FOR THE USE OF CONE PENETROMETER

folder

State of Louisiana

Department of Environmental Quality

M. J. "MIKE" FOSTER, JR.
GOVERNOR

APR 2 4 2003

L. HALL BOHLINGER
SECRETARY

CERTIFIED MAIL 7002 0460 0001 3659 5062
RETURN RECEIPT REQUESTED

Mr. A. J. Ward Jr., President
River Birch Landfill
P. O. Box 1938
Gretna, Louisiana 70054

Re: Exemption Approval (LAC 709.C.1.c and LAC 709.C.1.d)
River Birch Landfill
AI #32219/D-051-6741/P-0321
Jefferson Parish (PER20030001)

Dear Mr. Ward:

The Department has reviewed your request for an exemption pursuant to LAC 33:VII.307 which was dated December 11, 2002, and submitted to the Department on January 24, 2003. You have requested an exemption from the use of boreholes to characterize the subsurface soils and groundwater conditions at a Type I/Type II landfill and proposed the use of innovative or alternative technology to provide this information utilizing an electronic piezocone penetrometer.

Pages four and five of your request state that use of the penetrometer will satisfy all of the applicable standards in LAC 33:VII.709.C.1 except for the use of borings to complete characterization of soils and groundwater conditions. Page three of your request notes that penetrometer technology will produce performance equivalent or superior to the use of borings in obtaining subsurface soil information thereby providing environmental protection.

Your December 11, 2002, letter requests an exemption from LAC 33:VII.709.C.1.c or the requirement to complete borings to characterize the subsurface soils and groundwater conditions. Specifically, you are requesting authorization to use a combination of cone penetrometer technology and soil borings. The facility proposes to complete 22 soil borings and 24 cone penetrometer tests. Twenty soil borings will be completed to 70 feet and two borings to 100 feet. Nineteen of the cone penetrometer tests will be completed to 70 feet and three to 100 feet. Two sites will be used to provide duplicate information to gauge the accuracy of the use of the alternative method in characterizing the soils and groundwater conditions at this site.

The attached Eustis Engineering Company, Inc. letter dated December 5, 2002, requests an exemption from LAC 33:VII.709.C.1.d or the requirement to complete borings to a depth of at least 30 feet below the lowest point of the zone of incorporation. Specifically, you propose to use cone penetrometer technology to characterize an additional 40 foot depth below the area previously sampled using borings.

The Department hereby approves an exemption to the requirements imposed by LAC 33:VII.709.C.1.c and LAC 33:VII.709.C.1.d as outlined in your proposal. You are required to notify Mr. Hamilton Shaw at least five working days prior to initiation of the cone penetrometer procedure outlined above.

Please refer to your agency interest number (AI 32219), facility identification number (D-051-6741), permit number (P-0321) and PER20030001 on all future correspondence. If you have any questions concerning this matter, you may contact Cheryl O'Neal of the Permits Division at (225) 765-0036 or Hamilton Shaw, of the Environmental Technology Division at (225) 765-0632.

Sincerely,

Linda Korn Levy
Assistant Secretary

cko

cc: Southeast Regional Office
Hamilton Shaw, Geology Group 2

ATTACHMENT 15

PROOF
OF
PUBLIC NOTICE

RECEIVED MAR 1 4 2003

RiverBirch
INCORPORATED

Post Office Box 1938 • Gretna, Louisiana 70054
504.364.1140 • 504.364.1120 FAX

March 13, 2003

VIA HAND-DELIVERY
Ms. Linda Levy, Assistant Secretary
Office of Environmental Services
Louisiana Department of Environmental Quality
Post Office Box 82135
Baton Rouge, LA 70884-2135

Re: Request for Exemption Pursuant to LAC 33:VII..307; River Birch Landfill, Jefferson Parish, Louisiana; Solid Waste Permit No. D-051-6741/P-0321.

Dear Ms. Levy:

Enclosed are two proofs of publication required by LAC 33:VII.307.B3 in connection with exemption requests under the Solid Waste Regulations. Please attach same to the exemption request dated December 11, 2002 and submitted to your office on behalf of River Birch Landfill. As the proofs of publication complete the necessary components of the exemption request, we request that the exemption request now be formally accepted by LDEQ for processing.

If you have any questions concerning this matter, please feel free to contact us. Thanking you for your attention to this matter, we remain,

Sincerely,

Albert J. Ward, Jr.
President

Enclosures

cc: Ms. Cheryl O'Neal (w/encl.)
Mr. Hamilton Shaw (w/encl.)

CAPITAL CITY PRESS

Publisher of

THE ADVOCATE

PROOF OF PUBLICATION

The hereto attached notice was published in THE ADVOCATE, a daily newspaper of general circulation published in Baton Rouge, Louisiana, and the Official Journal of the State of Louisiana, he City of Baton Rouge, and the Parish of East Baton Rouge, in the followng issues:

02/19/03

Legal/Public Notices Representative

Sworn and subscribed before me by the person whose signature appears above In Baton Rouge, Louisiana, on

February 19, 2003

Notary Public
My Commission Expires: Indefinite
Baton Rouge, Louisiana

PUBLIC NOTICE

OF

INTENT TO SUBMIT AN EXEMPTION REQUEST

FROM

FROM SOLID WASTE REGULATIONS

RIVER BIRCH LANDFILL
PERMIT P-0321

River Birch Landfill, Inc. hereby provides notice of its intent to submit request for an exemption from otherwise applicable provisions of th Solid Waste Regulations, LAC Title 33, Part VII. The exemptio request is being submitted to the Louisiana Department Environmental Quality pursuant to LAC 33:VII.307. The specific prov sions of the Solid Waste Regulations from which an exemption sought are LAC 33:VII.709.C.1.c and LAC 33:VII.709.C.1.d. Th exemption request includes a proposal to use an electronic piezocon penetrometer, instead of geotechnical boreholes as required by LA 709.C.1.c and LAC 709.C.1.d, to characterize the subsurface soils an groundwater conditions at and near the existing River Birch Landfill Jefferson Parish. The exemption request states that the proposed us of the electronic piezocone penetrometer qualifies as an innovative alternative technology under LAC 33:VII.307.D. Under this regulatio a proposed innovative or alternative technology must satisfy all of th applicable standards in LAC, Title 33, Part VII, other than those fro which the exemption is sought. Additionally, the regulation require that the proposed innovative or alternative technology must produc performance or provide protection that is equivalent or superior to the required by all of the standards for which the exemption is sough Information related to the River Birch Landfill, Inc. exemption reques can be obtained at the Louisiana Department of Environmental Quality Office of Environmental Services, located at 7290 Bluebonnet Blvd Baton Rouge, Louisiana.

2559854

BREAZEALE SACHSE & WILSON
R CHARLES ELLIS
PO BOX 3197
BATON ROUGE LA 70821-3197

2559854

...ing
...the
...which
...14, 2002 at
...rilling Rig #49,
...stock 17, and ended
...reshwater City Dock,
...ana, on July 14, 2002, as
...fully described in the
...laint;

...ersons having such claims
...file their respective claims,
...ovided in Rule F, including
...graphs (4) and (5) thereof,
...e Supplemental Rules for
...ain Admiralty & Maritime
...ms of the Federal Rules of
...Procedure, with the Clerk
...his Court at the United States
...ri House, 500 Camp Street,
...om C-151, New Orleans,
...isiana, and must serve a
...y thereof on attorneys for
...intiff, Robert C. Clotworthy
...Evan T. Caffrey of Phelps
...nbar, LLP, on or before the
...st day of March, 2003, or be
...aulted.

...any claimant desires to
...ontest either the right to
...security from or the right to
...limitation of liability, he shall file
...and serve on the attorneys for
...plaintiff an answer to the
...complaint on or before the
...aforesaid date unless his claim
...has included an answer, so
...designated, or be defaulted.

New Orleans, Louisiana, this 16
day of JANUARY, 2003.

/s/ Loretta G. Whyte
CLERK

Respectfully submitted,
PHELPS DUNBAR LLP

By: /s/ Robert C. Clotworthy
Robert C. Clotworthy (Bar No. 04204)
Evan T. Caffrey (Bar No. 25607)
Canal Place
365 Canal Street - Suite 2000
New Orleans, Louisiana
70130-6534
Telephone: (504) 566-1311
Facsimile: (504) 568-9130 or 9007

ATTORNEYS FOR PELLEGRIN, ADAMS & CHAUVIN TOWING COMPANY, INC.

PUBLIC NOTICE

The Federal Emergency Management Agency (FEMA) hereby gives notice to the public of its intent to reimburse State and local governments and agencies, and eligible private non-profits for eligible costs under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121, et seq., as amended (Stafford Act) that are incurred as a consequence of the collection of

...ancellation in ...
of the project estimate) and the local match of $297,804 (20% of the project estimate) will be provided by the Regional Transit Authority.

No persons, families, or businesses will be displaced by this project. Project funds have been programmed in the local and State Transportation Improvement Programs.

The project is responsive to the Americans with Disabilities Act and Clean Air legislation.

If the request is received by the RTA by February 28, 2003, the hearing will be held at the Regional Transit Authority Administration Offices, 6700 Plaza Drive, New Orleans, LA 70127. Should a hearing be requested and held, the RTA will afford an opportunity for interested persons or agencies to be heard with respect to the social, economic, and environmental aspects of the project. A copy of the grant application is currently available for public inspection at the above address. The request(s) for a public hearing should be addressed to Mr. Mark Major at the above address.

It is anticipated that the project as advertised herein represents the final version of the RTA fiscal year 2003 Program of Projects. Should any amendments, additions or deletions to made to this program based on public hearings or other comments, said changes will be re-advertised.

William J. DeVille
General Manager
Regional Transit Authority

NOTICE OF ACTION & ARREST OF VESSEL

Please take notice that on December 13, 2002, CitiCapital Commercial Corporation commenced an action in the United States District Court for the Eastern District of Louisiana to foreclose upon a preferred ship mortgage bearing against the barges RCI 1401B (O/N 1036338), RCI 1402B (O/N 1036340), RCI 1403B (O/N 1036341), RCI 1404B (O/N 1036342), RCI 1405B (O/N 1036343), RCI 1406B (O/N 1036344), RCI 1407B (O/N 1036345), RCI 1408B (O/N 1036346), RCI 1409B (O/N 1036347), RCI 1410B (O/N 1036348), RCI 1411B (O/N 1036349), RCI 1412B (O/N 1036350), RM 1406B (O/N 1061629), and RM 1407B (O/N 1061630), their tackle, furniture, apparel, appurtenances, etc., in rem. The action is entitled "CitiCapital Commercial

Orleans, LA 70123; 111 West Center Drive, Lafayette, LA 70508; 104 Lococo Drive, Raceland, LA 70394 or on the Internet at http://www.deq.state.la.us/planning/regs/index.htm.

James H. Brent, Ph.D.
Assistant Secretary

buildings and improvements thereon and all the rights, ways, privileges, servitudes, appurtenances and advantages thereunto belonging or in anywise appertaining, situated in the Third District of New Orleans, in Square No. 157, bounded by Esplanade, Dauphine and Bourbon

SUBSCRIBE TODAY!
(504)822-6660
or toll-free 1-800-925-0000

PUBLIC NOTICE

OF

INTENT TO SUBMIT AN EXEMPTION REQUEST

FROM

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY SOLID WASTE REGULATIONS

RIVER BIRCH LANDFILL

PERMIT P-0321

River Birch Landfill, Inc. hereby provides notice of its intent to submit a request for an exemption from otherwise applicable provisions of the Solid Waste Regulations, LAC Title 33, Part VII. The exemption request is being submitted to the Louisiana Department of Environmental Quality pursuant to LAC 33:VII.307. The specific provisions of the Solid Waste Regulations from which an exemption is sought are LAC 33:VII.709.C.1.c and LAC 33:VII.709.C.1.d. The exemption request includes a proposal to use an electronic piezocone penetrometer, instead of geotechnical boreholes as required by LAC 709.C.1.c and LAC 709.C.1.d, to characterize the subsurface soils and groundwater conditions at and near the existing River Birch Landfill in Jefferson Parish. The exemption request states that the proposed use of the electronic piezocone penetrometer qualifies as an innovative or alternative technology under LAC 33:VII.307.D. Under this regulation, a proposed innovative or alternative technology must satisfy all of the applicable standards in LAC, Title 33, Part VII, other than those from which the exemption is sought. Additionally, the regulation requires that the proposed innovative or alternative technology must produce performance or provide protection that is equivalent or superior to that required by all of the standards for which the exemption is sought. Information related to the River Birch Landfill, Inc. exemption request can be obtained at the Louisiana Department of Environmental Quality, Office of Environmental Services, located at 7290 Bluebonnet Blvd. in Baton Rouge, Louisiana.

The Times-Picayune

3800 HOWARD AVE. NEW ORLEANS, LA 70125-1429 TELEPHONE (504) 826-3206

State of Louisiana

Parish of Orleans

City of New Orleans

Personally appeared before me, a Notary in and for the parish of Orleans, Robert J. Chiasson who deposes and says that he is the Accounts Receivable Manager, of The Times-Picayune Publishing Corporation, a Louisiana Corporation, Publishers of The Times-Picayune, Daily and Sunday, of general circulation; doing business in the City of New Orleans and the State of Louisiana, and that the attached

LEGAL NOTICE
RE:PUBLIC NOTICE OF INTENT TO SUBMIT AN EXEMPTION REQUEST LOUISIANA DEPT. OF ENVIRONMENTAL QUALITY SOLID WASTE REGULATIONS RIVER BIRCH LANDFILL PERMIT P-0321

Advertisement of BREAZEALE, SACHSE & WILSON

P.O. BOX 3197

BATON ROUGE, LA. 70821-3197

Was published in THE TIMES PICAYUNE

on the following dates FEBRUARY 19, 2003

Robert J. Chiasson

Sworn to and subscribed before me this

11th day of MARCH, 2003

Notary Public
My commission expires at my death.

1186-N

The Times-Picayune

3800 HOWARD AVENUE, NEW ORLEANS, LOUISIANA 70140-1097 TELEPHONE (504) 326-3200

RECEIVED

MAR 18 1999

Dept. of Environmental Quality
Office of Waste Services

State of Louisiana

Parish of Orleans

City of New Orleans

Personally appeared before me, a Notary in and for the parish of Orleans, Robert J. Chiasson who deposes and says that he is the Accounts Receivable Manager, of the Times-Picayune Publishing Corporation, a Louisiana Corpora- Publishers of The Times-Picayune, Daily Sunday, of general circulation; doing ...ess in the City of New Orleans and the ... of Louisiana, and that the attached

NOTICES:

...TICE OF INTENT TO SUMBIT A REQUEST FOR AN ...TION UNDER THE LOUISIANA SOLID WASTER ...ATIONS RIVER BIRCH INCORPORATION

...tisement of Kean, Miller, Hawthorne, D'Armon

...BOX 3513

... Rouge, La. 70821

...ublished in The Times Picayune

...Howard Ave.

...relans, La. 70140

...e following dates February 25, 1999

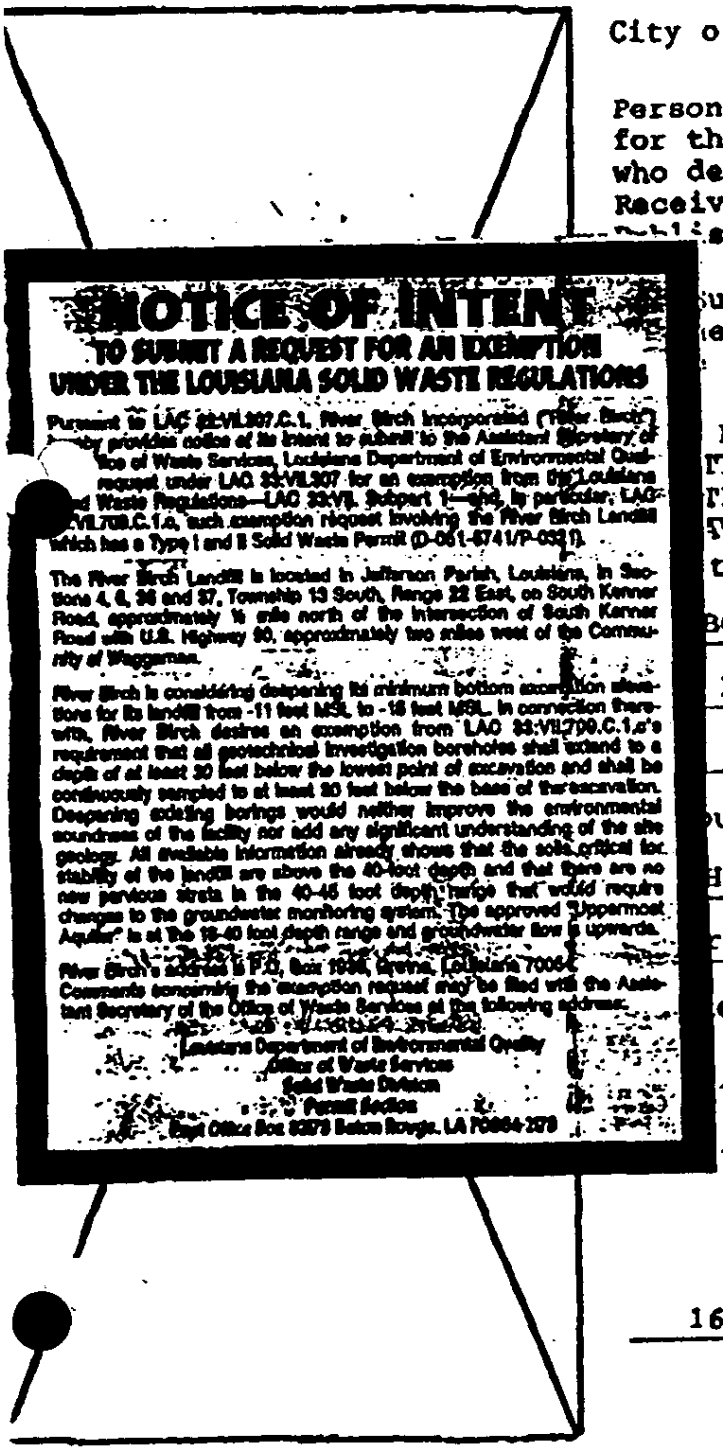
Robert J. Chiasson

Sworn to and subscribed before me this

16th day of March A.D., 19 99

Notary Public

... expires at my death



NOTICE OF INTENT

TO SUBMIT A REQUEST FOR AN EXEMPTION UNDER THE LOUISIANA SOLID WASTE REGULATIONS

Pursuant to LAC 33:VII.307.C.1, River Birch Incorporated ("River Birch") hereby provides notice of its intent to submit to the Assistant Secretary of the Office of Waste Services, Louisiana Department of Environmental Quality request under LAC 33:VII.307 for an exemption from the Louisiana Solid Waste Regulations—LAC 33:VII, Subpart 1—and, in particular, LAC 33:VII.709.C.1.c, such exemption request involving the River Birch Landfill which has a Type I and II Solid Waste Permit (D-061-6741/P-0321).

The River Birch Landfill is located in Jefferson Parish, Louisiana, in Sections 4, 6, 36 and 37, Township 13 South, Range 22 East, on South Kenner Road, approximately ½ mile north of the intersection of South Kenner Road with U.S. Highway 90, approximately two miles west of the Community of Waggaman.

River Birch is considering deepening its minimum bottom excavation elevations for its landfill from -11 feet MSL to -15 feet MSL. In connection therewith, River Birch desires an exemption from LAC 33:VII.709.C.1.c's requirement that all geotechnical investigation boreholes shall extend to a depth of at least 30 feet below the lowest point of excavation and shall be continuously sampled to at least 30 feet below the base of the excavation. Deepening existing borings would neither improve the environmental soundness of the facility nor add any significant understanding of the site geology. All available information already shows that the soils critical for stability of the landfill are above the 40-foot depth and that there are no new pervious strata in the 40-45 foot depth range that would require changes to the groundwater monitoring system. The approved "Uppermost Aquifer" is at the 15-40 foot depth range and groundwater flow is upwards.

River Birch's address is P.O. Box 1936, Gretna, Louisiana 70054. Comments concerning the exemption request may be filed with the Assistant Secretary of the Office of Waste Services at the following address:

Louisiana Department of Environmental Quality
Office of Waste Services
Solid Waste Division
Permit Section
Post Office Box 8378 Baton Rouge, LA 70884-2178

FORM 105-N

RECEIVED

MAR 1 8 1999

Dept. of Environmental Quality
Office of Waste Services

NOTICE OF INTENT
TO SUBMIT A REQUEST FOR AN EXEMPTION
UNDER THE LOUISIANA SOLID WASTE REGULATIONS

Pursuant to LAC 33:VII.307.C.1, River Birch Incorporated ("River Birch") hereby provides notice of its intent to submit to the Assistant Secretary of the Office of Waste Services, Louisiana Department of Environmental Quality, a request under LAC 33:VII.307 for an exemption from the Louisiana Solid Waste Regulations—LAC 33:VII, Subpart 1—and, in particular, LAC 33:VII.709.C.1.c, such exemption request involving the River Birch Landfill which has a Type I and II Solid Waste Permit (D-061-6741/P-0321). [illegible] River Birch Landfill is located in Jefferson Parish, Louisiana, in Section [illegible] and 37, Township 13 South, Range 22 East, on South Kenner Road, approximately 1/2 mile north of the intersection of South Kenner Road with U.S. Highway 90, approximately two miles west of the Community of Waggaman.

River Birch is considering deepening its minimum bottom excavation elevations for its landfill from 11 feet MLS to -15 feet MSL. In connection therewith, River Birch desires an exemption from LAC 33:VII.709.C.1.c's requirement that all geotechnical investigation boreholes shall extend to a depth of at least 30 feet below the lowest point of excavation and shall be continuously sampled to at least 30 feet below the base of the excavation. Deepening existing borings would neither improve the environmental soundness of the facility nor add any significant understanding of the site geology. All available information already shows that the soils critical for stability of the landfill are above the 40-foot depth and that there are no new previous strata in the 40-46 foot depth range that would require changes to the groundwater monitoring system. The approved "Uppermost Aquifer" is at the 16-40 foot depth range and groundwater flow is upwards.

River Birch's address is P. O. Box 1938, Gretna, Louisiana 70054.

Comments concerning the exemption request may be filed with the Assistant Secretary of the Office of Waste Services at the following address:

Louisiana Department of Environmental Quality
Office of Waste Services
Solid Waste Division
Permit Section
Post Office Box 82178
Baton Rouge, LA 70884-2178

1627645-feb 24-1t

CAPITAL CITY PRESS

Publisher of

THE ADVOCATE

OOF OF PUBLICATION

tached notice was published in
TE, a daily newspaper of general
blished in Baton Rouge, Louisia-
Official Journal of the State of
City of Baton Rouge and the
Baton Rouge, in the issues of:

24, 1999

Susan A. Bush

Advertising Representative

scribed before me by the person
ure appears above in Baton
his

ay of Feb. 1999 AD.

Vicky H. Nile

Notary Public

My Commission Expires: Indefinite

Dean Miller Hawthorne D'Armond McCowan Jarman
P.O. Box 3513
Baton Rouge, La 70821

1627645

ATTACHMENT 16

PROOF
OF
AUTHORITY TO SIGN PERMIT

MINUTES OF A SPECIAL MEETING OF
THE BOARD OF DIRECTORS OF RIVER BIRCH INCORPORATED
HELD AT THE OFFICE OF THE CORPORATION ON APRIL 25, 1994
AT WHICH A QUORUM WAS PRESENT PURSUANT TO NOTICES PREVIOUSLY GIVEN

The meeting was called to order by the President. Upon motion duly made, seconded and adopted, the following was adopted:

RESOLVED that Albert J. Ward, Jr., President of this corporation, be and he is hereby authorized and empowered to execute any and all documents on behalf of said corporation relative to its applications for a landfill. In connection therewith, the said agent is further authorized to sign any and all documentation necessary and proper to accomplish the foregoing and to include within such documentation such terms and provisions as the said agent, in his sole and exclusive discretion, should deem necessary and appropriate.

There being no further business, the meeting was adjourned.

CERTIFICATE

I, the undersigned Secretary of River Birch Incorporated hereby certify that the above and foregoing is a true and correct copy of a resolution adopted by the Board of Directors of said corporation on the 25th day of April, 1994, at a meeting called pursuant to proper notice, at which a quorum was present and voting and said resolution remains in full force and effect.

Gretna, Louisiana this 25th day of April, 1994.

ADREA D. HEEBE, Secretary

ATTEST:

ALBERT J. WARD, JR., President

APPENDIX A

OPERATIONAL PLAN

OPERATIONAL PLAN

RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

Prepared for
River Birch, Inc.

June 1998
Revised Mod. No. 5 - January 1999
April 1999
Revised Mod. No. 6 - March 2000
Revised Mod. No. 7 – October 24, 2003
Revised June 2006

TABLE OF CONTENTS

Section

1.0 FACILITY PROCESS

- 1.1 Receipt of Wastes
- 1.2 Placing Waste
- 1.3 Waste Decomposition
- 1.4 Site Control
- 1.5 Operation During Wet Weather
- 1.6 Cover Material
- 1.7 Alternate Daily Cover Material

2.0 ACCEPTABLE WASTES, ACCEPTANCE PROCEDURES, AND INSPECTION PROCEDURES

- 2.1 Acceptable Waste Types
- 2.2 Quantity of Waste Handled
- 2.3 Waste Acceptance Procedures
  - 2.3.1 Residential Waste
  - 2.3.2 Industrial Waste
  - 2.3.3 Commercial Waste
- 2.4 Waste Inspection Procedures

3.0 PROPOSED DEVELOPMENT

4.0 MONITORING

- 4.1 Groundwater Monitoring
- 4.2 Leachate Collection
- 4.3 Air Monitoring

5.0 RECORDKEEPING AND REPORTING

- 5.1 Recordkeeping Requirements
- 5.2 Reporting Requirements
  - 5.2.1 Annual Reporting Requirements
  - 5.2.2 Groundwater Reports

6.0 PERIMETER BERMS AND CONTROL MEASURES

7.0 EQUIPMENT REQUIREMENTS

Section

8.0 PERSONNEL

9.0 EMERGENCY PROCEDURES
- 9.1 Fire
- 9.2 Injuries
- 9.3 Spills
- 9.4 Broken Equipment
- 9.5 Inclement Weather

10.0 SPECIAL WASTE ACCEPTANCE
- 10.1 Acceptance Evaluation
- 10.2 Landfill Gate QA/QC
- 10.3 Special Waste Streams
- 10.4 Recording System
- 10.5 Asbestos Waste

LIST OF APPENDICES

I Waste Characterization Data
II Generator's Certification of Representative Sample
III Maximum TCLP Compounds
IV Emergency Response Personnel

1.0 FACILITY PROCESS

1.1 Receipt of Wastes

The first element consists of receiving the waste into the landfill property and unloading it in the tipping area at the active landfill face. Earliest planned hours of operation are 4:00 am with a latest closing time of 8:00 pm Monday through Sunday. Hours of operation will vary with seasonal daylight savings time and disposal demands. Sunday operation will only be used in case of major clean-up work following storms, to accommodate large demolition projects, special holidays seasons, etc.

User vehicles enter the site through a security gate, over a queing space and on to a scale where gross weight is measured. The weighmaster will issue a tipping authorization ticket. This ticket is handed to the driver of the user vehicle and is his authorization to proceed into the landfill along the interior two-way landfill road to the tipping area or to the designated public disposal area for small vehicles. During heavy disposal periods, the disposal cells may be divided into two tipping areas; one for large trailer trucks and one for smaller trucks and private haulers. Each disposal area will be operated independent from the other with each having its own equipment and personnel. This procedure will be used to separate the small vehicles from the larger trailer units for safety purposes.

Once a vehicle reaches the tipping area, the driver will be directed to an unloading position by signs, spotters or by the compactor operator. As the vehicle is unloaded and waste spread it will be inspected for materials or containers that are frequently associated with hazardous materials or liquids. If suspicious items are found, the truck and driver will be detained, proper authorities will be notified and the unloading position will not be used until the authorities give instruction to do so.

Once the vehicle is unloaded, it will proceed back along the interior road to the scale where the tare weight will be measured. A transaction ticket will be issued and the transaction entered into the facility records. These records are not only for financial accounting but are also for developing annual reports.

When cleared by the weighmaster, the vehicle will exit the site through the same gate used for entry.

1.2 Placing Waste

Tipped loads of waste will be spread and compacted using a heavy landfill compactor designed specifically for this purpose. Waste will be spread to a thickness ranging from 1 to 2 feet under the blade and compacted using multiple wheel passes over each area of waste. The working face where the waste is tipped and compacted will be kept as small as practicable considering the rate of receipt of waste.

The waste that is received and compacted each day constitutes a daily cell. At the end of each working day, the surfaces of the daily cell will be covered with a 6-inch thick layer of suitable soil or with an approved alternative cover material. Surfaces of the daily cell that are not intended to receive additional waste for 60 days will receive a one foot thick layer of suitable interim soil cover. When the last waste is placed in an operating area of the landfill, interim cover shall be placed within 48 hours of the last receipt of waste in that area. At the beginning of each working day, daily and interim soil cover may be removed, where possible, from previously placed waste in areas to be used that day. This recovered soil will be reused for cover as appropriate. Removal of daily and interim cover greatly improves the efficiency of leachate and gas management systems and also reduces soil needs. Waste will not be placed in standing water.

In general, wastes will not be segregated upon receipt or after placement in the landfill, except white goods which will be recycled and construction/demolition which may be used as base material for landfill roads within the limits of active landfill cells. All wastes will be placed in the landfill and handled in the same manner. White goods, however, will be segregated and stored in the area designated for the storage of white goods. White goods will be removed from the site on a monthly basis and taken to a salvaging facility.

Tires are not accepted for disposal at River Birch Landfill. If they are found during the disposal operation they are removed from the waste and stock piled near the disposal area until they can be removed to an approved tire disposal facility. The tires will be removed prior to or immediately following the occurrence of any vector concerns.

1.3 Waste Decomposition

Waste in landfills decomposes anaerobically to a stable brown soil-like texture. This process requires many years to react to completion. Reaction time varies based principally on the moisture content of the waste. Within limits, wetter waste decomposes more rapidly than drier waste.

The anaerobic decomposition process produces a mixture of carbon dioxide, methane, and to a lesser extent, other gases. In addition, the liquid that passes slowly through the waste accumulates at the base of the landfill as leachate. Gas and leachate must be managed.

Leachate management consists of collecting the accumulated liquid from the landfill through the leachate collection system or by removing it from the surface of the active cell by portable pumps. Leachate will be pumped to the leachate treatment pond where it will be held for a sufficient time to allow water quality to reach acceptable discharge limits. After the injection wells and surface treatment facilities are permitted and constructed, the leachate will be piped to this system instead of the leachate pond.

The landfill is constructed with a leachate collection system and a landfill gas collection and treatment system. The leachate collection system construction is explained in the following paragraphs:

- The primary leachate collection and removal system consists of a drainage net (10/gal/min/ft) sandwiched between two geotextile layers (No. 100 to 140 sieve size), located above the primary liner, covered with a 1- to 2-foot thick granular protective layer.

Grade

- The system has a 2 percent minimum fall to the leachate collection pipes spaces 100 feet from the highest subgrade point. The leachate collection pipes have a 1.6 percent minimum fall in cells 1-31 and 2 percent fall in cells 32-51 from the highest collection point to the collection sump.

Sump

- The leachate collection sump is 3 feet deep, 20 feet wide at the base with 2(H):1(V) side slopes. The sump contains ASTM C-33 gravel encapsulated in a geotextile layer (No. 100 to 140 sieve size). This design should contain one day of the peak daily flow from a 24-hour, 25-year storm event, with a cover system in place. The collection sump is not intended to control normal rainfall within an uncovered cell.

Pipe

- All piping for the primary leachate collection and removal system is HDPE with a minimum SDR value of 17. The leachate collection pipe is 6 inches in diameter with a double row of perforations less than 3/8-inch in diameter spaced 6 inches from center to center, off-set by 3 inches, oriented along the bottom of the pipe. The leachate pipe will be slotted with a maximum slot width of 1/4 inch. The leachate collection pipe is placed in a swale surrounded by ASTM C-33 gravel encapsulated by a geotextile layer (No. 100 to 140 sieve size) and is be sloped down toward the perimeter of the unit. This gravel backfill provides additional support and protection to the leachate collection pipe. The leachate collection pipes discharge into the leachate collection sump. The leachate head will be maintained in a pumped-down condition such that 1 foot of head will exist above the lowest bottom elevation of the leachate collection pipes.

- The leachate extraction pipe is 18 inches in diameter. A small diameter pipe can be specified subject to the pump selection. The leachate extraction pipes and the leachate collection pipes are all designed with access ports for cleanout. These access ports are all located at the surface near the pump pad for each sump. An HDPE rub sheet is located beneath the extraction pipe in the sump. On Cells 13-31 and on the old leachate treatment pond an additional vertical rise pipe will be

installed at each leachate collection sump to extend vertically upward as waste is placed over the sump to allow pump access. These vertical pipes will extend all the way to the top of the final grades. See Figure 40A for details of these vertical risers.

- The purpose of the cleanout pipes for the leachate collection is to provide access to leachate collection pipes and sumps for maintenance to the sumps, pumps, and pipes, as necessary. Deflection of the leachate pipes will not impede maintenance of the leachate collection sumps, pumps, or pipes. Cleaning and other maintenance of the collection sumps and pipes can be accomplished by flexible cleaning equipment and is adequately sized to accommodate normal facility operations.

- Leachate collection pumps are equipped with discharge lines which connect to the perimeter force-main. All force-main lines are pressure tested prior to their use.

- Leachate is removed from leachate collection sumps by pumps located in the leachate collection sumps. Leachate collection pumps are activated by level control switches. All control systems for pumps, valves and meters are designed to be operated from the ground level. Leachate is removed from the surface of the active module by portable pumps. These pumps are manually controlled and activated on an as-needed basis. Leachate is discharged to the leachate treatment pond for treatment prior to being discharged to the Saul's Canal. Representative samples of raw leachate are collected and analyzed annually for the same parameters required for the facility groundwater monitoring wells in LAC 33:VII.709.E.4. Once the injection wells are operational, leachate may be piped to the injecton well site and filtered and pH adjusted, if necessary, before deep well injection.

Protective Layer

- Directly above the collection and removal pipes and sumps is a 1- to 2-foot layer of protective cover. The purpose of this layer is to protect the underlying synthetics. The drainage net will provide the transmissivity capacity to meet the Minimum Technology Guideline or the design requirements.

Daily Cover

- Infiltration of water into the waste will be minimized by daily, interim and final cover as required in LAC 33:VII.

Liner System

- River Birch Landfill will be able to demonstrate that the liner system is placed on a base that provides adequate support for the contents, provides maximum resistance to settlement of a magnitude sufficient to affect the integrity of the liner or the proper positioning of the leachate collection system, provides maximum resistance to hydrostatic heave on the sides or the bottom of the excavation, and provides maximum resistance to desiccation. Units of the landfill will be lined along the sides and bottom with a liner system installed under the supervision of a registered engineer, licensed in the state of

Louisiana and with appropriate expertise. During the construction of new landfill cells, the liner will be installed with a leachate collection system designed and constructed in accordance with the specifications described in the above paragraphs.

In accordance with 40 CFR 60.752(b)(2)(ie), River Birch has installed and operates a Landfill Gas Collection and Control System (LFGCCS). The LFGCCS is installed according to the specifications listed in 40CFR60.759 for an active landfill.

River Birch has constructed an active landfill gas collection and treatment system. The system includes collection pipes installed in the landfill, a collection pipe manifold, blower, and flare. Plans showing the landfill gas collection system are included as Figures J1 and J2 found in Volume IV.

Subsurface gas monitoring probes consist of installing perforated PVC pipe in a borehole equal to the depth of the bottom of the waste. The perforated section of these vents is encased in a sand pack and the annulus space around the blank section of pipe is sealed to the surface with a cement-bentonite grout. The gas collection and removal system limits methane gas to lower explosive limits at the facility boundary and to 25% of the lower explosive limits in the facility buildings.

There will be no gas collection system installed for the leachate treatment pond since the potential to produce gas will be very small. Any sludge which remains in the pond will be dewatered and removed once the leachate treatment pond is closed. This will result in clean closure.

1.4 Site Control

Due to the nature of the operation, there is potential for the landfill to attract birds, burrowing animals, and provide a habitat for various vectors. The attraction of the landfill to these animals will be minimized by site operations. The facility will be operated such that only the minimal amount of waste will be exposed at any one time. Daily cover will be applied to exposed waste by the end of each day. Operating with a minimum of exposed waste and the application of daily cover will also assist in controlling odors. Dust will be controlled by water trucks equipped with sprinklers. Should birds become a problem in the leachate treatment pond, a grid of monofilament wire will be placed across the top of the pond to prevent access to birds. Construction and operation of the injection well system will also eliminate odors caused by the leachate pond.

Bird control on the landfill surface is accomplished by the use of a appropriate daily cover to prevent birds access to food. A depredation permit was issued to River Birch by the Federal Aviation Agency for bird control when the use of daily cover does not suffice.

At the request of the Federal Aviation Administration, Moisant International Airport, and the U.S. Department of Wildlife and Fisheries, River Birch has recently initiated a more aggressive bird control program. River Birch has implemented the program in close cooperation with the adjacent Jefferson Parish Landfill, which is also a Type I/II Facility. River Birch's new bird control program instituted the following procedures and techniques:

- Hiring of a dedicated bird management employee to implement the program as written in our standard operation procedures, under the direction of River Birch's Technical Director.

- Daily usage of non-lethal mitigation techniques including propane cannons, screamer and banger rockets, and use of distress calls.

- Implementation of lethal techniques on a limited basis to augment the effectiveness of non-lethal techniques under the guidelines specified in River Birch's Federal Wildlife Depredation Permit (Permit No. MB119952-D)

- Monitoring of bird flight paths and flock locations within the landfill including speciation and estimation of bird numbers.

This aggressive plan has significantly reduced the numbers of birds of concern including gulls, blackbirds, grackles, vultures, and crows.

1.5 Operation During Wet Weather

River Birch plans to continue landfilling operations during light rain. However, during heavy rains, the site will temporarily cease landfilling operations. Additional suitable materials may be placed on the road surfaces to provide better traction during wet weather.

Access to the site and roads through the site will be designed and constructed as all weather roads. Roads constructed onsite will have parallel ditches and culverts under the road to control water along the road.

Uncontaminated stormwater will flow along natural drainage patterns to the exterior perimeter drainage ditch that will surrounds the site. This ditch will prevent run-on and remove water away from the cell.

Water that collects on the upper surface of the active portion of the cell (contaminated stormwater) will be removed with portable pumps. This water will be pumped to the leachate treatment pond or injection wells for treatment. Water that percolates through the fill will be removed by the leachate collection system. Water removed by the leachate collection system will also be pumped to the leachate treatment pond or injection wells for treatment.

Mats will be available to allow working in the cell during wet weather. Sand and gravel will be stockpiled on-site in the event that they are needed.

1.6 Cover Material

River Birch will use silty clay, sandy clay, or clay material for daily and interim cover. Daily cover will be applied at a minimum thickness of six inches to control insects, birds, attraction of other animals, and minimize infiltration and leachate generation. Interim cover will be applied at a minimum of twelve inches. Clay will be used in the final cover. Material for daily and interim cover will be obtained from the excavation of the cell and stockpiled onsite so that cover material will always be accessible. Cover material may also be obtained from the nearby Highway 90 C&D Landfill excavation and stockpiled onsite. Clay for the final cover will be obtained from onsite deposits or from Highway 90 C&D Landfill which meet the requirements of a permeability of less than 1×10^{7} cm/sec.

River Birch will use an alternate cover, of tarps, synthetic fabrics, spray-applied covers, or soil type waste. Article 1.7 reviews the operational plan for alternate daily cover. Alternate covers will only be used for daily cover and will not be used as interim cover, interim compacted cover or final cover. Soil cover or soil type covers described in section 1.7.2 below will have the PSDC removed and will be used to cover all waste at the end of each work week on Saturday. Waste covered by PSDC will have the PSDC removed and will be recovered by Soil or Soil Type covers on Saturday. Soil cover placed at the end of the work week will remain in place as a fire break. Interim cover or interim compacted cover shall be applied on all operating areas of the facility that will not receive solid waste for a period longer than 60 days. Interim cover or interim compacted cover must be applied within 48 hours of the last receipt of solid waste in the operating area.

1.7 Alternate Daily Cover Material

1.7.1 Requirements

The use of alternative cover materials and portable daily synthetic cover at River Birch Landfill must achieve the purposes of daily cover as specified in the Louisiana Solid Waste Regulations.

i. minimize vector-breeding areas and animal attraction by controlling:
   (a) fly, mosquito, and other insect emergence and entrance;
   (b) rodent burrowing for food and harborage; and
   (c) bird and animal attraction.

ii. control leachate generation by:
   (a) minimizing external-moisture infiltration;
   (b) minimizing erosion; and
   (c) utilizing materials with minimum free-liquid content and minimum concentration of constituents monitored in leachate.

iii. reduce fire-hazard potential by minimizing inward movement of atmospheric oxygen;

iv. minimize blowing paper and litter;

v. reduce noxious odors by minimizing outward movement of methane and other gases;

vi. provide an aesthetic appearance to the landfill operation; and

vii. allow accessibility regardless of weather conditions.

Soils such as silty clays or sandy clays applied a minimum of twelve inches thick at the end of each operating day are satisfactory for daily cover, or for interim cover. Alternative daily cover materials available on a regular basis and that demonstrates reasonably consistent composition and performance characteristics may be used for daily cover but not for interim cover or interim compacted cover. The source of daily and interim cover must be accessible regardless of weather.

1.7.2. Alternative Cover Materials

Waste streams with similar characteristics of soil or which meet the above-listed requirements of conventional soil cover materials will be utilized for daily cover materials. Typical waste streams that can meet these requirements are excavated materials from underground storage tank removals, materials from pond closures and materials from spills and general plant clean-ups. This type of waste stream is predominately soil in nature and thus identical in function to on-site or borrow soils. The alternative cover material will be utilized and will remain in place in accordance with LAC 33:VII.711.B.2.e. Proper waste management and application of the alternative cover material will provide similar characteristics of soil cover in its ability to minimize the infiltration of precipitation into the waste and should be at least equal to the performance of soil cover in all other respects.

Spray-applied covers will consist of natural earthen materials and/or recycled cellulose mixed into a slurry with water and a polymeric binding agent. The slurry is continuously mixed in a tank and applied using a high-pressure cannon. The product application must completely cover the entire working face, provide complete coverage of all waste materials, and adhere to the alternative daily cover requirements listed in Section 1.7.1. Only spray-applied daily cover products approved by the administrative authority will be used for daily cover. Within 7 days spray-applied covers will be reapplied or covered with 6-inches of earthen material.

Portable synthetic daily cover (PSDC) will consists of a series of waterproof panels or tarps over the working face in a shingle-like fashion (lower panels overlapped by higher panels). The panels or tarps are typically made of plastic, or coated or bonded fabric, or an equivalent material that provides similar qualities. The use of PSDC must also achieve the purposes of conventional soil daily cover material as outlined. Proper compaction of refuse and application of the PSDC can achieve these purposes. Certain wastes, that by their nature of being odorous or attracting vectors, should be placed deep in the daily life of waste and not left on the surface to be covered with daily cover. A conventional soil cover must be used unless such wastes can be well covered with typical refuse prior to application of the PSDC.

Each panel is applied by hand or by machine overlapping lower and adjacent panels. If a problem with high winds can be expected, the joints between panels can be secured by placing weights (non-putrecible refuse such as pieces of concrete, demolition debris, etc. or sand bags) at intervals along those joints. The top panels may be secured if necessary by the use of weights as described above or by the placement of sand or conventional cover material along the edge of each panel. The panels are typically placed on the sloping surface of the daily working face. However, in horizontal areas where trucks will not be running, the PSDC may be used in accordance with the periodic soil cover requirements. The placement of PSDC panels on the working face or horizontal portions of the active area will not altar the surface water drainage and collection practices established by the facility permit.

Minor rips or penetrations of the panels can be expected to occur and do not compromise the integrity of the alternate cover. However, upon any significant damage to the panels, they must be repaired or replaced. There will always be sufficient soil cover material available to use as daily cover until use of the PSDC can be reinstituted with new or repaired panels. The individual PSDC panels will be utilized and will remain in place for no more than three days. Interim cover or interim compacted cover shall be constructed of soil and shall be applied on all operating areas of the facility as required above.

Only materials approved by the administrative authority will be used as an alternate cover material.

PROCEDURE FOR APPLYING HYDROMULCH AS AN ALTERNATIVE DAILY COVER

TRAINING

The operator shall be familiar with the M.S.D.S. for all hydromulch material. Training will be conducted on the use of the material and the operations of the hydroseeder to properly apply the hydromulch.

MIXING PROCEDURE

The operator will mix the fiber material into the appropriate amount of water. Upon the addition of all bags of fiber, the total batch will be agitated at about half speed for a minimum of 15 minutes before application. The correct amount of all ingredients will be determined by the supplier. The total amount of the hydromulch to be applied is directly proportional to the size (square feet) of the active work face and the extent of the compaction of the surface. For each 900 square feet of active work face, the following amounts should be used:

Water	120 gallons
Waste-Cover	100 lbs

APPLICATION PROCEDURE

The application of a hydromulch mixture should be done to the entire working face of the landfill at the end of the workday. This is best accomplished by directing the flow of hydromulch into the air allowing it to "rain down" onto the active working face. This will ensure that no shadows are created as a result of inadequate surface compaction. The operator may elect to apply the mulch from two directions to ensure that all areas are covered and all shadowing is eliminated. Complete coverage is required to meet LAC 33:VII.711.B.2. for controlling disease vectors, fire, odors, vermin, blowing litter, scavenging and creating an acceptable aesthete. The hydromulch mixture must be applied to a thickness of 1/4" or greater. This can be done from the tower of a standard hydroseeding machine.

If inclement weather conditions render the placement of hydromulch as a daily cover ineffective, the landfill shall temporarily revert to using another approved daily cover such as tarps or 6" of dirt.

The mixture of Waste-Cover is non-toxic, non-combustible, totally biodegradable, and harmless to fish, birds, plants, and animals.

Operation Plan:

- Fiber mulch mix will be applied as daily cover on well compacted exposed waste
- Materials will be mixed and applied to the entire active working face in accordance with the manufacturer's specifications
- The application will be made at the end of each work day
- The hydromulch mixture will be applied with a landfill modified hydroseeder to a thickness of 1/4" or greater
- The hydromulch applied as a slurry should be allowed to dry for approx. 2 hours depending on weather conditions
- Traffic will be restricted over the areas covered until the material has set
- Hydromulch can be applied in moderate rain. During heavy inclement weather, other approved material will be used for daily cover
- Each application should last for seven days, after which additional waste must be added to the working face or another application of hydromulch could be performed based on regulatory requirements.

Note: The information noted herein was derived from information provided by Landfill Solutions, Baton Rouge, Louisiana.

2.0 ACCEPTABLE WASTES, ACCEPTANCE PROCEDURES, AND INSPECTION PROCEDURES

2.1 Acceptable Waste Types

Wastes to be accepted at this facility are nonhazardous solid waste. Hazardous waste will not be accepted at this facility. Acceptable waste includes the following:

- Residential solid waste
- Commercial solid waste
- Industrial solid waste
- Non-hazardous incinerator ash
- Properly packaged asbestos
- Properly packaged and certified noninfectious medical waste from hospitals or clinics that has been certified noninfectious by the (Department of Health and Hospitals) DHH
- Non-hazardous liquid waste which may be solidified before disposal into landfill cells or injected into the River Birch disposal well

Waste not acceptable at this facility include the following:

- Hazardous waste
- PCB contaminated material exceeding the TSCA limit

Open burning, salvaging, and scavenging will be prohibited. Unauthorized access to the facility and grazing of livestock will be prevented by a perimeter fence.

A sign will be posted at the entrance to the facility listing normal operating hours for the facility and acceptable and unacceptable wastes.

2.2 Quantity of Waste Handled

Quantities of waste expected per week are shown in response to LAC.33.VII.519.O. The maximum annual quantity of waste is anticipated to be 52 times the weekly average.

2.3 Waste Acceptance Procedures

2.3.1 Residential Waste

The River Birch Landfill will accept residential solid waste. Residential waste may be brought to the facility by commercial haulers or by individuals. To accept residential solid waste, prior waste acceptance is not required. As vehicles enter the site, they will be directed to the appropriate unloading area. Commercial haulers will be instructed to drive directly to the active module of the landfill to empty their load. Vehicles with small loads may be directed to an unloading area equipped with a waste storage container. The waste will be unloaded into the

storage container. The storage container will be unloaded at least once per day. During periods of high volumes of disposal by private individuals with small loads, arrangements are made to empty the storage container more frequently as needed.

2.3.2 Industrial Waste

Generators of non-hazardous industrial solid waste must submit waste characterization information to River Birch prior to shipping waste to the landfill for disposal. The waste characterization must include at a minimum the generator industrial solid waste code, a physical description of the material, pertinent documents certifying that the waste is non-hazardous, and any additional information which may be required to determine acceptability of waste in accordance with LAC 711.D.3.d which may include pertinent TCLP analysis and/or process knowledge. Upon review of the waste characterization, acceptance of the waste will either be approved or rejected. The generator will be informed in writing whether waste acceptance has been approved or rejected. Generators of industrial solid waste must update the waste characterization in accordance with LAC 711.D.3.d or when the characterization of the waste has changed.

Before accepting industrial solid waste, incinerator ash, and nonhazardous petroleum contaminated media and debris from underground storage tanks (UST) corrective action, or sewer sludge (Special Waste), River Birch will implement the comprehensive quality assurance/quality control plan for special waste acceptance found in section 10.0 herein.

2.3.3 Commercial Waste

Generators of commercial non-hazardous solid waste must submit waste characterization information to River Birch prior to shipping waste to the landfill for disposal. The waste characterization must include at a minimum a physical description of the material, and chemical. Upon review of the waste characterization, acceptance of the waste will either be approved or rejected. The generator will be informed in writing whether waste acceptance has been approved or rejected.

2.3.4 Liquid Waste

Liquid wastes that may be acceptable for disposal are non-hazardous liquid wastes which may be solidified before disposal into landfill cells or injected into the River Birch disposal well. Solidification for disposal within the landfill will occur within the existing disposal cell over a previously lined area. Watertight tanks that can be moved by landfill equipment will be used to solidify liquids. The liquids will be mixed with fly ash or similar type dry material until no free liquid is present. Once elevations around the mixing tank have reached a point when the tank area needs to be filled, the tank will be emptied and moved to a new location where the process will be repeated. Each time the tank is relocated it will be checked for holes to assure that no liquid escapes.

Non-hazardous liquids from offsite sources will be disposed of in the injection wells. In addition, all or a portion of the leachate generated from landfill operations will be disposed of in the injections wells. The injection wells will be properly permitted and operated in accordance with the Louisiana Department of Environmental of Natural Resources Mining and Injection Divisions.

2.4 Waste Inspection Procedures

Incoming loads will be randomly inspected to ensure that unauthorized wastes are not handled at the facility. Waste loads will be inspected at a rate of 10 trucks per week. These inspections will be conducted at the gatehouse from an elevated platform used to visually check incoming loads. In addition, at least 4 loads per month will be completely checked. At random, drivers will be instructed to drive to the inspection area and empty their entire load into the inspection area. The load will be visually inspected by site personnel to determine if the shipment matches the profile of the waste. If the load matches the profile and is appropriate for disposal at the site, the waste will be pushed into the waste disposal area. If the load does not match the profile, then a determination will be made if the load is acceptable for disposal at the site. This determination will be made by the operations manager and will be based on a visual inspection of the waste. If the shipment does not contain any unacceptable materials (see Section 2.0 of the Operation Plan) then it will be handled in the same manner as an accepted load. If the load contains unacceptable material (e.g. hazardous waste, liquid solid waste, used oil, contaminated soil without accompanying waste characterization, etc.) then the load and visibly affected soil will be placed into the original transport vehicle and rejected. The driver will be instructed to leave the site and return the shipment to the generator (unless the generator has made other arrangements with the transporter). River Birch will inform the LDEQ of the rejected load. A form has been developed to document these inspections. A copy of the form is included in the Operation Plan.

3.0 PROPOSED DEVELOPMENT

One of the very early steps in preparing to develop this facility will be establishment of a three dimensional location control system on the ground. A base point for north and east references will be established for the site. For vertical control, a permanent bench mark will be set on the site with precise relation to the U.S. Geological Survey mean sea level (MSL) elevation. Semi-permanent and temporary bench marks will be set from the site B.M. as needed for convenience in dimensional control.

This dimensional control system allows precise reconstruction if site references are ever lost.

Final topography intended for the site is shown in the drawings. End use of the site, after landfilling is complete, is proposed to be a nature area with habitat for a variety of fauna. The higher elevations of the landfilled part of the site should add to the variety of plant and animal life in the general area.

Buildings consist of a scalehouse, an equipment maintenance building and an office. The equipment maintenance building is a pre-engineered steel unit.

Operational development of the site began in the northwest end (Phase I) of the landfill as shown on Figure 30 of the solid waste permit application. This phase consists of 12 cells. Each cell is approximately 200' wide and varies in length. Filling will continue in a north to south direction until filling the landfill is completed.

Each successive area of the landfill will be protected by a perimeter levee or temporary levee. The perimeter levee will provide anchorage for the flexible membrane liner system as well as maintain separation of stormwater from leachate. All temporary levees will be constructed along a high line between leachate collection pipes.

Placement of waste in each cell will begin by placing a five foot thick layer of "municipal" waste over the floor of the cell with little compaction except at the top surface of the layer. General waste will be placed on top of the select waste.

Filling above the select layer will begin at the high end of the cell and continue downslope to final waste grade as directly as is practicable. Final capping of the cell will begin as soon as a large enough area is ready. In this way covering and closure will advance across the site just behind landfilling.

4.0 MONITORING

4.1 Groundwater Monitoring

Groundwater monitoring will be conducted during the active life of the facility and the post-closure period as described in Appendix B of the permit application.

4.2 Leachate Collection

The leachate collection systems will be operated during the active life of the facility and the post-closure period. Leachate will be removed by pumps located in leachate collection sumps. These pumps will be activated by leachate level controls. Leachate will be pumped to the leachate treatment pond, until such time as injection wells are constructed.

4.3 Air Monitoring

The facility will be monitored for methane gas. Methane gas will be monitored by a portable explosion meter or similar device. The purpose of this monitoring is to ensure that methane levels do not approach the lower explosive limit (LEL). Measurements will be collected inside the active area and on the perimeter of the facility. Air monitoring will be conducted on a quarterly basis. All calibrations will be recorded on appropriate forms.

Cap vents and subsurface monitoring probes will also be monitored for methane. Monitoring will be conducted with the same equipment used in monitoring the site. Vent monitoring will be conducted during the operating life of the facility and during the post-closure period. During the operation life of the facility methane will be monitored quarterly unless methane gas is detected above the lower-explosive limits at the facility boundary or at 25 percent of the lower-explosive limits in facility building. If methane is detected over these limits, monitoring will be performed monthly until no detection over the limits are recorded for 12 consecutive months at which time monitoring will return to monthly. During the post-closure vent monitoring will be conducted quarterly.

If the monitoring instrument indicates that 25% of the LEL is exceeded in facility buildings, then the site supervisor should be notified immediately. Monitoring should continue until the source is identified or the methane level decreases below 25% of the LEL for a period of at least 30 minutes. The source should be identified and appropriate corrective action should be taken. Within seven days of detecting a reading above 25% of the LEL a report should be submitted to the administrative authority stating the level detected and the steps taken to protect human health.
Within thirty (30) days of detecting a reading above 25% of the LEL, a remediation plan should be submitted to the office of Environmental Assessment. The plan should describe the nature and extent of the problems and at he proposed remedy and will include an implementation schedule. The plan will be implemented within sixty (60) days of detection.

In general, odors will be controlled through daily cover, institution of the injection well system, and controlling the size of the exposed face of waste. Odors will be monitored by facility employees during routine operation of the facility. Incidence of strong odors will be reported to the site supervisor and appropriate corrective action taken.

5.0 RECORDKEEPINC AND REPORTING

5.1 Recordkeeping Requirements

The facility will implement a recordkeeping system. Records maintained at the facility will include the following:

- Current Louisiana Solid Waste Rules and Regulations
- A copy of the permit
- A copy of the permit application
- Permit modifications
- Copies of all documents received from and submitted to the Solid Waste Division of the Louisiana Department of Environmental Quality and other regulatory agencies
- Correspondence
- Construction records
- Certified field notes for construction
- Records demonstrating that liners, leachate control systems, and leak-detection and cover systems are constructed or installed in accordance with appropriate quality assurance procedures
- Quality assurance/quality control records
- Training records
- Operator training programs
- Board of Certification and Training for Solid Waste Disposal System Operator certificates
- Generator waste profiles
- Waste receipts
- Records of generators of industrial solid waste
- Generator disposer records
- Records on transporters of solid waste indicating date of receipt and Transporter ID Number
- Inspection records
- Groundwater monitoring results
- Records on leachate volume and results of leachate sampling
- Monitoring, testing, and analytical data
- Daily logs
- All Louisiana Department of Natural Resources (LDNR) records for the operation of the Class I (non-hazardous) disposal facility (injection well)

All records will be retained onsite for the life of the facility and at least three years after closure.

5.2 Reporting Requirements

5.2.1 Annual Reporting Requirements

River Birch will submit an annual report to the Office of Management and Finance, Financial Services Division by August 1 of each year. The annual report will cover disposal activities conducted at the site during the previous reporting year. The reporting year is from July 1 through June 30. Annual reports will be submitted until closure of the facility.

Each annual report will contain the following information:

- type and quantity of solid waste received from in-state and out-of-state generators during the reporting year;
- quantities will be expressed in wet-weight tons/year;
- industrial waste number of generators from which the facility has received waste;
- estimated remaining capacity of the facility as of the end of the reporting period expressed in wet-weight tons; and
- appropriate supporting calculations.

River Birch will obtain a form from the LDEQ for filing the annual report. In addition, a monthly/annual report will be submitted to the LDNR for the commercial disposal facility.

5.2.2 Groundwater Reports

River Birch will submit to the LDEQ the results of each groundwater monitoring sampling event. Groundwater monitoring reports must be submitted to the LDEQ within 90 days after completion of the sampling event. Groundwater monitoring procedures are described in Appendix B of the River Birch solid waste permit application. Groundwater monitoring reports will be submitted on forms provided by the LDEQ, if available. Groundwater monitoring reports must include at a minimum the following information:

- groundwater monitoring sample results;
- documentation of the chain of custody of samples for each sampling event;
- a potentiometric surface map for each zone monitored;
- an isopleth map for each well of all parameters or constituents or plots by sample concentration of parameters or constituents versus time; and
- a statement of whether a statistically significant difference in concentration over background concentrations is detected

6.0 PERIMETER BERMS AND CONTROL MEASURES

The largest potential contribution to the quantity of leachate produced by a landfill comes from rainwater impinging on an open module. The landfill design for the completed landfill promotes stormwater runoff and diminishes percolation. Contemporary capping systems using various combinations of compacted cohesive soils and flexible membranes virtually stop rainwater infiltration and; thus, greatly reduce leachate generation in completed areas. The operational challenge is to prevent the entrance of water into active areas insofar as is practicable.

During landfilling, berms, ditches, ponds and liners are used to manage stormwater and groundwater. Rain which falls directly in active areas cannot be prevented from contacting waste and becoming leachate. Therefore, it is the surface water run-on and the groundwater seepage that is amenable to management.

Run-on occurs when areas surrounding an open cell are higher than the floor of the cell and water from those areas is permitted to enter the cell through sheet flow or channel flow. This inward potential is almost always true because cells are typically excavated below surrounding grade to provide leachate containment.

To control run-on, the most common practice is to construct earthen levee around the cell to divert flow away from the cell. Swales and ditches are placed outside the levees to direct the uncontaminated stormwater to natural storm flow channels.

Liners of compacted soil or plastic membranes or both are carried up on the inside slopes of these berms to produce a large impermeable bowl to keep leachate in the landfill, to safely separate leachate from groundwater and to direct leachate to the collection system.

During construction of the cells, a pressure relief system will be constructed below the lower liner. The pressure relief system is used to relieve the hydrostatic pressure exerted against the bottom and sides of the liner as a result of excavation. The pressure relief system will be operated until there is a sufficient amount of waste in the cell to offset the hydrostatic pressure.

The River Birch Landfill will use these techniques to control run-on and groundwater infiltration to minimize leachate generation.

7.0 EQUIPMENT REQUIREMENTS

In order to landfill waste in an environmentally sound way, the waste must be received, spread and compacted and covered. Waste is received over a scale, spread and then compacted using landfill compactors. Excavators and trucks are used to dig and transport cover materials.

The minimum equipment necessary for proper compaction is one compactor. Under normal conditions two compactors will be used to compact the waste and 2 large dozers will be used to cover the waste. A third compactor will be used as a stand-by compaction machine for extra heavy volumes and as a spare should one of the other machines have mechanical difficulty. An excavator and dump trucks are used to excavate and deliver cover soil to the disposal cell as needed to maintain a source of cover soil near the disposal area.

At any time when the landfill is open, the minimum equipment necessary will be present and operational. This consists of one compacter, dozer, excavator, and dump truck. The cover soil will be stockpiled near the disposal area.

As the receipt of waste increases above 600 tons per day, additional landfill equipment may be needed. This additional equipment will not work full time unless needed.

This minimum fleet of equipment can produce a properly compacted and covered daily cell. However, a number of additional pieces of equipment will be kept on-site for efficiency and convenience. Following are optional pieces of equipment:

- large dozers;
- off-road trucks;
- small track loaders;
- motor graders;
- street sweepers;
- utility tractors;
- light plants;
- diesel pumps;
- utility trucks for site clean-up and;
- water trucks.

Alternative pieces may be substituted in the above list from time to time.

8.0 PERSONNEL

Field personnel required to operate the facility in the minimum configuration will consist of at least one scale house operator and three equipment operators. At least one of these people shall hold a Level B certification. In addition, trained personnel will be employed to operate the injection wells, once constructed.

Normal staffing will consist of the following additional workers:

- Weigh Master;
- Compact Operator;
- Facility Manager;
- Secretary/Bookkeepers;
- Truck Drivers;
- Mechanics;
- Utility workers and;
- Equipment Operators;
- Injection Well Operator.

Staffing will vary from time to time in response to specific landfill needs. At all times during operating hours, the landfill shall be managed by a Level A Operator with a minimum Level B operator on-site. There shall be at least one Level C operator for every 10 operational personnel. Operational personnel do not include clerical personnel.

Site personnel will be trained in facility operations including: types of wastes handled by the site; waste acceptance procedures, waste characterization, random waste inspection procedures, monitoring procedures, and emergency situations.

9.0 EMERGENCY PROCEDURES

During the operation of the landfill various types of emergency situations might occur. A few types of emergencies are listed below. A list of emergency personnel, location, and telephone number has been updated and is included as Appendix IV of this Operational Plan. In the case of an emergency situation that cannot be handled by River Birch Landfill personnel, arrangements have been made with local authorities, hospitals, and other potential emergency responders. Letters regarding these arrangements have been included in Volume II, Attachment 10 of the Permit Renewal Application.

9.1 Fire

Fires in buildings will be fought using ABC dry chemical extinguishers, fire hoses and by notification of the nearest fire station.

Landfill surface fires will be handled by pushing soil over the fire while making sure that the blade of the machine does not go into the burning area; the bladeful of earth will precede the blade and cover the fire. When no more flames or embers are visible, drive the tracks or wheels of the machine over the area to eliminate air. Add more soil if necessary. Wait a few minutes and then open up the area incrementally using the end of the blade on a machine. If the fire starts again, repeat the above steps. If not, spread the pile out, track it down and cover it with daily cover.

Landfill underground fires are almost unheard of in modern landfills. In the past, underground fires would start spontaneously due to lack of proper compaction coupled with saturated waste inside the landfill. Today, run-on protection, leachate collection and good compaction have substantially eliminated underground fires. However, if one of these fires starts, it must be excavated out using a large backhoe or dragline to expose the burning zone. Water will extinguish the flame and cool the material. Then water must be pumped out and treated as leachate. Waste can be replaced in the landfill with particular attention to good compaction. Liner repair may be required because plastic can melt and clay can desiccate.

Machine fires occur in response to two factors: 1) Litter, dirt and paper inside various machine compartments and 2) sudden conflagration due to something in the waste. The litter, dirt and paper problem can be completely eliminated by regularly cleaning the machines. Sudden fire under a machine must be handled by operator training. When there is a fire under a machine, the operator must drive out of the fire before bailing out. There is nothing on heavy compactors or dozers that will ignite easily or quickly. If the operator jumps out while the machine is in the fire, the chances of personal injury are greatly increased. By driving out of the flames, the operator can jump down in a safe spot.

In the event a fire cannot be handled by site personnel, the Live Oak Manor Volunteer Fire Company will be contacted. Emergency personnel are listed in Appendix IV of this Operational Plan.

9.2. Injuries

The best deterrent to personal injury is job training and safety training. The Applicant plans to have a monthly safety meeting of all personnel. These meetings will include presentations by company personnel, insurance company representatives and equipment manufacturer experts.

Safety rules will be prepared and distributed, with signed copies in each worker's file. Emergency telephone numbers will be posted on each telephone and will be programmed into telephones having a memory feature. Each major piece of equipment will be equipped with radio communication to one another and to a base station in the office. First aid stations will be placed in the scalehouse and the maintenance building.

After each accident that requires off-site treatment, a safety meeting will be held to determine if safety rules were broken or if they need to be changed.

One person on-site will be designated as safety officer at all times.

If an injury cannot be handled by on-site personnel, then emergency response personnel will be contacted or the person transported to the nearest hospital. Emergency personnel, including area hospitals are listed in Appendix IV at the end of this Operational Plan.

9.3 Spills

Spills should be cleaned up in a timely manner. Spilled dry material can be picked up with a shovel or front-end loader placed in a container then placed in the landfill. For wet spilled material, an absorbent should be applied first then picked up like dry spills.

9.4 Broken Equipment

Since the facility relies on equipment for optimal operation, broken equipment will be repaired as soon as possible. If facility equipment cannot be repaired in a timely manner, then replacement equipment will be obtained until the equipment can be repaired.

9.5 Inclement Weather

Weather, in particular, storms can impact the landfill operation. The landfill can continue to operate during light rains. However, as the intensity of storms increase the impact on site operation increases. During heavy storms the site will cease operation until the storm abates. The site is located in an area periodically impacted by hurricanes. The site will be closed from the time that a hurricane may pose a threat to the site until the time that the hurricane is no longer a threat.

10.0 SPECIAL WASTE ACCEPTANCE

This Quality Assurance/Quality Control (QA/QC) Plan for waste acceptance has several functions. A major function is to insure that the facility accepts only those wastes that it can feasibly and legally dispose of under the conditions of its permit and state regulations. A second function of the plan is to assure that received wastes are disposed of in a safe, efficient and environmental manner.

10.1 Acceptance Evaluation

Procedures in acceptance evaluation are designed to determine whether a given special waste should be accepted for disposal. Waste origin, quantity, properties, solidification or mixing requirements, and compatibility with other wastes disposed of at the site are major considerations. The acceptance plan is a method for deciding to reject or accept a particular waste, prior to its shipment to the facility, based on the capabilities of the facility.

10.1.1 Generator Requirements

A generator of non-hazardous industrial waste who applies for disposal privileges at the site will be required to submit the following:

(1) Pertinent chemical and physical data requested on a "Waste Characterization Data Sheet" or on an equivalent form.
(2) Documents certifying that the waste is non-hazardous, as defined by all applicable state and federal regulations (i.e. 40 CFR 261).
(3) One representative sample. River Birch reserves the right the collect a sample from any incoming loads to serve as a representative sample on file.

10.1.2 Pre-Acceptance Waste Evaluation and Approval

The waste data and/or analytical data will be evaluated to assure that the chemical and physical properties of the waste are essentially the same as those listed on the "Waste Characterization Form". This evaluation will be conducted by a qualified professional experienced with waste acceptance. Any missing physical and chemical data or additional information that is required will be obtained from the waste generator, or by analysis of the waste sample. Waste testing shall be in accordance with LAC 711.D.3.d. Typical tests for preliminary waste evaluation for all waste samples evaluated may include reactivity, corrosivity, ignitability, pertinent TCLP constituents, and/or documented process knowledge.

Following review of the physical and chemical characteristics, testing, and evaluation, the evaluator shall either approve or reject the waste. If the waste is approved, it will then be evaluated for compatibility and manageability by a qualified professional experienced with waste acceptance. Each waste will be evaluated to determine whether physical handling of the material will present any operational problems or require any pretreatment or special handling procedures. The waste characterization information will be reviewed to ensure that the waste material does not contain any specific compounds or characteristics that are prohibited and/or

inappropriate for treatment, storage or disposal at the facility. Factors influencing site waste compatibility include the ability of the waste to be handled or solidified, and the type and amount of solidifying agent required. The site is capable of accepting a variety of waste streams with the exception of those listed below:

(1) Hazardous waste as defined by the State of Louisiana;
(2) Hydrophoric Materials;
(3) Pyrophoric Materials;
(4) Shock Sensitive Materials;
(5) Thermally Sensitive Materials;
(6) Explosive Materials;
(7) Materials Containing Regulated Levels of Polychlorinated Biphenyls;
(8) Materials Containing Regulated Levels of Radioactive Wastes;
(9) Materials Containing Dioxin.

Following the completion of the waste characterization, testing and evaluation; if the waste is judged acceptable, a letter of approval will be issued to the generator and a unique waste code number will be assigned. This waste code number will be cross referenced with the DEQ Waste Numbering System. Waste evaluation records will be kept on file at the facility and will be available for DEQ review. Wastes with compatibility or handling problems will be rejected or approved under the condition that a special handling and/or segregation plan be implemented. These special handling and/or segregation plans will be consistent with the Permit Application and this QA/QC plan.

Each generator of industrial solid waste must update the waste characterization in accordance with LAC 711.D.3.d or when the characterization of the waste has changed. The generator will be responsible to inform the operator of the landfill of any changes in the process that might affect the properties of the waste. In such an event, no further acceptance of the waste will be allowed pending the receipt of revised characterization data and their subsequent evaluation and approval.

10.2 Landfill Gate QA/QC

After a particular waste has successfully passed through the acceptance evaluation, it is ready to enter the on-site waste process. This system involves record keeping, monitoring, sampling, waste handling, and waste disposal. During this stage, wastes are constantly cataloged and monitored.

The objectives of QA/QC in the on-site waste process are to verify that incoming wastes are consistent with acceptance evaluation descriptions and that all wastes are properly handled and disposed in an environmentally sound manner.

10.2.1 Delivery

The Landfill Gate QA/QC process begins when a transporter of an approved waste arrives at the facility with a shipment.

The transporter is required to present, a non-hazardous waste manifest, or an approved manifest or approved bill of lading which contains as a minimum:

- the generator's name and dated signature of an authorized representative;
- a D.O.T. description of the waste(s), if applicable, including waste name, number and quantity;
- identification of the transporter.

10.2.2 Load Inspection

The personnel at the landfill's gate will visually inspect the waste material and complete a waste disposal log. The representative waste sample will serve as an aid in visual identification and variance control of incoming wastes. Wastes which are different from the approved waste will be rejected at the gate. Any hazardous waste materials (solvents, pesticides, or other materials defined in the Louisiana Hazardous Waste Regulations) will be rejected at the gate.

The following items are typical of what would be considered significant discrepancies in the waste shipment initial inspection, evaluation and analysis procedure:

(1) Any shipment which upon inspection is found to differ visually from the description contained on the pre-approved Waste Characterization Data Sheet.

(2) Any shipment which exhibits an odor which is noticeably different or stronger than the odor described on the Waste Characterization Data Sheet.

(3) Any shipment which is distinctly different from the color specified on the Waste Characterization Data Sheet.

(4) Any shipment which exhibits a different number of phases, liquid content, etc. than specified on the Waste Characterization Data Sheet.

(5) Any shipment which exhibits a pH value outside the range of 2.0 to 12.5. (pH will be tested using a pH meter if the material is soluble in deionized water, if not, litmus paper will be used.)

(6) Any shipment which exhibits ignitability.

If any of the above discrepancies are noted between an arriving waste shipment and the pre-approved waste characterization data the shipment will be detained until the discrepancy is resolved to the satisfaction of the River Birch Landfill management. If no resolution is possible, the shipment will be rejected and returned to the generator.

10.2.3 Waste Identification

Incoming waste will be identified by bill of lading or manifest and inspection upon entering the gate as described above. If initial tests listed under section 10.2.2 indicate a potential problem, additional tests will be required or the particular waste will be rejected.

1) Sampling System

The site manager will have the option of taking a sample of any shipment. At times, during the unloading of wastes, a quality control observer may take a sample of shipments of waste and preserve these samples for possible future testing.

10.2.4 Waste Discrepancy/Rejected Load Report

This report will be completed when:

1) Waste arrives without an acceptable manifest.
2) Waste is not consistent with manifest.
3) Waste contains hazardous materials (as defined by State Regulations).
4) Waste is not consistent with waste characterization data on file.

10.2.5 Site Coordinate System

As an aid to waste cataloging and accounting procedures, a land coordinate system will be used to accurately describe the location of the daily working areas. Figure 47 shows the coordinate system for the site.

The coordinates of all disposal operations will be recorded daily on each waste disposal log and on the site daily activity log.

10.2.6 Unloading

Once the shipment has been checked in and inspected at the front gate, the quality control personnel will direct the transporter to the appropriate unloading location.

Waste unloading will be conducted in either a solidification tank or on the working face.

While unloading, if any problems or discrepancies occur between the waste identification documents and the observed waste occur, the unloading will be halted and the transporter will remain on site while an investigation is conducted. In such a case, appropriate supervisory personnel will be notified and the waste generator will be contacted. If the discrepancy cannot be resolved, or if the waste is judged to be unacceptable, the waste will be reloaded into the transport vehicle or into a suitable container if reloading into the original vehicle is not feasible, and removed from the site.

1. A Solidification Tank

Liquids which require solidification will be unloaded directly into a solidification tank. Once in the basin, the appropriate solidifying agent will be placed in the basin in predetermined quantities to solidify the liquid. Dry small particulate materials such as kiln dust, fly ash, etc. may be used a solidifying agents. In order to prevent dust problems, the solidification agent may be moistened prior to placement in the solidification tank.

The components will be mixed with a backhoe or similar equipment until the desired handling consistency is obtained. The solidified material is then loaded and hauled to the working face and unloaded. From this stage on, the solidified sludge is manipulated in the same manner as other bulk solid material that is delivered directly to the working face.

Liquids that exhibit an odor problem will be mixed with a solidifying agent as soon as possible and disposed of in the landfill to eliminate any possibility of odors extending beyond the solidification area.

2. The Working Face

Bulk solid loads which contain no free liquids and require no special handling or treatment will be directed to the working face at the landfill. The working face will also receive municipal garbage. The spreading and compacting equipment used for municipal garbage will commingle the industrial wastes with the loose garbage and compact them in place.

10.3 SPECIAL WASTE STREAMS

The following procedures will be used in addition to General Quality Assurance/Quality Control Plan to assure proper disposal of each of the following specific wastes.

10.3.1 Liquids

Liquid waste shall be classified as such, if the material contains free liquid, fails the paint filter test (S.W. 846 method 9095), or contains less than 15% solids. Liquid waste will not be disposed of without first being treated, solidified or processed in some manner (either on-site in a solidification tank or off-site by the generator) until the percent (%) solids are above 15% and the material is bladeable. Procedures outlined in 2.3.4 will be used to solidify liquid waste. Bladeability is a measurement of the ability to handle the waste without it spreading or separating into different phases. If a particular waste contains less than 15% solids, contains no free liquids, and is bladeable, a specific request will be made of the Department of Environmental Quality to approve the waste shown on a specific basis to allow that particular waste stream to be disposed of directly on the working face.

Liquid waste streams that can be deep well injected and that are approved for injection by the Department of Natural Resources Injection Well Permit will be directed to the injection well facility once it is permitted and constructed. All procedures associated with the injection well are outlined in Disposal Well Procedures provided in Attachment A of this plan.

All Class I (non-hazardous) industrial wastewater will be handled in accordance with the procedure illustrated in Figure 32, provided as Attachment B of this plan. An unloading station will be constructed of sloped concrete to contain any spills, leaks or stormwater. The fluid will drain to a steel or concrete sump with an automatic float switch to activate a pump that will transfer the fluid to the initial separation vessel.

The above-ground non-hazardous wastewater storage facility (Figure 32) will consist of eight (8) tanks to allow for separate storage of materials. On-going compatibility testing will be conducted to assure the materials that may react to form a precipitate down-hole are injected separately-with a buffer clarified brine solution separating the injected waste streams. Some chemical treatment will be implemented to prevent corrosion and scale build-up in the tubing and casing down-hole.

10.3.2 Sludges

Sludges shall include but not be limited to the following waste:

1. Water Treatment Sludge
2. Wastewater Treatment Sludge
3. Cooling Tower Sludge
4. Oil Tank Bottom Sludge

All sludges will contain solids above 15%, pass the paint filter test, contain no free liquids, and be bladeable by landfill equipment. Any sludges not meeting the above requirements will not be disposed of unless solidified in the solidification tank. No unstabilized wastewater sludge will be accepted. Sludges will be commingled with solid waste and will not be acceptable as the first load of the day or as the last load of the day. The sludge will be placed on the working face in such a manner as to achieve maximum mixing and distribution and to take advantage of the bulking capacity of the solid waste. Commingling will be accomplished by spreading alternating layers of solid waste and sludge. Sludges will not be utilized as a daily cover material.

Domestic septage or sewage sludges from publicly owned treatment works will be tested in accordance with LA 33.717.D.3.d.

10.3.3 Dry Small Particulate Waste

Dry small particulate waste shall include but not be limited to coke. This waste will be handled in such a manner as to minimize emission of dust. Generators may be required to wet the material prior to transporting it. In such case the moisture content will be adjusted to such a level so that the material is dampened, but no free liquid is present. If free liquid is present, the material will not be accepted. Loads of this material will not be accepted unless they are covered or are in closed containers. These materials may accepted at the facility manager's discretion, or commingled with liquid waste in the solidification tank to eliminate dust or thicken the liquid waste.

10.3.4 Contaminated Soil

Contaminated soil will be commingled with the solid waste received on that operating day. At the end of the day, the entire disposal area will be covered with the required amount of daily cover. Petroleum contaminated soils will be tested in accordance with LAC 711.D.3.d.

10.3.5 Empty Contaminated Containers

Empty contaminated containers will be acceptable if they have been triple rinsed (certification must be provided by the generator), are "RCRA Empty", and are opened either by having lids removed or by puncturing. If the containers have been pressurized (such as Freon tanks), valves must be removed to relieve pressure build up resulting from temperature fluctuation and compacting activities.

10.3.6 Incinerator Ash

Incinerator Ash will be analyzed in accordance with LAC 711.D.3.d. The ash must be sufficiently cool so as not to start fires. If necessary, ash will be handled as fine particulate matter described above and as such will be required to be covered, dampened to eliminate dust or commingled with liquid in the solidification tank. Each load of ash will be tested as required under 10.2.b - On-Site Waste Process, Inspection.

10.4 Recording System

Upon receipt of asbestos-containing waste material, the operator will use the Asbestos Disposal Verification Form (ADVF) to maintain complete records of all friable and regulated asbestos-containing waste material received at the facility and will include all of the information as required by LAC 33:III.5151.N.5. One copy of each bill of lading or manifest will be kept on file for a period of the life of the site plus three (3) years. All asbestos-containing waste material which comes from an industrial source will be tracked using a waste code numbering system, and will be available for DEQ inspection. In addition, a cross reference with LDEQ's waste codes will be available.

The landfill will also maintain a daily log of activities at the site with records of specific locations of waste disposal for that day. The daily logs will provide documentation of site activity and will identify unusual events taking place on the site.

As required by LAC 33:III.5151.N.6. the landfill will maintain, until closure, records of the location, depth and area, and quantity in cubic meters (cubic yards) of asbestos-containing waste material within the disposal site on a map or diagram of the disposal area.

10.5 Asbestos Waste

The following requirements and procedures will be adhered to while managing asbestos. The primary health objective in handling asbestos waste is preventing the release of asbestos-containing dust. The potential human health effects associated with exposure to asbestos indicate the necessity for strict compliance with the policies and procedures. Each asbestos waste stream will be subjected to special waste approval process and record keeping requirements.

This will include a waste characterization information assigning a waste code number and special waste manifest for industrial solid waste.

10.5.1 Non-Hazardous (Special Waste Manifest)

All asbestos transporters will be required to submit a non-hazardous waste manifest for all asbestos-containing waste material. Additionally, a State of Louisiana Asbestos Disposal Verification Form ADVF is also required for friable and regulated asbestos containing waste material in accordance with applicable previsions of LAC Title 33. Part III. This manifest is to be completed by the generator and transporter, and then sent with the driver of each load. Landfill personnel will then complete the destination section and give the driver a copy. Another copy will go to the generator to verify final destination. One copy will be permanently filed at the River Birch Landfill office. One copy of the ADVF will be provided to the Office of Environmental Services, Air Permits Division as soon as possible and no longer than 30 days after receipt of the waste in accordance with LAC33:III.5151.N.5.b.

Transporters delivering asbestos-containing materials without the required documentation listed above will be rejected in accordance with LAC Title 33 Part III.

10.5.2 Waste Discrepancy/Rejected Load Report

This report will be completed when:

(1) asbestos arrives without a non-hazardous waste manifest or ADVF per LAC 33:III.5151.F.2.g.vii.

(2) asbestos arrives and the waste material does not match the description on the non-hazardous waste manifest or the ADVF per LAC33:III.5151.F.2.g.vii.

(3) asbestos arrives and the non-hazardous waste manifest information or the ADVF information is not complete or is incorrect per LAC33:III.5151.F.2.g.iv and vii.

(4) asbestos arrives not properly enclosed or uncovered per LAC33:III.5151.N.5.a.iv.

(5) there is a discrepancy between quantity of waste shipped and quantity of waste received which cannot be reconciled per LAC 33:III.5151.N.5.c.

The report will then be permanently filed at the River Birch, Inc. office. A copy of the report will be forwarded to the administrative authority as required by LAC 33:III.515.N.5.c.

10.5.3 Packaging

Friable asbestos waste will be accepted only when it is in wetted condition and after it has been placed in closed, unruptured bags (preferably double bagged) or in other tightly closed containers. If bagged, these bags will be "goose-necked" and double tied. Dry friable asbestos will not be received by the facility.

Non-friable asbestos waste will be accepted only when it is thoroughly wetted (but not dripping wet) and the load covered prior to arrival, or the waste is enclosed in bags.

Warning Labels. Each bag or container that contains asbestos waste should have the warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (O.S.H.A.) under 29 CFR.1101 or as stated in LAC 33:III.5151.N.2.a.

10.5.4 Operations

The landfill supervisor will ensure all asbestos wastes are carefully unloaded, placed in the proper location and covered. The landfill supervisor will implement the contingency plan in the event of accidental spills. The following minimum guidelines will always be adhered to:

1. Delivery of asbestos waste will be coordinated so that the waste arrives at the landfill at a specific time that will facilitate adequate personnel and equipment to immediately handle, dispose of, and cover the waste.

2. The disposal area will be away from non-essential personnel, preferably 100' from the active disposal face. The disposal area will be an excavation, depression in the working face or at the toe of the slope.

   The perimeter of the disposal area will comply with the requirements of LAC 33:III.5151.N.2.

   The area will be large enough to contain the entire load and required cover material.

3. The generator (and/or transporter) will be responsible for all transportation and unloading and must certify all containers and loads are in compliance with all regulatory agencies. The material will be carefully unloaded and place in the final disposal area. Care will be taken not to rupture any bags or containers.

4. At the end of each operating day the asbestos-containing waste material that has been deposited at the site during that operating day will be covered with at least 6 inches of compacted nonasbestos-containing cover material. Application of cover will be visually inspected to ensure complete disposal. Additional cover may be added if the inspector determines that 6 inches is insufficient for complete coverage of the asbestos-containing waste.

5. Asbestos waste will not be placed within 15 feet of final grade (or slope) or within 15 feet of intermediate grade slope). Intermediate grade is defined as an area that will be exposed more than 3 months.

6. In the event of a spill (ruptured containers), the landfill supervisor is responsible for directing the collection and disposal of spilled material. Approved containers or bags will be readily available to hold this material. Spilled material may be wetted (to prevent dust) and placed in the disposal area. Care will be taken not to over-wet to the point where the material flows. All employees involved in spill cleanup will wear and use the required personal protective equipment.

7. A grid described in Section 10.2.5 will be used to locate the position of the waste within the site. The grid number and approximate elevation where each load was disposed will be recorded on the manifest and records maintained until closure. These records will comply with applicable provisions of LAC 33:III.5151.N.6.

8. The Administrative Authority will be modified in writing at least 45 days prior to excavating or otherwise disturbing any asbestos-containing waste material that has been deposited at River Birch Landfill. The notice shall comply with applicable provisions of LAC 33.III.5151.N.10.

10.5.5 Personnel Protection

It is the responsibility of the transporter and/or generator to unload all asbestos-containing material. During unloading operations, River Birch employees will remain at least 100 feet from the disposal area with the exception of the employee responsible for covering the asbestos-containing waste with a bulldozer. This employee will be enclosed within the cab of the dozer and protected from significant dermal exposure. As an extra level of protection, the dozer operator will don an OSHA-approved half-face respirator equipped with a HEPA cartridge.

In the event a River Birch employee is required to inspect unloading operations from within 100 feet of the disposal area and is not protected by a fully enclosed cab, the employee shall wear disposable clothing, including coveralls, booties, and gloves, and an OSHA-approved half-face respirator equipped with a HEPA cartridge.

Personnel Hygiene

After the asbestos waste has been buried and prior to leaving the immediate work area, and before entering eating, smoking or drinking areas, employees will remove their disposable clothing and respirator cartridges and seal them ~~it~~ inside a plastic bag. The respirator will be the last piece of personal protective gear to be removed. Discarded clothing and disposable respirator cartridges will not be re-used. If asbestos is released, such as might happen if waste was not wetted or a container has burst open, disposable clothing and respirators cartridges will be considered as potentially contaminated and therefore subject to applicable disposal requirements. Otherwise, sealed bags of disposable clothing and respirators cartridges will be promptly disposed of in the landfill.

As soon as possible after removal of personal protective gear, employees will wash their hands and face. Uniforms and other potentially contaminated clothing to be laundered off-site will be sealed in a plastic bag.

Notification To Laundry

Launderers of uniforms will be notified of the potential that asbestos fibers may be present and that caution should be taken to prevent release of asbestos fibers.

Facial Hair (29 CFR 1910.134)

Anyone required to wear a respirator will obtain a good seal between the face and the respirator. Therefore, facial hair between the face and the sealing surface of the respirator, or hair that may interfere with the function of a respirator seal is not allowed. This includes beards, sideburns, long moustaches, low hairlines or bangs and stubble.

10.5.6 Personnel Surveillance

FREQUENCY

Per OSHA requirements all employees will receive a physical examination prior to performing asbestos disposal activities or being required to wear a respirator.

CONTENT

At a minimum, the examination will include: general physical, health history, chest X-ray, pulmonary function testing and evaluation of the ability to use a respirator.

RECORDS RETENTION

River Birch, Inc. will maintain records of physical examinations at least 30 years beyond an individual's term of employment.

10.5.7 Training And Informing Employees

FREQUENCY

Employees will be trained by qualified in-house personnel or a qualified outside training facility prior to being assigned to asbestos management duties and annually thereafter.

TRAINING

Employees will receive training in the proper management of asbestos, what it is, and its potential health effects if mismanaged. In addition, employees will be informed of the industrial hygiene monitoring, its purpose and meaning, and of their right of access to that information.

Included in the subject of proper management of asbestos will be: standard operating procedures, local policies, procedures and regulations, proper use of personal protective equipment and good personal hygiene practices. All training will be documented and shall comply with applicable provisions of LAC 33:III.5151.P. Accreditation concerning such training shall not be required, however, recognition of training organizations and their trainers will be in accordance with LAC 33:III Chapter 27 Appendix A, Section F.

INFORMING EMPLOYEES

It is the policy of River Birch, Inc. to inform employees of the results of industrial hygiene monitoring regardless of concentrations measured. If results of asbestos monitoring indicate that concentrations of asbestos fibers exceed the regulatory action limit, personal monitoring results will be reported to affected employees within five (5) days of receipt of results.

10.5.8 Industrial Hygiene Monitoring

FREQUENCY

Any landfill accepting asbestos waste will be monitored for asbestos fibers annually if asbestos waste is received during that year. Samples will be collected while asbestos is being received and disposed at the landfill.

METHODOLOGY

Samples will be collected in accordance with approved OSHA Standards Methods will be prescribed by the National Institute of Safety and Health (NIOSH). Samples will be analyzed by American Industrial Hygiene Association (AIHA) accredited laboratory, participating in the NIOSH P.A.T. program (Proficiency in Analytical Testing).

REPORTS

The industrial hygiene consultant will report results of sampling to River Birch, Inc.

10.5.9 Effect On Environment And Operation

The acceptance and disposal of asbestos at this landfill, while following the above outlined procedure and this Quality Assurance and Quality Control Plan, should not have an adverse affect on either the operation or the environment at the landfill.

APPENDIX I
WASTE CHARACTERIZATION DATA

General Directions: In order for us to determine whether we can lawfully and safely dispose of your waste, we must obtain certain information about the chemical and physical properties of the waste. Please be complete in your answers; if your response is "none" or "not available", so indicate. Answers must be printed in ink or typewritten and the completed form must be signed. Please make a copy of this form for your records.

(1) Generator Name: _____

NPDES Permit No._____State W.D. Permit No._____

(2) Generating Facility Complete Address:

_____

(3) Authorized Representative:_____ Title: _____

(4) Phone Number: _____

(5) Emergency Contact: _____ Title:_____ Phone: _____

(6) General Description of The Waste:_____

_____

(7) Process Generating Waste: _____

(8) Anticipated volume:___ o Cubic Yards o Other _____

Per: o Day o Week o Month

(9) Method(s) of stabilization to control odor and pathogens _____

(10) Sample included __yes; ___ no

(11) Chemical Properties of Waste

TCLP Parameters (See Table of Maximum Concentration For TCLP Compounds)

(Example Only)

(12) Physical Properties of Waste:

A. Color:	B. Odor:	C. Physical State @ ___ °F:	D. Layers/Phases:
o Black o Grey o Brown o Other:	o Yes o No o Strong o Mild o Other:	 o Solid o Liquid o Semi Solid o Powder o Other	o Single o Bi-layered o Multi-layered

E. Free Liquids: o Yes o No	J. Reactivity YES NO
F. ____% Solids	o o Hydrophoric
G. pH:____ S.U. Expected Range ___ to ___ S.U.	o o Pyrophoric
H. Specific Gravity:	o o Explosive
I. Flash Point: _____ °F Closed Cup _____ None	o o Shock Sensitive o o Thermally Sensitive o o Capable of producing hazardous levels of toxic gases

CERTIFICATION

I hereby certify that the waste named and described herein is non-hazardous and is not classified as hazardous by any of the criteria defined in 40 CFR Part 259 and applicable Louisiana Solid Waste Rules and Regulations and that all information submitted in this document and attached documents is a true and accurate description of the waste material. All relevant information regarding known or suspected hazards has been disclosed.

_____ _____

Signature Title

_____ _____

Name (Type or Print) Date

(Example Only)

APPENDIX II

GENERATOR'S CERTIFICATION OF REPRESENTATIVE SAMPLE

GENERATOR NAME:_____ NPDES PERMIT NO. _____ GENERATING

FACILITY ADDRESS:

_____

_____

AUTHORIZED REPRESENTATIVE _____ TITLE _____

PHONE NUMBER ( ) _____

EMERGENCY CONTACT _____TITLE _____

PHONE NUMBER ( )_____

In order to determine whether the River Birch Landfill can accept the waste presented here, you must obtain and supply River Birch, Inc. with one (1) representative sample of the waste along with a laboratory report of an equivalent sample conforming to the physical and chemical characteristics listed on the Waste Characterization Data Sheet. A representative sample is defined as a sample obtained using any of the applicable sampling methods specified in 40CFR261-Appendix 1 or an equivalent method.

Collect a representative sample of your waste, label it with the information given on the completed form below:

Sample Source _____
Sample hour/date _____
Sampler's signature _____
Print sampler's name _____
Sampler's title _____

I certify that the samples submitted here are representative of the entire mass of waste to be presented for disposal at the River Birch Landfill. I further testify that the waste is consistent with the waste data submitted to River Birch, Inc. or its assigns for approval to dispose of at the River Birch Landfill.

Signed_____ Date _____

Title _____

This completed form must be returned, with the representative sample to:

River Birch Landfill, Jefferson Parish, Louisiana

(Example Only)

APPENDIX III
MAXIMUM CONCENTRATION FOR TCLP COMPOUNDS

Contaminant	Maximum Concentration Level (mg/)
Arsenic	5.0
Barium	100.0
Benzene	0.5
Cadmium	1.0
Carbon Tetrachloride	0.5
Chlordane	0.03
Chlorobenzene	100.00
Chloroform	6.0
Chromium	5.0
o-Cresol	200.0
m-Cresol	200.0
p-Cresol	200.0
Cresol	200.0
2,4-D	10.0
1,4-Dichlorobenzene	7.5
1,2-Dichloroethane	0.5
1,1-Dichloroethylene	0.7
2,4-Dinitrotoluene	0.13
Endrin	0.02
Heptachlor & epoxides	0.008
Hexachlorobenzene	0.13
Hexachlorobutadiene	0.5
Hexachloroethane	3.0
Lead	5.0
Lindane	0.4
Mercury	0.2
Methoxychlor	10.0
Methyl Ethyl Ketone	200.0
Nitrobenzene	2.0
Pentrachlorophenol	100.00
Pyridine	5.0
Selenium	1.0
Silver	5.0
Tetracholoroethylene	0.7
Toxaphene	0.5
Trichloroethyene	0.5
2,4,5 – Trichlorophenol	400.0
2,4,6 – Trichlorophenol	2.0
2,4,5 – TP (Silvex)	1.0
Vinyl Chloride	0.2

Note: Subject to change as regulations change.

APPENDIX IV

RIVER BIRCH LANDFILL
EMERGENCY RESPONSE PERSONNEL

ORGANIZATION	LOCATION	TELEPHONE NUMBER
Jefferson Parish Sheriff Department	1233 West Bank Expressway, Building C Harvey, Louisiana 70085	504-363-5500
Live Oak Manor Volunteer Fire Company	404 Azalea Dr. Waggaman, Louisiana	911 504-431-9899
Louisiana State Police	2101 I-10 Service Road Marrero, Louisiana 70072	504-471-2775
Ambulance Service – West Jefferson Medical Center Ambulance Service	5698 Belle Terre Road Marrero, Louisiana 70072	911 504-340-8661
West Jefferson Medical Center	1101 Medical Center Blvd. Marrero, Louisiana 70072	504-347-5511

ATTACHMENT A

DISPOSAL WELL PROCEDURES

DISPOSAL WELL PROCEDURES

This section will provide information procedures for the River Birch Waste Disposal Well No. 1 and No. 2. These procedures include storage and pre-injection treatment of the waste stream, operational monitoring, and well use schedule.

Note: The 2.66 acres on which the disposal well(s) and associated equipment are located has been formally removed from the footprint of River Birch Landfill. As such, the well(s) and associated equipment are not regulated by the solid waste regulations applicable to River Birch Landfill and the information provided herein is for informational purposes only.

Rate and Volumes

The expected monthly injection volume is approximately 15,000,000 gallons per month. The actual Louisiana Department of Natural Resources (LDNR) allowed injection volume will be issued from the LDNR after the facility is built and tested.

Injection Pressures

The calculated maximum surface injection pressure (MSIP) is 1,789 psi. The actual LDNR allowed MSIP will be issued from the LDNR after the facility is built and tested.

Characteristics of the Injected Fluid

The expected fluids for injection will be leachate and stormwater from the River Birch Landfill operations. The River Birch commercial disposal facility may accept "non-hazardous" liquid waste from other industrial generators.

Waste Identification Plan

This LDNR facility may ONLY receive and inject "non-hazardous" liquid wastes. The wastes authorized for injection at this site include:

- All wastes identified in 40 CFR 261, Section 261.4(b) – as being non-hazardous and suitable for deep-well injection.
- Any wastes suitable for deep well disposal, which do not meet the criteria for hazardous wastes, as identified in Subpart C of 40 CFR 261.
- Any wastes that may contain chemicals listed ins Subpart D of 40 CFR 261 – "if the Administrator has determined under the provisions of 40 CFR 261, Section 261.11(a)(3)..."that the waste is not capable of posing substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed."

To assure that only non-hazardous materials that meet the above criteria are injected at the site - proper records are maintained that demonstrate that only non-hazardous wastes are received and injected at this site. The Waste Identification Plan is divided into the following sections:

- Waste Pre-Acceptance Requirements
- On-Site Waste Acceptance Requirements
- Recordkeeping Procedures

Waste Pre-Acceptance Requirements

The purpose of a pre-acceptance review is to:

- Determine if a waste material meets all requirements for a non-hazardous waste.
- Evaluate potential waste fluid compatibility problems that may arise due to the mixing of the waste with other non-hazardous fluids accepted for disposal.
- Develop a database and test methods for on-site verification that the waste received at the site conforms to the standards established in the pre-acceptance review.

Sampling

All samples obtained for analysis will be obtained using protocols outlined in Appendix 1 for 40 CFR 261 (Appendix D) or SW 846 (Appendix E). A description of the sampling methods approved by River Birch Management will be maintained at the facility, and the sampling method will be noted for each shipment. For regular shipments of non-hazardous waste received at this site, only periodic sampling will be conducted once the waste composition has been appropriately established. For infrequent waste shipments that may vary in composition, each shipment will be sampled and analyzed by the appropriate methods described in SW-846.

Analysis

Each waste stream, prior to acceptance for disposal at this site, will be sampled and analyzed under the supervision of River Birch representatives by a commercial laboratory that has been audited by the Louisiana Department of Environmental Quality (LDEQ). The third-party laboratory contracted for analysis of waste streams will be certified by the Louisiana Accreditation Program (LELAP). The specific analysis performed will be based on the review of the generator's waste and potential contaminants.

Specifically,

- Each waste analysis provided by the generator will be reviewed to determine if the waste demonstrates any of the general characteristics of a hazardous waste as provided in Subpart C of 40 CR 261.
- Each generator will be required to provide a list of all specific chemicals used at their site, which appear in the lists provided in Subpart D of 40 CFR 261.
- An analysis for each chemical in Subpart D of 40 CFR 261 that the generator uses on-site will be performed prior to waste shipment or acceptance for disposal.
- The analysis obtained by the River Birch representative will be compared to the physical and chemical description provided by the generator. When the analysis and description provided by the generator match, the waste would be accepted for disposal. When the analysis and the description do not match, the waste will be rejected.

On-Site Requirements

Before a waste shipment is accepted at the site for disposal, the following requirements must be satisfied.

1. The Site Supervisor has a written notification that the shipment has been properly approved for disposal at the River Birch facility.
2. The volume of waste manifested for shipment and the volume received at the facility is approximately the same.
3. A copy of the non-hazardous waste shipping manifest has been properly completed, signed, authorized, and accepted by the facility.
4. After the waste is pre-accepted for disposal, a set of analyses will be developed for on-site evaluation to verify that the received waste is the same waste shipped and analyzed by the laboratory. At a minimum, the on-site testing will include, but not limited to :

    - Total Suspended Gravity
    - pH
    - Color
    - Odor
    - Specific Conductance

All samples will be obtained and analyzed in accordance with the specifications found in SW-846.

Record Keeping Procedures

The following records will be kept on file for review per LDNR requirements:

- A copy of the pre-acceptance review, including:
    1. Chemical and physical analysis provided by the generator.
    2. Sampling technique used by the generator.
    3. Chemical analysis performed by River Birch representative.
    4. Sampling technique used by River Birch representative.
- A copy of the Uniform Waste Manifest including:
    1. All appropriate signatures.
    2. Certifications by the generator concerning the non-hazardous designation of the waste.
- A copy of the on-site test results, which were specified in the pre-acceptance review including sampling technique.
- A record of when the waste was stored on-site and the final disposal date.

Storage and Treatment of the Waste Stream

Figure 32 is a conceptual model of the Detailed Facility Diagram, depicting the facility boundary, the proposed injection wells and the proposed facility for treatment and storage of non-hazardous liquids prior to injection. The waste stream is stored in tanks prior to injection. **Figure 34** is a surface facility flow model illustrating River Birch's disposal wells, surface storage and treatment systems. The system consists of pH adjustment to a target of 5.0 to 6.0 standard units. Additional treatment of non-hazardous fluids may include filtration through diatomaceous earth pre-coat leaf filter, followed by polish filtration using a cartridge filter. The waste stream is then pumped to a pre-injection storage tank and into the well.

Operational Monitoring

River Birch operators will operate the injection pump system to ensure that the permitted operating parameters, as reviewed, approved and permitted by the Louisiana Department of Natural Resources (LDNR) – Injection and Mining Division, are not exceeded.

The instrumentation gauges for the waste disposal wells measure and continuously record the injection pressure, flow rate and temperature of the injected fluids, the "tubing/long-string casing" annulus pressure, and the volume injected into the well. All recorders are located in weatherproof enclosures. A conceptual model of the monitoring system is depicted in **Figure 39.**

Annulus pressure and injection gauges are installed at the wellhead to allow visual monitoring of operating conditions. Additionally, visual and audible alarms alert operators to high flow rates or low annulus pressure. The alarms are set to sound at the following limits –

- "Long-string casing-tubing" annulus pressure decreases to less than 50 psi above injection tubing pressure.
- Annular pressure decreases to less than 200 psi.
- Flow rate exceeds the State-allowable flow rate (417 gpm).
- Wellhead tubing pressure exceeds the State-allowed (1,789 psig).

Well Use Schedule

The River Birch disposal wells will be used on a continuous basis. The wells will not be used during periods of maintenance, testing or workover.

Operating Personnel Qualifications

River Birch will hire and train employees to operate the waste disposal wells. River Birch currently has trained personnel on staff with experience in waste profiles, analyzing waste streams, and determining if waste streams are hazardous or non-hazardous. The on-site operations supervisor will be trained and be familiar with all State and Federal regulations regarding Class I wells. The facility has resident engineers and chemists to check compatibility of the wastes and to lend technical assistance to the operations supervisor and operations technicians. All facility personnel will be trained using the technical operations manual. Continuing training programs will be held on an annual basis to keep personnel informed of any changes within the system. Safety programs will also be part of the annual training program.

Injection Procedures

All Class I (non-hazardous) industrial wastewater will be handled in accordance with the procedure illustrated in **Figure 32.** An unloading station will be constructed of sloped concrete to contain any spills, leaks or storm water. The fluid will drain to a steel or concrete sump with an automatic float switch to activate a pump that will transfer the fluid to the initial separation vessel.

The above ground non-hazardous wastewater storage facility (**Figure 32**) will consist of eight (8) tanks to allow for separate storage of materials. On-going compatibility testing will be conducted to assure the materials that may react to form a precipitate down-hole are injected separately – with a buffer of clarified brine solution separating the injected waste streams. Some chemical treatment will be implemented to prevent corrosion and scale buildup in the tubing and casing down-hole.

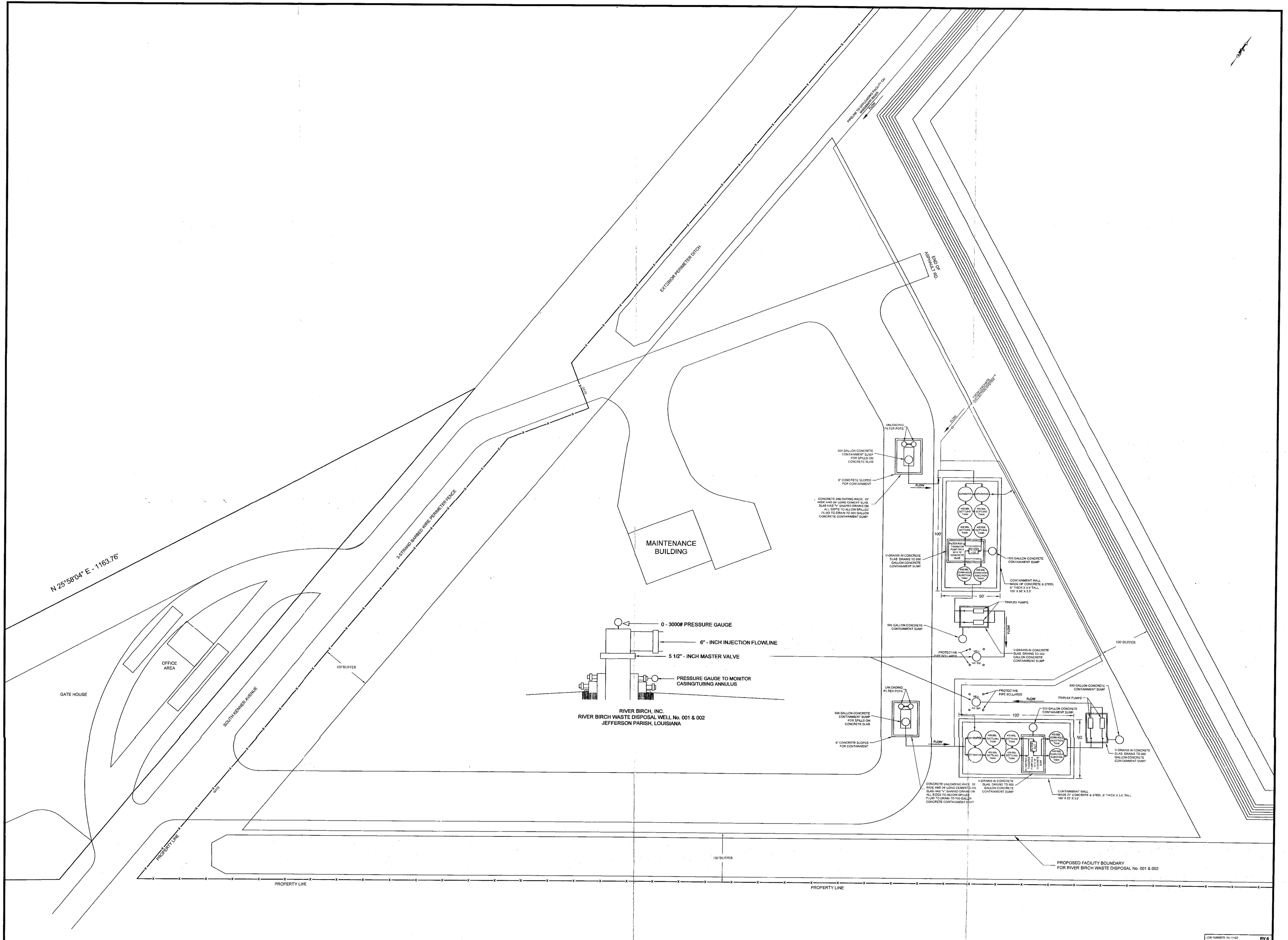
Contingency Plans and Maintenance

River Birch will have a Spill Prevention Control and Countermeasure (SPCC) plan in place in the event of a non-hazardous wastewater release. The storage tanks will have the proper containment and the off-loading facilities will be contained to prevent releases to the environment. Inspection of the facility and personnel training will be implemented as part of the SPCC plan.

In the event the injection wells are "off-line" for maintenance, the facility may accept non-hazardous industrial wastewater until the storage tanks are full.

ATTACHMENT B

FIGURE 32-DETAILED FACILTIY DIAGRAM



JOB NUMBER: 04-11122	RV-6
FILE NAME: F:\drawings\RiverBirch-Detailed\Facility.dwg	
DATE: 02/27/06	PAGE: 1 OF 1
SCALE: 1" = 30'	DRAWN BY: TWW

MoWalk Consulting Co

River Birch Landfill
River Birch Waste Disposal Wells No.001 & No.002

Figure 32

APPENDIX B

GROUNDWATER MONITORING PLAN

GROUNDWATER MONITORING PLAN

RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

Prepared For:
River Birch, Inc.

Original Document: May 1994
Revised Modification No. 7: October 24, 2003

TABLE OF CONTENTS

Section			Page
1.0	INTRODUCTION		1
2.0	GROUNDWATER MONITORING PROGRAM OVERVIEW		2
3.0	GROUNDWATER SAMPLING PROCEDURE		3
	3.1	WATER LEVEL MEASUREMENT	3
	3.2	WELL EVALUATION - PURGING THE WELL	5
	3.3	MONITOR WELL SAMPLING	7
	3.4	SAMPLE PRESERVATION AND HANDLING	8
		3.4.1 Sample Containers	9
		3.4.2 Sample Preservation and Handling Procedures	9
4.0	FIELD DOCUMENTATION		10
5.0	DECONTAMINATION AND CROSS-CONTAMINATION CONTROL		12
6.0	ANALYTICAL PROCEDURES		14
	6.1	FIELD QA/QC PROGRAM	14
	6.2	LABORATORY QA/QC PROGRAM	15
7.0	EVALUATION OF GROUNDWATER DATA		16
	7.1	INITIAL SAMPLING	16
	7.2	STATISTICAL EVALUATION	16
	7.3	REPORTS	17
8.0	MONITOR WELL MAINTENANCE		18

LIST OF TABLES

Table 1	Monitor Well Information
Table 2	Analytical Parameter List
Table 3	Container Type, Preservation and Holding Times
Table 4	Accuracy and Precision Criteria for SW-846 Analysis
Table 5	Surrogate Control Limits for SW-846 Organics Analysis
Table 6	QC Level of Effort for SW-846 Analysis

LIST OF EXHIBITS

Groundwater Collection Report Form
Chain-of-Custody Form
Monitor Well Maintenance Form

LIST OF ATTACHMENTS

Attachment 1 Proposed Well Construction Diagram and Monitoring Well Plan
Attachment 2 Groundwater Statistical Evaluation Plan
Attachment 3 Monitor Well Installation Plan
Attachment 4 Monitor Well Plug and Abandonment Plan

1.0
INTRODUCTION

This groundwater sampling and analysis plan (SAP) has been developed for the groundwater monitoring program for the River Birch Landfill located in Jefferson Parish, Louisiana. This SAP has been prepared in accordance with the Louisiana Solid Waste regulations dated February 20, 1993.

This plan describes sampling and analysis procedures which ensure that collected samples are representative of the water-bearing zones being monitored. Sampling and analysis of all wells included in this detection monitoring program will be performed quarterly for the first year and every six months thereafter. The groundwater background quality will be established by collection of samples from upgradient wells and statistical evaluation of the parameter concentrations.

This plan details sampling and analysis elements including:

- Groundwater sampling procedure (water level measurement, evacuation, sampling)
- Sample preservation, handling and analytical parameters
- Field documentation
- Chain-of-custody control
- Decontamination and cross-contamination control
- Analytical procedures, and
- Field and laboratory quality assurance/quality control

Groundwater monitor well installation plan, monitor well plug and abandonment plan, and groundwater statistical evaluation plan are presented in Attachments 2, 3 and 4, respectively in this document.

< THIS SECTION INTENTIONALLY LEFT BLANK >

The groundwater monitoring system for the River Birch Landfill has not been installed. This section will be completed after the system has been installed.

3.0
GROUNDWATER SAMPLING PROCEDURE

The following sections describe the procedures for depth measurements, well evacuation, sample collection, and sample preservation and handling.

3.1 WATER LEVEL MEASUREMENT

The water level measurement is performed on the same day and immediately prior to purging.

Procedure:

A. The elevation at the top of the casing (TOC) shall be established at each well. This information will be used to calculate the water level elevation in each well. To calculate this elevation, the distance to the water level from the TOC needs to be measured. This can be achieved by either of the following procedures:

Weighted Tape

1. A weighted tape must be decontaminated prior to use and between wells by procedures detailed in Section 5.0. The weight shall consist of an inert, open-ended object that will create a distinct sound when tapped on the water's surface. The weight shall be lowered gently into the well until it is heard to have touched the water surface. The water level measurement from top of casing to water level shall be determined to $\pm$ 0.01 foot and recorded in a logbook or on a Groundwater Collection Report Form. A second measurement of well depth from the top of the casing to the bottom of the well shall also be made. The weight shall be pulled up and allowed to fall back into the well bottom several

times to disturb any fine silts that may have accumulated. In addition to depth measurements, this procedure can be used to determine if a significant silt build-up has occurred at the bottom of the well (or that the well casing is not blocked).

NOTE: When using a weighted tape, be sure that the weight is not secured using an adhesive tape (duct tape or strapping tape, etc.); the adhesive may contain organic compounds which could contaminate the well.

Electric Water Level Indicator

2. An electrical water level indicator must also be decontaminated by procedures detailed in Section 5.0 prior to use and between wells. The indicator probe, connected to a graduated wire is lowered down the well casing. A light turning on or a meter deflection occurs when the electrical circuit is closed indicating that the probe tip has touched the water. The reading shall be taken to the nearest 0.01 foot by recording the length of graduated wire between the TOC and the water level (probe tip).

   The water level will be recorded in a logbook or a Groundwater Collection Report Form. A second measurement shall be made from top of casing to the bottom of the well using the probe and again trying to disturb fine silts that may have settled to the bottom.

B. If groundwater contamination is ever detected or suspected, the sequence of water level measurements shall begin with the wells least likely to be contaminated and end with the wells most likely contaminated to reduce the potential for cross-contamination of samples. If this information is not available, an attempt shall be made to sample upgradient wells first and then downgradient wells.

C. The water level measurement is used to calculate the volume of water in the well from the linear feet of standing water and the well diameter. This calculation is then used to determine the volume of static groundwater to be purged from the well prior to sampling. To calculate the linear feet of water in the well, subtract the depth to the water from the total depth of the well. From the table below, determine the appropriate factor for the specific well inside diameter, multiply the linear feet by the appropriate factor listed on the table below to obtain the gallons of water present in the well.

Casing Diameter	Gallons/Linear Feet
2 inches	0.163
3 inches	0.367
4 inches	0.653

If 10 percent of the screened interval is blocked by sediments, the well will be redeveloped prior to the next required sampling event. Wells with dedicated sampling devices which preclude total-depth measurement must be measured annually.

3.2 WELL EVALUATION - PURGING THE WELL

In order to obtain a representative sample of groundwater, the standing water in the well casing shall be purged or evacuated. Evacuation allows fresh or formation groundwater to enter the well. The optimum method to ensure that formation water is sampled, is to monitor the water being purged by field measurements of pH, temperature and conductivity. For each well volume purged from the well (as calculated earlier) a measurement of these three indicator parameters shall be taken. When the subsequent samples are observed to have less than $\pm$ 10 percent variation in these parameters, the well is presumed to be adequately flushed. At a minimum, three well volumes shall be removed; however, in wells with very low recoveries this may not be practical. When full recovery exceeds two hours, the well shall be purged to dryness. If the well is evacuated to dryness, samples of the groundwater shall be collected whenever there is sufficient recovery, but within 24 hours of evacuation.

Evacuation rates shall be kept below 5 gpm. At no time shall a well be pumped to dryness if recharge rates cause groundwater to vigorously cascade down the sides of the screen which can potentially cause an accelerated loss of volatiles.

If at all possible, the water shall be drawn down from above the screen in the uppermost part of the water column in high yield formations to ensure that fresh water from the formation will move upward in the screen. In low yield formations, water shall be purged so that it is removed from the bottom of the screen.

Procedure:

As discussed previously, temperature, pH and specific conductivity are recorded in the field at each bailed well volume. These results are recorded in the logbook and on the groundwater sampling form. An example of the groundwater sampling form is included as an exhibit.

Evacuation of a well can be accomplished in several different ways. In any instance it is paramount to ensure that the evacuation procedure does not cause cross contamination from one well to the next. Dedicated PVC bailers will be used for evacuating the wells. Bailers will either be stored in their respective wells or stored in a clean, dry storage area. Bailers shall be decontaminated before use. Decontamination procedures described in Section 5.0 shall be followed.

The preferable materials of bailer construction are teflon, stainless steel, polypropylene, polyethylene, vitron, and polyvinyl chloride (PVC). The bailer shall be lowered into the well using a non-porous rope made out of material such as polypropylene or teflon-coated cord. Caution shall be used when lowering the bailer into the water so as to avoid aeration of the well water. Retrieve the bailer after it is filled and pour water into a graduated container to measure the amount of water removed from the well. Care shall be taken to keep the rope and bailer from touching the ground or other potentially contaminated surfaces. When the first well volume has been removed, a groundwater sample shall be

collected from the bailer for field measurements of pH, temperature and conductivity. These field measurements shall be repeated for each subsequent well volume removed.

3.3 MONITOR WELL SAMPLING

After evacuation of an adequate volume of water from the well, sampling can begin. Sampling of the monitor well shall occur as soon as possible after evacuation, preferably immediately but at a minimum within 24 hours of completion of purging activities. The purging and sampling method will be consistent throughout the life of the facility.

Procedure:

A. Prior to collecting the groundwater samples, the appropriate sample containers and preservatives shall be set out and readily available for sample collection. Ideally, the sample containers shall be cleaned and prepared by the laboratory that is going to conduct the analysis. Some of the parameters for which samples are to be collected will require a preservative. Section 3.4 provides details on sample container size and preservatives to be used.

With the use of a dedicated bailer for sampling, the same bailer and rope used to purge the well may be used to sample it. An effort will be made to keep the rope from touching the ground or the casing. The bailer will be lowered slowly into water. Do not let the bailer free fall into the water. Attempt to lower the bailer to the same depth in the well each time. Retrieve the bailer smoothly but quickly and empty the water into the sample container in a steady stream. Samples shall be collected in the following order: Volatile Organics, Semivolatile Organics, and metals. Temperature, pH and specific conductivity shall be recorded in the field. Once collected, the samples shall be labeled using a waterproof label and waterproof ink, sealed in plastic bags, and placed on ice in an ice chest and cooled to 4° C. The sample number, amount collected, date and time of collection, analytes and method of

preservation shall be recorded on a chain-of-custody form, groundwater sampling form, and in a logbook.

B. As with purging, the sequence of monitor well sampling shall be done whenever possible, from least likely contaminated to most likely contaminated to minimize the potential for cross-contamination. If this information is not available, an attempt shall be made to collect samples from upgradient wells first, and then from downgradient wells.

C. Each well shall have a dedicated bailer that may be stored in the well or sealed in a secure location. Dedicated equipment shall still be decontaminated as described in Section 5.0 prior to use. By using dedicated equipment, the chances of cross-contamination are greatly reduced.

D. Special care shall be taken when collecting samples to be analyzed for volatile compounds. The water shall be transferred slowly from the dedicated bailer to the sample container to reduce the potential for aeration of the samples. Samples requiring the analysis for organics shall not be filtered or transferred from one container to another because losses of organic compounds onto the walls of the containers or aeration may occur. No headspace shall exist in the sample containers for volatile compounds to minimize the possibility of volatilization of organics. The collection of groundwater samples for metals analysis will not be field filtered.

3.4 SAMPLE PRESERVATION AND HANDLING

The following section discusses the procedures for preserving samples, the sample containers to be employed for the appropriate set of parameters, and procedures for transferring the samples to the off-site laboratory.

3.4.1 Sample Containers

The sample containers and associated volumes for the various parameters are outlined in Table 3. Sample containers are to be cleaned by the laboratory prior to shipment for sampling. Recommended cleaning procedures include EPA approved methods for each parameter of interest. Verification of the cleanliness of a batch of precleaned bottles shall be conducted by the laboratory. Analysis of residues in the bottles is recommended periodically, especially prior to resampling events to confirm exceedances. Container type and volumes shall be documented on sampling forms, chain-of-custody and in the logbook.

3.4.2 Sample Preservation and Handling Procedures

Sample preservation, handling and analysis must meet the specifications of Test Methods for Evaluating Solid Waste Physical/Chemical Methods Third Edition (EPA Publication Solid Waste Physical/Chemical Methods third Edition (EPA Publication Number SW-846, 1986, as revised December, 1987) or an equivalent substitute as approved by LDEQ. Preservation methods are presented in Table 3 for the facility groundwater monitoring parameters. The preservatives should be supplied by the laboratory and placed into the appropriate containers by the field crew or the laboratory. Documentation of the preservative will be done on the sample labels, groundwater sampling form, chain-of-custody and logbook.

Samples to be analyzed for volatile organics shall have no headspace in the respective sample containers to minimize the potential for organic volatilization. Organic samples will not be transferred from one container to another so as to reduce losses of organic material by aeration or onto the walls of the container. Preservatives shall not be used for the VOC samples.

Immediately upon collection, all sample containers shall be placed on ice and cooled to 4° C until delivery to the analytical laboratory. Table 2 lists the parameters (as listed in the Louisiana Solid Waste Regulations, Table 1 of Appendix C) to be analyzed, and the corresponding test methods and practical quantification limits (PQL).

4.0
FIELD DOCUMENTATION

A. Logbook

It is recommended that a logbook shall be kept to record all pertinent information about the monitor well sampling event. The logbook shall be a bound notebook with consecutively numbered pages, and records shall be kept using waterproof ink. Documentation shall be sufficient to reconstruct each sampling event without relying on the collector's memory. Entries in the logbook shall include:

- Names and organization of the persons performing the sampling
- Location of the sampling (well number or cluster)
- Purpose of the sampling (i.e., quarterly, annual, groundwater sampling)
- Calibration information
- Water level readings
- Date and time of sample collection
- Sample container size, type and preservation
- Sample distribution (laboratory)
- Weather conditions
- Any other field observations

B. Sample Labels

The sample labels shall be waterproof and filled out with waterproof ink. At a minimum, the sample label shall contain:

- Site, project or plant area
- Sample number (monitor well number)
- Collector's name
- Date and time of sample collection
- Parameters for analysis

- Preservatives, as applicable

C. A separate groundwater collection report form can be used in conjunction with a logbook. A groundwater collection report form shall be filled out for each well sampled. This form contains blanks for information about the monitor well, the well evacuation, replicate measurements, sampling and sample condition. The groundwater collection report form may be used as a stand-alone document to represent a monitor well sampling event. An example of one type of groundwater collection report form is included as an exhibit in this plan.

D. Each sample collected for analysis must be recorded on a chain-of-custody form. The chain-of-custody form will become the permanent record of all sample handling and shipment. Chain-of-custody documentation will include the following information:

- Sample identification number
- Date of sample collection
- Date sample was submitted to the laboratory
- Sample collector's signature
- Number and type of containers
- Preservation
- Parameters to be analyzed
- Signature of persons relinquishing and obtaining custody of samples
- Date and time of custody transfer

With each transfer of sample custody, the persons involved will verify sample numbers and conditions. When custody is transferred, both the person relinquishing and receiving custody must sign in the proper place. An example of the chain of custody form is included as an exhibit in this plan.

A. In order to minimize the possibility of cross-contamination, strict cross-contamination control procedures shall be followed. These include:

- Sample jars shall be kept in limited access areas until used
- Latex gloves shall be worn during all sampling activities and changed between sampling events
- Clean equipment shall be wrapped in aluminum foil or plastic sheeting prior to use
- Clean plastic sheeting shall be placed at the sampling area and all equipment shall be placed on the sheets. This plastic shall be discarded after each use
- Equipment refueling shall be performed in designated areas. These areas shall be at a distance from any sampling points, to minimize the potential that vapors from fuel will affect sample quality
- All purge water, decontamination water and discarded gloves shall be containerized for disposal

B. All equipment used to collect groundwater samples shall be decontaminated prior to the collection of the samples and in between sample locations. Decontamination of this equipment will be accomplished by the following procedure:

- Washing in a phosphorous-free detergent (i.e., Alconox)
- Triple rinse with clean deionized water

Afterwards, decontamination equipment shall be wrapped in aluminum foil or clean plastic until used.

6.0
ANALYTICAL PROCEDURES

Analyses of the groundwater samples are to be performed in accordance with SW-846 test methods as specified herein or an equivalent method if approved by the administrative authority. The alternative test methods and PQLs for metals and organics are specified in Table 2. Container types, preservation methods and holding time requirements as specified by each method are to be adhered to and are listed by parameter in Table 3. Data from samples that are not analyzed within recommended holding times shall be considered suspect. Deviations from the EPA approved methods specified shall be adequately documented to ensure that the quality of the results meets the performance specifications (e.g., detection limit, sensitivity, precision, accuracy) of the reference method. Prior approval from the LDEQ will be obtained if such methods are substituted.

6.1 FIELD QA/QC PROGRAM

The Field Quality Assurance/Quality Control Program will consist of meticulous sampling, handling and transfer procedures previously discussed in Section 3.0. The Field QA/QC program will also consist of two types of quality control blanks, a trip blank and a field blank.

The trip blank will be prepared by the analytical laboratory. Two VOA vials will be filled at the laboratory with Type II reagent grade water, transported to the site, handled like a sample and returned to the laboratory for volatile organic analysis using the same method as the collected groundwater samples. One trip blank per sampling event will be analyzed. Any contaminants found in the trip blanks could be attributed to interaction between the sample container, handling procedures or laboratory contamination. The concentration levels of any contaminants found in the trip blank will be noted but will not be used to correct the groundwater results. If the trip blank contaminant levels are beyond an order of magnitude when compared to field sample results, resampling shall be considered.

Field blanks will be prepared by the sampling crew by pouring unused decontamination water into the sampling containers, handled like a sample and sent to the laboratory for analysis of all parameters. Contaminants found in the field blanks may be attributed to interaction between the sample and container, contaminated rinse water, or a handling procedure that alters the sample analysis results. Similar to the trip blanks, the results of the field blank shall not be used to correct the groundwater data; but the source of the contamination shall be identified and corrective action, possibly including resampling, shall be initiated.

6.2 LABORATORY QA/QC PROGRAM

The analytical laboratory will provide for tuning, calibration and identification of potential matrix interferences using standards, laboratory blanks and spiked samples in accordance with EPA Publication No. SW-846 Third Edition Requirements, 1986, as revised December 1987, or equivalent methods if approved by the administrative authority. Accuracy and precision criteria for the various SW-846 analyses are provided in Table 4. Surrogate Control Limits are also given in Table 5. A summary of the QC level of effort for this program is given in Table 6 which lists the types of laboratory QC Samples and associated analytical frequency.

Data from QC samples shall be used as a measure of performance or as an indicator of potential sources of contamination, but shall not be used to alter or correct analytical data. These data will be reported with other sample results. An effective program to resolve testing problems shall be in place for the laboratory and this program shall be implemented when such problems arise.

7.0
EVALUATION OF GROUNDWATER DATA

The sampling objective is to routinely obtain representative groundwater samples from the monitor wells that reflect actual aquifer conditions. The results of the field and laboratory analysis of the samples are evaluated and reported in a format dependent on the monitoring mode, i.e., detection, assessment, or corrective action monitoring. The initial monitoring program will be detection monitoring. Detection monitoring will be conducted in accordance with LAC 33:VII.709.E.3.

7.1 INITIAL SAMPLING

During the first year of detection monitoring (the year following the installation of the monitoring system) independent samples will be collected from all wells quarterly to provide a basis for statistically calculating background quality. Quarterly samples will provide for temporal changes in groundwater and allow for an initial assessment of seasonality effects. Monitoring data from upgradient wells will assist in determining the natural spatial variability of monitoring results, which shall be taken into account.

7.2 STATISTICAL EVALUATION

During the detection monitoring program, a statistical analysis of the analytical results will be implemented to determine if there have been significant changes in groundwater quality over the reporting period. The statistical procedures for groundwater monitoring data to be used are presented in Attachment 2.

In the event of a significant statistical change, LDEQ will be notified in accordance with LAC 33:I.Subpart 2. A written report will be sent to LDEQ within 14 days after the determination which identifies the parameter(s) causing the statistical exceedance. Within 90 days after the determination, River Birch will either initiate an assessment monitoring program or submit a report to LDEQ demonstrating the change is due to causes other than an actual release. Confirmation of a significant change will indicate the need to conduct an assessment monitoring program as specified in LAC:VII.709.E.4.

7.3 REPORTS

Four bound copies of a report summarizing the results from the initial and all subsequent sampling events will be due within 90 days after completing sampling activities. The reports will include the following:

- Chain-of-custody documents
- Potentiometric maps for each zone monitored
- Analytical results
- Isopleths or plots versus time of parameter concentrations, as appropriate
- Statistical evaluations and a statement of whether a statistically significant difference in concentrations over background concentrations is detected
- For the initial report, boring logs showing the screened interval and ground surface elevation

As stated earlier, evidence of statistically significant change requires early notification to LDEQ to be followed by a written report in 14 days stating the parameters of concern. A 90-day report demonstrating the cause of the exceedance is required if reasons other than a release from the facility are believed to have occurred.

8.0
MONITOR WELL MAINTENANCE

A monitor well maintenance program will be implemented at the facility to ensure monitor well integrity. Each monitor well will be reviewed periodically to check for damage or potential problems. A form or checklist similar to that in the exhibit may be used for this purpose. Major improvements affecting well construction will require LDEQ approval.

TABLES

RIVERBIRCH LANDFILL
Table 1
MONITORING WELL DETAILS
(PERMANENT WELLS)

Well No.	Relative Location	Screen Interval		Slot Size (inches)	Casing ID (inches)	Grout Type	Surface Elevation[1] (ft. MSL)	TOC Elevation (ft. MSL)	Nearest Boring	Remarks
		Depth (feet)	Elevation[1] (ft. MSL)							
MW-1	UG	15-25	-16 : -26	0.010	4.0	HSB	-0.6	> +4.0	B-8	Phase I
MW-2	DG	15-25	-15 : -25	0.010	4.0	HSB	+0.2	> +4.0	C-24	Phase I
MW-3	DG	15-25	-14 : -24	0.010	4.0	HSB	+0.6	> +4.0	C-35	Phase I
MW-4[2]	DG	10-20	-10 : -20	0.010	4.0	HSB	+0.2	> +4.0	B-36	Phase I
MW-5	DG	10-20	-11 : -21	0.010	4.0	HSB	-0.6	> +4.0	B-43	Phase I
MW-6	UG	20-30	-21 : -31	0.010	4.0	HSB	-1.0	> +4.0	B-6	Phase I
MW-7	DG	15-25	-15 : -25	0.010	4.0	HSB	0.0	> +4.0	B-44	Phase IA
MW-8	DG	12-22	-13 : -23	0.010	4.0	HSB	-1.2	> +4.0	B-40	Phase III
MW-9[3]	DG	20-30	-21 : -31	0.010	4.0	HSB	-0.8	> +4.0	B-39	Phase IV
MW-10[4]	DG	10-20	-11 : -21	0.010	4.0	HSB	-1.3	> +4.0	B-31	Phase IV
MW-11	UG	10-20	-11 : -21	0.010	4.0	HSB	-1.4	> +4.0	C-5	Phase IV
MW-12	DG	8-18	-10 : -20	0.010	4.0	HSB	-1.5	> +4.0	C-31	Phase V
MW-13	DG	10-20	-11 : -21	0.010	4.0	HSB	-1.2	> +4.0	C-30	Phase V
MW-14	DG	10-20	-11 : -21	0.010	4.0	HSB	-1.2	> +4.0	C-17	Phase V
MW-15	UG	10-20	-11 : -21	0.010	4.0	HSB	-1.3	> +4.0	C-3	Phase V

UG: Upgradient
DG: Downgradient

Note: All dimensions anticipated. Verify in field during installation.
HSB: High-Solids Bentonite

[1]: Elev. Before site development
[2]: If do not encounter silt body during drilling, move towards B-36 until silt is encountered.
[3]: If do not encounter silt body during drilling, move towards C-39 until silt is encountered.
[4]: If do not encounter silt body during drilling, move towards B-31 until silt is encountered.

RIVERBIRCH LANDFILL
Table 1A
MONITORING WELL DETAILS
(TEMPORARY WELLS)

Well No.	Relative Location	Screen Interval		Slot Size (inches)	Casing ID (inches)	Grout Type	Surface Elevation[1] (ft. MSL)	TOC Elevation (ft. MSL)	Nearest Boring	Remarks
		Depth (feet)	Elevation[1] (ft. MSL)							
T-1	DG	10-20	-11 : -21	0.010	4.0	HSB	-0.6	> +4.0	B-37	In : Ph I; Out : Ph II
T-2	DG	15-25	-16 : -26	0.010	4.0	HSB	-0.7	> +4.0	B-26	In : Ph I; Out : Ph II
T-3	DG	15-25	-16 : -26	0.010	4.0	HSB	-0.8	> +4.0	B-11	In : Ph I; Out : Ph II
T-4	DG	10-20	-11 : -21	0.010	4.0	HSB	-0.8	> +4.0	C-37	In : Ph II; Out : Ph III
T-5	DG	10-20	-11 : -21	0.010	4.0	HSB	-1.1	> +4.0	C-26	In : Ph II; Out : Ph III
T-6	DG	15-25	-16 : -26	0.010	4.0	HSB	-1.0	> +4.0	B-12	In : Ph II; Out : Ph III
T-7	DG	15-25	-16 : -26	0.010	4.0	HSB	-1.3	> +4.0	C-32	In : Ph III; Out : Ph IV
T-8	DG	15-25	-16 : -26	0.010	4.0	HSB	-1.0	> +4.0	C-20	In : Ph III; Out : Ph IV
T-9	DG	15-25	-16 : -26	0.010	4.0	HSB	-1.2	> +4.0	B-13	In : Ph III; Out : Ph IV
T-10	DG	15-25	-16 : -26	0.010	4.0	HSB	-1.3	> +4.0	B-29	In : Ph IV; Out : Ph V
T-11	DG	12-22	-12 : -22	0.010	4.0	HSB	-0.4	> +4.0	B-14	In : Ph IV; Out : Ph V

UG: Upgradient
DG: Downgradient
[1]: Elev. before site development

HSB: High-Solids Bentonite
Note: All dimensions anticipated. Verify in field during installation.

TABLE 2

ASSESSMENT MONITORING PARAMETERS[1]

River Birch Landfill
Avondale, Louisiana
Jefferson Parish

Common Name[2]	CAS RN[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL[6] (ug/L)
Acetone	67-64-1	2-Propanone	8260	100
Acrylonitrile	107-13-1	2-Propenenitrile	8260	200
Antimony	(Total)	Antimony	6010	300
Arsenic	(Total)	Arsenic	6010	500
Barium	(Total)	Barium	6010	20
Benzene	71-43-2	Benzene	8260	5
Beryllium	(Total)	Beryllium	6010	3
Bromochloro methane; Chloro-bromomethane	74-97-5	Methane, bromochloro-	8260	5
Bromodichloro methane	75-27-4	Methane, bromodichloro-	8260	5
Bromoform; Tribromomethane	75-25-2	Methane, tribromo-	8260	5
Cadmium	(Total)	Cadmium	6010	40
Carbon disulfide	75-15-0	Carbon disulfide	8260	100
Carbon tetrachloride	56-23-5	Methane, tetrachloro-	8260	10
Chlorobenzene	108-90-7	Benzene, chloro-	8260	5
Chloroethane; Ethyl chloride	75-00-3	Ethane, chloro-	8260	10
Chloroform	67-66-3	Methane, trichloro-	8260	5
Chromium	(Total)	Chromium	6010	70
Cobalt	(Total)	Cobalt	6010	70
Copper	(Total)	Copper	6010	60
Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, diboro-chloro	8260	5
1,2-Dibromo-3-chloropropane; DBCP	96-12-8	Propane, 1,2-dibromo-3-chloro-	8260	25
1,2-Dibromoethane; Ethylene dibromide	106-93-4	Ethane, 1,2-dibromo-	8260	5
o-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro	8260	5
p-Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8260	5
trans-1,4-Dichloro-2-butene	110-57-6	2-Butene, 1,4-dichloro-,(E)-	8260	100
1,1-Dichloroethane	75-34-3	Ethane, 1,1-dichloro-	8260	5
1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,2-dichloro-	8260	5
1,1-Dichloroethylene;Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro	8260	5
cis-1,2-Dichloroethylene; cis-1,2-Dicyhloroethene	156-59-2	Ethene, 1,2-dicholoro-,(Z)	8260	5
trans-1,2-Dichloroethylene	156-60-5	Ethene, 1,2-dichloro-(E)-	8260	5
1,2-Dichloropropane	78-87-5	Propane, 1,2-dichloro-	8260	5
cis-1,3-Dichloropropene	10061-01-5	1-Propene, 1,3-dichloro-,(Z)	8260	10
trans-1,3-Dichloropropene	10061-02-6	1-Propene, 1,3-dichloro-,(E)	8010	5
Ethylbenzene	100-41-4	Benzene, ehthyl-	8260	5
2-Hexanone	591-78-6	2-Hexanone	8260	50

< Denotes concentration below the laboratory detection limit

TABLE 2

ASSESSMENT MONITORING PARAMETERS[1]

River Birch Landfill
Avondale, Louisiana
Jefferson Parish

Common Name[2]	CAS RN[3]	Chemical Abstracts Service Index Name[4]	Suggested Methods[5]	PQL[6] (ug/L)
Lead	(Total)	Lead	6010	10
Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8010	20
Methyl chloride; Chloromethane	74-87-3	Methane, chloro-	8010	1
Methyl ethyl ketone; MEK	78-93-3	2-Butanone	8260	100
Methyl iodide; Iodomethane	74-88-4	Methane, iodo-	8260	10
4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1	2-Pentanone, 4-methyl	8260	100
Methylene bromide; Dibromo-methane	74-95-3	Methane, dibromo-	8260	10
Methylene chloride; Dichloromethane	75-09-2	Methane, dichloro-	8260A	0.30
Nickel	(Total)	Nickel	6010	50
Selenium	(Total)	Selenium	6010	5
Silver	(Total)	Silver	6010	10
Styrene	100-42-5	Benzene, ethenyl-	8260	10
1,1,1,2-Tetrachloroethane	630-20-6	Ethane, 1,1,1,2-tetrachloro-	8260	5
1,1,2,2-Tetrachloroethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8260	5
Tetrachloeroethylene; Perchloroethylene; Tetrachloroethene	127-18-4	Ethene, tetrachloro-	8260	5
Thallium	(Total)	Thallium	7841	1
Toluene	108-88-3	Benzene, methyl-	8260	5
1,1,1-Trichloroethane; Methylchloroform	71-55-6	Ethane, 1,1,1-trichloro-	8260	5
1,1,2-Trichloroethane	79-00-5	Ethane, 1,1,2-trichloro-	8260	5
Trichloroethylene; Trichloroethene	79-01-6	Ethene, trichloro-	8260	5
Trichlorofluoromethane	75-69-4	Methane, trichlorofluoro-	8260	5
1,2,3-Trichloropropane	96-18-4	Propane, 1,2,3-trichloro-	8260	15
Vanadium	(Total)	Vanadium	6010	40
Vinyl acetate	108-05-4	Acetic acid, ethenyl ester	8260	50
Vinyl chloride	75-01-4	Ethene, chloro-	8260A	0.17
Xylene (total)	1330-20-7 See note 7	Benzene, dimethyl-	8260	5
Zinc	(Total)	Zinc	6010	20

< Denotes concentration below the laboratory detection limit

TABLE 2

ASSESSMENT MONITORING PARAMETERS[1]

River Birch Landfill
Avondale, Louisiana
Jefferson Parish

Notes:

[1] The regulatory requirements pertain only to the list of substances; the right-hand columns (Methods and PQL) are given for informational purposes only. See also footnotes 5 and 6.

[2] Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

[3] Chemical Abstracts Service registry number. Where "Total" is entered, all species in the groundwater that contain this element are included.

[4] CAS index numbers are those used in the 9th Collective Index.

[5] Suggested Methods refer to analytical procedure numbers used in EPA Report SW-846 "Test Methods for Evaluating Solid Waste," third edition, November 1986, as revised, December 1987. Analytical details can be found in SW-846 and in documentation on file at the agency.

Caution: The methods listed are representative SW-846 procedures and may not always be the most suitable method(s) for monitoring an analyte under the regulations.

Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in ground waters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. PQLs are based on 5-ml samples for volatile organics and 1-L samples for semivolatile organics.

Caution: The PQL values in many cases are based only on a general estimate for the methods and not on a determination for individual compounds; PQLs are not a part of the regulation.

[7] Toxaphene: This entry includes congener chemicals contained in technical toxaphene (CAS RN 8001-35-20), i.e, chlorinated camphene.

TABLE 3

SAMPLE CONTAINERS PRESERVATIVES AND HOLDING TIMES
RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

Parameters[1]	Container Type	Preservation Method	Holding Time[2]
Volatile Organics	G, 2-40 ml vials with teflon-lined septum	Zero headspace, cool to 4° C	7 days
Metals	G, P, 1-1 liter	HNO_3 to pH < 2	6 months
Semivolatiles/BNAs	G, 1-1 liter amber with teflon-lined septum	Cool to 4° C	Extract in 7 days, analyze in 40 days

NOTES:

[1] See Table 2 for list of specific parameters.
[2] Holding times are from validated time of sample collection.
G Glass
P Polyethylene

Reference: Test Methods for Evaluating Solid Waste - Physical/Chemical Methods: SW-846 3rd Edition.

TABLE 4

ACCURACY AND PRECISION CRITERIA FOR SW-846 ANALYSIS
RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

Parameters	Water Control Limits	
Volatile and Extractable Organic Compounds (VOAs, BNAs)	Laboratory Blank	± P.Q.L.
	Surrogate Spike	(1)
	Initial Calibration (VOAs)	RRF(2) >0.3 <30% RSD(3)
	Continuing Calibration (VOAs)	RRF(2)> 0.3 <25% D(4)
	Initial Calibration (BNAs)	RRF(2) >0.05 <30% RSD(3)
	Continuing Calibration (BNAs)	RRF(2) >0.05 <30% D(4)
	Internal Standard	-50 to +100%
	GC/MS Tuning	(5)
	MS/MSD	(6)
Metals		
AA-Furnace	Calibration Blank	±P.Q.L.
	Initial Calibration Verification	80-120%
	Continuing Calibration Verification	80-120%
	Preparation Blank	±P.Q.L.
ICP	Calibration Blank	±P.Q.L.
	Initial Calibration Verification	90-110%
	Continuing Calibration Verification	90-110%
	Preparation Blank	±P.Q.L.
	Interference Check Sample	80-120%
	Serial Dilution Analysis	90-110%

NOTES:

TABLE 4 (Continued)

ACCURACY AND PRECISION CRITERIA FOR SW-846 ANALYSIS
RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

(1) Surrogate Control Limits are presented in Table 5. These surrogate compounds are recommended. Other compounds may be used as surrogates, depending upon the analysis requirements.

(2) Average Relative Response Factor (RRF) for the System Performance Check Compounds.

(3) Percent Relative Standard Deviation (RSD) for the Calibration Check Compounds.

(4) Percent Difference (%D) for the Calibration Check Compounds.

(5) DFTPP and BFB tuning and calibration as specified in SW-846, 3rd Edition.

(6) MS/MSD criteria as specified in SW-846, 3rd Edition.

AA	=	Atomic Adsorption
P.Q.L.	=	Practical Quantitation Limit
ICP	=	Inductively Coupled Plasma

TABLE 5

SURROGATE CONTROL LIMITS FOR SW-846 ORGANICS ANALYSIS[1]
RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

Fraction	Compound	Water Recovery Limits (%)
Method 8240		
VOA	Toluene-d_8	88-110
VOA	4-Bromofluorobenzene	86-115
VOA	1,2-Dichloroethane-d_4	76-114
Method 8260		
VOA	Toluene-d_8	88-110
VOA	4-Bromofluorobenzene	86-115
VOA	Dibromofluoromethane	86-118
Method 8270		
BNA	Nitrobenzene-d_5	35-114
BNA	2-Fluorobiphenyl	43-116
BNA	p-Terphenyl-d_{14}	33-141
BNA	Phenol-d_6	10-94
BNA	2-Fluorophenol	21-100
BNA	2,4,6-Tribromophenol	10-123

NOTES:

1 Spike levels will be in accordance with SW-846, 3rd Edition or Equivalent. These surrogate compounds are recommended. Other compounds may be used as surrogates, depending upon the analysis requirements.

TABLE 6

QC LEVEL OF EFFORT FOR SW-846 ANALYSIS
RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

Laboratory QA/QC Parameters		Frequency
Organics	Initial Calibration	Initially before first samples are analyzed and when the continuing calibration significantly fail the criteria
	Continuing Calibration	Per instrument for each 12 hour shift
	Laboratory Blank	One per instrument for each 12 hour shift samples are analyzed (VOAs)
		One per batch of 20 are fewer samples or each time samples are extracted or new reagents are employed.(BNAs)
	Surrogate Spike	Each sample
	MS/MSD	Initial sampling and periodically as deemed necessary
Metals (ICP and AA)	Calibration Blank	Each calibration, beginning and end of each analytical run sequence
	Initial Calibration (ICP and AA)	Daily and each instrument setup verification
	Continuing Calibration (ICP and AA)	Begining and end of each analytical run sequence and at a and 10% frequency
	Preparation Blank (ICP and AA)	One per batch of 20 or fewer samples each time samples are digested or new reagents are employed
Field Blank/Trip Blank[1]		One per sampling event
Field Duplicate		One per sampling event
MS/MSD[2]		Initial sampling event and periodically as deemed necessary

NOTES:

1 Trip blank to be analyzed if volatiles are detected in the field blank.
2 Extra sample volume required for this laboratory QA/QC sample.

EXHIBITS

Woodward-Clyde

GROUNDWATER COLLECTION REPORT

PROJECT NUMBER AND NAME _____ LOCATION _____
COLLECTOR/OPERATOR _____ WELL NO. _____
TYPE OF SAMPLE _____ ( ) GRAB ( ) COMPOSITE ( ) OTHER _____
METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

EVACUATION: DATE/TIME _____ METHOD OF EVACUATION _____
INITIAL DEPTH TO WATER _____ TOP OF CASING TO BOTTOM _____
GALLONS PER WELL VOLUME _____ TOTAL VOLUME EVACUATED _____
FINAL DEPTH TO WATER _____ TOP OF CASING ELEVATION _____
SAMPLING: DATE/TIME _____ METHOD OF SAMPLING _____
DEPTH TO WATER _____

CALIBRATION INFORMATION

	pH	CONDUCTIVITY
DATE/TIME	_____	_____
TEMPERATURE	_____	_____
STANDARDS	_____	_____
READINGS	_____	_____

ATTACH ADDITIONAL PAGES AS NECESSARY

SAMPLE DATA

FIELD REPLICATE #1 TEMP. _____ pH _____ CONDUCTIVITY _____
FIELD REPLICATE #2 TEMP. _____ pH _____ CONDUCTIVITY _____
FIELD REPLICATE #3 TEMP. _____ pH _____ CONDUCTIVITY _____
FIELD REPLICATE #4 TEMP. _____ pH _____ CONDUCTIVITY _____

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING _____
SAMPLING CHARACTERISTICS _____
CONTAINERS AND PRESERVATIVES _____
_____
RECOMMENDATIONS/OBSERVATIONS _____
_____
_____
_____
SAMPLE ID NUMBERS _____

SAMPLING PERSONNEL

_____ TIME: _____ TO _____
(PRINT NAME AND COMPANY)

_____ DATE: _____
(SIGNED)

Woodward-Clyde Consultants

CHAIN - OF - CUSTODY RECORD

SAMPLE NO.	DATE MM/DD/YR	TIME	SAMPLE TYPE		STATION LOCATION	TOTAL NO. CONTAINERS					
			COMP.	GRAB							

SAMPLE COLLECTION:

PROJECT NO. AND NAME _____

LOCATION OF SAMPLE: _____

COLLECTOR'S NAME _____ TELEPHONE: ( ) _____

COMPANY NAME: _____

ADDRESS: _____

WITNESS: _____ COMPANY NAME: _____

FIELD INFORMATION:

TYPES OF SAMPLES: LIQUID GAS SLUDGE SOIL OTHER(SPECIFY) _____

FIELD NOTES: _____

TRANSPORTER: _____ AIRBILL/INVOICE: _____ DESTINATION: _____

SAMPLE TRANSFER (Original must be retained with sample at all times)

		RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1	NAME:				
	COMPANY:				
2	NAME:				
	COMPANY:				
3	NAME:				
	COMPANY:				

TERMINATION OF CHAIN-OF-CUSTODY:

AUTHORIZED BY: _____ DATE: _____ TIME: _____

COMPANY NAME: _____

SAMPLE DISPOSTION: STORAGE _____ DISPOSAL _____ OTHER _____

MONITOR WELL MAINTENANCE CHECKLIST

Inspector:_____ Well Number:_____

Date of Inspection:_____ Location:_____

REQUIREMENT	OKAY?	COMMENTS
Well must be accessible and well maintained	_____	_____
Area around well should be dry	_____	_____
Well should be correctly located on map	_____	_____
Cap should not be missing, damaged or loose	_____	_____
Well riser should have a vent hole below cap	_____	_____
Chemicals or pesticides should not be used around well	_____	_____
Wellhead should not be tilted, damaged or loose	_____	_____
Concrete pad must be intact and sloped away from well	_____	_____
No gaps or erosion should be present between concrete pad and ground	_____	_____
Four guardposts should be present outside of concrete slab, firmly set and painted	_____	_____
Protective casing should be intact, including:		
____ functioning locks	_____	_____
____ functioning casing cover	_____	_____
____ no standing water or material in casing	_____	_____
____ grout level inside casing at or above pad level	_____	_____
____ unblocked drainhole at grout level	_____	_____
____ painted and not rusting	_____	_____
Well should be constructed as per permit	_____	_____
Sign/plate must be affixed showing well ID, up-gradient/downgradient, TOC and screen depth elevations (MSL), dates of installation/repair(s)	_____	_____

Additional Comments:_____

_____

_____

Recommendations:_____

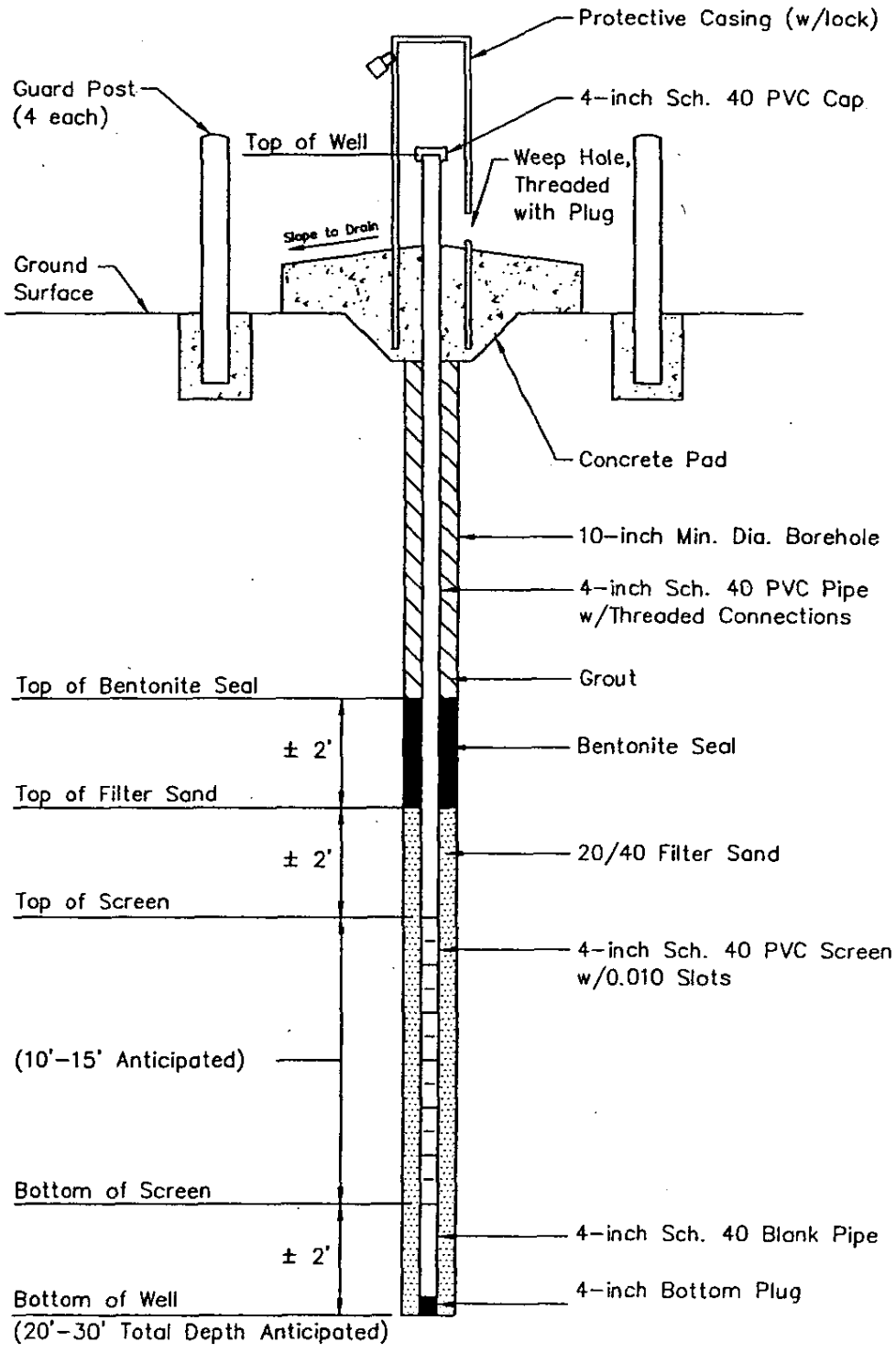
_____

_____

ATTACHMENT 1

PROPOSED WELL CONSTRUCTION DIAGRAM & MONITORING WELL PLAN

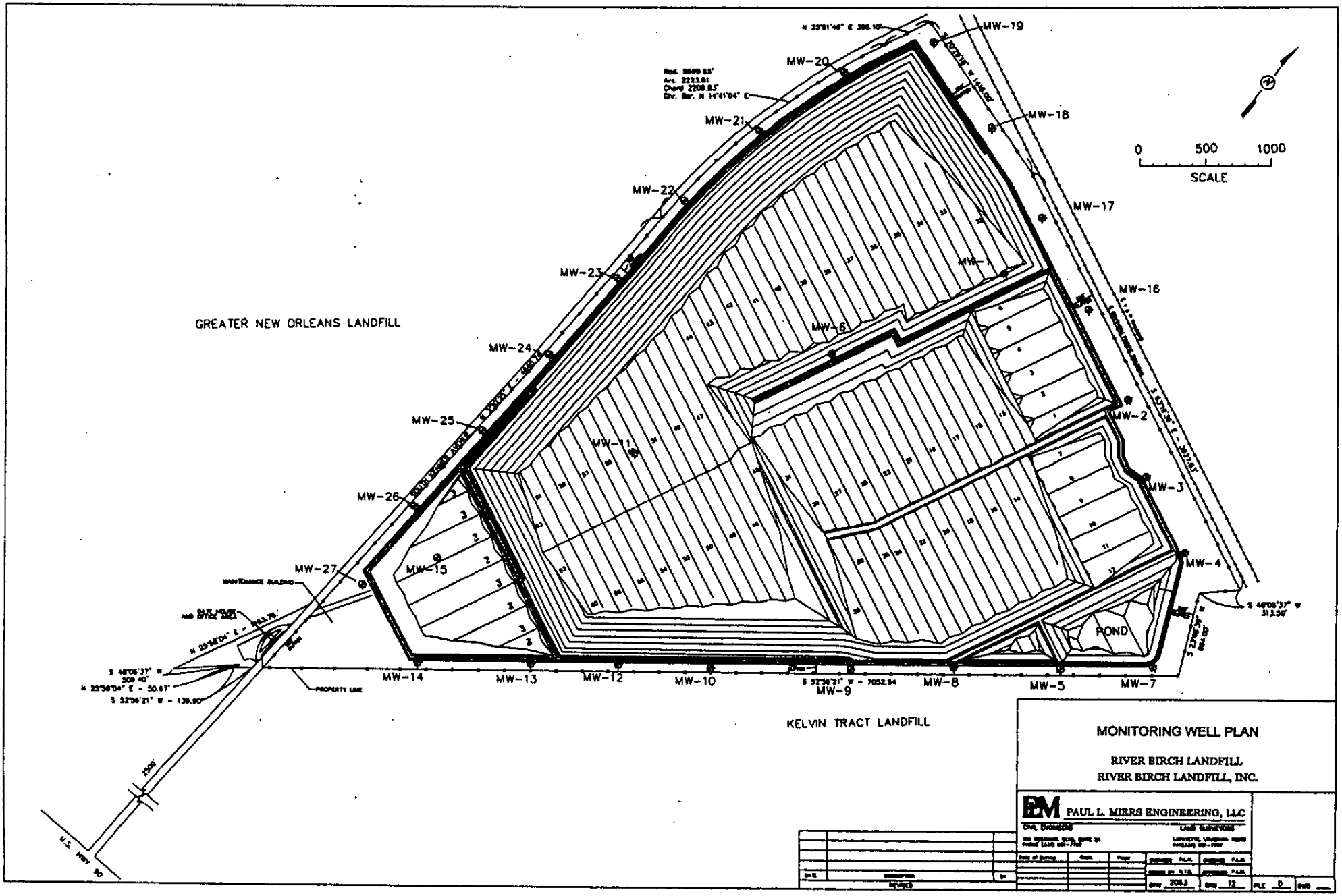
AWN BY	SWC 9-18-01
CHECKED BY	
APPROVED BY	
FILE NAME:	9/19/03



PROPOSED WELL CONSTRUCTION DIAGRAM (NTS)

West Expansion Area
River Birch Landfill
Jefferson Parish, Louisiana

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 Delplaza Dr., Ste. B
Baton Rouge, LA. 70815
(225) 926-2025



MONITORING WELL PLAN

RIVER BIRCH LANDFILL
RIVER BIRCH LANDFILL, INC.

PAUL L. MIERS ENGINEERING, LLC
CIVIL ENGINEERS
LAND SURVEYORS

ATTACHMENT 2

GROUNDWATER STATISTICAL EVALUATION PLAN

FINAL

GROUNDWATER STATISTICAL EVALUATION PLAN

RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

Prepared for
Gulf Engineers and Consultants
Baton Rouge, Louisiana

May 1994

WCC File 93B248C

Woodward-Clyde

Woodward-Clyde Consultants
2822 O'Neal Lane (70816)
P.O. Box 66317 (70896)
Baton Rouge, Louisiana

TABLE OF CONTENTS

Section			Page
1.0	INTRODUCTION		1
2.0	STATISTICAL METHOD REQUIREMENTS		1
3.0	STATISTICAL METHOD APPROACH		3
	3.1	General Procedures	4
	3.2	Specific Requirements	5
4.0	REPORTING		6

RIVER BIRCH LANDFILL
GROUNDWATER STATISTICAL EVALUATION PLAN

1.0 INTRODUCTION

This groundwater statistical evaluation plan (GSEP) has been prepared for use on groundwater data that will be collected at the River Birch Landfill in Jefferson Parish, Louisiana. The GSEP is based on the assumption that the facility will be in a detection monitoring program in which background data from upgradient wells is compared to downgradient or compliance point wells to determine whether there is statistical evidence of a significant release from the regulated unit. Alternate methods may be more appropriate for compliance monitoring or corrective actions which may become necessary in the future.

The GSEP specifies the rationale for selection of the most appropriate statistical method which is both technically sound and protective of human health and the environment. Since normality, seasonality and numbers of background samples are unknown at the time of this writing, the GSEP allows for flexibility in modifying the statistical methods to fit actual site conditions. This flexibility is recognized by EPA and industry as being necessary to meet the objectives of the program and to avoid cumbersome and unnecessary permit modifications in the future.

2.0 STATISTICAL METHOD REQUIREMENTS

The groundwater statistical evaluation plan has been developed in accordance with LAC 33.VII.709.E.2 and 3 for Types I and II municipal solid waste landfill. In addition, EPA's "Guidance Document on the Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities" and the June, 1992 "Addendum to Interim Final Guidance" are referenced for selection of an appropriate statistical method.

The facility must initially begin a detection monitoring program which consists of quarterly monitoring and analysis for the constituents listed in Table 1 of the

Groundwater Sampling and Analysis Plan. This list consists of 15 naturally occurring metals and 47 organic chemicals.

During the first year of the detection monitoring period, the LASWRR requires that a minimum of four independent samples from each well (upgradient and downgradient) must be collected and analyzed during the first sampling event. Thereafter, at least one sample from each well must be collected and analyzed for each sampling event. EPA guidance documents and literature clearly specify that "independent samples" be collected from more than a single point in time in order to establish background ranges that are representative of spatial, temporal and seasonal changes. A more representative range will reduce false positive statistical occurrences, thereby reducing unnecessary reporting and retesting.

The regulations allow for selection of one of the following statistical methods to establish groundwater quality as long as a sufficient number of samples are used to make the method valid:

- A parametric ANOVA followed by multiple comparisons procedures to identify statistically significant evidence of contamination
- An ANOVA based on ranks followed by multiple comparisons procedures to identify statistically significant evidence of contamination
- A tolerance or prediction interval procedure where concentrations in compliance wells are compared to an upper tolerance or prediction limit
- A control chart approach with control limits for each parameter or constituent
- Another statistical test method as approved by the administrative authority

The regulations also provide certain performance standards which any selected statistical method must meet. These performance standards can be summarized by the following:

- The method must be appropriate for the actual distribution of the data. If the distribution is inappropriate for a normal theory test, the data must be transformed or a distribution-free theory test must be used.

- For each testing period, Type I error levels must be no more than 0.01 for individual well comparisons and no more than 0.05 for multiple comparison procedures. This does not apply to tolerance intervals, /prediction intervals or control charts.

- Control charts, tolerance intervals and prediction interval approaches must be protective of human health and the environment with parameters selected after consideration of number of background samples, data distribution and concentration ranges.

- The selected statistical method must account for values below the limit of detection using one or more statistical procedure

- The statistical procedure must control or correct for seasonal or spatial variability as well as temporal correlation

- The selected statistical method must enable determination of whether or not there is a statistically significant increase over background values.

3.0 STATISTICAL METHOD APPROACH

In the absence of historical groundwater data, the basic assumptions for statistical models are unknown. Selection of a particular method for statistical evaluation without any historical data (which is the case at the time of this permit application) is therefore difficult at best and may present the permittee and regulators with invalid procedures in the future. A preferable approach is to specify the logic and conditions to guide the

permittee toward selection of the most appropriate agency-approved statistical method for the specific site.

The approach for selecting the most appropriate agency-approved statistical evaluation method for the subject facility will be to apply the logic and criteria outlined in the most recent EPA guidance documents for groundwater monitoring at RCRA facilities. This logic is illustrated in the flowchart in Figure 1. The logic flowchart is based on a detection monitoring scenario where background wells are compared to single observations from compliance point wells. Absent from the flowchart are ANOVA methods which are suitable for multiple comparisons (i.e. replicates from conventional parameters) and compare background to the means of a group of compliance wells. The flowchart will be used in conjunction with the requirements stated in the Louisiana Solid Waste Rules and Regulations in selecting the most appropriate statistical method for the facility.

3.1 General Procedures

The flowchart contains several key decision points which determine the most appropriate statistical method. The general procedure will consist of the following steps:

- Collect one year of background data from all wells. Ideally, this should consist of a minimum of 8 samples from upgradient wells, however, 12 samples are needed for normality tests. To achieve this, 4 independent samples should be collected from each well. Quarterly sampling is recommended, given groundwater velocities in the region.

- Begin statistical evaluations after one year of sampling by sampling all wells on a semiannual basis.

- Semiannually review results and if no detects for a given parameter (e.g. organics), no analysis is required.

- Determine if extreme values are outliers using appropriate tests.

- Parameters with a nondetect rate above 50 percent should be statistically analyzed using proportional nonparametric tests such as Poisson's distribution or nonparametric prediction intervals. Parameters can be reduced or combined to run the tests to avoid high false positive rates and reduce unnecessary numbers of runs. It is anticipated that the organics will be analyzed using this procedure.

- Parameters with a nondetect rate above 15 percent should be statistically evaluated with a nonparametric test. Prediction intervals or Tolerance intervals are appropriate with the latter recommended.

- Parameters with a nondetect rate below 15 percent should be handled by first adjusting the nondetects by using the "half-rule". The data should next be checked for normality, using the log function. If normally distributed, either of the parametric interval methods or the control charts are appropriate. The parametric tolerance interval is recommended. It is anticipated that the detected metals will fall into this category. If the data is not normally distributed, seasonality or other variabilities are involved and a statistician should be consulted.

- The upgradient wells should be compared to each other using one of the above methods and then pooled to calculate the parameter limits.

- The pooled background limits should then be compared to each downgradient well to determine whether there is statistical evidence of a significant release. Any explanations as to the reason should be explored, including seasonality, errors, etc.

3.2 Specific Requirements

The detection monitoring parameters from Appendix E, Table 1 include naturally occurring metals and organics. The results from these two parameter groups are anticipated to be differentiated by detects for the metals fraction and nondetects for the

organics fraction. The most appropriate approach for this scenario is to apply different statistical tests for the metals and the organics.

As detailed previously, certain requirements must be met for the selected statistical method. The following will apply to the chosen method.

- Normality tests will require a minimum of 12 background samples. Interval tests will require a minimum of 8 background samples. The wells used for background will not be contaminated wells.

- Nondetects will be adjusted by using half of the MDL if not believed to be present or if detected below the PQL, using half of the sum of the MDL plus the PQL.

- The confidence level for a parametric tolerance or parametric interval test will be 99 percent with a tolerance interval coverage of 95 percent. (Nonparametric interval methods would require more samples to reach these confidence and coverage levels).

- Corrections for seasonality will be made as necessary.

- The upper limits for the interval or control chart methods will be protective of human health and the environment

4.0 REPORTING

The results of the statistical evaluation will be included in the semianmual reports. A statement of whether or not there is a statistically significant increase of parameter concentrations over background will be included in the report.

Evidence of a statistically significant increase over background of any parameter or constituent requires notification in accordance with the Notification Regulations and Procedures for Unauthorized Discharge (LAC 33:I. Subpart 2). A written report is due within 14 days stating the parameters or constituents that showed the increase. Within

90 days, a report is due to LDEQ documenting the reason for the increase. Possible reasons for a false indication of a statistically significant increase could include errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. If the increase is indicative of an actual release, an assessment monitoring program must be initiated in accordance with LAC 33:VII.709.E(4).

FIGURE

Figure 1. Statistical Method Decision Flowchart. Background Wells to Compliance Well Comparisons

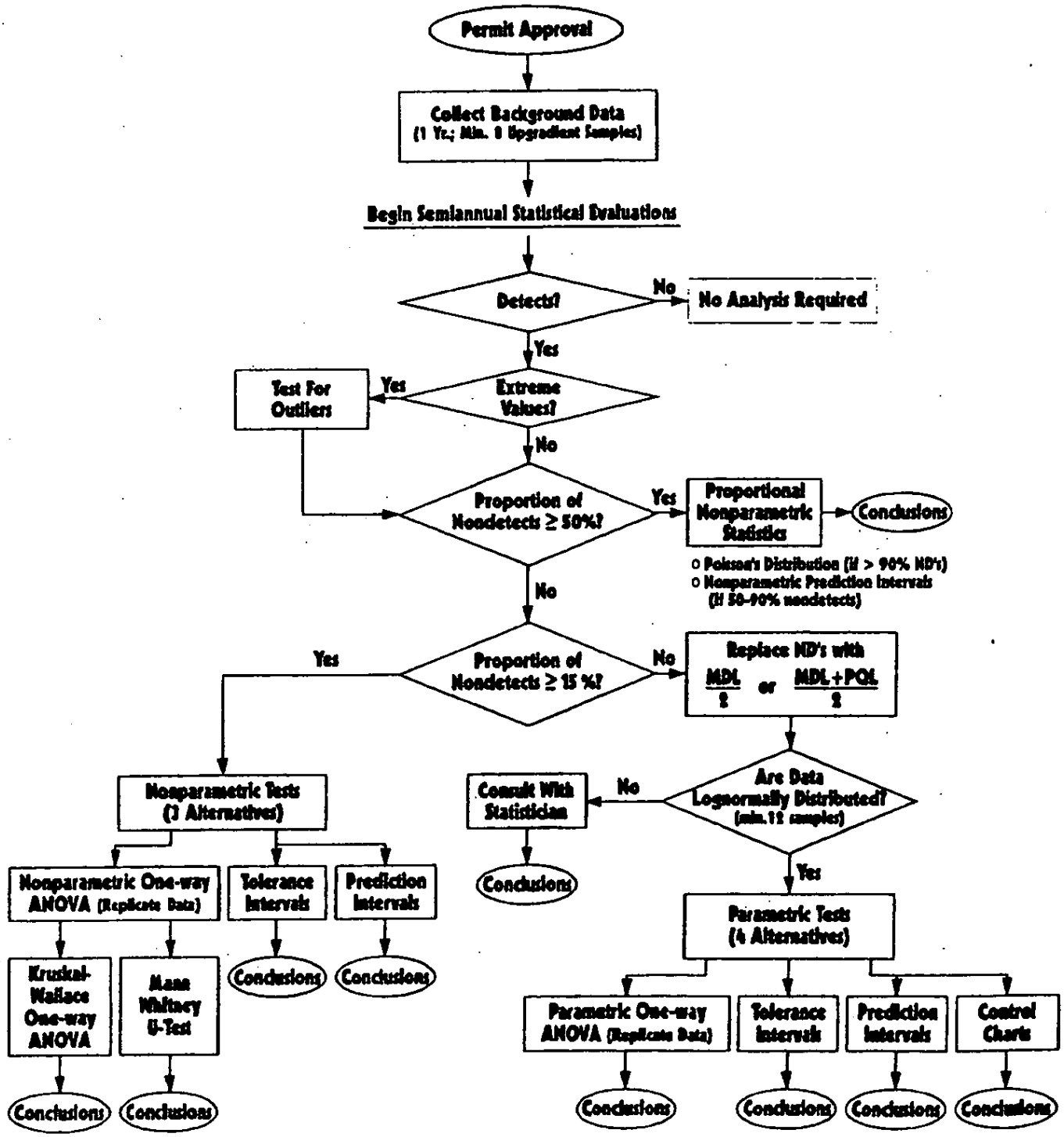


FIGURE 1

ATTACHMENT 3

MONITOR WELL INSTALLATION PLAN

FINAL

MONITOR WELL INSTALLATION PLAN

RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

Prepared for
Gulf Engineers and Consultants
Baton Rouge, Louisiana

May 1994

WCC File 93B248C

Woodward-Clyde

Woodward-Clyde Consultants
2822 O'Neal Lane (70816)
P.O. Box 66317 (70896)
Baton Rouge, Louisiana

RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA
MONITOR WELL INSTALLATION PLAN

All wells installed at the site shall be in accordance with the "Water Wells Rules, Regulations, and Standards, State of Louisiana" (LAC 70:XIII) as adopted by the Louisiana Department of Transportation and Development, Water Resources Section. Approval from the Louisiana Department of Environmental Quality, Solid Waste Division will be obtained prior to construction of the monitoring wells.

EQUIPMENT

Drill Rig

The well installation specified in this work plan will be accomplished using hollow stem, solid stem auger or hydraulic rotary drill rigs.

Only teflon tape or vegetable based lubricants will be used on the threads of downhole drilling equipment. Additives containing lead or copper will not be used. Any hydraulic or other fluids used in the drilling rig, pumps, or other field equipment/vehicles will not contain polychlorinated biphenyls (PCBs).

If antifreeze is added to a pump, hose, etc., in an area in contact with drilling fluids, this antifreeze will be completely purged prior to the equipment's use in drilling, mud mixing, or any other part of the overall drilling operation. Only antifreeze without rust inhibitors and/or sealants will be used.

Drilling equipment that has a visible loss of grease, hydraulic fluids, oils, fuels and/or transmission oil to drilling fluids or the borehole will not be allowed for soil boring activities until the problem is corrected.

Recirculation Tanks

Hydraulic rotary drilling operations will be conducted with portable recirculation tanks/pans for the "mud pit" and for mixing grout. Dug pits or sumps will not be used.

BORING METHODS

The borings will be drilled using solid stem, hollow stem, or hydraulic rotary methods. Borings will be advanced by dry auger methods until free water is encountered. Drilling operations will be stopped for 10 to 15 minutes and the water level will be allowed to rise. The initial water and the water level after 10 to 15 minutes will be noted and recorded.

The boring will be continuously sampled in 2-foot intervals to the total depth. Samples will be obtained by hydraulically pushing a thin walled Shelby tube or driving a split spoon sampler as conditions warrant at each 2-foot interval. All borings will be sampled and described by a geologist/engineer.

Soil boring logs will be recorded in the field. Borings and samples will be numbered in a systematic order. A typed copy will be prepared, later to be checked to verify that it accurately reproduces the field log.

Soil classifications will be in accordance with the Unified Soil Classification System. Soil classifications will be prepared in the field at the time of sampling by a geologist/engineer and are subject to change based upon laboratory test and/or subsequent review.

The field geologist/engineer will describe and classify each stratum. The locations of strata changes will be clearly defined on the logs at the appropriate depth. Depths will be recorded to the nearest tenth of a foot. When depths are estimated, the estimated range will be noted. The secondary features or changes within each stratum will also be recorded at the appropriate depth on the boring log where the change occurs. Strata descriptions will include the following parameters:

Parameter	Example
Classification	Sandy Clay
Unified Soil Classification	CL
Secondary Sedimentary Structures, Inclusions, Staining	Iron staining, calcareous nodules, oyster shells, laminated.
Consistency (cohesive soil)	Stiff
Density (noncohesive soil)	Loose
Moisture Content. Use relative term. Do not express as a percentage unless a value has been measured.	Dry, moist, wet, etc.

Other information to be placed on the soil boring logs, as appropriate, include:

- The drilling method used will be generally described either on each log or in a general legend.
- Each log will record the drilling sequence.
- Any special problems and their resolution will be recorded on the log (e.g., hole caving, recurring problems at a particular depth, sudden tool drops, excessive grout fill, drilling fluid losses, unrecovered tools in hole, lost casing, etc.).
- The dates for the start and completion of borings will be recorded on the log along with notation by depth for drill crew shifts and days of work.
- The depth of first encountered free water will be indicated. The depth of water after allowing the level to partially stabilize (10 to 15 minutes) will also be recorded along with the time between readings.
- Drilling Contractor

- Driller

- The estimated depth interval for each soil sample taken, classified, and/or retained will be noted on the log. For each driven (split spoon), and pushed (Shelby-tube) sample, the length of sample recovery and the sampler type and size (diameter and length) will be recorded.

- The blow counts, hammer weight, and length of hammer fall for driven samplers will be recorded in the log. The log will indicate whether the sampler was pushed or driven. Blow counts will be recorded in half foot increments when standard (1 3/8-inch ID by 2-inch OD) samplers are driven. For penetration of less than a half foot, it will be annotated in the log along with the blow count and the distance over which the count was taken.

- Special abbreviations used on a soil boring log and/or well diagram will be defined either in the log/diagram where used, or in a general legend.

WELL INSTALLATION

The monitor wells will be installed and developed as described below.

An 8-inch or 10-inch borehole will be advanced to the bottom of the zone to be screened with continuous sampling and visual classification as noted in the previous sections. The borehole will not be advanced more than 4 feet beyond the proposed screened interval of the well. Clean water will be used to flush the borehole to remove as much drill wash water, mud, and debris as possible. Once adequately clean water returns are obtained, a 2- or 4-inch diameter schedule 40 PVC plastic riser pipe and a screen with a .01 inch slot size and a length no greater than 10 feet and equipped with flush threaded joints will be assembled and placed in the reamed borehole. PVC solvent glues will not be used in the well construction. With the well screen fixed at the desired depth, 20-40 filter sand will be placed in the annulus below, around and at least 2 feet above the screen unless conditions warrant otherwise. A layer of bentonite pellets of a minimum thickness of 2 feet will then be placed in the annulus on top of

the sand pack to act as a seal in order to prevent the migration of cement/bentonite grout into the screened zone.

Grouting

After the bentonite is allowed to swell (approximately 4 to 8 hours), a cement/bentonite grout will be placed in the annulus above the bentonite pellets. The grout will be mixed at an approximate ratio of 8 gallons of potable water per 94 pound sack of Type I Portland cement with about 4 percent bentonite gel. The grout will be mixed by recirculating through the pump into a clean, above ground rigid container with an appropriate quantity of water. Manual mixing will not be done. Mixing activities will continue until a smooth lump free consistency is achieved with a uniform blend of the three components.

The grout will be pumped through rigid tremie pipe placed approximately six inches above the base of the zone to be grouted and slowly withdrawn during grouting operations.

The length of the well pipe and screen, depth to sand, depth to bentonite pellets and depth to grout will be measured with a weighted tape and recorded on well construction logs. Type of materials used will be recorded on construction logs.

After the grout has set for 24 hours, the annulus will be checked to be sure the well is grouted to the surface. Additional grout will be added as needed.

All cuttings from each borehole will be containerized for proper disposal.

SURFACE FEATURES

The well will extend at least 3 feet above ground surface. A permanent mark will be cut (a small V notch) into the top outside edge of the well for survey and water level measuring purposes. A vent hole will be drilled in the riser pipe immediately below the well riser cap. A protective casing with a lockable cap will be placed over each well. There will be sufficient clearance between the cover and the top of the well as to not

obstruct opening the casing cover. A weep hole will be placed in the side of the protective cover at the base (above the concrete pad level). A sign or plate will be fixed to the protective well casing which will have the following information:

- Well identification number
- Identification of well as upgradient or downgradient
- Elevation of top of well casing in relation to mean sea level
- Screen depth in relation to mean sea level
- Well depth
- Date installed and any subsequent repairs
- Well construction contractor's name

The exterior protective casing and cover will be painted with a weather-resistant orange or yellow paint. The well designation will be placed on the outside of the protective casing using a paint of a contrasting color.

A pad will be placed around each well with a minimum distance of 2.5 feet from the well to the corner of the pad. The pad will be concrete and have a minimum thickness of four inches. Guard posts, anchored outside the well slab but not in contact with the slab and at least 3 feet in height and extending at least 1.5 feet into the ground, will be set around each well, except where field conditions make it impractical and or unnecessary.

WELL DEVELOPMENT

After sufficient time has been allowed for the grout to properly set, the wells will be developed. Development will be accomplished by a combined surge/air lift technique. The air source will be an air compressor equipped with an oil filter, oil trap and an activated carbon filter. No water or additives will be added to the well during development. The development procedure will consist of an initial purging for sediment removal using intermittent cycling at two-minute intervals until all sediment and other fine-grained material is removed. The well will then be purged for a minimum of four hours or until the water discharge is reasonably clean. Purge water will be containerized for proper disposal.

WELL REGISTRATION AND REPORTING

Following completion, these wells will be registered with the Louisiana Department of Transportation and Development in accordance with the State of Louisiana Water Well Rules, Regulations and Standards, dated November 1, 1985.

As required by the Solid Waste Permit Rules and Regulations, within 90 days after construction of the wells, River Birch will submit well completion details verifying that the wells were constructed according to the approved specifications and to document construction procedures. The well completion details will include:

- Daily field notes documenting construction procedures and unusual occurrences, if any.
- Boring log for each well including surface elevations with respect to mean sea level or comparable reference points.
- As-built diagrams for each well showing all pertinent features such as elevation of reference point for measuring groundwater levels, screen interval, and ground surface. A permit modification request will be submitted if features change from the approved plans.

ATTACHMENT 4

MONITOR WELL PLUG AND ABANDONMENT PLAN

FINAL

MONITOR WELL
PLUG AND ABANDONMENT PLAN

RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

Prepared for
Gulf Engineers and Consultants
Baton Rouge, Louisiana

May 1994

WCC File 93B248C

Woodward-Clyde

Woodward-Clyde Consultants
2822 O'Neal Lane (70816)
P.O. Box 66317 (70896)
Baton Rouge, Louisiana

RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA
PLUG AND ABANDONMENT PLAN

The plug and abandonment (P/A) of the wells at the River Birch Landfill will be accomplished in accordance with the Louisiana "Water Wells Rules and Regulations" (LAC 70:XIII), as adopted by the Louisiana Department of Transportation and Development (LDOTD), Water Resources Section and the guidelines as set forth in the Louisiana Department of Environmental Quality Solid Waste Regulations (LAC 33:VII:709.E.1(e) as revised February 20, 1993. The P/A will be accomplished in the following manner:

- The concrete pad and protective posts will be broken up and dismantled.

- The protective casing will be removed.

- An attempt will be made to pull the well casing intact, including the surface and subsurface PVC pipe, grout seal, filter pack, well screen and native soil in immediate contact with the grout and subsequent installation of cemet-bentonite grout. If the well casing is successfully pulled, the remaining borehole will be backfilled with a cement-bentonite grout mixture. The borehole will be backfilled from the bottom of the borehole by pumping the grout through a rigid tremie pipe. The grout mixture will be pumped into the borehole until grout overflows the hole onto the ground surface. The grout mixture will consist of one sack of Type I Portland cement or equivalent, 5 percent bentonite by dry weight (approximately 4.7 pound) and approximately 8.5 gallons of potable water mixed in a homogeneous, lump-free mixture. The bentonite will consist of 100 percent pure sodium bentonite with no additives and will be added after the cement and water are completely mixed. Mud balance readings will be taken with each grout mix.

- If pulling the well casing and screen is not possible or successful, the well or remainder of the well will be drilled out to a slightly larger diameter with the appropriate sized drill bit to the bottom of the well to flush out remaining casing and screen. The resulting annular space will be grouted with cement-bentonite slurry grout mixture using the tremie pipe method from the bottom of the hole to ground surface as described above.

- If all or part of the well casing cannot be plugged and abandoned by pulling or overdrilling as described above, the well will be plugged and abandoned by tremying a cement-bentonite grout inside the well's casing from the bottom of the well to the ground surface. In the event, the following will be submitted:

    - supporting documentation prior to plugging the well that demonstrates that removal of all or part of the well's casing and other components of the well would be detrimental to the environment, and /or

    - certification and supporting documentation by a qualified professional that shows that removal of the well's casing was attempted and that continued attempts to remove all or a part of the well's casing and other components of the well would be detrimental to the environment.

- The grout backfill will be allowed to set for a minimum of 24 hours. After setting a minimum of 24 hours, the backfill will be inspected, and additional grout will be added as necessary to bring firm grout to within one foot of the ground surface. The remaining space below ground surface will be backfilled to the ground surface with clean compacted clay.

- All surface features will be disposed of in an environmentally sound manner.

When the well P/As are completed, River Birch will complete the required P/A forms will be submitted to the LDOTD and a letter with documentation to the LDEQ-Solid Waste Division advising that P/A was completed in accordance with the approved P/A plan. River Birch will also maintain records of the P/A.

APPENDIX C

ENGINEERING CALCULATIONS

ENGINEERING CALCULATIONS
FROM
ORIGINAL PERMIT

APPENDIX C

CALCULATION PACKAGE

CONSTRUCTION SEQUENCE DESIGN

Subject:CONSTRUCTION SEQUENCE FOR BERM AND LANDFILL P.Name:RiverBirch
By : S. Togan ALPER S.T.A. Date: March 21, 1995 P.Number:95B034-7
Checked By: MB Date: 3/30/95 Q.A. 09/02/95 CS-1/2

SCOPE:

To determine the construction sequence of the perimeter berm, leachate collection and pressure relief sumps and the landfill excavation .

REFERENCES:

. Settlement Calculation Package
. Slope Stability Package
. Buffer Zone Cross Section Design Package

DISCUSSION

. Due to the low shear strength soils underlying the Cell 1 area the following design sequence has been developed in order to prevent a slope failure into the open excavation during the construction of the liner systems and also during the early years of the landfill, while the cells are mostly empty.

CONSTRUCTION SEQUENCE (Attached Figure)

1. The 4 ft.deep keyway of the perimeter berm will be compacted

2.The sump locations will be excavated to the required depths, the sumps will be constructed.

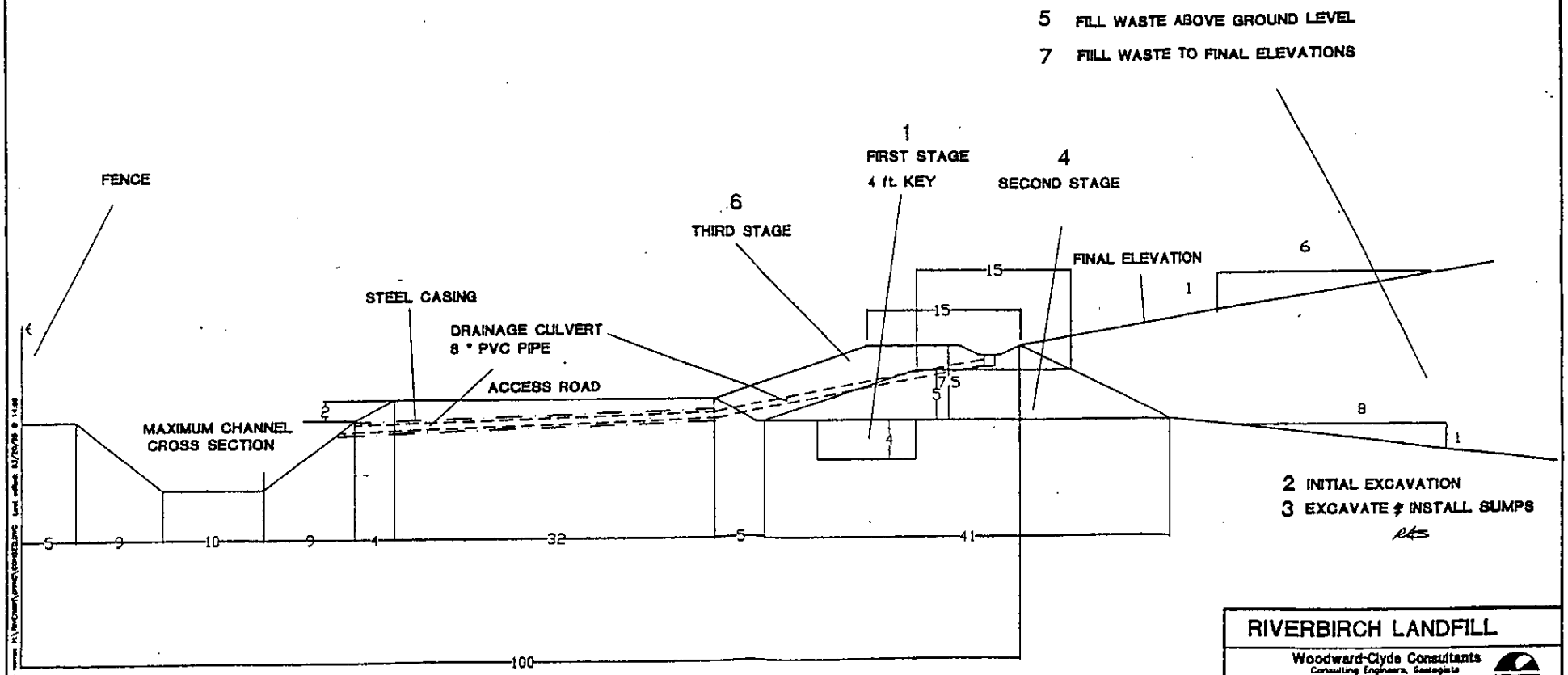
3.a.. The rest of cell 1 area will be excavated
3.b. During the excavation of the cell 1 area a perimeter will be constructed to Elevation 5-feet above existing grade.

4. The liner and drainage systems will be installed

5. The height of the perimeter berm will be increased to EL. 7.5-feet after the waste has been placed to El. 0-feet.

The berm will be constructed as follows:

Crest width = 15-feet ✓
Side slopes = 3(H): 1(V) ✓
Keyway = 4-feet deep and 10 feet wide ✓
Strength of berm = cohesion must exceed 900 psf, unit weight = 110 pcf. ✓



RIVERBIRCH LANDFILL

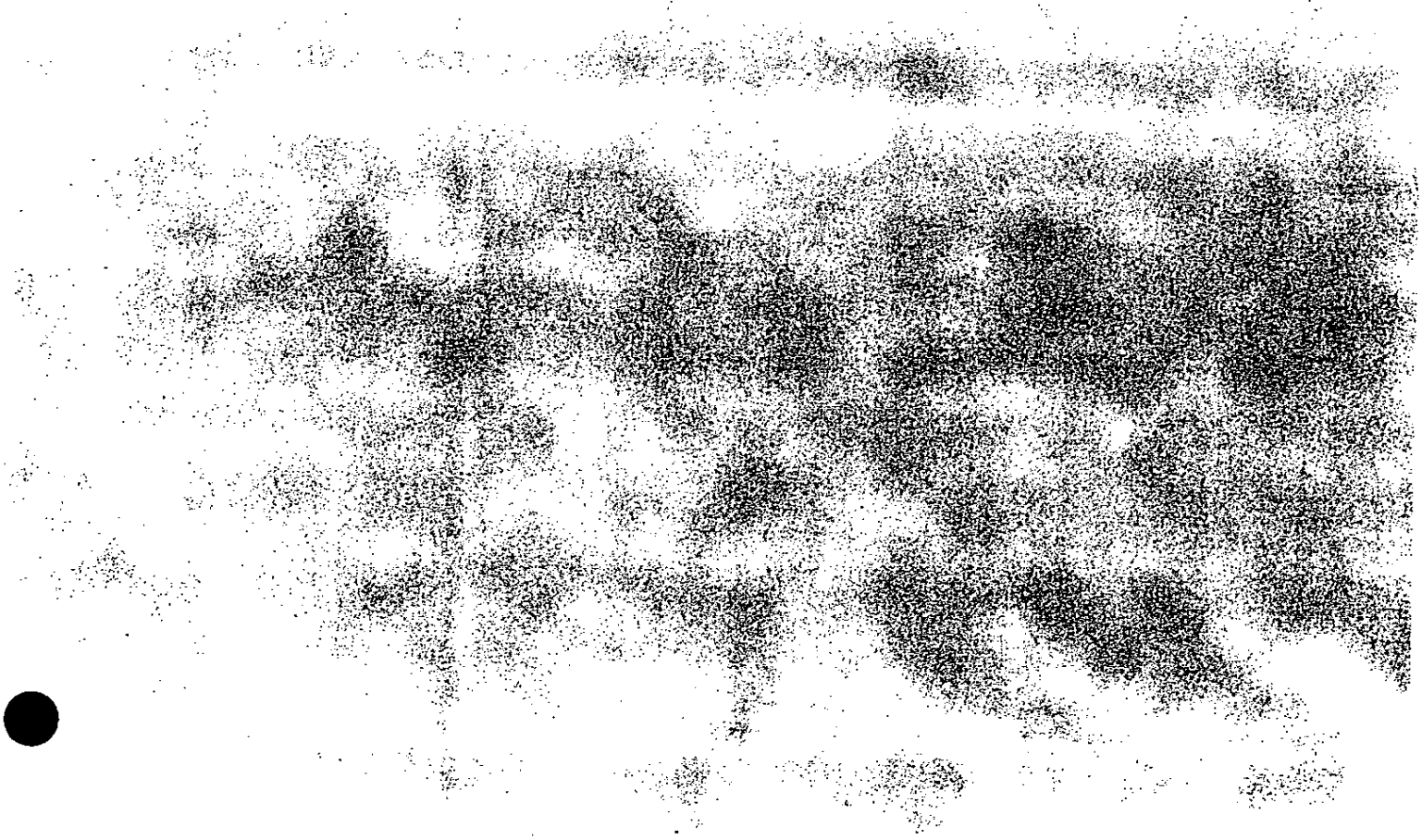
Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVERBIRCH, INC.
GRETNA, LOUISIANA

SCALE: 1"=10' | MADE BY: T. ALPER | DATE: | CHECKED BY: | DATE: | FILE NO.

CONSTRUCTION SEQUENCE | FIGURE

WASTE CHARACTERIZATION



Subject: WASTE CHARACTERIZATION
By : S. Togan ALPER Date: March 21, 1995
Checked By: R A Hall Date: March 29, 1995

P.Name: RiverBirch
P.Number:95B034-7

Q.A 04/02/95

SCOPE:
To estimate the physical parameters of the solid waste layer .

REFERENCES:

. Corbit,R.A.,"Standard Handbook Of Environmental Engineering", Mc Graw Hill,p. 8.28-8.29.
. Tchobanogus,Thiesen,Vigil,"Integrated Solid Waste Management", Mc Graw Hill, p. 70-71.
. Aruida, O.L. and Clark, J.I.," Geotechnics of Waste Fill", ASTM, 1990, STP1070.
. Singh, S. and Bruce, J.M., "Evaluation of the Stability of Sanitary Landfills",ASTM 1991, STP1070.
. Caterpillar Reference Manual for Waste Disposal, Waste Densities Sheet.(attached)

DISCUSSION
A number of references have been reviewed to select a typical unit weight and strength for the landfill waste layer.

The data indicates a range for unit weight between 700 pcy to 1700 pcy including the daily cover, final cover and refuse.

. Loose residential and commercial refuse vary from 250 to 300 pcy
. In-place in the landfill this values can vary from 600 pcy to 1500 pcy
. Demolition waste can vary up to 2500 pcy
.Cover material will generally raise the above fill densities 100 to 200 pcy over the above values.

.The unit weight for the composite waste layer including the waste and the daily cover is estimated as 1600 pcy (60 pcf) for design purposes.

. It is assumed that 250 pound of daily cover material will be used for each cubic yard of composite waste layer.

The data from the references indicated a range between 26 to 36 degrees for the waste friction angle. The friction angle is estimated as 30 degrees for design purposes.

Even though some the data from the references indicated a cohesion intercept, for design purposes the cohesion of the waste layer is neglected, resulting in an added factor of safety.

WASTE LAYER CHARACTERIZATION
The physical parameters of the waste layer are;
Unit weight = 60 pcf
Friction angle = 30 degrees
Cohesion = 0 psf

B. *Amount and type of cover material to be handled* — Although landfill size and type will vary, a rule of thumb for estimating the amount of needed cover material is one cubic meter (cubic yard) of cover material for every four cubic meters (or cubic yards) of in-place compacted waste. That is, about 20-25% of a sanitary landfill's volume consists of soil used for cover (including daily and final covering). On smaller landfills, the percentage of soil could be as high as 50% to meet reasonable cover requirements.

It is important to remember that cover material also occupies landfill space reducing the amount of volume available for refuse. For example a landfill with 1 900 000 m^3 (2,500,000 yd^3) of *total volume* would provide for disposing of 1 520 000 m^3 (2,000,000 yd^3) of refuse and allow 380 000 m^3 (500,000 yd^3) of cover material. This example considers one cubic yard of cover for every 4 cubic yards of in place compacted waste.

The type of cover material can also be important. If the material is sandy or highly abrasive, a rubber tired wheel loader or scraper might be considered rather than a track-type unit.

C. *Distance cover material is to be transported* will have a large effect on cover equipment selection. The following economic limits or guidelines are recommended for cover material movement. The quantity of material to be moved as well as the time available must be considered when using these guidelines.

Track-type tractor	0-90 m	(0-300 ft)
Track-type loader	0-152 m	(0-500 ft)
Wheel loader	0-185 m	(0-600 ft)
Wheel tractor-scraper	over 185 m	(over 600 ft)

D. *Weather conditions* — when working in inclement weather, the tractive capability of a track-type machine may be necessary for poor underfoot conditions or to rip frozen cover material.

E. *Compaction requirements* — are becoming critical as extended landfill life is sought. If high density is desired, then a compactor may be necessary.

REFUSE DENSITIES

Generally, loose residential and commerical refuse weighs 150-180 kg/m^3 (250-300 lb/yd^3). A refuse collection vehicle will increase this density to 237-415 kg/m^3 (400-700 lb/yd^3). In-place landfill density can vary from 355-890 kg/m^3 (600-1500 lb/yd^3), depending on the compactive effort applied to the refuse.

Landfill sites that accept a high percentage of demolition waste can have densities up to 1485 kg/m^3 (2500 lb/yd^3). Cover material will generally raise fill densities 60-120 kg/m^3 (100-200 lb/yd^3) over the figures given above.

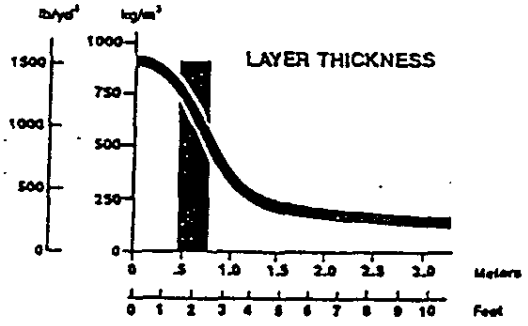
Weight of Refuse

	kg/m^3	lb/yd^3
Loose Refuse:	148-178	250-300
Packer Truck	237-415	400-700
Fill Density:	356-890	600-1500
Refuse and Cover:	415-1009	700-1700

FACTORS GOVERNING COMPACTION

Assuming equal machine weight, regardless of the type of machine, the following factors (1-4) affect compaction:

1. Refuse Layer Thickness —The depth of each compacted layer is perhaps the single most important controllable factor influencing density. To obtain maximum density, waste should be spread and compacted in layers not exceeding a depth of 610 mm (2 ft). Thicker layers will reduce the density that a machine can develop in a given number of passes. (Density figures shown do not include cover material.)



referred to in the solid waste literature incorrectly as density. In U.S. customary units density is expressed correctly as slug/ft^3.) Because the specific weight of MSW is often reported as *loose, as found in containers, uncompacted, compacted,* and the like, the basis used for the reported values should always be noted. Specific weight data are often needed to assess the total mass and volume of waste that must be managed. Unfortunately, there is little or no uniformity in the way solid waste specific weights have been reported in the literature. Frequently, no distinction has been made between uncompacted or compacted specific weights. Typical specific weights for various wastes as found in containers, compacted, or uncompacted are reported in Table 4-1.

TABLE 4-1
Typical specific weight and moisture content data for residential, commercial, industrial, and agricultural wastes

Type of waste	Specific weight, lb/yd^3		Moisture content, % by weight	
	Range	Typical	Range	Typical
Residential (uncompacted)				
Food wastes (mixed)	220–810	490	50–80	70
Paper	70–220	150	4–10	6
Cardboard	70–135	85	4–8	5
Plastics	70–220	110	1–4	2
Textiles	70–170	110	6–15	10
Rubber	170–340	220	1–4	2
Leather	170–440	270	8–12	10
Yard wastes	100–380	170	30–80	60
Wood	220–540	400	15–40	20
Glass	270–810	330	1–4	2
Tin cans	85–270	150	2–4	3
Aluminum	110–405	270	2–4	2
Other metals	220–1940	540	2–4	3
Dirt, ashes, etc.	540–1685	810	6–12	8
Ashes	1095–1400	1255	6–12	6
Rubbish	150–305	220	5–20	15
Residential yard wastes				
Leaves (loose and dry)	50–250	100	20–40	30
Green grass (loose and moist)	350–500	400	40–80	60
Green grass (wet and compacted)	1000–1400	1000	50–90	80
Yard waste (shredded)	450–600	500	20–70	50
Yard waste (composted)	450–650	550	40–60	50
Municipal				
In compactor truck	300–760	500	15–40	20
In landfill				
Normally compacted	610–840	760	15–40	25
Well compacted	995–1250	1010	15–40	25
Commercial				
Food wastes (wet)	800–1600	910	50–80	70

Because the specific weights of solid wastes vary markedl location, season of the year, and length of time in storage, gr used in selecting typical values. Municipal solid wastes as delive vehicles have been found to vary from 300 to 700 lb/yd^3; a typi 500 lb/yd^3.

Moisture Content

The moisture content of solid wastes usually is expressed in on the wet-weight method of measurement, the moisture in a san

TABLE 4-1 (*continued*)

Type of waste	Specific weight, lb/yd^3		R
	Range	Typical	
Commercial (*cont.*)			
Wooden crates	185–270	185	1
Tree trimmings	170–305	250	2
Rubbish (combustible)	85–305	200	1
Rubbish (noncombustible)	305–610	505	
Rubbish (mixed)	235–305	270	1
Construction and demolition			
Mixed demolition (noncombustible)	1685–2695	2395	
Mixed demolition (combustible)	505–675	605	4
Mixed construction (combustible)	305–605	440	4
Broken concrete	2020–3035	2595	0
Industrial			
Chemical sludges (wet)	1350–1855	1685	75
Fly ash	1180–1515	1350	2
Leather scraps	170–420	270	6
Metal scrap (heavy)	2530–3370	3000	0
Metal scrap (light)	840–1515	1245	0
Metal scrap (mixed)	1180–2530	1515	0
Oils, tars, asphalts	1350–1685	1600	0
Sawdust	170–590	490	10
Textile wastes	170–370	305	6
Wood (mixed)	675–1140	840	30
Agricultural			
Agricultural (mixed)	675–1265	945	40
Dead animals	340–840	605	
Fruit wastes (mixed)	420–1265	605	60
Manure (wet)	1515–1770	1685	75
Vegetable wastes (mixed)			

TABLE 8.11 Densities of Waste Components

Component	Density
Waste densities, lb/yd³	
Loose waste	100–200
After dumping from compactor truck	350–400
In compactor truck	500–700
In landfill	500–900
Shredded waste	600–900
Baled in paper baler	800–1200
Bulk densities, lb/ft³	
Cardboard	1.87
Aluminum	2.36
Plastics	2.37
Miscellaneous paper	3.81
Garden waste	4.45
Newspaper	6.19
Rubber	14.90
Glass	18.45
Food	23.04
True densities, lb/ft³	
Wood	37
Cardboard	43
Paper	44–72
Glass	156
Aluminum	168
Steel	480
Polypropylene	56
Polyethylene	59
Polystyrene	65
ABS	64
Acrylic	74
Polyvinylchloride (PVC)	78
Resource recovery plant products, lb/ft³	
dRDF	39
Aluminum scrap	15
Ferrous scrap	25
Crushed glass	85

Source: Prepared by Cal Recovery Systems, Richmond, Calif., for ASTM E-38.
Note: 1 lb/yd³ = 1.685 kg/m³; 1 lb/ft³ = 0.0624 kg/m³.

rements are necessary so that average values for quantity and character are resentative of the whole. As a practical matter, a program withdrawing many)- to 300-lb (90- to 135-kg) increments of waste for sorting can be reasonably licative of the character of the waste.

A procedure which has been found to be expedient employs the use of a crane th grapple bucket, such as those found at an incinerator, resource recovery nit, or a mobile articulated unit at a transfer station or landfill (16,17). The

TABLE 8.1. uel Proximate Analysis for Typical Components (21)

	Proximate analysis (as-received), weight %					Higher heating value, Btu/lb	
	Moisture	Volatile matter	Fixed carbon	Non-comb.	S	As-received	Moisture and ash free
Paper, mixed	10.24	75.94	8.44	5.38	0.20	6,800	8,055
Newsprint	5.97	81.12	11.48	1.43	0.16	7,974	8,600
Brown paper	5.83	83.92	9.24	1.01	0.11	7,256	7,800
Trade magazine	4.11	66.39	7.03	22.47	0.09	5,254	7,150
Corrugated boxes	5.20	77.47	12.27	5.06	0.21	7,043	7,850
Plastic-coated paper	4.71	84.20	8.45	2.64	0.08	7,341	7,940
Waxed milk cartons	3.45	90.92	4.46	1.17	0.10	11,327	11,890
Paper food cartons	6.11	75.59	11.80	6.50	0.16	7,258	8,250
Junk mail	4.56	73.32	9.03	13.09	0.09	6,088	7,400
Office trash	4.10	79.80	7.90	8.20	<.1	6,950	7,860
Vegetable food waste	78.29	17.10	3.55	1.06	0.20	1,795	8,700
Citrus rinds and seeds	78.70	16.55	4.01	0.74	0.12	1,707	8,300
Meat scraps (cooked)	38.74	56.34	1.81	3.11	0.19	7,623	13,110
Fried fats	0.00	97.64	2.36	0.00	0.07	16,466	16,466
Mixed food waste	72.00	20.26	3.26	4.48	0.52	2,370	10,100
Hardwood (pallets, crates)	11.60	74.80	14.00	0.60	<.1	7,500	8,520
Green logs	50.00	42.25	7.25	0.50	0.08	2,102	4,250
Rotten timbers	26.80	55.01	16.13	2.06	1.2	4,710	6,560
Demolition softwood	7.70	77.62	13.93	0.75	<.1	7,300	7,995
Waste hardwood	12.00	75.05	12.41	0.54	<.1	6,430	7,340
Furniture wood	6.00	80.92	11.74	1.34	<.1	7,350	7,940
Evergreen shrubs	69.00	25.18	5.01	0.81	0.19	2,708	8,960
Balsam spruce	74.35	20.70	4.13	0.82	0.20	2,447	9,850
Flowering plants	53.94	35.64	8.08	2.34	0.26	3,697	8,460
Lawn grass	75.24	18.64	4.50	1.62	0.42	2,058	8,900
Ripe leaves	9.97	66.92	19.29	3.82	0.16	7,984	9,270
Wood and bark	20.00	67.89	11.31	0.80	0.05	6,900	8,700
Brush	40.00	—	—	5.00	0.05	4,745	8,600
Mixed greens	62.00	26.74	6.32	4.94	0.05	2,690	8,135
Upholstery	6.9	75.96	14.52	2.62	<.1	6,960	7,690
Tires, whole	1.02	64.92	27.51	6.55	1.5	13,800	14,900
Leather	10.00	68.46	12.49	9.10	0.40	7,960	9,850
Leather shoe	7.46	57.12	14.26	21.16	1.00	7,243	10,150
Shoe heel and sole	1.15	67.03	2.08	29.74	1.34	10,899	15,790
Rubber	1.20	83.98	4.94	9.88	2.00	11,200	12,600
Mixed plastics	2.0	—	—	10.00	—	14,100	16,000
Plastic film	3.20	—	—	—	0.07	—	14,870
Polyethylene	0.20	98.54	0.07	1.19	0.03	18,687	20,000
Polystyrene	0.20	98.67	0.68	0.45	0.02	16,419	16,510
Polyurethane	0.20	87.12	8.30	4.38	0.02	11,203	11,730
Polyvinyl chloride	0.20	86.89	10.85	2.06	0.14	9,754	10,000
Linoleum	2.10	64.50	6.60	26.80	0.40	8,150	11,450
Rags	10.00	84.34	3.46	2.20	0.13	6,900	7,844
Textiles	15.31	—	—	—	0.20	—	8,300
Oils, paints	0	—	—	16.30	—	13,400	16,000
Vacuum-cleaner dirt	5.47	55.68	8.51	30.34	1.15	6,386	9,900
Household dirt	3.20	20.54	6.26	70.00	0.01	3,670	13,650
Street sweepings	20.00	54.00	6.00	20.00	0.20	4,800	8,000

CONCEPTUAL LINER SYSTEM

Woodward-Clyde Consultants

Project Notes

Project Name: River Birch
Project No.: 93B248C
Task No.: File No.:
Sheet CLS-1 of

Subject: Conceptual Liner System
By: R. DeGall Date: 2/27/94
Checked By: [illegible] Date: 3/31/94

Scope For reference purposes, outline the conceptual liner systems and leachate collection systems for the landfill.

Cover System

Topsoil - 1-foot thick over clay cover layer

Clay cover - 1 foot thick over drainage system provides protection to synthetics in the cover system, $k = 1 \times 10^{-7}$ cm/sec

Drainage system - consists of a geotextile beneath the clay cover and above the drainage net. The drainage net minimizes buildup of moisture between the clay cover and geomemb

Barrier system - consists of 1-layer of 60 mil HDPE geomembrane beneath the drainage system and in direct contact with 2-feet of 1×10^{-7} cm/. clay.

Waste

Bottom Liner System

Sand - 12-inches thick for protection of synthetics and drainage of leachate; 1×10^{-2} cm/sec permeability.

Drainage layer - 1-layer of geotextile beneath the sand plus drainage net. Leachate will be removal via a leachate collection pipe and sump system

Barrier System - consists of 1-layer of 60 mil HDPE geomembrane beneath the drainage layer and in direct contact with 3-feet of 1×10^{-7} cm/sec clay.

Pressure Relief System - a sandwich of drainage net between two layers of geotextile to minimize uplift pressures, if any. Fluid will be removed via a system of sumps.

GRADATION - GRANULAR GRAVEL/SAND

Woodward-Clyde Consultants

Project Notes

Subject: Gradations

R. SeGall Date: 2/16/94

Checked By: [illegible] Date: [illegible]

Project Name: River Birch

Project No.:

Task No.: File No.:

Sheet G-1 of G-5

Scope: Evaluate the typical gradation limits for fine and coarse ASTM C-33 aggregate

References:

1.) ASTM C-33-86, Standard Specifications for Concrete Aggregate.

2.) An Introduction to Geotechnical Engineering by R. Holtz & W. Novacs, 1981

Assumptions:

1. The fine aggregate will be placed beneath the waste, approximately 12 inches thick. The fine aggregate will primarily serve as a protection layer to the primary LCR system during initial waste placement. In addition this aggregate will transmit leachate to the collection lines and sump.

2. The collection lines and sump consists of coarse aggregate fill.

3. The following is the grain size distribution for fine aggregate (ASTM C-33-86)

Sieve Size	Percent Passing (%)
3/8"	100%
No. 4	95 to 100
No. 8	80 to 100
No. 16	50 to 85
No. 36	25 to 60
No. 50	10 to 30
No. 100	2 to 10

The grain size distribution curve is presented on page G4.

An empirical equation relating the coefficient of permeability to D_{10}, the effective grain size, was proposed by A. Hazen (1911). For clean sands (with less than 5% passing the No. 200 sieve) with D_{10} sizes between 0.1 and 3.0 mm, the coefficient of permeability K is

$$K = C D_{10}^2$$

K = cm/sec
D_{10} is in mm.
C varies from 0.4 to 1.2
average value is 1.0

Equation is valid for $K > 10^{-3}$ cm/sec (Ref 2)

C	D_{10} (mm)	K (cm/sec)
0.4	0.2	1.6×10^{-2}
0.7	0.2	2.8×10^{-2}
1.0	0.2	4.0×10^{-2}
1.2	0.2	4.8×10^{-2}

Previous permeability tests with samples within the gradation limits from commercial suppliers and subject to laboratory permeability tests has yielded permeability of 26×10^{-2} cm/sec.

4.) The following is the grain size distribution for the size No. 57 coarse aggregate (ASTM C-33-86) :

Sieve Size	Percent Passing (%)
1 1/2"	100
1"	95 to 100
1/2"	25 to 60
No. 4	0 to 10
No. 8	0 to 5

The grain size distribution curve is presented on page G5.

Woodward-Clyde Consultants

Project Notes

Subject: Gradation

R. Ce Goll Date: 2/16/94

Checked By: [illegible] Date: 03/31/94

Project Name: River Birch

Project No.:

Task No.: File No.:

Sheet G-3 of G-5

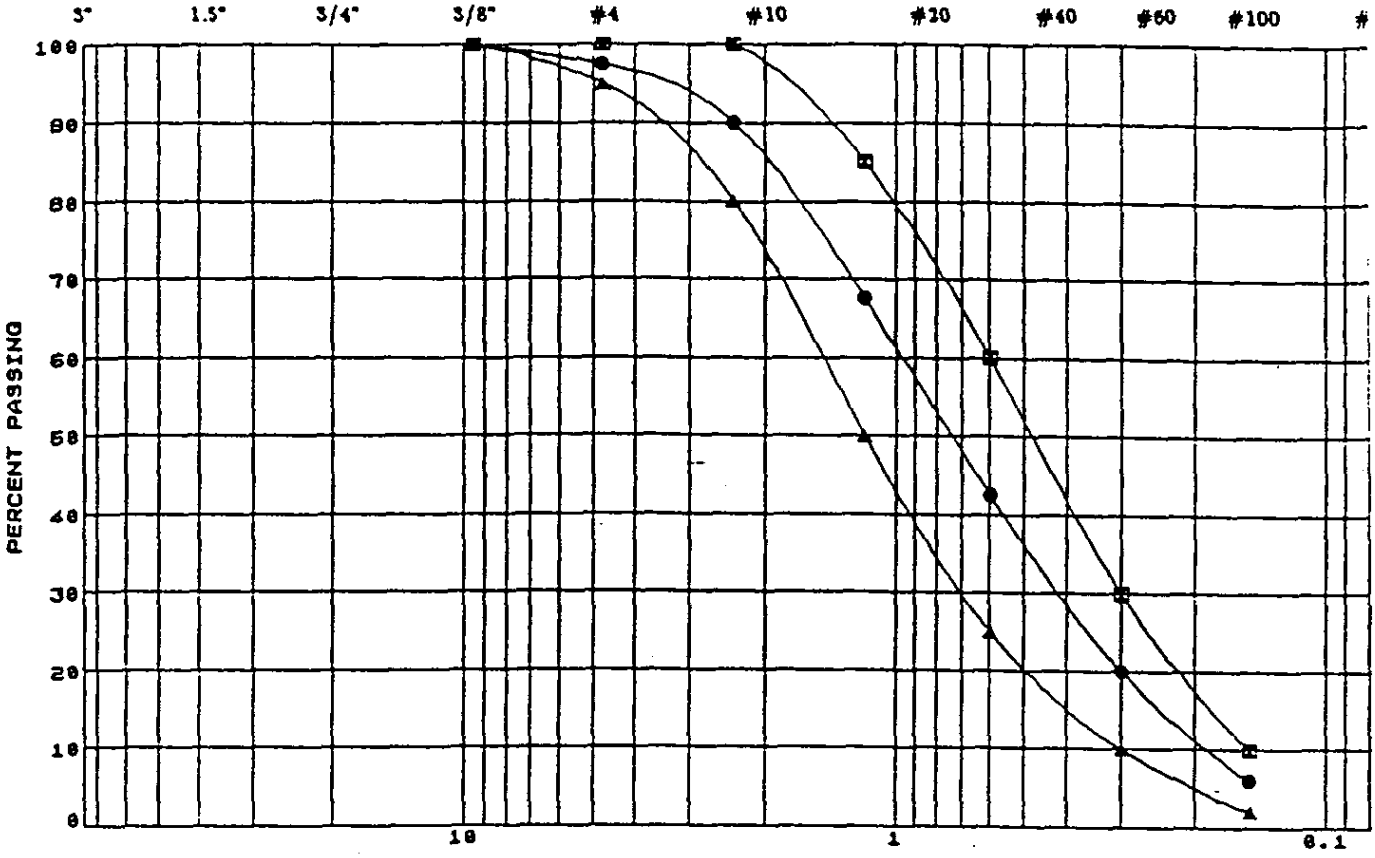
$K = C D_{10}^2$ $D_{10} = 5$ $P_u = D_{60}/D_{10} = 3$ within equation limits.

C	D_{10} (mm)	K cm/sec
0.4	5	70
0.7	5	17.5
1.0	5	25
1.2	5	30

It is recommended that a geonet composite with a geotextile be incorporated into the design to ensure achieving the 1×10^{-2} cm/sec drainage for the fine aggregate.

The material for the leachate collection lines and sump should be a siliceous non-carbonate non angular rock or gravel conforming the stated gradation requirements for fine (include a geonet) and coarse aggregate

SIEVE SIZE



PARTICLE SIZE IN MILLIMETERS

GRAVEL		SAND		
coarse	fine	coarse	medium	fine

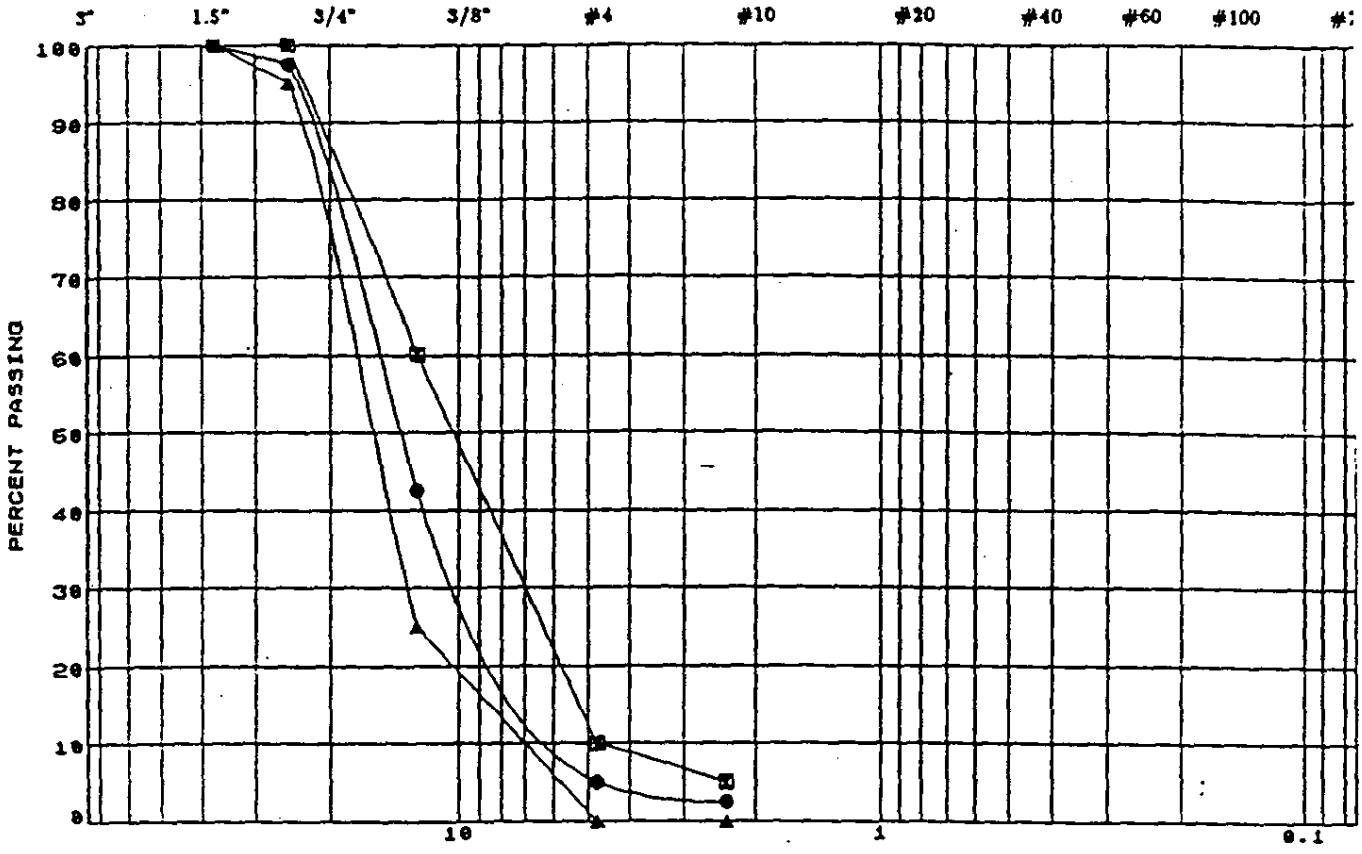
LEGEND:

- ● AVERAGE GRADATION CURVE
- ⊠ HIGH SIDE OF THE BAND WIDTH
- ▲ LOW SIDE OF THE BAND WIDTH

RESULTS OF SIEVE ANALYSIS

ASTM C-33 GRADATION FOR FINE AGGREGATE

SIEVE SIZE



PARTICLE SIZE IN MILLIMETERS

GRAVEL		SAND		
coarse	fine	coarse	medium	fine

LEGEND:

- ● AVERAGE GRADATION CURVE
- ■ HIGH SIDE OF THE BAND WIDTH
- ▲ LOW SIDE OF THE BAND WIDTH

RESULTS OF SIEVE ANALYSIS

ASTM C-33 GRADATION FOR COARSE AGGREGATE-NO. 57

HEAVE POTENTIAL

Subject: HEAVE POTENTIAL
By : S. Togan ALPER STA Date: March 21, 1995
Checked By: AAS Date: 3/30/95

P.Name:RiverBirch
P.Number:95B034-7
HP-1/7

Q.A 04/4/95

SCOPE:

To evaluate the heave potential for excavation of collection sumps and the landfill modules .

REFERENCES:

. Soil Characterization Package
. Boring Logs and Cone Penetrometer soundings
. Geologic Crossections

DISCUSSION

. Due to the high ground water table and excavations going below the natural ground water table (GWT), there may be a heave potential during the excavation for construction and early periods of the operation of the landfill.

. The heave potential of granular materials within a stratum of alternating layers of silty clays, clays and silts (CL-ML, CL) is very small, since sufficient head pressure can not be developed in the isolated granular and organic materials to induce heave. Therefore such layers found in boring are not considered as a potential sources for heave.

ASSUMPTIONS

. Piezometric clusters were installed to the depths as directed by LDEQ at boring locations B-4, B-24 and B-31. Cluster B-4 consists of 3 piezometers at elevations -24, -44, and -74. Cluster B-24 consist of two piezometers at elevations -18, and -33. Cluster B-31 consists of two piezometers at elevations -19, and -40. The piezometer readings have been previously submit to LDEQ on a quarterly basis, field notes are attached in Appendix.

. Piezometric heads of nearby borings (B-4, B-24) the piezometric heads change between -2 ft and -6 ft. seasonally.(Figure 1)

. Piezometric head = -4ft.

Subject: HEAVE POTENTIAL
By : S. Togan ALPER STA Date: March 21, 1995
Checked By: BS Date: 3/30/95

P.Name:RiverBirch
P.Number:95B034-7
HP-2/7

4.2 04/02/95

CALCULATIONS

The results of the calculations are listed in HP-1.
The heave calculations are based on the following equation;

$$F.S. = \frac{\gamma' T}{\gamma_w \cdot H}$$

γ' = Buoyant unit weight of soil
γ'_{DESIGN} = 100 pcf
T = thickness of the soil layer above
H = hydraulic head at the granular layer
F.S. = Factor of Safety

RESULTS & RECOMMENDATIONS

. The list of the boring is given in Table HP-1

. The location of nearby borings are presented in Figure 2.

. The related boring logs are attached in Appendix.

. The Borings B-11, B-12, B-13,B22, B-23,B-26, B-27 did not encounter permeable layers.

. The excavation depth below the compacted clay liner will be 12 ft or less in the cell 1 area.

.The Borings B-8 and B-24 indicate the potential for isolate pockets of heave. Analyzing the nearby borings, soundings and geological crossections, it is assumed that these are local heave potential points.
At boring location B-24 the water bearing strata is granular material within a stratum of alternating layers of silty clays, clays and silts (CL-ML, CL). As mentioned in the discussions the potential for heave in this type of conditions is very small, since sufficient head pressure can not be developed in the isolated granular and organic materials. Therefore such layers found in boring are not considered as a potential sources for heave.
According the bottom elevations of the cell 1, the excavation in the close vicinity of B-8 will be much less than 12 ft. since the boring is located close to the NW corner of the facility, not even in the footprint area of the cell 1. None of the surrounding soundings or borings of B-8 indicate a similar sand layer. Therefore no heave problem is expected to occur during cell 1 excavations at this area.

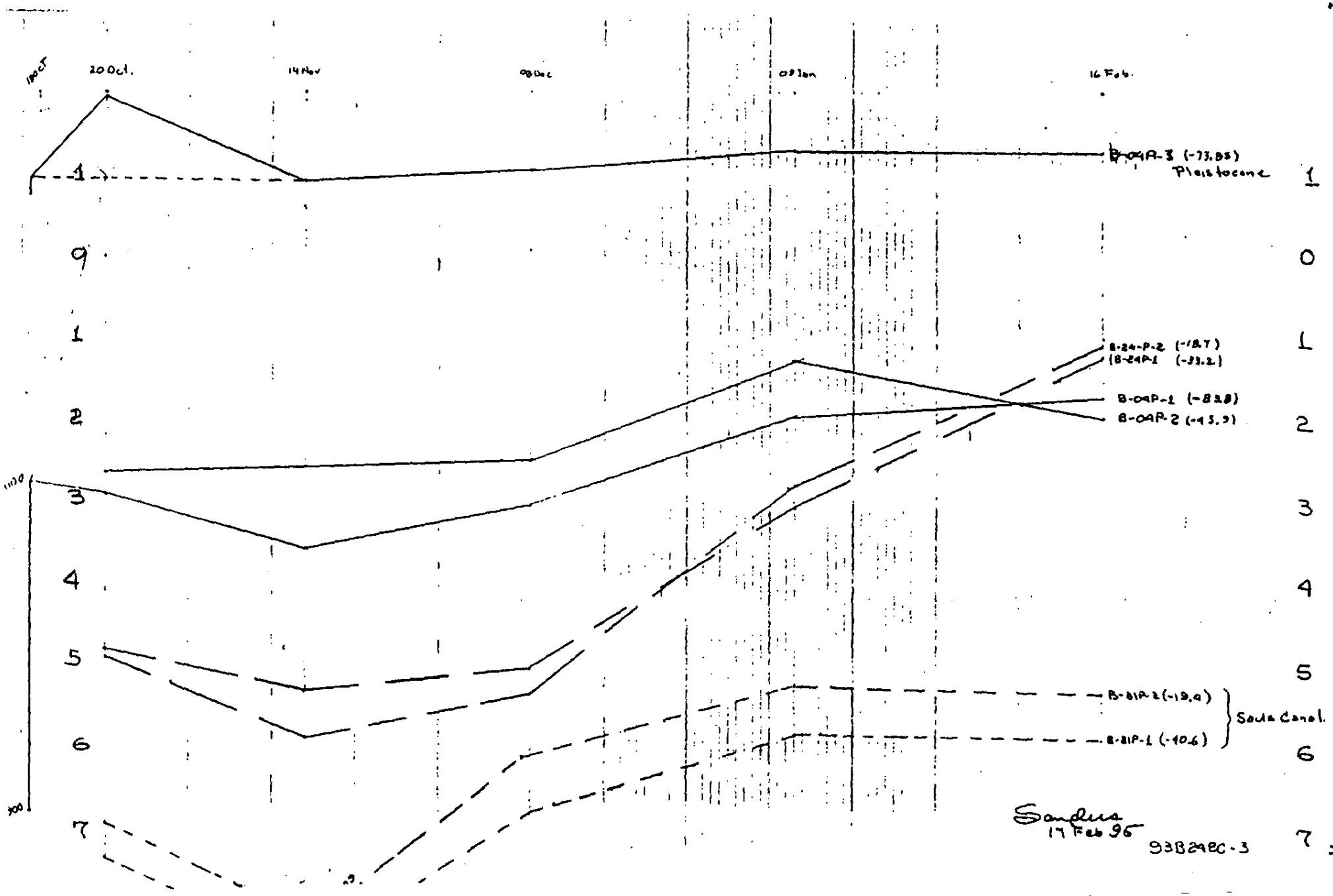
Subject: HEAVE POTENTIAL
By : S. Togan ALPER STA. Date: March 21, 1995
Checked By: RAS Date: 3/30/95

P.Name:RiverBirch
P.Number:95B034-7
HP 3/7

. The excavation depth will be up to 18 ft. in some local spots in order to install the sumps for the leachate collection and pressure relief systems. This sumps are relatively small areas and this excavations will be short lasting operations and will be filled in a shot period to -12ft or above. The piezometric head is also expected to be lower than the design value(-4ft.)since during the excavation of the total cell area the head will drop to a value close to the average excavation depth. As a result the construction of the sumps do not create a potential for heave.

The heave potential induced by the swell potential of the high plasticity materials is most likely to be greater then the potential due to piezometric pressures.

1. Piezometric Readings



AP-577

Woodward-Clyde Consultants

Project Notes

Subject: RIVER BIRCH GROUND WATER LEVELS

By: BOB SANDERS

Dept.: ENGINEERING

Date: October 1994-

Project Name: River Birch Landf

Project No.: 93B248C-0003

Page No.: ____ of ____

		B-04P-1	B-04P-2	B-04P-3 △	B-24P-1	B-24P-2	B-31P-1	B-31P-
	TOC-elev.	+ 1.27	+ 1.07	+ 2.10	+ 2.12	+ 1.16	- 0.27	- 0.0
	TOC-btm.(ft)	23.90	44.92	75.95	35.30	20.30	40.34	19.0
	btm. elev.	23.83	43.85	-73.85	33.18	18.69	40.61	19.1
	G.L. elev.	- 1.71	- 2.00	- 1.80	- 0.50	- 0.58	- 1.98	- 2.1
1994	Stick up(ft)	2.98	3.07	3.90	2.70	2.11	2.25	2.2
① 18Oct	TOC-H_2O(ft)	7.65	26.50	0.35	19.40	7.55	7.03	9.8
0900	elev.	- 6.38	- 25.43	+ 0.75	- 17.28	- 5.94	- 7.30	- 9.8
	TOC-H_2O(ft)	4.13	15.70	0.18				
1100	elev.	- 2.86	- 14.63	+ 0.92				
20Oct	TOC-H_2O(ft)	4.20	3.73	0.15	7.00	6.10	7.06	6.8
	elev.	- 2.93	- 2.66	+ 1.95	- 4.88	- 4.94	- 7.33	- 6.92
14Nov	TOC-H_2O(ft)	4.87	3.67	1.20	7.45	7.05	8.20	8.0
	elev.	- 3.60	- 2.60	+ 0.90	- 5.33	- 5.89	- 8.47	- 8.0
08Dec	TOC-H_2O(ft)	4.33	3.57	1.06	7.20	6.50	6.50	6.02
	elev.	- 3.06	- 2.50	+ 1.04	- 5.08	- 5.34	- 6.77	- 6.11
1995								
09Jan	TOC-H_2O(ft)	3.22	3.35	0.80	5.17	3.95	5.55	5.14
	elev.	- 1.95	- 1.28	+ 1.30	- 3.05	- 2.79	- 5.82	- 5.23
16Feb	TOC-H_2O(ft)							
	elev.	2.97	3.02	0.82	3.33	2.25	5.57	5.23
		- 1.70	- 1.95	+ 1.28	- 1.21	- 1.09	- 5.84	- 5.32

TOC: Top of casing

elev: Elevation NGVD

btm: Bottom

G.L.: Ground level

① No "weepholes" drilled into the casing until 1040/18 Oct.

△ The original elevation was +1.10 NGVD. An evel 1.0 foot of 2" Ø PVC pipe was added to the top of the piezometer on 20 October 1994. All previous measurements were adjusted.

Check By:

HP-6/7

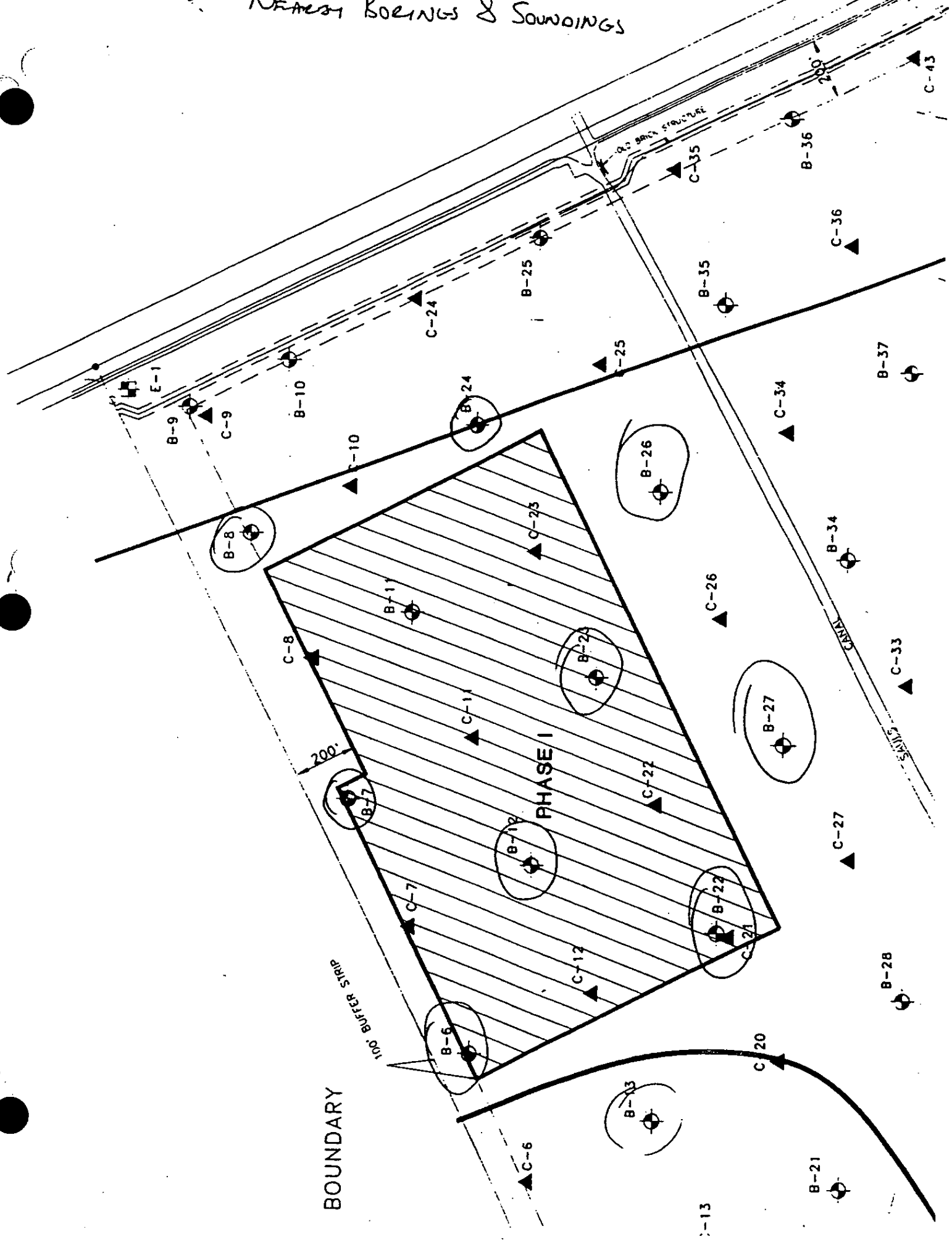
TABLE HP-1. HEAVE POTENTIAL CALCULATION

Heave is calculated based on individual locations
Buyont unit weight of soil = 100 pcf
Piezomteric head = -4ft.

Boring			Stata		Factor of Safety agains Heave Excavation Depth (ft)		
Number	G.Elev.	GWT	Depth	Description	-8	-10.0	-12.0
B-6	-1	-7.5	-26	CH-ML	2.7	1.6	1.1
B-7	-0.7	-7	> -40	SC-CH	4.8	3.0	2.1
B-8	-0.3		-22	SP	2.1	1.2	0.8
B-11	-0.5	-8	> -40	not found	4.8	3.0	2.1
B-12	-1.1	-7.5	> -40	not found	4.8	3.0	2.1
B-13			> -40	not found	4.8	3.0	2.1
B-22	-1.3	-4	> -40	not found	4.8	3.0	2.1
B-23	-1.2	-6.5	> -40	not found	4.8	3.0	2.1
B-24	-0.1	-4	> -24	ML-CL	2.4	1.4	0.9
B-26	-0.8	-7.5	> -40	not found	4.8	3.0	2.1
B-27	-1.5	-6.5	> -40	not found	4.8	3.0	2.1

G. Elev = ground elevation of the boring
GWT = Ground water table
Depth = Depth of the first permeable strata (granular layer or peat layers)
Strata = Description of the first permeable layer

FIGURE 2. LOCATION OF NEARBY BORINGS & SOUNDINGS 3/30/95 HP-7/7



APPENDIX

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-4
FILE: 93B248C
DATE: 9/1/93
TECHNICIAN: M. Fontenot
APPROVED: [signature]
PAGE: 1 of 3

Dry Augered: 0'- 10' Wash Bored: 10'- 100'

Free water was encountered at a depth of 7' during dry augering. The water level rose to a depth of 5.5' after an observation period of 15 minutes.

Coordinates: N 460,292 E 2,338,707 Ground Surface Elevation: -1.4'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0					3.05	39	92	100	64	Very stiff brown, gray and black CLAYS with wood, organic materi and peat (CH-OH
5					0.12	92	88	104	71	Very soft gray CLAYS with organic material and wood (CH)
10			(1)			219	75	275	218	
15						108	87	93	64	Very soft gray CLAYS with peat and wood (CH-OH)
20					0.21	49	97	99	67	Very soft gray CLAYS (CH)
25										
30						51	102	52	28	—with silt below 30'
35						54	102	83	54	Alternating layers and lenses of soft gray CLAYS and Sandy SILTS to Silty SANDS (CH/ML/SM)
40										

Continued Next Page

(1) K = 6.8E-08 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-4
FILE: 93B248C
DATE: 9/1/93
TECHNICIAN: M. Fontenot
APPROVED: [signature]
PAGE: 2 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
40										Alternating layers and lenses of soft gray CLAYS and Sandy SILTS Silty SANDS (CH/ML/SM
45									—	
										Soft gray CLAYS with shell fragments (CH
50			0.25		0.42	52	101	91	62	
			0.75		0.51	67	99	103	67	—medium below 53'
55										
60			1.00							
			2.5			21				Stiff bluish gray and greenish gray Silty CLAYS (CL)
65										
70			3.75							
			1.75			28				Firm tan and light gray Clayey SILTS (ML-CL)
75										
80										

Continued Next Page

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-4
FILE: 93B248C
DATE: 9/1/93
TECHNICIAN: M. Fontenot
APPROVED:
PAGE: 3 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
80										Firm tan and light gray Clayey SILTS (ML-CL)
			1.5			36				Medium greenish gray and gray CLAYS with traces of silt, sand and shell fragments (CH)
85										
			1.0							
90										
			1.0			41				
95										
			1.25		0.78	38	108	59	- 38	
100										Bottom of boring at 100'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-6
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: M. Fontenot
APPROVED: [signature]
PAGE: 1 of 3

Dry Augered: 0'- 10' Wash Bored: 10'- 100'

Free water was encountered at a depth of 9' during dry augering. The water level rose to a depth of 7.5' after an observation period of 15 minutes.

Coordinates: N 461,943 E 2,339,402 Ground Surface Elevation: -1.0'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0										Stiff brown and gray Silty CLAYS (CL)
5						60		98	71	Very soft brown and gray CLAYS with wood and organic material (CH)
10										
15										
		(1)				52	113	46	28	Very soft gray Silty CLAYS with some fine silty sand (CL)
20										Very soft gray CLAYS (CH)
25										
30						45		52	33	Alternating layers of soft gray CLAYS, Sandy SILTS and SILTS (CH/ML)
35										
40										Very soft gray CLAYS (CH)

Continued Next Page

(1) K = 6.5E-07 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-6
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: M. Fontenot
APPROVED: [illegible]
PAGE: 2 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
40										Very soft gray CLAYS (C
					0.19	60	98	80	58	
45										
50										
					0.25	66	97	95	68	
55										
60										
					0.67	54	103	81	58	—medium, with shells below 63'
65										
			0.25							
70										
										Medium greenish gray Silty CLAYS with shells
			1.00		0.68	26	116	34	12	(CL)
75										
			1.0							
80										

Continued Next Page

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-6
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: M. Fontenot
APPROVED: MB
PAGE: 3 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (taf)	Organic Content (%)	Compress. Stress (taf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
80										Medium greenish gray Silty CLAYS with shells (CL
			1.5						–	
85										
										Stiff greenish gray to bluish gray CLAYS (CH-CL)
			1.0	1.3		27		43	25	
90										
95										
						45		76	53	
100										Bottom of boring at 100'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-7
FILE: 93B248C
DATE: 9/30/93
TECHNICIAN: Fontenot
APPROVED:
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 8.5' during dry augering. The water level rose to a depth of 7' after an observation period of 15 minutes.

Coordinates: N 462,752 E 2,339,796 Ground Surface Elevation: -0.7'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compres. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0										Soft brown and gray CLAYS (CH
5						82		109	77	—gray below 6'
10				2.1	0.21	84	94	122	88	
15										
20						73		80	52	
25										Soft gray CLAYS with sandy silt seams (CL)
30										
35						42		49	28	
40										Bottom of boring at 40'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

LOCATION: Jefferson Parish, Louisiana

CLIENT: Gulf Engineers and Consultants, Inc.

FILE: 93B248C
DATE: 10/7/93
TECHNICIAN: R. Rizzo
APPROVED: MAS
PAGE: 1 of 1

Dry Augered: 0'- 4' Wash Bored: 4'- 40'

Free water was encountered at a depth of 4' during dry augering. The water level remained at a depth of 4' after an observation period of 15 minutes.

Coordinates: N 463,521 E 2,340,279 Ground Surface Elevation: -0.3'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0										Soft gray and brown CLAYS (CH)
5						80		141	101	
10				6.0	0.31	60	96	86	56	
15										Alternating layers of very soft gray CLAYS, Clayey SILTS and Silty SANDS (CL-ML)
20						69		46	21	
25										Gray SANDS (SP)
30				4.0	0.29	66	104	48	24	Very soft gray CLAYS (CL)
35										Gray SANDS (SP)
40										Very soft gray CLAYS (CH) Bottom of boring at 40'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-11
FILE: 93B248C
DATE: 10/1/93
TECHNICIAN: Fontenot
APPROVED: MS
PAGE: 3 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
80										Stiff light gray and brown Silty CLAYS (CL)
85										
90										
						27		50	31	Very stiff tan and light gray CLAYS (CH)
95										
100										Bottom of boring at 100'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-12
FILE: 93B248C
DATE: 9/29/93
TECHNICIAN: Fontenot
APPROVED:
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 9.5' during dry augering. The water level rose to a depth of 7.5' after an observation period of 15 minutes.

Coordinates: N 462,145 E 2,340,001 Ground Surface Elevation: -1.1'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0										Soft gray and brown CLAYS (CH)
5									–	—very soft, gray below 4'
10										
15						84		107	75	
20										
25						53		55	31	
30										
35						49		84	54	
40										Bottom of boring at 40'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

JAN 28 94 WCSOBR9 JB248

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-13
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: M. Fontenot
APPROVED:
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 7' during dry augering. The water level rose to a depth of 4' after an observation period of 15 minutes.

Coordinates: N 461,336 E 2,339,607 Ground Surface Elevation: -1.2'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0										Stiff brown and gray CLAYS (CH)
5										—soft, gray below 4'
10										
15				1.8		55		50	31	
20						62		94	66	
25										
30					0.32	54	100	53	32	
35										
40						54		82	59	Bottom of boring at 40'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-22
FILE: 93B248C
DATE: 8/22/93
TECHNICIAN: M. Fontenot
APPROVED:
PAGE: 1 of 1

Dry Augered: Not reported
Wash Bored: Not reported
Coordinates: N 461,539 E 2,340,207
Ground Surface Elevation: -1.3'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0										Very soft gray CLAYS (CH)
5						74	89	100	71	
10										
15		(1)		2.0	0.41	46	105	45	22	Very soft gray Silty CLAYS (CL)
20										Very soft gray CLAYS with silt layers (CH)
25						45	104	54	30	
30		NR			0.30	57	99	67	42	Soft gray CLAYS (CH)
35						46	102	38	10	Soft gray CLAYS with silt seams (CL)
40										Bottom of boring at 40'. Borehole grouted full depth.

NR = No Recovery
(1) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-23
FILE: 93B248C
DATE: 9/30/93
TECHNICIAN: M. Fontenot
APPROVED:
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 6.5' after an observation period of 15 minutes.

Coordinates: N 462,348 E 2,340,601 Ground Surface Elevation: -1.2'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0										Stiff brown and black CLAYS with organic material (CH-OH
										—very soft below 2'
										—gray below 4'
5						79		100	73	
10										—with silt pockets below 10'
					0.31	63	100	85	61	
20										Stiff brown and black CLAYS with silt seams, pockets and layers (CH)
25						80		98	75	
30										
35						64		79	52	
40										Bottom of boring at 40'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-24
FILE: 93B248C
DATE: 10/7/93
TECHNICIAN: R. Rizzo
APPROVED: [signature]
PAGE: 1 of 1

Dry Augered: 0'- 4' Wash Bored: 4'- 40'

Free water was encountered at a depth of 4' during dry augering. The water level remained at a depth of 4' after an observation period of 15 minutes.

Coordinates: N 463,157 E 2,340,995 Ground Surface Elevation: -0.1'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0										Stiff brown CLAYS with black organic material and roots (CH-OH)
5										—medium, brown, gray and tan below 2'
										—with ferrous nodules, 4'- 6'
10						67		101	74	Soft gray CLAYS (CH)
15										
20										
25			(1) (2)			40	113	34	8	Alternating layers and lenses of gray Silty SANDS, Sandy SILTS and CLAY (ML-CL)
30										Very soft gray CLAYS (CH)
35						57		51	31	
40										Bottom of boring at 40'. Borehole grouted full depth.

(1) See grain size distribution curve.
(2) K = 8.4E-07 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

LOCATION: Jefferson Parish, Louisiana

CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-28
FILE: 93B248C
DATE: 9/10/93
TECHNICIAN: M. Fontenot
APPROVED:
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 9' during dry augering. The water level rose to a depth of 7.5' after an observation period of 15 minutes.

Coordinates: N 462,550 E 2,341,200 Ground Surface Elevation: -0.8'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0				12.4		57		94	63	Stiff brown, tan and light gray CLAYS with roots and organic material (CH)
5					0.33	55	99	106	74	Very soft gray CLAYS with organic material (CH)
10										
15					0.32	74	100	94	67	Very soft gray CLAYS with silt seams and partings and occasionally organic material (CH)
20										
25					0.24	54	96	88	58	
30										
35			(1)	4.5	0.22	48	103	56	33	
40										Bottom of boring at 40'. Borehole grouted full depth.

(1) K = 4.5E-08 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

JAN 28 94 WCSOBR9 3B248

Woodward-Clyde Consultants

LOCATION: Jefferson Parish, Louisiana

CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-27
FILE: 93B248C
DATE: 9/30/93
TECHNICIAN: Fontenot
APPROVED:
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 6.5' after an observation period of 15 minutes.

Coordinates: N 461,741 E 2,340,806 Ground Surface Elevation: -1.5'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0										Firm brown and black CLAYS with organic materials (CH)
										—soft, 2'- 4'
5						61		127	95	—firm, 4'- 6'
										—very soft below 6'
10										Very soft gray CLAYS with sandy silt pockets, seams and layers (CH)
15					0.28	80	88	134	100	
20										
25										
30										
35						56		52	33	
40										Bottom of boring at 40'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-31
FILE: 93B248C
DATE: 9/15/93
TECHNICIAN: Bailey
APPROVED:
PAGE: 1 of 1

Dry Augered: 0'- 8' Wash Bored: 8'- 40'

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 5.5' after an observation period of 15 minutes.

Coordinates: N 459,920 E 2,340,296 Ground Surface Elevation: -1.9'

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Organic Content (%)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0				8.0		41		93	56	Stiff brown, gray and tan CLAYS (CH)
5					0.58	31	114	46	23	Medium tan and light gray Silty CLAYS (CL)
10			5 b/f (1)			29				Loose gray SILTS with some sand (ML)
			5 b/f							
			6 b/f (1)							
15			6 b/f			24				
			4 b/f							
20			4 b/f							
			3 b/f (1)			34				
			3 b/f							
25			4 b/f (1)			30				
						53		95	66	Soft gray CLAYS (CH)
30					0.38	69	98	87	57	
35										
40					0.37	54	101	72	49	Bottom of boring at 40'. Borehole grouted full depth.

(1) See grain size distribution curves.

Unified Soil Classifications based on limited laboratory test data and visual observations.

BOTTOM ELEVATIONS AND SIDE SLOPES

Subject : BOTTOM ELEVATION AND SIDE SLOPES
By: S. Togan ALPER Date: March 21, 1995
Checked By: [illegible] Date: 3/30/95

P.Name: RiverBirch
P.number: 95B034-7
1/4

SCOPE:

To determine;
. the bottom elevations at the top of the clay liner,
. the side slopes of the modules,
. the slope of the leachate drainage system at the center of the cell and
. the bottom slope of the leachate collection sump.

REFERENCES:

. Slope Stability Calculation Package
. Settlement Calculation Package
Drawing - Settlement Point Locations
. Site Plan with Cap installed

DEFINITIONS (Figure 1,2)

Mid-crest Line : The final grade of the cap has two different slopes(1(H):6(V) and 5%). As a result of the slope change a crust named **mid-crest** is formed at the point of the slope change. The horizontal ~~protection~~ projection of the mid- crest on to the excavation grade is defined as **mid-crest** line.

Crest Line: The horizontal ~~protection~~ projection of the top crest on to the excavation grade is defined as crest line.

DISCUSSION

LONGITUDINAL SETTLEMENTS RELATIVE TO MODULE BOUNDARIES(Figure 1)

All Modules

. A two phase settlement profile is expected to occur as a result of the cap configuration ,due to the slope change (from 1:6 to 5%) at 180 ft from the module boundary. The analysis using the DEFORM program shows that the expected total settlement to be ~ 4 ft at the module boundary,with 12 feet at the crest (Ref 2.)

. The maximum differential settlement between the leachate collection sump and the mid-crest line is 4.1 ft. resulting in a change of -2.5% of the bottom slope throughout the life of the module. Therefore the bottom slope of the module along the leachate collection system between the mid crest line and the leachate collection sump is initially designed with a slope of 4%. The

bottom of the leachate collection sump will also have a 4% slope.This design will secure a final bottom slope of 1.5% or higher for the entire life of the module.

. An engineering detail will be provided to minimize the internal stresses on geomembrane and clay liners induced from the differential settlements. Refer to related Calculation Package.

Group I (#1,2,15,16,3,4,13,14)

. The maximum expected differential settlement between the mid-crest. line and the crest line of the modules is 0.5 ft.or less over a 320 ft. span which results in a maximum final slope change of .15%. An initial slope of >=1.4 % is used to design the drainage in the longitudinal direction of the module. Therefore even at the closed stage and after all the consolidation settlements are occurred the longitudinal slope will still be >= 1%. (Figure 1,2) (Ref. 2.)

Group II (#5,6,7,8,9,10,11,12)

. The maximum expected differential settlement between the mid-crest. line, and the crest line of the modules is 2.5 ft.or less over a 320 ft. span which results in a maximum final slope change of .8%. An initial slope of >=1.8 % is used to design the drainage in the longitudinal direction of the module. Therefore even at the closed stage and after all the consolidation settlements are occurred the longitudinal slope will still be >= 1%.

CROSSECTIONAL DIFFERENTIAL SETTLEMENTS THROUGH THE MODULE

Regarding differential settlements throughout the cell 1, the modules can be grouped in 2 categories

Group I (#1,2,15,16,3,4,13,14)

In these modules the corner closest to the phase center is expected to settle more relative to the center than at the crest border of the module. .

The reason of this differential is that the centerline of the module is less loaded compared to the corner of the module. Therefore the expected differential settlement along the centerline of these modules between the crest border and mid- crest line is also expected to be less. (Deform results for module #2 are 9.6' and 9.1' respectively compared to 12.1' & 9.6' at module #9) (Ref. 2).

The slope along the centerline of this modules is >=1.4%. Using a lower slope at the

centerline of these modules and the same maximum excavation depth as other modules results in an increase of initial side slopes to >= 2.5%. After the consolidation settlements are achieved and the differential settlements occur, the side slopes are still >=2.0%

Group II (#5,6,7,8,9,10,11,12)

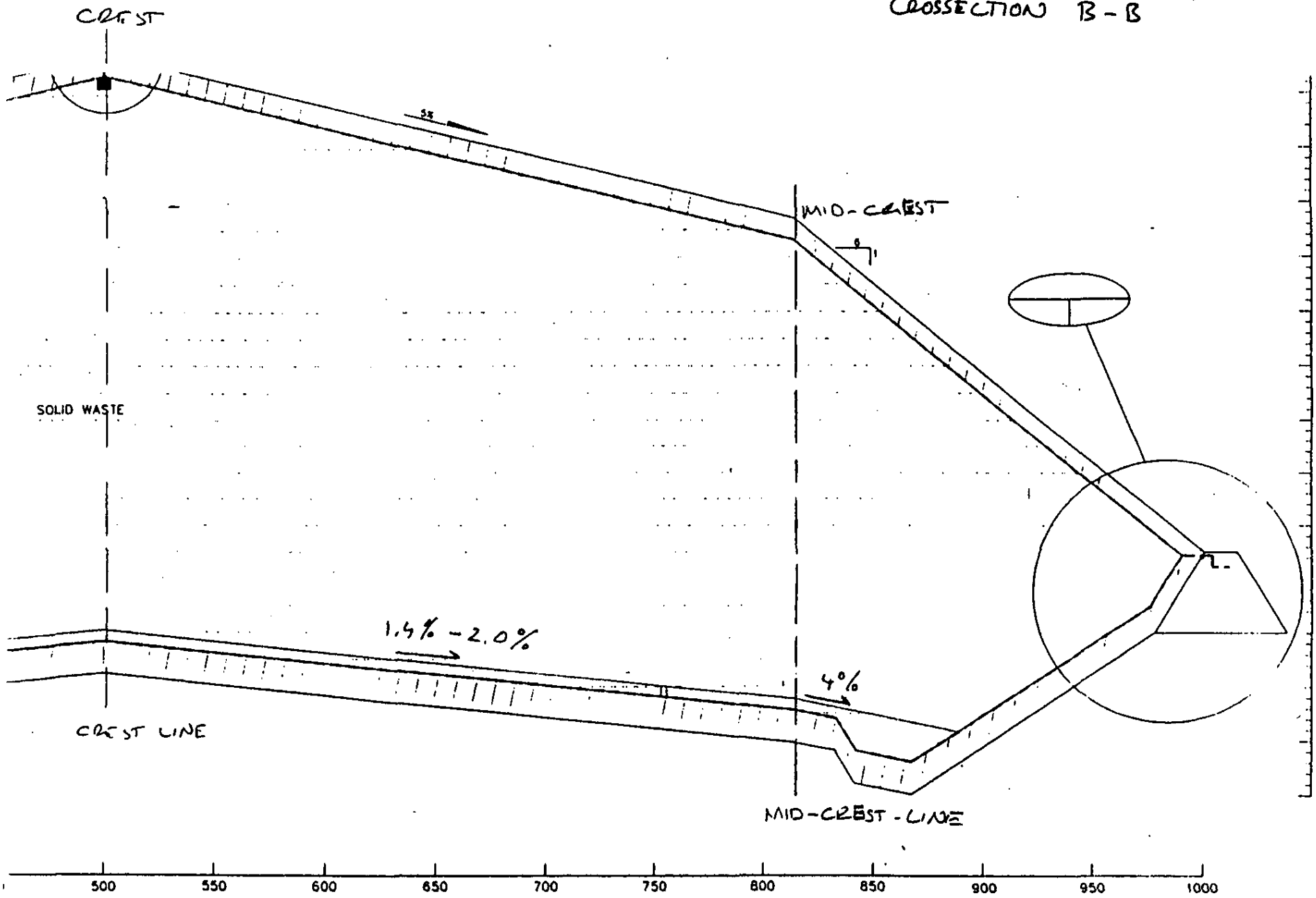
. There is no lateral differential settlement in these modules therefor the slopes are expected to have minor slope changes during the life of the module . The side slopes are designed as 2%.

. At module #8 the differential settlements throughout the module result in increased slopes which has an positive impact on drainage if any.

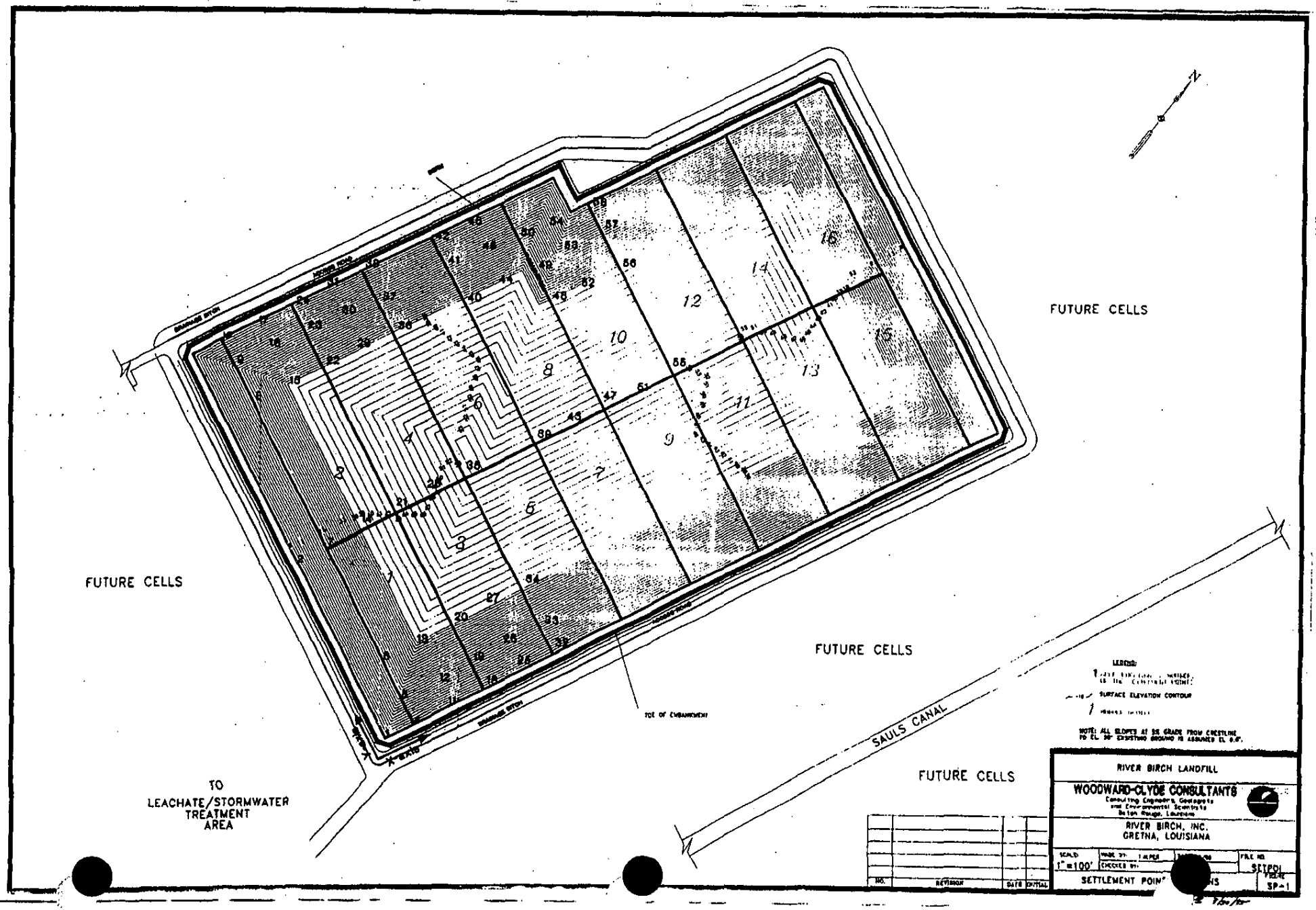
RESULTS

The bottom elevation and slope contours are designed and presented on the related plan according to the discussed design considerations. The excavation elevations and contours are designed using the outcome of this discussions and the liner system design detail thickness. The excavation elevations and slope contours are presented in the related drawing.

FIGU[illegible] SKETCH OF BOTTOM SLOPES [illegible] THE MODULES AT THE MODULE CENTERLINE (REF. DRW - CELL 1, FINAL GRADE) CROSSECTION B-B



Done by: T. ALPER 03/21/95
Ch. Dg:
3/30/95
4/4


FUTURE CELLS
FUTURE CELLS
FUTURE CELLS
FUTURE CELLS
TO
LEACHATE/STORMWATER
TREATMENT
AREA
SAULS CANAL
TOE OF EMBANKMENT
RIVER BIRCH LANDFILL
WOODWARD-CLYDE CONSULTANTS
RIVER BIRCH, INC.
GRETNA, LOUISIANA
1" = 100'
SETTLEMENT POINT
SP-1

OPERATIONAL STRESSES

SUBJECT: OPERATIONAL STRESSES
By: S. Togan ALPER STA. Date:March 17, 1995
Checked By: [illegible] Date: 3/30/95

P.Name: RiverBirch
P.number:95B034-7
OP - 1/5

04/03/95

SCOPE:

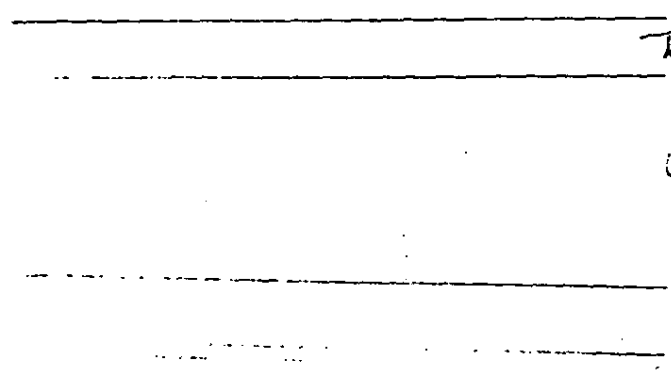
To evaluate the effects of operational stresses on the GM

REFERENCES:

. Designing with Geosythetics by R.M. Koerner, 1990.
. Gradation Package
. Conceptual Liner System

ASSUMPTIONS

. The liner will be subjected to a maximum compressive stress as a result of the following landfill configuration



Topsoil + Clay 4ft @ 110 pcf

Waste 4ft @ 60 pcf

Sand 1ft @ 10 pcf

GM

$\sigma = 4' * 110\,pcf + 60\,pcf * 4\,ft + 1' * 10\,pcf = 3250\,psf = 22.6\,psi$

. The liner system will be underlying by a fine grained clayey soil. The liner will be in direct contact with the soil

. The liner system will be protected by the primary sand layer (12 inches), 1 layer of geotextile and the drainage net

. Coarse aggregate will be used around the sump and leachate collection pipes.

SUBJECT: OPERATIONAL STRESSES
By: S. Togan ALPER STA. Date:March 17, 1995
Checked By: NAS Date: 3/30/95

P.Name: RiverBirch
P.number:95B034-7
OP - 1215

04/07/95

CALCULATIONS

.Review two critical cases to burst and /or puncture;

CASE A. Consider the geotextile above the GM which is in contact with the coarse aggregate bursts or puncture due stresses induced by the waste fill at closure stage.

CASE B. Consider the geotextile above the GM which is in contact with the coarse aggregate bursts or puncture due stresses induced by operational equipment during early stages of the waste placement operation.

CASE A.

. Calculate the required geotextile parameters for stability to minimize the potential for burst and/or puncture,

. Compare selected range of Geotextiles with the filter and retention requirements

. The geotextile is assumed to fail prior to the GM in this case therefor the GM will not be analyzed.

. d_a from gradation package is between 3/8" and 3/4" ===> d_a = 3/4" (conservative)

. use F.S. = 3.0 (Mullen burst)

F.S. = $(3.6 \times P_{test}) / (d_a \times P')$;

P' = 22.6 psi for closed landfill; solve for P_{test};

$P_{test} = 3 \times 0.75 \times 22.6 / 3.6 = 14.2$ psi

P_{test} = 14 psi;

Based on the above calculation any Geotextile with a Mullen burst test result greater than 14 psi is acceptable.

SUBJECT: OPERATIONAL STRESSES
By: S. Togan ALPER STA Date:March 17, 1995
Checked By: MS Date: 3/30/95

P.Name: RiverBirch
P.number:95B034-7
OP - 13/5

Puncture

Assume worse case ;
$.d_i$ = (0.5 - 0.2)mm = (0.0197- 0.0079)
use 0.0197 for worse case;

$.d_a$ = 3/4";
P' = 22.6 psi
s' = 0.3 for gravel
$T_{req} = \pi$ x 0.0197 x 0.75 x 22.6 x 0.3 = 0.31 lbs

using a F.S.=3 any geotextile with a burst resistance greater than 1lb would be acceptable. ✓

CASE B

Assume a D-6 dozer is used to operate the landfill;

Contact pressure ~ 10 psi (no cover in evaluating stress distribution ==> 10 psi at the liner)

Dynamic stress = 1.7 (assumed) x static stress
Dynamic stress = 17 psi

Overburden stress = 2(110)=220 psf = 1.5 psi

Total stress = 18.5 psi

Burst Resistance

F.S. = 3
d"= 3/4"
P' = 18.5

P_{test} = 3 x 0.75 x 18.5 / 3.6

P_{test} = 11.6 ~ 12 psi

SUBJECT: OPERATIONAL STRESSES
By: S. Togan ALPER STA Date:March 17, 1995
Checked By: MAS Date: 3/30/95

P.Name: RiverBirch
P.number:95B034-7
OP - 14/5

Puncture

T_{req} = x 0.0197 x 0.75 x 18.5 x 0.3 = 0.26 psi

using F.S >3 T_{req} = 1 lb.

CONCLUSIONS AND RECOMMENDATIONS

Any geotextile that meet the strength parameters as noted above (mullen burst > 14 psi, puncture resistance > 1 lb) should be sufficient against both final and operational stresses .

The filter retention recommendations will govern the selection of geotextiles

Woodward-Clyde Consultants

Project Notes

S: Operational Stresses

T. ALPEZ SSA Date: 02/29/95

Checked By: NAS Date: 3/30/95

Project Name: River Birch

Project No.: 95R034

Task No.: 7 File No.:

Sheet OP-5 of 5

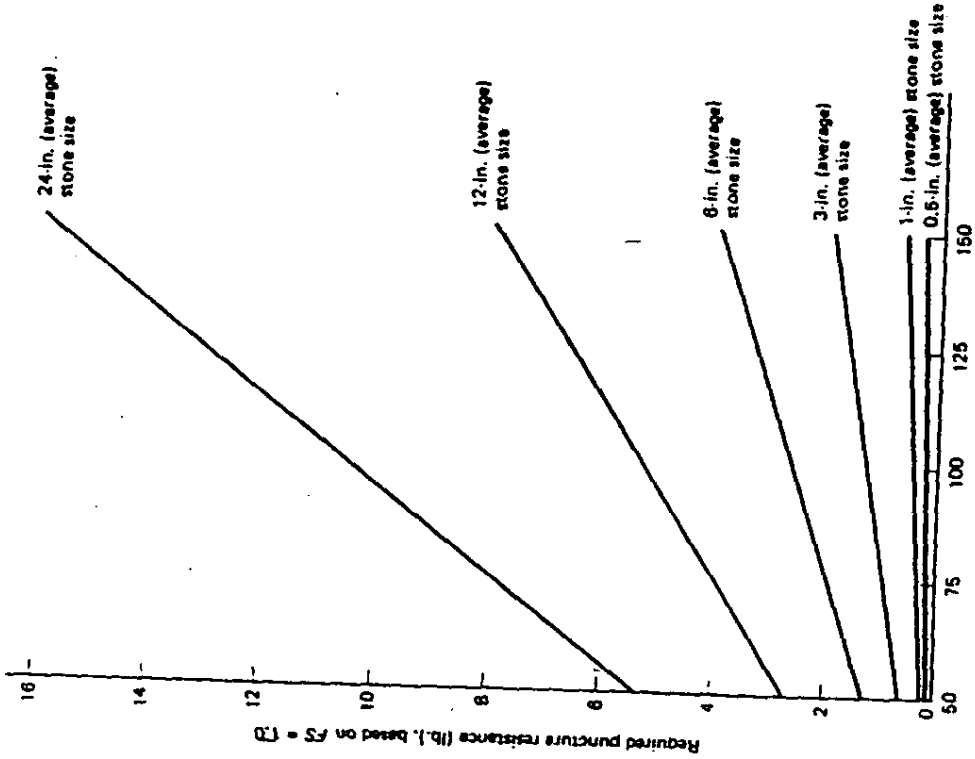


Figure 2.28 Puncture resistance design guide.

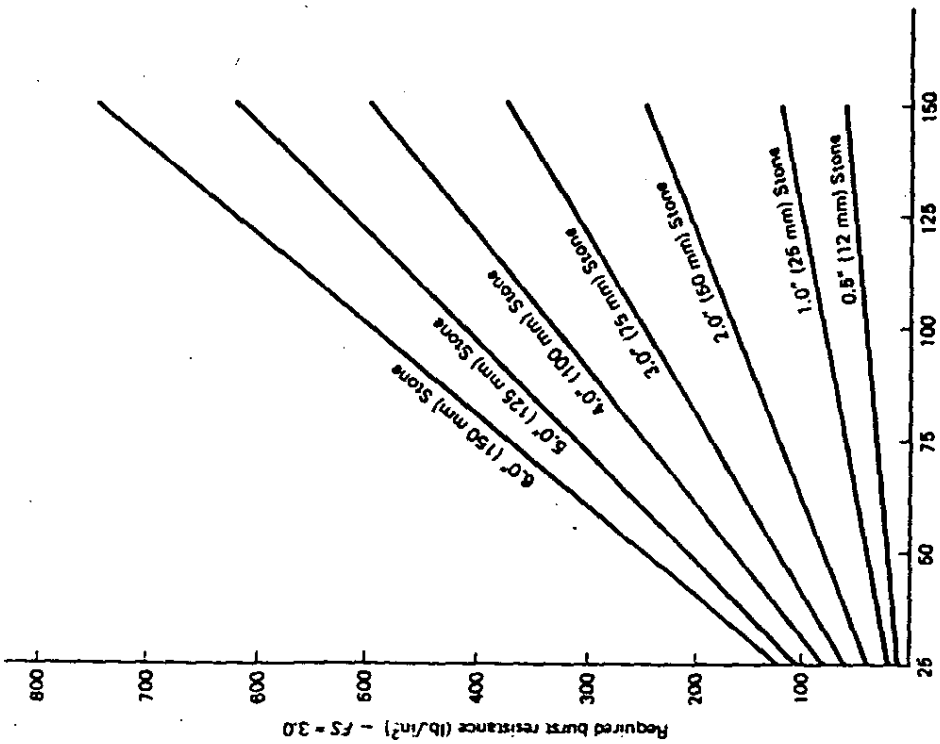


Figure 2.25 Design guide for burst analysis of geotextile used in a separation function based on an FS = 3.0.

Ref. 1

INTEGRITY OF THE LINER SYSTEM

Woodward-Clyde Consultants

Project Notes

Subject: LINER INTEGRITY
T ALPER Date: 07/04/95
Checked By: NAB Date: 4/6/95

Project Name: RIVERBIRD
Project No.: 95B034
Task No.: 7 File No.:
Sheet 1 of 5

SCOPE: TO INVESTIGATE THE EFFECTS OF EXPECTED SETTLEMENTS ON THE INTEGRITY OF THE LINER SYSTEM.

REFERENCES:

- SETTLEMENT CALCULATION PACKAGE
- CELL-1- CROSS-SECTION B-B DRAWING

ASSUMPTIONS

$E_{CLAY} = 2000 psi$

$h_{WASTE (AT SIDE SLOPES)} = 30'$

DISCUSSIONS

THE INTEGRITY OF THE LINER SYSTEMS CAN BE [illegible] IN TWO PARTS.

1. THE INTEGRITY OF THE LINER SYSTEM OVERLYING THE BOTTOM OF THE CELL
2. THE INTEGRITY OF THE LINER SYSTEM OVERLYING THE SIDE SLOPES OF THE CELL

Woodward-Clyde Consultants

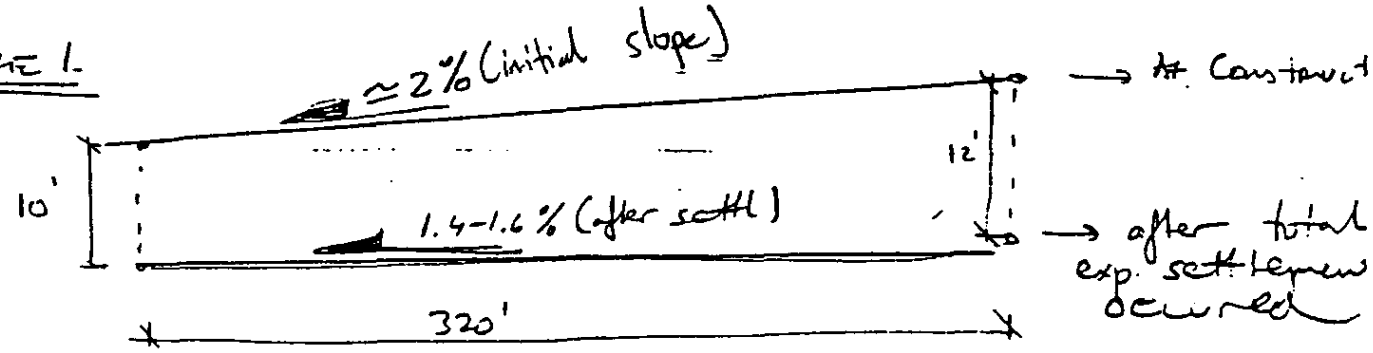
Project Notes

Subject: LINER INTEGRITY
T. AUPEL Date: 03/04/95
Checked By: AB Date: 4/6/95

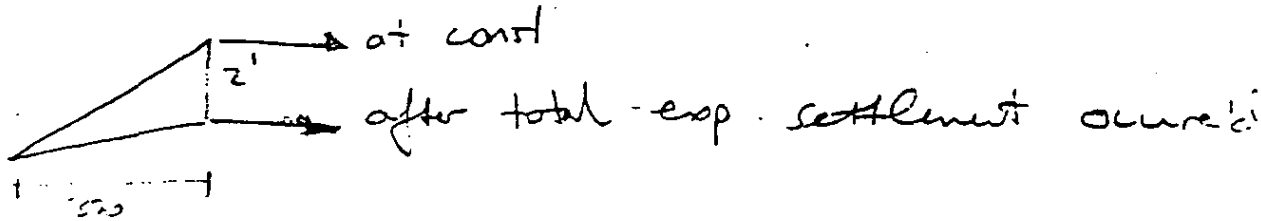
Project Name: RIVERBIRD
Project No.: 95B034
Task No.: 7 File No.:
Sheet 2 of 5

1. THE INTEGRITY OF THE LINER SYSTEM OVERLYING THE BOTTOM OF THE CELL

FIGURE 1.



⇒



⇒ THE EXPECTED DIFFERENTIAL SETTLEMENT INDUCES NEGATIVE (−) STRAIN (→ COMPRESSIVE STRESS), WHIL WILL HAVE A POSITIVE EFFECT ON THE INTEGRITY OF THE LINER SYSTEM.

∴ THE LONG TERM INTEGRITY OF THE LINER IS SAFE

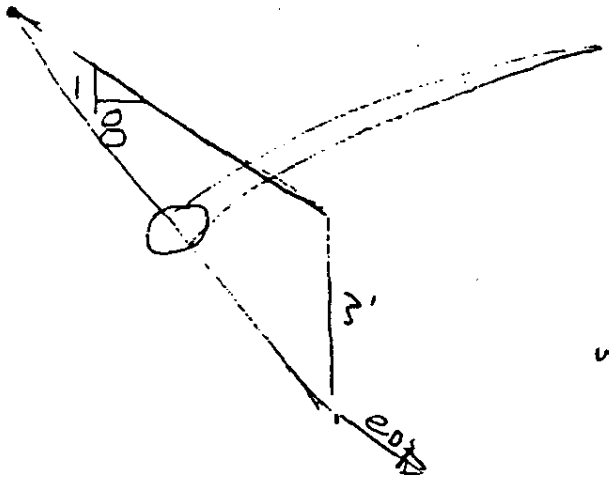
2. THE INTEGRITY OF THE LINER SYSTEM OVERLYING THE SIDE SLOPES OF THE CELL.

. THE BOTTOM OF THE SIDE SLOPE IS EXPECTED TO SETTLE 3' MORE, THAN THE TOP OF THE SLOPE.

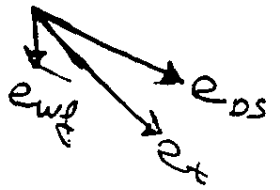
⟹ TENSILE STRESS. (POSITIVE(+) STRAIN)

. FIND THE EXPECTED STRAIN INDUCED BY THE WASTE FILL & DIFFERENTIAL SETTLEMENT

Fig 2



STRAIN DIAGRAM OF THE LINER SYSTEM



where

e_t - total strain

e_{DS} = strain induced by diff. settle.

e_{wf} - strain induced by waste fill

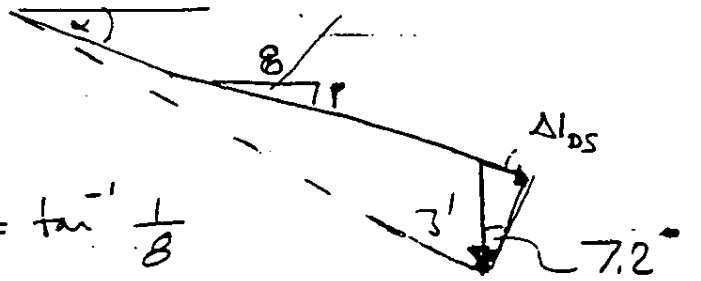
Woodward-Clyde Consultants

Project Notes

Project Name: RIVERBIRD
Project No. 95B034
Task No.: 1 File No.:
Sheet 4 of 5

Subject: LINER INTERIM
By: AJPEL Date: 03/04/95
Checked By: NB Date: 4/6/95

Find e_{DS}



$\alpha = \tan^{-1}\frac{1}{8}$ $\Rightarrow \sin\alpha = \frac{e_{DS}}{3}$

$\alpha = 7.2°$ ✓

$\Rightarrow \Delta l_{DS} = 3' * \sin 7.2°$

$\Delta l_{DS} = .38'$ ✓

$e_{DS} = \frac{\Delta l}{L} = \frac{.38'}{70'} = 0.005$ ✓

$\underline{\underline{e_{DS} = 0.005}}$ ✓

Find e_{WF}

$E = \frac{\sigma_{WF}}{\varepsilon_{WF}}$ $\sigma = h \cdot \gamma_{WASTE} \Rightarrow \varepsilon_{WF} = \frac{h \cdot \gamma_{WASTE}}{E}$

Assume $h_{WASTE} = 30'$

$\gamma_{WASTE} = 60$ pcf

$E = 2000$ psi $= 2.8 \times 10^5$ psf ✓

$\Rightarrow \underline{\underline{e_{WF}}} = \frac{30' \times 60\text{ pcf}}{2.8 \times 10^5\text{ psf}} = \underline{\underline{0.006}}$ ✓

Woodward-Clyde Consultants

Project Notes

Subject: LINER INTEGRITY
T. ALPER Date: 03/04/95
Checked By: MS Date: 4/6/95

Project Name: RVEN [illegible]
Project No.: 95B034
Task No.: 7 File No.:
Sheet 5 of 5

$$e_{TOTAL} = \sqrt{e_{WF}^2 + e_{DS}^2} = \sqrt{0.006^2 + 0.005^2}$$

TOTAL STRAIN $\varepsilon_{TOTAL} = 0.008 = \cancel{8}\ 0.6\ \%$

This is well within the tensile strains of clays
Ref: EPA 625-4-91/025, May 1991
Design & Construction RCRA/CERLA Final Covers
MS 4/61

RESULT

∴ THE INTEGRITY OF THE CLAY LINER WILL NOT BE ADVERSLY EFFECTED BY THE EXPECTED STRAIN.

∴ FOR ADDED FACTOR OF SAFETY & TO PREVENT INTERNAL STRESSES ON THE GEOMEMBRANE (GM), A TWO FOOT LONG FOLD WILL BE PLACED IN THE GM.

CONCLUSION: THE INTEGRITY OF THE LINER SYSTEM WILL NOT BE ADVERSLY AFFECTED BY THE EXPECTED SETTLEMENTS.

- A 2-Feet WIDE FOLD IN THE (GM) WILL BE INSTALLED ON THE SIDE SLOPES OF THE CELL FOR ADDED SAFETY.

PIPE STABILITY

Woodward-Clyde Consultants

Project Notes

Subject: Pipe Stability

R. SeGoll Date: 3/26/94

Checked By: AA Date: 03/31/94

Project Name: River Birch

Project No.: 93B248C

Task No.: File No.:

Sheet PS-1 of PS-8

Scope: Evaluate the stability of the 6 inch diameter HDPE pipe for short and long term conditions.

References:

1. Driscopipe Manual
2. Operational Stress package.

Assumptions:

1. Granular bedding has a relative density of 40-70
2. Vehicular load is perpendicular to pipe.
3. Landfill load is perpendicular to pipe.
4. Granular bedding has unit weight = 125 lbs/ft³
5. Pipe deflection should not exceed allowable of 6.5% for SDR = 26.0. Select SDR = 26.0

Static load for 15-foot trench = (1.5)(125) = 187.5 lbs/ft²

Live load (Ref Chart 30, H20 Highway Load) @ 1-foot = 1,750 lbs

Assume no vacuum load on ID pipe.

Total load/pressure = 187.5 + 1750 = 1937 psf = 13.5 psi

Short Term crushing:

$$S_A = \left(\frac{SDR-1}{2}\right) P_T = \left(\frac{26-1}{2}\right)(13.5) = 169 \text{ psi} \ll 1500 \text{ psi}$$

o.k. crushing is no problem

$$F.S. = \frac{1500}{169} \cong 8.9$$

Subject: Pipe Stability
R. SeGall Date: 3/21/94
Checked By: RA Date: 03/31/94

Critical Collapse

$$PC = \frac{2.32\,E}{(SDR)^3} = \text{(Ref chap 2F)}$$

Assume $E = 29{,}500$ psi for $\sigma = 16.9$ psi; 50 yrs

$$PC = \frac{2.32(29{,}500)}{(26)^3} = 3.89 \text{ psi}$$

Soil Modulus

$$E' = \frac{(P_T)^2}{0.64\,PC} = \frac{(13.5)^2}{0.64(3.89)} = 73.2 \text{ psi w/ F.S. } 3.0$$

$E'_{min} = 219.6$ psi

Deflection

$$E_s = \frac{P_T}{E'_{min}}(100) = \frac{13.5}{219.6}(100) = 6.15 < 6.5\%$$

O.K.

Note: All pipe diameters with the same SDR in the same burial situation have the same critical collapse and critical buckling endurance.

Closed Pull

From TD Operational Stress package $P_2 = 2800$ psf

$P_T = 187.5 + 2800 = 2987.5$ psf $= 20.75$ psi

$$S_A = \frac{(26-1)}{2}(20.75) = 259.4 \text{ psi}$$

$$FS = \frac{1500}{259.4} = 5.8 \quad \text{no crushing}$$

$E = 26{,}000$ psi

$$PC = \frac{2.32(26{,}000)}{(26)^3} = 3.43 \text{ psi}$$

Woodward-Clyde Consultants

Project Notes

Project Name: River Birch
Project No.: 7313248
Task No.: File No.:
Sheet PS-3 of PS-8

Subject: Pipe Stability
R. SeGoll Date: 3/26/94
Checked By: AA Date: 03/31/94

$$E' = \frac{(20.75)^2}{0.64(3.43)} = 196.1 \text{ psi}$$

$$E'_{min\ FS=3.0} = 588.4 \text{ psi}$$

$$\varepsilon_s = \frac{20.75}{588.4}(100) = 3.5\% < 6.5\%$$

Recommend use of HDPE pipe with SDR of at least 26 for the leachate collection system

Review Chart 24 as check:
Note SDR of 26 w/ Soil Modulus 3000 psi (granular backfill, indicates a maximum burial depth of 52-feet which is less than the site depth of 30 feet.

PS-4/8

Where: S_A = Actual compressive stress, psi
SDR = Standard Dimension Ratio
P_e = External Pressure, psi

Safety Factor = 1500 psi ÷ S_A where 1500 psi is the Compressive Yield Strength of Driscopipe.

Design by Wall Buckling: Local wall buckling is a longitudinal wrinkling of the pipe wall. Tests of *non-pressurized* Driscopipe show that buckling and collapse do not occur when the soil envelope is in full contact with the pipe and is compacted to a dense state. However, it can be forced to occur over the long term in *non-pressurized* pipe if the total external soil pressure, P_t, is allowed to exceed the pipe-soil system's critical buckling pressure, P_{cc}. If $P_t > P_{cc}$, gradual collapse may occur over the long term. A calculated, conservative value for the critical buckling pressure may be obtained by the following approximate formula. All pipe diameters with the same SDR in the same burial situation have the same critical collapse and critical buckling endurance

$$P_{cc} = 0.8\sqrt{E' \times P_c}$$

Where:

P_t = Total vertical soil pressure at the top of the pipe, psi

P_{cc} = Critical buckling soil pressure at the top of the pipe, psi

E' = Soil modulus in psi calculated as the ratio of the vertical soil pressure to vertical soil strain at a specified density

P_c = Hydrostatic, critical-collapse differential pressure, psi

$$P_c = \frac{2E(t/D)^3(D_{MIN}/D_{MAX})^3}{(1-\mu^2)}$$

$$P_c = \frac{2.32E}{(SDR)^3}$$

Where: $(D_{MIN}/D_{MAX}) = .95$
μ = Poission's Ratio
$\mu = .45$ for Driscopipe
E = stress and time dependent tensile modulus of elasticity, psi

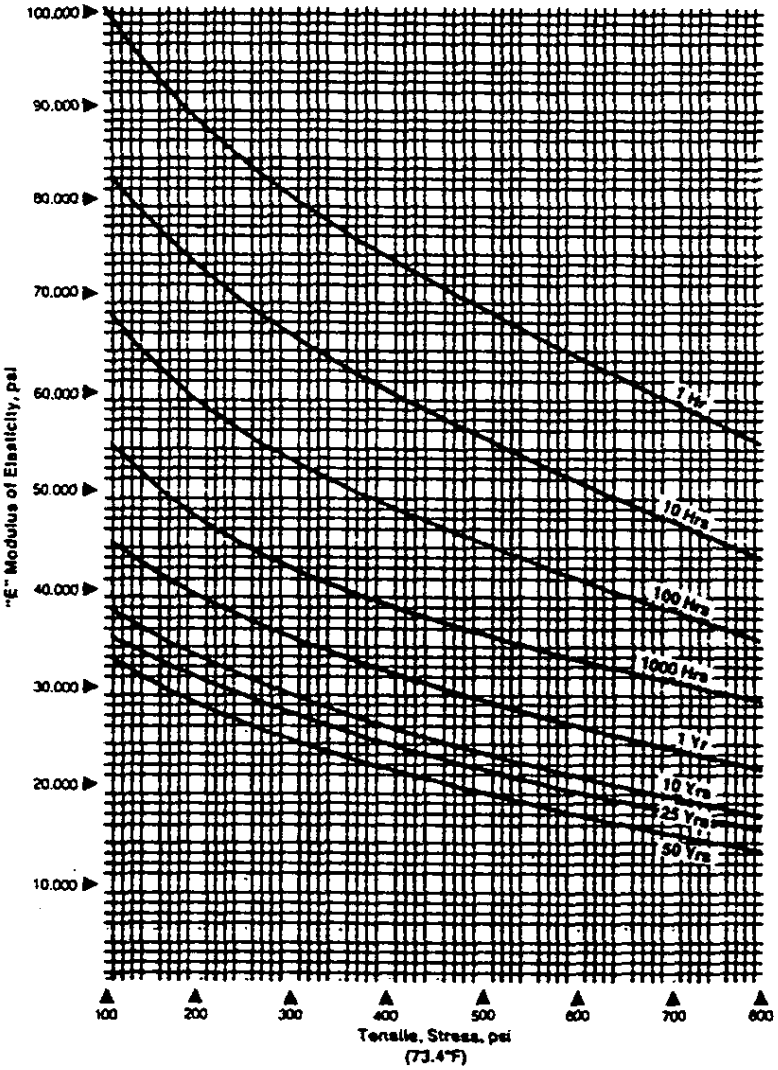
In a direct burial pressurized pipeline, the internal pressure is usually great enough to exceed the external critical-buckling soil pressure. When a pressurized line is to be shut down for a period, wall buckling should be examined.

Design by Wall Buckling Guidelines:
Although wall buckling is seldom the limiting factor in the design of a Driscopipe system, a check of non-pressurized pipelines can be made according to the following steps to insure $P_t < P_{cc}$.

1. Calculate or estimate the total soil pressure, P_t, at the top of the pipe.
2. Calculate the stress "S_A" in the pipe wall according to the formula:
$$S_A = \frac{(SDR - 1)P_t}{2}$$
3. Based upon the stress "S_A" and the estimated time duration of non-pressurization, use Chart 25 to find the value of the pipe's modulus of elasticity, E, in psi.

Chart 25

Time Dependent Modulus of Elasticity for Polyethylene Pipe vs. Stress Intensity (73.4°F)



NOTE: The short term modulus of elasticity of Driscopipe per ASTM D 638 is approximately 100,000 psi. Due to the cold flow (creep) characteristic of the pipe material, this modulus is dependent upon the stress intensity and the time duration of the applied stress.

4. Based upon the pipe SDR and the value of the polyethylene modulus of elasticity, E, calculate the pipe's hydrostatic, critical-collapse differential pressure, P_c.

$$P_c = \frac{2.32\,(E)}{(SDR)^3}$$

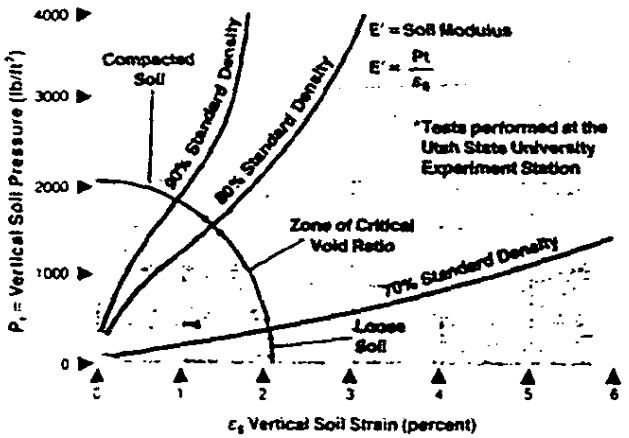
5. Calculate the soil modulus, E', by plotting the total external soil pressure, P_t, against a specified soil density to derive the soil strain as shown in the example problem on Chart 26.
6. Calculate the critical buckling pressure at the top of the pipe by the formula:

$$P_{CB} = 0.8\sqrt{E' \times P_c}$$

7. Calculate the Safety Factor: S.F. $= P_{CB} \div P_t$
   In burial applications, a safety factor of 1.0 may be considered a minimum because of the margin of safety provided by the arching action of the soil. However, Driscopipe endorses using a more conservative value approaching or exceeding a 2.0 safety factor.
8. The above procedures could be reversed to derive the minimum pipe SDR required for a given soil pressure and an estimated soil density. However, this procedure should permit the engineer to optimize the system design quickly by examining several combinations.

Chart 26

Plot of Vertical Stress-Strain Data for Typical Trench Backfill (Except Clay) from Actual Tests*



EXAMPLE

Find: E' @ 2000 PSF and 80% Density
Formula: $E' = P_t / \varepsilon_s$
Calculations: $E' = 2000\ PSF / .018 = 111111\ PSF = 771\ psi$

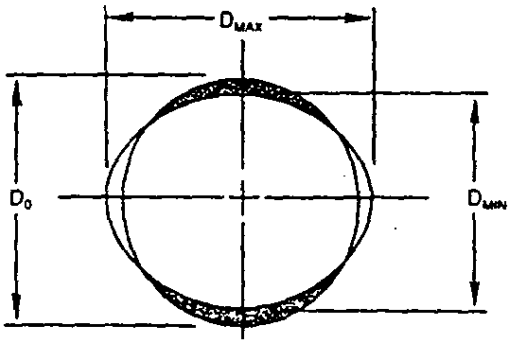
Note: The curves shown on this chart are sample curves for a granular soil. If other types of soil are used for backfill, such as clay or clay loam, curves should be developed from laboratory test data for the material used. Soil pressures greater than 4000 psi may be examined by extrapolating the slope of the curve or by generating curves by testing at those higher soil pressures. Probable error of curves is about half the distance between adjacent lines.

Design by Ring Deflection: Ring deflection is defined as the ratio of the vertical change in diameter to the original diameter. It is often expressed as a percentage. Ring deflection for buried Driscopipe is conservatively the same as (no more than) the vertical compression of the soil envelope around the pipe. Design by ring deflection matches the ability of Driscopipe to accommodate, without structural distress, the vertical compression of the soil enveloping the buried pipeline. *Design by ring deflection comprises a calculation of vertical soil strain to ensure it will be less than the allowable ring deflection of the pipe.* See Chart 27. The tabulation shows that with lower values of SDR, the allowable deflection is less. For installations which require thicker wall to resist the external soil pressure, actual ring deflection can easily be limited to the tabular values by proper compaction of the backfill around the pipe. The recommended allowable deflection for the various SDR's are:

Chart 27

SDR	Allowable Ring Deflection
32.5	8.1%
26.0	6.5%
21.0	5.2%
19.0	4.7%
17.0	4.2%
15.5	3.9%
13.5	3.4%
11.0	2.7%

The allowable ring deflection of polyethylene pipe is a function of the allowable tangential strain in the outer surface of the pipe wall. A conservative limit of 1-1½% tangential strain in the outer surface of the pipe wall due to vertical deflection of the pipe "ring" by soil compression can be understood by comparing two pipes of the same diameter but different wall thickness.



$$\%\ \text{Ring Deflection} = \left(1 - \frac{D_{MIN}}{D_0}\right) \times 100\%$$

NOTE: 5% deflection decreases flow-area by ¼%. 10% deflection decreases flow-area by 1%.

P_v: Apparent External Pressure Due To Vacuum:

3 psi × 144 = 432 psf

TOTAL EXTERNAL PRESSURE: $P_t = P_s + P_w + P_v$

P_t = 1390 psf + 99 psf + 432 psf = 1921 psf = 13.34 psi

Burial Design Guidelines: By combining the Burial Design Considerations with the Total External Soil Pressure, calculated by components, the designer can select the proper pipe SDR and specify the soil density to engineer into the pipeline the desired performance of the "pipe-soil" system. The following guidelines are presented for evaluation when designing a specific Driscopipe system. Because various parameters are available, in different situations, the guidelines may be approached in a mixed order or the equations may require mathematical rearrangement. These guidelines, along with the following notes and sample problem, should be helpful:

1. Calculate by components the total external soil pressure, P_t, at the top of the pipe.
2. Examine Short Term Wall Crushing by calculating the compressive stress in the wall of the pipe at the springline:

$$S_A = \frac{(SDR - 1)\,P_t}{2}$$

(a) If $S_A < 1500$ psi proceed to #3
(b) If $S_A > 1500$ psi consider a heavier pipe wall

3. Calculate the critical-collapse pressure, P_C, from this formula using the time dependent modulus of elasticity, E, rated at the stress level calculated above in #2 (see Chart 25).

$$P_C = \frac{2.32\,E}{(SDR)^3}$$

4. Examine Wall Buckling of the pipe-soil system. By assuming the critical buckling pressure, P_{cb}, equals the pressure at the top of the pipe, P_t (see #1), and by using the critical pressure, P_C, calculated in #3, the basic soil modulus, E', required to resist buckling can be calculated by:

$$E' = \frac{(P_{cb})^2}{.64\,(P_C)}$$

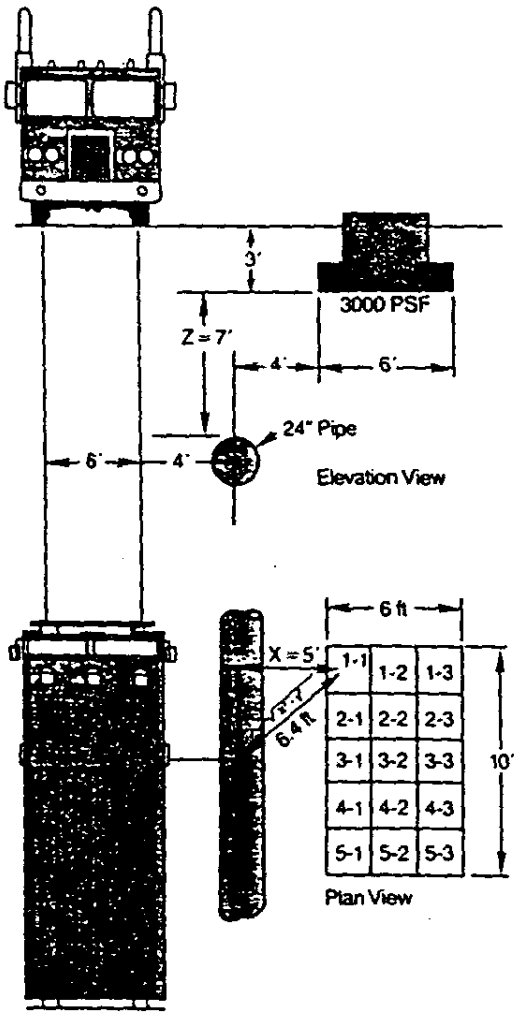
5. To safeguard against wall buckling, multiply E' by a reasonable safety factor (S.F.) equal to or greater than 2.0.

$$E'_{MIN} = (E')(S.F.)$$

6. Calculate pipe deflection based upon the principle that its deflection will be the same as the backfill surrounding the pipe under the influence of the soil pressure at the top of the pipe:

$$\%\ \text{Soil Strain} = \xi_S = \frac{P_t}{E'_{MIN}} \times 100$$

7. Examine allowable Ring Deflection for the specific SDR under consideration to insure the pipe deflection (#6) is less than the allowable deflection for that SDR (See Chart 27).
   - If the actual deflection exceeds the permissible value, increase E', the soil strength modulus, and recalculate #6. The other alternative is to consider another SDR at #1.
   - If the predicted deflection is less than the allowable value, proceed to #8.
8. Specify the primary backfill soil density matched to the soil pressure, P_t, and the calculated soil strain, ξ_S, by using soil stress/strain curves developed from field specimens or from Chart 26 on page 38.



wheel or axle weight should be increased by 50% to provide a pipe design with extra strength and endurance against the impact of these dynamic forces. The load at the top of the pipe caused by a superimposed dynamic load at point "A" is evaluated as:

$$P_B = \frac{3WZ^3}{2\pi R^5}$$

Where: W = 1½ times the superimposed dynamic load, pounds.

Z = Vertical distance from the point of load to the top of the pipe, feet.

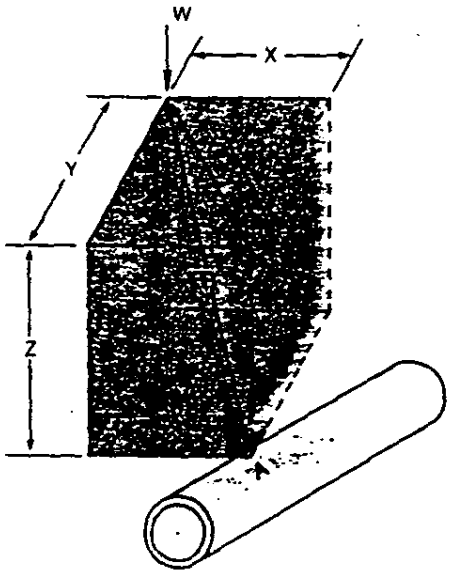
R = Straight line distance from point of load to the top of the pipe, feet.

$$R = \sqrt{X^2 + Y^2 + Z^2}$$

X and Y = Horizontal distances at 90° to each other from point of load to the top of the pipe, feet.

Unit underground pressures caused by a 1000 pound superimposed dynamic load is shown in Chart 28. Unit pressures for superimposed live loads can be obtained by multiplying the chart value by 1½ times the load ratio. Alternately, for heavy truck or railroad traffic, Charts 30 and 31 summarize the total pressure due to the weight of the soil alone together with the weight of the rolling vehicle. An allowance for impact is included in each of these two charts.

These graphs show that, beyond an optimum depth, the total pressure on the pipe increases due primarily to soil pressure. At shallower depths the load intensifies because it is nearer the rolling equipment and the live load is not as well distributed.



Note: If the live load pressure exceeds the capability of a specific SDR pipe for a specific traffic situation, the designer may want to consider the use of a steel or reinforced concrete casing to protect the pipeline.

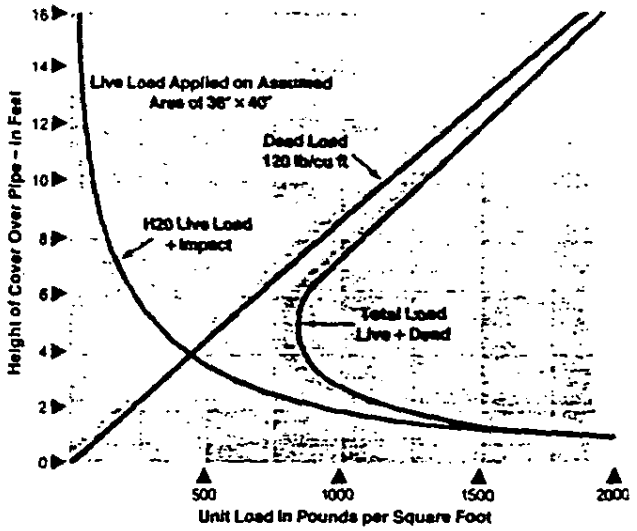
P_i: Apparent External Pressure Due to Internal Vacuum:

Positive pressure generates a tensile hoop stress in the pipe wall. Under its influence the pipe will be trying to expand. The pressure of the soil around the pipe will be trying to crush the pipe as shown in this illustration.

In a positive pressure situation, the value of P_i is negative and theoretically should be subtracted from the other two external pressure components of P_i because it is counteracting the external soil pressure. However, a pipeline should not be designed such that internal pressure is required to support the pipeline to prevent collapse from soil pressure. At some point in the system's operations, the pipeline will be shut down. The support offered by positive pressure against collapse by external soil pressure should be viewed as a means of adding additional

Chart 30

H20 Highway Loading



Note: The H20 live load assumes two 16,000 lb. concentrated loads applied to two 16" x 20" areas, one located over the point in question, and the other located at a distance of 72" away. In this manner, a truckload of 20 tons is simulated.

Source: American Iron and Steel Institute, Washington, D.C.

Simplified Burial Design: A conservative estimate of the ability of Driscopipe pipelines to perform in a buried environment is found in Chart 24. It is based on a minimum 2:1 safety factor and 50 year design service life. A detailed burial design starts on page 37. The detailed design should be used for critical or marginal applications or whenever a more precise solution is desired.

Detailed Burial Design:

Design by Wall Crushing: Wall crushing would theoretically occur when the stress in a pipe wall, due to the external vertical pressure, exceeded the long-term compressive strength of the pipe material. To ensure that the Driscopipe wall is strong enough to endure the external pressure the following check should be made:

$$S_c = \frac{(SDR - 1)}{2} P_T$$

Values of E'

Based on Soil Type (ASTM D2321) and Degree of Compaction

Soil Type of Initial Backfill Embedment Material	Description	E' (psi) for Degree of Compaction (Proctor Density, %)			
		Loose	Slight (70-85%)	Moderate (85-95%)	High (95%)
I	Manufactured angular, granular materials (crushed stone or rock, broken coral, cinders, etc.)	1,000	3,000	3,000	3,000
II	Coarse grained soils with little or no fines	N.R.	1,000	2,000	3,000
III	Coarse grained soils with fines	N.R.	N.R.	1,000	2,000
IV	Fine-grained soils	N.R.	N.R.	N.R.	N.R.
V	Organic soils (peat, muck, clay, etc.)	N.R.	N.R.	N.R.	N.R.

N.R. = Not Recommended for use by ASTM D2321 for pipe wall support

Chart 24

SDR	Maximum Burial Depth, ft. in dry soil of 100 lbs/cu. ft.			Maximum External Pressure psi			Maximum Deflection, % after installation		
	Soil Modulus, psi*			Soil Modulus, psi*			Soil Modulus, psi*		
	1000	2000	3000	1000	2000	3000	1000	2000	3000
32.5	25	32	37	17	22	26	1.7	0.9	0.6
26	33	45	52	23	31	36	2.3	1.2	0.8
21	46	61	71	32	42	49	3.2	1.6	1.1
19	52	69	81	36	48	56	3.6	1.8	1.2
17	61	121	181	42	84	126	4.2	2.1	1.4
15.5	56	112	168	39	78	117	3.9	2.0	1.3
13.5	49	98	147	34	68	102	3.4	1.7	1.1
11	39	78	117	27	54	81	2.7	1.4	0.9
9.3	33	68	101	23	47	70	2.3	1.2	0.8
8.3	30	61	89	21	42	62	2.1	1.1	0.7
7.3	26	52	79	18	36	55	1.8	0.9	0.6

*assumes no external loads

LEACHATE COLLECTION PIPE

Woodward-Clyde Consultants

Subject: LEACHATE COLLECTION PIPE
TOCAN AVE Date: 03/20/95
Checked By: MS Date: 3/20/95

Noted
QA
04/02/95

Project Notes

Project Name: RIVERBIRCH
Project No. 95B074
Task No. 7 File No.
Sheet 4-1 of 4

- SCOPE: TO DETERMINE THE SIZE OF THE LEACHATE COLLECTION PIPE.

- REFERENCES: o "SOLID WASTE DISPOSAL FACILITY CRITERIA", TECHNICAL MANUAL, EPA,
  - o LEACHATE GENERATION PACKAGE

- CALCULATIONS

- Spacing between collection pipes = 200'
  → AREA CONTRIBUTING TO EACH LEACHATE COLL. PIPE = 200

- FROM THE HELP MODEL OUTPUTS (REF 2)
  Ave. Monthly Total PERCOLATION = 3" – 6" per month
  FOR DESIGN use maximum
  ⟹ Percolation = 6"/per month.

- Figure 4.9 (Ref 1) (attached)
  For Perc = 6"/month & Δ = 200"
  Q = 18 gpm for 1000" of pipe
  → Q = 9 gpm for 500" of pipe (module lenght)

- Figure 4-10 (Ref 1.) (attached)
  For Q = 9 gpm & Slope = 1% D = 4'

Woodward-Clyde Consultants

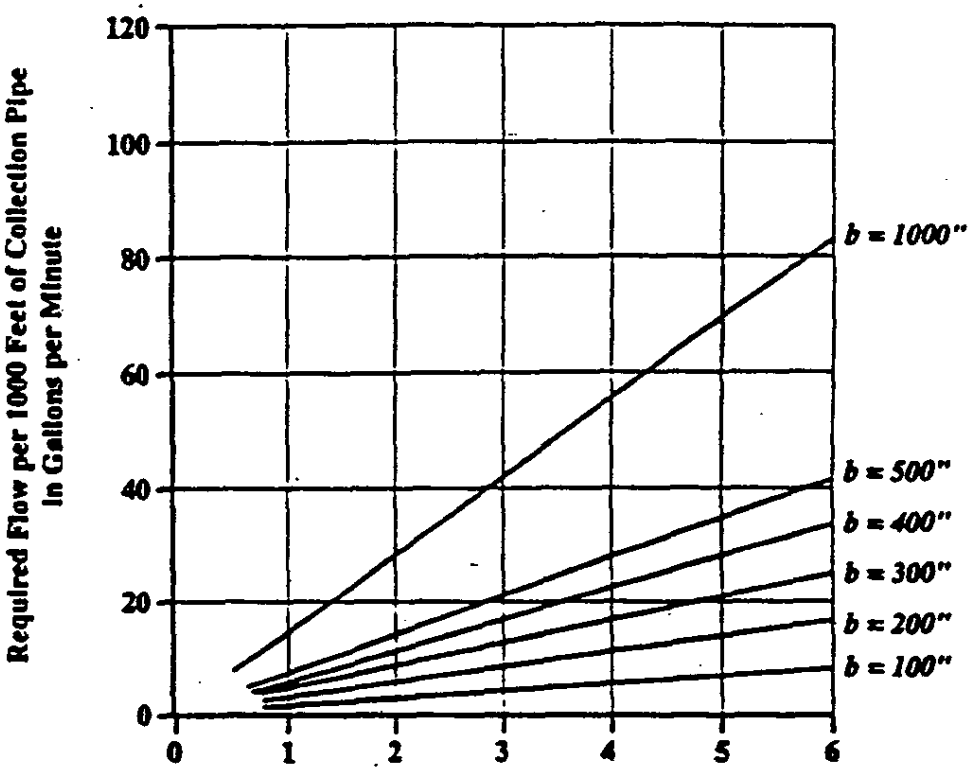
Project Notes

Subject: LEACHATE COLLECTION PIPE
Project Name: RIVERBIRCH
Project No.: 95B054
Task No.: 7 File No.
Sheet LP-2 of 4
Checked By: MF Date: 3/30/95

USE 6" DIAMETER PIPE (Minimum Standard)

RESULTS:

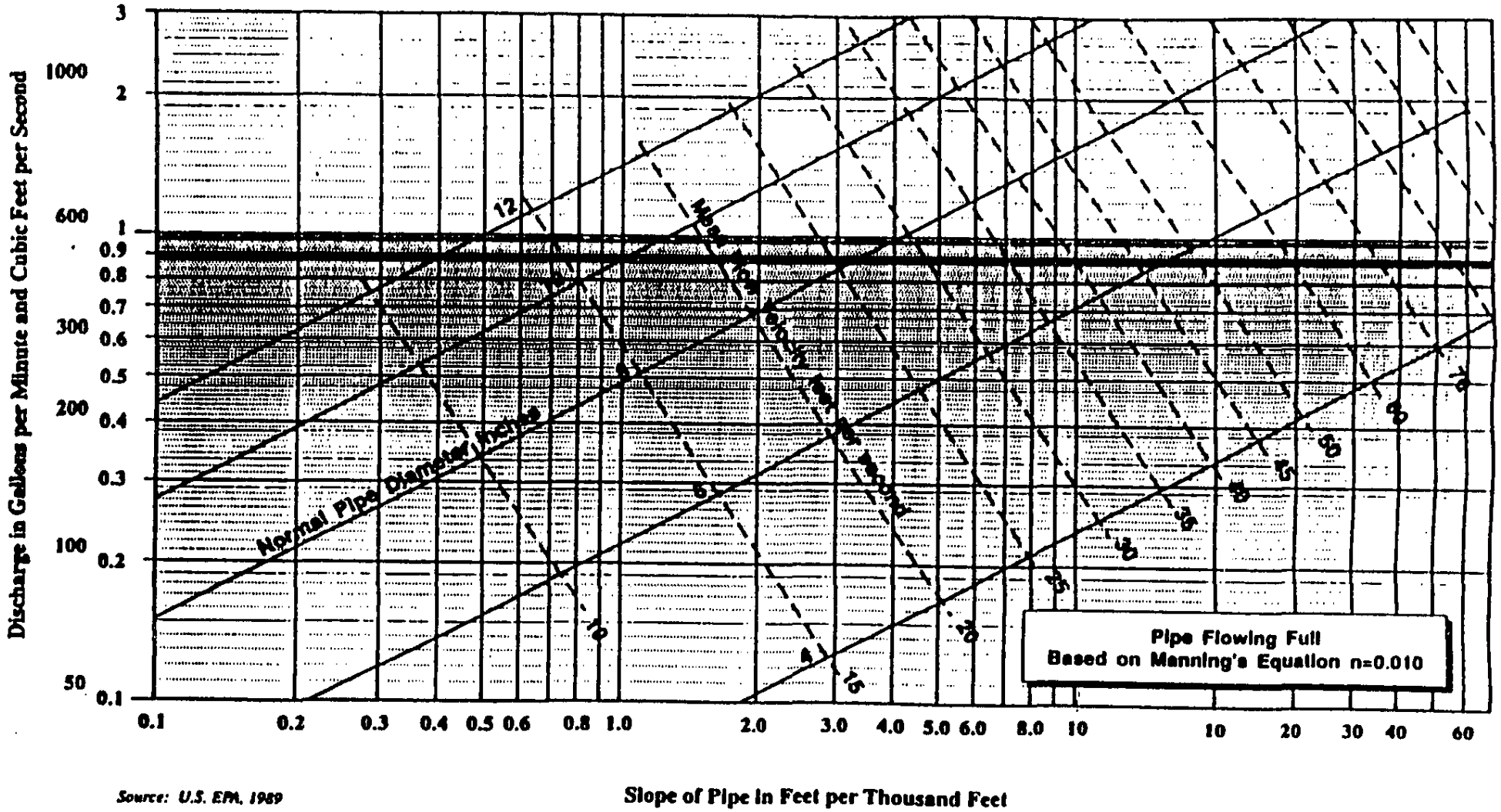
6" DIAMETER PIPES WILL BE USED IN LEACHATE COLLECTION TRENCHES.
The DETAIL OF THE TRENCHES AND DIMENSIONS ARE PRESENTED IN RELATED DRAWING.



*Where b = width of area contributing to leachate collection pipe

Source: U.S. EPA, 1989

Figure 4-9. Required Capacity of Leachate Collection Pipe

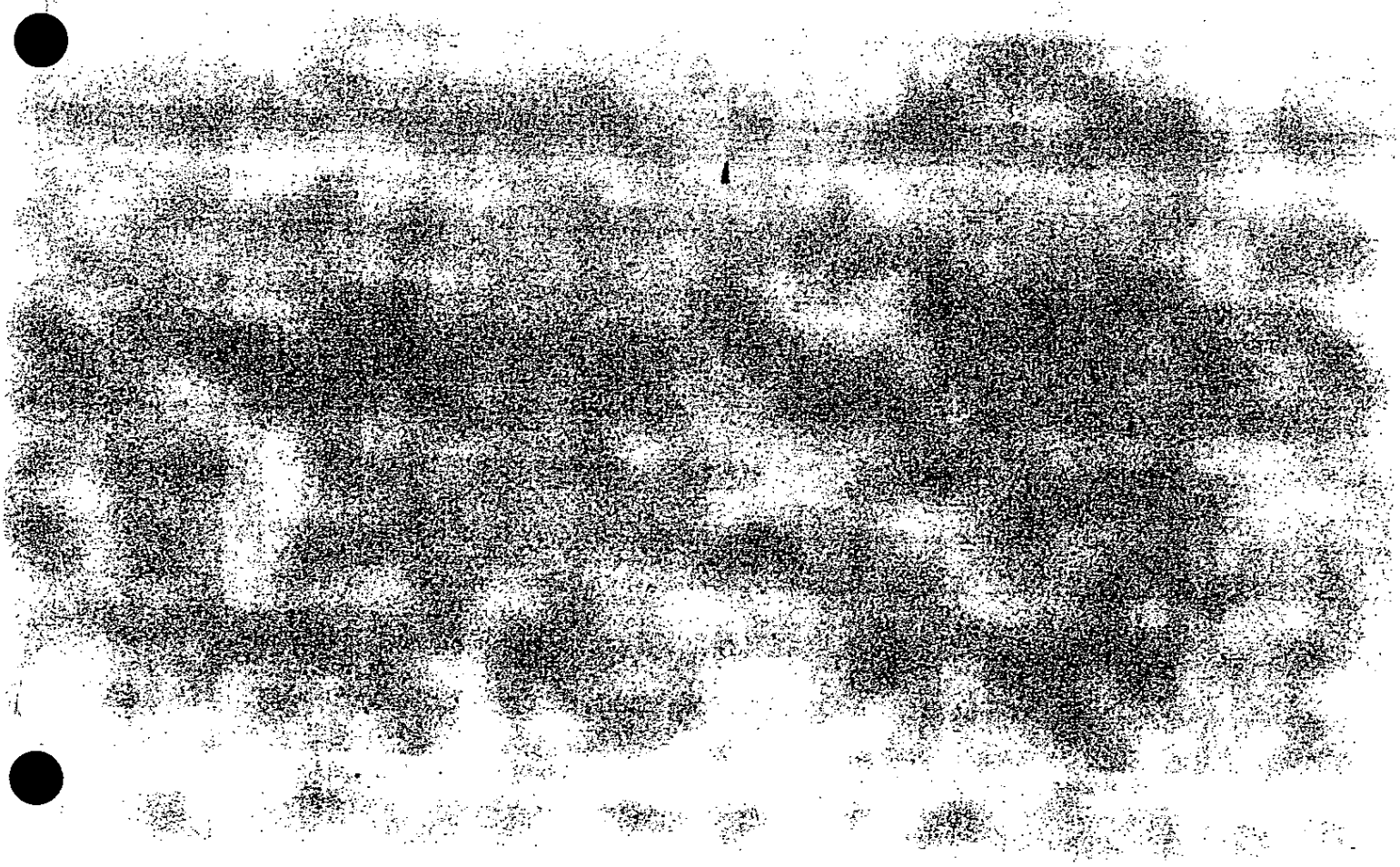


Source: U.S. EPA, 1989

Figure 4-10. Leachate Collection Pipe Sizing Chart

LP-41
AKS 3/30/95

PIPE PERFORATIONS



Woodward-Clyde Consultants

Project Notes

Subject: Pipe Perforations
R. SeGall Date: 2/27/94
Checked By: [illegible] Date: 03/31/94

Project Name: River Birch
Project No. 93B2148C
Task No. _____ File No. _____
Sheet PP-1 of PP-2

Scope: Estimate the maximum perforation size in the leachate collection pipes in the main drainage lines.

References

1. Design and Construction of Levees, EM-1110-2-19
2. Gradation Package

Assumptions

1. The pipe perforations are limited to the main collection path areas
2. The main collection pipes will be wrapped with geotextile and packed with ASTM C-33 No. 57 coarse aggregate. The geotextile shall be a nonwoven type as specified for filter retention. NS 4/31
3. Leachate collection pipe is 6-inch diameter HDPE with SDR wall thickness.
4. Assume a worse case scenario occurs if the geotextile wrap is torn or damaged in such a way that the gravel pack is in direct contact with the pipe.

From Ref. 1.

Circular Opening $\frac{\text{50\% of filter material}}{\text{hole diameter}} \geq 1.0$

Slotted Opening $\frac{\text{50\% of filter material}}{\text{slot width}} \geq 1.2$

This criteria is applicable for preventing infiltration of gravel into the perforated pipe

Woodward-Clyde Consultants

Project Notes

Subject: Pipe Perforations

R. Se Goll Date 2/27/94

Checked By: Date:

Project Name Ruer Birch

Project No. 93B 248C

Task No. File No.

Sheet PP-2 of PP-2

From the gradation package: D_{50} is between 3/8" & 3/4'
To be conservative use 3/8".

$$\text{Circular Opening} = \frac{0.375}{HD} \geq 1.0$$

$$\text{Hole Diameter} \leq 0.375''$$

$$\text{Slotted Opening} = \frac{0.375}{SW} \geq 1.2$$

$$\text{Slotted width} = \leq 0.312 \text{ inches}$$

Recommendations

Use a hole size less than 3/8-inch or slot width of 1/4-inch.

FML SUPPORT

Woodward-Clyde Consultants

Project Notes

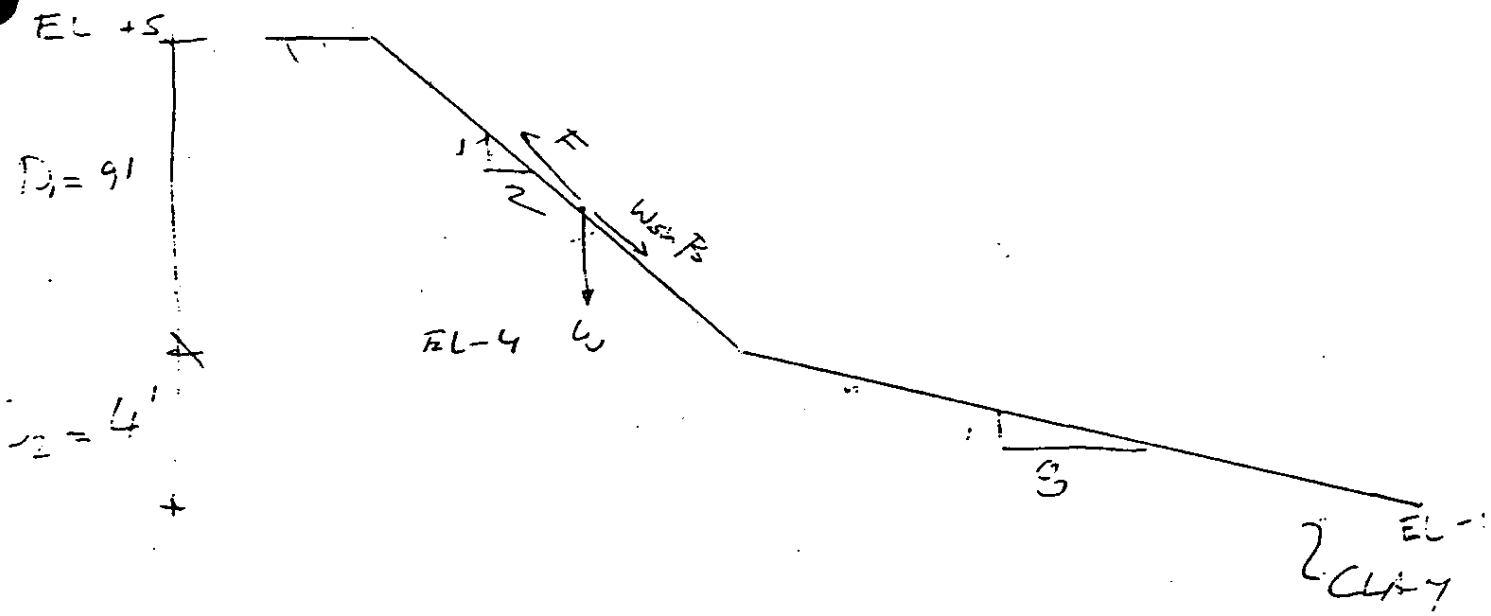
Subject: FML SUPPORT
T. ALPER Date: 02/29/95
Checked By: MS Date: March 12, 1995

EIA 04/03/95

Project Name: RIVERBIRCH
Project No.: 95 B034 -
Task No.: 7 File No.:
Sheet FML-1 of 5

SCOPE: EVALUATE THE ABILITY TO RESIST THE TENSILE FORCES ON THE SIDE SLOPES & TO SUPPORT [illegible] WEIGHT AT THE CAP.

REFERENCES
1. DESIGNING WITH GEOSYTHETICS BY Robert Koerner, 1990
2. Geosynthetics Design Guidance for Hazardous Waste Landfill Cells & Surface Impoundments, G.N. [illegible] [illegible] & [illegible] Koerner, 1987



Woodward-Clyde Consultants

Project Notes

Project Name: RWRR Burn
Project No.: 95B034
Task No.: 7 File No.:
Sheet TML-2 of 5

Subject: FML Support
T. Alper Date: 02/27/95
Checked By: MAS Date: March 12, 1995

ASSUMPTIONS: .60 mil HDPE geomembrane
- Tensile strength 140 lbs/inch
- $\delta = 12°$ between GM & Clay

- Since 8H:1V slope = 7.1° < 12° no stress will be developed on the GM at the bottom slope. The FML will be able to support itself along the [illegible] (-4 ft to -8 ft)

- The [illegible] force induced by the [illegible] will be calculated.

CALCULATIONS: $\beta = \tan^{-1}(\ldots) = 26°$

Tensile Force $T = \underbrace{W \sin\beta}_{\text{component}} - \underbrace{F}_{\text{force}}$

$W_{\text{[illegible]}} = [illegible] \text{ lb/ft}^2 \left(\frac{[illegible]}{[illegible]}\right) \frac{9}{\sin 26°} = 6.03$ [illegible]

$F = W \cos\beta \tan\delta = 6.03 * (\cos 26)(\tan 12) =$
$F = 1.15$ ✓

Woodward-Clyde Consultants

Project Notes

Subject: FML SUPPORT
J. ALPER Date: 02/29/98
Checked By: NKS Date: March 12, 1995

Project Name: RIVERSIDE
Project No.: 95B034
Task No.: 7 File No.:
Sheet: FML-3 of 5

$T = W \sin\beta - F$

$= 6.03 \cdot \sin 26 - 1.15$

$T = 1.50$ lbs/ft $\lll$ 1680 lb/ft (Tensile strength)

- This confirms that the membrane is capable to resist the tensile forces at the side slope. There will be a minor stress of $\simeq 1.5$ lbs/ft on the membrane. In order to prevent sliding during construction the GM should be temporarily stabilized by placing sandbags on the top of the GM at the top of the slope, until the top end [illegible] the anchor trench.

- At the final cover both of the slope (1V·6H & 5%) are less than the [illegible] between the clay & GM & $\delta = 0$ [illegible] will be [illegible], therefore the [illegible] will support itself on this slopes. There will be minimum if any tensile stresses on the GM.

SUMMARY OF INTERFACE SHEAR STRENGTH TESTS: KETTLEMAN HILLS REPOSITORY

Interface Components	Conditions	DIRECT SHEAR TESTS Residual Friction Angle: ϕ_r	PULLOUT BOX TESTS Residual Friction Angle: ϕ_r	Values Proposed for Stability Analyses
HDPE Liner/Geotextile	Dry, Unpolished Dry, Part. Polished Dry, Polished	9.5° to 12.5° 9.0° to 11.0° 8.5° to 10.5°	9.5° (1 Test) --- 8.0° (1 Test)	ϕ = 9° ± 1°
	Wet, Unpolished Wet, Polished	8.0° to 10.0° 7.0° to 9.5°	7.0° to 10.5° 6.5° to 9.0°	ϕ = 8° ± 1°
HDPE Liner/Clay	Dry (As-Compacted)	11.0° to 14.0°	---	ϕ = 12° ± 1°
	Saturated (U-U)	(r_r = 800 to 1000 psf)	---	r = 900 psf ± 250 psf
HDPE Liner/Geonet (Transverse Shear)	Dry	7.0° to 8.0°(+)	---	ϕ = 8.5° ± 1°
	Submerged	7.0° to 10.0°	8.0° to 9.0°	ϕ = 8.5° ± 1°
HDPE Liner/Geonet (Aligned Shear)	Submerged	5.0° to 8.0°	6.0° to 8.0°	ϕ = 7.0° ± 1.5°
Geotextile/Clay	Saturated (U-U)	~ 24°	---	$\phi \approx 24°$
Geotextile/Geonet	Dry	> 20°	---	ϕ > 20°
	Submerged	10° to 14°(+)	---	ϕ > 12°
HDPE Liner/HDPE Liner	Dry	6.0° to 13.0°	7.0° to 13.5°	ϕ = 9.5° ± 3°
	Submerged	6.0° to 11.0°	---	ϕ = 8.5° ± 2.5°

TML 5-5

Gundle

GUNDLINE® HD is a high quality formulation of High Density Polyethylene containing approximately 97.5% polymer and 2.5% of carbon black, anti-oxidants and heat stabilizers. The product was designed specifically for exposed conditions. It contains no additives or fillers which can leach out and cause embrittlement over time.

GUNDLINE® HD SPECIFICATIONS

TYPICAL PROPERTIES*	TEST METHOD	GAUGE (NOMINAL)							
		30 mil (0.75 mm)	40 mil (1.0 mm)	50 mil (1.25 mm)	60 mil (1.5 mm)	80 mil (2.0 mm)	100 mil (2.5 mm)	120 mil (3.0 mm)	140 mil (3.5 mm)
Density, g/cc. (Min.)	ASTM D1505	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Melt Flow Index, g/10 min. (Max.)	ASTM D1238 Condition E (190°C, 2.16 kg.)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Tensile Properties (Typical)	ASTM D 638 Type IV Dumb-bell at 2 ipm. 2 in. gauge length break. 1.3 in. gauge length yield.								
1. Tensile Strength at Break (Pounds/inch width)		120	160	200	240	320	400	480	560
2. Tensile Strength at Yield (Pounds/inch width)		70	95	115	140	190	240	290	340
3. Elongation at Break (Percent)		700	700	700	700	700	700	700	700
4. Elongation at Yield (Percent)		13	13	13	13	13	13	13	13
Tear Resistance Initiation, lbs. (Typical)	ASTM D1004 Die C	22	30	37	45	60	72	85	95
Low Temperature Brittleness, °F (Typical)	ASTM D746 Procedure B	−107	−107	−107	−107	−107	−107	−107	−107
Dimensional Stability, % Change Each direction. (Max.)	ASTM D1204 212°F 1 hr.	±2	±2	±2	±2	±2	±2	±2	±2
Resistance to Soil Burial, Percent change in original value. (Typical)	ASTM D3083 using ASTM D638 Type IV Dumb-bell at 2 ipm.								
Tensile Strength at Break and Yield	% Change	±10	±10	±10	±10	±10	±10	±10	±10
Elongation at Break and Yield	% Change	±10	±10	±10	±10	±10	±10	±10	±10
Environmental Stress Crack, Hours. (Min.)	ASTM D1693 (10% Igepal, 50°C)	1500	1500	1500	1500	1500	1500	1500	1500
Puncture Resistance, Pounds. (Typical)	FTMS 101 Method 2065	35	52	65	80	105	130	150	169
Coefficient of Linear Thermal Expansion, $\times 10^{-4}$ $\frac{cm}{cm\ °C}$ (Typical)	ASTM D696	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Thermal Stability Oxidative Induction Time (OIT), Minutes. (Min.)	ASTM D3895 130°C, 800 psi O_2	2000	2000	2000	2000	2000	2000	2000	2000

Note: All values except when specified as minimum or maximum are typical test results.

These specifications are offered as a guide for consideration to assist engineers with their specifications; however, Gundle assumes no liability in connection with the use of this information. The specifications on this data sheet are subject to change without notice.

ANCHOR TRENCH

Woodward-Clyde Consultants

Project Notes

Subject: Anchor Trench

R. Seboll Date: 3/27/94

Checked By: [illegible] Date: 03/31/94

Project Name: River Birch

Project No.: 93 B 248C

Task No. _____ File No. _____

Sheet AT-1 of AT-5

Scope: Evaluate the stability of the anchor trench configuration

References: 1) Designing with Geosynthetics by Koerner, 1990
2) Kettleman Hills Waste Landfill Slope Failure - Liner Sy Properties, J of Geot Eng. Vol. 116, No. 4, April 1990.

Primary System

Consider geomembrane in direct contact with clay.

Consider geonet in contact with geomembrane

Consider geonet in contact with geotextile.

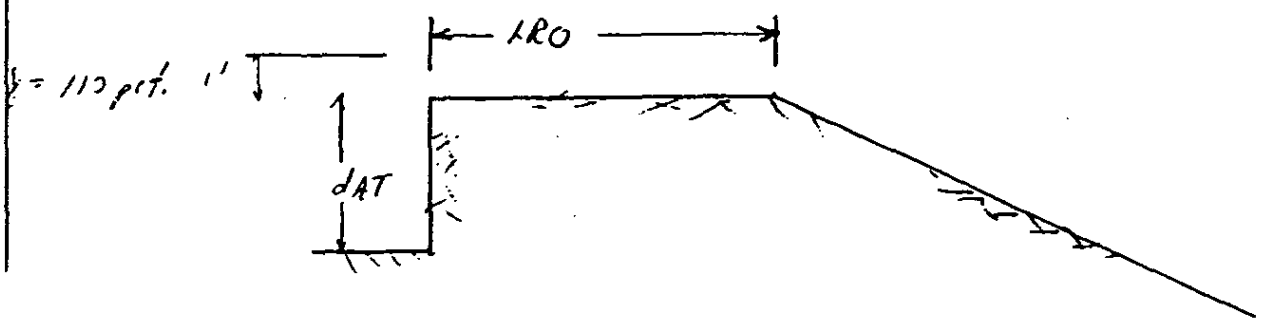
Geomembrane / clay $\phi = 12°$

Geomembrane / net $\phi = 8.5°$

Geonet / geotextile $\phi = 12°$

The factor of safety on follow reference 1 can be be estimated by Table 2.12 (Ref 1)

$F.S. = (1.55)(2.5)(1.25)(1.15) = 5.57$ ~ considers partial factors of safety for installation damage, creep, chemical and biological degradation.



Assume geomembrane is 60 mil (bundle)

$T_{allow} = \frac{T_Y}{F.S.} = \frac{140\ lbs/in}{5.57} = 25.1\ lbs/in = 302\ lbs/ft$

$T_{allow} = F_w + F_L + 2F_{AT}$

Assume $F_w = 0$ because of minor depth of cover soil.

Assume a worst case scenario of 2D geomembrane sandwiched between geotextile $\therefore \delta = 8°$

$F_L = \sigma_n \tan\delta (LRO) = \gamma(1) \tan(8°)(LRO) = 15.5\ LRO$

$F_{AT} = \sigma_h \tan(\delta_{AT})$

$\sigma_h = K_o \sigma_v$ $\quad K = 1$ for $\phi = 0$

$\sigma_v = (1)(110\ psf)\left(\frac{d_{AT}}{2} + 1\right) = 55\ psf \cdot d_{AT} + 110\ psf)$

$F_{AT} = [(55)(d_{AT}) + 110]\tan 8°\ d_{AT} = 7.7(d_{AT}) + 15.4\ d_{AT}$

$T_{allow} = F_L + 2F_A = 15.4\ (LRO) + 2(7.7\ (d_{AT})^2 + 15.4(d_{AT}))$

$302\ lb/ft = 15.4\ (LRO) + 15.4(d_{AT})^2 + 30.8\ (d_{AT})$

Assume $d_{AT} = 2' \rightarrow LRO = 11.6'$

$d_{AT} = 3' \rightarrow LRO = 4.6'$

This assumes $\delta = 8°$ not $12°$ which should improve the solution.

$\delta = 12°$ $\quad 23.4\ d_{AT} + 11.7(d_{AT})^2$

$302 = 23.4\ (LRO) + 23.4(d_{AT})^2 + 46.8\ (d_{AT})$

Assume $d_{AT} = 2' \rightarrow LRO = 4.9'$

$d_{AT} = 3' \rightarrow LRO = 0'$

Woodward-Clyde Consultants

Project Notes

Subject: Anchor Trench

R SeGall Date: 3/27/94

Checked By: RR Date: 03/31/94

Project Name: River Bend

Project No.: 93B245C

Task No.: File No.:

Sheet AT-3 of AT-5

The review indicates the anchor trenches should not present a problem in the design

With $\phi = 8°$ the values will improve. Note the anchor trench should fail before the liner

SUMMARY OF INTERFACE SHEAR STRENGTH TESTS: KETTLEMAN HILLS REPOSITORY

Interface Components	Conditions	DIRECT SHEAR TESTS Residual Friction Angle: ϕ_r	PULLOUT BOX TESTS Residual Friction Angle: ϕ_r	Values Proposed for Stability Analyses
HDPE Liner/Geotextile	Dry, Unpolished Dry, Part. Polished Dry, Polished	9.5° to 12.5° 9.0° to 11.0° 8.5° to 10.5°	9.5° (1 Test) --- 8.0° (1 Test)	ϕ = 9° ± 1°
	Wet, Unpolished Wet, Polished	8.0° to 10.0° 7.0° to 9.5°	7.0° to 10.5° 6.5° to 9.0°	ϕ = 8° ± 1°
HDPE Liner/Clay	Dry (As-Compacted)	11.0° to 14.0°	---	ϕ = 12° ± 1°
	Saturated (U-U)	(r_r = 800 to 1000 psf)	---	r = 900 psf ± 250 psf
HDPE Liner/Geonet (Transverse Shear)	Dry	7.0° to 8.0°(+)	---	ϕ = 8.5° ± 1°
	Submerged	7.0° to 10.0°	8.0° to 9.0°	ϕ = 8.5° ± 1°
HDPE Liner/Geonet (Aligned Shear)	Submerged	5.0° to 8.0°	6.0° to 8.0°	ϕ = 7.0° ± 1.5°
Geotextile/Clay	Saturated (U-U)	~ 24°	---	$\phi \approx 24°$
Geotextile/Geonet	Dry	> 20°	---	ϕ > 20°
	Submerged	10° to 14°(+)	---	ϕ > 12°
HDPE Liner/HDPE Liner	Dry	6.0° to 13.0°	7.0° to 13.5°	ϕ = 9.5° ± 3°
	Submerged	6.0° to 11.0°	---	ϕ = 8.5° ± 2.5°

Gundle

GUNDLINE® HD is a high quality formulation of High Density Polyethylene containing approximately 97.5% polymer and 2.5% of carbon black, anti-oxidants and heat stabilizers. The product was designed specifically for exposed conditions. It contains no additives or fillers which can leach out and cause embrittlement over time.

GUNDLINE® HD SPECIFICATIONS

TYPICAL PROPERTIES*	TEST METHOD	GAUGE (NOMINAL)							
		30 mil (0.75 mm)	40 mil (1.0 mm)	50 mil (1.25 mm)	60 mil (1.5 mm)	80 mil (2.0 mm)	100 mil (2.5 mm)	120 mil (3.0 mm)	140 mil (3.5 mm)
Density, g/cc. (Min.)	ASTM D1505	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Melt Flow Index, g/10 min. (Max.)	ASTM D1238 Condition E (190°C, 2.16 kg.)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Tensile Properties (Typical)	ASTM D 638 Type IV Dumb-bell at 2 ipm. 2 in. gauge length break. 1.3 in. gauge length yield.								
1. Tensile Strength at Break (Pounds/inch width)		120	160	200	240	320	400	480	560
2. Tensile Strength at Yield (Pounds/inch width)		70	95	115	140	190	240	290	340
3. Elongation at Break (Percent)		700	700	700	700	700	700	700	700
4. Elongation at Yield (Percent)		13	13	13	13	13	13	13	13
Tear Resistance Initiation, lbs. (Typical)	ASTM D1004 Die C	22	30	37	45	60	72	85	95
Low Temperature Brittleness, °F (Typical)	ASTM D746 Procedure B	−107	−107	−107	−107	−107	−107	−107	−107
Dimensional Stability, % Change Each direction. (Max.)	ASTM D1204 212°F 1 hr.	±2	±2	±2	±2	±2	±2	±2	±2
Resistance to Soil Burial. Percent change in original value. (Typical)	ASTM D3083 using ASTM D638 Type IV Dumb-bell at 2 ipm.								
Tensile Strength at Break and Yield	% Change	±10	±10	±10	±10	±10	±10	±10	±10
Elongation at Break and Yield	% Change	±10	±10	±10	±10	±10	±10	±10	±10
Environmental Stress Crack, Hours. (Min.)	ASTM D1693 (10% Igepal, 50°C)	1500	1500	1500	1500	1500	1500	1500	1500
Puncture Resistance, Pounds. (Typical)	FTMS 101 Method 2065	35	52	65	80	105	130	150	180
Coefficient of Linear Thermal Expansion. $\times 10^{-4} \frac{cm}{cm\ °C}$ (Typical)	ASTM D696	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Thermal Stability Oxidative Induction Time (OIT), Minutes. (Min.)	ASTM D3895 130°C, 800 psi O_2	2000	2000	2000	2000	2000	2000	2000	2000

Note: All values except when specified as minimum or maximum are typical test results.

These specifications are offered as a guide for consideration to assist engineers with their specifications; however, Gundle assumes no liability in connection with the use of this information. The specifications on this data sheet are subject to change without notice.

PLANAR FLOW

Woodward-Clyde Consultants

Project Notes

Project Name: River Birch
Project No.: 95B034
Task No.: 7 File No.:
Sheet: PF-1 of 2

Subject: Planar Flow
T. Alper Date: 02/29/95
Checked By: RA So Gall Date: 3/12/95

A.A. 04/02/95

SCOPE: Evaluate the Planar Flow Capacity at the Primary Leachate Collection System.

REFERENCES:
1. Designing With Geosynthetics, D. Koerner, 1990
2. Sump Design Package
3. Leachate Gen Package
4. PN-2000 SPEC'S (ATTACHED)

ASSUMPTIONS

- The geosynthetic system must either provide the min. flow capacity defined by the Minimum Technology Guidance (MTG) document or maintain the liquid level less than 12" over the liner. The MTG criteria of 12" of 1×10^{-2} cm/sec for material over the liner $\Rightarrow 3 \times 10^{-5}$ m²/sec
- Neglect the capacity of the sand layer
- Max. Slope Length = 100' on 2% slope ($\theta = 1.15$

The HELP Model in the open cell config. indicates a peak of 2000 ft³/day of leachate entering each sump.

$$T = \frac{B^2 g}{h_{max} + \beta \sin\theta}$$

$B = 100$ ft
$\theta = 1.15°$
$h_{max} = 1$ ft
g = flow ft/day

Woodward-Clyde Consultants

Project Notes

Subject: PLANAR FLOW
J. ALPER Date: 02/29/95
Checked By: MAB Date: 3/30/95

Project Name: RIVERBIRCH
Project No.: 95B034
Task No.: 7 File No.:
Sheet PE-2 of 2

AREA CONTRIBUTING EACH LEACHATE LINE = 100,000 ft^2

$$g = \frac{2000\ ft^3/day}{100.000\ ft^2} = 0.02\ ft/day \checkmark$$

$$T_{act} = \frac{100^2 ft^2\ (0.02)}{1 + 100 \cdot \sin 1.15} = 67\ ft^2/day \checkmark$$

$$T_{ACT} = 67 \frac{\cancel{ft^2}}{\cancel{day}} \cdot \frac{1\ \cancel{day}}{86400\ sec} \cdot \frac{0.3^2\ m^2}{1^2\ \cancel{ft^2}} = 7 \times 10^{-5} \frac{m^2}{sec} \checkmark$$

Transmissivity must equal 7×10^{-5} to handle the peak flow and this value is greater than MTG. $\Longrightarrow T_{DESIGN} \geq 7 \times 10^{-5}\ m^2/sec$ ✓

Assume $T_{LCR} = 1 \times 10^{-3}\ m^2/sec$ for 2000 psf load on Polynet PN-2000

$$DR_{FLOW} = \frac{T_{LCR}}{T_{REQ}} = \frac{1 \times 10^{-3}\ \text{DA.}}{7 \times 10^{-5}\ \text{DA.}} = \underline{\underline{15}} \quad O.K. \checkmark$$

- The planar flow for the primary LCS appears more than adequate. The pressure relief system will be similar design.

∴ DRAINAGE NET SHOULD BE SIMILAR IN TRASMISSIVITY to POLYNET PN-2000.

POLY-NET™

SPECIFICATIONS AND PROPERTIES

SPECIFICATION	PN-1000	PN-2000	PN-3000	PN-4000
ROLL LENGTH (MAXIMUM) (FT.)	300	300	300	300
ROLL WIDTH (+ 1 in.—0 in.) (FT.)	6.750	6.750	6.750	6.750
THICKNESS (IN.)	.250	.160	.200	.300
S.F. IN ROLL	2025	2025	2025	2025
WEIGHT PER ROLL (LBS.)	340	270	330	500
WEIGHT PER S.F.	.165	.130	.180	.245

*Available to Lengths of 400 Feet

PROPERTY	PN-1000	PN-2000	PN-3000	PN-4000
RAW MATERIAL (ALL DOMESTIC AND VIRGIN MATERIAL)	POLYETHYLENE	POLYETHYLENE	POLYETHYLENE	POLYETHYLENE
MANUFACTURING	FOAMED + EXTRUDED	EXTRUDED	EXTRUDED	FOAMED + EXTRUDED
COLOR	BLACK	BLACK	BLACK	BLACK
CARBON BLACK	2%	2%	2%	2%
DENSITY & POLYMER (g/cm^3)	.936	.936	.936	.936
MELT INDEX (g/10 MIN)	1.10	1.10	1.10	1.10
TENSILE STRENGTH (LBS./IN.) (MACH. DIRECTION)	43	42	53	58
TENSILE STRENGTH (LBS./IN.) (TRANS. DIRECTION)	23	22	28	33
ELONGATION TO BREAK (MACH. DIRECTION)	140%	670%	875%	175%
ELONGATION TO BREAK (TRANS. DIRECTION	160%	280%	335%	165%
POROSITY	.81-.84	.81-.84	.81-.84	.81-.84
U.V. RESISTANCE	STABLE	STABLE	STABLE	STABLE
TRANSMISSIVITY		—SEE TABLES—		

POLY-NET IS PROUDLY MANUFACTURED IN THE U.S.

NSC NATIONAL SEAL COMPANY

1225 MONMOUTH BLVD.
GALESBURG, ILLINOIS 61401
800/323-3820
309/343-3418

FILTER RETENTION

Woodward-Clyde Consultants

Project Notes

Subject: Filter Retention

Project Name: River Bend
Project No.: 95 B 245
Task No.: File No.:
Sheet FR-1 of FR-3

R. DeGoll Date: 3/26/94

Checked By: WA Date: 3/31/94

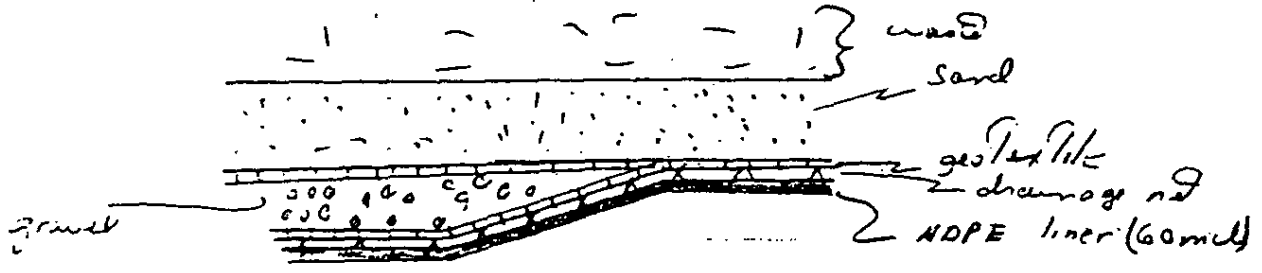
Scope Evaluate retention of particles and potential for clogging by comparing grain size distribution of retained soil to opening size of geotextile.

References:

1. Designing with Geosynthetics by R Koerner, 1990.
2. GeoTextile Engineering Manual by Federal Highway Administration.
3. Gradation Package
4. Design and Construction of Levees EM-1110-2-19 March 1978. Dept of Army
5. Geosynthetics Design Guidance for Hazardous Waste Landfill and Impoundments, R. Landon and Koerner, 1987.

Assumptions

1. Assume D sand/gravel used for filtration is as presented in the Gradation package.
2. Leached collection system is as follows:



Evaluate D sand/geotextile retention:

Assume D geotextile is nonwoven Polyfelt 750,
AOS No. = O_{95} = 110 to 140 sieve size (0.149 to 0.105 mm)

Ref 1 Soil < 50% passing No. 200 sieve
AOS No. of fabric > No. 30 sieve (0.5-9 mm)

$\frac{O_{95}\ \text{geotextile}}{d_{85}\ \text{soil}} < 2$

$d_{85} = 2$ mm (Gradation Package)

$O_{95} = 0.149$ mm

$\frac{O_{95}}{d_{85}} = \frac{0.149}{2} = 0.0745 < 2$ o.k.

Criteria To soil/geotextile filtration:

Ref. 1.

D.R	$1 < C_u < 3$	$C_u > 3$
Loose $D_r < 50\%$	$O_{95} < C_u d_{50}$	$O_{95} < 9(d_{10})/C_u$
Intermediate $50\% < D_r < 80\%$	$O_{95} < 1.5(C_u) d_{50}$	$O_{95} < 13.5(d_{50})/C_u$
Dense $D_r > 80\%$	$O_{95} < 2(C_u) d_{50}$	$O_{95} < 18(d_{50})/C_u$

$C_u = d_{60}/d_{10}$

From Gradation Package $d_{60} = 0.88$ mm, $d_{10} = 0.18$ mm $\therefore C_u = 5.4$

Assume D_r of sand range between 50% & 80%.

$d_{50} = 0.73$ mm

$O_{95} = 0.105$ mm

$0.105 < \frac{13.5(0.73)}{5.4} = 1.83$ mm o.k.

Assume D_r increases due to loading of landfill

$0.105 < \frac{18.5(0.73)}{5.4} = 2.50$ o.k.

Woodward-Clyde Consultants

Project Notes

Subject: Filter Retention

R. McColl Date: 3/26/94

Checked By: E.A. Date: 03/31/94

Project Name: River Bend

Project No.: 933248

Task No.: File No.:

Sheet FR-3 of FR-3

An alternate approach to minimize clogging potential is to avoid materials or field conditions that increase the potential for clogging. Avoid / minimize the following:

a.) Use of cohesive silts and sands with gap graded particle size distributions.

b.) High hydraulic gradients.

c.) Dynamic or pulsating fluid action across the plane of the geotextile.

The above conditions should not occur in this facility.

The above criteria for clogging and retention indicates a geotextile with an AOS No. between 100 to 140 sieve size is acceptable.

It is not practical to evaluate the waste / sand interface due to the nature of the waste. The sand is primarily a protective layer.

The leachate system should have a clean-out system incorporated into the design.

LEACHATE GENERATION

Subject: LEACHATE GENERATION
By : S. Togan ALPER Date: March 21, 1995
Checked By: Date: 3/30/95

04/03/95

P.Name:RiverBirch
P.Number:95B034-7
1/3

SCOPE:

Estimate the amount of leachate that will infiltrate through the waste into the leachate collection system prior placement of the final cover and after closure .

REFERENCES:

. Cap Efficiency Package
. EPA HELP Model

DISCUSSION

. The leachate generation can be investigated in four different stages of the landfill namely;
a. early periods of the module with some waste placed
b. just before installing the final cover,with waste placed to the final elevation
c. right after the placement of the cap
d. later stages of the closure, after the steady state has been reached in the module, and the field capacity change, induced by decomposition of waste layer has slowed down, to a negligible amount

. Stage A : During this stage the leachate collection sump is either not in use or used to support the temporary sumps installed in the active landfill module.

. Stage B : After the waste is placed to the final elevation and before the final cover is placed the maximum amount of leachate is collected in the leachate collection sump. Usually some part of the modules at this stage is covered with the interim cover which will in reality decrease the amount of infiltration into the module.

. Stage C : The gravity forces together with the decomposition of the waste will force the excess water out of the waste layer, which results in increased values of leachate compared to the infiltration into the module.

. Stage D : The leachate collection system receives quantities equal to the amount of rainfall penetrating through the cap system.

. As mentioned above the leachate generated at the first stage will be handled by temporary pumps. The amount of leachate generated at this stage is used mainly to design the leachate treatment plant. The leachate collection sump design is based on the amount of leachate generated during the stages B,C and D.

Subject: LEACHATE GENERATION
By : S. Togan ALPER Date: March 21, 1995
Checked By: NAS Date: 3/30/95

P.Name:RiverBirch
P.Number:95B034-7
2/3

ASSUMPTIONS

. Default soil characteristics for HELP Model has been used

. Max. drainage distance = 550 ft

. Area of largest module = 120,000 ft2

. Slope of cap = %5(Stage c,d)

. Moisture content calculated by HELP Model(Stage b,d)

. Moisture content of the waste layer is increased by 5% to model the change in the field capacity of waste layer due to decomposition and also to demonstrate the extra leachate generated until the steady state is reached (Stage c)

. Runoff CN = 40 (calc. by HELP) (Stage c,d)
. Runoff CN = 80 (calc. by HELP) (Stage b)

. Geomembrane (GM) liner hole density = .5 holes/acre
. GM liner installation defects = 10 holes/acre
. GM placement quality = 3 -good

. Fair grass developed on the cover (Stage c,d)

. Evaporative depth = 6"

. Waste thickness = 45'

CALCULATIONS

. The computer output with the input echo is given in Appendix for all stages.

. The same computer output for stage "d" can be crossreferenced from Cap Efficiency Package.

.The daily values per module is calculated by dividing the annual values by 365 days and 16 modules.

Subject: LEACHATE GENERATION
By : S. Togan ALPER Date: March 21, 1995
Checked By: Date: 3/30/95

P.Name:RiverBirch
P.Number:95B034-7
3/3

RESULTS

The expected volumes of leachate for all four stages is given in the table below;

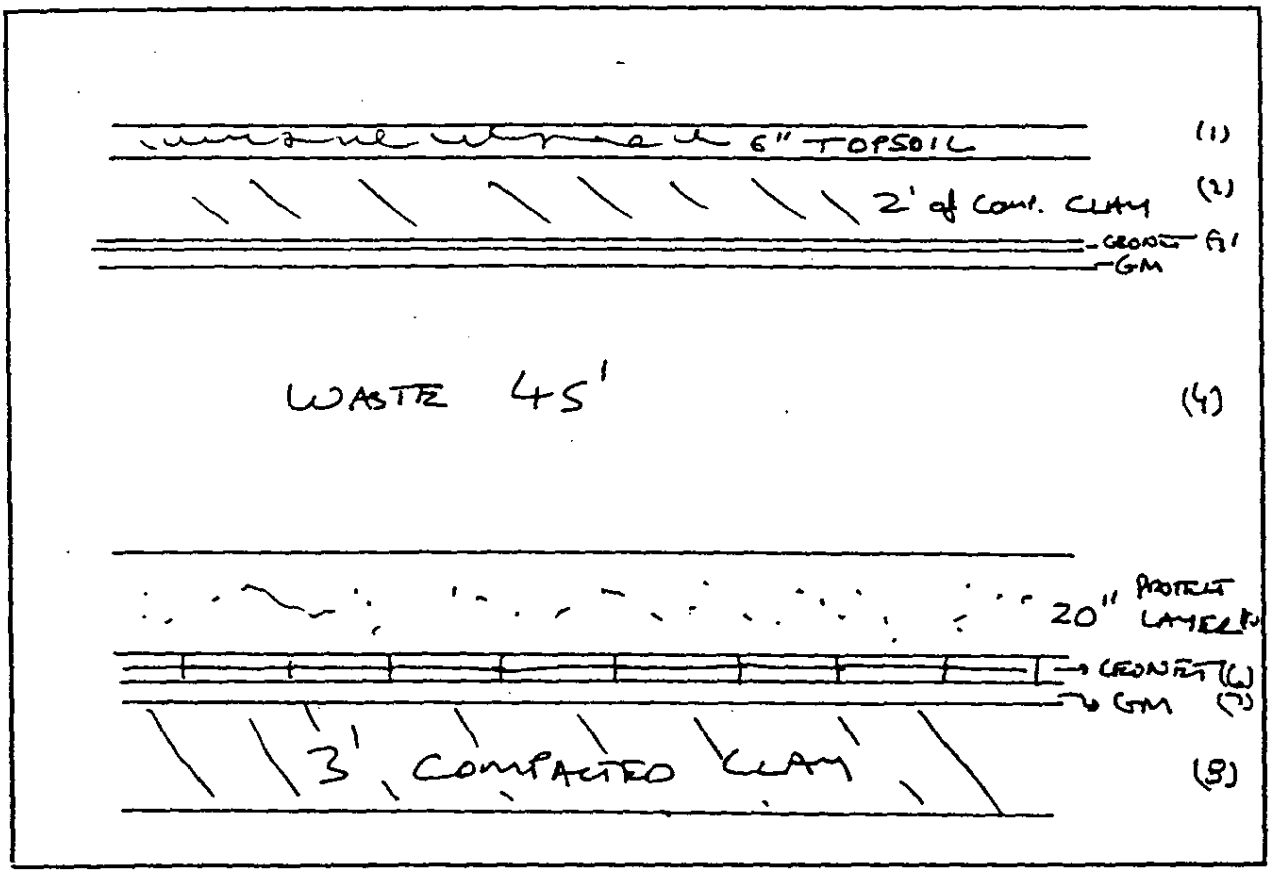
Stage	Average Daily Value per Module (ft3)	Peak Daily Value per Module (ft3)
a1. with 5ft. of waste in place	800	16000
a2. with 10 ft. of waste in place	800	8400
b.with waste placed to final elevation, just before cap placement (45 ft. of waste)	800	2700
c. right after cap placement, assuming that waste has higher water content than field capacity initially	170	*
d. after steady state is reached	5	10

* The peak value for this stage has no significant meaning , since this model is used to simulate the decomposition(slow steady process), and generate average values including the effect of decomposition. The peak leachate generation rate for this stage should be less or equal to the rate at stage b.

APPENDIX

VA 3/21/95 AB 3/30/95 LG-1

LANDFILL REPRESENTATIVE CROSSECTION



STAGE A1. 3/30/95 LG-2

```
******************************************************************************
******************************************************************************
**                                                                          *
**                                                                          *
*              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                *
**              HELP MODEL VERSION 3.01   (14 OCTOBER 1994)                 *
**                 DEVELOPED BY ENVIRONMENTAL LABORATORY                    *
**                   USAE WATERWAYS EXPERIMENT STATION                      *
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              *
**                                                                          *
**                                                                          *
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     h:\riverbir\help\PREPF.D4
TEMPERATURE DATA FILE:       h:\riverbir\help\TEMPF.D7
SOLAR RADIATION DATA FILE:   h:\riverbir\help\SOLF.D13
EVAPOTRANSPIRATION DATA:     h:\riverbir\help\EVAF.D11
SOIL AND DESIGN DATA FILE:   h:\riverbir\help\op5ft.D10
OUTPUT DATA FILE:            h:\riverbir\help\op5ft.OUT


TIME:  11:31     DATE:   3/ 8/1995


******************************************************************************

     TITLE:  RIVERBIRCH PHASE I - open cell

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                      TYPE 1 - VERTICAL PERCOLATION LAYER
                          MATERIAL TEXTURE NUMBER  18
          THICKNESS                    =     60.00   INCHES
          POROSITY                     =      0.6710 VOL/VOL
          FIELD CAPACITY               =      0.2920 VOL/VOL
          WILTING POINT                =      0.0770 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.2835 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.20
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                  LAYER  2
                                  --------

                      TYPE 2 - LATERAL DRAINAGE LAYER
                          MATERIAL TEXTURE NUMBER   4
```

THICKNESS	=	20.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.1050	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2405	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.170000002000E-02	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0642	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.50	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 29

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4510	VOL/VOL
FIELD CAPACITY	=	0.4190	VOL/VOL
WILTING POINT	=	0.3320	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4510	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.680000028000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #18 WITH BARE

GROUND CONDITIONS, A SURFACE SLOPE OF 5.% AND
A SLOPE LENGTH OF 500. FEET.

SCS RUNOFF CURVE NUMBER	=	79.80	
FRACTION OF AREA ALLOWING RUNOFF	=	0.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	42.880	ACRES
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	4.466	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	14.762	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.694	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	38.069	INCHES
TOTAL INITIAL WATER	=	38.069	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
NEW ORLEANS LOUISIANA

MAXIMUM LEAF AREA INDEX	= 3.00	
START OF GROWING SEASON (JULIAN DATE)	= 24	
END OF GROWING SEASON (JULIAN DATE)	= 365	
AVERAGE ANNUAL WIND SPEED	= 8.20	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	= 73.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	= 75.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	= 79.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	= 74.00	%

NOTE: PRECIPITATION DATA FOR NEW ORLEANS LOUISIANA
WAS ENTERED FROM THE DEFAULT DATA FILE.

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
52.40	54.70	61.40	68.70	74.90	80.10
82.10	81.70	78.50	69.20	59.80	54.80

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

STATION LATITUDE = 29.95 DEGREES

MONTHLY TOTALS (IN INCHES) FOR YEAR 1974

MS 3/30/15

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN
PRECIPITATION	8.46 5.66	5.53 6.70	6.64 7.58	5.52 2.26	9.84 5.88	3.1 4.1
RUNOFF	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.0 0.0
EVAPOTRANSPIRATION	1.343 5.510	2.106 4.141	3.149 2.508	4.980 2.485	6.104 3.069	6.0 2.7
LATERAL DRAINAGE COLLECTED FROM LAYER 3	3.3518 0.4895	8.8150 0.2140	1.6981 1.4915	3.2633 2.4896	2.6766 0.9874	1.6 1.4
PERCOLATION THROUGH LAYER 5	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0 0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.010 0.001	0.028 0.001	0.005 0.004	0.010 0.007	0.008 0.003	0. 0.
STD. DEVIATION OF DAILY HEAD ON LAYER 5	0.006 0.001	0.017 0.000	0.004 0.006	0.007 0.004	0.006 0.002	0. 0.

ANNUAL TOTALS FOR YEAR 1974

	INCHES	CU. FEET	PERCENT
PRECIPITATION	72.79	11330084.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	44.208	6881208.000	60.73
DRAINAGE COLLECTED FROM LAYER 3	28.5866	4449636.500	39.27
PERC./LEAKAGE THROUGH LAYER 5	0.000097	15.160	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0071		
CHANGE IN WATER STORAGE	-0.005	-772.501	-0.01
SOIL WATER AT START OF YEAR	38.069	5925566.500	
SOIL WATER AT END OF YEAR	38.064	5924794.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-2.691	0.00

JAN 3/30/95

MONTHLY TOTALS (IN INCHES) FOR YEAR 1975

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	2.95	3.64	5.32	6.69	8.03	12.2
	8.35	10.11	3.97	4.00	11.35	3.8
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
EVAPOTRANSPIRATION	1.236	1.921	3.391	4.619	5.835	6.4
	7.122	5.859	2.678	2.262	2.820	2.2
LATERAL DRAINAGE COLLECTED FROM LAYER 3	3.1745	1.1443	1.8466	3.0675	1.0274	2.7
	5.4265	4.8850	2.1504	0.3971	7.9383	1.6
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.009	0.004	0.005	0.009	0.003	0.
	0.015	0.014	0.006	0.001	0.023	0.
STD. DEVIATION OF DAILY HEAD ON LAYER 5	0.006	0.002	0.005	0.004	0.002	0.
	0.008	0.005	0.004	0.000	0.022	0.

ANNUAL TOTALS FOR YEAR 1975

	INCHES	CU. FEET	PERCENT
PRECIPITATION	80.50	12530176.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	46.488	7236063.500	57.75
DRAINAGE COLLECTED FROM LAYER 3	35.4780	5522313.000	44.07
PERC./LEAKAGE THROUGH LAYER 5	0.000119	18.555	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0086		
CHANGE IN WATER STORAGE	-1.466	-228212.453	-1.82
SOIL WATER AT START OF YEAR	38.064	5924794.000	

AS 3/30/95

DRAINAGE COLLECTED FROM LAYER 3	11.7529	1829393.750	24.8:
PERC./LEAKAGE THROUGH LAYER 5	0.000043	6.727	0.0(
AVG. HEAD ON TOP OF LAYER 5	0.0029		
CHANGE IN WATER STORAGE	4.247	661049.062	8.9:
SOIL WATER AT START OF YEAR	36.598	5696581.500	
SOIL WATER AT END OF YEAR	40.845	6357630.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.0(
SNOW WATER AT END OF YEAR	0.000	0.000	0.0(
ANNUAL WATER BUDGET BALANCE	0.0000	-1.977	0.0(

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1977

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	5.31	3.08	3.54	6.80	1.87	2.4
	2.91	16.02	13.44	4.47	7.89	5.0:
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.0(
	0.000	0.000	0.000	0.000	0.000	0.0(
EVAPOTRANSPIRATION	1.554	2.162	3.383	4.358	3.485	2.3:
	2.688	5.295	2.940	2.627	2.805	2.4(
LATERAL DRAINAGE COLLECTED FROM LAYER 3	6.0356	2.8962	1.5776	1.0898	2.3998	0.4·
	0.1821	0.2339	14.2755	3.5290	2.5818	4.0!
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0(
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0(

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.017	0.009	0.004	0.003	0.007	0.(
	0.001	0.001	0.042	0.010	0.008	0.(
STD. DEVIATION OF DAILY HEAD ON LAYER 5	0.009	0.005	0.003	0.001	0.005	0.(
	0.000	0.002	0.019	0.007	0.004	0.(

****

****

RAB 3/30/95

ANNUAL TOTALS FOR YEAR 1977

	INCHES	CU. FEET	PERCEN
PRECIPITATION	72.81	11333198.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	36.104	5619678.500	49.59
DRAINAGE COLLECTED FROM LAYER 3	39.3472	6124560.500	54.04
PERC./LEAKAGE THROUGH LAYER 5	0.000128	19.992	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0096		
CHANGE IN WATER STORAGE	-2.641	-411060.531	-3.63
SOIL WATER AT START OF YEAR	40.845	6357630.500	
SOIL WATER AT END OF YEAR	38.204	5946570.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.398	0.00

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/D
PRECIPITATION	13.37	2.18	3.29	3.44	9.71	7.83
	10.32	14.70	2.98	0.00	4.67	4.36
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.00
	0.000	0.000	0.000	0.000	0.000	0.00
EVAPOTRANSPIRATION	1.574	2.195	3.082	3.720	5.557	5.06
	7.360	5.541	2.573	1.696	1.794	2.58
LATERAL DRAINAGE COLLECTED FROM LAYER 3	7.6227	6.4042	1.1783	1.3097	3.0521	1.39
	1.7228	2.7503	7.0944	0.7525	1.0598	1.62
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
	0.0000	0.0000	0.0000	0.0000	0.0000	0.00

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.022	0.020	0.003	0.004	0.009	0.00

LAYER 5	0.005	0.008	0.021	0.002	0.003	0
STD. DEVIATION OF DAILY	0.038	0.012	0.002	0.002	0.006	0
HEAD ON LAYER 5	0.008	0.006	0.015	0.001	0.002	0

****

****

ANNUAL TOTALS FOR YEAR 1978

	INCHES	CU. FEET	PERCE
PRECIPITATION	76.85	11962044.000	100.0
RUNOFF	0.000	0.000	0.0
EVAPOTRANSPIRATION	42.741	6652790.500	55.6
DRAINAGE COLLECTED FROM LAYER 3	35.9615	5597561.000	46.7
PERC./LEAKAGE THROUGH LAYER 5	0.000118	18.378	0.0
AVG. HEAD ON TOP OF LAYER 5	0.0088		
CHANGE IN WATER STORAGE	-1.852	-288328.562	-2.41
SOIL WATER AT START OF YEAR	38.204	5946570.000	
SOIL WATER AT END OF YEAR	36.351	5658241.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	2.998	0.00

****

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1974 THROUGH 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	6.73	3.46	4.37	4.55	7.01	5.95
	6.58	9.84	5.91	3.16	7.12	5.37
STD. DEVIATIONS	4.28	1.27	1.55	2.74	3.35	4.09
	2.84	5.88	4.76	2.06	2.63	1.97
RUNOFF						
TOTALS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

STD. DEVIATIONS	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
EVAPOTRANSPIRATION						
TOTALS	1.408	2.112	3.083	4.017	5.190	4.5
	5.594	4.727	2.353	2.117	2.591	2.4
STD. DEVIATIONS	0.149	0.112	0.400	1.010	1.042	1.8
	1.870	1.259	0.737	0.489	0.494	0.2
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	4.1699	4.3663	1.6016	1.8648	1.8941	1.28
	1.5918	1.6572	5.0304	1.4541	2.5279	2.78
STD. DEVIATIONS	2.7087	3.1506	0.2551	1.2173	1.1679	1.02
	2.2382	2.1117	5.7979	1.4844	3.1557	1.67
PERCOLATION/LEAKAGE THROUGH LAYER 5						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
	0.0000	0.0000	0.0000	0.0000	0.0000	0.00

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ACROSS LAYER 5						
AVERAGES	0.0119	0.0138	0.0046	0.0055	0.0054	0.003
	0.0045	0.0047	0.0148	0.0041	0.0074	0.007
STD. DEVIATIONS	0.0077	0.0099	0.0007	0.0036	0.0033	0.003
	0.0064	0.0060	0.0171	0.0042	0.0093	0.004

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1974 THROUGH 1978

	INCHES		CU. FEET	PERCENT
PRECIPITATION	70.06	(13.090)	10905458.0	100.00
RUNOFF	0.000	(0.0000)	0.00	0.000
EVAPOTRANSPIRATION	40.180	(6.2646)	6254217.50	57.349
LATERAL DRAINAGE COLLECTED FROM LAYER 3	30.22525	(11.04102)	4704693.500	43.14072
PERCOLATION/LEAKAGE THROUGH FROM LAYER 5	0.00010	(0.00003)	15.762	0.00014
AVERAGE HEAD ACROSS TOP OF LAYER 5	0.007	(0.003)		

CHANGE IN WATER STORAGE	-0.343	(2.7387)	-53465.00	-0.4

****

IN 1/21/D

NAB 3/30/95

****

PEAK DAILY VALUES FOR YEARS 1974 THROUGH 1978

	(INCHES)	(CU. FT.)
PRECIPITATION	8.52	1,326,175.620
RUNOFF	0.000	0.0000
DRAINAGE COLLECTED FROM LAYER 3	1.63802	254965.70300
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000004	0.65450
AVERAGE HEAD ACROSS LAYER 5	0.144	
SNOW WATER	1.58	245982.9840

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5065
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0677

****

NAB 3/30/95

****

FINAL WATER STORAGE AT END OF YEAR 1978

LAYER	(INCHES)	(VOL/VOL)
1	15.9611	0.2660
2	4.1435	0.2072
3	0.0106	0.0532
4	0.0000	0.0000
5	16.2360	0.4510
SNOW WATER	0.000	

****
****

SINUE AL. AK3 3/30/95

```
*****************************************************************************
*****************************************************************************
**
**
 *              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**               HELP MODEL VERSION 3.01   (14 OCTOBER 1994)
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**                    USAE WATERWAYS EXPERIMENT STATION
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
**
*****************************************************************************
*****************************************************************************


PRECIPITATION DATA FILE:     h:\riverbir\help\PREPF.D4
TEMPERATURE DATA FILE:       h:\riverbir\help\TEMPF.D7
SOLAR RADIATION DATA FILE:   h:\riverbir\help\SOLF.D13
EVAPOTRANSPIRATION DATA:     h:\riverbir\help\EVAF.D11
SOIL AND DESIGN DATA FILE:   h:\riverbir\help\op10ft.D10
OUTPUT DATA FILE:            h:\riverbir\help\op10ft.OUT


TIME:  13:19     DATE:   3/ 8/1995


*****************************************************************************

     TITLE:  RIVERBIRCH PHASE I - open cell

*****************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                      TYPE 1 - VERTICAL PERCOLATION LAYER
                          MATERIAL TEXTURE NUMBER  18
          THICKNESS                    =    120.00   INCHES
          POROSITY                     =      0.6710 VOL/VOL
          FIELD CAPACITY               =      0.2920 VOL/VOL
          WILTING POINT                =      0.0770 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.2991 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.20
                FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                  LAYER  2
                                  --------

                      TYPE 2 - LATERAL DRAINAGE LAYER
                          MATERIAL TEXTURE NUMBER   4
```

THICKNESS	=	20.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.1050	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1979	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.170000002000E-02	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0248	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.50	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 29

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4510	VOL/VOL
FIELD CAPACITY	=	0.4190	VOL/VOL
WILTING POINT	=	0.3320	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4510	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.680000028000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #18 WITH BARE

5134/13

GROUND CONDITIONS, A SURFACE SLOPE OF 5.% AND
A SLOPE LENGTH OF 500. FEET.

SCS RUNOFF CURVE NUMBER	=	79.80	
FRACTION OF AREA ALLOWING RUNOFF	=	0.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	42.880	ACRES
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	4.466	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	14.762	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.694	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	56.087	INCHES
TOTAL INITIAL WATER	=	56.087	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
NEW ORLEANS LOUISIANA

MAXIMUM LEAF AREA INDEX	= 3.00	
START OF GROWING SEASON (JULIAN DATE)	= 24	
END OF GROWING SEASON (JULIAN DATE)	= 365	
AVERAGE ANNUAL WIND SPEED	= 8.20	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	= 73.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	= 75.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	= 79.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	= 74.00	%

NOTE: PRECIPITATION DATA FOR NEW ORLEANS LOUISIANA
WAS ENTERED FROM THE DEFAULT DATA FILE.

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
52.40	54.70	61.40	68.70	74.90	80.10
82.10	81.70	78.50	69.20	59.80	54.80

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

STATION LATITUDE = 29.95 DEGREES

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1974

JN · NAE 3/30/95

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN
PRECIPITATION	8.46	5.53	6.64	5.52	9.84	3.
	5.66	6.70	7.58	2.26	5.88	4.
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.
	0.000	0.000	0.000	0.000	0.000	0.
EVAPOTRANSPIRATION	1.343	2.106	3.149	4.980	6.104	6.
	5.510	4.141	2.508	2.485	3.069	2.
LATERAL DRAINAGE COLLECTED FROM LAYER 3	3.0975	6.6262	4.0897	1.9677	4.1101	1.
	0.8410	0.2547	0.1785	2.9426	1.8288	1.
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.
	0.0000	0.0000	0.0000	0.0000	0.0000	0.

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.009	0.021	0.012	0.006	0.012	0.
	0.002	0.001	0.001	0.008	0.005	0.
STD. DEVIATION OF DAILY HEAD ON LAYER 5	0.005	0.013	0.005	0.004	0.004	0.
	0.002	0.000	0.001	0.004	0.003	0.

ANNUAL TOTALS FOR YEAR 1974

	INCHES	CU. FEET	PERCENT
PRECIPITATION	72.79	11330084.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	44.208	6881208.000	60.73
DRAINAGE COLLECTED FROM LAYER 3	28.6362	4457347.500	39.34
PERC./LEAKAGE THROUGH LAYER 5	0.000099	15.375	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0070		
CHANGE IN WATER STORAGE	-0.055	-8486.225	-0.07
SOIL WATER AT START OF YEAR	56.087	8730179.000	
SOIL WATER AT END OF YEAR	56.032	8721693.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.234	0.00

NAS 3/30/95

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1975

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	2.95	3.64	5.32	6.69	8.03	12.2
	8.35	10.11	3.97	4.00	11.35	3.8
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
EVAPOTRANSPIRATION	1.236	1.921	3.391	4.619	5.835	6.4
	7.122	5.859	2.678	2.262	2.820	2.2
LATERAL DRAINAGE COLLECTED FROM LAYER 3	2.8830	1.8429	0.9542	2.8233	2.0812	0.4
	4.7655	5.3543	4.2646	0.8325	4.8732	4.4
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.008	0.006	0.003	0.008	0.006	0.0
	0.014	0.015	0.013	0.002	0.014	0.0
STD. DEVIATION OF DAILY HEAD ON LAYER 5	0.005	0.003	0.002	0.004	0.004	0.0
	0.008	0.006	0.002	0.001	0.013	0.0

****

****

ANNUAL TOTALS FOR YEAR 1975

	INCHES	CU. FEET	PERCENT
PRECIPITATION	80.50	12530176.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	46.488	7236063.500	57.75
DRAINAGE COLLECTED FROM LAYER 3	35.5613	5535265.500	44.18
PERC./LEAKAGE THROUGH LAYER 5	0.000121	18.839	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0086		
CHANGE IN WATER STORAGE	-1.549	-241163.859	-1.92
SOIL WATER AT START OF YEAR	56.032	8721693.000	

MAR 3/30/95

SOIL WATER AT END OF YEAR	54.483	8480529.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.0
SNOW WATER AT END OF YEAR	0.000	0.000	0.0
ANNUAL WATER BUDGET BALANCE	-0.0001	-8.151	0.0

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1976

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	3.57 5.67	2.89 1.69	3.08 1.57	0.28 5.08	5.58 5.80	3.3 8.7
RUNOFF	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.000 0.000	0.0 0.0
EVAPOTRANSPIRATION	1.334 5.290	2.177 2.796	2.411 1.068	2.408 1.516	4.972 2.468	2.8 2.0
ATERAL DRAINAGE COLLECTED FROM LAYER 3	0.9547 0.1393	0.9921 0.2038	3.0989 0.1407	0.8315 0.1024	0.3322 0.0597	0.1 1.7
PERCOLATION THROUGH LAYER 5	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0000 0.0000	0.0 0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.003 0.000	0.003 0.001	0.009 0.000	0.002 0.000	0.001 0.000	0.(0.(
STD. DEVIATION OF DAILY HEAD ON LAYER 5	0.002 0.000	0.003 0.000	0.003 0.000	0.001 0.000	0.000 0.000	0.(0.(

****

****

ANNUAL TOTALS FOR YEAR 1976

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.36	7371792.500	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	31.360	4881345.000	66.22

DRAINAGE COLLECTED FROM LAYER 3	8.8388	1375801.500	18.6
PERC./LEAKAGE THROUGH LAYER 5	0.000035	5.401	0.0
AVG. HEAD ON TOP OF LAYER 5	0.0021		
CHANGE IN WATER STORAGE	7.161	1114641.750	15.1
SOIL WATER AT START OF YEAR	54.483	8480529.000	
SOIL WATER AT END OF YEAR	61.644	9595171.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.0
SNOW WATER AT END OF YEAR	0.000	0.000	0.0
ANNUAL WATER BUDGET BALANCE	0.0000	-0.948	0.0

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1977

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	5.31	3.08	3.54	6.80	1.87	2.4
	2.91	16.02	13.44	4.47	7.89	5.0
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
EVAPOTRANSPIRATION	1.554	2.162	3.383	4.358	3.485	2.3
	2.688	5.295	2.940	2.627	2.805	2.4
LATERAL DRAINAGE COLLECTED	6.2871	4.1953	2.9897	1.3994	1.8271	0.9
FROM LAYER 3	0.2263	0.1186	9.3379	7.1474	2.6007	3.7
PERCOLATION THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.018	0.013	0.009	0.004	0.005	0.0
LAYER 5	0.001	0.000	0.027	0.020	0.008	0.0
STD. DEVIATION OF DAILY	0.009	0.006	0.003	0.002	0.005	0.0
HEAD ON LAYER 5	0.000	0.000	0.024	0.011	0.004	0.0

****

****

NA 3/30/95

ANNUAL TOTALS FOR YEAR 1977

	INCHES	CU. FEET	PERCEI
PRECIPITATION	72.81	11333198.000	100.0(
RUNOFF	0.000	0.000	0.0(
EVAPOTRANSPIRATION	36.104	5619678.500	49.5(
DRAINAGE COLLECTED FROM LAYER 3	40.8401	6356948.000	56.0(
PERC./LEAKAGE THROUGH LAYER 5	0.000134	20.850	0.0(
AVG. HEAD ON TOP OF LAYER 5	0.0099		
CHANGE IN WATER STORAGE	-4.134	-643447.812	-5.68
SOIL WATER AT START OF YEAR	61.644	9595171.000	
SOIL WATER AT END OF YEAR	57.510	8951723.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.256	0.00

MONTHLY TOTALS (IN INCHES) FOR YEAR 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/I
PRECIPITATION	13.37	2.18	3.29	3.44	9.71	7.8:
	10.32	14.70	2.98	0.00	4.67	4.3(
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.0(
	0.000	0.000	0.000	0.000	0.000	0.0(
EVAPOTRANSPIRATION	1.574	2.195	3.082	3.720	5.557	5.0(
	7.360	5.541	2.573	1.696	1.794	2.5(
LATERAL DRAINAGE COLLECTED FROM LAYER 3	2.4578	10.7278	3.6757	1.4237	1.6156	2.6(
	0.3719	3.3456	5.9191	2.7938	1.0871	0.3:
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0(
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0(

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.007	0.034	0.010	0.004	0.005	0.0

LAYER 5	0.001	0.010	0.017	0.008	0.003	0
STD. DEVIATION OF DAILY	0.005	0.017	0.004	0.002	0.003	0
HEAD ON LAYER 5	0.000	0.005	0.010	0.004	0.002	0

ANNUAL TOTALS FOR YEAR 1978

	INCHES	CU. FEET	PERCEN
PRECIPITATION	76.85	11962044.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	42.741	6652790.500	55.62
DRAINAGE COLLECTED FROM LAYER 3	36.4450	5672819.500	47.42
PERC./LEAKAGE THROUGH LAYER 5	0.000122	18.968	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0090		
CHANGE IN WATER STORAGE	-2.336	-363591.250	-3.04
SOIL WATER AT START OF YEAR	57.510	8951723.000	
SOIL WATER AT END OF YEAR	55.174	8588132.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	6.565	0.00

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1974 THROUGH 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	6.73	3.46	4.37	4.55	7.01	5.95
	6.58	9.84	5.91	3.16	7.12	5.37
STD. DEVIATIONS	4.28	1.27	1.55	2.74	3.35	4.09
	2.84	5.88	4.76	2.06	2.63	1.97
RUNOFF						
TOTALS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

STD. DEVIATIONS	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0

EVAPOTRANSPIRATION

TOTALS	1.408	2.112	3.083	4.017	5.190	4.5
	5.594	4.727	2.353	2.117	2.591	2.4
STD. DEVIATIONS	0.149	0.112	0.400	1.010	1.042	1.8
	1.870	1.259	0.737	0.489	0.494	0.2

LATERAL DRAINAGE COLLECTED FROM LAYER 3

TOTALS	3.1360	4.8769	2.9616	1.6891	1.9932	1.18
	1.2688	1.8554	3.9682	2.7637	2.0899	2.27
STD. DEVIATIONS	1.9502	3.9387	1.2075	0.7506	1.3618	1.00
	1.9734	2.3859	3.9287	2.7414	1.8168	1.75

PERCOLATION/LEAKAGE THROUGH LAYER 5

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
	0.0000	0.0000	0.0000	0.0000	0.0000	0.00

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ACROSS LAYER 5

AVERAGES	0.0089	0.0154	0.0084	0.0050	0.0057	0.00
	0.0036	0.0053	0.0117	0.0079	0.0061	0.00
STD. DEVIATIONS	0.0056	0.0124	0.0034	0.0022	0.0039	0.00
	0.0056	0.0068	0.0116	0.0078	0.0053	0.00

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1974 THROUGH 1978

	INCHES	CU. FEET	PERCENT
PRECIPITATION	70.06 (13.090)	10905458.0	100.00
RUNOFF	0.000 (0.0000)	0.00	0.000
EVAPOTRANSPIRATION	40.180 (6.2646)	6254217.50	57.349
LATERAL DRAINAGE COLLECTED FROM LAYER 3	30.06427 (12.64524)	4679636.500	42.91096
PERCOLATION/LEAKAGE THROUGH FROM LAYER 5	0.00010 (0.00004)	15.887	0.0001
AVERAGE HEAD ACROSS TOP OF LAYER 5	0.007 (0.003)		

NP 3/30/95

CHANGE IN WATER STORAGE	-0.183	(4.3607)	-28409.49	-0.261

****

MAS 3/30/95

****

PEAK DAILY VALUES FOR YEARS 1974 THROUGH 1978

	(INCHES)	(CU. FT.)
PRECIPITATION	8.52	1326175.620
RUNOFF	0.000	0.0000
DRAINAGE COLLECTED FROM LAYER 3	0.86093	134006.79700
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000002	0.37306
AVERAGE HEAD ACROSS LAYER 5	0.076	
SNOW WATER	1.58	245982.9840

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5065
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0677

****

TA. NAS 3/30/95

****

FINAL WATER STORAGE AT END OF YEAR 1978

LAYER	(INCHES)	(VOL/VOL)
1	34.3513	0.2863
2	4.5793	0.2290
3	0.0077	0.0387
4	0.0000	0.0000
5	16.2360	0.4510
SNOW WATER	0.000	

****
****

DIHTER IS NAB 5/30/95

```
******************************************************************************
******************************************************************************
**
**
*              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**              HELP MODEL VERSION 3.01   (14 OCTOBER 1994)
**                 DEVELOPED BY ENVIRONMENTAL LABORATORY
**                   USAE WATERWAYS EXPERIMENT STATION
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
**
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:      C:\HELP3\PREPF.D4
TEMPERATURE DATA FILE:        C:\HELP3\TEMPF.D7
SOLAR RADIATION DATA FILE:    C:\HELP3\SOLF.D13
EVAPOTRANSPIRATION DATA:      C:\HELP3\EVAF.D11
SOIL AND DESIGN DATA FILE:    C:\HELP3\open.D10
OUTPUT DATA FILE:             C:\HELP3\open.OUT


TIME:  13:43     DATE:   3/ 8/1995


******************************************************************************

     TITLE:  RIVERBIRCH PHASE I - open cell

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER  18
          THICKNESS                    =    540.00   INCHES
          POROSITY                     =      0.6710 VOL/VOL
          FIELD CAPACITY               =      0.2920 VOL/VOL
          WILTING POINT                =      0.0770 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.2949 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.20
                FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                  LAYER  2
                                  --------

                       TYPE 2 - LATERAL DRAINAGE LAYER
                         MATERIAL TEXTURE NUMBER   4
```

THICKNESS	=	20.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.1050	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1882	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.170000002000E-02	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0284	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.50	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 29

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4510	VOL/VOL
FIELD CAPACITY	=	0.4190	VOL/VOL
WILTING POINT	=	0.3320	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4510	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.680000028000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #18 WITH BARE

VB 105 - 3/30/13

GROUND CONDITIONS, A SURFACE SLOPE OF 5.% AND
A SLOPE LENGTH OF 500. FEET.

SCS RUNOFF CURVE NUMBER	=	79.80	
FRACTION OF AREA ALLOWING RUNOFF	=	0.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	42.880	ACRES
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	4.466	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	14.762	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.694	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	179.232	INCHES
TOTAL INITIAL WATER	=	179.232	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
NEW ORLEANS LOUISIANA

MAXIMUM LEAF AREA INDEX	=	3.00
START OF GROWING SEASON (JULIAN DATE)	=	24
END OF GROWING SEASON (JULIAN DATE)	=	365
AVERAGE ANNUAL WIND SPEED	=	8.20 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	75.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	79.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00 %

NOTE: PRECIPITATION DATA FOR NEW ORLEANS LOUISIANA
WAS ENTERED FROM THE DEFAULT DATA FILE.

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
52.40	54.70	61.40	68.70	74.90	80.10
82.10	81.70	78.50	69.20	59.80	54.80

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

STATION LATITUDE = 29.95 DEGREES

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1974

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/I
PRECIPITATION	8.46	5.53	6.64	5.52	9.84	3.8
	5.66	6.70	7.58	2.26	5.88	4.8
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
EVAPOTRANSPIRATION	1.343	2.106	3.149	4.980	6.104	6.0
	5.510	4.141	2.508	2.485	3.069	2.7
LATERAL DRAINAGE COLLECTED FROM LAYER 3	1.6606	0.8043	3.8764	2.2914	3.6211	2.6
	3.9058	3.2627	1.1565	1.2781	2.5034	1.5
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.005	0.003	0.011	0.007	0.010	0.0
	0.011	0.009	0.003	0.004	0.007	0.0
STD. DEVIATION OF DAILY HEAD ON LAYER 5	0.004	0.002	0.003	0.005	0.005	0.0
	0.001	0.001	0.002	0.003	0.002	0.0

ANNUAL TOTALS FOR YEAR 1974

	INCHES	CU. FEET	PERCENT
PRECIPITATION	72.79	11330084.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	44.208	6881208.000	60.73
DRAINAGE COLLECTED FROM LAYER 3	28.6367	4457433.000	39.34
PERC./LEAKAGE THROUGH LAYER 5	0.000101	15.731	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0069		
CHANGE IN WATER STORAGE	-0.055	-8569.353	-0.08
SOIL WATER AT START OF YEAR	179.232	27898282.000	
SOIL WATER AT END OF YEAR	179.177	27889714.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-2.965	0.00

NAB 3/30/95

MONTHLY TOTALS (IN INCHES) FOR YEAR 1975

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/I
PRECIPITATION	2.95	3.64	5.32	6.69	8.03	12.28
	8.35	10.11	3.97	4.00	11.35	3.81
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.00
	0.000	0.000	0.000	0.000	0.000	0.00
EVAPOTRANSPIRATION	1.236	1.921	3.391	4.619	5.835	6.47
	7.122	5.859	2.678	2.262	2.820	2.27
LATERAL DRAINAGE COLLECTED	1.4562	1.9986	1.4293	1.2199	2.9220	1.84
FROM LAYER 3	0.7531	1.2127	3.9400	3.9513	1.3129	4.77
PERCOLATION THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.00

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.004	0.006	0.004	0.004	0.008	0.0
LAYER 5	0.002	0.003	0.012	0.011	0.004	0.0
STD. DEVIATION OF DAILY	0.003	0.002	0.003	0.003	0.003	0.0
HEAD ON LAYER 5	0.001	0.002	0.003	0.003	0.003	0.0

ANNUAL TOTALS FOR YEAR 1975

	INCHES	CU. FEET	PERCENT
PRECIPITATION	80.50	12530176.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	46.488	7236063.500	57.75
DRAINAGE COLLECTED FROM LAYER 3	26.8155	4173952.000	33.31
PERC./LEAKAGE THROUGH LAYER 5	0.000095	14.802	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0065		
CHANGE IN WATER STORAGE	7.196	1120148.370	8.94
SOIL WATER AT START OF YEAR	179.177	27889714.000	

VN AHS 3/30/95

SOIL WATER AT END OF YEAR	186.374	29009862.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.0
SNOW WATER AT END OF YEAR	0.000	0.000	0.0
ANNUAL WATER BUDGET BALANCE	0.0000	-2.630	0.0

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1976

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	3.57	2.89	3.08	0.28	5.58	3.3
	5.67	1.69	1.57	5.08	5.80	8.7
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
EVAPOTRANSPIRATION	1.334	2.177	2.411	2.408	4.972	2.8
	5.290	2.796	1.068	1.516	2.468	2.0
ATERAL DRAINAGE COLLECTED	3.6184	1.9839	3.0084	3.3244	2.9995	0.5
FROM LAYER 3	0.2138	0.2412	0.1495	0.1061	0.0622	0.2
PERCOLATION THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.010	0.006	0.009	0.010	0.009	0.(
LAYER 5	0.001	0.001	0.000	0.000	0.000	0.(
STD. DEVIATION OF DAILY	0.002	0.004	0.002	0.002	0.002	0.(
HEAD ON LAYER 5	0.000	0.000	0.000	0.000	0.000	0.(

****

****

ANNUAL TOTALS FOR YEAR 1976

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.36	7371792.500	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	31.360	4881345.000	66.22

DRAINAGE COLLECTED FROM LAYER 3	16.5322	2573315.250	34.9
PERC./LEAKAGE THROUGH LAYER 5	0.000060	9.400	0.0
AVG. HEAD ON TOP OF LAYER 5	0.0040		
CHANGE IN WATER STORAGE	-0.532	-82876.664	-1.1
SOIL WATER AT START OF YEAR	186.374	29009862.000	
SOIL WATER AT END OF YEAR	185.841	28926984.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.0
SNOW WATER AT END OF YEAR	0.000	0.000	0.0
ANNUAL WATER BUDGET BALANCE	0.0000	-0.493	0.0

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1977

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	5.31	3.08	3.54	6.80	1.87	2.4
	2.91	16.02	13.44	4.47	7.89	5.0
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
EVAPOTRANSPIRATION	1.554	2.162	3.383	4.358	3.485	2.3
	2.688	5.295	2.940	2.627	2.805	2.4
LATERAL DRAINAGE COLLECTED FROM LAYER 3	0.8742	2.1296	3.7886	3.5346	2.1606	3.6
	2.7702	0.4112	0.2522	3.4506	3.7269	3.7
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.002	0.007	0.011	0.010	0.006	0.
	0.008	0.001	0.001	0.010	0.011	0.
STD. DEVIATION OF DAILY HEAD ON LAYER 5	0.002	0.005	0.002	0.003	0.004	0.
	0.003	0.001	0.000	0.007	0.005	0.

****

****

VN TAB 3/30/95

ANNUAL TOTALS FOR YEAR 1977

	INCHES	CU. FEET	PERCE
PRECIPITATION	72.81	11333198.000	100.0
RUNOFF	0.000	0.000	0.0
EVAPOTRANSPIRATION	36.104	5619678.500	49.5
DRAINAGE COLLECTED FROM LAYER 3	30.4696	4742728.500	41.8
PERC./LEAKAGE THROUGH LAYER 5	0.000106	16.499	0.0
AVG. HEAD ON TOP OF LAYER 5	0.0074		
CHANGE IN WATER STORAGE	6.237	970773.687	8.57
SOIL WATER AT START OF YEAR	185.841	28926984.000	
SOIL WATER AT END OF YEAR	192.078	29897758.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.721	0.00

MONTHLY TOTALS (IN INCHES) FOR YEAR 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	13.37	2.18	3.29	3.44	9.71	7.8
	10.32	14.70	2.98	0.00	4.67	4.3
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
EVAPOTRANSPIRATION	1.574	2.195	3.082	3.720	5.557	5.06
	7.360	5.541	2.573	1.696	1.794	2.58
LATERAL DRAINAGE COLLECTED FROM LAYER 3	2.9452	3.6702	6.6919	4.7989	2.8945	4.73
	3.3286	2.9257	2.1401	4.3714	3.5474	2.38
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
	0.0000	0.0000	0.0000	0.0000	0.0000	0.00

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.008	0.012	0.019	0.014	0.008	0.0

LAYER 5	0.009	0.008	0.006	0.012	0.010	0
STD. DEVIATION OF DAILY	0.006	0.009	0.004	0.003	0.005	0
HEAD ON LAYER 5	0.005	0.005	0.006	0.002	0.002	0

****

****

ANNUAL TOTALS FOR YEAR 1978

	INCHES	CU. FEET	PERCEN
PRECIPITATION	76.85	11962044.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	42.741	6652790.500	55.62
DRAINAGE COLLECTED FROM LAYER 3	44.4338	6916318.500	57.82
PERC./LEAKAGE THROUGH LAYER 5	0.000150	23.329	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0108		
CHANGE IN WATER STORAGE	-10.325	-1607086.120	-13.43
SOIL WATER AT START OF YEAR	192.078	29897758.000	
SOIL WATER AT END OF YEAR	181.753	28290672.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.953	0.00

****

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1974 THROUGH 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	6.73	3.46	4.37	4.55	7.01	5.95
	6.58	9.84	5.91	3.16	7.12	5.37
STD. DEVIATIONS	4.28	1.27	1.55	2.74	3.35	4.09
	2.84	5.88	4.76	2.06	2.63	1.97
RUNOFF						
TOTALS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

STD. DEVIATIONS	0.000	0.000	0.000	0.000	0.000	0.(
	0.000	0.000	0.000	0.000	0.000	0.(

EVAPOTRANSPIRATION

TOTALS	1.408	2.112	3.083	4.017	5.190	4.5
	5.594	4.727	2.353	2.117	2.591	2.4
STD. DEVIATIONS	0.149	0.112	0.400	1.010	1.042	1.6
	1.870	1.259	0.737	0.489	0.494	0.2

LATERAL DRAINAGE COLLECTED FROM LAYER 3

TOTALS	2.1109	2.1173	3.7589	3.0338	2.9196	2.6
	2.1943	1.6107	1.5277	2.6315	2.2305	2.5
STD. DEVIATIONS	1.1324	1.0207	1.9110	1.3502	0.5185	1.5
	1.6238	1.4081	1.5699	1.8473	1.5485	1.7

PERCOLATION/LEAKAGE THROUGH LAYER 5

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ACROSS LAYER 5

AVERAGES	0.0059	0.0067	0.0107	0.0089	0.0083	0.0(
	0.0062	0.0046	0.0045	0.0075	0.0066	0.0(
STD. DEVIATIONS	0.0031	0.0032	0.0054	0.0040	0.0015	0.0(
	0.0046	0.0040	0.0046	0.0053	0.0046	0.0(

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1974 THROUGH 1978

	INCHES		CU. FEET	PERCEN
PRECIPITATION	70.06	(13.090)	10905458.0	100.00
RUNOFF	0.000	(0.0000)	0.00	0.000
EVAPOTRANSPIRATION	40.180	(6.2646)	6254217.50	57.349
LATERAL DRAINAGE COLLECTED FROM LAYER 3	29.37758	(9.99998)	4572749.500	41.9308
PERCOLATION/LEAKAGE THROUGH FROM LAYER 5	0.00010	(0.00003)	15.952	0.000
AVERAGE HEAD ACROSS TOP OF LAYER 5	0.007	(0.002)		

CHANGE IN WATER STORAGE	0.504	(7.0054)	78477.98	0.72(

****

VD MAR 3/30/95

****

PEAK DAILY VALUES FOR YEARS 1974 THROUGH 1978

	(INCHES)	(CU. FT.)
PRECIPITATION	8.52	1326175.620
RUNOFF	0.000	0.0000
DRAINAGE COLLECTED FROM LAYER 3	0.27905	43436.00390
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000001	0.13596
AVERAGE HEAD ACROSS LAYER 5	0.025	
SNOW WATER	1.58	245982.9840

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5065
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0677

****

VB

MAE 3/30/85

****

FINAL WATER STORAGE AT END OF YEAR 1978

LAYER	(INCHES)	(VOL/VOL)
1	161.0278	0.2982
2	4.4829	0.2241
3	0.0064	0.0322
4	0.0000	0.0000
5	16.2360	0.4510
SNOW WATER	0.000	

****
****

SITUE - C

```
******************************************************************************
******************************************************************************
**
**
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**               HELP MODEL VERSION 3.01   (14 OCTOBER 1994)
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**                    USAE WATERWAYS EXPERIMENT STATION
**              FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
**
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:      C:\HELP3\PREPF.D4
TEMPERATURE DATA FILE:        C:\HELP3\TEMPF.D7
SOLAR RADIATION DATA FILE:    C:\HELP3\SOLF.D13
EVAPOTRANSPIRATION DATA:      C:\HELP3\EVAF.D11
SOIL AND DESIGN DATA FILE:    C:\HELP3\close2.D10
OUTPUT DATA FILE:             C:\HELP3\close2.OUT


TIME:  13:30     DATE:   3/ 8/1995


******************************************************************************

     TITLE:  RIVERBIRCH PHASE I - closed cell - fair grass
                (MODIFIED WATER CONTENT FOR WASTE LAYER
******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER
              WERE SPECIFIED BY THE USER.


                                  LAYER  1
                                  --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   1
          THICKNESS                    =      6.00   INCHES
          POROSITY                     =      0.4170 VOL/VOL
          FIELD CAPACITY               =      0.0450 VOL/VOL
          WILTING POINT                =      0.0180 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.0450 VOL/VOL
          EFFECTIVE, SAT. HYD. COND.   =  0.999999978000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.20
                FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                  LAYER  2
                                  --------

                         TYPE 3 - BARRIER SOIL LINER
                         MATERIAL TEXTURE NUMBER  29
```

3/30/15

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4510	VOL/VOL
FIELD CAPACITY	=	0.4190	VOL/VOL
WILTING POINT	=	0.3320	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4510	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.680000028000E-06	CM/SEC

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.50	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	540.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3500	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 5

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 4

THICKNESS	=	20.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.1050	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1050	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.170000002000E-02	CM/SEC

LAYER 6

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL

WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0100	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 7

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.50	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 8

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 29

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4510	VOL/VOL
FIELD CAPACITY	=	0.4190	VOL/VOL
WILTING POINT	=	0.3320	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4510	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.680000028000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 1 WITH A FAIR STAND OF GRASS, A SURFACE SLOPE OF 5.% AND A SLOPE LENGTH OF 500. FEET.

SCS RUNOFF CURVE NUMBER	=	39.30	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	42.880	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	0.270	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	2.502	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.108	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	218.432	INCHES
TOTAL INITIAL WATER	=	218.432	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
NEW ORLEANS LOUISIANA

MAXIMUM LEAF AREA INDEX	= 3.00	
START OF GROWING SEASON (JULIAN DATE)	= 24	
END OF GROWING SEASON (JULIAN DATE)	= 365	
AVERAGE ANNUAL WIND SPEED	= 8.20	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	= 73.00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	= 75.00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	= 79.00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	= 74.00	%

NOTE: PRECIPITATION DATA FOR NEW ORLEANS LOUISIANA
WAS ENTERED FROM THE DEFAULT DATA FILE.

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
52.40	54.70	61.40	68.70	74.90	80.10
82.10	81.70	78.50	69.20	59.80	54.80

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

STATION LATITUDE = 29.95 DEGREES

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1974

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/D
PRECIPITATION	8.46	5.53	6.64	5.52	9.84	3.83
	5.66	6.70	7.58	2.26	5.88	4.89
RUNOFF	4.918	4.328	4.133	2.979	2.686	0.00
	0.000	0.000	5.010	0.000	2.461	3.26
EVAPOTRANSPIRATION	1.363	1.950	2.492	4.172	5.784	5.18
	5.602	4.614	2.611	2.065	3.156	2.73
ERCOLATION THROUGH	0.0144	0.0156	0.0168	0.0145	0.0127	0.00
LAYER 3	0.0091	0.0148	0.0168	0.0163	0.0168	0.01
LATERAL DRAINAGE COLLECTED	7.0458	6.8056	5.6355	4.2900	3.6407	2.49
FROM LAYER 6	0.3876	0.1693	0.1001	0.0750	0.0582	0.04

PERCOLATION THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	2.703	5.026	4.151	2.998	2.887	0.
LAYER 3	0.611	3.231	5.244	3.387	5.086	5.
STD. DEVIATION OF DAILY	2.463	0.650	0.905	1.573	2.144	0.
HEAD ON LAYER 3	0.760	1.770	0.549	1.075	0.612	0.
AVERAGE DAILY HEAD ON	0.034	0.036	0.027	0.021	0.017	0.
LAYER 8	0.002	0.001	0.000	0.000	0.000	0.
STD. DEVIATION OF DAILY	0.023	0.003	0.002	0.001	0.001	0.
HEAD ON LAYER 8	0.001	0.000	0.000	0.000	0.000	0.

ANNUAL TOTALS FOR YEAR 1974

	INCHES	CU. FEET	PERCEN
PRECIPITATION	72.79	11330084.000	100.00
RUNOFF	29.780	4635335.500	40.91
EVAPOTRANSPIRATION	41.731	6495577.500	57.33
PERC./LEAKAGE THROUGH LAYER 3	0.175142	27261.580	0.24
AVG. HEAD ON TOP OF LAYER 3	3.4546		
DRAINAGE COLLECTED FROM LAYER 6	30.7511	4786544.000	42.25
PERC./LEAKAGE THROUGH LAYER 8	0.000090	13.940	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0127		
CHANGE IN WATER STORAGE	-29.472	-4587378.000	-40.49
SOIL WATER AT START OF YEAR	218.432	33999884.000	
SOIL WATER AT END OF YEAR	188.960	29412508.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	-0.0001	-8.893	0.00

08 BA 3/30/9

MONTHLY TOTALS (IN INCHES) FOR YEAR 1975

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	2.95	3.64	5.32	6.69	8.03	12.2
	8.35	10.11	3.97	4.00	11.35	3.8
RUNOFF	0.846	1.850	2.987	1.959	2.035	5.7
	2.902	5.319	0.121	2.706	8.365	0.8
EVAPOTRANSPIRATION	1.252	1.908	2.689	3.919	6.060	6.4
	6.316	5.548	2.819	1.785	2.610	2.2
PERCOLATION THROUGH LAYER 3	0.0174	0.0157	0.0171	0.0142	0.0150	0.0
	0.0124	0.0164	0.0163	0.0168	0.0162	0.0
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.0419	0.0332	0.0327	0.0272	0.0282	0.0
	0.0212	0.0263	0.0231	0.0212	0.0190	0.0
PERCOLATION THROUGH LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

VERAGE DAILY HEAD ON LAYER 3	5.178	5.139	4.744	3.023	3.483	4.8
	2.833	3.607	4.325	4.189	4.195	3.7
STD. DEVIATION OF DAILY HEAD ON LAYER 3	0.984	0.607	0.781	1.594	1.926	1.1
	2.194	1.789	1.613	0.735	1.151	0.8
AVERAGE DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
STD. DEVIATION OF DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0

ANNUAL TOTALS FOR YEAR 1975

	INCHES	CU. FEET	PERCENT
PRECIPITATION	80.50	12530176.000	100.00
RUNOFF	35.677	5553208.500	44.32
EVAPOTRANSPIRATION	43.592	6785319.500	54.15
PERC./LEAKAGE THROUGH LAYER 3	0.190684	29680.816	0.24
AVG. HEAD ON TOP OF LAYER 3	4.1087		
DRAINAGE COLLECTED FROM LAYER 6	0.3202	49842.227	0.40

PERC./LEAKAGE THROUGH LAYER 8	0.000002	0.358	0.0
AVG. HEAD ON TOP OF LAYER 8	0.0001		
CHANGE IN WATER STORAGE	0.911	141807.594	1.1
SOIL WATER AT START OF YEAR	188.960	29412508.000	
SOIL WATER AT END OF YEAR	189.871	29554314.000	.
SNOW WATER AT START OF YEAR	0.000	0.000	0.0
SNOW WATER AT END OF YEAR	0.000	0.000	0.0
ANNUAL WATER BUDGET BALANCE	0.0000	-1.754	0.0

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1976

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	3.57	2.89	3.08	0.28	5.58	3.3
	5.67	1.69	1.57	5.08	5.80	8.7
RUNOFF	2.199	1.626	0.452	0.000	0.174	0.0
	0.000	0.000	0.000	1.530	3.309	6.9
EVAPOTRANSPIRATION	1.309	1.931	1.885	2.645	5.432	2.4
	5.506	2.798	1.147	1.580	2.464	2.0
PERCOLATION THROUGH LAYER 3	0.0181	0.0156	0.0166	0.0087	0.0116	0.0
	0.0099	0.0057	0.0060	0.0112	0.0167	0.0
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.0192	0.0158	0.0168	0.0107	0.0207	0.0
	0.0227	0.0186	0.0220	0.0236	0.0222	0.0
PERCOLATION THROUGH LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 3	5.467	5.046	3.836	1.719	2.004	0.1
	1.398	0.522	0.152	2.017	4.935	5.5
STD. DEVIATION OF DAILY HEAD ON LAYER 3	0.474	0.637	1.021	2.037	1.791	0.4
	1.406	0.797	0.230	2.076	0.802	0.3
AVERAGE DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
STD. DEVIATION OF DAILY	1.070	0.000	0.000	0.000	0.000	0.0

HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000

****

****

ANNUAL TOTALS FOR YEAR 1976

	INCHES	CU. FEET	PERCE
PRECIPITATION	47.36	7371792.500	100.0
RUNOFF	16.272	2532744.750	34.3
EVAPOTRANSPIRATION	31.212	4858317.000	65.9
PERC./LEAKAGE THROUGH LAYER 3	- 0.140423	21857.426	0.3
AVG. HEAD ON TOP OF LAYER 3	2.7399		
DRAINAGE COLLECTED FROM LAYER 6	0.2247	34979.531	0.4
PERC./LEAKAGE THROUGH LAYER 8	0.000002	0.291	0.0
AVG. HEAD ON TOP OF LAYER 8	0.0001		
CHANGE IN WATER STORAGE	-0.349	-54247.234	-0.7
SOIL WATER AT START OF YEAR	189.871	29554314.000	
SOIL WATER AT END OF YEAR	189.523	29500068.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-1.757	0.00

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1977

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	5.31	3.08	3.54	6.80	1.87	2.4
	2.91	16.02	13.44	4.47	7.89	5.0
RUNOFF	3.454	1.493	1.620	3.222	0.000	0.0
	0.000	8.276	11.068	1.840	4.561	2.6
VAPOTRANSPIRATION	1.487	1.571	2.643	4.677	2.556	2.33
	2.927	5.360	2.997	2.398	2.808	2.48
PERCOLATION THROUGH LAYER 3	0.0176	0.0154	0.0170	0.0142	0.0053	0.00
	0.0023	0.0157	0.0170	0.0170	0.0167	0.01

VD VRP 3/30/87

LATERAL DRAINAGE COLLECTED	0.0139	0.0101	0.0100	0.0081	0.0035	0.
FROM LAYER 6	0.0136	0.0255	0.0194	0.0151	0.0121	0.
PERCOLATION THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.
LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	5.637	4.694	4.599	2.825	0.592	0
LAYER 3	0.009	4.494	5.509	4.596	5.069	4
STD. DEVIATION OF DAILY	0.312	0.885	0.889	1.689	1.039	0
HEAD ON LAYER 3	0.021	1.758	0.521	0.712	0.755	0
AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0
LAYER 8	0.000	0.000	0.000	0.000	0.000	0
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0
HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0

ANNUAL TOTALS FOR YEAR 1977

	INCHES	CU. FEET	PERCEI
PRECIPITATION	72.81	11333198.000	100.0(
RUNOFF	38.139	5936516.000	52.38
EVAPOTRANSPIRATION	34.247	5330715.500	47.04
PERC./LEAKAGE THROUGH LAYER 3	0.158344	24646.916	0.22
AVG. HEAD ON TOP OF LAYER 3	3.5891		
DRAINAGE COLLECTED FROM LAYER 6	0.1503	23401.998	0.21
PERC./LEAKAGE THROUGH LAYER 8	0.000001	0.232	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0001		
CHANGE IN WATER STORAGE	0.273	42561.750	0.38
SOIL WATER AT START OF YEAR	189.523	29500068.000	
SOIL WATER AT END OF YEAR	189.796	29542630.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	2.577	0.00

NAB 3/30/98

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN
PRECIPITATION	13.37	2.18	3.29	3.44	9.71	7.
	10.32	14.70	2.98	0.00	4.67	4.
RUNOFF	11.697	0.908	1.163	1.641	4.107	0.
	4.150	8.315	0.596	0.000	1.445	2.
EVAPOTRANSPIRATION	1.569	2.100	2.199	3.344	5.389	4.
	7.329	5.343	2.388	1.515	1.637	2.
PERCOLATION THROUGH LAYER 3	0.0177	0.0157	0.0169	0.0141	0.0122	0.
	0.0168	0.0150	0.0163	0.0163	0.0089	0.
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.0099	0.0080	0.0086	0.0076	0.0093	0.
	0.0186	0.0154	0.0148	0.0135	0.0080	0.
PERCOLATION THROUGH LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.
	0.0000	0.0000	0.0000	0.0000	0.0000	0.

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 3	5.812	5.143	4.413	2.783	1.872	0.
	4.160	3.278	4.255	3.413	1.026	5.
STD. DEVIATION OF DAILY HEAD ON LAYER 3	0.128	0.559	0.786	1.599	1.835	0.
	1.313	2.187	0.700	1.030	1.699	0.
AVERAGE DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
	0.000	0.000	0.000	0.000	0.000	0.
STD. DEVIATION OF DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
	0.000	0.000	0.000	0.000	0.000	0.

****

****

ANNUAL TOTALS FOR YEAR 1978

	INCHES	CU. FEET	PERCENT
PRECIPITATION	76.85	11962044.000	100.00
RUNOFF	36.892	5742453.500	48.01
EVAPOTRANSPIRATION	40.195	6256464.500	52.30
PERC./LEAKAGE THROUGH LAYER 3	0.174857	27217.221	0.23

AVG. HEAD ON TOP OF LAYER 3	3.4650		
DRAINAGE COLLECTED FROM LAYER 6	0.1398	21754.289	0.1
PERC./LEAKAGE THROUGH LAYER 8	0.000001	0.226	0.0
AVG. HEAD ON TOP OF LAYER 8	0.0001		
CHANGE IN WATER STORAGE	-0.377	-58626.914	-0.4
SOIL WATER AT START OF YEAR	189.796	29542630.000	
SOIL WATER AT END OF YEAR	189.420	29484002.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.0
SNOW WATER AT END OF YEAR	0.000	0.000	0.0
ANNUAL WATER BUDGET BALANCE	0.0000	-1.590	0.0

****

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1974 THROUGH 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DE
PRECIPITATION						
TOTALS	6.73	3.46	4.37	4.55	7.01	5.95
	6.58	9.84	5.91	3.16	7.12	5.37
STD. DEVIATIONS	4.28	1.27	1.55	2.74	3.35	4.09
	2.84	5.88	4.76	2.06	2.63	1.97
RUNOFF						
TOTALS	4.623	2.041	2.071	1.960	1.800	1.30
	1.410	4.382	3.359	1.215	4.028	3.16
STD. DEVIATIONS	4.232	1.325	1.478	1.282	1.736	2.51
	1.981	4.181	4.784	1.190	2.680	2.31
EVAPOTRANSPIRATION						
TOTALS	1.396	1.892	2.382	3.751	5.044	4.24
	5.536	4.733	2.393	1.869	2.535	2.42
STD. DEVIATIONS	0.130	0.194	0.337	0.783	1.417	1.77
	1.630	1.139	0.732	0.366	0.565	0.27
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0171	0.0156	0.0169	0.0131	0.0113	0.00
	0.0101	0.0135	0.0145	0.0155	0.0151	0.01
STD. DEVIATIONS	0.0015	0.0001	0.0002	0.0025	0.0036	0.00
	0.0053	0.0044	0.0048	0.0024	0.0035	0.00

NR 3/30/93

LATERAL DRAINAGE COLLECTED FROM LAYER 6

TOTALS	1.4261	1.3745	1.1407	0.8687	0.7405	0.5
	0.0927	0.0510	0.0359	0.0297	0.0239	0.0
STD. DEVIATIONS	3.1415	3.0361	2.5126	1.9125	1.6213	1.1
	0.1648	0.0663	0.0360	0.0257	0.0200	0.0

PERCOLATION/LEAKAGE THROUGH LAYER 8

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ACROSS LAYER 3

AVERAGES	4.9594	5.0095	4.3487	2.6698	2.1676	1.28
	1.8022	3.0263	3.8969	3.5204	4.0619	4.90
STD. DEVIATIONS	1.2825	0.1845	0.3622	0.5416	1.1007	2.02
	1.6894	1.4892	2.1650	0.9867	1.7364	0.70

DAILY AVERAGE HEAD ACROSS LAYER 8

AVERAGES	0.0068	0.0073	0.0055	0.0043	0.0036	0.00
	0.0004	0.0002	0.0002	0.0001	0.0001	0.00
STD. DEVIATIONS	0.0150	0.0162	0.0121	0.0095	0.0078	0.00
	0.0008	0.0003	0.0002	0.0001	0.0001	0.00

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1974 THROUGH 1978

	INCHES	CU. FEET	PERCENT
PRECIPITATION	70.06 (13.090)	10905458.0	100.00
RUNOFF	31.352 (9.0188)	4880051.50	44.749
EVAPOTRANSPIRATION	38.195 (5.2434)	5945279.50	54.517
PERCOLATION/LEAKAGE THROUGH FROM LAYER 3	0.16789 (0.01915)	26132.791	0.2396
AVERAGE HEAD ACROSS TOP OF LAYER 3	3.471 (0.489)		
LATERAL DRAINAGE COLLECTED FROM LAYER 6	6.31723 (13.65914)	983304.500	9.01663
PERCOLATION/LEAKAGE THROUGH FROM LAYER 8	0.00002 (0.00004)	3.009	0.0000

NAB 3/30/95

AVERAGE HEAD ACROSS TOP OF LAYER 8	0.003	(0.006)		
CHANGE IN WATER STORAGE	-5.802	(13.2420)	-903176.50	-8.28

****

NA 3/30/95

****

PEAK DAILY VALUES FOR YEARS 1974 THROUGH 1978

	(INCHES)	(CU. FT.)
PRECIPITATION	8.52	1326175.620
RUNOFF	7.202	1121079.5000
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000576	89.65855
AVERAGE HEAD ACROSS LAYER 3	6.000	
DRAINAGE COLLECTED FROM LAYER 6	0.37798	58833.59770
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.000001	0.15759
AVERAGE HEAD ACROSS LAYER 8	0.056	
SNOW WATER	1.58	245982.9840

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4170
MINIMUM VEG. SOIL WATER (VOL/VOL)	-0.0109

****

VC NR 3/30/85

****

FINAL WATER STORAGE AT END OF YEAR 1978

LAYER	(INCHES)	(VOL/VOL)
1	2.0045	0.3341
2	10.8240	0.4510
3	0.0000	0.0000
4	157.6800	0.2920
5	2.6731	0.1337
6	0.0021	0.0107
7	0.0000	0.0000
8	16.2360	0.4510
SNOW WATER	0.000	

****

****

```
******************************************************************************
******************************************************************************
**
**
 *              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
 *               HELP MODEL VERSION 3.01    (14 OCTOBER 1994)
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY
**                    USAE WATERWAYS EXPERIMENT STATION
**              FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
**
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     h:\riverbir\help\PREPF.D4
TEMPERATURE DATA FILE:       h:\riverbir\help\TEMPF.D7
SOLAR RADIATION DATA FILE:   h:\riverbir\help\SOLF.D13
EVAPOTRANSPIRATION DATA:     h:\riverbir\help\EVAF.D11
SOIL AND DESIGN DATA FILE:   h:\riverbir\help\close.D10
OUTPUT DATA FILE:            h:\riverbir\help\close.OUT


TIME:  11:11     DATE:   3/ 8/1995


******************************************************************************

     TITLE:  RIVERBIRCH PHASE I - closed cell - fair grass

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                      TYPE 1 - VERTICAL PERCOLATION LAYER
                          MATERIAL TEXTURE NUMBER   1
          THICKNESS                    =       6.00   INCHES
          POROSITY                     =       0.4170 VOL/VOL
          FIELD CAPACITY               =       0.0450 VOL/VOL
          WILTING POINT                =       0.0180 VOL/VOL
          INITIAL SOIL WATER CONTENT   =       0.2291 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.999999978000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.20
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                  LAYER  2
                                  --------

                          TYPE 3 - BARRIER SOIL LINER
                          MATERIAL TEXTURE NUMBER  29
```

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4510	VOL/VOL
FIELD CAPACITY	=	0.4190	VOL/VOL
WILTING POINT	=	0.3320	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4510	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.680000028000E-06	CM/SEC

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.50	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	540.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 5

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 4

THICKNESS	=	20.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.1050	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1135	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.170000002000E-02	CM/SEC

LAYER 6

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL

WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0100	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

3/30/93

LAYER 7

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.50	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 8

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 29

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4510	VOL/VOL
FIELD CAPACITY	=	0.4190	VOL/VOL
WILTING POINT	=	0.3320	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4510	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.680000028000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 1 WITH A FAIR STAND OF GRASS, A SURFACE SLOPE OF 5.% AND A SLOPE LENGTH OF 500. FEET.

SCS RUNOFF CURVE NUMBER	=	39.30	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	42.880	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	1.374	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	2.502	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.108	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	188.387	INCHES
TOTAL INITIAL WATER	=	188.387	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

3/30/21

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
NEW ORLEANS LOUISIANA

MAXIMUM LEAF AREA INDEX	=	3.00
START OF GROWING SEASON (JULIAN DATE)	=	24
END OF GROWING SEASON (JULIAN DATE)	=	365
AVERAGE ANNUAL WIND SPEED	=	8.20 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	75.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	79.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00 %

NOTE: PRECIPITATION DATA FOR NEW ORLEANS LOUISIANA
WAS ENTERED FROM THE DEFAULT DATA FILE.

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
52.40	54.70	61.40	68.70	74.90	80.10
82.10	81.70	78.50	69.20	59.80	54.80

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

STATION LATITUDE = 29.95 DEGREES

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1974

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	8.46	5.53	6.64	5.52	9.84	3.8
	5.66	6.70	7.58	2.26	5.88	4.8
RUNOFF	6.020	4.328	4.133	2.979	2.686	0.0
	0.000	0.000	5.010	0.000	2.461	3.2
EVAPOTRANSPIRATION	1.363	1.950	2.492	4.172	5.784	5.1
	5.602	4.614	2.611	2.065	3.156	2.7
ERCOLATION THROUGH	0.0171	0.0156	0.0168	0.0145	0.0127	0.0
LAYER 3	0.0091	0.0148	0.0168	0.0163	0.0168	0.0
LATERAL DRAINAGE COLLECTED	0.0000	0.0000	0.0000	0.0000	0.0014	0.0
FROM LAYER 6	0.0011	0.0019	0.0017	0.0001	0.0000	0.0

PERCOLATION THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.
LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	4.748	5.026	4.151	2.998	2.887	0.
LAYER 3	0.611	3.231	5.244	3.387	5.086	5.
STD. DEVIATION OF DAILY	0.997	0.650	0.905	1.573	2.144	0.
HEAD ON LAYER 3	0.760	1.770	0.549	1.075	0.612	0.
AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.
LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.
HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.

ANNUAL TOTALS FOR YEAR 1974

	INCHES	CU. FEET	PERCEN
PRECIPITATION	72.79	11330084.000	100.00
RUNOFF	30.881	4806825.500	42.43
EVAPOTRANSPIRATION	41.731	6495577.500	57.33
PERC./LEAKAGE THROUGH LAYER 3	0.177846	27682.463	0.24
AVG. HEAD ON TOP OF LAYER 3	3.6250		
DRAINAGE COLLECTED FROM LAYER 6	0.0074	1155.715	0.01
PERC./LEAKAGE THROUGH LAYER 8	0.000000	0.045	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0000		
CHANGE IN WATER STORAGE	0.170	26525.092	0.23
SOIL WATER AT START OF YEAR	188.387	29323270.000	
SOIL WATER AT END OF YEAR	188.557	29349794.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.615	0.00

VK AB 3/31

MONTHLY TOTALS (IN INCHES) FOR YEAR 1975

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN
PRECIPITATION	2.95	3.64	5.32	6.69	8.03	12.
	8.35	10.11	3.97	4.00	11.35	3.
RUNOFF	0.846	1.850	2.987	1.959	2.035	5.
	2.902	5.319	0.121	2.706	8.365	0.
EVAPOTRANSPIRATION	1.252	1.908	2.689	3.919	6.060	6.
	6.316	5.548	2.819	1.785	2.610	2.
PERCOLATION THROUGH LAYER 3	0.0174	0.0157	0.0171	0.0142	0.0150	0.
	0.0124	0.0164	0.0163	0.0168	0.0162	0.
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.
	0.0000	0.0000	0.0000	0.0000	0.0000	0.
PERCOLATION THROUGH LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.
	0.0000	0.0000	0.0000	0.0000	0.0000	0.

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

VERAGE DAILY HEAD ON LAYER 3	5.178	5.139	4.744	3.023	3.483	4.
	2.833	3.607	4.325	4.189	4.195	3.
STD. DEVIATION OF DAILY HEAD ON LAYER 3	0.984	0.607	0.781	1.594	1.926	1.
	2.194	1.789	1.613	0.735	1.151	0.
AVERAGE DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
	0.000	0.000	0.000	0.000	0.000	0.
STD. DEVIATION OF DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
	0.000	0.000	0.000	0.000	0.000	0.

ANNUAL TOTALS FOR YEAR 1975

	INCHES	CU. FEET	PERCEN
PRECIPITATION	80.50	12530176.000	100.00
RUNOFF	35.677	5553208.500	44.32
EVAPOTRANSPIRATION	43.592	6785319.500	54.15
PERC./LEAKAGE THROUGH LAYER 3	0.190684	29680.816	0.24
AVG. HEAD ON TOP OF LAYER 3	4.1087		
DRAINAGE COLLECTED FROM LAYER 6	0.0003	39.918	0.00

PERC./LEAKAGE THROUGH LAYER 8	0.000000	0.002	0.0(
AVG. HEAD ON TOP OF LAYER 8	0.0000		
CHANGE IN WATER STORAGE	1.231	191613.391	1.5:
SOIL WATER AT START OF YEAR	188.557	29349794.000	
SOIL WATER AT END OF YEAR	189.788	29541408.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-4.887	0.00

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1976

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	3.57	2.89	3.08	0.28	5.58	3.3
	5.67	1.69	1.57	5.08	5.80	8.7
RUNOFF	2.199	1.626	0.452	0.000	0.174	0.0
	0.000	0.000	0.000	1.530	3.309	6.9
EVAPOTRANSPIRATION	1.309	1.931	1.885	2.645	5.432	2.4
	5.506	2.798	1.147	1.580	2.464	2.0
PERCOLATION THROUGH LAYER 3	0.0181	0.0156	0.0166	0.0087	0.0116	0.0
	0.0099	0.0057	0.0060	0.0112	0.0167	0.0
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.0027	0.0037	0.0055	0.0035	0.0119	0.0
	0.0176	0.0149	0.0193	0.0217	0.0210	0.0
PERCOLATION THROUGH LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 3	5.467	5.046	3.836	1.719	2.004	0.1
	1.398	0.522	0.152	2.017	4.935	5.5
STD. DEVIATION OF DAILY HEAD ON LAYER 3	0.474	0.637	1.021	2.037	1.791	0.4
	1.406	0.797	0.230	2.076	0.802	0.3
AVERAGE DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
STD. DEVIATION OF DAILY	1.070	0.000	0.000	0.000	0.000	0.0

HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.

****

****

ANNUAL TOTALS FOR YEAR 1976

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.36	7371792.500	100.00
RUNOFF	16.272	2532744.750	34.36
EVAPOTRANSPIRATION	31.212	4858317.000	65.90
PERC./LEAKAGE THROUGH LAYER 3	0.140423	21857.426	0.30
AVG. HEAD ON TOP OF LAYER 3	2.7399		
DRAINAGE COLLECTED FROM LAYER 6	0.1465	22799.475	0.31
PERC./LEAKAGE THROUGH LAYER 8	0.000001	0.229	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0001		
CHANGE IN WATER STORAGE	-0.270	-42072.480	-0.57
SOIL WATER AT START OF YEAR	189.788	29541408.000	
SOIL WATER AT END OF YEAR	189.518	29499336.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	3.610	0.00

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1977

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/D
PRECIPITATION	5.31	3.08	3.54	6.80	1.87	2.46
	2.91	16.02	13.44	4.47	7.89	5.02
RUNOFF	3.454	1.493	1.620	3.222	0.000	0.00
	0.000	8.276	11.068	1.840	4.561	2.60
EVAPOTRANSPIRATION	1.487	1.571	2.643	4.677	2.556	2.33
	2.927	5.360	2.997	2.398	2.808	2.48
PERCOLATION THROUGH LAYER 3	0.0176	0.0154	0.0170	0.0142	0.0053	0.00
	0.0023	0.0157	0.0170	0.0170	0.0167	0.01

LATERAL DRAINAGE COLLECTED	0.0132	0.0096	0.0095	0.0077	0.0032	0.0(
FROM LAYER 6	0.0131	0.0252	0.0193	0.0150	0.0120	0.0:
PERCOLATION THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0(
LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0(

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	5.637	4.694	4.599	2.825	0.592	0.(
LAYER 3	0.009	4.494	5.509	4.596	5.069	4.5
STD. DEVIATION OF DAILY	0.312	0.885	0.889	1.689	1.039	0.2
HEAD ON LAYER 3	0.021	1.758	0.521	0.712	0.755	0.7
AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.(
LAYER 8	0.000	0.000	0.000	0.000	0.000	0.(
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.(
HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.(

ANNUAL TOTALS FOR YEAR 1977

	INCHES	CU. FEET	PERCENT
PRECIPITATION	72.81	11333198.000	100.00
RUNOFF	38.139	5936516.000	52.38
EVAPOTRANSPIRATION	34.247	5330715.500	47.04
PERC./LEAKAGE THROUGH LAYER 3	0.158344	24646.916	0.22
AVG. HEAD ON TOP OF LAYER 3	3.5891		
DRAINAGE COLLECTED FROM LAYER 6	0.1462	22758.242	0.20
PERC./LEAKAGE THROUGH LAYER 8	0.000001	0.230	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0001		
CHANGE IN WATER STORAGE	0.278	43207.777	0.38
SOIL WATER AT START OF YEAR	189.518	29499336.000	
SOIL WATER AT END OF YEAR	189.796	29542544.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.308	0.00

NA

NB 3/30/

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/
PRECIPITATION	13.37	2.18	3.29	3.44	9.71	7.8
	10.32	14.70	2.98	0.00	4.67	4.3
RUNOFF	11.697	0.908	1.163	1.641	4.107	0.7
	4.150	8.315	0.596	0.000	1.445	2.1
EVAPOTRANSPIRATION	1.569	2.100	2.199	3.344	5.389	4.7
	7.329	5.343	2.388	1.515	1.637	2.5
PERCOLATION THROUGH LAYER 3	0.0177	0.0157	0.0169	0.0141	0.0122	0.0
	0.0168	0.0150	0.0163	0.0163	0.0089	0.0
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.0098	0.0080	0.0086	0.0076	0.0092	0.0
	0.0185	0.0153	0.0147	0.0134	0.0080	0.0
PERCOLATION THROUGH LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 3	5.812	5.143	4.413	2.783	1.872	0.[illegible]
	4.160	3.278	4.255	3.413	1.026	5.[illegible]
STD. DEVIATION OF DAILY HEAD ON LAYER 3	0.128	0.559	0.786	1.599	1.835	0.[illegible]
	1.313	2.187	0.700	1.030	1.699	0.[illegible]
AVERAGE DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.[illegible]
	0.000	0.000	0.000	0.000	0.000	0.[illegible]
STD. DEVIATION OF DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.[illegible]
	0.000	0.000	0.000	0.000	0.000	0.[illegible]

****

****

ANNUAL TOTALS FOR YEAR 1978

	INCHES	CU. FEET	PERCENT
PRECIPITATION	76.85	11962044.000	100.00
RUNOFF	36.892	5742453.500	48.01
EVAPOTRANSPIRATION	40.195	6256464.500	52.30
PERC./LEAKAGE THROUGH LAYER 3	0.174857	27217.221	0.23

AVG. HEAD ON TOP OF LAYER 3	3.4650		
DRAINAGE COLLECTED FROM LAYER 6	0.1393	21681.340	0.18
PERC./LEAKAGE THROUGH LAYER 8	0.000001	0.225	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0001		
CHANGE IN WATER STORAGE	-0.376	-58555.660	-0.49
SOIL WATER AT START OF YEAR	189.796	29542544.000	
SOIL WATER AT END OF YEAR	189.420	29483988.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.109	0.00

****

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1974 THROUGH 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	6.73	3.46	4.37	4.55	7.01	5.95
	6.58	9.84	5.91	3.16	7.12	5.37
STD. DEVIATIONS	4.28	1.27	1.55	2.74	3.35	4.09
	2.84	5.88	4.76	2.06	2.63	1.97
RUNOFF						
TOTALS	4.843	2.041	2.071	1.960	1.800	1.302
	1.410	4.382	3.359	1.215	4.028	3.161
STD. DEVIATIONS	4.280	1.325	1.478	1.282	1.736	2.518
	1.981	4.181	4.784	1.190	2.680	2.316
EVAPOTRANSPIRATION						
TOTALS	1.396	1.892	2.382	3.751	5.044	4.244
	5.536	4.733	2.393	1.869	2.535	2.421
STD. DEVIATIONS	0.130	0.194	0.337	0.783	1.417	1.776
	1.630	1.139	0.732	0.366	0.565	0.277
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0176	0.0156	0.0169	0.0131	0.0113	0.007
	0.0101	0.0135	0.0145	0.0155	0.0151	0.017
STD. DEVIATIONS	0.0004	0.0001	0.0002	0.0025	0.0036	0.005
	0.0053	0.0044	0.0048	0.0024	0.0035	0.000

JH NAB 3/30/95

LATERAL DRAINAGE COLLECTED FROM LAYER 6

TOTALS	0.0051	0.0042	0.0047	0.0038	0.0052	0.0
	0.0101	0.0115	0.0110	0.0100	0.0082	0.0
STD. DEVIATIONS	0.0060	0.0044	0.0046	0.0038	0.0052	0.0
	0.0089	0.0104	0.0095	0.0097	0.0088	0.0

PERCOLATION/LEAKAGE THROUGH LAYER 8

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ACROSS LAYER 3

AVERAGES	5.3682	5.0095	4.3487	2.6698	2.1676	1.2
	1.8022	3.0263	3.8969	3.5204	4.0619	4.9
STD. DEVIATIONS	0.4181	0.1845	0.3622	0.5416	1.1007	2.0
	1.6894	1.4892	2.1650	0.9867	1.7364	0.7

DAILY AVERAGE HEAD ACROSS LAYER 8

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
	0.0000	0.0001	0.0001	0.0000	0.0000	0.00
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
	0.0000	0.0001	0.0000	0.0000	0.0000	0.00

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1974 THROUGH 1978

	INCHES		CU. FEET	PERCEN
PRECIPITATION	70.06	(13.090)	10905458.0	100.00
RUNOFF	31.572	(8.9841)	4914349.50	45.063
EVAPOTRANSPIRATION	38.195	(5.2434)	5945279.50	54.517
PERCOLATION/LEAKAGE THROUGH FROM LAYER 3	0.16843	(0.01944)	26216.967	0.240
AVERAGE HEAD ACROSS TOP OF LAYER 3	3.506	(0.493)		
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.08793	(0.07686)	13686.937	0.1255
PERCOLATION/LEAKAGE THROUGH FROM LAYER 8	0.00000	(0.00000)	0.146	0.000

/365 days/
→ check to gauther

AVERAGE HEAD ACROSS TOP OF LAYER 8	0.000 (0.000)		
CHANGE IN WATER STORAGE	0.207 (0.6370)	32143.62	0.295

****

IAP 3/31/1

PEAK DAILY VALUES FOR YEARS 1974 THROUGH 1978

	(INCHES)	(CU. FT.)
PRECIPITATION	8.52	1326175.620
RUNOFF	7.202	1121079.5000
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000576	89.65855
AVERAGE HEAD ACROSS LAYER 3	6.000	
DRAINAGE COLLECTED FROM LAYER 6	0.00096	148.85124
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.000000	0.00154
AVERAGE HEAD ACROSS LAYER 8	0.000	
SNOW WATER	1.58	245982.9840

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4170
MINIMUM VEG. SOIL WATER (VOL/VOL)	-0.0109

NY-3/30/

****

FINAL WATER STORAGE AT END OF YEAR 1978

LAYER	(INCHES)	(VOL/VOL)
1	2.0045	0.3341
2	10.8240	0.4510
3	0.0000	0.0000
4	157.6800	0.2920
5	2.6730	0.1337
6	0.0021	0.0107
7	0.0000	0.0000
8	16.2360	0.4510
SNOW WATER	0.000	

****
****

LEACHATE GENERATION - ADDENDUM

Subject: LEACHATE GENERATION-ADDENDUM
By : S. Togan ALPER Date: March 31, 1995
Checked By: Date: 4/6/95

P.Name:RiverBirch
P.Number:95B034-7

SCOPE:

Estimate the maximum amount of leachate that will infiltrate through the waste into the leachate collection system during worse conditions with one foot of waste in place and the one whole module is open to precipitation.

REFERENCES:

. EPA HELP Model

DISCUSSION

. The HELP model has been used to determine the average and peak volumes of leachate generated.

. 5-year default rainfall data have been used in the analysis. During this five year period the peak daily rainfall was 8.5 inches. In order to determine the leachate generated during a 10 inch/day storm event, the peak value of leachate generated during the 8.5 inch/day storm event has been linearly interpolated with respect to the ratio of leachate generated versus precipitation recorded.

ASSUMPTIONS

. Default soil characteristics for HELP Model has been used
. No surface runoff allowed
. Area of largest module = 120,000 ft2
. Moisture content calculated by HELP Model
. Geomembrane (GM) liner hole density = .5 holes/acre
. GM liner installation defects = 10 holes/acre
. GM placement quality = 3 -good
. Evaporative depth = 12"
. Waste thickness = 1'
. No intermediate or final cover on the whole cell

Subject: LEACHATE GENERATION
By : S. Togan ALPER Date: March 31, 1995
Checked By: Date: 4/6/95

P.Name:RiverBirch
P.Number:95B034-7

CALCULATIONS

. The computer output with the input echo is given in Appendix .

.The daily values per module is calculated by dividing the annual values by 365 days and 16 modules.

. The peak daily value is calculated by dividing the output value by 16 modules.

RESULTS

The expected volumes of leachate for all four stages is given in the table below;

Stage	Leachate Generated (ft3)
Daily average for 5-year period	880
Peak daily amount during 8.5 inch/day storm event	17500
Peak daily value during 10.0 inch/day storm event*	20600

* The peak value for this stage is calculated by linear interpolation based on the 8.5 inch/day storm event

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 3.01 (14 OCTOBER 1994)
DEVELOPED BY ENVIRONMENTAL LABORATORY
USAE WATERWAYS EXPERIMENT STATION
FOR USEPA RISK REDUCTION ENGINEERING LABORATORY

PRECIPITATION DATA FILE: C:\HELP3\DATA4.D4
TEMPERATURE DATA FILE: C:\HELP3\DATA7.D7
SOLAR RADIATION DATA FILE: C:\HELP3\DATA13.D13
EVAPOTRANSPIRATION DATA: C:\HELP3\DATA11.D11
SOIL AND DESIGN DATA FILE: C:\HELP3\DATA10.D10
OUTPUT DATA FILE: H:\RIVERBIR\HELP\OP1FT.OUT

TIME: 9: 9 DATE: 3/31/1995

TITLE: RIVERBIRCH PHASE I - open cell (1 ft - Waste in Place

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	12.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1483	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 4.20 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 4

THICKNESS	=	20.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.1050	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2048	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.170000002000E-02	CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0328	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.50	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 5

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 29

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4510	VOL/VOL
FIELD CAPACITY	=	0.4190	VOL/VOL
WILTING POINT	=	0.3320	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4510	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.680000028000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE #18 WITH BARE

GROUND CONDITIONS, A SURFACE SLOPE OF 5.% AND
A SLOPE LENGTH OF 500. FEET.

SCS RUNOFF CURVE NUMBER	=	79.80	
FRACTION OF AREA ALLOWING RUNOFF	=	0.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	42.880	ACRES
EVAPORATIVE ZONE DEPTH	=	12.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	1.779	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	8.052	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.924	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	22.117	INCHES
TOTAL INITIAL WATER	=	22.117	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
NEW ORLEANS LOUISIANA

MAXIMUM LEAF AREA INDEX	=	3.00
START OF GROWING SEASON (JULIAN DATE)	=	24
END OF GROWING SEASON (JULIAN DATE)	=	365
AVERAGE ANNUAL WIND SPEED	=	8.20 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	75.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	79.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00 %

NOTE: PRECIPITATION DATA FOR NEW ORLEANS LOUISIANA
WAS ENTERED FROM THE DEFAULT DATA FILE.

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
52.40	54.70	61.40	68.70	74.90	80.10
82.10	81.70	78.50	69.20	59.80	54.80

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

STATION LATITUDE = 29.95 DEGREES

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1974

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
ECIPITATION	8.46	5.53	6.64	5.52	9.84	3.83
	5.66	6.70	7.58	2.26	5.88	4.89
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	1.422	2.162	2.798	4.145	5.660	5.001
	5.376	4.460	2.715	1.976	3.149	2.736
LATERAL DRAINAGE COLLECTED FROM LAYER 3	4.8301	5.9117	2.1294	3.9848	2.2154	1.4346
	0.2743	0.1483	3.6817	1.6267	0.3156	4.6376
PERCOLATION THROUGH LAYER 5	0.0002	0.0003	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.268	0.491	0.006	0.012	0.006	0.004
	0.001	0.000	0.011	0.005	0.001	0.013
STD. DEVIATION OF DAILY HEAD ON LAYER 5	1.017	1.532	0.013	0.012	0.008	0.004
	0.000	0.000	0.016	0.003	0.000	0.008

ANNUAL TOTALS FOR YEAR 1974

	INCHES	CU. FEET	PERCENT
PRECIPITATION	72.79	11330084.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	41.599	6475114.000	57.15
DRAINAGE COLLECTED FROM LAYER 3	31.1901	4854883.000	42.85
PERC./LEAKAGE THROUGH LAYER 5	0.000538	83.754	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0682		
CHANGE IN WATER STORAGE	0.000	0.000	0.00
SOIL WATER AT START OF YEAR	22.117	3442636.250	
SOIL WATER AT END OF YEAR	22.117	3442636.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	3.531	0.00

MONTHLY TOTALS (IN INCHES) FOR YEAR 1975

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	2.95	3.64	5.32	6.69	8.03	12.28
	8.35	10.11	3.97	4.00	11.35	3.81
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	1.288	1.951	3.416	3.196	5.445	6.472
	5.995	5.239	2.745	2.287	2.821	2.254
LATERAL DRAINAGE COLLECTED FROM LAYER 3	1.3406	0.9186	3.2283	1.8775	1.0528	5.7091
	5.0714	5.9670	0.5708	1.8350	8.3587	0.7365
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0002	0.0000	0.0000	0.0008	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.004	0.003	0.009	0.006	0.003	0.017
	0.014	0.248	0.002	0.005	1.346	0.002
STD. DEVIATION OF DAILY HEAD ON LAYER 5	0.002	0.004	0.006	0.004	0.002	0.013
	0.012	0.921	0.001	0.006	4.077	0.001

ANNUAL TOTALS FOR YEAR 1975

	INCHES	CU. FEET	PERCENT
PRECIPITATION	80.50	12530176.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	43.111	6710431.500	53.55
DRAINAGE COLLECTED FROM LAYER 3	36.6663	5707268.000	45.55
PERC./LEAKAGE THROUGH LAYER 5	0.001042	162.213	0.00
AVG. HEAD ON TOP OF LAYER 5	0.1382		
CHANGE IN WATER STORAGE	0.722	112315.406	0.90
SOIL WATER AT START OF YEAR	22.117	3442636.250	

SOIL WATER AT END OF YEAR	22.839	3554951.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.707	0.00

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1976

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	3.57	2.89	3.08	0.28	5.58	3.36
	5.67	1.69	1.57	5.08	5.80	8.79
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	1.396	2.209	1.811	2.123	4.725	2.591
	5.409	2.798	0.752	1.473	2.480	2.029
ERAL DRAINAGE COLLECTED	0.7111	3.1283	0.6941	0.2376	0.2634	0.4829
FROM LAYER 3	0.1935	0.1192	0.0813	0.0702	2.9025	8.0745
PERCOLATION THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	0.002	0.010	0.002	0.001	0.001	0.001
LAYER 5	0.001	0.000	0.000	0.000	0.009	0.023
STD. DEVIATION OF DAILY	0.002	0.010	0.001	0.000	0.001	0.001
HEAD ON LAYER 5	0.000	0.000	0.000	0.000	0.006	0.018

****

****

ANNUAL TOTALS FOR YEAR 1976

	INCHES	CU. FEET	PERCENT
RECIPITATION	47.36	7371792.500	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	29.796	4637877.500	62.91

DRAINAGE COLLECTED FROM LAYER 3	16.9585	2639672.500	35.81
PERC./LEAKAGE THROUGH LAYER 5	0.000059	9.132	0.00
AVG. HEAD ON TOP OF LAYER 5	0.0041		
CHANGE IN WATER STORAGE	0.605	94234.375	1.28
SOIL WATER AT START OF YEAR	22.839	3554951.500	
SOIL WATER AT END OF YEAR	23.444	3649186.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.819	0.00

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1977

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	5.31	3.08	3.54	6.80	1.87	2.46
	2.91	16.02	13.44	4.47	7.89	5.02
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	1.560	2.140	3.271	3.202	2.160	2.494
	2.692	5.459	3.111	2.847	2.824	2.483
LATERAL DRAINAGE COLLECTED FROM LAYER 3	3.8863	1.9501	1.1501	3.0778	1.2522	0.2311
	0.1321	5.9562	12.5922	1.6508	2.0055	3.8956
PERCOLATION THROUGH LAYER 5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0001	0.0008	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 5	0.011	0.006	0.003	0.009	0.004	0.001
	0.000	0.213	1.256	0.005	0.006	0.011
STD. DEVIATION OF DAILY HEAD ON LAYER 5	0.007	0.005	0.002	0.016	0.003	0.000
	0.000	0.780	2.683	0.003	0.005	0.016

****

****

ANNUAL TOTALS FOR YEAR 1977

	INCHES	CU. FEET	PERCENT
PRECIPITATION	72.81	11333198.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	34.244	5330183.500	47.03
DRAINAGE COLLECTED FROM LAYER 3	37.7799	5880607.000	51.89
PERC./LEAKAGE THROUGH LAYER 5	0.000988	153.860	0.00
AVG. HEAD ON TOP OF LAYER 5	0.1271		
CHANGE IN WATER STORAGE	0.785	122252.516	1.08
SOIL WATER AT START OF YEAR	23.444	3649186.000	
SOIL WATER AT END OF YEAR	24.230	3771438.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.818	0.00

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION	13.37	2.18	3.29	3.44	9.71	7.83
	10.32	14.70	2.98	0.00	4.67	4.36
RUNOFF	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
EVAPOTRANSPIRATION	1.630	2.215	2.926	2.262	4.655	4.852
	7.277	4.793	2.696	1.558	0.851	2.587
LATERAL DRAINAGE COLLECTED FROM LAYER 3	11.6344	2.5358	1.1329	1.3113	4.8932	0.3541
	4.7590	6.1812	3.2055	0.6073	0.3197	3.5494
PERCOLATION THROUGH LAYER 5	0.0009	0.0000	0.0000	0.0000	0.0002	0.0000
	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	1.430	0.008	0.003	0.004	0.350	0.001

LAYER 5	0.014	0.600	0.009	0.002	0.001	0.010
STD. DEVIATION OF DAILY	3.991	0.006	0.003	0.003	1.243	0.000
HEAD ON LAYER 5	0.018	1.892	0.014	0.001	0.000	0.012

****

****

ANNUAL TOTALS FOR YEAR 1978

	INCHES	CU. FEET	PERCENT
PRECIPITATION	76.85	11962044.000	100.00
RUNOFF	0.000	0.000	0.00
EVAPOTRANSPIRATION	38.302	5961847.500	49.84
DRAINAGE COLLECTED FROM LAYER 3	40.4840	6301506.000	52.68
PERC./LEAKAGE THROUGH LAYER 5	0.001557	242.415	0.00
AVG. HEAD ON TOP OF LAYER 5	0.2026		
CHANGE IN WATER STORAGE	-1.937	-301554.875	-2.52
SOIL WATER AT START OF YEAR	24.230	3771438.500	
SOIL WATER AT END OF YEAR	22.292	3469883.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	3.408	0.00

****

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1974 THROUGH 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	6.73	3.46	4.37	4.55	7.01	5.95
	6.58	9.84	5.91	3.16	7.12	5.37
STD. DEVIATIONS	4.28	1.27	1.55	2.74	3.35	4.09
	2.84	5.88	4.76	2.06	2.63	1.97
RUNOFF						
TOTALS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

STD. DEVIATIONS	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000

EVAPOTRANSPIRATION

TOTALS	1.459	2.135	2.844	2.986	4.529	4.282
	5.350	4.550	2.404	2.028	2.425	2.418
STD. DEVIATIONS	0.136	0.108	0.629	0.822	1.395	1.710
	1.673	1.053	0.939	0.563	0.911	0.279

LATERAL DRAINAGE COLLECTED FROM LAYER 3

TOTALS	4.4805	2.8889	1.6670	2.0978	1.9354	1.6424
	2.0860	3.6744	4.0263	1.1580	2.7804	4.1787
STD. DEVIATIONS	4.3509	1.8763	1.0186	1.4704	1.7936	2.3226
	2.5855	3.2334	5.0416	0.7758	3.3115	2.6322

PERCOLATION/LEAKAGE THROUGH LAYER 5

TOTALS	0.0002	0.0001	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0001	0.0002	0.0000	0.0002	0.0000
STD. DEVIATIONS	0.0004	0.0001	0.0000	0.0000	0.0001	0.0000
	0.0000	0.0002	0.0003	0.0000	0.0004	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ACROSS LAYER 5

AVERAGES	0.3430	0.1036	0.0047	0.0062	0.0727	0.0048
	0.0059	0.2121	0.2557	0.0033	0.2725	0.0119
STD. DEVIATIONS	0.6182	0.2166	0.0029	0.0043	0.1549	0.0068
	0.0074	0.2455	0.5594	0.0022	0.6003	0.0075

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1974 THROUGH 1978

	INCHES		CU. FEET	PERCENT
PRECIPITATION	70.06	(13.090)	10905458.0	100.00
RUNOFF	0.000	(0.0000)	0.00	0.000
EVAPOTRANSPIRATION	37.410	(5.4508)	5823090.50	53.396
LATERAL DRAINAGE COLLECTED FROM LAYER 3	32.61576	(9.38301)	5076787.500	46.55272
PERCOLATION/LEAKAGE THROUGH FROM LAYER 5	0.00084	(0.00057)	130.275	0.00119
AVERAGE HEAD ACROSS TOP OF LAYER 5	0.108	(0.075)		

116/360 ⇒ 8900 ft³

CHANGE IN WATER STORAGE	0.035	(1.1458)	5449.48	0.050

****

804

****

PEAK DAILY VALUES FOR YEARS 1974 THROUGH 1978

	(INCHES)	(CU. FT.)
PRECIPITATION	8.52	1326175.620
RUNOFF	0.000	0.0000
DRAINAGE COLLECTED FROM LAYER 3	1.80440	280863.00000
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.000338	52.60635
AVERAGE HEAD ACROSS LAYER 5	17.645	
SNOW WATER	1.58	245982.9840

/16 = 1750

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.5028
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0474

****

FINAL WATER STORAGE AT END OF YEAR 1978

LAYER	(INCHES)	(VOL/VOL)
1	2.2215	0.1851
2	3.8299	0.1915
3	0.0048	0.0242
4	0.0000	0.0000
5	16.2360	0.4510
SNOW WATER	0.000	

STORM WATER DRAINAGE

SUBJECT: STORM WATER DRAINAGE DESIGN
By: S. Togan ALPER STA Date:March 20, 1995
Checked By: MAR Date: 3/30/95

P.Name: RiverBirch
P.number:95B034-7
SW - 1/4

SCOPE:

Design the size and the slope of the stormwater drainage system surrounding the cell 1 facility and the channel connection to the NPDES discharge point.

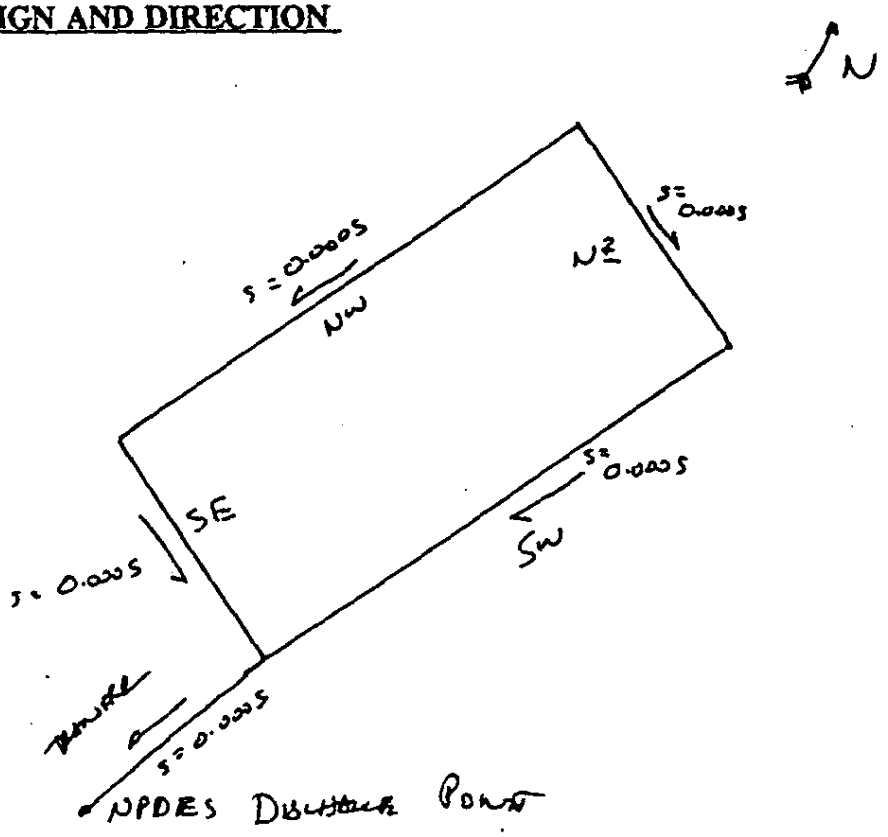
REFERENCES:

. Civil Engineering Reference Manual, Michael R. Lindenburg
. Climatological Data for 24h/ 25yr Storm event
. Footprint Area Calculation Package

ASSUMPTIONS

. The channel system should drain the 24h/25yr storm event
. No evapotranspiration is allowed during the storm event
. For a closed cell the penetration trough the cap is very small compared to the surface runoff.
===> Surface Runoff = Precipitation
. Area of the Cell 1 = 43 acres
. The NW channel should be designed to drain the precipitation load coming from the future cells.
. The other three surrounding channels will be removed or abandoned during the construction of the future cells. These channels are designed to drain their portion of the cell 1 only.
. The bottom slopes off the channels are 0.05%.

SLOPE DESIGN AND DIRECTION



SUBJECT: STORM WATER DRAINAGE DESIGN
By: S. Togan ALPER STA. Date:March 20, 1995
Checked By: MAS Date: 3/30/95

P.Name: RiverBirch
P.number:95B034-7
SW - 2/4

CALCULATIONS

. 1 foot freeboad ==> all channels
. A = 43 acres = 270 x 10^6 in^2

. Precipitation $_{(24h/25yr)}$ = 10.4 inches

. Total Drainage = 1,623,342 ft^3/day = 18.8 cfs

. Design for 20.0 cfs

. There are 16 culverts draining 16 submodules ==> $Q_{culvert}$ = 1.2 cfs.

. n = 0.04 (excavated or dredged channel)

. slope = 0.0005

$Q = (1.49 / n) \times A \times R_h^{2/3} \times S^{1/2}$; (Chezy - Manning Equation)

where;
n = manning constant
A = Area
R_h = Area / Wetted perimeter
S = slope

. Assume that the NW channel will drain the whole cell 1 area in the future with all the future cells constructed and design the channel accordingly.

CHANNEL CROSS - SECTION DESIGN

. 1 foot of freeboard for all channels
. X- sectional drawings for the different channels are attached
. Calculations for the capacity of the channels are attached.

CONCLUSIONS AND RECOMMENDATIONS

. The NW channel will have the capacity to support the facility in the future.
. The surrounding channels are designed to support only the drainage from Cell 1.

45B034/
3/4
MS 3/30

RIVERBIRCH LANDFILL - CELL 1
STORMWATER DRAINAGE CHANNEL CALCULATIONS

DESCRIPTION	DEPTH ft	BASE ft	TOP ft	AREA ft2	PERIMETER ft	(RH)2/3 ft	Q cfs	V ft/sec
NW-CHANNEL								
Starting X-sec	0.5	3	15	4.5	9.08	0.63	2.35	0.52
Ending X-sect	2	3	15	18	10.21	1.46	21.92	1.22
SW CHANNEL								
Starting X-sec	2	3	10	13	10.21	1.17	12.74	0.98
Ending X-sect	2.5	3	10	16.25	10.81	1.31	17.80	1.10
NE CHANNEL								
Starting X-sec	0.5	3	6	2.25	9.08	0.39	0.74	0.33
Ending X-sect	1	3	6	4.5	9.32	0.62	2.31	0.51
SE CHANNEL								
Starting X-sec	1	3	6	4.5	9.32	0.62	2.31	0.51
Ending X-sect	2.5	3	8	13.75	10.81	1.17	13.47	0.98
Transfer Channel								
Starting X-sec	2.5	3	15	22.5	10.81	1.63	30.61	1.36
Ending X-sect	3.5	3	15	31.5	12.22	1.88	89.87	2.85

NOTES:

1. The maximum side slope of the channels 1V:fH
2. The bottom slope of the channels is .05% NE
3. N-W channel is designed to drain the stormwater coming from the future cells in the final stage of the landfill.

n = 0.022

The max velocity less than 3 ft/sec ===> no erosion control necassary

Prepared by Togan Alper 3/20/95 SAA

Woodward-Clyde Consultants

Project Notes

Project Name: RIVERBIRCH
Project No.: 95B074
Task No.: 7 File No.:
Sheet SW-3 of 4

Subject: STORM-WATER DRAINAGE DESIGN
TOGAN ALPER Date: March, 20, 1995
Checked By: MS Date: 3/30/95

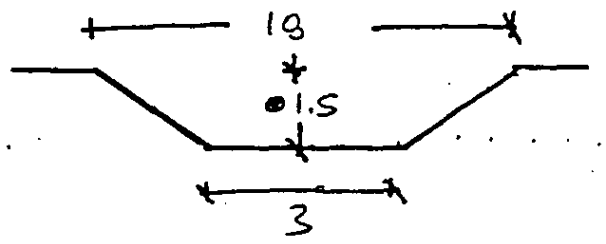
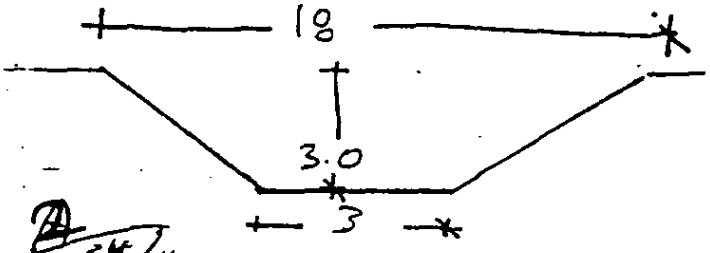
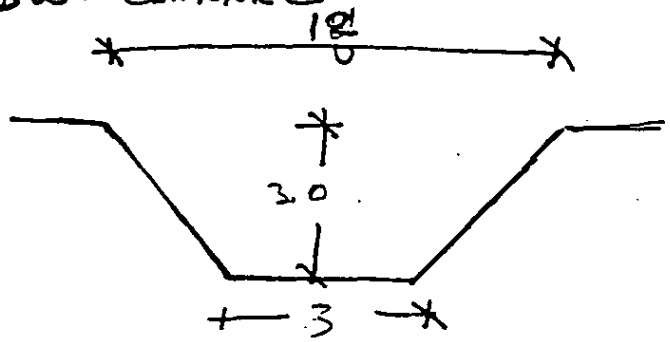
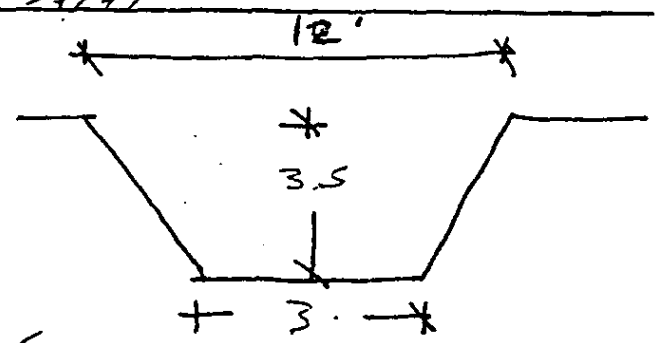
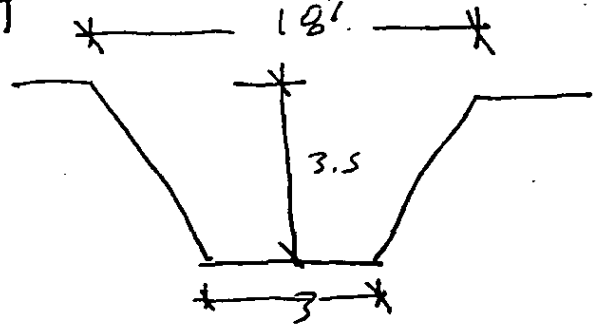
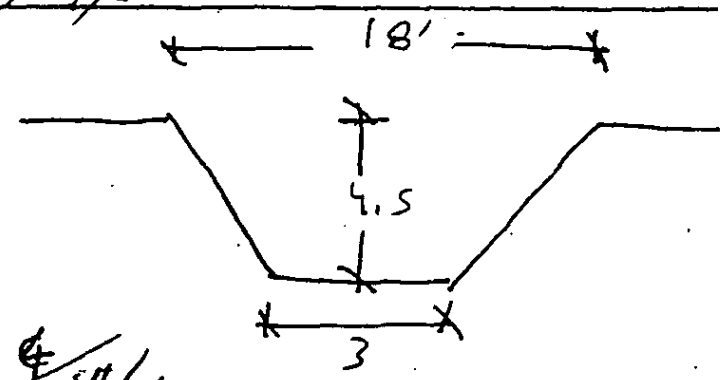
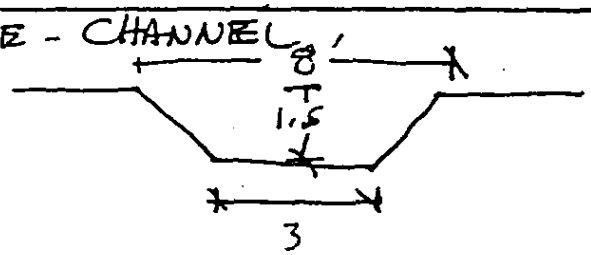
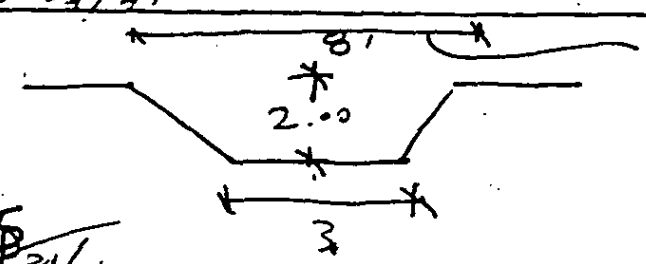
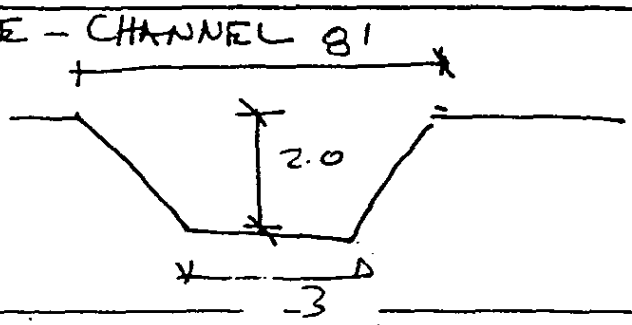
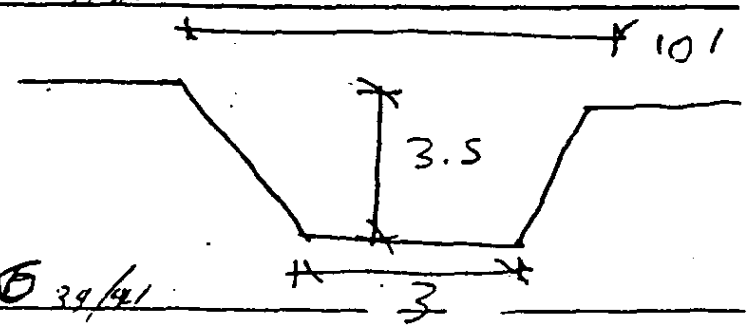
STARTING X-SECT	ENDING X-SECT
NW - CHNNEL 	 2 34/41
SW - CHANNEL 	 3 34/41
TRANSFER CHANNEL 	 4 34/41
NE - CHANNEL 	 5 34/41
SE - CHANNEL 	 6 34/41

TABLE 6-1 Values of the Manning Roughness Coefficient *n (Continued)*

DESCRIPTION OF CHANNEL	MINIMUM	NORMAL	MAXIMUM
8. Paved invert, sewer, smooth bottom	0.016	0.019	0.020
9. Rubble masonry, cemented	0.018	0.025	0.030
II. Lined or Built-up Channels			
A. Metal			
1. Smooth steel surface			
a. Painted	0.011	0.012	0.014
b. Unpainted	0.012	0.013	0.017
2. Corrugated	0.021	0.025	0.030
B. Nonmetal			
1. Cement			
a. Neat surface	0.010	0.011	0.013
b. Mortar	0.011	0.013	0.015
2. Concrete			
a. Trowel finish	0.011	0.013	0.015
b. Float finish	0.013	0.015	0.016
c. Finished, with gravel on bottom	0.015	0.017	0.020
d. Unfinished	0.014	0.017	0.020
3. Wood			
a. Planed, untreated	0.010	0.012	0.014
b. Planed, creosoted	0.011	0.012	0.015
c. Unplaned	0.011	0.013	0.015
d. Plank with battens	0.012	0.015	0.018
4. Brick			
a. Glazed	0.011	0.013	0.015
b. In cement mortar	0.012	0.015	0.018
5. Masonry			
a. Cemented rubble	0.017	0.025	0.030
b. Dry rubble	0.023	0.032	0.035
6. Asphalt			
a. Smooth	0.013	0.013	—
b. Rough	0.016	0.016	—
7. Vegetal lining	0.030	—	0.500
III. Excavated or Dredged			
A. Earth, straight and uniform	0.016	0.022	0.035
B. Earth, winding and sluggish	0.023	0.030	0.040
C. Rock cuts	0.030	0.040	0.050
D. Unmaintained channels	0.040	0.070	0.140

TABLE 6-1 Values of the Manning Roughness Coefficient *n (Continued)*

DESCRIPTION OF CHANNEL	MINIMUM	NORMAL	MAXIMUM
IV. Natural Channels (Minor streams, top width at flood 100 ft.)			
A. Fairly regular section	0.030	0.050	0.070
B. Irregular section with pools	0.040	0.070	0.100

SOURCE: Ieco, Inc.

TABLE 7-14 Maximum Permissible Velocities in Vegetal-Lined Channels

Cover Average, Uniform Stand, Well Maintained	Slope Range	Permissible Velocity[a]	
		Erosion Resistant Soils	Easily Eroded Soils
	Percent	ft/sec	ft/sec
Bermudagrass	0–5	8	6
	5–10	7	5
	over 10	6	4
Buffalograss Kentucky bluegrass Smooth brome Blue grama	0–5	7	5
	5–10	6	4
	over 10	5	3
Grass mixture[b]	0–5	5	4
	5–10	4	3
Lespedeza sericea Weeping lovegrass Yellow bluestem Kudzu Alfalfa Crabgrass	0–5	3.5	2.5
Common lespedeza[b] Sudangrass[b]	0–5[c]	3.5	2.5

[a]From *"Handbook of Channel Design for Soil and Water Conservation,"* Soil Conservation Service SCS-TP-61, Revised June 1954
[b]Annuals—used on mild slopes or as temporary protection until permanent covers are established
[c]Use on slopes steeper than 5 percent is not recommended.

SOURCE: American Iron and Steel Institute.

7-4 Channel Protection

If the mean velocity exceeds that permissible for the particular kind of soil, the channel should be protected from erosion. Grass linings are valuable where grass can be supported. Ditch bottoms may be sodded or seeded with the aid of temporary quick-growing grasses, mulches, jute bagging, or fiberglass. Grass may also be used in combination with other, more rigid types of linings, the grass being on the upper bank slopes.

Linings may consist of stone—dumped, hand placed, or grouted, preferably laid on a filter blanket of gravel or crushed stone.

CULVERT DESIGN

Woodward-Clyde Consultants

Subject: CULVERT DESIGN
Tocan Alber Date: 03/19/95
Checked By: MB Date: 3/31/95

04/03/95

Project Notes

Project Name: Diversions
Project No.: 95B034
Task No.: 7 File No.:
Sheet 1 of 1

OBJECTIVE: DESIGN THE DRAINAGE CULVERT BETWEEN THE DITCH AT THE TOP OF THE BERM & THE STORMWATER DRAINAGE DITCH.

REFERENCES: 1. "HYDRAULICS FIELD MANUAL" Robert O. PARMLEY, 1992, Mc GRAW HILL, Inc.

2. BUFFER ZONE DETAIL PACKAGE.

3. STORMWATER DRAINAGE CHANNEL DESIGN PACKAGE

DISCUSSIONS:

- Use 8" PVC pipe as culverts
- 1 culvert will be placed for each module
- $Q_{culvert} \cong 1.2$ cfs (from Ref B)
- DESIGN FOR 24h/25yr event.
- Check for Drainage Potential at discharge point.

CALCULATIONS:

- FROM BUFFER ZONE DETAIL DRWG (ATTACHED)

$\Delta H \simeq 5$ ft

Composite Slope $\cong \frac{5\text{ft}}{50\text{ft}} \cong .1$

Woodward-Clyde Consultants

Project Notes

Project Name: Riverbend
Project No.: 95 B034
Task No.: 7 File No.
Sheet 2 of 2

Subject: Culvert Design
Tower Alper Date: 03/20/95
Checked By: MB Date: 3/30/95

- For Max Velocity (quick check)
  use Bernoulli Eq^{n} ⇒ no losses

$$\frac{V_1^2}{2g} - \cancel{\frac{V_0^2}{2g}}^{\,0} = \Delta h$$

$$\Rightarrow V_1 = \sqrt{2(32\,ft/sec^2)\cdot 5\,ft} \cong 13\,ft/sec$$

- Use Manning Eq^{n} (Second Check)
  - Partially full pipe. (8")
  - $n = 0.01$
  - $Q = 1 - 2$ cfs.
  - $S = .1$
- From Chart (attached)
  $V = 11 - 13$ ft/sec

$$\boxed{V_{DESIGN} = 13\,ft/sec}$$

Velocity of the drainage water at the outlet of the culvert will be 13 ft/sec.
⇒ EROSION CONTROL NECESSARY.

Woodward-Clyde Consultants

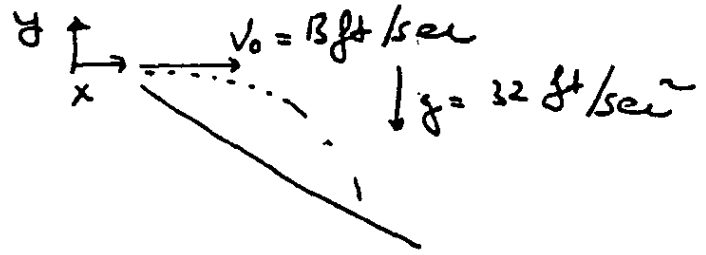
Project Notes

Project Name: Riverbrook
Project No.: 95 BOM
Task No.: 7 File No.:
Sheet 3 of 3

Subject: CULVERT DESIGN
Tomas Auber Date: 03/20/95
Checked By: AAS Date: 3/30/95

o FIND THE MAX. DISTANCE THE DRAINAGE WATER FROM THE CULVERT, WILL HIT IN THE STORMWATER DRAINAGE CHANNEL.

o max slope = 1(H):1(V)



$$X = V_0 \cdot t \quad (1)$$

$$y = -\frac{g t^2}{2} \quad (2)$$

max slope = 1:1 $\Rightarrow$ $y = -X$ (3)

(1) in (2) using (3)

$$V_0 \cdot \cancel{t} = \frac{g t^{\cancel{2}}}{2} \Rightarrow t = \frac{2V_0}{g} = \frac{26 \text{ ft/sec}^2}{32 \text{ ft/sec}^2} = .81 \text{ sec}$$

$$X = .81 \text{ sec} \cdot 13 \text{ ft/sec} \cong 10 \text{ feet}$$

RESULTS:

1) The culverts will be constructed using 8" PVC pipe, The culverts will be placed in

Woodward-Clyde Consultants

Culvert Design

Tomas Ameer Date: 03/20/95

Checked By: NAB Date: 3/30/95

Project Notes

Project Name: Riverbrook

Project No.: 95B034

Task No.: 7 File No.:

Sheet 4 of 4

steel casing under the access road (See Drawing B2-1)

2) An erosion control device such as geotextile or concrete pad should be constructed at the outlets of the culverts.

The erosion control device should extend 10 ft. from the outlet point into the channel.

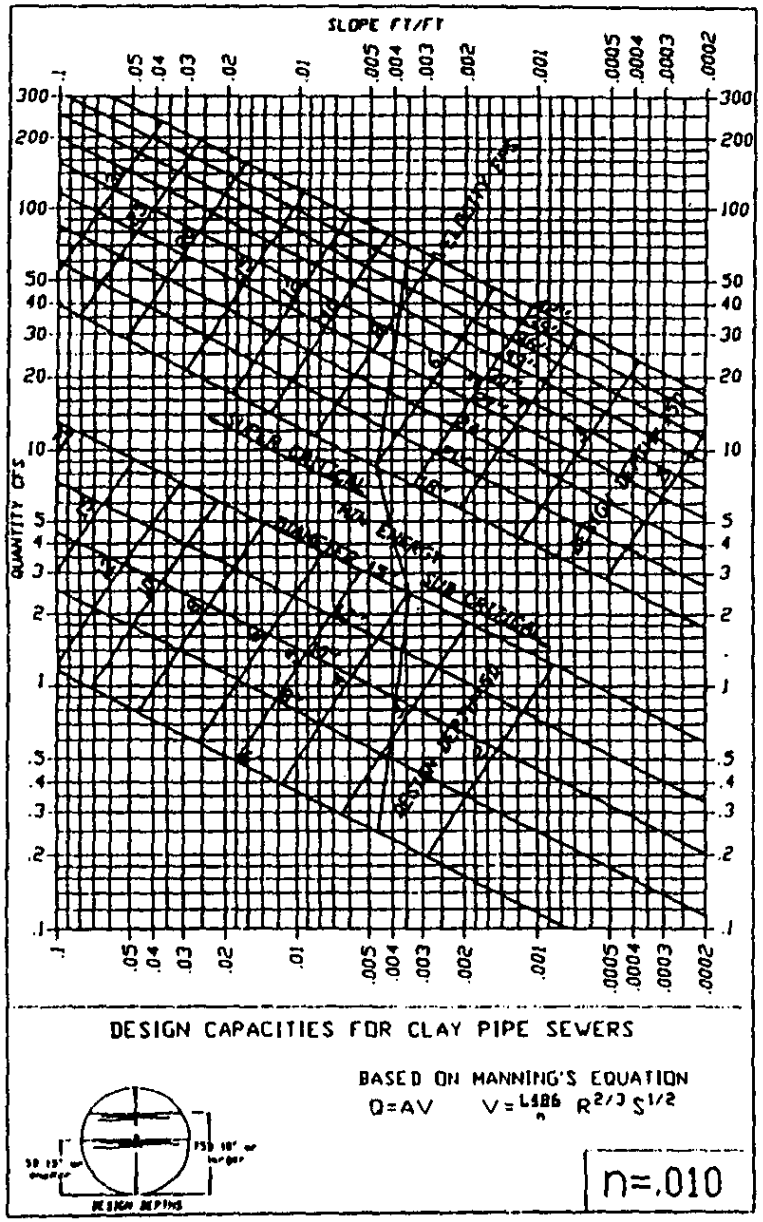
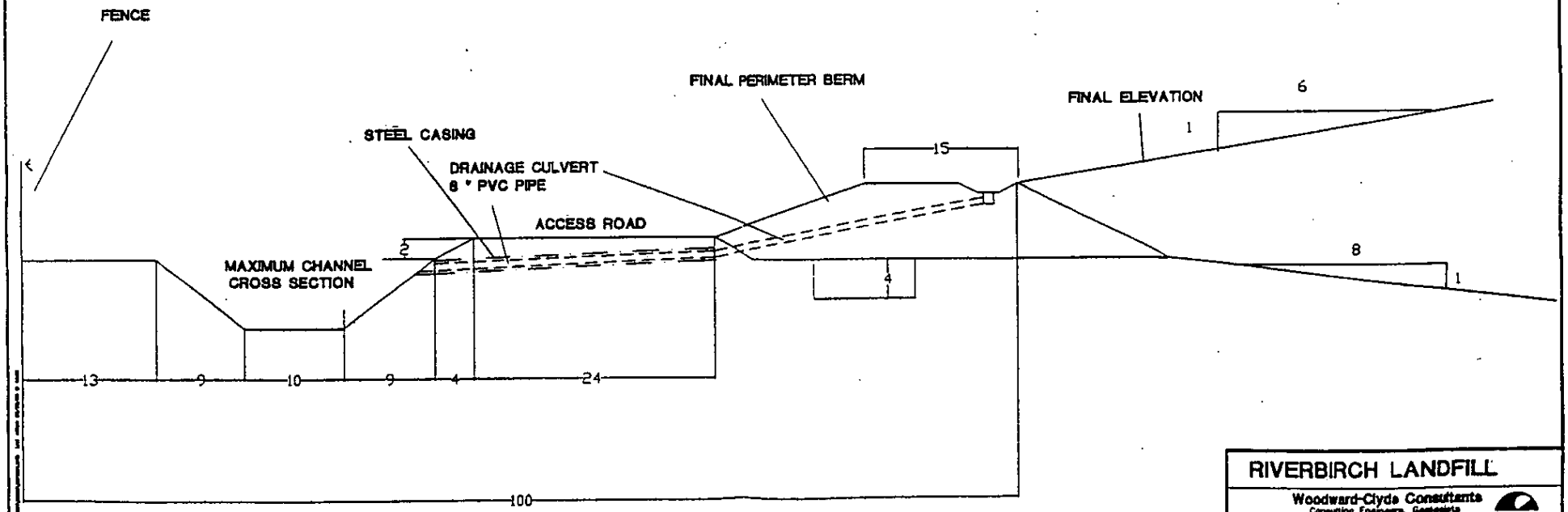


FIGURE 6-10 *Design capacities for clay pipe sewers. n = 0.010. (Courtesy: National Clay Pipe Institute.)*



RIVERBIRCH LANDFILL

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVERBIRCH, INC.
GRETNA, LOUISIANA

SCALE: 1"=10' | MADE BY: T.ALPER | DATE: | FILE NO.
CHECKED BY: | DATE: | FIGURE

BUFFER ZONE DETAIL

SUMP DESIGN

Subject: SUMP DESIGN
By : S. Togan ALPER STA Date: 02/28/95
Checked By: MB Date: 3/30/95

04/03/95

P.Name:RiverBirch
P.Number:95B034-7
SD-1/2

SCOPE:

Estimate the appropriate sump size for the primary leachate collection system.

REFERENCES:

. Gradation Package
. Cap Efficiency Package
. Leachate Generation Package

DISCUSSION

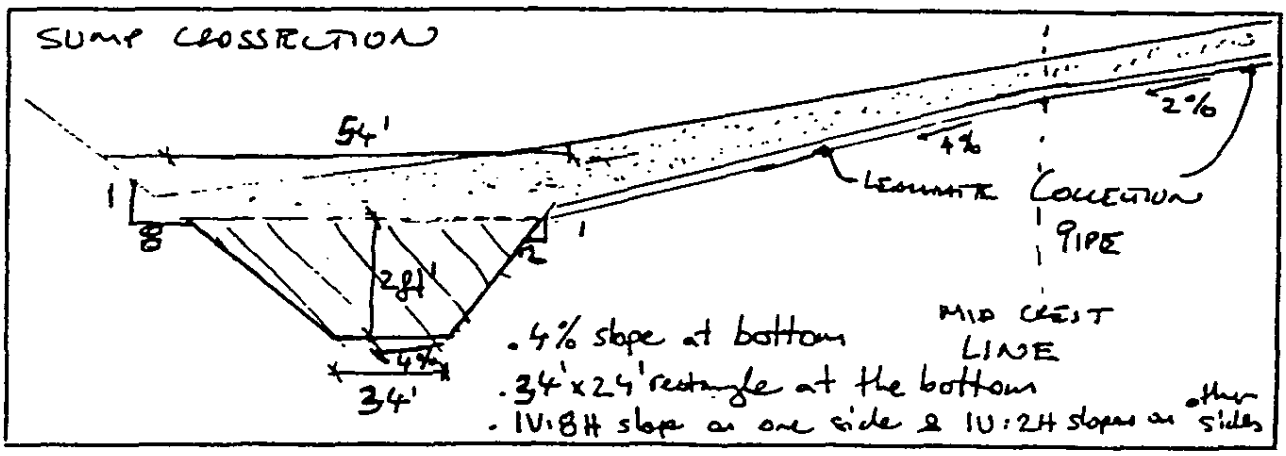
. The leachate collection sump should be sized so that it has the capacity to hold 24-Hr of leachate generated in normal conditions (average values).

Considering the three stages discussed in leachate generation package, the limiting leachate generation occurs in the average conditions during the stage A. At this stage ~ 800 ft3 of leachate is generated in 24-Hr period per module. Therefore the sumps should be designed with a volume no less than 800 ft3 (24-Hr storage).

ASSUMPTIONS

. The maximum level of leachate in the drainage layer = 1'
. Average porosity in the sump (n) = 0.3
. Sump depth = 2'

DESIGN



Subject: SUMP DESIGN
By : S. Togan ALPER Date: March 30, 1995
Checked By: NAE Date: 3/30/95

P.Name:RiverBirch
P.Number:95B034-7
SD-2/2

CALCULATIONS

The max volume (V) of the above presented sump assuming 1' of water in the drainage layer

$V = \underbrace{\left[\frac{34+54}{2} * \frac{24+32}{2} * 2\right]}_{\text{sump}} + \underbrace{[54 * 32 * 1]}_{\text{drainage layer}}$ = 4192 ft3 ✓

Considering the average porosity (n) of the fill material in the sump
n = 0.3

$V_{\text{water capacity}}$ = V x n =4192 ft3 x 0.3 = 1257 ft3 ~ 1250 ft3 ✓

The expected volumes of leachate and the capacity of the sump for each stage is given in the table below;

Stage	Average Daily Value per Module (ft3)	Capacity of the sump to hold the leachate generated (time)
a1. with 5ft. of waste in place	800	36 hours
a2. with 10 ft. of waste in place	800	36 hours
b.with waste placed to final elevation, just before cap placement (45 ft. of waste)	750	40 hours
c. right after cap placement, assuming that waste has higher water content than field capacity initially	170	7 days
d. after steady state is reached	3	12 months

RESULTS

This size sump has the capacity to store more than 24- h average leachate generated in the maximum average generation conditions during the active life of module and has sufficient volume to store nearly a weeks leachate after the placement of the cap (early years of the passive module).After the steady state is reached in the passive module the sump can hold several months of leachate generated.
The pressure relief system may be constructed with an offset distance to the leachate collection sump, but in case it is decided to design both sumps stacked vertically, this sump design has enough space to construct the pressure relief system underneath.

The sump layout and construction details are presented in the related drawing.
The drainage to the sumps are discussed in the Planar Flow package.

CAP EFFICIENCY

Subject: CAP EFFICIENCY
P.Name:RiverBirch
By : S. Togan ALPER STA Date: 02/28/95
Checked By: NAS Date: 5/30/95

QA 04/03/95

P.Number:95B034-7
CP1/2

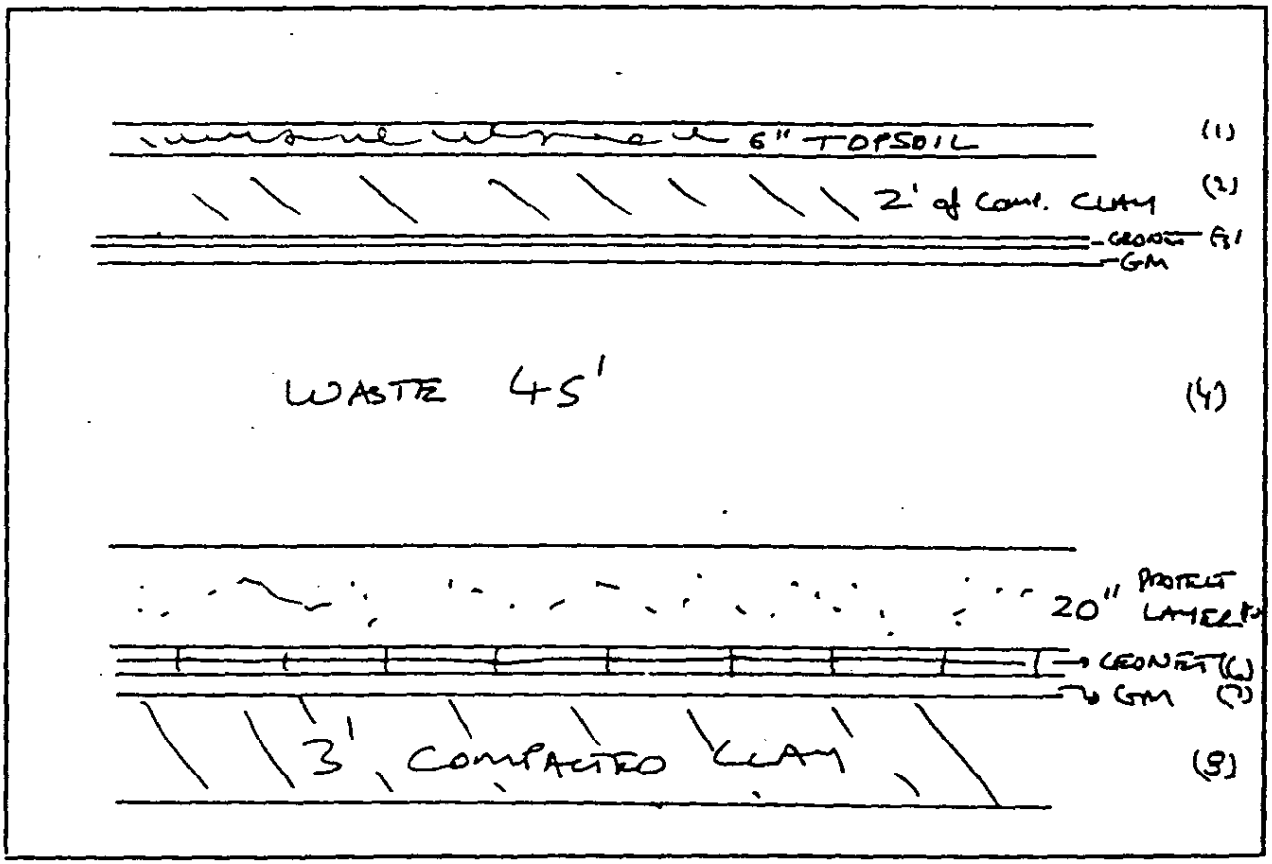
SCOPE:

To evaluate the proposed final cover system to determine the cap efficiency and infiltration into the closed cell leachate collection sumps .

REFERENCES:

. EPA HELP Digital Processing Code for Calculation of Leachate Generation, Release 3.0

LANDFILL REPRESENTATIVE CROSSECTION



By: T. Alpel 02/28/15
Check By:

04/02/15

358034-7

CP-2/2

DISCUSSION

. Considering the worse case the lateral drainage caused by the Geotextiles and Geonet between the 2' of compacted clay (CC) layer and the geomembrane (GM) layer in the cap system is not taken into consideration.

ASSUMPTIONS

. Default soil characteristics for HELP Model has been used
. Max. drainage distance = 550 ft
. Area of largest ~~cell~~ module = 120,000 ft2
. Slope of cap = %5
. Moisture content calculated by HELP Model
. Runoff CN = 40 (calc. by HELP)
. GM liner hole density = .5 holes/acre
. GM liner installation defects = 10 holes/acre
. GM placement quality = 3 -good
. Fair grass developed on the cover
. Evaporative depth = 6"
. Waste thickness = 45'

CALCULATIONS

The computer output with the input echo is given in Appendix

The cap efficiency is described as the ratio of the water percolated trough the cap system versus the removed rainfall by the cap system;

$$\text{Cap Efficiency} = \left[1 - \left(\frac{\text{Percolation tr. Cap System}}{\text{Per tr. Cap + Runoff + Evapotr.}}\right)\right] * 100$$

$$= \left[1 - \left(\frac{0.17}{31.6 + 38.2 + 0.17}\right)\right] * 100 = 99.75\%$$

Cap Efficiency = 99.75%

RESULTS

The cap efficiency is found to be 99.75% for the worse case.
The actual cap efficiency is expected to be greater, when the drainage net with geotextiles in the cap is considered.
An average of ~5 gallon of rainwater is expected to penetrate each ~~cell~~ module daily.

APPENDIX

NAS 3/30/95

```
******************************************************************************
******************************************************************************
**                                                                          *
*                                                                          *
*              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                *
*               HELP MODEL VERSION 3.01   (14 OCTOBER 1994)                 *
*                  DEVELOPED BY ENVIRONMENTAL LABORATORY                    *
**                   USAE WATERWAYS EXPERIMENT STATION                      *
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY              *
**                                                                          *
**                                                                          *
******************************************************************************
******************************************************************************


PRECIPITATION DATA FILE:     h:\riverbir\help\PREPF.D4
TEMPERATURE DATA FILE:       h:\riverbir\help\TEMPF.D7
SOLAR RADIATION DATA FILE:   h:\riverbir\help\SOLF.D13
EVAPOTRANSPIRATION DATA:     h:\riverbir\help\EVAF.D11
SOIL AND DESIGN DATA FILE:   h:\riverbir\help\close.D10
OUTPUT DATA FILE:            h:\riverbir\help\close.OUT


TIME:  11:11     DATE:   3/ 8/1995


******************************************************************************

     TITLE:  RIVERBIRCH PHASE I - closed cell - fair grass

******************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                      TYPE 1 - VERTICAL PERCOLATION LAYER
                          MATERIAL TEXTURE NUMBER   1
          THICKNESS                    =      6.00   INCHES
          POROSITY                     =      0.4170 VOL/VOL
          FIELD CAPACITY               =      0.0450 VOL/VOL
          WILTING POINT                =      0.0180 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.2291 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.999999978000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.20
                FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                  LAYER  2
                                  --------

                          TYPE 3 - BARRIER SOIL LINER
                          MATERIAL TEXTURE NUMBER  29
```

IR>
5/30/95

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4510	VOL/VOL
FIELD CAPACITY	=	0.4190	VOL/VOL
WILTING POINT	=	0.3320	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4510	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.680000028000E-06	CM/SEC

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.50	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	540.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 5

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 4

THICKNESS	=	20.00	INCHES
POROSITY	=	0.4370	VOL/VOL
FIELD CAPACITY	=	0.1050	VOL/VOL
WILTING POINT	=	0.0470	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1135	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.170000002000E-02	CM/SEC

LAYER 6

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL

WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0100	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	2.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 7

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	0.50	HOLES/ACRE
FML INSTALLATION DEFECTS	=	10.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 8

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 29

THICKNESS	=	36.00	INCHES
POROSITY	=	0.4510	VOL/VOL
FIELD CAPACITY	=	0.4190	VOL/VOL
WILTING POINT	=	0.3320	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4510	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.680000028000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 1 WITH A FAIR STAND OF GRASS, A SURFACE SLOPE OF 5.% AND A SLOPE LENGTH OF 500. FEET.

SCS RUNOFF CURVE NUMBER	=	39.30	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	42.880	ACRES
EVAPORATIVE ZONE DEPTH	=	6.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	1.374	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	2.502	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.108	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	188.387	INCHES
TOTAL INITIAL WATER	=	188.387	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

3/30/15

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
NEW ORLEANS LOUISIANA

MAXIMUM LEAF AREA INDEX	=	3.00
START OF GROWING SEASON (JULIAN DATE)	=	24
END OF GROWING SEASON (JULIAN DATE)	=	365
AVERAGE ANNUAL WIND SPEED	=	8.20 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	75.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	79.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	74.00 %

NOTE: PRECIPITATION DATA FOR NEW ORLEANS LOUISIANA
WAS ENTERED FROM THE DEFAULT DATA FILE.

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
52.40	54.70	61.40	68.70	74.90	80.10
82.10	81.70	78.50	69.20	59.80	54.80

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR NEW ORLEANS LOUISIANA

STATION LATITUDE = 29.95 DEGREES

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1974

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/D
PRECIPITATION	8.46	5.53	6.64	5.52	9.84	3.83
	5.66	6.70	7.58	2.26	5.88	4.89
RUNOFF	6.020	4.328	4.133	2.979	2.686	0.00
	0.000	0.000	5.010	0.000	2.461	3.26
EVAPOTRANSPIRATION	1.363	1.950	2.492	4.172	5.784	5.18
	5.602	4.614	2.611	2.065	3.156	2.73
ERCOLATION THROUGH LAYER 3	0.0171	0.0156	0.0168	0.0145	0.0127	0.00
	0.0091	0.0148	0.0168	0.0163	0.0168	0.01
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0014	0.00
	0.0011	0.0019	0.0017	0.0001	0.0000	0.00

PERCOLATION THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	4.748	5.026	4.151	2.998	2.887	0.
LAYER 3	0.611	3.231	5.244	3.387	5.086	5.
STD. DEVIATION OF DAILY	0.997	0.650	0.905	1.573	2.144	0.
HEAD ON LAYER 3	0.760	1.770	0.549	1.075	0.612	0.
AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.
LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.
HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.

ANNUAL TOTALS FOR YEAR 1974

	INCHES	CU. FEET	PERCENT
PRECIPITATION	72.79	11330084.000	100.00
RUNOFF	30.881	4806825.500	42.43
EVAPOTRANSPIRATION	41.731	6495577.500	57.33
PERC./LEAKAGE THROUGH LAYER 3	0.177846	27682.463	0.24
AVG. HEAD ON TOP OF LAYER 3	3.6250		
DRAINAGE COLLECTED FROM LAYER 6	0.0074	1155.715	0.01
PERC./LEAKAGE THROUGH LAYER 8	0.000000	0.045	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0000		
CHANGE IN WATER STORAGE	0.170	26525.092	0.23
SOIL WATER AT START OF YEAR	188.387	29323270.000	
SOIL WATER AT END OF YEAR	188.557	29349794.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.615	0.00

AS 3/30/

MONTHLY TOTALS (IN INCHES) FOR YEAR 1975

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN
PRECIPITATION	2.95	3.64	5.32	6.69	8.03	12.
	8.35	10.11	3.97	4.00	11.35	3.
RUNOFF	0.846	1.850	2.987	1.959	2.035	5.
	2.902	5.319	0.121	2.706	8.365	0.
EVAPOTRANSPIRATION	1.252	1.908	2.689	3.919	6.060	6.
	6.316	5.548	2.819	1.785	2.610	2.
PERCOLATION THROUGH LAYER 3	0.0174	0.0157	0.0171	0.0142	0.0150	0.
	0.0124	0.0164	0.0163	0.0168	0.0162	0.
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.0000	0.0000	0.0000	0.0000	0.0000	0.
	0.0000	0.0000	0.0000	0.0000	0.0000	0.
PERCOLATION THROUGH LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.
	0.0000	0.0000	0.0000	0.0000	0.0000	0.

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 3	5.178	5.139	4.744	3.023	3.483	4.
	2.833	3.607	4.325	4.189	4.195	3.
STD. DEVIATION OF DAILY HEAD ON LAYER 3	0.984	0.607	0.781	1.594	1.926	1.
	2.194	1.789	1.613	0.735	1.151	0.
AVERAGE DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
	0.000	0.000	0.000	0.000	0.000	0.
STD. DEVIATION OF DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
	0.000	0.000	0.000	0.000	0.000	0.

ANNUAL TOTALS FOR YEAR 1975

	INCHES	CU. FEET	PERCENT
PRECIPITATION	80.50	12530176.000	100.00
RUNOFF	35.677	5553208.500	44.32
EVAPOTRANSPIRATION	43.592	6785319.500	54.15
PERC./LEAKAGE THROUGH LAYER 3	0.190684	29680.816	0.24
AVG. HEAD ON TOP OF LAYER 3	4.1087		
DRAINAGE COLLECTED FROM LAYER 6	0.0003	39.918	0.00

PERC./LEAKAGE THROUGH LAYER 8	0.000000	0.002	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0000		
CHANGE IN WATER STORAGE	1.231	191613.391	1.53
SOIL WATER AT START OF YEAR	188.557	29349794.000	
SOIL WATER AT END OF YEAR	189.788	29541408.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-4.887	0.00

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1976

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/I
RECIPITATION	3.57	2.89	3.08	0.28	5.58	3.3(
	5.67	1.69	1.57	5.08	5.80	8.7(
RUNOFF	2.199	1.626	0.452	0.000	0.174	0.0(
	0.000	0.000	0.000	1.530	3.309	6.9(
EVAPOTRANSPIRATION	1.309	1.931	1.885	2.645	5.432	2.4(
	5.506	2.798	1.147	1.580	2.464	2.0(
PERCOLATION THROUGH LAYER 3	0.0181	0.0156	0.0166	0.0087	0.0116	0.0(
	0.0099	0.0057	0.0060	0.0112	0.0167	0.0(
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.0027	0.0037	0.0055	0.0035	0.0119	0.0(
	0.0176	0.0149	0.0193	0.0217	0.0210	0.0(
PERCOLATION THROUGH LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0(
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0(

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 3	5.467	5.046	3.836	1.719	2.004	0.1
	1.398	0.522	0.152	2.017	4.935	5.5
STD. DEVIATION OF DAILY HEAD ON LAYER 3	0.474	0.637	1.021	2.037	1.791	0.4
	1.406	0.797	0.230	2.076	0.802	0.3
AVERAGE DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.0
	0.000	0.000	0.000	0.000	0.000	0.0
STD. DEVIATION OF DAILY	1.070	0.000	0.000	0.000	0.000	0.0

HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.

****

****

ANNUAL TOTALS FOR YEAR 1976

	INCHES	CU. FEET	PERCEN
PRECIPITATION	47.36	7371792.500	100.00
RUNOFF	16.272	2532744.750	34.36
EVAPOTRANSPIRATION	31.212	4858317.000	65.90
PERC./LEAKAGE THROUGH LAYER 3	0.140423	21857.426	0.30
AVG. HEAD ON TOP OF LAYER 3	2.7399		
DRAINAGE COLLECTED FROM LAYER 6	0.1465	22799.475	0.31
PERC./LEAKAGE THROUGH LAYER 8	0.000001	0.229	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0001		
CHANGE IN WATER STORAGE	-0.270	-42072.480	-0.57
SOIL WATER AT START OF YEAR	189.788	29541408.000	
SOIL WATER AT END OF YEAR	189.518	29499336.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	3.610	0.00

****

****

MONTHLY TOTALS (IN INCHES) FOR YEAR 1977

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/I
PRECIPITATION	5.31	3.08	3.54	6.80	1.87	2.4
	2.91	16.02	13.44	4.47	7.89	5.0
RUNOFF	3.454	1.493	1.620	3.222	0.000	0.0
	0.000	8.276	11.068	1.840	4.561	2.6
VAPOTRANSPIRATION	1.487	1.571	2.643	4.677	2.556	2.33
	2.927	5.360	2.997	2.398	2.808	2.48
PERCOLATION THROUGH LAYER 3	0.0176	0.0154	0.0170	0.0142	0.0053	0.00
	0.0023	0.0157	0.0170	0.0170	0.0167	0.01

LATERAL DRAINAGE COLLECTED	0.0132	0.0096	0.0095	0.0077	0.0032	0.0
FROM LAYER 6	0.0131	0.0252	0.0193	0.0150	0.0120	0.0
RCOLATION THROUGH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON	5.637	4.694	4.599	2.825	0.592	0.
LAYER 3	0.009	4.494	5.509	4.596	5.069	4.
STD. DEVIATION OF DAILY	0.312	0.885	0.889	1.689	1.039	0.
HEAD ON LAYER 3	0.021	1.758	0.521	0.712	0.755	0.
AVERAGE DAILY HEAD ON	0.000	0.000	0.000	0.000	0.000	0.
LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
STD. DEVIATION OF DAILY	0.000	0.000	0.000	0.000	0.000	0.
HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.

ANNUAL TOTALS FOR YEAR 1977

	INCHES	CU. FEET	PERCENT
PRECIPITATION	72.81	11333198.000	100.00
RUNOFF	38.139	5936516.000	52.38
EVAPOTRANSPIRATION	34.247	5330715.500	47.04
PERC./LEAKAGE THROUGH LAYER 3	0.158344	24646.916	0.22
AVG. HEAD ON TOP OF LAYER 3	3.5891		
DRAINAGE COLLECTED FROM LAYER 6	0.1462	22758.242	0.20
PERC./LEAKAGE THROUGH LAYER 8	0.000001	0.230	0.00
AVG. HEAD ON TOP OF LAYER 8	0.0001		
CHANGE IN WATER STORAGE	0.278	43207.777	0.38
SOIL WATER AT START OF YEAR	189.518	29499336.000	
SOIL WATER AT END OF YEAR	189.796	29542544.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.308	0.00

BAB 3/30/

MONTHLY TOTALS (IN INCHES) FOR YEAR 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN
PRECIPITATION	13.37	2.18	3.29	3.44	9.71	7.
	10.32	14.70	2.98	0.00	4.67	4.
RUNOFF	11.697	0.908	1.163	1.641	4.107	0.
	4.150	8.315	0.596	0.000	1.445	2.
EVAPOTRANSPIRATION	1.569	2.100	2.199	3.344	5.389	4.
	7.329	5.343	2.388	1.515	1.637	2.
PERCOLATION THROUGH LAYER 3	0.0177	0.0157	0.0169	0.0141	0.0122	0.
	0.0168	0.0150	0.0163	0.0163	0.0089	0.
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.0098	0.0080	0.0086	0.0076	0.0092	0.
	0.0185	0.0153	0.0147	0.0134	0.0080	0.
PERCOLATION THROUGH LAYER 8	0.0000	0.0000	0.0000	0.0000	0.0000	0.
	0.0000	0.0000	0.0000	0.0000	0.0000	0.

MONTHLY SUMMARIES FOR DAILY HEADS (INCHES)

AVERAGE DAILY HEAD ON LAYER 3	5.812	5.143	4.413	2.783	1.872	0.
	4.160	3.278	4.255	3.413	1.026	5.
STD. DEVIATION OF DAILY HEAD ON LAYER 3	0.128	0.559	0.786	1.599	1.835	0.
	1.313	2.187	0.700	1.030	1.699	0.
AVERAGE DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
	0.000	0.000	0.000	0.000	0.000	0.
STD. DEVIATION OF DAILY HEAD ON LAYER 8	0.000	0.000	0.000	0.000	0.000	0.
	0.000	0.000	0.000	0.000	0.000	0.

ANNUAL TOTALS FOR YEAR 1978

	INCHES	CU. FEET	PERCEN
PRECIPITATION	76.85	11962044.000	100.00
RUNOFF	36.892	5742453.500	48.01
EVAPOTRANSPIRATION	40.195	6256464.500	52.30
PERC./LEAKAGE THROUGH LAYER 3	0.174857	27217.221	0.23

AVG. HEAD ON TOP OF LAYER 3	3.4650		
DRAINAGE COLLECTED FROM LAYER 6	0.1393	21681.340	0.1
PERC./LEAKAGE THROUGH LAYER 8	0.000001	0.225	0.0
AVG. HEAD ON TOP OF LAYER 8	0.0001		
CHANGE IN WATER STORAGE	-0.376	-58555.660	-0.4
SOIL WATER AT START OF YEAR	189.796	29542544.000	
SOIL WATER AT END OF YEAR	189.420	29483988.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.0
SNOW WATER AT END OF YEAR	0.000	0.000	0.0
ANNUAL WATER BUDGET BALANCE	0.0000	0.109	0.0

****

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1974 THROUGH 1978

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DE
PRECIPITATION						
TOTALS	6.73	3.46	4.37	4.55	7.01	5.95
	6.58	9.84	5.91	3.16	7.12	5.37
STD. DEVIATIONS	4.28	1.27	1.55	2.74	3.35	4.09
	2.84	5.88	4.76	2.06	2.63	1.97
RUNOFF						
TOTALS	4.843	2.041	2.071	1.960	1.800	1.302
	1.410	4.382	3.359	1.215	4.028	3.161
STD. DEVIATIONS	4.280	1.325	1.478	1.282	1.736	2.518
	1.981	4.181	4.784	1.190	2.680	2.316
EVAPOTRANSPIRATION						
TOTALS	1.396	1.892	2.382	3.751	5.044	4.244
	5.536	4.733	2.393	1.869	2.535	2.421
STD. DEVIATIONS	0.130	0.194	0.337	0.783	1.417	1.776
	1.630	1.139	0.732	0.366	0.565	0.277
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0.0176	0.0156	0.0169	0.0131	0.0113	0.007
	0.0101	0.0135	0.0145	0.0155	0.0151	0.017
STD. DEVIATIONS	0.0004	0.0001	0.0002	0.0025	0.0036	0.005
	0.0053	0.0044	0.0048	0.0024	0.0035	0.000

PKS 3/30

LATERAL DRAINAGE COLLECTED FROM LAYER 6

TOTALS	0.0051	0.0042	0.0047	0.0038	0.0052	0.0
	0.0101	0.0115	0.0110	0.0100	0.0082	0.0
STD. DEVIATIONS	0.0060	0.0044	0.0046	0.0038	0.0052	0.0
	0.0089	0.0104	0.0095	0.0097	0.0088	0.0

PERCOLATION/LEAKAGE THROUGH LAYER 8

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ACROSS LAYER 3

AVERAGES	5.3682	5.0095	4.3487	2.6698	2.1676	1.28
	1.8022	3.0263	3.8969	3.5204	4.0619	4.90
STD. DEVIATIONS	0.4181	0.1845	0.3622	0.5416	1.1007	2.02
	1.6894	1.4892	2.1650	0.9867	1.7364	0.70

DAILY AVERAGE HEAD ACROSS LAYER 8

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
	0.0000	0.0001	0.0001	0.0000	0.0000	0.00
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
	0.0000	0.0001	0.0000	0.0000	0.0000	0.00

****

****

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1974 THROUGH 1978

	INCHES		CU. FEET	PERCEN
PRECIPITATION	70.06	(13.090)	10905458.0	100.00
RUNOFF	31.572	(8.9841)	4914349.50	45.063
EVAPOTRANSPIRATION	38.195	(5.2434)	5945279.50	54.517
PERCOLATION/LEAKAGE THROUGH FROM LAYER 3	0.16843	(0.01944)	26216.967	0.240
AVERAGE HEAD ACROSS TOP OF LAYER 3	3.506	(0.493)		
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.08793	(0.07686)	13686.937	0.12551
PERCOLATION/LEAKAGE THROUGH FROM LAYER 8	0.00000	(0.00000)	0.146	0.0000

/365 days/
→ cut to gather

JTC 5/30/95

AVERAGE HEAD ACROSS TOP OF LAYER 8	0.000	(0.000)		
CHANGE IN WATER STORAGE	0.207	(0.6370)	32143.62	0.295

****

NK 3/30/95

****

PEAK DAILY VALUES FOR YEARS 1974 THROUGH 1978

	(INCHES)	(CU. FT.)
PRECIPITATION	8.52	1326175.620
RUNOFF	7.202	1121079.5000
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.000576	89.65855
AVERAGE HEAD ACROSS LAYER 3	6.000	
DRAINAGE COLLECTED FROM LAYER 6	0.00096	148.85124
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.000000	0.00154
AVERAGE HEAD ACROSS LAYER 8	0.000	
SNOW WATER	1.58	245982.9840

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4170
MINIMUM VEG. SOIL WATER (VOL/VOL)	-0.0109

****

****

FINAL WATER STORAGE AT END OF YEAR 1978

LAYER	(INCHES)	(VOL/VOL)
1	2.0045	0.3341
2	10.8240	0.4510
3	0.0000	0.0000
4	157.6800	0.2920
5	2.6730	0.1337
6	0.0021	0.0107
7	0.0000	0.0000
8	16.2360	0.4510
SNOW WATER	0.000	

****
****

PRESSURE RELIEF

Subject: PRESSURE RELIEF
By : S. Togan ALPER Date: 02/28/95
Checked By: RA Sabell Date: 3/30/95

P.Name:RiverBirch
P.Number:95B034-7
PR-1/2

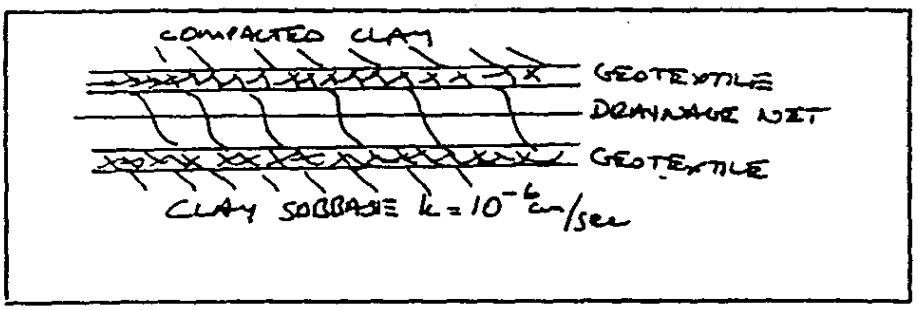
SCOPE:

Evaluate the pressure relief system and estimate the appropriate sump size for pressure relief system.

REFERENCES:

Graduation
. Graduation Package
. Sump Design

PRESSURE RELIEF SYSTEM



DISCUSSION

. Module Area (A) = 100,000 ft2
. Hydraulic gradient (i) = 1.0 (**)
. Hydraulic permeability (k) = 1x10E-6 cm/sec (*)

. (*)This design assumes that the water level is above the bottom of the pressure relief system. The lab tests show that the permeability of the in-situ clay at this strata is >= 1x10E-6 cm/sec. Therefore the water generated by the pressure relief system is limited and a result of the upward permeability of the subbase clay layer.

. No problems with transmissivity are expected ==> similar to the leachate collection sump.

. $Q_{\text{daily per module}} = k \times i \times A$

$= 1\times10^{-6}\,\text{cm/sec}\left(\frac{1''}{2.54\,\text{cm}}\right)\left(\frac{1\,\text{ft}}{12''}\right)\left(\frac{3600\,\text{sec}}{1\,\text{h}}\right)\left(\frac{24\,\text{h}}{1\,\text{day}}\right)\times 1.0' \times 100{,}000\,\text{ft}^2$

$= 284\,\text{ft}^3/\text{day}$ ✓

(**) GWT = -2 ft
Depth of Pressure Relief = -12 ft
Upper Sub Layer = -22 ft

$i = \frac{\Delta h}{L} = \frac{12'-2'}{22'-12'} = \frac{10'}{10'} = 1$

By: T. ALPER [illegible]. MB 3/30/95

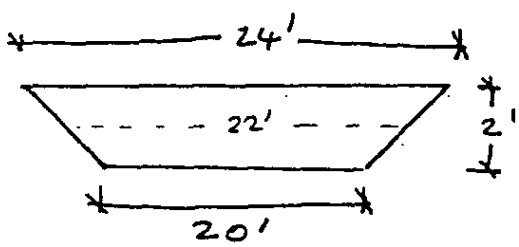
RESULTS AND DESIGN

The sump should be capable to withhold 284 ft3 of water drained from the pressure relief system (24-h drainage). Using porosity of sump fill material n = 0.3 for the fill material of the sump

V_{sump} >= Q x 1/n
= 284 ft3 x 1/0.3 = 947 ft3 ✓

CROSSECTION OF SUMP

.Two feet deep rectangular box, with
Base dimensions = 20' x 20'
Side slopes = 1V:1H
Top dimensions = 24' x 24'



$V_{sump} = \left(\frac{20'+24'}{2}\right)^2 \times 2'$ = 968 ft3 ✓

968 ft3 > 947 ft3 =======> sump is appropriate
Sump has enough capacity to withhold 24-h drainage from the pressure relief system.

EROSION POTENTIAL

X = RKLSCP
where;

X = Eroded soil in tons per acre-year,
R = Rainfall & runoff index, (Figure 1)
K = Erodibility factor, (Table 1)
L = Slope Length
S = Slope gradient factor
LS = Composite of L and S (Figure 2)
C = Cover Management Factor (Table 2)
P = Erosion Control Practice Factor, (Table 3)

From the related figures and tables the values of the listed parameters are;

R = 554 ;
K = 0.25;
C = .003;
P = 1.0;
LS = 1.86;

X = 554 * 0.25 * 2.02 * .003 * 1.0 = .84 tons per acre per year

CONCLUSIONS AND RECOMMENDATIONS

The erodible mass (.84 tons/acre-year) is less than the maximum allowed value by EPA (2 tons/acre-year). Therefore no erosion control measures are necessary at this time. Regular maintenance should be implemented and inspections should be performed, to protect the vegetation on the cover .

Woodward-Clyde Consultants

Project Notes

Subject: EROSION POTENTIAL
T. Miller Date: 02/29/95
Checked By RA [illegible] Date: 3/30/95

Project Name: RIVERBIRCH
Project No.: 95R034
Task No. 7 File No.
Sheet ED-3 of 5

From Ref (2) pg. 102

FIGURE I

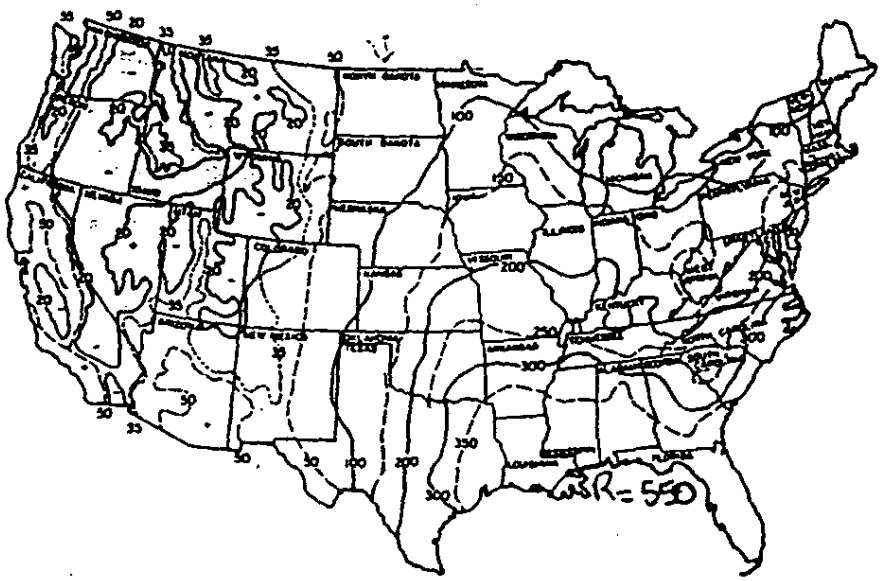


Fig. 5.6. Rainfall and runoff erosivity index R by geographic location. (From USDA and EPA, 1975.)

102 WATER EROSION AND CONTROL PRACTICES

From Ref (2) pg. 105

TABLE I.

Table 5.4 K. Soil-Erodibility Factor by Soil Texture in t/a[a]

Textural Class	Organic Matter Content (%) 0.5	2	4
Fine sand	0.16	0.14	0.10
Very fine sand	0.42	0.36	0.28
Loamy sand	0.12	0.10	0.08
Loamy very fine sand	0.44	0.38	0.30
Sandy loam	0.27	0.24	0.19
Very fine sandy loam	0.47	0.41	0.33
Silt loam	0.48	0.42	0.33
Clay loam	0.28	0.25	0.21
Silty clay loam	0.37	0.32	0.26
Silty clay	0.25	0.23	0.19

[a] Selected from USDA-EPA, Vol. I (1975) and are estimated averages of specific soil values. For more accurate values by soil types use local recommendations of Soil Conservation Service or state agencies. (1 t/a = 2.24 Mg/ha)

Woodward-Clyde Consultants

Project Notes

Project Name: 95B034
Project No.: RIVERBIRCH
Task No.: 7 File No.:
Sheet EP-4 of 5

Subject: EROSION POTENTIAL
T. ALPER Date: 02/29/95
Checked By: [illegible] Date: 3/30/95

From Ref (1) pg. 22

TABLE II.

Table 2.5. C factors for pasture, rangeland, and idle land.[1]

Vegetal Canopy			Cover That Contacts the Surface					
			Percent Ground cover					
Type and height of raised canopy[2]	Canopy cover[3] %	Type[4]	0	20	40	60	80	95–100
Column no.:	2	3	4	5	6	7	8	9
No appreciable canopy		G	.45	.20	.10	.042	.013	.003
		W	.45	.24	.15	.090	.043	.011
Canopy of tall weeds or short brush (0.5 m fall ht.)	25	G	.36	.17	.09	.038	.012	.003
		W	.36	.20	.13	.082	.041	.011
	50	G	.26	.13	.07	.035	.012	.003
		W	.26	.16	.11	.075	.039	.011
	75	G	.17	.10	.06	.031	.011	.003
		W	.17	.12	.09	.067	.038	.011
Appreciable brush or bushes (2 m fall ht.)	25	G	.40	.18	.09	.040	.013	.003
		W	.40	.22	.14	.085	.042	.011
	50	G	.34	.16	.085	.038	.012	.003
		W	.34	.19	.13	.081	.041	.011
	75	G	.28	.14	.08	.036	.012	.003
		W	.28	.17	.12	.077	.040	.011
Trees but no appreciable low brush (4 m fall ht.)	25	G	.42	.19	.10	.041	.013	.003
		W	.42	.23	.14	.087	.042	.011
	50	G	.39	.18	.09	.040	.013	.003
		W	.39	.21	.14	.085	.042	.011
	75	G	.36	.17	.09	.039	.012	.003
		W	.36	.20	.13	.083	.041	.011

[1] All values shown assume: (1) random distribution of mulch or vegetation, and (2) mulch of appreciable depth where it exists.

[2] Average fall height of waterdrops from canopy to soil surface: m = meters.

[3] Portion of total-area surface that would be hidden from view by canopy in a vertical projection (a bird's-eye view).

[4] G: Cover at surface is grass, grasslike plants, decaying compacted duff, or litter at least 2 inches deep.

W: Cover at surface is mostly broadleaf herbaceous plants (as weeds) with little lateral-root network near the surface, and/or undecayed residue.

Source: USDA Soil Conservation Service, 1978

From Ref (1) pg. 23

TABLE II.

Table 2.7 *P* factors for standard erosion control practices.

Slope, %	Up and down hill	Cross slope farming without strips	Contour tillage	Cross slope farming with strips	Contour stripcropping
2.0–7	1.0	.75	.50	.37	.25
7.1–12	1.0	.80	.60	.45	.30
12.1–18	1.0	.90	.80	.60	.40
18.1–24	1.0	.95	.90	.67	.45

(From USDA Soil Conservation Service, 1978)

Woodward-Clyde Consultants

Project Notes

Subject: EROSION POTENTIAL
G. ALPER Date: 02/29/95
Checked By: NA [illegible] Date: 3/30/95

Project Name: 95B034
Project No.: RIVERBIRD
Task No.: 7 File No.
Sheet EP-5 of 5

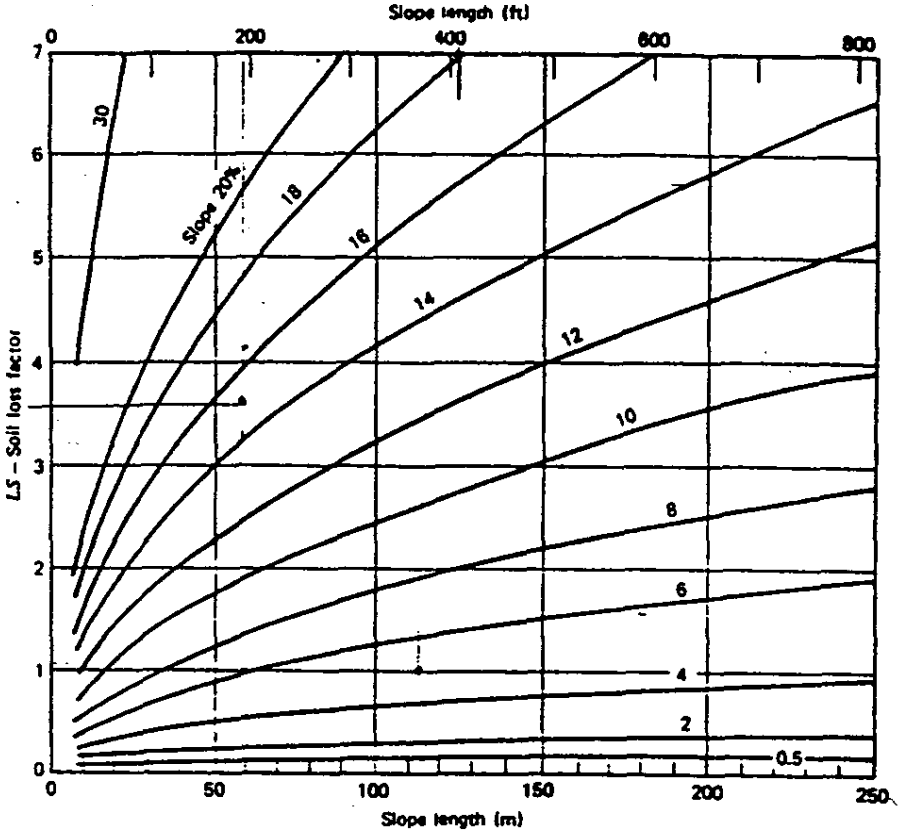


Fig. 5.7. LS soil loss factor by length and steepness of slope. (From Wischmeier and Smith, 1965.)

FIGURE 2. (Ref 2, p. 104)

For 371 ft / %5 slope → LS = 1.0 ✓

For 183 ft / 6H/1V slope → 16.7% → L.S. = 4.1

$$LS_{composite} = \frac{371 * (1.0) + 183 * (4.1)}{554} = 2.02$$

GAS COLLECTION SYSTEM

MG 2/8
SDA 03/02/15
MB 3/2/15

ASSUMPTIONS

. Cap in place
. Production rate = 200 ft3/ ton MSW/year
. Gas Conductivity of the fill is 10^{-4} cm/sec
. Assume laminar flow ====> Darcy's e. can be used
. Passive extraction system will be used for methane gas collection.
. The methane gas has a lower density than air. Therefore the methane gas will rise vertically to the top of the waste layer through the waste.

CALCULATIONS

attached papers

RESULTS

A gas vent should be placed at the mid section of every cell at the mid-crust or at the top-crust alternatingly.The diameter of the gas vents => 4".

The gas vents will be installed before the placement of the final cap to the mid depth of the waste layer. This will enable the gas collection system to perform even under the worse case, where a relatively low permeability layer is formed at some depth in the waste layer preventing the methane gas from migrating vertically to the top of the waste layer.

Refer to the related drawing for design details of the gas vent.

Woodward-Clyde Consultants

Project Notes

Subject: Methane Gas
Project Name: Rw. B
Project No.: 95B034
Task No. 7 File No.
Sheet MC-3 of 8
Checked By: NAS Date: 3/30/95

GAS FLOW TOWARDS AN EXTRACTION WELL

Gas Velocity $V_r = \frac{Q}{A}$

Q = Magnitude of the gas flow rate across the imaginary cylindrical surface of radius r.

$Q = \pi (R^2 - r^2)\, t\, D\, F_g$

A = Area of imaginary surface
R = radius of influence
t = Refuse fill thickness
D = refuse density
F_g = gas Production Rate per unit mass of refuse

$$V_r = \frac{\pi (R^2 - r^2)\, t\, D\, F_g}{2 \pi r t} = \frac{(R^2 - r^2) D F_g}{2r} \quad (1)$$

DARCY'S LAW FOR RADIAL FLOW TOWARD WELL

$V_r = -k \frac{dh}{dr}$ — static head

k = coef. of perm.
r = radial distance

Woodward-Clyde Consultants

Subject: Methane Gas
T. ALPER Date: 03/02/95
Checked By: NAS Date: 3/30/95

Project Notes

Project Name: Riv. B
Project No.: 956034
Task No.: 7 File No.
Sheet MG-4 of 9

$$h = \frac{p}{\gamma} + z$$

p = total pressure at distance r
γ = spec. weight of gas
z = elev. some datum.

$$\Rightarrow V_r = -k \frac{d\left(\frac{p}{\gamma} + z\right)}{dr}$$

- Gas streamlines are horizontal $\Rightarrow z = \text{const.}$
& $\gamma = \text{const}$ (gas incompressible)

$$\Rightarrow V_r = -\frac{k}{\gamma}\frac{dp}{dr}$$

$$k = \frac{\gamma}{\mu} k_s$$

μ = absolut viscosity
k_s = intrinsic permeability.

$$\Rightarrow V_r = \frac{-k_s}{\mu}\frac{dp}{dr} \qquad (2)$$

Woodward-Clyde Consultants

Project Notes

Subject: Methane Gas
TALPRR Date: 03/02/95
Checked By: RAS Date: 3/30/95

Project Name: RIJ B
Project No.: 95B074
Task No.: 7 File No.:
Sheet: M6-5 of 8

Eq. (1) & (2)

$$-\frac{(R^2 - r^2) D F_g}{2r} = -\frac{k_s}{\mu}\frac{dP}{dr}$$

$$\int_{P_w}^{P_e} dp = \frac{\mu D F_g}{2 K_s}\int_{R_w}^{R}\left(\frac{R^2 - r^2}{r}\right) dr$$

$$\Delta p = \frac{\mu F_g D}{2 K_s}\left[R^2 \ln\left(\frac{R}{r_w}\right) + \frac{r_w^2}{2} - \frac{R^2}{2}\right]$$

∴ the manhole is directly connected to open air ✓

$\Rightarrow P_w = 0 \Rightarrow P_{max} = \Delta p$ ✓

For design. ✓ $\Delta p \leq$ F.S. X $\quad 30'' H_2O = 7 \times 10^{-2}$ a

$D_{gas\,vent} = 4''$

$\Rightarrow r = 2'' \cong 0.05$ cm

Woodward-Clyde Consultants

Subject: Methane Gas
TALFGR Date: 03/02/95
Checked By: NAS Date: 3/30/95

Project Notes

Project Name: Riv. B
Project No.: 95B024
Task No. 7 File No.
Sheet MG-6 of 8

Solve Eq (1) & (2) together

$$-\frac{(R^2-r^2)\,DF_g}{2r} = -\frac{k_s}{\mu}\frac{dP}{dr}$$

Integrate

$$\int_{P_w}^{P_e} dp = \frac{\mu D F_g}{2k_s}\int_{r_w}^{R}\frac{(R^2-r^2)}{r}\,dr$$

$$\Rightarrow \Delta p = P_{max} - P_{well} = \frac{\mu F_g D}{2k_s}\left[R^2 \ln\left(\frac{R}{r_w}\right) + \frac{r_w^2}{2} - \frac{R^2}{2}\right]$$

Use F.S. = 1.5 ✓ (1.3 FS + 0.2 diffusion) ✓

$P_{well} = 0$ since well is open to atmosphere.

$$\Rightarrow P_{max} = \frac{\mu F_g D}{2k_s}\left[R^2 \ln\left(\frac{R}{r_w}\right) + \frac{r_w^2}{2} + \frac{R^2}{2}\right]$$

<u>Design Parameters</u>

$r_w = 0.05$ m ✓ $\quad k_s = 10^{-4}$ cm/sec $= 10^{-6}$ m/sec

$\mu = 1.04 \times 10^{-5}$ ✓

$D = 60$ lb/ft^3 ✓ $= 960$ kg/m^3

$\bar{g} = 200$ sf/ton·year $= 0.2$ ft^3/kg·year

$= 1.5 \times 10^{-5}$ m^3/day·kg

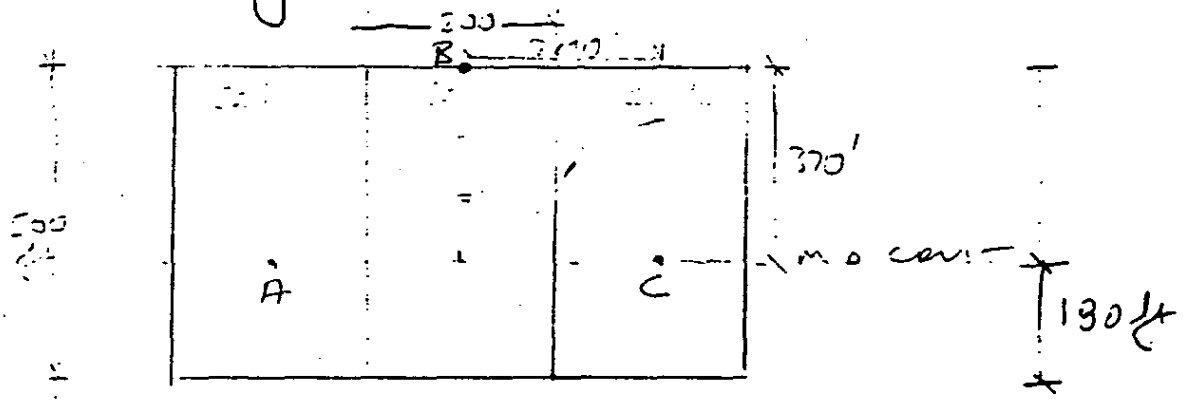
$F_g = 1.8 \times 10^{-10}$ m^3/kg·sec

$P_{max} \leq 30\ mm\ H_2O = 7 \times 10^{-2}\ atm$ ✓

$P_{design} = \frac{P_{max}}{F.S.} = 4.5 \times 10^{-2}\ atm$ ✓

LOCATION DESIGN OF MANHOLES:

- One Manhole at the center crust for every second cell & one manhole at the mid crust for every second cell.



$X_{MAX}\ R = \frac{\sqrt{700^2 + 300^2}}{2} = 210'$

assume $R = 230' \simeq 70\ m$

Woodward-Clyde Consultants

Project Notes

Subject: Methane Gas
T. [illegible] Date: 03/02/95
Checked By: RAS Date: 3/30/95

Project Name: Kil B
Project No.: 95 N034
Task No.: 7 File No.:
Sheet MG-8 of 8

Find Δp for $R = 70m$

$$P = \frac{1.04 \times 10^{-5} * 1.8 \times 10^{-10} * 960}{2 * 10^{-6}} \left(70^2 \ln\left(\frac{70}{0.85}\right) + \frac{0.85^2}{2} + \frac{70}{2}\right.$$

$$P_{Design} = .89 \times 10^{-6} (27663) = 2.9 \times 10^{-2} \text{ atm}$$

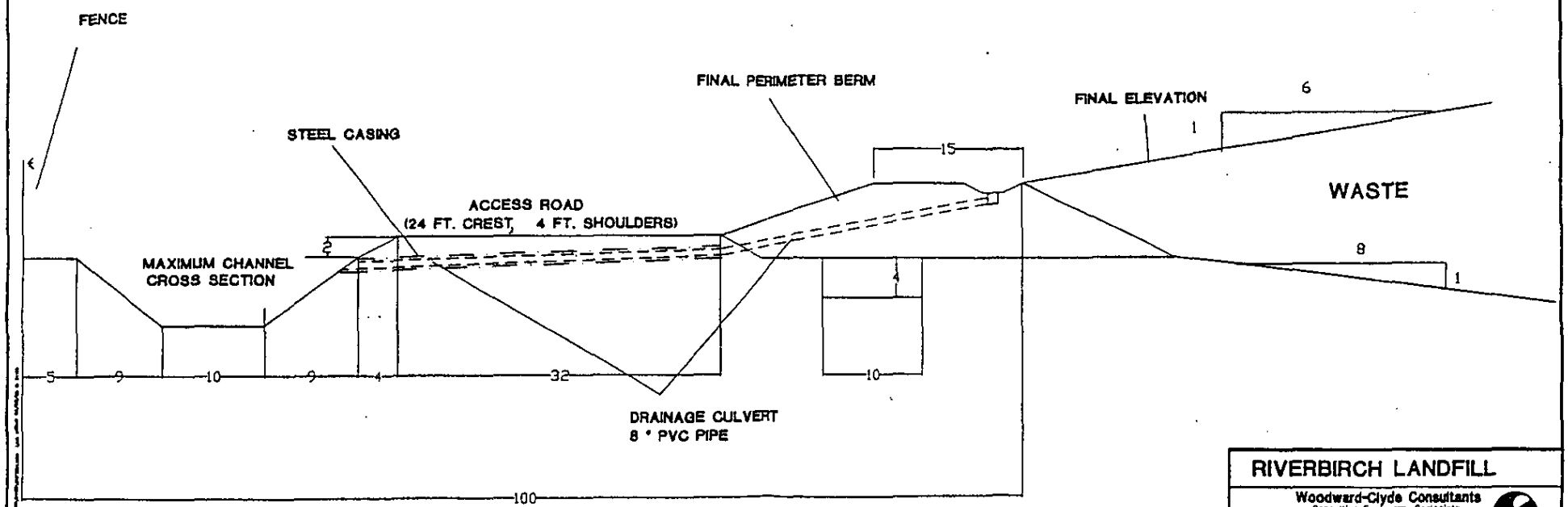
Required.

$$1.5 \times 10^{-2} \text{ atm} \leq P_{Design} \leq 4.5 \times 10^{-2} \text{ atm}$$

$$\downarrow$$

$$2.9 \times 10^{-2}$$ ✓

The design is adequate ✓



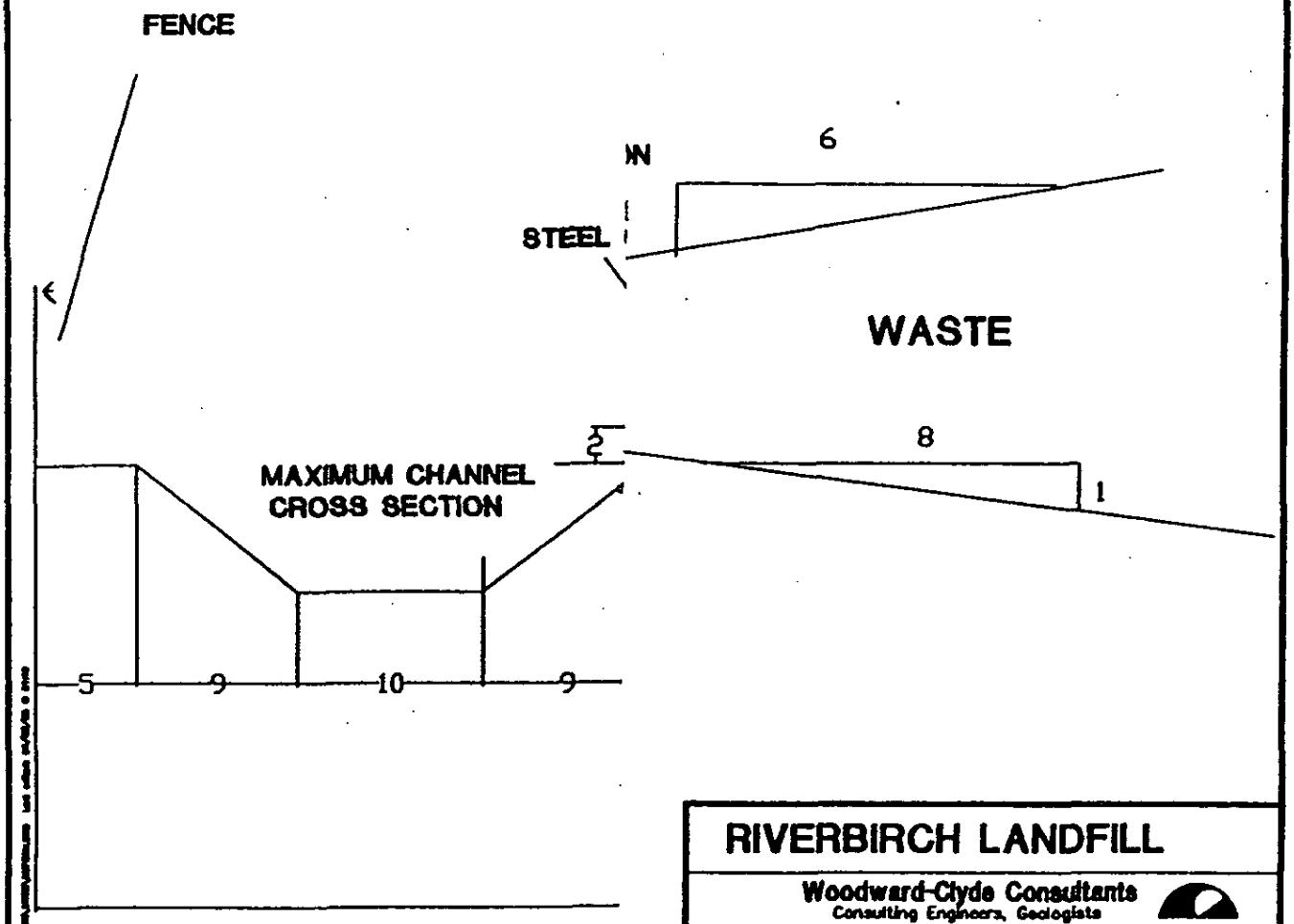
RIVERBIRCH LANDFILL

Woodward-Clyde Consultants
Consulting Engineers, Geologists
and Environmental Scientists
Baton Rouge, Louisiana

RIVERBIRCH, INC.
GRETNA, LOUISIANA

SCALE: 1"=10' | MADE BY: T. ALPER | DATE: 07/04/95 | FILE NO.
CHECKED BY: | DATE: | FIGURE

BUFFER ZONE DETAIL



RIVERBIRCH LANDFILL

Woodward-Clyde Consultants
Consulting Engineers, Geologists
and Environmental Scientists
Baton Rouge, Louisiana

RIVERBIRCH, INC.
GRETNA, LOUISIANA

SCALE: 1"=10'	MADE BY: T.ALPER	DATE: 03/04/93	FILE NO.
	CHECKED BY:	DATE:	

BUFFER ZONE DETAIL

FIGURE

BUFFER ZONE DETAIL

Q.A. 04/03/95

Subject:BUFFER ZONE DETAIL
By : S. Togan ALPER STA Date: 02/2695
Checked By: NAB Date: 3/30/95

P.Name:RiverBirch
P.Number:95B034-7
BZ- 1/2

SCOPE:

To determine the typical cross section of the 100-feet buffer zone

REFERENCES:

. Storm Water Drainage Channel Calculation Package
. Culvert Design package
. Slope Stability Package
. Buffer Zone Cross Section Design Package

DISCUSSION

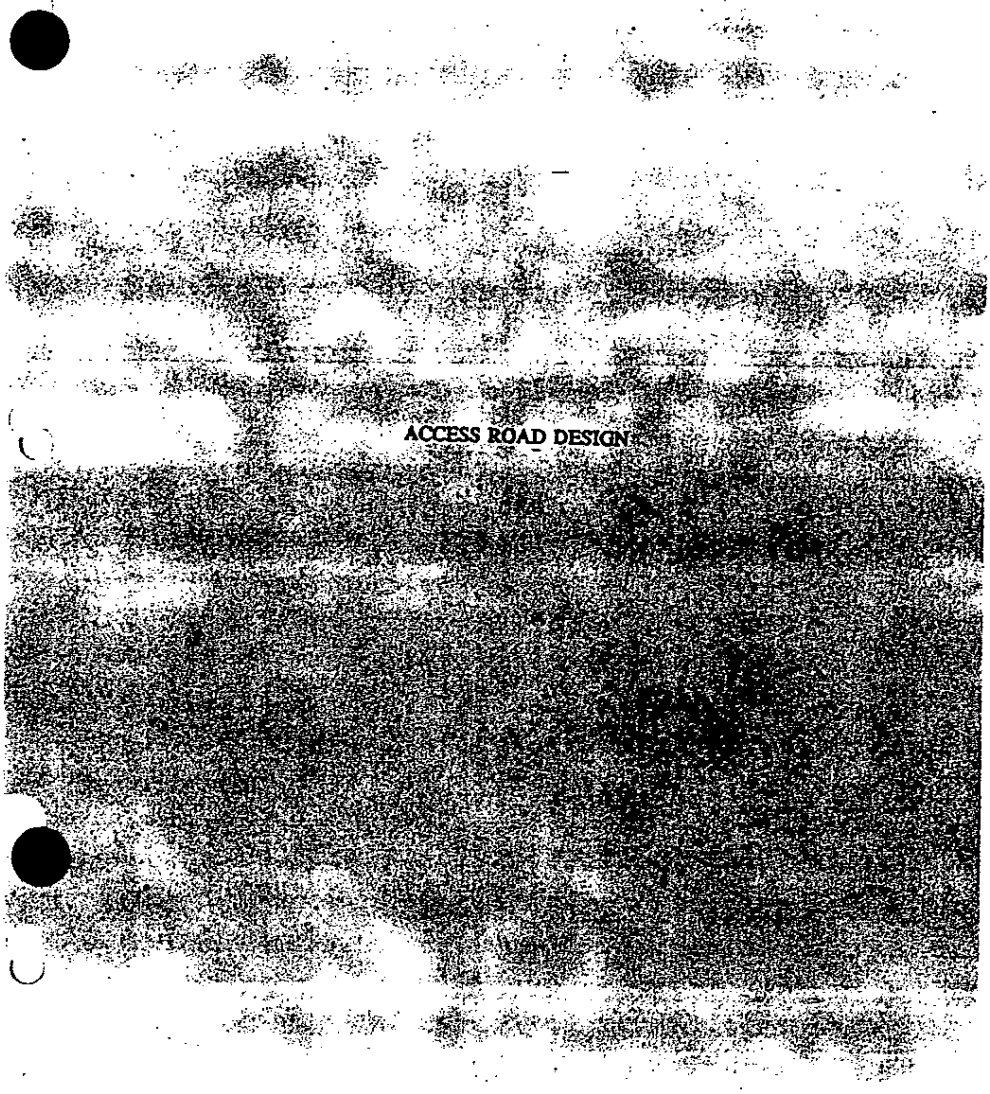
. A minimum of 24 ft. wide all weather access road should be placed around the cell 1 area.

. A perimeter berm will be constructed as follows;
Crest width = 15-feet
Slope = 3(H): 1(V)
Keyway = 4-feet deep and 10 feet wide
Strength of berm = cohesion must exceed 900 psf, unit weight = 110 pcf.

. The maximum cross section is used for storm water drainage channel presentation.

. The storm water will be drained from the ditch at the top of the berm to the storm water drainage channel via culverts. The culverts will be placed 200 ft. apart, each one draining one module of cell 1. The culverts are designed as 8" PVC pipes. The culverts will be placed in a steel casing under the access road.

The Buffer Zone Cross Section is presented in the attached drawing BF-1.


ACCESS ROAD DESIGN

Woodward-Clyde Consultants

Project Notes

Project Name: Riverbend
Project No.: 95B074
Task No.: 7 File No.:
Sheet 1 of 6

Road Design
I. Alper Date: 04/10/95
Checked By: [illegible] Date: 4/13/95

OBJECTIVE: To Design The Access Road To The Facility To Withstand The Expected Traffic Load.

REFERENCES:

1. Resl S., Werner G., "The Influence Of Non-Woven Needle-Punched Geotextile On The Ultimate Bearing Capacity Of The Subgrade", Third Int. Conf. On Geotextiles, Vienna, 1986.
2. Polyfelt TS. Design & Practice Manual.

ASSUMPTIONS

Subgrade: Soft Clay $C_{BR} = 2.5$ 1.0 MS
$k_s = 5 \times 10^{-6}$ cm/sec
$d_{50} = 0.004$ mm
$d_{85} = 0.008$ mm

Fill Material $\phi' = 30'$
$c_u = 900$ psf $\cong 6$ psi
$d_m =$ inches

Traffic Load
20 ton trucks (18 ton of waste) ⇒ axle load = 10 ton
1000 ton/day ⇒ 300,000 tons/year ⇒ n = 16500 repetitions

Woodward-Clyde Consultants

Project Notes

Subject: Road Design
T. Alper Date: 04/10/95
Checked By: NAB Date: 4/13/95

Project Name: Riverbend
Project No.: 95B034
Task No.: 7 File No.:
Sheet 2 of 6

- Max rut depth = 4 inch.

Road Design

- Find Minimum Embankment Fill Thickness

Parameters.

- Traffic Load
  - repetitions
  - axle load
  - Subbase quality

  } ⇒ as factor f_v from UR-II

- Individual Load
  - axle load
  - subbase

  } D_o from UR-I

- Site & Installation

  f_s = Range = 1.0 ↔ 1.5

$$D = D_o \times f_s \times f_v$$

Woodward-Clyde Consultants

Project Notes

Project: Road Design
T. Alger Date: 04/00/95
Checked By: MAB Date: 4/13/95

Project Name: [illegible]
Project No.: 98B034
Task No.: 7 File No.:
Sheet 3 of 6

From UR I

$C_u = 6$ psi
$\phi' = 30°$ } $D_o = 10''$

From UR II

$n = 16{,}500$
$r = 4$ inch } $f_v = 1.75$
$CBR = 2.5$ 1.0 ~~1.5~~

$f_s = 1.3$

$D = 10'' * 1.75 * 1.3 = 22.75''$

$D \cong 2'$

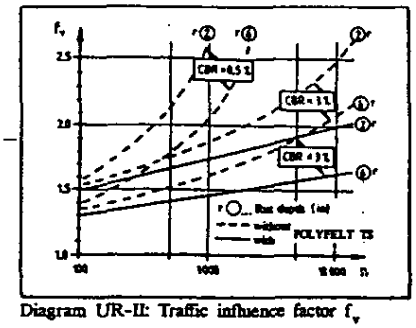


Diagram UR-II: Traffic influence factor f_v

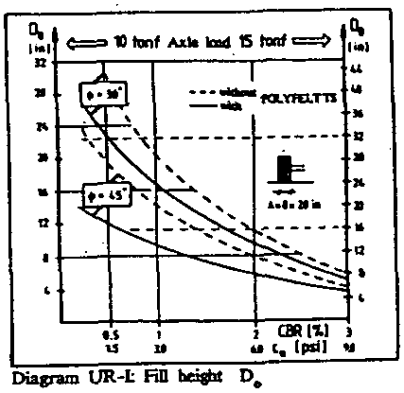


Diagram UR-I: Fill height D_o

Check if a geotextile meets mechanical & hydraulic requirements, such that it can withstand the pulture stresses of the sharp fibered aggregate to the geotextile due to the soil pressures caused by the axle loads.

Woodward-Clyde Consultants

Project Notes

Project Name: Riverbrook
Project No.: 950874
Task No.: 7 File No.:
Sheet 4 of 6

Subject: Road Design
T. Alper Date: 04/10/95
Checked By: AAS Date: 4/13/95

From Diagram UR-IV:

10 tonf axle load
D = 24 inch.
d_m = 4 inch
} ⇒ TS 500

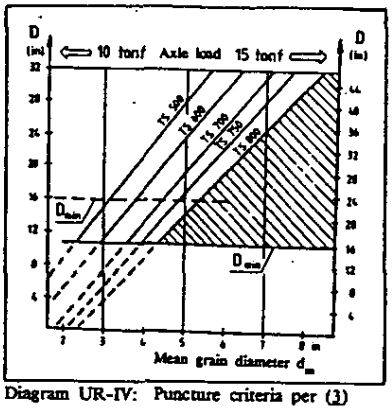


Diagram UR-IV: Puncture criteria per (3)

∴ There are several geotextiles which can resist the puncture stresses

Hydraulic Analysis:

Fill Material: "b" ⇒ $D_w \leq 0.15$ mm (see next page)
Traffic Load "heavy"
D
↳ Effective opening of the geotextile

D_w (TS500) = 0.12 ≤ 0.15mm ✓

∴ $k_g \geq 100 \cdot k_s$ ⇒ $k_g \geq 5 \times 10^{-4}$ cm/sec
k_g(TS500) 5×10^{-1} cm/sec > 5×10^{-4} ✓

Conclusions:

The access roads shall be constructed with a 2 feet thick embankment overlying a geotextile such as Polyfelt TS 500 or better. (Figure 1)
The specifications of diff geotextiles are given in Table 2.

Woodward-Clyde Consultants

Project Notes

Subject: Road Design
T. Alber Date: 04/10/95
Checked By: DAS Date: 7/13/95

Project Name: [illegible]
Project No.: 95B034
Task No.: 7 File No.:
Sheet 5 of 6

TABLE 1.
FILTER CRITERIA
FOR GEOTEXTILES

The filter criteria for POLYFELT TS in road construction (Table UR-1) are based on project specific criteria studies and laboratory tests collected semi-empirically over an observation period of 15 years.

Influence Factors		Filter Criteria	
Fill material	Traffic stress	D_w (mm)	k_g (cm/s)
a	medium/ heavy	$D_w \leq 0.10$	
a	light	$D_w \leq 0.11$	$k_g \geq 100 \cdot k_s$
b	heavy	$D_w \leq 0.12$	
b	medium/ light	$D_w \leq 0.15$	

Table UR-1: Filter criteria for POLYFELT TS in road construction

Definition of filter criteria:

D_w = Effective Opening Size of the Geotextile
k_g = Permeability Coefficient of the Geotextile
k_s = Permeability Coefficient of the Soil

Definition of influence parameters:

Fill material "a": $C_u < 5$ and $d_{60} > 2$ in.
Fill material "b": $C_u > 5$ or
$C_u < 5$ and $d_{60} < 2$ in.

$C_u = d_{60}/d_{10}$ = Uniformity Coefficient

Traffic load:

Light	< 10	Trucks/day
Medium	10 - 100	Trucks/day
Heavy	> 100	Trucks/day

Woodward-Clyde Consultants

Subject: Road Design

T. Allen Date: 04/10/95

Checked By: [illegible] Date: 4/13/95

Project Notes

Project Name: Riverbirch

Project No.: 95 R074

Task No.: 7 File No.:

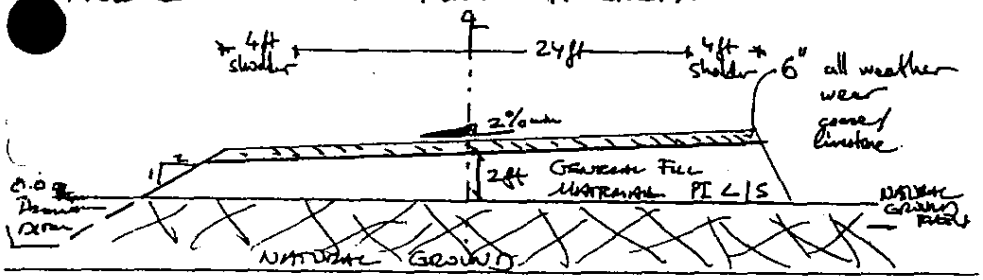
Sheet 6 of 6

TABLE 2. RELEVANT GEOTEXTILE PARAMETERS

RELEVANT GEOTEXTILE PARAMETERS			TYPE OF POLYFELT				
Parameter	Standard	Unit	TS 500	TS 600	TS 700	TS 750	TS 800
Puncture Resistance (Rod Puncture)	ASTMD-751[1] (Modified)	lbf	65	90	120	130	150
Puncture Resistance (CBR Puncture)	DIN 54307 (CBR)	lbf	300	400	585	630	740
Tensile elongation	ASTM D-4595	%	50-90	50-90	50-90	50-90	50-90
Effective Opening Size D_w	CW02215	mm	0.12	0.11	0.09	0.08	0.07
Thickness t_g at 0.3 psi	ASTM D-1777	mil	55	80	105	115	125
Planar Permeability k_h at 0.3 psi	Constant Head	cm/s	100	100	90	80	80
Permeability normal to plane k_v at 0.3 psi	Constant Head Permeability	cm/s ($x10^{-2}$)	50	50	50	40	40

[1]ASTM D 751, modified using a 5/16 in. diameter steel rod with hemispherical tip.
Note: The values stated in this table are typical average values.

FIGURE 1. ACCESS ROAD X-SECTION



CLOSURE
AND
POST-CLOSURE COST ESTIMATE

Woodward-Clyde Consultants

Woodward-Clyde Project Notes

CLOSURE CAT ESTIMATE

T. ALPER Date: 04/17/95

Checked By: MS Date: 7/20/9[illegible]

Project Name: [illegible]
Project No.: 95B034
Task No.: 7 File No.:
Sheet 3 of 5

CAP INSTALLATION

- Recom Clay (2 ft) ⇒ 210,000 × 2/3 = 140,000 yd³
- Geosynthetics (in ordp) = 210,000 × 1.05 = 220,000 yd²
- SAND ON CREST & MIDCREST ⇒

L = 730 + 30 + 110 + 30 + 1400 + [illegible]

5170 = 1725 yd Sand Volume = 1725 × 3 × 1/6 ≅ 865 yd³ = 900 yd³

- Air Vents = 12 piece
- Gas Monitoring Wells = 8 piece

Top Soil = 35,000 yd³

Vegetation = 43 acre

Oversight = 25 days

Certification = 10,000

CLOSURE COST ESTIMATE
RIVER BIRCH LANDFILL

	Closure Tasks	Unit	Unit Cost	Quantity	Cost
I	CAP INSTALLATION				
	Recompacted Clay (2')	Cu.yd.	$ 4.00	460,000	$ 1,840,000.00
	Geosynthetics	Sq.yd.	$ 4.50	677,600	$ 3,049,200.00
	Gas Collection Pipe	Ln. Ft.	$ 22.00	8,636	$ 189,992.00
	Gas Vents	Each	$ 2,000.00	70	$ 140,000.00
	Monitoring Gas Vents	Each	$ 800.00	28	$ 22,400.00
	Top Soil	Cu.yd.	$ 4.00	230,384	$ 921,536.00
	Vegetation	Acre	$ 1,500.00	140	$ 210,000.00
	TOTAL CAP INSTALLATION				$ 6,373,128.00
II	REMOVAL OF ALL EQUIPMENT ASSOCIATED WITH INJECTION WELLS	Each	$ 36,000.00	1	$ 36,000.00
	CONFIRMATORY SOIL SAMPLING	Each	$ 312.00	10	$ 3,120.00
III	OVERSIGHT	Days	$ 300.00	180	$ 54,000.00
IV	CERTIFICATION	Report	$ 20,000.00	1	$ 20,000.00
	SUBTOTAL				$ 6,486,248.00
	CONTINGENCY (10%)				$ 648,624.80
	TOTAL				$ 7,134,872.80

LANDFILL
POST-CLOSURE COST ESTIMATE

Post-Closure Task	Unit	Quantity	Unit Cost	Frequency	Cost	Annual Cost
CAP MAINTENANCE						
Inspection	Day	1	$450.00	4	$1,800	
Routine Maintenance (Approx. 10% per year)	Acre	40	$150.00	1	$6,000	
Mowing	Acre	399	$15.00	2	11,970	
Repairs	Cu.yd.	800	$15.00	1	12,000	
					TOTAL ANNUAL CAP MAINTENANCE	$31,770
LEACHATE COLLECTION SYSTEM MAINTENANCE						
Inspection and Maintenance	Day	1	$300	12	$3,600	
Leachate Pump Maintenance (20% of pumps each year)	pump	12	$500	1	$6,000	
Electrical Cost for Pump Maintenance	Month	12	$300.00	1	$3,600	
Treatment Pond	Discharge	1	$500	12	$6,000	
					TOTAL ANNUAL LEACHATE COLLECTION SYSTEM MAINTENANCE	$19,200
GAS COLLECTION AND MONITORING PROGRAM						
Inspection and Monitoring	Day	1	$450.00	4	$1,800	
Maintenance	Each	1	$450.00	24	$10,800	
Gas Flare Operation	Monthly	1	$5,000	12	$60,000	
					TOTAL ANNUAL GAS COLLECTION SYSTEM	$72,600
GROUNDWATER MONITORING						
Sampling and Analysis (Assuming ~~10~~ 23 Wells)	Well	23	$1,250.00	2	57,500	
Maintenance	Well	23	$100.00	2	4,600	
					TOTAL ANNUAL GROUNDWATER MONITORING SYSTEM	$62,100
LANDFILL OPERATOR	person	1	$50,000	1	$50,000	$50,000
					SUBTOTAL	$235,670
					CONTINGENCY (10%)	$23,567
					TOTAL ANNUAL COST	$259,237
					TOTAL 30 YEAR COST	$7,777,110

ENGINEERING CALCULATIONS
FROM
MODIFICATION NO. 5

SECTION V

GEOTECHNICAL REPORT

(Appendix B Subsurface Characterization; Attachment G Soil Testing Engineer's Geotechnical Report and Landfill Expansion)

STE
Soil Testing Engineers, Inc.
316 HIGHLANDIA DRIVE (70810) • P.O. BOX 83710 (70884) • BATON ROUGE, LOUISIANA
PHONE (225) 752-4790 • FAX (225) 752-4878

GORDON P. BOUTWELL, JR., Ph.D.
DANIEL L. FRANKLIN, JR., MS
CHARLES S. HEDGES, MS
CHING N. TSAI, MS
DANIEL J. HOLDER, MS
KENNETH A. FLUKER, MS
ZIAD H. ALEM, MS
STEVE M. MEUNIER
REGISTERED PROFESSIONAL ENGINEERS

VERNON C. ASHWORTH, MS
MICHAEL J. ALLEN
CERTIFIED PROFESSIONAL GEOLOGISTS

BILLY SINGLETON, BS Geology

January 19, 1999

River Birch, Inc.
Post Office Box 1938
Gretna, LA 70054

Attn.: A. J. Ward, Jr.

Re: Geotechnical Report
River Birch Landfill
Avondale, Louisiana
STE File No. 98-1171

Dear Mr. Ward:

Soil Testing Engineers, Inc. (STE) has completed the pertinent geotechnical engineering analyses for the above mentioned site. The work was authorized by River Birch Inc. in October, 1998. Our findings are discussed and presented in the attached report.

Should you have any questions or need more information, please do not hesitate to call our offices.

Sincerely,
Soil Testing Engineers, Inc.

STATE OF LOUISIANA
ZIAD H. ALEM
REG. No. 26365
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING

Ziad H. Alem, P.E.
Senior Geotechnical Engineer

Gordon P. Boutwell, Jr., P.E.
Senior Consultant

Attachments

cc: Paul Miers, P.E., Mader-Miers Engineers.

TABLE OF CONTENTS

Section			Page
1.0	**INTRODUCTION**		**1**
2.0	**BASAL HEAVE**		**2**
3.0	**SLOPE STABILITY**		**3**
	3.1	**Excavation Stability**	**4**
	3.2	**Waste Stack Stability**	**5**
	3.2.1	Phase I - Zero Consolidation	5
	3.2.2	Phase I - One-Year Consolidation	5
	3.2.3	Phase II - Three-Year Consolidation	5
	3.2.4	Phase III - Six-Year Consolidation	6
	3.2.5	Phase III - Eight-Year Consolidation	6
	3.2.6	Block Failure	6
4.0	**SETTLEMENT**		**8**
5.0	**CONCLUSIONS**		**9**

List of Attachments

1. Basal Heave Calculations
2. UTEXAS3 Sample Output File

List of Figures

60 Excavation Stability - Cell 1
61 Excavation Stability - General
62 Phase I - Zero Consolidation
63 Oxidation Pond Stability - Zero Consolidation
64 Phase I - One-Year Consolidation
65 Phase II - Three-Year Consolidation
66 Phase III - Six-Year Consolidation
67 Phase III - Eight-Year Consolidation
68 Oxidation Pond Stability - Eight-Year Consolidation
69 Block Failure
70 Settlement Contours

1.0 INTRODUCTION

Soil Testing Engineers, Inc. (STE) was retained by the River Birch Corporation in October of 1998 to provide geotechnical engineering assistance as part of the re-design of the River Birch Landfill in Avondale, Louisiana. STE's assignement was to investigate engineering concerns such as:

- basal heave to determine the minimum allowable excavation elevations (maximum depth of excavation);
- slope stability to address the stability of both excavation and waste slopes; and
- settlement to determine the loss of grade along the leachate lines due to the ensuing differential settlement.

These concerns are addressed in the following sections. Also, all the elevations mentioned in this report are relative to the National Geodetic Vertical Datum (NGVD).

2.0 BASAL HEAVE

The allowable depth of excavation is governed by several factors. Primary among these are the potential for bottom heave and the thickness of barrier clay remaining below the liner system. At a site underlain at depth by water-bearing permeable deposits, heave usually governs the depth of allowable excavation. Another consideration is control of seepage into the excavation during construction. The amount of seepage is controlled by the storativity and transmissivity of the water-bearing zone.

Soil conditions were obtained from the soil boring logs provided in the Permit Application dated October 5, 1995 and the soil behavior parameters from the provided strength data plus the cone penetrometer testing. Two water-bearing zones are identified. A shallow silt zone occurs sporadically at the site between elevations -22 feet and -8 feet. This zone consists of mostly silty soils of moderately low transmissivity. The deeper zone occurs below elevation -64 feet and is more permeable. The allowable excavation depths at the boring locations based on the shallow silt zone and deep permeable zone are presented in Attachment 1.

For excavations deeper than the allowable excavation depths governed by the shallow zone, basal heave should be controlled. This shallow silt zone is not a continuous stratum. Therefore, seepage cutoff using slurry wall technique would not be effective. The low transmissivity enables an adjustable groundwater control system by installing drains below the clay liner. The drains would lead to a sump or multiple sumps where the water can be pumped out effectively. The drains would be extended depending on the progress of the excavation. Pumping would be stopped once the liner is in place.

All design excavation depths are shallower than the maximum excavation depths dictated by the deep permable zone. Therefore, the deep permeable zone will not impact the excavation of the landfill.

3.0 SLOPE STABILITY

STE analyzed the stability of both the excavation and waste slopes in order to recommend design configurations that are considered safe under worst-case assumptions associated with the loading and waste-filling sequence. Loading and filling sequences are used in these analyses to evaluate the evolution of the strength of the underlying soils as the landfill is being loaded. This evolution is manifested as an increase in the strength of the underlying clays. This geotechnical engineering concept is explained herein.

Saturated cohesive soils undergo volume change in response to a change in stress caused by loading. This change in volume, which is caused by the squeezing of pore water out of the voids and into drainage layers and the subsequent closing of the voids, is more frequently referred to as *consolidation*; its surface manifestation is *settlement*. The rate of consolidation is related to the length of time it takes the water to leave the voids and reach the closest drainage layer. This rate of consolidation at a point in time is measured as a percent of the ultimate settlement, or the *degree of consolidation* at that specific point in time. In normally-consolidated soils, consolidation is accompanied by an increase in the strength of the consolidating soils. The amount of that increase is directly related to the degree of consolidation and is thus time-dependent:

- the amount of maximum possible strength gain increases with the applied load; and
- the amount of actual strength gain increases with time towards the maximum possible strength gain.

STE used the projected filling sequence (representing the worst-case or fastest loading scenario) to determine the gradual increase in strength of the underlying cohesive soils. STE first determined the stress distribution for the various loading configurations defined in the projected filling sequence. STE then determined the degree of consolidation at the center of any normally-consolidated cohesive layer for the duration of each specific loading configuration. The degree of consolidation is then multiplied by the stress increase due to the load to obtain the real stress change at that time. This real stress change is multiplied by the ratio of the undrained strength to the overburden pressure to determine the appropriate strength increase. The strength increase is then added to the undrained strength to determine the partially drained strength at the center of any normally consolidated cohesive unit underlying the site for the duration of a specific loading configuration.

The stability of a slope is measured by its "safety factor", which is the ratio of the soil strength forces resisting movement to the gravitattional forces tending to produce movement. Each potential failure surface has its own safety factor. Numerous potential failure surfaces are analyzed until the one having the lowest safety factor is found. The safety factor on this "critical" surface governs stability.

The strength profile from each specific loading configuration is then used to help create a slope stability analysis model for that configuration. Each model is then analyzed using the computer program UTEXAS3 to determine the most critical potential failure surface and the governing safety factor for each loading configuration.

Three initial phases are defined in the projected filling sequence plan. Phase I will cover the area of Cell 1 with waste elevations of +45 feet and a lifetime of one year. Phase II will expand Phase I to the south by approximately 600 feet with maximum waste elevations at the stack center reaching +55 feet. Phase II will reach capacity in three years after which it will be expanded to the south by approximately 800 feet to create Phase III. Waste elevations in Phase III will ultimately reach +98 feet with a lifetime of eight years. These are conservative assumptions based on worst-case (fastest anticipated) filling scenarios. Furthermore, analyzing these phases is representative of the entire landfill.

The following sections present the various waste-filling models and the corresponding most critical safety factors. A sample UTEXAS3 output file is included in Attachment 2. The various models and the corresponding most critical failure surfaces and safety factors are presented in Figures 60 through 69. During the analyses, close liaison was maintained with the designers (Mader-Miers Engineering) to ensure that the configurations were such as to maintain safety factors within acceptable ranges (1.3 - 1.5).

3.1 Excavation Stability

STE analyzed the stability of the excavation slopes. Two minimum excavation elevations (maximum depth) were considered: -11' in Phase 1 & -16' in subsequent cells. Stability analyses for the short-term should and did use the soils undrained parameters (short-term strength). The analysis revealed most critical safety factors of 1.39 and 1.30 for Cell 1 and for subsequent cells, respectively. These safety factors are considered acceptable in the short term. These factors of safety will gradually increase as the cells fill up with waste and any concern will eventually disappear. The slope stability models for the excavation slopes are presented in Figures 60 and 61. These figures also

illustrate the critical failure surfaces and their corresponding governing safety factors.

3.2 Waste Stack Stability

3.2.1 Phase I - Zero Consolidation

STE performed analyses to determine the stability of the waste slopes in Phase I assuming that no consolidation has taken place. Although this assumption is unrealistic since it implies immediate loading to +45 feet, it nevertheless provides both an understanding of the undrained soil response to the new loads and a baseline for further analyses. The most critical safety factors for the undrained case were 1.29 and 1.18 for the stability of the exterior and interior working faces, respectively. The most critical surfaces, governing safety factors, and a listing of the strength parameters used in this analysis are presented on the Phase I loading model shown in Figure 62. The stability of the waste slopes adjacent to the planned oxidation pond was also investigated and a most critical (governing) factor of safety of 1.49 calculated. The most critical surface and governing safety factor for the oxidation pond are presented in Figure 63.

3.2.2 Phase I - One-Year Consolidation

In this model, the strengths of the underlying normally-consolidated cohesive materials were modified to account for the degree of consolidation at the end of one year, which is the projected lifetime of Phase I. Slope stability analyses were then performed and most critical (governing) safety factors of 1.42 and 1.34 were calculated for the stabilities of the exterior and interior working faces, respectively. The most critical surfaces, governing safety factors, and a listing of the strength parameters used in this analysis are presented on the Phase I loading model shown in Figure 64.

3.2.3 Phase II - Three-Year Consolidation

The projected lifetime of Phase II is approximately three years. Consequently, the strength profile for this model reflects a strength increase characterized by the degree of consolidation over that period of time. Critical (governing) safety factors of 1.46 and 1.31 were calculated for the stabilities of the exterior and interior working faces, respectively. The most critical surfaces, governing safety factors, and a listing of the strength parameters used in this analysis are presented on the Phase II loading model shown in Figure 65.

3.2.4 Phase III - Six-Year Consolidation

The projected lifetime of Phase III is approximately six years (including only the interior and exterior working faces). Consequently, the strength profile for this model reflects a strength increase characterized by the degree of consolidation six years following the completion of Phase II. Critical (governing) safety factors of 1.64 and 1.31 were calculated for the stabilities of the exterior and interior working faces, respectively. The most critical surfaces, governing safety factors, and a listing of the strength parameters used in this analysis are presented on the Phase III loading model shown in Figure 66.

3.2.5 Phase III - Eight-Year Consolidation

Phase III will be completed approximately eight years following its initiation as final cover is be applied on the perimeter slopes. The waste will be placed along 6H:1V interior and exterior slopes to a maximum elevation of 75 feet, followed by a 4% climb to a maximum elevation of 98 feet at the center of the waste stack. The strength profile was consequently modified to reflect the strength increase at the end of the two additional years during which the soils were allowed to consolidate under the increased loads. Critical (governing) safety factors of 1.61 and 1.33 were calculated for the stabilities of the final cover slopes and working interior faces, respectively. The most critical surfaces, governing safety factors, and a listing of the strength parameters used in this analysis are presented on the Phase III loading model shown in Figure 67. The stability of the waste slopes adjacent to the planned oxidation pond was also investigated and a most critical factor of safety of 1.57 calculated. The most critical surface, governing safety factor, and strength parameters used for this analysis are presented in Figure 68.

3.2.6 Block Failure

The bottom liner proposed for the landfill consists of, from top to bottom: one foot of drainage sand, 60-mil high-density polyethylene (HDPE), a geosynthetic clay liner, 40-mil HDPE, and a two-foot re-compacted clay liner. The friction angles along the interfaces between the various layers range from 10 to 20 degrees. The most critical interface is the one between the GCL and the HDPE where the most critical failure surface is expected to occur. The worst-case scenario for this type of failure is when the waste reaches its maximum elevation in Phase III. The analysis for this case yielded a critical (governing) safety factor of 2.42 against a block failure along the GCL-HDPE interface under maximum waste elevations. The model and results are presented in Figure 69.

4.0 SETTLEMENT

The settlement of the underlying soils under the closed landfill loads was calculated. The purpose of this analysis is to investigate the effect of differential settlement on leachate drainage and to consequently devise a grading plan that will account for the loss of gradient at the bottom of the leachate trenches due to differential settlement. Therefore, calculations were made for the settlement at numerous locations. A settlement of approximately 14 feet is expected under the highest landfill elevation (109 feet) with a settlement of approximately three feet at the location of the leachate sumps near the edge of the landfill. The resulting differential settlement is 11 feet over a distance of approximately 1,200 feet, resulting in a loss of gradient of approximately one percent at the bottom of the leachate trenches. A settlement contour map is presented in Figure 70.

5.0 CONCLUSIONS

Geotechnical engineering analyses were performed to evaluate designs for the proposed River Birch Landfill. These analyses included basal heave, slope stability, and settlement. These analyses took into consideration the current soil and hydrologic conditions and the impacts of both construction and waste placement of the strength profile of the underlying soils. Minimum excavation elevations based on two permeable strata were determined and are tabulated in Attachment 1. Most critical safety factors from slope stability analyses assuming both current and future strength conditions were determined. Most critical failure surfaces and the corresponding governing safety factors from these analyses are presented in Figures 60 through 69. Adequate stabilities are indicated. Finally, settlement calculations provided the expected loss of gradient due to differential settlement under design elevations. A settlement contours plan is presented in Figure 70. The ultimate settlement will result in a loss of gradient of about one percent from the as-constructed drainage pipe slope, which is 1.6%. Thus, positive drainage will still be maintained.

ATTACHMENT 1

Basal Heave Calculations

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
MINIMUM EXCAVATION ELEVATIONS
SHALLOW PERMEABLE ZONE

Boring	Water Elev. (ft MSL)	Top of Zone B Elev. (ft MSL)	Mean Soil Density (pcf)	Hw (ft)	Hs (ft)	Max. Excav. Depth (ft)	Min. Excav. Elev. (ft MSL)
B-1	-2.0	-40.2	97.5	38.2	26.9	13.1	-13.3
B-2	-2.0	-42	98	40.0	28.0	12.0	-14.0
B-3	-2.0	-42.5	98	40.5	28.4	11.6	-14.1
B-4	-2.0	-33.4	96	31.4	22.5	9.5	-10.9
B-5	-2.0	-39	95	37.0	26.7	11.3	-12.3
B-6	-2.0	-27	95	25.0	18.1	7.9	-8.9
B-7	-2.0	-40.7	95	38.7	28.0	12.0	-12.7
B-8	-2.0	-22.3	96	20.3	14.5	7.5	-7.8
B-9	-2.0	-40.2	100	38.2	26.2	13.8	-14.0
B-10	-2.0	-39.9	102	37.9	25.5	14.5	-14.4
B-11	-2.0	-40.5	100	38.5	26.4	13.6	-14.1
B-12	-2.0	-41.1	95	39.1	28.3	11.7	-12.8
B-13	-2.0	-41.2	100	39.2	26.9	13.1	-14.3
B-14	-2.0	-41.4	97	39.4	27.9	12.1	-13.5
B-15	-3.0	-42.9	96	39.9	28.5	11.5	-14.4
B-16	-2.0	-41.7	97	39.7	28.1	11.9	-13.6
B-17	-2.0	-41	100	39.0	26.8	13.2	-14.2
B-18	-2.5	-41.5	98	39.0	27.3	12.7	-14.2
B-19	-3.0	-42	95.5	39.0	28.0	12.0	-14.0
B-20	-4.0	-41.6	99.5	37.6	25.9	14.1	-15.7
B-21	-3.0	-41.5	100	38.5	26.4	13.6	-15.1
B-22	-2.0	-35.3	101	33.3	22.6	11.4	-12.7
B-23	-2.0	-41.2	95	39.2	28.3	11.7	-12.9
B-24	-2.0	-23.6	95	21.6	15.6	7.9	-8.0
B-25	-2.0	-39.7	98	37.7	26.4	13.6	-13.3
B-26	-2.0	-40.8	99.5	38.8	26.8	13.2	-14.0
B-27	-2.0	-41.5	95	39.5	28.5	11.5	-13.0
B-28	-3.5	-41.4	95	37.9	27.4	12.6	-14.0
B-29	-5.0	-41.4	99	36.4	25.2	14.8	-16.2
B-30	-4.5	-41.8	105	37.3	24.4	15.6	-17.4
B-31	-5.0	-41.9	99	36.9	25.6	14.4	-16.3
B-32	-5.0	-29.4	102	24.4	16.4	11.6	-13.0
B-33	-4.0	-41.7	95	37.7	27.2	12.8	-14.5

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
MINIMUM EXCAVATION ELEVATIONS
SHALLOW PERMEABLE ZONE (CONT.)

Boring	Water Elev. (ft MSL)	Top of Zone B Elev. (ft MSL)	Mean Soil Density (pcf)	Hw (ft)	Hs (ft)	Max. Excav. Depth (ft)	Min. Excav. Elev. (ft MSL)
B-34	-3.0	-41.5	95	38.5	27.8	12.2	-13.7
B-35	-2.0	-40.7	95	38.7	28.0	12.0	-12.7
B-36	-2.0	-31.9	95	29.9	21.6	10.4	-10.3
B-37	-3.5	-40.7	103	37.2	24.8	15.2	-15.9
B-38	-4.5	-40.9	104	36.4	24.0	16.0	-16.9
B-39	-5.0	-22.8	108	17.8	11.3	10.7	-11.5
B-40	-5.0	-41.2	95	36.2	26.2	13.8	-15.0
B-41	-5.0	-40.6	95	35.6	25.7	14.3	-14.9
B-42	-4.0	-40.3	105	36.3	23.7	16.3	-16.6
B-43	-5.0	-40.6	104	35.6	23.5	16.5	-17.1
B-44	-5.0	-20.3	95	15.3	11.1	8.9	-9.2
C-1	-2.0	-40.2	100	38.2	26.2	13.8	-14.0
C-2	-2.0	-19.1	100	17.1	11.7	6.3	-7.4
C-3	-2.0	-19.25	100	17.3	11.8	5.2	-7.4
C-4	-2.0	-41.95	100	40.0	27.4	12.6	-14.5
C-5	-2.0	-17.2	100	15.2	10.4	5.6	-6.8
C-6	-2.0	-41	100	39.0	26.8	13.2	-14.2
C-7	-2.0	-33.85	100	31.9	21.9	11.1	-12.0
C-8	-2.0	-19.5	100	17.5	12.0	7.0	-7.5
C-9	-2.0	-14.2	100	12.2	8.4	5.6	-5.8
C-10	-2.0	-19.2	100	17.2	11.8	7.2	-7.4
C-11	-2.0	-19.3	100	17.3	11.9	6.6	-7.4
C-12	-2.0	-19.15	100	17.2	11.8	6.2	-7.4
C-13	-2.0	-18.3	100	16.3	11.2	5.8	-7.1
C-14	-3.0	-36.15	100	33.2	22.8	11.2	-13.4
C-15	-2.0	-41.3	100	39.3	27.0	12.0	-14.3
C-16	-2.0	-40.35	100	38.4	26.3	12.7	-14.0
C-17	-2.0	-41.25	100	39.3	26.9	13.1	-14.3
C-18	-4.0	-20.8	100	16.8	11.5	7.5	-9.3
C-19	-3.5	-38.55	100	35.1	24.1	12.9	-14.5
C-20	-2.0	-19.4	100	17.4	11.9	6.1	-7.5
C-21	-2.0	-15.3	100	13.3	9.1	4.9	-6.2
C-22	-2.0	-34.25	100	32.3	22.1	10.9	-12.1
C-23	-2.0	-40.65	100	38.7	26.5	13.5	-14.1
C-24	-2.0	-39.8	100	37.8	25.9	14.1	-13.9

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
MINIMUM EXCAVATION ELEVATIONS
SHALLOW PERMEABLE ZONE (CONT.)

Boring	Water Elev. (ft MSL)	Top of Zone B Elev. (ft MSL)	Mean Soil Density (pcf)	Hw (ft)	Hs (ft)	Max. Excav. Depth (ft)	Min. Excav. Elev. (ft MSL)
C-25	-2.0	-18.25	100	16.3	11.2	6.8	-7.1
C-26	-2.0	-34.15	100	32.2	22.1	10.9	-12.1
C-27	-3.5	-12.3	100	8.8	6.0	4.0	-6.3
C-28	-4.0	-34.4	100	30.4	20.9	12.1	-13.5
C-29	-5.0	-18.6	100	13.6	9.3	7.7	-9.3
C-30	-3.5	-14.6	100	11.1	7.6	5.4	-7.0
C-31	-5.0	-19.85	100	14.9	10.2	7.8	-9.7
C-32	-5.0	-18.55	100	13.6	9.3	7.7	-9.2
C-33	-4.0	-10.6	100	6.6	4.5	4.5	-6.1
C-34	-3.5	-10.1	100	6.6	4.5	4.5	-5.6
C-35	-3.0	-22.8	100	19.8	13.6	9.4	-9.2
C-36	-4.0	-10.3	100	6.3	4.3	5.7	-6.0
C-37	-4.5	-40.8	100	36.3	24.9	15.1	-15.9
C-38	-5.0	-21	100	16.0	11.0	9.0	-10.0
C-39	-5.0	-21.4	100	16.4	11.3	8.7	-10.1
C-40	-5.0	-8	100	3.0	2.1	3.0	-4.0
C-41	-5.0	-19.9	100	14.9	10.2	8.8	-9.7
C-42	-4.0	-18.45	100	14.5	9.9	8.1	-8.5
C-43	-3.0	-20.1	100	17.1	11.7	8.3	-8.4
C-44	-2.0	-34.45	100	32.5	22.3	11.7	-12.2

* Boring is outside the cut area.

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
MINIMUM EXCAVATION ELEVATIONS
DEEP PERMEABLE ZONE

Boring	Water Elev. (ft MSL)	Top of Zone B Elev. (ft MSL)	Mean Soil Density (pcf)	Hw (ft)	Hs (ft)	Max. Excav. Depth (ft)	Min. Excav. Elev. (ft MSL)
B-1	0.5	-75	97.5	75.5	53.2	21.6	-21.8
B-2	1.0	-75	98	76.0	53.2	19.8	-21.8
B-3	1.0	-70	98	71.0	49.7	17.8	-20.3
B-4	1.5	-73.4	96	74.9	53.6	18.4	-19.8
B-5	1.8	-70	95	71.8	51.9	17.1	-18.1
B-6	2.0	-70	95	72.0	52.0	17.0	-18.0
B-7	2.5	-70	95	72.5	52.4	16.9	-17.6
B-8	2.8	-69	96	71.8	51.3	17.4	-17.7
B-9	3.0	-67.2	100	70.2	48.2	18.8	-19.0
B-10	2.6	-70	102	72.6	48.9	21.2	-21.1
B-11	2.3	-72	100	74.3	51.0	20.5	-21.0
B-12	2.0	-70	95	72.0	52.0	16.9	-18.0
B-13	1.6	-70	100	71.6	49.1	19.7	-20.9
B-14	1.5	-70	97	71.5	50.6	18.0	-19.4
B-15	1.0	-70	96	71.0	50.8	16.3	-19.2
B-16	0.6	-70	97	70.6	50.0	18.3	-20.0
B-17	0.5	-75	100	75.5	51.8	22.2	-23.2
B-18	0.5	-65	98	65.5	45.9	17.6	-19.1
B-19	0.6	-65	95.5	65.6	47.1	15.9	-17.9
B-20	0.8	-65	99.5	65.8	45.4	18.0	-19.6
B-21	1.2	-73.5	100	74.7	51.3	20.7	-22.2
B-22	1.6	-70	101	71.6	48.7	20.0	-21.3
B-23	1.8	-75	95	76.8	55.5	18.3	-19.5
B-24	2.0	-70	95	72.0	52.0	17.9	-18.0
B-25	2.0	-75	98	77.0	53.9	21.4	-21.1
B-26	1.7	-75	99.5	76.7	52.9	21.3	-22.1
B-27	1.3	-75	95	76.3	55.1	18.4	-19.9
B-28	1.0	-70	95	71.0	51.3	17.3	-18.7
B-29	0.7	-65	99	65.7	45.6	18.0	-19.4
B-30	0.5	-63.8	105	64.3	42.0	20.0	-21.8
B-31	0.5	-65	99	65.5	45.4	17.7	-19.6
B-32	0.6	-65	102	65.6	44.1	19.5	-20.9
B-33	0.8	-101.7	95	102.5	74.1	25.9	-27.6
B-34	1.2	-80	95	81.2	58.7	19.8	-21.3

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
MINIMUM EXCAVATION ELEVATIONS
DEEP PERMEABLE ZONE (CONT.)

Boring	Water Elev. (ft MSL)	Top of Zone B Elev. (ft MSL)	Mean Soil Density (pcf)	Hw (ft)	Hs (ft)	Max. Excav. Depth (ft)	Min. Excav. Elev. (ft MSL)
B-35	1.6	-80	95	81.6	59.0	20.3	-21.0
B-36	1.4	-80	95	81.4	58.8	21.3	-21.2
B-37	1.0	-83.7	103	84.7	56.4	26.6	-27.3
B-38	0.7	-80	104	80.7	53.3	25.8	-26.7
B-39	0.5	-65	108	65.5	41.6	22.6	-23.4
B-40	0.5	-75	95	75.5	54.6	19.2	-20.4
B-41	0.6	-75	95	75.6	54.6	19.8	-20.4
B-42	0.9	-75	105	75.9	49.6	25.1	-25.4
B-43	0.5	-75	104	75.5	49.8	24.6	-25.2
B-44	0.6	-75	95	75.6	54.6	20.1	-20.4
E-1	3.0	-70	104	73.0	48.2	21.6	-21.8
E-2	0.5	-75	114	75.5	45.5	28.9	-29.5
E-3	0.5	-75	105	75.5	49.4	25.4	-25.6

* Boring is outside the cut area.

ATTACHMENT 2

UTEXAS3 Sample Output File

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP

TABLE NO. 1

```
*******************************************
* COMPUTER PROGRAM DESIGNATION - UTEXAS3 *
* Originally Coded By Stephen G. Wright  *
* Version No. 1.120                      *
* Last Revision Date 10/08/92            *
* (C) Copyright 1985-1992 S. G. Wright   *
* All Rights Reserved                    *
*******************************************
```


```
*****************************************************************
*                                                               *
*      RESULTS OF COMPUTATIONS PERFORMED USING THIS COMPUTER    *
* PROGRAM SHOULD NOT BE USED FOR DESIGN PURPOSES UNLESS THEY    *
* HAVE BEEN VERIFIED BY INDEPENDENT ANALYSES, EXPERIMENTAL      *
* DATA OR FIELD EXPERIENCE. THE USER SHOULD UNDERSTAND THE      *
* ALGORITHMS AND ANALYTICAL PROCEDURES USED IN THE COMPUTER     *
* PROGRAM AND MUST HAVE READ ALL DOCUMENTATION FOR THIS         *
* PROGRAM BEFORE ATTEMPTING ITS USE.                            *
*                                                               *
*      NEITHER THE UNIVERSITY OF TEXAS NOR STEPHEN G. WRIGHT    *
* MAKE OR ASSUME LIABILITY FOR ANY WARRANTIES, EXPRESSED OR     *
* IMPLIED, CONCERNING THE ACCURACY, RELIABILITY, USEFULNESS     *
* OR ADAPTABILITY OF THIS COMPUTER PROGRAM.                     *
*                                                               *
*****************************************************************
```


1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP

RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 2

```
**************************
```

* NEW PROFILE LINE DATA *
****

PROFILE LINE 1 - MATERIAL TYPE = 1
WASTE

Point	X	Y
1	337.000	45.000
2	1500.000	45.000

PROFILE LINE 3 - MATERIAL TYPE = 3
NON CONSOLIDATED CLAY

Point	X	Y
1	715.000	.720
2	760.000	.000
3	817.000	.000
4	877.000	-6.000

PROFILE LINE 4 - MATERIAL TYPE = 4
NON CONSOLIDATED CLAY

Point	X	Y
1	715.100	-6.000
2	877.000	-6.000
3	957.000	-14.000
4	1500.000	-14.000

PROFILE LINE 5 - MATERIAL TYPE = 5
CONSOLIDATED CLAY

Point	X	Y
1	640.000	-1.920
2	715.000	.720

3	715.100	-6.000
4	715.200	-16.000

PROFILE LINE 6 - MATERIAL TYPE = 6
CONSOLIDATED CLAY

Point	X	Y
1	565.000	-3.120
2	640.000	-1.920
3	640.100	-16.000

PROFILE LINE 7 - MATERIAL TYPE = 7
CONSOLIDATED CLAY

Point	X	Y
1	490.000	-4.320
2	565.000	-3.120
3	565.100	-6.000

PROFILE LINE 8 - MATERIAL TYPE = 8
CONSOLIDATED CLAY

Point	X	Y
1	337.000	-6.770
2	490.000	-4.320
3	490.100	-16.000

PROFILE LINE 9 - MATERIAL TYPE = 9
NON CONSOLIDATED CLAY

Point	X	Y
1	715.200	-16.000
2	1500.000	-16.000

PROFILE LINE 10 - MATERIAL TYPE = 10
CONSOLIDATED CLAY

Point	X	Y
1	640.100	-16.000
2	715.100	-16.000
3	715.200	-40.000

PROFILE LINE 11 - MATERIAL TYPE = 11
UNCONSOLIDATED CLAY

Point	X	Y
1	565.100	-16.000
2	640.100	-16.000
3	640.200	-40.000

PROFILE LINE 12 - MATERIAL TYPE = 12
CONSOLIDATED CLAY

Point	X	Y
1	490.100	-16.000
2	565.100	-16.000
3	565.200	-40.000

PROFILE LINE 13 - MATERIAL TYPE = 13
CONSOLIDATED CLAY

Point	X	Y
1	337.000	-16.000
2	490.100	-16.000

PROFILE LINE 14 - MATERIAL TYPE = 14
CONSOLIDATED CLAY

Point	X	Y
1	640.200	-40.000
2	715.200	-40.000
3	715.300	-60.000

PROFILE LINE 15 - MATERIAL TYPE = 15
CONSOLIDATED CLAY

Point	X	Y
1	565.200	-40.000
2	640.200	-40.000
3	640.300	-60.000

PROFILE LINE 16 - MATERIAL TYPE = 16
CONSOLIDATED CLAY

Point	X	Y
1	490.200	-40.000
2	565.200	-40.000
3	565.300	-60.000

PROFILE LINE 17 - MATERIAL TYPE = 17
CONSOLIDATED CLAY

Point	X	Y
1	337.000	-40.000
2	490.200	-40.000

PROFILE LINE 18 - MATERIAL TYPE = 18
OVERCONSLIDATED CLAY

Point	X	Y
1	337.000	-60.000

2 1500.000 -60.000

All new profile lines defined - No old lines retained

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 9
****
* NEW SLOPE GEOMETRY DATA *
****

All new data input - No old data retained

Slope Coordinates -

Point	X	Y
1	337.000	45.000
2	490.000	45.000
3	760.000	.000
4	817.000	.000
5	957.000	-14.000
6	1500.000	-14.000

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 3
****
* NEW MATERIAL PROPERTY DATA - CONVENTIONAL/FIRST-STAGE COMPUTATION
****

DATA FOR MATERIAL TYPE 1

WASTE

Unit weight of material = 63.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 300.000
Friction angle - - - - - - 23.000 degrees

No (or zero) pore water pressures

DATA FOR MATERIAL TYPE 3
NON CONSOLIDATED CLAY

Unit weight of material = 109.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 400.000
Friction angle - - - - - - .000 degrees

No (or zero) pore water pressures

DATA FOR MATERIAL TYPE 5
CONSOLIDATED CLAY

Unit weight of material = 102.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 302.000
Friction angle - - - - - - .000 degrees

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 6
CONSOLIDATED CLAY

Unit weight of material = 102.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 347.000
Friction angle - - - - - - .000 degrees

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 7
CONSOLIDATED CLAY

Unit weight of material = 102.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 419.000
Friction angle - - - - - - .000 degrees

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 8
CONSOLIDATED CLAY

Unit weight of material = 102.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 6860.000
Friction angle - - - - - - .000 degrees

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 9
NON CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 160.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 10
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 185.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 11
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 217.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 12
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 267.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 13
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 469.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 14
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 388.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 15

CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 402.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 16
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 424.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 17
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 514.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 18
OVER CONSOLIDATED PLEISTOCENE

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 1500.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 4
NON CONSOLIDATED CLAY

Unit weight of material = 102.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 280.000
Friction angle - - - - - .000 degrees

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

All new material properties defined - No old data retained
1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 5
****
* NEW PIEZOMETRIC LINE DATA - CONVENTIONAL/FIRST-STAGE COMPUTATIONS *
****

Line No.	Point	X	Y
1 - Unit weight of water =			62.40
1	1	337.000	-4.000
1	2	857.000	-4.000
1	3	957.000	-14.000
1	4	1500.000	-14.000

All new piezometric lines defined - No old lines retained

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT

Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP

RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 15

****
* NEW ANALYSIS/COMPUTATION DATA *
****

Circular Shear Surface(s)

Automatic Search Performed

Starting Center Coordinate for Search at -

X = 700.000
Y = 50.000

Required accuracy for critical center (= minimum spacing between grid points) = 1.000

Critical shear surface not allowed to pass below Y = -60.000

For the initial mode of search
all circles are tangent to horizontal line at -

Y = -60.000

Short form of output will be used for search

Procedure used to compute the factor of safety: SPENCER

THE FOLLOWING REPRESENT EITHER DEFAULT OR PREVIOUSLY DEFINED VALUES

Initial trial estimate for the factor of safety = 3.000

Initial trial estimate for side force inclination = 15.000 degrees
(Applicable to Spencer's procedure only)

Maximum number of iterations allowed for
calculating the factor of safety = 40

Allowed force imbalance for convergence = 100.000

Allowed moment imbalance for convergence = 100.000

Initial trial values for factor of safety (and side force inclinati
for Spencer's procedure) will be kept constant during search

Maximum subtended angle to be used for subdivision of the
circle into slices = 3.00 degrees

Depth of crack = .000

Search will be continued to locate a more critical shear
surface (if one exists) after the initial mode is complete

Depth of water in crack = .000

Unit weight of water in crack = 62.400

Seismic coefficient = .000

Conventional (single-stage) computations to be performed
UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT

Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 20

****

* SHORT-FORM TABLE FOR SEARCH WITH CIRCULAR SHEAR SURFACES *

****

Mode	Center Coordinates of Critical Circle X	Y	Radius	1-Stage Factor of Safety	Side Force Inclin.
2 Tangent Line at Y = -60.0	639.000	167.000	227.000	1.355	-3.04
3 Constant Radius of R = 227.0	632.000	173.000	227.000	1.341	-3.02
2 Tangent Line at Y = -54.0	632.000	173.000	227.000	1.341	-3.02

TABLE NO. 21

***** 1-STAGE FINAL CRITICAL CIRCLE INFORMATION *****

X Coordinate of Center - - - - - - - - 632.000
Y Coordinate of Center - - - - - - - - 173.000
Radius - - - - - - - - - - - - - - - - - 227.000
Factor of Safety - - - - - - - - - - - 1.341
Side Force Inclination - - - - - - - - -3.02

Number of circles tried - - - - - - - 141
No. of circles F calc. for - - - - - - 134

UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT

Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 26

****

* Coordinate, Weight, Strength and Pore Water Pressure *
* Information for Individual Slices for Conventional *
* Computations or First Stage of Multi-Stage Computations. *
* (Information is for the Critical Shear Surface in the *
* Case of an Automatic Search.) *

****

Slice No.	X	Y	Slice Weight	Matl. Type	Cohesion	Friction Angle	Pore Pressur
	444.5	45.0					
1	448.0	40.2	2111.4	1	300.00	23.00	.
	451.5	35.4					
2	455.2	30.7	6696.1	1	300.00	23.00	.
	458.9	26.1					
3	462.9	21.7	11644.6	1	300.00	23.00	.
	466.9	17.2					
4	471.1	13.0	16871.2	1	300.00	23.00	.
	475.2	8.8					
5	479.6	4.8	22288.7	1	300.00	23.00	.
	484.0	.8					
6	487.0	-1.6	17098.2	1	300.00	23.00	.
	489.9	-4.0					
7	489.9	-4.1	391.6	1	300.00	23.00	.
	490.0	-4.1					
8	490.0	-4.1	309.6	1	300.00	23.00	.
	490.1	-4.2					
9	490.2	-4.2	310.0	1	300.00	23.00	.
	490.2	-4.3					
10	490.2	-4.3	209.1	1	300.00	23.00	.
	490.3	-4.3					
11	495.0	-7.9	32432.2	7	419.00	.00	243.
	499.7	-11.5					
12	503.0	-13.7	25723.0	7	419.00	.00	608.
	506.3	-16.0					

13	511.3	-19.2	44450.1	12	294.81	.00	946.0
	516.3	-22.3					
14	521.5	-25.2	51338.0	12	348.08	.00	1323.8
	526.7	-28.1					
15	532.0	-30.7	57770.3	12	396.57	.00	1667.6
	537.4	-33.3					
16	542.8	-35.7	63637.2	12	440.15	.00	1976.6
	548.3	-38.0					
17	550.9	-39.0	31673.6	12	469.45	.00	2184.3
	553.5	-40.0					
18	559.1	-41.9	71020.9	16	440.79	.00	2365.9
	564.8	-43.8					
19	564.9	-43.9	1488.2	16	457.89	.00	2486.7
	565.0	-43.9					
20	565.0	-43.9	645.8	16	458.34	.00	2489.9
	565.1	-43.9					
21	565.2	-43.9	646.4	16	458.61	.00	2491.8
	565.2	-43.9					

UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 26

****
* Coordinate, Weight, Strength and Pore Water Pressure *
* Information for Individual Slices for Conventional *
* Computations or First Stage of Multi-Stage Computations. *
* (Information is for the Critical Shear Surface in the *
* Case of an Automatic Search.) *
****

Slice No.	X	Y	Slice Weight	Matl. Type	Cohesion	Friction Angle	Pore Pressure
	565.2	-43.9					
22	565.2	-44.0	127.8	16	441.36	.00	2493.0

CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 26

****

* Coordinate, Weight, Strength and Pore Water Pressure *
* Information for Individual Slices for Conventional *
* Computations or First Stage of Multi-Stage Computations. *
* (Information is for the Critical Shear Surface in the *
* Case of an Automatic Search.) *

****

Slice No.	X	Y	Slice Weight	Matl. Type	Cohesion	Friction Angle	Pore Pressur
	565.2	-43.9					
22	565.2	-44.0	127.8	16	441.36	.00	2493.
	565.2	-44.0					
23	565.3	-44.0	518.4	15	436.91	.00	2493.
	565.3	-44.0					
24	571.0	-45.6	75257.3	15	451.07	.00	2594.
	576.7	-47.2					
25	582.5	-48.5	78421.0	15	476.52	.00	2774.
	588.3	-49.8					
26	594.2	-50.8	80665.0	15	496.62	.00	2917.
	600.1	-51.7					
27	606.0	-52.4	81948.2	15	511.33	.00	3021.
	611.9	-53.1					
28	617.8	-53.5	82244.6	15	520.60	.00	3087.
	623.7	-53.8					
29	627.9	-53.9	56899.1	15	524.54	.00	3115.
	632.0	-54.0					
30	636.0	-53.9	54410.3	15	524.58	.00	3115.
	640.0	-53.9					
31	640.0	-53.9	675.2	15	523.94	.00	3111.
	640.1	-53.9					
32	640.2	-53.9	675.5	15	523.91	.00	3110.
	640.2	-53.9					
33	640.2	-53.8	467.3	15	462.94	.00	3110.
	640.3	-53.8					
34	640.3	-53.8	207.7	14	509.85	.00	3110.
	640.3	-53.8					
35	646.2	-53.5	78966.9	14	506.59	.00	3087.

	652.2	-53.1					
36	658.1	-52.4	76028.2	14	497.30	.00	3021
	664.0	-51.7					
37	669.8	-50.7	72167.3	14	482.58	.00	2917
	675.7	-49.8					
38	681.5	-48.5	67437.9	14	462.46	.00	2774
	687.3	-47.2					
39	693.0	-45.6	61908.5	14	437.00	.00	2593
	698.7	-44.0					
40	704.4	-42.1	55661.0	14	406.26	.00	2375
	710.0	-40.2					
41	710.2	-40.1	2303.0	14	388.79	.00	2252
	710.5	-40.0					
42	712.7	-39.1	20584.7	10	388.64	.00	2192
	715.0	-38.3					

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 26

****
* Coordinate, Weight, Strength and Pore Water Pressure *
* Information for Individual Slices for Conventional *
* Computations or First Stage of Multi-Stage Computations. *
* (Information is for the Critical Shear Surface in the *
* Case of an Automatic Search.) *
****

Slice No.	X	Y	Slice Weight	Matl. Type	Cohesion	Friction Angle	Pore Pressu
	715.0	-38.3					
43	715.0	-38.3	447.0	10	380.91	.00	2138.
	715.1	-38.2					
44	715.1	-38.2	413.3	10	282.87	.00	2135.
	715.2	-38.2					
45	715.2	-38.2	33.3	5	302.00	.00	2134.
	715.2	-38.2					
46	715.3	-38.2	448.3	9	355.21	.00	2133.
	715.3	-38.2					

47	720.8	-35.8	45697.0	9	334.59	.00	1986.
	726.2	-33.5					
48	731.6	-30.9	37843.4	9	291.18	.00	1679.
	736.9	-28.3					
49	742.1	-25.4	29660.1	9	242.86	.00	1336.
	747.3	-22.5					
50	752.3	-19.4	21276.1	9	189.76	.00	959.
	757.4	-16.2					
51	757.6	-16.1	594.1	9	161.01	.00	756.
	757.7	-16.0					
52	758.9	-15.2	3652.0	4	280.00	.00	701.
	760.0	-14.5					
53	764.8	-11.0	11208.5	4	280.00	.00	436.
	769.6	-7.5					
54	770.6	-6.8	1435.7	4	280.00	.00	172.
	771.6	-6.0					
55	772.9	-5.0	1377.4	3	400.00	.00	.
	774.1	-4.0					
56	776.5	-2.0	1055.7	3	400.00	.00	.
	779.0	.0					

UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 27

****
* Seismic Forces and Forces Due to Surface Pressures for *
* Individual Slices for Conventional Computations or the *
* First Stage of Multi-Stage Computations. *
* (Information is for the Critical Shear Surface in the *
* Case of an Automatic Search.) *
****

FORCES DUE TO SURFACE PRESSURES

Slice No.	X	Seismic Force	Y for Seismic Force	Normal Force	Shear Force	X	Y
1	448.0	0.	42.6	0.	0.	.0	.0
2	455.2	0.	37.9	0.	0.	.0	.0

3	462.9	0.	33.3	0.	0.	.0
4	471.1	0.	29.0	0.	0.	.0
5	479.6	0.	24.9	0.	0.	.0
6	487.0	0.	21.7	0.	0.	.0
7	489.9	0.	20.5	0.	0.	.0
8	490.0	0.	20.4	0.	0.	.0
9	490.2	0.	20.4	0.	0.	.0
10	490.2	0.	20.3	0.	0.	.0
11	495.0	0.	17.1	0.	0.	.0
12	503.0	0.	12.3	0.	0.	.0
13	511.3	0.	8.1	0.	0.	.0
14	521.5	0.	3.5	0.	0.	.0
15	532.0	0.	-.6	0.	0.	.0
16	542.8	0.	-4.2	0.	0.	.0
17	550.9	0.	-6.6	0.	0.	.0
18	559.1	0.	-8.8	0.	0.	.0
19	564.9	0.	-10.3	0.	0.	.0
20	565.0	0.	-10.3	0.	0.	.0
21	565.2	0.	-10.3	0.	0.	.0
22	565.2	0.	-10.3	0.	0.	.0
23	565.3	0.	-10.3	0.	0.	.0
24	571.0	0.	-11.6	0.	0.	.0
25	582.5	0.	-13.9	0.	0.	.0
26	594.2	0.	-15.9	0.	0.	.0
27	606.0	0.	-17.5	0.	0.	.0
28	617.8	0.	-18.8	0.	0.	.0
29	627.9	0.	-19.7	0.	0.	.0
30	636.0	0.	-20.2	0.	0.	.0
31	640.0	0.	-20.4	0.	0.	.0
32	640.2	0.	-20.4	0.	0.	.0
33	640.2	0.	-20.4	0.	0.	.0
34	640.3	0.	-20.4	0.	0.	.0
35	646.2	0.	-20.6	0.	0.	.0
36	658.1	0.	-20.7	0.	0.	.0
37	669.8	0.	-20.5	0.	0.	.0
38	681.5	0.	-20.0	0.	0.	.0
39	693.0	0.	-19.2	0.	0.	.0
40	704.4	0.	-18.0	0.	0.	.0

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF

CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 27

****

* Seismic Forces and Forces Due to Surface Pressures for *
* Individual Slices for Conventional Computations or the *
* First Stage of Multi-Stage Computations. *
* (Information is for the Critical Shear Surface in the *
* Case of an Automatic Search.) *

****

Slice No.	X	Seismic Force	Y for Seismic Force	Normal Force	Shear Force	FORCES DUE TO SURFACE PRESSURES X	Y
41	710.2	0.	-17.3	0.	0.	.0	.
42	712.7	0.	-17.0	0.	0.	.0	.
43	715.0	0.	-16.6	0.	0.	.0	.
44	715.1	0.	-16.5	0.	0.	.0	.
45	715.2	0.	-16.4	0.	0.	.0	.
46	715.3	0.	-16.5	0.	0.	.0	.
47	720.8	0.	-15.6	0.	0.	.0	.
48	731.6	0.	-13.8	0.	0.	.0	.
49	742.1	0.	-11.6	0.	0.	.0	.
50	752.3	0.	-9.2	0.	0.	.0	.
51	757.6	0.	-7.8	0.	0.	.0	.
52	758.9	0.	-7.4	0.	0.	.0	.
53	764.8	0.	-5.4	0.	0.	.0	.
54	770.6	0.	-3.4	0.	0.	.0	.
55	772.9	0.	-2.5	0.	0.	.0	.
56	776.5	0.	-1.0	0.	0.	.0	.

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 29

****

* Information Generated During Iterative Solution for the Factor *
* of Safety and Side Force Inclination by Spencer's Procedure *

****

Iteration	Trial Factor of Safety	Trial Side Force Inclination (degrees)	Force Imbalance (lbs.)	Moment Imbalance (ft.-lbs.)	Delta-F	Delta Theta (degrees
1	3.00000	-15.0000	-.3818E+05	-.3861E+07		
First-order corrections to F and THETA					-.539E+01	.215E+0
Values factored by .928E-01 - Deltas too large					-.500E+00	.199E+0
2	2.50000	-13.0061	-.3235E+05	-.3709E+07		
First-order corrections to F and THETA					-.292E+01	.163E+0
Values factored by .171E+00 - Deltas too large					-.500E+00	.280E+0
3	2.00000	-10.2070	-.2277E+05	-.3289E+07		
First-order corrections to F and THETA					-.120E+01	.100E+0
Values factored by .418E+00 - Deltas too large					-.500E+00	.420E+0
4	1.50000	-6.0047	-.5053E+04	-.1895E+07		
First-order corrections to F and THETA					-.186E+00	.317E+0
Second-order correction - Iteration 1					-.166E+00	.317E+0
Second-order correction - Iteration 2					-.166E+00	.317E+0
Second-order correction - Iteration 3					-.166E+00	.317E+0
5	1.33391	-2.8331	.1710E+03	.1312E+06		
First-order corrections to F and THETA					.752E-02	-.191E+0
Second-order correction - Iteration 1					.756E-02	-.191E+0
Second-order correction - Iteration 2					.756E-02	-.191E+0
6	1.34147	-3.0240	-.2930E-01	.2367E+03		
First-order corrections to F and THETA					.105E-04	-.342E-0
Second-order correction - Iteration 1					.105E-04	-.343E-0
7	1.34148	-3.0243	-.8789E-02	-.6803E+00		
First-order corrections to F and THETA					-.117E-06	.108E-0

Factor of Safety - - - - - - - - - 1.341
Side Force Inclination - - - - - - -3.02
Number of Iterations - - - - - - - 7
UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP

RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 38

****
* Final Results for Stresses Along the Shear Surface *
* (Results for Critical Shear Surface in Case of a Search.) *
****

SPENCER'S PROCEDURE USED TO COMPUTE FACTOR OF SAFETY
Factor of Safety = 1.341 Side Force Inclination = -3.02 Degree

-------- VALUES AT CENTER OF BASE OF SLICE---------

Slice No.	X-center	Y-center	Total Normal Stress	Effective Normal Stress	Shear Stress
1	448.0	40.2	3.7	3.7	224.8
2	455.2	30.7	438.7	438.7	362.4
3	462.9	21.7	882.0	882.0	502.7
4	471.1	13.0	1329.1	1329.1	644.2
5	479.6	4.8	1775.6	1775.6	785.5
6	487.0	-1.6	2139.9	2139.9	900.7
7	489.9	-4.1	2284.1	2284.1	946.4
8	490.0	-4.1	2289.0	2289.0	947.9
9	490.2	-4.2	2292.9	2292.9	949.2
10	490.2	-4.3	2296.3	2296.3	950.2
11	495.0	-7.9	3079.9	2836.4	312.3
12	503.0	-13.7	3609.1	3001.0	312.3
13	511.3	-19.2	4152.6	3206.6	219.8
14	521.5	-25.2	4676.8	3353.1	259.5
15	532.0	-30.7	5151.6	3484.0	295.6
16	542.8	-35.7	5574.2	3597.7	328.1
17	550.9	-39.0	5855.8	3671.5	349.9
18	559.1	-41.9	6106.7	3741.2	328.6
19	564.9	-43.9	6265.4	3778.7	341.3
20	565.0	-43.9	6269.5	3779.6	341.7
21	565.2	-43.9	6272.0	3780.2	341.9
22	565.2	-44.0	6310.1	3817.2	329.0
23	565.3	-44.0	6270.6	3776.7	325.7

24	571.0	-45.6	6403.8	3809.5	336.2
25	582.5	-48.5	6622.5	3847.7	355.2
26	594.2	-50.8	6780.2	3862.8	370.2
27	606.0	-52.4	6875.5	3853.8	381.2
28	617.8	-53.5	6907.3	3819.9	388.1
29	627.9	-53.9	6888.0	3772.7	391.0
30	636.0	-53.9	6835.2	3719.6	391.0
31	640.0	-53.9	6801.1	3690.0	390.6
32	640.2	-53.9	6800.1	3689.2	390.5
33	640.2	-53.8	6842.4	3731.8	345.1
34	640.3	-53.8	6687.0	3576.5	380.1
35	646.2	-53.5	6723.7	3636.4	377.6
36	658.1	-52.4	6542.4	3521.0	370.7
37	669.8	-50.7	6294.7	3377.6	359.7
38	681.5	-48.5	5980.3	3205.9	344.7
39	693.0	-45.6	5599.1	3005.2	325.8
40	704.4	-42.1	5151.0	2775.1	302.8

1

-------- VALUES AT CENTER OF BASE OF SLICE---------

Slice No.	X-center	Y-center	Total Normal Stress	Effective Normal Stress	Shear Stress
41	710.2	-40.1	4898.2	2646.1	289.8
42	712.7	-39.1	4781.6	2588.8	289.7
43	715.0	-38.3	4694.9	2557.0	283.9
44	715.1	-38.2	4690.8	2555.4	210.9
45	715.2	-38.2	4240.7	2106.5	225.1
46	715.3	-38.2	4700.2	2567.1	264.8
47	720.8	-35.8	4396.0	2409.2	249.4
48	731.6	-30.9	3758.1	2079.1	217.1
49	742.1	-25.4	3053.9	1717.5	181.0
50	752.3	-19.4	2283.1	1323.3	141.5
51	757.6	-16.1	1864.9	1108.9	120.0
52	758.9	-15.2	1825.4	1124.4	208.7
53	764.8	-11.0	1377.4	941.1	208.7
54	770.6	-6.8	941.6	769.5	208.7
55	772.9	-5.0	831.5	831.5	298.2
56	776.5	-2.0	502.0	502.0	298.2

CHECK SUMS - (ALL SHOULD BE SMALL)
SUM OF FORCES IN VERTICAL DIRECTION = .04 (= .368E-01)
SHOULD NOT EXCEED .100E+03
SUM OF FORCES IN HORIZONTAL DIRECTION = .12 (= .117E+00)
SHOULD NOT EXCEED .100E+03
SUM OF MOMENTS ABOUT COORDINATE ORIGIN = .29 (= .293E+00)
SHOULD NOT EXCEED .100E+03
SHEAR STRENGTH/SHEAR FORCE CHECK-SUM = .01 (= .110E-01)
SHOULD NOT EXCEED .100E+03

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 39

****

* Final Results for Side Forces and Stresses Between Slices. *
* (Results for Critical Shear Surface in Case of a Search.) *

****

SPENCER'S PROCEDURE USED TO COMPUTE FACTOR OF SAFETY
Factor of Safety = 1.341 Side Force Inclination = -3.02 Degree

---------- VALUES AT RIGHT SIDE OF SLICE ----------

Slice No.	X-Right	Side Force	Y-Coord. of Side Force Location	Fraction of Height	Sigma at Top	Sigma at Bottom
1	451.5	-1530.	40.0	.481	-140.4	-176.7
2	458.9	-167.	113.6	ABOVE	-227.6	209.9
3	466.9	3666.	17.3	.001	-262.7	526.5
4	475.2	9480.	14.4	.153	-282.4	805.7
5	484.0	16740.	9.9	.204	-292.7	1049.8
6	489.9	21857.	6.9	.223	-295.4	1186.3
7	490.0	21970.	6.9	.223	-295.4	1189.1
8	490.1	22058.	6.8	.223	-295.3	1191.4
9	490.2	22147.	6.8	.224	-295.2	1193.8
10	490.3	22207.	6.7	.224	-295.2	1195.3
11	499.7	41372.	-.4	.201	-595.8	2101.8

12	506.3	55628.	-4.1	.203	-743.4	2649.5
13	516.3	79700.	-9.1	.210	-939.3	3468.7
14	526.7	104099.	-13.4	.220	-1057.7	4161.4
15	537.4	127945.	-17.1	.230	-1123.0	4750.4
16	548.3	150417.	-20.4	.240	-1150.0	5248.9
17	553.5	160260.	-21.8	.244	-1152.5	5453.7
18	564.8	179890.	-24.6	.252	-1151.6	5857.1
19	565.0	180259.	-24.6	.252	-1151.4	5864.4
20	565.1	180419.	-24.7	.252	-1151.3	5867.6
21	565.2	180578.	-24.7	.252	-1151.1	5870.8
22	565.2	180603.	-24.7	.252	-1151.1	5871.3
23	565.3	180739.	-24.7	.252	-1151.1	5874.0
24	576.7	197363.	-27.0	.259	-1131.9	6203.9
25	588.3	210413.	-29.0	.265	-1094.5	6456.6
26	600.1	219508.	-30.5	.271	-1042.2	6634.2
27	611.9	224389.	-31.6	.277	-977.4	6738.2
28	623.7	224923.	-32.3	.282	-902.0	6769.5
29	632.0	222725.	-32.5	.286	-843.8	6748.6
30	640.0	218627.	-32.5	.289	-783.4	6695.3
31	640.1	218563.	-32.5	.289	-782.6	6694.4
32	640.2	218500.	-32.5	.289	-781.8	6693.5
33	640.3	218427.	-32.5	.289	-781.4	6692.6
34	640.3	218439.	-32.5	.289	-781.1	6692.8
35	652.2	208936.	-32.2	.294	-687.7	6558.7
36	664.0	195610.	-31.5	.299	-586.3	6353.3
37	675.7	178902.	-30.3	.305	-476.9	6076.4
38	687.3	159378.	-28.7	.311	-358.7	5727.9
39	698.7	137730.	-26.7	.318	-230.2	5307.1
40	710.0	114766.	-24.3	.327	-88.7	4813.3

1

---------- VALUES AT RIGHT SIDE OF SLICE ----------

Slice No.	X-Right	Side Force	Y-Coord. of Side Force Location	Fraction of Height	Sigma at Top	Sigma at Bottom
41	710.5	113737.	-24.2	.328	-82.0	4789.7
42	715.0	104200.	-23.1	.332	-16.8	4562.5
43	715.1	103987.	-23.1	.332	-15.3	4557.2
44	715.2	103766.	-23.0	.332	-14.1	4552.1
45	715.2	103779.	-23.0	.332	-14.0	4552.4

46	715.3	103567.	-23.0	.332	-12.5	4547.2
47	726.2	80370.	-20.0	.346	160.5	3940.3
48	736.9	58422.	-16.5	.367	362.8	3266.9
49	747.3	38903.	-12.7	.398	607.8	2544.5
50	757.4	23066.	-8.9	.441	891.7	1872.4
51	757.7	22594.	-8.8	.443	903.5	1851.7
52	760.0	19323.	-7.8	.450	905.9	1689.2
53	769.6	7714.	-3.8	.488	953.4	1097.1
54	771.6	5877.	-3.1	.491	925.3	1030.8
55	774.1	3457.	-1.9	.532	1028.8	697.1
56	779.0	0.	177.9	ABOVE	.0	.0

CHECK SUMS - (ALL SHOULD BE SMALL)

SUM OF FORCES IN VERTICAL DIRECTION = .04 (= .368E-01)
SHOULD NOT EXCEED .100E+03

SUM OF FORCES IN HORIZONTAL DIRECTION = .12 (= .117E+00)
SHOULD NOT EXCEED .100E+03

SUM OF MOMENTS ABOUT COORDINATE ORIGIN = .29 (= .293E+00)
SHOULD NOT EXCEED .100E+03

SHEAR STRENGTH/SHEAR FORCE CHECK-SUM = .01 (= .110E-01)
SHOULD NOT EXCEED .100E+03

***** CAUTION ***** FORCES BETWEEN SLICES ARE NEGATIVE AT POINTS ALONG THE UPPER ONE-HALF OF THE SHEAR SURFACE - A TENSION CRACK MAY BE NEEDED.

***** CAUTION ***** SOME OF THE FORCES BETWEEN SLICES ACT AT POINTS ABOVE THE SURFACE OF THE SLOPE OR BELOW THE SHEAR SURFACE - EITHER A TENSION CRACK MAY BE NEEDED OR THE SOLUTION MAY NOT BE A VALID SOLUTION.

END-OF-FILE ENCOUNTERED WHILE READING COMMAND WORDS - END OF PROBLEM(S) ASSUMED

ENGINEERING CALCULATIONS
FROM
MODIFICATION NO. 7

SUMMARY OF STORAGE
FOR
STORM WATER TREATMENT POND

STORAGE REQUIRED (MAX 200 ACRES ACTIVE LANDFILL)

Runoff from 100-Year Rainfall (13.0" in 24 hours) (See Hydrograph Report)	6,989,558 cu. ft.
Average Rainfall per discharge period of 45 days = (45 days)/(365 days) * (60 in./Yr) → 7.4 inches	
Average Runoff from 7.4" Rainfall (100% Runoff)	5,372,400 cu. ft.
Total storage needed for 45 day storage Annual rainfall and 100-Year Rainfall	12,361,958 cu. ft.

STORAGE PROVIDED

Normal Operation Levels (ELEV. -8 to -1) (See calculation for treatment pond size)	5,376,762 cu. ft.
High Water Storage (Elev. -1 to 5.5)	7,569,292 cu. ft.
Total Storage	12,946,054 cu. ft.

BOD/Hydraulic Loading Calculation

Calculate Volume of Runoff at Maximum Production, ie., Last Year Operation

(397 Ac. – 40 Ac. (Active)) * 82 gal/Ac/day + 40 Ac * 2226 gal/Ac/day

Volume = 29,274 gals/day + 89,040 gals/day

= 118,314 gals/day Hydraulic Load

Storage Volume between -1 depth and -8 depth = 40.2 million gallons or 340 days.
Normal storage detention time required 90 days. Hydraulic Loading O.K.

Calculate BOD Loading

(397 – 120 Ac)@1,000 mg/l + 40Ac@5,000 mg/l + 40Ac@10,000 mg/l + 40Ac @ 500 mg/l

= (277 * 82 gal/Ac/day * 1000 mg/l) + (40*82*5,000) + (40*82*10,000) + (40*2226*500)

= 116,434,000 gal/(mg/l)/day * 8.34 lbs/mil gal = 971 lbs, BOD/day

BOD Load 971 lbs/day

Required Pond Size

Available BOD Loading 50 lbs/Ac = 19.4 Ac

Hydraulic Loading 60 days at 5' depth
(118,314 gal/day) / (7.48 gal/ft^3) * (60 days) / (5' depth) / (43560 ft^2) = 4.4 Ac

Pond Sizing Governing	19.4 Ac.
Actual Pond Size	27.8 Ac.

Provide Aeration for Pond

Actual BOD Loading = (971 lbs. BOD/day) / (27.8 Ac.) = 34.9 lbs. BOD/Ac → O.K.

CALCULATIONS
FOR
SIZING OF TREATMENT POND

CONTOUR ELEVATION (MSL)	AREA (SQ. FT.)	AVERAGE AREA (SQ. FT.)	HEIGHT	STORAGE VOLUME (CU. FT.)	TOTAL STORAGE (CU. FT.)
5.5	1211025				
		1207789	0.5	603895	
5.0	1204553				603,895
		1197652	1.0	1197652	
4.0	1190750				1,801,546
		1183889	1.0	1183889	
3.0	1177027				2,985,435
		1170205	1.0	1170205	
2.0	1163382				4,155,639
		1156600	1.0	1156600	
1.0	1149817				5,312,239
		1143074	1.0	1143074	
0.0	1136331				6,455,313
		1113979	1.0	1113979	
-1.0	1091627				7,569,292
		1062091	1.0	1062091	
-2.0	1032555				8,631,383
		983911	1.0	983911	
-3.0	935267				9,615,294
		876981	1.0	876981	
-4.0	818695				10,492,275
		764015	1.0	764015	
-5.0	709335				11,256,290
		658406	1.0	658406	
-6.0	607476				11,914,695
		560889	1.0	560889	
-7.0	514302				12,475,584
		470470	1.0	470470	
-8.0	426638				12,946,054
		385071	1.0	385071	
-9.0	343504				13,331,125
		304861	1.0	304861	
-10.0	266217				13,635,986
		232314	1.0	232314	
-11.0	198411				13,868,300
		168987	1.0	168987	
-12.0	139563				14,037,287
		112499	1.0	112499	
-13.0	85434				14,149,785
		60634	1.0	60634	
-14.0	35834				14,210,419
		19323	1.0	19323	
-15.0	2812				14,229,742

HYDROGRAPH CALCULATIONS
FOR
LANDFILL AREA

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 1

RIVER BIRCH EXPANTION

Hydrograph type	= SCS Runoff	Peak discharge	= 452.84 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 200.00 ac	Curve number	= 74
Basin Slope	= 1.0 %	Hydraulic length	= 7600 ft
Tc method	= LAG	Time of conc. (Tc)	= 192.7 min
Total precip.	= 13.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 6,989,558 cuft

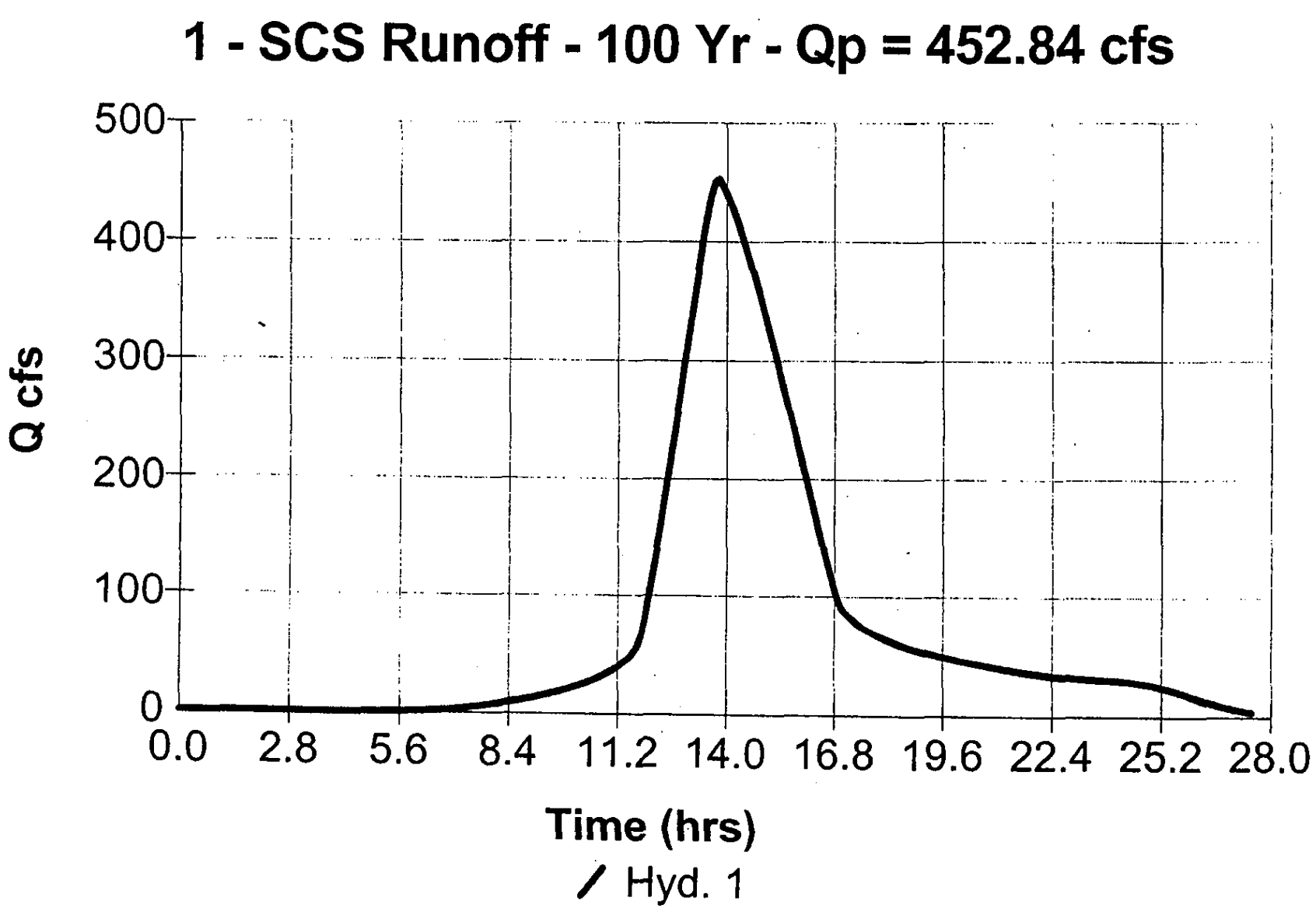
Hydrograph Discharge Table

Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)		Time -- Outflow (hrs cfs)	
7.50	4.82	10.90	33.64	14.30	415.55	17.70	70.84
7.60	5.24	11.00	35.46	14.40	405.71	17.80	69.08
7.70	5.67	11.10	37.41	14.50	395.41	17.90	67.43
7.80	6.12	11.20	39.54	14.60	384.71	18.00	65.90
7.90	6.59	11.30	41.90	14.70	373.62	18.10	64.47
8.00	7.07	11.40	44.53	14.80	362.21	18.20	63.12
8.10	7.56	11.50	47.47	14.90	350.50	18.30	61.85
8.20	8.07	11.60	51.25	15.00	338.53	18.40	60.65
8.30	8.60	11.70	56.83	15.10	326.32	18.50	59.52
8.40	9.15	11.80	65.60	15.20	313.89	18.60	58.44
8.50	9.72	11.90	80.58	15.30	301.28	18.70	57.42
8.60	10.31	12.00	100.03	15.40	288.50	18.80	56.43
8.70	10.92	12.10	120.22	15.50	275.58	18.90	55.49
8.80	11.55	12.20	141.04	15.60	262.53	19.00	54.58
8.90	12.22	12.30	162.34	15.70	249.37	19.10	53.70
9.00	12.91	12.40	184.02	15.80	236.13	19.20	52.85
9.10	13.63	12.50	205.93	15.90	222.83	19.30	52.02
9.20	14.38	12.60	227.98	16.00	209.48	19.40	51.22
9.30	15.16	12.70	250.12	16.10	196.11	19.50	50.43
9.40	15.97	12.80	272.30	16.20	182.70	19.60	49.67
9.50	16.80	12.90	294.46	16.30	169.31	19.70	48.92
9.60	17.67	13.00	316.59	16.40	155.97	19.80	48.20
9.70	18.56	13.10	338.55	16.50	142.71	19.90	47.49
9.80	19.50	13.20	360.26	16.60	129.55	20.00	46.79
9.90	20.47	13.30	381.65	16.70	116.83	20.10	46.11
10.00	21.50	13.40	402.63	16.80	105.12	20.20	45.45
10.10	22.57	13.50	422.33	16.90	95.25	20.30	44.80
10.20	23.70	13.60	439.18	17.00	89.04	20.40	44.16
10.30	24.89	13.70	450.98	17.10	85.46	20.50	43.53
10.40	26.14	13.80	452.84 <<	17.20	82.30	20.60	42.92
10.50	27.46	13.90	447.55	17.30	79.51	20.70	42.32
10.60	28.86	14.00	441.01	17.40	77.03	20.80	41.73
10.70	30.35	14.10	433.38	17.50	74.80	20.90	41.15
10.80	31.94	14.20	424.83	17.60	72.75	21.00	40.59

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Outflow cfs)	Time (hrs)	Outflow cfs)
21.10	40.03	26.20	14.31
21.20	39.49	26.30	13.30
21.30	38.96	26.40	12.34
21.40	38.45	26.50	11.41
21.50	37.94	26.60	10.51
21.60	37.46	26.70	9.66
21.70	36.99	26.80	8.84
21.80	36.54	26.90	8.06
21.90	36.11	27.00	7.32
22.00	35.69	27.10	6.61
22.10	35.30	27.20	5.94
22.20	34.92	27.30	5.31
22.30	34.56	27.40	4.71
22.40	34.22		
22.50	33.89		
22.60	33.58	*...End*	
22.70	33.28		
22.80	33.00		
22.90	32.73		
23.00	32.48		
23.10	32.23		
23.20	32.00		
23.30	31.78		
23.40	31.57		
23.50	31.37		
23.60	31.18		
23.70	31.00		
23.80	30.83		
23.90	30.66		
24.00	30.50		
24.10	30.29		
24.20	30.03		
24.30	29.72		
24.40	29.36		
24.50	28.94		
24.60	28.48		
24.70	27.96		
24.80	27.39		
24.90	26.76		
25.00	26.08		
25.10	25.35		
25.20	24.56		
25.30	23.72		
25.40	22.82		
25.50	21.88		
25.60	20.87		
25.70	19.82		
25.80	18.71		
25.90	17.55		
26.00	16.43		
26.10	15.35		


1 - SCS Runoff - 100 Yr - Qp = 452.84 cfs
Q cfs
500
400
300
200
100
0
0.0
2.8
5.6
8.4
11.2
14.0
16.8
19.6
22.4
25.2
28.0
Time (hrs)
Hyd. 1

APPENDIX D

CONSTRUCTION QUALITY ASSURANCE PLAN

CONSTRUCTION QUALITY ASSURANCE PLAN
For
LANDFILL CONSTRUCTION

RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

May 1994 by Woodward-Clyde
Revised Mod. No. 5 - January 1999 by Mader-Miers
Revised Mod. No. 6 - August 2000 by Mader-Miers

TABLE OF CONTENTS

Section

1.0 INTRODUCTION
- 1.1 PURPOSE OF PLAN
- 1.2 PLAN USERS
- 1.3 SCOPE OF CQA PLAN

2.0 RESPONSIBILITY AND AUTHORITY
- 2.1 DEFINITION OF PARTIES AND TERMS OF REFERENCE
- 2.2 PROJECT RESPONSIBILITIES
  - 2.2.1 Owner
  - 2.2.2 CQA Consultant
  - 2.2.3 Geomembrane Manufacturer
  - 2.2.4 Geosynthetics Installer
  - 2.2.5 Geosynthetics Quality Assurance Laboratory

3.0 PROJECT MEETING
- 3.1 PRE-CONSTRUCTION MEETING
- 3.2 PROGRESS MEETING
- 3.3 RESOLUTION/DEFICIENCY MEETINGS

4.0 EARTHWORK CONSTRUCTION
- 4.1 GENERAL
- 4.2 MATERIAL EVALUATION
- 4.3 CONSTRUCTION QUALITY EVALUATION
  - 4.3.1 Nuclear Gauge Calibration
  - 4.3.2 Compaction Window
- 4.4 CONSTRUCTION
- 4.5 SPECIAL TESTING
- 4.6 COHESIVE SOIL LINER PERFORATIONS
- 4.7 DEFICIENCIES
- 4.8 NOTIFICATION
- 4.9 REPAIRS AND RETESTING
- 4.10 ACCEPTANCE

5.0 GEOSYNTHETICS CONSTRUCTION QUALITY ASSURANCE

- 5.1 GENERAL
- 5.2 GEOMEMBRANE LINER
  - 5.2.1 Materials
  - 5.2.2 Transportation, Handling and Placement
  - 5.2.3 Seams
  - 5.2.4 Defects and Repairs
  - 5.2.5 Documentation of Synthetic Membrane Liner

5.3 GEOTEXTILES
5.3.1 Requirements
5.3.2 Shipment and Storage
5.3.3 Conformance Testing
5.3.4 Handling and Placement
5.3.5 Repairs
5.3.6 Placement of Soil Materials
5.4 GEONETS
5.4.1 Material
5.4.2 Placement of Synthetic Drainage Nets
5.5 HDPE RISER PIPES
5.5.1 Manufacturing
5.5.2 Shipment and Storage
5.5.3 Handling and Placement
5.5.4 Pipe Perforations
5.5.5 Liner Perforation Boots

6.0 DOCUMENTATION
6.1 DAILY SUMMARY REPORTS
6.1.1 Observation and Testing Data Sheets
6.1.2 Problems and Corrective Measures
6.1.3 Materials Reporting Forms
6.2 DESTRUCTIVE TEST REPORTS
6.3 PHOTOGRAPHIC REPORTING FORMS
6.4 DESIGN AND/OR SPECIFICATIONS CHANGES
6.5 PROGRESS REPORTS
6.6 RECORD DRAWINGS
6.7 FINAL CERTIFICATION AND SUMMARY REPORT
6.8 STORAGE OF RECORDS

LIST OF TABLES

Table 1 Preconstruction Testing Frequency for Material from Borrow Locations and Stockpiles
Table 2 Construction Testing Frequency for Earthen Material Evaluation
Table 3 Construction Testing Frequency for Construction Quality Evaluation
Table 4 Testing Frequency for Synthetic Liner Evaluation

1.0 INTRODUCTION

1.1 PURPOSE OF PLAN

This Construction Quality Assurance (CQA) plan describes the procedures for the construction and closure of the River Birch Landfill for the River Birch, Inc., Gretna, Louisiana. The construction and closure will consist of the following: (1) excavation, (2) recompaction of the clay liner, (3) placement of synthetic liner and leachate collection system, and (4) construction of the final cover for closure.

The procedures outlined are necessary to provide a level of confidence that the completed facility will meet contractual and regulatory requirements by strictly conforming to the technical specifications and present industry standards. Observations and documentation are the main emphasis of the CQA plan and implementation of these activities provide evidence that the construction was performed according to the technical specifications. These organized activities assist in identifying problems occurring during construction, and provide evidence that the problems were addressed before the construction is complete.

1.2 PLAN USERS

Everyone involved in the construction is required to be familiar with this document. All parties should review this document with particular attention to those sections applicable to their responsibilities.

1.3 SCOPE OF CQA PLAN

The procedures addressed in the CQA plan are intended to facilitate proper construction and use of materials for components of this facility.

The elements of this plan include: (1) defining the responsibility and authority of all organizations and key personnel, (2) presenting the qualifications of the CQA consultant, (3) summarizing the activities used to document the installation, (4) presenting the sampling requirements as addressed in the technical specifications, and (5) describing in detail the documentation to be completed, organized and archived.

2.0 RESPONSIBILITY AND AUTHORITY

2.1 DEFINITION OF PARTIES AND TERMS OF REFERENCE

The terms of reference are presented to define each term within the context of the CQA plan. The identity, qualifications, responsibilities and authority, regarding individuals/parties are discussed in subsequent sections of this plan.

Construction Quality Assurance. Planned and systematic procedures developed to ensure that materials and services meet the requirements of the technical specifications and comply with present industry standards. Construction quality assurance complements construction quality control. In general, CQA refers to procedures employed by the owner and the CQA consultant to

document that the completed landfill meets or exceeds design criteria and conforms to the technical specifications requirements.

Construction Quality Control. Construction quality control (CQC) provides a means to measure, regulate, and compare the characteristics of a material and/or service. CQC refers to those actions taken by the contractor(s)/manufacturer(s) to ensue that materials and workmanship meet the requirements of the technical specifications.

Owner. The individual or party who owns the facility can be either the "owner" or the "operator", i.e., the party responsible for operating the facility.

Project Engineer. An individual or firm responsible for the design and technical specifications of the facility, that fulfills the needs of the owner in terms of function and the requirements of the permitting and/or regulatory agency.

Construction Quality Assurance Consultant. The firm or individual, (CQA consultant) Responsible for observing testing and documenting activities related to CQC and CQA during the landfill construction and closure.

Project Manager. The official representative of the owner. In this plan, the term "project manager" shall mean a duly authorized employee or representative of the owner, and is the individual in charge of coordinating field activities and administering the terms of the technical specifications.

Technical Specifications. Includes all project contract documents, specifications, design drawings and any modifications approved at the pre-construction and/or other meetings.

General Contractor. The individual or firm who will perform the construction activities to meet the construction requirements.

Earthworks Contractor. The individual or firm who may subcontract the earthwork portion of the construction requirements.

Geosynthetics Installer. The individual or firm, also referred to as "installer", who may contract or subcontract the geosynthetics (i.e., geomembrane, geotextile, geonets) portion of the construction requirements.

Geosynthetics Manufacturer(s) The firm or party(ies) responsible for production of geomembrane rolls, geotextiles, and geonet drainage materials.

Geosynthetics Quality Assurance Laboratory. The firm responsible for performing testing on samples of geosynthetics for construction quality control.

2.2 PROJECT RESPONSIBLITIES

2.2.1 Owner

The owner is responsible for the design, project management and operation of the facility for which this CQA plan applies. The owner must comply with the requirements of the permitting agencies. The owner has the responsibility of ensuring that the facility was constructed, with reasonable degree of certainty, to met the design criteria, as evidenced by complete documentation of the procedures outlined in the CQA plan. The owner has the authority to select and/or dismiss parties charged with CQA and construction activities. The owner also has the authority to accept or reject CQA and CQC plans, recommendations of the CQA consultant and the materials and workmanship of the contractor(s), when such is not in conformance with the requirements of the terms and conditions of the permit. The owner/operator will provide a project manager responsible for coordinating and scheduling construction activities. The project manager will keep the project engineer informed of the construction progress.

2.2.2 CQA Consultant

The CQA consultant is accountable to the owner for providing documentation that materials and construction were in accordance with the technical specifications. The CQA consultant shall be an established professional engineering firm incorporated or registered in Louisiana. The CQA consultant is responsible for providing qualified personnel to observe and document all aspects of the landfill to certify that the construction, as observed, was performed in accordance with the technical specifications. The consultant will be responsible for conformance and CQA testing to confirm the contractors' CQC and manufacturer's quality control (QC).

The CQA consultant will provide personnel with the appropriate training and experience in order to fulfill their specific responsibilities.

CQA Officer/Certifying Engineer. The certifying engineer has overall responsibility to the owner for the technical quality of the CQA activities. The certifying engineer shall be a professional engineer registered in the State of Louisiana and with the appropriate expertise.

CQA Project Manager. The project manager will work closely with the certifying engineer and the CQA site personnel to provide overall project control for the landfill activities. He will review the technical goals, objectives and all plans, procedures and policies necessary to achieve these objectives. The project manager will monitor activities to ensure that the work performed is in accordance with schedules and will also be responsible for the overall quality of services. He will be responsible for the preparation and submittal of all project reports and deliverables to the owner and for coordinating all CQA activities with the certifying engineer.

CQA Inspector The CQA inspector, as representative(s) of the CQA consultant, shall observe and document the activities of the contractor(s) in sufficient detail and continuity to provide a level of confidence that the construction complies with the technical specifications. CQA inspectors may, as approved by the owner, have the authority to accept or reject construction not in conformance with the technical specifications. The inspector has the authority to direct the contractor(s) to test or retest to provide the required degree of certainty that the specified material properties and the design requirements are achieved.

CQA inspectors shall maintain daily reports of construction activities. These reports shall include details of visual observations of construction activities and test results as well as problems encountered and the measures taken to resolve the problems. These daily reports shall be distributed as approved in the pre-construction meeting. It is the responsibility of the CQA personnel to report any problem or deviation from the responsibility technical specifications to the owner/project engineer/project manager.

2.2.3 Geomembrane Manufacturer

The geomembrane manufacturer is responsible for the production and fabrication of geomembrane rolls and panels.

2.2.4 Geosynthetics Installer

The geosynthetics installer is responsible for the field handling, storing, placing, seaming, temporary loading and other aspects of the geosynthetics installation, including the geomembranes, geotextiles and geonets. The installer is also responsible for submitting all QC certificates including: geomembrane manufacturer, geomembrane fabricator to the owner and a detailed geomembrane panel layout in five copies, one week prior to the pre-construction meeting. The drawings submitted shall be of sufficient size and detail to distinguish the geomembrane panels and various features of the cell (anchor trench, sumps, etc.). The owner reserves the right to reject any drawings submitted and/or request additional information to be submitted to satisfy the intent of the technical specifications.

2.2.5 Geosynthetics Quality Assurance Laboratory

The geosynthetics quality assurance laboratory is responsible for conducting tests on samples of geosynthetics taken from the site.

3.0 PROJECT MEETING

3.1 PRE-CONSTRUCTION MEETING

A pre-construction meeting shall be held at the site. As a minimum the meeting shall be attended by project engineer/project manager, CQA consultant, earthworks contractor and the geosynthetics installer and subcontractors, as required.

Topics considered for this meeting include:

- Make any appropriate modifications to the CQA plan
- Review the responsibilities of each party
- Review lines of authority and communication
- Review methods for documenting reporting and for distributing documentation
- Review site safety requirements
- Establish rules for writing on the geomembrane, i.e., who is authorized to write, what can be written and in which color

- Outline procedures for packaging and storing archive samples
- Review schedule for all construction
- Conduct a site walk-around, review material storage and stockpiling locations
- Review protective methods for the geosynthetics from wind, dust control and site housekeeping
- Review methods of the geomembrane placement and numbering systems for panels and seams
- Establish procedures for the selected geomembrane seaming apparatus
- Finalize sampling procedures
- Review test procedures
- Review repair procedures

The meeting shall be documented by a person designated at the beginning of the meeting and the minutes shall be distributed to all parties.

3.2 PROGRESS MEETINGS

Daily/weekly progress meetings shall be held at the work area. Earthwork and geosynthetics contractors should attend when appropriate and requested by the Owner. These meetings shall discuss current progress, planned activities, and any new business or revisions. The CQA consultant shall document problems, decisions and questions arising at these meetings. Any matter(s) requiring action shall be reported to the appropriate parties. The general discussions in these meetings can be reported in the CQA consultant's daily reports. Specific problems/questions shall be addressed in the problem/deficiency report forms.

3.3 RESOLUTION/DEFICIENCY MEETINGS

A meeting shall be held when a problem or deficiency is present or likely to occur. At a minimum, the meeting shall be attended by the project manager and CQA consultant. The general contractor and subcontractors should attend when appropriate and when requested by the Owner. If a problem requires a design modification, the project engineer should also be present. The purpose of the meeting is to define and resolve the problem or deficiency as follows:

Define and discuss the problem or deficiency Review solutions Implement a plan to address the problem or deficiency Implement a plan so problems or deficiencies are not repeated.

The meeting shall be documented by the CQA consultant.

4.0 EARTHWORKS CONSTRUCTION

4.1 GENERAL

The clay liner must be constructed in strict accordance with the technical specifications. The earthworks contractor's compliance with the technical specifications is confirmed by checking that construction materials meet the required physical characteristics and that the established placement techniques are used. The work described in these sections will be conducted as part of the certification program. Any results of additional quality control work performed by the

contractors shall be reported to the CQA consultant by submittal of copies of the test results. It is the responsibility of the CQA consultant to report any problem or deviation from the technical specifications to the project manager.

Assurance that construction and closure of the landfill is in accordance with the technical specifications shall be accomplished by the use of quality control testing and, at the discretion of the CQA officer, quality assurance testing to verify the QC testing. Specifically, quality assurance testing shall be conducted in two categories:

- Preconstruction testing
- Construction testing

Quality assurance testing within these two categories shall consist of the following:

- Material evaluation
- Construction quality evaluation
- Hydraulic conductivity evaluation
- Special testing

Testing frequencies are presented in Tables I through 4.

4.2 MATERIAL EVALUATION

Material evaluation shall be performed on proposed sources to ascertain their acceptability as construction materials (prequalification). Additional evaluation and testing will be performed during construction to ensure that acceptable materials are used for construction. The prequalification testing requirements are summarized below, Table I presents the testing frequency to be used for prequalification. The testing frequency to be used for determination of acceptability of materials for use during construction are summarized in Table 2.

All materials not meeting the requirements of the technical specifications will be rejected, removed and replaced or reworked if possible.

The following tests shall be performed, as a minimum to facilitate material evaluation prior to and during construction.

Test	ASTM Standard Number	Minimum Acceptance Criteria
Laboratory Determination of Water (Moisture) Content of Rock and Soil Aggregate Mixtures	D2216	N/A
Particle-Size Analysis of Soils	D422	N/A
Amount of Material in Soils Finer Than the No. 200 Sieve	D1140	>50%
Liquid limit (LL) Plasticity Index (PI) of Sod	D4318	LL > 30 PI > 15
Moisture Density Relationships of Soils and Soil Aggregate Mixtures Using 5.5-pound Rammer and 12 Inch Drop (Standard Proctor)	D698	N/A
Hydraulic Conductivity Tea (Back Pressure. Saturated)	ASTM D5084	$<1x10^{-7}$ cm/sec

The hydraulic conductivity test for material evaluation shall be conducted on a sample compacted to meet the minimum allowable density and water content combination for the material. Alternatively, a "window" of allowable compaction can be determined by multiple hydraulic conductivity tests.

4.3 CONSTRUCTION QUALITY EVALUATION

Construction quality evaluation shall be performed on all components of the construction. These evaluations will become part of the certification program Criteria to be used for determination of acceptability of the clay liner construction work are summarized below.

Construction evaluation testing will include visual observations and documentation of the work, field density/moisture content determinations, surveys of finished conditions, investigations into the adequacy of layer bonding and special testing. Visual evaluation of the construction work will include, as a minimum, the following.

- Observations and documentation of the water content and other physical properties of the soil during processing placement and, compaction
- Measurement and documentation of the thickness of lifts as loosely placed and as compacted
- Observations and documentation of the action of the compaction and heavy hauling equipment on the construction surface

Determinations of hydraulic conductivity and in-place density, will be performed in accordance with the following methods:

Test	ASTM Standard Number	Minimum Acceptance Criteria
Density of Soil-In-Place by Drive Cylinder	D2937	>90% Maximum Dry Density
Density of Soil and Soil-Aggregate, In-Place, by Nuclear Methods (Shallow Depth)	D2922	>90% Maximum Dry Density
Moisture Content of Soil and Soil-Aggregate, In-Place by Nuclear Methods (Shallow Depth)	D3017	+1 to +7% Optimum Moisture[1]
Hydraulic Conductivity Test (back-pressure saturated)	D5084	$\leq 1 \times 10^{-7}$ cm/sec
Maximum Clod Size		½ lift thickness

[1] Or "Window" yielding saturation ≥85% and Hydraulic Conductivity ≤1 x 10^{-7} cm/sec.

Questions concerning the accuracy of any single test shall be addressed by retesting twice in the immediate location. The location shall be accepted if both (1) the retests pass and (2) the average of the original and retests pass. Questions concerning the suitability of the equipment shall be addressed to the owner and CQA consultant for confirmation purposes.

The general contractor shall demonstrate the adequacy of lift bonding with the use of test pits. All test pits shall be excavated in a manner acceptable to the owner. All test pits will be excavated to a width no greater than 1.5 feet. Depths of the test pits shall be no greater than 1 foot All pits shall be backfilled and compacted in accordance with specifications. Compaction shall be achieved with the use of hand compacting equipment and shall be done to the satisfaction of the owner.

Topographic surveys to determine elevations, grades, lines and locations of finished conditions shall be conducted for all components of the landfill.

4.3.1 Nuclear Gauge Calibration

During the course of liner construction, both D2937 and D2922/3017 tests shall be performed when permeability test are conducted. This will result in a rate of approximately one D2937 per nine D2922/3017 tests. If Liner Permeability Testing is reduced to 1 test per acre as outlined in Table 3. The rate of test will be one D2937 per 18 D2922/3017. The results of the two methods will be compared to verify the calibration of the D2922/3017 nuclear density gauge. This calibration sequence will be repeated if, in the opinion of the CQA Officer, the soil materials have changed significantly from those previously calibrated.

The CQA Officer shall determine the gauge calibration constants from the above and other pertinent data and shall check these calibrations periodically.

4.3.2 Compaction Window

In lieu of the water content requirement of +1 to +7 points above optimum, the CQA Officer may determine a "Window of Acceptability" using either the method in EPA/600/R-93/182 or Boutwell and Hedges, ICCSMFE, 1989. The resulting windows of acceptable water content-density combinations for each material may then be used to control compaction, except that the degree of saturation at compaction shall not be less than 85% nor the dry density less than 90% of its maximum as determined by ASTM D698 (Standard Proctor).

4.4 CONSTRUCTION

Testing frequencies for each of the quality assurance testing categories identified in Section 4.1 are summarized in Tables 1 through 3. All quality assurance testing has been related to the construction sequence. To facilitate the CQA program, the following definitions are presented.

- A layer is defined as a compacted stratum composed of several lifts to a total thickness as specified in the technical specifications.
- A lift is defined as a constructed segment of a layer composed of materials placed in approximately an 8 to 10-inch loose thickness and compacted to 6 inches.

Recompacted clay liner shall be compacted in layers of maximum compacted thickness of 6 inches. However, where recompacted clay is placed directly against a liner system component which can be damaged by compaction equipment (such as the pressure relief drain net) the compacted thickness may increase to a maximum 12 inches. When the compacted thickness of the clay increased above 6 inches test frequencies shall be increased to the same number as if 2 separate lifts were placed with compaction and permeability test being taken in both the upper and lower half of the thickened lift.

All quality assurance testing shall be conducted in accordance with this plan of as directed by the owner and or the CQA consultant. All applicable testing methods for soils as previously identified shall be observed. Documentation and reporting of test results will be in accordance with the requirements identified in Section 6.0.

Testing frequency may be changed at the discretion of the owner or CQA consultant when visual observations of construction performance indicate a potential problem. Additional testing for suspected areas shall be considered when:

- Rollers slip during rolling operation
- Lift thickness is greater than specified
- Earthfill is at improper and/or variable moisture content
- Less than specified number of roller coverages are made
- Dirt-clogged rollers are used to compact the material
- Fill materials differ substantially from those specified
- The degree of compaction is doubtful
- Rollers may not have optimum ballast, and
- Pumping of soil is encountered during compaction

All applicable test methods shall be observed. Documentation and reporting of test results shall be in accordance with the requirements identified in Section 6.0.

During construction, the frequency of testing may be increased in the following situations:

- Adverse weather conditions
- Breakdown of equipment
- At the start and finish of grading
- Materials fail to meet specifications, and
- The work area is reduced

4.5 SPECIAL TESTING

Construction evaluation involving special testing may be conducted at the direction of the owner. Special testing will be performed on samples of the clay liner or appurtenant component. Criteria to be used for the determining acceptability will be established with input from the Project Engineer.

4.6 COHESIVE SOIL LINER PERFORATIONS

All clay liner perforations will be conducted in accordance with the testing frequencies identified in the previous sections. Post construction permeability samples shall be taken such that the sample tube is inserted into the liner normal to the plane of the lift.

All liner perforations shall be backfilled with clay materials suitable for liner construction. These perforations shall include, but shall not be limited to, the following:

- Nuclear density test probe locations
- Hydraulic conductivity sampling locations
- Test pit locations

All backfill shall be broken up so that the average particle size is less than one-half the diameter of the perforation or 2 inches in diameter, whichever is smaller. All fill shall be placed in lifts equal to one-third of the thickness of the compacted cohesive soil lift and shall be recompacted using a Standard Proctor rammer or other equivalent compacting tool. The fill shall be tamped no less than 25 times until the backfill is greater than or equal to the thickness of the clay lift Small-diameter perforations may be backfilled with bentonite.

4.7 DEFICIENCIES

If a deficiency is discovered in the earthworks, the CQA consultant shall immediately determine the extent and nature of the deficiency. If the deficiency is indicated by an unsatisfactory test result overly wet soils or surface desiccation, the CQA consultant shall determine the extent of the deficient area by additional tests, observations, a review of records, or other appropriate methods.

4.8 NOTIFICATION

After determining the extent and nature of a deficiency, the CQA consultant shall notify the project manager and general or earthworks contractors and schedule appropriate retesting after the deficiency is corrected.

4.9 REPAIRS AND RETESTING

The general or earthworks contractors shall correct the deficiency to the satisfaction of the CQA consultant If a requirement cannot be met, or unusual weather conditions hinder work, then the CQA consultant shall suggest to the project manager and general or earthworks contractors solutions to obtain acceptance.

All retests performed by the general or earthworks contractors must confirm that the deficiency has been corrected before any additional work is performed in the area of the deficiency. The CQA consultant shall confirm that all installation requirements are met and that all CQC submittals are provided.

4.10 ACCEPTANCE

The CQA consultant shall recommend to the project manager acceptance of the work performed by the general or earthworks contractors when soil liner(s) and cover are completed in accordance with this technical specification. Acceptance of the soil liner(s) and cover will also be based on laboratory test results. Ibis includes that the soil liner(s) and cover meet the quality of the construction and material requirements (i.e., Atterberg Limits and permeability).

The following shall be used by the CQA consultant to judge for the acceptability of the construction of the soil liner(s) and cover.

- Evaluate the following for a given lift or section:

    - Dry density
    - Moisture content
    - Lift thickness
    - Clod size

- Compare measured results to technical specifications requirements and determine the variation
- if dry density is too low, adjust moisture content and recompact lift
- If moisture content is too low

    - Adjust moisture content upward and recompact, or
    - Run laboratory permeability on field-compacted sample. If laboratory permeability correlates to an acceptable field permeability, then accept the work

If lift is too thick:

- Decrease thickness
- Check dry density and moisture at bottom of lift, or
- Run laboratory permeability on field-compacted sample. If laboratory permeability results correlate to an acceptable field permeability, then accept the work. If the lift or section being assessed is deemed unacceptable, it shall be broken up, moisture content adjusted, recompacted and retested.

5.2.3 Seams

Individual panels of liner material shall be laid out and overlapped by at least four inches prior to welding. All areas to be welded or otherwise bonded shall be cleaned and prepared according to the procedures recommended by the material manufacturer. Approved welding processes for HDPE geomembranes are extrusion welding and hot double wedge welding.

Proposed alternate processes shall be documented and submitted for approval. When extrusion welding is used, all sheeting shall be welded together by means of integration of the extrudate bead with the lining material. The composition of the extrudate shall be identical to the lining material. Resin used for extrusion welding shall be produced from the same resin as the geomembrane. Physical properties shall be the same as those of the resin used in the manufacture of the geomembrane.

The welding equipment used shall be capable of continuously monitoring and controlling the temperatures and pressures in the zone of contact where the machine is actually fusing the lining material so as to ensure changes in environmental conditions will not affect the integrity of the weld.

No seaming should be attempted above 104° F ambient air temperature. Below 41°F ambient air temperature, preheating of the geomembrane will be required unless it is demonstrated that this is not necessary. Seaming will extend to the outside edge of panels to be placed in anchor trenches.

All areas to be seamed will be free from dirt, mud, water, etc., prior to seaming. Grinding prior to extrusion welding shall be done perpendicular to the sheet edge. Overground or improperly ground areas shall be replaced at the installer's expense. No support equipment used by the installer shall be allowed on the geomembrane. Personnel working on the geomembrane shall not smoke, wear damaging shoes, or engage in any activity that damages the geomembrane.

No "fish mouths" shall be allowed within the seam area. Where "fish mouths" occur, the material shall be cut, overlapped, and an overlap extrusion weld shall be applied.

All welds on completion of the work shall be tightly bonded. Any membrane area showing injury due to excessive scuffing, puncture, or distress from any cause shall be replaced with an additional piece of membrane.

The liner shall be sealed to all pipe penetrations. The liner shall be sealed to the pipe utilizing a prefabricated liner pipe collar for a minimum seam width of four inches and the collar damped to the pipe with pipe clamps. An adhesive recommended by the liner manufacturer shall be spread between the liner and collar prior to tightening the clamps. The base of the collar shall be seamed all around the liner. All pipe collars shall be made to the liner material.

5.0 GEOSYNTHETICS CONSTRUCTION QUALITY ASSURANCE

5.1 GENERAL

The performance of the facility is dependent upon the integrity of the geosynthetic components. Construction of each system must be in accordance with the technical specifications. The geosynthetics are an integral part of the soil liner(s), cover, leachate collection system(s). The geosynthetics for this project are:

- HDPE Geomembrane Liner(s)
- Geotextile-Filter Fabrics and Protective Cover
- HDPE Geonets (drainage nets)
- HDPE Riser Pipes

To confirm that all geosynthetic materials and installation. are in accordance with the technical specifications or as required by the owner and or the CQA consultant, manufacturing QC and CQC testing and observations shall be employed for each of the geosynthetic systems to be installed.

5.2 GEOMEMBRANE LINER

5.2.1 Materials

All test reports, material properties sheets and quality control certificates shall be supplied to the CQA consultant by the synthetic materials manufacturer prior to installation.

The quality control certificates will be reviewed by the CQA consultant to verify that a certificate has been received for all rolls.

The CQA inspector will inspect each roll of synthetic materials, prior to placement in the work to ensure that the specified material selections have been observed.

5.2.2 Transportation, Handling and Placement

Upon arrival at the site, the installer and the CQA inspector shall inspect all materials for defects in the manufacturing process and for damage during transportation. Materials judged to be severely damaged shall be rejected, marked and removed from the site. Minor damages and other defects shall be identified, marked and repaired.

The CQA inspector shall inspect each panel, after placement and prior to seaming, for damage caused by placement operations or by wind. Damaged panels or portions of damaged panels which have been rejected, as judged by the CQA consultant, shall be marked and their removal from the work area recorded.

5.2.3 Seams

Individual panels of liner material shall be laid out and overlapped by at least four inches prior to welding. All areas to be welded or otherwise bonded shall be cleaned and prepared according to the procedures recommended by the material manufacturer. Approved welding processes for HDPE geomembranes are extrusion welding and hot double wedge welding.

Proposed alternate processes shall be documented and submitted for approval. When extrusion welding is used, all sheeting shall be welded together by means of integration of the extrudate bead with the lining material. The composition of the extrudate shall be identical to the lining material. Resin used for extrusion welding shall be produced from the same resin as the geomembrane. Physical properties shall be the same as those of the resin used in the manufacture of the geomembrane.

The welding equipment used shall be capable of continuously monitoring and controlling the temperatures and pressures in the zone of contact where the machine is actually fusing the lining material so as to ensure changes in environmental conditions will not affect the integrity of the weld.

No seaming should be attempted above 104° F ambient air temperature. Below 41°F ambient air temperature, preheating of the geomembrane will be required unless it is demonstrated that this is not necessary. Seaming will extend to the outside edge of panels to be placed in anchor trenches.

All areas to be seamed will be free from dirt, mud, water, etc., prior to seaming. Grinding prior to extrusion welding shall be done perpendicular to the sheet edge. Overground or improperly ground areas shall be replaced at the installer's expense. No support equipment used by the installer shall be allowed on the geomembrane. Personnel working on the geomembrane shall not smoke, wear damaging shoes, or engage in any activity that damages the geomembrane.

No "fish mouths" shall be allowed within the seam area. Where "fish mouths" occur, the material shall be cut, overlapped, and an overlap extrusion weld shall be applied.

All welds on completion of the work shall be tightly bonded. Any membrane area showing injury due to excessive scuffing, puncture, or distress from any cause shall be replaced with an additional piece of membrane.

The liner shall be sealed to all pipe penetrations. The liner shall be sealed to the pipe utilizing a prefabricated liner pipe collar for a minimum seam width of four inches and the collar damped to the pipe with pipe clamps. An adhesive recommended by the liner manufacturer shall be spread between the liner and collar prior to tightening the clamps. The base of the collar shall be seamed all around the liner. All pipe collars shall be made to the liner material.

The installer is responsible for ensuring, and the CQA inspector will verify that:

- The seaming personnel have the required qualifications and experience
- The overlap meets the requirements
- The seaming area is clean
- Seaming equipment is available on the site and meets the project requirements
- Weather conditions for seaming are acceptable
- All seaming procedures outlined in the specifications are followed
- The panels are properly positioned to minimize wrinkling and any wrinkled areas are properly seamed
- Equipment for testing seams-is available on-site

Test seams shall be performed to verify that seaming conditions are adequate. Test seams shall be conducted at least two times each day (at the beginning of the morning and the beginning of the afternoon), for each seaming equipment and seamer used that day. Test seaming shall be performed under the same conditions as production seaming. The test seam shall be at least three feet long.

Specimens shall be cat from the test seam: These specimens shall be 0.5 inches wide. Specimens shall be tested in shear and peel, and shall not fail in the joint. If a test seam fails, the seaming equipment or product shall be rejected and not used for production seaming until the deficiencies are corrected and a successful full test seam is produced.

The CQA inspector will observe all test seams. A sample from each test seam shall be retained and labeled with the date, ambient temperature, number of seaming unit, seamer, and pass or fail description. One half of the sample shall be retained by the installer for subsequent laboratory testing and the other half retained by the owner. The samples shall be tested in accordance with the requirements for field seams.

All field seams shall be non-destructively tested over their full length. Each seam shall be numbered or otherwise designated. The location, date, test unit, name of tester, and outcome of all non-destructive testing will be recorded by the installer and given to the owner through the CQA inspector.

The CQA inspector will observe all testing. Testing shall be done as the seaming work progresses, not at the completion of all field seaming. All defects found during tests shall be numbered and marked immediately after detection. All defects found shall be repaired, retested and remarked to indicate a completion of the repair and acceptability. The testing shall be performed utilizing the appropriate ASTM (e.g., D4437) or Geosynthetics Research Institute procedures.

Destructive seam testing involves cutting out a sample of an existing seam for the purpose of verifying seam conditions through laboratory testing. Destructive seam testing frequency shall be performed as described in Table 4.

The destructive testing specimen shall be at least 24 inches in length parallel to the seam and 12 inches wide, with the seam in the middle.

Each destructive seam test sample shall be numbered. The sample number, seam number, location of sample along the seam, and the reason for the destructive seam test shall be recorded on the test sample by the CQA inspector. One half of the test sample shall be retained by the installer for subsequent laboratory testing and the other half retained by the owner. The installer shall test the sample in accordance with requirements of these specifications for field seams.

All holes remaining in the synthetic membrane after taking destructive seam samples shall be immediately repaired in accordance with repair procedures described in the specifications. The new seams in the repaired area shall be tested by non-destructive testing as outlined above.

Destructive seam test samples shall be stored and shipped in a manner which will not damage the test sample.

Tests to be performed in a laboratory are "Bonded Seam Strength" (i.e., tensile shear) and "Peel Adhesion," as recommended in the National Sanitation Foundation (NSF) Proposed Standards for synthetic membrane liners in accordance with ASTM D4437. The specific values to be obtained in these tests are the values given in this section.

All seams in special locations shall be non-destructively tested if the seam is accessible to testing equipment. If the seam cannot be tested in-place, but is accessible to testing equipment prior to final installation, it shall be observed by the CQA inspector and installer for uniformity and completeness. The seam number, date of observation, name of tester, and outcome of the test or observation shall be recorded.

The owner or its representative reserves the right of access for inspection of any or all phases of this installation.

Field seams shall meet the following specifications:

Test	ASTM Standard Number	Minimum Acceptance Criteria
Seam Strength	(ASTM D4437 as modified in NSF Appendix A)	120 lb/in. width Film Tear Bond
Peel Adhesion	(ASTM D 4437 as modified in NSF Appendix A)	Film Tear Bond (and minimum of 80 percent of sheet strength)

5.2.4 Defects and Repairs

All seam and non-seam areas of the synthetic membrane liner shall be inspected for identification of defects, holes, blisters, undispersed raw materials and any sign of contamination by foreign matter.

The surface of the synthetic membrane liner shall be clean at the time of inspection. Brooming and/or washing of the synthetic membrane liner surface shall be required if the amount of surface dust or mud inhibits inspection.

Defective seams shall be repaired by applying a cap-strip. Tears, pinholes, blisters, large holes, undispersed raw materials and contamination by foreign matter shall be repaired by patches. Each patch shall be numbered. Patches shall be round or oval in shape, made of the same synthetic membrane material and extend a minimum of 6 inches beyond the edge of defects.

The number of each patch, date, location, patcher and the outcome shall be recorded by the installer and the record provided to the CQA inspector.

5.2.5 Documentation of Synthetic Membrane Liner

The quality control certificates pertaining to raw materials and manufactured synthetic membrane rolls shall be provided by the geosynthetics manufacturer to the CQA inspector prior to installation. The CQA inspector will review the test results for completeness and for compliance with the required minimum properties for both the raw materials and manufactured synthetic membrane rolls. Materials and rolls which are in non-compliance with the minimum required properties shall be rejected, marked and removed from the site.

The installer shall provide the certification of acceptance of surface preparation to the CQA inspector prior to any synthetic membrane installation. Thereafter, the installer shall provide to the CQA inspector written acceptance daily for the surface to be covered by synthetic membrane in that day's operations.

The installer shall provide the CQA Inspector with daily reports of: (1) the total amount and locations of synthetic membrane placed; (2) total amount and locations of seams completed and seamer and units used; (3) changes in layout drawings; (4) results of test seams; (5) location and results of non-destructive testing, (6) location and results of repairs; and (7) location of destructive test samples.

The CQA inspector shall record daily all activities of the synthetic membrane installation, which shall include but not be limited to:

- Receipt of the written daily acceptance of surface preparation from the installer
- Observations of all synthetic membrane placement activities and record of defects caused during transportation and handling

- Observations of test seams, including seaming unit number, names of seamers, weather conditions and results
- Observations of anchor trench excavation, backfilling and compaction
- Observations of field seaming operations, including weather conditions, cleaning, overlaps, rate of seaming, names of seamers and units used
- Observations of Seams around appurtenances and connection to appurtenances
- Observations of non-destructive seam testing including testing location, location of defects and testing unit used
- Observations of repairs and retesting, including locations, name of repairer and seaming equipment or product used.

5.3 GEOTEXTILES

5.3.1 Requirements

The installer is responsible for providing a geotextile that meets or exceeds the requirements described in the technical specifications, including both filter fabrics and protective fabrics. The installer shall provide certification from the manufacturer that the materials used have property values which meet or exceed all values of properties
required for that type of geotextile.

The CQA consultant shall examine all manufacturers' certifications to confirm that the Property values listed meet or exceed those required. Any deviations shall be reported to the project manager.

5.3.2 Shipment and Storage

During shipment and storage, the geotextile shall be protected from ultraviolet light exposure, Precipitation, mud, dirt, dust, puncture, cutting or any other damaging or deleterious conditions. The geotextile rolls shall be shipped and stored in relatively opaque and watertight wrappings.

Wrappings protecting geotextile rolls shall be removed prior to placing the geotextile. After the wrapping has been removed, a geotextile shall not be exposed to sunlight for more than fifteen days, unless otherwise approved and guaranteed against degradation by the manufacturer.

The CQA consultant shall inspect rolls upon delivery and any deviation from the above requirements shall be reported to the project manager. Any damaged rolls shall be, rejected and replaced.

5.3.3 Conformance Testing

Upon delivery of the rolls of geotextile(s), the CQA consultant shall direct samples to be removed and forwarded to the QA laboratory for testing, as directed in the technical specifications.

As a minimum, the following tests shall be performed:

- Grab strength and elongation
- Tear strength
- Burst strength (for protective fabrics)
- Puncture strength (for protective fabrics), and
- Permeability and apparent opening size (for filter fabrics)

Unless otherwise required in the technical specifications, samples shall be taken at a rate of one per lot.

Test Results. The CQA consultant shall examine all test results and report any noncompliance to the project manager.

5.3.4 Handling and Placement

The installer shall handle and place all geotextile(s) in a manner to prevent damage of any type. The CQA consultant shall note any non-compliance and report to the project manager.

5.3.5 Repairs

Any holes or tears in the geotextile shall be repaired. Care shall be taken to remove any soil or other material which may have penetrated the geotextile. Should any tear exceed 10 percent of the width of the roll, that roll shall be removed and replaced.

5.3.6 Placement of Soil Materials

The installer/contractor shall place all soil materials on top of a geotextile in such a manner to avoid:

- Damage of the geotextile or other geosynthetics
- Slippage of the geotextile on underlying layers, and
- Excess tensile stresses in the geotextile

Unless otherwise required, soil material shall be placed as outlined in the technical specifications. Any non-compliance shall be noted by the COA consultant and reported to the project manager.

5.4 GEONETS

5.4.1 Material

Synthetic drainage net (geonet) materials shall be constructed of non-core high density polyethylene (HDPE) conforming to the following minimum material requirements.

Parameter/Test	Minimum Acceptable Criteria	ASTM Standard Number
Polymer	Polyethylene	--
Polymer Density	>.093 g/cm^3	ASTM D792 Method A
Melt Index	<0.2 g/10 min	AM D1238
Flow Capacity (with 14.5 psi loading)	>10 gal/min/ft	ASTM D3503 and 8402
Thickness	> 200 mils	ASTM D1777
Percent Carbon Black	2 to 3%	ASTM 1603
Standard Crush Strength	>100 psi	ASTM D1621

All material properties sheets, test reports and quality control certificates for the drainage net material shall be supplied to the owner through the CQA consultant prior to installation.

Raw material and sheet thickness testing by the supplier shall be in accordance with Table 4; transmissivity testing shall be one sample per lot or a maximum of 100,000 square feet installed. The transmissivity test shall model the actual boundary conditions in the design.

Upon arrival at the site, the installer and the CQA inspector shall inspect all materials for damage during transportation, loading or unloading.

The CQA inspector will inspect each roll of drainage netting prior to its use in the work to ensure the specified material selected has been delivered. Unsuitable materials shall be rejected, marked and removed from the site by the installer.

The CQA inspector will check that the materials are stored by the installer in a protected environment to prevent damage from weather or exposure to direct sunlight for periods of time exceeding the manufacturer's recommendation.

5.4.2 Placement of Synthetic Drainage Nets

Geonets shall be placed to the dimensions, cross-sections and details shown in the technical specifications. Synthetic drainage net roll lengths shall be longer than the length of the slope. If

material constraints do not permit this, drainage net field scams running across the slopes shall be constructed as per the manufacturer's recommendations.

Synthetic drainage net panel overlaps between two rolls placed end to end along the side slope shall be no less than one foot. Panels shall be physically joined by utilizing non-metallic, non-abrasive "tie-wraps" or "twist-ties" at no less than three locations per panel width or not more than three foot spacings center to center, whichever is smaller. At each location, no fewer than two connections shall be made at different points of the overlap.

Drainage net overlap between two adjacent rolls, such that the field seams run down the slope, shall be no less than six inches. Panels shall be physically joined by non-metallic, non-abrasive "tie-wraps" or "twist-ties" at spacings of no less than six feet center to center.

The CQA inspector will inspect each panel, after placement for damage caused by placement operations or by wind. Damaged panels or portions of damaged panels which have been rejected, as judged by the CQA inspector, will be marked, removed from the area, and replaced by the installer.

The installer shall ensure and the CQA inspector will also verify:

- The required field overlaps are obtained
- The panel has not shifted or moved
- Seaming equipment and supplies are available and meet the requirements of the specifications
- Weather conditions for seaming are acceptable
- Seaming procedures as outlined in the specifications are allowed

After placement, and prior to subsequent construction, the CQA inspector or his representative will verify that suitable protective measures have been taken by the installer to prevent UV degradation of in-place netting.

5.5 HDPE RISER PIPES

The HDPE riser pipes and installation methods shall be in accordance with the requirements outlined in the technical specifications. The CQA inspector shall observe all phases of pipe installation to confirm that required materials and techniques are used.

5.5.1 Manufacturing

The installer shall provide the CQA consultant with the manufacturer's guaranteed properties of the HDPE pipe to be used on this project. Material properties and dimensions shall be in accordance with the technical specifications.

The CQA consultant shall examine all pipe upon delivery and non-compliance with the requirements shall be reported to the project manager.

5.5.2 Shipment and Storage

The installer shall be responsible for all shipping and storage of the HDPE pipe. The installer is responsible to store pipe in an area where the pipe can be protected from damage. The CQA consultant shall observe the pipe prior to placement to confirm that no damage has occurred to the pipe during storage.

5.5.3 Handling and Placement

The HDPE pipe shall be installed in accordance with the technical specifications. The CQA consultant shall observe and document all pipe installation procedures and notify the installer of any procedures that are not in conformance with the technical specifications, especially alignment of pipe.

Connecting and Joining. The inside of the pipe shall be reamed smooth to provide a continuous flush surface. The pipe shall be visually inspected for smoothness to permit installation of submersible pump equipment to the lower end of the pipe without jamming.

5.5.4 Pipe Perforations

The CQA consultant shall observe the pipe-perforation to confirm that the size and spacing of the perforations are in accordance with the technical specifications.

5.5.5 Liner Perforation Boots

Liner perforation boots shall be constructed with the same material and in accordance with installation procedures for the geomembrane in order that infiltration of water between boot and pipe does not occur. The CQA consultant shall review boot details prior to installation. Seaming operations shall use the same procedures as for the geomembrane. Field testing and inspection shall be performed in the same manner where possible. Destructive test specimens will not be taken due to the nature of the fabrication of the boots. The CQA consultant shall observe the fabrication to confirm that boots are constructed in accordance with the requirements and shall notify the project manager of any deficiencies. The CQA consultant should confirm that repairs are made in accordance with the repairs for the geomembrane.

6.0 DOCUMENTATION

An effective CQA plan depends on the documentation of all construction activities that should be observed. The CQA consultant shall confirm that all CQA requirements have been addressed.

The COA consultant shall provide the project manager with signed descriptive remarks, memorandums, data sheets, and checklists to confirm that all monitoring activities have been completed. The CQA consultant shall maintain at the job site a complete set of technical specifications, a CQA plan, checklists, test procedures, daily logs, and other pertinent documents.

6.1 DAILY SUMMARY REPORTS

The CQA inspector shall complete a daily report and logs on prescribed forms using a black ink pen. This report must be completed by summarizing the daily activities and a copy submitted to

the project manager. Any matter requiring action by the project manager should be highlighted. The daily report and log shall consist of: (1) field notes, including memorandum of meetings and/or discussions with the contractor(s) or installer(s) and telephone conversation records; (2) observation and testing sheets; and (3) construction problem identification and corrective measure sheets.

6.1.1 Observation and Testing Data Sheets

Observation and testing data sheets will be prepared daily. At a minimum these sheets will include the following information:

- Identifying sheet number for cross referencing and document control
- Date, project name, location, and other identification
- Weather conditions
- A reduced-scale Site Plan showing all work areas
- Equipment and personnel in each work area, including subcontractor(s)
- Descriptions and specific locations of work being tested and/or observed
- Locations where tests and samples were taken
- Summary of test results
- Calibration or recalibration of test equipment
- Materials received, including QC documentation
- Identification of the panels/seams completed and approved, and measures taken to protect unfinished areas
- Identification of seams or panel areas requiring repairs
- Identification of repairs completed
- Decisions regarding acceptance of work and/or corrective actions taken in instances of substandard quality, and
- The CQA inspector's signature

Items above should be organized on log sheets so that none are overlooked.

6.1.2 Problems and Corrective Measures

Sheets describing construction problems shall be cross-referenced with observation and testing data sheets, and must include the following information, where available:

- Identifying number for cross-referencing and document control
- Detailed description of the problem or deficiency
- The location and probable cause of the problem or deficiency
- How and when the problem or deficiency was found or located
- Documentation of the response(s)
- Final results of any response(s)
- Measures taken to prevent a similar situation from occurring in the future, and
- The signature of the CQA consultant/inspector and project manager indicating concurrence -

A summary of all supporting data sheets, along with test results and the CQA consultant's approval of the work, shall be required upon completion of construction.

6.1.3 Materials Reporting Forms

During construction, the contractor shall submit CQA data. All data shall be summarized on the daily test summary form in addition to the CQA data sheets for each individual test. This summary shall be submitted daily for work completed the previous day.

Laboratory testing for material characterization of cohesive and non-cohesive materials shall be summarized by the contractor on a weekly basis. This summary of information will be provided on the summary of laboratory test results form.

6.2 DESTRUCTIVE TEST REPORTS

The destructive test reports from all sources shall be collected by the CQA consultant. This includes field tests, installer's laboratory tests, and geosynthetics QA laboratory tests. A log of test samples results should be prepared by the CQA consultant on an ongoing basis, and submitted with the progress reports.

6.3 PHOTOGRAPHIC REPORTING FORMS

Photographic reporting when used, shall be cross-referenced with observation and test data sheet(s) and/or construction problem and solution data sheet(s).

These photographs will serve as a pictorial record of work progress, problems, and mitigating activities. The basic file will contain color prints; negatives will also be stored in a separate file in chronological order. These records shall be presented to the project manager upon completion of the project

6.4 DESIGN AND/OR SPECIFICATIONS CHANGES

Design and/or specifications changes may be required during construction. In such cases, the CQA consultant shall notify the project manager and project engineer. Design and/or specifications changes shall be made only with written agreement of the project manager and the project engineer, and shall take the form of an addendum to the technical specifications and CQA plan.

6.5 PROGRESS REPORTS

The CQA consultant shall prepare a progress report once every two weeks, or at time intervals established at the pre-construction meeting. As a minimum, this report shall include the following information:

- Identifying number for cross-referencing and document control
- The date, project name, location, and other information
- Summary of work activities during progress reporting period
- Summary of construction problems, deficiencies
- Summary of weather conditions
- Brief description of activities anticipated for the next reporting period
- Signature of the CQA consultant

6.6 RECORD DRAWINGS

Drawings will be prepared under the direction of the CQA consultant. At a minimum, the drawings should include the following information:

- Top dimensions of each layer of backfill with spot elevations
- Location and details of the earthwork construction including depths, plan dimensions, elevations, soil components, thickness', etc.
- Location, as closely as possible, of each panel relative to the surveyors plan (furnished by the owner)
- Identification of all seams and panels with appropriate identification codes
- Location of major patches and repairs
- Location of all destructive testing samples

The drawings shall address each of the soil and geomembrane layers and, if necessary, another drawing shall identify problem or unusual conditions of the geotextile or geonet layers. In addition, applicable cross-sections shall show layouts of geonets or geotextiles which differ from the technical specifications.

6.7 FINAL CERTIFICATION AND SUMMARY REPORT

A final certification report shall be submitted upon completion of the work. This report shall include all reports prepared by the CQA consultant, summarizing the activities of the project, and the documentation for all aspects of the CQA plan performed. The final certification report shall include as a minimum the following information:

- Personnel involved with project
- Scope of work
- Outline of project
- CQA methods
- Test results (destructive and non-destructive, including laboratory tests)
- Certification sealed and signed by a registered professional engineer

The summary report, prepared by the CQA consultant, shall also verify that construction was done in substantial compliance with the project drawings project specifications and the CQA plan.

6.8 STORAGE OF RECORDS

All originals, especially those containing signatures, should be stored by the owner/project manager in a safe repository on site. Other reports may be stored by any standard method which will allow for easy access.

TABLE 1

PRECONSTRUCTION TESTING FREQUENCY FOR
MATERIAL FROM BORROW LOCATIONS AND STOCKPILES

Material	Frequency of Test
Clay Liner*	1 minimum/material type (1/5,000 yd^3)
Stone and Sand***	1 minimum/material type (1/5,000 ft^2 per 1 ft layer)

NOTES:
* Tests include ASTM D698, D1140, D2216, D5084 and D4318
** Tests include ASTM D422.

ASTM D698	Moisture Density Relationships of Soils and Soil Aggregate Mixtures Using 5.5 pound Rammer and 12-inch drop (Standard Proctor)
ASTM D1140	Amount of Material in Soils Finer that the No. 200 Sieve
ASTM D2216	Laboratory Determination of Water (Moisture) Content of Soil, Rock and Soil Aggregate Mixtures
ASTM D4318	Liquid Limit, Plastic Limit and Plasticity Index of Soil
ASTM D422	Particle-size Analysis of Soils
ASTM D5084	Permeability

TABLE 2

CONSTRUCTION TESTING FREQUENCY FOR
EARTHEN MATERIAL EVALUATION

Material	Frequency of Test
Stone and Sand*	1 per 5,000 sq.ft. per 1 ft. layer
Clay Liner **	1 per 5,000 cu.yd.

NOTES:

* Tests include ASTM D422
** Tests include ASTM D1140, D2216 and D4318

ASTM D422	Particle-size analysis of soils
ASTM D4318	Liquid Limit, Plastic Limit and Plasticity Index of Soil
ASTM D1140	Amount of Material in soils finer than the No. 200 sieve
ASTM D2216	Laboratory Determination of Water (Moisture) Content of Soil, Rock and Soil Aggregate Mixtures

TABLE 3

CONSTRUCTION TESTING FREQUENCY FOR
CONSTRUCTION QUALITY EVALUATION

Activity	Frequency of Test
Visual Observations	Full time
Clay Liner Density*	1 per 2,500 sq.ft.
Clay Liner Permeability**	1 per 22,000 sq.ft./lift or minimum 1 per lift. Can reduce to 1 per 43,560 sq.ft./lift if less than 1% of samples fail.
Surveys • As-built condition • Elevation Monitoring	• All appurtenant components • 50 feet center to center of minimum 6 points per grade at a minimum of the following locations: - Base of Elevation - Top of primary clay liner - Top of protective layer - Top of graded waste - Top of compacted clay cap - Top of clay cover soil - Top of topsoil - As directed by owner or its representative
Layer Bonding Compacted Clay Material	2 test pits per lift

NOTES:

* Tests include ASTM D2922 and D3017 or D2937.
** Tests include ASTM D1140, D2216, D5084 and D4318; three samples per test will be taken.

ASTM D2922	Density of Soil and Soil-Aggregate, In-Place, by Nuclear Methods (Shallow Depth)
ASTM D3017	Moisture Content of Soil and Soil-Aggregate, In-Place, by Nuclear Methods (Shallow Depth)
ASTM D2937	Density of Soil In-Place by Drive Cylinder
ASTM D1140	Amount of Material in Soils Finer than the No. 200 Sieve
ASTM D2216	Laboratory Determination of Water (Moisture) Content of Soil, Rock and Soil Aggregate Mixtures
ASTM D4318	Liquid Limit, Plastic Limit and Plasticity Index of Soil

TABLE 4

TESTING FREQUENCY FOR
SYNTHETIC LINER EVALUATION

RAW MATERIALS EVALUATION

Program	Frequency
Specific Gravity-ASTM D1505.68 or ASTM D792, Method A	1 per batch
Melt Index-ASTM D1238 Procedure A, Cond. E and F	1 per batch
Low Temperature Brittleness-ASTM D746 Provision B	1 per batch

ROLL EVALUATION

Program	Frequency
Sheet Thickness	Continuous
Other Specification Properties*	Continuous
Resistance to Soil Burial and Environmental Stress Crack (D1693)	**

CONSTRUCTION QUALITY EVALUATION

Program	Frequency
Seams-Non-Destructive	Continuous
Seams-Destructive***	1/500 ln.ft.

* Tests are D6693 (tensile properties), D746, D1004-DieC, D1204, D1603, D1693, ISO13949, FTMS 101B/2065.

** Each of these tests shall be conducted on a sample obtained at the start of the production for the project. The properties will be certified for the entire production run.

*** Tests include ASTM D4437 as modified in NSF Appendix A and ASTM D4437 as modified in NSF Appendix A.

APPENDIX E

CLOSURE – POST CLOSURE PLAN AND COST

CLOSURE COST ESTIMATE
RIVER BIRCH LANDFILL

	Closure Tasks	Unit	Unit Cost	Quantity	Cost
I	**CAP INSTALLATION**				
	Recompacted Clay (2')	Cu.yd.	$ 3.50	460,000	$ 1,610,000
	Geosynthetics	Sq.yd.	$ 4.50	677,600	$ 3,049,200
	Gas Collection Pipe	Ln. Ft.	$ 22.00	8,636	$ 189,992
	Gas Vents	Each	$ 2,000.00	70	$ 140,000
	Monitoring Gas Vents	Each	$ 800.00	28	$ 22,400
	Top Soil	Cu.yd.	$ 3.50	230,384	$ 806,344
	Vegetation	Acre	$ 1,500.00	140	$ 210,000
	TOTAL CAP INSTALLATION				$ 6,027,936
II	**OVERSIGHT**	Days	$ 300.00	180	$ 54,000
III	**CERTIFICATION**	Report	$ 20,000.00	1	$ 20,000
	SUBTOTAL				$ 6,101,936
	CONTINGENCY (10%)				$ 610,194
	TOTAL				$ 6,712,130

LANDFILL
POST-CLOSURE COST ESTIMATE

	Post-Closure Task	Unit	Quantity	Unit Cost	Frequency	Cost	Annual Cost
I	CAP MAINTENANCE						
	Inspection	Day	1	$450.00	4	$1,800.00	
	Routine Maintenance (Approx. 10% per year)	Acre	20	$150.00	1	$3,000.00	
	Mowing	Acre	221	$15.00	2	$3,315.00	
	Repairs	Cu.yd.	400	$15.00	1	$6,000.00	
					TOTAL ANNUAL CAP MAINTENANCE		$14,115
II	**LEACHATE COLLECTION SYSTEM MAINTENANCE**						
	Inspection and Maintenance	Day	1	$300.00	12	$3,600.00	
	Leachate Pump Maintenance (20% of pumps each year)	pump	12	$500.00	1	$6,000.00	
	Electrical Cost for Pump Maintenance	Month	12	$300.00	1	$3,600.00	
	Treatment Pond	Discharge	1	$500.00	12	$6,000.00	
				TOTAL ANNUAL LEACHATE COLLECITON SYSTEM MAINTENANCE			$19,200
III	**GAS COLLECTION AND MONITORING PROGRAM**						
	Inspection and Monitoring	Day	1	$450.00	4	$1,800.00	
	Maintenance	Each	1	$450.00	24	$10,800.00	
	Gas Flare Operation	Annual	1	$5,000.00	1	$5,000.00	
					TOTAL ANNUAL GAS COLLECTION SYSTEM		$17,600
IV	**GROUNDWATER MONITORING**						
	Sampling and Analysis (Assuming 15 wells)	Well	15	$1,250.00	2	$37,500.00	
	Maintenance	Well	15	$100.00	2	$3,000.00	
					TOTAL ANNUAL GROUNDWATER MONITORING SYSTEM		$40,500
V	**LANDFILL OPERATOR**	person	1	$50,000.00	1	$50,000.00	$50,000
						SUBTOTAL	$141,415
						CONTINGENCY (10%)	$14,142
						TOTAL ANNUAL COST	$155,557
						TOTAL 30 YEAR COST	$4,666,695

LEACHATE TREAMENT POND CLOSURE COST
RIVER BIRCH LANDFILL

POST CLOSURE TASK	UNIT	QUANTITY	UNIT PRICE	EXTENSION
Remove Sludge	Cu.yd.	25,700	$5.00	$ 128,500
Remove Cover Soil and Contaminated Material	Cu.yd.	51,420	$5.00	$ 257,100
Fill Pond Area with On-Site Clay	Cu.yd.	300,000	$3.50	$ 1,050,000
Seed Area	Acre	12	$1,000.00	$ 12,000
TOTAL				$ 1,447,600

P.O. Box 697
Harvey, La. 70059
504-366-2355

River Birch Incorporated

May 30, 2007

Department of Environmental Quality
Municipal and Waste Permits
P.O. Box 82135
Baton Rouge, La. 70884

Re: Financial Assurance for River Birch Landfill - P-0321

AI # 32219

Dear Sir:

River Birch Incorporated established a Trust Fund as required by the Louisiana Department of Environmental Quality to account for the Closure and Post Closure cost associated with the River Birch landfill. Annually, as of April 30th of each year, the Company calculates its required contribution as set forth in the regulations prescribed by the LDEQ.

Enclosed are the calculations as of April 30, 2007. In accordance with the regulations, River Birch will deposit $319,353 into the Trust fund. The Trust Fund established by River Birch is administered by Capital One Bank and the LDEQ is the beneficiary of the Trust.

Sincerely,

Dominick J Fazzio
Chief Financial Officer

Remaining Life Calculation			Adjustment 2004	April 30, 2006 Totals	April 30, 2007 Totals
Total volume	19,700,000	19,700,000	30,300,000	50,000,000	50,000,000
Less: Usage 7/99 thru 4/02	(2,210,771)	(3,126,899)		(3,126,899)	(3,126,899)
Less: Usage 5/03 thru 4/04				(930,544)	(930,544)
Less: Usage 5/04 thru 4/05				(1,050,433)	(1,050,433)
Less: Usage 5/05 thru 4/06				(1,158,819)	(1,158,819)
Less: Usage 5/06 thru 4/07					(1,510,202)
Available volume	17,489,229	16,573,101		43,733,305	42,223,103
Average annual tonnage	900,000	900,000		1,100,000	1,100,000
Remaining life based on Average Tons/Year	19.43	18.41		39.76 Years	38.38 Years

CapitalOne
private client group

River Birch, Inc. Trust Summary
April 1, 2007 - April 30, 2007

Account Number: 41-9858-00-6

Account Manager:

Colleen M McCarthy (504) 533-3406

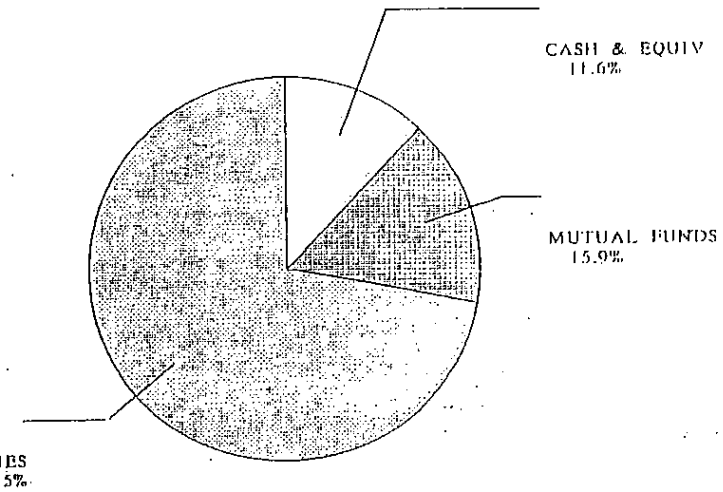
RIVER BIRCH, INC.
ATTN: PRESIDENT
P. O. BOX 1938
GRETNA LA 70054-1938

Account Review

Your Beginning Market Value:	$ 6,031,855.87
Income Earned :	$ 8,684.12
Contributions :	$ 25,000.00
Withdrawals :	$ -40,225.00
Realized Gains/Losses :	$ -17,267.15
Market Appn/Depn :	$ 201,038.25
Your Ending Market Value :	$ 6,209,086.09

-25000 = 15225

Portfolio Summary



Bureau of Economic Analysis
National Income and Product Accounts Table

Table 1.1.9. Implicit Price Deflators for Gross Domestic Product

[Index numbers, 2000=100] Seasonally adjusted

Today is: 5/30/2007 Last Revised on April 27, 2007 Next Release Date May 31, 2007

Line		2006 I	2006 II	2006 III	2006 IV
1	**Gross domestic product**	114.951	115.887	116.420	116.895
2	**Personal consumption expenditures**	113.436	114.564	115.232	114.957
3	Durable goods	89.389	89.210	88.970	88.370
4	Nondurable goods	113.466	115.750	116.423	114.122
5	Services	119.185	120.051	120.953	121.816
6	**Gross private domestic investment**	112.797	113.644	113.777	114.690
7	Fixed investment	113.219	114.056	114.205	115.156
8	Nonresidential	105.459	106.255	106.490	107.310
9	Structures	145.685	149.434	151.374	153.403
10	Equipment and software	93.889	93.922	93.706	94.196
11	Residential	130.724	131.654	131.613	132.870
12	Change in private inventories	---	---	---	---
13	**Net exports of goods and services**	---	---	---	---
14	Exports	110.720	112.383	113.614	113.361
15	Goods	109.176	110.836	112.271	112.284
16	Services	114.420	116.087	116.803	115.884
17	Imports	113.890	116.581	118.116	115.475
18	Goods	112.297	115.162	116.789	113.695
19	Services	122.243	123.892	124.877	124.905
20	**Government consumption expenditures and gross investment**	124.784	126.254	127.143	127.724
21	Federal	123.715	124.865	125.475	125.489
22	National defense	124.746	125.999	126.707	126.601
23	Nondefense	121.783	122.733	123.151	123.402
24	State and local	125.428	127.090	128.142	129.057
	Addendum:				
25	Gross national product	114.942	115.879	116.414	116.889

115.226 1/2007

112.797 1/2006

2.429

2.15%
INCREASE

Bureau of Economic Analysis
National Income and Product Accounts Table

Table 1.1.9. Implicit Price Deflators for Gross Domestic Product

[Index numbers, 2000=100] Seasonally adjusted

Today is: 5/30/2007 Last Revised on April 27, 2007 Next Release Date May 31, 2007

Line		2007 I
1	**Gross domestic product**	**118.041**
2	**Personal consumption expenditures**	**115.908**
3	Durable goods	87.960
4	Nondurable goods	115.538
5	Services	122.882
6	**Gross private domestic investment**	[illegible]
7	Fixed investment	115.652
8	Nonresidential	107.787
9	Structures	153.502
10	Equipment and software	94.774
11	Residential	133.401
12	Change in private inventories	---
13	**Net exports of goods and services**	---
14	Exports	114.369
15	Goods	113.352
16	Services	116.739
17	Imports	115.841
18	Goods	114.032
19	Services	125.430
20	**Government consumption expenditures and gross investment**	**129.571**
21	Federal	127.547
22	National defense	128.573
23	Nondefense	125.637
24	State and local	130.779
	Addendum:	
25	Gross national product	---

APPENDIX F, ATTACHMENT 2
RIVERBIRCH LANDFILL
CLOSURE COST ESTIMATE

APPROXIMATELY 140 ~~40~~ ACRES

Closure Tasks	Unit	Unit Cost	Quantity	Cost
CAP INSTALLATION				
Recompacted Clay (2')	Cu.yd.	~~$12.00~~ ~~$4.00~~	~~140,000~~ 460,000	~~$1,680,000.00~~ $1,840,000.00
Geosynthetics	Sq.yd.	~~$9.00~~ $4.50	~~220,000~~ 677,600	~~$2,178,000.00~~ $3,049,200.00
Gas Collection Pipe	Ln. Ft..	~~$12.00~~ $22.00	~~900~~ 8,636	~~$10,800.00~~ $189,992.00
Gas Vents	Each	$2,000.00	~~20~~ 70	~~$40,000.00~~ $140,000.00
Monitoring Gas Vents	Each	$800.00	~~8~~ 28	~~$6,400.00~~ $22,400.00
Top Soil	Cu.yd.	~~$12.00~~ ~~$4.00~~	~~35,000~~ 230,384	~~$420,000.00~~ $921,536.00
Vegetation	Acre	$1,500.00	~~40~~ 140	~~$60,000.00~~ $210,000.00
TOTAL CAP INSTALLATION				~~$4,459,200.00~~ $6,373,128.00
OVERSIGHT	Days	$300	180	$54,000.00
CERTIFICATION	Report	~~$10,000~~ $20,000	1	~~$10,000.00~~ $20,000.00
SUBTOTAL				~~$4,459,200.00~~ $6,447,128.00
CONTINGENCY (10%)				~~$445,920.00~~ $644,712.80
TOTAL				~~$4,905,120.00~~ $7,091,840.80

ATTACHMENT 3
POST-CLOSURE COST ESTIMATE

Post-Closure Task	Unit	Quantity	Unit Cost	Frequency	Cost	Annual Cost
CAP MAINTENANCE						
Inspection	Day	1	$450.00	4	$1,800	
Routine Maintenance (Approx. 10% per year)	Acre	~~24~~ 40	$150.00	1	~~$3,600~~ $6,000	
Mowing	Acre	~~243~~ 399	$15.00	2	~~$7,290~~ $11,970	
Repairs	Cu.yd.	~~400~~ 800	$15.00	1	~~$6,000~~ $12,000	
				TOTAL ANNUAL CAP MAINTENANCE		~~$18,690~~ $31,770
LEACHATE COLLECTION SYSTEM MAINTENANCE						
Inspection and Maintenance	Day	1	~~$300~~	12	$3,600	
Leachate Pump Maintenance (20% of pumps each year)	pump	12	$500	1	$6,000	
Electrical Cost for Pump Maintenance	Month	12	$300.00	1	$3,600	
Treatment Pond	~~Discharge~~	1	~~$500~~	12	$6,000	
				TOTAL ANNUAL LEACHATE COLLECTION SYSTEM MAINTENANCE		~~$11,400~~ $19,200
GAS COLLECTION AND MONITORING PROGRAM						
Inspection and Monitoring	Day	1	$450.00	4	$1,800	
Maintenance	Each	1	$450.00	~~12~~ 24	~~$5,400~~ $10,800	
Gas Flare Operation	~~Annual~~ Monthly	1	~~$10,000.00~~ $5,000	~~1~~ 12	~~$10,000~~ $60,000	
				TOTAL ANNUAL GAS COLLECTION SYSTEM		~~$17,200~~ $72,600
GROUNDWATER MONITORING						
Sampling and Analysis (Assuming ~~10~~ 23 Wells)	Well	~~15~~ 23	$1,250.00	2	~~$37,500~~ 57,500	
Maintenance	Well	~~15~~ 23	$100.00	2	~~$3,000~~ 4,600	
				TOTAL ANNUAL GROUNDWATER MONITORING SYSTEM		~~$40,500~~ $62,100
LANDFILL OPERATOR	person	1	$50,000	1	$50,000	$50,000
				SUBTOTAL		~~$137,790~~ $218,380
				CONTINGENCY (10%)		~~$13,790~~ $21,838
				TOTAL ANNUAL COST		~~$151,580~~ $240,220
				TOTAL 30 YEAR COST		~~$4,547,370~~ $7,206,870

RIVER BIRCH LANDFILL

ATTACHMENT NO. 4

LEACHATE TREATMENT POND CLOSURE COST

POST CLOSURE TASK	UNIT	QUANTITY	UNIT PRICE	EXTENSION
Remove Sludge	Cu. Yds.	~~20,000~~ 60,000	$5.00	~~$100,000~~ $300,000
Remove Cover Soil and Contaminated Material	Cu. Yds.	~~40,000~~ 120,000	$5.00	~~$200,000~~ $600,000
Fill Pond Area	Cu. Yds.	~~150,000~~ 300,000	$4.00	~~$600,000~~ $1,200,000
Seed Area	Acre	~~12~~ ~~28~~	$1,000	~~$12,000~~ ~~$28,000~~
			Total	~~$912,000~~ ~~$2,128,000~~

Closure and Post Closure		(Implicit Price Deflator) 2.15% April 30, 2007		Revised Cost Estimates April 30, 2007
Closure for 140 Acres		$ 8,046,746		$ 3,780,753
Post Closure Cost		$ 8,045,083		$ 7,777,110
Leachate Pond Closure		$ 2,375,503		$ 3,628,000
Total cost		$ 18,467,332		$ 15,185,863
Less: Trust Cash Acct April 30,	**2007**	→ (6,209,086)	**2007**	→ (6,209,086)
Balance		$ 12,258,246		$ 8,976,777
Pay in Period remaining Remaining life in years		38.38		
Amount required to be deposited (Balance divided by Remaining Life)		$ 319,353		**Amount Deposited 5/07** $ 319,353

RiverBirch
INCORPORATED

Post Office Box 1938 • Gretna, Louisiana 70054
504 364.1140 • 504 364.1120 FAX

November 6, 2007

Secretary
Louisiana Department of Environmental Quality
Post Office Box 4313
Baton Rouge, La. 70821

Attention: Office of Environmental Services,
Waste Permits Division

RE: River Birch Landfill, P-0321, AI 32219

Dear Sir:

I am the chief financial officer of River Birch Incorporated, 2000 S. Kenner Rd, Waggamann, La. 70094. River Birch Incorporated has established a Trust Fund to provide Financial Assurance for Closure and Post Closure cost as required by the Louisiana Department of Environmental Quality Title 33, Part VII, Subpart 1 Section 1303. All documentation and calculations with respect to the Trust Fund is prepared annually (as of April 30) and is on file with the Louisiana Department of Environmental Quality. The Company is currently in compliance with Financial Assurance as required by the State Regulations.

This letter is in support of this firm's use of the Financial Test to demonstrate financial responsibility for Closure and Post Closure as set forth in Environmental Protection Agency section 258.74, paragraph (e).

1. The current cost estimates covered by the financial test are set forth in Exhibit A, attached hereto, total $12,826,425. They include current landfill closure cost of $6,712,130, pond closure of $1,447,600 and post closure cost of $4,666,695.
2. The Company meets the requirements of Section 258.74 paragraph (e)(1)(i)(B) which states that "A ratio of less than 1.5 comparing total liabilities to net worth." As of December 31, 2006 the Company has a ratio of total liabilities to net worth of .38, well below the amount required by Section 258.74 paragraph (e)(1)(i)(B).
3. The Company meets the requirements of Section 258.74 paragraph (e)(1)(ii) which states " the tangible net worth of the owner must be greater than the sum of the current closure and post closure cost estimates covered by the financial test plus $10 million." The closure and post closure cost as set forth in Exhibit A are $12,826,425, plus $10 million equals $22,826,425. The tangible net worth of the Company as of December 31, 2006 is in excess of $25,000,000.

4. The Company meets the requirements of Section 258.74 paragraph (e)(1)(iii) which states "the owner must have assets located in the United States amounting to at least the sum of the closure and post closure cost estimates." Closure and post closure cost estimate as set forth in Exhibit A are $12,826,425. The company has total assets as of December 31, 2006 in excess of $25,000,000 all of which are located in the United States.
5. Enclosed is a copy of the unqualified opinion issued by our independent Certified Public Accountants as of December 31, 2006.
6. Enclosed is a letter certification from the independent accounting firm of Laporte, Sehrt, Romig & Hand Certified Public Accountants confirming that the Company complies with the Financial Test specified in Section 258.74, paragraph (e) of the Environmental Protection Agency.

Sincerely,

Dominick J. Fazzio, CPA
Chief Financial Officer
Dated:

Summary of Financial Assurance

Financial Assurance
Closure and Post Closure Cost Estimates

Closure	$ 6,712,130	
Pond Closure	$ 1,447,600	
	$ 8,159,730	
Post Closure	$ 4,666,695	
Total Closure and Post Closure Estimate		$ 12,826,425

CLOSURE COST ESTIMATE
RIVER BIRCH LANDFILL

	Closure Tasks	Unit	Unit Cost	Quantity	Cost
I	**CAP INSTALLATION**				
	Recompacted Clay (2')	Cu.yd.	$ 3.50	460,000	$ 1,610,000
	Geosynthetics	Sq.yd.	$ 4.50	677,600	$ 3,049,200
	Gas Collection Pipe	Ln. Ft.	$ 22.00	8,636	$ 189,992
	Gas Vents	Each	$ 2,000.00	70	$ 140,000
	Monitoring Gas Vents	Each	$ 800.00	28	$ 22,400
	Top Soil	Cu.yd.	$ 3.50	230,384	$ 806,344
	Vegetation	Acre	$ 1,500.00	140	$ 210,000
	TOTAL CAP INSTALLATION				$ 6,027,936
II	**OVERSIGHT**	Days	$ 300.00	180	$ 54,000
III	**CERTIFICATION**	Report	$ 20,000.00	1	$ 20,000
	SUBTOTAL				$ 6,101,936
	CONTINGENCY (10%)				$ 610,194
	TOTAL				$ 6,712,130

C:\10-07\21140\closuretasktable.1007

LEACHATE TREAMENT POND CLOSURE COST
RIVER BIRCH LANDFILL

POST CLOSURE TASK	UNIT	QUANTITY	UNIT PRICE	EXTENSION
Remove Sludge	Cu.yd.	25,700	$5.00	$ 128,500
Remove Cover Soil and Contaminated Material	Cu.yd.	51,420	$5.00	$ 257,100
Fill Pond Area with On-Site Clay	Cu.yd.	300,000	$3.50	$ 1,050,000
Seed Area	Acre	12	$1,000.00	$ 12,000
TOTAL				$ 1,447,600

LANDFILL
POST-CLOSURE COST ESTIMATE

	Post-Closure Task	Unit	Quantity	Unit Cost	Frequency	Cost	Annual Cost
I	CAP MAINTENANCE						
	Inspection	Day	1	$450.00	4	$1,800.00	
	Routine Maintenance (Approx. 10% per year)	Acre	20	$150.00	1	$3,000.00	
	Mowing	Acre	221	$15.00	2	$3,315.00	
	Repairs	Cu.yd.	400	$15.00	1	$6,000.00	
					TOTAL ANNUAL CAP MAINTENANCE		$14,115
II	LEACHATE COLLECTION SYSTEM MAINTENANCE						
	Inspection and Maintenance	Day	1	$300.00	12	$3,600.00	
	Leachate Pump Maintenance (20% of pumps each year)	pump	12	$500.00	1	$6,000.00	
	Electrical Cost for Pump Maintenance	Month	12	$300.00	1	$3,600.00	
	Treatment Pond	Discharge	1	$500.00	12	$6,000.00	
					TOTAL ANNUAL LEACHATE COLLECITON SYSTEM MAINTENANCE		$19,200
III	GAS COLLECTION AND MONITORING PROGRAM						
	Inspection and Monitoring	Day	1	$450.00	4	$1,800.00	
	Maintenance	Each	1	$450.00	24	$10,800.00	
	Gas Flare Operation	Annual	1	$5,000.00	1	$5,000.00	
					TOTAL ANNUAL GAS COLLECTION SYSTEM		$17,600
IV	GROUNDWATER MONITORING						
	Sampling and Analysis (Assuming 15 wells)	Well	15	$1,250.00	2	$37,500.00	
	Maintenance	Well	15	$100.00	2	$3,000.00	
					TOTAL ANNUAL GROUNDWATER MONITORING SYSTEM		$40,500
							$50,000
V	LANDFILL OPERATOR	person	1	$50,000.00	1	$50,000.00	
						SUBTOTAL	$141,415
						CONTINGENCY (10%)	$14,142
						TOTAL ANNUAL COST	$155,557
						TOTAL 30 YEAR COST	$4,666,695

LAPORTE SEHRT ROMIG HAND
CERTIFIED PUBLIC ACCOUNTANTS

To the Stockholders of
River Birch Incorporated

Independent Auditor's Report

We have audited the accompanying consolidated balance sheet of River Birch Incorporated (the Company) as of December 31, 2006, and the related consolidated statements of operations, changes in stockholders' equity and cash flows for the year then ended. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of River Birch Incorporated as of December 31, 2006, and the results of its operations, and its cash flows for the year then ended in conformity with accounting principles generally accepted in the United States of America.

LaPorte, Sehrt, Romig & Hand

A Professional Accounting Corporation

July 20, 2007
Metairie, LA

110 VETERANS MEMORIAL BOULEVARD, SUITE 200, METAIRIE, LA 70005-4958 · 504.835.5522 · FAX 504.835.5535
5100 VILLAGE WALK, SUITE 202, COVINGTON, LA 70433-4012 · 985.892.5850 · FAX 985.892.5956
WWW.LAPORTE.COM

RSM McGladrey Network
An Independently Owned Member

RIVER BIRCH, INCORPORATED
P-0321, AI 32219
Examination of Assertion of Compliance with
Title 40 Of the Code of Federal Regulations,
Section 258.74 Paragraph (e)

December 31, 2006

CONTENTS

	Pages
Independent Accountant's Report	1
Schedule of Compliance with 40 CFR CH I (7-1-05 Edition) Section 258.74 Paragraph (e) Corporate Financial Test	2
Notes to Schedule of Compliance with 40 CFR CH I (7-1-05 Edition) Section 258.74 Paragraph (e) Corporate Financial Test	3

LAPORTE SEHRT ROMIG HAND
CERTIFIED PUBLIC ACCOUNTANTS

INDEPENDENT ACCOUNTANT'S REPORT

To Members of the Board of Directors
River Birch, Incorporated

We have examined management's assertion that the accompanying schedule of Schedule of Compliance with 40 CFR CH I (7-1-05 Edition) Section 258.74 Paragraph (e) Corporate Financial Test of River Birch, Incorporated as of December 31, 2006 is presented in accordance with, and demonstrates compliance with Title 40 Section 258.74 paragraph (e) of the Code of Federal Regulations criteria set forth in the schedule. River Birch, Incorporated's management is responsible for these assertion. Our responsibility is to express an opinion on these assertions based on our examination.

Our examination was conducted in accordance with attestation standards established by the American Institute of Certified Public Accountants and, accordingly, included examining, on a test basis, evidence supporting management's assertion and performing such other procedures as we considered necessary in the circumstances. We believe that our examination provides a reasonable basis for our opinion.

In our opinion, management's assertions referred to above are fairly stated, in all material respects, based on the stated criteria as set forth in the accompanying schedule.

This report is intended soley for the information and use River Birch, Incorporated, the United States Environmental Protection Agency, and the Department of Environmental Quality of the State of Louisiana, and is not intended to be, and should not be used by anyone other than these specified parties.

LaPorte, Sehrt, Romig & Hand

A Professional Accounting Corporation

Metairie, LA
November 27, 2007

110 VETERANS MEMORIAL BOULEVARD, SUITE 200, METAIRIE, LA 70005-4958 · 504.835.5522 · FAX 504.835.5535
5100 VILLAGE WALK, SUITE 202, COVINGTON, LA 70433-4012 · 985.892.5850 · FAX 985.892.5956
5153 BLUEBONNET BOULEVARD, SUITE B, BATON ROUGE, LA 70809 · 225.296.5150 · FAX 225.296.5151
WWW.LAPORTE.COM

RSM McGladrey Network
An Independently Owned Member

River Birch, Incorporated
Schedule of Compliance with
40 CFR CH I (7-1-05 Edition) Section 258.74
Paragraph (e) Corporate Financial Test

Current closures and post closure cost estimates covered by the financial test are as of November 26, 2007:

Landfill Closure	$ 6,712,130
Pond Closure	1,447,600
Total Current Closure Cost Estimate	$ 8,159,730
Total Post Closure Cost Estimate	4,666,695
Total Closure and Post Closure Cost Estimate	$ 12,826,425

Section 258.74 paragraph (e)(1)(i)(B) Requirement : Ratio of less than 1.5 comparing total liabilities to net worth:

River Birch, Incorporated has a ratio of .38 as of December 31, 2006 and exceeds the stated requirements.

Section 258.74 paragraph (e)(1)(ii) Requirement: Tangible net worth of the owner must be greater than the sum of the current closure and post closure care, corrective action cost estimates and any other environmental obligations, including guarantees covered by a financial test plus $10 million:

River Birch, Incorporated's tangible net worth as of December 31, 2006 is **greater than $25,000,000** which exceeds the tangible net worth requirement.

Section 258.74 paragraph (e)(1) (iii) The owner or operator must have assets located in the United States amounting to at least the sum of current closure, post-closure care, corrective action cost estimates and any other environmental obligations covered by a financial test as described in paragraph (e)(3) of this section:

River Birch, Incorporated has **total assets in excess of $25,000,000** as of December 31, 2006. All of River Birch's assets are located in the United States and River Birch exceeds the stated requirements.

Based on the calculations presented above, River Birch, Incorporated has complied with the stated criteria.

River Birch, Incorporated

Notes To Schedule of Compliance with
40 CFR CH I (7-1-05 Edition Section 258.74
Paragraph (e) Corporate Financial Test
As of December 31, 2006

Note 1. **Basis Of Presentation**

The accompanying Schedule of Compliance with 40 CFR CH I (7-1-05 Edition) Section 258.74 Paragraph (e) *Corporate Financial Test*, and managements' statements regarding compliance is based upon the following:

Closure and Post Closure Cost Estimates are determined by estimate of independent engineering firm within the established parameters of Title 40 of the Code of Federal Regulations Ch. I (7-1-05 Edition).

Tangible Net Worth means the tangible assets that remain after deducting liabilities; such assets would not include intangibles such as goodwill and rights to patents or royalties.

1.0 INTRODUCTION

This River Birch Closure and Post-Closure Plan has been developed in accordance with the guidelines of the February 1993 Louisiana Solid Waste Rules and Regulations (LSWRR). The final cover system will be designed and constructed in accordance with the specifications in Appendix D, Construction Quality Assurance Plan, of the permit application. The final cover will be sloped so as to allow unimpeded drainage of the area. The entire landfill will be closed on a cell by cell basis to provide environmental protection. Prior to final closure of any area, River Birch will provide the Louisiana Department of Environmental Quality (LDEQ) 90 days notice in advance of its intent to close. Any changes or modifications in the approved closure plan will be noted. A written request for final inspection of the cell shall be filed with LDEQ.

2.0 CLOSURE PLAN

2.1 Preclosure Activities

The administrative authority will be notified at least 90 days prior to the initiation of closure of the facility's intent to close. The notification will include the anticipated date of closure, requested changes from the approved closure plan, a schedule of closure activities, and a closure cost estimate.

Final cover installation will be initiated no later than 30 days after and will be completed no later than 90 days after final grade is reached for the entire unit or the date of known final receipt of solid waste, which ever comes first. If delays are encountered beyond the control of the facility, such as rain delays, River Birch will request an extension for initiation or completion of closure, as appropriate.

Prior to closure all standing water will be removed or solidified. The runoff diversion system will be maintained throughout closure activities. A documented insect and rodent inspection will be conducted prior to installation of the final cover.

Final machine compacting and grading will be completed before capping to provide a stable base for the cap. Since this unit will have the potential to produce gas, the cap will be equipped with a gas vent system.

The closure and post-closure plan for the landfill will be reviewed and amended as required. Any amendments to the plan will be submitted to the administrative authority for approval prior to final closure implementation.

2.2 Closure Activities

The landfill will be closed cell by cell until the entire facility is filled to its maximum design capacity. On-site soils or equivalent will be used to apply the interim cover required before a final clay cover is installed over the waste. A composite cap system designed and constructed in accordance with the specifications in Appendix D. The final cap will have a permeability of less than $1x10^{-7}$ cm/sec or will be at least as impermeable as the liner system beneath the cover. The cap will be overlain with topsoil and seeded with grass. The top and sides of the cap will be sloped to facilitate drainage.

The cap will be constructed in ascending order as follows:

Geotextile overlying the final application of soil cover, 2 feet of recompacted clay having a maximum permeability of 1×10^{-7} cm/sec; 60 mil HDPE liner; Geotextile installed over the HDPE liner; 6 inches of topsoil; and Vegetative cover.

Design of the final cap is shown in Figures 35, 36, 37, 38, and 39 of the permit application.

After the installation of topsoil but prior to planting the vegetative cover, the facility will request a closure inspection from the administrative authority. After approval, the cover will be seeded with grass.

In addition to closure of the landfill cells, all storage tanks, piping and equipment associated with the River Birch waste disposal wells will be removed from the site. Once the tank battery area has been cleared and all equipment removed, approximately ten confirmatory soil samples will be collected from the area in order to confirm that no impacts to surface soils have occurred during the life of the wells. The soil samples will be collected from 0-6" below ground surface and analyzed for volatiles, semi-volatiles, RCRA metals, and chlorides. The analysis may be amended based upon the type of materials placed in the disposal wells during their use. Once acceptable sample analysis results have been confirmed, the area will be backfilled and seeded to reduce erosion. In the event of unacceptable analysis results, impacted soils will be excavated and disposed of appropriately.

Final documentation and closure certification of the landfill will be prepared and submitted to the Jefferson Parish Clerk of Court. A copy of the closure certification document will be submitted to the LDEQ within 60 days of the completion of final closure.

2.3 Closure Cost Estimate

The closure cost estimate for landfill development of the site is provided herein.

3.0 POST CLOSURE

3.1 General Requirements

Post-closure must be conducted for 30 years after closure unless the post-closure period is reduced by the administrative authority. There is no anticipated future use of the facility at the conclusion of the post-closure care period. During the post-closure period public safety will be ensured through continued controlled access to the site. Access to the site will be controlled by a perimeter fence and locked gates. The cost estimate for the post-closure period is found herein. Post-closure maintenance and monitoring activities will consist of the following activities:

Inspection and maintenance of the cap; Maintenance of the leachate collection system; Inspection, monitoring, and maintenance of the gas vent system; Groundwater monitoring; and Semiannual and annual reporting.

3.2 Monitoring and Maintenance of the Cap

The cap will be inspected quarterly to detect defects or deterioration of the final cap. Repairs will be implemented when there are signs of sloughing, erosion, excessive desiccation cracks, damage from burrowing animals, or other types of damage to the cap. Repairs will typically consist of placing and compacting additional clay or topsoil and revegetating the cap, Oversized vegetation will be removed to prevent puncturing of the clay liner by root system. Voids will be carefully backfilled to maintain the integrity of the clay cap.

Maintenance will consist of periodic mowing of the vegetative cover and reseeding of the cap as needed. The shallow-rooted grasses will be periodically mowed to maintain the height of vegetation at levels that will facilitate inspections. This will also help to discourage rodents and/or other small animals living in the area. Mowing activities will be carried out on an as-needed basis.

3.3 Leachate Collection System

The leachate collection system will be inspected and maintained during the post-closure period. The leachate collection system will be inspected quarterly. Inspection of the leachate collection system will consist of inspecting the riser pipes for damage and checking the system for the presence of liquids. If liquids are present, then they will be pumped from the collection system into the leachate treatment pond.

At the conclusion of the post-closure period, the leachate collection pipes will be abandoned by cutting off the leachate pipes near the surface and sealing a cap over the end of the pipe.

3.4 Gas System

Inspection and monitoring of the gas system will consist of inspecting the recovery wells, condensate sumps, flares, and related equipment for damage and monitoring for methane gas. Monitoring of methane gas will be performed with a portable instrument as described in the Operations Plan.

At the conclusion of the post-closure period, the gas system will be abandoned by cutting the pipes off at the surface, and plugging the remaining in-ground pipe at the surface .

3.5 Groundwater Monitoring

Groundwater monitoring requirements and procedures are described in Appendix E of the permit application. During the post-closure period in detection monitoring, groundwater sampling and analysis will be conducted semiannually. Plugging and abandonment procedures for monitoring wells at the end of the post-closure are provided herein.

3.6 Closure of Leachate Treatment Pond

The leachate treatment pond will be maintained for the entire period during which leachate is removed from the landfill. Upon closure of the leachate collection system, the leachate treatment pond will also be closed.

All liquids will be removed from the pond and sludge solidified with lime, fly ash or similar type material to prepare the sludge for removal. The sludge and cover soil shall then be removed and disposed at an approved facility.

Once all contaminated soil is removed, the area shall be certified clean. The remaining liner and levees above elevation 3.5 feet (100 year flood elevation) will be pushed into the excavation and soil brought in to bring the pond area to finished grade shown on Figure 42. Costs for the leachate treatment pond closure are found herein.

3.6.1 Conversion of Existing Leachate Treatment Pond to Disposal Cell

As River Birch Landfill is expanded to the West a new larger 28 acre leachate treatment pond will be constructed at the south end of the landfill to provide treatment and stormwater holding capacity for the new larger site. The existing leachate treatment pond and operations area near the northeast corner of the site will remain in use as a pond for approximately ten (10) years after the larger pond is constructed. As disposal cells 32-43 located in the West Expansion are filled and prior to cell 43 being completely filled, the existing pond and operations area will be closed and converted to a disposal cell.

Conversion of the leachate treatment pond to a disposal cell will be carried out as follows:

Stormwater and leachate flowing in to the original pond will continue to flow into this facility until cells 32-43 are full. Prior to cell 43 being completely filled, the existing pond will be cleared of any sludge and the protective concrete pad removed. The 60 mil HPDE liner will be checked for any damage and a new liner installed if required. Once the integrity of the liner is assured, a 36 inch layer of clay will be installed over the HDPE liner to provide protection to the liner and create a base into which the leachate pipe and sump can be installed. The details for the leachate system will be identical to other locations of the site. All water still flowing into the original pond will be redirected to other locations of the site. All water still flowing into the original pond will be redirected to the new larger pond near the south end of the site prior to the original being closed.

3.7 Reporting

During the post-closure period groundwater monitoring data will be submitted to the administrative authority semiannually. Groundwater monitoring reporting requirements are discussed herein.

Annually a report will be submitted to the administrative authority documenting post closure activities of the past year. This report will include the following:

- Evaluation of the integrity of the cap
- Details of repairs of maintenance to the cap
- Information on the functioning of the leachate collection system

Results of inspection, monitoring, and maintenance of the gas vent system

Groundwater maintenance and monitoring activities

3.8 Post-Closure Cost Estimate

An estimate of post-closure costs on an annual basis and for the 30 year post-closure care period is provided herein.

4.0 FINANCIAL ASSURANCE

Proof of financial assurance is provided on the following pages.

PROOF OF FINANCIAL ASSURANCE

Closure and Post Closure	Adjusted Cost	(Implicit Price Deflator) 1.78% April 30, 2004		(Implicit Price Deflator) 3.30% April 30, 2005		(Implicit Price Deflator) 3.94% April 30, 2006
Closure for 140 Acres	7,208,360	7,336,669		7,578,779		$ 7,877,383
Post Closure Cost	7,206,870	7,335,152		7,577,212		$ 7,875,755
Leachate Pond Closure	2,128,000	2,165,879		2,237,353		$ 2,325,504
Total cost	16,543,230	16,875,807		17,431,816		$ 18,078,642
Less: Trust Cash Acct April 30,		(3,646,676)	2005 →	(4,251,666)	2006 →	(5,335,854)
Balance		13,229,131		13,180,150		$ 12,742,788
Pay in Period remaining Remaining life in years		45.94		44.89		39.76
Amount required to be deposited (Balance divided by Remaining Life)		287,965		293,596		$ 320,493

Remaining Life Calculation			Adjustment 2004	April 30, 2006 Totals
Total volume	19,700,000	19,700,000	30,300,000	50,000,000
Less: Usage 7/99 thru 4/02	(2,210,771)	(3,126,899)		(3,126,899)
Less: Usage 5/03 thru 4/04				(930,544)
Less: Usage 5/04 thru 4/05				(1,050,433)
Less: Usage 5/05 thru 4/06				(1,158,819)
Available volume	17,489,229	16,573,101		43,733,305
Average annual tonnage	900,000	900,000		1,100,000
Remaining life based on Average Tons/Year	19.43	18.41		39.76 Years

River Birch Incorporated
Transactions by Account
As of June 3, 2006

Type	Date	Num	Na	Memo	Split	Amount	Balance
1449 · Deferred Costs							5,051,645.17
1037 · Hibernia Trust Account							5,051,645.17
General Journal	1/31/2006	9250		Jan 2006	-SPLIT-	232,474.22	5,284,119.39
General Journal	2/28/2006	9286		feb 2006	9116 · Divide...	-69,535.73	5,214,583.66
General Journal	3/31/2006	9320		Mar 2006	9116 · Divide...	113,232.83	5,327,816.49
General Journal	4/30/2006	9353		April 2006	9116 · Divide...	8,037.52	5,335,854.01
Total 1037 · Hibernia Trust Account						284,208.84	5,335,854.01
Total 1449 · Deferred Costs						284,208.84	5,335,854.01
TOTAL						284,208.84	5,335,854.01

BEA National Economic Accounts

108.182
112.449
4.267
3.94 %

National Income and Product Accounts Table

Table 1.1.9. Implicit Price Deflators for Gross Domestic Product

[Index numbers, 2000=100]

Seasonally adjusted

Today is: 6/6/2006 Last Revised on May 25, 2006 Next Release Date June 29, 2006

First Year 2005-A & Q Last Year 2006-Q ○ Annual(A) ◉ Quarterly(Q) Refresh Table

☐ Get all years

◉ HTML ○ Locking Stubs (Requires Java Enabled Browser) What is that?

Line		2005 I	2005 II	2005 III	2005 IV	2006 I
1	**Gross domestic product**	**110.905**	**111.622**	**112.527**	**113.494**	**114.417**
2	**Personal consumption expenditures**	**109.927**	**110.824**	**111.838**	**112.628**	**113.177**
3	Durable goods	90.646	90.524	89.837	89.657	89.487
4	Nondurable goods	109.315	110.842	112.972	113.205	113.509
5	Services	114.795	115.625	116.500	117.825	118.684
6	**Gross private domestic investment**	**108.182**	**108.987**	**109.954**	**111.380**	**112.449**
7	Fixed investment	108.493	109.224	110.289	111.757	112.904
8	Nonresidential	102.231	102.702	103.345	104.314	105.278
9	Structures	125.847	128.857	133.884	140.203	144.921
10	Equipment and software	95.072	94.915	94.495	94.179	94.240
11	Residential	123.019	124.315	126.290	128.844	130.399
12	Change in private inventories	---	---	---	---	---
13	**Net exports of goods and services**	---	---	---	---	---
14	Exports	107.540	108.515	109.304	110.033	110.654
15	Goods	106.757	107.527	107.886	108.453	109.157
16	Services	109.433	110.887	112.702	113.822	114.236
17	Imports	107.727	109.868	112.355	113.566	113.398
18	Goods	105.875	108.409	111.162	112.472	112.167
19	Services	117.560	117.505	118.497	119.150	119.773
20	**Government consumption expenditures and gross investment**	**116.740**	**117.814**	**119.744**	**121.336**	**122.755**
21	Federal	117.542	118.161	119.048	119.320	121.125
22	National defense	118.050	118.459	119.482	119.753	121.399
23	Nondefense	116.643	117.676	118.293	118.566	120.681
24	State and local	116.285	117.628	120.180	122.561	123.749
	Addendum:					
25	Gross national product	110.890	111.607	112.512	113.477	114.399

Help with Comma Separated Value (CSV) Download

Download Dates Shown (CSV) | Download All Years (CSV) | Advanced Download

Try Our Printer Friendly Page (Prototype)

CLOSURE COST ESTIMATE
RIVER BIRCH LANDFILL

	Closure Tasks	Unit	Unit Cost	Quantity	Cost
I	CAP INSTALLATION				
	Recompacted Clay (2')	Cu.yd.	$ 4.00	460,000	$ 1,840,000.00
	Geosynthetics	Sq.yd.	$ 4.50	677,600	$ 3,049,200.00
	Gas Collection Pipe	Ln. Ft.	$ 22.00	8,636	$ 189,992.00
	Gas Vents	Each	$ 2,000.00	70	$ 140,000.00
	Monitoring Gas Vents	Each	$ 800.00	28	$ 22,400.00
	Top Soil	Cu.yd.	$ 4.00	230,384	$ 921,536.00
	Vegetation	Acre	$ 1,500.00	140	$ 210,000.00
	TOTAL CAP INSTALLATION				$ 6,373,128.00
II	REMOVAL OF ALL EQUIPMENT ASSOCIATED WITH INJECTION WELLS	Each	$ 36,000.00	1	$ 36,000.00
	CONFIRMATORY SOIL SAMPLING	Each	$ 312.00	10	$ 3,120.00
III	OVERSIGHT	Days	$ 300.00	180	$ 54,000.00
IV	CERTIFICATION	Report	$ 20,000.00	1	$ 20,000.00
	SUBTOTAL				$ 6,486,248.00
	CONTINGENCY (10%)				$ 648,624.80
	TOTAL				$ 7,134,872.80

LANDFILL
POST-CLOSURE COST ESTIMATE

Post-Closure Task	Unit	Quantity	Unit Cost	Frequency	Cost	Annual Cost
CAP MAINTENANCE						
Inspection	Day	1	$450.00	4	$1,800	
Routine Maintenance (Approx. 10% per year)	Acre	40	$150.00	1	$6,000	
Mowing	Acre	399	$15.00	2	11,970	
Repairs	Cu.yd.	800	$15.00	1	12,000	
					TOTAL ANNUAL CAP MAINTENANCE	$31,770
LEACHATE COLLECTION SYSTEM MAINTENANCE						
Inspection and Maintenance	Day	1	$300	12	$3,600	
Leachate Pump Maintenance (20% of pumps each year)	pump	12	$500	1	$6,000	
Electrical Cost for Pump Maintenance	Month	12	$300.00	1	$3,600	
Treatment Pond	Discharge	1	$500	12	$6,000	
					TOTAL ANNUAL LEACHATE COLLECTION SYSTEM MAINTENANCE	$19,200
GAS COLLECTION AND MONITORING PROGRAM						
Inspection and Monitoring	Day	1	$450.00	4	$1,800	
Maintenance	Each	1	$450.00	24	$10,800	
Gas Flare Operation	Monthly	1	$5,000	12	$60,000	
					TOTAL ANNUAL GAS COLLECTION SYSTEM	$72,600
GROUNDWATER MONITORING						
Sampling and Analysis (Assuming ~~10~~ 23 Wells)	Well	23	$1,250.00	2	57,500	
Maintenance	Well	23	$100.00	2	4,600	
					TOTAL ANNUAL GROUNDWATER MONITORING SYSTEM	$62,100
LANDFILL OPERATOR	person	1	$50,000	1	$50,000	$50,000
					SUBTOTAL	$235,670
					CONTINGENCY (10%)	$23,567
					TOTAL ANNUAL COST	$259,237
					TOTAL 30 YEAR COST	$7,777,110

LEACHATE TREATMENT POND CLOSURE COST

POST CLOSURE TASK	UNIT	QUANTITY	UNIT PRICE	EXTENSION
Remove Sludge	Cu. Yds.	60,000	$5.00	$300,000
Remove Cover Soil and Contaminated Material	Cu. Yds.	120,000	$5.00	$600,000
Fill Pond Area	Cu. Yds.	300,000	$4.00	$1,200,000
Supply Offsite Clay	Cu. Yds.	300,000	$5.00	$1,500,000
Seed Area	Acre	28	$1,000	$28,000
			Total	$3,628,000

APPENDIX F

PHASE I
LANDFILL GAS COLLECTION SYSTEM SUMMARY

JUN 0 3 2005

Enviro One

611 North Street
Baton Rouge, Louisiana 70802
Phone 225-344-6625
Fax 225-344-2771

June 2, 2005

Mr. Paul Miers
Miers Engineering Inc
104 Westmark Blvd, Suite 2A
Lafayette, LA 70506

Re: Landfill Gas Collection and Control System (LGCCS) for River Birch Landfill, Waggaman, Jefferson Parish, Louisiana AI # 32219

Dear Mr. Miers:

Please find enclosed the as-built drawings for the River Birch Landfill (RBL) Landfill Gas Collection and Control System (LGCCS) (see figures 1 and 2). Phases 1 and 2 (see figure 3) are currently operationally. Forty wellheads were installed during the construction of Phases 1 and 2. Phases 3 and 4 (see figure 3) are beginning the construction phase. The LGCCS meets the requirements set forth in 40 CFR 60 Subpart WWW.

RBL collects gas from the required well heads and from the leachate system. The gas is then routed to the flare system. According to 40 CFR 60.753, each owner or operator of a municipal solid waste (MSW) landfill with a LGCCS shall:

> *Operate the collection system such that the gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for 5 years or more if active or 2 years or more if closed or at final grade.*

RBL has been monitoring the wellheads in accordance with 40 CFR 60.753. Phases 1 and 2 of the landfill are still active. The wastes in Phase 1 reached the 5-year mark on February 28, 2005. The wastes in Phase 2 will reach the 5-year mark on June 30, 2005.

RBL is currently proceeding with the construction of the LGCCS for Phases 3 and 4 by installing a series of horizontal wells and connecting them to the new flare system (see figure 3). After the horizontal well system is installed for Phases 3 and 4, the landfill gases from these phases will be routed to a blowers/flares system for destruction to at least 98%.

Below is a timeline of activities related to the RBL LGCCS:

- March 1, 1999 – RBL began accepting waste.
- August 30, 2002 - RBL submitted its Tier 2 sampling report in accordance with Specific Condition No. 2 of the current Part 70 permit (Permit No. 1340-00223-V0). The report indicated that the non-methane organic compounds (NMOC) emission rate is over 50 megagrams (Mg) per year. This triggered the start of the LGCCS. RBL had to submit a LGCCS design plan that met design requirements of 40 CFR 60.752(b)(2)(i) and 40 CFR 60.752(b)(2)(ii) within one year (i.e., August 30, 2003) and according to Specific Condition 2 and 40 CFR 60.752(b)(2)(ii), RBL had to install and operate a LGCCS within 30 months after the date the Tier 2 report was submitted (February 28, 2005).
- September 2, 2003 – LGCCS plan prepared by SCS Engineers was submitted to LDEQ.

- August 2004 – LGCCS detailed design plan was prepared by SCS Engineers.
- September 2, 2004 – Enviro One sent out requests for proposals based on the SCS detailed design to construct Phases 1 and 2. Proposals were evaluated on past experience, approach, technical merit and cost.
- September 20, 2004 – Contract for construction of Phases 1 and 2 was awarded to Shaw EMCON/OWT, Inc.
- October 28, 2004 – LDEQ granted RBL a variance to construct and operate Phases 1 and 2 of the LGCCS and to route the gas collected to the flare or to sell off-site as fuel.
- October 29, 2004 – Phases 1 and 2 construction began.
- February 13, 2005 - RBL successfully completed and started-up an active LGCCS for Phase 1 of its landfill.
- March 10, 2005 – LDEQ granted RBL a variance to construct and operate Phases 3 and 4 of the LGCCS and to tie in the flare.
- April 25, 2005 - RBL installed and started-up an active LGCCS for Phase 2 of its landfill.

If you have any questions please contact Mr. Ed Lee at or me (225) 344-6625.

Sincerely,

ENVIRO ONE, LLC

John P. Black, P.E.
Principal

Enclosures

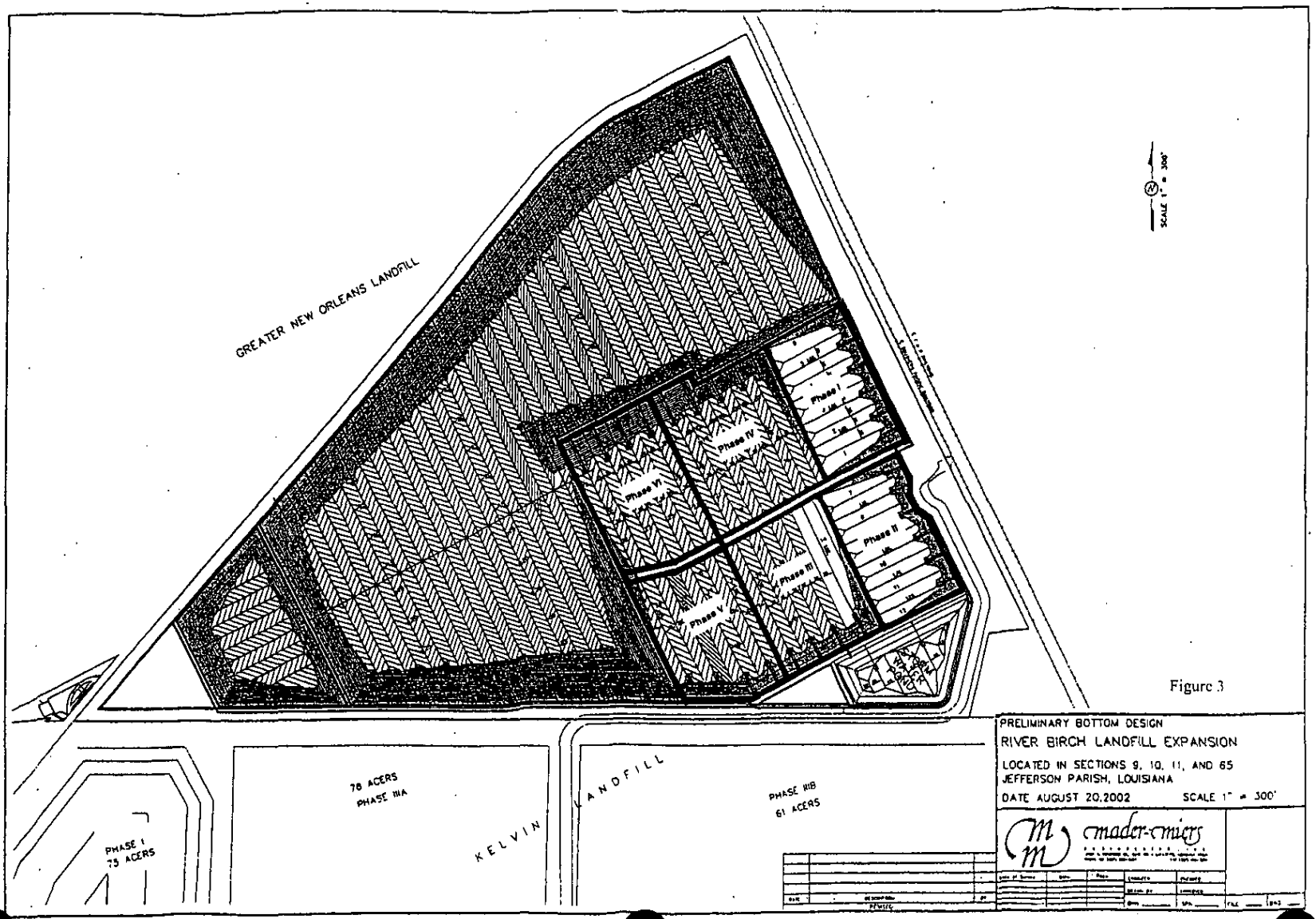
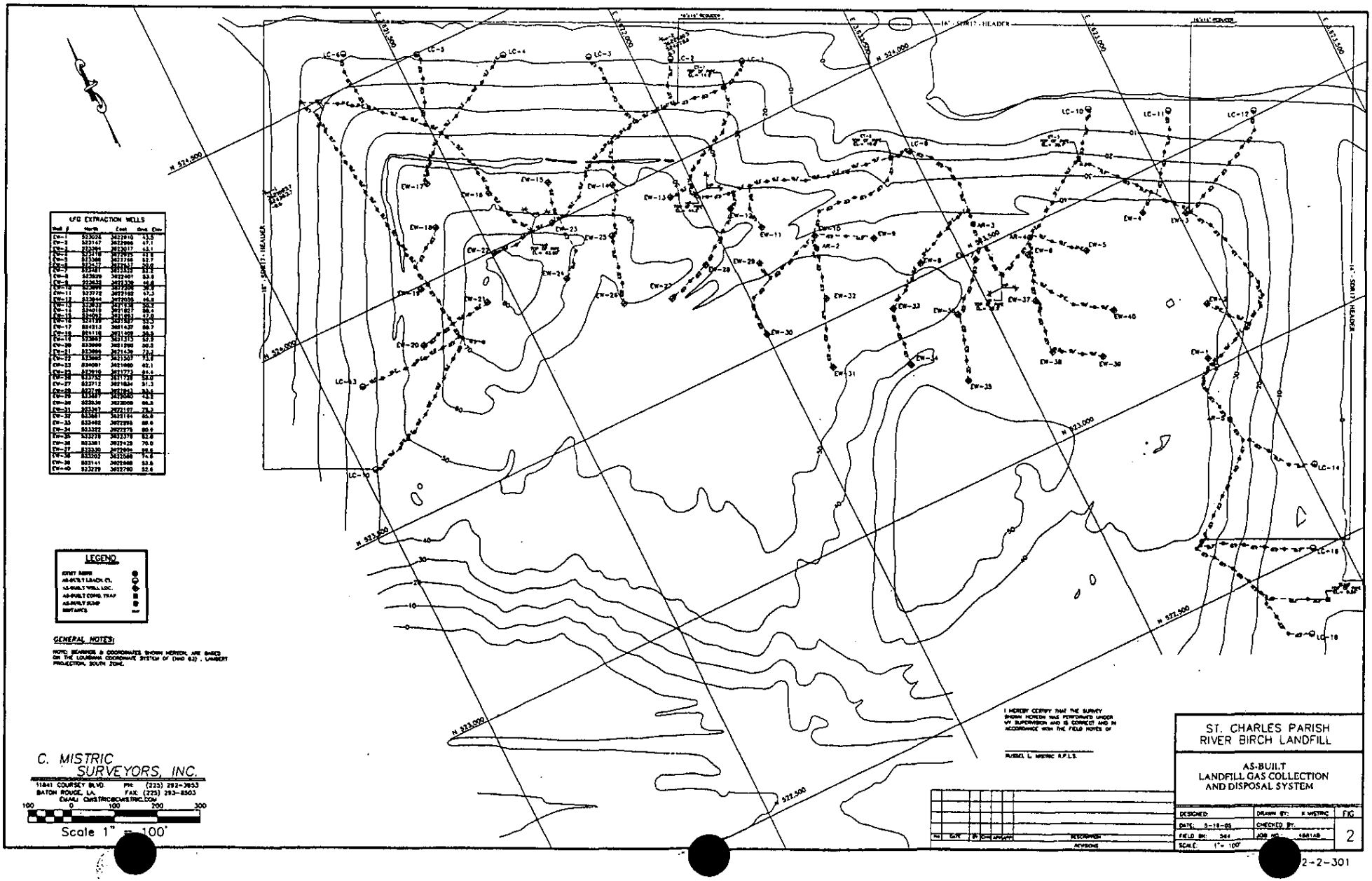
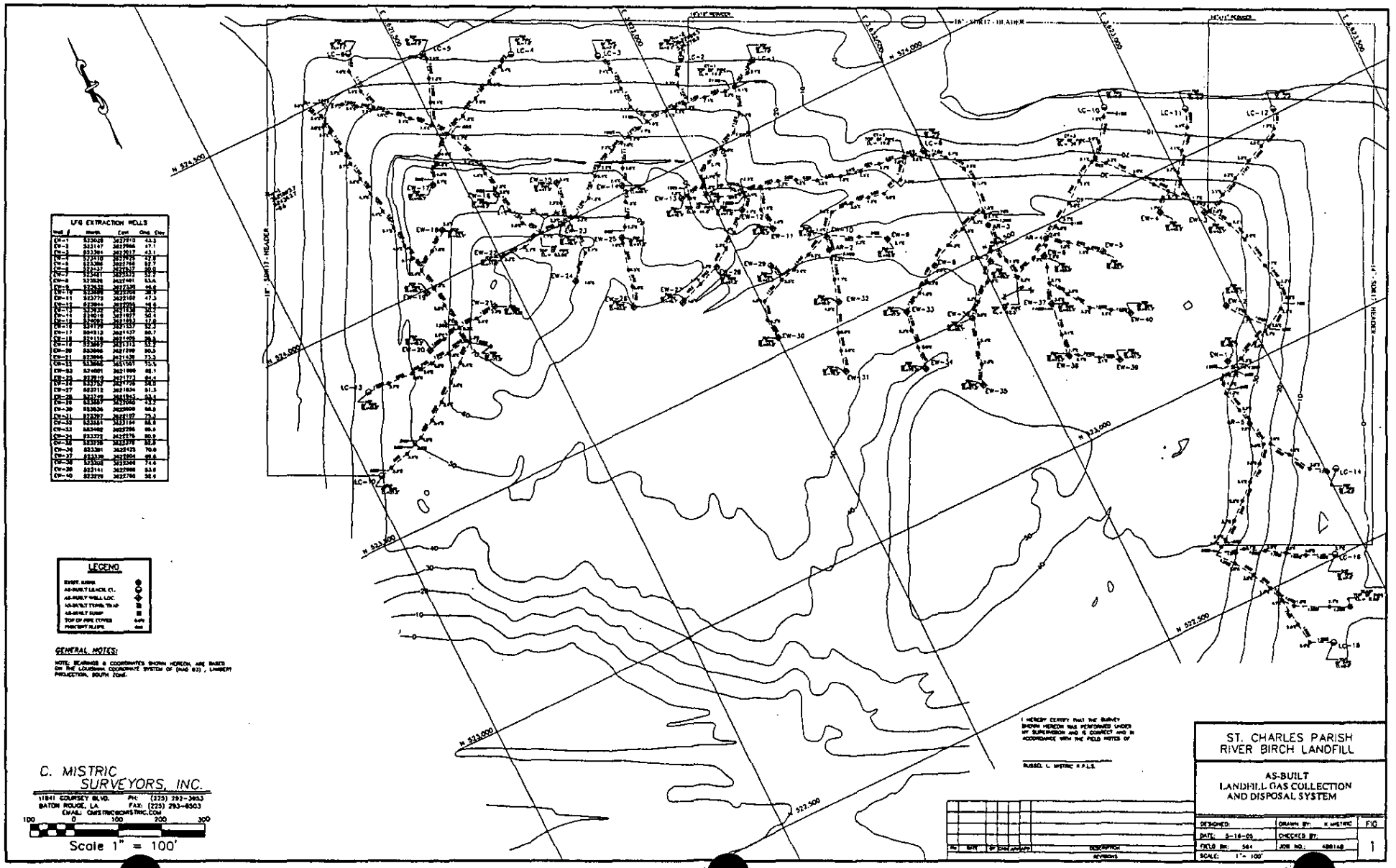

GREATER NEW ORLEANS LANDFILL
SCALE 1" = 300'
Phase I
Phase II
Phase III
Phase IV
Phase V
Phase VI
78 ACERS
PHASE IIIA
PHASE I
75 ACERS
KELVIN
LANDFILL
PHASE IIIB
61 ACERS
PRELIMINARY BOTTOM DESIGN
RIVER BIRCH LANDFILL EXPANSION
LOCATED IN SECTIONS 9, 10, 11, AND 65
JEFFERSON PARISH, LOUISIANA
DATE AUGUST 20,2002
SCALE 1" = 300'
mader-emiers

Figure 3


LFG EXTRACTION WELLS
LEGEND
GENERAL NOTES:
NOTE: BEARINGS & COORDINATES SHOWN HEREON, ARE BASED ON THE LOUISIANA COORDINATE SYSTEM OF (NAD 83), LAMBERT PROJECTION, SOUTH ZONE.
I HEREBY CERTIFY THAT THE SURVEY SHOWN HEREON WAS PERFORMED UNDER MY SUPERVISION AND IS CORRECT AND IN ACCORDANCE WITH THE FIELD NOTES OF
RUSSEL L. MISTRIC R.P.L.S.
C. MISTRIC SURVEYORS, INC.
11841 COURSEY BLVD.
BATON ROUGE, LA.
PH: (225) 292-3853
FAX: (225) 293-8503
EMAIL: CMISTRIC@MISTRIC.COM
Scale 1" = 100'
ST. CHARLES PARISH
RIVER BIRCH LANDFILL
AS-BUILT
LANDFILL GAS COLLECTION
AND DISPOSAL SYSTEM
DESIGNED:
DRAWN BY: K.MISTRIC
DATE: 5-18-05
CHECKED BY:
FIELD BK: 544
JOB NO: 4861AB
SCALE: 1" = 100'
FIG 2
DESCRIPTION
REVISIONS
2-2-301



LFG EXTRACTION WELLS
LEGEND
GENERAL NOTES:
NOTE: BEARINGS & COORDINATES SHOWN HEREON, ARE BASED ON THE LOUISIANA COORDINATE SYSTEM OF (NAD 83), LAMBERT PROJECTION, SOUTH ZONE.
C. MISTRIC SURVEYORS, INC.
11841 COURSEY BLVD. PH: (225) 292-3953
BATON ROUGE, LA. FAX: (225) 293-6503
EMAIL: CMISTRIC@CMISTRIC.COM
100 0 100 200 300
Scale 1" = 100'
I HEREBY CERTIFY THAT THE SURVEY SHOWN HEREON WAS PERFORMED UNDER MY SUPERVISION AND IS CORRECT AND IN ACCORDANCE WITH THE FIELD NOTES OF
RUSSEL L. MISTRIC R.P.L.S.
ST. CHARLES PARISH
RIVER BIRCH LANDFILL
AS-BUILT
LANDFILL GAS COLLECTION
AND DISPOSAL SYSTEM
DESIGNED:
DRAWN BY: K MISTRIC
FIG
DATE: 5-16-05
CHECKED BY:
FIELD BK: 564
JOB NO.: 488148
1
SCALE: 1" = 100'
REVISIONS

M 2-301