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SMITH AND GILLESPIE ENGINEERS, INC.
POST OFFICE BOX 53138
JACKSONVILLE, FLORIDA 32201

May 7, 1975

Mr. J. W. Beasley, Technician
Special Analytical Division
Florida Department of Pollution Control
West Central Region
Post Office Box 9205
Winter Haven, Florida 33880

Subject: Regional Solid Waste Study
S&G File No. 6902-17
Wauchula, Florida

Dear Mr. Beasley:

Confirming our telephone conversation last week and upon the direction of the City, please find enclosed a Status Copy of our Engineering Report on the Regional Solid Waste Study for the City of Wauchula, Florida, dated September 17, 1974.

As stated, this report is a comprehensive engineering study on the Greater Wauchula solid waste program with definite alternate plans in developing a regional solid waste facility. Therefore, we feel that the City of Wauchula has pursued a definite and sound course of direction in trying to obtain a regional solid waste disposal area that will meet your current regulations under Chapter 17-7.

The City and our firm will be pleased to keep you informed on the progress of the City's endeavor and especially any interim improvements they might pursue to continually upgrade their present facilities.

Thank you again for the excellent and continued cooperation you have given the City of Wauchula.

Very truly yours,

SMITH AND GILLESPIE ENGINEERS, INC.

James C. Williamson

JCW:lmj

cc: Mr. George Burris

ENGINEER'S REPORT ON

REGIONAL SOLID WASTE STUDY

FOR

CITY OF WAUCHULA, FLORIDA

FILE NO. 6902-17

* * * * *

SEPTEMBER 1974

ENGINEER'S REPORT ON
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FOR
CITY OF WAUCHULA, FLORIDA
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ENGINEER'S REPORT ON

REGIONAL SOLID WASTE STUDY

FOR

CITY OF WAUCHULA, FLORIDA

FILE NO. 6902-17

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1. AUTHORIZATION

This "Engineer's Report on Regional Solid Waste Study" was authorized by the City of Wauchula's Letter of Authorization dated April 9, 1974.

2. PURPOSE

The purpose of this report is (1) to evaluate solid refuse generation for the Greater Wauchula Area; (2) to determine the adequacy of present solid refuse facilities; (3) to review current sanitary landfill requirements including supporting documents required for an application for sanitary landfill; (4) to propose course of action required to obtain a sanitary landfill operating permit; (5) to estimate cost of sanitary landfill required according to rules of the Florida Department of Pollution Control, Chapter 17-7, Solid Waste Control; (6) to propose a method of financing the sanitary landfill improvements.

3. SCOPE

The scope of this report includes the Greater Wauchula Area, i.e., City of Wauchula, City of Bowling Green, City of Zolfo Springs and solid refuse contribution by Hardee County. The immediate program required to obtain temporary operation permit for the City of Wauchula only, as well as final program for the Greater Wauchula Area is recommended.

4. DESCRIPTION OF PLANNING AREA

A. Geographic Location and Population

The City of Wauchula is located in the central southern section of the State, as shown on Exhibit "A", "Location Map". The City is in Hardee County, approximately six miles south of Bowling Green.

The 1960 and 1970 population for Wauchula according to the Bureau of Census are 3,411 and 3,007, respectively. The 1975 projected population is estimated to be 3,860 people. Considering the present growth rate in Central Florida, it is reasonable to predict a steady increase of population for Wauchula. The 1985 estimated population is 4,711 people, a gain of 22 percent.

A regional solid waste study for the greater Wauchula area will include Bowling Green, Zolfo Springs, Wauchula and the County contributing population (which is assumed to be equal to the population

of Wauchula as shown in Exhibit "A". Table I, "Population Predictions", shows the present and projected populations of these three communities. The 1985 populations are based on a 22 percent increase from 1975, the projected growth rate for Hardee County.

Population data of 1972 are based on publications of the Florida Department of Commerce, Tallahassee, Florida.

Population data of June 1973 are based on publications of the University of Florida, Gainesville.

The Hardee County projected growth rate is based on 1974 Kiplinger Forecast of Florida's Growth.

TABLE I

POPULATION PREDICTIONS

	1960	1970	1972	Jul. 1973	1985
Wauchula	3,411	3,007	3,697	3,710	4,711
Bowling Green	838	1,117	1,350	1.415	1,801
Zolfo Springs	1,171	1,357	1,117	1,201	1,525
TOTAL	5,420	5,481	6,164	6,326	8,037

B. Land Use and Industrial Activity

Land within this area is used mainly for residential and citrus orientated, agricultural activities. Land utilized for commercial activities

is mainly devoted to citrus processing operations. Undeveloped land is being used for residential purposes, including homes and mobile home parks.

Industrial activities are the result of citrus processing processing plants. Agriculture, predominately citrus production, continues to play an important part in the economy of Wauchula. The development of future industrial operations will help supplement the agricultural activities.

5. SOLID REFUSE GENERATION

There are four basic factors which can affect the amount of solid refuse generated in an area or community, and these are as follows:

A. Geographic

The longer growing season produced by a warmer climate and sufficient annual rainfall increases the amount of yard trash generated such as grass clippings and tree trimmings. This is significant for this particular geographical area.

B. Economic

The quantities of solid waste generated are affected by per capita income and other habits and characteristics of the populace. Of the three communities considered, all have similar character of small cities in rural areas. The Cities of Wauchula and Bowling Green have

populations with income close to the national average, whereas Zolfo Springs is a community with rather low income. This results in a slightly smaller quantity of refuse generated per capita from the combined three communities when compared to the national averages.

C. Industrial and Manufacturing Activity

National average per capita waste figures do include industrial and manufacturing wastes. This contributes a significant portion to the per capita average. Since industry represents a small percentage of the total business activity in the region, the quantity of solid waste generated is less when compared to other industrial areas or the national averages.

D. Agriculture

Agriculture wastes are principally the manures and crop residues from various agricultural pursuits, including dairying and the raising of livestock and poultry. Although agriculture is normally thought of as separated from the municipalities, in the Greater Wauchula area various types of farms and small ranches may contribute to waste generation. The greater Wauchula area includes some agricultural installations, therefore both urban and rural activities have to be taken into consideration. Sanitary problems of animal and agricultural waste disposal cannot be ignored. Such wastes are largely organic and readily decomposable so that they must be disposed of in a sanitary manner. Joint disposal of moderate quantities of agricultural wastes along with

municipal refuse may be most satisfactory and economical. Agricultural wastes may slightly increase the total amount of waste.

The estimated amount of solid waste in 1970 generated per capita per year in the Greater Wauchual area is about 1,280 pounds per capita per year.The overall national average of refuse produced in 1970 per capita is 1,750 pounds per capita per year. The smaller quantities generated in the Greater Wauchula area are related to the four basic factors previously stated. The economic and the industrial activity factors reduce the average quantities generated in the area while the geographical and agricultural factors are tending to increase the average.

Practically all of the refuse produced in the Greater Wauchula area orginates in households, commercial business establishments, restaurants, institutions, and agriculture. The only substantial industry in the area is the citrus processing plant in Wauchula. Refuse from this plant is not disposed of on City landfill.

Presently there are no industries, commercial establishments or other notable businesses producing any significant amount of solid refuse. No changes are anticipated with regard to increasing amounts of disposable industrial solid wastes.

To determine the future solid waste disposal requirements for the Greater Wauchula area, it is necessary to forecast the population

changes and the per capita refuse production changes.

In the United States, the average per capita refuse production increased from 1,000 pounds per capita per year in 1920 to about 1,750 pounds per capita per year in 1970. (See Sigure 2.) Although the Greater Wauchula area has a 1970 average assumed to be approximately 1,280 pounds per capita per year, it is reasonable to assume that these quantities will continue to follow the upward trend of the national average. These long term trends are illustrated in Figures 1 and 2.

Forecasting per capita refuse production quantities is complicated by many factors, such as changes in packaging materials, the increased usage of home and institutional disposal devices, such as waste grinders and incinerators, changes in eating habits, i.e., prepared foods, and the increased use of disposable clothing and household furnishings. Despite these unpredictable factors, a reasonable forecasting formula is available, and that is: refuse quantities will continue to increase at the 2% per capita annual rate reported in the NAS-NCR "Waste Management and Control" report. Using the 2% increase and 1,280 pounds per year per capita for 1970, projections were made of refuse quantities to the year 1985. These quantities are shown in Table II.

EXHIBIT "B" TOTAL REFUSE PRODUCTION IN THE U.S.

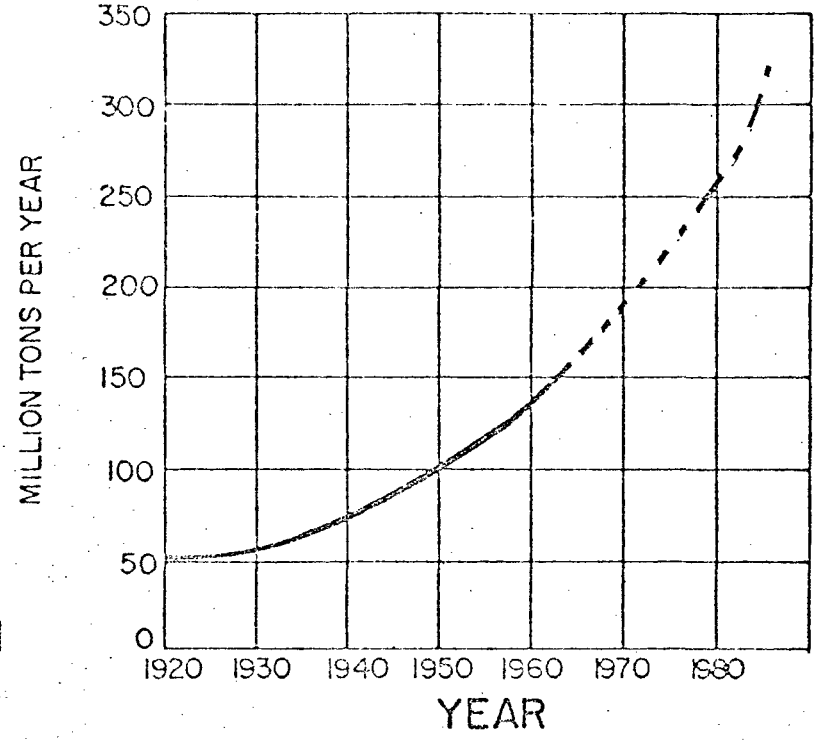

FIGURE-1

PER CAPITA REFUSE PRODUCTION

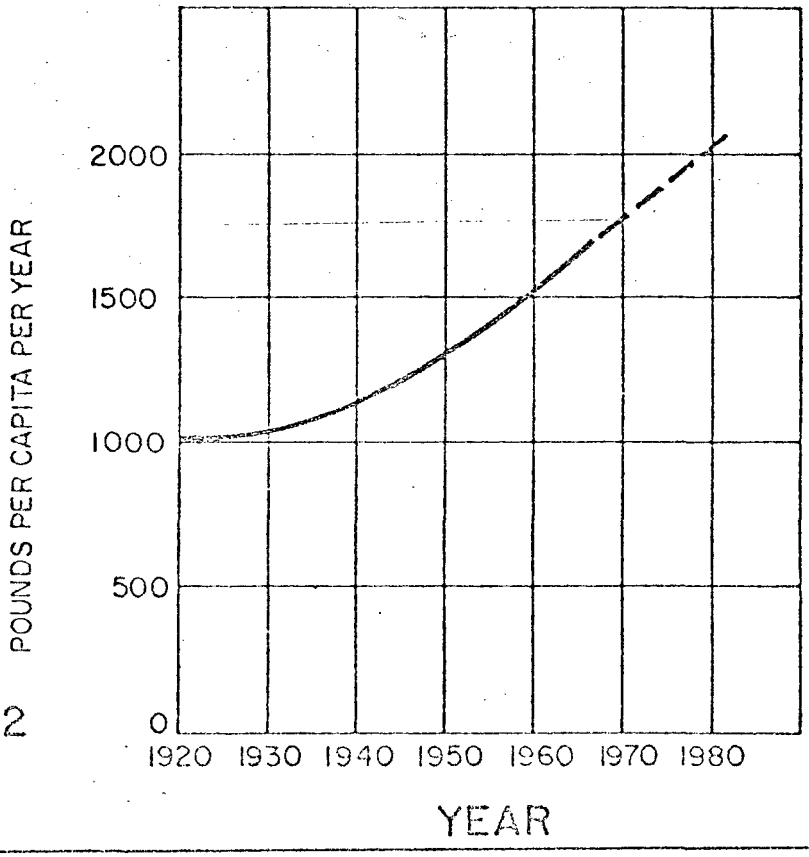

FIGURE-2

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TABLE II

PROJECTED POPULATION AND PER CAPITA REFUSE PRODUCTION FOR WAUCHULA AND THE GREATER WAUCHULA AREA

Year	Lbs./Yr. Capita	Population					
		Wauchula	Bowling Green	Zolfo Springs	Total of 3 Cities	County Contribution	The Greater Wauchula Area
1975	1,420	3,860	1,460	1,255	6,575	3,860	10,435
1976	1,448	3,960	1,500	1,288	6,748	3,960	10,708
1977	1,477	4,050	1,535	1,318	6,903	4,050	10,953
1978	1,506	4,140	1,570	1,348	7,058	4,140	11,198
1979	1,536	4,240	1,600	1,376	7,216	4,240	11,456
1980	1,567	4,320	1,640	1,402	7,360	4,320	11,680
1981	1,598	4,400	1,670	1,429	7,499	4,400	11,899
1982	1,630	4,480	1,700	1,452	7,632	4,480	12,112
1983	1,663	4,560	1,735	1,480	7,775	4,560	12,335
1984	1,696	4,640	1,770	1,502	7,912	4,640	12,552
1985	1,730	4,711	1,801	1,525	8,037	4,711	12,748

(County Contribution was Assumed Equal to Wauchula Population)

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TABLE III

PROJECTED SOLID WASTE GENERATION FOR THE GREATER WAUCHULA AREA

Year	Lbs/Yr. Capita	Population			Tons/Day			Total T/Day	Tons/Year			Total T/Year
		Wauchula	Bowling Green	Zolfo Springs	Wauchula	Bowling Green	Zolfo Springs		Wauchula	Bowling Green	Zolfo Springs	
1970	1,280	3,007	1,117	1,357	7.40	2.75	3.34	13.49	1,924	714	868	3,506
1975	1,420	3,860	1,460	1,255	10.53	3.99	3.43	17.95	2,740	1,037	891	4,668
1980	1,567	4,320	1,640	1,400	13.02	4.94	4.22	22.18	3,385	1,285	1,097	5,767
1985	1,730	4,711	1,801	1,525	15.67	5.97	5.07	26.71	4,075	1,554	1,319	6,948

Year	Lbs./Yr. Capita	Population of The Greater Wauchula	Waste Generation For The Greater Wauchula Area	
			Tons/Day	Tons/Year
1970	1,280	8,488	20.89	5,432
1975	1,420	10,435	28.49	7,409
1980	1,567	11,680	35.20	9,151
1985	1,730	12,748	42.40	11,023

NOTE: Tons/Day Based on a Five-Day Week, 52 Weeks Per Year

6. LAND REQUIREMENTS FOR PROPOSED SOLID WASTE DISPOSAL FACILITIES

In computing required sanitary landfill space through 1985, three possibilities have been considered:

1. Sanitary landfill for the Greater Wauchula Area.
2. Sanitary landfill for Greater Wauchula Area excluding Zolfo Springs.
3. Sanitary landfill for Wauchula only (including County contribution) basic assumptions:

Volume requirements shall be calculated as follows:

$$V = \frac{R}{D}\left(1 - \frac{Cr}{100}\right) + C_v$$

where:

V - volume required for refuse disposed of per capita per year in cubic yards.

R - amount of refuse in pounds per capita per year to be handled at landfill.

D - average density of refuse in pounds per cubic yard.

C_r - percent reduction of refuse from compaction.

C_v - volume of cover material required in cubic yards; C_v was assumed to be 30% of total compacted material.

C_r - compaction ratio of 50%, i.e., 2 : 1 was assumed, the depth of the refuse fill 6 feet. A compacted cover of 6" of earth at the end of each day and two feet of final compacted cover, total 2.5 feet.

Total depth of compacted sanitary landfill 8.5 feet.

Density of mixed refuse without compaction: 300 lb./cu. yd.

6. LAND REQUIREMENTS FOR PROPOSED SOLID WASTE DISPOSAL FACILITIES (CONT'D)

$$V = 1.3 \frac{R}{300} \left(1 - \frac{50}{100}\right) = 0.002\ R$$

Let's compute sanitary landfill space required in 1974 and through 1985 for the Greater Wauchula Area and separately for City of Wauchula.

R from Table II

$V_{1975} = 0.002 \cdot 1420 = 2.84$ cu. yd./yr. capita.

$V_{1976} = 0.002 \cdot 1448 = 2.90.$

$V_{1977} = 0.002 \cdot 1477 = 2.95.$

$V_{1978} = 0.002 \cdot 1506 = 3.01.$

$V_{1979} = 0.002 \cdot 1536 = 3.07.$

$V_{1980} = 0.002 \cdot 1567 = 3.13.$

$V_{1981} = 0.002 \cdot 1598 = 3.20.$

$V_{1982} = 0.002 \cdot 1630 = 3.26.$

$V_{1983} = 0.002 \cdot 1663 = 3.33.$

$V_{1984} = 0.002 \cdot 1696 = 3.39.$

$V_{1984} = 0.002 \cdot 1696 = 3.39.$

$V_{1985} = 0.002 \cdot 1730 = 3.46.$

Area required: $A = \frac{V \times 27 \times P}{8.5 \times 43560} = \frac{27 \times V \times P}{370260}$ (acres)

Total compacted depth: 8.5 foot.

P - Population.

Sanitary Landfill Area required for the Greater Wauchula Area:

$$A_{1975} = \frac{2.84 \times 27 \times 10435}{370260} = 2.16.$$

$$A_{1976} = \frac{2.90 \times 27 \times 10708}{370260} = 2.26.$$

$$A_{1977} = \frac{2.95 \times 27 \times 10953}{370260} = 2.36.$$

$$A_{1978} = \frac{3.01 \times 27 \times 11198}{370260} = 2.46.$$

$$A_{1979} = \frac{3.07 \times 27 \times 11456}{370260} = 2.56.$$

$$A_{1980} = \frac{3.13 \times 27 \times 11680}{370260} = 2.66.$$

$$A_{1981} = \frac{3.20 \times 27 \times 11899}{370260} = 2.78.$$

$$A_{1982} = \frac{3.26 \times 27 \times 12112}{370260} = 2.88.$$

$$A_{1983} = \frac{3.33 \times 27 \times 12335}{370260} = 3.00.$$

$$A_{1984} = \frac{3.39 \times 27 \times 12552}{370260} = 3.10.$$

$$A_{1985} = \frac{3.46 \times 27 \times 12748}{370260} = 3.22.$$

Total Net Area: 29.44 acres

Add 10% for the access roads and separating ridges.

Total net area required: 29.44 x 1.1 = 32.3; say, 32 acres;

including 200 feet buffer zone, about 60 acres are required.

Sanitary Landfill Area required for the Greater Wauchula Area, excluding Zolfo Springs:

$$A_{1975} = \frac{2.84 \times 27 \times 9180}{370260} = 1.90.$$

$$A_{1976} = \frac{2.90 \times 27 \times 9420}{370260} = 1.99.$$

$$A_{1977} = \frac{2.95 \times 27 \times 9635}{370260} = 2.07.$$

$$A_{1978} = \frac{3.01 \times 27 \times 9850}{370260} = 2.16.$$

$$A_{1979} = \frac{3.07 \times 27 \times 10080}{370260} = 2.26.$$

$$A_{1980} = \frac{3.13 \times 27 \times 10273}{370260} = 2.35.$$

Sanitary Landfill Area required for the Greater Wauchula Area, excluding Zolfo Springs (cont'd):

$$A_{1981} = \frac{3.20 \times 27 \times 10470}{370260} = 2.44.$$

$$A_{1982} = \frac{3.26 \times 27 \times 10660}{370260} = 2.53.$$

$$A_{1983} = \frac{3.33 \times 27 \times 10855}{370260} = 2.64.$$

$$A_{1984} = \frac{3.39 \times 27 \times 11048}{370260} = 2.73.$$

$$A_{1985} = \frac{3.46 \times 27 \times 11223}{370260} = 2.83.$$

Total Net Area: 25.90 acres.

Add 10% for the access roads and separating ridges.

Total area required: 25.90 x 1.1 = 28.49; say, 28.5 acres.

Sanitary Landfill Area required for City of Wauchula and County contribution only:

$$A_{1975} = \frac{2.84 \times 27 \times 7720}{370260} = 1.60.$$

$$A_{1976} = \frac{2.90 \times 27 \times 7920}{370260} = 1.67.$$

$$A_{1977} = \frac{2.95 \times 27 \times 8100}{370260} = 1.74.$$

$$A_{1978} = \frac{3.01 \times 27 \times 8280}{370260} = 1.82.$$

$$A_{1979} = \frac{3.07 \times 27 \times 8480}{370260} = 1.90.$$

$$A_{1980} = \frac{3.13 \times 27 \times 8640}{370260} = 1.97.$$

$$A_{1981} = \frac{3.20 \times 27 \times 8800}{370260} = 2.05.$$

$$A_{1982} = \frac{3.26 \times 27 \times 8960}{370260} = 2.13.$$

$$A_{1983} = \frac{3.33 \times 27 \times 9120}{370260} = 2.21.$$

$$A_{1984} = \frac{3.39 \times 27 \times 9280}{370260} = 2.29.$$

$$A_{1985} = \frac{3.46 \times 27 \times 9422}{370260} = 2.38.$$

Total Net Area: 21.76 acres

Add 10% for the access roads and separating ridges.

Total area required: 21.76 x 1.10 = 23.93; say, 24.0 acres.

At present time, the City of Wauchula has solid waste landfill located close to local airport, about two miles east of the City.

Total area available for sanitary landfill, assuming present location of the airport, is about 11 acres. In case of relocation of the airport, and considering required buffer zones, area available for sanitary landfill would be about 72 acres. This land has water table less than five feet below normal ground surface, therefore installation of properly designed sanitary landfill requires drainage. The City of Bowling Green has recently bought 20 acres for solid waste landfill in addition to existing 10 acres which has already been filled. This area is located about 1.5 miles west of Bowling Green.

Considering land requirements for three above calculated options, we can see that in all cases much more than 20 acres of land is required; therefore location of Greater Wauchula Area sanitary landfill in Bowling Green has to be excluded. The most desirable location of sanitary landfill is close to the City of Wauchula, where the largest amount of solids are generated and hauling distance is reasonable for all three cities considered. Operating costs of sanitary landwill will vary with the size of operation. Operating costs may be up to five times lower for large sanitary landfill, comparing small operations. Operating cost for small sanitary landfill may vary approximately between $4.00 to $5.00 per ton. In circumstances it is highly recommended to design common facilities for Greater Wauchula Area.

7. PROPOSED SOLID WASTES DISPOSAL FACILITIES FOR GREATER WAUCHULA AREA

At the present time, the Wauchula waste landfill is operated at the area neighboring airport. Available land in existing circumstances is only about 11 acres.

Considering space limitations and requirement of the Florida D. P. C. of one mile buffer zone between aircraft runway and sanitary landfill, design and operation of sanitary landfill for the City of Wauchula or Greater Wauchula Area at present location would not be possible.

The only solution for sanitary landfill design, according to the rules of the Florida D. P. C., is therefore to relocate sanitary landfill or to relocate the airport.

At the present time the Site Selection Study for the Wauchula Airport is being made as a part of the Master Plan Study of the airport. From preliminary data it looks like there is a strong possibility that one of two other proposed locations for the airport may be more economical than the present one.

If the airport would be relocated, available area for the Greater Wauchula Area sanitary landfill would be sufficient for about 24 years (considering 200 foot buffer zone of any habitation). On the other hand, if the airport would stay in its present location, the City has to find some other location for the sanitary landfill. No matter what shall be the final solution, some transition period is required. During that period both solid waste landfill and airport have to be operated for the City of Wauchula at present location.

To satisfy requirements of the Florida D. P. C. at this transition period, at least drainage of the area which is presently utilized for solids disposal shall be required, followed by design of suitable sanitary landfill for Greater Wauchula Area,

in present or new location.

During the transition period, available 11 acres would be sufficient for Wauchula and County contribution only, for a period of about 5 years. If during transition period, available 11 acres at the airport side are going to be utilized, Northwest, Southeast Runway at the airport has to be closed. Incidentally, five years is just about the period of time which is required before practical relocation of existing airport would take place. Having in mind costs of high water table control, as well as fact that the airport may stay at its present location, it is strongly recommended that the City would start immediately looking for possible other location for sanitary landfill. Through 1985 for the Greater Wauchula Area, including 200 foot buffer zone, about 60 acres of land would be required.

Three suggested locations are shown on Exhibit "B".

8. SANITARY LANDFILL REQUIREMENTS

Sanitary landfill is a disposal facility employing an engineering method of disposing of solid waste on land in a manner which minimizes environmental hazards by spreading the solid wastes in thin layers, compacting the solid wastes to the smallest practical volume, and applying cover material once each working day.

To conform to the requirements and regulations of Chapter 17-7, Solid Waste Control Rules of the Florida Department of Pollution Control, solid wastes can not be disposed of on existing or new landfill by being placed : in an area subject to frequent and periodic flooding, unless drainage provisions approved by the Department are installed, within 200 feet of any habitation or place of business that is served by public water supply, within the right-of-way of any public highway, street or alley within the boundaries of any airport, within the cone of influence of public water supply pumping, or in the area immediately adjacent to it, where the water table is less than 5 feet below normal ground surface.

A. Recommended Site Location Considerations:

a.) Availability of suitable access roads to the site.

b.) The site should be located in an area where there is no possibility of polluting surface or groundwater.

c.) The area should be adequately drained so that it can be operated during "wet" periods as well as "dry" periods.

d.) Adequate cover material should be available.

e.) Future land use and zoning should be considered.

f.) The site selected should also consider likely public acceptance.

B. Sanitary Landfill Operating Facilities:

a.) The site should be surrounded by a fence.

b.) All-weather access road to the site.

c.) Signs indicating name of operating authority, hours of operation and charges for disposal (if any).

d.) Dust control method such as water spray or other methods.

e. Fencing should be provided to prevent the blowing of paper or other refuse.

f.) Fire protection service.

g.) Emergency First Aid equipment.

h.) Personnel : full-time equipment operator.

i.) Facilities : telephone, water supply, electric service, a suitable employee and equipment shelter, handwashing and toilet facilities.

j.) Sanitary landfills shall provide for the collection, control (and treatment if required by the D. P. C.) of surface runoff and leachate emanating from a landfill).

k.) Equipment sufficient for the spreading, compacting, and covering operations.

9. AN APPLICATION FOR THE SANITARY LANDFILL PERMIT

To apply for Department of Pollution Control sanitary landfill permit, the following data are required.

1. A location map or aerial photographs of the area showing land use and zoning within 1/4 mile of the solid disposal side (scale 1/2 mile to 1" with the contours and elevations of the area surrounding the site).

2. Plot plan of site, showing dimensions, scale not greater than 200' to 1" (location of soil borings, proposed trenching plan, cover stock piles, fencing and equipment facilities); cross sections showing the original and proposed fill elevations.

3. Topographic map of landfill at a scale not greater than 200' to 1" with 5-foot contour intervals showing existing and final grades. This map ought to show:

   a. Proposed fill area.

   b. Borrow area (if any).

   c. Access roads.

   d. Grades required for proper drainage of each completed horizontal series of cells.

   e. Drainage devices and leachate collection and control facilities, if required.

   f. A typical cross section of completed horizontal series of cells.

4. A complete soil survey by a qualified U.S.D.A. Soil Conservation Service (ground water elevations, soil map, soil borings).

5. A complete hydrological survey including:

   a. Depth to the shallow groundwater aquifer and artesian aquifer.

   b. Local and regional groundwater flow systems.

   c. Chemical quality of surface and groundwater.

   d. Frequency and extent of flooding of the area.

   e. Nature and volume of waste materials to be buried.

6. Equipment data.

7. Projected amount of waste to be handled.

8. Operating procedures.

9. Land disposal site data form.

10. COST ESTIMATE FOR A 26-TONS-PER-DAY LANDFILL, EXISTING LOCATION, TEMPORARY OPERATION FOR 5 YEARS - WAUCHULA AND COUNTY CONTRIBUTION ONLY.

BASIS: 8 Hours per Operation Day, Daylight Only, 260 Operating Days per Year, 6,760 Tons/Year, Municipally Owned and Operated.

INVESTMENT COST	PRO-RATA INVESTMENT	ACTUAL INVESTMENT REQUIRED
1. New bulldozer (pro-rata cost for 3 years, assuming 10 years operating age of equipment and assuming that existing bulldozer will work two more years).	$14,200	$47,200
2. Surface and groundwater control perimeter ditches. 5,800 L.F. at $2.7/L.F.	15,700	15,700
3. Cell water control pumps; two pumps @1050 each. Pro-rata cost for five years.	1,100	2,100
4. Cell water 6" aluminum piping (irrigation type), 1,000 L.F. and fittings; pro-rata cost for five years.	1,500	2,900
5. Cell water catch basis; 200 ft. x 200 ft. x 8 ft. including compaction.	8,700	8,700
Total:	$41,200	$76,000

INVESTMENT COST	$/TON	$/YEAR
	$1.22	$8,200

Note: Minimum immediate investment required for temporary operation $29,400. (Does not include new bulldozer.)

OPERATING COST	$/TON	$/YEAR
DIRECT:		
Labor - One bulldozer operator @$3.00/hr.		$ 6,200
Fringe Benefits @35%		2,200
Fuel, lubrication, supplies		
Maintenance 10% of Movable Equipment Cost		4,900
Total Direct Cost:		$13,200
INDIRECT:		
Amortization, Movable Equipment, 10 years @6%		$ 7,100
Administrative Overhead, @20% of Direct Labor		1,200
Total Indirect Cost:		$ 8,300
Total Operating Cost:	$3.19	$21,600
Total Pro-rata Investment and Operating Cost:	$4.40	$29,800

Pop
8100 = $3.68 $/cap/yr

11. COST ESTIMATE FOR A 35-TONS-PER-DAY LANDFILL EXISTING LOCATION AT WAUCHULA, ASSUMING RELOCATION OF THE AIRPORT

BASIS: 8 Hours per Day Operation, Daylight Only, 260 Operating Days per Year, 9,100 Tons/Year, Municipally Owned and Operated.

INVESTMENT COST

1.	One bulldozer.	$ 47,200
2.	Aluminum, 6 inch pipe (farm irrigation type), 1700 L.F. and fittings.	4,600
3.	Two pumps for cells' dewatering @$1,050 each.	2,100
4.	Cells' water catch basin, 200 x 200 x 8 ft., including compaction.	8,700
5.	Surface and groundwater control ditches, 7,000 L.F. @$2.70/L.F.	18,900
6.	Weighing facilities (Martin Decker or equal).	8,000
7.	Industrial type metal building, 10 x 20 ft., for equipment storage and personnel, including telephone, electric connection and small A/C unit.	4,300
8.	A chain-link fence, 6 ft. high, including gate (galvanized 11.5 gauge wire), 4,700 L.F.	15,700
9.	Water tank truck for fire fighting.	7,800
10.	Signs indicating name of authority and rates, emergency First Aid kit.	200
	Total Investment Cost:	$117,500

Investment Cost:	$/TON	$/YEAR
	$1.18	$10,700

11. COST ESTIMATE FOR A 35-TONS-PER-DAY LANDFILL (CONT'D)

OPERATING COST			$/YEAR
DIRECT:			
Labor - One bulldozer operator @$3.00/hr.			$ 6,200
Fringe Benefits @35%			2,200
Fuel, lubrication, supplies, electricity, Maintenance, 10% of Movable Equipment Cost			4,900
Portable chemical toilet service			600
Total Direct Cost:			$13,900
INDIRECT:			
Amortization of Buildings, Scales and Movable Equipment, 10 Years @6%			$ 9,000
Administrative Overhead @20% of Direct Labor			1,200
Total Indirect Cost:			$10,200
Total Operating Cost:	$/Ton: 2.65	$/Year: $24,100	
Total Investment and Operating Cost:	$/Ton: 3.81	$/Year: $34,700	Pop. 11,650 = $2.97 per

12. COST ESTIMATE FOR A 35 TONS-PER-DAY LANDFILL AT A NEW LOCATION

BASIS: 8 Hours Per Day Operation, Daylight Only, 260 Operating Days Per Year, 9,100 Tons/Year Municipally Owned and Operated

1.	One Bulldozer	$ 47,200
2.	Aluminum 6 Inch Pipe (Fram Irrigation Type) 1,700 L.F. and Fittings	4,600
3.	Two Pumps For Cells' Dewatering @ $1,050 Each	2,100
4.	Cells' Water Catch Basin 200 x 200 x 8 ft., Including compaction	8,700
5.	Weighing Facilities (Martin Decker or Equal)	8,000
6.	Industrial Type Metal Building 10 x 20 ft. Including Telephone, Electric Connection and Small A/C Unit	4,300
7.	A Chain-Link Fence 6 Ft. High, Including 24 Ft. Gate (Galvanized 11.5 Gauge Wire) 4,700 L.F.	15,700
8.	Water Truck For Fire Fighting	7,800
9.	Signs Indicating Name of Authority and Rates, Emergency First Aid Kit	200
10.	Cost of Land 60* Acres, Including Buffer Zone @ $4,000/Acre	240.000
	TOTAL INVESTMENT COST	$338,600

INVESTMENT COST	$/Ton	$/Year
	$3.38	$30,800

* 60 Acres is Minimum Area of Sanitary Landfill for Period of 11 Years and Assuming 200 ft. Buffer Zone Only.

OPERATING COST			$/YEAR
Direct			
Labor, One Bulldozer Operator @ $3.00/Hr.			$ 6,200
Fringe Benefits @ 35%			2,200
Fuel, Lubrication, Supplies, Electricity, Maintenance, 10% of Movable Equipment Cost			4,900
Portable Chemical Toilet Service			600
TOTAL DIRECT COST			$13,900
Indirect			
Amortization of Building, Scales and Movable Equipment, 10 Yrs. @ 6% Administrative Overhead @ 20%			$ 9,000
Direct Labor			1,200
TOTAL INDIRECT COST			$10,200
TOTAL OPERATING COST	$/Ton 2.65	$/Year	$24,100
TOTAL INVESTMENT AND OPERATING COST	$/Ton 6.03	$/Year	$54,900

11680 = $4.7 per ton

13. A METHOD OF FINANCING THE PROPOSED IMPROVEMENTS

There are basically two methods of financing the Capital Expenditures of the proposed improvements:

1. Financing by Farmers Home Administration.
2. Conventional, under general obligation bond issue.

To generate required amount of revenue, rates schedule and fees collection for refuse disposal should be established.

14. SUMMARY

Calculations presented consider 5 to 11 years' period of sanitary landfill operations for the City of Wauchula and Greater Wauchula Area.

Assuming this limited period of time, the most economical solution would be to start temporary sanitary landfill at the airport side and to relocate the existing airport as soon as possible. After that, further improvements could be done, so that solid waste removal facilities would fully comply with Florida Department of Pollution Control sanitary landfill requirements. As far as available land is concerned, present area after airport relocation could be utilized for the Greater Wauchula Area up to ~~14~~ 24 years. Because of the very high value of land in Wauchula area, as well as necessity of some investments at present location (to make possible at least temporary operation), relocation of present sanitary landfill and organization of new facility for 10 to 11 years on 60 acres of land required, seems to be economically unjustified. On the other hand, ample consideration should be given to minimum life of sanitary landfill for the community which, if possible, should be at least 30 years. In this case, depending on actual location and required buffer zone for the Greater Wauchula Area land required for sanitary landfill would be about 150 to 200 acres.

Capital outlay associated with purchase of 200 acres of land required for 30-year optimum sanitary landfill life, may be beyond the financing capabilities of communities involved. In such a case, it may be advantageous for the disposing communities to lease or rent the land. The balance of benefits and costs associated with either purchase or lease of land must be

14. SUMMARY (CONT'D)

determined for the particular locality in which the landfill is going to be constructed.

15. RECOMMENDATIONS

It is respectfully recommended that:

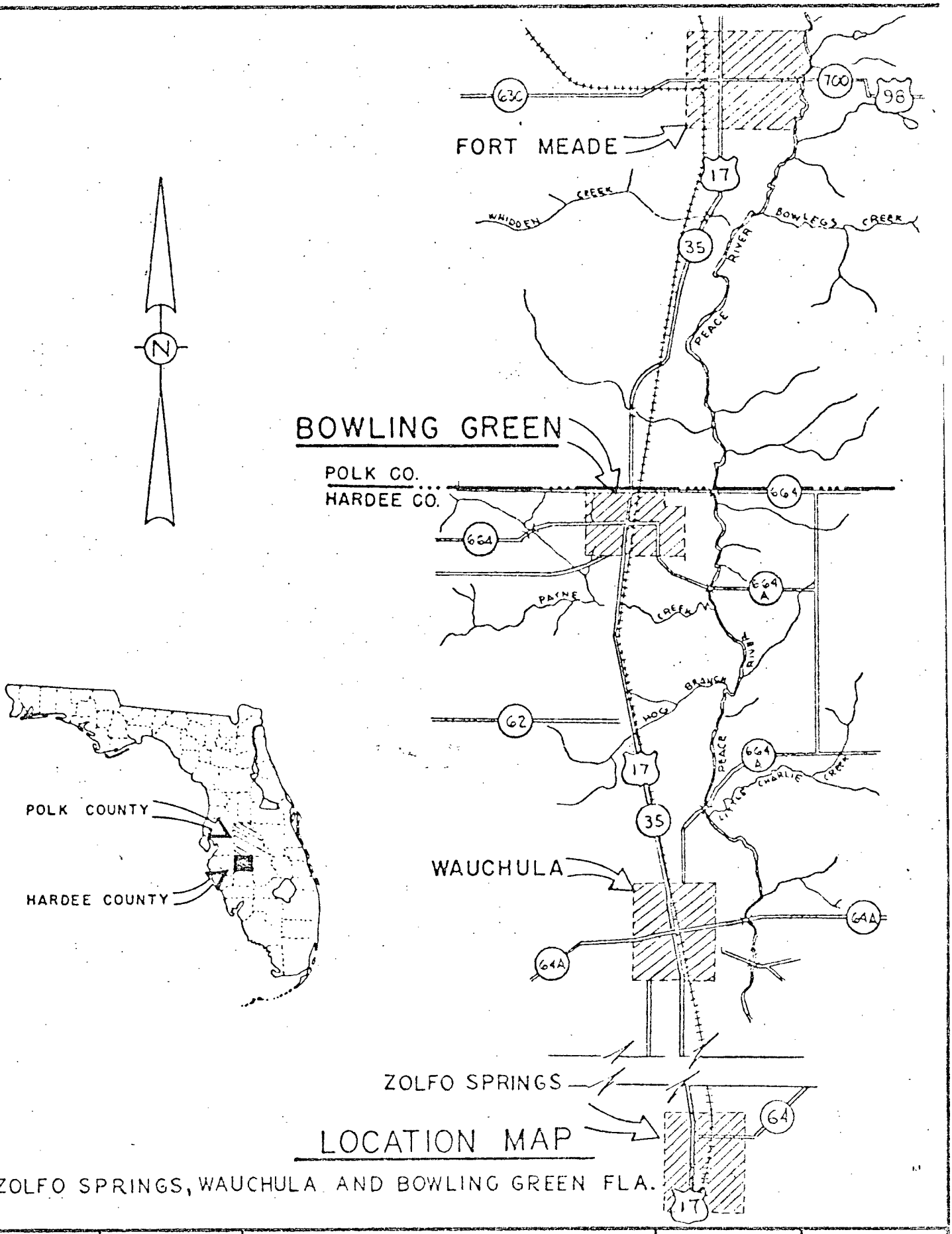
1. Sanitary landfill, in order to reduce operating cost, should be organized as a combined effort for the Greater Wauchula Area.

2. Communities involved should consider the possibility of leasing or purchasing about 200 acres of land, which could be done in stages.

3. Future location of existing airport in Wauchula should be decided as soon as possible.

4. If new location for sanitary landfill is not feasible in the immediate future, the City of Wauchula should authorize Smith and Gillespie Engineers, Inc., to design a temporary sanitary landfill at the present location, including all supporting documents necessary for obtaining a sanitary landfill temporary operation permit.

5. If new location for sanitary landfill is not available, the City of Wauchula should encourage relocation of the present airport to make possible, in the near future, to design sanitary landfill and obtain operation permit for the Greater Wauchula Area at present location for a time period of about ~~14~~ 24 years.



LOCATION MAP

ZOLFO SPRINGS, WAUCHULA AND BOWLING GREEN FLA.

DRAWN	SCALE	SMITH AND GILLESPIE ENGINEERS, INC. JACKSONVILLE, FLA.	FILE NO.	DWG. NO.
CHECKED	DATE			EXHIBIT A

N

SCALE ~ 1" = 200'

35 | 36
2 | 1

600'

2,080.5 ± FT.

LANDFILL THRU 1966
500' x 1800' = 900,000 SQ.FT. (20.7 ACRES)

FUTURE LANDFILL
350' x 1200' = 420,000 SQ.FT. (9.6 ACRES)

$\frac{400' \times 350'}{2}$ = 70,000 SQ.FT.
(1.6 ACRES)

DIRT RD.

PRESENT LANDFILL
600' x 300' = 180,000 SQ.FT.
(4 ACRES)

LANDFILL THRU 1972
600' x 350' = 210,000 SQ.FT.
(4.8 ACRES)

2,684 ± Ft.

2,642 ± Ft.

200'

RUNWAY

FUTURE LANDFILL
$\frac{400' \times 500'}{2}$ = 100,000 SQ.FT. (2.3 ACRES)

TOTAL AREA INCLUDING AIRPORT
2650' x 2250' = 5,962,500 SQ. FT.
(137 ACRES)

2,379 ± Ft.

R/W LINE

STATE ROAD Nº 64

R/W LINE

EXHIBIT "C"
CITY OF WAUCHULA FLA.
EXISTING LANDFILL AT AIRPORT SITE

SMITH & GILLESPIE
ENGINEERS, INC.
JACKSONVILLE, FLORIDA
9-9-74 6902-17R

Drive-in Theater

ATLANTIC COAST LINE

Hog Branch

Thompson Branch

Little Charl

PEACE R.

Radio Tower

Coker

WAUCHULA
(BM 109)

Wauchula Municipal Landing Field

Wauchula Cem.

BM 118

BM 57

BM 73

BR 64

BR 72

BR 65

CH

WT

4

3

2

EXHIBIT "D"
CITY OF WAUCHULA, FLORIDA
PROPOSED LANDFILL LOCATIONS

Smith and Gillespie Engineers, Inc.
Jacksonville, Florida
9-11-74 Project 6909-17R

CHAPTER 17-7

SOLID WASTE

RESOURCE RECOVERY AND MANAGEMENT

17-7.01 Declaration and Intent

The Florida Department of Pollution Control finds and declares that improper disposal of solid waste on or in the land and use of dumps as a means of final disposal results in or contributes to air pollution, water pollution, and land blight. The Department further finds that regulation of land disposal of solid waste will reduce air pollution, water pollution and the use of the land as an uncontrolled receptacle for improperly treated waste.

It is the intent of the Department to require that solid waste disposal be conducted in a manner and under conditions that will eliminate the dangerous and deleterious effects of [illegible] solid waste disposal upon air quality, water quality, [illegible] human health.

The Department shall plan for and regulate the storage, collection, transport, separation, processing, recycling and disposal of solid waste in order to protect the public safety, health and welfare, to enhance the environment for the people of the state, and to recover resources which have the potential for further use.

The Department will establish, maintain and promote a cooperative state program of planning and technical assistance for resource recovery and management; require counties and municipalities to plan for and provide efficient, environmentally acceptable resource recovery and management; review design and issue permits for operation of resource recovery and management facilities.

Pursuant to Sections 403.061(3),(7) and Sections 403.701 through 403.713, Florida Statutes, the execution and enforcement of any section regarding actual or potential pollution of the air or waters is under the jurisdiction of the Department of Pollution Control. Chapter 17-7 F.A.C. replaces all applicable sections of Chapter 10 D-12 F.A.C.

General Authority 403.061 FS Law Implemented 403.021, 403.031, 403.061, 403.087, 403.701 through 403.713 FS. Chapter 74-342. New 10-1-74.

17-7.02 Definitions

The following words, phrases or terms as used in this Chapter, unless the context indicates otherwise, shall have the following meaning:

(1) "Solid Waste" is garbage, rubbish, refuse, or other discarded solid or semi-solid materials resulting from domestic, commercial, industrial, agricultural activities and Governmental operations excluding solids or dissolved material in domestic sewage or other significant pollutants in water resources such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flows or

other common water pollutants.

(2) "Resource Recovery" means the process by which materials, excluding those under control of the Atomic Energy Commission, which still have useful physical or chemical properties after serving a specific purpose are reused or recycled for the same or other purposes, including use as an energy source.

(3) "Recycling" means the reuse of solid waste in manufacture, agriculture, power production, or other process.

(4) "Resource Management" means the process by which solid waste is collected, transported, stored, separated, processed, or disposed of in any other way according to an orderly, purposeful, and planned program.

(5) "Resource Recovery and Management Facility" means any solid waste disposal area, volume reduction plant, or other facility the purpose of which is resource recovery or the disposal, recycling, processing, or storage of solid waste.

(6) "Sanitary Landfill" is a disposal facility employing an engineered method of disposing of solid waste on land in a manner which minimizes environmental hazards by spreading the solid wastes in thin layers, compacting the solid wastes to the smallest practical volume, and applying cover material once each working day.

(7) "Dump" is a land disposal site at which solid waste is disposed of in a manner which does not protect the environment and is exposed to the elements, vectors and scavengers.

(8) "Ground Water" is subsurface water in the zone of saturation of the earth's crust. The top of this zone of saturation is commonly defined as the water table.

(10) "Hazardous Wastes" are materials or combinations of materials which require special management techniques because

of their acute and/or chronic effects on air and water quality; on fish, wildlife, or other biota; and on the health and welfare of the public. These materials include, but are not limited to, volatile, chemical, biological, explosive, flamable, radioactive and toxic materials.

(11) "Abandoned Vehicles" are passenger automobiles, trucks, trailers, farm equipment, etc., that have no remaining useful life and are left unattended on public or private property.

(12) "White Goods" are inoperative and discarded refrigerators, ranges, washers, water heaters and other similar domestic and commercial appliances.

(13) "Volume Reduction Plant" includes, but is not limited to, incinerators, pulverizers, compactors, shredding and baling plants, transfer stations, composting plants and other plants which accept and process solid waste for recycling or disposal.

(14) "Cell" is a volume of solid waste compacted on an inclined plane and enclosed by a layer of earth.

(15) "Lift" is a completed horizontal series of cells.

(16) "Daily Cover" is a six (6) inch layer of compacted earth used to enclose a cell once each working day.

(17) "Intermediate Cover" is a layer of compacted earth one foot in depth applied to a partially completed landfill where final cover is not to be applied within one year of cell completion.

(18) "Final Cover" is a layer of compacted earth two feet in depth applied to a completed landfill the top six (6) inches of which is loosely compacted to promote plant growth.

(19) "Leachate" is a liquid that has percolated through solid waste and contains dissolved or suspended materials that may contaminate surface or underground waters used as sources of food, water supplies recreation, etc.

(20) "Working Face" is that portion of a sanitary landfill where waste is discharged, spread and compacted prior to placement of daily cover.

(21) "Monitoring Wells" are strategically located shallow and deep wells from which water samples are drawn for analysis of possible contaminants and from which direction of ground water flow is determined.

(22) "Infectious Wastes" are those wastes resulting from the operation of medical clinics, hospitals, abbatoirs, and other facilities producing waste which may consist of but, are not limited, to human and animal parts, contaminated bandages, pathological specimens, hypodermic needles, contaminated clothing, and surgical gloves.

(23) "Putrescible Wastes" are materials capable of decomposition, causing environmental nuisances and/or obnoxious odors

(24) "Milled Refuse" is refuse that has been mechanically ground, shredded or pulverized.

General Authority 403.061 FS. Law Implemented 403.021, 403.031, 403.061, 403.087, 403.701 through 403.713 FS. Chapter 74-342. History 10D-12.02

17-7.03 Solid Waste Resource Recovery and Management Responsibilities

(1) All counties, municipalities or other governmental agencies shall be responsible for providing adequate, safe and sanitary resource recovery and management facilities within their respective jurisdictions. This responsibility may be delegated to a private operator through a franchise or contract.

(2) Garbage storage and Collections. Garbage shall be retained in watertight receptacles of impervious material which are provided with tight fitting closures suitable to protect the

contents from flies, insects, rats and other animals. Garbage collection shall be made at such intervals and collection equipment shall be of such design as meets the approval of the Department.

(3) All facility operators other than counties, municipalities or other governmental agencies shall post a performance bond or other approved security with the agency within whose jurisdiction the site is located in an amount consistent with the scope of the operation.

(4) The person making application for a resource recovery and management facility permit shall submit to the Department four copies of an engineering plan of the proposed operation prepared by a Professional Engineer registered in the State of Florida. Said Engineer shall be required to make periodic inspections of the facility to insure that design integrity is maintained.

(5) All plans and applications for a permit to construct and operate a sanitary landfill shall be signed by a Professional Engineer registered in the State of Florida in accordance with the provisions of Chapter 471 F.S. If the person is acting as a public officer employed by the State, a county or a municipality and where the total estimated cost is less than ten thousand dollars, this requirement may be waived in accordance with Chapter 471.05(4) F.S.

(6) The Department, following a review of the facility plans, shall impose such revisions as necessary, including provisos, in connection with the issuance of a permit for construction and/or operation.

The Department may consider minimized requirements for those counties, municipalities and small communities having a very small population of a principally rural nature if the

Department determines that no significant threat to environmental quality or public health will result.

(7) Permits. --

(a) After January 1, 1975, no resource recovery and management facility or site shall be operated, maintained, constructed, expanded, or modified without an appropriate and currently valid permit issued by the Department as defined in Chapter 17-4 F.A.C. Provided that no public nuisance or any condition adversely affecting the public health is created and provided that the activity does not violate other state or local laws, ordinances, rules, regulations or orders, no permit under this section shall be required for the following activities:

1. Persons who dispose of solid waste resulting from their own activities on their own property;

2. Normal farming operations.

(b) Existing resource recovery and management facilities which meet the criteria of this rule may be issued an operation permit upon application and approval by the Department.

(c) Temporary operating permits may be issued to existing resource recovery and management facilities upon submission of a compliance schedule to correct deficiencies. An operation permit shall be issued by the Department when the facility meets all criteria.

Failure to correct deficiencies within the compliance schedule will result in formal enforcement procedures.

(8) All persons operating existing facilities on the effective date of this rule shall take necessary corrective actions as expeditiously as possible so as to be in full compliance with these regulations no later than July 1, 1977.

(9) Garbage feeding of hogs or other animals. Feeding of garbage to hogs without first adequately cooking said material

in a manner prescribed by the Department of Agriculture and Consumer Services in accordance with provision of Chapter 585.50 F.S. is prohibited. A feeding permit shall be obtained from the Department of Agriculture and Consumer Services, and approval granted by the Department of Pollution Control before such feeding commences. After cooking, the garbage shall be fed to hogs on impervious feeding platforms. Platforms and surrounding areas shall be maintained in such a manner as to prevent environmental nuisances.

General Authority 403.061 F.S. Law Implemented 403.021, 403.031, 403.061, 403.087, 403.701 through 403.713 F.S. Chapter 74-342. History 10D-12.03,.04,.07.

17-7.04 Prohibitions

(1) No solid waste shall be disposed of except by sanitary landfill, incineration or other method approved by the Department and consistant with applicable approved county or municipal programs.

(2) Unless otherwise approved by the Department, no solid waste shall be disposed of by being placed:

(a) in or within 200 feet of any natural or artificial body of water or on the watershed of any surface public water supply where leachate or runoff may result in violation of city, county, State or Federal Laws and regulations concerning the pollution of ground or surface waters.

(b) on the banks of a stream known to be hydraulically connected to the Floridan aquifer.

(c) in a sink hole or in the immediate area thereof.

(d) in a limestone, or gravel pit.

(e) in an area subject to frequent and periodic flooding unless drainage provisions approved by the Department are installed.

(f) where the water table is less than five (5) feet below normal ground surface, unless otherwise approved by the Department, following installation of permanent control methods.

(g) in an area immediately adjacent to or within the cone of influence of public water supply pumping.

(h) within two hundred (200) feet of any habitation or place of business that is served by a public water supply system or within one thousand (1000) feet of any habitation or place of business that is served by an individual potable shallow water supply well located on the premises.

(i) in any area open to public view from any major thoroughfare without proper screening where it can practically be provided.

(j) on any public highway, road or alley or the right-of-way thereof.

(k) within the boundaries of any airport property whether such airport be for public, private or limited use (F.S. 330.30, Florida Administrative Rules 14-60).

(l) within two (2) miles of the closest point of any runway at any airport licensed by the State of Florida or any airport operated by the Federal Government which are or maybe used by turbo-jet aircraft; or within one mile of any aircraft runway used only by piston engine type aircraft.

(m) no burning of solid waste shall be permitted at any land disposal site in accordance with the provisions of Chapter 17-5 F.A.C.

(n) in any other than the above defined areas that in the opinion of the Department would result in damage to the environment.

(3) Hazardous Waste: The land disposal or incineration of hazardous waste which would create a condition harmful to the

environment, shall, at the owners expense, be rendered safe and sanitary prior to delivery to the disposal facility. Should a hazardous waste be of such a chemical composition that it cannot be rendered innocuous, the producer of such wastes must confer with appropriate authorities or the Department to determine a safe disposal or storage method.

(4) Infectious waste shall be properly incinerated or processed by an alternate method which has been approved by the Department. No raw infectious waste shall be deposited in any sanitary landfill.

(5) Transportation of solid waste thru the state, across county or municipal boundaries shall not be impeded provided such transport is in accordance with the provisions of this rule does not degrade the environment, cause a health hazard or create a physical or aesthetic nuisance.

(6) No solid waste generated outside the State of Florida shall be transported into the State for the purposes of disposal without the prior approval of the Department and the political entity(s) where disposal is to occur. No solid waste shall be transported across county boundaries for disposal at sites within another county without prior approval of the political entity(s) where disposal is to occur.

(7) The construction of buildings, sewage, or gas or water supply mains, parking lots, or paved areas on or through completed portions of sites filled with solid waste is prohibited unless specifically approved by the Department.

General Authority 403.061 F.S. Law Implemented 403.021, 403.031, 403.061, 403.087, 403.701 through 403.713 F.S. History 10D-12.06,.07.

17-7.05 Sanitary Landfill Criteria

(1) Location Requirements.

(a) Soil Survey

Solid waste shall be disposed of only in areas where an adequate soil survey by a qualified U.S.D.A. Soil Conservation Service or other Soil Scientist has been made using the U.S.D.A. Soil Conservation Service taxonomy. The degree of limitation of the soils found shall be rated in accordance with the U.S.D.A. Soil Conservation Service Guide for Interpreting Engineering Uses of Soils. Such requirement may be waived by the Department only after being advised in writing by the Soil Scientist that the soils are such that a determination of soil series is not possible.

(b) Hydrological Survey

Solid waste shall be disposed of only in areas where an adequate hydrological survey has been made. Where this is not feasible the best available information from Water Management Districts, U.S. Geological Survey, Florida Bureau of Geology, or other acceptable sources shall be required.

(c) Site Requirements

The land disposal site location shall:

1. be easily accessible by collection vehicles, automobiles and where applicable, transfer vehicles;

2. safeguard against water pollution originating from the disposal of solid waste;

3. have an adequate quantity of acceptable earth cover available. The cover material should be easily workable, compactible, and should not contain organic matter conducive to the harborage and/or breeding of vectors;

4. conform with the present zoning of the area.

(2) Operation Plans - The proposed operational plans shall include:

(a) Map or aerial photograph of the area showing land use

and zoning within ¼ mile of the solid waste disposal site. This photograph shall be of sufficient scale to show all homes, industrial buildings, wells, watercourses, dry runs, rock outcroppings, roads and other significant details.

(b) Plot plan of the site showing dimensions, location of soil borings, proposed trenching plan and original elevation, cover stock piles, and fencing. Cross sections shall be included on the plot plan or on separate sheets showing both the original and proposed fill elevations. The scale of the plot plan should not be greater than 200 feet to the inch.

(c) The design of the sanitary landfill shall include one or more topographic maps at a scale of not over 200 feet to the inch with 5-foot contour intervals. These maps shall show: the proposed fill area; any borrow area; access roads; grades required for proper drainage of each lift and typical cross section of a lift; special drainage devices if necessary; fencing; equipment facilities; and all other pertinent information.

(d) A report shall accompany the plans indicating:

1. population and area to be served by the proposed site.

2. anticipated type, annual quantity and source of solid waste, expressed in cubic yards of compacted materials.

3. anticipated life of the site.

4. geological formations and groundwater elevations to a depth of at least 10 feet below proposed excavations and lowest elevation of the site. Such data shall be obtained by soil borings or other appropriate means.

5. soil map, interpretive guide sheets, and a report giving the suitability of the site for such an operation.

6. source and characteristics of cover material.

7. type and amount of equipment to be provided at the

site for excavating, earth moving, spreading, compaction and other needs.

8. persons responsible for actual operation and maintenance of the site and intended operating procedures.

(e) Operational design features. The disposal site shall be provided with operation features and appurtenances necessary to maintain a clean and orderly operation. These minimum features are:

1. operational plans to direct and control the use of the site;

2. the site shall be surrounded by a fence or other suitable barrier;

3. an all-weather access road to the site. A special area with a stabilized roadway shall be provided within the site for wet weather operations.

4. signs indicating name of operating authority, traffic flow, hours of operation, and charges for disposal (if any);

5. scales for weighing solid waste received at the landfill; or, in lieu thereof, estimates of the number of cubic yards received. Quantitative records shall be forwarded to the Department upon request.

6. suitable dust control methods such as approved chemicals, oils, or water sprays;

7. litter control devices; portable fences, or other suitable means.

8. fire protection and fire-fighting facilities adequate to insure the safety of employees and provisions to deal with accidental burning of solid waste within the sanitary landfill;

9. emergency first aid equipment to provide adequate treatment of accidents, especially those associated with hazardous wastes.

(f) Personnel and Facilities. In order to provide proper staffing and suitable facilities the following shall be required at all sites, except where otherwise approved by the Department in writing for sites serving less than 5,000 people.

1. A trained equipment operator in full time attendance during operating hours.

2. Employees shall be trained in the proper and safe operation of all equipment and first aid procedures.

3. Communication facilities for use in emergencies.

(g) Equipment. To assure adequate operation the following is required:

1. equipment sufficient for spreading, compacting, and covering operations;

2. sufficient reserve equipment, or arrangements to provide alternate equipment within 24 hours following equipment breakdown;

3. safety devices on equipment to shield and protect the operators from potential hazards during operation;

(h) The Department recommends:

1. A potable water supply.

2. A suitable employee shelter.

3. Handwashing and toilet facilities.

4. Equipment wash-out facilities.

5. Electric service for operations and repairs.

6. Equipment shelter for maintenance and storage of parts equipment and tools.

(3) Operations.

(a) At the time of design approval or at any time ground water contamination is suspected the Department shall have the option to require the installation of monitoring wells and may specify the number, location, and depth of monitoring wells

addition to the frequency of samples to be taken, and the analyses to be run.

(b) A minimum separation of five (5) feet shall be maintained between putrescible solid waste and anticipated high ground water table. Nonputrescible and insoluble materials such as brick, stone, concrete, and similar materials but not yard clippings, asphalt or other bituminous materials may be deposited below the anticipated high ground water table if in the determination of the Department such deposition will not result in the pollution of ground water. The Department may at its discretion waive this requirement if it finds adequate controls such as perimeter ditches or well point systems are provided. Exceptions will not normally be granted for areas where the soil is saturated or the capillary fringe reaches the soil surface an average of more than two months per year, seven out of ten years.

(c) Sanitary landfills shall provide for the collection, control and treatment of surface runoff from the site to meet established water quality standards of the receiving waters.

(d) Any leachate emanating from a landfill shall be collected and treated if it is a potential source of water pollution.

(e) The grade of the completed refuse cells and lifts in addition to the final cover shall drain the surface runoff water to prevent uncontrolled ponding. Thus, it is best to slightly overdesign initial grades so that good drainage will be maintained after final settlement.

(f) All completed portions of sanitary landfills which have received final cover and no future vehicular traffic is anticipated shall be planted with grass or acceptable cover vegetation to minimize infiltration, erosion and dust.

(g) All sanitary landfills where gas generated by decomposition of wastes cannot readily be dispersed into the atmosphere shall be provided with a gas control system. This requirement is particularly applicable to all multiple lift sites.

(h) All solid waste shall be spread in layers of approximately two (2) feet in thickness and compacted to approximately one (1) foot in thickness before the next layer is applied.

(i) All solid waste except materials such as abandoned vehicles, white goods and certain hazardous wastes as specified by the Department shall be compacted to form cells which have a vertical depth not to exceed ten (10) feet with working face and side grades at a slope of approximately thirty (30) degrees.

(j) All cells shall receive a compacted cover of six (6) inches of earth once each working day.

(k) The working face of a cell shall be kept as narrow as is consistent with the proper operation of trucks and equipment to minimize exposed areas.

(l) An intermediate cover of one (1) foot of compacted earth in addition to the daily six (6) inch cover shall be applied within seven (7) days of cell completion if final cover is not to be applied within one (1) year of cell completion especially on all sites where multiple lifts are to be constructed.

(m) All completed cells shall receive a final cover of two (2) feet of earth compacted in six (6) inch layers within one (1) year of cell completion with the final six (6) inches loosely compacted to promote plant growth.

(n) The side slopes in addition to the top of all

completed sanitary landfills constructed five (5) feet or more above surrounding ground elevation shall have a minimum of three and one half (3½) feet of compacted earth cover (which is the sum of daily, intermediate and final cover). The sides shall have a slope not to exceed one (1) foot vertical to three (3) feet horizontal to minimize erosion.

(o) Pesticides used to control rodents, flies and other insects shall be as specified by the Florida Department of Agriculture and Consumer Services. (Chapter 5 E-2).

(p) Scavengers shall not be permitted at any sanitary landfill site.

(q) Alternate procedures not included in this section shall require Department approval.

General Authority 403.061 F.S. Law Implemented 403.021, 403.031, 403.061, 403.087, 403.701 through 403.713 F.S. Chapter 74-342. History 10D-12.07.

17-7.06 Special Waste Handling

(1) Disposal of waste sludges and liquids, including septic tank contents refered to in 17-13.09, shall be with special consideration of air and water pollution and health and safety of landfill employees. Appropriate provisions shall be made for handling these waste materials in a landfill, only where alternate disposal methods are not available and when such disposal does not violate laws and regulations.

(2) If abandoned vehicles are brought to the site, they may be stored temporarily in a separate area, provided arrangements have been made for frequent removal to an automobile shredding, or compacting plant. If such arrangement has not been made all abandoned automobiles, white goods and similar materials shall be compacted before being placed in the fill area to minimize voids.

(3) In the event of natural disasters, in which large accumulations of debris are created--such as trees and buildings that have been destroyed, the debris may be transported to an area remote from habitation, and burned, in accordance with Chapter 17-5.08(1).

(4) Landfilling milled solid waste without daily soil cover can be an environmentally acceptable method of final disposal. The same engineering principles involved in sanitary landfill sites must be employed, including a properly designed, and operated milling facility. The Department will grant approvals contingent upon the following conditions:

(a) Particle size. Seventy to seventy five percent (70-75%), of all milled refuse, dry weight, shall be capable of passing through a one (1) inch screen.

(b) Waste must be spread to a smooth contour and compacted promptly after placement and left undisturbed to prevent odors. Wind blowing of milled refuse and paper shall be controlled.

(c) Gas entrapment in milled solid waste is minimal, however, addition of cover or possible migration of gases through fissures, etc., requires the same attention to gas control as a sanitary landfill.

(d) All solid waste storage areas in the milling facility must be maintained and cleaned at the end of each day's operations, or during continuous operation, as necessary, to prevent fly, rodent or other vector problems. All milling equipment must be maintained to control spillage and to achieve the required milled product quality.

(e) An operational plan must include provision for removal and proper disposal of wastes within 24 hours should the mill facility breakdown or operational quality is diminished

The operational plan must include provision for a stock pile of emergency soil cover material and a plan to convert the operation to a sanitary landfill.

(f) Upon completion of the site, it shall be closed, covered with a final two (2) feet thick soil cover and shall be seeded or planted with grass or suitable cover vegetation to minimize erosion.

General Authority 403.061 F.S. Law Implemented 403.021, 403.031, 403.061, 403.087, 403.701 through 403.713 F.S. Chapter 74-342. History 10D-12.07.

17-7.07 Dump Closing

It shall be required of all persons operating land disposal sites which are dumps, as defined in Section 17.02(7) to eliminate or convert them to sanitary landfills as expeditiously as possible but no later than July 1, 1977. The sites shall be closed or converted to sanitary landfills in accordance with the following criteria:

(1) Access to the site shall be restricted by a fence or other appropriate and effective means.

(2) Information signs shall be placed at the entrance to the site and on roads leading to the site stating that it is closed, the penalty for dumping at the site, the location and hours of operation of the alternate approved site and the name of the operating agency.

(3) A responsible person shall be assigned to supervise the closing procedures on a full time basis during the closing operations.

(4) Burning of solid waste shall be prohibited except upon approval by the Department.

(5) The site shall be closed to incoming solid waste as soon as the alternate site is in operation.

(6) Steps shall be taken, where potential water pollution exists, to prevent its continuance by diverting surface waters around the site, removing wastes from the water table or by other means approved by the Department.

(7) Upon completion, the closed site shall be seeded or planted with grass or suitable cover vegetation to minimize erosion.

General Authority 403.061 F.S. Law Implemented 403.021, 403.031, 403.061, 403.087, 403.701 through 403.713 F.S. Chapter 74-342. History 10D-12.07.

17-7.08 Supervision and Inspection

(1) Supervision of the operation shall be the responsibility of a qualified person experienced in the operation of a resource recovery and management facility.

(2) Routine inspections and evaluations of facility operations shall be made by the Department. A notice of deficiencies, with recommendations for their correction, shall be provided to the person responsible for the operation.

(3) Inspection of a completed sanitary landfill shall be made by the Department before the earthmoving equipment is removed from the site. Any corrective work shall be performed before the landfill project is accepted by the Department as completed. Arrangements shall be made for the repair or restoration of the final cover as required for at least two years following completion.

General Authority 403.061 F.S. Law Implemented 403.021, 403.031, 403.061, 403.087, 403.701 through 403.713 F.S. Chapter 74-342. History 10D-12.07.

17-7.09 Volume Reduction Plants

(1) Permits will be required for all volume reduction plants as defined in Section 17-7.02(13).

(2) Volume reduction plants shall be designed and operated to meet all applicable rules of the Department including Chapters 17-2 and 17-3 F.A.C. and shall be reviewed for permitting based on the receipt of comprehensive data on the process and its relative potential as a pollution source.

(3) Recovered resources resulting from such facilities and which may be offered for sale shall comply with applicable regulations of all appropriate State agencies.

(4) Experimental methods and operations will be reviewed by the Department for a permit based on purpose and design effectiveness.

General Authority 403.061 F.S. Law Implemented 403.021, 403.031, 403.061, 403.087, 403.701 through 403.713 F.S. Chapter 74-342. New 10-1-74.

APPLICATION TO CONSTRUCT ( ) OPERATE ( ) A SOLID WASTE

RESOURCE RECOVERY AND MANAGEMENT FACILITY

Applicant:
(Owner or authorized agent) _____

Street Address: _____

_____

Mailing Address:
(If different from above) _____

_____ _____
(City) (County)

Location of Site: _____

_____
(Township, Range, Section, & Lat., Long.

_____
(Name of Access Road and Crossroad)

Towns and Areas to be Served: _____

_____

Population Served: _____ Area of Site: _____ Acres

Date Site Ready to Receive Refuse: _____

General Requirements

A permit is required for each Resource Recovery and Management Facility. Separate applications for each permit, four copies each, should be submitted to the Regional Office of the Department of Pollution Control. Complete appropriate sections of the application for the type of facility proposed: sanitary landfill, incinerator, volume reduction plant, etc.

Each application shall be accompanied by an application fee of $20.00 payable by check drawn in favor of "State of Florida, Department of Pollution Control."

Applicant has the responsibility to provide copies of the application to appropriate city, county and/or regional pollution control agencies, established pursuant to Section 403.182 Florida Statutes. Applicant shall also clear the application through appropriate local planning agencies. Comments from any of these agencies shall be forwarded with the application to the Department.

Information contained in the application shall conform to requirements of Chapter 17-7 F.A.C. All entries should be typed or printed in ink. If additional space is needed, separate, properly identified sheets of paper may be attached.

All documents submitted to support the application should be on 8.5" x 11" paper.

Processing of the application will begin when the foregoing requirements have been met.

Permit Number _____ Issue Date _____

Review Date _____ Expiration Date _____

STATEMENTS BY APPLICANT AND ENGINEER

A. Applicant

The undersigned owner, or authorized representative*, of _____, is aware that statements made in this form and attached exhibits are an application for a _____ Permit from the Florida Department of Pollution Control 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 the rules and regulations of the Department. It is understood that the Permit is not transferable, and, if granted a permit, the Department will be notified prior to the sale or legal transfer of the permitted establishment.

_____
Signature of owner or agent

_____
Name and Title

Date: _____

*Attach letter of authorization

B. Professional Engineer Registered in Florida

This is to certify that the engineering features of this resource recovery and management facility have been designed/examined by me and found to conform to engineering principles 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 for proper maintenance and operation of the facility.

Signature _____ Mailing Address: _____

_____

_____

Name _____ Telephone No.: _____
(please type)

Florida Registration Number _____ Date: _____
(please affix seal)

(Submit in the order listed)

1. Maps
   A. A location map drawn to a scale of one inch equals one half mile showing the contours and elevation of the area surrounding the site.
   B. A topographic map of the site drawn to a scale not to exceed one inch equals two hundred feet showing existing and final grades.
2. Drawings which shall include:
   A. Property lines
   B. Land use including existing habitations; other structures; public roads and highways; shallow and deep wells; trees; etc.
   C. Area and depth of the proposed fill
   D. All borrow areas
   E. Location and elevation of surface and highest ground waters
   F. A wind rose to show prevailing winds
   G. Special provisions for surface and subsurface drainage and erosion control
   H. Leachate treatment and control provisions
   I. Necessary provisions for gas control
   J. Method of operation and completion
   K. Cross sections showing typical lifts not to exceed ten feet compacted depth of refuse
   L. The necessary grade for proper drainage of each lift and the final grade of the completed operation
   M. Locations of stockpiled cover material
   N. Access routes, approach roads and on-site roads
   O. Fencing, direction and information signs
   P. Weighing facilities, locker room; toilet and shower facilities; equipment shelter, and wash-out facilities
   Q. Locations of existing and proposed utilities
   R. Fire Control and potable water supply locations
3. Hydrogeological Report which shall include:
   A. Thickness and character of the overburden (soil)
   B. Character of bedrock
   C. Depth of the water table and potentiometric surfaces
   D. Depth to the shallow ground water aquifer and artesian aquifer
   E. Local and regional ground water flow systems
   F. Chemical quality of surface and ground water. (See Page 24 - A Handbook for Sanitary Landfills in Florida for list of substances to be tested for.)
   G. Frequency and extent of flooding of the area.
   H. Nature and volume of the waste materials to be buried

4. Soils Survey which shall include

   A. Depth to seasonal high watertable

   B. Soil Series

   C. Soil Drainage Class

   D. Flooding

   E. Permeability

   F. Slope

   G. Soil Texture (dominant to depth of 60")

   H. Depth to bedrock

   I. Stoniness Class

   J. Rockiness Class

5. Equipment -- Discuss

   A. Present - types, sizes, numbers

   B. Proposed - types, sizes, numbers

6. Discuss projected amount of waste to be handled including basis for projection.

7. Operating procedures - explain methods of

   A. Controlling the length and width of the working face

   B. Disposing of large items, special industrial, and hazardous wastes

   C. Confining papers to the site

   D. Waste handling in the wake of a natural disaster

   E. Emergency provisions for insect and rodent control

   F. Providing adequate site supervision

   G. Controlling unauthorized fires

   H. Maintaining an all weather access road

   I. Posting operating hours, fee schedule, waste restrictions, the name, address and phone number of the operating agent

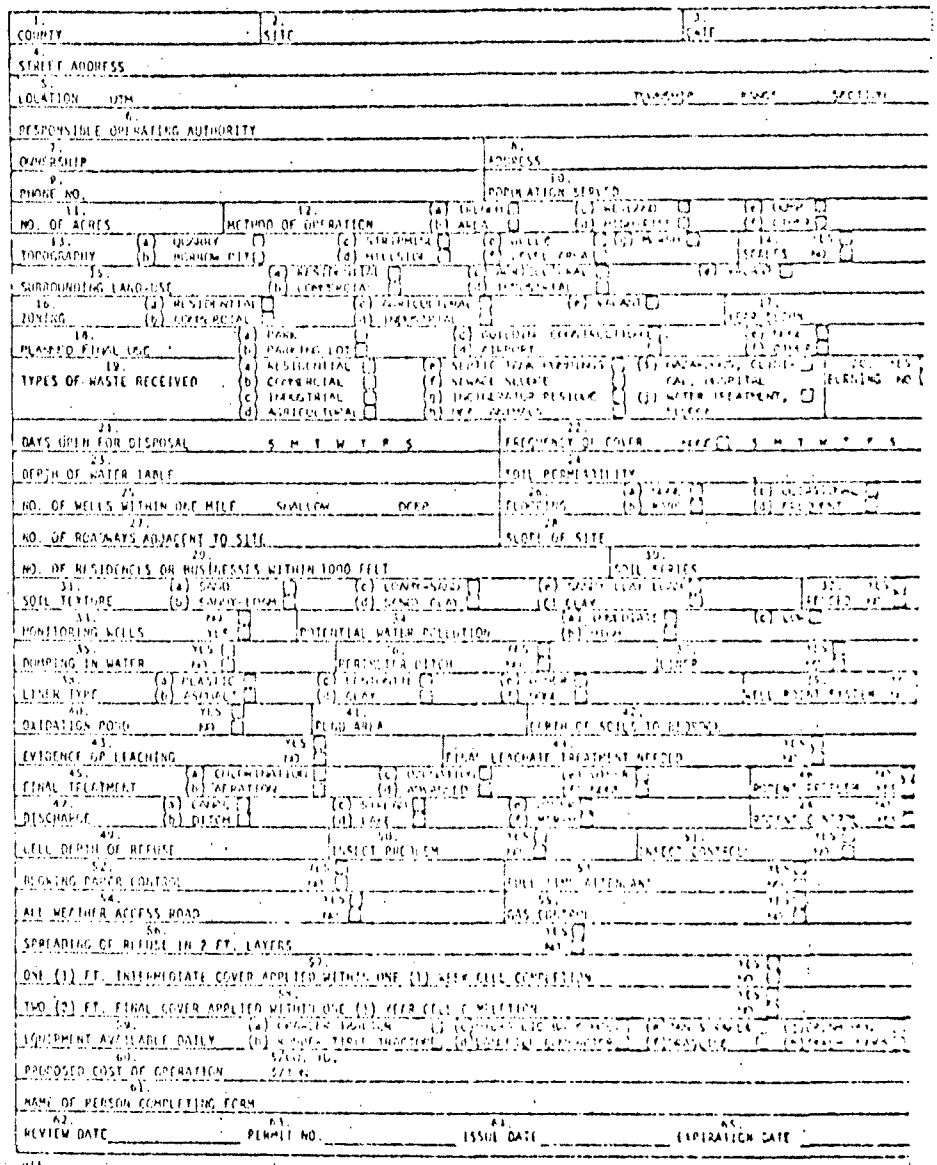
   J. Locating signs to direct traffic

8. Land Disposal Data Form

NOTE: Additional information may be required as determined by the Department.

LAND DISPOSAL SITE DATA FORM
(Fill in and check blocks as appropriate.)

CONTROL NO. _____



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STATE OF FLORIDA DEPARTMENT OF POLLUTION CONTROL

INSTRUCTIONS FOR THE

"LAND DISPOSAL SITE DATA FORM"

The purpose of these instructions is to provide information to those filling out the "Land Disposal Site Data Form" so that the data is complete and it can be processed in Tallahassee without delay. This form is designed for computerization so as to enable the Department to have instant access to information on all registered land disposal sites operated in the State of Florida. This data form must be completed by the applicant as follows:

The control number and the delete, add, change and inactive block are for the Department's use only.

1. County - This is self-explanatory.
2. Site - The name of the land disposal site - not to exceed 30 spaces. Abbreviate if necessary.
3. Date - The date of this report shall be expressed as the month, day, year, in numbers, (i.e., 1-1-73).
4. Address - The actual address of the land disposal site or the route by which access to the site is made, not to exceed 30 spaces.
5. Location - The location of the disposal site in both UTM Co-ordinates and the township - range and section.
6. Responsible Operating Authority - The authority responsible for the operation of the disposal site. Abbreviate where necessary so as to not exceed 40 spaces.
7. Ownership - The agency or individual who owns or leases this particular site. Abbreviate if necessary, so as not to exceed 30 spaces.
8. Address - The mailing address of the agency shown in Item 7. Abbreviate if necessary so as not to exceed 30 spaces.
9. Phone Number - The phone number of the agency shown in Item 7.
10. Population Served - The population which this disposal site is estimated to serve.
11. Number of Acres - The total number of acres of land purchased or leased for the operation of this site.
12. Method of Operation - More than one item may be checked.
13. Topography - The topography of the area in which the site is located. Check one only.
14. Scales - Check whether scales are available at the site to determine the weight of the waste received.

15. Surrounding Land-Use - Check as many blocks as are appropriate to give the predominant land use within the immediate area of the site. If there is no specific surrounding land use then (e) Vacant would be checked.
16. Zoning - Check if the site is located in an area which is zoned. If there is no zoning in the area, then (e) Vacant shall be checked.
17. Year Begun - Year in which the operation of this site is to be begun or was begun.
18. Planned Final Use - Check if there is a planned final use which is listed; however, if there is no final use established for the site, check (e) None; or if the final use is not listed, then check (f) Other. Check only one.
19. Types of Waste Received - Check all types of waste received at this site.
20. Burning - Chapter 17-5 prohibits open burning; however, check to denote whether new sites plan to use air curtain incinerators to handle land clearing waste.
21. Days Open for Disposal - Circle the days on which the site is open for disposal.
22. Frequency of Cover - Circle the days on which the site receives a 6" cover of compacted earth. If the site receives cover at intervals less frequently than once per week, then check none.
23. Depth of Water Table - Indicate the depth to the seasonal high shallow ground water aquifer in feet.
24. Soil Permeability - Indicate the rate at which water will percolate through the soil in terms of inches per hour.
25. Number of Wells Within One Mile - Indicate the number of private water supply wells within one mile of the site to the left of the word - Shallow. Indicate the number of public water supply wells or deep wells within one mile of the site to the left of the word - Deep.
26. Flooding - Periods when the water-table rises above the surface - If two per/yr. or greater, check (d) Frequent. If one per/yr., check (c) Occasional. If less than once in (2) two years, check (b) Rare.
27. Number of Roadways Adjacent to Site.-
28. Slope of Site - Indicate the general slope of the site area expressed as a percentage.
29. Number of Residences or Businesses Within 1000 Feet
30. Soil Series - Indicate the predominant soil series at the site to a depth of at least 60". This information may be obtained from the required soils survey.
31. Soil Texture - Check the one which best describes the general soil texture at the site.
32. Fenced - This refers to permanent fencing surrounding the site.

33. Monitoring Wells - Check to indicate whether test wells exist to monitor any degradation of groundwater quality.

34. Potential Water Pollution - This should be evaluated on the basis of the relationship between the bottom of the landfill and the water table; the types of underlying soils; the type and amount of material used for cover; and types of materials being disposed of at the site.

35. Dumping In Water - This is self-explanatory.

36. Perimeter Ditch - This indicates the existance of a suitable ditch surrounding the site for the interception of surface and subsurface waters which would normally flow through or from the site; the collection of leachate, and runoff, and the transmission of these liquids to receiving waters or to a treatment pond.

37. Liner - Indicate whether an impervious material is being placed on undisturbed earth on which solid waste is deposited to retard the movement of leachate into the shallow groundwater aquifer.

38. Liner Type - Check one of the materials listed which is being used for a liner.

39. Well Point System - Indicate whether there is a well point system used to lower the water table in the immediate area of the landfill.

40. Oxidation Pond - Check whether or not there exists a pond to receive liquids collected in the perimeter ditch and/or leachate collection system to oxidize or otherwise treat these liquids and remove settleable solids.

41. Pond Area - Indicate area in acres.

42. Depth of Soils to Bedrock - Indicate the measured depth of soil in feet between the surface and bedrock. This information may be obtained from the required geological survey.

43. Evidence of Leaching - Leaching often manifests itself in the form of springs of dark liquid coming from the sides of land disposal sites or through the contamination of nearby shallow water wells. On new sites, this has to be a judgement evaluation based on designs under similar conditions.

44. Final Treatment Needed - Indicate whether liquids collected from existing or proposed sites will need final treatment prior to discharge.

45. Final Treatment - If final treatment is indicated in Item 44, then check this item to enable the Department to determine if the proper type of treatment is to be provided. It may be either a single type or a combination of methods; however, if a single method is to be used other than those listed, then check (e) Other. If it is a combination of (a) (b) or (c), in addition to spray irrigation, then check (d) Advanced.

46. Rodent Problem - Indicate whether a proposed or an existing site has or will have a need for rodent control measures.

47. Discharge - Check the receiving waters into which the collected liquids from the perimeter ditch or oxidation pond are discharged. Do not check more than one.

48. Rodent Control - This is to be used in conjunction with Item 46 to indicate whether rodent control is being adequately provided.

49. Cell Depth of Refuse - Vertical depth in feet of refuse between the base and the top surface of compacted refuse before cover material is added.

50. Insect Problem - The same basis as Item 46.

51. Insect Control - The same basis as Item 48.

52. Blowing Paper Control - Indicate control if the site is policed daily and a portable snowfence or other measure is used to help control blowing papers.

53. Full Time Attendant - This is self-explanatory.

54. All Weather Access Road - This is self-explanatory.

55. Gas Control - Are special relief devices provided to collect and disperse methane and other gasses?

56. Spreading of Refuse in 2 Feet Layers - When constructing a refuse cell in a sanitary landfill, the refuse should be spread in two foot layers and compacted to a thickness of one foot in order to achieve maximum compaction.

57. One Foot Intermediate Cover Applied Within One Week of Cell Completion - This is self-explanatory.

58. Two Foot Final Cover Applied Within One Year of Cell Completion - This is self-explanat

59. Equipment Available Daily - The types of equipment available daily for sanitary landfil operation. Check as many as are applicable.

60. Proposed Cost of Operation - This should be an estimate of the cost of operation at an existing site or projected cost of operation at a proposed site.

61. Name of Person Completing Form - This is self-explanatory.

Items 62, 63, 64, and 65 are for Department use only.

(4) Volume Reduction Plant Requirements. These pertain to incinerators, pulverizers, compactors, shredding and baling plants, transfer stations, composting plants and other plants which accept and process solid waste for recycling or disposal.

1. Maps

(a) Location map drawn to a scale of one inch equals one half mile, showing general geographic features of the area surrounding the site.

(b) Topographic map of the site drawn to a scale of one inch equals 200 feet, showing existing and final contours.

2. Drawings, to include:

(a) Property lines, site dimensions.

(b) Land use, including habitations and other structures, roads, wells, vegetation, etc.

(c) Equipment used in the operation with equipment components shown in sufficient detail to indicate method of operations.

(d) Process flow, materials handling and storage.

(e) Location of existing and proposed utilities.

(f) Access routes, approach roads and on-site roads.

3. Process description to show:

(a) Method of operation.

(b) Type and volume of materials processed.

(c) Population and area served.

(d) Employee facilities.

(e) Provisions for disposal of residual waste after processing.

(f) Type of materials recovered and disposition of same.

(g) Process water and treatment after use.

(h) Auxiliary fuel.

(i) Schedule of operations.

(j) Site management.

(k) General maintenance procedures.

4. Emergency procedures

(a) Alternate waste handling procedures in the event of equipment breakdown, natural disasters.

(b) Corrective or alternate procedures in the event of diminished operational quality.