



# Board of County Commissioners

DEPARTMENT OF PUBLIC WORKS

DIVISION OF ENGINEERING

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Lecanto, Florida 34461

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January 8, 2010

Florida Department of Environmental Protection  
Southwest District Office – Enforcement Program Area  
Attn: Steve Morgan  
13051 N. Telecom Parkway  
Temple Terrace, FL 33637

*Dept. of Environmental Protection*

*JAN 11 2010*

*Southwest District*

**SUBJECT: CITRUS COUNTY CENTRAL CLASS I LANDFILL (FDEP PERMIT NO. 21375-008-S0/01)  
ANNUAL SITE LIFE CALCULATION TRANSMITTAL**

Dear Mr. Morgan:

Pursuant to Specific Condition #C.13.f of the subject operation permit (which requires landfill site life calculations to be submitted annually no later than January 15<sup>th</sup> of each year), please find the enclosed 2009 Site Life Calculation reports and supporting documentation.

As discussed in our telephone conversation yesterday afternoon, two (2) separate Site Life Calculation reports are being submitted for this reporting period. The first of the two reports addresses the period from 26-Sep-08 to 8-Apr-09 and was prepared by King Engineering Associates, Inc. The more recent report was prepared by this office and covers the period from 8-Apr-09 to 20-Oct-09. Taken together, the two reports present data covering the time period since the last site life calculation was submitted to the FDEP.

The two reports reach landfill site life conclusions as follows:

	26-Sep-08 to 8-Apr-09 ( <u>King Engineering Report</u> )	8-Apr-09 to 20-Oct-09 ( <u>Citrus County Report</u> )
Phases 1/1A and 2:	May 2014	October 2015
Phases 1 thru 3:	February 2023	June 2027

Noting the discrepancy in calculated site life, it is my professional opinion the results of the more recent Citrus County report should govern based on the following justification:

1. The earlier King report utilizes the University of Florida Bureau of Economic Research (BEER) population projections of Bulletin 150 which were the latest projections available at that time. Subsequent the preparation of that report, updated BEER population projections were made available in Bulletin 153. The site life calculation presented in the report prepared by this office enjoys the most current population estimates.

2. The Citrus County report is based on existing topographic data obtained by professional surveyors and mappers who were on the ground whereas the earlier King report relied on information obtained from aerial reconnaissance. As the County crews utilized state-of-the-art real time kinematic satellite navigation (which was also ground-truthed through conventional surveying techniques), the three dimensional surface of the existing conditions created by this method of data collection is arguably more accurate than the earlier report's surface which was generated using LIDAR fly-overs.

The Citrus County report concludes a longer landfill site life than estimated in the earlier report since the latest BEBR population projections better reflect the current economic conditions of our country. Although both of the referenced BEBR bulletins indicate population growth for Citrus County (and for the entire state for that matter) will continue to rise, the most recent data suggests the rate of increase will be lesser than previously estimated. As there is an obvious direct correlation between population and landfill site life, the Citrus County report concludes later (and in my opinion more accurate) closure/buildout dates.

Thank you again for the assistance and guidance you provided in our telephone conversation. If you have any questions or require additional information, please don't hesitate to contact me at (352) 527-5446.

Very truly yours,



Beau Keene, P.E.  
Engineering Project Manager

- Enclosures: 1) "Citrus County Central Landfill April 2009 Site Life Calculation" report prepared by King Engineering Associates, Inc. and signed and sealed by Christopher F. Kuzler, P.E. on 1-Jul-09
- 2) "Citrus County Central Landfill October 2009 Site Life Calculation Annual Report" report prepared by Citrus County Department of Public Works – Division of Engineering and signed and sealed by the author of this letter on 7-Jan-10

Copies To: Casey T. Stephens, Director of Solid Waste Management (w/ enclosures)  
Glenn W. McCracken, P.E., Public Works Director (via Email)  
Charles I. Balut, P.E., Director of Engineering Services (via Email)



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**CITRUS COUNTY CENTRAL LANDFILL**

**OCTOBER 2009 SITE LIFE CALCULATION ANNUAL REPORT**

**FDEP PERMIT NO. 21375-008-S0/01**

**PHASES 1/1A, 2 and 3**

**Located in S1/T19S/R18E, Citrus County, Florida**

**Prepared for:**

**Citrus County Department of Public Works**

**Solid Waste Management Division**

**Attn: Casey T. Stephens, Director**

**230 W. Gulf-to-Lake Highway**

**Lecanto, FL 34461**

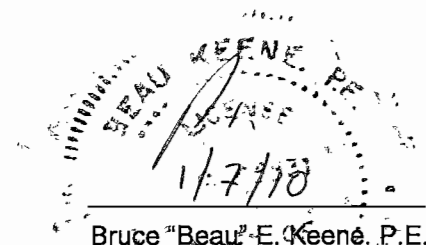
**(352) 527-7670**

Dept. of Environmental Protection

JAN 7 2010

Southwest District

**Prepared on January 6, 2010**



Bruce "Beau" E. Keene, P.E.  
FL. Reg. No. 46831  
Engineering Project Manager

Citrus County's Department of Public Works - Division of Engineering has calculated the remaining site life for Phases 1/1A, 2 and 3 of the Citrus County Central Landfill based on the past six months of data. The remaining airspace was estimated using population projections, projections of future waste receipts and topographic survey efforts performed by the Citrus County Survey Section in October 2009. The topographic survey information was compiled using real time kinematic satellite navigation (GPS) and is based on NAVD88 datum.

#### Phases 1/1A and 2:

The airspace consumed from April 8, 2009 (the date of the last topographic survey as prepared by King Engineering Associates, Inc. and as referenced in their April 2009 Site Life Calculation Report) to October 20, 2009 (the date of the current survey) was calculated by comparing the three dimensional surfaces of the two topographic surveys. With reference to Attachment #1 – Sheet 2, it was determined that approximately 80,087 cubic yards (CY) of airspace was consumed during this period. The effective density of the waste deposited in the landfill was estimated by comparing the waste tonnage records supplied by Citrus County Solid Waste Management Division for the same period (62,213 tons) to the airspace consumed. The estimated effective density was determined to be 1,553.6 pounds per cubic yard. This translates to an effective airspace consumption rate of 1.29 CY per ton of waste disposed. These calculations are shown in Attachment #2.

The remaining life through build out of Phases 1/1A and 2 was estimated by multiplying the future projected quantities of waste by the effective airspace consumption rate. Waste tonnage was assumed to increase each year at the same rate as the population as estimated by the "High" projections in the University of Florida Bureau of Economic Research (BEER) population projections for Citrus County. The projected waste tonnage for each year was multiplied by the effective airspace consumption rate to obtain the airspace volume consumed each year. This is then subtracted from the remaining airspace for each year until the available airspace is depleted. The calculations indicate that Phases 1/1A and 2 had approximately 831,164 CY of available airspace as of the October 20, 2009 survey (Attachment #1, Sheet 4) and that this airspace could be completely utilized by October 2015. This assumes that all waste will continue to be disposed of in the landfill and does not take account trash hauled off site due to the operation of the proposed transfer station. The proposed transfer station project is currently on hold by the Citrus County Board of County Commissioners. For quick reference, the previous Site Life Calculation Report prepared in June 2009 estimated this date to be May 2014; the longer life estimated at this time can be attributed to lower population projections of the BEER reports due to the current economic condition of our country and other factors.

The Division of Engineering calculated the total amount of trash buried in Phases 1/1A and 2 of the landfill by subtracting the bottom surface of Phases 1 through 3 from the October 20, 2009 topographic survey surface. The results indicate that 2,782,512 CY of trash is buried in Phases 1/1A and 2. This is shown in Attachment #1, Sheet 1.

### Phases 1/1A, 2, and 3

The Division of Engineering also calculated the remaining available airspace assuming that Phase 3 is constructed as currently designed and submitted for permitting. The available airspace volume was calculated by comparing the final build out design contours of Phases 1/1A, 2, and 3 to the October 20, 2009 topographic survey merged with the design bottom surface of Phase 3. It was assumed that the waste will be filled up to the final capacity and allowed to settle before the cap is placed. Therefore, no cap volume was subtracted from the airspace volume in the calculations. The remaining airspace available in Phases 1/1A and 2 plus the additional airspace that will be provided by Phase 3 was calculated to be 2,610,647 CY as of the October 20, 2009 topographic survey (Attachment 1, Sheet 3). The calculations are shown in Attachment #1, Sheet 3 and Attachment #2.

The remaining life through build out of Phases 1/1A, 2 and 3 was calculated using the same methodology described above for Phases 1/1A, and 2. The calculations indicate that Phases 1/1A, 2, and 3 of the landfill could be completed by June 2027. Again, this assumes that all waste will continue to be disposed of in the landfill and does not take into account trash hauled off site due to the operation of the proposed transfer station. The June 2009 Site Life Calculation Report estimated a reach date of February 2023.

### Landfill Side Slopes

Specific Condition C, 13, f, of the site's FDEP permit (Permit No. 21375-008-S0/01) requires that the disposal capacity and site life calculations submitted each year be accompanied by a survey indicating that the actual above grade side slopes are no greater than the design slopes and that the top elevation does not exceed the design elevation. As shown in the cross-sections provided on Sheet 5 of Attachment #1, the side slopes appear to be less than or equal to the design slopes, and the design top elevation of the landfill has not been attained.

**ATTACHMENT 1**

**VOLUME CALCULATION DRAWINGS**

# ATTENTION



**OVERSIZED DRAWINGS  
HAVE BEEN SCANNED  
SEPARATELY PLEASE  
SEE:**

- **ANNUAL 2009 TOPO/CAPACITY ESTIMATE DRWG 1 OF 5**
- **ANNUAL 2009 TOPO/CAPACITY ESTIMATE DRWG 2 OF 5**
- **ANNUAL 2009 TOPO/CAPACITY ESTIMATE DRWG 3 OF 5**
- **ANNUAL 2009 TOPO/CAPACITY ESTIMATE DRWG 4 OF 5**
- **ANNUAL 2009 TOPO/CAPACITY ESTIMATE DRWG 5 OF 5**

**ATTACHMENT 2**  
**SITE LIFE CALCULATIONS**



**CITRUS COUNTY DIVISION OF ENGINEERING  
CENTRAL LANDFILL SITE LIFE CALCULATION  
JANUARY 2010 REPORT**

**Objective:** Calculate the October 2009 remaining site life for Citrus County Central Landfill Phases 1 and 2 using waste tonnage records from Citrus County and calculated waste generation projections.

- Approach:**
1. Calculate the available airspace as of the most recent survey.
  2. Calculate the "Effective Density" using volume consumed between April 2009 and October 2009.
  3. Use the effective density to calculate the remaining life of the available airspace.

Available Airspace Calculation:

Airspace available from Oct 2009 to Final Grade = 831,164 CY  
 Air volume consumed 4/8/09 to 10/20/09 = 80,087 CY

Effective Density Calculation:

Waste Disposed of between 4/8/09 and 10/20/09 = 62,213 tons (per records)

Effective Density =  $\frac{62,213 \text{ tons}}{80,087 \text{ CY}} \times 2,000 \frac{\text{lbs}}{\text{ton}} = \frac{1553.64 \text{ lbs}}{\text{CY}}$

Effective Airspace Consumption Rate =  $\frac{80,087 \text{ CY}}{62,213 \text{ ton}} \times 1.29 \text{ CY/ton}$

Assuming the waste will be filled up to the final capacity and allowed to settle before placing the cover soil.

Cap Volume = 0 CY

Subtract Cap Volume from air volume (airspace available) to determine useable waste volume for site life calculation.

Remaining Volume = 831,164 CY - 0 CY = 831,164 CY

Calculation

Bureau of Business and Economic research (BEER). The population mirrors the BEER high estimates. Therefore, that population projection was used. The tonnage used for the waste projection was the average daily period from January 2009 to December 2009.

FISCAL YEAR	TONNAGE	VOLUME CONSUMED (CY)	NET REMAINING AIRSPACE (CY)
			831,164
2009-2010	99,146	127,898	703,266
2010-2011	101,664	131,147	572,119
2011-2012	104,106	134,297	437,822
2012-2013	106,549	137,448	300,374
2013-2014	108,991	140,599	159,775
2014-2015	111,433	143,749	16,026
2015-2016	113,876	146,900	-130,874
2016-2017	116,547	150,346	-281,220
2017-2018	119,295	153,891	-435,110
2018-2019	121,813	157,139	-592,250
2019-2020	124,485	160,586	-752,835
2020-2021	127,233	164,130	-916,965

**CONCLUSION:**

**Estimated Phases 1 & 2 Fill Completion Date = OCTOBER, 2015**

**CITRUS COUNTY'S DIVISION OF ENGINEERING  
CENTRAL LANDFILL SITE LIFE CALCULATION  
JANUARY 2010 REPORT**

SHEET:1 OF 1

**Objective:** Calculate the October 2009 remaining site life for Phases 1 thru 3 using waste tonnage records from Citrus County and calculated waste generation projections.

- Approach:**
1. Calculate the available airspace as of the most recent survey.
  2. Calculate the "Effective Density" using volume consumed between April 2009 and October 2009.
  3. Use the effective density to calculate the remaining life of the available airspace.

Available Airspace Calculation:

Airspace available from Oct 2009 to Final Grade = 2,610,647 CY

Air volume consumed 4/8/09 to 10/2009= 80,087 CY

Effective Density Calculation:

Waste Disposed of between 4/8/09 and 10/2009 = 62,213 tons (per records)

Effective Density=  $\frac{62,213 \text{ ton}}{80,087 \text{ CY}} \times \frac{2,000 \text{ lbs}}{1 \text{ ton}} = \frac{1553.64 \text{ lbs}}{1 \text{ CY}}$

Effective Airspace Consumption Rate=  $\frac{80,087 \text{ CY}}{62,213 \text{ ton}} \times \frac{1.29 \text{ lbs}}{1 \text{ CY}} = 1.29 \text{ CY/ton}$

Assuming the waste will be filled up to the final capacity and allowed to settle before placing the cover soil.

Cap Volume = 0 CY

Subtract Cap Volume from air volume (airspace available) to determine useable waste volume for site life calculation.

Remaining Volume= 2,610,647 CY - 0 CY = 2,610,647 CY

Site Life Calculation

The site life calculation is based on Citrus County waste tonnage records and population projections from the University of Florida Bureau of Business and Economic research (BEER). The population mirrors the BEER high estimates. Therefore, that population projection was used. The tonnage used for the waste projection was the average daily period from Jan 2009 to Dec 2009.

FISCAL YEAR	TONNAGE	VOLUME CONSUMED (CY)	NET REMAINING AIRSPACE (CY)
			2,610,647
2009-2010	99,146	127,898	2,482,749
2010-2011	101,664	131,147	2,351,602
2011-2012	104,106	134,297	2,217,305
2013-2014	108,991	140,599	2,076,706
2014-2015	111,433	143,749	1,932,957
2015-2016	113,876	146,900	1,786,057
2016-2017	116,547	150,346	1,635,711
2017-2018	119,295	153,891	1,481,821
2018-2019	121,813	157,139	1,324,681
2019-2020	124,485	160,586	1,164,096
2020-2021	127,233	164,130	999,966
2021-2022	129,980	167,674	832,292
2022-2023	132,728	171,219	661,073
2023-2024	135,475	174,763	486,310
2024-2025	138,223	178,308	308,002
2025-2026	141,200	182,148	125,854
2026-2027	144,028	185,790	-59,936

**CONCLUSION: Estimated Phases 1 thru 3 Fill Completion Date = JUNE, 2027**

**CITRUS COUNTY CENTRAL LANDFILL  
WASTE DISPOSED IN LANDFILL 4/09-10/09**

ITEM	ITEM #	APRIL 2009 TONS	MAY 2009 TONS	JUNE 2009 TONS	JULY 2009 TONS	AUGUST 2009 TONS	SEPTEMBER 2009	OCTOBER 2009 TONS	
MSW	900	9,774	9,545	9,086	9,270	8,164	8,378	7,996	
	<b>DAILY AVERAGE</b>	<u>407</u>	<u>382</u>	<u>349</u>	<u>357</u>	<u>314</u>	<u>335</u>	<u>286</u>	
		<b>TOTAL TONNAGE DISPOSED OF 4/09 THROUGH 10/09=</b>							<u>62,213</u> TONS
		<b>AVERAGE DAILY TONNAGE DISPOSED OF 4/9 THROUGH 10/09=</b>							<u>347</u> TONS

Note: Only Product Code 900 (municipal solid waste) is accepted at the landfill.

**CITRUS COUNTY CENTRAL LANDFILL  
WASTE TONNAGE PROJECTION**

<b>YEAR</b>	<b>*POPULATION (BEHR HIGH ESTIMATE)</b>	<b>% CHANGE IN POPULATION</b>	<b>AVERAGE DAILY TONNAGE TO LANDFILL</b>	<b>TONS/YEAR</b>
2000	<b>118,085</b>			
2001	121,080	2.47%		
2002	124,075	2.41%		
2003	127,069	2.36%		
2004	130,064	2.30%		
2005	133,059	N/A		
2006	136,054	2.20%		
2007	139,048	2.15%		
2008	<b>142,043</b>	2.11%		
2009	146,072	2.76%	318	<b>97,770</b>
2010	<b>150,100</b>	2.68%	327	100,391
2011	153,860	2.44%	335	102,841
2012	157,620	2.39%	343	105,298
2013	161,380	2.33%	351	107,752
2014	165,140	2.28%	359	110,209
2015	<b>168,900</b>	2.23%	367	112,666
2016	173,000	2.37%	375	115,337
2017	177,100	2.32%	384	118,012
2018	181,200	2.26%	393	120,679
2019	185,300	2.21%	401	123,347
2020	<b>189,400</b>	2.16%	410	126,011
2021	193,680	2.21%	419	128,796
2022	197,960	2.16%	428	131,578
2023	202,240	2.12%	437	134,367
2024	206,520	2.07%	446	137,149
2025	<b>210,800</b>	2.03%	455	139,933
2026	215,220	2.05%	465	142,801
2027	219,640	2.01%	474	145,672
2028	224,060	1.97%	483	148,541
2029	228,480	1.93%	493	151,408
2030	<b>232,900</b>	1.90%	502	154,285

\*POPULATION PROJECTION DATA FOR CITRUS COUNTY ORIGINATED FROM FLORIDA POPULATION STUDIES CREATED BY THE UNIVERSITY OF FLORIDA BUREAU OF ECONOMIC RESEARCH (BEHR); A LINEAR INTERPOLATION FOR YEARLY POPULATION INCREASE ESTIMATES WAS PERFORMED BETWEEN THE HIGHLIGHTED YEARS THE 2009 TONS PER YEAR IS BASED ON SCALE HOUSE DATA.

**FY 2009**

	# Transactions	% Transactions	Tons	% Tons	Material Revenues	% Revenues	Transaction Fee	Total Rev.
October	12,781	7.77%	8,666.64	8.08%	\$277,636.03	8.21%	\$16,768.00	\$294,404.03
November	11,706	7.12%	7,390.32	6.89%	\$237,092.44	7.01%	\$15,552.00	\$252,644.44
December	13,316	8.09%	9,485.30	8.84%	\$295,626.08	8.75%	\$18,742.00	\$314,368.08
January	13,925	8.46%	9,107.53	8.49%	\$281,024.68	8.31%	\$19,048.00	\$300,072.68
February	13,642	8.29%	8,400.53	7.83%	\$278,796.41	8.25%	\$18,552.00	\$297,348.41
March	16,728	10.17%	9,995.81	9.32%	\$312,382.04	9.24%	\$23,762.00	\$336,144.04
April	16,298	9.91%	9,774.27	9.11%	\$307,116.32	9.09%	\$22,892.00	\$330,008.32
May	14,290	8.69%	9,545.45	8.90%	\$293,648.71	8.69%	\$20,042.00	\$313,690.71
June	13,318	8.10%	9,085.98	8.47%	\$283,141.73	8.38%	\$18,454.00	\$301,595.73
July	13,359	8.12%	9,270.11	8.64%	\$291,156.62	8.61%	\$18,402.00	\$309,558.62
August	12,786	7.77%	8,163.59	7.61%	\$259,080.51	7.66%	\$17,622.00	\$276,702.51
September	12,369	7.52%	8,378.21	7.81%	\$263,721.60	7.80%	\$17,218.00	\$280,939.60
<b>Total</b>	<b>164,518</b>		<b>107,263.74</b>		<b>\$3,380,423.17</b>		<b>\$227,056.00</b>	<b>\$3,607,479.17</b>

FY 2009 Month: 13,710      8,938.64      \$281,701.93      \$18,921.33      \$300,623.26  
 Budgeted rev      \$329,452.00

**FY 2009**

	# Transactions	% Transactions	Tons	% Tons	Net Revenues	% Revenues	
Fires	100	2.023	1.23%	395.18	0.37%	\$16,592.26	0.49%
Yardwaste	300	26,379	16.03%	10,800.13	10.07%	\$239,056.63	7.07%
Metal	400	7,116	4.33%	1,030.65	0.96%	\$732.90	0.02%
MCD	500	856	0.52%	3.60	0.00%	\$1,260.90	0.04%
ecycle/Electronic	600	12,250	7.45%	118.47	0.11%	\$3,504.50	0.10%
HHW/CESQG	700	2,865	1.74%	368.60	0.34%	\$6,993.15	0.21%
Special/Tanks	800	489	0.30%	1,584.85	1.48%	\$43,967.90	1.30%
MSW	900	112,539	68.41%	92,962.26	86.67%	\$3,068,314.93	90.77%
Other	Other	1	0.00%	0.00	0.00%	\$0.00	0.00%
Emergency	E	0	0.00%	0.00	0.00%	\$0.00	0.00%
<b>Monthly grand total</b>		<b>164,518</b>		<b>107,263.74</b>		<b>\$3,380,423.17</b>	

FY 2010	# Transactions	% Transactions	Tons	% Tons	Material Revenues	% Revenues	Transaction Fee	Total Rev.	Delta from projection	% of delta from projection	days in month	Transactions per day	Tons per day	Total revenue per day
October	12,432	51.57%	7,995.68	50.53%	\$257,048.89	50.53%	\$33,524.00	\$290,572.89	\$4,499.84	-1.52%	27	460	296.14	\$10,781.88
November	11,676	48.43%	7,628.83	49.47%	\$251,702.56	49.47%	\$31,580.00	\$283,282.56	\$11,787.77	-3.99%	25	467	313.16	\$11,331.30
December	0	0.00%	0.00	0.00%	\$0.00	0.00%			\$0.00	0.00%	24	0	0.00	\$0.00
January	0	0.00%	0.00	0.00%	\$0.00	0.00%			\$0.00	0.00%	25	0	0.00	\$0.00
February	0	0.00%	0.00	0.00%	\$0.00	0.00%			\$0.00	0.00%	24	0	0.00	\$0.00
March	0	0.00%	0.00	0.00%	\$0.00	0.00%			\$0.00	0.00%	27	0	0.00	\$0.00
April	0	0.00%	0.00	0.00%	\$0.00	0.00%			\$0.00	0.00%	25	0	0.00	\$0.00
May	0	0.00%	0.00	0.00%	\$0.00	0.00%			\$0.00	0.00%	26	0	0.00	\$0.00
June	0	0.00%	0.00	0.00%	\$0.00	0.00%			\$0.00	0.00%	26	0	0.00	\$0.00
July	0	0.00%	0.00	0.00%	\$0.00	0.00%			\$0.00	0.00%	26	0	0.00	\$0.00
August	0	0.00%	0.00	0.00%	\$0.00	0.00%			\$0.00	0.00%	27	0	0.00	\$0.00
September	0	0.00%	0.00	0.00%	\$0.00	0.00%			\$0.00	\$0.00	25	0	0.00	\$0.00
<b>Total</b>	<b>24,108</b>		<b>15,824.59</b>		<b>\$508,749.25</b>		<b>\$65,104.00</b>	<b>\$573,853.25</b>	<b>\$16,287.41</b>	<b>-2.76%</b>				
FY 2009 Month	12,054		7,912.60		\$254,874.83		\$32,552.00	\$286,926.63	\$8,143.70					
							Budgeted rev	\$295,070.33						

FY 2010	# Transactions	% Transactions	Tons	% Tons	Net Revenues	% Revenues	
Tires	100	308	128%	16.25	0.10%	\$1,632.60	0.30%
Yardwaste	300	3,363	13.95%	1,334.70	8.43%	\$29,852.45	5.83%
Metal	400	1,007	4.18%	187.89	1.19%	\$90.00	0.02%
MCD	500	128	0.53%	0.31	0.00%	\$114.40	0.02%
Recycle/Electronic	600	2,122	8.80%	21.00	0.13%	\$1,176.00	0.23%
HHW/CESQG	700	437	1.81%	12.49	0.08%	\$1,258.85	0.25%
Special/Tanks	800	24	0.10%	4.09	0.03%	\$295.90	0.06%
MSW	900	16,719	69.35%	14,248.08	90.04%	\$474,831.15	93.29%
Other	Other	0	0.00%	0.00	0.00%	\$0.00	0.00%
Emergency	E	0	0.00%	0.00	0.00%	\$0.00	0.00%
<b>Monthly grand total</b>	<b>24,108</b>		<b>15,824.59</b>		<b>\$508,749.25</b>		

Dept. of Environmental Protection  
JAN 17 2009  
Solid Waste Disposal

# CITRUS COUNTY CENTRAL LANDFILL APRIL 2009 SITE LIFE CALCULATION

**PREPARED FOR:**

Citrus County  
Solid Waste Management Department  
230 West Gulf-to-Lake Highway  
Lecanto, FL 34461

**PREPARED BY:**



KING ENGINEERING ASSOCIATES, INC.  
4921 Memorial Highway  
One Memorial Center, Suite 300  
Tampa, FL 33634

**Revised:**  
**JUNE 2009**

**Replaces:**  
**JUNE 4, 2009 REPORT**

Christopher F. Kuzler, P.E.  
FL PE# 45532  
7/1/09

A circular professional engineer seal for Christopher F. Kuzler, P.E., with the number 45532. The seal is stamped over a handwritten signature and the date 7/1/09.

SEARCHED  
SERIALIZED  
INDEXED  
FILED  
MAD

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
JAN 11 2010  
SOUTHWEST DISTRICT  
TAMPA



4921 Memorial Highway, Suite 300  
Tampa, Florida 33634  
(813) 880-8881 ♦ (813) 880-8882 fax  
www.kingengineering.com

**MEMORANDUM**

**To:** Ms. Susan J. Metcalfe, P.G.  
Director

**From:** Christopher F. Kuzler, P.E.

**Subject:** April 2009 Site Life Calculation  
- Phases 1/1A, 2 & 3  
Revised April 2009 Report

**Date:** June 18, 2009

**Project No.:** 4217-003-001

**Project Name:** Citrus County Central  
Landfill

King Engineering Associates, Inc. (King) has calculated the remaining site life for Phases 1/1A, 2 and 3 of the Central Landfill based on the past six months of data. The remaining airspace was estimated using population projections, projections of future waste receipts and aerial topographic maps of the disposal area dated September 26, 2008 and April 8, 2009 by Pickett & Associates, Inc. (Pickett).

Phases 1/1A and 2

The airspace consumed from September 26, 2008, the date of the last survey, to April 8, 2009, date of the current survey was calculated by comparing the three dimensional surfaces from the two surveys. It was determined that 77,937 cubic yards of airspace (Attachment 1, Sheet 2) was consumed during this period. The effective density of the waste deposited in the landfill was estimated by comparing the waste tonnage records supplied by the County for the same period (49,640 tons) to the airspace consumed. The estimated effective density was determined to be 1,273.8 pounds per cubic yard. This translates to an effective airspace consumption rate of 1.57 cubic yards per ton of waste disposed. These calculations are shown in Attachment 2.

The remaining life through buildout of Phases 1/1A and 2 was estimated by multiplying the future projected quantities of waste by the effective airspace consumption rate. Waste tonnage was assumed to increase each year at the same rate as the population as estimated by the "High" projections in the University of Florida Bureau of Economic Research (BEBR) population projections for Citrus County. The projected waste tonnage for each year was multiplied by the effective airspace consumption rate to obtain the airspace volume consumed each year. This is then subtracted from the remaining airspace



for each year until the available airspace is depleted. The calculations indicate that Phases 1/1A and 2 had approximately 882,550 cubic yards of available airspace as of the April 2009 survey (Attachment 1, Sheet 4) and that this airspace could be completely utilized by May 2014. This assumes that all waste will continue to be disposed of in the landfill and does not take into account trash hauled off site due to operation of the proposed transfer station.

King calculated the total amount of trash buried in Phases 1/1A and 2 of the landfill by subtracting the bottom surface of phases 1 through 3 from the April 2009 survey surface. The results indicate that 2,738,950 cubic yards of trash is buried in Phases 1/1A and 2. This is shown in Attachment 1, Sheet 1.

#### Phases 1/1A, 2 and 3

King also calculated the remaining available airspace volume assuming that Phase 3 is constructed as currently designed and submitted for permitting. The available airspace volume was calculated by comparing the final buildout design contours of Phases 1/1A, 2 and 3 to the April 8, 2009 aerial topographic map merged with the design bottom surface of Phase 3. It was assumed that the waste will be filled up to the final capacity and allowed to settle before the cap is placed. Therefore, no cap volume was subtracted from the airspace volume in the calculations. The remaining airspace available in Phases 1/1A and 2 plus the additional airspace that will be provided by Phase 3 was calculated to be 2,692,215 cubic yards as of April 8, 2009 (Attachment 1, Sheet 3). The calculations are shown in Attachment 2 and on the Sheet 3 in Attachment 1.

The remaining life through buildout of Phases 1/1A, 2 and 3 was calculated using the same methodology described above for Phases 1/1A and 2. The calculations indicate that Phases 1/1A, 2 and 3 of the landfill could be completely utilized by February 2023. Again, this assumes that all waste will continue to be disposed of in the landfill and does not take into account trash hauled off site due to operation of the proposed transfer station.

#### Landfill Side Slopes

Specific Condition C., 13., f., of the site's FDEP permit requires that the disposal capacity and site life calculations submitted each year be accompanied by a survey indicating that the actual above grade side slopes are no greater than the design slopes and that the top elevation does not exceed the design elevation. As shown on Sheet 5 in Attachment 1, side slopes appear to be less than or equal to the design slopes, and the design top of the landfill has not been attained.

Ms. Susan J. Metcalfe, P.G.

June 18, 2009

Page 3 of 3

### Stockpile Volumes

The northeast area of the site is used by the County to store a soil stockpile for use as daily cover. As shown on Sheet 6 in Attachment 1, the stockpile area is of varying elevation ranging from elevation  $\pm 122$  up to elevation  $\pm 148$ . Surface differences between the September 26, 2008 survey and the April 8, 2009 survey indicate that during that period, the net volume of this area, which can be assumed to be the stockpile volume, decreased by 17,567 CY. In preparation for construction of the proposed transfer station and new Citizens Service Area, the County will utilize the stockpile soil to an elevation no lower than EL 125. Areas lower than elevation 125 will remain in place, to be filled and graded as necessary for construction of the new site improvements. The April 8, 2009 survey indicates that  $\pm 66,224$  CY of stockpile soil was available for use above elevation 125 as of the date of the survey.

**ATTACHMENT 1**  
**VOLUME CALCULATION DRAWINGS**

# ATTENTION



## **OVERSIZED DRAWINGS HAVE BEEN SCANNED SEPARATELY PLEASE SEE:**

- **ATTACHMENT 1 DRWG 1 OF 6 ANNUAL 2009 TOPO/CAPACITY ESTIMATE**
- **ATTACHMENT 1 DRWG 2 OF 6 ANNUAL 2009 TOPO/CAPACITY ESTIMATE**
- **ATTACHMENT 1 DRWG 3 OF 6 ANNUAL 2009 TOPO/CAPACITY ESTIMATE**
- **ATTACHMENT 1 DRWG 4 OF 6 ANNUAL 2009 TOPO/CAPACITY ESTIMATE**
- **ATTACHMENT 1 DRWG 5 OF 6 ANNUAL 2009 TOPO/CAPACITY ESTIMATE**
- **ATTACHMENT 1 DRWG 6 OF 6 ANNUAL 2009 TOPO/CAPACITY ESTIMATE**

**ATTACHMENT 2**  
**SITE LIFE CALCULATIONS**

**KING ENGINEERING ASSOCIATES, INC.**

<b>Client</b> Citrus County	<b>Project</b> Central Landfill, Citrus County, Florida	<b>Project No.</b> 4217-003-001
<b>Subject</b> April 2009 Remaining site life for Phases 1 & 2	<b>By</b> DAM	<b>Date</b> 6/17/2009
	<b>Checked</b>	<b>Date</b>

**Objective:** Calculate the remaining site life for Phases 1 and 2 using waste tonnage records from Citrus County and calculated waste generation projections

- Approach:**
1. Calculate the available airspace as of the most recent survey
  2. Calculate the "Effective Density" using volume consumed between October 2008 and April 2009
  3. Use the effective density to calculate the remaining life of the available airspace

Available Airspace Calculation:

Airspace available from April 2009 to Final Grade = 882,550 CY  
 Air volume consumed 9/26/08 to 4/8/09 = 77,937 CY

Effective Density Calculation:

Waste Disposed of between 9/26/08 and 4/8/09 = 49,640 tons (per records)  
 Effective Density =  $\frac{49,640 \text{ tons}}{77,937 \text{ CY}} \times 2000 \frac{\text{lb}}{\text{ton}} = 1273.8 \text{ lb/CY}$   
 Effective Airspace consumption rate =  $\frac{77,937 \text{ CY}}{49,640 \text{ tons}} = 1.57 \text{ CY/ton}$

Assuming the waste will be filled up to the final capacity and allowed to settle before placing the cover soil

Cap volume = 0 CY

Subtract Cap Volume from air volume (airspace available) to determine useable waste volume for site life calculation

Remaining Volume = 882,550 CY

Site Life Calculation

The site life calculation is based on Citrus County waste tonnage records and population projections from University of Florida Bureau of Business and Economic Research (BEBR). The population mirrors the BEBR high estimates. Therefore, that population projection was used. The tonnage used for the waste projection was the average daily for the period from 10/08 to 4/09.

<u>Fiscal Year</u>	<u>Tonnage</u>	<u>Volume Consumed (CY)</u>	<u>Net Remaining Airspace (CY)</u>	
			882,550	(approx. air volume remaining as of 4/8/09)
2008-09*	53,594	84,146	798,404	Predicted waste for 2 <sup>nd</sup> half of 2008-2009 year
2009-10	106,150	166,662	631,743	
2010-11	109,037	171,194	460,549	
2011-12	111,924	175,726	284,822	
2012-13	114,810	180,259	104,563	
2013-14	117,697	184,791	-80,228	
2014-15	120,584	189,324	-269,552	
2015-16	123,537	193,959	-463,511	
2016-17	126,489	198,595	-662,106	
2017-18	129,442	203,231	-865,337	
2018-19	132,394	207,867	-1,073,204	
2019-20	135,347	212,502	-1,285,706	
2020-21	138,431	217,345	-1,503,051	

**CONCLUSION:**

Approximate Fill Completion Date = May 2014

\*The projected waste tonnage for the 2008-09 year was 103,234 tons. The tonnage for 9/26/09 to 4/8/09 was 49,640 tons. The remaining 53,594 is projected for the 2nd half of the year.

**KING ENGINEERING ASSOCIATES, INC.**

Client Citrus County	Project Central Landfill, Citrus County, Florida	Project No. 4217-003-001
Subject April 2009 Remaining site life for Phases 1 - 3	By DAM	Date 5/22/2009
	Checked	Date

**Objective:** Calculate the remaining site life for Phases 1 through 3 using waste tonnage records from Citrus County and calculated waste generation projections

- Approach:**
1. Calculate the available airspace as of the most recent survey
  2. Calculate the "Effective Density" using volume consumed between October 2008 and April 2009
  3. Use the effective density to calculate the remaining life of the available airspace

Available Airspace Calculation:

Airspace available from April 2009 to Final Grade =	2,692,215	CY
Air volume consumed 9/26/08 to 4/8/09 =	77,937	CY

Effective Density Calculation:

Waste Disposed of between 9/26/08 and 4/8/09 =	49,640	tons (per records)
Effective Density =	$\frac{49,640 \text{ tons}}{77,937 \text{ CY}} \times 2000 \frac{\text{lb}}{\text{ton}} =$	1273.8 lb/CY
Effective Airspace consumption rate =	$\frac{77,937 \text{ CY}}{49,640 \text{ tons}} =$	1.57 CY/ton

Assuming the waste will be filled up to the final capacity and allowed to settle before placing the cover soil

Cap volume =	0	CY
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Subtract Cap Volume from air volume (airspace available) to determine useable waste volume for site life calculation

Remaining Volume =	2,692,215	CY
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Site Life Calculation

The site life calculation is based on Citrus County waste tonnage records and population projections from University of Florida Bureau of Business and Economic Research (BEER). The population mirrors the BEER high estimates. Therefore, that population projection was used. The tonnage used for the waste projection was the average daily for the period from 10/08 to 4/09.

Fiscal Year	Tonnage	Volume Consumed (CY)	Net Remaining Airspace (CY)	
			2,692,215	(approx. air volume remaining as of 4/8/09)
2008-09*	53,594	84,146	2,608,069	Predicted waste for 2 <sup>nd</sup> half of 2008-2009 year
2009-10	106,150	166,662	2,441,408	
2010-11	109,037	171,194	2,270,214	
2011-12	111,924	175,726	2,094,487	
2012-13	114,810	180,259	1,914,228	
2013-14	117,697	184,791	1,729,437	
2014-15	120,584	189,324	1,540,113	
2015-16	123,537	193,959	1,346,154	
2016-17	126,489	198,595	1,147,559	
2017-18	129,442	203,231	944,328	
2018-19	132,394	207,867	736,461	
2019-20	135,347	212,502	523,959	
2020-21	138,431	217,345	306,614	
2021-22	141,516	222,187	84,427	
2022-23	144,600	227,030	-142,603	

**CONCLUSION:**

Approximate Fill Completion Date = February, 2023

\*The projected waste tonnage for the 2008-09 year was 103,234 tons. The tonnage for 9/26/09 to 4/8/09 was 49,640 tons. The remaining 53,594 is projected for the 2nd half of the year.

**CITRUS COUNTY CENTRAL LANDFILL  
WASTE DISPOSED OF IN LANDFILL 9/08 THROUGH 4/09**

		SEPTEMBER 2008	OCTOBER 2008	NOVEMBER 2008	DECEMBER 2008	JANUARY 2009	FEBRUARY 2009	MARCH 2009	APRIL 2009
ITEM	ITEM #	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
MSW	900	7,383.1	7,639.6	6,568.9	8,429.85	7,978.1	7,259.8	8,383.8	8,164.9
<b>TOTALS</b>		<b>7,383.1</b>	<b>7,639.6</b>	<b>6,568.9</b>	<b>8,429.8</b>	<b>7,978.1</b>	<b>7,259.8</b>	<b>8,383.8</b>	<b>8,164.9</b>
<b>AVERAGE DAY =</b>		<b>295.32</b>	<b>282.95</b>	<b>273.70</b>	<b>324.22</b>	<b>306.85</b>	<b>302.49</b>	<b>322.46</b>	<b>314.03</b>

Total tonnage disposed of 9/08 through 4/09 = 61,808 tons  
Average Daily Tonnage = 302.8 tons  
Total tonnage disposed of 9/26/08 through 4/8/09 = 49,640 tons  
Average Daily Tonnage disposed of 9/26/08 to 4/8/09 = 302.7 tons

Note: Only Product Code 900 (municipal solid waste) is accepted at the landfill.



**CITRUS COUNTY CENTRAL LANDFILL  
WASTE DISPOSED OF IN LANDFILL 5/08 THROUGH 4/09**

ITEM	ITEM #	MAY 2008 Tons	JUNE 2008 Tons	JULY 2008 Tons	AUGUST 2008 Tons	SEPTEMBER 2008 Tons	OCTOBER 2008 Tons	NOVEMBER 2008 Tons	DECEMBER 2008 Tons	JANUARY 2009 Tons	FEBRUARY 2009 Tons	MARCH 2009 Tons	APRIL 2009 Tons
MSW	900	8,206.1	7,931.1	8,422.6	7,900.5	7,383.1	7,639.6	6,568.9	8,429.8	7,978.1	7,259.8	8,383.8	8,164.9
<b>TOTALS</b>		<b>8,206.1</b>	<b>7,931.1</b>	<b>8,422.6</b>	<b>7,900.5</b>	<b>7,383.1</b>	<b>7,639.6</b>	<b>6,568.9</b>	<b>8,429.8</b>	<b>7,978.1</b>	<b>7,259.8</b>	<b>8,383.8</b>	<b>8,164.9</b>
<b>AVERAGE DAY =</b>		<b>315.62</b>	<b>305.04</b>	<b>323.94</b>	<b>292.61</b>	<b>295.32</b>	<b>282.95</b>	<b>273.70</b>	<b>324.22</b>	<b>306.85</b>	<b>302.49</b>	<b>322.46</b>	<b>314.03</b>

Total tonnage disposed of 5/1/08 through 4/30/09 = 94,269.0 tons  
Average Daily Tonnage = 305.0 tons  
Total tonnage disposed of 10/1/08 through 4/30/09 = 54,425.0 tons  
Average Daily Tonnage = 304.0 tons

Note: Only Product Code 900 (municipal solid waste) is accepted at the landfill.

**CITRUS COUNTY CENTRAL LANDFILL  
WASTE TONNAGE PROJECTION**

Year	*Population (BEER High Estimate)	% Change in Population	Average Day Tonnage to Landfill	Tons/Year
<b>2002</b>	<b>123,008</b>			
2003	126,443	2.72%	290	
2004	129,879	2.64%	298	
<b>2005</b>	<b>133,314</b>	2.58%	306	
<b>2006</b>	<b>136,749</b>	2.51%	314	
<b>2007</b>	<b>140,124</b>	2.41%	322	
2008	144,449	2.99%	<b>330</b>	<b>100,317</b>
2009	148,775	2.91%	303	103,234
<b>2010</b>	<b>153,100</b>	2.83%	311	106,150
2011	157,380	2.72%	320	109,037
2012	161,660	2.65%	328	111,924
2013	165,940	2.58%	337	114,810
2014	170,220	2.51%	345	117,697
<b>2015</b>	<b>174,500</b>	2.45%	354	120,584
2016	178,880	2.45%	362	123,537
2017	183,260	2.39%	371	126,489
2018	187,640	2.33%	380	129,442
2019	192,020	2.28%	388	132,394
<b>2020</b>	<b>196,400</b>	2.23%	397	135,347
2021	200,980	2.28%	406	138,431
2022	205,560	2.23%	415	141,516
2023	210,140	2.18%	424	144,600
2024	214,720	2.13%	433	147,684
<b>2025</b>	<b>219,300</b>	2.09%	442	150,769
2026	224,020	2.11%	451	153,945
2027	228,740	2.06%	461	157,122
2028	233,460	2.02%	470	160,298
2029	238,180	1.98%	479	163,475
<b>2030</b>	<b>242,900</b>	1.94%	489	166,652

\*Population projection data for Citrus County originated from Florida Population Studies created by the University of Florida Bureau of Economic Research (BEER).

The Average Day Tonnage of 303 tons for the first half of the 2008-2009 year was calculated from the waste disposed of from 10/08 through 4/09.

**TABLE 1 - POPULATION PROJECTIONS**

Year	Low Estimate (Based on BEBR)	% Change	Moderate Estimate (Based on BEBR)	% Change	High Estimate (Based on BEBR)	% Change
<b>2002</b>	<b>123,008</b>	N/A	<b>123,008</b>	N/A	<b>123,008</b>	N/A
2003	126,443	2.72%	126,443	2.72%	126,443	2.72%
2004	129,879	2.64%	129,879	2.64%	129,879	2.64%
<b>2005</b>	<b>133,314</b>	2.58%	<b>133,314</b>	2.58%	<b>133,314</b>	2.58%
<b>2006</b>	<b>136,749</b>	2.51%	<b>136,749</b>	2.51%	<b>136,749</b>	2.51%
<b>2007</b>	<b>140,124</b>	2.41%	<b>140,124</b>	2.41%	<b>140,124</b>	2.41%
2008	140,516	0.28%	141,749	1.15%	144,449	2.99%
2009	140,908	0.28%	143,375	1.13%	148,775	2.91%
<b>2010</b>	<b>141,300</b>	0.28%	<b>145,000</b>	1.12%	<b>153,100</b>	2.83%
2011	142,760	1.02%	147,640	1.79%	157,380	2.72%
2012	144,220	1.01%	150,280	1.76%	161,660	2.65%
2013	145,680	1.00%	152,920	1.73%	165,940	2.58%
2014	147,140	0.99%	155,560	1.70%	170,220	2.51%
<b>2015</b>	<b>148,600</b>	0.98%	<b>158,200</b>	1.67%	<b>174,500</b>	2.45%
2016	149,740	0.76%	160,620	1.51%	178,880	2.45%
2017	150,880	0.76%	163,040	1.48%	183,260	2.39%
2018	152,020	0.75%	165,460	1.46%	187,640	2.33%
2019	153,160	0.74%	167,880	1.44%	192,020	2.28%
<b>2020</b>	<b>154,300</b>	0.74%	<b>170,300</b>	1.42%	<b>196,400</b>	2.23%
2021	155,200	0.58%	172,640	1.36%	200,980	2.28%
2022	156,100	0.58%	174,980	1.34%	205,560	2.23%
2023	157,000	0.57%	177,320	1.32%	210,140	2.18%
2024	157,900	0.57%	179,660	1.30%	214,720	2.13%
<b>2025</b>	<b>158,800</b>	0.57%	<b>182,000</b>	1.29%	<b>219,300</b>	2.09%
2026	159,420	0.39%	184,180	1.18%	224,020	2.11%
2027	160,040	0.39%	186,360	1.17%	228,740	2.06%
2028	160,660	0.39%	188,540	1.16%	233,460	2.02%
2029	161,280	0.38%	190,720	1.14%	238,180	1.98%
<b>2030</b>	<b>161,900</b>	0.38%	<b>192,900</b>	1.13%	<b>242,900</b>	1.94%

Source:

Population data obtained from University of Florida Bureau of Business and Economic Research (BEBR) bulletin 150 Volume 41, Florida State and County Population Estimates, March, 2008 and Projections for 2007 through 2035 in five-year increments.

A linear interpolation for increase in population was performed between the two highlighted years.