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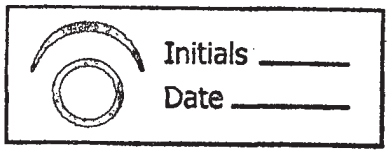
VISTA LANDFILL PERMIT APP SC-019

KEENE ROAD DISPOSAL CLASS III LANDFILL

TABLE OF CONTENTS



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TABLES

FIGURES

EXHIBITS

BISHOP & BUTTREY
INCORPORATED

February 14, 2000

Mr. James Bradner, P.E.
FDEP Solid Waste
Central District
3319 Magurie Blvd., Ste. 232
Orlando, Florida 32803-3767

Subject: Class III Landfill Application
Orange County, Florida

Dear Mr. Bradner:

This submittal application is for the Buttrey Development L.L.C. Class III Landfill, located at 230 W. Keene Road in Apopka Florida. The proposed landfill is referred to as the "Keene Road Disposal" facility. The following sections are intended to satisfy FDEP regulations to the best of my understanding of the required materials. If anything has been omitted, or you require additional information please do not hesitate to call me a 407- 296-0016.

Sincerely,

Ed Chesney

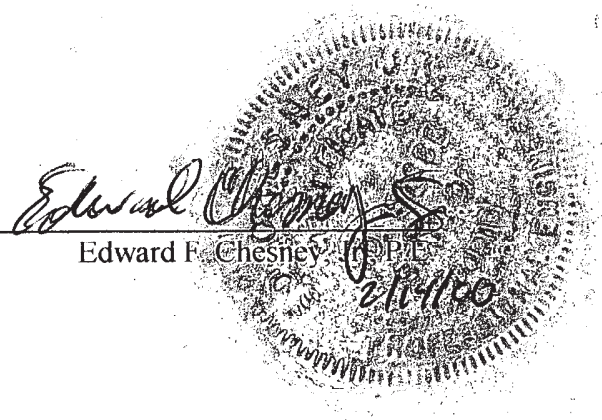
Ed Chesney, P.E.

C:\OFFICE\WPWIN\WPDOCS\PIT91L\FDEP.WPD

6239 Edgewater Dr., Suite D-1, Orlando, Florida 32810-4747
Telephone: (407) 296-0016; FAX: (407) 294-8090

CERTIFICATION BY A PROFESSIONAL ENGINEER

The engineering components which include the civil, geotechnical and hydogeological elements of this application have been prepared by me or under my direct supervision as a professional engineer (P.E. No. 51888) licensed under the provisions of Chapter 471, Florida Statutes. The information presented in this application is believed to be accurate. Furthermore, the design concepts and elements are believed to be appropriate for the permitting of the Keene Road Disposal Class III Landfill application.



Edward F. Chesney, Jr. P.E.

Orange Co FL 1998-0543812
12/31/98 11:40:10am
OR Bk 5649 Pg 4804
Rec 10.50 DSC 5,040.00

This instrument prepared by
and return to:
G. Thomas Ball, Esq.
BAKER & HOSTETLER LLP
2300 SunTrust Center
200 South Orange Avenue
Post Office Box 112
Orlando, Florida 32802
(407) 649-4000

Parcel Identification (Folio)
No. 28-21-28-0000-00009
28-21-28-0000-00016

WARRANTY DEED

THIS WARRANTY DEED, made and given this 30th day of December, 1998 by and between **ROY B. WHITE, a single man,** whose mailing address is 356 Nelson Road, Lawrenceburg, Tennessee 38464 (hereinafter called the "Grantor") to **BUTTREY DEVELOPMENT, LLC, a Florida limited liability company**, whose mailing address is 6239 Edgewater Drive. Suite D-1, Orlando, Florida 32810 (hereinafter called the "Grantee").

WITNESSETH:

That the Grantor, for and in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration to said Grantor, in hand paid by the Grantee, the receipt of which is hereby acknowledged, hereby grants, bargains, sells, aliens, remises, releases, conveys and confirms unto the Grantee, all that certain piece, parcel or tract of land lying and being in the County of Orange, State of Florida, more particularly described as follows:

NE ¼ of the NE ¼ and E ½ of NW ¼ of NE ¼ of Section 28, Township 21S, Range 28E, Orange County, Florida.

GRANTOR HEREIN HEREBY CERTIFIES THAT THE ABOVE-DESCRIBED PROPERTY IS NOT HIS HOMESTEAD, THAT HE DOES NOT NOW, NOR HAS HE OR ANY MEMBER OF HIS FAMILY, EVER RESIDED ON SAID PROPERTY OR ON PROPERTY CONTIGUOUS THERETO.

This conveyance is subject to the following:

1. Taxes for the year of 1999 and subsequent years.

TOGETHER with all the tenements, hereditaments and appurtenances thereto belonging or in anywise appertaining

TO HAVE AND TO HOLD the same in fee simple forever.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
APPLICATION FOR PERMIT TO CONSTRUCT, OPERATE, MODIFY OR CLOSE
A SOLID WASTE MANAGEMENT FACILITY

Please Type or Print

A. GENERAL INFORMATION

1. Type of facility:

Disposal [X]

Class I Landfill	[ ]	Ash Monofill	[ ]
Class II Landfill	[ ]	Asbestos Monofill	[ ]
Class III Landfill	[X]	Industrial Solid Waste	[ ]
Other	[ ]	_____	

Volume Reduction [ ]

Incinerator	[ ]	Pulverizer / Shredder	[ ]
Composting	[ ]	Compactor / Baling Plant	[ ]
Materials Recovery	[ ]	Energy Recovery	[ ]
Other	[ ]	_____	

2. Type of application:

Construction	[ ]	Construction/Operation	[ ]
Operation	[ ]	Closure	[ ]

3. Classification of application:

New	[X]	Substantial Modification	[ ]
Renewal	[ ]	Minor Modification	[ ]

4. Facility name: Keene Road Disposal

5. DEP ID number: N/A County: ORANGE

6. Facility location (main entrance): 230 WEST KEENE ROAD

APOPKA FLORIDA 32703

7. Location coordinates:

Section: 28 Township: 21 Range: 28

UTMs: Zone _____ _____ km E _____ km N

Latitude: 28 ° 22 ' 58 " Longitude: 81 ° 18 ' 29 "

8. Applicant name (operating authority): BUTTREY DEVELOPMENT, LLC

Mailing address: 6239 EDGEWATER DRIVE STE. D-1 ORLANDO, FL 32810
Street or P.O. Box City State Zip

Contact person: JOHN BUTTREY Telephone: (407) 296-0016

Title: PRESIDENT

9. Authorized agent/Consultant: ED CHESNEY, P.E.

Mailing address: 6239 EDGEWATER DR. STE. D-1 ORLANDO, FL 32810
Street or P.O. Box City State Zip

Contact person: ED CHESNEY Telephone: (407) 296-0016

Title: PROJECT ENGINEER

10. Landowner(if different than applicant): N/A

Mailing address: N/A
Street or P.O. Box City State Zip

Contact person: N/A Telephone: (___)_____

11. Cities, towns and areas to be served: NORTH WEST ORANGE COUNTY, METROPOLITAN ORLANDO

12. Population to be served:

Current: + 100,000 Five-Year Projection: + 100,000

13. Volume of solid waste to be received: 2,500 yds^3/day tons/day gallons/day

14. Date site will be ready to be inspected for completion: 2011

15. Estimated life of facility: 11 years

16. Estimated costs:

Total Construction: $_____ Closing Costs: $_____

17. Anticipated construction starting and completion dates:

From: 2000 To: 2011

B. **DISPOSAL FACILITY GENERAL INFORMATION**

1. Provide brief description of disposal facility design and operations planned by this application:

The landfill footprint will utilize an existing 37 acre dry borrow pit. The borrow pit terminates above a clay layer which will serve as an inplace liner of the landfill.

2. Facility site supervisor: Vic McCall

Title: Field Supervisor Telephone: (407) 296-0016

3. Disposal area: Total 37 acres; Used 0 acres; Available 37 acres

4. Weighing scales used: Yes [X] No [ ]

5. Security to prevent unauthorized use: Yes [X] No [ ]

6. Charge for waste received: * $/yds^3 _____ $/ton * dependent on market

7. Surrounding land use, zoning:

Residential	[ ]	Industrial	[ ]
Agricultural	[X]	None	[ ]
Commercial	[ ]	Other	[ ] _____

8. Types of waste received:

Residential	[ ]	C & D debris	[X]
Commercial	[ ]	Shredded/cut tires	[ ]
Incinerator / WTE ash	[ ]	Yard trash	[X]
Treated biohazardous	[ ]	Septic tank	[ ]
Water treatment sludge	[ ]	Industrial	[ ]
Air treatment sludge	[ ]	Industrial sludge	[ ]
Agricultural	[ ]	Domestic sludge	[ ]
Asbestos	[ ]		
Other	[ ] _____		

9. Salvaging permitted: Yes [ ] No [X]

10. Attendant: Yes [X] No [ ] Trained operator: Yes [X] No [ ]

11. Spotters: Yes [X] No [ ] Number of spotters used: 2

12. Site located in: Floodplain [ ] Wetlands [ ] Other [X] Uplands Only

13. Property recorded as a Disposal Site in County Land Records: Yes [ ] No [X] not yet

14. Days of operation: Monday through Saturday

15. Hours of operation: 0700 - 1700 Mon. - Fri. 0700 - 1200 Sat.

16. Days Working Face covered: Weekly - Saturdays

17. Elevation of water table: 50-60 Ft. NGVD

18. Number of monitoring wells: 11

19. Number of surface monitoring points: 0

20. Gas controls used: Yes [ ] No [X] Type controls: Active [ ] Passive [ ]

Gas flaring: Yes [ ] No [X] Gas recovery: Yes [ ] No [X]

21. Landfill Unit - liner type:

Natural soils	[X]	Double geomembrane	[ ]
Single clay liner	[ ]	Geomembrane & composite	[ ]
Single geomembrane	[ ]	Double composite	[ ]
Single composite	[ ]	None	[X]
Slurry wall	[ ]		
Other	[ ]		

22. Leachate collection method:

Collection pipes	[ ]	Sand layer	[ ]
Geonets	[ ]	Gravel layer	[ ]
Well points	[ ]	Interceptor trench	[ ]
Perimeter ditch	[ ]	None	[X]
Other	[ ]		

23. Leachate storage method:

Tanks	[ ]	Surface impoundments	[ ]
Other	[X] NONE		

24. Leachate treatment method:

Oxidation	[ ]	Chemical treatment	[ ]
Secondary	[ ]	Settling	[ ]
Advanced	[ ]	None	[X]
Other	[ ]		

25. Leachate disposal method:

Recirculated	[ ]	Pumped to WWTP	[ ]
Transported to WWTP	[ ]	Discharged to surface water	[ ]
Injection well	[ ]	Evaporation (ie: Perc Pond)	[ ]
Other	[X] NONE		

26. For leachate discharged to surface waters:

Name and Class of receiving water: N/A

27. Storm Water: Collected: Yes [X] No [ ] Type of treatment: DRY RETENTION

Name and Class of receiving water: N/A

28. Management and Storage of Surface Waters (MSSW) Permit number or status:

4-095-0564-ERP- PENDING MODIFICATION

C. **MATERIALS RECOVERY / VOLUME REDUCTION FACILITY GENERAL INFORMATION**

1. Provide brief description of materials recovery / volume reduction facility design and operations planned by this application:

N/A

2. Facility site supervisor: N/A

Title: N/A Telephone: (___) N/A

3. Disposal area: Total _____ acres; Used _____ acres; Available _____ acres

4. Security to prevent unauthorized use: Yes [ ] No [ ]

5. Site located in: Floodplain [ ] Wetlands [ ] Other [ ] N/A

6. Days of operation: N/A

7. Hours of operation: N/A

8. Number of operating staff: N/A

9. Expected useful life: N/A Years

10. Weighing scales used: Yes [ ] No [ ]

11. Normal processing rate: _____ yd^3/day _____ tons/day _____ gal/day

12. Maximum processing rate: _____ yd^3/day _____ tons/day _____ gal/day

13. Charge for waste received: N/A

14. Type of facility (check one or more):

Incinerator	[ ]	Composting	[ ]
Pulverizer / shredder	[ ]	Materials recovery	[ ]
Compactor / baling	[ ]	Energy recovery	[ ]
Sludge concentration	[ ]	Pyrolysis	[ ]
Other	[ ]	N/A	

15. Material recovered, tons/week:

_____	Paper	_____	Glass
_____	Ferrous metals	_____	Non-ferrous metals
_____	Aluminum	_____	Plastics
_____	Other:	N/A	

16. Energy recovery, in units shown:

_____	High pressure steam, lb/hr	_____	Chilled water, gal/hr
_____	Low pressure steam, lb/hr	_____	Oil, gal/hr
_____	Electricity, kw/hr	_____	Oil, BTU/hr
_____	Gas, ft^3/hr	_____	Gas, BTU/hr
_____	Other:	_____	N/A

17. Process water management:

Recycled: Yes [ ] No [ ]

Treatment method used: N/A

Discharged to: Surface waters [ ] Underground [ ] Other [ ]

Name and Class of receiving water: N/A

18. Storm Water:

Collected: Yes [ ] No [ ] Type of treatment: N/A

Name and Class of receiving water: N/A

19. ERP Permit number or status: N/A

20. Final residue produced:

N/A % of normal processing rate

N/A % of maximum processing rate

Disposed of at (Site name): N/A

21. Supplemental fuel used:

Type: N/A Quantity used/hour: N/A

22. Costs:

Estimated operating costs (material-energy revenue): $ N/A

Total cost/ton: $ N/A Net cost/ton: $ N/A

23. State pollution control bond financing amount: $ N/A

24. Estimated amount of tax exemptions that will be requested: $ N/A

D. SOLID WASTE MANAGEMENT FACILITY PERMIT GENERAL REQUIREMENTS (62-701.320, FAC)

S	LOCATION	N/A	N/C		
X	HEREIN			1.	Six copies, at minimum, of the completed application form, all supporting data and reports; (62-701.320(5)(a),FAC)
X	HEREIN			2.	Engineering and/or professional certification (signature, date and seal) provided on the applications and all engineering plans, reports and supporting information for the application; (62-701.320(6),FAC)
X	Beginning of Package			3.	A letter of transmittal to the Department; (62-701.320(7)(a),FAC)
X	HEREIN			4.	A completed application form dated and signed by the applicant; (62-701.320(7)(b),FAC)
X	ATTACHED			5.	Permit fee specified in Rule 62-4.050, FAC and Rule 62-701.320(5)(c), FAC in check or money order, payable to the Department; (62-701.320(7)(c),FAC)
X	SECTION II			6.	An engineering report addressing the requirements of this rule and with the following format: a cover sheet, text printed on 8 1/2 inch by 11 inch consecutively numbered pages, a table of contents or index, the body of the report and all appendices including an operation plan, contingency plan, illustrative charts and graphs, records or logs of tests and investigations, engineering calculations; (62-701.320(7)(d),FAC))
X	SECTION I			7.	Operation Plan; (62-701.320(7)(e)1,FAC)
X	SECTION I			8.	Contingency Plan; (62-701.320(7)(e)2,FAC)
				9.	Plans or drawings for the solid waste management facilities in appropriate format (including sheet size restrictions, cover sheet, legends, north arrow, horizontal and vertical scales, elevations referenced to NGVD) showing; (62-702.320(7)(f),FAC)
X	SECTION II FIG. 5			a.	A regional map or plan with the project location;
X	SECTION II EXHIBIT B			b.	A vicinity map or aerial photograph no more than 1 year old;
X	SECTION III SHEET 3			c.	A site plan showing all property boundaries certified by a registered Florida land surveyor;

S	LOCATION	N/A	N/C	
X	SECTION II			d. Other necessary details to support the engineering report.
X	HEREIN			10. Proof of property ownership or a copy of appropriate agreements between the facility operator and property owner authorizing use of property; (62-701.320(7)(g),FAC)
		X		11. For facilities owned or operated by a county, provide a description of how, if any, the facilities covered in this application will contribute to the county's achievement of recycling goals contained in Section 403.706,FS; (62-701.320(7)(h),FAC)
		X		12. Provide a history and description of any enforcement actions taken by the Department against the applicant for violations of applicable statutes, rules, orders or permit conditions relating to the operation of any solid waste management facility in this state; (62-701.320(7)(i),FAC)
TO FOLLOW UNDER SEPERATE COVER				13. Proof of publication in a newspaper of general circulation of notice of application for a permit to construct or substantially modify a solid waste management facility; (62-702.320(8),FAC)
		X		14. Provide a description of how the requirements for airport safety will be achieved including proof of required notices if applicable; (62-701.320(12),FAC)

E. LANDFILL PERMIT GENERAL REQUIREMENTS (62-701.330, FAC)

S	LOCATION	N/A	N/C		
X	SECTION II EXHIBIT B			1.	Vicinity map or aerial photograph no more than 1 year old and of appropriate scale showing land use and local zoning within one mile of the landfill and of sufficient scale to show all homes or other structures, water bodies, and roads other significant features of the vicinity. All significant features shall be labeled; (62-701.330(4)(a),FAC)
		X		2.	Vicinity map or aerial photograph no more than 1 year old showing all airports that are located within five miles of the proposed landfill; (62-701.330(4)(b),FAC)
X	SECTION III SHEET 3			3.	Plot plan with a scale not greater than 200 feet to the inch showing; (62-701.330(4)(c),FAC)
X	SECTION III SHEET 3			a.	Dimensions;
X	SECTION II FIG. 4			b.	Locations of proposed and existing water quality monitoring wells;
X	SECTION II FIG. 2			c.	Locations of soil borings;
X	SECTION III SHEET 5			d.	Proposed plan of trenching or disposal areas;
X	SECTION III SHEET 6			e.	Cross sections showing original elevations and proposed final contours which shall be included either on the plot plan or on separate sheets;
		X		f.	Any previously filled waste disposal areas;
X	SECTION III SHEET 3			g.	Fencing or other measures to restrict access.
				4.	Topographic maps with a scale not greater than 200 feet to the inch with 5-foot contour intervals showing; (62-701.330(4)(d),FAC):
X	SECTION III ALL SHEETS			a.	Proposed fill areas;
X	SECTION II EXHIBIT I			b.	Borrow areas;
X	SECTION III SHEET 3			c.	Access roads;
X	SECTION III SHEET 7			d.	Grades required for proper drainage;
X	SECTION III SHEET 8			e.	Cross sections of lifts;

S	LOCATION	N/A	N/C		
X	SECTION III SHEET 7				f. Special drainage devices if necessary;
X	SECTION III SHEET 3				g. Fencing;
X	SECTION III SHEET 7				h. Equipment facilities.
				5.	A report on the landfill describing the following; (62-701.330(4)(e),FAC)
X	SECTION I				a. The current and projected population and area to be served by the proposed site;
X	SECTION I				b. The anticipated type, annual quantity, and source of solid waste, expressed in tons;
X	SECTION III SHEET 5				c. The anticipated facility life;
X	SECTION II				d. The source and type of cover material used for the landfill.
X	SECTION II EXHIBIT F			6.	Provide evidence that an approved laboratory shall conduct water quality monitoring for the facility in accordance with Rule 62-160,FAC; (62-701.330(4)(h),FAC)
X	SECTION II			7.	Provide a statement of how the applicant will demonstrate financial responsibility for the closing and long-term care of the landfill; (62-701.330(4)(i),FAC)

F. **GENERAL CRITERIA FOR LANDFILLS** (62-701.340,FAC)

X	SECTION II EXHIBIT H			1.	Describe (and show on a Federal Insurance Administration flood map, if available) how the landfill or solid waste disposal unit shall not be located in the 100-year floodplain where it will restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain unless compensating storage is provided, or result is a washout of solid waste; (62-701.340(4)(b),FAC)
	VARIANCE X REQUESTED, EXISTING BORROW PIT FOOT PRINT.			2.	Describe how the minimum horizontal separation between waste deposits in the landfill and the landfill property boundary shall be 100 feet, measured from the toe of the proposed final cover slope; (62-701.340(4)(c),FAC)
X	SECTION II			3.	Describe what methods shall be taken to screen the landfill from public view where such screening can practically be provided; (62-701.340(4)(d),FAC)

G. LANDFILL CONSTRUCTION REQUIREMENTS (62-701.400,FAC)

S	LOCATION	N/A	N/C	
X	SECTION III SHEET 5			1. Describe how the landfill shall be designed so that solid waste disposal units will be constructed and closed at planned intervals throughout the design period of the landfill; (62-701.400(2),FAC)
				2. Landfill liner requirements; (62-701.400(3),FAC)
				a. General construction requirements; (62-701.400(3)(a),FAC):
___	_____	X	___	(1) Provide test information and documentation to ensure the liner will be constructed of materials that have appropriate physical, chemical, and mechanical properties to prevent failure;
___	_____	X	___	(2) Document foundation is adequate to prevent liner failure;
___	_____	X	___	(3) Constructed so bottom liner will not be adversely impacted by fluctuations of the ground water;
___	_____	X	___	(4) Designed to resist hydrostatic uplift if bottom liner located below seasonal high ground water table;
___	_____	X	___	(5) Installed to cover all surrounding earth which could come into contact with the waste or leachate.
				b. Composite liners; (62-701.400(3)(b),FAC)
___	_____	X	___	(1) Upper geomembrane thickness and properties;
___	_____	X	___	(2) Design leachate head for primary LCRS including leachate recirculation if appropriate;
___	_____	X	___	(3) Design thickness in accordance with Table A and number of lifts planned for lower soil component.

S	LOCATION	N/A	N/C		
		X		c.	Double liners; (62-701.400(3)(c),FAC)
		X			(1) Upper and lower geomembrane thicknesses and properties;
		X			(2) Design leachate head for primary LCRS to limit the head to one foot above the liner;
		X			(3) Lower geomembrane sub-base design;
		X			(4) Leak detection and secondary leachate collection system minimum design criteria ($k \geq 1$ cm/sec, head on lower liner ≤ 1 inch, head not to exceed thickness of drainage layer);
				d.	Standards for geomembranes; (62-701.400(3)(d),FAC)
		X			(1) Field seam test methods to ensure all field seams are at least 90 percent of the yield strength for the lining material;
		X			(2) Design of 24-inch-thick protective layer above upper geomembrane liner;
		X			(3) Describe operational plans to protect the liner and leachate collection system when placing the first layer of waste above 24-inch-thick protective layer.
				e.	Geosynthetic specification requirements; (62-701.400(3)(e),FAC)
		X			(1) Definition and qualifications of the designer, manufacturer, installer, QA consultant and laboratory, and QA program;
		X			(2) Material specifications for geomembranes, geotextiles, geogrids, and geonets;

S	LOCATION	N/A	N/C	
___	_____	X	___	(3) Manufacturing and fabrication specifications including geomembrane raw material and roll QA, fabrication personnel qualifications, seaming equipment and procedures, overlaps, trial seams, destructive and nondestructive seam testing, seam testing location, frequency, procedure, sample size and geomembrane repairs;
___	_____	X	___	(4) Geomembrane installation specifications including earthwork, conformance testing, geomembrane placement, installation personnel qualifications, field seaming and testing, overlapping and repairs, materials in contact with geomembrane and procedures for lining system acceptance;
___	_____	X	___	(5) Geotextile and geogrid specifications including handling and placement, conformance testing, seams and overlaps, repair, and placement of soil materials;
___	_____	X	___	(6) Geonet specifications including handling and placement, conformance testing, stacking and joining, repair, and placement of soil materials;
				f. Standards for soil components (62-710.400(3)(f),FAC):
___	_____	X	___	(1) Description of construction procedures including overexcavation and backfilling to preclude structural inconsistencies and procedures for placing and compacting soil component in layers;
___	_____	X	___	(2) Demonstration of compatibility of the soil component with actual or simulated leachate in accordance with EPA Test Method 9100 or an equivalent test method;
X	SECTION II	___	___	(3) Procedures for testing in-situ soils to demonstrate they meet the specifications for soil liners;

S	LOCATION	N/A	N/C
X	SECTION II		
		X	
		X	
X	SECTION II FIG. 3		
X	SECTION III SHEET 8		
		X	
X	SECTION II		
		X	

(4) Specifications for soil component of liner including at a minimum:

(a) Allowable particle size distribution, Atterberg limits, shrinkage limit;

(b) Placement moisture and dry density criteria;

(c) Maximum laboratory-determined saturated hydraulic conductivity using simulated leachate;

(d) Minimum thickness of soil liner;

(e) Lift thickness;

(f) Surface preparation (scarification);

(g) Type and percentage of clay mineral within the soil component;

(5) Procedures for constructing and using a field test section to document the desired saturated hydraulic conductivity and thickness can be achieved in the field.

3. Leachate collection and removal system (LCRS); (62-701.400(4),FAC)

a. The primary and secondary LCRS requirements; (62-701.400(4)(a),FAC)

		X	
		X	
		X	
		X	

(1) Constructed of materials chemically resistant to the waste and leachate;

(2) Have sufficient mechanical properties to prevent collapse under pressure;

(3) Have granular material or synthetic geotextile to prevent clogging;

(4) Have method for testing and cleaning clogged pipes or contingent designs for rerouting leachate around failed areas;

S	LOCATION	N/A	N/C	
				b. Primary LCRS requirements; (62-701.400(4)(b),FAC)
___	_____	X	___	(1) Bottom 12 inches having hydraulic conductivity $\geq 1 \times 10^{-3}$ cm/sec;
___	_____	X	___	(2) Total thickness of 24 inches of material chemically resistant to the waste and leachate;
___	_____	X	___	(3) Bottom slope design to accomodate for predicted settlement;
___	_____	X	___	(4) Demonstration that synthetic drainage material, if used, is equivalent or better than granular material in chemical compatibility, flow under load and protection of geomembrane liner.
				4. Leachate recirculation; (62-701.400(5),FAC)
___	_____	X	___	a. Describe general procedures for recirculating leachate;
___	_____	X	___	b. Describe procedures for controlling leachate runoff and minimizing mixing of leachate runoff with storm water;
___	_____	X	___	c. Describe procedures for preventing perched water conditions and gas buildup;
___	_____	X	___	d. Describe alternate methods for leachate management when it cannot be recirculated due to weather or runoff conditions, surface seeps, wind-blown spray, or elevated levels of leachate head on the liner;
___	_____	X	___	e. Describe methods of gas management to control odors and migration of methane;
___	_____	X	___	f. If leachate irrigation is proposed, describe treatment methods and standards for leachate treatment prior to irrigation over final cover and provide documentation that irrigation does not contribute significantly to leachate generation.

S	LOCATION	N/A	N/C	
				5. Leachate storage tanks and leachate surface impoundments; (62-701.400(6),FAC)
				a. Surface impoundment requirements; (62-701.400(6)(b),FAC)
___	_____	X	___	(1) Documentation that the design of the bottom liner will not be adversely impacted by fluctuations of the ground water;
___	_____	X	___	(2) Designed in segments to allow for inspection and repair as needed without interruption of service;
				(3) General design requirements;
___	_____	X	___	(a) Double liner system consisting of an upper and lower 60-mil minimum thickness geomembrane;
___	_____	X	___	(b) Leak detection and collection system with hydraulic conductivity $\geq$ 1 cm/sec;
___	_____	X	___	(c) Lower geomembrane placed on subbase $\geq$ 6 inches thick with k $\leq$ $1x10^{-5}$ cm/sec;
___	_____	X	___	(d) Design calculation to predict potential leakage through the upper liner;
___	_____	X	___	(e) Daily inspection requirements and notification and corrective action requirements if leakage rates exceed that predicted by design calculations;
___	_____	X	___	(4) Description of procedures to prevent uplift, if applicable;
___	_____	X	___	(5) Design calculations to demonstrate minimum two feet of freeboard will be maintained;
___	_____	X	___	(6) Procedures for controlling vectors and off-site odors.

S	LOCATION	N/A	N/C	
___	_____	X	___	b. Above-ground leachate storage tanks; (62-701.400(6)(c),FAC)
___	_____	X	___	(1) Describe tank materials of construction and ensure foundation is sufficient to support tank;
___	_____	X	___	(2) Describe procedures for cathodic protection if needed for the tank;
___	_____	X	___	(3) Describe exterior painting and interior lining of the tank to protect it from the weather and the leachate stored;
___	_____	X	___	(4) Describe secondary containment design to ensure adequate capacity will be provided and compatibility of materials of construction;
___	_____	X	___	(5) Describe design to remove and dispose of stormwater from the secondary containment system;
___	_____	X	___	(6) Describe an overfill prevention system such as level sensors, gauges, alarms and shutoff controls to prevent overfilling;
				(7) Inspections, corrective action and reporting requirements;
___	_____	X	___	(a) Overfill prevention system weekly;
___	_____	X	___	(b) Exposed tank exteriors weekly;
___	_____	X	___	(c) Tank interiors when tank is drained or at least every three years;
___	_____	X	___	(d) Procedures for immediate corrective action if failures detected;
___	_____	X	___	(e) Inspection reports available for department review.
				c. Underground leachate storage tanks; (62-701.400(6)(d),FAC)
___	_____	X	___	(1) Describe materials of construction;
___	_____	X	___	(2) A double-walled tank design system to be used with the following requirements;

S	LOCATION	N/A	N/C	
___	_____	X	___	(a) Interstitial space monitoring at least weekly;
___	_____	X	___	(b) Corrosion protection provided for primary tank interior and external surface of outer shell;
___	_____	X	___	(c) Interior tank coatings compatible with stored leachate;
___	_____	X	___	(d) Cathodic protection inspected weekly and repaired as needed;
___	_____	X	___	(3) Describe an overfill prevention system such as level sensors, gauges, alarms and shutoff controls to prevent overfilling and provide for weekly inspections;
___	_____	X	___	(4) Inspection reports available for department review.
___	_____	X	___	d. Schedule provided for routine maintenance of LCRS; (62-701.400(6)(e),FAC)
				6. Liner systems construction quality assurance (CQA): (62-701.400(7),FAC)
___	_____	X	___	a. Provide CQA Plan including:
___	_____	X	___	(1) Specifications and construction requirements for liner system;
___	_____	X	___	(2) Detailed description of quality control testing procedures and frequencies;
___	_____	X	___	(3) Identification of supervising professional engineer;
___	_____	X	___	(4) Identify responsibility and authority of all appropriate organizations and key personnel involved in the construction project;
___	_____	X	___	(5) State qualifications of CQA professional engineer and support personnel;
___	_____	X	___	(6) Description of CQA reporting forms and documents;

S	LOCATION	N/A	N/C	
___	_____	X	___	b. An independent laboratory experienced in the testing of geosynthetics to perform required testing;
				7. Soil Liner CQA (62-701.400(8)FAC)
___	_____	X	___	a. Documentation that an adequate borrow source has been located with test results or description of the field exploration and laboratory testing program to define a suitable borrow source;
___	_____	X	___	b. Description of field test section construction and test methods to be implemented prior to liner installation;
___	_____	X	___	c. Description of field test methods including rejection criteria and corrective measures to insure proper liner installation.
				8. Surface water management systems; (62-701.400(9),FAC)
X	SECTION II	___	___	a. Design of surface water management system to isolate surface water from waste filled areas and to control stormwater run-off;
X	SECTION III SHEET 7			b. Details of stormwater control design including retention ponds, detention ponds, and drainage ways;
				9. Gas control systems; (62-701.400(10),FAC)
___	_____	X	___	a. Design details for gas control system including collection pipes and vents, and passive venting or vacuum extraction details;
___	_____	X	___	b. Documentation that the gas control system will not impact the liner or leachate control system;
___	_____	X	___	c. Proposed methods of odor control including flaring designs in accordance with Chapter 62-296, FAC;
				d. Description of a routine gas monitoring program to ensure gas control system is operating properly including:
___	_____	X	___	(1) Location of monitoring points;

S	LOCATION	N/A	N/C	
___	_____	X	___	(2) Requirements for quarterly sampling of all monitoring points;
___	_____	X	___	(3) Description of corrective measures to be completed within 60 days of detection of elevated levels of explosive gases;
___	_____	X	___	e. Description of condensate collection and disposal methods.
				10. Landfill gas recovery facilities; (62-701.400(11),FAC)
___	_____	X	___	a. Information required in Rules 62-701.320(7) and 62-701.330(4), FAC supplied;
___	_____	X	___	b. Information required in Rule 62-701.600(4), FAC supplied where relevant and practical;
___	_____	X	___	c. Estimate of current and expected gas generation rates and description of condensate disposal methods provided;
___	_____	X	___	d. Description of procedures for condensate sampling, analyzing and data reporting provided;
___	_____	X	___	e. Closure plan provided describing methods to control gas after recovery facility ceases operation;
___	_____	X	___	f. Performance bond provided to cover closure costs if not already included in other landfill closure costs.
___	_____	X	___	11. For landfills designed in ground water, provide documentation that the landfill will provide a degree of protection equivalent to landfills designed with bottom liners not in contact with ground water; (62-701.400(12),FAC)

H. HYDROGEOLOGICAL INVESTIGATION REQUIREMENTS (62-701.410(1), FAC)

S	LOCATION	N/A	N/C		
				1.	Submit a hydrogeological investigation and site report including at least the following information:
X	SECTION II	___	___	a.	Regional and site specific geology and hydrogeology;
X	SECTION II	___	___	b.	Direction and rate of ground water and surface water flow including seasonal variations;
___	PENDING	___	___	c.	Background quality of ground water and surface water;
X	SECTION II	___	___	d.	Any on-site hydraulic connections between aquifers;
X	SECTION II	___	___	e.	Site stratigraphy and aquifer characteristics for confining layers, semi-confining layers, and all aquifers below the landfill site that may be affected by the landfill;
X	SECTION II	___	___	f.	Site topography and soil characteristics;
X	SECTION II TABLE 1 EXHIBIT B	___	___	g.	Inventory of all public and private water wells within a one-mile radius of the landfill including well top of casing and bottom elevations, name of owner, age and usage of each well, stratigraphic unit screened, well construction technique and static water level;
X	SECTION II	___	___	h.	Description of topography, soil types and surface water drainage systems;
X	SECTION TABLE 1	___	___	i.	An inventory of all public and private water wells within one mile of the landfill.
___	___	X	___	j.	Existing contaminated areas on landfill site.
X	CERTIFICATION LETTER	___	___	2.	Report signed, sealed and dated by PE or PG.

I. GEOTECHNICAL INVESTIGATION REQUIREMENTS (62-701.410(2),FAC)

S	LOCATION	N/A	N/C		
				1.	Submit a geotechnical site investigation report defining the engineering properties of the site including at least the following:
X	SECTION II	___	___		a. Description of subsurface conditions including soil stratigraphy and ground water table conditions;
X	SECTION II	___	___		b. Investigate for the presence of muck, previously filled areas, soft ground, lineaments and sink holes;
X	SECTION II	___	___		c. Estimates of average and maximum high water table across the site;
					d. Foundation analysis including:
X	SECTION II EXHIBIT E				(1) Foundation bearing capacity analysis;
X	SECTION II EXHIBIT E				(2) Total and differential subgrade settlement analysis;
X	SECTION II EXHIBIT E				(3) Slope stability analysis;
X	SECTION II EXHIBIT C FIG. 3				e. Description of methods used in the investigation and includes soil boring logs, laboratory results, analytical calculations, cross sections, interpretations and conclusions;
___	_____	X	___		f. An evaluation of fault areas, seismic impact zones, and unstable areas as described in 40 CFR 258.13, 40 CFR 258.14 and 40 CFR 258.15.
X	SECTION II	___	___	2.	Report signed, sealed and dated by PE or PG.

J. VERTICAL EXPANSION OF LANDFILLS (62-701.430,FAC)

S	LOCATION	N/A	N/C		
___	_____	X	___	1.	Describe how the vertical expansion shall not cause or contribute to leachate leakage from the existing landfill or adversely affect the closure design of the existing landfill;
___	_____	X	___	2.	Describe how the vertical expansion over unlined landfills will meet the requirements of Rule 62-701.400, FAC with the exceptions of Rule 62-701.430(1)(c),FAC;
___	_____	X	___	3.	Provide foundation and settlement analysis for the vertical expansion;
___	_____	X	___	4.	Provide total settlement calculations demonstrating that the final elevations of the lining system, that gravity drainage, and that no other component of the design will be adversely affected;
___	_____	X	___	5.	Minimum stability safety factor of 1.5 for the lining system component interface stability and deep stability;
___	_____	X	___	6.	Provide documentation to show the surface water management system will not be adversely affected by the vertical expansion;
___	_____	X	___	7.	Provide gas control designs to prevent accumulation of gas under the new liner for the vertical expansion.

K. LANDFILL OPERATION REQUIREMENTS (62-701.500,FAC)

X	SECTION I	___	___	1.	Provide documentation that landfill will have at least one trained operator during operation and at least one trained spotter at each working face; (62-701.500(1),FAC)
				2.	Provide a landfill operation plan including procedures for: (62-701.500(2), FAC)
X	SECTION I	___	___	a.	Designating responsible operating and maintenance personnel;
X	SECTION I	___	___	b.	Contingency operations for emergencies;
X	SECTION I	___	___	c.	Controlling types of waste received at the landfill;

S	LOCATION	N/A	N/C		
X	SECTION I	___	___		d. Weighing incoming waste;
X	SECTION I	___	___		e. Vehicle traffic control and unloading;
X	SECTION I	___	___		f. Method and sequence of filling waste;
X	SECTION I	___	___		g. Waste compaction and application of cover;
X	SECTION I	___	___		h. Operations of gas, leachate, and stormwater controls;
X	SECTION II	___	___		i. Water quality monitoring.
X	SECTION I	___	___	3.	Provide a description of the landfill operation record to be used at the landfill; details as to location of where various operational records will be kept (i.e. FDEP permit, engineering drawings, water quality records, etc.) (62-701.500(3),FAC)
X	SECTION I	___	___	4.	Describe the waste records that will be compiled monthly and provided to the Department quarterly; (62-701.500(4),FAC)
X	SECTION I	___	___	5.	Describe methods of access control; (62-701.500(5),FAC)
X	SECTION I	___	___	6.	Describe load checking program to be implemented at the landfill to discourage disposal of unauthorized wastes at the landfill; (62-701.500(6),FAC)
				7.	Describe procedures for spreading and compacting waste at the landfill that include: (62-701.500(7),FAC)
X	SECTION I	___	___		a. Waste layer thickness and compaction frequencies;
X	SECTION I	___	___		b. Special considerations for first layer of waste placed above liner and leachate collection system;
X	SECTION I	___	___		c. Slopes of cell working face and side grades above land surface, planned lift depths during operation;
X	SECTION I	___	___		d. Maximum width of working face;

S	LOCATION	N/A	N/C		
X	SECTION I	___	___	e.	Description of type of initial cover to be used at the facility that controls:
X	SECTION I	___	___		(1) Disease vector breeding/animal attraction
X	SECTION I	___	___		(2) Fires
X	SECTION I	___	___		(3) Odors
X	SECTION I	___	___		(4) Blowing litter
X	SECTION I	___	___		(5) Moisture infiltration
X	SECTION I	___	___	f.	Procedures for applying initial cover including minimum cover frequencies;
X	SECTION I	___	___	g.	Procedures for applying intermediate cover;
X	SECTION I	___	___	h.	Time frames for applying final cover;
X	SECTION I	___	___	i.	Description of litter policing methods;
X	SECTION I	___	___	j.	Erosion control procedures.
				8.	Describe operational procedures for leachate management including; (62-701.500(8),FAC)
___	_____	X	___	a.	Leachate level monitoring, sampling, analysis and data results submitted to the Department;
___	_____	X	___	b.	Operation and maintenance of leachate collection and removal system, and treatment as required;
___	_____	X	___	c.	Procedures for managing leachate if it becomes regulated as a hazardous waste;
___	_____	X	___	d.	Agreements for off-site discharge and treatment of leachate;
___	_____	X	___	e.	Contingency plan for managing leachate during emergencies or equipment problems;
___	_____	X	___	f.	Procedures for recording quantities of leachate generated in gal/day;
___	_____	X	___	g.	Procedures for comparing precipitation experienced at the landfill with leachate generation rates.

S	LOCATION	N/A	N/C		
___	_____	X	___	9.	Describe routine gas monitoring program for the landfill as required by Rule 62-701.400(10),FAC; (62-701.500(9),FAC)
___	_____	X	___	10.	Describe procedures for operating and maintaining the landfill stormwater management system to comply with the standards of Chapters 62-3, 62-302 and 62-25, FAC; (62-701.500(10),FAC)
				11.	Equipment and operation feature requirements; (62-701.500(11),FAC)
X	SECTION I	___	___	a.	Sufficient equipment for excavating, spreading, compacting and covering waste;
X	SECTION I	___	___	b.	Reserve equipment or arrangements to obtain additional equipment within 24 hours of breakdown;
X	SECTION I	___	___	c.	Communications equipment;
X	SECTION I	___	___	d.	Personnel shelter and sanitary facilities, first aid equipment;
X	SECTION I	___	___	e.	Dust control methods;
X	SECTION I	___	___	f.	Fire protection capabilities and procedures for notifying local fire department authorities in emergencies;
X	SECTION I	___	___	g.	Litter control devices;
X	SECTION I	___	___	h.	Signs indicating operating authority, traffic flow, hours of operation, disposal restrictions.
X	SECTION I	___	___	12.	Provide a description of all-weather access road, inside perimeter road and other roads necessary for access which shall be provided at the landfill; (62-701.500(12),FAC)

S	LOCATION	N/A	N/C		
				13.	Additional record keeping and reporting requirements; (62-701.500(13),FAC)
X	SECTION I	___	___	a.	Records used for developing permit applications and supplemental information maintained for the design period of the landfill;
X	SECTION I	___	___	b.	Monitoring information, calibration and maintenance records, copies of reports required by permit maintained for at least 10 years;
X	SECTION I	___	___	c.	Background water quality records shall be maintained for the design period of the landfill;
X	SECTION I	___	___	d.	Maintain annual estimates of the remaining life of constructed landfills and of other permitted areas not yet constructed and submit this estimate annually to the Department.

L. **WATER QUALITY AND LEACHATE MONITORING REQUIREMENTS** (62-701.510, FAC)

S	LOCATION	N/A	N/C		
X	SECTION II			1.	Water quality and leachate monitoring plan shall be submitted describing the proposed ground water, surface water and leachate monitoring systems and shall meet at least the following requirements;
X	SECTION II			a.	Based on the information obtained in the hydrogeological investigation and signed, dated and sealed by the PG or PE who prepared it; (62-701.510(2)(a),FAC)
X	SECTION II EXHIBIT F			b.	All sampling and analysis preformed by organizations having Department approved Comprehensive Quality Assurance Plans; (62-701.510(2)(b),FAC)
				c.	Ground water monitoring requirements; (62-701.510(3),FAC)
X	SECTION II			(1)	Detection wells located downgradient from and within 50 feet of disposal units;
X	SECTION II			(2)	Downgradient compliance wells as required;
X	SECTION II			(3)	Background wells screened in all aquifers below the landfill that may be affected by the landfill;
X	SECTION II			(4)	Location information for each monitoring well;
X	SECTION II			(5)	Well spacing no greater than 500 feet apart for downgradient wells and no greater than 1500 feet apart for upgradient wells unless site specific conditions justify alternate well spacings;
X	SECTION II			(6)	Well screen locations properly selected;
		X		(7)	Procedures for properly abandoning monitoring wells;
		X		(8)	Detailed description of detection sensors if proposed.

S	LOCATION	N/A	N/C	
				d. Surface water monitoring requirements; (62-701.510(4),FAC)
		X		(1) Location of and justification for all proposed surface water monitoring points;
		X		(2) Each monitoring location to be marked and its position determined by a registered Florida land surveyor;
		X		e. Leachate sampling locations proposed;(62-701.510(5),FAC)
				f. Routine sampling frequency and requirements; (62-701.510(6),FAC)
		X		(1) Background ground water and surface water sampling and analysis requirements;
		X		(2) Leachate semi-annual and annual sampling and analysis requirements;
		X		(3) Detection well semi-annual sampling and analysis requirements;
		X		(4) Compliance well sampling and analysis requirements;
		X		(5) Surface water sampling and analysis requirements.
X	SECTION I			g. Describe procedures for implementing assessment monitoring and corrective action as required; (62-701.510(7),FAC)
X	SECTION II			h. Water quality monitoring report requirements; (62-701.510(9),FAC)
X	SECTION II			(1) Semi-annual report requirements;
X	SECTION II			(2) Bi-annual report requirements signed, dated and sealed by PG or PE.

M. SPECIAL WASTE HANDLING REQUIREMENTS (62-701.520, FAC)

S	LOCATION	N/A	N/C		
X	SECTION I			1.	Describe procedures for managing motor vehicles; (62-701.520(1),FAC)
X	SECTION I			2.	Describe procedures for landfilling shredded waste; (62-701.520(3),FAC)
		X		3.	Describe procedures for asbestos waste disposal; (62-701.520(4),FAC)
		X		4.	Describe procedures for contaminated soil disposal; (62-701.520(5), FAC)

N. LANDFILL FINAL CLOSURE REQUIREMENTS (62-701.600,FAC)

				1.	Closure schedule requirements; (62-701.600(2),FAC)
X	SECTION II			a.	Documentation that a written notice including a schedule for closure will be provided to the Department at least one year prior to final receipt of wastes;
X	SECTION II			b.	Notice to user requirements within 120 days of final receipt of wastes;
X	SECTION II			c.	Notice to public requirements within 10 days of final receipt of wastes.
				2.	Closure permit general requirements; (62-701.600(3),FAC)
X	SECTION II			a.	Application submitted to Department at least 90 days prior to final receipt of wastes;
				b.	Closure plan shall include the following:
X	SECTION II			(1)	Closure report;
X	SECTION II			(2)	Closure design plan;
X	SECTION II			(3)	Closure operation plan;
X	SECTION II			(4)	Closure procedures;
X	SECTION II			(5)	Plan for long term care;

S	LOCATION	N/A	N/C	
X	SECTION II	___	___	(6) A demonstration that proof of financial responsibility for long term care will be provided.
				3. Closure report requirements; (62-701.600(4),FAC)
				a. General information requirements;
X	SECTION II	___	___	(1) Identification of landfill;
X	SECTION II	___	___	(2) Location, description and vicinity map;
X	SECTION II	___	___	(3) Total acres of disposal areas and landfill property;
X	SECTION II	___	___	(4) Legal property description;
X	SECTION II	___	___	(5) History of landfill;
X	SECTION II	___	___	(6) Identification of types of waste disposed of at the landfill.
X	SECTION II	___	___	b. Geotechnical investigation report and water quality monitoring plan required by Rule 62-701.330(4),FAC;
X	SECTION III SHEET 3			c. Land use information report indicating: identification of adjacent landowners; zoning; present land uses; and roads, highways right-of-way, or easements.
___	_____	X	___	d. Report on actual or potential gas migration at landfills containing biodegradable wastes including detailed description of test and investigation methods used;
X	SECTION I, SECTION II			e. Report assessing the effectiveness of the landfill design and operation including results of geotechnical investigations, surface water and storm water management, gas migration and concentrations, condition of existing cover, and nature of waste disposed of at the landfill;
				4. Closure design requirements to be included in the closure design plan: (62-701.600(5),FAC)
X	SECTION III SHEET 5			a. Plan sheet showing phases of site closing;

S	LOCATION	N/A	N/C		
X	SECTION III SHEET 6			b.	Drawings showing existing topography and proposed final grades;
X	SECTION II			c.	Provisions to close units when they reach approved design dimensions;
X	SECTION II			d.	Final elevations before settlement;
X	SECTION II			e.	Side slope design including benches, terraces, down slope drainage ways, energy dissipators and discussion of expected precipitation effects;
				f.	Final cover installation plans including:
	NOT SUBMITTED				(1) CQA plan for installing and testing final cover;
X	SECTION II				(2) Schedule for installing final cover after final receipt of waste;
X	SECTION II				(3) Description of drought-resistant species to be used in the vegetative cover;
X	SECTION II				(4) Top gradient design to maximize runoff and minimize erosion;
X	SECTION II				(5) Provisions for cover material to be used for final cover maintenance.
				g.	Final cover design requirements:
X	SECTION II				(1) Protective soil layer design;
X	SECTION II				(2) Barrier soil layer design;
X	SECTION II				(3) Erosion control vegetation;
		X			(4) Geomembrane barrier layer design.
X	SECTION II			h.	Proposed method of stormwater control;
X	SECTION II			i.	Proposed method of access control;
X	SECTION II			j.	Description of proposed final use of the closed landfill, if any;

S	LOCATION	N/A	N/C		
				5.	Closure operation plan shall include: (62-701.600(6),FAC)
X	SECTION II				a. Detailed description of actions which will be taken to close the landfill;
X	SECTION II				b. Time schedule for completion of closing and long term care;
X	SECTION II				c. Describe proposed method for demonstrating financial responsibility;
X	SECTION II				d. Indicate any additional equipment and personnel needed to complete closure.
X	SECTION II				e. Development and implementation of the water quality monitoring plan required in Rule 62-701.510, FAC.
		X			f. Development and implementation of routine gas monitoring program required in Rule 62-701.400(10)(c), FAC.
		X		6.	Justification for and detailed description of procedures to be followed for temporary closure of the landfill, if desired; (62-701.600(7),FAC)

O. CLOSURE PROCEDURES (62-701.610,FAC)

S	LOCATION	N/A	N/C		
X	SECTION II	___	___	1.	Survey monuments; (62-701.610(2),FAC)
X	SECTION II	___	___	2.	Final survey report; (62-701.610(3),FAC)
X	SECTION II	___	___	3.	Certification of closure construction completion; (62-701.610(4),FAC)
X	SECTION II	___	___	4.	Declaration to the public; (62-701.610(5),FAC)
X	SECTION II	___	___	5.	Official date of closing; (62-701.610(6),FAC)
X	SECTION II	___	___	6.	Use of closed landfill areas; (62-701.610(7),FAC)

P. LONG TERM CARE REQUIREMENTS (62-701.620,FAC)

X	SECTION II	___	___	1.	Right of property access requirements; (62-701.620(4),FAC)
X	SECTION II	___	___	2.	Successors of interest requirements; (62-701.620(5),FAC)
X	SECTION II	___	___	3.	Requirements for replacement of monitoring devices; (62-701.620(7),FAC)
X	SECTION II	___	___	4.	Completion of long term care signed and sealed by professional engineer (62-701.620(8), FAC).

Q. FINANCIAL RESPONSIBILITY REQUIREMENTS (62-701.630,FAC)

SUBMITTED UNDER SEPERATE COVER		___	___	1.	Provide cost estimates for closing, long term care, and corrective action costs estimated by a PE for a third party performing the work, on a per unit basis, with the source of estimates indicated; (62-701.630(3)&(7), FAC).
___	"	___	___	2.	Describe procedures for providing annual cost adjustments to the Department based on inflation and changes in the closing, long-term care, and corrective action plans; (62-701.630(4)&(8), FAC).
___	"	___	___	3.	Describe funding mechanisms for providing proof of financial assurance and include appropriate financial assurance forms; (62-701.630(5),(6),&(9), FAC).

R. CLOSURE OF EXISTING LANDFILLS (62-701.640, FAC)

S	LOCATION	N/A	N/C		
X	SECTION I			1.	Demonstration that facility does not pose a bird hazard to aircraft as specified in Rule 62-701.320(12)(b), FAC.
X	SECTION II EXHIBIT H			2.	Demonstration that facility does not restrict the flow of the 100-year flood, reduce water storage capacity or result in wash-out of solid waste as specified in Rule 62-701.340(4)(b), FAC.
X	SECTION II			3.	Demonstration that facility is not located in a fault area, seismic zone or unstable area as specified in Rule 62-701.410(2)(c), FAC.
				4.	Request for extension of closure criteria as specified in Rule 62-701.640(2)(a) & (2)(b), FAC.
		X		a.	Demonstration of no alternative disposal capacity.
X	SECTION I			b.	Demonstration of no threat to human health or the environment.

S. MATERIALS RECOVERY FACILITY REQUIREMENTS (62-701.700,FAC)

		X		1.	Demonstration of financial assurance to cover closing costs, if required; (62-701.700(4),FAC)
		X		2.	Materials recovery facility requirements; (62-701.700,FAC)
		X		a.	Submit information required in Rule 62-701.320,FAC
		X		b.	Submit an engineering report including the following:
		X			(1) Description of the solid waste proposed to be collected, stored, processed or disposed;
		X			(2) Projection with assumptions for waste types and quantities expected in future years;

S	LOCATION	N/A	N/C	
___	_____	X	___	(3) Description of operation and functions of all processing equipment with design criteria and expected performance;
___	_____	X	___	(4) Description of flow of solid waste, expected regular facility operations, procedures for start up and shut down, potential safety hazards and control methods including fire protection;
___	_____	X	___	(5) Description of loading, unloading, and processing areas;
___	_____	X	___	(6) Identification and capacity of temporary on-site storage areas for materials handled and provisions for solid waste and leachate containment;
___	_____	X	___	(7) Identification of potential ground water and surface water contamination;
___	_____	X	___	(8) Plan for disposal of unmarketable recyclables and residue and contingencies for waste handling during breakdowns.

c. Submit the following operational information:

___	_____	X	___	(1) Operation and maintenance manual;
___	_____	X	___	(2) Waste control plan to manage unauthorized wastes;
___	_____	X	___	(3) Contingency plan for emergencies;
___	_____	X	___	(4) Closure plan including the following:
___	_____	X	___	(a) Notification to Department 180 days prior to closure;
___	_____	X	___	(b) Procedures for removal of all waste within 30 days of receipt of final waste;
___	_____	X	___	(c) Completion of closure activities within 180 days of receipt of final waste and notification to the Department that closure is complete.

T. **CERTIFICATION BY APPLICANT AND ENGINEER OR PUBLIC OFFICER**

A. Applicant

The undersigned applicant or authorized representative of BUTTREY DEVELOPMENT, LLC. is aware that statements made in this form and attached information are an application for a CLASS III LANDFILL Permit from the Florida Department of Environmental Regulation and certifies that the information in this application is true, correct and complete to the best of his knowledge and belief. Further, the undersigned agrees to comply with the provisions of Chapter 403, Florida Statutes, and all rules and regulations of the Department. It is understood that the Permit is not transferable, and the Department will be notified prior to the sale or legal transfer of the permitted facility.

Signature of Applicant or Agent

JOHN BUTTREY, PRESIDENT
Name and Title

Date: 2-14-00

Attach letter of authorization if agent is not a governmental official, owner, or corporate officer.

B. Professional Engineer Registered in Florida or Public Officer as required in Section 403.707 and 403.707(5), Florida Statutes.

This is to certify that the engineering features of this solid waste management facility have been designed/examined by me and found to conform to engineering principals applicable to such facilities. In my professional judgement, this facility, when properly maintained and operated, will comply with all applicable statutes of the State of Florida and rules of the Department. It is agreed that the undersigned will provide the applicant with a set of instructions of proper maintenance and operation of the facility.

Signature

EDWARD CHESNEY, P.E.
Name and Title (please type)

51888
Florida Registration Number
(please affix seal)

Date: 2/14/00

6239 EDGEWATER DR. SUITE D-1
Mailing Address

ORLANDO, FL 32810
City, State, Zip Code

(407) 296-0016
Telephone Number

DEP FORM 62-701.900(1)
Effective 05-19-94

SECTION II

ENGINEERING REPORT

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

1.0 INTRODUCTION

1.1 Objective

The objective of this Engineering Report is to develop an acceptable construction plan for the proposed Keene Road Disposal Class III landfill. This report is designed to meet the Class III requirements of the Florida Department of Environmental Protection (FDEP) as outlined in 62-701.320 (7) (a) (d), Florida Administrative Code (FAC). A similar application has already been submitted to Orange County E.P.D.

1.2 Site Location and Background

The proposed landfill site is located at 230 west Keene Road, Apopka Florida, Orange County, Section 28 - Township 21- Range 28. The attached aerial (Exhibit A) shows the site borrow activity, as well as the surrounding land use. This site is located just south of the existing Waste Management Keene Road Landfill, and adjacent to the B.F.I. Medical Waste Facility. Located just to the south of the site is the Northwest Water Reclamation Rapid Infiltration Basin (RIB) Facility, owned and operated by Orange County. The proposed landfill site is 60 acres and currently has 37 acres permitted as a borrow pit. The 37 acre borrow pit is the proposed Class III landfill footprint. Above ground construction is proposed to elevation +150 feet NGVD. The average site elevation is approximately + 100 feet NGVD.

2.0 REGIONAL GEOLOGY & HYDROGEOLOGY

2.1 Geology

The site lies within the Apopka Upland physiographic subdivision, a part of the Central Lake District (Brooks, 1981) which is characterized by sand hills and small lakes. These features are developed on a thick sequence of limestone which lie beneath 80 to 100 feet of surficial sands and clays. The area is known for typical relic karstic features (steep sided conical depressions) some of which are filled with water (lakes).

In general, the sediments which underlie Orange County consist of about 6500 feet of marine sand, limestone, anhydrite, dolomite and shale which overlie granite and other crystalline rocks. Only the upper 2,000 feet contain fresh water, therefore, discussion is limited to these sediments.

The surficial soils are mostly undifferentiated marine sediments consisting of loose poorly- sorted quartz sand with varying amounts of organic matter and occasional lenses of clay. These sediments are generally thought to have been deposited on the bottom of shallow seas during interglacial times when sea level was higher than it is at present. Thickness of the surficial deposits ranges from approximately 30 to 60 feet in the area around the site.

According to the Soil Conservation Service (1989) this site is located within the Lakeland-Blanton

Soil Association. These soils are characterized as fine sands with a deep water table and rapid permeability. The wet season water table is reported to be deeper than 10 feet in Lake land soils and to be within 2 to 6 feet of ground surface in Blanton soils. Permeability of these soils ranges from 6 to 20 inches per hour.

The Hawthorn Formation lies beneath the surficial deposits. The Hawthorn consists mostly of greenish, clayey sand and sandy clay with appreciable quantities of phosphorite grains. It is highly variable in character and includes interbedded sands, clayey sands, sandy clays, phosphatic sediments, dolomites and limestones. The limestones and dolomite generally occur near the base of the Hawthorn and may be hydraulically connected with the underlying Floridan aquifer. Orange County is an a transitional lithologic zone where the presence of the Hawthorn limestone and dolomite is quite variable. The Hawthorn Formation, where present, forms a confining layer between the surficial and underlying Floridan aquifer. This confining layer is estimated to be between 50 and 80 feet thick, but may be entirely absent in some areas.

The Hawthorn Formation unconformably overlies the Ocala Limestone, which consists of cream to tan, fine grained, porous limestone. After deposition, the limestone was exposed above sea level for an extended period of time. During that exposure, the limestone was weathered prior to re-submergence and the deposition of the Hawthorn Formation sediments. The Ocala Limestone beneath the proposed site is estimated to be approximately 30 feet thick (Litchtler, et al, 1968). Scott (1980) estimated the top of the Ocala to occur at elevation 0 feet NGVD in the area surrounding the site (approximately 100 feet below ground surface). Beneath the Ocala there is 1100 to 1300 feet of limestone belonging to the Avon Park Formation.

2.2 Hydrogeology

Groundwater in western Orange County occurs under both non-artesian and artesian conditions. The non-artesian surficial aquifer occurs in the undifferentiated marine deposits which extend to a depth of 30 to 60 feet. The aquifer in the vicinity of the proposed landfill is recharged by infiltration of rainfall and by return seepage of irrigation water.

The Ocala Limestone and underlying limestones form one to the most productive aquifers in the world, the Floridan aquifer. The potentiometric surface of the Floridan aquifer was approximately 55 feet NGVD in May, 1983 (Barr, Schiner, 1983) and 58 feet NGVD in September 1983 (Barr, Schiner, 1983). Gradients between the surficial and Floridan aquifers indicate the surficial aquifer at various times of the year may recharge the Floridan aquifer in the project area. Based on potentiometric surface maps, regional flow in the Floridan aquifer is generally northeastward under the project area (Figure 1). Several Floridan aquifer wells installed across the street at the existing Keene Road landfill confirm the above mentioned potentiometric surface elevations on average, but have also at times reported values of five feet or more below those values mentioned above. Based on observed head readings of the surficial and Floridan aquifers in this area, there does not appear to be a downward tendency between the two.

2.3 Sinkholes

It is likely that higher elevation portions of the region have experienced sinkhole activity during prehistoric time. While the region has several characteristics which are indicative to sinkholes (lakes), the area has a low probability of sinkhole activity for the near future. The area around this site has been and is still subject to large withdrawals from the Floridan aquifer for spray irrigation of the many nurseries which occupy the region. The proposed site area has no recorded history of subsidence events and there is no reason from observations during field work to suspect that any such events are likely to happen during the life or closure period of the landfill. In addition the active Orange County Northwest Water Reclamation RIBS Facility located south of the proposed landfill site may actually reduce the potential for sinkholes due to the infiltration and recharge it provides to the area.

2.4 Well Inventory

Several well inventories within one mile of the of the project site have already been performed during the permitting of the Waster Management Landfill across the street, and the B.F.I. facility next door. The attached Table 1 was compiled from their records obtained from the St. Johns River Water Management District, along with a ground search for other visible wells not registered. Most of the wells within this radius are used for irrigating foliage plant or citrus. Other uses include public, industrial, and private supply. Well depths range from 105 to 668 feet, with the deepest, largest capacity wells being the deepest. Little data is know about the well construction of wells in this area. Typically, most wells are cased to about 100 feet, which would allow for most of the water being withdrawn from the upper part of the Floridan aquifer. Exhibit B contains an aerial which covers a one mile radius and shows the location of know wells within this radius.

3.0 Site Geology & Hydrogeology

The subsurface exploration for this study first began during the borrow pit permitting phase of this project. At that time, four Standard Penetration Test (SPT) borings to various depths were performed. Following these borings, five additional deeper SPT borings were performed as part of the landfill exploration. Refer to Figure 2 of this section for the soil boring locations, and Figure 3 for a cross section of these borings. Also attached as Exhibit C are two Soil Reports, prepared by Universal Engineering Sciences. These reports contain the boring logs and associated laboratory tests done at each boring location.

The soil profile beneath this site generally consists of fine to slightly silty fine sands of various depths (0-40 feet) which overlies clayey sands and sandy clays. Based on seven borings (B-1 through B-7) which were performed within the foot print of the proposed landfill and permitted borrow pit, the clayey sand and sandy clay layers appear to be continuous under this area. The profile for B-9 was consistent with that of borings B-1 through B-7, while B-8 reported fine sands to its terminated depth.

Groundwater beneath the site is generally found in the lower sands and upper part of the clayey sands or clay layers. Groundwater flow in the surficial aquifer is primarily controlled by local topography. Groundwater estimates are based on piezometers and soil borings from the borrow pit permitting, along with additional borings and monitor wells installed as part of this assessment. Sandy clays which exist across this site have the ability to perch water and can actually give a false interpretation of the actual groundwater elevation. Based on the results of site investigation, along with known data in the area (lake levels, adjacent monitor wells), an average (seasonal normal) groundwater elevation of 50.0 feet NGVD can estimated. Also based on these elevations, a surficial groundwater flow direction to the southwest (towards Lake Apopka) was determined. Exhibit D contains a groundwater report prepared by Universal Engineering showing the existing monitor well locations along with a groundwater flow direction map developed from these wells. Note, the water table elevations recorded were determined during a reasonably dry period at the beginning of 1999.

3.1 Soil Testing

In addition to visual examination of the recovered samples, the following laboratory tests were conducted on select samples; full Grain Size and -200 Sieve Analysis, Atterburg Limits, vertical permeability (from Shelby Tube samples), porosity, along with FDOT corrosive series testing. The clays and sandy clays are the materials in which the proposed landfill will be constructed on top of. The results of all laboratory tests are listed on the corresponding soil boring log at the depth of the material tested, or the within the appendix of the associated report. Vertical permeability as determined by the constant head method ranged from $3.01E^{-6}$ to $5.29E^{-7}$ cm/sec. These confining type soils underlie the sandy material excavated during the borrow pit operations. The clayey and silty sands and clays are classified as the Hawthorn Formation. These sediments, when present, form an effective confining layer above the Floridan aquifer. The presence of these soils across the site, its relative thickness and confining qualities support the request to permit this Class III facility without installing an additional liner system. These clayey confining stratums have also been proven to exist across the street (to the north) at the Keene Road Landfill site at similar depths with similar composition, as well as similar to the soils found south at the Orange County RIB facility.

Attached as Exhibit E are two reports prepared by Universal Engineering Sciences Inc., these reports cover the bearing capacity and settlement analyses (foundation analysis) and the slope stability of the proposed landfill design. The purpose and goal of these evaluations was to examine the structural integrity of the landfill subgrade to support the expected loads and stresses at design elevations and the associated slope stability using design criteria.

4.0 Groundwater Monitoring Plan

The purpose of this Groundwater Monitoring Plan is to monitor groundwater and groundwater quality following the permitting of this site as a Class III Landfill. The goal of the system is to identify any potential groundwater quality impacts caused by site landfilling activities that would violate State of Florida groundwater quality standards. Water quality will be monitored within the zone of discharge. The zone of discharge is defined as the volume of aquifer underlying and

surrounding the site to the base of the uppermost aquifer and out 100 feet from the landfill, or to the property line, whichever is less. Monitoring within this area allows for the treatment, mixture or dispersion of waters into the receiving groundwater if necessary. This will be achieved first by establishing a baseline of the existing groundwater conditions prior to any filling, and then monitoring the site for any changes or deviations in groundwater quality.

The proposed groundwater monitoring system was based on all the geologic and hydrogeologic information collected to date, regional data and as several file reviews of the neighboring Keene RD. Class III landfill and the Northwest Water Reclamation Facility. Based on investigations to date, we are able to describe the aquifer(s) potentially affected by the proposed facility, and the most likely pathways and rates of any leachate or contaminants that may discharge from the facility.

4.1 Monitor Well Locations

The proposed well locations (Figure 4) have been strategically located to establish the background quality of the surficial aquifer, followed by ongoing monitoring of the water quality down gradient of the proposed landfill. Based on the depth of the screened intervals, each well will monitor the surficial/intermediate water bearing sands above the Floridan confining unit. Deeper wells are also proposed for Floridan monitoring. Based on the varying thickness of each soil unit and the depth to groundwater, this site does not have distinct "surficial" or "intermediate" aquifer zones, because site confining units/layer exists at elevations within the surficial aquifer.

The potentiometric surface map of the Floridan Aquifer (refer back to Figure 1) indicates groundwater flow direction beneath the facility is northeastward. Referring back to Figure 4, MW-F3 serves as an upgradient well, and MW-F1 and MW-F2 serve as downgradient wells for the Floridan aquifer monitoring.

Monitoring of the surficial aquifer is as follows: two of the three monitor well installed during site investigations (MW-2 & MW-3) are proposed to become part of the groundwater monitoring plan. Monitor wells MW-3, MW-4 & MW-5 will serve as downgradient wells. MW-2 & MW-6 will serve as upgradient wells. Two side gradient wells (MW-7 & MW-8) are also proposed.

4.2 Groundwater Flow Direction & Velocities

As discussed above, regional flow in the Floridan aquifer is known to be generally northeastward in the project area. Multiple Floridan monitor wells located just across the street, agree with this flow direction. Comparing four Floridan wells (FL-05, FL-06, FL-07, & FL-08) located at the Waste Management Keene Road Landfill, an average horizontal gradient (I) of 5.8 E^{-04} ft/ft resulted. An average horizontal velocity (V_h) of the Floridan can be calculated using this horizontal gradient along with representative horizontal hydraulic conductivity (K_h) (100 ft/day (0.35cm/sec) and porosity values (n_e) (0.27).

Average horizontal groundwater velocities can be calculated based on the following equation:

$$V_h = (I)(K_h)/(n_e)$$

Thus an average groundwater velocity in the Floridan Aquifer System can be calculated as 7.51 E^{-04} cm/sec or 0.21 ft/day.

Similarly, average groundwater velocities, hydraulic conductivities and flow direction for the surficial/intermediate aquifer system have been calculated. These values were calculated by Universal Engineering Sciences, using slug test data from site wells installed specifically for that purpose. The hydraulic conductivity as measured at MW-2 is representative of the typical surficial sands (101.29 ft/day). The hydraulic conductivity measured at MW-3 is representative of the typical surficial/intermediate aquifer sandy clays (1.03 ft/day). Values determined from MW-1 (0.94 ft/day) are representative of a saturated zone of silty sands/clays. Refer back to the attached Universal Engineering Sciences Report (Exhibit D) for more specific details and analysis. The groundwater flow velocity varies across the site due to the variable hydraulic conductivities and is estimated to be 0.23 ft/day.

5.0 Groundwater Monitoring System Design

As discussed above, the surficial aquifer at the site is shown to have a general flow trend to the southwest, while the Floridan aquifer is known to have a general flow to the northeast. Although our study found no direct or significant interconnection between the surficial and Floridan aquifers, monitoring of the Floridan aquifer will be achieved following the installation of three deep monitor wells MW-F1, MW-F2 and MW-F3. MW-F3 will serve as a background well, while MW-F1 and MW-F2 will be used to intercept flow deep beneath the landfill. Monitoring of the surficial/intermediate aquifers will be achieved by the monitoring of seven surficial wells. Monitor wells MW-2 & MW-6 will serve as upgradient wells, while MW-3, MW-4 & MW-5 will serve as downgradient wells. MW-7 & MW-8 are for the purpose of side gradient wells. Refer back to Figure 4 for the proposed monitor well locations.

5.1 Monitor Well Installation

Based on the groundwater information gathered during the site investigation, and all other materials used during our review (IE: Keene Road Landfill), all permanent monitor wells should be installed to the depths specified in Table 2. These depths and construction details are based on field conditions encountered through June, 1999. Actual well construction details will depend on field conditions encountered at the time of installation, at which time adjusts may be made. The proposed wells (as were the existing wells) will be installed by a licensed water well contractor utilizing 6-inch I.D. hollow-stem augers. At each well location, a standard penetration test (SPT) boring will be advanced, to assure proper placement and screen interval location. Following the SPT boring and visual examination, the hollow stem augers will be advanced.

5.1.1 Monitor Well Design

Design details of all existing monitor wells as well as those proposed are shown on Table 2. Well screen and filter pack selections was based on lithologic samples and grain size analysis conducted at the various soil boring and monitor well locations. Using this data and recommendations from EPA, ASTM and Driscoll's "Groundwater and Wells", standard commercial slot sizes and filter pack gradations were selected. Each well will be finished with a 6-inch locking galvanized steel protector set in concrete. Well depths were determined based on existing site monitor wells, along with available local data. Screen lengths for the surficial wells were selected to accommodate for both drought and surplus groundwater conditions. Upon completion, the top of casing elevation will be surveyed and tied to existing well elevations on the site. Development of each well will follow consisting of pumping with a small submersible pump until the water is clear.

5.2 Sampling and Analysis Plan

The sampling and analysis plan is developed for a 'virgin" landfill site. Following the acceptance of the proposed monitor well locations, (and prior to the acceptance of waste) background evaluation at each well location will be performed (for a total of eleven wells). The parameters for the background evaluation and the first semi-annual monitoring event shall be the Florida Primary and Secondary Drinking Water parameters, and those listed in Appendix I and II of 40 CFR part 258. Following the results of the first semi-annual sampling event, (assuming favorable results) MW-6, MW-7, MW-8, & MW-F3 are proposed to go to annual sampling only. MW-1 will completely drop out of the sampling lineup. In addition, at the agencies discretion, sampling parameters will also be re-evaluated following the first semi-annual event.

All related field and laboratory activities will be performed by ENCO Laboratories of Orlando, who have an FDEP approved CompQAP. ENCO's approved CompQAP outlines both their field and laboratory parameters, as well as specific procedures. Monitor well sampling following the baseline will occur semi-annually. Refer to Exhibit F for a copy of their qualifications. At least ten days prior to the next sampling event, both Orange County and FDEP will be notified. At that time, the sampling team will be prepared to submit a split sample/samples if requested. In addition, keys for all monitor well will be stored on site and made available to monitoring agencies during normal business hours (even without prior notice).

5.2.1 Implementation

Upon approval of the location and sampling plans discussed above, all wells will be installed and sampled. Well completion logs as well as surveys for each well will be submitted to all appropriate agencies within thirty days of installation.

6.0 Stormwater Management

6.1 Introduction

The site is currently permitted with Orange county as a borrow pit operation (98-E2-213) and is also permitted by the Saint Johns River Waster Management District (SJRWMD) (Management and Storage of Surface Waters (MSSW) No. 4-095-0564-ERP). The current SJRWMD permit covers the surface water management of the 60 acre site through the active life of the borrow pit and beyond however, it does not cover the proposed landfill activities such as the proposed changes in the elevation of the site. Exhibit G contains a copy of the active SJRWMD permit. As a result, this active SJRWMD permit substitutes for the pre-development analysis and discussion. The discussion and calculations contained herein, pickup with the landfilling operations and the landfill mound (post conditions) which will result. With this application to the FDEP, it is intended/assumed that the existing SJRWMD MSSW permit will be transferred (taken over by) to the FDEP, and stormwater management will fall under FDEP jurisdiction for the life of the landfill.

6.2 Development Basin Discussion

For the purpose of this application, the proposed landfill site can divided into three development basins. These basins are identified as B10, B20, & B30. Three stormwater ponds identified as P10, P20, & P30 are designed and proposed to manage the surface water related to the construction of the landfill. In addition 2 infiltration galleries along the southern property line are proposed to readily handle any excess runoff on the southern face of the high rise. Prior to landfilling above the existing grades, temporary storage areas within the open excavation will divert water away from the active working face. A perimeter berm around the open excavation will prevent surface runoff from entering the excavation. As a result, the only water able to enter the open excavation would be from normal rain fall events. Refer to Sheet 4 of 11 of the construction plans for a map of the site's basin boundaries.

The proposed landfill site does not lie within any boundaries of the 100 year floodplain as delineated by the Federal Emergency Management Agency. Exhibit H contains a copy of the relative FIRM panel. Figure 5 depicts the site location on the corresponding U.S.G.S topographic map. Several small lakes can be identified on the U.S.G.S map and referenced to the lake level data provided on Table 3. This lake level data was obtained from Orange county records, and further supports the groundwater elevation data collected as part of this projects field investigations.

6.3 Stormwater Management

The project was evaluated considering the 100 year, 24 hour storm event using a 10.60 inch rainfall depth. (ADVANCED INTERCONNECTED CHANNEL & POND ROUTING (ICPR VER 2.11)). This approach uses the Soil Conservation Service (SCS) Unit Hydrograph Method to compute runoff hydrographs for small watersheds. Rainfall excess is computed using the SCS curve number and infiltration formulas outlined in Urban Hydrology for Small Watersheds, Technical Release 55.

Rainfall excess is then applied based on the basin characteristics and hydrograph shape factor to obtain runoff throughout the entire storm duration.

6.4 Design Notes

The site generally ranges in altitude from approximately 108 feet at its highest point to approximately 78 feet at its lowest point, with the landfill footprint falling within (averaging) the 95 to 100 foot elevations. Refer to Exhibit I for a copy of the most recent topographic/boundary survey.

The proposed stormwater management system consists primarily of three retention basins designed to collect runoff from the covered landfill areas through a system of inlets, piping, chutes and swales. The project as designed provides total onsite storage and percolation of the design storm runoff. In addition to the three ponds which were designed to accommodate the 100 year 24 hr storm event, two infiltration galleries are proposed along the southern property line. The addition of these infiltration components is to insure that runoff of the southern face does not leave the site.

The typical swale ditches were developed as a dry conveyance system, with 5 foot wide bottoms and 3 to 1 side slopes. The depths of these conveyance channels may vary depending on calculated flows. All three retention basins are designed as dry ponds with 5 to 1 side slopes. In each basin, the seasonal high groundwater table elevation is greater than 5 feet below the pond bottom. The lowest bottom elevation proposed is 70.0' N.G.V.D. which is in excess of 10 feet above the seasonal high groundwater table. The three ponds are sized to provide total onsite storage/retention of site runoff in excess of the 100 year 24 hour storm event.

Construction Plan Detail Sheets 8, 9, & 10 contain the various aspects of the drainage design features. In addition, flow and routing directions within each basin are also indicated.

6.5 Soil Design

SCS Type soils: For the purpose of these calculations, curve numbers (CN) of 49 and 90 were used for the pre & post development conditions of the site, considering soil types A and C/D respectively. Figure 6 presents the Orange County Soil Survey Map for the site and surrounding areas. The "virgin" site consists of Hydrologic Soil Group A (Candler Fine Sand). Once the site is land filled, the land filled areas would then be classified as Hydrologic Soil Group C/D (Arents). Exhibit J contains the post development time of concentration calculations used in the I.C.P.R. modeling.

Based on the findings reported of the hydrogeologic survey (discussed above), a surficial aquifer elevation of approximately 50 feet was established. This elevation is considered to be below normal for the season. Also referenced and discussed above were other details of the hydrogeologic survey, which contains all of laboratory tests to date. These tests include horizontal and vertical permeability along with field tested hydraulic conductivities.

The system is designed for the 100 year, 24 hour storm event, using a 10.60 inch rainfall depth. Runoff will be routed to the surrounding dry bottom ponds where water will be allowed to percolate naturally into the surficial aquifer without any mounding or other effects to the site water table.

6.6 Post Development Conditions

The following summary (Table 4) Basin/Pond relationships are a result of the I.C.P.R. modeling of each basin and pond. These relationships provide the stage/area data for each of the three basins and three ponds for the 100 year 24 hour rain event. Exhibit K contains the computer generated input and output results of each basin run.

6.7 Pond Recovery

The computer program "PONDS" version 2.25 was utilized to demonstrate the ability of the ponds to recover from storage of runoff in reasonable time frames. The recovery analysis also considered the 100 year 24 hour storm event (10.60 inch). Due to the comfortable separation between the pond bottoms and the seasonal high groundwater table, groundwater mounding is not expected, or considered in the program run.

Exhibit L contains the program runs for each basin/pond relationship. These runs also include all the input parameters and assumptions used. Pond 10 is expected to recover in 3.3 days, Pond 20 is expected to recover in 1.5 days, and Pond 30 is expected to recover in 10.5 days. These recovery periods are all based on the 100 year storm event. The recovery period of Pond 30 may seem long, but was modeled considering a hydraulic conductivity "K" of 1 ft/day as calculated in the MW-1 data.

6.8 Conclusions

Based on the ample separation between the pond bottoms and the estimated seasonal high surficial aquifer along with the field tested for the sites hydraulic conductivity, the available storage volume of the proposed ponds is sufficient to contain the required storm event. In addition, these ponds as proposed exceed Orange county criteria for land-locked basins and have been designed to provide greater than one foot of freeboard in each pond as an additional factor of safety.

7.0 Reclamation & Closure Plan

7.1 Objective

The Keene Road Disposal Class III Landfill will be closed in accordance with Chapter 62-701, FAC. and all Orange County Solid Waste regulations. The final cover system proposed is designed to prevent infiltration of stormwater into the waste, and to provide positive drainage of stormwater off of the landfill mound. In addition, design elements are expected to minimize erosion of the cover

soil, and provide long term low maintenance performance.

7.2 Closure

In accordance with Orange county code, closure will be complete within 180 days of filling a cell to final grades. Cover material will be placed as follows: A weekly cover consisting of a 6 inch layer of clean fill material shall be applied to active filling areas. An intermediate cover consisting of 1 foot of clean fill material shall be applied within 7 days of placing waste in areas which will not receive additional waste for 180 days. The final cover shall be installed within 180 days after waste has been placed to final grades within each cell. Closure will occur in phases on a cell by cell basis. Based on available volume and expected disposal rates, the projected life of the proposed landfill is 11.31 years. Refer to Sheet 5 of 11 of the construction plans for the cell layout and volume calculations.

As determined during the October 19, 1999 B.O.C.C. approval, following closure, this site may become a Orange County Park. The decision to turn this into a park site is subject to the acceptance by the B.O.C.C. at that future time. If this is the case, the Department will be notified of the future use or activity.

7.3 Closure Design

The landfill is proposed to have side slopes of 3(horizontal) : 1(vertical). The top of the landfill will be graded at approximately 2% to direct runoff towards the swale design. The final design height will reach elevation 150' N.G.V.D. This is based on an average site elevation of 100'. The nearly level (gently sloping) top of the landfill will cover approximately 17 acres. Drainage swales will be constructed on the final cover to collect and divert surface runoff to perimeter swales and down chutes directed towards three stormwater ponds. Refer back to the construction plans for complete details and design of the drainage system.

7.4 Final Cover Design

The final cover for this facility will consist of the following design: Beginning at the top, a 0.5 foot thick layer of topsoil material will overlay a 1.0 foot thick layer of common fill material, which over lays a 1.5 foot thick clay unit (barrier layer). Refer to the construction plans found in Section III (Detail Sheets) for various cross sections of this design.

The 0.5 foot topsoil layer will be vegetated by seeding and mulching with Argentine Bahia grass. This type of drought tolerant grass is known to help minimize erosion. These seeded areas shall be watered to promote optimum growth using water from site water trucks. The underlying 1.0 of fill will be compacted during construction/placement to inhibit any root penetration down into the underlying clay barrier layer. The onsite sandy clays will serve as a cap, used as a final cover. The clays used will have a maximum permeability of 1.0×10^{-5} cm/sec. Soils are proposed to come from

onsite sources and have been laboratory test by Universal Engineering Sciences, Inc. Refer to the Universal Soils Reports found in Exhibit C for specific details of the onsite soils including laboratory testing done to date. Figure 3 presents the soil boring locations and cross sections which locates the clays proposed for use.

7.5 Final Cover Stability

Refer back to the Universal Engineering Sciences, Inc., Slope Stability Report found in Exhibit E, for details which evaluate the slope stability of the final cover system.

7.6 Final Cover Drainage System

Drainage swales will be incorporated in the final cover system to route and intercept surface water runoff. These swales along with a system of down chutes and drop inlets will convey the surface water runoff to adjacent dry detention areas. Refer to the construction plans which provide details of the proposed surface water routing for the proposed system.

7.7 Landscape Plan

During the Orange county "Special Use Zoning" approval of this project, we proposed to leave the existing site vegetation in its natural state where possible. The landfill will be located in excess of 400 feet south from the center line of Keene Road. The existing vegetation now shields the borrow activity nicely, and it expected to do the same for the land filling activities. A 50' minimum dense vegetative buffer will remain along Keene Road at all times. All areas outside of the landfill facilities/features will remain undisturbed as much as practicable. As a result, the landscape plan proposed for this site will exceed the minimum standards required by Chapter 32 of Orange County Code.

Referring to the construction plans (Sheet 11 of 11) an attempt to show the existing landscape is made. Also referring back to the 1999 aerial flown for this application (Exhibit A Section II), the existing buffer/landscape is more clearly shown. Any bare areas within the existing buffer will be filled in as required by the county, and additional buffering along the east, west and southern property lines will be in accordance with Orange County Code Section 21-5.

7.8 Closure and Long Term Care Cost

As required, a cost estimate for closure and long term care is being prepared by Chris Kohl Training and Consulting Services. Mr Kohl has prepared a similar estimate for Orange County on this project. This cost estimate will follow under separate cover, as submitted by Mr. Kohl. Once these costs are reviewed and deemed complete and acceptable to the FDEP, a surety guaranteeing performance will be forthcoming.

As required, at least one year prior to the projected closure date at which time wastes will no longer be accepted, written notices will be provided to Orange county as well as to the FDEP. At least 120 days prior to the projected closing date, the operator shall advise all known users of the upcoming closing of the facility. In addition, signs will be posted at this time and remain post throughout the closing period. Prior to closing and no less than 90 days prior to the scheduled closing day, a revised/updated closure plan/application will be submitted to both Orange county and FDEP. Finally, within 10 days prior to the actual closing date, a legal notice shall be published in the legal advertising section of a newspaper of general circulation in Orange county.

Long term care for this facility will include maintaining the landscaping, security features (fencing), and erosion control devises for a period conditioned and required by the county and FDEP. A approved groundwater monitoring plan and reporting schedule will also remain in force for the length of time conditioned by both entities (thirty years).

A final survey report will be prepared and submitted to verify that final contours and elevations of the facility are in accordance with the plans as approved in the permit. In addition, certification of closure construction completion, signed, dated and sealed by a professional engineer shall be provided to the Department.

7.9 Long Term Maintenance

Regular maintenance of all reclaimed areas shall be performed by the operator or a designated agent in order to assure that the reclamation standards are achieved and the approved reclamation plan is accomplished. The maintenance shall include monitoring and replacement of any planted areas that fail to survive in accordance with county standards. The monitoring time period shall be no less than the current regulations required and will be conditioned to the permit as well as directly related to the surety for long term care. Non-native species may be required to be removed during this period. In addition, general maintenance of the required slopes, embankment, ponds, fences, signs or any other site feature deemed necessary will be performed.